

American Association of Port Authorities  
2010 Environmental Awards Competition

# Gog-le-hi-te II Habitat Action Project

## Port of Tacoma



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## Table of Contents

Introduction	1
Goals and Objectives	3
Discussion	5
Background	5
Objectives and Methodology	5
How Project Meets Six Award Criteria	7
Conclusion	11

## Introduction

The Port of Tacoma is honored to apply to the American Association of Port Authorities' 2010 Environmental Awards Competition. The Port is submitting its Gog-le-hi-te II Habitat Action (GLHT II Action) project for consideration in the Mitigation Category.

*Gog-le-hi-te* is a Puyallup Indian word for "Where the Land and Waters Meet".

The GLHT II Action site was constructed on a tidally influenced stretch of the Puyallup River adjacent to Commencement Bay in Tacoma, Washington (Figure 1). This region is one of the most important salmon rearing areas in all of Washington's Puget Sound. It is just upstream of a wetland the Port of Tacoma previously constructed (Gog-le-hi-te I) and proximate to other Port habitat projects. The site's strategic location, habitat characteristics, and restoration potential complement other habitat improvements and significantly contribute to Puget Sound restoration and salmon recovery. Functioning habitat sites like GLHT II are of particular importance as they support juvenile salmon's transition from freshwater to the marine environment as they prepare for their migration to the Pacific Ocean.

In 2007, with the creation of a new executive agency—the Puget Sound Partnership—and the subsequent adoption of the Puget Sound Action Agenda, the State of Washington made a new, major commitment to restore the health of Puget Sound and its salmon resources by 2020. Completed in 2008, the GLHT II Action is an important component of the Port of Tacoma's commitment to the restoration of Puget Sound. It is also critical to the Port's environmental stewardship objectives, and active preparations for future maritime industrial growth and the creation of new family-wage jobs.

The GLHT II Action project was led, managed, and funded by the Port of Tacoma, with cooperation from the Puyallup Tribe of Indians (Tribe) and the U.S. Army Corps of Engineers (USACE). The Action provides mitigation for developments that impacted more than 3 acres of

aquatic habitat. Federally mandated mitigation ratios required more than 6 acres of aquatic habitat compensation before the developments could proceed.

Upon its completion, the Action resulted in the creation of 6.84 acres of aquatic habitat for juvenile salmon. A significant additional benefit was the removal of approximately 145,000 tons of refuse and contaminated soils that remained from an old City of Tacoma dump. The GLHT II Action recreated a portion of the Puyallup River delta that had been damaged during 100 years of urban activity.

The total project cost was approximately \$10,750,000, including costs associated with the removal of refuse and contamination from the old municipal waste site. Construction activities at the site entailed grading and filling; removing refuse, debris and contaminants, and planting native species. The basic construction sequencing for phase II included testing of soils and refuse, clearing and grubbing of the site; removing and stockpiling topsoil for reuse; excavating and stockpiling appropriate cover soil for reuse in the levee; excavating and disposing of refuse; constructing the new setback levee; grading the habitat area; breaching the existing levee; and planting native grasses, plants, and trees in the habitat area.

While the GLHT II Action is relatively young, with less than two years since completion, it is already a success. Biologists monitoring the site have documented its use by juvenile salmon, migratory birds, and other wildlife. Scientific monitoring at the site will continue until approximately 2018.

## Goals and Objectives

The creation of the Puget Sound Partnership and adoption of the Action Agenda to restore the Sound's health by 2020 provide continuing evidence that salmon are extremely important to the environment, tribal and non-tribal communities, economy and culture of the Puget Sound region and the entire Pacific Northwest. The GLHT II Action enhances the region's valued salmon resources by creating new, high quality habitat that supports juvenile salmon's transition from the freshwater environment of the Puyallup River system to the marine environment of Commencement Bay and Puget Sound, and then to their lives in the Pacific Ocean.

The Action site is on the Puyallup River, just upstream of the existing Gog-le-hi-te I (GLHT I) wetland that the Port of Tacoma constructed in 1986. It is integrated with a new Puyallup River levee, an element of the USACE Puyallup River Channel Improvement Project. Developing the new project here not only created the best habitat restoration opportunities, it also paved the way for future Port industrial development along the more economically valuable and viable Blair Waterway

The Port of Tacoma's four primary objectives for the GLHT II Action were:

**One:** Develop an effective and sustainable compensatory habitat site to mitigate for the Blair Waterway maritime developments that were critical to maintaining the Port's competitive business positions and living up to community responsibilities.

**Two:** remove approximately 145,000 tons of refuse, contaminated soils and other remnants of the site's long-term use as a municipal dump.

**Three:** monitor and demonstrate the success of the Action, so that techniques applied and lessons learned by the Action can be applied to other Port properties and potential restoration sites in different Puget Sound watersheds.

**Four; and most importantly,** build a working restoration site in the most scientifically beneficial location, and move beyond basic mitigation requirements in order to:(1) provide substantial salmon recovery and other wildlife and environmental benefits; (2) complement and connect to other enhancement sites in Puyallup River/Commencement Bay the watershed; (3) serve as a key building block to improve the benefits and cost effectiveness of future enhancements; and (4) demonstrate and further the Port's stewardship commitments to the Puyallup Tribe, greater Tacoma community, and Puget Sound.

## Discussion

### Background

The Port of Tacoma has been building salmon habitat mitigation projects in the Puyallup River Estuary and Commencement Bay since the mid 1980s, including a first phase (GLHT I) at the Gog-le-hi-te habitat site. These habitat projects have been necessary to meet the requirements of federal, state and local laws to mitigate for habitat loss through development. The subject habitat project was focused on offsetting the impacts of widening the Blair Waterway and filling an obsolete barge slip adjacent to the Waterway. Blair Waterway has four major container shipping terminals and represents the Port of Tacoma's largest expansion opportunity.

Compensatory habitat mitigation was required for the widening and filling project by the state of Washington, and the USACE, under Section 404 of the Clean Water Act and Endangered Species Act. In addition, the Port of Tacoma included the requirement for a salmon habitat project at the Gog-le-hi-te II site in an Interlocal Agreement with the Puyallup Tribe of Indians to compensate for vacating a public road right-of-way serving a major tribally-owned business.

GLHT II is the second phase of a three phase habitat action. GLHT II is designed to be compatible with a future action that could be constructed between GLHT I and GLHT II, to be called Gog-le-hi-te III (GHT III). There is currently no construction schedule for GLHT III, but the site is an opportunity for the future

### Objectives and Methodology

To meet the objectives stated above, the Port of Tacoma brought what had been learned at GLHT I to an iterative planning process with federal, state, and tribal biologists to design the GLHT II Action. Design alternatives were developed and evaluated with a hydraulic model that

assessed the physical processes of the lower Puyallup River. The results of the model were used to develop the best configurations and construction sequence for phases II and III to achieve a consolidated habitat encompassing phases I, II, and III.

The key design consideration learned from GLHT I was that the silt load carried by the Puyallup River rapidly adjusts the topography of an off-channel habitat with a single connection to the river. The Puyallup River carries a large silt load that originates on the glaciers of Mount Rainer. This material is a good habitat medium as long as the initial habitat elevations are designed close to an equilibrium level. The siltation rate and equilibrium topography from GLHT I were used to lay out the configuration of GLHT II. In the future, the consolidated habitat area (phases I, II, III) are anticipated to be interconnected and have a flow-through connection to the river. This future configuration was modeled and adjustments were applied to the GLHT II Action design to accommodate the flow-through connection. Design modification included over-excavation and subsequent refilling of a channel path through GLHT II Action that was aligned along the modeled flow path. The intent was to loosen subsoils so that when the future flow-through connection to the river is established through phases I, II, and III, the flow is directed naturally along the modeled path.

The modeling results and the iterative approach to habitat design allowed the Port and the biologists from the resource agencies and the Tribe to predict and discuss the long term relationship between GLHT II and other phases of the consolidated habitat area. This approach kept the focus on the long-term opportunity provided at the consolidated site, while yielding a logical increment of habitat to offset the impacts of two specific development projects.

The basic construction sequencing for GLHT II included testing of soils and refuse, clearing and grubbing of the site; removing and stockpiling topsoil for reuse; excavating and stockpiling appropriate cover soil for reuse in the levee; excavating and disposing of refuse; constructing the new setback levee; grading the habitat area; breaching the existing levee; and planting native grasses, plants, and trees in the habitat area.



## How Project Meets Six Award Criteria

1. The creation of approximately 7 acres of estuarine intertidal habitat in a key portion of the Puyallup River met the objective of mitigating for the impacts of vital Port development projects. Further, a future opportunity that GLHT II offers is highly desirable mitigation to offset the impacts of future Port developments. The regulatory agencies understand the value of the future combined phase I, II, and III, and this perspective will aid in rapid resolution of mitigation needs for future projects.

This project removed approximately 145,000 tons of contaminated material from a location adjacent to the Puyallup River and placed it in a licensed, permitted landfill.

The Port used what was learned on phase I of the habitat site to develop the best phase II configuration for the long term. Biological and physical monitoring programs are elements of the future activities at the site. The results of those efforts will be used to refine the future design of phase III.

The project was developed, evaluated, and discussed with agency and tribal biologists from the perspective of achieving the greatest long-term benefits from a consolidated habitat site in a key location within the drainage. The end result is that the long-term perspective of the importance and future opportunity at this location has led to a broad appreciation of how the site contributes to regional efforts to restore depleted salmon runs.

2. The Port of Tacoma led all aspects of the project and conducted the discussions with the regulatory agencies and the Puyallup Tribe to determine the appropriate mitigation for Port of Tacoma development projects. The Port of Tacoma proposed an action at this site because of its potential key role in the Puyallup River watershed, and it was the Port that developed the rationale for long-term action at this site. Further, the Port of

Tacoma led the design and construction of the project including the hiring and management of the consultants and contractors.

3. The site was a former City of Tacoma garbage dump that was ideal for estuarine habitat. The Port of Tacoma developed a creative plan that resulted in the removal of refuse, satisfied immediate mitigation requirements for development projects, laid a foundation for future habitat opportunities, and addressed tribal concerns about impacts to a tribally-owned business. Essentially, the Port's focus on building habitat in the correct ecological location, along with the multiple benefits of the project, reflects a more holistic approach to mitigation than merely identifying the cheapest per-acre cost for a mitigation site. However, due to the expected cost of the building the site in the old dump, it was important that the Port also incorporated creativity in the design to yield cost savings during construction.

The Port of Tacoma achieves further cost savings by backhauling material and working with the contractor to move clean fill soils for levee construction.

These creative design features included reusing as much of the clean cover soils in the levee as possible, which reduced the volume of imported materials required; utilizing surplus soils from other Port of Tacoma projects at the site; and working with the Puyallup Tribe to discharge clean effluent from the site to the river rather than to the City's sewer system.

The project excavated and properly disposed of 145,000 tons of contaminated materials at a cost of \$4.9 million, or \$28 per ton. This is an extremely cost-effective rate for excavation, haul, and re-disposal of municipal refuse. The Port successfully negotiated a refuse transport and disposal cost in a nearby regional landfill at a rate of only \$22 per ton, substantially below the regional market rate for refuse disposal of \$40 to \$50 per ton.

The Port worked cooperatively with the USACE to obtain approval for a narrower flood control levee (18 ft crest vs. 24 ft crest per the USACE original request) in order to maximize the habitat mitigation acreage within the fixed site area. Further cost savings were attained by using clean fill soils for levee construction.

The Port completed extensive groundwater characterization that enabled substantial savings by allowing the discharge of water from the site dewatering system directly to the Puyallup River.

Further, the Port of Tacoma was also able to leverage the settlement of costs with the City of Tacoma for the liability associated with the contamination caused by the former garbage dump into a cost-effective purchase of 32 nearby acres of land, which will remain a greenbelt in perpetuity to buffer industrial activities from residential neighborhoods overlooking the Port and provide publicly accessible open space.

4. Less than two years after construction, the site has already established a community of high tidal marsh vegetation species, complementing a number of native freshwater wetland and upland riparian vegetation species along the outer margins of the site. These vegetation communities continue to mature and provide enhanced habitat functions. In addition, the mud flat throughout the center of GLHT II provides foraging opportunities for juvenile salmon during high tides as well as for shorebirds and waterfowl during low tides. This mud flat also continues to evolve, creating tidal channels which juvenile salmon use for ingress and egress during the tidal cycles.
5. On the face of it, the creation of about 7 acres of estuarine habitat for \$10.75 million or \$1.57 million per acre does not appear very cost effective. However, the Port of Tacoma intentionally chose to build habitat on this site, rather than other available cleaner sites, in order to provide the most ecological function possible. In many urban settings, such as the Port of Tacoma, the opportunities for habitat construction are very limited due to existing uses. The response to this is often to locate a more distant and initially cheaper

location for habitat. That approach is not very workable for northwest salmon populations that depend upon an intact sequence of habitats being available from their spawning areas through the estuaries and ultimately to the Pacific Ocean.

Cost effectiveness in the context of habitat restoration is measured by providing the most ecological function for salmon at the lowest price. This demands that habitat actions be built where large numbers of fish will occupy it. GLHT II is located in an area that fish need and will use. High quality habitat at this location is cost effective in terms of the realized ecological function and long-term restoration goals. GHLT II is an increment of a future consolidated site that can provide even greater ecological benefits at a lower cost because a new USACE-approved flood levee has already been built around the overall habitat site.

Thinking more broadly, the project provides long-term economic benefit by allowing larger vessels to transit the Blair Waterway as required for port tenants, and by providing additional land to be incorporated into a container terminal, both of which will create local jobs and generate additional revenue each year.

6. The technologies and ideas involved in this project are readily transferable to other ports. As the shipping industry increases its understanding of its impacts to local fisheries and recognizes its long-term role in addressing habitat issues, ports can take a leading role in implementing actions that truly contribute to regional habitat restoration initiatives.

## Conclusion

**The key conclusion to draw about the GHT II Action is that it is a success.** The work succeeded because it: (1) effectively mitigated for the environmental impacts of economically important business development projects and enabled those projects to move forward in a timely manner; (2) was appropriately sited based on sound scientific goals, strategies, and analysis; (3) seized the opportunity to integrate the cleanup of historically contaminated land into the habitat restoration initiative; (4) is being scientifically monitored to demonstrate attainment of its habitat and fisheries restoration goals; (5) is providing valuable information regarding restoration strategies and techniques that can be applied to other actions; (6) will result in reduced costs for future habitat actions, because critical upfront infrastructure investments were made; (7) will functionally complement future restoration work in the Commencement Bay/Puyallup River Watershed; and (8) continues to demonstrate the Port's stewardship commitment to the environment, community, and economy.