



This project area is a 10+-acre site located in Woodard Bay, one of two small bays in Henderson Inlet of South Puget Sound, Washington. This site was identified through the completed Willamette Valley – Puget Trough – Georgia basin (WPG) Ecoregional Assessment. Woodard Bay was one of two places initially identified where native oysters are known to grow and that both tribes and shellfish growers agreed upon as a suitable location for shellfish restoration. Advantages of the site include the long-term conservation of bedlands, tidelands and adjacent uplands in the Woodard Bay Natural Resource Conservation Area.

The Woodard Bay NRCA is in a low density rural area and contains relatively undisturbed habitats including tidelands with salt-marsh communities, old- and second-growth forests, freshwater wetlands and streams. The upland topography is relatively flat to rolling with a few ephemeral creeks. Elevations range from sea level to 100 feet.

The site is Essential Fish habitat for Puget Sound Chinook (Fed. Threatened, State Candidate), and designated critical habitat for chinook salmon as well as Olympia Oysters (State Candidate). It has value for commercial and recreational fishing, is home to a large population of harbor seals and provides important nursery habitat for Dungeness crab and forage fish.

Zip code: 98506

- Relevant Maps or Photos (may be included as appendices) with site location(s) indicated

See attached map and photo

- Land Ownership (public and private)

The project site is located on publicly owned bedlands. The Conservancy will lease the area from the Washington State Department of Natural Resources (DNR). In Washington, these state aquatic lands are managed by DNR for the benefit of the public trust. Immediately adjacent to the site is the Woodard Bay Natural Resource Conservation Area also owned by DNR, but managed for resource protection.

- Anticipated Benefits to Species and Habitat(s)

The project site was once used as a log storage site and contains an un-quantified amount of wood waste. Accumulations of bark and wood on the bottom can affect the physical, chemical and biological characteristics of the substratum in several ways- some positive, some negative<sup>1</sup>. At low accumulations, wood can be a benefit for habitat and is a carbon source. At high accumulations wood can physically smother benthic organisms and block access between sediments and the overlying water column. Also, bark and wood decomposition can result in anoxic conditions and elevated levels of hydrogen sulfide.

The proposed sediment restoration will not only benefit existing populations of native Olympia oysters, but will enhance the entire benthic community which has been severely disturbed by past land uses. We anticipate increased spat recruitment as a result of the wood waste removal and re-introduction of appropriate substrate (oyster shell cultch). We predict that this project will also benefit other benthic invertebrates such as worms and crustaceans which are an important food source for crabs, oysters and multiple fish species including flounder, sole, and juvenile salmonids. As oyster populations increase we also anticipate long-term benefits to water quality since oysters are filter feeders and concentrate many of the pollutants and pathogens from their surroundings. Extensive monitoring should also provide much needed information about the site that will help inform future restoration actions as well as management decisions about the NRCA.

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<sup>1</sup> *Review of the Significance of Log Handling and Wood Debris in the Marine Environment*, 1997. Floyd & Snider Inc., and Pentec Environmental, Inc.

Both native Olympia (*Ostrea conchaphila*) and non-native Pacific oysters (*Crassostrea gigas*) present at the site. There are also clams of various species present including horse clams (*Tresus nuttalli*) and native soft shell clams. The small population of native oysters appears to be sustaining itself in tidal channels inside the NRCA, while the few large Pacific oysters in the area appear to be older relics from either direct plantings, or sporadically successful natural sets of spat from commercial beds in Henderson Inlet. These findings indicate that while the site is disturbed, the critical ecosystem processes needed to support shellfish are still somewhat intact and could benefit greatly from the proposed sediment restoration.

### **Project scale:**

The pilot project will encompass a several acre portion of intertidal and subtidal habitat at the mouth of Woodard Bay in Henderson Inlet (see map). If we are successful at this pilot site, we can quickly expand restoration actions to several thousand feet of shoreline adjacent to DNR's upland Natural Resource Conservation Area (NRCA). This action could lead to an integrated terrestrial, intertidal and submerged nearshore marine reserve at the site and eventually to similar restoration efforts throughout the Puget Sound.

### **Describe the threats to this specific ecosystem:**

#### Disturbance in the benthic environment

Olympia oyster populations in Washington have been drastically reduced due to pollution, over harvest and degradation of habitat (Cook et al. 2000)<sup>2</sup>. The greatest threat to this local estuarine habitat is the extensive disturbance that has occurred in the benthic environment. The project site was a former log dump that has left a significant amount of wood debris and bark in the sediments, resulting in a lack of appropriate substrates for shellfish.

While there is some continued recruitment of native Olympia oysters on large rocks in the tidal channel, the population is very low and appropriate substrate is nearly nonexistent outside of the occasional chunk of rip rap that has fallen into the tide channel. Initial surveys have found very little Pacific oyster recruitment, reducing the possibility of space competition from non-native Pacific species.

#### Water quality

Current water quality conditions are also a threat to the estuarine environment and pose a human health risk. While the immediate area surrounding the project site is relatively undeveloped, water quality impacts from urban/suburban areas further south have led to a steady increase in the fecal coliform levels in Woodard Creek and Woodard Bay. High fecal coliform levels are not known to affect growth of Olympia oysters and are therefore a greater threat to harvest than to the oysters themselves. In fact, a robust and protected oyster population at the mouth of Woodard Creek could improve the quality of water entering Henderson Inlet from the stream (Newell and Ott, 1999).

#### Biological and other threats

The greatest threats in terms of predators and diseases are the Japanese oyster drill and Denman Island disease. However, neither of these has been found in Woodard Bay. Other potential predators in the area include sea stars, oyster drills and moon snails.

Since the area is protected, commercial shellfish practices that alter intertidal and subtidal habitat will not pose a threat although introduced? non-native larvae and predators to the surrounding area could potentially pose a threat.

### **WORK PLAN**

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<sup>2</sup> Cook, A.E., J.A. Shaffer, B.R. Dumbauld, and B.E. Kauffman. 2000. A plan for rebuilding stocks of Olympia oysters (*Ostreola conchaphila*, Carpenter 1857) in Washington State. *Journal of Shellfish Research*, 19:409-412.

- Start and End Date (1 year projects are preferred, projects up to 2 years are acceptable, particularly if the longer time is needed for monitoring)

Start Date: Sept 1, 2004

End Date: Dec 1, 2005

- Restoration Methodology

Secure conservation lease. We are currently in the process of applying for a 50-year conservation lease for the subtidal portion of the project site. The proposed area for restoration includes our subtidal lease, and portions of the adjacent tidelands owned and managed by DNR's Woodard Bay NRCA. The proposed project is the first of what is likely to be numerous long-term restoration actions for the site, and will serve as a pilot for possible sediment restoration throughout the entire NRCA.

Sediment restoration. While the project site at the mouth of a tidal creek is well suited for shellfish restoration, the sediments are contaminated with excess wood debris from historic log storage at the site that will have to be removed before significant shellfish restoration occurs. A consultant/contractor will be hired to complete the following work:

- Conduct sediment survey to identify the type, amount, chemical characteristics and distribution of wood waste in the subtidal and intertidal habitats
- Conduct biological surveys to be used as a baseline for monitoring and future restoration. We will assess biological diversity in the sediments before and after clean up, and use clean and contaminated reference sites to measure performance.
- Develop recommendations for wood-waste removal and/or other sediment remediation actions
- Remove wood waste

Site selection and cultch placement. The Conservancy, NOAA and project partners all support the use of natural restoration techniques for shellfish restoration. Our approach is to identify where oysters settle naturally and then improve those habitats to facilitate natural oyster recruitment and reproduction. We will also actively place oysters on site. Working closely with a shellfish expert from the University of Washington and DNR staff we will:

- Do preliminary studies to identify best location for cultch placement in terms of depth, salinity, and relationship to potential spat sources.
  - To ID where native oyster spats settle naturally, we will place spat collection plates within and around the site of the leased area and the NRCA to determine natural recruitment potential.
  - Measure density of settlement on cultch plates

Place juvenile and adult oysters in monitored plots to measure growth and predation in the area relative to salinity gradient, depth and level of sediment disturbance/contamination.

Project monitoring and evaluation methodology.

The removal of wood waste from the pilot site will serve as a test of effectiveness for rehabilitating intertidal and subtidal substrate for restoration of oysters and other benthic dwelling organisms. We will assess biological diversity in the sediments before and after clean up, and use clean and contaminated reference sites to measure performance.

- Timeline for Anticipated Actions

TARGET DATES:

1. Sediment and biological survey complete (Dec 15, 2004)
2. Wood waste removed (Feb 15, 2005)
3. Preliminary studies started (Sept 1, 2004)
4. Preliminary studies complete (Sept 1, 2005)

- Identification of the mechanism that will be used, by TNC or a partner, to ensure that necessary environmental permits and consultations will be secured prior to the use of Federal funds.

A contractor will be hired for the sediment and biological surveys and to develop recommendations for wood waste removal. Identification of all necessary permits will be a required element in the contract. Due to the presence of salmonids, seals, a maternity colony of bats and nesting bald eagles at the site, there will probably be only a short window during which time in-the-water work can be done.

We will work closely with DNR staff, including the land manager and natural area scientist, to ensure all necessary environmental considerations are included in our work plans. DNR staff will have an opportunity to review all work plans.

- Identification of Goals-- Description of Long-Term Measures of Success

The principle long term goal for the project is to establish a successfully reproducing native oyster population in a subtidal and intertidal preserve adjacent to an upland conservation area. Successfully reproducing oyster populations would be an indicator of restored ecosystem processes and a healthy benthic environment.

- Identification of Measurable Objectives-- Project-specific Benchmarks for Measuring Short-Term Success.
  1. Completion of sediment and biological surveys – establishment of baseline
  2. Successful removal of wood waste in pilot area (1 – 2 acres treated)
  3. Results of preliminary study – density per cultch location, oyster growth and survival
  4. Development of specific oyster restoration plan for oyster substrate in the pilot area, and intertidal and subtidal habitat restoration over the nearshore area adjacent the entire NRCA
- Community Engagement (may include: hands-on training and restoration activities undertaken by volunteers; sponsorship from local entities, either through in-kind goods and services or cash contributions; public education and outreach; and/or support from state and local governments)

Shellfish restoration in Puget Sound is a complex activity with a lot of policy issues around locating appropriate sites and management. The commercial shellfish growers are sensitive about project placement because restoration activities may compete for space or be incompatible with (or harmed by) commercial operations. Native American tribes have legal rights to 50% of the harvestable standing stock of shellfish in the Sound (regardless of most conservation designations), and also have commercial growing and harvesting interests of their own. Working with these groups is critical to the long-term success of any shellfish restoration program, and therefore a significant constraint.

We intend to involve local community groups in understanding the benefits of native oyster reintroduction and ultimately enlist their help in restoration (putting cultch down, introducing adult oysters and native oyster spat), and monitoring and stewardship of restored habitats to ensure the success of the reintroduction program.

- Anticipated outreach, e.g., presentations, papers, publications, if applicable.

We will share best practices from pilot project and replicate on adjoining state-owned Natural Resources Conservation Area intertidal and subtidal areas . We anticipate producing at least one published scientific paper, giving at least one presentation at a national conference (e.g. RAE conference), and generating multiple articles in TNC magazines and website.

#### **PROJECTED BUDGET AND NARRATIVE** (see Appendix II)

- Completed *Projected Budget Template*
- Grant Amount Requested \$ 94,600

- Match Amount (non-federal is required.) \$ 93,600
- Source(s) of Match (confirmed and pending) Matching funds have been budgeted for in the Washington Field Office's budget for FY05 and include non-federal and private sources.
- Justification For Fund Use (as listed in projected budget) and a budget narrative

**APPENDIX II**

**PROJECTED BUDGET TEMPLATE  
COMMUNITY-BASED HABITAT RESTORATION PROJECT**

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<b>FUNDS</b>	<b>REQUESTED GRANT FUNDS</b>	<b>TNC MATCH</b> (state whether confirmed or pending)	<b>Third-Party In-Kind Match</b> (State if confirmed or pending)	<b>PURPOSE</b> (briefly state and elaborate in narrative)
<b>Personnel</b>		45,058		Marine Program Mgt. and project mgr
<b>Fringe Benefits</b> (full-time @ 40 % short-term @ 8.5%)		18,023		
<b>Travel</b>	1,100	2,100		Travel to worksite and conference
<b>Equipment</b>				
<b>Supplies</b>		2,000		GPS and digital camera for monitoring
<b>Contractual</b>	93,500	20,000		Site assessment and restoration
<b>Other</b>		6,419		Communication, taxes and fees
<b>Total Direct Expenses</b>	94,600	93,600		
<b>TOTAL</b>	<b>94,600</b>	<b>93,600</b>		

\* Proposals are not to include indirect costs due to the nature of the matching grants program.

**NARRATIVE.** Provide detail on how the amounts listed above (in all columns) will be used to meet the goals of this project. Also address where confirmed or potential sources of match will come from.

**Personnel & Benefits (\$63,081- TNC MATCH)**

- Marine Program Manager- the program manager will provide broad oversight of the project and the project manager  
Restoration project Manager- a short term, project manager will be hired to implement the restoration project, hire and manage contractor and budget, oversee monitoring. The Project Manager will also develop an oyster restoration strategy from the results.
- GIS staff time to incorporate spatial environmental data and produce maps of the site

**Travel (\$3,200- GRANT FUNDS)**

- Includes mileage to and from site for program director and project manager; travel

to a national conference, and 2 nights of lodging associated with conference attendance

Supplies (\$2,000- TNC MATCH)

- GPS unit, digital camera and misc

Contractual (\$93,500- GRANT FUNDS)

- Biological survey, monitoring and oyster placement (\$13,500)- University of Washington shellfish specialist
- Wood Waste Removal (\$80,000)

Contractual (\$20,000- TNC MATCH)

- Marine survey of sediments and woodwaste (\$20,000)

Other (\$6,419- TNC MATCHING FUNDS)

- Postage (\$500)
- Maps, photos, printing and copies (\$2,750)
- Communication (\$1,250)- cell phone, conference registration fees, publication fees, meetings
- Permit fees (\$500)
- B&O tax (\$1,419)

## **APPENDIX III**

### **DEFINITION OF RESTORATION & REPRESENTATIVE ACTIVITIES**

TNC's definition of "restoration" closely mirrors that published by the National Research Council in their book on Restoration of Aquatic Ecosystems:

"Restoration is defined as the return of an ecosystem to a close approximation of its condition prior to disturbance. In restoration, ecological damage to the resource is repaired. Both the structure and the functions of the ecosystem are recreated. Merely recreating the form without the functions, or the functions in an artificial configuration bearing little resemblance to a natural resource, does not constitute restoration. The goal is to emulate a natural, functioning, self-regulating system that is integrated with the ecological landscape in which it occurs. Often, natural resource restoration requires one or more of the following processes: reconstruction of antecedent physical hydrologic and morphologic conditions; chemical cleanup or adjustment of the environment; and biological manipulation, including re-vegetation and the reintroduction of absent or currently nonviable native species."

An illustrative, but not exhaustive, list of possible restoration activities to be funded under this national partnership might include:

- Restoring marsh, wetland, seagrass, or riparian communities through re-vegetation, invasive plant control, natural re-contouring of the landscape, removing levees and artificial drainage systems, and related activities.
- Restoring natural shellfish beds in estuarine areas through seeding juvenile shellfish, creating adult spawner sanctuaries, and/or introducing appropriate substrate for shellfish growth
- Restoring native populations of aquatic organisms through re-introductions and control of invasive plant and animal species.
- Working with landowners or managers to restore water clarity, quality, and natural flow of fresh and saltwater.
- Working with water managers to restore natural volumes and timing of freshwater flows through rivers and into estuarine and coastal areas, and to remove or reduce the impacts of barriers to the movement of aquatic organisms in rivers and estuaries.
- Working with coastal and freshwater management authorities to effect ecologically compatible dredging, channelization, shoreline protection, and related activities.