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PROJECT TITLE: Olympia Oyster Restoration Final Report

DELIVERABLES FOR TASK NO: 5.2

PROGRESS REPORT: [ ] FINAL REPORT [X]

PERIOD COVERED: October 1, 2016 – September 30, 2017

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This report must accompany all requests for payment, along with any other deliverables per the scope of work.

Olympia Oyster Restoration

Introduction

In 2012 Jamestown S'Klallam Tribe (JST) partnered with Clallam MRC and Puget Sound Restoration Fund (PSRF) to restore Olympia oysters on one acre of their tidelands in Sequim Bay. Grow-out bags with approximately 6,200 Olympia oyster seed were planted on the tidelands and the following year seeded cultch bags with approximately 500,000 oysters were spread onto the tidelands. In 2014 seeded cultch bags with approximately 250,000 seed were spread on to an additional half acre of tidelands making the total restoration site 1.5 acres. In 2016 the Olympia oyster bed had reached a size of approximately 0.74 acres with a population estimated at 55,770 individuals.

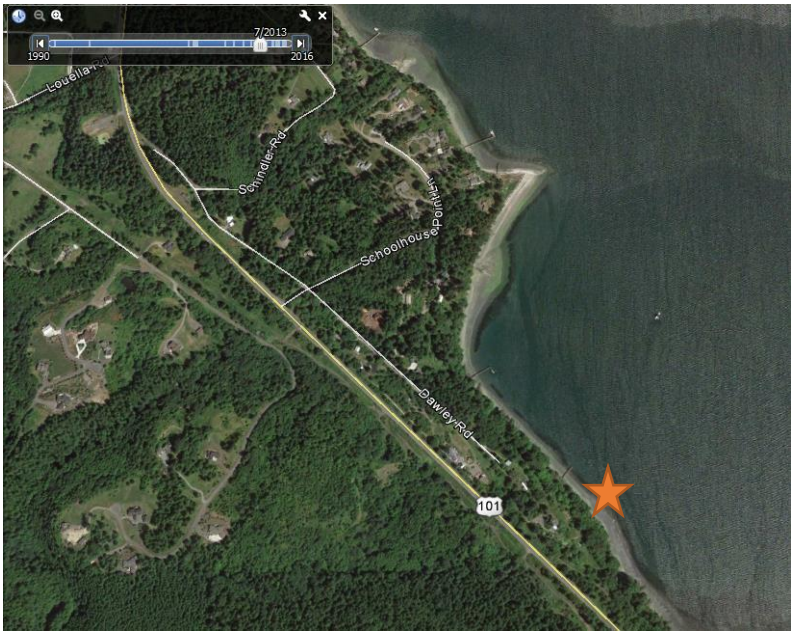
The successful restoration effort on Jamestown's tidelands in Sequim Bay near Blyn prompted Clallam MRC and their partners to search for other potential restoration sites in Sequim Bay in 2016; one of these sites the small cove next to John Wayne Marina at Pitship Point. In early April 2016 a landowner agreement was signed by the Port of Port Angeles and Clallam County and a visit to Pitship Point May 8th identified about 0.5 acre of suitable habitat in the eastern part of the cove.

On August 17, 2016h a team, led by JST shellfish biologist Ralph Riccio, spread seeded cultch from two cultch bags at two test plots selected within the restoration site, one shallow and one deep. The intention was to observe survival and growth through the rest of the year and early 2017 to assess the suitability of the Pitship Point area for restoring a population of Olympia oysters. On March 7, 2017, at one of the first day-time minus tides, five CMRC members went out to monitor survival and growth of the oysters. Unfortunately the test plots had been destroyed and the mother shells were widely scattered, including up on the beach. It appears that the area was a much higher energy beach than anticipated and Pitship Cove was abandoned as a potential restoration site.

In the spring and summer of 2017 Clallam MRC continued to search for another potential restoration site including US Fish and Wildlife Service (USFWS) property at Dawley Road, the tidelands at Dungeness Farms and Cline Spit.

Dawley Road Property

On May 24, 2017 five MRC members and staff visited the site at Dawley Road along with Jennifer Scott-Brown and Lorenz Sollman from the USFWS. Suitable habitat was identified along the shore and a Special Use Permit was submitted to USFWS in September requesting permission to establish two test plots.



Google Earth picture of the shoreline around the Dawley Road site taken at low tide in July, 2013. The USFWS property is identified with a red star

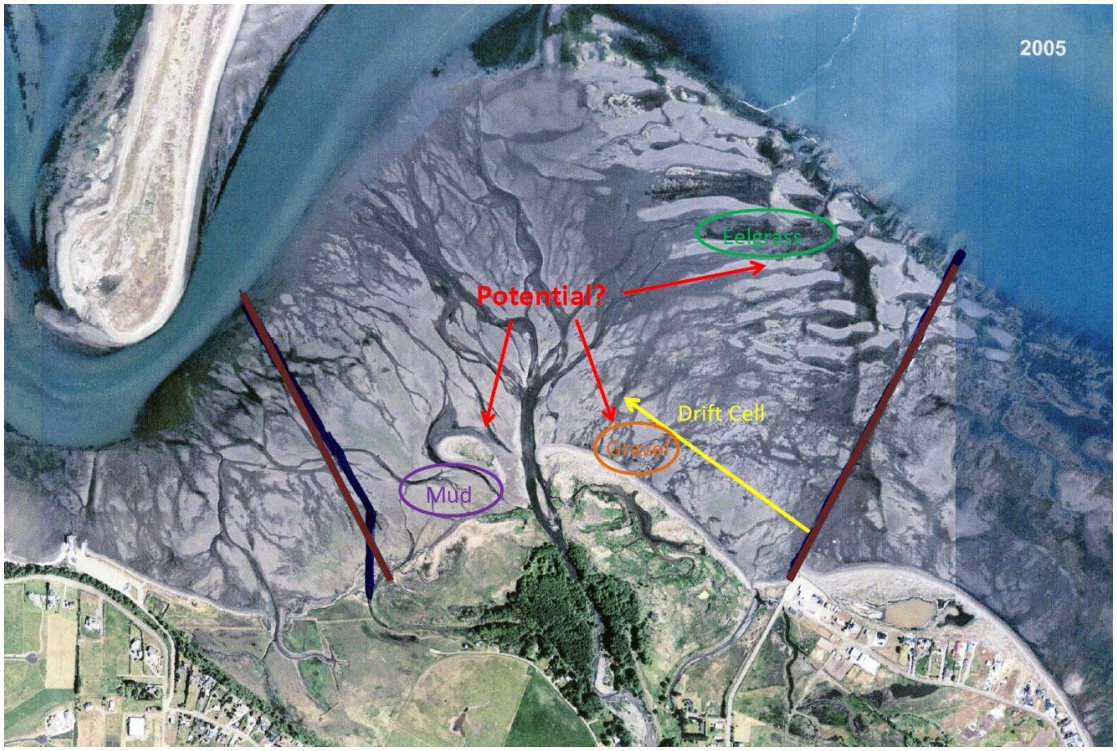
Looking north – property extends to the large tree on the left

Looking south – property extends to the small person

Figure 1. Location and tidelands at the Dawley Road property

Dungeness Farms

On May 25, 2017 three MRC members and staff visited the tidelands at Dungeness Farms along with Matt Heins the manager of the farms. In June at the MRC meeting the members decided that the tidelands at Dungeness Farms were too exposed for Olympia oysters and the site was abandoned.



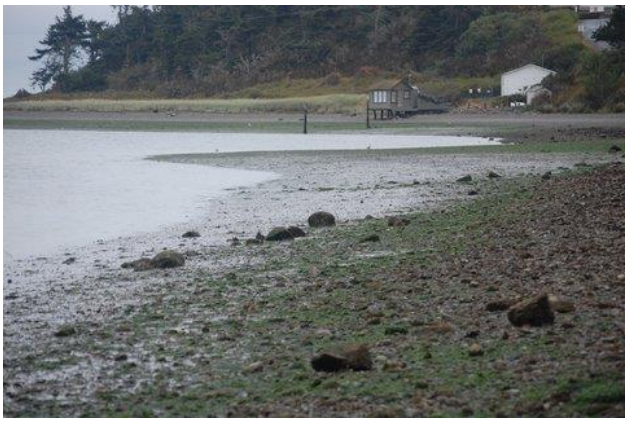
Potential restoration locations within the tidelands at Dungeness Farms

Composite picture of the tidelands

Figure 2. Tidelands at the Dungeness Farms.

Cline Spit

A private landowner, Bob Phreaner, contacted JST and Clallam MRC about using part of his tidelands at Cline Spit as a restoration site. Site visits were conducted July 24th and 25th and the tidelands were assessed as suitable Olympia oyster habitat. On September 8th JST shellfish biologist and Clallam MRC members installed two test plots at the site.



Tidelands looking east

Establishing one of the two test plots

Figure 3. Tidelands at Cline Spit

Purchase of Seeded Cultch

On June 7th JST employees and one Clallam MRC member organized to pick-up 100 seeded cultch bags from PSRF and transport them to Jamestown tribal tidelands. The seed will be stored until further decisions have been made about their final placement (newly identified restoration site(s) or added to the site in Blyn).

Figure 4. Transportation of seeded cultch to the Jamestown tribal tidelands

Jamestown Tidelands Restoration Effort Summer 2017

An Olympia oyster population survey was completed at the Jamestown restoration site by four members of Jamestown's Natural Resources department on September 5th 2017. The purpose of this survey was to estimate the size and survivorship of the Olympia oyster population within the 1.5 acre boundary of the restoration site, determine the perimeter of the oyster bed and identify the size distribution of the Olympia oyster population.

Survey Methods:

The population survey was carried out using a systematic random design to eliminate any bias in the sampling scheme. The Olympia oyster survey was conducted during a 0.0 ft MLLW tide so that the entire oyster bed was exposed to allow for complete sampling. Eight transects were laid out 30 feet apart along the southern boundary of the restoration site. The starting position of the first transect was randomly selected using a random number generator. Along each transect, a 2.0 ft^2 (0.19 m^2) quadrat was used to subsample Olympia oysters every 30 feet. The starting position of each subsample plot was randomized for each transect. A total of 78 subsample plots (equal to a 156 ft^2/14.5 m^2 area) were examined within the restoration site. This sampling protocol allowed for the 1156.5 acre restoration site to be sampled at the same density throughout. All substrate within a subsample plot was examined and the numbers of live and dead Olympia oysters were counted. Shell length, measurement from the hinge to the longest edge of the shell, was measured in every quadrat divisible by three. A survey grade GPS unit was also used to walk the perimeter of the Olympia oyster population area. All field data was compiled and analyzed by Jamestown's Shellfish Biologist, Liz Tobin, and reported to the Clallam MRC.

Survey Results:

The 2017 population survey found the mean Olympia oyster density of 5 oysters per m^2 (95% CI [2, 8]) within the entire 1.5 acre restoration site and a mean density of 8 oysters per m^2 (95% CI [4, 12]) within the population area. In 2017, the area of the Olympia oyster bed increased by approximately 40% to 1.05 acres with an estimated population size of 33,978 (Figure 1, Table 1). While the Olympia oyster population area has clearly expanded, the oysters are not evenly distributed throughout the population area. The 2017 population estimate may appear lower than the 2016 survey, but the number of subsample plots examined within the restoration site increased compared to 2016. This increase in sample size, along with the patchy distribution of oysters, introduced more "zero" observations which reduce the calculated mean density; however, it provides a more accurate representation of the Olympia oyster population distribution within the surveyed area (Fig. 2). In early 2017, the restoration site boundary was shifted southward to encompass and protect the southward expansion of the Olympia oyster bed observed from the 2016 survey. This southward shift of the oyster bed was re-confirmed in the 2017 survey where the highest density of Olympia oysters occurs in the center of the relocated restoration site. Assessment of Olympia oyster survivorship indicated that 62% of the counted oysters were viable. The size range of the subsampled live adult oysters was 28-61mm. These survey results indicate that restoration efforts have been successful at the Jamestown site as Olympia oysters appear to be thriving, growing and expanding their population area.

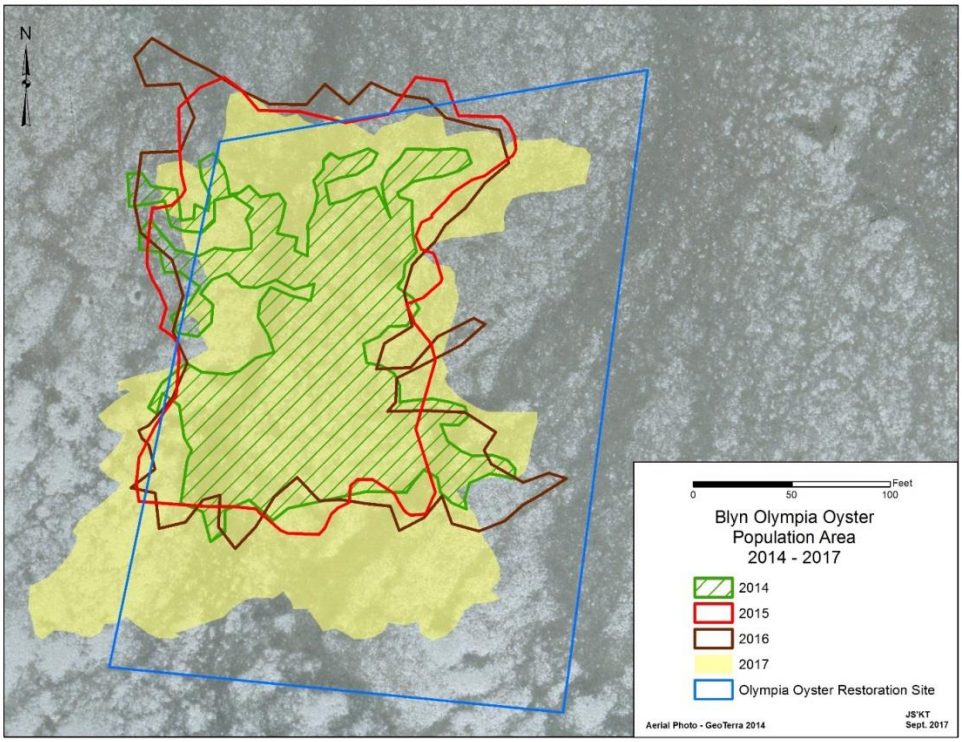


Figure 1: Estimated size of the Jamestown Olympia oyster bed in 2014, 2015, 2016 and 2017.

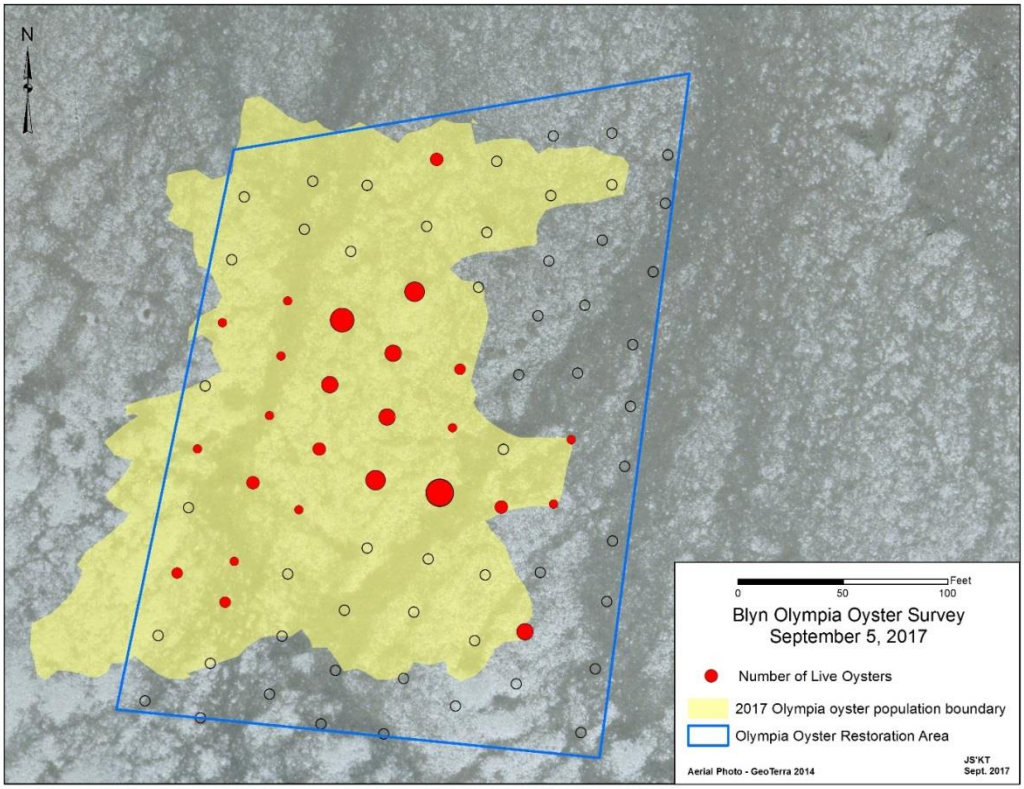


Figure 2: 2017 Jamestown Olympia oyster population survey. Open circles represent subsample plots where no live oysters were observed. Red circles represent subsample plots where live oysters were observed and the size of the circle is proportional to the total number of oysters counted within a plot.

Table 1: Oyster density data, population area and population size estimate for the Jamestown Olympia oyster restoration site from 2014 – 2017. The 2017 population estimate includes 95% confidence intervals.

Survey Year	Mean Restoration Site Density (m^{-2})	Population Area (acres)	Mean Population Area Density (m^{-2})	Population Estimate	Notes
2014	--	0.42	28	46,800	Survey only within oyster bed area; 39 subsamples
2015	18	0.64	24	46,620	Unseeded cultch added; Survey throughout 1.5 acre restoration site
2016	15	0.74	19	55,770	Survey throughout 1.5 acre restoration site: 51 subsamples
2017	5	1.05	8	33,978 (±15,783)	Restoration site shifted southward, Survey throughout 1.5 acre restoration site: 78 subsamples

Task Number: 5.4

What was the goal of this project and did you accomplish it?

The goal was to expand the restoration efforts in Sequim Bay by identifying a new restoration site. After the failure of the Pitship restoration site Clallam MRC continued in spring and summer of 2017 to search for another potential restoration site. Potential sites included US Fish and Wildlife Service (USFWS) property at Dawley Road, the tidelands at Dungeness Farms and Cline Spit.

Please provide a list of measurable outcomes or accomplishments from this project (e.g. number of people trained, miles of shoreline restored, etc.):

A Special Use Permit for establishing two test plots at Dawley Road property was submitted to USFWS. Two test plots were identified at the Cline Spit potential restoration site and two seeded cultch bags were spread at the plots. A population survey at the Jamestown restoration site estimated that the area of the oyster bed had increased with about 40% to cover 1.05 acres.

Please list the specific deliverables associated with this project (e.g. educational/outreach materials, monitoring protocol, summary report):

Submittal of Special use Permit to USWFS.

This final report summarizing all the restoration efforts carried out in 2016-17

Any difficulties encountered or lessons learned during the project?

Identifying an area within Sequim Bay suitable for restoration of Olympia oysters

If this task was part of an ongoing project, please provide a brief summary of the project to date, including initiation and expected completion dates, overall goals and anticipated outcomes:

This task is part of an on-going effort to restore Olympia oysters within Puget Sound, and specifically within Clallam County.

Were any other resources or funding leveraged for this project?

Jamestown S'Klallam Tribe donated staff time and equipment to the project.

Did you work with any partners or other MRCs to carry out this project?

Jamestown S'Klallam Tribe, Puget Sound Restoration Fund, USFWS, local landowner

What are the regional cumulative significance/impacts/results of this project?

Clallam MRC, JST and PSRF are working together to restore Olympia oysters in Clallam County with a focus on Sequim Bay. The effort is part of a larger goal underway to restore 100 acres of Olympia oyster habitat in the Puget Sound area by 2020.

Which NWSC Performance Benchmarks or PSP Near Term Actions does this project address?

NWSC: Nine acres of oyster habitats will be restored

PSP: Restoration of native oyster beds addresses two regional priorities: mitigation of ocean acidification and preservation of open shellfish beds through improved water quality.