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Deliverable 5.2: Olympia oyster survey data and summary report for Discovery Bay

PROGRESS REPORT: [ ] FINAL REPORT [X]

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Olympia Oyster Survey Data & Summary Report
For Discovery Bay

Olympia Oyster Task 5.2

Overview & Summary

Discovery Bay has a small natural Olympia oyster population near the southeast (Maynard Beach) portion of the bay. The MRC's goal is to enhance and expand that population by creating appropriate substrate (clean cultch spread on the tideflats) in nearby areas and monitoring for recruitment. We started this project in 2014 with distribution of shell within a half-acre tideflat project area surrounded by eelgrass. 2017 was our third year of monitoring for Discovery Bay natural recruitment at that site.

In August 2015 (during our first year of monitoring), Brady Blake, our WDFW advisor, recommended adding more unseeded cultch to the site in 2016 to bring the available shell density back up to an average of 2 shells/sq ft. Tides had moved some of the initial shell out of the project area, and some shell had settled deeper into the mud. On July 21, 2016, 13 MRC volunteers dispersed an additional 80 bags of clean cultch to the Discovery Bay site. We did not do this earlier in the year because our original permits prohibited in-water activity before July 15th. The 2017 monitoring included cultch from both the 2014 and 2016 placements.

Spat numbers and size measurements give us an indication of successful natural recruitment. A direct comparison of 2015, 2016 and 2017 data is difficult due to several factors: (1) Additions of new shell in July 2016 significantly affected how much spat was found on the cultch in August 2016. (2) As a result of several workshops and conversations with other MRCs and Olympia oyster researchers, the Jefferson MRC began collecting data on slightly different parameters to more closely align with regional Olympia oyster recovery efforts. (3) In 2017, a monitoring transect ran East-West in a location south of the original project boundary (south of the powerlines), as we had seen large numbers of Olympia oyster on shell in that area in 2016. These had to be the Pacific oyster shell we placed in 2014 that were moved south by the currents, as there was almost no substrate present on or near the project site before the MRC began its work.

We also placed six shell stacks for the Puget Sound Restoration Fund (PSRF) study at this location at the end of May. Three shell stacks were placed within the 2014 Restoration Site and three were placed in the lagoons adjacent to the extant Maynard Beach population. PSRF uses this approach for measuring recruitment in order to compare results from various sites around Puget Sound. Annual monitoring took place on **August 20, 2017**, with four MRC volunteers and one MRC staff (Neil Harrington, Chuck Lowe, Luzi Pfeninger, Jeff Saeger and Cheryl Lowe). Shells stacks were collected on Aug 20 from both Discovery Bay sites. Monitoring data was compiled and summarized in this report. Shell stack data is being compiled in October to be sent to PSRF.

Data & Observations

Data tables and a summary table are included in this Report, along with monitoring protocols used.

A few comparisons of 2015, 2016 and 2017 Discovery Bay data are as follows:

Data Collected	2015	2016	2017
# of quadrats monitored	43	46	48
Average % shell cover per quadrat	5%	7%	12.4%
Total # spat counted	215	83	595
Total # of adult Olympia oysters found	2	13	----

Each year we counted about the same number of quadrats. Significant increases in total number of Olympia oyster spat and percent cover were probably due to several factors: We placed quadrats along East-West transects this year to give us a more even distribution within the project area, as per recommendations from last year's report. More importantly, we added a transect just south of the project area to include the 2014 and 2016 cultch that had been moved there by the currents. Total spat count was much higher in 2015 than 2016, which reflects the shorter time that the 2016 shell was available for larval settlement. In 2015 and 2016, spat height was only measured as greater than or less than 15 mm (a rough estimate of reproductive maturity). In 2017, we recorded actual height to be more consistent with other regional monitoring efforts.

Amy Does, the volunteer processing the six PSRF shell strings for Discovery Bay has not yet completed her work. Original data sheets are stored at the MRC office and a copy is sent to PSRF. No comparisons are provided here. Cheryl Lowe compiled the Discovery Bay data collected by the MRC monitoring team.

Discovery Bay Recommendations for 2018

Continue monitoring using the East-West transects layout. Due to the uneven distribution of the shell within the original project area, it would be useful to somehow determine the approximate boundary of where the cultch is now distributed, including south of the powerlines. It could be a challenge to determine this "boundary", as in 2017, the cultch was often hidden under a thin layer of green macro-algae (temporarily removed when collecting data in a quadrat) or the cultch could also be doing well in the adjacent eelgrass, which we do not want to disturb.

If time allows, it also would be interesting to complete a second transect south of the power lines.

Outreach and Photos

A posting about the Discovery Bay monitoring appeared on the Jefferson MRC website in September.

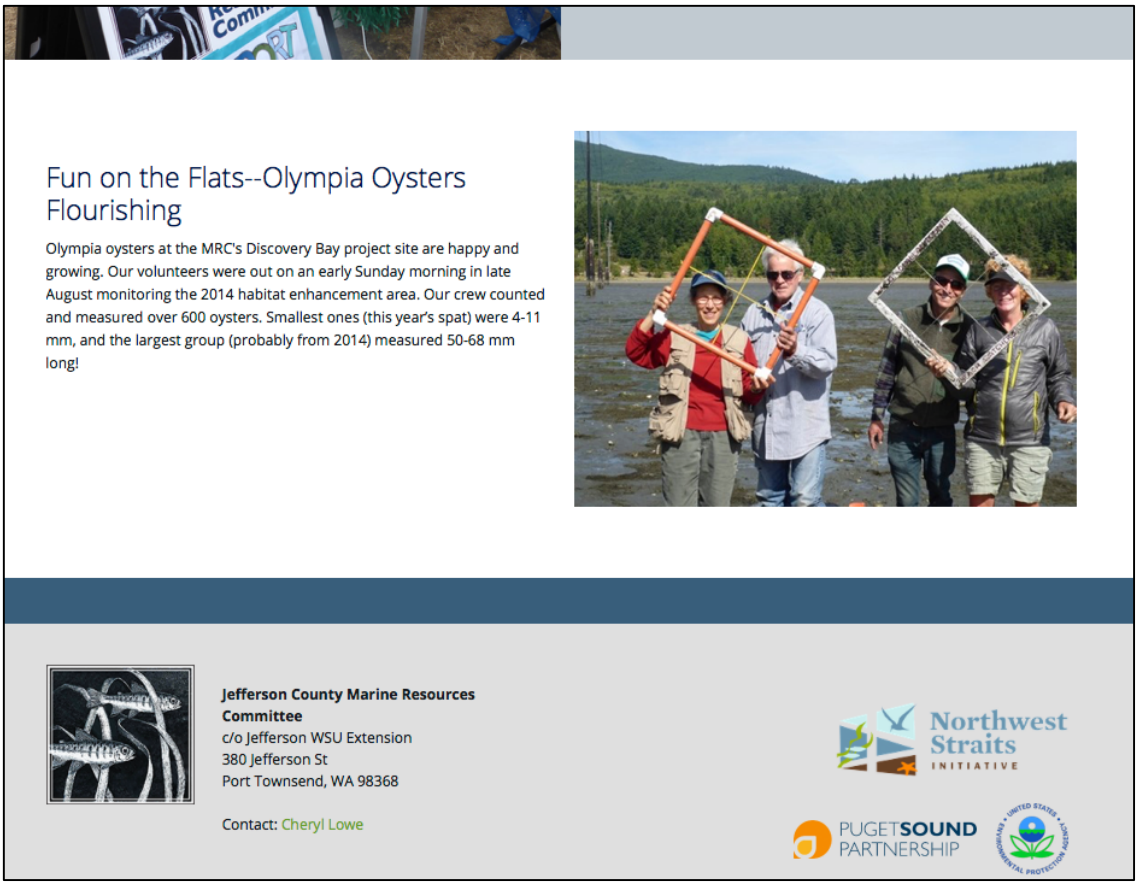


Photo 1: Discovery Bay shell with many adult Olympia oysters found just outside boundary of project area.

Photos 2: Volunteer monitoring in August 2017.

Discovery Bay MRC Olympia Oyster Project

SIZE & Number of SPAT - 2017 Transects

Measuring Ht of Olys in quadrats along 7 random transects

Waterbody: **Discovery Bay**

Station Name: **DiscoBay 2014 Restoration Site**

Monitoring Date 20-Aug-17 7:45 am - 11 am on-site. Final clean-up completed at 12:30 pm.

Time of Low tide -1.5' tide at 9 am

Monitored Area (m2) ?

Original Project Area (m2): ?

Quadrats are 0.5m2

Per Transect

Transect #	# Quad w spat*	# Quad w no shell or spat	Q-Area monitored (m2)	# Spat	# of shells w Olys:	Avg Length	Avg % cover**	Ave % cover-allQ
1	**7**	3	3.5	76	36	40	10.7	7.5
2	7	2	3.5	102	39	39.5	10.4	8.1
3	5	3	2.5	78	28	33.9	10	6.25
4	2	4	1	34	16	34.8	25	8.3
5	3	2	1.5	11	8	17.4	9	17.4
6	3	2	1.5	14	7	19.2	7	4.2
T-A	5	0	2.5	280	83	41.8	35	35
Sub-Totals	**32**	**16**	**16**	**595**	**217**	**32.37**	**15.3**	**12.4**

* number of quadrats with Oly spat in them

** percent cover only for quadrats with shells and Oly spat

Olympia Oyster Monitoring--Discovery Bay 2017
Jefferson County Marine Resources Committee

August 20, 2017

Protocols approved by WDFW Shellfish Biologist Brady Blake, August 2015.

Goal:

To monitor oyster spat set on clean Pacific oyster shells placed in August 2014 & July 2016 in a ½ acre area in lower Discovery Bay. Shell placement is to test effectiveness of a low-impact strategy to encourage natural seed set from a nearby existing Olympia Oyster population. For more details about initial work, see Jefferson MRC's Olympia oyster project report and maps.

Equipment:

- GPS & notebook for writing notes
- 100' tape measure (optional)
- camera for quadrat pix
- 2 sets of data sheets (on waterproof paper), pencils, clipboards
- Stakes or pin flags to mark transect start, end and quadrat centers.
- Flagging and 20 wire flags
- Volunteer sign-in forms
- Safety review & first aid kit
- Gloves
- Mudboots
- Rulers with mm measure
- 3 5-gal buckets
- collect shell stacks?

Random numbers for August 20, 2017: **4, 5, 9, 5, 3, 9, 4, 8, 3, 10**
-1.5' tide predicted at 9 am that day. Volunteers met at 7:45 am at Hwy 101 DFW parking lot. Monitored until 11 am, when tide pushed us out. Approximate tide ht at that time was 0.0. Five volunteers in 2 teams did the monitoring.

Protocols:

Random numbers are used to locate the start of transects and quadrats within the project area (pace = one step of one leg). Because a number of shells have drifted south of the Powerlines (southern boundary of original project area, in 2017 we will add one transect parallel to and 6 paces south of the Powerline,

1. Use the Powerlines as the South boundary of the plot (it's actually SW edge).

2. Beginning at approximately the SE end of that boundary line (GPS lat-long _____), walk North, using flags to mark a long N-S Baseline transect on the E side of the plot. This line is where all the E-W transects will start from.

3. Walk **4** [random number above] of paces in a N direction along the N-S Baseline to beginning point of Transect 1. Mark with a stake for beginning of Transect #1. Record the GPS coordinates for start of Transect (**or record GPS end points of all transects once they are marked)**.

4. Walk **5** more paces along the Baseline and mark beginning of transect #2 (using stakes or wire flags). Record the GPS coordinates for start of Transect.

5. Walk **9** more paces along powerline and mark beginning of transect #3. Record the GPS coordinates for start of Transect.

6. Walk **5** more paces along powerline and mark beginning of transect #4. Record the GPS coordinates for start of Transect.

NOTE: At this point we realized we were short on time and decided to record data from more widely spaced transect to get a better idea of distribution. We skipped Transects 4 and 5. Data was collected in quadrats along T6 (#4 in database) and T8 (#5 in database). See next four items for spacing of those transects.

7. Walk **3** more paces along powerline and mark beginning of transect #5. Record the GPS coordinates for start of Transect.

8. Walk **9** more paces along powerline and mark beginning of transect #6. Record the GPS coordinates for start of Transect.

9. Walk **4** more paces along powerline and mark beginning of transect #7. Record the GPS coordinates for start of Transect.

10. Walk **8** more paces along powerline and mark beginning of transect #8. Record the GPS coordinates for start of Transect.

11. From each Transect starting point, facing NW in a line parallel to the powerlines. Walk a straight line out to the end of the visible shell, or when you reach the edge of the eelgrass, and put a tall, flagged stake in the mud. **Record the GPS coordinates of the end point of each Transect.**

12. **Go back to the East starting point** of Transect #1 and **walk 6 [random number] of pace**s. Put a wire flag at that point. You will place the quadrat frames on the ground with the stake at the center and the tape (or imaginary transect line) running through the center of the quadrat. After the first wire flag, **walk 5 more paces** and place another wire flag/quadrat in the same orientation. Repeat to the end of the Transect #1.

13. Repeat for each transect, starting at:
    - **5 paces for #2**

- **2 paces for #3**
- **7 paces for #4**
- **repeat this pattern of (random) 5, 2 and 7 paces to start placement of the first quadrat along each transect, keeping all the other quadrat spacing at 5 paces apart.**

NOTE: Again, due to limited time, we shifted to every 10 paces starting with Transect #3.

NOTE: Due to the large number of Olympia oysters in Transect A (south of the powerlines) one team collected data on T-A after completing T#!, where quadrats were 5 paces apart, after starting with a random number..

Quadrat Instructions

1. For each quadrat, you will
    a. Rearrange shell in preparation for data collection
    b. Measure and record the size of each Oly spat found on each shell
    c. Estimate percent cover of oyster shell and take a photo

    Due to limited time, available cameras, and the fact that we haven't used this info in the past, we skipped the photo-taking step.)

2. Record on the data sheet the **Transect # and time** you start that Transect.

3. Move all the shell out of one-quarter section and then start inspecting and moving them into that first quarter section as you collect data. Pick up each shell piece and inspect it for Olympia oyster spat. **Using a new column on the data sheet for each shell**, record sizes of all Oly spat found on each shell. Once you have counted a shell, placed it on the ground in that first quarter section that was emptied.

    To estimate overall coverage, place all the counted shells with edges touching so you can easily estimate the total % cover for that quadrat. **Record the % cover estimate on the data sheet at the top of the shell count for that quadrat, and take a photo** (automatically time-stamped), so we can match them up (for percent cover.) *Due to limited time, available cameras, and the fact that we haven't used this info in the past, we skipped the photo-taking step*.)

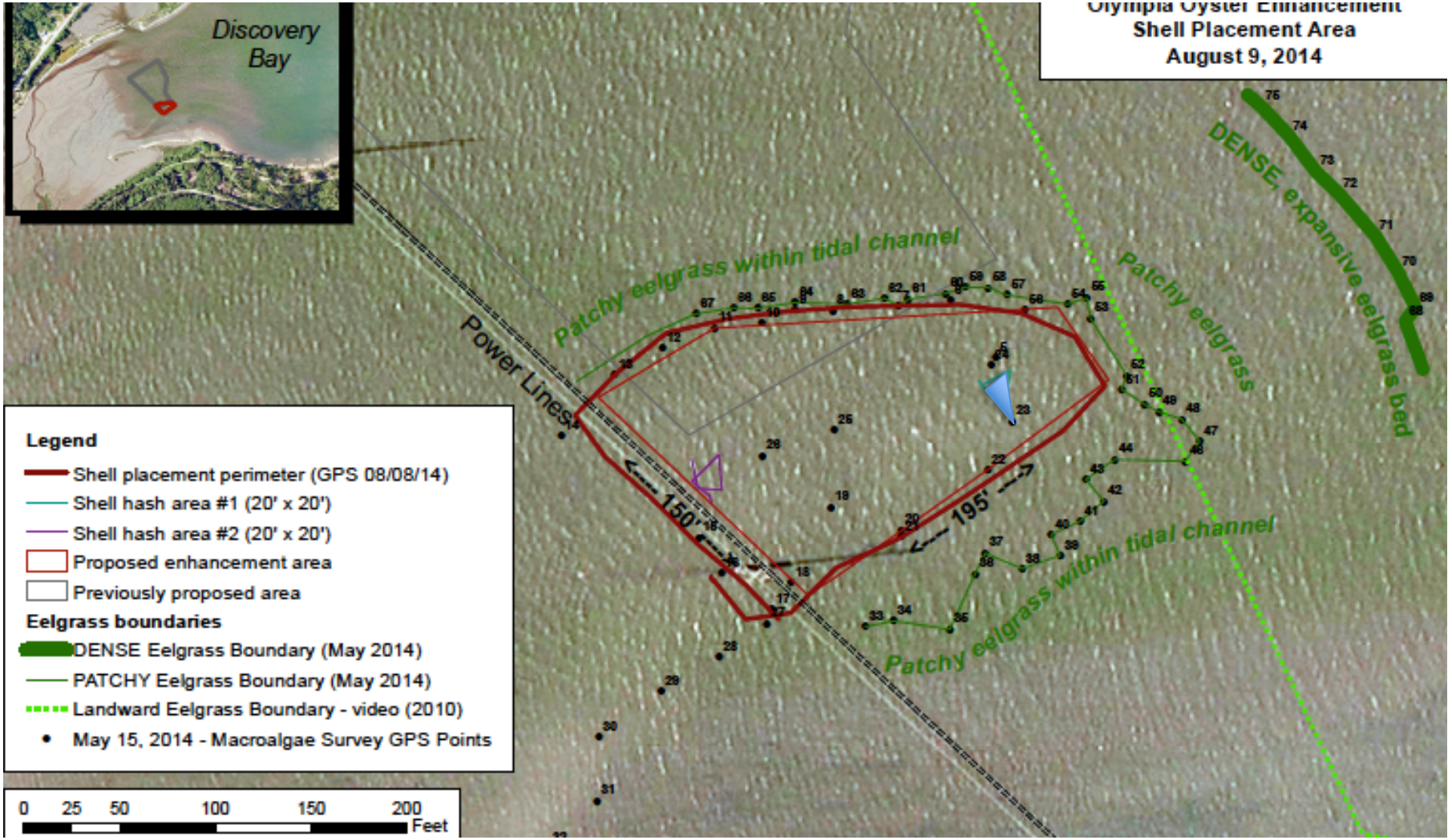
4. **Go to the next quadrat in that Transect.**

5. If you have more than 3 quadrats in a Transect, start another sheet and **be sure to note the Transect # at the top.**

6. If there are no shells with Olys anywhere in a quadrat, then add a tally mark to "# Quadrats with No Shell" box at the top of the data sheet.

7. Repeat for each quadrat in the Transect. When you get to the end of the Transect line, make sure you have recorded the End Point on the GPS.

8. **Start a new page for a new Transect.**


Discovery Bay
Olympia Oyster Enhancement
Shell Placement Area
August 9, 2014
Patchy eelgrass within tidal channel
Power Lines
Patchy eelgrass
DENSE, expansive eelgrass bed
150'
195'
Patchy eelgrass within tidal channel
Legend
Shell placement perimeter (GPS 08/08/14)
Shell hash area #1 (20' x 20')
Shell hash area #2 (20' x 20')
Proposed enhancement area
Previously proposed area
Eelgrass boundaries
DENSE Eelgrass Boundary (May 2014)
PATCHY Eelgrass Boundary (May 2014)
Landward Eelgrass Boundary - video (2010)
May 15, 2014 - Macroalgae Survey GPS Points
0 25 50 100 150 200
Feet