County: Jefferson
Grant No: SEANWS-2017-JeCoWS-00003

PROJECT TITLE: Jefferson County MRC Operations and Projects

DELIVERABLES FOR **TASK NO: 6 – Olympia Oysters**

T6.5 Olympia Oyster Summary Report

PROGRESS REPORT: [ ] FINAL REPORT [X]

PERIOD COVERED: July 1, 2018 – September 30, 2018

DATE ORIGINALLY SUBMITTED: Oct. 15, 2018

**** DATE of REVISED REPORT: Feb. 15, 2019.**

See also T6.5A for copies of Olympia Oyster permits for upcoming Discovery Bay deployment

**This report contains corrections due to errors in data entry and calculations. It also revises the discussion of comparisons of 2017 and 2018 data in Discovery Bay.

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2018 Olympia Oyster Survey Data & Summary Report (Discovery and Quilcene Bays)

Olympia Oyster Task 6.5

This Report includes summaries of Olympia oyster monitoring and enhancement activities at Discovery and Quilcene Bays, including monitoring summaries, data collected at both sites, photos and media articles. Copies of agency permits for the Discovery Bay 'Lagoon Site" where we will be placing additional shell in 2019 is under separate cover as Task 6.5A deliverable.

DISCOVERY BAY

Background

Discovery Bay has a small natural Olympia oyster population near the southeast portion of the bay (Maynard Beach area), along with scattered occurrences of Olympia oysters in other areas of the Bay. The MRC's goal is to collaborate with WDFW and Jamestown S'Klallam Tribe (Co-Managers) to enhance and expand the main population by increasing appropriate, available substrate (clean cultch spread on tidelands) in nearby areas to facilitate natural recruitment. We started this particular project in 2014 with distribution of clean shell within a half-acre area out in the bay ("Powerline Site"), surrounded by eelgrass. In July 2016 volunteers dispersed an additional 80 bags of clean cultch over the Powerline Site, just a month before our annual 2016 monitoring. No additional cultch was added in 2017 or 2018.

In 2017 we decided that adding additional clean cultch to the area immediately adjacent to the established population would allow additional recruitment and expansion of that segment of the population. In 2018 we completed the process of applying for and receiving all the necessary agency permits to add additional cultch adjacent to the main population, in the area we are calling the "Lagoon Site". Copies of all the permits are included in Deliverable 6.5A, submitted separately.

Annual monitoring took place on **July 13, 2018**, with 7 volunteers and one MRC staff. Monitoring data has been compiled and is summarized in this report.

Shells Stacks: On May 29, 2018 we placed 3 shell stacks for the Puget Sound Restoration Fund (PSRF) at the Discovery Bay Powerline site and collected those stacks on September 6, 2018. PSRF uses this technique to compare recruitment rates from various sites around Puget Sound. Shell stacks were delivered to PSRF for their staff to process and collect data.

Monitoring Results for Discovery Bay

Table 1 provides a summary of the last 4 years of monitoring. Spat numbers and size measurements should give us an indication of success by showing the presence of natural recruitment, multiple age classes and changes in average spat sizes. Monitoring protocols were adjusted and refined in the first 2 years: in 2015 and 2016, spat height was only measured as greater than or less than 15 mm (a rough estimate of reproductive maturity). The addition of new shell in July 2016 (a month before monitoring) made it even more difficult to directly compare data from 2015-16 with 2017-18 data.

In 2017, Jefferson MRC began collecting data in a way that more closely aligns with regional Olympia oyster recovery efforts by measuring actual spat height. We also shifted the orientation of the transects and added a transect immediately south of the powerlines to capture more of the Olympia oysters on shell that we assumed was moved there by wave action, as very little shell substrate was present on or immediately adjacent to that area before the MRC began this project. We compared 2017 and 2018 data since we used the same protocols for both. In 2018, we also upgraded our database organization, using pivot tables in Excel, which will allow us to create a wider range of reports as we continue annual monitoring.

Table 1: Summary of Discovery Bay Data from 2015-2018

Data Collected	2015	2016	2017	2018
# of ¼m^2 quadrats monitored	43	46	48	77
Q Area Monitored (m^2)	10.75	11.5	12	19.25
Average # spat/ m^2	--	--	49	38
Average % cultch shell cover per quadrat	5%	7%	12.4%	17.9%
Total # spat counted	215	83	592	732
Average size of spat (mm)	--	--	32.60	33.92

In 2018, we had more time to monitor (lower tides) and a larger volunteer team than in 2017, so we were able to measure a total of 732 spat from 77 quadrats (19.25 m^2) compared to 595 spat from 48 quadrats (12 m^2) in 2017. When we looked spat size measurements, we observed that the range of spat sizes observed in 2018 (5 to 66 mm) was similar to the range of 2017 spat sizes (4 to 75 mm [& one outlier shell recorded as 112 mm]. This wide range of multi-age classes supports our assumption that natural recruitment is continuing to occur over sequential years.

The average size of spat increased slightly in 2018 compared to 2017, from 32.60 to 33.92, however the average density (number of spat/m^2) of our quadrats decreased from 49 to 38. We will need several more years of data to observe trends and consider if this is significant over the long term.

Table 2 and Table 3 below provides specific data about individual transects for 2017 and 2018.

Table 2: 2017 Discovery Bay Monitoring Data

Transect #	Total # Quad	Q-Area monitored (m^2)	# Spat	Avg Length (mm)
1	10	2.5	73	41.6
2	9	2.25	102	39.5
3	8	2	78	33.9
4	6	1.5	34	34.8
5	5	1.25	11	17.4
6	5	1.25	14	19.2
T-A	5	1.25	280	41.8
2017 Totals	48	**12**	**592**	**32.60**

Table 3: 2018 Discovery Bay Monitoring Data

Transect #	Total # Quad	Q-Area monitored (m^2)	# Spat	Avg Length (mm)
1	6	1.5	117	31.53
2	9	2.25	31	31.19
3	7	1.75	145	32.98
4	7	1.75	109	35.26
5	9	2.25	120	39.61
6	7	1.75	54	36.09
7	4	1	31	35.19
8	5	1.25	9	37.11
9	5	1.25	19	20.16
10	4	1	15	29.93
11	4	1	36	25.03
12	4	1	1	50.00
T-A	6	1.5	45	36.91
2018 Totals	**77**	**19.25**	**732**	**33.92**

Documentation: Original data forms are stored at the MRC office, scanned copies are saved in electronic files, and data is entered in an Excel database. Shell stack data reporting forms are stored at the MRC office, scanned and also sent to PSRF. The MRC does not maintain a database for the shell stack data or do any comparisons from year to year. Bridget Gregg compiled the 2018 Discovery Bay data collected by the MRC monitoring team.

Discovery Bay Recommendations for 2019

Continue monitoring using the same protocols, with perhaps some tweaking of the data sheets to allow for easier data entry. Due to the uneven distribution of the shell within the original project area, it would be useful to measure the actual area of cultch observed each year, including south of the powerlines and see how it changes over time. It could be a challenge to determine this "boundary", since the cultch was often hidden under a thin layer of green macro-algae (temporarily removed when collecting data in a quadrat) in some areas in 2017 and 2018. Also, it would be difficult to see how much cultch has moved into adjacent eelgrass beds without disturbing the eelgrass.

QUILCENE BAY

Quilcene Bay is the Jefferson MRC's second Olympia Oyster project site. Our goal here is to test feasibility of re-establishing a healthy population of Olympia oysters in Quilcene Bay. Scattered Olympias are present along much of the bay's beaches in the low-tide areas (observed during a May reconnaissance survey with Puget Sound Restoration Fund staff), but there are no dense beds of Olympia present. The MRC test plots are on WDFW tidelands adjacent to commercial clam beds on the southwest side of Quilcene Bay. Access is from the WDFW Quilcene Bay Tidelands access at the Linger Longer Rd parking lot. The project is a collaboration with WDFW, Tribal Co-Managers and the MRC. The MRC serves as team facilitator, coordinates volunteers, arranges for donated and purchased seeded cultch (Hood Canal genotype), and manages the database. In addition to our work, Puget Sound Restoration Fund (PSRF) also has an Olympia oyster site on the east side of Quilcene Bay. We established test beds to allow us to figure out if environmental conditions (water temperatures, adjacent uses and predators such as oyster drills) are a problem before investing in larger scale enhancement work in an area that historically had a large population of Olympia oysters.

We began in 2016 by placing already set wild-seeded Olympia oyster cultch (set near Dosewallips by Taylor Shellfish Farms) from 11 bags into 5 small plots. Initial results from the 2017 monitoring of the 2016 seeded cultch were encouraging, so we set out another 78 bags of

PSRF hatchery-seeded, overwintered cultch in May 2017 over the 2016 seeded cultch in the same plots.

On May 18, 2018, we monitored those same 5 plots with 11 volunteers and 4 staff from the MRC, WDFW and Jamestown S'Klallam Tribe. See Table 4 below for 2018 monitoring results. Table 5 shows the baseline measurements of the May 2017 PSRF seeded cultch sampled from the bags, before the cultch was spread into the plots.

Overall, we were disappointed in the survival rate for the number of spat placed in the plots (average number of spat/shell dropped from **5.64 spat/shell** when first set out in 2017 to **1.68 spat/shell** the following year. Average spat also decreased in average size from **19.81 to 17.88 mm**). A wide range of age classes was present in both the 2017 seeded cultch in the bags (5 to 35 mm) and the 2018 test plot spat (6 mm to 33 mm). We decided that it would be useful to test a new area at a lower tidal elevation and further away from the shellfish growing areas to see if survival rates are higher in a different location. (See below.) Both sets of test plots will be monitored in 2019.

Table 4: <u>2018</u> Spat Quantity & Size in the 2017 Quilcene Bay Test Plots

Summary of 2018 Spat # and Size from 2017 Quilcene Test Plots						
	Plot 1	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**	**TOTALS**
Avg Spat Size/Plot	19.51	17.05	15.33	18.57	18.95	**17.88**
Avg # spat/shell	1.56	1.36	1.63	2.00	1.87	**1.68**
# of spat measured	161	98	83	126	174	**642**
Min. # quadrats*	10	6	8	11	8	**43**
Max # quadrats*	13	6	8	11	13	**51**

** The number of quadrats reported on the field sheets was sometimes unclear, so we aren't quite sure how many quadrats were sampled. Spat measurements and total number of spat counted were clear.*

Table 5: Baseline data of seeded cultch from 2017 Quilcene Bay bags

SUMMARY of Spat # and Size from 2017 Cultch Bag Sampling Before Spreading							
	Plot 1	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**	**3 sm bags***	**All Plots**
Avg Spat Size/Plot	20.24	19.74	17.86	19.52	20.13	21.37	**19.81**
Avg # spat/shell	5.22	4.9	3.98	6.04	4.58	9.1	**5.64**
# of spat measured	100	100	100	100	100	20	**520**

** 3 small bags of shell were counted separately, then dispersed into plots*

Shells Stacks: On May 18, 2018 we placed 3 shell stacks for the Puget Sound Restoration Fund (PSRF) at the Quilcene Bay Powerline site and collected those stacks on October 5, 2018. PSRF uses this technique to compare recruitment rates from various sites around Puget Sound. Collected stacks were sent to PSRF for data collection and analysis.

2018 Deployment of Seeded Cultch into New Quilcene Bay Test Plots

On August 11, 2018, 9 volunteers and one MRC staff collected baseline data from 75 bags of wild-seeded cultch from Taylor Shellfish Farms (Dosewallips) and spread them in 3 test plots in a new area southeast of the original five test plots. Taylor Shellfish provided the cultch with an approved WDFW Transfer Permit (50 bags were purchased; 25 bags were donated) and arranged for delivery to the site by boat. WDFW and MRC staff marked the site on August 9th with a buoy marker placed at low tide and GPS coordinates, so Taylor Shellfish could deliver them to the right location at high tide on August 10th.

Protocols for sampling are included in the attachments. Basically, we counted the number of spat per shell from a random sampling of 60 shells (10 shells/cultch bag from 6 bags) to get an average # of spat/shell. We also measured the height of 100 Olympia oysters on random shell from those same bags. Table 6 summarizes the baseline data.

Table 6: Summary of Spat # and Size from 2018 Cultch in New Test Plots

Summary of Spat # and Size from 2018 Cultch in New Test Plots				
	Plot 2018-1	**Plot 2018-2**	**Plot 2018-3**	**All Plots**
Avg Spat size/Plot	23.33	23.23	23.86	23.47
Avg # spat/shell	2.43	2.92	2.75	2.70
# of spat measured	100	100	100	300

Quilcene Bay Next Steps

- Revise data sheets to make them easier for volunteers to use, easier for data entry, and check if they can also be more consistent with other regional efforts.
- Invest in improvements to database so it can be more useful, such as creating pivot tables like we're doing for Discovery Bay.
- Plan for better training of volunteers who are entering the data in the field.

- Plan for the new challenge of having 2 different sets of test plots to be monitored in 2019.
- The MRC has no plans for adding new seeded cultch to any of the test plots in 2019.

The MRC also assisted four Puget Sound Restoration Fund and WDFW staff with a reconnaissance survey of lower Quilcene Bay shorelines on May 16, 2018. MRC recruited 7 volunteers who worked with agency staff in four teams to walk various sections of shoreline, taking photos and notes along the way. Volunteers donated over 38 hours for this effort. Sign-in sheets and few photos are included below.

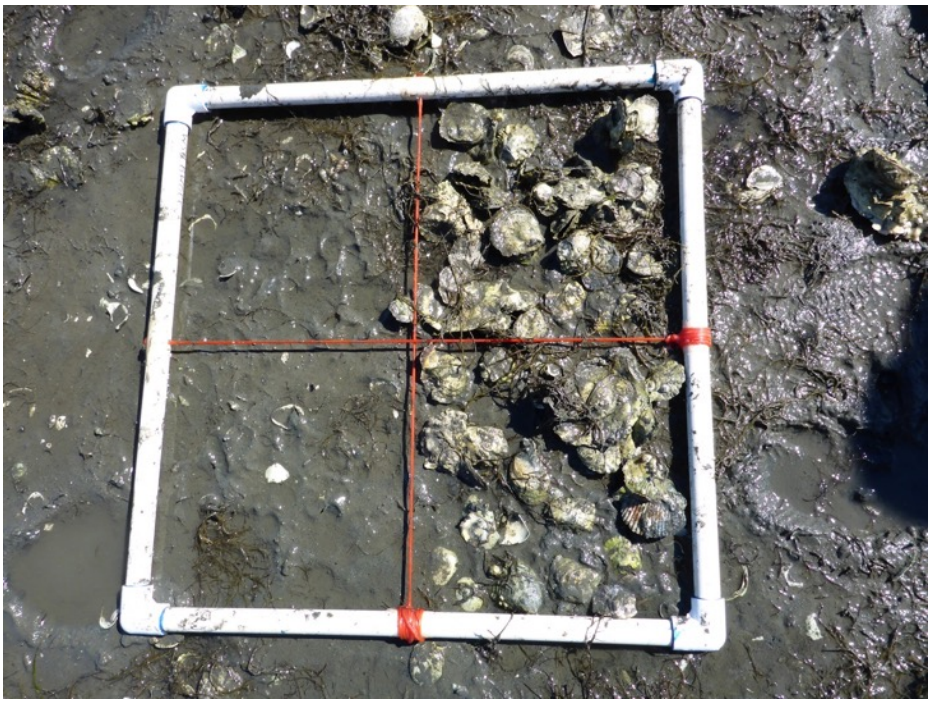
Attached:

- Photos. *All photos by Cheryl Lowe unless otherwise noted.*
- Media & Outreach: *Article in Port Townsend Leader about Quilcene Bay Olympia oysters*
- Protocols
- Data Sheets

DISCOVERY BAY PHOTOS

Monitoring the Powerline Site: L to R, Greg Patton, Frank Handler, Neil Harrington, Shelley Patton, Kathy Woods-Smith, Jed Marshall, Glenn Hartmann.

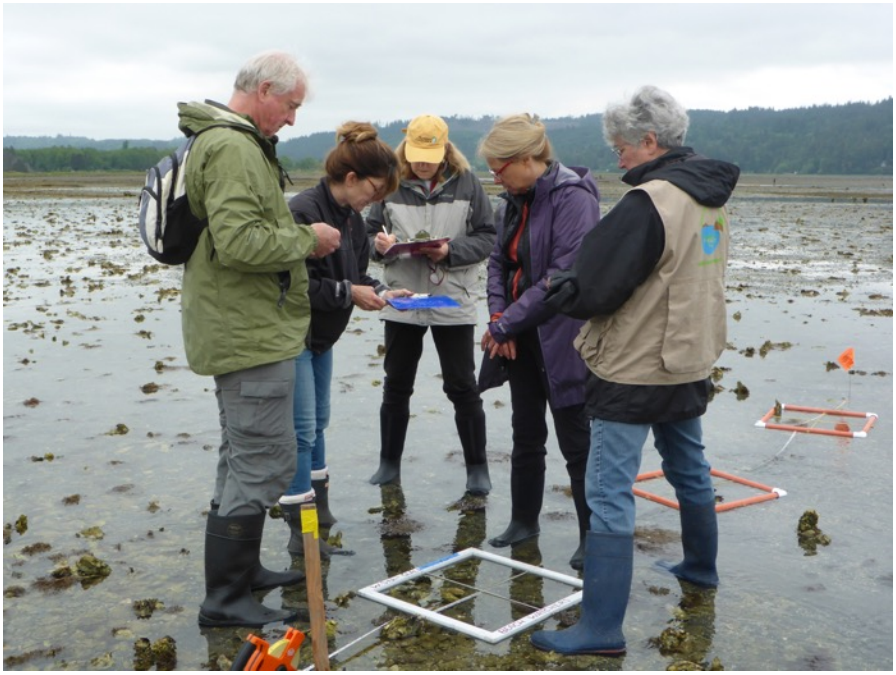
Healthy Olympia oysters at the Powerline Site.



Sample quadrat with 50% shell coverage (protocols call for rearranging shell within quadrat in order to estimate coverage)

Broader view of Powerline Site, with pink flags marking shell stacks.

QUILCENE BAY PHOTOS



Oly Plot Monitoring_5.18.18: L-R, Gregg & Shelley Patton, Becky Brown-Nienow, Nancy Stevens, Jackie Gardner

Monitoring Team for new test plots (baseline data) Aug2018_P1040447: L-R, Sarah Fisken, Anne Seeley, Sarah Whitten, Kathy Woods-Smith, Shelley & Gregg Patton, Frank Handler, Kathy & Glenn Hartmann.

Getting ready to spread cultch from bags at new test plots_Aug2018_P1040454

PSRF Olympia oyster Quilcene Bay Reconnaissance May 16, 2018 with Chris Eardley & Betsy Peabody.

Olympia Oyster Monitoring Protocols--Discovery Bay 2018
Jefferson County Marine Resources Committee

July 13, 2018 ***(field notes in italics, updated after monitoring)***

Basic protocols approved by WDFW Shellfish Biologist Brady Blake, August 2015.

NOTE: **May 29, 2018**
Three shell stacks placed today at Powerline project site. 47.995170, -122.877619. North of the 3rd powerpole (incl first one on land). About 30 ft north of 3rd pole. Cheryl + Bridget Gregg.

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 measures—3 tapes for 3 teams
- camera for quadrat pix & people pix
- 3 sets of data sheets (on waterproof paper), pencils, clipboards **(*NOTE: 25 data sheets, with 4 blank pages not used).***
- Stakes or pin flags to mark transect start, end and quadrat centers. Wooden stakes & flags & flagging tape
- Flagging and 20 wire flags
- Volunteer sign-in forms
- Safety review & first aid kit
- Gloves
- Mudboots
- Rulers with mm measure—4 sets or calipers?
- 4 5-gal buckets
- collect shell stacks? (in August)
- Snacks
- Compass or functioning GPS compass

Random numbers for July 13, 2018: **9, 3, 2, 3, 7, 1, 8,5,1,9,7,6**

GPS Reference Point for project area: Δ = 3-pole wood powerline tower
GPS = Δ 47° 59.702'N and 122° 52.668'W ±16 ft

2018: Minus 3.1' tide predicted at 10:20 am that day. Volunteers met at 8:30 am at Hwy 101 DFW parking lot. Monitoring actually started at 9:30am and went until 12

noon when we finished. Approximate tide ht at that time was -1.7 ft. Eight volunteers in 2 - 3 teams did the monitoring. One volunteer collected all the GPS points once the transects were laid out and recorded numbers in a field notebook. These were recorded as degrees, minutes.seconds. These figures were converted to decimal degrees and transferred to the data sheets later. Best to instruct GPS volunteer to set their device to decimal degrees at the start.

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 2018 we will add one transect parallel to and 9 paces south of the Powerline,

1. Use the Powerlines as the guidelines for the South boundary of the plot (it's actually SW edge). *NOTE: due to orientation, baseline was 20 degrees NE to allow more accurately follow the edge of the plot and visible shell. Transect lines were laid out parallel to the Powerlines for ease of orientation.*

2. Beginning at approximately the SE end of the Powerlines pole (GPS = Δ 47° 59.702'N and 122° 52.668'W ±16 ft), Walk **South 9 paces** and mark the start of the Transect #1 with a stake. *R**ecord all GPS end points of all transects once they are marked.** These were then transferred to the first page of the data sheets for each transect from the field notebook.*

3. Go back to the Powerline SE end (GPS lat-long: *Δ noted above*), 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, except Transect #1.

4. Walk **3** [random number above] of paces in a N direction along the N-S Baseline to beginning point of Transect 2. Mark with a stake for beginning of Transect #2. *One person recorded GPS end points of all transects once they were marked, as only one person had the GPS).*

5. *All subsequent transects are parallel to the powerlines and 7 paces north of the Transect 2.*

6. Walk ***7*** more paces along the Baseline and mark beginning of transect #3 (using stakes or wire flags).
7. *Repeat for each additional parallel transect until very little shell is seen on the ground at the north end of the project area.*

NOTE: In 2017 we ran short on time when we had transects 5 paces apart and decided to record data from more widely spaced transect to get a better idea of distribution. We skipped a couple of Transects and then collected more quadrats data. In 2018 we

had plenty of time with more team members and 7 paces between transects. Also, the low tide was -3.1 ft MLLW.

8. 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. *(13 transects in total. We had more time after doing transect 12 at the end of the shell area, so added Transect 1A along the powerlines),* ***Again, see GPS points in field notebook.***

9. **Go back to the East starting point** of Transect #1 and **walk 2 [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, with each quadrat 5 paces apart.

10. Repeat for each transect, starting at:
    - **3 paces for #2**
    - **7 paces for #3**
    - **1 paces for #4**
    - ***repeat this pattern of (random) paces using random numbers list on first page, to start placement of the first quadrat along each transect, keeping all the other quadrat spacing at 5 paces apart.***

Quadrat Instructions

1. For each quadrat, you will
    a. Find all shell and put them in one quarter quadrat 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*. A few photos were taken in 2018 for illustration. In 2017, 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 altogether.*)

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

3. Move all the shell into one or two quarter sections of the quadrat 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, *or place it outside the quadrat frame so you don't count it twice.*

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 in 2017 and 2018*.)

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

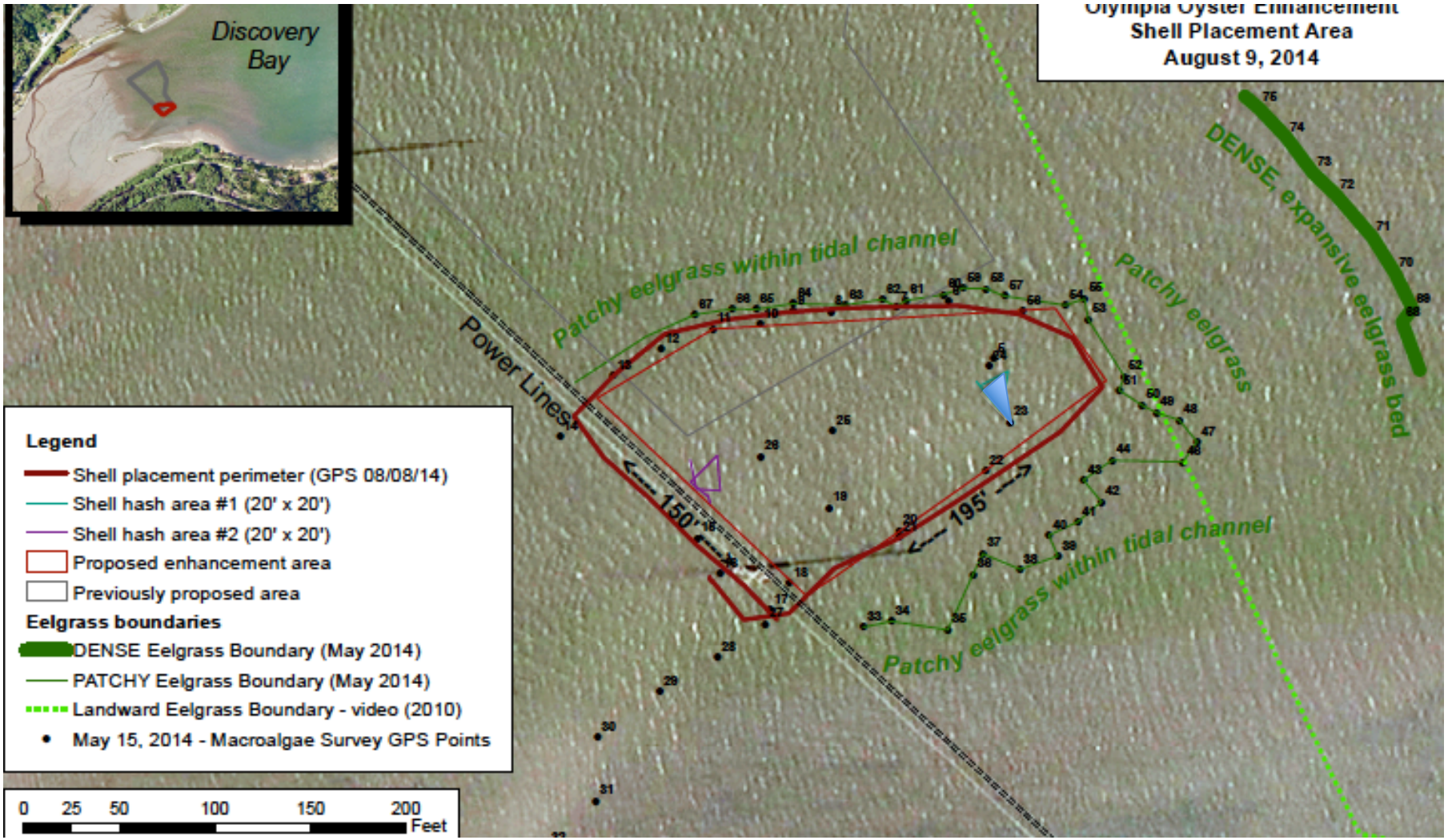
5. If you have more than 3 quadrats in a Transect, start another sheet and **be sure to note the Transect # at the top.**

6. *Clearly note on data sheet when you start a new quadrat, and also when you start a new transect.*

7. 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.

8. 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.

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

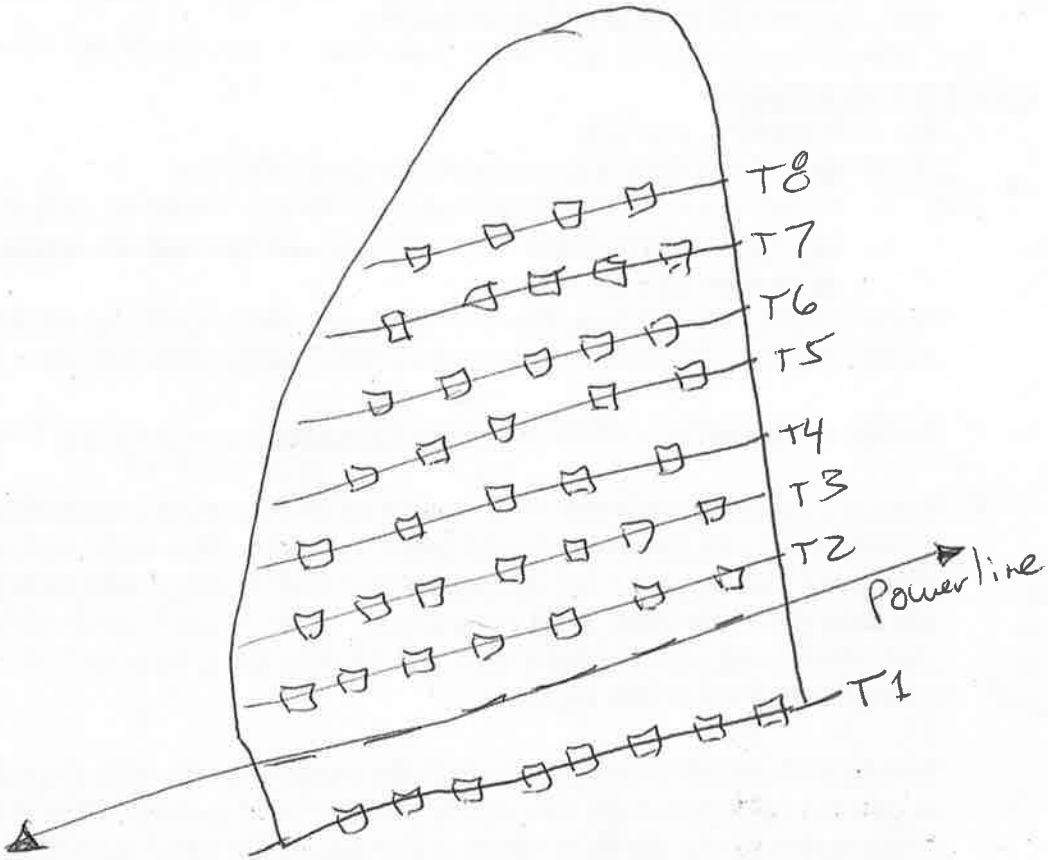

Olympia Oyster Enhancement
Shell Placement Area
August 9, 2014
Discovery Bay
Power Lines
Patchy eelgrass within tidal channel
Patchy eelgrass
DENSE, expansive eelgrass bed
Patchy eelgrass within tidal channel
150'
195'
Legend
Shell placement perimeter (GPS 08/08/14)
Shell hash area #1 (20' x 20')
Shell 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

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. Clearly note on data sheet when the new quadrat starts & when you are in a new transect.
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.**

SKETCH



Olympia Oyster Monitoring Test PLOTS--Quilcene Bay 2018
Jefferson County Marine Resources Committee
May 18, 2018

Protocols described below are similar to 2017, with minor changes. Updates in italics, based on field notes.

Goal:
To monitor oyster spat survival of wild-seeded cultch that were placed in 5 test plots in May 2016 & 2017 in Quilcene Bay. For more details about initial work, see Jefferson MRC's Olympia oyster project report and maps from 2017.

Equipment:
- GPS *(Chris Eardley will bring this in 2018)*
- notebook for writing notes
- 100' tape measure
- camera for (optional) quadrat pix
- data sheets (on waterproof paper)
- pencils & clipboards
- Stakes with painted tip or pink duct tape
- 20 wire flags to mark points and/or quadrat locations
- ~~materials for temp buoy for boat delivery~~ *2018 cultch placed in July 2018*
- NWSF Volunteer sign-in forms
- Be sure to do safety talk and safe access route to project area
- Shell stacks (1 set) labeled
- Discover Pass
- Buckets & gloves
- Snacks

2017 GPS locations for Test Plots—*Same for 2018*

Test Plot #1
N47.80806, W122.86204

Test Plot #2
N47.80796, W122.86237

Test Plot #3
N47.80784, W122.86278

Test Plot #4
N47.80767, W122.86319

Test Plot #5
N47.80779, W122.86340

2018 Participants:
Jackie Gardner
Frank Handler
Kathy Hartman
Glenn Hartman
Nancy Stevens
Brady Blake
Cheryl Lowe
Chris Eardley
Barbara Heiner
Neil Harrington
Marilyn Chadwell
Bridget Gregg
Shelley Patton
Greg Patton
Becky Brown-Nienow

Compass directions (from www.Randomnumbergenerator.com) to bisect the circle:
53, 10, 66, 70, 30, 17, 155, 115, 92

Protocols:

Overview: Test plots are circles. We use 4 radius transects and random placement of quadrats along each transect. Each radius transect is 20 ft long, with (5) ½ meter quadrats per transect. We use random numbers to generate a compass direction when standing at the center of the circular plot (clockwise from magnetic north) to locate the first transect in each plot. Then other 3 transects are 90° clockwise from that.

1. Install a new stake at the center of each test plot. Confirm GPS coordinates and/or record new GPS coordinates on the data sheet.

2. From the center point of the **first plot**, face **53° NE** and place a wire flag at 20' from center. Lay measuring tape to mark transect. The first placement is determined by a random number between 0 and 4 (volunteer will call out the first number that comes to their head); place the first quadrat at that point. Then place the remaining 4 quadrat frames per transect 4 ft apart. (Example: If 2 is the random number, quadrats were placed at 2', 6', 10', 14' and 18' along the transect.)

3. Then repeat at 90 degrees rotation from that first transect for another 3 transects to finish the plot.

4. For each quadrat, you will

a. Count the number of Oly spat on each shell in the quadrat.
b. Measure and record the size of each spat found on each shell piece
c. (More details in next section)

5. **<u>Second Plot</u>:** Face **10° NE** and repeat the process above.

6. **<u>Third Plot:</u>** Face **66° NE** and repeat the process above.

7. **<u>Fourth Plot</u>**: Face **70° NE** and repeat the process above.

8. **<u>Fifth Plot:</u>** Face **30° NE** and repeat the process above.

Notes: **from 2018 Plot Monitoring**
<u>PLOTS</u>: We started monitoring with #4 and #5, then jumped to far end (#1 and #3) and ended with #2, when the tide was coming in. Monitoring started at parking lot at 11:30 am, first plots started at 12:30 pm, and the last plot was started at 2 pm. Back at parking lot at 3:30 pm.

<u>Data Sheets</u>: Several teams. Need to do a training before going out, to make sure it is clear how to fill out data sheets. Kathy Woods-Smith, Bridget Gregg and Cheryl should rethink the data sheets and redesign them to make them easier to fill out and to read afterwards, driven by what data we really want to know.

<u>Specific Data Sheet Quadrat Instructions</u>

1. Record the date, team member names, Test Plot #, lat/long for each plot, and start time for monitoring each test plot. Start a new section for each new quadrat (you should have 20 quadrat data sections completed for each plot). (Photos of quadrats are not required, since we are not measuring percent cover.)

2. <u>Which shells to be counted?</u> On 2 sides of the square, include any shells that are touching or under the quadrat frame. Don't count any shells under the other 2 sides of the frame.

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. **Use a new column on the data sheet for each shell,** record sizes of all spat found on each shell. Once you have counted a shell, placed it on the ground in that first quarter section that was emptied so you don't count it twice.

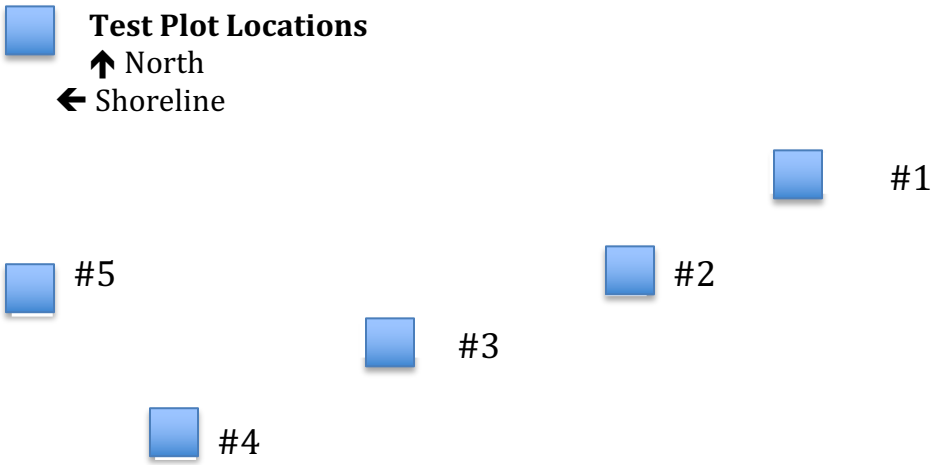
4. If there are more than 4 shells in a quadrat, or more than 8 spat on a shell, use the next section on the data sheet and clearly mark that it is a continuation of the same quadrat.

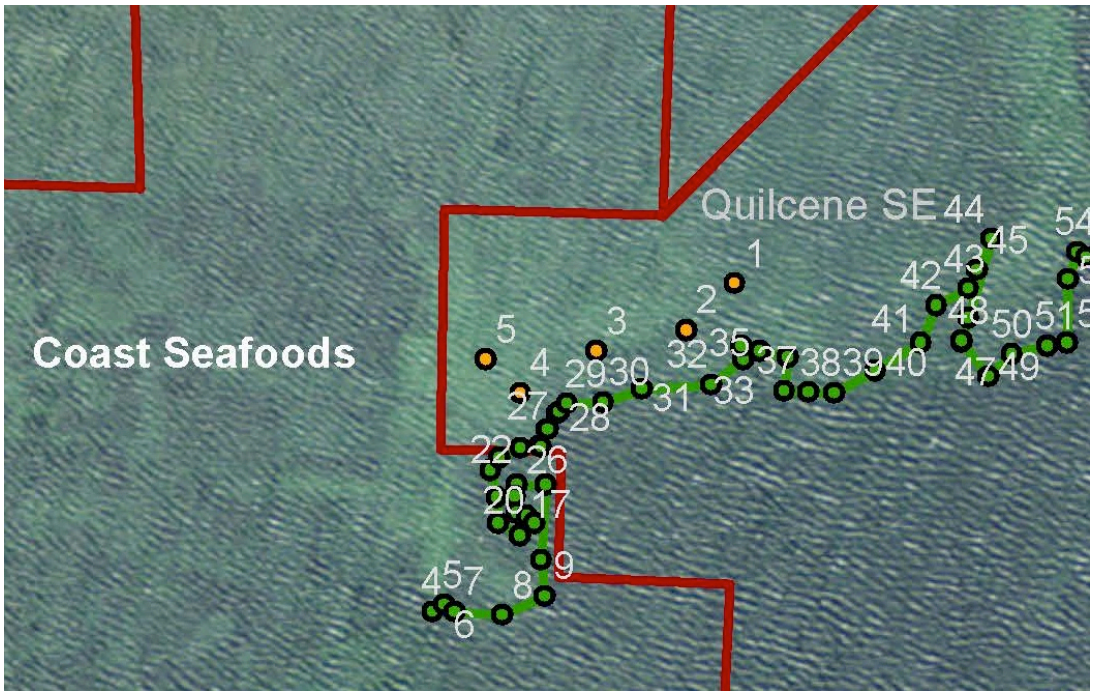
5. If there are no shells with Olys, then add a tally mark to “empty quadrats” cell near the top of the data sheet.

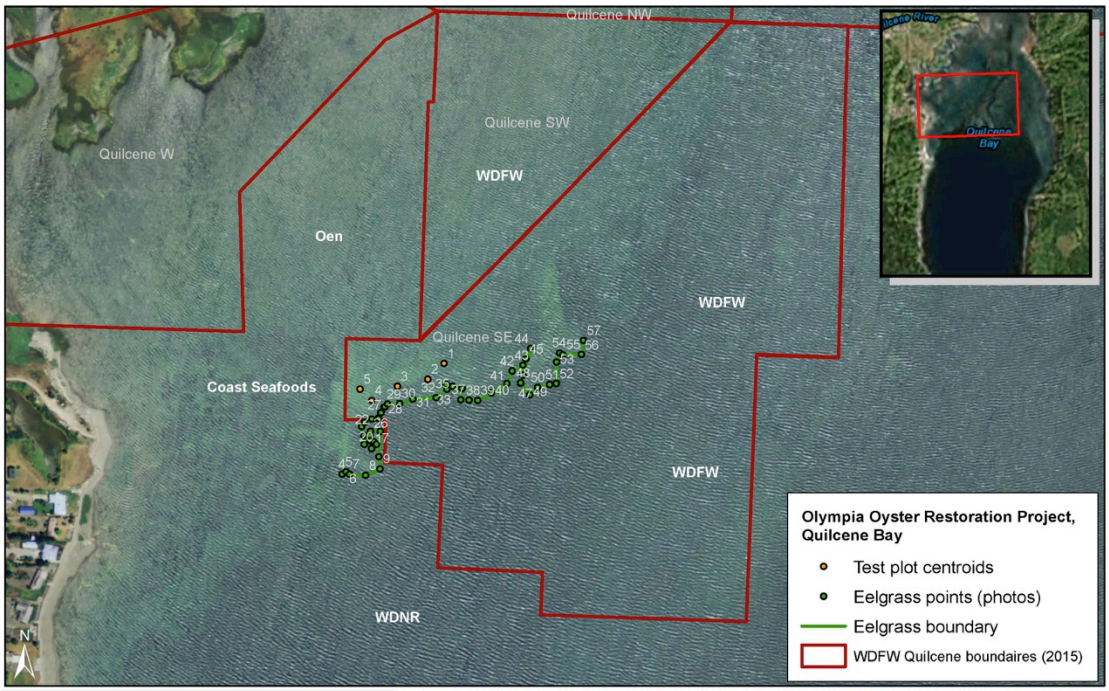
6. Repeat for each quadrat in each plot.

7. Repeat for each test plot.

Shell stack locations: Place 3 shell stacks and r*ecord GPS and notes for their location (relative to which plots) in notebook. Place approximately 15 ft apart. Shellstacks have QB on label.*







Corps Reference # NWS- Applicant: Jefferson County Marine Resources Committee Site address: n/a; tidelands in Quilcene, WA 0 205 410 820 1,230 Feet Map creation: C. Eardley, Skokomish Tribe; 01/15/16	Parcel owner/ID: Washington Department of Fish and Wildlife WDNR Aq. Pr. # 1937029/BIDN 270940 ("Quilcene Southeast") Adjacent property owners: WDFW (N, S, E); Oen (NW); Coast Seafoods (W); WDNR (S) See JARPA for full listing.	**Proposed Project:** **Olympia oyster Habitat enhancement** Survey data: 07/31/15 Tidal datum: Feet MLLW, Scale: 1: 5000 Coordinate datum: NAD 1983 Aerials: ESRI/DeLorme

2018 Protocols for Seeded Cultch Baseline & Field Notes

Quilcene Bay Olympia Oyster
Aug 11, 2018 Seeded Cultch Deployment (75 bags)
(with post-deployment updates)

Time and Location of Deployment for New Test Plots:
Meet at 9:30am at WDFW Indian George Creek beach access on Linger Longer Rd. Low tide is predicted to be -2.9 at 11:20 am*. Finished at 12:30 pm at parking lot. Verified NOAA low tide in Port Townsend was about 0.15 ft higher than predicted (predicted was -2.46. Actual was -2.30 at the Port Townsend gauge.)*

GPS locations for 2018 NEW Test Plots: *These are closer to the main channel and further south than the first set of test plot from 2 years ago. General area lat/long for buoy marker: 47.807607, -122.860907. All 3 plots still had 2-4" of water on them at lowest tide. Plot #2 was at the corner point, with Plot #1 approximately 30 paces to the East of #2, and Plot #3 being approximately 30 paces to the south of #2..*

Test Plot #2018-1: ***47.807552, 122.860508***

Test Plot #2018-2: ***47.807379, 122.860827***
NOTE: This plot was a slightly higher elevation than the other 2, based on amount of water covering the shells at 11:30 am)

Test Plot #2018-3: ***47.807362, 122.860825***

NOTE: *10 volunteers monitoring, which took 3 hrs of time. (9:30am – 12:30 pm, starting at DFW parking lot)*
Approximately 25 bags/plot placed this day.

Volunteers on Aug 11, 2018:
Frank Handler, Sarah Whitten, Anne Seeley, Kathy Woods-Smith, Kathy & Glenn Hartman, Greg & Shelley Pattoon, Sarah Fisken, Cheryl Lowe

Equipment:
- Volunteer sign-in (NWSF)
- Gloves (to protect from sharp shell edges)-*bring extras, emphasize to volunteers.*
- Mudboots-*mid-calf is not high enough for this location. Expect wet feet…At 10:30 am there was still about 6" of water while we dragged the bags to the plots.*
- Bring 3 stakes (15" stakes with orange painted tops or duct tape)/ Lat-long GPS data of test plot centers~~/hammer~~
- Tape measure (1) –only used to measure final diameter of plots once shell was distributed- *or pace it out*

- Calipers for measuring Olys (8)
- camera
- GPS (optional if centers already located)
- (6) 5-gal buckets *Add water to stabilize bucket from floating in water, or stack 'dry buckets' on top* of others.
- 2 sets of data sheets on waterproof paper (8 copies of blank for each type of data sheet) –*printed 3 sheets of each—one of each type of data sheet for each plot*
- clip-boards—*bring 4 so there are 2 clipboards per team. Also binder clips to hold down blowing paper, or metal data box clipboards.*
- pencils
- Rite in the Rain Notebook
- Cookies
- Discover Pass
- First Aid Kit *with extra bandaids and water to rinse cuts first*
- 2-3 knives or sharp blades to cut bags open *better to have 4-5 so volunteers can cut shell from netting as they spread it. Shells grew into bags since they were older.*
- Map of site with reference points such as property corners marked with tall white pvc pipe) *Very useful to have JSK orange buoy and rope with screw anchor from day before, since there was still water over the site when we arrived. Also very helpful to Gordon with boat delivery.*

Overview

We will take baseline info for number and size of overwintered seeded cultch (Taylor shellfish) for each test plot then spread out the cultch in the plots. *(Bags were from wild-seeded cultch from Dosewallips (John Adams), donated by Taylor Shellfish, and kept at Dosewallips Taylor Shellfish hatchery from June 2017- Aug 2018.)*

Agenda for the day.

1. Volunteer sign-in at parking lot.
2. Safety review and goals for the day.
3. Walk out to site.
4. Put a new stake at each of 3 test plot locations:
   - *one plot just SE of buoy marker*
   - *30 paces east of buoy anchor*
   - *30 paces south of buoy anchor*
5. Take new GPS coordinates for all 3 stakes.
6. Record GPS lat-long data and time on data sheets.
7. Place 25 bags near the center of each of the test plots, next to the stakes.
8. See instructions below for monitoring protocols.

NOTES on TEAM ASSIGNMENTS: Once bags are moved to the site, one person cut open 6 randomly selected bags. One team member puts a handful of sub-samples from all the cut bags into one bucket before the counting team arrives at that plot.

In 2018, each team had 1-2 recorders and 3-4 people total. Volunteers were counting # per shell or measuring Olys and calling them out the recorders name, then, specifying info was for shell # or size.

- *SPAT COUNT monitors measured how many spat are on each shell, up to 60 sample shells (average of 10 shells/sampled bag). Sometimes needed to grab a few more random shells to finish the page of data.*
- *A second team (SPAT SIZE monitors) measured and recorded size of spat from the same batch/bucket until they reached 100 measured Olys.*

We cut the rest of the bags and spread out the shell at the end of the monitoring, so we knew we had finished the data collection first. Remember that it takes some time to empty the bags as some shells had grown around the netting mesh. Extra knives were handy for this part.

At each PLOT:

1. Cut open 6 bags. Grab 10 oyster shells from various locations in each bag (outside edge, inside, left, right and center) and place them in a 5-gallon bucket. Mix them up a little.
2. Take out 60 shells and count all the Olympia oysters ~~and Pacific oysters~~ on each shell on both sides. *It was too difficult for volunteers, without shellfish experts assisting, to distinguish Pacifics from Olympias when they are small. Some volunteers did record Pacifics, but Cheryl Lowe thinks we should disregard these numbers which are not consistent from team to team. With wild-seeded cultch, there were also small limpets, and other bivalves on the cultch.* Record numbers on **SPAT COUNT data sheet**. Once counted, put in a second bucket or pile.
3. A second team will then measure 100 Olympia oysters on randomly selected shells from the second bucket or pile and record height on **SIZE of SPAT data sheet**. *Sometimes a monitor counted # of spat, then used the same shell to measure lengths and fed the data to the appropriate reporter.* ***There are separate tally sheets for each plot****, but you can use the same data sheet within a plot.)*
4. Spread all the shells at that plot in a fairly dense distribution, starting at the center and keeping the distribution in a rough circle shape *(diameter of plots ranged from 25-35 ft, depending on who spread the shell there. We allowed for some mud visible between shells.*
5. Repeat at the other 2 plots.

We did not count the number of shells/bag, but assume an average number is 250-300 shells/bag.

NOTES:
NOTES: These are new test plots at lower tidal elevation. May need to use pins or hooks to hold quadrats next year so they don't float when monitoring. For this year, take notes on when tide is coming into new site. Plots are around -2.9 or -3.0 MLLW, since there was still water on the site at lowest tide. Overcast day and winds from the South.

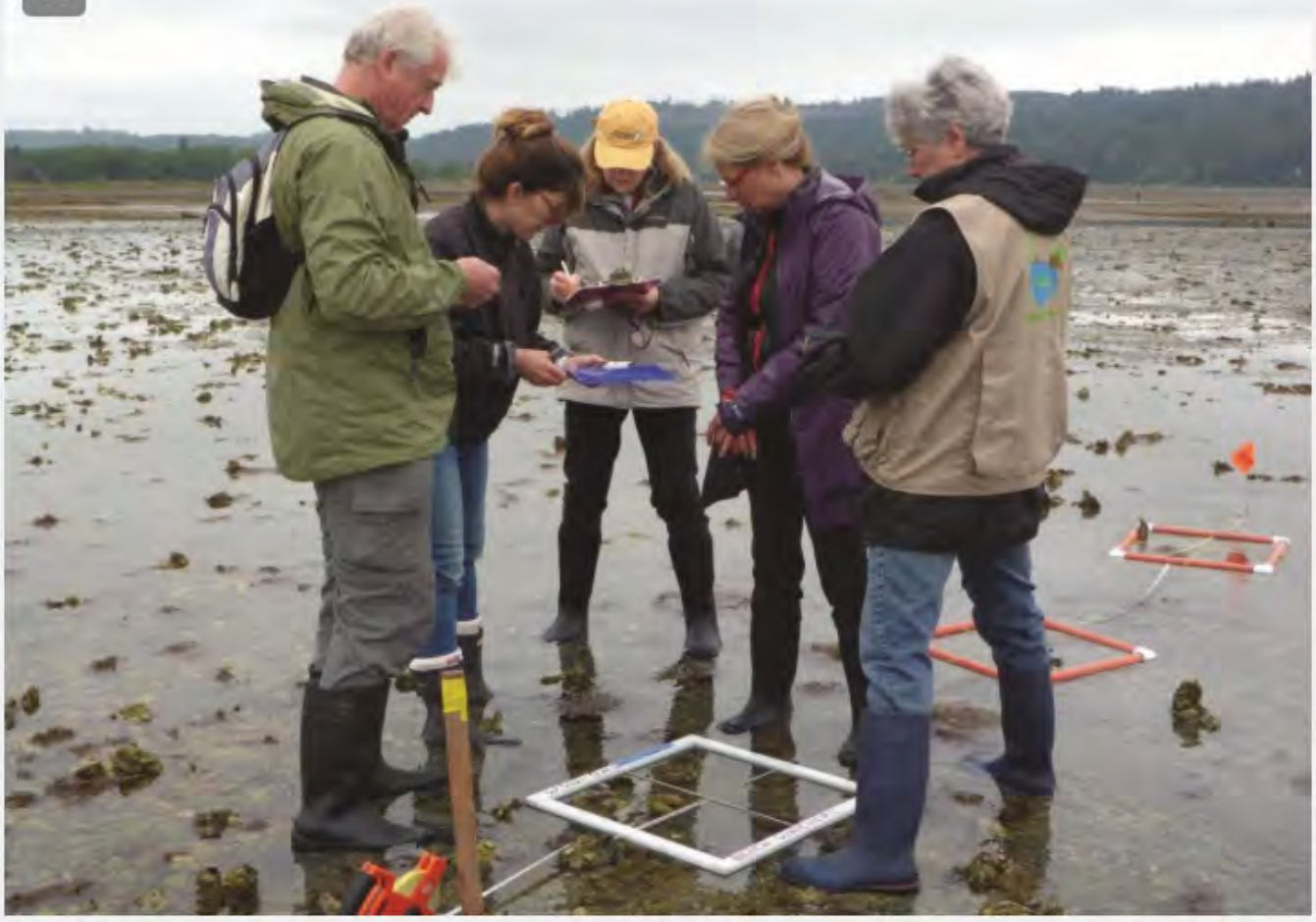
WDFW standard protocols use mm for biological measurements, but measure tideland lengths in feet, so we used the same standards.
2016: 5 ft radius = 7.3 sq meters (= 78.5 sq ft)
2017: 7 ft radius (new distribution) = 154 sq ft

2018—we were out Aug 9th before shell bags were delivered (Aug 10th) and installed a temporary buoy tied to a stake small screw anchor near where the next day's shell should be dropped. The buoy seemed to work well for getting the new bags in the right place, but the GPS coordinates helped locate the buoy. NOTE: Google Maps does not locate Lat-Long correctly, but Google Earth does work.

- *This was a good size for a team—would be difficult to do all this with fewer people.*
- *See notes on boots.*
- *We had time to finish, but no extra time to look at what else was out there, to learn and explore.*
- *Revise data sheet to it has Start time and Predicted Low Tide*
- *Figure out how to tell Pacifics from Olys—need instruction- when small.*
- *What is the history of these particular bags?*

Can Olympia oysters make a comeback in Quilcene Bay?

KIRK BOXLEITNER
KBOXLEITNER@PTLEADER.COM May 22, 2018 0



Volunteers take stock of the Olympia oyster population in Quilcene Bay during low tide May 16.

Courtesy photo

http://www.ptleader.com/testing/can-olympia-oysters-make-a-comeback-in-quilcene-bay/article_e83f49b4-f13c-5d7f-9a62-7bfb983a2318.html

Can Olympia oysters make a comeback in Quilcene Bay?

KIRK BOXLEITNER
KBOXLEITNER@PTLEADER.COM May 22, 2018

Volunteers take stock of the Olympia oyster population in Quilcene Bay during low tide May 16.

Courtesy photo

Many hands sought to make relatively light work out of an ambitious undertaking May 16 in Quilcene, as roughly a dozen volunteers assembled at the end of Linger Longer Road to take stock of the area's remaining Olympia oyster population.

Before over-harvesting and pulp mill pollution forced Pacific Northwest oyster farmers to turn to the Pacific oysters of Japan as a substitute, Olympia oysters were the dominant native species, and various environmental and oyster farming-affiliated groups are keen to see the molluscs make a comeback.

Brian Allen, a marine ecologist with the Puget Sound Restoration Fund (PSRF), instructed the volunteers who arrived at the Quilcene Boat Ramp to record not only where they found any Olympia oysters as the tide went out, but also where the oysters tend to aggregate.

"I take digital pictures with GPS notes," Allen said. "The important thing is to identify the locations well enough that other people can return to those places and confirm your findings, and eventually cobble this all together into one big map image. Where is the oysters' largest presence? Where do you stop encountering them? This is what we need to know."

Allen and Brady Blake, a shellfish biologist with the state of Washington, advised volunteers to check underneath rocks or pieces of wood, since oysters prefer "thermal refuges" that avoid going to extremes of hot or cool.

"Bear in mind, you're going to find the oysters not in the places they've sought out, but in the places they've managed to survive," Allen said. "They need structures to which they can attach themselves."

Chris Eardley, the Puget Sound shellfish policy coordinator for the state Department of Fish and Wildlife, agreed with Allen and Blake that the sound has become "more favorable" to Olympia oysters in recent years than it was during the early part of the 20th century, as most of the "major stressors" which impeded the species' survival are "no longer in play," in Blake's words.

"But in order for us to develop a plan to restore the species, we need to know what the state of the species looks like right now," Eardley said, citing the potential impacts of factors such as shoreline ownership and the presence of predator species.

PSRF executive director Betsy Peabody recalled that Quilcene Bay alone once hosted roughly 100 acres of "solid" Olympia oyster beds.

"They were the dominant life form," Peabody said. "So, the question becomes, to what extent are they still here, and where?"

According to Peabody, the PSRF, which was founded in 1997, was looking for restoration programs to which it could "add value" when the state Department of Fish and Wildlife released its initial Olympia oyster stock rebuilding plan in 1998.

"We love collaborating with tribes, industry, government, researchers and community groups," Peabody said, outlining PSRF's mission to rebuild Olympia oyster populations and restore native oyster habitat at 19 priority locations throughout Puget Sound. "Oyster beds are themselves a biogenic habitat in that they're a living organism which provides a natural habitat for other species."

Among PSRF's tribal partners are the Jamestown S'Klallam Tribe, represented during the May 16 outing by environmental biologist Neil Harrington, who would return to the site two days later for the tribe's yearly monitoring of its own test plots on the Quilcene tidelands.

"These test plots are areas where we spread oyster shell with young Olympia oysters in 2016, and again in 2017, to gauge if this area would be suitable for a larger project," Harrington said. "If this area does have a good survival rate, we'll be looking to expand and create a larger oyster bed. If the survival rate is low, we'll have to look for a new area to create a bed in this general area of the Quilcene Bay."

Harrington told The Leader after the May 16 outing that the volunteers found "significant wild populations" in Quilcene Bay.

"So they are persisting, albeit not so much as beds of oysters, but in more scattered populations" he said.

Cheryl Lowe, water programs coordinator with the Jefferson County Marine Resources Committee and the Washington State University Extension Office in Port Hadlock, reiterated Peabody and Allen's points about Olympia oyster beds growing together to create overlapping, layered structures that provide shelter, habitat and food for other marine species, much like eelgrass or kelp beds.

"Restoring Olympia oyster beds makes Puget Sound more resilient as conditions continue to change," Lowe said.

Lowe acknowledged that native oysters tend to grow slower and smaller than the non-native Pacific oysters, but she touted the Olympia oysters' superior resiliency in the face of ocean acidification.

"Perhaps it's because they've evolved and adapted in the Pacific Northwest, from Baja California to Southeast Alaska, where marine conditions have changed over time," Lowe said. "I've read several articles about Olympia oysters being 'wiped out,' which is not quite true. Large beds of Olympia oysters are very uncommon in much of their historic range, but small numbers have managed to hold on in scattered areas."

Lowe confirmed Harrington's account that the May 16 survey in Quilcene located Olympia oysters in small clusters or singles attached to rocks or Pacific oyster shells along the many small seeps and narrow strips of suitable habitat on those shores.

"They're around, but not providing the ecological services they could offer if they were growing in denser, larger beds," Lowe said. "It's like scattered trees planted in parks and gardens, versus a forest."

Lowe welcomes the involvement of private tidelands landowners in restoration efforts, so long as the property owners can ensure they have suitable habitat and get seeded cultch genotypes from their part of Puget Sound.

Cultch is the mass of stones, broken shells and grit from which an oyster bed is formed.

"For example, southern Hood Canal stock is very different than Sequim Bay or Discovery Bay stock, since each sub-population has adapted to local conditions," Lowe said.

She added that PSRF is growing several different genotypes in its hatchery.

"Private shellfish growers like Taylor Shellfish have also been donating seeded Olympia oyster cultch for the test plots that we looked at (May 18)," she said.

47.9951
122.878067

47.994967
122.87785

2018 DISCOVERY BAY OLYMPIA OYSTER MONITORING

Date:	7/13/18		
Start time:	9:42	**End time:**	~~10:30~~
Monitors:	Greg, Glen, Kathy, Nigel	*shells are Pacific oyster unless otherwise noted: Only shells with spat are itemized	
TRANSECT #	1	**Lat/Long**	E 47° 59.698 / 122° 52.671 W
# Quadrats with no shell:		**Lat/Long**	W 47° 59.706 122° 52.684

QUADRAT 1 — % Coverage: 30

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	15	48, 10	32	59, 12	12, 26	58	43	38, 15, 12, 21, 10
#2	15	50, 20	30	19	47		52	44, 18, 30, 44, 11
#3		52, 20	18	21	41			48, 49, 40, 35
#4		48	45	42				30, 62, 48, 47
#5		42	40	35				44, 8
#6		5	14	30				44
#7		10	13					25
#8		6						43
		same		diff				

QUADRAT 2 — % Coverage: 20

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	56	48	47	55, 20	39	51		
#2				44, 18		40		
#3				45, 10				
#4				44, 7				
#5				40, 34				
#6				45				
#7				18				
#8				28				
				same				

QUADRAT 3 — % Coverage: 10

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	18	46	50	9, 45	12			
#2	16	50		12, 50	8			
#3	42			11, 30	12			
#4	34			11, 11	10			
#5	40			11	32			
#6	58			22	41			
#7	12			40	40			
#8				38	58			
				same				

2018 DISCOVERY BAY OLYMPIA OYSTER MONITORING

pg 2

Date:	7/13/18		
Start time:	~~10~~ 9:42	**End time:**	
Monitors:	Neil, Greg, Kathy	*shells are Pacific oyster unless otherwise noted: Only shells with spat are itemized	
TRANSECT #	1	**Lat/Long**	
# Quadrats with no shell:	1	**Lat/Long**	

4

QUADRAT				**% Coverage:** 5				
# of Oly's measured	Shell 1 Oly mm	Shell 1 ~~Shell 2~~ Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	**notes--type of shell, etc**
#1	7	35						
#2	17							
#3	22							
#4	12							
#5	35							
#6	34							
#7	39							
#8	38							
	← SAME →							

5

QUADRAT				**% Coverage:** 5				
# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	**notes--type of shell, etc**
#1	49	52						
#2								
#3								
#4								
#5								
#6								
#7								
#8								

QUADRAT				**% Coverage:**				
# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	**notes--type of shell, etc**
#1								
#2								
#3								
#4								
#5								
#6								
#7								
#8								

2018 DISCOVERY BAY OLYMPIA OYSTER MONITORING

Date:	7/13/18		
Start time:	9:40	**End time:**	
Monitors:	Shelley, Jed, Frank	*shells are Pacific oyster unless otherwise noted: Only shells with spat are itemized	
TRANSECT #	2	**Lat/Long**	47.99505 122.87779
# Quadrats with no shell:		**Lat/Long**	47.99523 122.878

new

QUADRAT				**% Coverage:**				
# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	**notes--type of shell, etc**
#1	34							
new #2	38							
new #3	3							
#4								
#5								
#6								
#7								
#8								

QUADRAT				**% Coverage:**				
# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	**notes--type of shell, etc**
#1								
#2								
#3								
#4								
#5								
#6								
#7								
#8								

QUADRAT				**% Coverage:**				
# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	**notes--type of shell, etc**
#1								
#2								
#3								
#4								
#5								
#6								
#7								
#8								

2018 DISCOVERY BAY OLYMPIA OYSTER MONITORING

pg 2

Date:	7/13/18		
Start time:	9:40	**End time:**	
Monitors: Shelley Jed / Erin K		*shells are Pacific oyster unless otherwise noted: Only shells with spat are itemized	
TRANSECT #	2	**Lat/Long**	
# Quadrats with no shell:	TTN	**Lat/Long**	

QUADRAT 1 — **% Coverage:** ~~Shell 4~~ — Forgot to do this until next transect

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	30	15	40	35				
#2	36		38					
#3	21		35					
#4	22		35					
#5	21		38					
#6	28		42					
#7	25		42					
#8								

new **QUADRAT** — **% Coverage:** See above

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	43	15						
#2	26	30						
#3		25						
#4								
#5								
#6								
#7								
#8								

new **QUADRAT** — **% Coverage:** See above

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	31	38	45	40				
#2	35	34		15				
#3				15				
#4								
#5								
#6								
#7								
#8								

2018 DISCOVERY BAY OLYMPIA OYSTER MONITORING

Date:	7/13/18		
Start time:	10:35 am *	**End time:**	
Monitors:	Shelley, Jed, Frank	*shells are Pacific oyster unless otherwise noted: Only shells with spat are itemized	
TRANSECT #	3	**Lat/Long**	47.99503 122.87717
# Quadrats with no shell:		**Lat/Long**	47.99522 122.87797

QUADRAT — **% Coverage:** *25%

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	Shell 8	Shell 9	Shell 10 notes--type of shell, etc
#1	43	30								
#2	30	16								
#3		31								
#4	45	39	44	45	30	30	20	26	25	40
#5			28		45	24	35	15	25	
#6			49		30	15	15	38	25	
#7			28			25	35	35	25	
#8									150	

New Q

*New Q

QUADRAT — **% Coverage:**

# of Oly's measured	Shell 11 Oly mm	Shell 12 Oly mm	Shell 13 Oly mm	Shell 14 Oly mm	Shell 15 Oly mm	Shell 16 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	34	25	36	35	33	35		
#2	40	15	35		36			
#3	14	15	38		23			
#4	12	15	13		28			
#5								
#6								
#7								
#8								

same

New

QUADRAT — **% Coverage:** 33%

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	Shell 8	Shell 9	Shell 10 notes--type of shell, etc
#1	28	40	36	20	13	40	38	30	28	38
#2	40		44	15	38		36		37	
#3	23		32	20			34			
#4	28			15						
#5	31			5						
#6	20			10						
#7				45						
#8				10						

Shell 11	Shell 12	Shell 13	Shell 14	Shell 15
35	37	35	44	

2018 DISCOVERY BAY OLYMPIA OYSTER MONITORING

Pg 2

Date:	7/13/18		
Start time:		**End time:**	
Monitors:	Shelley, Frank, Jed	*shells are Pacific oyster unless otherwise noted: Only shells with spat are itemized	
TRANSECT #	3	**Lat/Long**	
# Quadrats with no shell:		**Lat/Long**	

QUADRAT — **% Coverage:** 25%

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	Shell 8	Shell 9	Shell 10 notes--type of shell, etc
#1	36/9	25	31	40	15	38	64	52	40	45
#2	50	40							15	
#3	40	15							10	
#4	46								40	
#5										
#6										
#7										
#8										

same ↑

QUADRAT — **% Coverage:** 20%

# of Oly's measured	Shell 11 Oly mm	Shell 12 Oly mm	Shell 13 Oly mm	Shell 14 Oly mm	Shell 15 Oly mm	Shell 16 Oly mm	Shell 17 Oly mm	notes--type of shell, etc
#1	43	45	41	20	45	8	50	
#2	11					10	14	
#3	18						8	
#4								
#5								
#6								
#7								
#8								

New

QUADRAT — **% Coverage:** 20%

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	Shell 8	Shell 9	Shell 10 notes--type of shell, etc
#1	45	60	45	48	40	33	47	50	45	47
#2	50	47				38		47	50	
#3		31							60	
#4		36							45	
#5		35							30	
#6		48								
#7		26								
#8										

New

40	45	40	20 coverage	12%	
	27	20	44	50	
	46				
	49				

2018 DISCOVERY BAY OLYMPIA OYSTER MONITORING

Date:	7/13/18	**End time:**	
Start time:	10:25		
Monitors:	Greg, Kathy, Neil	*shells are Pacific oyster unless otherwise noted: Only shells with spat are itemized	
TRANSECT #	4	**Lat/Long**	47.99503 122.87787
# Quadrats with no shell:		**Lat/Long**	47.99525 122.87782

1 **QUADRAT** — **% Coverage:** 25

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	43	43	41	42				
#2								
#3								
#4								
#5								
#6								
#7								
#8								

2 **QUADRAT** — **% Coverage:** 7

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	10	15						
#2	46	18						
#3	46	35						
#4		42						
#5		42						
#6								
#7								
#8								

3 **QUADRAT** — **% Coverage:** 45

# of Oly's measured	Shell 1/14 Oly mm		Shell 2/15 Oly mm		Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc 8	9	10	11	12	13
#1	48	49	51	40	35/11	42	40	40	55	15	48	43	50	53	52
#2			40	52	41		50	40	55	14			55	49	48
#3				41	32			45		45			35		14
#4				39	20					47			34		33
#5					16								35		
#6					15								5		
#7					17								9		
#8					10								7		
					16								12		

SHELL 16: 45, 40, 44

SHELL 17: 40

SHELL 18: 42

SHELL 19: 46

SHELL 20

P92

2018 DISCOVERY BAY OLYMPIA OYSTER MONITORING

Date:	7/13/18		
Start time:		**End time:**	
Monitors:	KATHY, NEIL, GREGG	*shells are Pacific oyster unless otherwise noted: Only shells with spat are itemized	
TRANSECT #	4	**Lat/Long**	
# Quadrats with no shell:		**Lat/Long**	

4 **4 QUADRAT** — **% Coverage:** 10%

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	45 /45	50	48	48				
#2	38							
#3	45							
#4	53							
#5	19							
#6	14							
#7	22							
#8	37							

5 **QUADRAT** — **% Coverage:** 7%

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	45	45	47	42	18			
#2		18			38			
#3					48			
#4								
#5								
#6								
#7								
#8								

6 **QUADRAT** — **% Coverage:** 5%

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	35	20	30	40				
#2	50	48	47					
#3								
#4								
#5								
#6								
#7								
#8								

p3

2018 DISCOVERY BAY OLYMPIA OYSTER MONITORING

Date:	7/13/18		
Start time:		**End time:**	
Monitors:	KATHY, NEIL, CRAIG	*shells are Pacific oyster unless otherwise noted: Only shells with spat are itemized	
TRANSECT #	4	**Lat/Long**	
# Quadrats with no shell:		**Lat/Long**	

7

QUADRAT — **% Coverage:** 5%

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	11 / 20							
#2	13 / 13							
#3	43 / 14							
#4	50 / 53							
#5	32 / 22							
#6	44 / 18							
#7	44 / 18							
#8	20 / 43 / 34							

TRANSECT #7

1 **QUADRAT** — **% Coverage:** 50%

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	51	34	32	25				
#2		20						
#3								
#4								
#5								
#6								
#7								
#8								

2 **QUADRAT** — **% Coverage:** 20%

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	30							
#2	20							
#3								
#4								
#5								
#6								
#7								
#8								

2018 DISCOVERY BAY OLYMPIA OYSTER MONITORING

Date:	7/13/18		
Start time:		**End time:**	
Monitors:	Shelley, Frank, Jed	*shells are Pacific oyster unless otherwise noted: Only shells with spat are itemized	
TRANSECT #	5	**Lat/Long**	47.99507 122.8776
# Quadrats with no shell:		**Lat/Long**	47.99525 122.87786

QUADRAT — **% Coverage:** 4% 1 shell

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	44							
#2	35	25	45	% coverage 10%				
#3	45	45	55					
#4		45	40					
#5			25					
#6			30					
#7			40					
#8								

New

QUADRAT — **% Coverage:** 50%

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	Sh 8	Sh 9	Sh 10	Sh 11 notes--type of shell, etc
#1	45	40	40	50	52	60	38	47	45	41	60
#2	46				42		25		15	44	
#3							46			37	
#4										39	
#5											
#6											
#7											
#8											

QUADRAT — **% Coverage:**

# of Oly's measured	Shell #12 Oly mm	Shell #13 Oly mm	Shell #14 Oly mm	Shell #15 Oly mm	Shell #16 Oly mm	Shell #17 Oly mm	Shell #18 Oly mm	Sh 19	Sh 20	Sh 21	Sh 22 notes--type of shell, etc
#1	38	45/40	34	35	45	45	35	41	45	38	160
#2	40	45/40	41	60	52		40			14	50
#3	15	40		30							
#4	33	40		50							
#5	28	20									
#6	41	35									
#7		35									
#8		50									
		40									

same

2018 DISCOVERY BAY OLYMPIA OYSTER MONITORING

Date:	7/13/18		
Start time:		**End time:**	
Monitors:	Shelley Frank, Jed	*shells are Pacific oyster unless otherwise noted: Only shells with spat are itemized	
TRANSECT #	5	**Lat/Long**	
# Quadrats with no shell:		**Lat/Long**	

QUADRAT — **% Coverage:** 20%

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	40	45	45	45	48	50		
#2	45	35		25	36			
#3	50	40		20	48			
#4	45			10	23			
#5	35			5				
#6	40			30				
#7								
#8								

QUADRAT — **% Coverage:** 20%

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	50	45	40	18	45	41	60	
#2	40		40	47	50	33	40	
#3			40	42		42	50	
#4				43		58		
#5						33		
#6								
#7								
#8								

QUADRAT — **% Coverage:** 10%

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	45	45	15					
#2		35	20					
#3								
New #4	45			Coverage		5%		
#5	20							
#6								
New #7	50	35		Coverage		20%		
#8								

New

40/50
40/45
25
30
45
45

Coverage 5%

2018 DISCOVERY BAY OLYMPIA OYSTER MONITORING

Date:	7/13/18		
Start time:	10:40	**End time:**	
Monitors:	Glenn & Cheryl	*shells are Pacific oyster unless otherwise noted: Only shells with spat are itemized	
TRANSECT #	~~5~~ 6	**Lat/Long**	47.99512 122.87755
# Quadrats with no shell:		**Lat/Long**	47.99527 122.8775

QUADRAT — **% Coverage:** 8 %

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	43	44	46	47	55	59		
#2			48					
#3								
#4								
#5								
#6								
#7								
#8								

new **QUADRAT** — **% Coverage:** 27 %

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	~~notes~~ 8 notes--type of shell, etc
#1	10	57	31	49	50	48	38	42
#2	18	60	45				35	
#3	35	18	12				20	
#4			10				54	
#5							18 ~~17~~	
#6							45 12	
#7							49 20	
#8							14 15	
							~~2~~	

new **QUADRAT** — **% Coverage:** 15 %

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	8 notes--type of shell, etc
#1	53	48	49	44	18	45	39	40
#2					19		48	50
#3					20		30	42
#4					18		38	
#5					41			
#6					~~40~~			
#7								
#8								

2018 DISCOVERY BAY OLYMPIA OYSTER MONITORING

PG2

Date:	7/13/18	**End time:**	11:05 m
Start time:			
Monitors:	Glenn & Cheryl	*shells are Pacific oyster unless otherwise noted: Only shells with spat are itemized	
TRANSECT #	6 PG2	**Lat/Long**	
# Quadrats with no shell:	1 (5% other shell)	**Lat/Long**	

new

QUADRAT — **% Coverage:** 2 %

Transect 6

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	45							
#2	50							
#3								
new Q #4	28	25						60% shell
#5								
#6								
#7 Transect 9		11:05 pm						
~~#8~~								

new Q

QUADRAT — **% Coverage:** 65

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	15							
new Q #2	12	11	12	16				90% shell cover
#3		15		24				
#4								
new Q #5	39							25% cover
#6	30							
#7	34							
#8								

new

QUADRAT — **% Coverage:** 24 %

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	40	10	20	12				
#2			15					
#3			11					
#4			34					
#5			13					
#6								
new Q #7	20							8% cov
#8								

Transect 9 data copied to a new data sheet

2018 DISCOVERY BAY OLYMPIA OYSTER MONITORING

Date:	7/13/18		
Start time:	10:50	**End time:**	
Monitors:	KATHY, NEIL, GREGG	*shells are Pacific oyster unless otherwise noted: Only shells with spat are itemized	
TRANSECT #	7	**Lat/Long**	47.9951 122.87753
# Quadrats with no shell:		**Lat/Long**	47.99522 122.87760

3

QUADRAT				**% Coverage: 25%**				Shell 8
# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	**notes--type of shell, etc**
#1	43	40	43	53	52/45	23	34	46
#2					48/44			
#3					35/47			
#4					17			
#5					15			
#6					42			
#7					15			
#8					5			

4

QUADRAT				**% Coverage: 45%**				SHELL
# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	**notes--type of shell, etc**
#1	40	44	43	35	40	30		
#2								
#3								
#4								
#5								
#6								
#7								
#8								

TRAN-SECT #11

1 QUADRAT				**% Coverage: 25%**				
# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	**notes--type of shell, etc**
#1	16	10						
#2	18	13						
#3	13	14						
#4	7	14						
#5	9							
#6	15							
#7	16							
#8								

Transfered to Transect 11

2018 DISCOVERY BAY OLYMPIA OYSTER MONITORING

Date:	7/13/18		
Start time:	11am	**End time:**	
Monitors:	Shelley, Frank, Jed	*shells are Pacific oyster unless otherwise noted: Only shells with spat are itemized	
TRANSECT #	8	**Lat/Long**	47.99515 122.877483
# Quadrats with no shell:		**Lat/Long**	47.99527 122.87760

QUADRAT				**% Coverage:** 12%				Sh 8 Sh 9, shell 10
# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	**notes--type of shell, etc**
#1	40/40	41						
NEW #2				coverage		50%		
#3	43	60						
NEW #4				coverage		25%		
#5								
NEW #6				coverage		10%		
#7	25/23							
#8	30/32							

QUADRAT				**% Coverage:** 0.5%				
# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	**notes--type of shell, etc**
NEW #1				coverage		2%		
#2								
#3 NEW TRANSECT			10					
#4								
#5								
#6								
#7								
#8								

QUADRAT				**% Coverage:**				
# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	**notes--type of shell, etc**
#1								
#2								
#3								
#4								
#5								
#6								
#7								
#8								

2018 DISCOVERY BAY OLYMPIA OYSTER MONITORING

Date:	7/13/18		
Start time:	11:05	**End time:**	
Monitors:	Cheryl & Glenn	*shells are Pacific oyster unless otherwise noted: Only shells with spat are itemized	
TRANSECT #	9	**Lat/Long**	47.99517 122.877383
# Quadrats with no shell:		**Lat/Long**	47.99523 122.87750

(5 Quadrats measured)

QUADRAT				**% Coverage:** 65				
# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	**notes--type of shell, etc**
#1	15							not many dy on shell
#2								
#3								
#4	12	11	12	16				80 % shell cov
#5		15		24				not many dy
#6								
#7								
#8								

new Q

QUADRAT				**% Coverage:** 25 %				
# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	**notes--type of shell, etc**
#1	39							25 % cov
#2	30							
#3	34							
#4								
#5	40	10	20	12				24 % cover in this Quadrat
#6			15					
#7			11					
#8			34					
			13					

new Q

new

QUADRAT				**% Coverage:** 8 %				
# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	**notes--type of shell, etc**
#1	20							
#2								
#3								
#4								
#5								
#6								
#7								
#8								

2018 DISCOVERY BAY OLYMPIA OYSTER MONITORING

Date:	7/13/18		
Start time:		**End time:**	
Monitors:	Shelley, Frank, Jed	*shells are Pacific oyster unless otherwise noted: Only shells with spat are itemized	
TRANSECT #	10	**Lat/Long**	47.995167 122.87738
# Quadrats with no shell:	1	**Lat/Long**	47.99533 122.87752

QUADRAT				**% Coverage:** 60%				
# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	30	66	42	37				
#2	15							
#3				Coverage		25%		
#4	15	15	30					
#5			45					
#6			35					
#7			35					
#8								

QUADRAT				**% Coverage:** 6%				
# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1								
#2								
#3								
#4								
#5								
#6								
#7								
#8								

QUADRAT				**% Coverage:** 5%				
# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	35							
#2	12							
#3	11							
#4	26							
#5								
#6								
#7								
#8								

2018 DISCOVERY BAY OLYMPIA OYSTER MONITORING

Date:	7/13/18		
Start time:		**End time:**	
Monitors:	KATHY, NEIL, GREGG	*shells are Pacific oyster unless otherwise noted: Only shells with spat are itemized	
TRANSECT #	11	**Lat/Long**	47.99522 122.87732
# Quadrats with no shell:		**Lat/Long**	47.99533 122.87745

2

QUADRAT				**% Coverage:** 15%				SHELL 8	
# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	**notes--type of shell, etc**	
#1	35	48	33	42	50	46	17		
#2		45	50						
#3		13	14						
#4									
#5									
#6									
#7									
#8									

3

QUADRAT				**% Coverage:** 5%				
# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	**notes--type of shell, etc**
#1	13							
#2	25							
#3								
#4								
#5								
#6								
#7								
#8								

4

QUADRAT				**% Coverage:** 25%				
# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	**notes--type of shell, etc**
#1	38	41	15	40				
#2		52	14					
#3		53						
#4		18						
#5		12						
#6		14						
#7		12						
#8		16						

2018 DISCOVERY BAY OLYMPIA OYSTER MONITORING

Date:	7/13/18		
Start time:	10:59	**End time:**	
Monitors:	Kathy, Neil, Gregg	*shells are Pacific oyster unless otherwise noted: Only shells with spat are itemized	
TRANSECT #	11	**Lat/Long**	
# Quadrats with no shell:		**Lat/Long**	

QUADRAT — **% Coverage:** 25%

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	16	10						
#2	18	13						
#3	13	14						
#4	7	14						
#5	9							
#6	15							
#7	14							
#8								

QUADRAT — **% Coverage:**

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1								
#2								
#3								
#4								
#5								
#6								
#7								
#8								

QUADRAT — **% Coverage:**

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1								
#2								
#3								
#4								
#5								
#6								
#7								
#8								

2018 DISCOVERY BAY OLYMPIA OYSTER MONITORING

Date:	7/13/18		
Start time:		**End time:**	
Monitors:	Shelley, Frank, Jed	*shells are Pacific oyster unless otherwise noted: Only shells with spat are itemized	
TRANSECT #	12	**Lat/Long**	47.99525 122.87725
# Quadrats with no shell:	111	**Lat/Long**	47.99533 122.87740

QUADRAT				**% Coverage:** 1%				
# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	50							
#2								
#3								
#4								
#5								
#6								
#7								
#8								

Trans 1A 11:35

QUADRAT 4				**% Coverage:** 15%				
# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	27	48	40	48	54	10	60	52
#2						12	30	
#3	Copied to					20	11	
#4	new data					18		
#5	sheet for					51		
#6	Transect 1A					38		
#7						54		
#8						50		

QUADRAT				**% Coverage:**				
# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1								
#2								
#3								
#4								
#5								
#6								
#7								
#8								

2018 DISCOVERY BAY OLYMPIA OYSTER MONITORING

Date:	7/13/18		
Start time:	11:30 am	**End time:**	
Monitors:	JED, FRANK, SHELLEY, KATHY, GREGG, NEIL	*shells are Pacific oyster unless otherwise noted: Only shells with spat are itemized	
TRANSECT #	1A	**Lat/Long**	(along powerlines - no lat/long GPS recorded) ~~taken~~
# Quadrats with no shell:		**Lat/Long**	

1

QUADRAT				**% Coverage:** 8%				
# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	**notes--type of shell, etc**
#1	20							
#2	35							
#3	12							
#4								
#5								
#6								
#7								
#8								

2

QUADRAT	Ø			**% Coverage:** Ø				
# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	**notes--type of shell, etc**
#1								
#2								
#3								
#4								
#5								
#6								
#7								
#8								

3

QUADRAT				**% Coverage:** 20%				
# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	**notes--type of shell, etc**
#1	50	40	50	55	20	45	48	
#2	15	45	35		40	40		
#3	20	60	45		50	50		
#4	20	50	'		45	25		
#5		45			20	10		
#6								
#7								
#8								

Pg 2

2018 DISCOVERY BAY OLYMPIA OYSTER MONITORING

Date:	7/13/18		
Start time:		**End time:**	
Monitors:	KATHY, NEIL, JED, FRANK, SHELLEY, GREGG	*shells are Pacific oyster unless otherwise noted: Only shells with spat are itemized	
TRANSECT #	1A	**Lat/Long**	
# Quadrats with no shell:	11	**Lat/Long**	

5

QUADRAT 5 — **% Coverage:** 82

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	48							
#2								
#3								
#4								
#5								
#6								
#7								
#8								

6

QUADRAT — **% Coverage:** 15%

Shelley Frank Jed 11:35 am

copied from other data sheet

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1	27	48	40	48	54	10	60	52
#2						12	30	
#3						20	11	
#4						18		
#5						51		
#6						38		
#7						54		
#8						50		

QUADRAT — **% Coverage:**

# of Oly's measured	Shell 1 Oly mm	Shell 2 Oly mm	Shell 3 Oly mm	Shell 4 Oly mm	Shell 5 Oly mm	Shell 6 Oly mm	Shell 7 Oly mm	notes--type of shell, etc
#1								
#2								
#3								
#4								
#5								
#6								
#7								
#8								

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING

Date:	5/18/18			
Monitors:	Kathy Hartmann Glenn Hartman Shelley, Frank, Marilyn			
PLOT #	1	**Center Pt Latitude:**		
		Center Pt Longitude:		
Start Time:				
			# Quadrats w/ no shell:	1

QUADRAT #	New			
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	18	20	19	
2	19			
3				
4				
5				
6				
7				
8				

QUADRAT #	New			
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	26	21	19	25
2	23		16	
3	17			
4	15			
5	22			
6	20			
7	21			
8				

QUADRAT #	same as above			
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	22	18	23	16
2		14		
3				
4				
5				
6				
7				
8				

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING				
Date:	5/18/18			
Monitors:	Shelley, Marilyn			
PLOT # 1		**Center Pt Latitude:**		
		Center Pt Longitude:		
Start Time:				
			# Quadrats w/ no shell:	
QUADRAT #	same as page 7			
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	17	20	13	
2	29			
3				
4				
5				
6				
7				
8				
QUADRAT #	New			
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	16	21	20	16
2		12		
3		17		
4		20		
5		18		
6				
7				
8				
QUADRAT #	same			
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	24	14	20	20
2	23	16		
3		12		
4				
5				
6				
7				
8				

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING

Date:	5/18/18			
Monitors:				
PLOT #	1	**Center Pt Latitude:**		
		Center Pt Longitude:		
Start Time:				
			# Quadrats w/ no shell:	

QUADRAT # same as page 8

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	20	22	24	20
2				
3				
4				
5				
6				
7				
8				

QUADRAT # same as above

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	24	22	18	20
2		17		18
3				30
4				
5				
6				
7				
8				

QUADRAT # same

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	22	30	16	28
2	20		21	20
3			21	
4				
5				
6				
7				
8				

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING

Date:	5/18/18			
Monitors:	Glenn, Shelley, Marilyn, Frank, Kathy			
PLOT # 1		**Center Pt Latitude:**		
		Center Pt Longitude:		
Start Time:				
			# Quadrats w/ no shell:	
QUADRAT # New				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	18	13	16	12
2			18	
3			7	
4				
5				
6				
7				
8				
QUADRAT # same.				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	12	20	30	13
2				
3				
4				
5				
6				
7				
8				
QUADRAT #				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	30	18	21	
2		20	12	
3		12		
4		20		
5		21		
6				
7				
8				

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING

Date: 5/18/18	Shelley, Glenn, Frank, Marilyn		
Monitors:			
PLOT # 1	**Center Pt Latitude:**		
	Center Pt Longitude:		
Start Time:			
		# Quadrats w/ no shell:	

QUADRAT # New

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	21	22	22	18
2		29		
3				
4				
5				
6				
7				
8				

QUADRAT # New

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	21	22	21	20
2				
3				
4				
5				
6				
7				
8				

QUADRAT # same

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	26	24	19	20
2	18	20		
3				
4				
5				
6				
7				
8				
	shell 5	shell 6	shell 7	shell 8
	18	21	30	14

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING				
Date:	5/18/18			
Monitors:				
PLOT #	1	**Center Pt Latitude:**		
		Center Pt Longitude:		
Start Time:				
			# Quadrats w/ no shell:	

QUADRAT # same as page 11

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	20	19	20	16
2		22	12	
3			16	
4				
5				
6				
7				
8				

QUADRAT # same as above

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	22	20	28	
2	18		14	
3			11	
4			21	
5			16	
6				
7				
8				

QUADRAT # New

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	20	16	16	10
2				18
3				
4	~~~~~	~~~~~	~~~~~	~~~~~
5	#5	#6	#7	#8
6	20	21	19	20
7			22	20
8				

Page 12

New

#1
11

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING

Date:	5/18/18			
Monitors:	Becky B-N, Nancy Stevens, Barb Heiner, Greg Patton			
PLOT #	1	**Center Pt Latitude:**		
		Center Pt Longitude:		
Start Time:	1:30pm			
			# Quadrats w/ no shell:	1

QUADRAT # 2

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	20			
2	15			
3	23			
4	25			
5				
6				
7				
8				

QUADRAT # 3

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	18	18	20	16
2		15	18	
3			18	
4 Quad #3				
5	13	17	26	21
6			20	
7			26	
8				

QUADRAT # 3

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	22	20		
2				
3 Quad #4	20	18	22	26
4	24	22		19
5				
6 Quad #4	23	30	33	14
7			29	
8				

Quad #4	27	19 14	22	28
Quad #4	19	20	18	

calipers
- extra tine w/ new shell

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING				
Date:	5/18/18			
Monitors:				
PLOT #	2	**Center Pt Latitude:**		
		Center Pt Longitude:		
Start Time:				
			# Quadrats w/ no shell:	
Trans **QUADRAT #**	2			
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1				
2				
3				
4				
5				
6				
7				
8				
QUADRAT #				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1				
2				
3				
4				
5				
6				
7				
8				
QUADRAT #				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1				
2				
3				
4				
5				
6				
7				
8				

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING

Date:	5/18/18			
Monitors:	Blake, Eardley, Lowe[illegible], Parker			
PLOT #	2	**Center Pt Latitude:**	47.8079	
		Center Pt Longitude:	122.8624	
Start Time:				
2:06 PM			**# Quadrats w/ no shell:**	
Trans. **QUADRAT #**	1			
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	11	13	26	17
2				
3				
4				
5				
6				
7				
8				
QUADRAT #				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	20	27	25	9
2			7	
3				
4				
5				
6				
7				
8				
QUADRAT #				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	25	25	17	17
2				
3				
4				
5				
6				
7				
8				

Shell 1 24

Shell 2 24

0/11

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING

Date:	5/18/18			
Monitors:				
PLOT #	2	**Center Pt Latitude:**		
		Center Pt Longitude:		
Start Time:				
			# Quadrats w/ no shell:	
Trans	**~~QUADRAT #~~** 2			
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	25	12 12	23 12	12 11
2				
3				
4				
5				
6				
7				
8				
QUADRAT #				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	12	20	22	17 23
2				
3				
4				
5				
6				
7				
8				
QUADRAT #				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	13 9	25	19 18	25
2				
3	20			
4				
5				
6				
7				
8				

Shell 1
23
12
5

Shell 2
15

Shell 3
28

Shell 4
11

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING				
Date:	5/18/18			
Monitors:				
PLOT #	2	**Center Pt Latitude:**		
		Center Pt Longitude:		
Start Time:				
			# Quadrats w/ no shell:	
Trans **QUADRAT #**	2			
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	30	8	13	10
2	18	29		10
3				17
4				
5				
6				
7				
8				
QUADRAT #				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	28	20	27	19
2	19	24		
3				
4				
5				
6				
7				
8				
QUADRAT #				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	13	25	18	20
2	10			
3	19			
4				
5				
6				
7				
8				

Shell 1
10
11

Shell 2
15

Shell 3
13

Shell 4

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING				
Date:	5/18/18			
Monitors:	Eyerly, Harrington, Blake, Gardner			
PLOT #	3	**Center Pt Latitude:**	47.8078	
		Center Pt Longitude:	122.8628	
Start Time:	1:37 PM			
			# Quadrats w/ no shell:	
QUADRAT #	1			
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	14	25		
2				
3				
4				
5				
6				
7				
8				
QUADRAT #				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1				
2				
3				
4				
5				
6				
7				
8				
QUADRAT #				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1				
2				
3				
4				
5				
6				
7				
8				

0 shell
1111

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING				
Date:	5/18/18			
Monitors:				
PLOT #	3	**Center Pt Latitude:**		
		Center Pt Longitude:		
Start Time:				
			# Quadrats w/ no shell:	
QUADRAT #	4			
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	13	18	12	20
2	16		8	8
3				
4				
5				
6				
7				
8				
QUADRAT #				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	29	21	12	10
2	22			
3				
4				
5				
6				
7				
8				
QUADRAT #				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	13			
2				
3				
4				
5				
6				
7				
8				

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING				
Date:	5/18/18			
Monitors:				
PLOT #	3	**Center Pt Latitude:**		
		Center Pt Longitude:		
Start Time:				
			# Quadrats w/ no shell:	
~~**QUADRAT #**~~	4			
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	25	15	24	18
2				
3				
4				
5				
6				
7				
8				
QUADRAT #				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	17	17	16	17
2	16			11
3	6			
4				
5				
6				
7				
8				
QUADRAT #				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	9	19	9	12
2	14			11
3	19			
4	21			
5	7			
6				
7				
8				

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING

Date:	5/18/18			
Monitors:				
PLOT #	3	**Center Pt Latitude:**		
		Center Pt Longitude:		
Start Time:				
			# Quadrats w/ no shell:	

QUADRAT # 3

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	20	31	18	11
2	13			
3	7			
4	17			
5	10			
6	15			
7				
8				

QUADRAT #

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	31	15	21	19
2				
3				
4				
5				
6				
7				
8				

QUADRAT #

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	12			
2				
3				
4				
5				
6				
7				
8				

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING

Date:	5/18/18			
Monitors:				
PLOT #	3	**Center Pt Latitude:**		
		Center Pt Longitude:		
Start Time:				
			# Quadrats w/ no shell:	
QUADRAT #	2			
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	22	11	15	17
2	25			14
3				
4				
5				
6				
7				
8				
QUADRAT #				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	30	11	10	16
2				
3				
4				
5				
6				
7				
8				
QUADRAT #				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	12	14	12	15
2				
3				
4				
5				
6				
7				
8				

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING

Date:	5/18/18			
Monitors:	Eardley, Blake, Harrington, Gardner			
PLOT #	3	**Center Pt Latitude:**		
		Center Pt Longitude:		
Start Time:				
1:42			**# Quadrats w/ no shell:**	
QUADRAT #	2			
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	19	16	16	12
2	10		10	
3	10		19	
4	21			
5				
6				
7				
8				
QUADRAT #				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	23	21	14	16
2	17		12	
3			6	
4				
5				
6				
7				
8				
QUADRAT #				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	10	25	22	30
2				
3				
4				
5				
6				
7				
8				

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING

Date:	5/18/18			
Monitors:	Kathy Hartmann, Glenn Hartmann, Shelly, Frank, Marilyn			
PLOT # 4		**Center Pt Latitude:**		
		Center Pt Longitude:		
Start Time: 12:30				
			# Quadrats w/ no shell:	
QUADRAT #				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	13mm	24 mm	11 mm	28mm
2	13mm	22 mm	18mm	12
3		15mm		8
4				30
5				29
6				18
7				30
8				
QUADRAT # same as above				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	14	27	12	12
2	21	10	14	
3	18		12	
4				
5				
6				
7				
8				
QUADRAT # same as above				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	24			
2	27			
3				
4				
5				
6				
7				
8				

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING

Date:	5/18/18			
Monitors:	Kathy Glenn Frank Shelley Marilyn			
PLOT # 4		**Center Pt Latitude:**		
		Center Pt Longitude:		
Start Time:				
			# Quadrats w/ no shell:	111
QUADRAT # New				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	8	16	12	24
2			21	20
3			12	
4				
5				
6				
7				
8				
QUADRAT # same				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	10	30	22	20
2	14		8	
3	12			
4	10			
5	7			
6	20			
7				
8				
QUADRAT # same				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	32	20	22	19
2		7	7	12
3		23	22	
4				
5				
6				
7				
8				

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING

Date: 5/18/18			
Monitors:			
PLOT # 4	**Center Pt Latitude:**		
	Center Pt Longitude:		
Start Time:			
		# Quadrats w/ no shell: 11	

QUADRAT # same from page 2

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	22	21	24	25
2			20	
3			23	
4				
5				
6				
7				
8				

QUADRAT # same

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	22	19	20	26
2			24	
3			20	
4			26	
5			20	
6			18	
7				
8				

QUADRAT # New

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	27	29	10	12
2			12	
3				
4				
5				
6				
7				
8				

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING

Date:	5/18/18			
Monitors:	Shelley, Marilyn, Glenn, Frank, Kathy			
PLOT #	4	**Center Pt Latitude:**		
		Center Pt Longitude:		
Start Time:				
			# Quadrats w/ no shell:	

QUADRAT # same from page 3

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	9	22	21	13
2	13	17	32	16
3		30		
4				
5				
6				
7				
8				

QUADRAT # same

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	25	19	16	12
2		18		
3		20		
4				
5				
6				
7				
8				

QUADRAT # New

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	22	23	20	17
2		17	22	28
3			18	
4				
5				
6				
7				
8				

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING

Date:	5/18/18			
Monitors:	Shelley, Marilyn, Glenn, Frank, Kathy			
PLOT # 4		**Center Pt Latitude:**		
		Center Pt Longitude:		
Start Time:				
			# Quadrats w/ no shell:	
QUADRAT #	same as page 4			
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	17			
2				
3				
4				
5				
6				
7				
8				
QUADRAT #	New			
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	22	20	27	22
2		18	20	24
3		26		
4		25		
5		17		
6				
7				
8				
QUADRAT #	same			
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	12	30	22	25
2				
3				
4				
5				
6				
7				
8				

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING

Date:	5/18/18			
Monitors:	Glenn, Shelley, Marilyn, Frank, Kathy			
PLOT # 4		**Center Pt Latitude:**		
		Center Pt Longitude:		
Start Time:				
			# Quadrats w/ no shell:	
QUADRAT # New				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	20	32	22	16
2	18		30	12
3			24	14
4			20	14
5				12
6				
7				
8				
QUADRAT # same				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	22	18	22	20
2				
3				
4				
5				
6				
7				
8				
QUADRAT # same				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	28			
2				
3				
4				
5				
6				
7				
8				

page 6

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING

Date:	5/18/18			
Monitors:	Becky B-N, Nancy Stevens, Barb Heiner, Greg P.			
PLOT # 5		**Center Pt Latitude:**	47.8078	
		Center Pt Longitude:	122.863	
Start Time: 12:30				
			# Quadrats w/ no shell: / /	

N + center count

QUADRAT # (3) nearest

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	15	10	8	8
2				
3				
4				
5				
6				
7				
8				

QUADRAT # 3

Same

Oly measured on →	Shell 5 Oly Ht mm	Shell 6- Oly Ht mm	Shell 7- Oly Ht mm	Shell 8 Oly Ht mm
1	16	20	20	10
2				
3				
4				
5				
6				
7				
8				

QUADRAT # 7

Same

Oly measured on →	Shell 9 Oly Ht mm	Shell 10- Oly Ht mm	Shell 1- Oly Ht mm	Shell 12 Oly Ht mm
1	22	28	20	20
2				
3				
4				
5				
6				
7				
8				

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING

Date:	5/18/18			
Monitors:				
PLOT #	5	**Center Pt Latitude:**	47.8078	
		Center Pt Longitude:	122.863	
Start Time:	12:30			
			# Quadrats w/ no shell:	

QUADRAT # 3

Oly measured on →	Shell 13 Oly Ht mm	Shell 14 Oly Ht mm	Shell 15 Oly Ht mm	Shell 16 Oly Ht mm
1	20	29	25	28
2				15
3				
4				
5				
6				
7				
8				

QUADRAT # 3

Oly measured on →	Shell 17 Oly Ht mm	Shell 18 Oly Ht mm	Shell 19 Oly Ht mm	Shell 20 Oly Ht mm
1	15	13	25	18
2				
3				
4				
5				
6				
7				
8				

QUADRAT # 3

Oly measured on →	Shell 21 Oly Ht mm	Shell 22 Oly Ht mm	Shell 23 Oly Ht mm	Shell 24 Oly Ht mm
1	23	25	20	
2	20			
3				
4				
5				
6				
7				
8				

2

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING

Date:	5/18/18			
Monitors:	Nancy Stevens,			
PLOT #	5	**Center Pt Latitude:**	47.8078	
		Center Pt Longitude:	122.863	
Start Time:				
			# Quadrats w/ no shell: 11	

90°

QUADRAT # 3

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	15	20	22	17
2		23		
3		20		
4		15		
5				
6				
7				
8				

QUADRAT # Same

Oly measured on →	Shell 5 Oly Ht mm	Shell 6- Oly Ht mm	Shell 7- Oly Ht mm	Shell 8 Oly Ht mm
1	15	16	20	25
2			20	
3				
4				
5				
6				
7				
8				

QUADRAT # Same

Oly measured on →	Shell 9- Oly Ht mm	Shell 10 Oly Ht mm	Shell 11 Oly Ht mm	Shell 12 Oly Ht mm
1	15	10	30	20
2		16	25	
3		25	20	
4		10		
5		18		
6				
7				
8				

3RD TYLANSEA

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING

Date:	5/18/18			
Monitors:				
PLOT #	5	**Center Pt Latitude:**	47.9078	
		Center Pt Longitude:	122.863	
Start Time:				
			# Quadrats w/ no shell:	

QUADRAT # (1)

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	12	18	15	30
2				20
3				20
4				15
5				
6				
7				
8				

Same

QUADRAT # (1)

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	20	28		
2	20	25		
3	20	25		
4				
5				
6				
7				
8				

QUADRAT # (2)

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	22	20	20	20
2				
3				
4				
5				
6				
7				
8				

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING

Date: 5/18/18			
Monitors:			
3RD TRANSECT **PLOT #** 5	**Center Pt Latitude:**	47.8078	
	Center Pt Longitude:	122.863	
Start Time:			
		# Quadrats w/ no shell:	

QUADRAT # (2)

Oly measured on →	Shell 5 Oly Ht mm	Shell 6 Oly Ht mm	Shell 7 Oly Ht mm	Shell 8 Oly Ht mm
1	23	30	22	25
2		20	20	
3		25	16	
4			17	
5			21	
6				
7				
8				

Same

QUADRAT #

Oly measured on →	Shell 9 Oly Ht mm	Shell 10 Oly Ht mm	Shell 11 Oly Ht mm	Shell 12 Oly Ht mm
1	32	10	13	18
2	15	12		
3	17	15		
4	10	17		
5	22	13		
6	18	10		
7				
8				

Same

QUADRAT #

Oly measured on →	Shell 13 Oly Ht mm	Shell 14 Oly Ht mm	Shell 15 Oly Ht mm	Shell 16 Oly Ht mm
1	22	32	10	25
2	15	20		20
3	20			
4	20			
5				
6				
7				
8				

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING

Date:	5/18/18			
Monitors:				
PLOT # 5		**Center Pt Latitude:**	47.8078	
		Center Pt Longitude:	122.863	
Start Time:				
			# Quadrats w/ no shell:	

Same

QUADRAT # (2)

Oly measured on →	Shell 1 Oly Ht mm	Shell 2 Oly Ht mm	Shell 3 Oly Ht mm	Shell 4 Oly Ht mm
1	28	25	25	15
2	30			
3	15			
4	15			
5	20			
6				
7				
8				

Same

QUADRAT # (3)

Oly measured on →	Shell 1 Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	20			
2				
3				
4				
5				
6				
7				
8				

New

QUADRAT # (1)

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	20	23	20	23
2			20	20
3			20	23
4			13	25
5			18	
6				
7				
8				

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING

Date:	5/18/18			
Monitors:				
PLOT # 5		**Center Pt Latitude:**	47.8078	
		Center Pt Longitude:	122.863	
Start Time:				
			# Quadrats w/ no shell:	

QUADRAT # 3

Oly measured on →	Shell 5 Oly Ht mm	Shell 6 Oly Ht mm	Shell 7 Oly Ht mm	Shell 8 Oly Ht mm
1	20	20	13	35
2	20	28	18	
3	18			
4	20			
5	13			
6				
7				
8				

same

QUADRAT #

Oly measured on →	Shell 9 Oly Ht mm	Shell 10 Oly Ht mm	Shell 11 Oly Ht mm	Shell 12 Oly Ht mm
1	10	20	20	25
2				15
3				
4				
5				
6				
7				
8				

same

QUADRAT #

Oly measured on →	Shell 13 Oly Ht mm	Shell 14 Oly Ht mm	Shell 15 Oly Ht mm	Shell 16 Oly Ht mm
1	25	15	20	23
2	20	15		18
3		15		22
4				
5				
6				
7				
8				

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING				
Date:	5/18/18			
Monitors:				
PLOT #	5	**Center Pt Latitude:**	47	
		Center Pt Longitude:	122	
Start Time:				
			# Quadrats w/ no shell:	
QUADRAT #				
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	10			
2	12			
3				
4				
5				
6				
7				
8				
QUADRAT #	2			
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	18	20		
2		23		
3		25		
4				
5				
6				
7				
8				
QUADRAT #	3			
Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	20	26	28	10
2		22	10	
3		25	15	
4		23		
5				
6				
7				
8				

2018 QUILCENE BAY OLYMPIA OYSTER PLOT MONITORING

Date:	5/18/18			
Monitors:				
PLOT # 5		**Center Pt Latitude:**	47.8078	
		Center Pt Longitude:	122.863	
Start Time:				
			# Quadrats w/ no shell:	

QUADRAT # 3

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	11	20	15	20
2	12	14	18	
3	14			
4	25			
5	22			
6				
7				
8				

QUADRAT # 3

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1	15	32	25	24
2			25	
3			18	
4			25	
5			20	
6				
7				
8				

QUADRAT #

Oly measured on →	Shell 1- Oly Ht mm	Shell 2 - Oly Ht mm	Shell 3- Oly Ht mm	Shell 4- Oly Ht mm
1				
2				
3				
4				
5				
6				
7				
8				

Quilcene MRC Olympia Oyster Project

SIZE OF SPAT - 2018 Seeded Cultch.

Measuring Ht of 100 Olys on random shell

3-4 handfuls/bag mixed in bucket from 6 bags/plot

Recorder's Names: Anne S. Kathy W-S Shelley, Gregg, Sarah W		**Station Information**	
		Waterbody: Hood Canal	
Deployment Date:	8-10-18	Station Name: Quilcene	
Monitoring Date:	8-11-18	Lat (WGS 84):	
Time of ~~Low tide:~~ Start	10:30am	Long (WGS 84)	
TEST PLOT #	2018-1	Low tide predicted: 11:20am (-2.9)	

Olys only	length - mm	length - mm	length - mm	length - mm	length - mm
1	35	29	31	14	38
2	48	15	22	32	20
3	30	26	28	24	35
4	24	11	12	17	17
5	39	16	19	28	11
6	13	15	37	35	22
7	40	17	23	32	25
8	15	42	38	26	13
9	11	24	33	21	38
10	17	22	27	27	15
11	12	24	25	20	30
12	16	10	15	28	12
13	11	17	31	27	15
14	31	19	20	21	9
15	22	28	16	22	14
16	21	22	17	21	11
17	32	33	13	46	21
18	29	23	24	32	10
19	17	28	41	12	26
20	21	20	45	18	15

Quilcene MRC Olympia Oyster Project

SIZE OF SPAT - 2018 Seeded Cultch.

Measuring Ht of 100 Olys on random shell

3-4 handfuls/bag mixed in bucket from 6 bags/plot

Recorder's Names: Kathy & Glenn H, Sarah Fisher, Frank H	**Station Information**
	Waterbody: Hood Canal
Deployment Date:	Station Name: Quilcene
Monitoring Date: 8/11/18	Lat (WGS 84):
Time of Low tide: 10:45 am	Long (WGS 84)

TEST PLOT # 2018-2

Olys only	length - mm	length - mm	length - mm	length - mm	length - mm
1	34	10	31	30	17
2	42	16	22	16	15
3	16	32	34	22	11
4	17	29	24	22	24
5	15	28	11	18	25
6	15	22	29	22	24
7	11	31	30	31	27
8	25	11	20	36	21
9	12	33	11	31	36
10	16	31	21	8	20
11	31	37	19	8	19
12	19	36	13	16	26
13	23	18	31	18	37
14	8	11	18	18	23
15	20	36	11	8	31
16	20	30	23	33	28
17	33	18	18	26	32
18	21	30	16	24	15
19	13	29	31	34	20
20	33	31	17	39	24

Quilcene MRC Olympia Oyster Project
SPAT COUNT - 2018 Seeded Cultch.

Counting # of spat/shell for a random 10 shells/bag with 20 bags/plot

Recorder's Names: ANNES, KATHY W-S
GREGG, CHERYL, SHELLEY, SARAH W

Deployment Date: 8/10/18
Monitoring Date: 8/11/18
Time of Low tide: 10:30 AM
TEST PLOT # 2018-2

Station Information

Waterbody: Hood Canal
Station Name: Quilcene
Lat (WGS 84):
Long (WGS 84)

Shell Sample #	Both sides # Olympias	# Pacifics	Shell Sample #	Both sides # Olympias	# Pacifics
1	1		31	4	
2	3		32	1	
3	2		33	Ø	4
4	4		34	5	1
5	1		35	4	
6	1		36	1	
7	1		37	2	
8	3	2	38	4	
9	4	2	39	4	
10	3		40	2	
11	3	2	41	3	
12	1		42	2	
13	9	1	43	Ø	3
14	1		44	4	
15	4		45	1	
16	6		46	4	
17	Ø		47	1	
18	3	1	48	6	
19	1		49	1	
20	1		50	2	
21	1		51	3	
22	5		52	4	
23	2		53	1	1
24	2		54	6	
25	1	1	55	3	
26	1	1	56	4	1
27	6	1	57	Ø	
28	3		58	1	
29	8		59	7	1
30	1		60	3	

Quilcene MRC Olympia Oyster Project
SPAT COUNT - 2018 Seeded Cultch.

Counting # of spat/shell for a random 10 shells/bag with 20 bags/plot

Recorder's Names: ANNE, KATHY W-S SHELLEY, GREGG, SARAH W	**Station Information**
	Waterbody: Hood Canal
Deployment Date: 8/10/18	Station Name: Quilcene
Monitoring Date: 8/11/18	Lat (WGS 84):
Time of ~~Low tide~~: 10:30 AM - 11:30 am	Long (WGS 84)

TEST PLOT # 2018-1 (Low Tide 11:20 am) (-2.9 predicted)

Shell Sample #	Both sides # Olympias	# Pacifics	Shell Sample #	Both sides # Olympias	# Pacifics
1	12		31	2	
2	1		32	1	
3	4		33	2	1
4	2		34	4	
5	2	2	35	1	
6	5	1	36	3	
7	2	2	37	~~1~~	1
8	1		38	7	2
9	1		39	1	1
10	3		40	Ø	
11	2	2	41	1	
12	Ø	1	42	3	
13	1		43	Ø	
14	2		44	4	1
15	Ø	1	45	1	1
16	Ø		46	2	
17	2		47	1	
18	Ø		48	1	
19	Ø		49	4	
20	4		50	Ø	
21	3		51	2	
22	2	1	52	4	
23	2	1	53	1	1
24	3	1	54	2	
25	2		55	Ø	
26	3		56	Ø	1
27	1		57	1	1
28	3	3	58	2	
29	5	1	59	2	
30	1	1	60	1	

Quilcene MRC Olympia Oyster Project
SPAT COUNT - 2018 Seeded Cultch.

Counting # of spat/shell for a random 10 shells/bag with 20 bags/plot

Recorder's Names: Kathy & Glenn Hartman, Sarah Fisher, Frank H.	**Station Information**
	Waterbody: Hood Canal
Deployment Date: 8/11/18	Station Name: Quilcene
Monitoring Date:	Lat (WGS 84):
Time of ~~Low tide~~ start: ~~10:45am~~ 10:45am Low tide - 11:20am	Long (WGS 84)
TEST PLOT # 2018-2	

Shell Sample #	Both sides # Olympias	# Pacifics	Shell Sample #	Both sides # Olympias	# Pacifics
1	5		31	4	
2	2		32	1	
3	4		33	4	
4	4		34	3	
5	3		35	1	
6	4		36	3	
7	1		37	2	
8	2		38	0	
9	2		39	12	
10	5		40	3	
11	0		41	3	
12	1		42	4	
13	5		43	1	
14	2		44	1	
15	2		45	2	
16	7		46	2	
17	2		47	1	
18	4		48	0	
19	1		49	1	
20	3		50	2	
21	2		51	3	
22	7		52	2	
23	1		53	0	
24	1		54	0	
25	1		55	1	
26	8		56	2	
27	3		57	0	
28	1		58	0	
29	0		59	0	
30	1		60	3	

Quilcene MRC Olympia Oyster Project

SIZE OF SPAT - 2018 Seeded Cultch.

Measuring Ht of 100 Olys on random shell

3-4 handfuls/bag mixed in bucket from 6 bags/plot

Recorder's Names: Anne S, Kathy W-S, Gregg, Shelley, Sarah W, Cheryl	**Station Information**
	Waterbody: Hood Canal
Deployment Date: 8-10-18	Station Name: Quilcene
Monitoring Date: 8-11-18	Lat (WGS 84):
Time of ~~Low tide~~ start: 10:30	Long (WGS 84)
TEST PLOT # 2018-23	Low Tide 11:20am (-2.9 predicted)

Olys only	length - mm	length - mm	length - mm	length - mm	length - mm
1	29	25	24	19	43
2	41	12	15	19	42
3	30	17	28	18	20
4	25	6	19	19	12
5	27	14	31	20	11
6	24	10	56	18	31
7	20	27	12	25	32
8	24	32	17	26	36
9	23	40	44	28	22
10	28	37	13	20	22
11	34	33	22	39	26
12	33	28	17	29	38
13	22	32	24	29	17
14	20	22	21	13	31
15	24	21	22	19	29
16	30	21	19	15	18
17	17	30	12	9	20
18	16	28	10	22	19
19	37	34	16	9	13
20	41	16	18	27	11