Olympia Oyster Network Data Collection

Start of Block: Survey Introduction

Q1.1 **INTRODUCTION**

Please read this entire lengthy introduction – it will help you to understand how and why we are collecting this information.

Purpose Of Survey

This survey is designed to capture information on all past and current Olympia oyster restoration or enhancement projects. The information will be used to:

Conduct outreach to the public and stakeholders about Olympia oyster projects, by creating an ArcGIS Story Map, an interactive website with photos and information about each site in a geographic context (so for this we need info on exact locations, links to your website, photos of the project, etc.)

Improve future restoration efforts, by publishing a paper that provides a synthesis of restoration techniques, locations, objectives, success, and lessons learned (so for this we need information and expert opinion on those aspects, etc.)

Safely archive a history of Olympia oyster projects for posterity by summarizing information in a database to be available online (so we need all key information that might be useful to future practitioners/scientists in the future)

Survey Design And Length

Because we are using the survey for the three different purposes described above, we are collecting a lot of information. This means that **filling it out is likely to take about two hours per project**, because you'll be looking up information on your project objectives from your grant proposals, finding photos and uploading them, looking up recruitment data, etc. We recognize this is a big "ask" but hope that you see the investment as worth while for what it will achieve.

Which Projects To Include

We would like to capture **all substantial projects intended at least in part to benefit Olympia oysters**, whether considered enhancement or restoration. This includes experimental projects (where goals included helping oysters and learning about best methods/sites). We do not want to include purely scientific projects (e.g. tiles put out to understand spatial variation in recruitment, not put out to benefit oysters). Pilot projects that were very tiny (testing just a couple of methods) or not meant to last more than a year should not be included. We welcome inclusion of new or on-going projects, recognizing that you may not be able to answer all the questions (about whether restoration was successful, etc.). Every section has optional comment boxes -- just use these to explain ("can't answer this because project is only 6 months old", etc.).

We would like to **request each project to fill out a separate survey**. We will leave it up to you how to lump or split projects. Different sites/years can be combined into a single project, so long as restoration goals, methods, and success were broadly similar, so that it it makes sense to treat them as a single unit in our synthesis paper. As a rule of thumb, it would seem reasonable to include multiple sites under a single project if they are within a few miles of each other, and multiple time periods if they are consecutive years.

Survey logistics and Important Tidbits

A **.pdf of the entire survey can be downloaded** from the link below. You may find it helpful to download this and skim the whole thing before you start to fill out the online version, so you have everything you need at your fingertips. Click Here to Downlad Survey Outline

There is a **table of contents** accessed by clicking on the three-stacked line graphic on the upper left side of the questions. You can navigate the survey by clicking on section titles OR by using the arrows at the bottom of the page. The table of contents often pops up and blocks the questions – you can click on it to get rid of it.

The **online survey automatically saves your work** as you fill it out. When you are finished with a session, you can close the page. To pick up where you left off use your custom link to open up the survey again. Please note 1) At the end of the survey a table of contents will display what pages are complete/unfinished 2) Be sure you are ready to submit your survey (by clicking the right arrow all the way through) as the link expires and you may NOT edit your responses. So please do not submit your survey until all relevant information is entered. In the survey we ask you to upload several documents associated with your projects. To do this **please create a folder in each of our Google Drive folders: "Upload: Pictures for Oyster Restoration Storymap" --**
> https://drive.google.com/drive/folders/1y30tUl1WvM0DmkD-U7VmS9Tboy7LwgKA?usp=sharing **"Upload: Publications/Docs For Oyster Restoration Database - Public OK"**--
> https://drive.google.com/drive/folders/1lYVULgPbq5GbnTh858yxaNAn3bt0vUBp?usp=sharing **"Upload: Documents fo Oyster Resotration Database - Internal Only" -->**
https://drive.google.com/drive/folders/1h2Ozjs9E_nXSCL2rCl-56fR8QnO8_Rrl?usp=sharing **labeled with your project name, waterbody, and state/providence** (e.g. "Newport Bay Living Shorelines (Newport Bay,CA)"). We prompt you later on for what kind of files to upload to this folder. **For projects conducted by large collaborative teams, please coordinate so that only one survey is filled out for each project. Possible Strategies for Collaborative Projects:** Download the .pdf outlining this survey and jointly fill out this version. Different staff can fill out different parts and then a single person can enter it to the online survey (or you can email us the Word version and we will enter it for you) Have one person fill in their relevant information in the online survey using one of their custom survey links. Then share the link with a colleague so they can then access the same survey to fill out other information.

Support For Filling Out Survey

We are happy to help you fill out the survey, via screenshare and GoToMeeting. If you'd like someone to basically walk you through the whole thing, please contact April Ridlon

(ctenophores@gmail.com) and she will make you an appointment with herself or Althea Marks. If you just have a quick question, please don't hesitate to email that too.

End of Block: Survey Introduction

Start of Block: Contact Information

Q2.1
CONTACT INFORMATION

Please let us know who you are, so we can follow up with questions as needed. Note that there is another question later about who is the official contact for the public website, which may be different.

Q2.2 Survey Respondent #1

- Name (1) _____
- Organization (2) _____
- Email (3) _____
- Comments: (4) _____

Q2.3 Survey Respondent #2

- Name (1) _____
- Organization (2) _____
- Email (3) _____
- Comments : (4) _____

End of Block: Contact Information

Start of Block: General Project Information

Q3.1

GENERAL PROJECT INFORMATION

This information will be provided on the **public outreach website** (Story Map) and in the database to be archived, so please be sure the information is how you wish it to appear.

Q3.2

Project Information

- ○ Project Name (make one up if there isn't an official one) (1) _____
- ○ Estuary/Waterbody Name (2) _____
- ○ State or Province (3) _____
- ○ Comments (9) _____

Q3.3 Project lead to list on website

- ○ Name (1) _____
- ○ Organization (2) _____
- ○ Email (10) _____
- ○ Comments (3) _____

Q3.4 Science/Monitoring lead to list on website

- Name (1) _____
- Organization (2) _____
- Email (3) _____
- Comments (10) _____

Q3.5 List the major funding sources for this project (including grants specifically for it and organizations that contributed substantial staff time or resources)

- Funding Source #1 (1) _____
- Funding Source #2 (2) _____
- Funding Source #3 (3) _____
- Funding Source #4 (4) _____
- Funding Source #5 (5) _____
- Funding Source #6 (6) _____
- Comments (7) _____

Q3.6 We realize that it can be difficult to calculate exact costs if they came from multiple sources and in-kind match, but please make a **ballpark estimate**. Include costs of personnel as well as materials.

- ○ Total project cost (US $) (1) _____
- ○ Amount spent on monitoring (US $) (2) _____
- ○ Comments (3) _____

End of Block: General Project Information

Start of Block: Publications, Web Resources & Photos

Q4.1
PUBLICATIONS, WEB RESOURCES & PHOTOS
Online resources. If you have web pages with information about the project, please list them here and we'll link to them in the Story Map.

- ○ URL (1) _____
- ○ Comments (3) _____

Q4.2 **Public Documents**. If you have **publications or reports** that we can **post on the website** with more information about the project, please upload them to a folder you have named with this project's name, water body, and state/providence (e.g "Newport Living Shorelines Project (Newport Bay, CA)") within our Google Drive folder and **provide the filename and any comments below** -->
https://drive.google.com/drive/folders/1IYVULgPbq5GbnTh858yxaNAn3bt0vUBp?usp=sharing

Q4.3 Public Document #1

- File Name (1) _____
- File Comments (2) _____

Q4.4 Public Document #2

- File Name (1) _____
- File Comments (2) _____

Q4.5 Public Document #3

- File Name (1) _____
- File Comments (2) _____

Q4.6 Public Document #4

- File Name (1) _____
- File Comments (2) _____

Q4.7 Public Document #5

- File Name (1) _____
- File Comments (2) _____

Q4.8 **Additional Documents for Internal Use Only.** If you have **documents** that provide more detail about this project that you'd be willing to share with us only for the purposes of building this database, but that you **don't want posted publicly**, please upload them to our Google Drive folder under a a new folder your create titled "Project name (waterbody, state/providence)" and provide the filename and any comments below. --> https://drive.google.com/drive/folders/1h2Ozjs9E_nXSCL2rCl-56fR8QnO8_Rrl?usp=sharing

For instance, you might share a final grant report that has detailed monitoring data that can help us to understand the project, but that you don't want to make public.

Q4.9 Internal File #1

- File Name (1) _____
- Comments (2) _____

Q4.10 Internal File #2

- File Name (1) _____
- Comments (2) _____

Q4.11 Internal File #3

- File Name (1) _____
- Comments (2) _____

Q4.12 **Photos**

We will use your photos for the Story Map website on your project, so **please share photos that you are willing to make public**. For photos of people, please **be sure those people have already consented to having the image be public**. Ideally we'd like at least one photo in each category below; multiples are welcome. Please **create a folder for your project in this folder** titled "Your project name (waterbody, state/providence)" and upload relevant photos described

below --> https://drive.google.com/drive/folders/1y30tUI1WvM0DmkD-U7VmS9Tboy7LwgKA?usp=sharing

Q4.13 General site photo (illustrating setting and conditions in area)

- File Name (1) _____
- Caption (2) _____
- Photo Credit (3) _____

Q4.14 Close-up of type of substrate deployed (for understanding method)

- File Name (1) _____
- Caption (2) _____
- Photo Credit (3) _____

Q4.15 Close-up of oysters on substrates deployed (to see where they settle, what numbers)

- File Name (1) _____
- Caption (2) _____
- Photo Credit (3) _____

Q4.16 Close-up of any challenges faced (sediment, predator, etc.)

- File Name (1) _____
- Caption (2) _____
- Photo Credit (3) _____

Q4.17 People photo (folks deploying or monitoring, because we love happy faces for outreach)

- File Name (1) _____
- Caption (2) _____
- Photo Credit (3) _____

Q4.18 Monitoring methods (illustrate how monitoring was done)

- File Name (1) _____
- Caption (2) _____
- Photo Credit (3) _____

Q4.19 Additional photo

- File Name (1) _____
- Caption (2) _____
- Photo Credit (3) _____

Q4.20 Photo Comments

_____

_____

_____

_____

_____

End of Block: Publications, Web Resources & Photos

Start of Block: Spatial & Temporal Information

Q5.1 **SPATIAL & TEMPORAL INFORMATION**

We will enter the **latitude and longitude** of your project site(s) in the **ArcGIS Story Map**. If you conducted similar work at **multiply nearby sites**, please **include the coordinates for all** of them here, so we archive for posterity where exactly restoration has occurred. Please include only the sites that fall under this project (see Intro for advice on lumping/splitting projects). There is an option to describe the spatial structure/design of your project if it is complicated.

Q5.2 Spatial design/structure of project (optional description):

_____

_____

_____

_____

_____

Q5.3 Site #1

- Name (1) _____
- Latitude (2) _____
- Longitude (8) _____
- Comments (7) _____

Q5.4 Site #2

- Name (1) _____
- Latitude (2) _____
- Longitude (8) _____
- Comments (7) _____

Q5.5 Site #3

- Name (1) _____
- Latitude (2) _____
- Longitude (8) _____
- Comments (7) _____

Q5.6 Site #4

- Name (1) _____
- Latitude (2) _____
- Longitude (8) _____
- Comments (7) _____

Q5.7 Site #5

- Name (1) _____
- Latitude (2) _____
- Longitude (8) _____
- Comments (7) _____

Q5.8 Site #6

- Name (1) _____
- Latitude (2) _____
- Longitude (8) _____
- Comments (7) _____

Q5.9 Site #7

- Name (1) _____
- Latitude (2) _____
- Longitude (8) _____
- Comments (7) _____

Q5.10 Site #8

- Name (1) _____
- Latitude (2) _____
- Longitude (8) _____
- Comments (7) _____

Q5.11 Site #9

- Name (1) _____
- Latitude (2) _____
- Longitude (8) _____
- Comments (7) _____

Q5.12 Site #10

- Name (1) _____
- Latitude (2) _____
- Longitude (8) _____
- Comments (7) _____

Q5.13 **TEAMPORAL INFOMATION**
During what year(s) was this project implemented (e.g. substrates or oysters deployed)?

_____

_____

_____

_____

_____

Q5.14 During what year(s) was this project monitored?

_____

_____

_____

_____

_____

Q5.15 Optional description/comment on temporal duration of project:

_____

_____

_____

_____

_____

End of Block: Spatial & Temporal Information

Start of Block: Project Methods

Q6.1 **PROJECT METHODS**

Restoration / Enhancement Approach. We want to quantify frequency of different restoration/enhancement approaches, so please check all that were used in this project. If you deployed hatchery raised juveniles substrates, please check both of the first boxes

Q6.2 Approaches used - check all that apply

- ☐ Provision of hard substrate (shells, reef balls, etc.) (1)
- ☐ Deployment of hatchery-raised juveniles to a field site (2)
- ☐ Transfer of spat from one field site to another (3)
- ☐ Transfer of adult oysters from one field site to another (4)
- ☐ Other, specify (5) _____

Q6.3 Comments

_____

_____

_____

_____

Q6.4 **Substrate Deployed**. What types of substrates were deployed? Check all that apply. (These boxes apply whether you deployed them bare or seeded with oysters.)

- ☐ Bags of C. *gigas* shell (1)
- ☐ Loose C. *gigas* shell (2)
- ☐ Bags of other shell (e.g. mussel, clam) (3)
- ☐ Loose other shell (e.g. mussel, clam) (5)
- ☐ Loose live Ostrea *lurida* (4)
- ☐ Bagged Ostrea lurida (11)
- ☐ Reef balls (concrete / baycrete) (6)
- ☐ Other concrete (7)
- ☐ Rip/rap, rocks (8)
- ☐ Stakes (wood, PVC, metal) (9)
- ☐ Other, specify: (10) _____

Display This Question:

If Approaches used - check all that apply = Deployment of hatchery-raised juveniles to a field site

Q6.5 Hatchery Raised Oysters

○ How where the oysters deployed in the field (i.e. single oysters, bags of spat-on-shell, or loose spat-on-shell) (1) _____

○ Number of hatchery-raised juveniles out-planted for this project (Can estimate order of magnitude) (2) _____

○ Name of hatchery used (3) _____

○ Broodstock source (collection location, date, and any other relevant details) (4) _____

○ Comments (5) _____

Q6.6 **Configuration/Amount Of Substrates**. To convey a sense of the design you used, please quantify approximate **numbers of units of each substrate type deployed**, and if construction was modular, please describe that. (e.g., “we bundled together 5 shell bags to make one unit, and deployed 50 such units, along with 10 reef balls”). We will used this summary in the Story Map.

○ Configuration of units (1) _____

○ Number of units added (2) _____

○ Comments (4) _____

Q6.7 **Amount Of Hard Substrate Added**. We would like to analyze the r**elationship between number of adults enhanced vs. amount of hard substrate added**. Please attempt to **estimate the total volume of hard substrate added** (mentally squish it all into one cube, even if in actuality it was spaced throughout a larger area). We realize this will probably be an order of magnitude level estimate.

○ Volume of hard substrate added (m^3) (1) _____

○ Comments (4) _____

Q6.8 **Restoration Area**. We're interested in **how large an are**a the restoration **substrates covered**. Please mentally (or in Google Earth) draw a polygon around the entire area that had hard substrates deployed (including areas of mudflat interspersed between them, and if this was at multiple sites, add up these areas). We realize this will probably be an order of magnitude level estimate.

○ Area of habitat where restoration substrates were deployed (m^2) (1)
_____

○ Comments (4) _____

Q6.9 **Tidal Elevation**. Tidal elevation can affect restoration success. Please **estimate** to the best of your abilities the **range of elevations** covered by your substrates (from their bottom to their top), and the **average tidal elevation** (the midpoint of typical restoration substrates you deployed for this project). Note that the currency is in **meters** (not feet) relative to Mean Lower Low Water. So if you put them where your tide chart says +1 ft, you'd enter +0.3 m; if you put them where it says -1 ft you'd put -0.3 m.

○ Min tidal elevation for project substrates (base of units or lower range of distribution of units), meters above (+) or below (-) MLLW (1)
_____

○ Max tidal elevation for project substrates (top of units or upper range of distribution of units), meters above (+) or below (-) MLLW (4)
_____

○ Average tidal elevation for project substrates (midpoint of units or middle range of distribution of units), meters above (+) or below (-) MLLW (5)
_____

○ Comments (6) _____

Q6.10 **Temporal Scale Of Project**. We're interested in **how long** the deployed **substrates were anticipated to last** (e.g., long for big concrete added, short for loose shells in muddy habitat, which are likely to get buried) and **how long they actually lasted**.

○ How long did you anticipate the added substrates remaining available to host oysters at the site (please provide number of years and any explanation) (1)
_____

○ How long did the substrates actually remain available to host oysters at the site (please provide number of years and any explanation, or indicate "unknown") (2)
_____

○ Comments (3) _____

End of Block: Project Methods

Start of Block: Monitoring Overview

Q7.1

MONITORING OVERVIEW

Many different types of data are collected as a part of restoration/enhancement projects. To synthesize what types of data have been collected by Olympia restoration projects, we'd like to ask you **select the data that is available for your project**. Note that we are not asking you to provide these data -- in later questions we ask for summary assessments that may be based on these data, but we are not asking for the data. For water quality parameters include monitoring close enough to be relevant to the project.

Note there are **two sections**, one for data relevant to the **restoration substrates**, and data relevant for the **general restoration area**.

- [ ] Oyster Density per m^2 (1)
- [ ] Oyster size frequency distribution (18)
- [ ] Oyster recruitment (16)
- [ ] Cover of sessile sp. (22)
- [ ] Tidal elevation (MLLW) (8)
- [ ] Reef/bed height (13)
- [ ] Tidal emersion (% time out of water) (7)
- [ ] Areal extent of project (m^2) (12)
- [ ] Other: (26) _____
- [ ] Other: (27) _____
- [ ] Oyster Density per m^2 (15)

- [ ] Oyster size frequency distribution (19)
- [ ] Oyster recruitment (17)
- [ ] Cover of sessile sp. (23)
- [ ] Water temperature (C) (4)
- [ ] Salinity (ppt) (5)
- [ ] Dissolved Oxygen (mg/L) (6)
- [ ] Shoreline protection resulting from project (10)
- [ ] Other (20) _____
- [ ] Other (21) _____

Q7.2 Comments on monitoring data

_____

_____

_____

_____

_____

End of Block: Monitoring Overview

Start of Block: Project Goals Description

Q8.1

PROJECT GOALS DESCRIPTION

Project Goals. In subsequent questions, we will ask you specifically about particular objectives for this project and whether they were achieved. Before we do that, we want to provide you the opportunity to **briefly state in your own words what the goals of the project were** (1-3 sentences). This is text we will probably use in the Story Map summary.

_____

_____

_____

_____

_____

Q8.2 **Restoration Vs. Enhancement**. Traditionally, restoration is considered an attempt to return an ecosystem to a historic trajectory or towards past conditions. We are interested in whether **you consider this project to be restoration**, i.e. an attempt to increase oyster distribution or numbers because there is evidence that historic levels were higher than currently in this region. **Or, did you consider it enhancement**, i.e. an effort to boost this species for other reasons (ecosystem services it provides or because it's clearly decreased throughout its range, but not necessarily in the project area). Please just pick one (every restoration is enhancement, but every enhancement is not restoration).

- ○ Restoration (1)
- ○ Enhancement (2)

Q8.3 If you considered your project restoration, please briefly describe evidence for higher distribution/abundance in the region in the past.

_____

_____

_____

_____

_____

End of Block: Project Goals Description

Start of Block: Project Objectives: Oysters On Restoration Substrate

Q9.1

PROJECT OBJECTIVE: OYSTERS ON RESTORATION SUBSTRATES We want to know about **Olympia oysters on the restoration substrates** you deployed: how many you were aiming for, and how many you got. This is assessed by **different currencies – number of adults in the area, density of adults, or recruitment rates**. We'd like your order of magnitude guesses in all three currencies. For this question and the ones that follow on other metrics of restoration success, we first ask you whether your project had objectives in this category, and if yes, ask you to specify them and whether they were achieved.

Next, we will ask for your **best guess about what happened in this category** (changes to oyster numbers or whatever). **We want everyone to fill this portion out**, regardless of whether your project had objectives in this category.

We realize that most projects will not have detailed data, especially not for long time periods or broader areas. Please try to make an educated guess where you can. We know there are order-of-magnitude differences among projects (e.g. Elkhorn Slough project generates 100s of oysters; San Francisco project generates millions), so even ballpark, order of magnitude estimates are fine for this synthesis.

Make use of the optional comment box for each section to explain issues that make answering any of the questions difficult (project only 6 months old, no monitoring funding for this parameter, etc.).

Q9.2 **Oyster Numbers On Restoration Substrates**

○ Did the project have objectives regarding oyster numbers that would be hosted by the newly deployed restoration substrates? (Yes/No) (1)

_____

○ If yes, specify the objectives including spatial and temporal scale (e.g. at least 2000 oysters on the restoration substrates 5 years after they were deployed) (2)

_____

○ If yes, overall does it seem like the objectives were met? Explain briefly. (3)

_____

○ Were objectives met? (AM analysis add) (4)

_____

Q9.3 Using monitoring data or your best guess, how many adult Olympias were on the restoration substrates in the entire project area? (leave blank if substrates have been deployed for less than 5 or 10 years)

	0 (1)	<1000 (2)			<1 Million (5)	> 1 Million (6)
1 year after deployment (1)	☐	☐	☐	☐	☐	☐
5 years after deployment (2)	☐	☐	☐	☐	☐	☐
10 year after deployment (3)	☐	☐	☐	☐	☐	☐

Q9.4 Optional comments

_____

_____

_____

_____

_____

Q9.5 **Oyster Densities On Restoration Substrates**

○ Did the project have objectives regarding increases in adult oyster densities on restoration substrates in the immediate surrounding area? (Yes/No) (1)
_____

○ If yes, specify the objectives including spatial and temporal scale (e.g. density of at least 10 per m^2 after 2 years) (2) _____

○ If yes, overall does it seem like the objectives were met? Explain briefly (3)
_____

○ Were goals met? (AM- added for analysis) (4)
_____

Q9.6 Using monitoring data or your best guess, what were adult Olympia densities on the newly deployed restoration substrates
(leave blank if substrates have been deployed for less than 5 or 10 years)

	0 (1)				>1,000/m^2 (5)	Unknown (Can't guess) (6)
1 year after deployment (1)	☐	☐	☐	☐	☐	☐
5 years after deployment (2)	☐	☐	☐	☐	☐	☐
10 year after deployment (3)	☐	☐	☐	☐	☐	☐

Q9.7 Optional comments

_____

_____

_____

_____

_____

Q9.8 **Recruitment Rates On Restoration Substrates**

○ Did the project have objectives regarding recruitment rates (young of the year per m^2 per year) directly on the restoration substrates? (Yes/no) (1)

_____

○ If yes, specify the objectives including spatial and temporal scale (e.g.recruitment rates of at least 10 per m^2 per year) (2)

_____

○ If yes, overall does it seem like the objectives were met? Explain briefly. (3)

_____

○ Goals met? (AM- analysis add) (4)

_____

Q9.9
Using monitoring data or your best guess, what were Olympia recruitment rates (number of new live Olympias growing on substrates after 12 month period)

(leave blank if substrates have been deployed for less than 5 or 10 years)

	0 (1)				>1,000/m^2 (5)	Unknown (Can't guess) (6)
1 year after deployment (1)	☐	☐	☐	☐	☐	☐
5 years after deployment (2)	☐	☐	☐	☐	☐	☐
10 year after deployment (3)	☐	☐	☐	☐	☐	☐

Q9.10 Optional Comment

_____

_____

_____

_____

_____

End of Block: Project Objectives: Oysters On Restoration Substrate

Start of Block: Project Objectives: Oysters In Immediate Surrounding Area

Q10.1

PROJECT OBJECTIVE: OYSTERS IN IMMEDIATE SURROUNDING AREA Another potential metric of restoration success is increase in **oysters in the area immediately surrounding the restoration site**, due to increased recruitment. This is assessed by different **currencies – number of adults in the area, density of adults on existing hard substrates, or recruitment rates**, typically measured on bare substrates deployed for this purpose. We'd like your **order of magnitude guesses** in all three currencies. Definition of "immediate surrounding area" = band of appropriate elevation (e.g. shallow subtidal to mid intertidal) stretching about 500 m in either direction from project area, i.e. a 1 km area of shoreline excluding the project area (**do not include oysters on your restoration substrates** in the estimates – this is for the surrounding area only).

Q10.2 **Oyster Numbers In Immediate Surrounding Area**

○ Did the project have objectives regarding increases in oyster numbers in the immediate surrounding area? (Yes/no) (1)

_____

○ If yes, specify the objectives including spatial and temporal scale (e.g. increase by at least 20% in the number of live oysters in the surrounding area) (2)

_____

○ If yes, overall does it seem like the objectives were met? Explain briefly. (3)

_____

○ Goals met? AM- analysis add (4)

_____

Q10.3 Using monitoring data or your best guess, how many adult Olympia are in the surrounding area on average?

	0 (1)	<1000 (2)			<1 Million (5)	> 1 Million (6)
On average 5 year before the project (5)	☐	☐	☐	☐	☐	☐
On average 5 years after the project (6)	☐	☐	☐	☐	☐	☐

Q10.4 Optional comment

_____

_____

_____

_____

_____

Q10.5 Since the categories above only allow for detection of order-of-magnitude changes in oyster abundance, which are unlikely, we'd also like to ask you to take your best guess at the following:

Q10.6 Please choose the option that best describes what you think happened to adult Olympia **numbers in the immediate surrounding area** in the **5 years after restoration** (relative to the 5 years before restoration):

- ○ No significant change (numbers changed less than 25% after restoration) (1)
- ○ Significant increase (numbers increased >25% after restoration) (2)
- ○ Significant decrease (numbers decreased >25% after restoration) (3)

Q10.7 **Oyster Densities In Immediate Surrounding Area**

- ○ Did the project have objectives regarding increases in adult oyster densities on existing hard substrates in the immediate surrounding area? (Yes/no) (1)
_____
- ○ If yes, specify the objectives including spatial and temporal scale (e.g. increase by at least 20% in the density of live oysters on hard substrates near MLLW in the immediate surrounding area). (2) _____
- ○ If yes, overall does it seem like the objectives were met? Explain briefly. (3)
_____
- ○ Goals met? AM- analysis add (4)
_____

Q10.8 Using monitoring data or your best guess, what were **Olympia densities on existing hard substrates** at the appropriate tidal elevation in the immediate surrounding area

	0 (1)				>1,000/m^2 (5)	Unknown / can guess (6)
On average 5 years <u>before</u> the project (1)	☐	☐	☐	☐	☐	☐
On average 5 years <u>after</u> the project (2)	☐	☐	☐	☐	☐	☐

Q10.9 Optional Comment

_____

_____

_____

_____

_____

Q10.10 Since the categories above only allow for detection of order-of-magnitude changes in oyster density, which are unlikely, we'd also like to ask you to take your best guess at the following:

Q10.11 Please choose the option that best describes what you think happened to adult Olyimpa **density** in the **immediate surrounding area** in the 5 years after restoration (relative to the 5 years before restoration):

- ○ No significant change (density changed less than 25% after restoration) (1)
- ○ Significant increase (density increased >25% after restoration) (2)
- ○ Significant decrease (density decreased >25% after restoration) (3)

Q10.12 **Recruitment Rates In Immediate Surrounding Area**

- ○ Did the project have objectives regarding increases in recruitment rates in the immediate surrounding area? (Yes/no) (1)
  _____
- ○ If yes, specify the objectives including spatial and temporal scale (e.g. increase by at least 30% in the density of recruits on settlement plates deployed near MLLW in the surrounding area). (2) _____
- ○ If yes, overall does it seem like the objectives were met? Explain briefly. (3)
  _____
- ○ Goals met - AM analysis add (4)
  _____

Q10.13 Using monitoring data or your best guess, what were Olympia r**ecruitment rates** (number of new live olys **growing on substrates** after 12 month period) at appropriate tidal elevations in the immediate surrounding area

	0 (1)				>1,000/m^2 (5)	Unknown / can guess (6)
On average 5 years before the project (1)	☐	☐	☐	☐	☐	☐
On average 5 years after the project (2)	☐	☐	☐	☐	☐	☐

Q10.14 Since everyone monitors recruitment differently, briefly summarize how you calculated this (in particular the temporal component -- were you assessing substrates after one year, or after one month, etc.).

_____

_____

_____

_____

_____

Q10.15 Since the categories above only allow for detection of order-of-magnitude changes in oyster density, which are unlikely, we'd also like to ask you to take your best guess at the following:

Q10.16 Please choose the option that **best describes** what you think happened to Olympia r**ecruitment rates** in the **immediate surrounding** area in the **5 years after restoration** (relative to the 5 years before restoration):

- ○ No significant change (recruit density changed less than 25% after restoration) (1)
- ○ Significant increase (recruit density increased >25% after restoration) (2)
- ○ Significant decrease (recruit density decreased >25% after restoration) (3)

Q10.17 Optional comment on any of these aspects of oyster change in immediate surrounding area:

_____

_____

_____

_____

_____

End of Block: Project Objectives: Oysters In Immediate Surrounding Area

Start of Block: Project Objectives: Oysters In Larger Area

Q11.1 **PROJECT OBJECTIVE: OYSTERS IN LARGER AREA**

Another potential metric of restoration success is to **increase oysters in a larger area surrounding the restoration project**. Definition of “larger surrounding area” = band of appropriate elevation (e.g. shallow subtidal to mid intertidal) stretching about 10 km in either direction from project area, i.e. a 20 km area of shoreline excluding the project area (do not include oysters on your restoration substrates in the estimates – this is for the surrounding area only).

Q11.2 **Oysters In Larger Area**

○ Did the project have objectives regarding increases in oyster numbers in the larger surrounding area? (Yes/no) (1)

_____

○ If yes, specify the objectives including spatial and temporal scale (e.g. increase by at least 5% in the number of live oysters in the larger surrounding area). (2)

_____

○ If yes, overall does it seem like the objectives were met? Explain briefly. (3)

_____

○ Goals met? AM-anlysis add (4)

_____

Q11.3 Using monitoring data or your **best guess,** how many **adult Olympias** were in the **larger surrounding are**a?

	0 (1)				<1 Million (5)	>1 Million (7)	Unknown / can guess (6)
On average 5 years before the project (1)	☐	☐	☐	☐	☐	☐	☐
On average 5 years after the project (2)	☐	☐	☐	☐	☐	☐	☐

Q11.4 Since the categories above only allow for detection of order-of-magnitude changes in oyster abundance, which are unlikely, we'd also like to ask you to take your best guess at the following:

Q11.5 Please choose the option that **best describes** what you think happened to **adult Olympia numbers in the larger surrounding area** in the 5 years after restoration (relative to the 5 years before restoration):

- ○ No significant change (numbers changed less than 25% after restoration) (1)
- ○ Significant increase (numbers increased >25% after restoration) (2)
- ○ Significant decrease (numbers decreased >25% after restoration) (3)

Q11.6 Optional comment

_____

_____

_____

_____

_____

End of Block: Project Objectives: Oysters In Larger Area

Start of Block: Project Objective: Ecosystem Services

Q12.1 **PROJECT OBJECTIVE: ECOSYSTEM SERVICES**
Another potential metric of restoration success is **enhancement in desired ecosystem services**. We will ask you about three ecosystem services that are commonly considered for oyster restoration projects, and give you the option to provide information on any additional ones.

Q12.2 **Shoreline Protection**

○ Did the project have objectives regarding shoreline protection? (Yes/no) (1)
_____

○ If yes, specify the objectives including spatial and temporal scale (e.g. 10% decrease in bank erosion in 100 m stretch of adjacent shoreline after 10 years). (2)
_____

○ If yes, does it seem like the objectives were met? Explain briefly, summarizing any relevant monitoring data. (3) _____

○ Goals met? (AM- analysis add) (4)
_____

Q12.3 **Water Quality**

○ Did the project have objectives regarding water quality? (Yes/no) (1)
_____

○ If yes, specify the objectives including spatial and temporal scale (e.g. 10% decrease in chlorophyll concentrations in 5 hectare area around project after 5 years). (2)
_____

○ If yes, does it seem like the objectives were met? Explain briefly, summarizing any relevant monitoring data. (3) _____

○ Goals met? AM- analysis add (4)
_____

Q12.4 **Increased Abundance Of Desired Animal Species**

○ Did the project have objectives regarding particular animal species that might be affected? (Yes/no) (1) _____

○ If yes, specify the objectives including spatial and temporal scale (e.g. 20% increase in diving duck numbers in 1 hectare around project after 5 years). (2)
_____

○ If yes, does it seem like the objectives were met? Explain briefly, summarizing any relevant monitoring data. (3) _____

○ Goals met? (Am- analysis add) (4)
_____

Q12.5 **Other Ecosystem Services**

○ Did the project have objectives regarding other ecosystem services? (Yes/no) (1)
_____

○ If yes, specify the objectives including spatial and temporal scale (2)
_____

○ If yes, does it seem like the objectives were met? Explain briefly, summarizing any relevant monitoring data. (3) _____

○ Goals met? (AM- analysis add) (5)
_____

○ Optional comments on ecosystem services: (4)
_____

End of Block: Project Objective: Ecosystem Services

Start of Block: Project Objectives: Community Engagement

Q13.1 **PROJECT OBJECTIVE: COMMUNITY ENGAGEMENT**
Another potential metric of restoration success is involvement of the community in wetland habitats and stewardship.

Q13.2 **Community Engagement**

○ Did the project have objectives regarding community engagement? Yes/no (1)
_____

○ If yes, specify the objectives as precisely as possible (e.g. give at least 3 presentations to public and have at least 100 volunteer hours contributed to restoration and monitoring) (2) _____

○ If yes, does it seem like the objectives were met? Explain briefly, summarizing any relevant evidence or accomplishments. (3)
_____

○ Goals met? (AM- analysis add) (5)
_____

○ Optional comment on community engagement: (4)
_____

End of Block: Project Objectives: Community Engagement

Start of Block: Project Objectives: Anything Else??

Q14.1 **PROJECT OBJECTIVES: ANYTHING ELSE??** We've covered a lot of ground here, but we may have missed some other objectives that your team had set for your project…

○ Did the project have any other objectives besides the ones already covered above? (Yes/no) (4) _____

○ If yes, specify the objectives as precisely as possible. (5)
_____

○ If yes, does it seem like the objectives were met? Explain briefly, summarizing any relevant evidence or accomplishments. (6)
_____

○ Goals met? (AM- analysis add) (8)
_____

○ Optional comment on further objectives (7)
_____

End of Block: Project Objectives: Anything Else??

Start of Block: Challenges to Success

Q15.1
CHALLENGES TO SUCCESS

We want to better understand the factors that provided challenges to restoration success. We will ask you about **various common problems**. In each case, we'll ask you to **score how much of a problem each one was** for success of your project. For those of you with multiple sites, years or substrates included under a single project, **please consider this an average score**. We then follow up with an open ended question – here you can explain in more detail, for instance if the problem only occurred in a subset of sites or substrates.

Finally, we'll give you a chance to fill in additional challenges beyond the common ones we included.

Q15.2 **Sediment Burial**. One common problem is that **substrates deployed** to provide habitat for olys become **buried in mud**. This can happen when heavy substrates (like reef balls) sink in soft mud, or when storms deposit large amounts of sediment. This may include sedimentation rates, subsidence rates, and % cover by mud.

How much of a problem was burial in sediment for the success of this project?

- ○ Not at all (1)
- ○ Minor impact (4)
- ○ Major impact (5)
- ○ Unknown / Can't guess (6)

Q15.3 If sediment burial had an impact, please briefly describe, including quantification of sedimentation or subsidence rates if they were an issue:

_____

_____

_____

_____

_____

Q15.4 **Damage / Disintegration Of Restoration Substrates**. Another common problem is that **substrates fall apart** – shell bags unravel and shells scatter, reef balls that are stacked fall over in strong currents, etc.

How much of a problem was damage/disintegration of restoration substrates for the success of this project?

- ○ Not at all (1)
- ○ Minor impact (4)
- ○ Major impact (5)
- ○ Unknown / Can't guess (6)

Q15.5 If substrate damage/disintegration had an impact, please briefly describe:

_____

_____

_____

_____

_____

Q15.6 **Competition With Other Sessile Species**. Another common problem is that **other sessile species** occupy the deployed substrates, **competing for space or food**. We are **particularly interested in non-native competitors and space limitation**, so ask you to quantify cover of natives, non-natives, cryptogens (unknown whether native or not) and bare space (an indicator of how limiting space is). We're also curious whether your project set targets about non-native cover and ask you about that.

How much of a problem was competition with other sessile species for the success of this project?

- ○ Not at all (1)
- ○ Minor impact (4)
- ○ Major impact (5)
- ○ Unknown / Can't guess (6)

Q15.7 If other sessile species had an impact, please briefly describe:

_____

_____

_____

_____

Q15.8 Please estimate percent cover by the following on the restoration substrates 1 year after deployment:

	0% (1)				>75% (5)
Ostrea lurida (1)	☐	☐	☐	☐	☐
Crassostrea gigas (2)	☐	☐	☐	☐	☐
Other non-native spp (3)	☐	☐	☐	☐	☐
Cryptogenic spp (4)	☐	☐	☐	☐	☐
Other native spp (5)	☐	☐	☐	☐	☐
Bare space (6)	☐	☐	☐	☐	☐

Q15.9 If these numbers changed significantly after year 1, please explain:

Q15.10 Did your project have any specific targets a priori as to percent cover or abundance of non-native species (e.g., native cover must be greater than non-native cover)? (Yes/no)

- ○ Yes (4)
- ○ No (5)

Q15.11 If yes, please briefly summarize the targets AND whether they were reached.

_____

_____

_____

_____

_____

Q15.12 **Predation.** Another common problem is **predation on the oysters**. We are particularly interested in non-native predators and have some follow-up questions on them.

How much of a problem was predation for the success of this project?

- ○ Not at all (1)
- ○ Minor impact (4)
- ○ Major impact (5)
- ○ Unknown / Can't guess (6)

Q15.13 If predators had an impact, please briefly describe (be sure to identify the predator that caused the problem):

_____

_____

_____

_____

_____

Q15.14 Please **estimate density** of the following **invasive predators** on your restoration substrates and/or in the immediate surrounding area:

	Absent (1)			
Carcinus (1)	☐	☐	☐	☐
Urosalpinx (2)	☐	☐	☐	☐
Ocenibrillus (3)	☐	☐	☐	☐
Other predator, name: (4)	☐	☐	☐	☐
Other predator, name: (5)	☐	☐	☐	☐
Other predator, name: (7)	☐	☐	☐	☐

Q15.15 **Freshwater Events**. Another common problem is freshwater input, with periods of **prolonged low salinity leading to oyster mortality**.

How much of a problem was low salinity for the success of this project?

- ○ Not at all (1)
- ○ Minor impact (4)
- ○ Major impact (5)
- ○ Unknown / Can't guess (6)

Q15.16 If low salinity had an impact, please briefly describe. If possibly, specify the salinity levels and duration of the event(s) that caused problems.

_____

_____

_____

_____

_____

Q15.17 Approximately what is the average salinity in the project area during the three rainiest months of the year (typically Jan-Mar):

_____

_____

_____

_____

_____

Q15.18 **Lack of Recruitment.** Another problem is deployed substrates fail to accumulate oysters due to low recruitment.

How much of a problem was low recruitment for the success of this project?

- ○ Not at all (1)
- ○ Minor impact (4)
- ○ Major impact (5)
- ○ Unknown / Can't guess (6)

Q15.19 If lack of recruitment had an impact, please briefly describe:

_____

_____

_____

_____

_____

Q15.20 **Other Factors With Significant Impact On Restoration Success**. The list above is not comprehensive – oyster recruitment or survival can be affected by many other factors, including desiccation or thermal stress at higher elevations with long exposure periods, disease, hypoxia, etc. Please tell us about **any other major problems encountered**:

_____

_____

_____

_____

_____

End of Block: Challenges to Success

Start of Block: Lessons Learned

Q16.1 **LESSONS LEARNED**
You are almost done with this survey! Before you finish, the last topic we want to cover is lessons learned. What did you **learn** from doing this project that **could improve future projects**?

Please share any key lessons learned, in any of the topic areas below (you don't need to fill them all out, only where you have insights you want to share).

- Choice of location: (4) _____
- Substrate type: (5) _____
- Physical site conditions: (6) _____
- Biological conditions: (7) _____
- Human factors: (8) _____
- Anything else? (9) _____

Q16.2 Any other comment about anything else related to this project or survey?

_____

_____

_____

_____

_____

End of Block: Lessons Learned