

2020 ANNUAL REPORT - FINAL REPORT

Status: Submitted (05/03/2021 08:07:35 AM)

Project: R/SFA-2

Project Title: Crossbreeding and Selection for Resistance to Ocean Acidification in Pacific Oysters

PUBLICATIONS

No user response.

ECONOMIC IMPACTS

For each economic impact: (provide a description and numbers in all relevant categories)

- 1 Description
One aquaculture business and two jobs sustained (valued at \$29,130/yr each per BLS Employment Statistics), to pursue continued development of OA resistant Pacific oyster lines based on WSG-supported research. (\$29,130 * 2 = \$58,260) R/SFA-2
 - 2 Economic Impact (market and/or non-market \$)
58260
 - 3 Number of Businesses Created
0
 - 4 Number of Businesses Retained
1
 - 5 Number of Jobs Created
0
 - 6 Number of Jobs Retained
2
 - 7 Number of Patents
0
 - 8 Notes (please provide details on the project role in contributing to this impact, and how the impact was calculated)
Development and maintenance of hybrid oyster lines developed as part of this project are an integral component of Pacific Hybreed's inventory of oysters that are in use for commercial production of oysters potentially resilient to environmental factors related to climate change including potential resistance to acidification.
Pacific Hybeed has been significantly impacted by the Covid 19 pandemic, specific to the capacity of the company to operate. That notwithstanding, the company has moved forward with breeding specific lines of Pacific oysters created during this project (15x4 hybrid lines) that we believe will have positive and significant impacts in the years ahead.
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TOOLS, TECHNOLOGIES, INFORMATION SERVICES / SEA GRANT PRODUCTS

Response 1

- 1 Description of tool, technology, information service / Sea Grant product developed, and who is using it (if applicable):
WSG-funded researchers developed small scale larval rearing techniques, including a unique larval rearing chamber, to rear up to 50 larval oyster coulters simultaneously in a flow through seawater system; for use in aquaculture production. R/SFA-2
-
- 2 Developed this reporting period?
 No
-
- 3 Used during this reporting period?
 Yes
-
- 4 If being used, approximately how many people are using it?
5
-
- 5 Who are the users?
hatchery managers and technicians
-
- 6 Is this an ELWD product (used by stakeholders or program staff to advance environmental literacy and workforce development)?
 Yes
-
- 7 Notes (please provide additional details on how this tool, technology, information service / product is being used for ecosystem-based management and/or to advance environmental literacy and workforce development)
The development of small scale larval rearing techniques including a unique larval rearing chamber was developed over the course of this project. Specifically, the capacity to rear up to 50 larval oyster cultures simultaneously in a flow through seawater system was developed for use in this project. This system remains in production and provides a means for Pacific Hybreed to advance its goals in providing breeding to the shellfish industry on the US west coast.
The capacity for the US west coast shellfish industry to incorporate breeding science into the production of commercial stocks of shellfish (oysters, mussels, clams and geoducks) is a critical need. At the moment, there are very few breeding programs in the US that have the capacity to supply the industry with broodstock, larvae or seed to support commercial production in a changing environment. As a result, issues associated with mortality and reduced performance of shellfish in growout has been well documented, and likely related at least in part to a changing environment. Warmer summers, increased acidification and other changes on the grown for shellfish companies has resulted in reduced revenues and increased costs. The availability of shellfish that is genetically improved to address this shortfall will make a significant difference in the capacity of the shellfish industry to adapt to climate changes.
-

Response 2

- 1 Description of tool, technology, information service / Sea Grant product developed, and who is using it (if applicable):
WSG-funded researchers developed a broodstock tracking system offering increased biosecurity for long term holding and maintenance of valuable broodstock lines that may have inherent resilience to conditions associated with seawater having high dissolved carbonate content and low pH; for use by aquaculture industry. R/SFA-2
-
- 2 Developed this reporting period?
 No
-
- 3 Used during this reporting period?
 Yes
-

- 4 If being used, approximately how many people are using it?
3
-
- 5 Who are the users?
hatchery and farm technicians
-
- 6 Is this an ELWD product (used by stakeholders or program staff to advance environmental literacy and workforce development)?
 Yes
-
- 7 Notes (please provide additional details on how this tool, technology, information service / product is being used for ecosystem-based management and/or to advance environmental literacy and workforce development)
-

COMMUNITY HAZARD RESILIENCE

No user response.

ADDITIONAL PERFORMANCE MEASURES AND METRICS

Acres of coastal habitat Number of acres of coastal habitat protected, enhanced, or restored as a result of Sea Grant activities. The area (in acres) of ocean, coastal and Great Lakes habitat relieved of environmental stressors or returned to a more natural state through Sea Grant products. Coastal habitats include ocean, coastal, and Great Lakes habitats as defined in the Sea Grant legislation. Linear measures should either be converted to acres for this measure or reported as impacts or accomplishments. Indirect protection, enhancement, or restoration (e.g., through policy changes, fish stock enhancement, or habitat located downstream) should be highlighted in impacts or accomplishments, but not included in this measure. Examples: Acres cleared of marine debris; Acres of dunes enhanced; Acres of stream restored through dam removal

- 1 Value
-
- 2 Notes
-

Resource managers Number of resource managers who use ecosystem-based approaches in the management of land, water, and living resources as a result of Sea Grant activities. This measure indicates Sea Grant's role in informing decisions by delivering scientifically rigorous and integrated approaches to managing ocean, coastal and Great Lakes ecosystems to resource managers. Ecosystem-based approaches are integrated approaches to resource management that considers the entire ecosystem, including humans. They require managing ecosystems as a whole instead of separately managing their individual components or uses. NOAA's definition of ecosystem approaches to management is "management that is adaptive, geographically specified, takes account of ecosystem knowledge and uncertainties, considers multiple external influences, and strives to balance diverse social objectives." Resource managers who use ecosystem-based approaches to management (e.g., a formal incorporation of approach into decision-making, guidance documents, etc.) can be counted. If said resource manager continues to use the approach annually, then this can be counted annually.

- 3 Value
-
- 4 Notes (please provide details on the approach(es) and user(s), including connection to your Sea Grant project)
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Fishermen and seafood industry personnel Number of fishermen, seafood processing or aquaculture industry personnel who modify their practices using knowledge gained in fisheries sustainability and seafood safety as a result of Sea Grant activities. Tracks Sea Grant's success in assisting industry personnel with the adoption of responsible harvesting and processing techniques that improve social, economic and ecological sustainability. Industry personnel include recreational, commercial (wild and cultured), and subsistence fishery participants, processors, and retailers. Practices include techniques, technologies and best management practices adopted. Fisheries sustainability and seafood safety refers to any combination of the ability of the ecosystem to remain diverse and productive; the social, cultural, and economic resilience of the fishing community; personal or crew safety; and quality and safety of the seafood product. Interactions with industry personnel should result in a behavioral change. Thus, conferences, social media, or handouts on fishing practices should not count unless there is evidence of behavioral change (e.g., survey or personal communication). Examples: Fishermen who reduce bycatch mortality using circle hooks or bycatch excluder devices; aquaculturists who take steps to minimize the spread of pathogens; retailers who seek locally-sourced seafood and take steps to ensure seafood safety; fishermen who take additional precautions to remain safe at sea

5 Value

6 Notes

Communities - economic and environmental development Number of communities that adopt/implement sustainable economic and environmental development practices and policies as a result of Sea Grant activities. Number of communities that have improved sustainability by improving the balance of natural resource use and conservation. Communities refer to local governments (cities, towns, villages, townships, counties, or census designated places). Sustainable economic and environmental development practices and policies consist of actions by decision makers to support "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development). Examples: Communities that implement policy changes in land-use planning, working waterfronts, energy efficiency, climate change planning, smart growth measures, green infrastructure.

7 Value

8 Notes

Stakeholders - sustainable approaches Number of stakeholders who use sustainable approaches to address development, marine resources use, water quality, hazards and ecosystem health in marine and coastal areas as a result of Sea Grant activities.

9 Value

10 Notes

Stakeholders who receive information Annual number of stakeholders who receive information about marine and coastal ecosystems and issues as a result of Sea Grant outreach, communication, education or research programs. Please report all people reached with information for this performance measure, including those who attend presentations, receive brochures, receive technical assistance, participate in a workshop, etc.

11 Value

12 Notes

Volunteer hours Shows how Sea Grant coordinates individuals who are willing to donate time without payment for their time and services in order to help a state Sea Grant program accomplish the goals of its four-year plan. These hours include training required to become a volunteer. Examples: volunteers at a beach clean-up, ecosystem restoration, citizen science, or outreach/education event sponsored by Sea Grant

13 Value

14 Notes

P-12 students reached Number of P-12 students reached through Sea Grant-trained educators or directly through Sea Grant education programs Demonstrates the number of preschool through 12th grade (P-12) students who have increased environmental literacy by attending a Sea Grant-sponsored event or were reached by teachers who have utilized information in the year that they receive Sea Grant training. P-12 educators that attend Sea Grant workshops should be asked to provide the number of students that they reach to establish a multiplier for students reached. Only students reached in the report period should be counted.

15 Value

16 Notes

P-12 educators Number of P-12 educators who participated in Sea Grant education programs Indicates the number of P-12 educators who attend a Sea Grant-sponsored workshop or training (i.e., by an educator/extension agent) and can then enhance the environmental literacy of students for years to come.

17 Value

18 Notes

LEVERAGED FUNDING

1 Purpose/Description
Crossbreeding and Selection for Resistance to Ocean Acidification in Pacific Oysters

2 Source of leveraged funds
Department of Commerce Small Business Innovative Research Program

3 Leveraged funding start date:
05-01-2020

4 Leveraged funding end date:
03-31-2022

5 SG functional area
Research

- 6 Managed/influenced?
Influenced
-
- 7 Primary focus area
Sustainable Fisheries and Aquaculture
-
- 8 Amount of leveraged funding
80000
-
- 9 Comments for PIER
-
- 10 Notes
WA Sea Grant funds added significant capacity for Pacific Hybreed to advance the company's goals as related to breeding for increased resilience to acidification and other climate induced stressors.
The Dept. Commerce SBIR grant has the intent to use genetic lines for broodstock development that were developed as part of this research. The project has been postponed due to Covid-19, however.
-

STUDENTS SUPPORTED

No user response.

MEETINGS, WORKSHOPS, PRESENTATIONS

No user response.

PARTNERS THIS PERIOD

1	Partner Name	Scale	Type
	Baywater Shell Company	REGIONAL	Industry/Business

Notes

Baywater Shellfish Company is an integral partner associated with the research. All broodstock lines are maintained by this partner on farm facilities located on Hood Canal, WA

IMPACTS AND ACCOMPLISHMENTS - QUESTIONS

Relevance - Briefly explain:

- 1 Why is this work important?
The development and availability of improved broodstock Pacific oysters that are resilient to climate change induced stressors remains a critical need in the west coast shellfish industry.
-
- 2 Who benefits from your research? Who is your target audience?
Shellfish growers including commercial hatcheries and consumers of shellfish.
-
- 3 What is the goal of your project?
To breed Pacific oysters having resilience to acidification and other climate change induced stressors.
-

Response - Briefly explain (without using jargon):

- 4 What steps did you take this past year toward your goal?
To regenerate brood lines of oysters from the original genetic lines created in 2015
-

Results

- 5 How is your research changing the issue or resolving the issue that it addresses?
Breeding for resilience to climate change induced resilience is a long term goal. This project assisted in initiating the work necessary to develop lines of Pacific oysters resilient to climate change induced stressors including acidification.
-
- 6 What changes have you confirmed as a result of your project? Provide specific information or percentage metrics where available.
NA - the work remains in progress
-
- 7 Do you have any stories or anecdotal comments from stakeholders about how your research positively changed how they work or improved their lives? Please describe.
NA
-
- 8 In 10 or 15 years, how will your research change the world for the better?
The availability of oyster seed from Pacific Hybreed will enable shellfish growers to sustainably rear oysters in the face of a changing climate.
-

Recap

- 9 Write in one sentence the accomplishments for this past year, or the sum result or impact of your work and the broader impacts of your research.
We are on the road to developing resilient lines of Pacific oysters and other shellfish to climate induced changes in the environment.
-

Additional Information

- 10 Additional Comments
-
- 11 Primary Focus Area
Sustainable Fisheries and Aquaculture
-
- 12 Secondary Focus Area
 Resilient Communities and Economies
-
- 13 Goals
 Aquaculture operations and shellfish harvests are safe, environmentally sustainable and support economically prosperous businesses. Coastal communities and economies are vibrant and resilient.
-
- 14 Partners
Baywater Shellfish Company
Hog Island Shellfish Company
Chelsea Farms
-

NARRATIVE

1 Narrative Title
Crossbreeding and Selection for Resistance to Ocean Acidification in Pacific Oysters - Final report

2 File Name
WSG_Final_Report.pdf

DATA SHARING PLAN UPDATE

1 Have you met the requirements of your data sharing plan?
 Yes

2 If no, please provide any updates on how you are planning to share your data.

3 If yes, please provide the following details: description of dataset(s); data ownership; data location (publicly available); release date

FUNDS SPENT INTERNATIONALLY

1 Total Sea Grant funds spent internationally
0

2 Notes (please provide details)

ADDITIONAL DOCUMENTS

No user response.