

Title: Hatchery Capacity & Technology Development to Secure Oyster Seed Supply in Alaska

Organization: Alaska Fisheries Development Foundation (AFDF)

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Priority Addressed: Priority #2 – Science or Technology that Promotes Sustainable U.S. Seafood Production and Harvesting

Background: In 2014, the Alaska Fisheries Development Foundation (AFDF) began spearheading the *Alaska Mariculture Initiative* – a strategy to accelerate the development of mariculture in Alaska. The Initiative led to the establishment of the Alaska Mariculture Task Force by AO #280 and #297 under Governor Walker and the adoption of a statewide comprehensive plan, called the Alaska Mariculture Development Plan (Plan) with the goal to grow a \$100 million mariculture industry in 20 years. A tangible indication of success is the significant increase in applications received by the state for aquatic farms, hatcheries or nurseries in 2017 and 2018. For example, in 2016, the state received only 4 applications. In 2017 and 2018, the state received 16 and 17 applications, respectively, for a total of 33 in 2 years. *The Initiative has raised awareness, interest and investment in mariculture opportunities in Alaska.*

Shellfish and seaweed hatcheries are an integral piece of infrastructure required for any mariculture development and securing seed supply through hatcheries is the #1 priority recommendation of the Plan. OceansAlaska is a marine science center and shellfish hatchery, located in Ketchikan, Alaska. Its mission is to support the mariculture industry by developing the capacity to produce commercial quantities of Pacific oyster seed for shellfish farmers in Alaska and the lower 48. To accomplish this goal, professors Eckert and Langdon, university researchers and graduate students will work directly with OceansAlaska on training, transfer of best practices and technology development to secure seed supply for Pacific oyster (*Crassostrea gigas*) farms in Alaska. AFDF will provide project, financial, and grant management as well as utilize existing organizational networks for outreach and education on project results.

Rationale: The Alaskan shellfish farm industry as a whole (including oysters, geoduck and clams) is still new, with an annual production around \$1 million. The mariculture industry in Alaska includes primarily small businesses, yet recent initiatives and economic opportunity are attracting larger investments in oyster farming. For example, in 2017 and 2018, Alaska received 12 new oyster farm applications, two of which will require an additional 50-60 million oyster seed per year. The industry is poised to grow and provide economic opportunities and jobs in coastal communities, diversifying economies that have historically been fishing communities. *The lack of adequate, consistent and locally-sourced seed supply is a critical limitation to the existing oyster industry and a hurdle to expansion.*

Pacific oysters are non-native and do not reproduce in Alaska because historically the water was too cold. Larvae are currently supplied to Alaskan hatcheries from Hawaii and Oregon and,

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in times of high demand, Alaskan hatcheries are at the low end of the supply list. In the face of climate change, Alaskan hatcheries can provide resilience for the West Coast oyster industry and could be a backup seed source in the future. This project will develop methods to rear larval & juvenile oysters in Alaska and expand the capacity of hatcheries and the developing mariculture industry. The proposed project is extremely well positioned to fulfill the objectives of the S-K Grant Program by addressing the needs of fishing communities in optimizing economic benefits by realizing the full potential of U.S. fishery resources.

Goal, Objectives & General Methodology: *The overall goal of this project is to support the development of mariculture in Alaska through increased oyster hatchery capacity and seed security.* This goal will be accomplished through the following objectives:

- **Objective #1: Examine the performance of oysters from the Molluscan Broodstock Program (MBP), including comparisons to triploid lines, in Alaskan hatcheries and nurseries.** MBP has been producing and selecting Pacific oysters since 1996. The broodstock population is based on six founder cohorts of 50 families each, produced from 600 "wild" oysters collected from different areas on the West Coast. Cohorts of Pacific oyster families that are produced in a pilot-scale hatchery located at the Hatfield Marine Science Center, Oregon State University (OSU) will be shipped to OceansAlaska, and larvae and juvenile oysters (spat) will be reared on algal diets in the nursery. Spat will be distributed to FLUPSY nurseries in the shellfish industry in Alaska, and growth will be measured for each family line. Triploid oysters sourced from Hawaii will be treated similarly and compared to the MBP lines (long-term, collaborative plan with farmers to track survival and yields to production size).
- **Objective #2: Conduct research to develop reliable and effective methods to rear larval & juvenile oysters in Alaska.** Larval oysters are not currently reared in Alaskan hatcheries; rather eyed larvae and spat are imported from out of state and then spat are grown in hatcheries and nurseries. Alaskan hatcheries have facilities to rear larvae including algal culture, but challenges exist as a result of limited personnel, cooler water, and limited hatchery space. A MS graduate student will be funded on this project to develop reliable and effective methods best suited to Alaska, including exploring high-density throughput larval rearing techniques recently developed in Brazil. The methods will be shared in a hatchery manual to transfer this technology to other hatchery managers.
- **Objective #3: Develop hatchery capacity and technologies in Alaska.** Hatchery personnel will travel to the OSU pilot-scale hatchery and OSU personnel will travel to OceansAlaska for technology transfer and training in best practices. OSU and UAF faculty will provide expertise to hatchery personnel and will supervise the trained MS graduate student.

Required Permits: OceansAlaska currently has State of Alaska broodstock acquisition and transport permits and approval for seed source distribution.

Estimated budget amount: \$297,000