ALASKA AQUACULTURE ACCOMPLISHMENTS

FISCAL YEAR 2025

NOAA FISHERIES

SEPTEMBER 2025

U.S. Department of Commerce | National Oceanic and Atmospheric Administration | National Marine Fisheries Service

National Marine Fisheries Service

Alaska Aquaculture Program

AQUACULTURE ACCOMPLISHMENTS

Fiscal Year 2025

U.S. DEPARTMENT OF COMMERCE

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National Marine Fisheries Service

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Acknowledgements

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Credits

Illustrations by Juliana Cornett.

Alaska Region's Fiscal Year 2025 Aquaculture Accomplishments

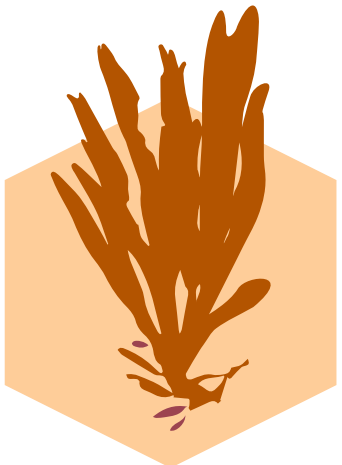
NOAA's Aquaculture Program supports cutting edge science and policies to foster sustainable domestic aquaculture growth. Produced responsibly, as it is here in the United States, aquaculture is one of the most resource-efficient ways to produce healthy food. By expanding domestic aquaculture, in harmony with wild-capture fisheries, NOAA helps create jobs, support coastal communities, and ensures healthy home-grown seafood for American families.

Strategic Alignment

The NOAA Fisheries Alaska Aquaculture Program has strategically aligned our annual activities to support President Trump's Executive Order 13921, "Promoting American Seafood Competitiveness and Economic Growth," and NOAA's 2023-2028 Aquaculture Strategic Plan, which lays out a framework to support a thriving, resilient, and robust U.S. aquaculture industry as part of a resilient seafood sector. The NOAA Fisheries Alaska Aquaculture Program has translated these directives into annual accomplishments through advancing the following four goals:

1. Manage Sustainably and Efficiently
2. Lead Science for Sustainability
3. Education and Exchange Information
4. Support Economic Viability and Growth

Each of the 15 projects listed below links back to a NOAA strategic goal and objective. This report highlights updates on the actions that supported each of the above Alaska aquaculture priorities, as well as updates on other notable accomplishments over the past year.



Goal 1:
Manage Sustainably and Efficiently

Objective 1A: Identify Aquaculture Opportunity Areas (AOA) to support planning for commercial aquaculture development in locations that reduce user conflict, maximize compatible uses, and minimize impacts to public trust resources through scientific analysis and public engagement

Project 1: State and Federal Engagement in the AOA Identification Process

The NOAA Fisheries Alaska Regional Office continues to engage with state and federal partners through the AOA Interagency Working Group. This Working Group includes participants from state and federal aquaculture regulators, including:

- Alaska Department of Natural Resources
- Alaska Department of Fish and Game
- Alaska Department of Environmental Conservation
- NOAA Fisheries Alaska Region
- U.S. Army Corps of Engineers

Assistant Regional Aquaculture Coordinator Hannah Wilson (left), Alaska Sea Grant Fellow Emily Reynolds (center), and NOAA Fisheries Alaska Regional Aquaculture Coordinator Alicia Bishop (right) enjoying Ketchikan during the Seagriculture Conference. Credit: NOAA Fisheries Credit: NOAA Fisheries

The Working Group is chaired by Alaska Regional Aquaculture Coordinator Alicia Bishop. The group's function is to increase coordination and collaboration across aquaculture constituents, finalize the AOA spatial analysis in an Atlas report, frame alternatives for the National Environmental Policy Act (NEPA) analysis, provide feedback and suggestions on AOA siting within Alaska to minimize user conflicts and maximize production, and help identify appropriate locations for AOAs in Alaska. To date, the Working Group has: finalized AOA study areas, developed planning goals, held two spatial planning workshops, and gathered input on draft AOA options.

Project 2: Soliciting Public Input on AOAs

NOAA Fisheries published a Notice of Availability releasing the preliminary results of the marine spatial planning study in April 2025. It included the identification of draft Aquaculture Opportunity Area options.

- The marine spatial planning study *An Aquaculture Opportunity Analysis for the Gulf of Alaska* summarizes the methods and analysis used to develop the draft AOA options and related suitability modeling efforts
- The National Center's for Coastal Ocean Science (NCCOS) WebMapper shows the layers for individual maps contained in the marine spatial planning study, as well as the locations of the draft AOA options

We received four oral comments from our listening sessions and 35 written comments. NOAA and the Interagency Working Group are considering the information received as we finalize the results of the marine spatial planning study and draft the Alaska Atlas, which is anticipated for release in December 2025.

This is a major step in NOAA's effort to advance aquaculture by identifying AOAs as directed by the Executive Order "*Promoting American Seafood Competitiveness and Economic Growth*" (May 7, 2020). This was a collaborative effort between NOAA Fisheries, NOAA's NCCOS, and the State of Alaska.

Project 3: Publishing an AOA Seaweed Source Inventory for AOA Spatial Analysis

To maintain genetic diversity, the Alaska Department of Fish & Game (ADF&G) requires that spores from 50-60 wild kelp plants be gathered within 50 km of the farm each year to seed the farm, so that many local individual plants contribute to the genetic makeup of the farm and any spores released from farmed seaweed will have a diverse and similar genetic makeup relative to local wild stocks.

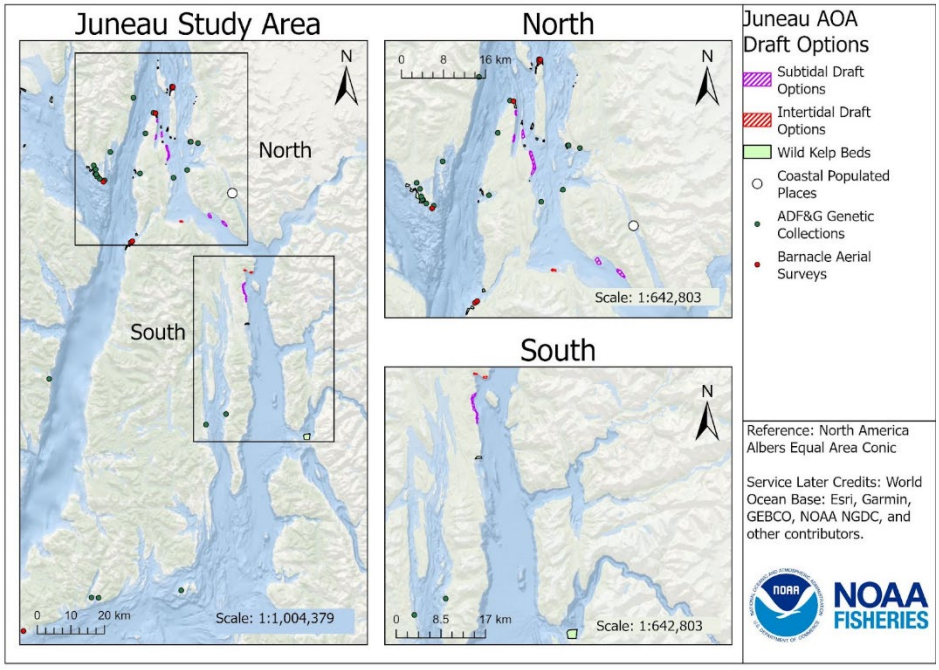


Figure 1: *Example map of wild kelp beds (green) and draft AOA options within the Juneau study area. Intertidal options are displayed in red and subtidal options in purple. Additional data points include ADF&G genetic kelp collections (green centroids) and Barnacle Foods aerial kelp surveys (red centroids).*

Also known as the 50-50 rule, this guideline requires that kelp farms be sited within 50 km of natural beds. To support current and prospective farmers in meeting the 50-50 rule, the Alaska Regional Office partnered with an Alaska Sea Grant State Fellow who took the lead in developing a seaweed source inventory. This project updated spatial data on the location of wild

seaweed beds within AOA study areas to aid in the AOA spatial and NEPA analyses. This effort involved two components:

- A participatory mapping process using SeaSketch, in which active seaweed farmers, hatchery workers/operators, and others with local knowledge were interviewed and asked to map known wild kelp beds
- Compiling best available existing seaweed data sources (e.g., Shorezone)

Together, these approaches were used to develop updated spatial data on the location of wild seaweed beds within AOA study areas to aid in the AOA environmental characterization. Eleven participants contributed to the mapping process across the AOA study areas.

Table 1: Data on mapped wild seaweed beds within AOA study subregions in Alaska from the participatory mapping effort.

Study Area Subregion	Number of Mapped Beds	Total Area of Mapped Beds (km^2)
Southeast	107	31.72
Southcentral	14	1.07
Southwest	19	27.69

Feature Story:
https://www.fisheries.noaa.gov/feature-story/mapping-alaskas-wild-kelp-beds-farmers

Publication:
Shapefile data download for Alaska seaweed source inventory on the NOAA Geoplatform
https://noaa.maps.arcgis.com/home/item.html?id=2f8c08abb1fb4d02a8a3f0c9603130b0

Project 4: Incorporating Protected Resources Information into AOA Spatial Analysis

NOAA Fisheries' Alaska Region Protected Resources Division provided protected species information as part of the AOA spatial analysis to ensure the process used the best available science to help identify areas suitable for commercial aquaculture while minimizing impacts to NOAA trust resources.

In order to holistically consider protected species, NCCOS developed a combined data layer reflecting the overall suitability scores for protected species within the Alaska AOA study areas.

Although protected species occur throughout all study areas, only the Kodiak and Sitka areas contained overlapping datasets sufficient to build a combined data layer. In Kodiak, this included feeding areas for the North Pacific right whale, gray whale, and fin whale, along with Steller sea lion haulouts and rookeries. In Sitka, the data included gray whale feeding areas and Steller sea lion

haulouts and rookeries. For the remaining eight study areas, only Steller sea lion haulouts and rookery data were included for modeling.

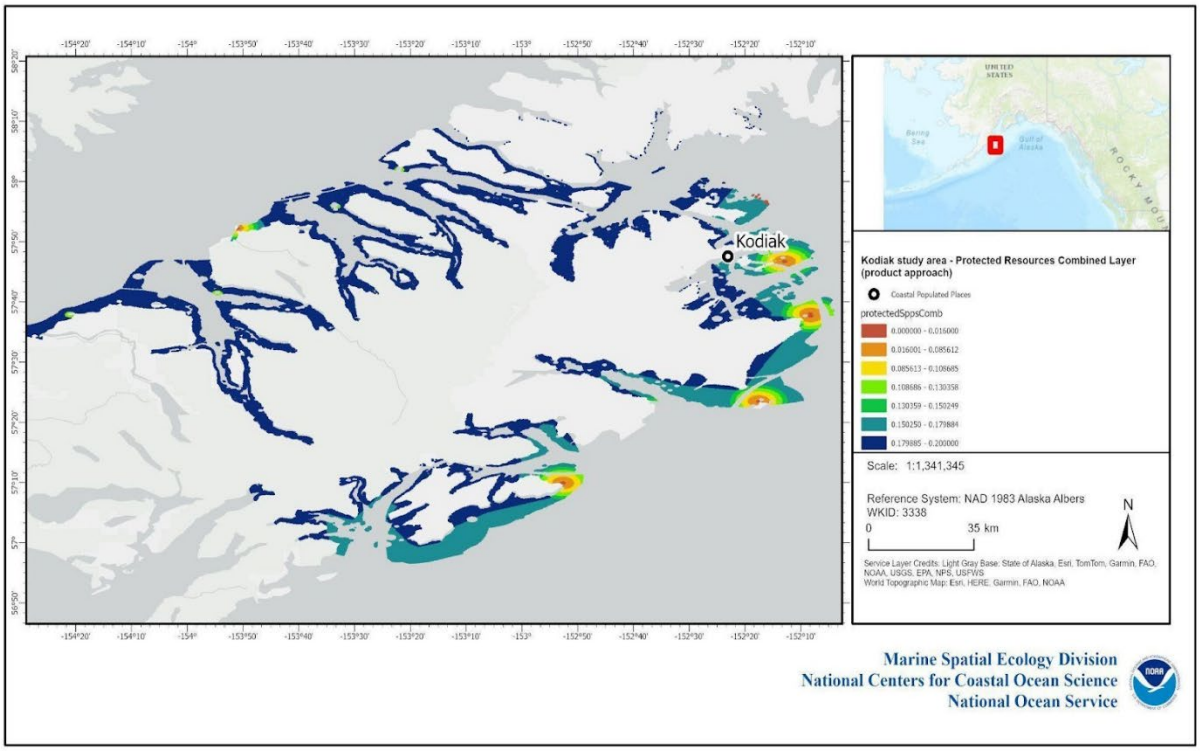


Figure 2: *Final combined scores from the protected resources combined data layer for the Kodiak study area, generated using the product method. Colors closer to blue indicate areas that are more suitable for aquaculture based on anticipated presence of protected species, whereas colors closer to red are less suitable (NOAA 2025, Protected Resources Memo).*

Information on this modeling effort will be included in the Alaska AOA Atlas under the Natural Resources section. In addition, information on species not included in modeling will be included, as appropriate, in the Characterization section of the Atlas. This information is critical in helping determine the most suitable AOA options and will help inform the development of alternatives for the upcoming NEPA.

Goal 2:
Lead Science for Sustainability

Objective 2A: Provide science-based products and tools, including bolstering the translation of research results into advice that supports regulatory and management decision-making Assessing the Potential Habitat Provisioning of Kelp Aquaculture Farms in Alaska

Project 5: Assessing the Potential Habitat Provisioning of Kelp Aquaculture Farms in Alaska

This project assesses the habitat provisioning of kelp farms in Southeast Alaska and Kodiak Archipelago, with a focus on species of commercial and regulatory importance in Alaska. We are applying a three-pronged approach to assess how local kelp farms, natural kelp beds, and control sites provide habitat for fish and invertebrate species:

1. Visual surveys with SCUBA divers or GoPro cameras to identify which species are using kelp as habitat in natural kelp beds, non-farm control sites, and farm locations
2. Standard Monitoring Units for the Recruitment of Fish (SMURFs) to capture specimens and confirm abundance and species composition in natural kelp beds, non-farm control sites, and farm locations
3. Environmental DNA (eDNA) to further confirm which species are present and identify species missed by the first two methodologies

This is a collaboration between the Alaska Fisheries Science Center, NOAA Restoration Center, Alaska Regional Office, and Alaska kelp farmers.

Alf Pryor, owner of Alaska Ocean Farms in Kodiak holds up sugar kelp. Credit: NOAA Fisheries

Kodiak

Year 1 work started in 2023 and was focused on visual surveys on Kodiak farms and natural kelp beds. We created a short film highlighting this research framework, and the close collaboration with local kelp farmers. Year 2 expanded to include new methodologies (visual surveys, eDNA, and fish recruitment devices), and we developed a second film exploring whether kelp farms provide habitat

for animals. Water column temperature, salinity, and nutrient concentrations were also measured concurrently with ecological sampling. The Kodiak research project compared local kelp farms and natural kelp beds.

For Year 3 the Kodiak focus was on developing a new camera system with farmer Alf Pryor, and assessing current SMURF collection techniques and data review.

Our results will help inform future regulatory consultations, and will help reduce negative impacts and enhance the benefits of Alaska kelp farms to native species.

NOAA researchers (Becca Cates, Hannah Ingerson, Kalei Shotwell, Krystal Renta, Jordan Hollarsmith, and Erika Ammann) collaborate with Sea Quester Farms (Olivia Dunner and Brielle Sansone) to assess kelp habitat provisioning in Juneau. Credit: NOAA Fisheries

Southeast Alaska

Surveys focused on fish and invertebrate communities inside and outside two kelp farm leases on the eastern coast of Admiralty Island in Juneau. Surveys were conducted in:

- Summer 2024 (before farm infrastructure was installed)
- Winter 2025 (after farm infrastructure was installed but before kelp was large)
- Spring 2025 (when kelp was at peak biomass)
- Summer 2025 (after harvest and when most of the gear had been removed)

Data collected includes visual surveys via SCUBA of fish, invertebrates, kelp, substrate characteristics, eDNA, nutrient concentrations, water column temperature, and salinity. Data collection was completed in August 2025, and analysis will now begin.

Film:

Do Alaska Kelp Farms Provide Habitat for Animals?

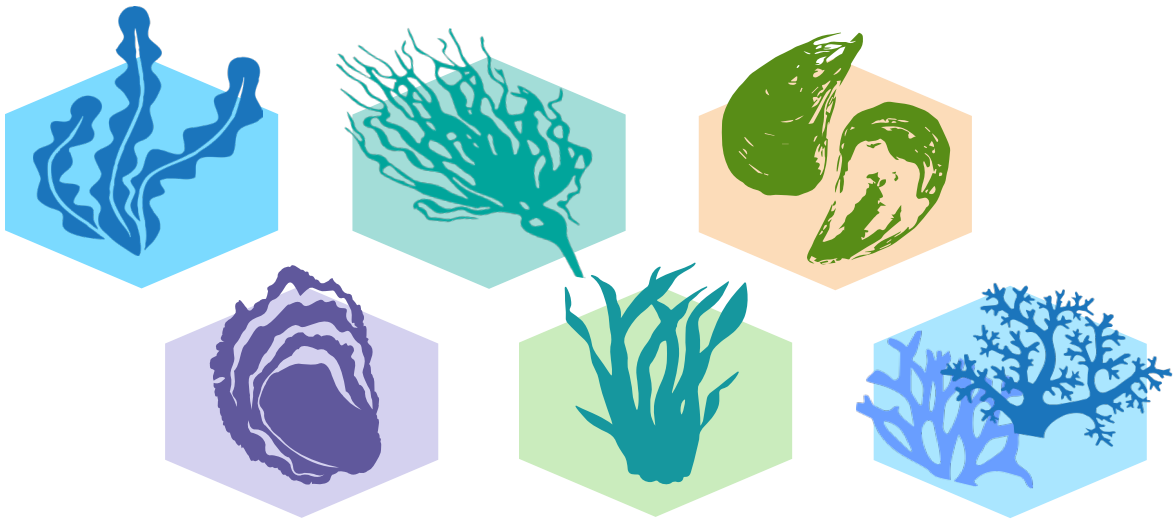
https://videos.fisheries.noaa.gov/detail/videos/aquaculture/video/6369110727112/do-alaskan-kelp-farms-provide-habitat-for-animals?autoStart=true

Objective 2B: Conduct coordinated, applied scientific research to support industry development, including innovations to improve industry success

Project 6: Assessing Novel Technologies for Early Warning of Harmful Algal Blooms

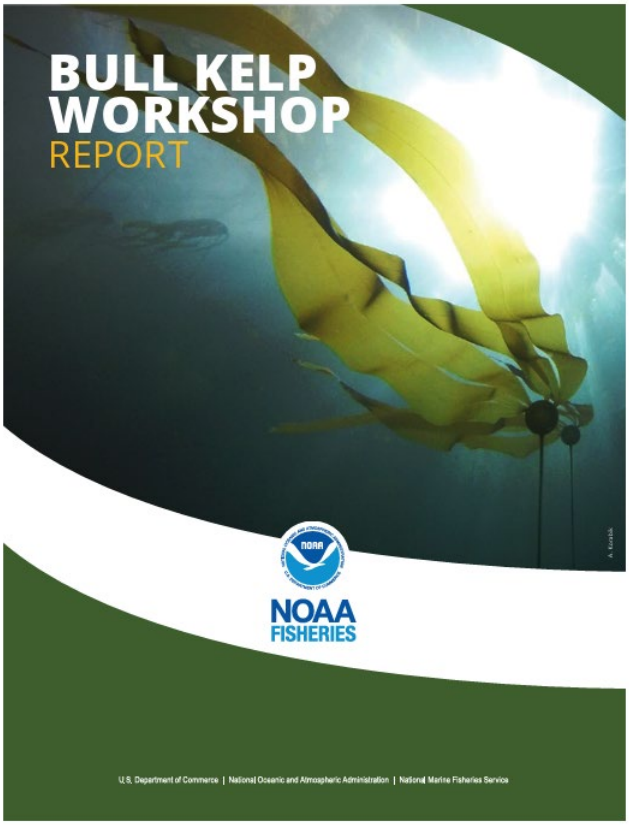
Harmful algal blooms (HABs) are a major threat to human health and the sustainable growth of the shellfish aquaculture industry. Consuming shellfish that have accumulated HAB biotoxins can result in paralysis, amnesia, death, gastrointestinal upset, or death for humans and marine mammals. In Alaska, HABs have directly affected local communities and economies by forcing farm shutdowns and disrupting recreational and subsistence shellfish harvest. Shellfish farms may be closed for sales for weeks to months when their product tests above the limits for biotoxins produced by the blooms.

In 2025, we continued work to assess methods for detecting *Alexandrium catenella*, a HAB species, and paralytic shellfish toxins (PSTs) by testing the PlanktoScope, a low-cost (< $5,000), open-source digital microscopy platform designed to image and identify plankton, as a HAB early warning tool for Alaska shellfish farmers and harvesters. This technology has the potential to provide farmers and harvesters with actionable information regarding the presence of HAB species, which would allow them to take mitigation steps to reduce the impact on farm operations and human health. Work is underway to use the PlanktoScope to monitor zooplankton grazer presence as well. HABs are difficult to predict and the mechanism for PST production is not clear, but it has been hypothesized that toxin production by harmful algal species (e.g. *Alexandrium* spp.) may act as a chemical defense against marine zooplankton grazers. Additionally, we are evaluating PSP Alert by Sensoreal, a new semi-quantitative rapid test kit for HAB toxins in shellfish tissue.



Project 7: Bull Kelp Research Squad Workshop

Bull kelp (*Nereocystis luetkeana*), found along the North American West Coast, is a species of kelp highly prized for both its ecological and commercial value. Bull kelp is unique among kelps because its stipe, in addition to its blades, is extremely palatable for human consumption and can be used for a variety of products such as pickles, salsa, and other foods. Currently, all bull kelp on the market is sourced from wild harvest, but, with supply limitations and environmental threats to the persistence of bull kelp forests, farmers and producers are working to develop bull kelp farming techniques to source this desirable species. However, due to the unique morphology of bull kelp (i.e., hollow stipe, highly buoyant), traditional kelp farm arrays have not been successful in producing a desirable product.



In November 2024, NOAA Fisheries Alaska Fisheries' Science Center and Alaska Regional Office hosted a Bull Kelp Workshop in Kodiak. Twenty-two participants from across Alaska were joined by 20 online participants for speaker sessions. Practitioners from California, Oregon, Washington, and British Columbia—throughout the range of bull kelp—participated in the sessions. This workshop was the outcome of the Bull Kelp Research Squad (BKRS), composed of bull kelp farmers and researchers in Alaska. BKRS was formed to:

- Document the current research underway
- Address the successes and challenges of farming bull kelp
- Collaborate to develop a proof of concept that bull kelp can be farmed

Thus far BKRS has shared innovations in farm and experimental design, discussed the successes and challenges of growing bull kelp, compiled a list of prioritized questions for future research, written standard operating procedures for monitoring across different experimental and farm designs, and submitted proposals for further collaborative research. Continuing work by this group will center on innovations in array design and hatchery strategies, as well as developing a better understanding of the ecology of natural kelp beds and how environmental factors impact growth. By collaborating and sharing innovative designs for arrays and seeding methods, BKRS is establishing the basis of an industry that could be unique to Alaska. For more information on BKRS please visit this website.

Project 8: The Effect of Glacial Silt on Pacific Oyster Physiology, Growth, and Condition

Alaska's aquaculture industry is set to grow rapidly within the coming years. The cold, nutrient-rich waters of Alaska support the growth and quality of Pacific oysters (*Crassostrea giga)*. Because oyster farms are typically located near the coast, they may be influenced by glacial outflow. As glaciers recede, the bedrock erodes, creating small, silt-sized particles called glacial silt. The silt may be carried to the surrounding waters where oyster farms are located, possibly affecting oyster physiology and condition. To better understand the potential effect of glacial silt on Pacific oysters, experimental trials were conducted at the Alaska Fisheries Science Center Mariculture Research Hatchery at the Ted Stevens Marine Research Institute in Juneau. Oysters were placed in control (0.0 g/L), medium (0.1 g/L), and high (0.2 g/L) glacial silt treatments as seen in Alaska's coastal waters.

Hump Island oysters in Ketchikan. Credit: NOAA Fisheries

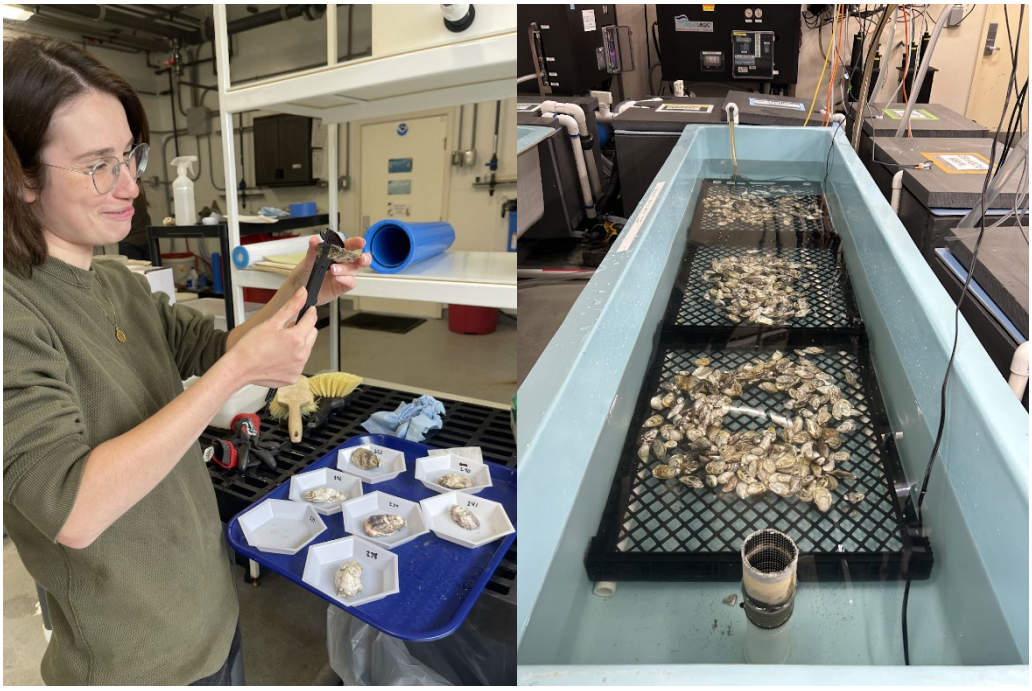
A 2-hour pilot study looking at short-term oyster physiological response showed a trend where increased clearance rate (filtering more water) occurred with increased silt concentrations. However, this negatively affected filtration efficiency, indicating that oysters spent more energy sorting food from sediment. Even though short-term exposure to glacial silt affects Pacific oyster physiology, a month-long study assessing chronic exposure demonstrated different results. Preliminary results indicate that glacial silt does not significantly affect Pacific oyster mortality, growth, and condition over time.

These findings highlight the impressive adaptive capability of Pacific oysters. While oyster physiology over the short term has been affected, overall growth and condition were not affected over the long term. Overall, these findings suggest that Pacific oysters are resilient organisms capable of being cultivated throughout the glacially influenced waters of Alaska, supporting growth of the state's aquaculture industry.

Project 9: Advancing Production of Pacific Oysters in Alaska through Field Testing, Hatchery Research, and Farmer Collaboration

In 2025, work continued to develop the Alaska Fisheries Science Center Mariculture Research Hatchery (MRH) at the Ted Stevens Marine Research Institute in Juneau. The MRH is now fully equipped for oyster spawning and rearing, including heated seawater capabilities, tanks and other equipment necessary for oyster conditioning and larval rearing, and photobioreactors to grow dense microalgae cultures. The space was also home to multiple experiments that addressed regulatory and industry-driven questions regarding oyster site suitability, regional variation in growth, and response to stressors such as harmful algal blooms (see projects 8, 10, and 12). Oysters were

successfully spawned in 2025 as a proof-of-concept for the functionality of the hatchery. To date, more than $1.6 million has been procured through external funding to support personnel, infrastructure, and collaborative research projects. We are ensuring no accidental release of oysters by carefully handling oysters when they are out of cages and otherwise keeping them enclosed in suspended plastic cages or floating metal cages that are resistant to sea otter tampering. To further avoid naturalization through reproduction, we are assessing gonadal development when working with larger oysters and have observed only immature gamete production. Most experimental oysters are too small to be reproductive.



Emily Reynolds (Alaska Sea Grant State Fellow) measures cup depth on oysters. The Alaska Fisheries Science Center Kodiak lab houses oysters before deploying on farms. Credit: NOAA Fisheries

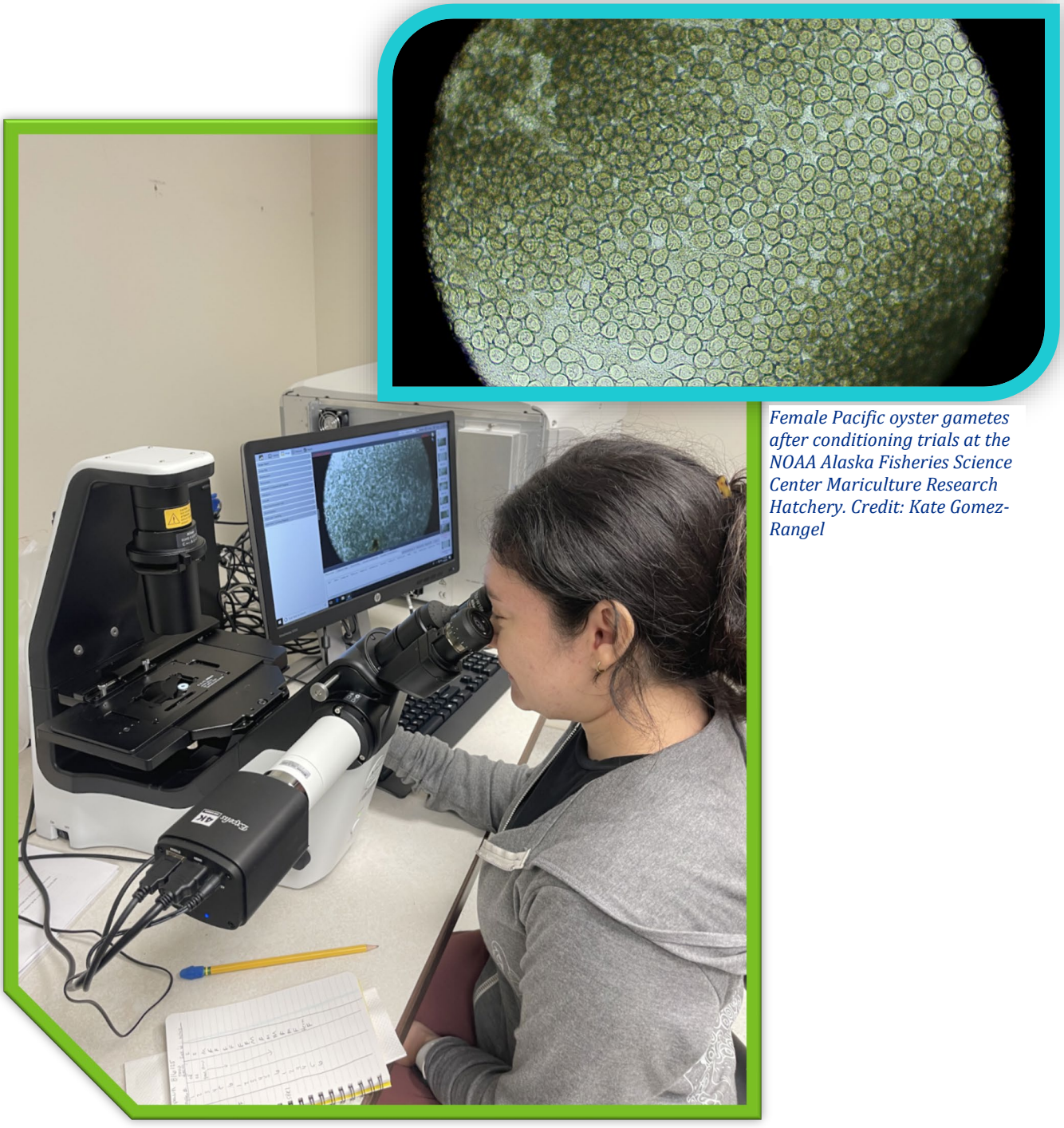
Project 10: Develop Improved Pacific Oyster Seed

Although the oyster industry is poised for rapid expansion in Alaska, the lack of oyster strains optimized for growth in Alaska present significant hurdles for current and future farm operations. Hatcheries in Alaska struggle to spawn Pacific oysters successfully, consistently, and cost-effectively, which creates a reliance on larvae supplied from outside the state. Oyster strains cultivated in out-of-state hatcheries have been bred for optimized growth in the Pacific Northwest where the range, seasonality and variability of temperature, pH, tidal amplitude, and salinity patterns in the nearshore differ from those found in Alaska. The goal of this project is to produce larvae and seed that are optimized for growth, but not reproduction, in Alaska waters. Alaska Fisheries Science Center researchers sourced oysters from the U.S. Department of Agriculture Pacific Shellfish Research Unit (USDA-PSRU) and private industry partners, including Pacific Hybreed, that specialize in oyster selective breeding. The development of improved seed includes two main efforts:

1. Hatchery production of genetically distinct lines at partnering research hatcheries (USDA-PSRU and Pacific Hybreed) and subsequent field testing of those genetic lines in Alaska

2. Developing technology and techniques to produce seed at the NOAA Alaska Fisheries Science Center MRH using broodstock originating from Alaska waters

Thus far, Alaska Fisheries Science Center researchers have developed systems and techniques for housing, conditioning, and spawning broodstock and subsequent generations at the Alaska Fisheries Science Center MRH.



Female Pacific oyster gametes after conditioning trials at the NOAA Alaska Fisheries Science Center Mariculture Research Hatchery. Credit: Kate Gomez-Rangel

Kate Gomez-Rangel looks for oyster gametes after conditioning trials at the NOAA Alaska Fisheries Science Center Mariculture Research Hatchery. Credit: NOAA Fisheries

In collaboration with USDA, MRH staff deployed strains of Pacific oysters to compare their growth and performance. These data will be incorporated into future breeding efforts for seed supplied to Alaska.

Alaska Sea Grant Fellow Krystal Renta prepares oysters for analysis at the Alaska Fisheries Science Center Little Port Walter Research Station. Credit: NOAA Fisheries

In FY 2024, the MRH staff and Pacific Hybreed (located at NOAA Manchester) produced 24 families of Pacific oysters and deployed them at the Alaska Fisheries Science Center's Little Port Walter Research Station for field assessment. These initial efforts revealed that oyster strains with improved performance in Alaska are distinct from those with high yields in other regions. Building on this finding, Pacific Hybreed is performing additional crosses of the higher-yielding oysters, for further rigorous field testing to evaluate seed performance in FY 2025. This is the initial step for establishing an oyster broodstock repository. While our selection will focus on improving survival and growth of oysters in controlled farm environments, we will also assess fecundity to prevent selected lines from increasing any risk of naturalization in the state. This collaboration will contribute to improved understanding of seed performance in specific cold-water ocean conditions, which could result in selection of genetic lines suitable for the Alaska shellfish industry. Once developed, this technology and broodstock can then be transferred to the industry.

Objective 2C: Strengthen data collection to support aquaculture industry management and development

Project 11: Water Column Interactions and Regional Variation in Oyster and Sugar Kelp Production (Mariculture ReCon)

In collaboration with industry, academic, and non-profit partners, the Alaska Fisheries Science Center is helping to develop a growing seaweed and shellfish aquaculture industry in Southcentral Alaska (Kodiak Island, Kachemak Bay, and Prince William Sound). This project is collecting information to examine the environmental and ecological effects of kelp and oyster farms in the region, as well as how oceanographic context influences the productivity of these farms. In FY 2025, additional data were collected on oyster and kelp growth and tissue quality across the region. Data are currently being analyzed.

Alaska Fisheries Science Center researchers have also evaluated the environmental effects of farming by determining its effects on fish and macrobenthic invertebrate assemblages. Divers collected information on large and mobile animals by transect counts, smaller organisms in quadrat counts, and infaunal assemblages using benthic cores. Farmed sites were compared to other farm sites and a nearby control site. This work is part of a larger 5- to 10-year collaboration between the Alaska

Fisheries Science Center, University of Alaska Fairbanks, Prince William Sound Science Center, Tribal entities, and farmers funded through the Exxon-Valdez Oil Spill Trustee Council. The goal of this collaboration—Mariculture Research and Restoration Consortium (Mariculture ReCon)—is to support aquaculture efforts in the Gulf of Alaska. The long-term nature of the funding will allow us to collaborate with new farms as the industry develops in Kodiak over the next 5 to 10 years. This information will be used to inform permitting and promote sustainable industry growth.

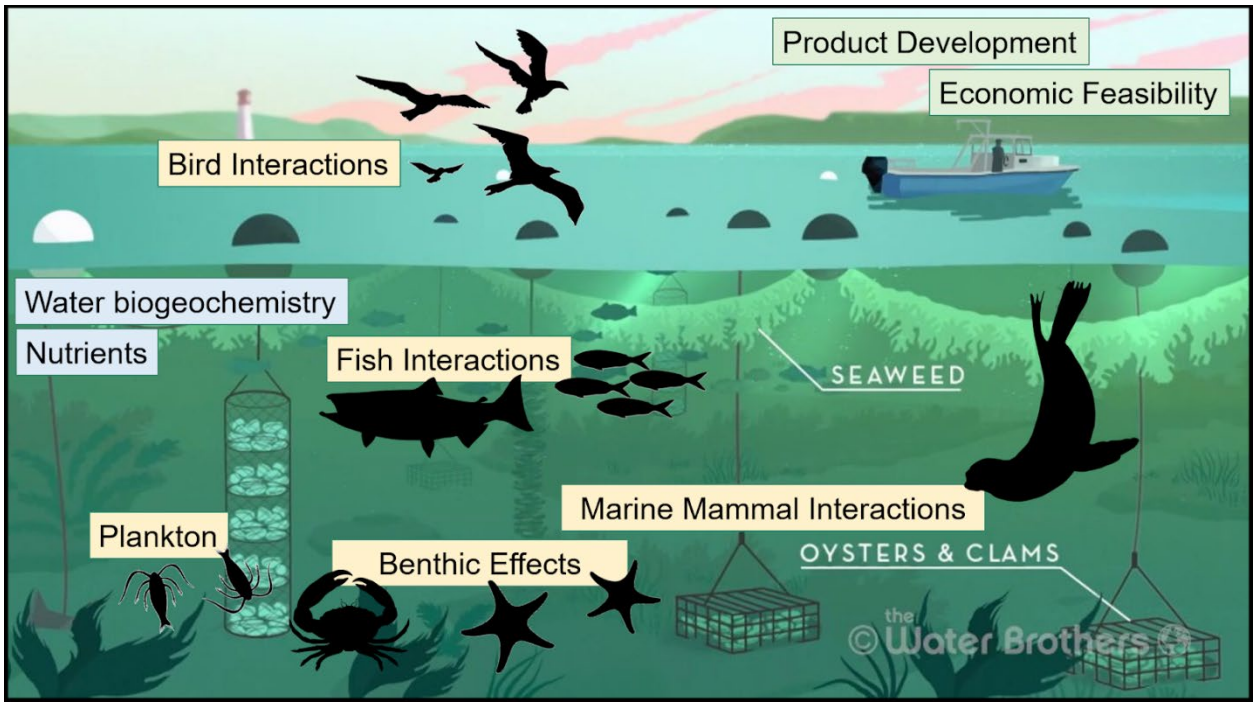


Figure 3: *Conceptual design for the Mariculture ReCon research components. This project will evaluate the impact of mariculture on the physical environment and biological communities in addition to evaluating farm production and conducting economic analysis and product development.*

Objective 2D: Confront climate change proactively, identifying threats and leveraging science-based resilience, mitigation, and adaptation opportunities

Project 12: Evolutionary Underpinnings of Stress Response in Pacific Oysters

Alaska Fisheries Science Center researchers aim to experimentally investigate Pacific oyster populations to characterize the genomic and phenotypic signals in growth that can be teased out in response to two stressors of concern to the Alaska aquaculture industry: heat stress and toxic algal exposure. Examining the possible impacts of these stressors at different life stages is informative across multiple stages of Alaska's oyster aquaculture supply chain, from hatcheries to nurseries to farms. Over the past year they have conducted experiments in the laboratory and monitored populations in the field to test responses to environmental conditions and stressors, as well as how sub-adults respond to non-lethal exposures. Prior studies on both heat stress and Alexandrium exposure have identified gene regions that respond to these stressors, which they will target in the study. Next steps include analyzing RNA-sequencing and environmental data from both farms and experimental settings. This work is led by Professor Jessica Glass and master's student Sof Fox, with the University of Alaska Fairbanks.

Goal 3: Educate and Exchange Information

Objective 3A: Seek, listen to, and incorporate stakeholder needs into decision-making by collecting information and feedback on key aquaculture topics using new and existing collaborative relationships.

Project 13: European Green Crab Invasive Species Outreach and Education

NOAA Fisheries' Alaska Regional Office Habitat Conservation Division hosted Alaska Sea Grant Fellow Alyssa Sanchez with the Alaska Invasive Species Partnership (AKISP) European Green Crab Subcommittee. The focus of Alyssa's fellowship was on outreach and education regarding the recent discovery in Alaska of the highly invasive European green crab, and engagement with aquaculture stakeholders. As a voracious shellfish predator, the green crab poses a potential threat to shellfish aquaculture. Alyssa developed the following outreach and education products in collaboration with the AKISP green crab subcommittee:

- StoryMap on European Green Crabs in Southeast Alaska
- Green Crab distribution map showing both carapace and live specimen locations
- Developed Molt Walk Application
- European Green Crab ID Challenge

Alyssa also hosted a green crab trap game at numerous outreach and education events, including the Juneau Maritime Festival and Douglas Island Pink and Chum, Inc. open house, and participated in green crab workshops and molt walks.

NOAA worked with Rogue Detection Teams to train detection dogs to sniff out green crabs in their coastal habitats in a groundbreaking pilot program. Since the crabs hide in estuaries and mudflats, early detection can be challenging. By using dogs' powerful sense of smell, researchers hope to locate green crabs before they establish large populations. This will give conservationists a new tool in the fight against this invasive species.

Story Map:

European Green Crabs in Southeast Alaska: A community effort to manage invasive green crab
https://storymaps.arcgis.com/stories/6b161b3547034a698586378e16c9c498

Detection dog and trainer practicing on trapped green crab in Willapa Bay, Washington. Credit: NOAA Fisheries

Objective 3B: Improve perception, social license, awareness, and understanding of aquaculture by strengthening communication with the general public, external stakeholders, and within NOAA to enhance awareness of available resources, expertise, and the current state of science regarding coastal, marine, and Great Lakes aquaculture

Project 14: Advancing Aquaculture Communications and AOA Outreach

A key focus of our Alaska Aquaculture Program is to provide accessible, relevant, and up-to-date information on marine aquaculture to the public.

Communications regarding the Aquaculture Opportunity Area identification process in Alaska included:

- Updates to the Alaska AOA identification webpage
- Publication of a Notice of Availability in the Federal Register
- Listening sessions for public comment and posting transcripts

- Alaska AOA frequently asked questions webpage
- Alaska AOA process roadmap webpage and graphic
- Alaska AOA spatial analysis webpage
- Alaska AOA public engagement webpage

In addition, the Alaska Regional Office and Alaska Fisheries Science Center staff have worked to improve aquaculture curriculum in Alaska schools, participated in events at local schools, and developed new curriculum and teaching aids. This work is highlighted in the new Information and Education Resource page, which offers a range of helpful resources, including general information about Alaska's aquaculture industry, education resources, and guidance on selecting and establishing new farm sites for new and prospective farmers.

Dr. Alix Laferriere preparing eDNA samples while communications specialist James Currie films at Kodiak Lab. Credit: NOAA Fisheries.

Our annual accomplishments reports highlight the strategic alignment of our work with NOAA goals and objectives and how we have accomplished them at a regional level.

Feature Story:

Dive into Alaska Aquaculture: NOAA Fisheries releases new aquaculture information and education resources page

https://www.fisheries.noaa.gov/feature-story/dive-alaska-aquaculture

Objective 3C: Advance innovative approaches to aquaculture literacy and provide equitable access to education and extension materials. Use these resources to inform the public and other stakeholders on the challenges and benefits of aquaculture and the current state of science and the industry.

Project 15: Published Second Edition of Field Guide to Seaweeds of Alaska

Members of NOAA Fisheries, University of British Columbia, and Alaska Sea Grant produced a second edition of the Field Guide to Seaweeds in Alaska. The updated field guide includes photos and

descriptions of more than 100 common seaweeds found in Alaska. The new guide also contains significant new content, including:

- 19 new seaweed taxa
- 32 species with updated scientific names
- More than 100 new images

Alaska Fisheries Science Center biologist Mandy Lindeberg was an author on both the first and second editions of the field guide and applied the advances in the classification and taxonomy of seaweed, including DNA sequencing information, to help refine species identification and expanded information on genetic diversity in seaweed groups into the new guide.

The guide will serve as a useful resource for the growing seaweed aquaculture industry in Alaska, particularly as farmers seek other commercially viable seaweed species to cultivate. The approximately 550 species of seaweeds known to occur in Alaska offer a wealth of possibilities.

Wild bull kelp (Nereocystis luetkeana). Credit: NOAA Fisheries

Feature Story:
https://www.fisheries.noaa.gov/feature-story/second-edition-field-guide-seaweeds-alaska-released

Publication:
Field Guide to Seaweeds of Alaska Second Edition
https://seagrant.uaf.edu/bookstore/pubs/SG-ED-69.html

Additional FY 2025 aquaculture publications

Crimp, J., L. A. Meyer, L. Horstmann, J. A. Hollarsmith, M. Montiel, F. L.-D. La Cruz, A. R. Frederick, W. Licht, and S. Umanzor. 2025. Effect of Macroalgal Diet on Growth Rate and Nutrition of the Pinto Abalone, *Haliotis kamtschatkana.* Journal of Shellfish Research 44(1).

Cates, R, J. Cornett, C. Hart, C. Pinger, J. Harley, K. Laboda, K. Koehler, M. Dittrich, J. Hollarsmith**.** Accepted. Oceanography and Pacific oyster biochemical composition in a novel oyster-growing region. Aquaculture, Fish and Fisheries.

Farrugia Drakard, V., J. A. Hollarsmith, and M. S. Stekoll. 2025. Impact of Multiple Climate Stressors on Early Life Stages of North Pacific Kelp Species. Ecology and Evolution 15(6):e71661.

Farrugia Drakard, V., J. A. Hollarsmith, and M. S. Stekoll. 2025a. Effects of temperature on early life-stages of *Alaria marginata*, a commercially important high-latitude kelp species. Journal of Applied Phycology 37(1):471–482.

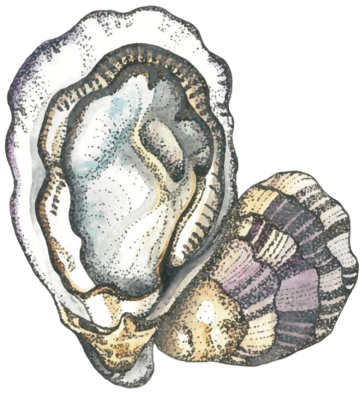
Farrugia Drakard, V., J. A. Hollarsmith, and M. S. Stekoll. 2025b. Hyposaline conditions impact the early life-stages of commercially important high-latitude kelp species. Journal of Phycology 61(2):317–329.

Farrugia Drakard, V., J. A. Hollarsmith, and M. S. Stekoll. *Accepted*. Climate-related sediment load has severe impacts on the early life-stages of commercially important high-latitude kelp species. Journal of Experimental Marine Biology and Ecology.

Hollarsmith, J. A., K. M. Boswell, C. Taylor, K. Friedman, J. Vollenweider, R. J. Cates, T. Stephens, A. Bishop, and K. Cieciel. 2025. Strategies to deter Pacific Herring from aquatic farm infrastructure. North American Journal of Aquaculture:vraf002.

Hollarsmith, J. A., R. J. Cates, A. M. Bishop, J. Starzynski-Hotch, S. C. Oates, and H. M. E. Wilson. 2024. Bringing Seaweed Cultivation into the Classroom: A Case Study in Rural Alaska. The Journal of STEM Outreach 7(1).

Korabik, A. R., V. F. Drakard, D. Baetscher, and J. A. Hollarsmith. 2025. Addressing the misidentification of sporangia as “embryonic sporophytes” in Nereocystis luetkeana (Mertens) Postels & Ruprecht. Algae 40(2):117–125.



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September 2025

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