

ALASKA MARICULTURE DEVELOPMENT PLAN



STATE OF ALASKA
MARCH 23, 2018 DRAFT

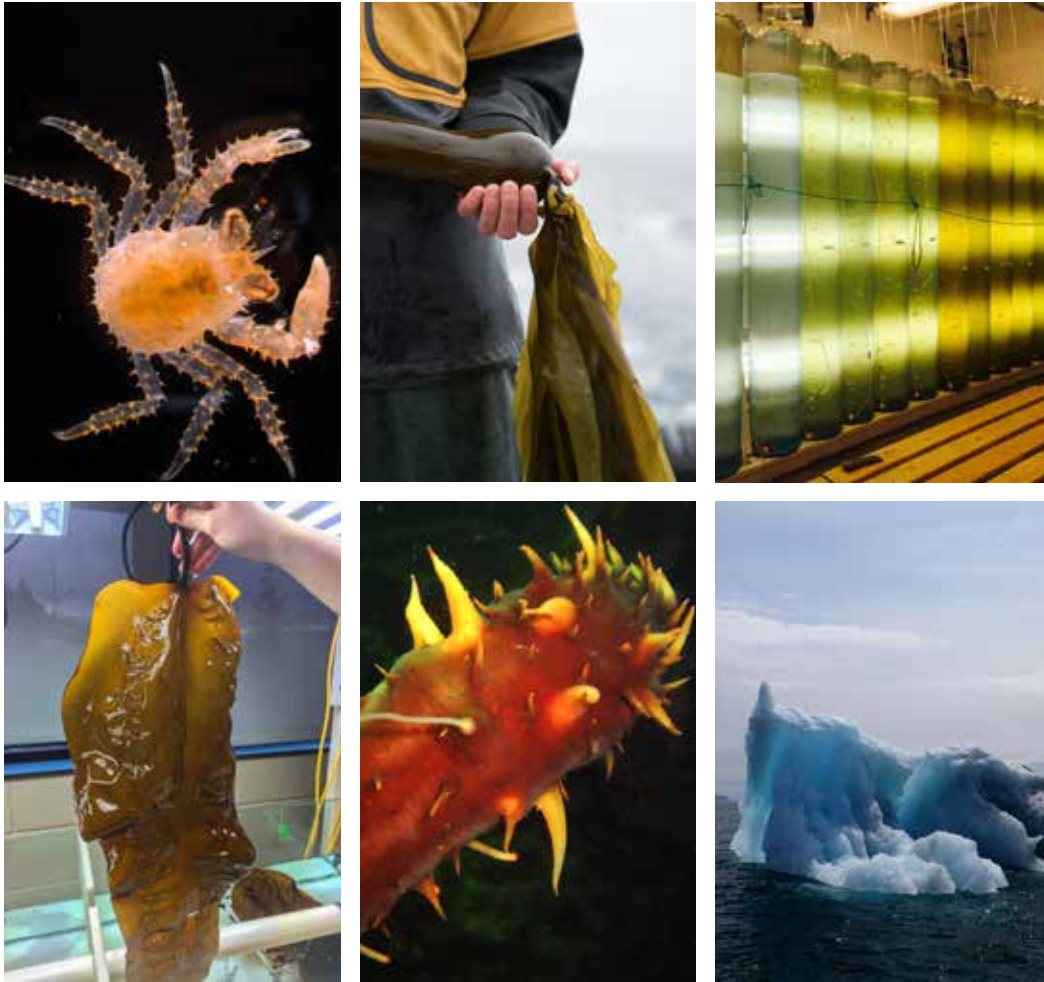


Photo credit clockwise from top left: King crab juvenile by Celeste Leroux; bull kelp provided by Barnacle Foods; algae tanks in OceansAlaska shellfish hatchery provided by OceansAlaska; fertile blade of ribbon kelp provided by Hump Island Oyster Co.; spawning sea cucumber provided by SARDFA; icebergs in pristine Alaska waters provided by Alaska Seafood.

Cover photos: Large photo: Bull kelp by ©“TheMarineDetective.com”. Small photos from left to right: Oyster spat ready for sale in a nursery FLUPSY by Cynthia Pring-Ham; juvenile king crab by Celeste Leroux; oyster and seaweed farm near Ketchikan, Alaska, provided by Hump Island Oyster Co.

Back cover photos from left to right: Nick Mangini harvests kelp on Kodiak Island, by Trevor Sande; oysters on the half-shell, by Jakolof Bay Oyster Company; oyster spat which is set, by OceansAlaska. Photo bottom: “Mariculture – Made in Alaska” graphic provided by Alaska Dept. of Commerce, Community and Economic Development, Division of Economic Development

Layout and design by Naomi Hagelund, Aleutian Pribilof Island Community Development Association (APICDA).

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*<https://www.afdf.org/wp-content/uploads/1c-Economic-Analysis-to-Inform-AMI-Phase-I-Case-Studies.pdf>

**<https://www.afdf.org/wp-content/uploads/AMI-Phase-II-Final-Nov2017.pdf>

MESSAGE FROM THE GOVERNOR

Aquatic plants and shellfish present a significant and sustainable economic opportunity for coastal Alaska communities, and now is the time for business leaders and policymakers to take the necessary steps for the industry to reach its full potential.

Our state has more than 30,000 miles of clean, pristine, nutrient-rich coastline, which produce more than 50 percent of seafood in the United States. However, this ecosystem also produces much more than fish: kelp, seaweed, geoducks, clams, and many other species are all also abundant. These species represent renewable resources that have long been crucial to subsistence and livelihoods of many Alaskans, and now we must prove our commitment to sustainability principles to ensure future generations will also enjoy these resources.



Governor Walker visits with Matthew Kern of Barnacle Foods while promoting the challenge to Alaskans to spend \$5 each week on Alaska Grown products; provided by the Governor's Office.

In 2016, I established the Alaska Mariculture Task Force through Administrative Order No. 280 to develop a comprehensive plan for the development of a viable and sustainable mariculture industry that produces shellfish and aquatic plants for the long-term benefit of Alaska's economy, environment, and communities. The Task Force represents a partnership among a broad spectrum of stakeholders.

I respect the long-term vision of Task Force participants who have been involved in this comprehensive planning process. Alaskans can accomplish great things when we collaborate, work toward a common vision, develop plans, and take actions to overcome challenges and achieve meaningful goals.

I support this comprehensive plan, and commit the State of Alaska to work in partnership with stakeholders and agencies toward its implementation.

Bill Walker

MESSAGE FROM THE ALASKA MARICULTURE TASK FORCE

The members of the Task Force deeply appreciate Governor Walker's leadership in support of mariculture development, and the support of his administration in the formulation of this plan. The diverse membership, listed below, reflects a true cross section of mariculture interests and experience, broadened further by the incorporation of effective and involved Advisory Committees on each major element. The Task Force believes that this work has resulted in a realistic plan that recognizes the ideal conditions in Alaska for mariculture development, identifies the challenges ahead, and recommends strategies and solutions to achieve the State's full potential.

Alaska has all the qualities of an ideal environment for mariculture development: clean and abundant waters, hardy citizens with maritime experience, and an existing seafood industry and infrastructure. The state has research and development capacity at the University and industry level, as well as a sophisticated seafood marketing organization that effectively reaches consumers all over the nation and the world. The regulatory process and agencies are accessible, and the Legislature is on the verge of passing essential laws to help fund mariculture and allow expanded hatchery shellfish production.

Along with these strengths come challenges. This plan identifies these challenges and barriers to development in the areas of investment, regulations, research and development, coordination and leadership, workforce needs, marketing and public education. The Task Force then makes detailed recommendations regarding the changes and additions needed to achieve the full potential of Alaska's opportunities. The elements, recommendations for action, and priority recommendations are presented in the body of the plan and the broader lists of recommendations from the Advisory Committees are included as appendices. The Task Force recognizes that over time priorities will change and should be updated. Long-term challenges, such as ocean acidification, climate change, sea otter population growth, and invasive species, will require more comprehensive future strategies.

We believe that mariculture development will bolster the economy of our state, in particular the coastal communities where much of the seafood infrastructure and experience already exist. This economic development will be environmentally sound, and designed to complement rather than replace existing uses. The plan is intended to increase profitability for those already engaged in mariculture, to expand participation, and to provide coordination to refine regulations, access funding and conduct needed research.

The recommended improvements and new solutions will require commitment, and an



Oyster farm near Kake.
Photo courtesy of Sealaska.

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implementation plan. The Task Force members remain committed, and are enthusiastic about expanding Alaska's mariculture industry. The Advisory Committees identified a common theme: the need to increase capacity to implement this plan. The Task Force thus recommends the formation of an Alaska Mariculture Development Council to continue making progress to develop the mariculture industry.



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Eric Wyatt, OceansAlaska (OA) and Blue Starr Oyster Company

EXECUTIVE SUMMARY

Alaska has all the qualities of an ideal environment for mariculture development: clean and abundant waters, hardy citizens with maritime experience, and an existing seafood industry and infrastructure. The state has research and development capacity at the University and industry level, as well as a sophisticated seafood marketing organization that effectively reaches consumers all over the nation and the world.

Along with these strengths come challenges. The Alaska Mariculture Development Plan identifies these challenges and barriers in the areas of investment, regulations, research and development, coordination and leadership, workforce needs, marketing and public education.

Mariculture development will bolster the economy of our state, in particular the coastal communities where much of the seafood infrastructure and experience already exist. This economic development will be environmentally sound, and designed to complement rather than replace existing uses. The Plan is intended to increase profitability for those already engaged in mariculture, to expand participation, and to provide coordination to refine regulations, access funding and conduct needed research.

The top priority recommendations to meet the challenges and increase capacity are:

- 1) Secure seed supply through hatcheries
- 2) Pass State legislation to A) help fund hatcheries through the Mariculture Revolving Loan Fund, and B) allow shellfish enhancement
- 3) Establish an Alaska Mariculture Development Council
- 4) Establish a Mariculture Research Center at the University of Alaska
- 5) Fill key positions to enable the growth of the industry: NOAA Aquaculture Coordinator in Alaska and Alaska Sea Grant Mariculture Specialist



Hump Island Oyster farm.
Photo provided by Hump
Island Oyster Company.

Individual sections of the Plan, as well as the Advisory Committee reports, provide detailed explanations of these priority recommendations. In addition, the Plan calls for aligning State and Federal regulations and agency practices with stakeholder needs, with a central point of contact for prospective mariculture participants.

The Plan encourages private investment in mariculture from within Alaska and outside Alaska, in part by coordinating existing federal and state funding sources for more efficient development of the industry. Elements of the Plan acknowledge the need to build public understanding and support for mariculture, to develop new mariculture products and markets, and to grow and develop the mariculture workforce.

Finally, the Plan promotes mariculture success through Alaska Native participation. Mariculture development will benefit from the participation of Alaska Natives in every element of the process, utilizing local and traditional knowledge in the siting of farms, accessing programs and funding sources geared towards economic and workforce development, and supporting appropriate development on Native owned lands.



VISION

Develop a viable and sustainable mariculture industry producing shellfish and aquatic plants for the long-term benefit of Alaska's economy, environment and communities.

GOAL

Grow a \$100 million mariculture industry in 20 years.

GUIDING PRINCIPLES

SCOPE: For the purpose of this plan, mariculture is defined as enhancement, restoration, and farming of shellfish (marine invertebrates) and seaweeds (macroalgae). Finfish farming is not legal in Alaska waters.

COORDINATION & LEADERSHIP: Effective implementation of this comprehensive plan requires coordination and commitment of time and resources from local, state, federal and tribal governments, industry, communities, the University, and other interested stakeholders.

SUSTAINABILITY: Development of mariculture will be compatible with sustainability principles to maintain and improve environmental integrity, as required by the Alaska Constitution and ADF&G management practices.

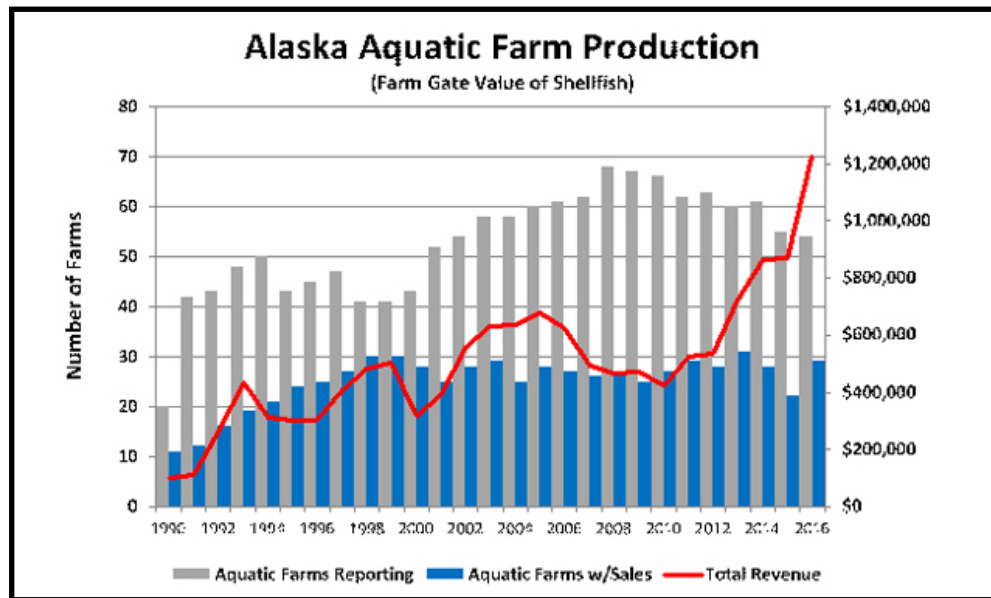
ALASKA NATIVE PARTICIPATION: Mariculture development will benefit from the involvement of Alaska Natives in every element of the process.

INNOVATION: Alaska presents many unique challenges, and developers will look globally to applicable research and solutions to apply to Alaska's circumstances and geography.

COMPATIBILITY: Implementation of this plan must protect existing marine uses, such as subsistence, commercial fishing, and recreation. It will also utilize Alaska assets and infrastructure.

INTRODUCTION

In 1988, the Aquatic Farm Act (Alaska Statutes 16.40.100-199) was passed by the Alaska Legislature. Since that time, development of the mariculture industry has progressed slowly, and annual production is approximately \$1 million.



During this same period, other regions of the world have seen tremendous growth in the areas of shellfish and seaweed mariculture. There is a significant opportunity for growth in Alaska's seafood production. The combination of this opportunity and other current events, such as the state budget gap, ocean acidification, climate change and otter predation, has inspired stakeholders to take a fresh look at the development of mariculture utilizing a more comprehensive approach.

In 2014, AFDF received a grant from the National Oceanic and Atmospheric Administration (NOAA) for AFDF's Alaska Mariculture Initiative – an effort to accelerate the development of mariculture in Alaska with the vision to grow a \$1 billion industry in 30 years. As a result of the Initiative, Governor Walker established the Alaska Mariculture Task Force (Task Force or MTF) in 2016 by [Administrative Order #280](#) (see Appendix A). AO#280 details the benefits to Alaskans which could be provided by a fully developed mariculture industry:

- Economic – provides jobs and commerce in coastal communities;
- Environmental – improves the local ecosystem in various ways, such as providing habitat improvement, carbon removal, or countering ocean acidification;
- Cultural – is compatible with traditions, cultures, and skills in rural communities;
- Industrial – complements and expands our existing renewable seafood industry, which is Alaska's largest private sector employer;
- Food Security – increases access to local foods for Alaskans.

The Task Force is comprised of 11 representatives of various stakeholders, including communities, tribes, industry, hatcheries, the University, and two state departments (Commerce, Fish and Game). The Task Force was directed by the Governor to create a comprehensive plan for the development of a viable and sustainable mariculture industry producing shellfish and aquatic plants for the long-term benefit of Alaska's economy, environment and communities. This document is a result of that comprehensive planning process by the MTF.

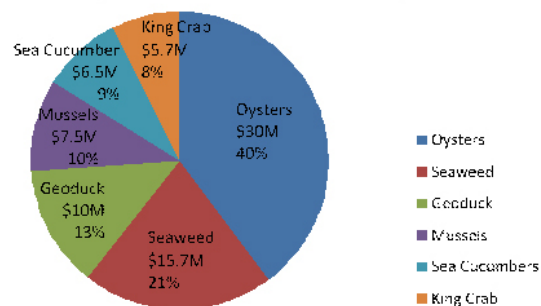
A part of the comprehensive planning process has included dozens of public meetings of not only the Task Force, but also five additional Advisory Committees in the following topic areas: Investment and Infrastructure, Research and Development, Regulatory Issues, Public Education and Marketing, and Workforce Development (see Appendix B, C, and D). All information related to meetings of the Task Force is available at the [Task Force's website](http://www.adfg.alaska.gov/index.cfm?adfg=amtf.main).*.

Another part of the planning process included a phased economic analysis to inform the development of the comprehensive plan. [The first phase of the economic analysis involved a set of case studies](#) of other regions with successful mariculture industries and relevance to Alaska in terms of species, regulatory structure, etc. These case studies found six key elements for successful mariculture development, which included: 1) pre-existing seafood industry infrastructure, 2) public acceptance and support, 3) favorable growing areas, 4) development plan with coordinated research and development strategy, 5) successful business plans and growing technology, 6) workforce development (see Appendix D).

The [second phase of the economic analysis provided an economic framework](#) for the development of a \$100 million mariculture industry in 20 years (total annual output, without adjustment for inflation). This framework

included the following six species currently under some level of research and development in Alaska and annual revenue goals in 20 years: oysters (\$30M), geoducks (\$10M), seaweeds (\$15.7M), mussels (\$7.5M), sea cucumbers (\$6.5M), and King crab (\$5.7M). 30-Year output associated with goals in this economic framework is projected at \$274 million, while 50-Year output totals \$571 million (see Appendix E).

Twenty-Year Annual Revenue Goals by Species



Pairing mariculture development with existing seafood industry infrastructure and expertise (e.g. vessels, processing plants, workforce, seafood markets, and hatcheries) is also likely to provide a successful platform from which to grow and expand the mariculture industry in Alaska. Additionally, small farms in Alaska have struggled for the past 30 years to provide the economies of scale necessary to pay for and support the shellfish hatchery infrastructure required. The addition of more participants, some of which are medium or larger-scale, will help support and stabilize the shellfish hatcheries and provide for other synergies and efficiencies to the benefit of smaller-scale participants as well.

A healthy and fully developed mariculture industry is likely to include small, medium and large farm sizes, and may also include a variety of business models for the interaction of participants and specialization of work related to the industry. One of the key findings of the ["Alaska Shellfish Farm Size Feasibility Study"](#), published by the

*<http://www.adfg.alaska.gov/index.cfm?adfg=amtf.main>

Alaska Department of Commerce in 2015, showed that larger farm sizes would result in better economic feasibility of farm businesses: “Regardless of farm type, larger farm size scenarios demonstrated better short and long term profitability than smaller farm sizes...new entrants into the Alaska shellfish farming industry should consider investments in medium and large scale farms”.

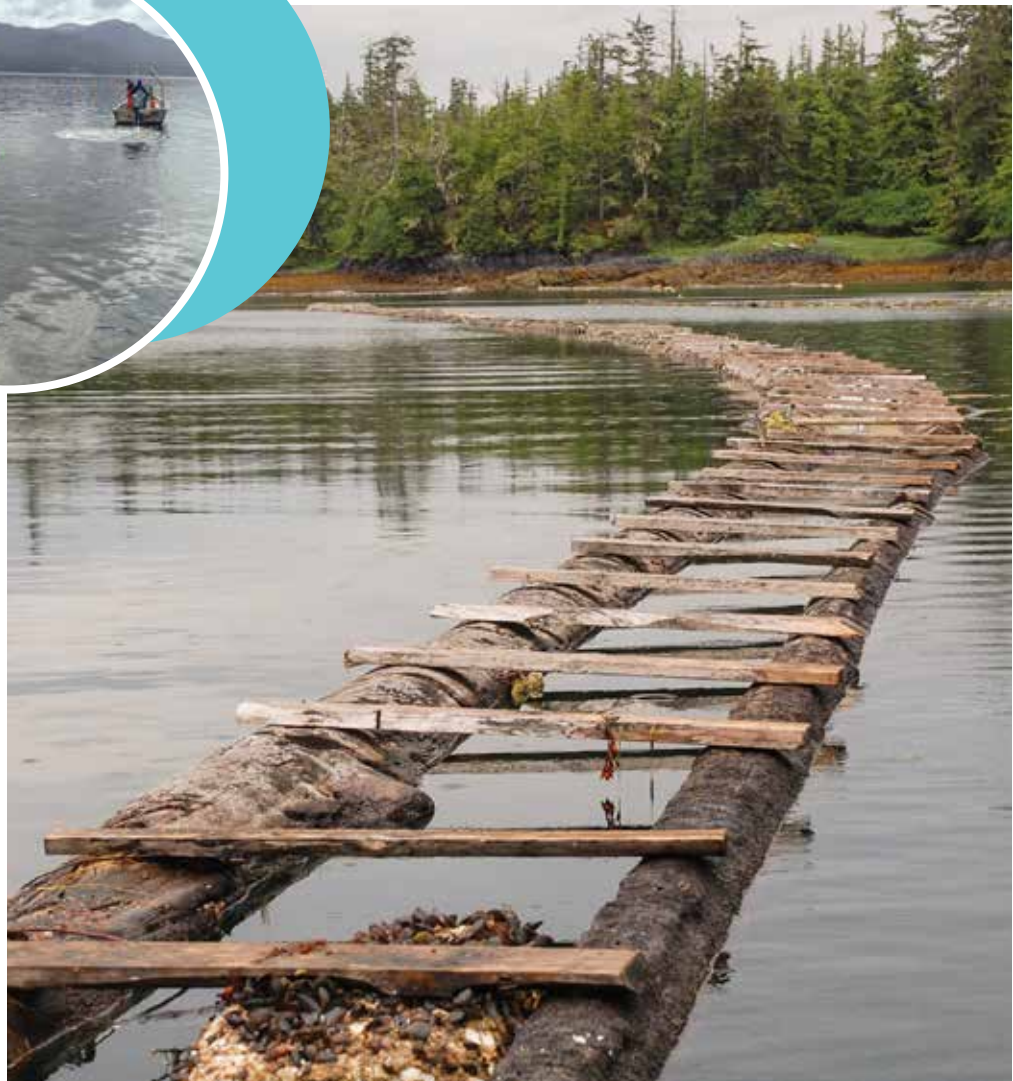
Alaska has a number of successful examples of resource development for the benefit of Alaskans from which to draw for guiding mariculture

development. Alaska’s salmon industry is a great example of how small, medium and large-scale participants have developed beneficial working relationships in order to harvest, process, develop new products, market and sell hundreds of millions of pounds of Alaska salmon every year. Alaska’s salmon fishery enhancement program is another example of a successful integration of sustainable resource management practices for the long-term benefit of public and private interests.



Photo above: Kelp being harvested in Ketchikan by Hump Island Oyster Co.

Photo right: Log float for culturing oysters near Coffman Cove, by Cynthia Pring-Ham.



A PLAN FOR ACTION

The Mariculture Task Force determined the following sections to be the priority elements for this comprehensive plan to develop the mariculture industry to its full potential. Each section discusses an element in general terms and also provides recommendations for actions. The full set of recommendations with detailed descriptions from the five Advisory Committees are included in Appendix E, and the Research and Development AC recommendations are expanded upon in the applied research section and in Appendix H. The priority recommendations are highlighted in blue throughout the elements and also summarized at the end of the elements.

• Secure Seed Supply Through Hatcheries

Shellfish and seaweed hatcheries are an integral piece of infrastructure required for any mariculture development. Several of the Task Force Advisory Committees identified adequate support for hatcheries at the early stages of development as one of the top priorities. Hatcheries can be independent entities that serve a variety of customers, such as small and medium-sized farms, and fishery enhancement or restoration programs. Hatcheries can also be vertically integrated within larger farm businesses. However, new farm entrants are most likely to limit their initial risks by purchasing seed from an existing hatchery. Without adequate quality, quantity and consistency of seed or juvenile production, the mariculture industry will not thrive. In comparison to other regions, Alaska has additional requirements regarding the use of local broodstock and seed production in state in order to address genetic concerns (oysters being the only exception). These requirements are a part of ADF&G's precautionary principles that help to ensure the long-term sustainability of the resources. However, in the short-term, they add additional cost and constraints to seed and juvenile production.

It is in the public's interest to support the development of the industry through short-term financial support of hatcheries with the eventual goal of self-sufficiency. This can be accomplished by aligning state, federal or private resources. (e.g. public/private partnerships, such as the models for the salmon enhancement program, seafood marketing or regional seafood development associations (RSDAs), sport fish restoration funds, or AIDEA partnerships)



Oyster spat at shellfish hatchery, by OceansAlaska

Mariculture Task force recommendations include:

- **Secure seed supply through direct funding for hatchery operating costs in the short term until the industry grows to a size that is self-sustaining.** Develop additional long-term funding options available to support hatchery production.
- **Amend the Mariculture Revolving Loan Fund to allow and encourage shellfish and seaweed hatcheries to utilize the fund.**
- Increase the principle of the Fund as utilization increases with the development of the industry.
- Provide technical assistance to existing and new hatcheries. As ocean conditions change, hatcheries play a role in monitoring these changes and can help identify suitable adaptations. Technical assistance will allow hatchery staff to adjust hatchery procedures quickly to overcome continually changing circumstances.

- **Establish an Alaska Mariculture Development Council**

In order to accelerate the development of the industry, coordination is necessary across stakeholder groups and across multiple elements needed to develop the mariculture industry. Several MTF Advisory Committees (ACs) identified lack of coordination as a systemic problem. The Task Force agreed, and considers creating an entity responsible for coordination one of the top priorities. The coordinating entity should be composed of a broad spectrum of stakeholders, be industry-driven and be given a charge to coordinate all aspects of mariculture development in Alaska, including coordination with recommended future key personnel (i.e. NOAA Aquaculture Coordinator in Alaska, Alaska Sea Grant Mariculture Specialist, and Mariculture Research Center Director).

A number of models exist (i.e. AKCRRAB, MTF, ASGA, Board of Fisheries, ASMI, etc.) with varying authority, capacity and scope. Additional discussion is expected to determine the best approach to selecting, staffing, and housing this entity.

Mariculture Task force recommendations include:

- **Establish an Alaska Mariculture Development Council (AMDC) beginning with the extension of the MTF and its ACs for three years with a new directive to begin implementation of the comprehensive plan and to work towards creation of the AMDC.**



| Sugar kelp at farm site, by Blue Evolution.

• Maximize Innovation and Growth through Research

Research can solve practical problems and contribute new knowledge, processes, technology and ideas to Alaska's growing mariculture industry. Partnering with farmers, hatcheries and other stakeholders in applied research is critical to the growth of the industry and to ensure the wise use of research dollars. Application of research results then requires demonstration to scale up to industry levels. The Task Force recommends supporting collaborative research with industry application.

The Task Force's Research and Development Advisory Committee identified an extensive list of applied research that would support development of the mariculture industry in Alaska. The Task Force endorses the near, mid and long-term research priorities described in the applied research section, and Appendices E and H.

Applied research in mariculture is happening around the world and the MTF encourages the development of active partnerships and monitoring relevant progress for potential application in Alaska. However, Alaska does not yet have the capacity to coordinate, direct and engage industry in research priorities effectively and has limited capacity to share and demonstrate applied research results. The Advisory Committee recognized this as a systemic barrier to development of the industry.

Mariculture Task force recommendations include:

- **Establish and staff a Mariculture Research Center within the University of Alaska with an Industry Advisory Body to coordinate and develop partnerships to address research priorities and continually update needs.**
- **Fill the Alaska Sea Grant Mariculture Specialist position within UAF to ensure engagement with, and application of research to, mariculture businesses.**
- **Fill the NOAA Aquaculture Coordinator position in the Alaska Region in order to facilitate coordination of research and growth of the industry.**

• Align Laws, Regulations and Agency Practices with Stakeholder Needs

Most tidelands and submerged lands within Alaska's coastline are common property and are managed using multiple use principles and sustained yield requirements. The Alaska Constitution requires resource decisions to be vetted through a public process to balance resource management decisions with the best interests of the people of the State of Alaska, and remain consistent with sustained yield principles. The statewide mariculture program is jointly administered by three state agencies.

The Alaska Department of Natural Resources (ADNR) authorizes the use of tideland and submerged land and seeks to balance use of the land for the development of aquatic farming with traditional uses of the area, upland owner access, public access, and navigation of public waters.

The Alaska Department of Fish and Game (ADFG) issues permits for the operation of aquatic farms and hatcheries, acquisition and transport of stock and seed, and ensures aquatic farming does not significantly affect existing uses of resources, or fish, wildlife or their habitats in an adverse manner.

The Alaska Department of Environmental Conservation (ADEC) is the Alaska Shellfish Sanitation Authority with regard to protecting human health while allowing for commercial sales of molluscan shellfish and also allows for oversight of processed seafood. As such, ADEC must demonstrate that it meets all requirements of the National Shellfish Sanitation Program (NSSP) in order to maintain

its membership in the Interstate Shellfish Sanitation Conference (ISSC). The US Food and Drug Administration (FDA) evaluates Alaska's program, determining Alaska's conformance with national standards for water quality of harvest areas, marine biotoxin controls, physical plant sanitation, harvest and handling practices, and control of harvest (patrol and enforcement). Alaska's commercial industry can ship outside of Alaska only if Alaska demonstrates conformance with the national sanitation program.

At times, agency responsibilities to protect common property resources and human health have resulted in an atmosphere perceived as being in opposition to development of the mariculture industry. For growth to occur, it will be incumbent upon both industry and agencies to work together to promote the development of mariculture in a manner that is compatible with the prescribed responsibilities. This will include enacting recommended legislation, modification of some regulations and policies, and leadership that provides direction towards accommodating mariculture projects while still ensuring protection of common use, human health, and sustained yield of natural resources.

In addition, current agency staffing levels are unlikely to absorb additional workload at the pace that a fast growing industry demands. More resources will be necessary. However, this growth will contribute to the economy and provide revenue to the state to support these needs.



Mussel culture rafts with predator exclusion panel in Halibut Cove, by Cynthia Pring-Ham.

Mariculture Task force recommendations include:

- **Enact legislation to allow restoration, rehabilitation, and enhancement of shellfish stocks.** These activities are currently not authorized in Alaska, therefore the only legal form of mariculture at this time is aquatic farming.
- Create a single point of contact housed in the Alaska Mariculture Development Council to assist applicants with state and federal permitting in state waters. A wide array of permits is required, each with individual permitting processes that an applicant for a mariculture farm or project must navigate. Most agencies do not know what permitting is required by other agencies and it is not within their legal purview to assist with those. Applicants will benefit from a single point of contact for all permit applications and instructions, as well as assistance in navigating the diverse permitting processes.
- Modify DNR farm site lease requirements, including bonding requirements, structure of lease fees, reduction of risk, and inclusion of best practices. These are often the most challenging aspect of aquatic farming, especially new farmers not selling product yet. Adjustments through legislation or regulatory amendments to reduce the cost burden commensurate with farmer qualifications/ circumstances would be beneficial (see detailed recommendations in Appendix E).
- Provide the resources necessary to ADEC to maintain access to commercial markets for Alaska shellfish and protect human health. In order for industry to sell molluscan shellfish, ADEC must meet NSSP requirements, provide biotoxin and water quality testing services, and address public health challenges such as *Vibrio parahaemolyticus* (Vp). Limited staff capacity and funding currently hinders ADEC from implementing these federal requirements and effectively advocating for Alaska's unique attributes which require federal regulatory exceptions. Additionally, very little research has been conducted in Alaska to monitor for Vp and biotoxins to verify that controls remain effective in preventing illness.
- Pursue clarification of current interpretations of regulations related to interactions between aquatic farming activities and marine mammals, and identify potential mitigations to allow increased area to be eligible for aquatic farming (e.g. existing interpretations restrict aquatic farming within 1 nautical mile of all seal areas of high-use).

- **Secure and Promote Investment in Mariculture**

Securing adequate capital to support mariculture operations remains a challenge for many interested developers in Alaska. While a diverse framework of funding mechanisms exists in the form of various loan and grant programs, the eligibility requirements, terms, funding caps and general complexities have created barriers for new operators, resulting in underutilization of these programs. Further challenges in securing financing are operational scale, species, risk, lack of operating history, access to collateral, the level of understanding and awareness of various funding options and the limited scope of Alaska's young mariculture industry.

At this early stage, mariculture is a relatively high-risk investment due to the unique characteristics of mariculture operations, including the relatively long grow-out periods of some species, learning curves associated with new operational techniques and the time needed to develop markets. While the MTF recognizes the need for continued and increased private investment, the developing industry needs the continued support and investment from public resources. Previous investment in the industry has started providing returns to Alaska, attracting interest from private investors and federal funding agencies.

While Alaska's mariculture industry will require new investment in infrastructure, there are significant challenges and costs associated with development and operating that are unique to rural coastal Alaska and can be exacerbated for small scale operators, such as high transportation and energy costs, limited workforce and minimal support services. Alaska's seafood processors have had to overcome these challenges and some have expressed interest in diversifying their operations through mariculture development, which could lend well to partnership opportunities.

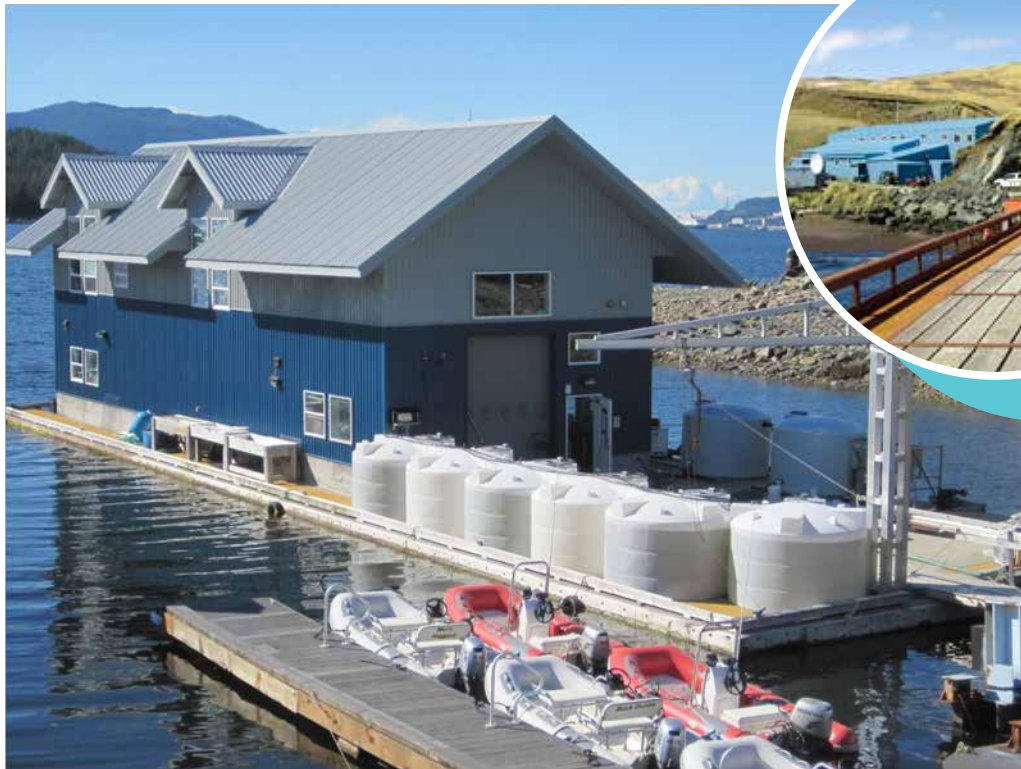


Photo above: Fish processing plant in Atka, by Mike Vickers.

Photo left: OceansAlaska floating shellfish hatchery in Ketchikan, by OceansAlaska.

Marketing of mariculture opportunities to the seafood industry itself will be an important part of development. The Task Force recommends further coordination to inform existing processing plant owners of potential business diversification opportunities, and to foster relationships between mariculture and traditional seafood participants in the harvesting and processing sectors.

Attracting a diverse range of private investment within and outside of Alaska will be key for the industry to reach a scale where it can support viable hatcheries, nurseries and growers. This will likely mean additional small, medium and large-scale development in the state. Protecting the existing and future participation of small and community-scale mariculture operators is of critical importance to stakeholders. As the industry continues to grow, regulators, stakeholders and coastal communities should continue to engage in discussions regarding their vision for the industry, and ways that small, medium and large-scale developers can leverage resources, share information and access capital.



Alutiiq Pride Shellfish Hatchery
in Seward, by Alutiiq Pride.

Recent agency cuts due to the State's reduction in oil revenues have hampered agency responsiveness to farm applications and ability of staff to address developmental challenges. As the industry grows, agency staffing needs will increase. However, revenues paid to the state by industry will also increase. Adequate staffing during developmental stages is important to enable accelerated industry growth.

The Task Force recommendations in Appendix E target increasing access to capital and resources for existing and prospective participants in the mariculture industry.

Mariculture Task force recommendations include:

- Increase the principal of the Mariculture Revolving Loan Fund as utilization increases with the development of the industry.
- Encourage private investment in mariculture from within Alaska and outside Alaska.
- Coordinate and align existing federal and state funding sources for more efficient development of the industry.
- Explore the development of new funding sources and structures focused at providing assistance with business planning and start-up costs for both farming and enhancement.
- Develop partnerships to leverage utilization of existing coastal infrastructure.
- Develop an interactive web-based map tool, housed with the State or NOAA, to help inform business planning, site selection and regulatory review.
- Provide adequate financial support for state agencies to properly manage and timely process new or modified farm applications.
- Develop options and support for self-assessments, taxation or other fee mechanisms which support growth in both state and industry capacity.

• Build Public Understanding and Support for Mariculture

One of the key elements of developing mariculture in Alaska is building public understanding of, and support for, mariculture. No amount of public and private investment can result in project implementation and success without the support of the affected public and the subsequent political approval. Of particular importance is providing information that emphasizes public and private commitment to maintaining both environmental integrity and existing traditional resource uses.

Mariculture proponents and producers should provide public outreach to multiple audiences to help assure realistic and positive views of mariculture development. This effort is a short and long-term need, recognizing and addressing existing negative attitudes about mariculture. These concerns include perceived environmental damage or genetic changes, concerns for aesthetics, market competition with wild-caught seafood, and conflict with existing users. Research into factual information in these areas can form the basis for information to reassure concerned members of the affected communities and the wider public.

Inclusion of all stakeholders and community members, Alaska youth, Alaska Native users and commercial fishing interests at the beginning of conversations about mariculture will go a long way toward allaying fears and concerns. The Task Force recommends identification of priority groups, and development of outreach and communication with each. Working with affected entities should be an integral part of the permitting process.



Original AKCRRAB steering committee members Gale Vick and Brian Allee hold a red king crab female used for brood-stock, by Celeste Leroux.

As developing and providing sources of important facts on an ongoing basis is an important element of mariculture development, it is crucial to identify the appropriate entities to gather and disseminate such information, and to provide advocacy for the growing industry. Some existing entities currently perform parts of these functions: the Alaska Sea Grant program with its extensive online library of mariculture information, the Alaska Fisheries Development Foundation (AFDF), the Alaska King Crab Research, Rehabilitation and Biology (AKCRRAB) program, the Alaska Shellfish Growers Association, the Pacific Shellfish Institute, the Pacific Coast Shellfish Growers Association, Kachemak Shellfish Mariculture Association, ADF&G, NOAA and Alaska Pacific University. In the future, coordination of advocacy and information functions should be integral to development plans.

In addition, information gathered by agencies related to the public health (i.e. water quality and PSP) should be made publicly available on a website managed by ADEC.

Mariculture Task force recommendations include:

- Provide public outreach to multiple audiences to promote mariculture development.
- Prepare and emphasize information about maintaining existing uses, preserving the environment, preventing genetic issues and avoiding market competition with wild-caught seafood.
- Identify and communicate with all community stakeholders early in the process.
- Coordinate information and advocacy through a central body.

• Promote Success through Alaska Native participation

Mariculture development will benefit from the participation of Alaska Natives in every element of the process, utilizing local and traditional knowledge in the siting of farms, accessing programs and funding sources geared towards economic and workforce development, and supporting appropriate development on Native-owned lands.

Mariculture Task force recommendations include:

- Provide outreach to Alaska Native organizations related to mariculture opportunities and relevant technical and financial support.
- Seek tribal engagement through local outreach during the farm permitting process to increase success for new farms.
- Establish collaborative workforce development programs between tribes, Alaska Native Corporations, industry and other relevant partners.
- Integrate mariculture topics and studies in relevant educational programs.



Photo left: The beach crew at Hobart Bay celebrates the completion of geoduck plantings in 2014; project sponsored by Goldbelt Inc, provided by Peter Metcalfe.

Photo above: Anthony Lindoff, owner of Kaawu Oyster Company in Hoonah, by Bob Koenitzer, McDowell Group.

• Grow and Develop the Mariculture Workforce

Self-employed owners and family members currently make up the bulk of the workforce at mariculture farms in Alaska. Hatchery and nursery operations generally employ full-time and/or seasonal employees. Farmers and hatchery operators identify workforce needs as an ongoing challenge.

Impediments to meeting workforce needs include: remote farm locations, short seasons, physically demanding and repetitive work, outdoor work in inclement weather, and relatively low wages. Targeting key populations of Alaskans habituated to weather and remote conditions, such as fishermen, tribal members, veterans and rural youth is one strategy to meet workforce needs. Incentives and workforce development programs may encourage more Alaskans to follow this career pathway.

Training and professional development is critical to recruiting a quality workforce and ensuring self-employed farmers gain the most value from their businesses. However, no required certification or degree is needed to operate a mariculture farm in Alaska. Hatchery workers may have some level of post-secondary education, although that requirement is not consistent across the state. Thus, the best training and professional development is often via short-courses available onsite or via distance delivery, focusing on operational and business needs of Alaska mariculture farms and hatcheries.



Oyster farm workers on Prince of Wales Island, by Blue Starr Oyster Company.

Mariculture Task force recommendations include:

- Develop mariculture skill-building resources and provide professional development opportunities to growers, available both remotely and in-person.
- Offer an intensive, hands-on “Introduction to Shellfish/Seaweed Farming” boot camp in partnership with industry, tribes, educators and other stakeholders.
- Utilize the University of Alaska’s Sea Grant Mariculture Specialist position (currently vacant) to implement these recommendations. Develop a mariculture apprenticeship/mentorship program.
- Participate in industry career awareness activities.
- Evaluate and track participant progress and include mariculture workforce impacts in economic and employment analyses.

• Develop New Mariculture Markets and Products

As mariculture of shellfish and aquatic plants grows in Alaska, marketing research and development, as well as product development, will help assure that increased production results in increased opportunity and stable revenue for the industry and the State.

Wild-caught seafood produced in Alaska is marketed by individual processing and distribution companies, and in a species-based program through the Alaska Seafood Marketing Institute (ASMI). Processors pay ASMI a self-imposed tax as a percentage of the value of the seafood products, and the State and Federal governments have contributed funding as well. The revenues are used for domestic and foreign food

service and retail marketing campaigns.

If Alaska mariculture-produced shellfish and aquatic plants are to benefit from the world-class ASMI marketing program, producers will need to contribute to ASMI funding through self-imposed contributions. If mariculture producers become part of the ASMI funding stream, ASMI could be encouraged to revise its strategic plan and advertising taglines to include mariculture products, shifting “wild” messaging to the more inclusive “Alaska Grown” or “Alaska Pure.”



*Alaska oysters,
photo provided by
Alaska Seafood.*

Part of the effort should include increased collaboration between ASMI and the existing Alaska Grown program, creating a synergy with a larger group of Alaska Food Producers.

In developing the public’s awareness and acceptance of mariculture products, public education and marketing intersect. Public information about mariculture’s economic and environmental benefits helps create a positive perception of a wide range of mariculture products. In turn, mariculture product marketing should include general education about mariculture at every level, similar to the current inclusion of sustainability in wild seafood marketing.

Research and development of new product forms and new market opportunities will also be needed, as detailed by the Research and Development Advisory Committee in Appendices E and H.. A dedicated Alaska Sea Grant Mariculture Specialist, as well as Federal focus and funding for mariculture will contribute to these efforts.

For oysters, research and develop value added products aimed at export markets; for mussels, develop frozen product form and other value added products and methods to compete in the world market; for sugar and ribbon kelp, develop international markets and product stabilization. New products for either frozen or dried products may make additional farm sites economically feasible due to lower cost of transportation and other factors

In addition, the developing industry has a great need for economic data collection and research, to help determine the financial viability of shellfish and aquatic plant operations, as described in the Research and Development section.

Mariculture Task Force recommendations include:

- Coordinate mariculture marketing efforts through trade associations and consider joining with ASMI through self-assessment.
- Encourage ASMI to expand marketing range to include mariculture products.
- Engage in product form research and development and market research.
- Support economic data collection and research.



PRIORITY RECOMMENDATIONS

The priority recommendations of this comprehensive plan are listed below:

Secure seed supply through hatcheries

•

Pass State legislation to A) help fund hatcheries through the Mariculture Revolving Loan Fund, and B) allow shellfish enhancement

•

Establish an Alaska Mariculture Development Council

•

Establish a Mariculture Research Center at the University of Alaska

•

Fill key positions to enable the growth of the industry: NOAA Aquaculture Coordinator in Alaska and Alaska Sea Grant Mariculture Specialist

Bull kelp forest. Photo by
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