

Alaskan Mariculture Diversification, Innovation and Technology Transfer

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with cooperation from the Alaska Shellfish Grower's Association



Background

- Salmon enhancement long history in Alaska \$100 to \$200 million industry
- Shellfish farming grown to about \$1 million since 1990.
- Growers cite seed availability, slow growth rates, labor costs, outdated technology, shipping costs and harmful algal bloom closures as limiting profitability
- Huge potential: vast growing areas, excellent reputation of Alaskan seafood

Alaskan Mariculture Case Studies*

How did mariculture evolve in the world leaders in this industry?



* Alaska Fisheries Development Foundation Alaska Mariculture Initiative Phase I
<http://www.afdf.org/wp-content/uploads/1c-Economic-Analysis-to-Inform-AMI-Phase-I-Case-Studies.pdf>

Moving the needle forward



- This proposal is using the Alaska Sea Grant capacity in partnership with Maine’s seaweed mariculture industry, shellfish farming industry partners and industry experts from around the country to “move the needle forward” and address some bottlenecks that are keeping Alaska’s mariculture industry from reaching its potential. This project is in alignment with ASG’s strategic plan (2014-2017), specifically:
- “Shellfish aquaculture is a growing industry in Alaska that will provide economic diversification for a number of coastal communities. Alaska shellfish farmers need support for efficient operations.”
- “Research and (technology) transfer information related to a secure source of shellfish seed supply for farmers, to improve farming practices and to maximize and diversify shellfish production.”

Ketchikan Shellfish Mariculture Summit (Oceans Alaska 2011) research priorities

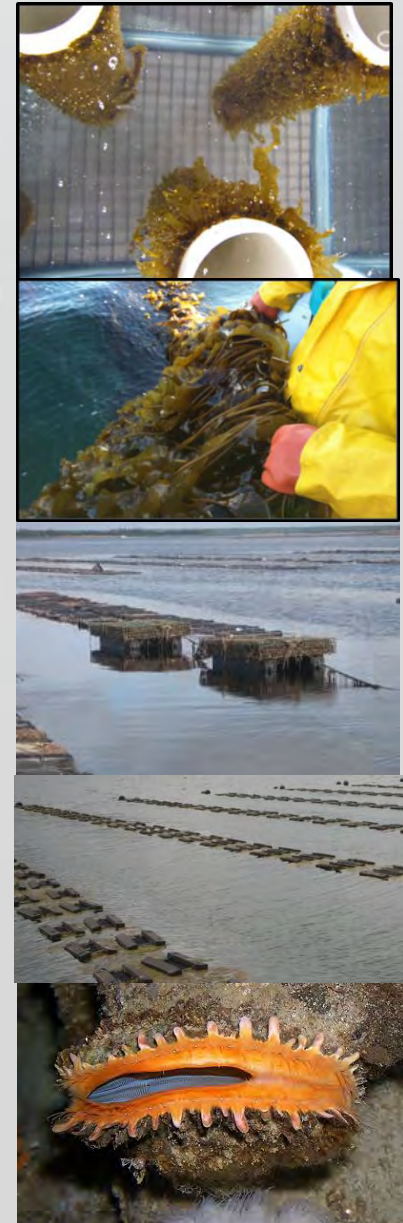
- 1.2 Improved *quality of the seed* available to farmers in Alaska
- 1.5 *Diversification of species*, develop sources of seed for native shellfish species
- 1.6 *Establish hatchery, nursery and grow-out techniques for rearing shellfish species with current or emerging potential* for private, public and tribal shellfish aquaculture, enhancement, restoration and mitigation.
- 3.1 Assist existing farmers to *increase the production from existing farms*.
- 3.3 Assist new farms in a region to *work together*.
- 4.1 Establish *training, education and outreach programs* for new and existing farmers
- 4.2 Implement outreach programs to *attract new farmers*
- 7.4 Research the opportunity to *culture kelp* (sugar kelp, giant kelp, bull kelp, porphyra, palmaria) for *economically viable businesses*.
- 7.5 Develop the opportunity for *polyculture activities* on various shellfish farms.
- 11.1 Investigate *methods of processing shellfish to reduce costs, increase quality and improve productivity*
- 11.2 Develop a *library of best practices for processing shellfish*
- 11.4 Investigate and report on *shellfish farming systems that reduce mortality in shellfish and reduce cost of labor* in all aspects of the farm structure
- 11.5 *Investigate farm methods* and provide information that improves the ergonomics that will reduce the risk of physical injuries.”

Potential production goals (5 years)

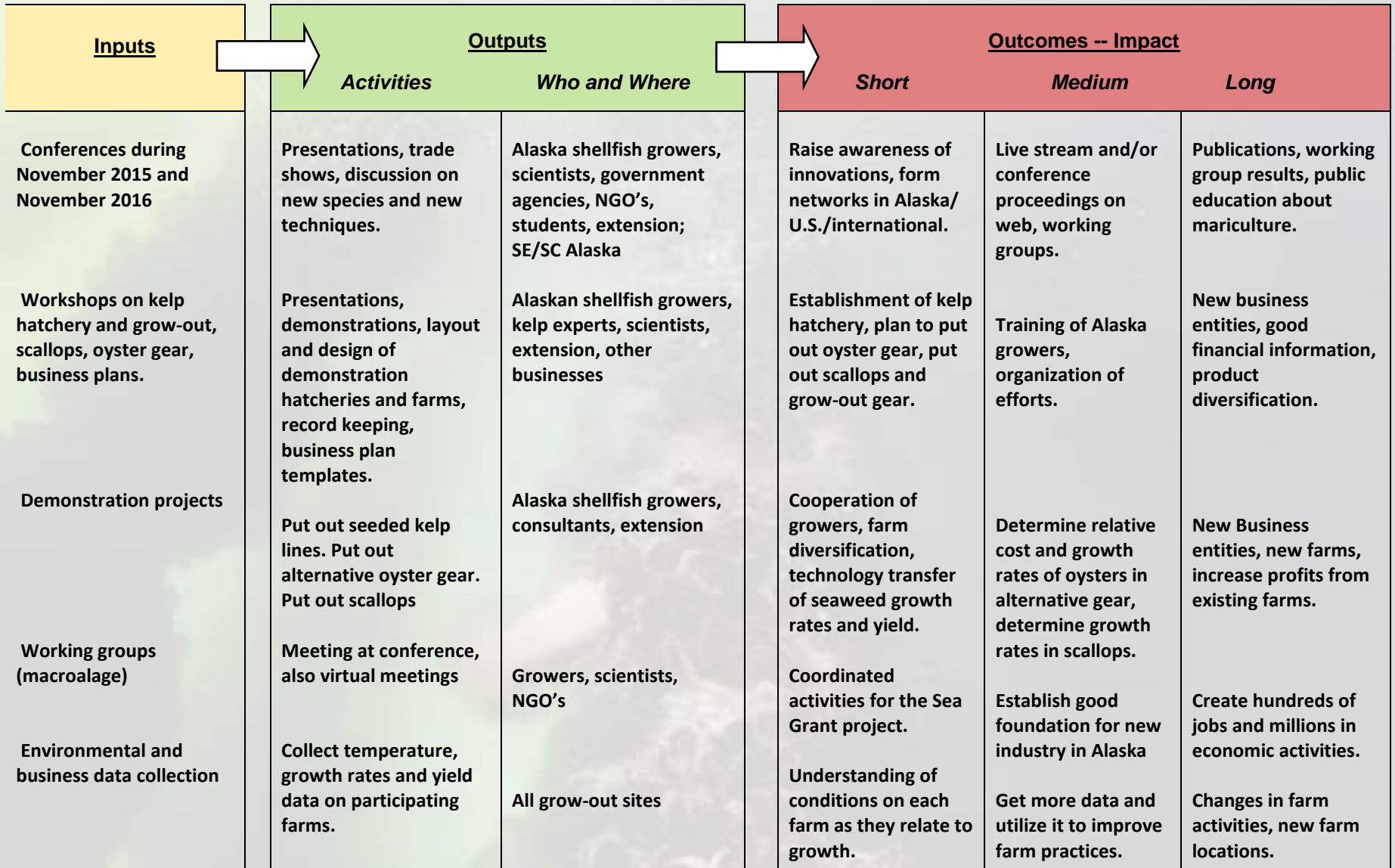
- A five-fold increase in **oyster farming** production from over \$800,000 to \$4 million. Achieved through increased seed availability, new technologies, new sites, and building on three decades of Sea Grant supported work in Alaskan mariculture.
- A 25 fold increase in **farmed mussel sales** from \$40,000 to \$1 million. Achieved through new technologies and building on state support and recent technology transfer.
- Establishment of 40 **seaweed aquaculture** farm sites, with annual production of 500 tons worth over \$2 million and sales possible during harmful algal bloom periods. Achieved through seed availability, new sites, and building on recent successes in Connecticut, Maine Sea Grant, and private macroalgae mariculture developments.
- Establishment of a **purple hinged rock scallop aquaculture** industry (?) built on existing and new seafarm sites with annual production over \$1 million, and sales of adductor muscle possible during harmful algal bloom periods. Achieved through seed availability, new sites, new technologies, and building on a USDA funded WRAC project.

Focus areas Sep 2015 – Aug 2017

- Establish kelp **hatchery** – Oceans Alaska
- Kelp **demonstration farms** on shellfish leases and elsewhere
- **Alternate oyster farming gear** (Oyster Gro, floating bag array) and compare with existing systems
- All demonstration activities in a **business plan context**
- **Conferences and workshops** with visiting speakers
- Purple hinged **rock scallop?**
- **Farming and processing machinery** technology transfer
- Seaweed mariculture **working group**



Logic model



Project timeline

- All team meeting in September 2015 and annual project meetings in 2015, 2016, 2017.
- **2015 ASGA meeting (Ketchikan area), adding introduction to seaweed and marketing, establish commercial hatchery, recruit growers (seaweed, alternate gear, scallops, business planning exercise), form seaweed working group with industry, extension, and government participants. Conference proceedings on Alaska Sea Grant website. PROJECT HAS FUNDS TO SUPPORT TRAVEL FOR GROWERS**
- **2016 ASGA meeting** (Anchorage area), speakers on seaweed mariculture, alternate gear, scallops, business planning exercise, recruit final kelp growers for year 2, meeting seaweed working group, trade show. Conference proceedings on Alaska Sea Grant website. **PROJECT HAS FUNDS TO SUPPORT TRAVEL FOR GROWERS**
- 2015-early 2016: **Utilize seaweed seed** from Premium Oceanic hatchery Juneau (3 farms).
- 2016-early 2017: **Commercial kelp hatchery (Oceans Alaska)**, seed to all 8 farms, meeting of Seaweed Mariculture Working Group.
- Coordination of **grow-out trials of kelp** seed (2006 and 2007), yields, numbers in business plan, diversification of 2-3 additional kelp species.
- **Purple hinged rock scallop field trials** 2015-2017 (using seed from Alutiq Pride shellfish hatchery, Seward, in cooperation with WRAC project and Dr. Joth Davis, 3 farms).
- **Testing alternative grow-out, farming and processing gear** (oysters/mussels). Also collect environmental data (water temperature) at all cooperating farm sites (2015-2017).
- **Trade show at 2016 conference** (focus on gear/farming system/efficiency).
- **Survey** of existing farms and update on **culture bottlenecks** 2015-2016: this activity will take place with all the Alaska extension agents, and PSI and Maine Shellfish R+D. The results will be presented at the 2016 conference (November, 2016)
- Use of **business plan structure** for evaluation of cost/benefit of alternative technology (2017).
- Develop network of research intensive **farm cooperators for demonstration** projects (2015).
- Develop **data collection and sharing plan** for farm oceanography in cooperating farms (2015-2017). This will start with water temperature but will expand to other parameters in future years (sustainability).

Shellfish farming gear (grant funds does not include matching funds)

1. Year 1. Zapco style oyster floating bag array 200 bag system (\$5,268 x 3 sites) **\$15,800**

Item	Number	Cost each	Item total
Norplex Vexar bag	200	\$5.00	\$1,000
Zapco shark clips (4 per bag)	800	\$1.10	\$880
Zapco foam floats (two per bag)	400	\$2.00	\$800
zipties (per bag)	1	\$1.00	\$1
2" ABS spreaders	22	\$15.00	\$330
bag lines 5/16" Bluesteel (in ft)	1200	\$0.10	\$120
Stainless swivels	4	\$5.00	\$20
Anchor lines (5/8" poly-dac)	200	\$1.00	\$200
Side float lines (poly in total ft)	440	\$0.47	\$207
Log staples	10	\$1.00	\$10
Two 12' Pike Poles	2	\$100.00	\$200
Two 16' logs (locally sourced)	2	\$200.00	\$400
Anchors local sourced (2 @ 1500#)	2	\$550.00	\$1,100
Total			\$5,268

2. Year 1. Oyster Gro trays (6 bags per tray) : 45 x \$200 = **\$9,000**
3 sites 15 per site (90 bags or about 100,000 oysters per site).
3. Year 2. Additional shellfish trays, bags, floats, anchors: **\$8,000**

Seaweed farming gear (grant funds does not include matching funds)

1. Premium Oceanic style longlines with anchors, rope and floats
\$2,000 x 7 longlines = **\$14,000** (preferably 7 different sites) – year 1
2. Ocean Approved style longlines \$1,500 x 8 longlines = **\$12,000** – year 2
3. Establishment of sugar kelp hatchery Oceans Alaska **\$15,000** equipment, plus salary support for hatchery manager and technician, and **\$4,000** to transport seeded kelp lines to 8 farms

Agreements with participating farms

1. Need to have a **permitted farm** to test gear on.
2. **Farm owns gear** after the demonstration project.
3. Farmer **documents matching time** in a project log, including hours labor, travel, boat use, shared equipment, etc. (Gary Freitag, ASG)
4. Farmer agrees to **document gear efficiency** (*labor cost* including construction, maintenance, husbandry), *growth rate* (seed size, density, increase in volume/weight/size), *harvest yield, quality of product*, and *value*) as compared to existing technology in a **project business plan format** (Quentin Fong, ASG)
5. Farmer agrees to **share project results** in report, meeting or workshop
6. Shellfish and seaweed grow-out gear purchased through P.S.I. subcontracts to individual farms

Experimental design

- Make sure moorings are secure.
- Get seed at same size and same time to put into alternate gear and at different sites.
- Keep a log of initial size/density/volume, stocking density, thinning, and final yield. If different densities are tried, have at least 6 replicates. Count per liter is a good way to keep track).
- Maintain gear (flipping, etc.) to prevent fouling on the cages and keep track of the labor costs.
- Add buoys to kelp longlines as necessary.
- Monitor water temperature at each site on the gear itself.



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