Alaska Mariculture Initiative
Phase I Case Studies
Where do we go from here?

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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• Growers cite seed availability, slow growth rates, labor costs, outdated technology, shipping costs and harmful algal bloom closures as limiting profitability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
• Need to build on successes, bring in technology transfer, innovation and diversification
• Need to form strategic partnerships
• What do successful aquaculture developments look like and what lessons can we learn?
Alaskan Mariculture Case Studies*
How did mariculture evolve in the world leaders in this industry?

- Experimentation by early entrepreneurs
- Existence of wild fisheries and markets
- Seed grants

Where we are now
- Breakthroughs in culture technology
- Development of successful business models
- Successful marketing
- R+D support for culture bottlenecks, financing
- Strategic partnerships
- Fishermen training

* Alaska Fisheries Development Foundation Alaska Mariculture Initiative Phase I
Who is successful and why?

Annual value of mariculture (USD)

- Spain mussel
- Salmon ranching
- New Zealand mussel
- Florida clams
- PEI mussel
- Washington Geoduck

$ Million
BRITISH COLUMBIA

• significant public investments in aquaculture planning and development, and its impacts on small rural coastal economies
• Successful integration of first nations into aquaculture
• Investment into training and research facilities
• many species successfully reared for mariculture in B.C. could likely be reared successfully in Alaska

Vancouver Island University Mariculture Programs

• 2 – year Diploma
• 1 – year Post-Degree Diploma
• Bachelor of Science Degree in Fisheries & Aquaculture

Center for Shellfish Research Deep Bay Station
PRINCE EDWARD ISLAND

- Shellfish aquaculture development strategy
- Efficient and improving production and processing sector
- Key involvement of local growers, and innovative owner-operator fishermen and farmers
- Early profits and successful business plans with mussels
- Government support
- Development based research
- Benefits from National, Regional and Provincial aquaculture research and development policy creating jobs and economic development
- Mussel farming has great potential for aquaculture development in Alaska, and developing a cost-effective growing technology, processing industry, and workforce is essential to achieving that potential

EXAMPLES

PEI Aquaculture Alliance
Aquaculture Innovation and Market Access Program (AIMAP)
Mussel spat survey and forecast for growers
Extensive oceanographic research in support of the industry
• Exceptional growing areas
• Set aside large mussel raft polygons, or **parks** established and developed over two thousand family run production systems in the sheltered rias
• *The technology of raft cultivation* is relevant to Alaska where predation of sea ducks and sea otters would require a **protected (i.e. predator nets) culture system**
• Spain, like Alaska, has huge wild fisheries and an extensive seafood processing industry involved in *aquaculture production, processing, marketing and distribution*
• The persistence of **small, family owned raft businesses** generating widespread support
• Separate industries in seed gathering, mussel processing, freezing and canning
• 50% subsidy for boats and rafts (€ 1 million ) enables sufficient capital for efficient farming

**EXAMPLES**

Efficient boat, processing and shoreside infrastructure
Diversification into new species
Florida

- Hatchery, nursery, and grow-out methods are highly applicable to any Alaska shellfish production
- Comprehensive retraining projects
- Local community and stakeholder driven approach, integrating existing fisheries skill sets and resources with a flexible and nuanced regulatory policy
- Technical and scientific support
- Financial support was provided to jump-start the novice farmer
- Long-term extension and technical assistance was (and is) maintained onsite long after completion of the training programs
- Existing infrastructure (roads, power and communication), the nearby availability of government offices, research and laboratory facilities, a large pool of researchers and extension personnel familiar with hard clam biology and culture, and the presence in the state of existing hard clam farms.

EXAMPLES

- University of Florida “Project Ocean” fishermen retraining program
- Seed clams produced by Harbor Branch Oceanographic Institute
- 130 farms established
New Zealand

- Both the transportation and seafood infrastructure in New Zealand are enhanced by a $1 billion wild fishery where many of the major companies process, distribute and market both aquaculture and fisheries products.
- **Concise, industry-driven aquaculture research and development plan with the goal of $1 billion** (New Zealand dollars) sales by 2025.
- Aquaculture New Zealand, developed as a single voice for the entire aquaculture industry, and funded by a small production tax, rallied the industry and government to implement the Aquaculture New Zealand Research Strategy (2011). The main elements are growth, diversification and efficiency, maintenance, sustainability and security, capability, expertise and infrastructure.
- An interactive process (which is still continuing) resulted in the development of an expansion of the industry while simultaneously resulting in an improvement in public attitudes about aquaculture.
- A marine spatial plan occurring in the Hauraki Gulf region, including aquaculture, is part of a comprehensive management exercise involving all stakeholders including the native Maori. AMA’s (aquaculture management areas) were created for socially and ecologically sustainable industry expansion.
- **Value-added processing industry** for export more than doubled the economic impact of mariculture products.
- Four university or technical college education and training programs

EXAMPLE

The New Zealand Industry Training Organization (NZITO) has an extensive training program in aquaculture, seafood processing, vessel operations, and wholesale and retail seafood trades.
Mariculture in Alaska

**Favorable growing areas**
All case studies

**Fishing and processing infrastructure**
All case studies

**Public acceptance and support**
Spain, Canada, developed in New Zealand, Florida

**Successful business plan and culture technology**
New Zealand, Canada, Florida, Washington, Spain

**Workforce development**
New Zealand, Canada, Florida

**Development plan with Coordinated R+D strategy**
New Zealand/Canada/Ireland

**Summary of all case studies**
### AMI Phase I Case Studies

#### Table 1. Critical Attributes, Case Study Areas Comparison with Alaska

<table>
<thead>
<tr>
<th>Area</th>
<th>Industry growth capacity</th>
<th>Rapid growth rates</th>
<th>Workforce development</th>
<th>Stakeholder supported development</th>
<th>Large Capture Fisheries</th>
<th>Advanced culture technology</th>
<th>Public and private investment</th>
<th>Coordinated research and development</th>
<th>Market access</th>
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<tbody>
<tr>
<td>Alaska</td>
<td>x</td>
<td></td>
<td></td>
<td>Not yet</td>
<td>Finfish and crab</td>
<td>x</td>
<td>minimal</td>
<td>x</td>
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<tr>
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<td>in progress</td>
<td></td>
<td>x</td>
<td>mostly private investment</td>
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<td>x</td>
<td>re-training program</td>
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<td>x</td>
<td>new species development</td>
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<td>small family enterprises</td>
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</table>

**Alaska has**
- Huge growth capacity
- Large capture fisheries
- Successful salmon enhancement
- Large commercial fishing workforce and infrastructure
- Market recognition for quality
- Steady growth in shellfish sector

**Alaska needs**
- Evaluate waters for mariculture potential
- Mariculture technology transfer
- Public and private investment
- Workforce development
- Coordinated research and development
- Value-added processing
Some ideas to ponder

- Is there a way to integrate the extensive salmon hatcheries into the initiative? Are there other species they can grow there (i.e. aquaponics, bivalve nursery, etc.)?

- How can we support the momentum generated from the National Sea Grant project on aquaculture innovation, diversification and technology transfer?

- Which areas with existing infrastructure can become aquaculture hubs to expand the industry?

- How can we engage university, state and federal marine scientists and oceanographers to think of Alaskan waters as growing areas and support mariculture R+D?

- What areas in Alaska can grow what species at a profit?

- How can we bring in additional expertise?

- What kind of workforce development is needed and where can that be done?

- What species are the “low hanging fruit” and what ones are likely candidate new species for long term development?

- What is a good model for an aquaculture development plan for Alaska?
Maine Example: 1990 Development plan executive summary *

1. Develop and disseminate information about aquaculture.
2. Cultivate a positive investment climate for small entrepreneurs.
3. Designate a lead state agency to support development of aquaculture.
4. Ensure consistency and predictability in the regulatory process.
5. Pursue a coordinated development strategy encompassing aquaculture and traditional fisheries.
6. Protect, preserve, and enhance coastal water quality.
7. Develop a comprehensive plan for use of coastal waters.


Btw: a lot of it worked!!!
Remote sensing (Landsat satellites) – PROSPECTING*

Maine Example: Remote sensing for site selection

Water temperature
Penobscot Bay Maine
August

Chl a mid-coast Maine August

*Aquaculture Site Prospecting: Developing Remote Sensing Capabilities for the Aquaculture Community of Maine, National Sea Grant Extension 2016-2018, U Maine SMS, Brady, Boss, Thomas, Newell and Morse.
Maine Example: Marine Spatial Planning by species

Site selection and farm management: SHELLGIS*

Shellfish growth model based on site specific environmental growth drivers reduces risk and trial and error (supported by MAIC, USDA)

Using SHELLSIM to model growth

Using Mike 21 to model water flow (50 m grid)

Using Flow-3D to model effects of cultures on flow and food

Maine example: SHELLGIS

SHELLGIS (shellgis.com). We have developed a software that provides, on a 50 m grid, a prediction of how fast your oysters will grow depending on type of culture (surface or bottom), time of year planted, seed size, and density in the culture unit.
Maine Examples: Coastal Monitoring Buoys

S Atlantic LOBO Buoys (120 k) and new COB buoy (2k), funded by National Science Foundation EPSCoR and Maine Technology Institute

Temp, sal, PAR, chl a, shellfish growth basket, wifi

www.Maine.loboviz.com