UNDERSTANDING AQUATIC FARMING
ADF&G PERMITTING

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KODIAK REGIONAL MARICULTURE CONFERENCES
SEPTEMBER 11, 2019
KODIAK, AK
MAJOR STATE, FEDERAL, LOCAL AUTHORIZATIONS

State
- DNR Land Lease
- ADF&G Operation, & Special Area Permits Transport & Acquisition
- DEC Shellfish Harvest, Processor, Shipper & Value Added Food Permits
- USACE In-water Structures

Federal
- NOAA NMFS Marine Mammal, ESA, EFH

Local
- City or Borough Planning Permit
- Ordinance

USFWS Wildlife Refuge

Operation Permit Issued
No later than 30 days after DNR Lease
Aquatic Farm Act Implementation (AK Statutes 16.40.100-199; 1988)

The department permits and regulates aquatic farming in the state in a manner that ensures:

1. the protection of the state's fish and game resources (and uses of those resources) and
2. improves the economy, and well being of the citizens of the state.
AQUATIC FARMING PROVISIONS

✓ Shellfish and aquatic plants only
✓ Commercial use only
✓ Finfish farming prohibited
✓ Indigenous species

• Exception: Pacific oysters allowed from a certified or approved seed source only
ADF&G PERMITS

1. **Aquatic Farming Operation Permit** - 10 yrs
   To operate an aquatic farm or hatchery

2. **Stock Transport Permit** - 1 yr
   To transfer stock to, from, or between an aquatic farm, hatchery, or stock acquisition site (waters of the state)
ADF&G PERMITS

3. **Stock Acquisition Permit** - 1 yr
   To collect wild stock from outside of an aquatic farm site, for the purposes of providing broodstock or seedstock to a hatchery or farm

4. **Shellfish Import Certification**
   (Hatchery/Nursery) 1 yr

5. **Shellfish Instate Seed Distributor Approval**
   (Hatchery/Nursery) 1–3+ yrs
To minimize the risk of genetic or disease impacts on wild populations, hatchery-cultivated macroalgae seedstock transport for out planting of seedstock must be within 50 km (by water) of the broodstock (parent) collection site.
**AQUATIC FARM SITE SUITABILITY / SITE SELECTION**

**MUST BE SUITABLE FOR THE FARM OR ORGANISM BEING CULTURED**

<table>
<thead>
<tr>
<th>Physical and Biological Characteristics</th>
<th>Other considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Protected</td>
<td>✓ Fouling organisms</td>
</tr>
<tr>
<td>✓ Exchange rates, water temps,</td>
<td>✓ Predation</td>
</tr>
<tr>
<td>currents, salinity, food availability,</td>
<td>✓ Pollution</td>
</tr>
<tr>
<td>light, and suspended sediments</td>
<td>✓ Paralytic Shellfish Poisoning (PSP)</td>
</tr>
<tr>
<td>✓ Suspended - Water depth (40-60 ft</td>
<td>✓ Distance from labor pool and market</td>
</tr>
<tr>
<td>or greater)</td>
<td>✓ Vicinity to other farms</td>
</tr>
<tr>
<td>✓ On bottom - Substrate composition,</td>
<td></td>
</tr>
<tr>
<td>Intertidal exposure</td>
<td></td>
</tr>
</tbody>
</table>
PROXIMITY TO SENSITIVE AREAS:

• Anadromous Fish Streams
• Herring Spawning Areas
• Kelp and Eelgrass beds
PROXIMITY TO SENSITIVE AREAS

CONT:

• Shorebirds and waterfowl concentrations

• Harbor seals, seal lion, walrus concentrations

• Guidance – Possibility of significant adverse effects if within 500 meters from haulout AND large haulouts (> 50 animals)
AQUATIC FARM SITE SUITABILITY / SITE SELECTION
MAY NOT REQUIRE SIGNIFICANT ALTERATIONS IN TRADITIONAL FISHERIES OR OTHER EXISTING USES OF FISH AND WILDLIFE RESOURCES

PROXIMITY TO EXISTING USE AREAS

- Existing commercial, subsistence, sport, or personal use areas for fish, shellfish, or aquatic plants
- Salmon Hatchery - special harvest areas or terminal harvest areas
- Major anchorages and floatplane access
PROXIMITY TO RESTRICTED AREAS

Designated Areas:

- State refuge and sanctuaries
- State parks and marine parks
- State critical habitat areas (CHA) except Fox River / Kachemak Bay
WHAT IS THE DEFINITION OF AQUATIC FARMING IN ALASKA?

Growing, farming, or cultivating aquatic farm products in captivity or under positive control by means of

1. **managed cultivation** for limited or no mobility species (e.g. oyster, kelp)

2. **enclosed within an escape-proof barrier** that is natural or artificial for motile species (e.g. sea cucumber, sea urchin)
WHAT THIS TERM CALLED MANAGED CULTIVATION?

**Improve productivity** of the species that is intended for culture at the aquatic farm above what would occur in natural conditions.
TYPES OF MANAGED CULTIVATION

1. Import of hatchery-produced or cultivated seed
HATCHERY SEED PRODUCTION

Shellfish
- Broodstock conditioned and spawned
- Production of Algae for feed
- Eyed-larvae to seed reared to 3–4 mm

Seaweed - Kelp
- Fertile Mature Blades with Sorus
- Spore Release / Inoculate Solution
- Light and Nutrient Solutions
- Sporophyte on string wrapped PVC
NURSERY
SEED REARING & CULTURE

REMOTE SETTING NURSERY
Eyed-larvae settles out and becomes spat
Feed Phytoplankton and Diatoms
Downwellers (200 μ) / Upwellers (240 – 400 μ)
Seedstock reared up to 3-4 mm

INWATER NURSERY
Seedstock cultured in marine waters
Fluid Upwelling System (FLUPSY) with paddle wheel
Brings in plenty of food phytoplankton
Seedstock reared from 3 – 15+ mm
2. Import of naturally-produced seed from either onsite or offsite

- Kelp on oyster longline
- Blue mussel fouling on stacked culture trays
- By catch in oyster tray culture gear (scallops)
- Blue Mussel culture socks
- Blue Mussel natural set lines
- Scallop culture gear - small scale
TYPES OF MANAGED CULTIVATION CONT.

3. Density manipulation by culling and redistribution

4. Reduction of competing species

5. Predator exclusion

Predator Netting
6. Programming harvest to optimize growth and shellfish & aquatic plant condition (e.g. Kelp 4-6 months, Oysters 3-4 yrs)
7. Habitat improvement
WHAT IS REQUIRED TO APPLY FOR AN AQUATIC FARM?

1. A COMPLETED JOINT-AGENCY APPLICATION

2. ADDITIONAL DOCUMENTS
   a. OPERATION AND DEVELOPMENT PLAN(S)
   b. PROJECT DESCRIPTION
   c. GENERAL LOCATION MAP (USGS)
   d. DETAILED LOCATION MAP (NOAA CHART)
   e. SITE PLAN - OPERATION LAYOUT AND LISTED ITEMS
   f. CROSS-SECTIONAL DIAGRAMS
   g. DETAILED DRAWINGS
FEW THINGS TO REMEMBER FOR SUBMITTALS

• One Operation and Development Plan (ODP) for each species to be cultured

• For Project Description use MS Word outline and provide for review
  • For culture method, describe “activities” used from acquiring seedstock up to harvest plus seed stocking schedules.
  • For harvest method, describe “activities” and harvest equipment to use and harvest schedules.
  • For culture gear, describe plans for removal and reinstallation and time period
    • (e.g. remove and reinstall submerged longline system on an annual basis)

• For maps: ArcGIS Online application

• Make sure all numbers, dimensions, and types are consistent throughout

• For all depths (e.g. below bottom of gear or surface to substrate bottom), specify Mean Low Water (MLLW) in ft
Most important:
Operation, development, & staffing plans for the farm **MUST** demonstrate technical and operational feasibility

How do you do that?
AQUATIC FARMING OPERATION PERMIT
OPERATION AND DEVELOPMENT PLAN REVIEW

1. Schedule is **consistent with life history** of species intended to be cultured.

2. Shows **improvement in productivity** of the organism **above** what would occur in natural conditions

3. Summarizes **installation and maintenance** of support facilities / culture gear / anchoring systems
COMPLETING THE OPERATION AND DEVELOPMENT PLAN: PART A – HEADING AND STAFF PLAN

Scientific Name and Common Name

Species: Sugar Kelp, Saccharina latissima

Staff Plan

Is it technically and operationally feasible?

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Days</th>
<th>Number of People</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>30</td>
<td>4</td>
</tr>
<tr>
<td>Year 2</td>
<td>30</td>
<td>4</td>
</tr>
<tr>
<td>Year 3</td>
<td>30</td>
<td>4</td>
</tr>
<tr>
<td>Year 4</td>
<td>30</td>
<td>4</td>
</tr>
<tr>
<td>Year 5</td>
<td>30</td>
<td>4</td>
</tr>
</tbody>
</table>
2. Site Monitoring/Maintenance

a. How often, in days per month, do you intend to monitor your site for things such as adequate anchoring, disease, exotic species settlement, fouling, gear drift, snow load, wind damage, vandalism, etc.?  

Growing season 4 (days/month) Winter months 4 (days/month)  

b. Where will you store any farm gear and/or equipment when not in use? [Longlines, buoys, depth control systems, and any anchor lines that are not currently being used onsite will be stored on my private property located in the Kodiak on Kodiak Island.]

c. How will you keep the gear and shellfish free of fouling organisms (hot-dip, air dry, pressure washing, etc.)? [For kelp, in order to minimize any fouling organisms such as bryozoans, barnacles, mussels, and algae epiphytes on the kelp product and gear, all kelp, longlines, depth control systems, and buoys, will be removed from the water after each harvest annually. All culture gear and equipment will be cleaned and stored on land until just prior to planting of seedstarts.]

d. How will you manage incidental species over the course of operations (sea urchins, sea cucumbers, butter clams, or other non-targeted species)? [For kelp, incidental species on product and longlines, buoys, and depth control systems, will be removed by hand or knocked off by knife and returned at the site into marine waters.]

e. For on-bottom culture, if you intend to use predator netting, how long will you keep netting over your product? N/A (months)
3. Recordkeeping

a. What methods are you going to use to measure the success of your operation (growth, survival or mortality rates, production, etc.)? For kelp, we plan to use kelp growth and final production to ascertain whether our operation is meeting our business plan goals.

b. Will you maintain records of aquatic farm product, such as counts and measurements to track survival and growth? **Yes** ☑ **No** ☐ Describe: For kelp, we plan to measure the the length of kelp on a monthly basis after seedstart lines are unwrapped on longlines. Final yield wet weight per meter of seeded line and length of 5 plants on the meter of line will be recorded at final yearly harvest.

c. Do you plan to record other physical or environmental parameters at your site such as water temperatures and salinity? **Yes** ☑ **No** ☐ Describe: Water temperature, salinity, turbidity, and nitrogen levels will be monitored and logged at the site.
OPERATION AND DEVELOPMENT PLAN:
PART A – SEED ACQUISITION

6. Seed Acquisition

a. Which certified seed source(s) will you use? 
   For kelp, Blue Evolution Hatchery in Kodiak

b. Applicable for indigenous species (mussels, scallops, abalone, etc.), how do you intend to collect wild seed? 
   Not applicable as do not intend to collect wild seed as part of this operation. We will work with the permitted hatchery as a collector approved to manually acquire fertile blades from an area within 50 km by water of the permitted aquatic farm outplanting location where kelp seedstarts on line will be placed.
## OPERATION AND DEVELOPMENT PLAN:
### PART B – INSTALLATION SCHEDULE

<table>
<thead>
<tr>
<th>Calendar Year</th>
<th>Installation Schedule</th>
<th># of Hatchery-Produced Seed</th>
<th># of Seed Collected Onsite (Only applies to indigenous sp.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Year 1) 2020</td>
<td>Support Facilities¹</td>
<td>10 - 600 ft of submerged longlines; 100 - depth control systems; 50 - LD-1 polyform buoys. Reinstalled and removed each year.</td>
<td>~1.5 million sporophytes (250 seed / ft of line)</td>
</tr>
<tr>
<td>(Year 2) 2021</td>
<td>Equipment/Gear Types And Numbers²</td>
<td>Same as above</td>
<td>Same as above</td>
</tr>
</tbody>
</table>

¹ Support Facilities
² Equipment/Gear Types And Numbers

Add any installation details:

Seed Acquired
For Kelp:
No. and seed / ft
For Oyster: No.
STANDARD CULTURE GEAR AND EQUIPMENT

- Raft & Trays
- Longlines & Lantern Nets
- Longlines & Trays
- Floating Bags
- Flip-flop Bags
- PVC Tubes / predator netting
- Floating cages
- Submerged longlines

Longlines – large, more exposed areas or less current; Rafts for small sites with sufficient current
OPERATION AND DEVELOPMENT PLAN:
PART B – INSTALLATION SCHEDULE

Scientific Name and Common Name

<table>
<thead>
<tr>
<th>Projected Sales ($)</th>
<th># of Animals or Plants</th>
<th># of Pounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$24,000</td>
<td></td>
<td>48,000</td>
</tr>
<tr>
<td>Same as above</td>
<td>Same as above</td>
<td></td>
</tr>
</tbody>
</table>

For Kelp – use Pounds sold column

For Oysters – use Numbers sold column

For Kelp – harvest in 2nd yr

For Oyster – harvest in 3rd or 4th yr

Kelp Sales – Investigate market and estimate sales based on price per lb. harvested
WHERE ARE PERMITTED AQUATIC FARMING OPERATIONS IN ALASKA?

59 Aquatic Farms
5 Hatcheries
8 Nurseries
WHAT ORGANISMS ARE APPROVED TO CULTURE FOR PERMITTED OPERATIONS?

LIMITED AND NO MOBILITY ORGANISMS

• Bivalves: Pacific oysters*, Geoduck, Blue mussel, Littleneck clam

MOBILE ORGANISMS

• Scallop (purple hinged, rock, pink, spiny), Cockles, Sea urchins (red, green, and purple), Sea cucumbers

* Pacific oysters are a non-native species – allowed to be imported into the state from certified sources using Pacific Northwest broodstock.
AQUATIC FARM PRODUCTION REGIONAL DISTRIBUTION

- Kachemak Bay 47%
- Prince William Sound 12%
- Southern SE 36%
- Northern SE 4%
- Westward - Kodiak 1%
- Other 5%

* Based on 2018 Annual Reports from Permitted Operators
AQUATIC FARM SHELLFISH PRODUCTS CULTURED AND SOLD

PACIFIC OYSTER
(Magallana gigas)
~1.9 million produced
26 operations
6% INC
1st species sold (93.5%)

BLUE MUSSEL
(Mytilus trossulus)
1,270 lbs. produced
7 operations
5% DEC

PACIFIC GEODUCK
(Panocea generosa)
Confidential

Data based on 2018 annual reports provided by operators
AQUATIC FARM AQUATIC PLANT PRODUCTS CULTURED AND SOLD

BY 2018, 7 FARMS PRODUCED 89,279 LBS. OF THESE 3 KELP SPECIES COMBINED.

DATA BASED ON 2018 ANNUAL REPORTS PROVIDED BY OPERATORS
WHY DO AQUATIC FARMING?

1. Sustainable
2. Economic opportunity
3. Opportunity to innovate
4. Opportunity to transfer technology
5. Opportunity to educate
6. Quality of life
7. Heritage
8. Food Security
9. Habitat for other species

BENEFITS
QUESTIONS

For additional assistance, please contact:
Aquaculture Section/Commercial Fisheries Division
Alaska Department of Fish and Game
P.O. Box 115526, Juneau, AK 99811-5526
(907) 465-6150 - cynthia.pring-ham@alaska.gov
(907) 465-4724 - michelle.morris@alaska.gov
(907) 465-4325 - garold.pryor@alaska.gov
Fax: (907) 465-4168

General Aquatic Farming email: dfg.dcf.aquaticfarming@alaska.gov

ADF&G:

APPLICATION: