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Aquaculture in Shared Waters Fact Sheet: Site Selection

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Aquaculture in Shared Waters

Site Selection



Dana Morse₁ and Chris Davis₂

Why is site selection so important?

Site selection is the process of determining the optimum place for the sea farm. It's a critical process, and will affect success - or failure. Crops grown on the wrong site may never do well, despite the best efforts of the farmer, and since obtaining a lease is usually a lengthy process, it's not easy for a farmer to simply start up at a new site. The best approach is to do your homework thoroughly.

Location, Location, Location

Sea farmers learn that farming is site specific: what works on one site may not work on another, even if the two sites are close to one another. Spend time getting to know prospective sites, and try pilot-scale production at different sites. There is no substitute for on-the-water observation and experimentation.

Sites may be well suited for certain *stages* of a particular crop. For example, a site needed for a shellfish nursery may not be best for final growout; or a good area for mussel seed collection may be too shallow to install a mussel raft. Match the site with the species (or stage of development) and the culture method.

Principal considerations for siting can be grouped into the following categories:

- Biological requirements
- Physical characteristics
- Social + regulatory factors

Oyster upweller next to a boat slip on the Damariscotta River. A boat slip for an upweller location is an example of good, creative siting.

Photo: Chris Davis



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Biological Factors

First and foremost, a site has to support the survival and growth of the crop.

- **Temperature and salinity** are critical. Do the levels at your proposed farm site match up with what is appropriate for the species being grown, both for the average values and extremes encountered during the year? What data are available to help you with this consideration?
- **Predators and pests** (crabs, starfish, ducks, shell-boring worms, etc.) or biofouling organisms (mussels, barnacles, tunicates, bryozoans), can be major sources of mortality, or can create high costs for labor and equipment to manage. Consider what to expect, how you will investigate this, and how you will manage these challenges.
- Is the **water quality** good enough in the area to raise, harvest and sell your crop? Check with ME DMR Water Quality staff about the water quality classification of the site and surrounding waters; they can tell you the history of things like red tide and bacterial contamination and the chances that water quality will improve or decline.
- What is the history of the area with respect to **diseases** that might affect your crop: Dermo, MSX, neoplasia, etc.?
- For bivalves: is the **food supply** adequate? How do naturally-occurring shellfish in the area grow?
- Are there **special considerations** like presence of eelgrass, protected species, or important bird nesting sites?

Physical Requirements

The physical environment will have a strong effect on siting decisions as well.

- **Accessibility:** how will you get on and off the farm? Can you observe it from the shore, to react to things like gear failure or poaching? Are there landing/mooring facilities close by, for moving equipment and bringing your product to market? Where are you planning to sort and grade? Do you need to plan for a work float on or near your lease site?
- **Bottom characteristics:** is the sediment too soft for bottom cages? What kind of moorings will work? The bottom type will tell you a lot about the site characteristics; hard or cobble bottom indicates higher energy, erosional sites. Softer or mud bottoms indicate depositional, lower energy sites.
- Is the **depth** at the site appropriate for your moorings and production equipment?
- What are **current velocities, tidal flow, tidal range and wind fetch** at the site? These will be important for food and oxygen delivery, removal of waste, and stress on the equipment.
- What is the **bottom profile**? Are there irregularities that may cause turbulence or short period wave patterns? Both of these may require different gear types than other sites.
- Is **ice** normally present in winter, and how will you deal with that?
- Is **turbidity** an issue....will your farm be subject to too much siltation?

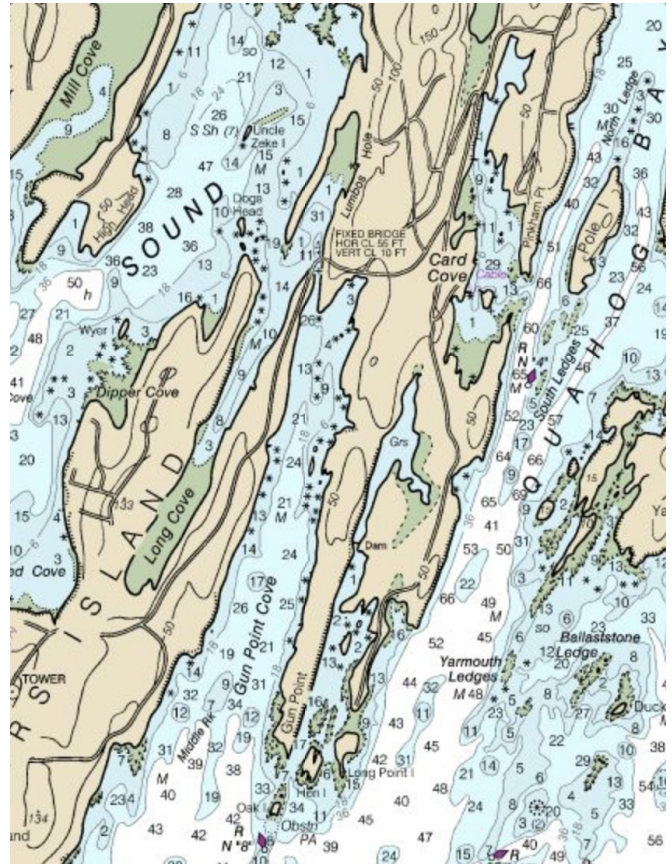
This lobster pound makes for a creative oyster nursery site; it's protected, has easy access and is warmer than the surrounding waters.
Photo: Dana Morse



Social and Regulatory Factors

Coastal waters of Maine are held in trust for public use, and farmers need to obtain permission for the rights of use. Accordingly, social and regulatory issues are important and may be more complex than the biophysical factors. The principal regulatory body - Maine Dept. of Marine Resources - will use several standards to evaluate a lease application, including the effects of the farm on: riparian owners' ingress and egress (ability to get to and from their shore by water and to use and maintain docks and moorings), navigation, commercial and recreational fishing, other aquaculture activities in the area, the effect of the farm on the environment, and on the use and enjoyment of nearby public facilities. DMR will also consider the original source of the organisms to be cultured. Be prepared to have your farm application evaluated on these criteria. Other criteria on Standard Leases (not Experimental Leases or Limited Purpose Aquaculture Licenses) currently require that light and noise from the lease site cannot have an unreasonable impact at the boundaries of the lease, and noise-making equipment must be muffled as much as possible. The criterion on visual impact requires gear and equipment to blend in with the surroundings as much as possible and includes a limit on height of any structures.

A measure of flexibility in selecting sites can be beneficial to new growers, when considering the other existing uses of a site, or what might arise by way of conflict. It is frequently helpful to spend time talking with people who fish in the area, or the nearby waterfront homeowners, the harbormaster, etc. By doing so, there is a good chance of minimizing potential conflicts, and local waterfront users will appreciate being brought into the process early.



Each farm site is unique. Depth, currents, exposure, temperature, salinity, and many other factors are important when choosing a farm site.
NOAA Office of Coast Survey

Many Sites vs. One Site?

New growers may want to evaluate several sites to start, before settling on a preferred area: the old adage against putting all of one's eggs into one basket is true for aquaculture. Disease outbreaks, impairments to water quality from bacteria or oil spills, and storms can all cause interruptions in production and sales on a given site, and having an additional farm site can help a producer limit such risk. A multiple-site approach gives the grower more options (species, gear, production stages) but will likely be more expensive and time-intensive. In Maine, the Limited Purpose Aquaculture License (LPA) can be a low-cost way to experiment with multiple sites, although on a limited scale. More detail about LPA's can be found at the Maine Dept. of Marine Resources web page: <http://www.maine.gov/dmr/aquaculture/>

How to get started, and where to find information

There are several ways to gather information about siting for aquaculture, and some contacts and resources are described on the next page. A good place to start is the Aquaculture Division at the Maine Dept. of Marine Resources: 207.633.9500 (web link on next page). Town Harbormasters and Shellfish Constables can be great sources of knowledge, usually contacted through their town office.

Some site selection equipment and software is available through both the Maine Aquaculture Innovation Center (www.maineaquaculture.org) and Maine Sea Grant (www.seagrant.umaine.edu); contact these organizations for details. Additional advice on site selection is available through the Maine Aquaculture Association (www.maineaquaculture.com).

Resources



Information on growing oysters, mussels, razor clams, scallops, and kelp

- <http://www.seagrant.umaine.edu/resources-for-shellfish-growers/species/american-oyster>
- <http://www.seagrant.umaine.edu/resources-for-shellfish-growers/species/mussel>
- <http://www.seagrant.umaine.edu/resources-for-shellfish-growers/species/razor-clam>
- <http://www.seagrant.umaine.edu/resources-for-shellfish-growers/species/scallop>
- <http://www.seagrant.umaine.edu/resources-for-seaweed-growers>

Aquaculture in Shared Waters fact sheet series:

- <http://www.seagrant.umaine.edu/Resources-and-news>

Maine Department of Marine Resources, Aquaculture Division:

- <http://www.maine.gov/dmr/aquaculture/index.html>

NOAA Charts online:

- <http://www.nauticalcharts.noaa.gov/mcd/NOAAChartViewer.html>

Maine EPSCoR LOBO buoys:

- <http://maine.loboviz.com/>

Northeast Regional Association of Coastal Ocean Observing Systems (NERACOOS):

- <http://neracoos.org/>

Friends of Casco Bay Water Quality Monitoring:

- <http://www.cascobay.org/water-quality-monitoring/>

The goal of these fact sheets is to inform readers about the possibilities of integrating aquaculture with current fishing and seafood businesses, and to diversify incomes along Maine's working waterfront.

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<http://www.seagrant.umaine.edu/aquaculture-in-shared-waters>.



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