

# Aquaculture in Shared Waters

## — Kelp Aquaculture —



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“Kelp” are large brown marine macroalgae species native to New England and traditionally wild harvested for food. There are three commercially important kelp species in Maine—**sugar kelp** (*Saccharina latissima*), **winged kelp** (*Alaria esculenta*), and **horsetail kelp** (*Laminaria digitata*). Maine is developing techniques for culturing kelp on sea farms as a way for fishermen and farmers to diversify their operations while providing a unique, high quality, nutritious vegetable seafood for new and existing markets. Kelp is grown on submerged horizontal long lines on leased sea farms from September to May, making it a “winter crop” for Maine. The simple farm design, winter season, and relatively low startup costs allow for new and existing sea farmers to experiment with this newly developing type of aquaculture on Maine’s coast.

“Kelp” can refer to **sugar kelp** (*Saccharina latissima*), **Alaria** (*Alaria esculenta*), or **horsetail kelp** (*Laminaria digitata*). Sugar kelp has been cultivated in Maine for several years, and successful experimental cultivation has been done with species such as *Alaria*. These photos are examples of the cultivation stages of sugar kelp.



Microscopic kelp seed



Seeded kelp line



Kelp line at time of harvest

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# Q: *Is there a viable market for kelps grown in Maine?*

Maine is home to a handful of companies that harvest sea vegetables from the wild, including kelps and other seaweeds. Over the last 40 years, they have successfully built relationships and markets throughout the US and around the world. These markets have primarily existed within the health food and macrobiotic realms, though sea vegetables are gaining in popularity among the mainstream markets as

consumers are looking for healthier alternatives. All of the traditional companies in Maine offer dried sea vegetables with the exception of one company, Ocean Approved, LLC, that offers a ready-to-eat cut and frozen kelp products. Both existing and emerging companies are interested in farmed kelp because of the sustainable production and unique product that it offers. Because kelp farming is a new and emerging

industry, the existing producers and marketers are working on building the infrastructure that will be required for new farmed product to enter the market. The Maine Seaweed Council ([www.seaweedcouncil.org](http://www.seaweedcouncil.org)) is an industry group made up of researchers, harvesters and growers who are working together to build this new industry, and is a good source for more information.

## Kelp

Kelp is a healthy and nutritious sea vegetable that is high in fiber, vitamins, and minerals, including vitamin C, vitamin K, iron, calcium, iodine, and magnesium, and has long been an important part of the diet of coastal people. Kelps are great in salads and soups, and can be added to foods and even beer (Marshall Wharf Brewery in Belfast makes a sugar kelp beer called "Sea Belt") to enhance flavor and nutrition. Kelp is also useful in the beauty industry, as it contains alginate and vitamins and minerals, which are nourishing to hair and skin.



Kelp salad



Dried sea vegetable varieties



Seaweed soap



Frozen kelp



Kelp soup



# What is the potential for growing kelp in Maine?



Maine is an ideal place to cultivate kelps, with its clean, cold water, abundant coastline, and knowledgeable watermen. Kelps are cultivated on sea farms, which are leased from the State of Maine through the Department of Marine Resources. Because kelp is a winter crop, it can

be grown in the "off-season" in Maine, when most lobster fishing and recreational boating is at a minimum. Winter kelp farms have great potential in Maine to provide a means for diversification and a way to increase seafood production in the State.



Sugar kelp drying after harvest



Young kelp growing on longline



Kelp at time of harvest



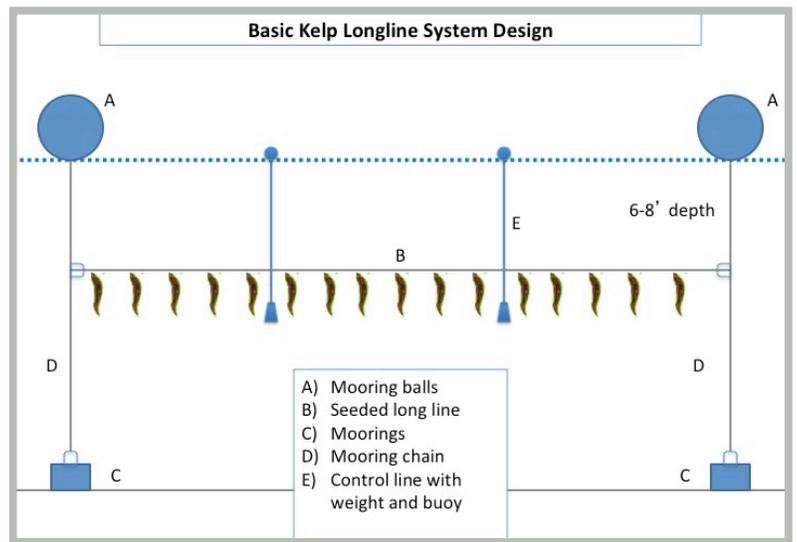
Young kelp on line



Harvested kelp



Rolls of kelp seeding line



Kelp grow-out line set-up

## What is the grow-out time for various kelp species?

The large brown kelps are a cold temperate group of marine macroalgae, able to take advantage of the increased nitrogen availability and reduced competition in the colder months of the season. For these reasons, the growing season for kelp is from fall to spring. Sugar kelp (*Saccharina latissima*) is the main cultivated kelp species so far in Maine, with a season that typically runs from October to May.

# Who can I talk to for more information about kelp production?

For more information about growing kelp, contact Maine Sea Grant marine extension agent Sarah Redmond at [sarah.redmond@maine.edu](mailto:sarah.redmond@maine.edu). There is also a valuable Manual on Kelp Cultivation, available for free download here: <http://www.oceanapproved.com/farming/>. For information on leasing and aquaculture regulations, visit the Department of Marine Resources at <http://www.maine.gov/dmr/aquaculture/>

## Resources

New England Seaweed Culture Handbook: Nursery Systems - An online manual that gives an overview of how to set up a seaweed nursery, and covers culture of Kelp, Gracilaria, Irish Moss, and Porphyra.  
<http://seagrant.uconn.edu/publications/aquaculture/handbook.pdf>

New England Seaweed Culture Handbook Video Series: Online Seaweed Culture in New England - YouTube

Maine's Kelp Highway. Article in Maine Boats, Homes & Harbors, Winter 2013, Issue 122. Online at Maine's Kelp Highway - Maine Sea Grant

Business Plan for the Establishment of a Seaweed Hatchery & Grow-out Farm. Online Publication by BIM, Irish Sea Fisheries Board. Online at Seaweed Hatchery & Grow-out Farm

Maine "Seaweed Scene" Annual Meetings:  
<http://www.seagrant.umaine.edu/seaweed/seaweed-scene-2012>  
<http://www.seagrant.umaine.edu/seaweed/seaweed-scene-2013>

Maine Seaweed Festival [www.seaweedfest.com](http://www.seaweedfest.com)

"In Maine, kelp is on the way from Ocean Approved". Article in Portland Press Herald, May 2014.  
[http://www.pressherald.com/2014/05/01/winning\\_recipe\\_frozen\\_kelp/](http://www.pressherald.com/2014/05/01/winning_recipe_frozen_kelp/)

"Sea Fare" UMaine Today Article on Sea Vegetables in New England  
<http://umainetoday.umaine.edu/archives/summer-2012/sea-fare/>

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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