Seagrove
Kelp Co.

Southeast Conference Annual Meeting

Premium Aquatics, LLC
d/b/a Seagrove Kelp Co.
Integrated Multitrophic Aquaculture Venture

9.24.2020

The Concept

Develop large, vertically integrated, multi-species mariculture operation in Southeast Alaska

The Opportunity

- Large and growing existing domestic and global marketplace
- Strong potential to implement new, high capacity, low cost production system
- Only place in North America with opportunity to significantly expand production of shellfish and other production to meet growing domestic and global demand
- Thousands of miles of available clean, fertile water
- Utilizes established grow-out technology and techniques
- Utilizes established seafood-smart workforce
- Utilizes established seafood production and transportation infrastructure
- Favorable political environment
- Strong and valuable Alaska brand

Global and US Markets

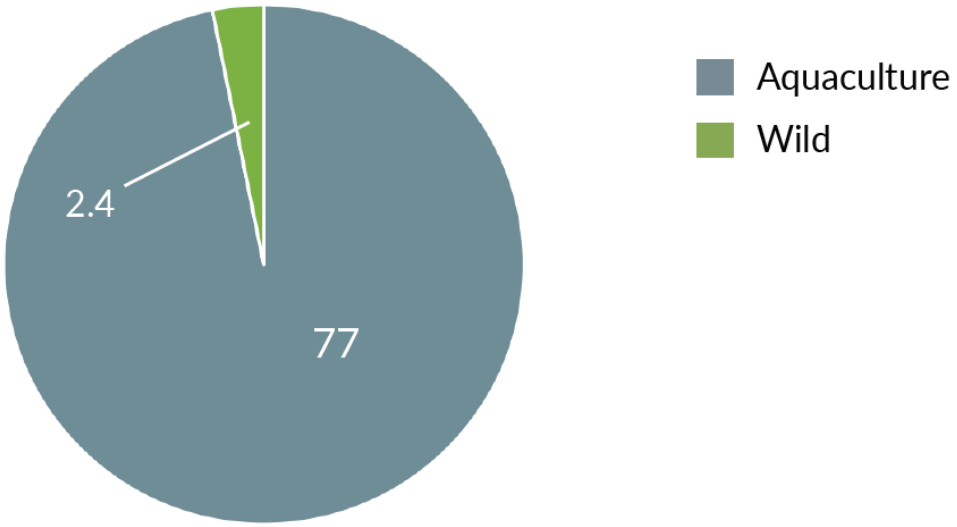
Global Market Overview

- The global seaweed market is large, diverse, and growing. Key global seaweed market dynamics include:
  - 80 billion pounds of worldwide production across all end-product applications (food and non-food)
  - 8% – 10% annual global growth rate due to population growth in high consumption countries, increased market penetration of less developed countries, end-product innovations, and growth of plant-based diets and product solutions, especially in Western countries
  - Numerous species and end product applications—food-related products account for the significant majority of end products
  - Almost exclusively reliant on aquaculture, or farmed, production to meet global demand
- Existing infrastructure and expertise for production of seed and adapting technology for local environment.

Global Annual Seaweed Harvest

- The global annual seaweed harvest represents almost 80 billion pounds (36 million metric tonnes), with a harvest value of approximately $6 billion USD across all species and end-product formats.
- Aquaculture-sourced seaweed accounts for almost 97% of global supply, or an estimated 77 billion pounds.

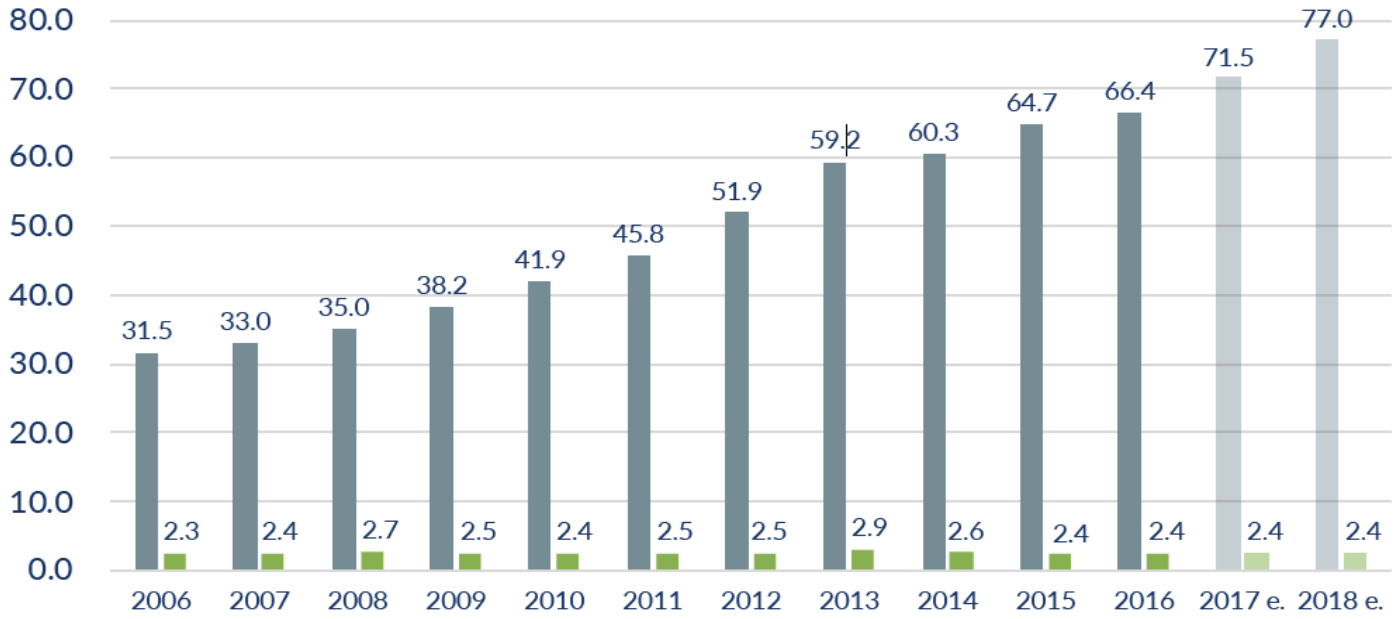
Figure 1A: Global Status of Seaweed Production – Weight (billions of pounds)



Source: Edible Seaweed Market Analysis. Island Instituts (2020) Citing the Food and Agriculture Organization of the United Nations (FAO); Globefish Research Programme; The Global Status of Seaweed Production, Trade and Utilization; Volume 124; 2018; Pentallect research

Global Market Growth

Aquaculture-sourced seaweed products have driven overall global industry growth, while wild production has plateaued.

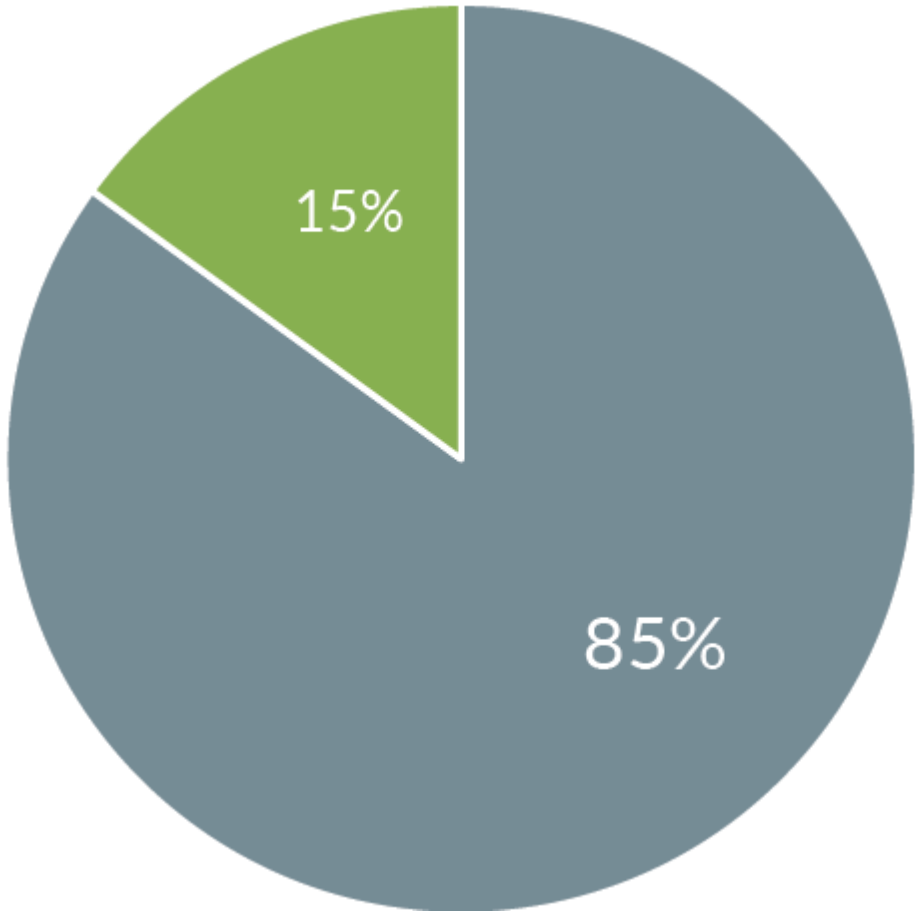


Source: Food and Agriculture Organization of the United Nations (FAO); Globefish Research Programme; The Global Status of Seaweed Production, Trade and Utilization; Volume 124; 2018; Pentallect research

Average Annual Growth
Aquaculture: 7.7%
Wild: 0.3%
Total: 7.3%

Edible Seaweed Global Market Share

Food products for human consumption represent an estimated 85% of total global seaweed production, including finished products and ingredients for beverages,
nutritional products, food production, etc. For aquaculture-sourced seaweed, human food products account for more than 90% of production.



- Human consumption
  - Consumer Food Products
  - Thickening Agents
  - Clarifying Agents
- All other uses
  - Fertilizers
  - Animal Feed
  - Pharmaceuticals
  - Cosmetics
  - Biofuel

Seaweed Imports

Total U.S. Edible Seaweed Market Size

The total domestic edible seaweed market is approximately 16 million pounds dry weight. Imported products represent almost all of the current domestic edible seaweed supply (more than 98%).

Source	Estimated Dry Pounds[1]
Net Imports[2]	16,000,000
Domestic Aquaculture	55,000 – 60,000
Domestic Wild	30,000 – 35,000
Total	**16,085,000 – 16,095,000**

1. Total U.S. imports (19 million lbs.) less FAO-sourced exports (-2 million lbs) less 5% estimated further processing yield loss (-1 million lbs.). Includes both wet and dry formats, although the majority of imports are dried product formats, and the imported volume may include some packaging weight, so the imported volume may be slightly overstated. Domestic wet harvest estimates are adjusted for a 10:1 dry yield to enable direct volume comparisons.
2. It is important to note that some of the imported volume is further processed within the U.S., which will result in volume losses during the further processing cycle.

Source: Food and Agriculture Organization of the United Nations (FAO); Global Seaweed Production Report; 2018; Pentallect research.

Ketchikan Nursery Operation

Phase I Multitrophic Aquatic Farming Project

Ribbon Kelp

Alaria marginata

Description:

Thallus of this common intertidal kelp is brown with a branched holdfast (haptera), a stipe, cylindrical near the base but flattened near the blade, that can reach 30 cm (12 in) or more in length, and a thin, lanceolate blade up to 3 m (10 ft) long with solid midrib. Twenty to forty elliptical sporophylls form in spring on the upper portion of the stipe and grow up to 25 cm (10 in) long, thickening with maturity.

Habitat:

This kelp is an annual found on rock in the mid to low intertidal from semi-protected (if there is sufficient current) to exposed habitats.

Edible Uses:

Miso soups, powdered additive to food products, as an emulsifier, condiment.

Sugar Kelp

Saccharina latissimi

Description:

Thallus of this very common kelp is light to medium brown with a finely branched holdfast (haptera), a cylindrical stipe up to 50 cm (20 in) long without mucilage ducts, and a blade up to 3.5 m (10 ft) long. The blade is moderately thin and undulate and frequently has rows of blister-like swellings or puckers (bullations) near the base.

Habitat:

Although this kelp is considered a perennial, the blade dies back in the fall/winter and re-grows in the spring. It attaches to rock in the low intertidal to subtidal and prefers protected to semi-protected habitats.

Edible Uses:

Sugar kelp is closely related to *Saccharina japonica*, the (farmed) seaweed basis of nearly all Japanese dashi, and can be used in similar ways – adding umami to soups, stews and stocks. Dried and powdered sugar kelp is used as an additive in pastas and other foods.

Bull Kelp

Nereocystis luetkeana

Description:

Thallus of this common canopy-forming kelp has a richly branched holdfast (haptera) and a cylindrical stipe 10–36 m (33–118 ft) long, terminating in a single, gas-filled pneumatocyst from which the many blades, up to 10 m (33 ft) long, develop. Blade growth can reach 15 cm (6 in) per day. Reproductive patches (sori) develop on the blades and drop to the seafloor at maturity. Bull kelp is the fastest growing seaweed in the world. It can grow from a tiny spore into a 200 foot long plant in one season!

Habitat:

This annual kelp grows on rock from the low intertidal to subtidal; it prefers semi-exposed habitats or high current areas. Offshore beds can persist for one to many years, usually in deeper water than Eualaria or Macrocystis, where they co-occur.

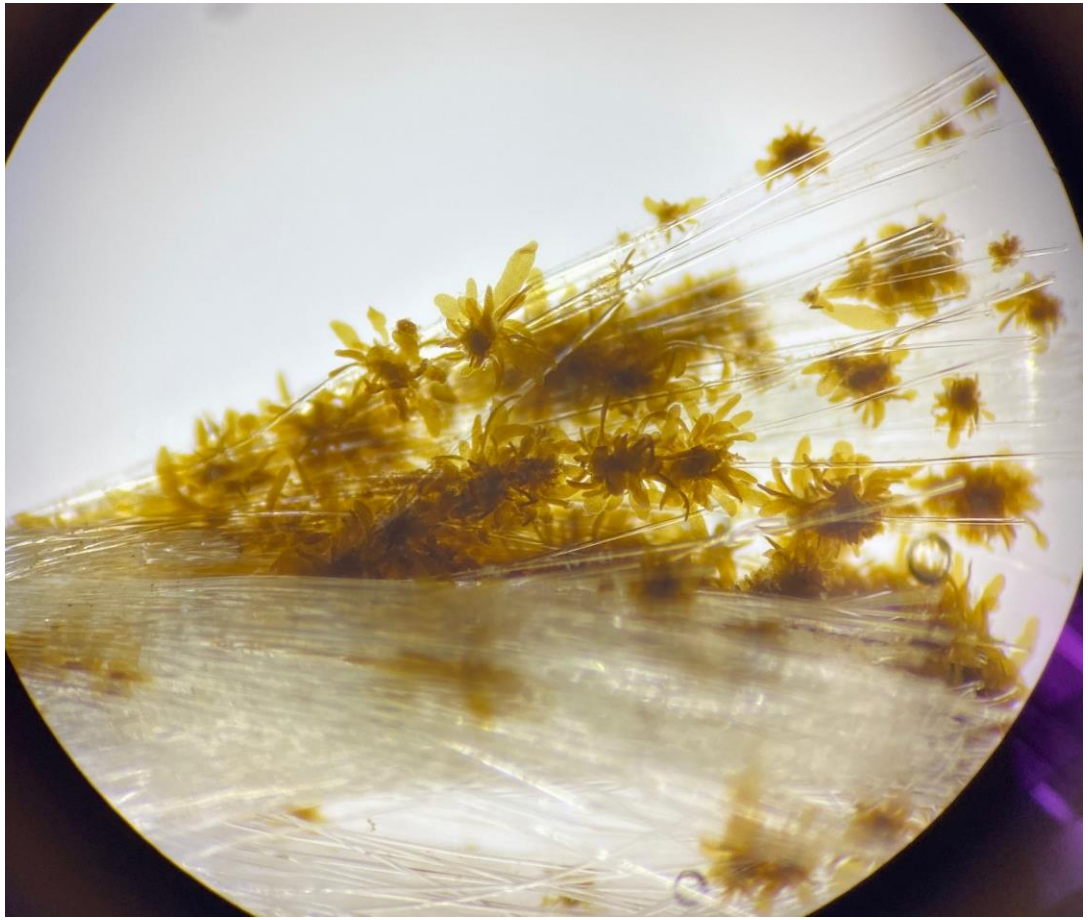
Edible Uses:

Food products, including salsas, pickles, Kelp extract (algin) thickens products such as ice cream, salad dressing, hand lotion, and paint and it can be used as an additive to organic seafood based fertilizers

The Ketchikan Nursery.
A collaboration with OceansAlaska.

Nereocystis Luetkeana (bull kelp) seed lines ready to go into the Doyle Bay site.

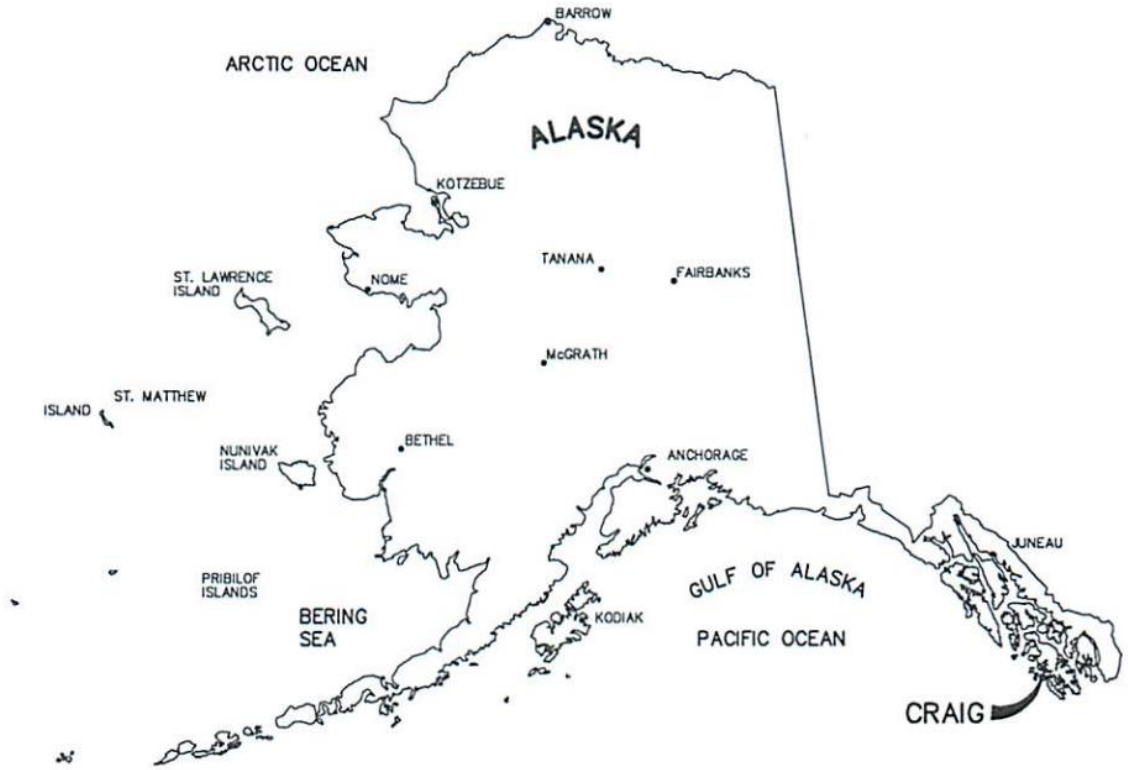
Nereocystis Gametophyte (baby bull kelp)



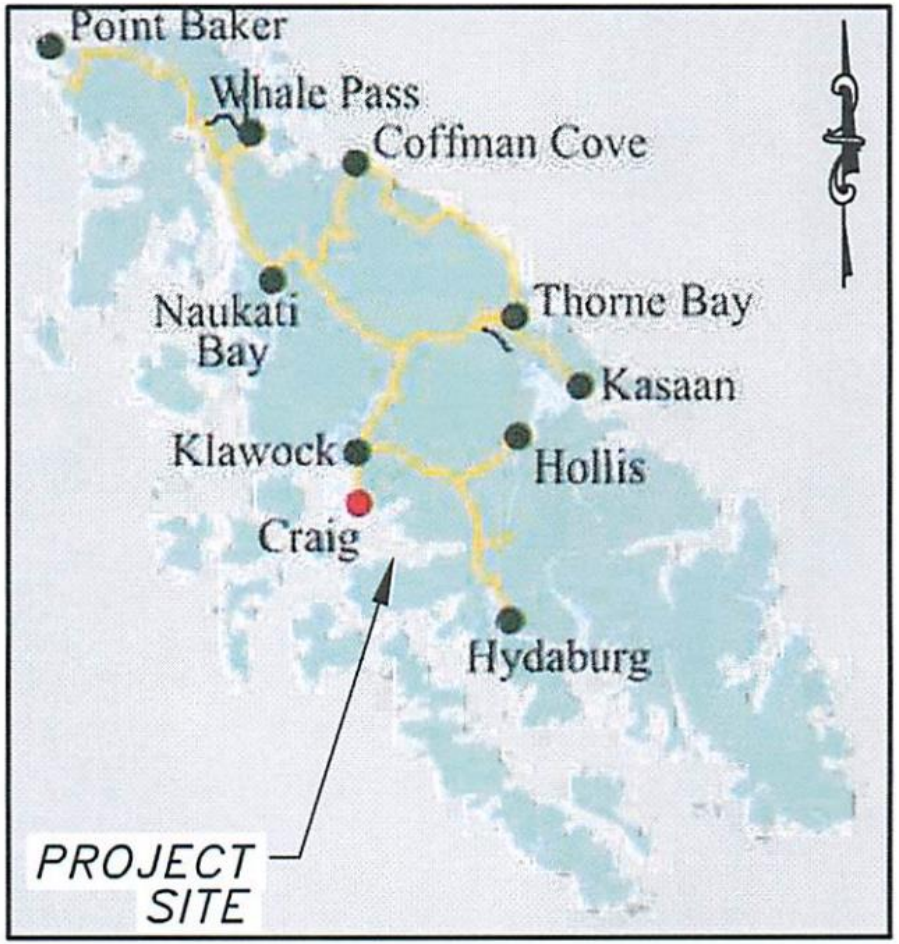
Prince of Wales Island

Multispecies Mariculture Site
At Doyle Bay

Site Location



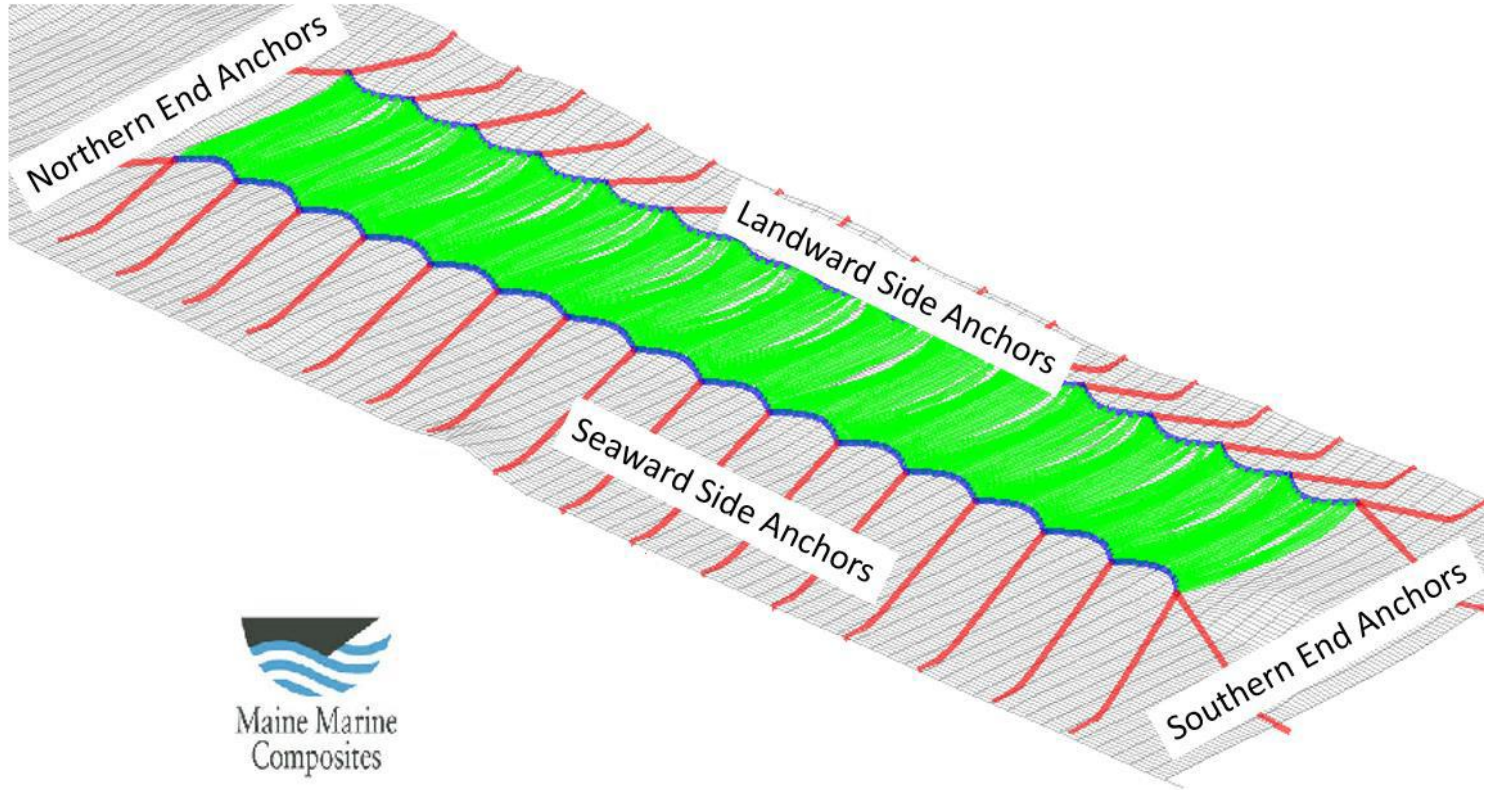
Prince of Wales Island
Southeast Alaska



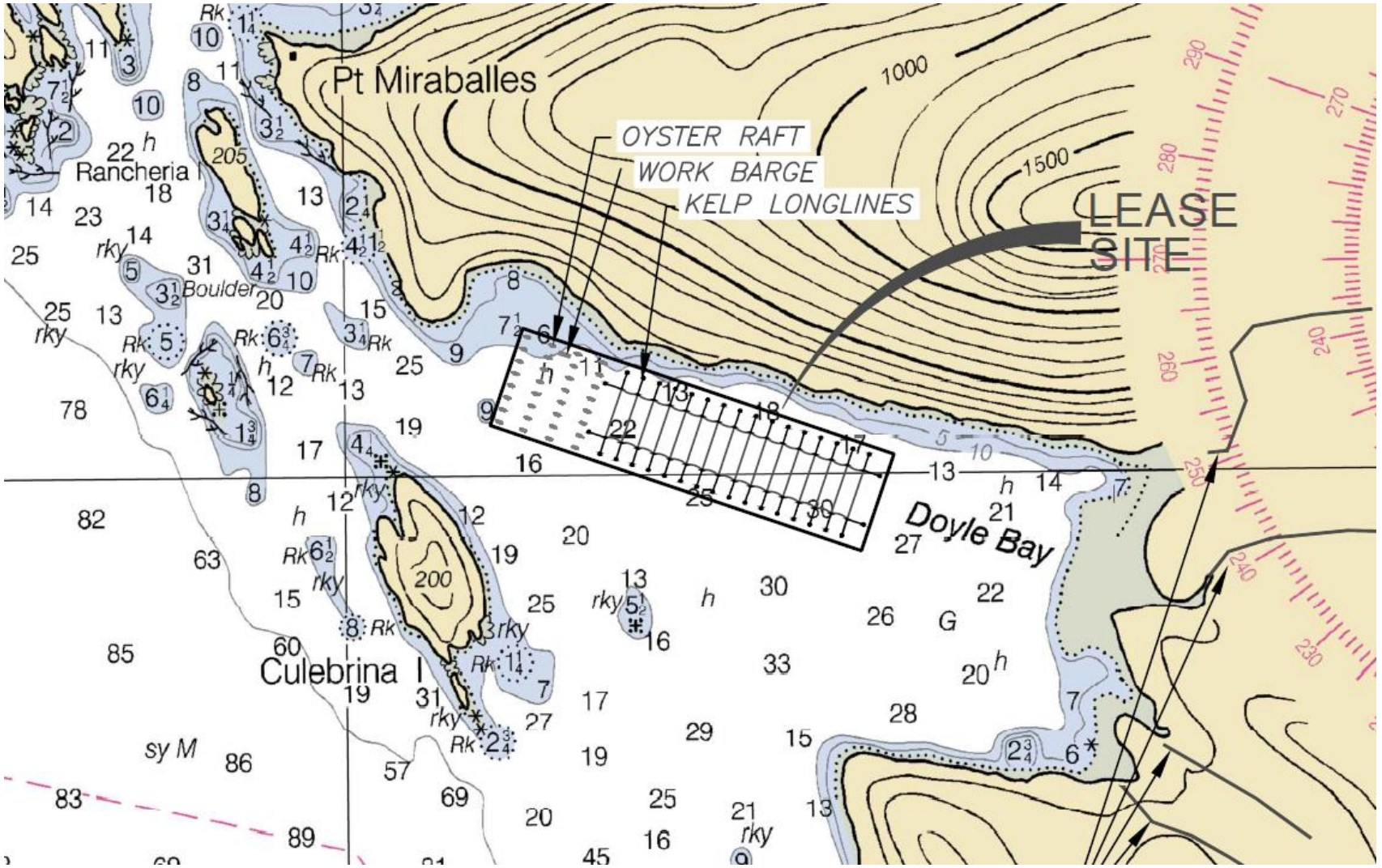
LOCATION MAP

Kelp Farming

- Kelp are grown from partially submerged longlines attached to floats (see diagram below).
- Kelp seeds are spread onto small diameter twine at a nursery facility. Seeded twine is sent to farms spooled around PVC pipe. Farmers wrap twine around partially submerged longlines (usually 4-8 feet).
- Kelp is usually planted in the fall (September or October) and typically take five to seven months to reach harvestable size.



Doyle Bay


Pt Miraballes
OYSTER RAFT
WORK BARGE
KELP LONGLINES
LEASE SITE
Doyle Bay
Culebrina I
Rancheria I
Boulder
1000
1500

Doyle Bay Site Overview

127-acre site is 6 miles (15-minute skiff ride) south of Craig, Alaska, in Doyle Bay, located on the west side of Prince of Wales Island in Southeast Alaska.

The site features approximately 27 subtidal acres dedicated to a Pacific oyster grow-out and 100 acres for culturing kelp.

The site is project to produce 20 million oysters per year and 1,000,000 pounds of kelp.

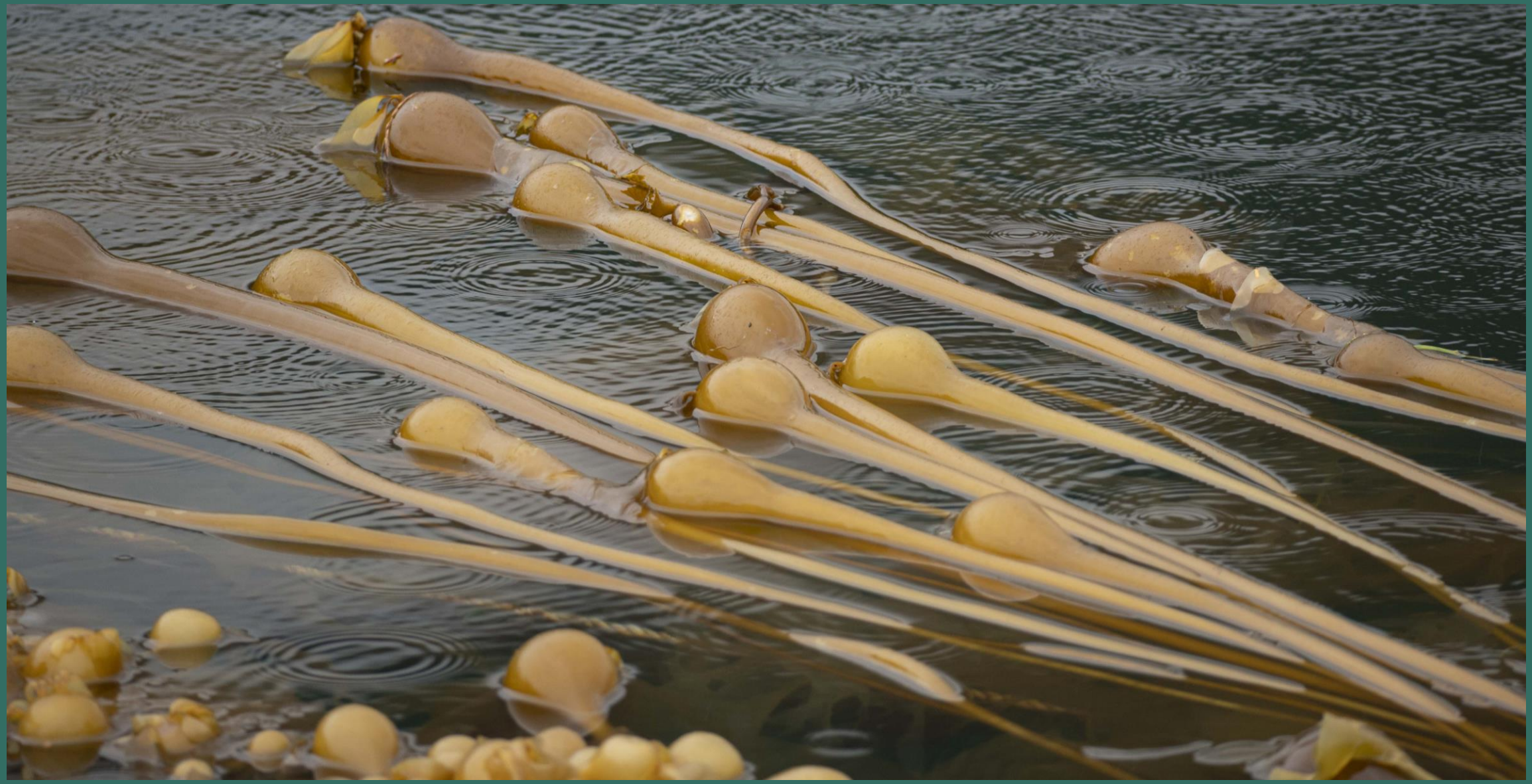
Creating 50-75 new full-time jobs, full time, plus seasonal employment opportunities.

Part of the Doyle Bay anchoring system.

Buoys in the Klawock warehouse.

Note: Thank you to the Klawock Tribal Association for working with us!

Preparing seed lines and gear for deployment at Doyle Bay

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