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Maine's Kelp Highway

Catherine Schmitt

University of Maine - Main, catherine.schmitt@umit.maine.edu

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| WINSLOW HOMER: Self-Made Man

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BOATS, HOMES & HARBORS



*The Magazine
of the Coast*

ANNIVERSARY ISSUE



BY CATHERINE SCHMITT

Maine's Kelp

WILD

FARMED

Seaweed is a \$7 billion industry worldwide, much of it in Asia.

Highway

DRIED PROCESSED

Edible seaweed is a little-known but important product native to the coast of Maine.

DOWN ALONG MAINE'S eastern coastline many people make a living harvesting edible seaweeds from the cold, clean waters of the Gulf of Maine. Individually, they would make an interesting story, but collectively, they are part of a broader tale: harvesters, entrepreneurs, scientists, and fishermen working together to take seaweed out of the wild, into the floating laboratories of aquaculture, and onto more American dinner tables.

The lead character in this new—yet really old—seaweed story is kelp, which is being harvested and farmed all along the coast of Maine. Ready-to-eat kelp can now be found in supermarket freezers, and it is showing up on restaurant menus and banquet tables as chefs experiment with new ways to use this healthy and local food.

The word “kelp” derives from the Middle English *culp* or *culpe*, but beyond that is of unknown origin. The verb “to kelp” once meant to burn

piles of brown algae that had washed up on beaches in France, Ireland, and Scotland; the resulting ashes provided carbonate of soda (needed for making glass), iodine, and potash (used to make soap and as a fertilizer). Today, kelp is a generic term for many different species of seaweed (see sidebar “Meet the Kelps”).

People have been eating kelp and other seaweeds for centuries, especially people who live in places where vegetable crops are hard to grow, such as islands, rocky shores, and cold lands. Ancient Chinese poetry and medical texts both refer to kelp. There is evidence that native peoples on the Atlantic coast harvested and dried certain seaweeds, particularly kelp stipes (the hollow stems) according to Shep Erhart and Leslie Cerier in their book, *Sea Vegetable Celebration*. Vikings carried dried seaweed for food on long voyages, and early New England whalers chewed on seaweed to prevent scurvy. Scottish, Irish, and English immigrants brought their



Photograph at left by the author. This page from the top: courtesy Maine Sea Grant, by the author, courtesy Maine Coast Sea Vegetables, Sarah Redmond.

Meet the Kelps

Kelp is a large, brown, broad-fronded marine macroalga, a giant form of a photosynthetic plant-like organism that grows in salt water. Three species of kelp are native to the Gulf of Maine; they are sometimes called by the same names as their more familiar Japanese counterparts.



Saccharina latissima: called sugar kelp or oarweed, but usually just “kelp,” it is similar to what the Japanese call kombu. Its long, leathery blades, sometimes with broad, ruffled edges, grow from the shallow rocky low intertidal zone out to depths of 60 feet. It can live up to three years but is usually an annual plant, completing its growth in less than a year, from late fall until May or June, when it is typically harvested. The blades can grow up to 25 feet long; hollow stems or “stipes” help the blades flex and float in the current.



Laminaria digitata: horsetail kelp, also similar to Japanese kombu. Its broad, flat, olive-brown fronds are divided into multiple blades or “fingers.” Digitata grows below the low-tide line in areas of heavy surf, strong tidal currents, and deep tide pools. It is harvested in April and May. Digitata has demonstrated its toughness by surviving hurricanes that have damaged other kelps.



Alaria esculenta: winged kelp, similar to the Japanese wakame. Its olive-brown blades grow up to 12 feet long and have a distinctive midrib along their length. It grows from just below the low-tide line to 25 feet in areas of strong tidal currents and waves, and sometimes mixes with digitata. Alaria growth peaks in May-June. It is milder in flavor and texture than the other kelps.



These tiny seedlings could grow to 12 feet in just 6 months.

own sea vegetable food customs to America.

Kelp has even been linked to the original peopling of North America, since giant kelps along the Pacific Coast create forest-like ecosystems inhabited by numerous fish and marine mammals. In a “Kelp Highway Hypothesis,” a group of scientists, including the University of Maine’s own Dr. Robert Steeneck, have noted that some of the earliest archaeological sites on the continent are

WILD

found on islands or in coastal areas next to productive kelp forests, where food would have been plentiful. The report proposes that, “Pacific Rim kelp forests may have provided a linear and relatively consistent ecological setting through which people could have migrated to the New World.”

MAINE HAS ITS OWN kelp highway. It runs along the coastline parallel to Route 1 in eastern Hancock County, where kelp abounds in the rocky intertidal zones and offshore islands surrounding the Schoodic Peninsula, Dyer Neck, and Petit Manan Island. Sugar kelp can be found in reversing tidal falls, digitata kelp in offshore caves, and alaria in deep pools. To see how this kelp is used commercially, turn off Route 1 and follow routes 182 or 200 where they skirt Taunton Bay to Franklin. Here, Maine Coast Sea Vegetables packs hundreds of thousands of pounds of certified organic dried seaweed for shipment around the world.

Shep Erhart, who started the company with his wife Linnette in 1971, has seen trends come and go over the years. “Seaweeds entered the modern American diet through

Maine Coast Sea Vegetables(3)

macrobiotics,” he said. “An interest in diverse, local, and healthy foods naturally leads people to seaweeds.”

Before founding Maine Coast Sea Vegetables, the Erharts had been eating lots of Japanese wakame and kombu as part of a macrobiotic diet. “I think we got into kelp because we cooked lots of our own beans in those days,” Erhart said. (When added to a pot of beans, kelp adds flavor while tenderizing the beans, making them more digestible.) “Kelp grows like gangbusters in the bay where we lived, and it has a similar function and taste profile. For us, it was a way of replacing the Japanese ingredients.”

Demand for the company’s products has been steady. Raw-food enthusiasts have found that seaweed provides nutrients and a texture rare in an uncooked diet. Following another trend, seaweeds have joined other nutrient-dense, small-portion “super foods.” Furthermore, the 2011 earthquake and subsequent tsunami and nuclear disaster in Japan have many people seeking clean sources of iodine-rich seaweed. Finally, the Internet has helped raise awareness of, and accessibility to, niche foods like seaweed while at the same time reducing the need for marketing, allowing the company to focus on production.

Maine Coast Sea Vegetables’ independent harvesters



Could kelp farming become an income source for Maine’s fishermen?

develop and demonstrate seaweed culture techniques.

A native of Litchfield, Maine, Redmond began working for the university last year, immediately after completing a graduate degree at the University of Connecticut, where she studied how climate change might affect kelp while also developing methods to culture seaweed species native to the northeast.

Redmond is no stranger to the sea; she has worked for both state and federal fisheries management agencies, as a sternman on a lobsterboat out of Port Clyde, and as a tech-

FARMED DRIED PROCESSED

collect the kelp and dry it in ventilated sheds, where fans circulate dry air warmed by a wood fire. The dry kelp is then packaged as whole blades, or processed into flakes, granules, and powders.

Erhart noted, however, that, “the most beautiful part of the cycle is when the kelp is in the water,” not when it is being processed. “You feel like you are in the presence of an incredible organism,” added Liz Solet, who heads the customer service department. “There’s something very mystical about it.”

DOWN THE ROAD IN FRANKLIN, Sarah Redmond recently took up residence as seaweed expert in the University of Maine’s Center for Cooperative Aquaculture Research. She is setting up a demonstration hatchery to

nician in a shellfish hatchery. She also worked for Tollef Olson and Paul Dobbins, the two men behind Portland-based Ocean Approved, the first commercial kelp farm in the United States in Casco Bay. At the University of Connecticut, she worked with Dr. Charles Yarish and Ocean Approved, as well as the University of New Hampshire and BRASSTEC high school in Bridgeport, Connecticut, to adapt kelp culture techniques developed on the Pacific Coast to New England’s native species.

In 2011, Redmond and colleague Dana Morse received funding from the Maine Aquaculture Innovation Center to test the feasibility of growing kelp at existing mussel farms along the coast. Morse views shellfish growers as natural candidates to become kelp farmers, since they already have the infrastructure and experience of growing food in



Racks of drying kelp—a scene that evokes Maine’s salt fish drying heyday.

Eat the Kelps

Seaweeds contain all of the 56 minerals, trace minerals, and essential amino acids required by the human body. They are especially rich in iodine, magnesium, calcium, potassium, selenium, and zinc. They also contain lots of protein, and the vitamins A, B3, B6, C, and E. They are “salty” without being high in sodium.



Kelp and other seaweeds contain glutamic acid (think of it as natural MSG) and therefore satisfy the elusive fifth taste of savory or “umami” in Japanese. Besides its affiliation with Asian cuisine, kelp works well with avocados, beans, nuts, seeds, and cucumbers.

Maine Coast Sea Vegetables, Maine Seaweed Company, VitaminSea, and Ironbound Island all sell dried kelp, which must be soaked in water, roasted, or otherwise processed before eating. Stored in a dark, dry place, dried kelp will keep for up to two years. A long soak or simmer in broth renders kelp silky; cook it longer and it dissolves completely and can then be used to lend a rich flavor to soups and stocks.

Ocean Approved sells pre-cooked, pre-cut frozen kelp prepared three different ways: a “salad cut” of alaria, “noodles” of sugar kelp, and digitata slaw. They have a milder flavor than the dried product.



Sarah Redmond(2)

Maine’s coastal waters. He also thinks fishermen might make good kelp farmers.

“Growing kelp would use much of the same expertise and equipment as lobstering,” he said. “Kelp grows fast, with the crop ready in spring just at the point when many lobstermen are feeling the financial pinch.”

Sugar kelp, *Saccharina latissima*, native to Maine, is the species being farmed. There is an established process for culturing seedlings, and it grows quickly.

An ancient plant that evolved to live in low light and cold temperatures, kelp reaches peak growth rates in February, when it doesn’t have to compete with other, smaller algae for nutrients. Within six months of being placed in the water, the seedlings have grown as long as 12 feet. According to Paul Dobbins, one acre at Ocean Approved’s site in Casco Bay can produce 40,000 to 50,000 pounds of kelp. Dobbins said that they see themselves more as a food company than as a producer, which is why they are encouraging lobstermen and others to also farm kelp to enhance the supply.

Dana Morse and fellow marine extension associate Sarah Redmond strung rope lines implanted with juvenile kelp seedlings grown in Ocean Approved’s kelp nursery laboratory at farms operated by Pemaquid Mussels, Blue Hill Bay Mussels, Wild Ocean Aquaculture, Long Cove Oyster Farm, and Oceanville Seafood. During the growing season from December to June, they collected data on temperature, nutrients, and kelp growth.

SEAWEED IS A \$1 BILLION industry in the United States; worldwide, the total is \$7 billion. Most seaweed comes from Asia, where it has been farmed for centuries. Today, the expansive seaweed farms off the coast of China can be seen from above in Google Earth.

Sarah Redmond, for one, wants seaweed businesses—both cultured and wild—to succeed in Maine, but she knows that increasing the supply is only half of the equation, as much work needs to be done on the demand side. She has been making up gift baskets of sea vegetable products, and taking seaweed cooking classes. She hangs seaweed to dry in the backyards of family and friends, and is always considering new ways to use seaweeds: dulce chips, kelp jerky, seaweed beer, dog treats, and more.

Paul Dobbins said that companies like his need to add value to the product to compete with Asia. He calls kelp the “Virtuous Vegetable,” and likes to boast that it has “more calcium than milk, more fiber than brown rice, more iron than spinach.”

From a human health perspective, seaweed has been used to treat numerous conditions and diseases, from high blood pressure to ulcers and cancer. It is a component of spa treatments and nutritional supplements.

BACK ON THE KELP HIGHWAY, a multitude of perceived benefits sustains those who continue to harvest wild kelp in traditional ways.

Larch Hanson has lived on the coast of Maine since

1970, and has been collecting seaweeds for nearly as long. He finds inspiration, metaphor, guidance, sustenance, and peace from the plants in the sea. His home and Maine Seaweed, the company he runs in Steuben, is a mecca for young apprentices, who come to learn from Hanson the trade and ways of living close to the land and water.

“Seaweeds survive the cold sea through a combination of tenacity, flexibility, and adaptability,” Hanson has written. “Kelp strikes me as the old grandfather of the sea. The holdfasts are deep, and a kelp’s daily life is the deep flow-pulsation of the tides, changing direction approximately every six hours. If corn is ancient and wise on land, so is kelp in the sea. It endures.”

Hanson is known as the Seaweed Man. In a beautiful short video produced by Daniel Klein and Mirra Fine, food bloggers and activists, Hanson is shown navigating a small wooden scow through kelp beds at sunrise. Waves crash on ledges and spin the boat in circles while he pulls blades of kelp from the kinetic sea. There is energy in this


space between the tides, a power that has a way of uniting people in the sea vegetable business; it makes them want to share with others their knowledge and love—for it is truly love—for these plants.

SARAH REDMOND and Dana Morse wrapped up their research project in June 2012, visiting each site a final time to collect kelp.

In Frenchman Bay, Redmond studied the stunted yet tender kelp hanging from beneath a mussel raft; it did not grow as well as on other sites to the south. She thought that perhaps the nets surrounding the raft to keep out predators, or the crowd of lines beneath the raft, weakened the current that the seaweed needed to prosper. Still, she said, couldn’t there be some use for the “baby” kelp? “We need to develop markets at the same time as we figure out what we can grow for product,” she said.

Redmond and Morse measured the seaweed, stuffed it into black plastic bags, and ferried it to shore for weighing. As she

stuffed the bags into her 1989 Volvo station wagon, she wondered aloud, “What am I going to do with all this seaweed?”

That seems to be the principal question on the minds of everyone who travels the kelp highway. 

Catherine Schmitt is Communications Coordinator at Maine Sea Grant and author of A Coastal Companion, A Year in the Gulf of Maine from Cape Cod to Canada.

FOR MORE INFORMATION

MAINE COAST SEA VEGETABLES

3 George’s Pond Rd., Franklin, ME 04634
207-565-2907; www.seaveg.com

MAINE SEAWEED

P.O. Box 57, Steuben, ME 04680
207-546-2875; www.theseaweedman.com

NORTH AMERICAN KELP

41 Cross St., Waldoboro, ME 04572
888-662-5357; www.noamkelp.com

OCEAN APPROVED

188 Presumpscot St., Portland, ME 04103
207-409-6485; www.oceanapproved.com