

Seaweed, Kelp, and Other Aquaculture Products – Legal Issues with Cultivation and Production as Food Sources

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The Cultivation and Wild Harvest of Seaweed and Kelp

Seaweed and kelp have traditionally had many uses, including as both food sources and food additives. Currently, East Asia is the leader in seaweed and kelp production. However, there is a budding seaweed and kelp aquaculture and wild harvest industry in the United States, which presents economic benefits and novel legal considerations. The Maine seaweed and kelp harvest currently brings in \$20 million annually, making it one of the state's most valuable commodities. Seaweed and kelp aquaculture could help replace traditional fisheries that are being negatively impacted by changing ocean conditions. In addition to these economic benefits, a commercial seaweed and kelp industry could also have significant ecological impacts—seaweed takes up carbon dioxide, draws down levels of nitrogen and phosphorus, and gives off oxygen, helping to improve water quality.

Seaweed and kelp can be either wild harvested or commercially cultivated, but farming produces more than 90% of the world's demand. Macroalgae is typically cultivated using either off-bottom line farming or floating line aquaculture. Most food species are cultivated using the floating line method, which is suitable for deep ocean areas or areas with weak currents.

- Off-bottom line farming-
 - Seaweed and kelp are grown in shallow parts of the ocean on lines stretched between wooden stakes anchored to the sea bed.
- Floating line-
 - Seaweed and kelp are grown from lines anchored directly to the sea floor.

Federal Aquaculture Permits

At the federal level, a lack of current, clear, and applicable statutory and regulatory structure for commercial seaweed and kelp aquaculture cultivates uncertainty. Rivers and Harbors Act (RHA) § 10 (33 U.S.C. § 403) and Clean Water Act (CWA) § 404 (33 U.S.C. § 1344) pose challenges for permit applicants, as permits under both acts may be required for commercial seaweed and kelp aquaculture using either the off-bottom line farming or floating line methods.

Both RHA § 10 and CWA § 404 could likely apply to seaweed and kelp farming. Section 10 applies to offshore aquaculture activities when they are attached to the seabed, including in federal waters. Because kelp is often commercially grown in floating line systems, Section 10's permitting requirements could easily be implicated. Furthermore, because commercial seaweed and kelp aquaculture may require the use of dredge or fill material, Section 404 may apply—but only in navigable waters up to three nautical miles from shore.

RHA § 10:

- Requires that regulated activities conducted below the high-water line of our nation's navigable waters be approved and permitted by the U.S. Army Corps of Engineers. 33 U.S.C. § 403.
- Regulated activities can include such things as the placement or removal of structures, dredging, filling, excavation, or any other disturbance of sediment or modification of a navigable waterway.

CWA § 404:

- Authorizes the Corps to permit the discharge of dredge and fill material into navigable waters. 33 U.S.C. § 1344.
- Because “navigable waters” are defined as three nautical miles or less from shore, this section does not apply in federal waters.

If an aquaculture project implicates either RHA § 10 or CWA § 404, an aquaculturist must obtain a permit or permits from the Corps for their new project before beginning operations.

- There are two different types of permits under these statutes: general and individual permits.
 - General Permits- issued when projects are expected to have only minor impacts.
 - Individual Permits (sometimes called “standard permits” or “letters of permission”)- issued when a project is anticipated to have more than a minor impact.

The individual permitting processes under both RHA § 10 and CWA § 404 can be quite lengthy and complicated. Because seaweed and kelp aquaculture is a novel activity with relatively unknown environmental impacts, it is unlikely that the Corps would predict such a project to have only “minor” impacts. Therefore, a commercial seaweed and kelp operation would not likely be able to obtain authorization through a less onerous general permit.

State Commercial Marine Algae Aquaculture Provisions

Despite the United States' abundant coastline, few coastal states have codified provisions related to commercial marine algae aquaculture, except Alaska, California, and Maine.

In February 2016, Alaska's governor took steps to move the state beyond wild harvest by signing an administrative order designed to help jumpstart mariculture—including kelp cultivation—in the state. Alaska Admin. Order No. 280 (Feb. 29, 2016).

- Established a Mariculture Task Force to provide recommendations to develop a viable and sustainable mariculture industry producing shellfish and aquatic plants for the long-term benefit of Alaska's economy, environment, and communities.
- Those who wish to operate a commercial sea vegetation farm can now apply for an Aquatic Farm Operation Permit through the Alaska Department of Fish and Game, just as one would for a commercial shellfish or finfish operation.

California currently has 87 administrative kelp beds containing both bull and giant kelp. These beds each fall into one of four management categories: 1) open; 2) leasable; 3) lease only; and 4) closed.

- If harvesters can gain access to one of these beds, they must first purchase an annual commercial kelp harvester license from the state and also abide by commercial algae harvest regulations. Cal. Code Regs. tit. 14, § 165.
- The state requires each harvester to pay a royalty to the state, in addition to any license fees, of no less than five cents per ton of wet, aquatic plants harvested. Cal. Fish & Game Code § 6680 (West 2013).

Sugar kelp was the first commercial kelp crop to be successfully cultivated in Maine in 2010, and other native species have been on the state's radar since then.

- Currently, Maine farms have successfully harvested winged kelp and are developing the capacity to grow at least four new species.
- Leasing is fairly streamlined, with standard state leases permitting leaseholders to culture finfish, shellfish, and/or marine algae on up to 100 acres in Maine waters for ten years.

Wild Harvest

Wild harvest often requires a valid state license in the United States (especially when collected for commercial use).

Both Alaska and Maine have regulated the wild harvest of seaweed and kelp. The vast majority of Alaska's coastline is categorized as a "subsistence use area." In this area, one can harvest seaweed without a sport fishing license for noncommercial purposes, and there are no seasonal closures. However, harvest limits and other guidelines are in place. Alaska Admin. Code tit. 5, § 37.100.

Intertidal rockweed, in particular, is plentiful along Maine's coasts, and has been harvested from the rocks at low tide for years. The Maine Department of Marine Resources even recognizes the species as a distinct fishery, and published a related management plan in January 2014. Me. Dep't of Marine Res., Fishery Management Plan for Rockweed (*Ascophyllum nodosum*) (Jan. 2014).

Public Trust Issues

Wild harvest can also raise private property concerns when collection requires venturing very close to shore and making use of the beach or rocks at low tide. Since seaweed and kelp grows offshore and in the intertidal zone, growing and harvesting it naturally implicates the Public Trust Doctrine. The Public Trust Doctrine has a firm basis in Roman and English common law, and these legal regimes recognized water and its associated tidelands as an important common resource.

The courts in the United States decided to follow the English common law, establishing that states hold the title to the tidelands and submerged lands below navigable waters in trust for the benefit of the residents of the state.

- Illinois Central Railroad Co. v. Illinois, 146 U.S. 387 (1892).
 - SCOTUS outlined the contours of the trust and differentiated it from other property interests, stating that "the state holds title to the lands under the navigable waters" of the state "in trust for the people of the state, that they may enjoy the navigation of the waters,

carry on commerce over them, and have liberty of fishing therein freed from the obstruction and interference of private parties.” *Id.* at 452.

- The Court also prohibited the alienation of trust property unless the transfer benefits the trust, such as through the building of wharves and docks.
- All states must manage their public trust resources to these standards.
- States can extend the public trust to more lands or more uses within their state.
 - Many state courts have noted that the trust is not static and should evolve to accommodate changing conditions and the public’s needs.
 - New Jersey- has expanded its trust to allow recreation and other shore activities, and even allows its residents to access and use privately owned dry sand beaches as needed to access the ocean. *Matthews v. Bay Head Improvement Association*, 95 N.J. 306 (1984).
 - California- In the famous Mono Lake case, California determined that the public trust required ecological effects to be considered when allocating water resources. *National Audubon Society v. Superior Court of Alpine County*, 658 P.2d 709 (Cal. 1983).

It is not necessarily clear how seaweed and kelp fit into the Public Trust Doctrine. However, a recent case in Maine helps to illuminate these issues. *Ross v. Acadian Seaplants Ltd.*, No. SC-CV-15-022 (Me. Super. 2017).

- Maine is only one of five “low water states” in the United States- the low water mark is the line dividing private property from state owned submerged lands.
 - The state owns the submerged lands below the low water mark in trust for the benefit of the state’s residents pursuant to the Public Trust Doctrine.
 - Upland land owners own property to the low water mark, making the intertidal zone (the land between the highest and lowest ebb of the tide) subject to private ownership.
 - Maine’s Colonial Ordinances did reserve certain rights for the public in the intertidal zone. In this area, the public has the right to fish, fowl, and navigate, even though the area is private property.

Where does seaweed fall within the scope of the private/public line and the public trust in Maine?

- Maine courts have traditionally found that seaweed is the property of the owner of the underlying land. *See Hill v. Lord*, 48 Me. 83 (1861). This applies both to seaweed that has washed ashore, as well as to seaweed that is still attached to the bottom.
- 2008 Maine Attorney General Memo- found that the historic seaweed cases remain good law, meaning that the Attorney General believes seaweed is the property of the underlying landowner and not covered by public trust rights in the intertidal zone. *See* letter from G. Steven Rowe, Attorney General, to George D. Lapointe, DMR Commissioner, Mar. 24, 2008.

Is rockweed harvesting fishing?

- Maine courts have extended fishing to go beyond simply catching fish.
- State statutory law includes harvesting rockweed within the state’s fishing provisions, thus requiring harvest permits.
- A 2011 Maine case, which concerned scuba diving, set a two-part test to determine whether an activity fell within the intertidal public trust uses. *McGarvey v. Whittredge*, 28 A.3d 620 (2011).
 - First, does the activity easily fall within fishing, fowling, or navigation?

- If it does not, should the common law be understood to include the activity?

Ross v. Acadian Seaplants Ltd., No. SC-CV-15-022 (Me. Super. 2017).

Recently, private landowners in Maine challenged the harvesting of rockweed in the intertidal zone, claiming that the rockweed was private property. In March 2017, the Maine Superior Court ruled in favor of the landowners, relying on the fact that seaweed is a plant that attaches itself to rocky substrates. Thus, harvesting seaweed, much like harvesting timber, is a right that belongs to the property owner, as it is a profit from the soil. The trial court also considered whether harvesting seaweed in the intertidal zone was a protected use under Maine's public trust doctrine. The court found that harvesting seaweed was not included in the express rights of fishing, fowling, or navigation, and that the common law in the state did not support a finding that rockweed harvesting should be a public right. Again, the court relied on previous cases that have held that seaweed harvesting is a right to take profit from soil that belongs to the property owner.

The case has moved to the Maine Supreme Judicial Court. Oral arguments were in November 2017, and the case has generated national attention as amicus briefs were filed on both sides of the issue.

FDA and USDA Issues

Both the United States Food and Drug Administration (FDA) and United States Department of Agriculture (USDA) have promulgated regulations that could greatly impact the success of kelp and seaweed products when put to market. First, the FDA's current regulations can help aquaculturists who wish to sell their product for use as a food additive, but are limited to certain marine algae species, and do not encompass sale of full seaweed or kelp goods. Second, the USDA's organic regulations are applicable to seaweed and kelp in some instances, but, again, not when referring to whole marine algae products. These regulatory gaps will need to be filled if the new industry wants a true shot at success in the United States.

FDA Marine Algae "Additive" Provisions

The FDA currently has several regulations controlling the legal consumption of seaweed and kelp products in the United States. The FDA's current regulations can help aquaculturists who wish to sell their product for use as a food additive, but are limited to certain marine algae species, and do not encompass sale of full seaweed or kelp goods.

The FDA considers kelp "generally recognized as safe" (GRAS), but *only* when used in other foods as an additive.

- A "food additive" legally refers to any substance the intended use of which results or may reasonably be expected to result—directly or indirectly—in its becoming a component or otherwise affecting the characteristics of any food. 21 U.S.C. § 321(s).
- The FDA has also set forth maximum daily amounts of kelp additive (including red and brown algae) certain subsets of people should be able to ingest without consuming too much iodine. 21 C.F.R. § 172.365.
- FDA's GRAS determination and regulations apply generally to certain species of dehydrated, ground kelp, including giant kelp, oarweed, sugar kelp, and cuvie. *Id.*

The FDA also has specific regulations for both brown and red algae. 21 C.F.R. §§ 184.1120, 1121.

- These regulations list the names of applicable GRAS species, and note both brown and red algae's functional uses include "flavor enhancer" and "flavor adjuvant."
- Listed brown and red algae species may be considered GRAS, whether or not they are meant to impart any of their own taste to the food to which they are added.
- GRAS determinations do not apply to singular products such as kelp or seaweed in its whole raw, cooked, or dried forms.

USDA Organic Regulations

Currently, the USDA regulates the classification of farmed kelp and other algae as organic, but, again, not when for sale in its whole form, and only when used as an ingredient in livestock feed, fertilizer, or food for human consumption.

- Allows for four nonorganic substances taken from farmed marine plants and algae to be allowed in products labeled "organic" when the algal product is not otherwise commercially available in organic form. 7 C.F.R. § 205.606.
- Allows farmed aquatic plant extracts to be used in organic crop production as plant or soil amendments in certain circumstances. 7 C.F.R. § 205.601(j)(1).

The National Organic Program (NOP) has produced at least one applicable rule and guidance document as well. 7 C.F.R. § 205.237.

- NOP 5027 provides for the use of kelp in organic livestock feed, and establishes that kelp must be certified organic if used as an ingredient in such. U.S. Dep't of Agric., Nat'l Organic Program, NOP 5027, The Use of Kelp in Organic Livestock Feed (2013).
- The only existing route to certification is through the USDA's wild harvest provisions.
 - Marine algae must be harvested in a manner that ensures the harvesting or gathering will not be destructive to the environment and will sustain the growth and production of the wild crop. 7 C.F.R. § 205.207.
 - Harvest must be from designated areas that have had no prohibited substances applied for a period of three years immediately preceding the harvest. Prohibited substances consist of seven listed categories including such things as ionizing radiation and sewage sludge. 7 C.F.R. § 205.105.
- While the USDA does not currently certify any type of commercial aquaculture production as organic, the NOP has stated it is in the process of developing related practice standards – though these may focus on aquatic animal production.