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# Navigating the Kelp Forest: Current Legal Issues Surrounding Seaweed Wild Harvest and Aquaculture

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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 generates \$20 million annually, making it one of the state's most valuable commodities. Seaweed and kelp aquaculture in other areas 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.

The seaweed and kelp industry in the United States is still quite small compared to production in East Asia, and faces several layers of federal and state regulatory uncertainty. Seaweed and kelp aquaculture and harvesting occur offshore, raising potential public trust implications. Further, there are issues regarding the U.S. Food and Drug Administration's (FDA) and U.S. Department of Agriculture's (USDA) respective regulation of seaweed and kelp products. If the United States can successfully address these issues, it could pave the way for a new marine algae industry that could greatly benefit both the economy and the environment.

The global marine algae market—valued at approximately \$6 billion—has been historically focused in East Asian countries, with seaweed and kelp frequently used in regional cuisine. Dennis J. McHugh, *A Guide to the Seaweed Industry* (2003). Products for human consumption contribute to around \$5 billion of this amount, while substances extracted from seaweeds (known as hydrocolloids) and miscellaneous uses make up the remaining sum. *Id.*

Seaweed and kelp can be either wild harvested or commercially cultivated, but farming produces more than 90 percent of the world's demand. Macroalgae are typically cultivated using either off-bottom line farming or floating line aquaculture. In 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. With floating line aquaculture, seaweed and kelp are grown from lines anchored directly to the sea floor. Most food species are cultivated using the floating line method, which is suitable for deep ocean areas or areas with weak currents. Aquaculture permits under the Rivers and Harbors Act (RHA) and Clean Water Act (CWA) are required in the United States to engage in either method, both on state and federal levels. Additionally, wild harvest often requires a valid state license in the United States (especially when collected for commercial use). This type of harvest is largely important in subsistence use areas like Alaska. However, wild harvest can raise private property concerns in places like Maine when collection requires venturing very close to shore and making use of the beach or rocks at low tide.

If the United States can take advantage of its ample coastline to successfully become a player in the international macroalgae industry, its participation could yield significant economic and environmental benefits. To attain this goal, however, aquaculturists and harvesters will have to contend with regulatory uncertainty, public trust issues, and relevant FDA and USDA rules.

## *Statutory and Regulatory Framework*

At the federal level, a lack of current, clear, and applicable statutory and regulatory structure for commercial seaweed and kelp aquaculture cultivates uncertainty. RHA section 10 (33 U.S.C. § 403) and CWA section 404 (33 U.S.C. § 1344) pose challenges for permit applicants if applied to commercial seaweed and kelp aquaculture. Current FDA and USDA regulations for handling, storage, processing, and organic certification also do not clearly apply to all aspects of commercial seaweed and kelp aquaculture. The current treatment of and future interest in commercial seaweed and kelp aquaculture in Alaska, California, and Maine provide insight into how the industry might further develop in other parts of the country.

RHA section 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 (Corps), 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. Under CWA section 404, the Corps is authorized to permit the discharge of dredge and fill material into navigable waters. 33 U.S.C. § 1344. However, because "navigable waters" are defined as three nautical

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miles or less from shore, this section does not apply in federal waters.

If an aquaculture project implicates either RHA section 10 or CWA section 404, an aquaculturist must obtain a permit or permits from the Corps for his new project before beginning operations. There are two different types of permits under these statutes, each with different requirements. General permits are issued when projects are expected to have only minor impacts, whereas individual permits (sometimes called “standard permits” or “letters of permission”) are issued when a project is anticipated to have more than a minor impact.

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The individual permitting processes under both RHA section 10 and CWA section 404 can be quite lengthy and complicated. Before submitting an application, the permit applicant may undergo a nonmandatory pre-application consultation if they need assistance or extra guidance in the process. Then, 15 days after receipt of the application itself, the Corps issues a public notice to receive comments from other agencies and the public concerning the proposed project. After the comment period, the Corps may request additional information or require additional steps to reduce environmental impacts or resolve public interest concerns. The Corps then reviews the application, holds a public hearing if necessary, and conducts a public interest review evaluation. Only then will the Corps decide whether to grant the permit. Courts have historically given the Corps significant discretion in making this determination. If the Corps decides to issue the permit, it may do so subject to certain special conditions required to protect the public interest. Permittees also may be required to take additional steps before beginning operations, such as those required under the Endangered Species Act (ESA), the Coastal Zone Management Act (CZMA), and CWA section 401 (state water quality certification of federal permits or licenses).

Unfortunately, current lack of knowledge surrounding commercial seaweed and kelp aquaculture indicates potential permittees would have to undergo this intricate individual permitting process. Both RHA section 10 and CWA section 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,

RHA 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, CWA section 404 may apply—but only in navigable waters up to three nautical miles from shore. 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 CWA section 404 general permit. This includes the Corps' Nationwide Permit 48, which federally authorizes many offshore shellfish aquaculture activities, but not projects related to finfish or sea vegetation. Because of this federal regulatory uncertainty, we must examine what is more certain in some areas—state regulations.

### *Alaska, California, and Maine Lead the Way*

Despite the United States' abundant coastline, only Alaska, California, and Maine have codified provisions related to commercial marine algae aquaculture. Examining these states' current treatment of the commercial seaweed and kelp industry can help us determine what steps other states, and perhaps the federal government, can take to cultivate a successful industry in the future.

Alaska is prime real estate for kelp. It has nutrient-rich, clear waters with optimal temperatures, as well as rocky ocean substrate—perfect for kelp holdfasts. Recently, state authorities have recognized commercial kelp aquaculture's profit potential and begun taking steps to foster development of the industry.

The majority of Alaska's coastline is categorized as a “subsistence use area” where those who wish may harvest seaweed for noncommercial purposes without a sport fishing license. In these areas, there are no seasonal closures, but there are always harvest limits and other guidelines in place. Alaska Admin. Code tit. 5, § 37.100. In areas designated as nonsubsistence, harvesting live aquatic plants currently is prohibited. However, harvest of dead kelp and seaweed is permitted, as long as it is truly dead, and only for personal use. Various other state regulations also have allowed for the commercial use of harvested seaweed and kelp in certain circumstances. For example, the state allows aquatic farms to add harvest of naturally set algae on their gear to their aquatic permits for sale. *Id.* at § 41.285. Furthermore, one may harvest wild seaweed and kelp to sell if authorized under a commissioner's harvest permit. *Id.* at § 37.100. These permits are issued by region and evaluated on a case-by-case basis.

In February 2016, Alaska's governor took steps to move the state beyond wild harvest by signing an administrative order establishing 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. Alaska Admin. Order No. 280 (Feb. 29, 2016). Now, those who wish to operate a commercial sea vegetation farm may 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.

Where Alaska's commercial seaweed and kelp industry is still in its very beginning stages, California has perhaps the most regulations in place of any coastal state. California has

recently begun amending existing harvest regulations to capitalize on its favorable habitat and ample coastline.

California currently has 87 administrative kelp beds containing both bull and giant kelp. These beds each fall into one of four management categories: open, leasable, lease only, and 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. California designed its regulations to ensure that the state profits from the burgeoning industry. 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).

However, changes to the existing system may be coming soon. In 2012, the California Fish and Game Commission directed the California Department of Fish and Wildlife to develop an approach to guide the revision of regulations governing commercial marine algae harvest. The department developed a three-phase approach to guide the revision and completed its first phase of amendments in April 2014, which included updated administrative kelp boundaries and editorial changes to improve clarity and consistency of existing regulations. Phase two began in late 2015, focusing on edible seaweed, agar-bearing algae, and kelp management policies, including harvest methods. Eventually, the department also hopes to review commercial kelp and edible seaweed license fees and state royalty rates.

Where Alaska and California have just recently realized the profit potential in cultivating seaweed and kelp commercially, Maine has been interested in the industry for longer than either of them. 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 10 years.

Despite this, commercial wild harvest is still abundant in the state. 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). However, this tradition of wild rockweed harvest may be at risk. A recent case filed by Maine landowners (discussed below) under the public trust doctrine may prevent wild harvesters from continuing to gather rockweed in state waters in the future—thus increasing reliance on development of successful seaweed and kelp farms.

### **Public Trust Doctrine Implicated**

Growing and harvesting seaweed and kelp offshore and in the intertidal zone 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. U.S. courts 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.

The seminal Supreme Court case on the public trust doctrine is *Illinois Central Railroad Co. v. Illinois*, 146 U.S. 387 (1892). In the case, the Court 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.

Thus, all states must manage their public trust resources to these standards. However, states can extend the public trust to more lands or more uses within their state. In fact, many state courts have noted that the trust is not static and should evolve to accommodate changing conditions and the public's needs. For instance, 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). Similarly, in the famous Mono Lake case, California determined that the public trust required ecological effects to be considered when allocating water resources. *National Audubon Soc. v. Superior Court of Alpine County*, 658 P.2d 709 (Cal. 1983).

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It is not necessarily clear how seaweed and kelp fit into the doctrine. However, a recent case in Maine helps to illuminate these issues. Maine is only one of five “low water states” in the United States, as the Colonial Ordinances of the 1640s made the low water mark the line dividing private property from state-owned submerged lands. Thus, the state of Maine 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. Conversely, 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.

The 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. So the legal question currently confronting courts in Maine today is where does seaweed fall within the scope of the private/public line and the public trust in Maine?

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## 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 the sale of full seaweed or kelp goods.

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Maine courts traditionally have 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. While the cases have been consistent as to seaweed, some early cases refer to “sea manure,” and it is unclear what the courts meant to refer to with this term. See *Marshall v. Walker*, 45 A. 497 (1900). Thus, some claim that this term refers to seaweed, which would be helpful to seaweed harvesters, as Maine case law has held that taking sea manure falls within the public trust right of fishing in the intertidal zone. However, a 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 the Maine public trust rights in the intertidal zone. See Letter from G. Steven Rowe, Attorney General, to George D. Lapointe, DMR Commissioner, Mar. 24, 2008.

Related to this is the question of whether rockweed harvesting is fishing. 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, the court must determine if the activity easily falls within fishing, fowling, or navigation. If it does not, the court stated that the question then becomes whether the common law should be understood to include the activity. It should be noted that Maine courts have extended fishing to go beyond simply catching fish, and state statutory law includes harvesting rockweed within the state's fishing provisions, thus requiring harvest permits.

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 for two primary reasons. *Ross v. Acadian Seaplants Ltd.*, No. SC-CV-15-022 (Me. Super. 2017). First, the court was influenced by

the fact that seaweed is a plant that attaches itself to rocky substrates. Relying on prior court decisions, the court held that 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 applied the two-part test discussed above in ruling for the property owners. First, the court found that harvesting seaweed was not included in the express rights of fishing, fowling, or navigation, relying again on the fact rockweed is a terrestrial plant, and thus, is more like cutting down trees than traditional fishing. The court also found 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. All parties are watching for the release of a decision, as it could have significant impacts on the wild rockweed harvest in Maine. If the court agrees with the property owners, seaweed harvesters will have to deal with another hurdle to seaweed harvesting in the intertidal zone.

### Do Current USDA and FDA Regulations Fit?

Where federal regulatory uncertainty and the public trust present interesting issues related to the commercial seaweed and kelp harvesting industry, there is one more body of regulation worth examining. Both the FDA and the 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 the 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.

The FDA currently has several regulations controlling the legal consumption of seaweed and kelp products in the United States. 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 also has 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. *Id.* at § 172.365. Additionally, the agency notes that its GRAS determination and regulations apply generally to certain species of dehydrated, ground kelp, including giant kelp, oarweed, sugar kelp, and curvie. *Id.*

Besides these general regulations, the FDA regulates brown and red algae. *Id.* at §§ 184.1120, 1121. These regulations list the names of applicable GRAS species, and note that 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. Until the FDA promulgates relevant regulations to that effect, commercial aquaculturists and harvesters could experience complications when trying to get such products to market.

If seaweed and kelp farmers succeed in getting their product to market, another issue arises when determining if their harvest can be legally categorized and labeled “USDA Organic.” Currently, the USDA regulates the classification of farmed kelp and other algae as organic, but, again, not when for sale in their whole forms, and only when used as an ingredient in livestock feed, fertilizer, or food for human consumption. The USDA allows four nonorganic substances taken from farmed marine plants and algae to be a part of products labeled “organic” when the algal product is not otherwise commercially available in organic form. 7 C.F.R. § 205.606. The USDA also allows farmed aquatic plant extracts to be used in organic crop production as plant or soil amendments in certain circumstances. *Id.* at § 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). However, the only existing route to certification is through the USDA’s wild harvest provisions.

To achieve wild harvest organic certification, marine algae must be harvested in a manner that ensures such 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. Crops must be harvested 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. *Id.* at § 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.

Maine has implemented a state organic program that could aid federal authorities if they do decide to develop organic standards for whole, farmed marine algae products. The Maine Organic Farmers and Gardeners Association (MOFGA) has pioneered organic certification standards for farmed seaweed and kelp products. MOFGA certifies both cultured and wild sea vegetables harvested from Maine’s coastal waters based on the relevant crop sections of the NOP’s certification criteria. Accordingly, MOFGA bases certification on compliance with eight standards: (1) land requirements; (2) soil fertility and crop nutrient management; (3) seed and planting stock; (4) crop rotation; (5) crop pest, weed, and disease management; (6) wild-crop harvesting; (7) comingling and contact with prohibited substances; and (8) record keeping. Furthermore, if Maine aquaculturists plan to dry and package or otherwise handle or process the sea vegetables they harvest, they must comply with MOFGA’s organic handling plan to

receive certification. Farmers also are subject to continuing certification requirements, including required annual updates to organic system plans, fees, and inspections. Maine’s organic certification process increases transparency for consumers and can make aquaculturists’ products more profitable. Creating applicable, federal organic standards for farmed kelp and seaweed is just one more way the United States can hope to foster a successful aquaculture industry within its borders.

### Overcoming Regulatory and Public Trust Issues

The potential benefits of an expanded commercial seaweed and kelp industry in the United States are obvious. What is not obvious is how the industry can overcome regulatory uncertainty and potential public trust issues to expand the industry. Alaska, California, and Maine have demonstrated that a commercial macroalgae industry can be developed, with each state exhibiting their own success stories and answers to the legal uncertainty facing the industry. It remains to be seen, however, whether other states and the federal government will follow suit.

For states that wish to take advantage of their coastlines and participate in the macroalgae industry, the first step would be to evaluate the potential for successful aquaculture in their waters. Further, states could proactively review their fishing and aquaculture laws and regulations to identify any potential barriers to seaweed and kelp harvesting and culture, evaluating how the state’s public trust doctrine might come into play. States that are more proactive at identifying potential barriers and solutions will be able to more efficiently and effectively develop a commercial macroalgae industry within their waters.

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While individual states can take steps to address state-level matters, potential cultivators and harvesters will still have to contend with RHA and CWA permitting obstacles, as well as FDA and USDA issues. Thus, if the United States wants to take advantage of its ample coastline and become a successful player in the international macroalgae industry, it will need to first resolve those federal regulatory issues. If adequately addressed, the commercial seaweed and kelp industry could yield significant economic and environmental benefits for the nation well into the future. 🌱