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Permitting Seaweed Cultivation for Carbon Sequestration in California: Barriers and Recommendations

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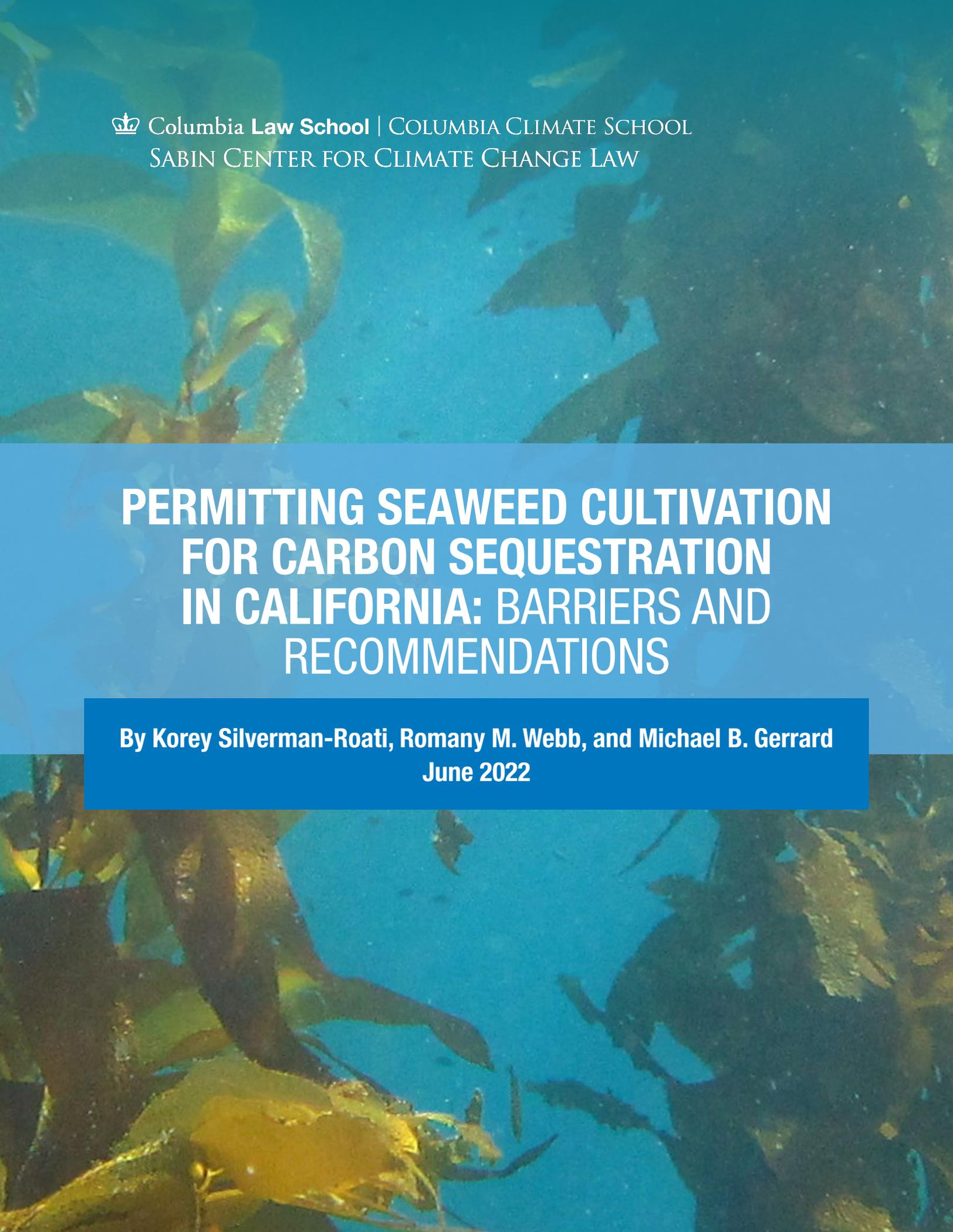
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By Korey Silverman-Roati, Romany M. Webb, and Michael B. Gerrard
June 2022

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1. INTRODUCTION

Growing interest in using the oceans to enhance removal of carbon dioxide from the atmosphere has in turn spurred more interest in seaweed cultivation. Seaweed cultivation refers to the growing of kelp and other macroalgae that uptake carbon dioxide as they grow. Seaweed is grown mostly near the shore, and stores the carbon dioxide it has drawn in principally in its biomass, with some carbon dioxide also stored in the sediment below where it is grown.

Seaweed can either be grown on the sea floor, attached to a hard surface, or along anchored lines or nets.¹ Seaweed growth requires adequate nutrients and light, and salinity, temperatures, and pH levels for healthy growth.² Seaweed is currently grown and harvested for human and animal food, fertilizer, medicine, cosmetics, and bioenergy. To offset emissions, cultivated seaweed could be used to replace more greenhouse gas-intensive products like animal-based foods, or in bioenergy systems. Seaweed could also be sunk in the deep sea for the purposes of carbon sequestration, for example, by

- allowing or engineering seaweed to float out to the open ocean and sink on its own;
- using floating platforms that both grow and sink seaweed; or
- harvesting seaweed cultivated near shore and using ships to transport it to the open ocean for sinking.

However, while some carbon is sequestered in sediments below where it is grown, little to no seaweed is currently sunk for carbon sequestration purposes.³

Seaweed cultivation off the California coast is still in nascent stages, with only two commercial, open-water seaweed farms in California waters at the time of writing, but farmers have expressed growing interest in expanding the practice.⁴ For further development, farmers will need to identify areas off the coast of California with suitable conditions for cultivating seaweed, where cultivation will not interfere with other commercial and public uses of the ocean⁵ or have adverse environmental impacts. The University of California, Irvine and the climate research nonprofit CarbonPlan developed a techno-economic model to identify promising sites for seaweed cultivation for carbon sequestration in various coastal regions

1 Sara Garcia-Poza et al., *The Evolution Road of Seaweed Aquaculture: Cultivation Technologies and the Industry 4.0*, 17 INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH & PUBLIC HEALTH 6528, 6537 (2020).

2 *Id.* at 6537–6538.

3 Halley E. Froehlich et al., *Blue Growth Potential to Mitigate Climate Change through Seaweed Offsetting*, 29 CURRENT BIOLOGY 3087, 3087 (2019).

4 Tara Duggan, *Companies want to grow seaweed in California to fight climate change. They're held back by environmental regulations*, San Francisco Chronicle (Jan. 2, 2022), <https://perma.cc/JZR5-NBB7>. In conversation, Karen Gray at GreenWave described a second farm, also in Humboldt Bay.

5 Sarah E. Lester et al., *Marine spatial planning makes room for offshore aquaculture in crowded coastal waters*, 9 NATURE COMMUNICATIONS 945 (2018).

around the world, including off California.⁶

One barrier to expanding seaweed cultivation in California is a complex, costly, and time-consuming lease and permitting process. Other states in the U.S., namely Maine and Alaska, have permitting systems designed to be more supportive of seaweed cultivation. This paper explores possible reforms to streamline California's permitting process, while maintaining appropriate environmental and other safeguards. The paper draws on discussions with seaweed farmers, as well as state officials involved in permitting projects.

This paper proceeds as follows. Section two describes the lease and multi-agency permitting process in California waters, including steps to obtain a farm lease, complete an environmental review, and obtain other required federal and state agency approvals. Section three describes the permitting processes in Alaska and Maine, with potential lessons for the California process. Section four lays out five recommendations, drawn from lessons in the Maine and Alaska systems, to improve permitting in California. These aim to facilitate seaweed cultivation without undermining important environmental protections and state reviews.

⁶ Julianne Deangelo et al., *Mapping Seaweed Farming Potential* (March 16, 2022), <https://perma.cc/P4M6-VRPL>. The model identifies the net cost of seaweed-related climate benefits in these regions.

2. PERMITTING PROCESS IN CALIFORNIA

Under the Submerged Lands Act of 1953, the boundaries of most coastal states, including California, extend three nautical miles from the coastline.⁷ California has title to, and ownership of, the land beneath state waters,⁸ except in areas where the state has granted ownership to local jurisdictions, like in the Humboldt Bay Harbor Recreation and Conservation District.⁹ The state also has the right to take the natural resources (including minerals, marine animals, and plant life) within its waters and the underlying land. The federal government has relinquished all of its property rights to, and interests in, land and resources within state waters. However, the federal government does retain some regulatory authority within those waters, for example, to regulate navigation, pollution, commerce, national defense, and international affairs¹⁰ and retains authority over National Marine Sanctuaries like Greater Farallones.¹¹

Permitting for seaweed cultivation in California involves approvals from a considerable number of state and federal agencies, pursuant to state and federal land use and environmental laws. The process can effectively be split into three parts – (1) obtaining a state water bottom lease; (2) completing an environmental review ; and (3) completing a multi-agency permitting process to allow seaweed ocean farming inside of the lease area. Applying for the water bottom lease triggers the environmental review process, and receipt of the bottom lease allows the multi-agency process to begin, although all agencies are allowed to provide public comment at the lease application stage. A table summarizing the various steps in the permitting process is included in Appendix A to this paper.

Due to the multiple steps involved, the permitting process for seaweed farming operations can be costly and may take several years to complete. GreenWave, a non-profit group that supports regenerative ocean farmers by providing training and support, estimates that obtaining a state water bottom lease and completing the associated environmental review may take between eighteen months and five years.¹² Although the filing fee for the lease application is only \$500, and total permitting fees may range from about \$6,000 to \$15,000, GreenWave estimates that compliance studies for environmental review can cost \$25,000 to \$500,000 and up.¹³ In total, the duration to lease and permit a new ocean farm, including navigating the multi-agency permitting process, can take between 3.5 and ten years.¹⁴

7 43 U.S.C. § 1312 (providing that “[t]he seaward boundary of each original coastal State is approved and confirmed as a line three geographic miles distant from its coast line”).

8 43 U.S.C. § 1311; 48 U.S.C. §§ 749 & 1705.

9 California State Lands Commission, *Humboldt Bay Harbor, Recreation, & Conservation District*, (March 16, 2022), <https://perma.cc/FF84-XPQ3>.

10 34 U.S.C. § 1314; 48 U.S.C. §§ 749 & 1706.

11 National Marine Sanctuaries, *About*, <https://perma.cc/X9NS-A9YD>.

12 GreenWave, *Guide to Navigating Lease & Permit Approvals for Ocean Farming in California*, <https://perma.cc/43XF-EE57>. GreenWave helped facilitate a commercial open-water seaweed farm off the coast of California in Humboldt Bay.

13 *Id.*

14 *Id.* Note that this estimate is speculative, as only two seaweed farms are in operation in the state, and may come down significantly as more applications begin to be processed.

2.1. State Water Bottom Lease

Obtaining approval for a seaweed aquaculture farm in California starts with preparatory steps towards obtaining a state water bottom lease. The Office of Aquaculture at the California Department of Fish and Wildlife directs prospective farmers to first develop a detailed project proposal, including location, scale, and species to be cultured.¹⁵ The office encourages prospective farmers to present this information to the State Aquaculture Coordinator, who will then guide the prospective farmer through the lease and permitting process, and can help refine the project proposal to ensure compliance with California’s state regulations. This pre-application process is optional but strongly encouraged. According to California officials, the more detailed the proposal, the more quickly detailed review can begin.

Once the potential new ocean farmer completes preliminary steps, they may apply to the Fish and Game Commission for review and approval of a state water bottom lease. The California Fish and Game Code § 15400 states that the Fish and Game Commission “may lease state water bottoms or the water column to any person for aquaculture” provided the Commission determines that “the lease is in the public interest in a public hearing conducted in a fair and transparent manner, with notice and comment, in accordance with commission procedures.”¹⁶ As discussed below, review by the State Lands Commission is required to ensure the lease area does not conflict with other existing sea uses. The Fish and Game Code defines aquaculture broadly to mean a “form of agriculture devoted to the propagation, cultivation, maintenance, and harvesting of aquatic plants and animals in marine, brackish, and fresh water.”¹⁷ Under this definition, seaweed cultivation would qualify as a type of aquaculture, for which a state water bottom lease could be issued. The Fish and Game Commission has not specified the criteria it will apply to determine whether the issuance of a lease for aquaculture is in the public interest. At the time of writing, no new water bottom leases had been granted by the Fish and Game Commission for over 25 years.¹⁸

Section 15400 of the California Fish and Game Code lays out the required information for lease applications: a map of the area to be leased, a description of the organisms and culture techniques, an estimate of the acreage, and a \$500 filing fee. The California Code of Regulations establishes additional rules, including a requirement that the Fish and Game Commission hold “a public hearing [on each application] at least ninety days after notice thereof has been published in a newspaper of general circulation within the county involved.”¹⁹

Applicants must ensure that aquaculture activities do not conflict with other sea uses and submit a five-year business plan. California regulations state that “[n]o aquaculture agreement will be valid until the State Lands Commission has certified to the department [of Fish and Wildlife] that the area applied for is unencumbered . . . so as not to preclude its use for the

15 California Department of Fish & Wildlife Office of Aquaculture, *Permit Guide to Aquaculture in California*, <https://perma.cc/H5BP-P5JW>.

16 Cal. Fish & Game Code § 15400(a).

17 *Id.* § 17.

18 GreenWave, *Guide to Navigating Lease & Permit Approvals for Ocean Farming in California*, <https://perma.cc/43XF-EE57>.

19 Cal. Code Regs. tit. 14, § 237(b)(4).

proposed culture.”²⁰ Applicants are instructed to include in their application a five-year business plan detailing the steps they will take to meet minimum planting and harvesting requirements.²¹

The term of each state water bottom lease cannot exceed twenty-five years.²² Lessees are given prior right to renewal on agreed upon terms,²³ and the area must be restored to its original condition upon termination.²⁴

Lessees must abide by environmental, management, and minimum planting and harvest standards. Environmental standards include that “[a] lease shall not unreasonably interfere with fishing or other uses or public trust values, unreasonably disrupt wildlife and marine habitats, or unreasonably harm the ability of the marine environment to support ecologically significant flora and fauna. A lease shall not have significant adverse cumulative impacts.”²⁵ Lessees must also ensure that management standards are followed, and “[a]pproved best management practices shall include a regular monitoring, reporting, and site inspection program that requires at least annual monitoring of lease sites.”²⁶ The Fish and Game Commission may terminate a lease if, for instance, it determines that the activities are damaging the marine environment.²⁷ Further, leases must include minimum planting and harvesting requirements to ensure that the water bottoms are used for their intended purpose.²⁸

2.2. Environmental Review

The submission of an application for a state water bottom lease triggers the start of the environmental review process. The California Environmental Quality Act (CEQA) requires state and local government agencies to assess the environmental impacts of proposed actions, starting with an initial study to determine environmental effects.²⁹ For any activity that “may cause either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment,” the agency must conduct an environmental review prior to undertaking or approving the activity.³⁰ The “lead agency” for an activity determines the extent of review required under CEQA. For the purposes of seaweed permitting, the Fish and Game Commission is the lead agency, with support from the California Department of Fish and Wildlife.³¹

20 *Id.* § 237(b)(3).

21 California Department of Fish and Wildlife, *Marine Region - Information Leaflet Regulations Governing Leasing Of State Water Bottoms For Aquaculture*, <https://perma.cc/UG55-KALL>.

22 Cal. Fish & Game Code § 15405.

23 *Id.* § 15406.

24 *Id.* § 15409.

25 *Id.* § 15400(b)(2). While this section is expressed to apply to leases for finfish aquaculture, the Fish and Game Commission imposes the same requirements on leases for other types of aquaculture projects.

26 *Id.* § 15400(b)(4).

27 *Id.*

28 Cal. Code Regs. tit. 14, § 237(i)(2)(A).

29 Cal. Pub. Res. Code § 21080(c)(2)

30 *Id.* § 21065.

31 GreenWave, *Guide to Navigating Lease & Permit Approvals for Ocean Farming in California*, <https://perma.cc/43XF-EE57>.

The Fish and Game Commission must determine, after the initial study, whether an environmental impact report (EIR), a negative declaration, or a mitigated negative declaration will be required for a seaweed cultivation project.³² If the Fish and Game Commission determines that a project will “not have a significant effect on the environment” or if agreed upon “revisions in the project plans . . . would avoid the effects or mitigate the effects to a point where clearly no significant effect on the environment would occur,” then CEQA requires it to issue a negative declaration.³³ On the other hand, “[i]f there is substantial evidence . . . that the project may have a significant effect on the environment, an [EIR] shall be prepared.”³⁴ If a federal Environmental Impact Statement (EIS) has been prepared under the National Environmental Policy Act (NEPA), agencies must use the federal EIS (i.e., rather than preparing a state EIR) when the state assessment has not yet been completed and the EIS complies with state guidelines.³⁵

CEQA provides for a series of categorical exemptions from the environmental review requirement. The categorical exemptions are “a list of classes of projects which have been determined not to have a significant effect on the environment and which shall, therefore, be exempt from the provisions of CEQA.”³⁶ Examples of exemptions include acquisitions of land for wildlife conservation purposes, designation of wilderness areas, enforcement actions by regulatory agencies, and minor divisions of land.³⁷ None of the current exemptions would apply to seaweed cultivation projects.

If a seaweed cultivation project will impact tribal resources, the Fish and Game Commission may be required to consult with native tribes as part of the CEQA process. To establish whether a project could cause “a substantial adverse change in the significance of a tribal cultural resource,”³⁸ CEQA requires state agency consultation with native tribes prior to the issuance of an environmental impact report for a project.³⁹ The consultation requirement is imposed upon the state agency, and the Fish and Game Commission will consider the requirement as part of its consideration of whether approval of the lease is in the public interest. Tribes must request an opportunity to consult with state agencies on proposed projects, and the California Department of Fish and Wildlife has made public a list of tribes that have made such requests.⁴⁰ The California Native American Heritage Commission has developed a digital atlas that includes educational information on tribal cultural resources overlaid on a map of California.⁴¹

32 Cal. Pub. Res. Code § 21080.1.

33 *Id.* § 21080(c).

34 *Id.* § 21080(d).

35 Cal. Code Regs. tit. 14, § 15221.

36 *Id.* § 15300.

37 *Id.* §§ 15301-33.

38 Cal. Pub. Res. Code § 21084.2 (2015).

39 *Id.* § 21080.3.1.

40 California Department of Fish and Wildlife, *Tribes Requesting Notification*, <https://perma.cc/85AQ-H5EX>.

41 California Native American Heritage Commission, *Digital Atlas of California Native Americans*, <https://perma.cc/GDZ5-V7B3>.

2.3. Multi-Agency Permit Process

Once environmental review is complete and a farmer obtains a state water bottom lease, they are then required to secure a number of state and federal agency approvals. These approvals may be consolidated into a multi-agency review process, but permitting may still be complex, time-consuming, and costly.

2.3.1 State Agency Approvals

A key permit required for all seaweed cultivation projects in California state waters is the coastal development permit issued by the California Coastal Commission. California's Coastal Act lays out the policies and regulations applicable to development in the coastal zone. The coastal zone includes the "land and water area of the State of California . . . extending seaward to the state's outer limit of jurisdiction" (i.e., three nautical miles from the coast).⁴² A permit is required for all "development" in the coastal zone. Development is defined in the Coastal Act as "in or under water, the placement or erection of any solid material or structure; discharge or disposal of any dredged material or of any gaseous, liquid, solid, or thermal waste; grading, removing, dredging, mining, or extraction of any materials; change in the density or intensity of use of land . . . and any other division of land."⁴³ The Coastal Act directs the Coastal Commission to maintain public access, protect coastal recreation activities, and protect the marine environment in coastal zones.⁴⁴ Seaweed cultivation projects may not begin operation until a coastal development permit has been issued by either the Coastal Commission or a local government that has a Coastal Commission-certified local coastal program.⁴⁵ Fees for coastal development permits start at \$3,228, but may be significantly higher depending on the gross square footage and cost of the development.⁴⁶

In limited circumstances, the Coastal Commission may issue a de minimis waiver for development, thereby eliminating the need for a coastal development permit. The Coastal Act states that "[a] proposed development is de minimis if the [Coastal Commission] determines that it involves no potential for any adverse effect, either individually or cumulatively, on coastal resources."⁴⁷ The Coastal Commission states that waivers may be available for small, simple, limited-scale projects located away from sensitive cultural resources.⁴⁸ In such cases, the de minimis waiver allows for shorter review time and an expedited public hearing.⁴⁹ A review of de minimis waivers from September 2021 shows that they are often granted for

42 Cal. Pub. Res. Code § 30103.

43 *Id.* § 30106.

44 *Id.* §§ 30200-70.

45 California Department of Fish and Wildlife, *Marine Region - Information Leaflet Regulations Governing Leasing Of State Water Bottoms For Aquaculture*, <https://perma.cc/UG55-KALL>.

46 California Coastal Commission, Filing Fee Instructions, <https://perma.cc/D3CX-JXGL>. \$3,228 is the fee for an "administrative" coastal development permit. Fees for regular permits range from \$6,455 to \$322,750, depending on the gross square footage and cost of the development.

47 Cal. Pub. Res. Code § 30624.7.

48 California Coastal Commission, *CDP Application Guidance: Aquaculture and Marine Restoration* p. 21 (2020), <https://perma.cc/Z728-6D2C>.

49 *Id.*

small projects like single-family home remodeling,⁵⁰ and thus may be less likely to be granted for more complex projects like seaweed cultivation.

Once a lease and related permits have been issued, the Department of Fish and Wildlife requires all aquaculture projects to be registered with their state registration program. Registration is required annually by March 1, and must list the owner’s name, the species grown, and the project location.⁵¹ The fee for a new registration in 2022 is \$953.⁵² For renewal registrations, the base fee is \$598.50, with a \$716.50 surcharge if gross annual revenues from the project are greater than \$25,000.⁵³

If the seaweed grown is imported from outside California, the farmer must obtain an importation permit.⁵⁴ Imported aquatic plants are subject to inspection by the Department of Fish and Wildlife to ensure that the plants are disease and parasite-free. The Department issues long-term and standard importation permits: long-term permits cost \$68.25 and are valid for multiple importations from a single supplier in a year, while standard permits cost \$57.00 and are valid for a single shipment for a single supplier.⁵⁵ To date, the Department of Fish and Wildlife has only set guidelines for inland operations,⁵⁶ so whether importation permits may be available for ocean farms is unclear.

If the seaweed grown is intended for human consumption, approval from the California Department of Public Health is also required. The California Health and Safety Code states that “[n]o person shall engage in the manufacture, packing, or holding of any processed food in this state unless the person has a valid registration from the [Department of Public Health].”⁵⁷ Processed food includes marine and freshwater algae for human consumption.⁵⁸ Approval requires the submission of a processed food registration application.⁵⁹

Applicants may also be required to obtain permits from local governments. For instance, if seaweed is farmed immediately near shore in bays that are within city limits, then a local land use permit would be required.⁶⁰ If business, such as food sale operations, is conducted within

50 California Coastal Commission, *San Diego Coast District Deputy Director’s Report for September 2021* (2021), <https://perma.cc/S5KD-EASL>.

51 Cal. Fish & Game Code § 15101.

52 California Department of Fish and Wildlife, *2022 Aquaculture Registration Application*, <https://perma.cc/WFM6-ZJ7Y>.

53 *Id.*

54 Cal. Fish & Game Code § 15600.

55 California Department of Fish and Game, *Importation of Live Aquatic Plants, Invertebrates, Fish, Amphibians and Reptiles* (2011), <https://perma.cc/ZLS3-7ESE>. See also, California Department of Fish and Game, *2022 Application for Importation Permit*, <https://perma.cc/39PK-CAA2>.

56 *Id.*

57 Cal. Health & Safety Code § 110460.

58 California Department of Fish & Wildlife Office of Aquaculture, *Permit Guide to Aquaculture in California*, <https://perma.cc/RWV5-54EJ>.

59 California Department of Public Health, *Processed Food Registration Application*, <https://www.cdph.ca.gov/CDPH%20Document%20Library/ControlledForms/cdph8610.pdf>.

60 See, e.g., Governor’s Office of Business and Economic Development, GO-Biz, *Business permits and other requirements in the City of Arcata (Humboldt County) for business types: Aquaculture*, <https://perma.cc/CZ73-F47Y>. Maps are available to help prospective farmers determine whether their project is within city limits. See, e.g., Stanford Libraries, EarthWorks, *City Boundaries: Humboldt County, California*, 2012, <https://perma.cc/V3A3-PEWW>.

city limits, then seaweed farmers would need to obtain a business license from the relevant city.⁶¹ California offers the public a permitting tool that lists required local permits, depending on location.⁶²

2.3.2 Federal Agency Approvals

The U.S. Army Corps of Engineers (ACE) oversees permitting under the River and Harbor Act (RHA) and section 404 of the Clean Water Act (CWA). Under section 10 of the RHA, ACE permits are required for certain regulated activities, including the placement or removal of structures and modification of the navigable waterway, conducted within three miles of the shore.⁶³ Seaweed farms could interfere with navigation through the placement of anchors and farm gear and thus require RHA permits even if they do not involve structures attached to the sea floor. Under section 404 of the CWA, ACE permits are required to discharge dredge and fill materials into waters within three miles of the shore, which may occur in some seaweed cultivation projects.⁶⁴ Permitting under section 404 of the CWA in turn triggers a CWA section 401 water quality certification requirement from the State Water Resource Control Board.⁶⁵

Both anchored and floating offshore structures, including those used to grow seaweed, require permit authorization from the U.S. Coast Guard under the aids to navigation program.⁶⁶ Before issuing such authorization, the Coast Guard must confirm that the structure will be appropriately marked.⁶⁷

Seaweed cultivation may also require consultation with the National Marine Fisheries Service (NMFS) to ensure compliance with review requirements under the Endangered Species Act (ESA) and other statutes. Under the ESA, consultation with NMFS is required to determine whether any marine species that have been listed as endangered⁶⁸ or threatened⁶⁹ are present in the project area.⁷⁰ If such species are present, further consultation with NMFS is required to see whether the project may adversely affect the species or their habitat.⁷¹ If the consultation with NMFS indicates that the project will result in the “take” of an endangered species,

61 See, e.g., Governor’s Office of Business and Economic Development, GO-Biz, *Business permits and other requirements in the City of Arcata (Humboldt County) for business types: Aquaculture*, <https://perma.cc/CZ73-F47Y>.

62 *Id.*

63 33 U.S.C. § 403.

64 *Id.* § 1344.

65 *Id.* § 1341(a)(1). Section 401 applies to discharges into U.S. waters (up to 2.6 n.m. from shore). *Id.* The state or tribe where the discharge originates must certify that the activity will meet water quality standards. *Id.*

66 33 C.F.R. § 64.21 (requiring the owner or operator of an offshore structure to “apply for Coast guard authorization” prior to installation). See also *id.* §§ 64.03 (indicating that the regulations apply to structure located in “waters subject to the jurisdiction of the U.S.”) & 64.04 (defining “structure”).

67 *Id.* §§ 64.21, 64.23, & 66.01-5. See also U.S. Coast Guard, *Aids to Navigation Manual Administration* (2005), <https://perma.cc/4F8V-CQBJ>.

68 A species is considered “endangered” if it “is in danger of extinction throughout all or a significant portion of its range.” See 16 U.S.C. § 1532(6).

69 A species is considered “threatened” if it “is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.” See *id.* § 1532(20).

70 *Id.* § 1536(a)(2).

71 *Id.*

including by “harassing” or “harming” the species, the project is unlawful,⁷² unless it obtains an incidental take permit.⁷³ Such a permit may only be issued if:

- the take is incidental to, and not the purpose of, an otherwise lawful activity;
- the applicant will minimize and mitigate the impacts of taking;
- the applicant has developed, and will implement, a conservation plan; and
- the take will not reduce the likelihood of survival and recovery of the species.⁷⁴

Consultation with NMFS is also required where an action could harm “essential fish habitat” designated under the Magnuson-Stevens Fishery Conservation and Management Act.⁷⁵ Consultation with the U.S. Fish and Wildlife Service may also be required to ensure activities do not harm seabirds under the Migratory Bird Treaty Act.⁷⁶

Federal permitting of seaweed cultivation projects may trigger environmental review requirements under NEPA. NEPA requires federal agencies to prepare an EIS for any major federal action “significantly affecting the quality of the human environment.”⁷⁷ The requirement applies whether the federal agency proposes to take the action itself or authorize or fund the action.⁷⁸ Thus, for example, NEPA would apply where ACE proposes to issue a permit for the alteration of the navigable waterway for seaweed farming. ACE would need to undertake a case-by-case assessment to determine whether a particular project is likely to significantly affect the quality of the human environment and thus requires preparation of an EIS. In making that determination, ACE may consider factors such as the size of the seaweed farm, the area where it will be developed, and whether the farm could alter the marine environment or harm fish, wildlife, or plant species. Large projects, particularly those in sensitive environments, would likely require preparation of an EIS. The EIS would need to assess the natural, economic, social, and cultural resource effects of the project, and ACE would be required to release relevant documents to the public and consider their input.⁷⁹ As explained above, if an EIS is prepared, this would likely obviate the need for a state environmental impact report under CEQA.

If a seaweed cultivation project involves the use of fertilizer or the sinking the seaweed in the ocean for the purposes of carbon sequestration, it may implicate the International Convention on the Prevention of Marine Pollution by Dumping of Waste and Other Matter (London Convention) and domestic laws implementing that Convention. The London Convention aims to control pollution resulting from the “dumping” of “waste or other matter at sea.”⁸⁰ The London Convention defines “waste or other matter” broadly to include “material of any kind,

72 *Id.* § 1538(a)(1)(B).

73 *Id.* § 1539(a)(1)(B).

74 *Id.* § 1539(a)(2)(B).

75 *Id.* § 1855(b)(2).

76 *Id.* § 703(a).

77 42 U.S.C. § 4321 et seq., 4332(2)(C).

78 40 C.F.R. § 1508.18(a).

79 42 U.S.C. 4332(2)(C).

80 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, Dec. 29, 1972, Art. I-II.

form or description.”⁸¹ “Dumping” is defined to mean the “deliberate disposal of waste or other matter at sea from vessels, aircraft, platforms, or other man-made structures.”⁸² Notably, however, the definition expressly excludes the “placement of matter for a purpose other than mere disposal thereof, provided that such placement is not contrary to the aims of” the London Convention or Protocol.⁸³

Sinking seaweed at sea for the purpose of carbon sequestration, if done by allowing or engineering seaweed to float to the deep sea on its own, would not constitute dumping because the seaweed would not be disposed from vessels, aircraft, platforms, or other man-made structures. However, floating platforms that both grow and sink seaweed could be used, and ships could be used to transport seaweed cultivated near shore to the deep sea for sinking. In these cases, when the seaweed is sunk, the key determination would be whether sequestration constitutes a sufficient purpose beyond mere disposal of the seaweed and whether that purpose is not contrary to the aims of the London Convention and Protocol. If it is found to have a sufficient alternative purpose and not to be contrary to the aims of the Convention and Protocol, the project would not involve dumping. Seaweed cultivation does not typically involve the use of fertilizer, but widespread seaweed cultivation in the open ocean is relatively under-studied, so as-yet unknown substances may be required to stimulate growth, depending on the availability of nutrients. The addition of growth-stimulating substances to ocean waters could constitute dumping under the London Convention.

The U.S. is a party to the London Convention and has implemented it domestically through the Marine Protection, Research, and Sanctuaries Act (MPRSA). The MPRSA regulates “the dumping of all types of materials into ocean waters” within twelve nautical miles of the U.S. coast and further in some circumstances.⁸⁴ The MPRSA defines “dumping” broadly to include any “disposition of material.”⁸⁵ The MPRSA excludes from the definition of dumping “the construction of any fixed structure or artificial island [] or the intentional placement of any device in ocean waters or on or in the submerged lands beneath such waters, for a purpose other than disposal, when such construction or such placement is otherwise regulated by Federal or State law or occurs pursuant to an authorized Federal or State program” (the “MPRSA exemption”).⁸⁶ The MPRSA “dumping” definition would encompass the addition of fertilizers or substances to ocean waters and the sinking of seaweed at sea from a vessel as both involve the “disposition of material” and do not involve the construction of any structure or placement of any device into ocean waters, meaning that the MPRSA exemption does not apply.

In general, and with some exceptions, the MPRSA prohibits the dumping of materials into ocean waters without a permit from the Environmental Protection Agency (EPA). Permits are required where the materials to be dumped are transported from within the U.S.⁸⁷ Thus, for

81 *Id.* Art. III.

82 *Id.*

83 *Id.*

84 33 U.S.C. § 1401(b).

85 *Id.* § 1402(f).

86 *Id.*

87 *Id.* § 1411(a)(1). Permits are also required where materials are transported from outside the U.S. if (1) transportation occurs on a U.S.-registered vessel or aircraft or (2) the materials are intended to be dumped within 12 nautical miles of the U.S. coast. See *id.* § 1411(a)(2) & (b).

example, a permit would be required where seaweed harvested in California state waters is transported via ship for sinking in the deep ocean.⁸⁸

EPA can only issue permits under the MPRSA if satisfied that the dumping of materials into ocean waters “will not unreasonably degrade or endanger human health, welfare, or amenities, or the marine environment, ecological systems, or economic potentialities.”⁸⁹ Dumping can only occur in EPA-designated dump sites, none of which currently allow for the dumping of seaweed or fertilizer.⁹⁰ Persons wanting to engage in seaweed carbon sequestration could apply to EPA for designation of a new dump site or approval to use an existing site.⁹¹ On receiving an application, EPA will evaluate the physical, chemical, and biological characteristics of the site, as well as the impacts of past dumping in areas with similar characteristics, to determine whether it is suitable for use, and must conduct environmental review under NEPA.⁹²

88 *Id.* § 1402(d) (defining U.S. to include “the several States”). See also 43 U.S.C. § 1312 (defining the boundaries of each coastal state as extending three nautical miles from the coast).

89 *Id.* § 1412(a)

90 Env'tl. Prot. Agency, *Ocean Disposal Map, Ocean Dumping*, <https://perma.cc/XG2L-UYLG>.

91 40 C.F.R. § 221.1(f).

92 *Id.* §§ 228.4 & 228.6.

3. ALTERNATE MODELS IN ALASKA AND MAINE

Table 1: Average time of commercial seaweed permitting from application to final approval

Alaska	10 months to over a year
Maine	1 to 2 years ⁹³
California	3.5 to 10 years

Table 2: Number of farms permitted and operating

Alaska	28 sites permitted, 19 active farms ⁹⁴
Maine	100+ sites permitted, 30+ active farms ⁹⁵
California	2 active farms

3.1. Seaweed Permitting in Alaska

In Alaska, permits are required from the Alaska Department of Fish and Game and Department of Natural Resources to engage in seaweed farming in state waters.⁹⁶ Alaska offers permittees a joint agency aquatic farming application that can be used to obtain the required site lease from the state Department of Natural Resources, farm operation permit from the Department of Fish and Game, and special area permit from the Department of Fish and Game if the farm is located in critical habitat area, state refuge, or sanctuary.⁹⁷

Similar to California, Alaska encourages applicants to consult with the lead agency prior to submitting an application by requesting a pre-application meeting with the Department of Natural Resources and/or Department of Fish and Game.⁹⁸ At the meeting, state agency officials review the draft application, project proposal, and supporting materials.⁹⁹

The Alaska Aquatic Farming Statutes state that “[a] person may not, without a permit from

93 Note that this estimate is speculative, as only one seaweed farm is in operation in the state, and may come down significantly as more applications begin to be processed.
 94 Sea Grant, *State of the States: Status of U.S. Seaweed Aquaculture (2022)*, <https://perma.cc/RG9H-D5JA>.
 95 *Id.*
 96 Alaska Statutes § 16.40.100; Alaska Department of Fish and Game, *Applying for Operation Permit*, <https://perma.cc/7AXF-WS3V>.
 97 *Id.*
 98 Alaska Aquatic Farm Program, *Joint Agency Application – Part I*, <https://perma.cc/9PXW-XWRX>.
 99 *Id.*

the [Department of Fish and Game], construct or operate an aquatic farm.”¹⁰⁰ Pursuant to the statute, Alaska issued regulations creating a multi-agency application.¹⁰¹ This multi-agency application, also referred to as a joint agency application, must be submitted to the Department of Natural Resources Aquatic Farm Leasing Program, which in turn distributes the application to the Department of Fish and Game and the Department of Environmental Conservation. The application requires a description of the site location, site dimensions, species intended to be cultivated, and culture methods.

Following submission, the application follows a number of set steps towards approval.¹⁰²

- First, the application is reviewed for completeness by the Departments of Natural Resources and Fish and Game.
- Second, other state agencies are given twenty days to review the application, with the possibility of extension.
- Third, the Department of Fish and Game conducts a preliminary review and makes a recommendation on issuance of the aquatic farm operation permit.
- Fourth, the Department of Natural Resources issues a preliminary decision on whether to issue a site lease based on information from the applicant and input from state agencies.
- Fifth, after a thirty day public notice and review period, the Department of Natural Resources issues a final finding and decision, including stipulations required throughout the lease term, and will send a ten-year lease to the applicant.
- Sixth, the Department of Fish and Game will issue a ten-year operation permit, including required conditions.
- Seventh, for projects producing food, a Department of Environmental Conservation food establishment permit is required. Similar to California, seaweed cultivation projects must also obtain any required local and federal authorizations.

Throughout the process, applicants may be asked to modify aspects of the project, and anyone who submitted comments during public review is given opportunities to appeal final permitting decisions. The application period is open every year from January 1 through April 30.¹⁰³ Applications have increased in recent years, with 15 joint seaweed farm applications in 2022, and higher quality applications than previous years according to state agencies.¹⁰⁴

The consolidated joint agency approach in Alaska is in part responsible for faster processing times than in California. Alaska is also a state with a long history of social and governmental

100 Alaska Statutes § 16.40.100.

101 5 A.A.C. § 41.220.

102 These steps are laid out in more detail in: Alaska Aquatic Farm Program, *Joint Agency Application – Part I*, <https://perma.cc/9PXW-XWRX>.

103 Alaska Department of Fish and Game, *Aquatic Farming Permit FAQs*, <https://perma.cc/FA9A-QP64>.

104 Melissa Good, *Alaska aquaculture permitting support bolsters new aquatic farm applications*, Sea Grant Alaska (May 18, 2022), <https://perma.cc/RA8L-U7JC>.

support for commercial fisheries, as the state had more fishing harvest volume than all other states combined in 2018.¹⁰⁵ NOAA Fisheries estimates that the permitting process for seaweed farms on state lands will take ten months to over a year from the time of first application to final issuance.¹⁰⁶

3.2. Seaweed Permitting in Maine

In Maine, the state Department of Marine Resources oversees aquaculture permitting.¹⁰⁷ The state defines “aquaculture” as “the culture or husbandry of marine organisms by any person. In order to qualify as aquaculture, a project must involve affirmative action by the individual to improve the growth rate, survivability or quality of the marine organism.”¹⁰⁸ Leasing authority is given to the Commissioner of the Department of Marine Resources: “The commissioner may lease areas in, on and under the coastal waters, including the public lands beneath those waters and portions of the intertidal zone, for scientific research or for aquaculture of marine organisms.”¹⁰⁹

Permitting may take one of three forms, each with different levels of complexity in the permitting process. First, applicants may apply for a standard lease, which may be up to 100 acres and for up to twenty years.¹¹⁰ Second, applicants may apply for a limited-purpose experimental (LPE) lease, which may be up to four acres and for up to three years.¹¹¹ Third, applicants may apply for a limited purpose aquaculture (LPA) license, which allows applicants to apply for a one-year license on no more than 400 square feet.¹¹² Each of these three types of permits are created by statute.

The Department of Marine Resources provides guidance to applicants on applying for a standard aquaculture lease.¹¹³ In determining whether to approve a lease, the department must ensure that the lease does not interfere with navigation, fishing, other landowner use, public use, or wildlife habitat, among other criteria.¹¹⁴ Applicants are encouraged to contact the Resource Management Coordinator to set up a pre-application meeting to introduce the project and define informational needs. Then, the applicant has four months to submit a draft of the standard lease and pay the \$500 application fee. The applicant then holds a scoping session in the town nearest to the lease site to provide an opportunity for public discussion on the application. The applicant then submits a final application along with a \$1000 or \$1500 fee, which the Department of Marine Resources must review for completeness within thirty days. The department must also send the lease to local authorities and other state and federal

105 Alaska Seafood Marketing Institute, *The Economic Value of Alaska’s Seafood Industry* (2020), <https://perma.cc/VSG2-Z94V>.

106 NOAA Fisheries, *State by State Summary of Seaweed Aquaculture Leasing/Permitting Requirements* (2021), <https://perma.cc/LT4C-H5K8>.

107 Maine Department of Marine Resources, *Aquaculture Lease Applications and Forms*, <https://perma.cc/HT5G-B2RE>.

108 Maine Code Regs. 13-188-2 § 05.

109 12 M.R.S.A. §6072.

110 *Id.*

111 *Id.* §6072-A.

112 *Id.* §6072-C

113 Maine Department of Marine Resources, *Standard Aquaculture Lease Process*, <https://perma.cc/H273-DDYL>.

114 12 M.R.S.A. §6072.

agencies for their review. The department then schedules a site visit, holds a public hearing, and issues a final decision.

LPE leases are available “for commercial aquaculture research and development or for scientific research.”¹¹⁵ LPE leases have fewer requirements and a less stringent standard of review than standard leases. The process involves submission of an application, a thirty day comment period, a site visit and site report by the Department of Marine Resources, the possibility of a public hearing, draft decision review, farmer review of a proposed decision, and final decision. The application is subject to a \$100 fee. If the LPE lease is for scientific research, it may be renewed. LPE leases for commercial purposes may not be renewed, so such limited-purpose leaseholders would then need to apply for a standard review at the end of the three-year period.

The LPA license is the least-stringent of the three permitting schemes. LPA licenses were created at the suggestion of shellfish growers to create a permitting scheme that allowed for experimentation in aquaculture growing locations. The application must identify the species to be cultivated, whether the project is commercial or personal, the source of the organisms, the gear used, the location of the project, and a set of plans.¹¹⁶ Fees are \$100 for Maine residents and \$400 for non-residents. The licenses can be reviewed annually.

The tiered system of permitting in Maine allows for faster processing times for farms. NOAA Fisheries estimates that lease times, from application to final issuance, are one to two years for a standard lease, three to twelve months for an LPE lease, and a matter of weeks for the LPA licenses.¹¹⁷ Processing times for standard leases are less than those for state water bottom leases in California, suggesting more streamlined review even for the most difficult to obtain leases in Maine. The LPE lease and LPA license options in Maine give farmers further flexibility, allowing for experimentation in location and methods, without onerous permitting requirements.

115 *Id.* §6072-A.

116 *Id.* §6072-C(5).

117 NOAA Fisheries, *State by State Summary of Seaweed Aquaculture Leasing/Permitting Requirements* (2021), <https://perma.cc/LT4C-H5K8>.

4. RECOMMENDATIONS TO OVERCOME LEASING AND PERMITTING ROADBLOCKS IN CALIFORNIA

The above examples suggest that at least two U.S. states outside of California have developed lease and permitting systems for seaweed cultivation that are more streamlined and less onerous. Building on those examples, we suggest five changes to the lease and permitting process in California. Ideally, these could serve to lessen or remove unnecessary roadblocks to permitting, while still maintaining important environmental and other review of prospective projects. We note that the final recommendation would require the enactment of new legislation. Efforts in California to update state law to facilitate restorative ocean farming are underway, but have so far failed to pass.¹¹⁸ Thus, priority might be given to the first four recommendations that can be implemented without new legislation. Further, in the fifth recommendation, an alternative option is proposed that would not require new legislation.

4.1. Streamline the Permit Application Process

California should streamline its application process into a joint multi-agency review. This would build on the example set in Alaska where applicants submit one application to one state agency, and are then guided through the application process by that agency. This serves to limit unnecessary applicant-state agency interaction and provides support to applicants throughout the process.

The California Department of Fish & Wildlife has already taken steps towards streamlining its application process. The State Aquaculture Coordinator guides applicants, and the state provides for multi-agency review at the third stage of the application process. The state encourages a pre-application meeting with the aquaculture coordinator to discuss the application and any issues that might arise during the review process. If the application is sufficiently detailed, the aquaculture coordinator contacts other state agencies to notify them of the application and to begin consultation. Further, state agencies have begun a voluntary effort to streamline the process, but have not reached any formal agreement on how to coordinate reviews.

We recommend that the application review process be consolidated further. The state could implement a policy to ensure that all agencies start their review at the time the application is first submitted to the extent allowed by law. Further, regulatory agencies could work in parallel to eliminate or reduce the extent of sequential review so the total review time, across all agencies, is reduced. This could lead to review by some state agencies of applications that may fail the environmental review process or may fail to secure water bottom leases. But the consolidated process would have the advantage of quicker turnarounds. California agency staff could consult with Alaska state officials on best practices for such a joint-agency review process.

118 Cal. Assembly Bill No. 303 (Jan. 25, 2021), <https://perma.cc/3SYC-B9CY>.

One aspect of the permitting process—i.e., consideration of the coastal development permit by the California Coastal Commission—is delayed by existing regulatory process. California Coastal Commission regulations require applicants to provide a description and documentation of their legal interest in the property in question in their application.¹¹⁹ As a result, applicants must first obtain a state water bottom lease before submitting their coastal development permit application. The underlying statute, the California Coastal Act, does not require evidence of a lease. The California Coastal Commission should consider revising its regulations to allow application processing to begin before the lease is secured. To eliminate any concerns about permits being issued for projects on land in respect of which the permittee does not hold a legal interest, the California Coastal Commission could require applicants to submit proof that they have applied for a state water bottom lease, and make the coastal development permit conditional on the issuance of that lease.

One potential aid to streamlining the review process would be an executive order directing state agencies to better coordinate their reviews of seaweed cultivation projects. An example that could be emulated is Executive Order S-14-08, signed by Governor Schwarzenegger on November 17, 2008, which directed the Department of Fish and Game and the California Energy Commission to “immediately create a ‘one-stop’ process for permitting renewable energy generation power plants” with “a concurrent application review process.”¹²⁰ This was done with climate goals in mind, and the same rationale could be used for updating the seaweed aquaculture permitting process. Such an executive order could direct limited agency resources towards development of a streamlined process.

California could also consider the enactment of new legislation to consolidate leasing/permitting authority for seaweed cultivation projects in a single state entity. Currently, project developers must deal with the California Department of Fish and Wildlife and Fish and Game Commission, California Coastal Commission, ACE, U.S. Coast Guard, and possibly also federal EPA, the State Water Resource Control Board, and the California Department of Public Health. Having just one state agency responsible for issuing all necessary state permits, and another federal agency responsible for all federal permits, would likely streamline/simplify the process. This would be especially helpful for carbon sequestration projects, and the state could consider limiting legislative changes to those types of projects.

4.2. Develop Public Interest Criteria that Balance Climate Goals and Environmental Stewardship

As explained above, under the California Fish and Game Code, the Fish and Game Commission can only issue a state water bottom lease for aquaculture if it determines that leasing is in the public interest.¹²¹ The Fish and Game Code does not identify any specific criteria on which the Commission should base its public interest determination. The Commission has not issued any regulations or guidance documents specifying the approach it will take. The lack of defined criteria could complicate the review of future seaweed cultivation projects and create

119 Cal. Code Regs. tit. 14, § 13053.5.

120 Office of the Governor of California, Executive Order S-14-08, <https://perma.cc/7S5K-MQT8>.

121 Cal. Fish & Game Code § 15400(a).

uncertainty for project developers, particularly those pursuing seaweed-based projects as the Commission has not issued a new water bottom lease in over 25 years and there is thus little precedent to inform developers. To clarify the review process, the Commission should specify the criteria it will apply to determine whether a lease is in the public interest.

State courts have never ruled on the scope of the public interest standard in the California Fish and Game Code. However, in other contexts, the courts have held that the public interest standard must be interpreted in light of the purposes of the statute in which it is found.¹²² The purpose of the California Fish and Game Code is to encourage responsible aquaculture development, while protecting the environment and minimizing conflicts with other ocean uses. This is reflected in section 14500(b) of the California Fish and Game Code, which provides for the issuance of leases for finfish aquaculture, but states that such leases “shall not unreasonably interfere with fishing or other uses or public trust values, unreasonably disrupt wildlife and marine habitats, or unreasonably harm the ability of the marine environment to support ecologically significant flora and fauna” and “shall not have significant adverse cumulative impacts.”¹²³ The section also imposes other requirements for the stated purpose of “reduc[ing] adverse effects on global ocean ecosystems.”¹²⁴

Consistent with the dual goals of leasing, in developing criteria for determining whether leasing is in the public interest, the Fish and Game Commission should consider potential environmental benefits of a project alongside potential environmental harms. The Commission’s review should include an assessment of whether and how a project will impact climate change, including whether it will sequester carbon dioxide and thus have climate change mitigation benefits. This in turn could require standardized carbon accounting criteria for assessment and quantification across projects.

Criteria developed for assessing the public interest under the Canadian Impact Assessment Act could serve as a guide for the California Fish and Game Commission. Under the Canadian Act, decisions on whether a project is in the public interest must be based on five factors, namely:

1. the extent to which the project contributes to sustainability,
2. the extent to which the adverse effects are significant,
3. the implementation of mitigation measures that could be appropriate to alleviate the adverse effects,

¹²² See e.g., *New York Central Securities Corp. v. U.S.*, 287 U.S. 12 (1932) (holding that the “public interest” standard must be construed in light of the statute in which it is found, including “the requirements [the statute] imposes, and the context of the provision in question”); *NAACP v. Fed. Power Comm’n*, 520 F. 2d 432, 441 (D.C. Cir. 1975) (holding that a statutory grant of authority to act “in the public interest” does not give an agency “a broad license to promote the general public welfare” but rather requires the agency to advance the goals of the statute).

¹²³ Cal. Fish & Game Code § 15400(b)(2). While the Fish and Game Code only imposes these standards on leases for finfish aquaculture, in an Information Bulletin issued in 2010 and updated in 2016, the Fish and Game Commission indicated that it would also impose the standards on leases for other (non-fish) aquaculture projects. See The Natural Resources Agency of California, Department of Fish and Wildlife, *Marine Region – Information Leaflet Regulations Governing Lasing of State Water Bottoms for Aquaculture* (2016), <https://perma.cc/UG55-KALL>.

¹²⁴ *Id.* §15400(b)(3).

4. the impact on Indigenous groups, and
5. the extent to which the effects of the project hinder or contribute to Canada's obligations to meet environmental obligations and its commitment in respect of climate change.¹²⁵

The Fish and Game Commission could adapt these criteria to the California context and statutory framework.

4.3. Prioritize State Water Bottom Leases for Seaweed Farms in Designated Areas and Prepare Program Environmental Impact Reports

The California Fish and Game Commission could prioritize state water bottom leases for seaweed farms in certain areas where it has conducted pre-application analysis. For example, the Commission could identify areas that are suitable for seaweed cultivation, based on habitat factors and low potential for conflict with other uses, and establish an expedited leasing process for projects in those areas. When an individual project application is submitted, the Commission would hold a public hearing and ensure that the project does not interfere with other public uses or harm wildlife. The advantage of this approach, though, is that it would allow the Commission to do some analysis before specific projects are proposed, and it would direct applications towards areas with fewer potential conflicts with other uses.

In developing this approach, the Commission could draw from the example set by the federal Bureau of Land Management (BLM) in its prioritization of solar energy on federal land in six southwestern states. As part of its Solar Energy Program, BLM identified locations that are suitable for utility-scale solar projects, called Solar Energy Zones.¹²⁶ BLM incentivizes development by giving applications within the zones higher priority over applications outside of the zones, and issues leases in abbreviated timeframes.

To aid streamlined permitting in pre-approved areas, the Department of Fish and Wildlife could prepare Program Environmental Impact Reports (Program EIRs) for the areas. Under CEQA regulations, Program EIRs may be prepared for “a series of actions that can be characterized as one large project” and are related geographically or through having similar environmental effects.¹²⁷ In 2006, the California legislature amended the Fish and Game Code to require the Department of Fish and Wildlife to prepare Program EIRs for potential commercial aquaculture operations in coastal areas if two conditions are met: (1) funds are appropriated to the department for this purpose; and (2) matching funds are provided by the aquaculture industry.¹²⁸ The Department of Fish and Game first undertook an effort to prepare a Program EIR for aquaculture in California in 2003. According to the state's Ocean Protection Council, the Department of Fish and Game lacked the necessary funds to complete the Program EIR and it was still under development at the time of writing.¹²⁹ If funds are made

¹²⁵ Impact Assessment Act, S.C. 2019, s.63, <https://perma.cc/N865-PG7V>.

¹²⁶ Bureau of Land Management, *Solar Energy Program*, <https://perma.cc/RRP9-CC9E>.

¹²⁷ Cal. Code Regs. tit. 14, § 15168.

¹²⁸ Cal. Fish & Game Code § 15008.

¹²⁹ Ocean Protection Council, *California Aquaculture Programmatic EIR*, <https://perma.cc/U9D6-VEKC>.

available, the department could prepare a Program EIR on its own initiative, consistent with the CEQA regulations. Once in place, Program EIRs could expedite environmental review of seaweed farms located in designated areas.

4.4. Create a New Categorical Exemption from CEQA

The California Natural Resources Agency could issue a regulation creating a categorical exemption from CEQA for certain types of seaweed farming. California allows any public agency to request a new or amended class of categorical exemptions.¹³⁰ The request must be made in writing to the Governor’s Office of Planning and Research and include detailed supporting information.¹³¹ Revisions are made by amendment to the CEQA regulations, which are issued by the California Natural Resources Agency.¹³²

As suggested above, California’s environmental review process under CEQA creates a significant time and cost barriers to applicants. CEQA has a number of categorical exemptions created through regulations. If a project meets the exemption definition, the project does not need to prepare any documents under CEQA, avoiding significant fees and delays. Even if a categorical exemption were established for seaweed projects, environmental safeguards would be maintained as projects with significant potential environmental harms would not be able to take advantage of the exemption, and would still have to undergo environmental review. CEQA includes a carve out where individual circumstances make exemptions inapplicable, such as where a project “will have a significant effect on the environment due to unusual circumstances.”¹³³

A CEQA categorical exemption for seaweed cultivation projects should be crafted so as to incentivize beneficial seaweed cultivation projects without undermining important goals for environmental review. For example, the exemption could be limited to small, experimental projects that are likely to have a limited impact on the environment. The exemption could be further limited projects intending to sink the seaweed grown for carbon dioxide sequestration purposes.

4.5. Create Experimental Permits

California could enact legislation to create classes of state water bottom leases that require less stringent review than standard leases. These would build on the example set in Maine where the state has created three classes of leases, with tiered size and time allowances, and in turn, tiered stringency of review. Like Maine, California could create a class of experimental leases and could expedite review procedures throughout the permitting process for those leases. This could include statutory changes that speed review of the lease itself and for coastal development permits required for the lease. The legislation could provide that experimental leases are only available to farmers with small seaweed farms, and who are working/partnering with academic scientists (and others) to address a set of high

130 Cal. Code Regs. tit. 14, § 15300.3.

131 *Id.*

132 *Id.* § 15300.

133 *Id.* § 15300.2.

priority, clearly defined climate-related questions. This legislation could further specify that experimental leases remain in effect for shorter durations than standard leases. The species able to be cultivated under experimental leases and the proposed methods of cultivation could also be limited to those known to be least environmentally harmful. This would give the state assurances that the review of farms with significant potential environmental effects will not be unduly truncated. It would also enable farmers to take advantage of an expedited, less-expensive permitting process, thus giving them more opportunities to experiment with the location of farms to ensure that the best areas are being utilized. Further, these projects could be required to report back on their progress and outcomes, and be required to revisit/update the project at regular intervals based on new learning.

California does already provide leases for experimental kelp projects run by universities, but these are not available for commercial projects. For instance, the State Lands Commission issued a three-year lease to the Regents of the University of California to build a small farm to investigate the breeding potential of giant kelp for use as biofuel.¹³⁴ The kelp studied was collected using a Scientific Collecting Permit offered by the Department of Fish and Wildlife, and the project was exempt from CEQA requirements because it was for the purpose of information collection.¹³⁵ The legislative change we are proposing would provide an analogous lease to small, experimental commercial farmers, especially those aiming to sequester carbon dioxide through their projects.

Without new legislation, the California Coastal Commission could look to expand the practice of issuing de minimis waivers for experimental seaweed farms, with appropriate limits to ensure projects with large potential environmental effects do not qualify. This could expedite one aspect of the permitting process for such farms, and would provide an advantage to those farms looking to develop methods for a later development on a larger farm under a coastal development permit.

134 California State Lands Commission, *Staff Report C91: General Lease – Other* (2018), <https://perma.cc/AZJ8-KUQW>.

135 *Id.*

APPENDIX A: PERMITS REQUIRED FOR OFFSHORE SEAWEED CULTIVATION IN CALIFORNIA

Stage	Permit	Agency	Notes
Stage 1	Water bottom lease	California Fish and Game Commission	Application for the water bottom lease triggers enviro review under CEQA
	Lands conflict certification	California State Lands Commission	
Stage 2	Coastal development permit	California Coastal Commission	These and below approvals come after water bottom lease approval and CEQA review (except species consultation)
	Aquaculture registration permit	California Department of Fish and Wildlife	
	Importation permit	California Department of Fish and Wildlife	Only required if seaweed grown is imported from out of state/ may on be available for inland operations
	Food process registration	California Department of Public Health	Only required if seaweed is grown for food
	Navigable waters authorization	U.S. Army Corps of Engineers	If environmental harms are significant, NEPA review is required
	Dredge and fill permit	U.S. Army Corps of Engineers	Only required if dredge and fill materials are discharged
	Water quality certification	California State Water Resource Control Board/Regional Water Quality Control Board	Only required if dredge and fill permit is requested
	Aids to navigation authorization	U.S. Coast Guard	Navigation markers required around the farm perimeter
	Species and habitat consultation	National Marine Fisheries Service	Part of CEQA/EIR review process
	Ocean dumping permit	U.S. Environmental Protection Agency	Only required if fertilizer is used or seaweed is sunk for carbon sequestration
	Zoning permit or business license	Local government	Only required if operations occur in local jurisdictions

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