



Comprehensive Review of Connecticut Aquaculture Laws

November 2021

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THE
UNIVERSITY
OF RHODE ISLAND

This review is a product of the Marine Affairs Institute at Roger Williams University School of Law and the Rhode Island Sea Grant Legal Program. It was conducted as part of the National Oceanic and Atmospheric Administration (NOAA) funded project, “Advancing Southern New England Shellfish Aquaculture Through an Engaged Public and Next Generation Decision Support Tools,” funding opportunity NA18OAR4170081. All research and writing was completed by Catherine Schluter, Research Attorney. All errors and omissions are the responsibility of the Marine Affairs Institute. This review is provided only for informational and educational purposes and is not legal advice.

This review was completed in partnership with Connecticut Sea Grant (publication CTSG-22-06), the University of Connecticut, and the Connecticut Department of Agriculture.



1 Executive Summary

Aquaculture is an important part of Connecticut’s seafood industry, as well as national and global seafood production. Shellfish aquaculture dominates Connecticut’s aquaculture production, but seaweed aquaculture is an emerging industry, as well. Connecticut’s aquaculture industry has deep roots in history, and the evolution of its aquaculture industry over hundreds of years has impacts on the legal systems regulating aquaculture development today. This review will assess Connecticut’s aquaculture laws, which have grown from colonial shellfishing to a multimillion-dollar industry. It will also compare various aspects of Connecticut’s aquaculture laws to those of its competitor states in the Northeast and Mid-Atlantic, including Rhode Island, Massachusetts, Maine, New Jersey, Virginia, and Maryland. This review will address eleven major questions and suggest policy changes to strengthen the regulatory systems, as described below:

What types of space allocations do states and municipalities offer for aquaculture activities?

States and municipalities in this review primarily allocate space for aquaculture through variations of leases or licenses, although the states or municipalities may have issued other types of space allocations prior to the leases and licenses issued today (e.g. some perpetual franchises issued by Connecticut still exist today). The various space allocations issued have different approved aquaculture products (shellfish or seaweed); different amounts of acreage; different durations; different renewability options; or different purposes (commercial, experimental, small-scale commercial). In Connecticut, the state Department of Agriculture, Department of Aquaculture (DA/BA), which oversees aquaculture development, offers shellfish aquaculture leases in state waters and seaweed aquaculture licenses in state and town waters. At the municipal level, local shellfish commissions offer either leases or licenses.

Suggested policy considerations related to space allocations include:

Decrease the minimum lease size in state waters: In Connecticut, shellfish leases in state waters must be between fifty and 200 acres, which is relatively large compared to the average sizes of leases in Rhode Island and licenses in Maine. Decreasing the minimum size of aquaculture leases in state waters could allow for the creation of more, smaller leases which can be granted to more prospective aquaculture producers.

Create experimental lease or limited-purpose aquaculture licenses: Connecticut does not have a small-scale or experimental space allocation. Creating an experimental lease or a limited-purpose aquaculture license, as is common in Maine for small-scale aquaculture or for experimenting with new techniques or species, could promote innovation in Connecticut aquaculture, as well as offer a space allocation appropriate for start-ups and recreational aquaculture producers.

What space allocation mechanisms do states use to allocate their waters and submerged lands for aquaculture?

States and municipalities use a variety of methods to allocate shellfishing grounds among interested aquaculture producers. They use either a competitive bidding process, a lottery, a preference system, or a first-come, first-served system. For example, DA/BA uses a competitive bidding process to allocate shellfishing grounds in state waters, which is unique among these states and municipalities. Some municipalities in Massachusetts use a first-come, first-served system, while Maine uses a preference system to rank interested aquaculture producers. Each space allocation method has strengths and weaknesses.

Suggested policy considerations include:

Adopting a new method to allocate shellfishing grounds in state waters: A handful of businesses dominate shellfishing grounds allocated by DA/BA. A new method of allocating shellfishing grounds could give smaller businesses and new entrants without the ability to outbid the largest businesses an opportunity to obtain a lease for shellfishing grounds.

Establishing fixed space allocation fees: If Connecticut switched to a new leasing method, it would need to set fixed fees for its leases. Rhode Island and Maine lease shellfishing grounds for close to \$100/acre to \$150/acre, but municipalities in Massachusetts and in mid-Atlantic states allocate some grounds for much lower. Connecticut would need to consider what a fair lease fee is for its shellfishing grounds.

What limits exist around consolidation of shellfishing grounds?

Connecticut, like most states in this review, does not limit the number of acres a single aquaculture producer can hold. The absence of consolidation limits has been a factor in the growth of a few large companies which dominate the state aquaculture industry. Although there are benefits of consolidating large tracts of shellfishing grounds for aquaculture, it can limit opportunity for competition, including newer entrants to the industry or smaller businesses. In contrast, in many Massachusetts municipalities where interest in shellfishing grounds is very high, aquaculture operations are limited to ten acres or fewer.

Suggested policy considerations include:

Adopt consolidation limits: Consolidation limits could help Connecticut allocate new shellfishing grounds that become available to new or smaller businesses. There is high interest in aquaculture, so consolidation limits could prevent large business from continued consolidation of shellfishing grounds, but it would come at the cost of limiting the continued growth of the larger businesses.

How do states ensure productive use of public submerged lands and waters allocated for aquaculture?

Most state and municipalities require aquaculture producers to use shellfishing grounds productively. Some shellfishing authorities have qualitative standards, such as requiring “substantial use” or “productive use” of the space allocations. Some states have additional quantitative requirements, such as requiring evidence of specified levels of plantings, investment, or sales. Most states have exceptions for good cause failures to meet productivity levels, and some recognize exceptions for valid reasons an aquaculture producer may not use a space allocation productively, such as fallowing the area or using it for transplanting, relaying, or depurating the product.

Suggested policy considerations include:

Define “good faith” aquaculture with specific quantitative measures: Connecticut could adopt a numeric-based measure that would provide clearer expectations for use of its aquaculture space allocations. With quantitative measures, Connecticut could more easily determine how productively its shellfishing grounds are used and potentially increase the productivity of its shellfishing grounds. Although enforcement would likely be necessary to create a real impact, if adopted, it would lead to greater productivity of shellfishing grounds.

What statutory provisions exist to protect the aesthetic values and rights of landowners abutting proposed aquaculture sites?

Most states and municipalities regulate aspects of the aesthetics of aquaculture operations, especially aquaculture gear, because it is a common concern among the general public. Most agencies review aesthetics of aquaculture at various points in the space allocation or gear permitting process. Some states or municipalities have specific restrictions that limit the size of aquaculture gear or the amount of aquaculture gear that can be used in the open water surface area. The public is generally notified at some point in the space allocation and permitting process, which alerts them to potential impacts on their use or enjoyment of the waters. Whether through the space allocation or gear permitting process, the public often has an opportunity to submit comments on an application, at which point they can raise any concerns over aesthetics. In state waters, Connecticut does not give notice to nearby landowners of applications for leases. In the town waters which DA/BA allocates space, this may be problematic.

Suggested policy considerations include:

Give notice to nearby landowners of lease applications: Connecticut differs from most states because it does not require nearby landowners to be notified when an aquaculture lease application is under consideration. Some, but not all, municipalities have adopted such a requirement. Notifying landowners within a specified distance of the proposed lease could increase public engagement, which could impede aquaculture development if the public opposes the application. However, if an applicant intends to use aquaculture gear, the Connecticut Department of Energy and Environmental Protection must notify landowners within 500 feet, which may make a leasing notification repetitive.

Adopt statutory gear restrictions: Connecticut stringently reviews aesthetics on a case-by-case basis. Statutory restrictions could potentially preempt some aesthetic concerns with aquaculture. However, current aesthetic reviews are stringent and may be sufficient to address aesthetic concerns that arise.

Do state or municipal laws or policies regulate the location or type of aquaculture gear that can be used?

Most state issue permits for aquaculture gear on a case-by-case basis. Some municipalities prohibit types of gear that does not meet statutory specifications, which can preemptively prevent the introduction of more controversial gear or gear that a municipality or state has deemed unsuitable for its shellfishing grounds. States and municipalities also regulate gear by restricting the locations where aquaculture with gear is suitable and the seasonal use of gear.

Suggested policy considerations include:

Identify areas suitable for aquaculture with gear consistent with the Long Island Sound Blue Plan: The Blue Plan has the capacity to identify locations where aquaculture operations with gear will result in fewer use and resource conflicts. Consultation with state and federal agencies can help identify areas where aquaculture with gear would be best. Identifying these areas will make it easier for aquaculture producers who want to use gear find areas where their aquaculture operation would result in fewer conflicts.

How do Connecticut’s regulations governing the size of wild-caught shellfish and aquaculture-reared shellfish compare to competitor states?

Most states adopt minimum sizes for some of their commercially harvested shellfish, often with a tolerance rate that allows for the incidental possession of undersized shellfish. Connecticut has adopted a three-inch minimum for commercially harvested oysters, both wild and aquaculture-reared. Some states have different minimum sizes for aquaculture-reared oysters and wild oysters. Most states have adopted statutory or regulatory minimum sizes for hard shell clams. Connecticut has adopted minimum sizes for hard shell clams through policy. Like most states, Connecticut does not have minimum sizes for aquaculture-reared soft-shell clams. Unlike many northeastern states, Connecticut has not adopted tolerance levels for any of its shellfish.

Suggested policy considerations include:

Adopt smaller commercial minimum oyster size for aquaculture-reared oysters: Connecticut's current three-inch minimum for commercially harvested oysters, both aquaculture-reared and wild, impedes the competition of Connecticut oysters in the lucrative petite oyster market. There are benefits to requiring oysters to reach three inches but reducing the size minimum could increase the profits and interest in oyster aquaculture.

Adopt tolerance rate for undersized shellfish: Most states have tolerance rates to account for mistakes made while efficiently harvesting and sorting shellfish. Connecticut has not established tolerance rates for its shellfish. Although tolerance rates would only be successful with enforcement, which requires additional funding, they could provide protection for harvesters.

Adopt statutory minimum size for commercially harvested hard shell clams: Connecticut has adopted a minimum size for commercially harvested hard shell clams through policy. If Connecticut wanted to make this minimum binding law, it could amend a statute or adopt a regulation to establish it.

Which regulatory authorities have established seaweed aquaculture space allocation provisions?

Seaweed aquaculture is an emerging industry in the Northeast. Most of the states have integrated seaweed aquaculture into their existing shellfish aquaculture regulatory regime. Connecticut has gone further, creating a license for seaweed aquaculture at a set price of \$25/acre for a term of five years. DA/BA issues seaweed licenses in both state and town waters. Seaweed license fees are waived if they take place in existing shellfish aquaculture space allocations.

Suggested policy considerations include:

Maintain a responsive and flexible legal framework: Seaweed aquaculture in the Northeast is still in its infancy, and as the industry develops, its needs may change. By creating a seaweed aquaculture license, Connecticut has shown it is responsive to the needs of the industry, and it should maintain that openness and flexibility.

Consider fee structure for seaweed license on shellfishing grounds leased for under \$25/acre: Some shellfish space allocations in Connecticut are leased for as low as \$4/acre. Leaseholders who pay less than \$25/acre for shellfish aquaculture and then add seaweed aquaculture would pay less than the fair price of a seaweed aquaculture license. Charging those who hold shellfishing grounds for under \$25/acre the \$25/acre seaweed license fee would give the state a fair value for use of its waters.

Adopt a residency requirement for seaweed aquaculture licenses: Connecticut has a residency requirement for shellfish aquaculture leases, but not for seaweed aquaculture licenses. If it adopted a residency requirement for seaweed aquaculture, it would give its residents the same protections as in the shellfish aquaculture regulatory system.

How have Connecticut municipalities utilized their authority to regulate commercial aquaculture space allocations in town waters?

Coastal Connecticut municipalities, excluding West Haven, New Haven, Milford, and Westport, have authority to regulate commercial aquaculture space allocations in their town waters. Most of

these municipalities have shellfish management plans, and three have created publicly available aquaculture leasing regulations. Some municipalities have recently updated their shellfish management plans, but many are from the mid-2000s.

Suggested policy considerations include:

Amend the law to clarify the contents of a shellfish management plan and how often municipalities should update the plans: If Connecticut wanted its municipalities to maintain updated shellfish management plans with consistent information, it could amend the law to require specified information and updates. Connecticut Sea Grant and DA/BA developed a template for shellfish management plans in 2016, but only a few municipalities have since used it to update their plans. Require shellfish management plans to be published online: State law directs each coastal municipality to prepare a shellfish management plan, but not every municipality publishes their plan online. Without accessibility, shellfishermen, aquaculture producers, and the general public cannot utilize the valuable information in the shellfish management plans. Requiring the plans be available online is a relatively easy step that would increase access to local shellfishing and aquaculture information.

Do Connecticut's commercial aquaculture laws and authority as written accurately reflect the practices now?

There are several areas in which Connecticut could clarify or update its law. These include defining terms of art, such as the differences between “leases,” “franchises,” and “licenses,” as well as defining designated natural beds as compared to undesignated natural beds. There are also obsolete provisions that can be removed. For example, although four municipalities have ceded shellfishing authority to the state, there are still some statutes regarding their historic authority. The law could also clarify the differences between recreational and commercial shellfishing regulations.

How can Connecticut better identify the locations of jurisdictions, shellfish beds, and other geographically significant places?

Connecticut has created GIS maps incorporating geographic boundaries relevant to shellfishing and aquaculture, including space allocations, natural beds, and more. Some of this geographic data is described in statutes or on file with DA/BA or local shellfish commissions, but the GIS maps in the *Aquaculture Mapping Atlas* are useful and workable visual representations of the data.

Suggested policy considerations include:

Adopt the shellfish mapping tool through law or guidance documents: Adopting the *Aquaculture Mapping Atlas* could provide an official visual depiction of important geographic locations for the public to work with.

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3 Introduction

Aquaculture is an increasingly significant sector of the global and national seafood industry.¹ In 2020, Connecticut marine aquaculture sales revenue was valued at almost \$25 million.² The majority of that revenue is derived from shellfish production, though there is also a fledgling seaweed industry. Connecticut has a centuries old shellfish industry, and the state enacted many of its shellfishing laws prior to the expansion of off-bottom aquaculture. For this reason, there may be inconsistencies, gaps, or outdated statutes in its aquaculture framework. Connecticut competes with other states on the East Coast to provide shellfish for steady consumer demand, and, like Connecticut, many of those states are now also seeing an expansion of seaweed production. The regulatory models adopted by different states have varying impacts on the productivity and competitiveness of the states' aquaculture sectors. To maintain its strong aquaculture sector, Connecticut laws should support the continued growth and development of the aquaculture industry while balancing other uses and interests in Connecticut waters. This review will compare different aspects of Connecticut aquaculture with the aquaculture regulatory regimes in Massachusetts, Rhode Island, Maine, New Jersey, Virginia, and Maryland.

This review primarily intends to examine Connecticut's existing legal infrastructure supporting shellfish and seaweed aquaculture, but it will also examine commercial and recreational shellfishing laws when necessary for a comprehensive consideration of Connecticut aquaculture laws. It will compare Connecticut's commercial aquaculture scheme with commercial aquaculture models in other states on the Atlantic coast, including Massachusetts, Rhode Island, Maine, New Jersey, Virginia, and Maryland. This review will primarily analyze the areas in which the state of Connecticut and its municipalities have authority to administer and develop its aquaculture industry, and so it will focus on state and local laws. In accord with the focus on state and local law, areas of federal authority and areas addressed in federal-state cooperative agreements that bind all states will not be analyzed, including sanitation requirements in the National Shellfish Sanitation Program Model Ordinance, Hazard Analysis and Critical Control Point plans and training requirements, and in-depth analysis of permits and authorizations required by the U.S. Army Corps of Engineers (USACE).

This review will first describe Connecticut's existing aquaculture regulatory model before considering specific elements of the aquaculture system in depth. Section 4 examines the historical context of Connecticut aquaculture to the present day. Section 5 explores the types of space allocations (e.g., leases and licenses) offered by the different states for aquaculture ventures. Section 6 will consider the various methods states use to allocate space to aquaculture producers. Section 7 examines whether the states have adopted limitations on the consolidation of shellfishing grounds among a few parties. Section 8 compares the productivity requirements states impose on aquaculture producers. Section 9 explores statutory requirements for shellfishing authorities to consider aesthetic

¹ Nat'l Oceanic & Atmospheric Admin., *Aquaculture*, <https://perma.cc/R7S9-W3WS>.

² Conn. Dep't of Agric., *Shellfish Industry Profile and Economic Impact*, <https://perma.cc/VK8U-3X7C>.

values when allocating aquaculture sites. Section 10 looks at state regulation of the gear that can be used in aquaculture operations. Section 11 compares the states' minimum sizes for harvestable shellfish. Section 12 looks at how states have incorporated the relatively new seaweed industry into their aquaculture allocation regimes. Section 13 considers how Connecticut municipalities in particular have used their municipal authority to regulate aquaculture in their town waters. Section 14 examines areas of discrepancies between aquaculture laws and the practice of allocating space for aquaculture in Connecticut. Section 15 considers how Connecticut uses and can expand use of GIS mapping to clarify legal descriptions of the geography of important places, such as jurisdictions and public oyster beds.

4 Connecticut's Current and Historical Aquaculture Industry

Shellfishing has a long history in Connecticut, reaching back to the pre-colonial era.³ Government regulation of the shellfisheries began when the Connecticut legislature passed laws to protect oysters from overfishing in 1762.⁴ Shellfishing regulations evolved over time to respond to new aquaculture methods, the privatization of shellfishing grounds, and intense competition among local shellfishermen. Connecticut's aquaculture regime is informed by this long history.

The colonial shellfishing industry began with the harvest of wild oysters and gradually developed aquaculture techniques. Early colonial shellfishermen used flat-bottomed sailboats and hand tools like rakes, tongs, and dredges to harvest wild oysters.⁵ Overfishing led to a scarcity of wild stock, so Connecticut oystermen developed basic bottom culture techniques to increase production.⁶ By the mid-1800s, bottom culture methods had proven successful, and the state legislature passed a law permitting towns to grant perpetual franchises of up to two acres of shellfishing grounds to individuals.⁷ However, the law was easily circumvented,⁸ and individuals were able to amass large tracts of shellfishing grounds, leading to the rise of Connecticut's commercial shellfishing industry.⁹

Connecticut introduced new shellfish regulations when shellfishing operations began using steam powered ships and tools, which allowed oyster cultivation to expand deeper and further from

³ See David J. Naumec, *Native American Oystering*, Connecticut Explored, Summer 2017, available at: <https://perma.cc/AF7H-LX3T>.

⁴ See Zachary C.M. Arnold, Note, *Against the Tide: Connecticut Oystering, Hybrid Property, and the Survival of the Commons*, 124 Yale L.J. 1206, 1223 (2015).

⁵ *Id.* at 1221.

⁶ *Id.* at 1222.

⁷ Kevin E. McCarthy, Conn. Office of Legislative Research, *Aquaculture in Connecticut* (Oct. 4, 2001), <https://perma.cc/HNQ4-336T>. See An Act Regulating and Protecting the Planting of Oysters, 1855 CONN. PUB. ACTS 112. This was preceded by a law allowing oystermen to stake out submerged land themselves, without government approval, which led to confusion and necessitated an authority to allocate and record claims. *Id.* at 1226. See An Act in Addition to an Act Entitled "An Act for the Growing of Oysters," 1845 CONN. PUB. ACTS 41-42.

⁸ Oystermen could transact around the law by buying franchises of other people or having a family amass multiple franchises. Arnold, *supra* note 4, at 1226, 1230.

⁹ Rindy Higgins, Team Enforcement: Key to healthy shellfish, *The Hour* (Aug. 22, 2011).

shore.¹⁰ With more powerful equipment, oyster growers could cultivate and harvest more acreage.¹¹ In the 1880s, the legislature repealed the two-acre limit to promote the growth of the aquaculture industry and created a shellfish jurisdiction line.¹² Towns could grant perpetual franchises of any size north of the line (in “town waters”), and the state could grant perpetual franchises of any size south of the line (in “state waters”).¹³ The recipients of these grants of perpetual franchises, which are still recognized today, are considered “owners” of the shellfishing grounds; however, in accordance with the public trust doctrine, ownership is limited to the exclusive right to plant, cultivate, and harvest shellfish on those grounds.¹⁴ In 1915, the franchise system was replaced with the current leasing system in which shellfishing grounds are leased for fixed periods of time.¹⁵

The leasing authority for shellfish aquaculture in Connecticut today is still bifurcated between the state and the municipalities according to the shellfish jurisdiction line.¹⁶ Now, the state Department of Agriculture (DoAg), Bureau of Aquaculture (DA/BA) has authority to lease grounds in state waters, and most municipalities have leasing authority in their town waters.¹⁷ Municipal leasing authority is usually exercised by the municipal board of selectmen or a local shellfish commission.¹⁸ Unlike shellfish aquaculture, DA/BA has sole authority over seaweed aquaculture licensing in all waters.¹⁹

Connecticut shellfish aquaculture operation gear permitting is now jointly administered by agencies at the state, local, and federal level. In both state waters and town waters, state and federal agencies have authority to permit aquaculture activities, including the planting the organisms, the use of cultivation gear or facilities, and harvest and sale. DA/BA is the primary state administrator, along with the state Department of Energy and Environmental Protection (DEEP),²⁰ and the U.S. Army Corps of Engineers (USACE) authorizes aquaculture operations as needed under the federal Rivers and Harbors Act and Clean Water Act § 404.²¹ Connecticut aquaculture producers predominantly use either traditional bottom culture operations or new aquaculture methods that use gear or facilities. Bottom culture aquaculture operations are principally authorized by DA/BA.²² Aquaculture operations that use gear or facilities are subject to a comprehensive review by DA/BA,

¹⁰ Arnold, *supra* note 4, at 1228-1229.

¹¹ *Id.* at 1226, 1229.

¹² *Id.* at 1232, 1233. *See* Concerning Raising of Oysters, 1879 CONN. SPEC. ACTS 128 (establishing the Commission). An Act Establishing a State Commission for the Designation of Oyster Grounds § 1, 1881 CONN. PUB. ACTS 100 (establishing the shellfish jurisdiction line).

¹³ *Id.*

¹⁴ *Shoreline Shellfish, LLC v. Town of Branford*, 336 Conn. 403, 415 (Conn. 2020); *Lovejoy v. City of Norwalk*, 152 A. 210, 216 (Conn. 1930).

¹⁵ *See* CONN. GEN. STAT. § 26-239. An Act concerning the Leasing of Shell-Fish Grounds, 1915 Conn. Pub. Acts 2112.

¹⁶ *See* CONN. GEN. STAT. § 26-192. West Haven, New Haven, Milford, and Westport ceded authority back to the state. *See id.* § 26-257.

¹⁷ CONN. GEN. STAT. §§ 26-194(a), 26-257a.

¹⁸ *Id.* § 26-257a.

¹⁹ CONN. GEN. STAT. § 22-11j.

²⁰ *Id.* §§ 22-11d, 22-11h(a).

²¹ 33 U.S.C. §§ 401-426p; 33 C.F.R. § 320.2.

²² *See id.* §§ 22a-361(d)(1), 26-192c(a).

DEEP, and USACE through a joint agency application, which allows for concurrent state and federal reviews.²³ If the proposed operation is in town waters, the agencies will consult with the municipality to discover existing conflicting uses of the site and other potential effects on the public or the environment.²⁴ Depending on the size, scope, and location of the proposed project, other federal or state agencies may be involved.²⁵

Connecticut aquaculture laws have changed to protect private rights, to encourage commercial success, and to modernize with the evolving industry. The Connecticut shellfish industry now competes with other states' aquaculture industries, which are subject to aquaculture laws that may promote different aquaculture values than Connecticut's laws. The following sections explore how different aspects of Connecticut's current laws may benefit or hinder aquaculture and identifies options Connecticut could take to improve its laws or align itself with other states' laws.

5 What types of space allocations do states and municipalities offer for aquaculture activities?

There are a variety of ways in which states and municipalities can convey rights to individuals wanting to perform aquaculture on public submerged lands and waters. The states in this review primarily use either leases or licenses.²⁶ Most states only use leases. Massachusetts is the only state that only issues licenses. Some states offer different types of space allocations for commercial aquaculture, which vary in size, duration, location, or approved activity, as shown in Table 1:

²³ See generally U.S. Army Corps of Eng'rs, *Joint Agency Application to Conduct Marine Aquaculture in Connecticut*, <https://perma.cc/GD7G-BH9P>.

²⁴ See T.L. Getchis et al., *A Guide to Marine Aquaculture Permitting in Connecticut* 19 (2009), <https://perma.cc/FQA8-FGGY> [hereinafter Conn. Aquaculture Permitting Guide]. In some municipalities, such as Stonington, the shellfish commission may not approve vote to deny the application, even if the applicant has obtained authorization from other required agencies. Stonington Shellfish Comm'n, *Shellfish Management Plan 9* (2005).

²⁵ See, e.g., 16 U.S.C. § 1536 (requiring federal consultation with the National Oceanic and Atmospheric Administration when federal actions affect endangered species); CONN. GEN. STAT. § 10-409 (giving the state Historic Preservation Council the responsibility to ensure that historic properties are taken into consideration at all levels or planning and development).

²⁶ Leases give the exclusive right to possess and use the land for any purpose not prohibited in the lease agreement, and licenses give the right to use for a particular purpose without conveying an interest in the land. See *Jones v. Donnelly*, 108 N.E. 1063, 1064 (Mass. 1915) (quoting *Lowell v. Strahan*, 12 N.E. 401, 406 (Mass. 1887)); *Benham v. Morton & Furbish*, 929 A.2d 471, 474-475 (Me. 2007); *Murphy, Inc. v. Remodeling, Etc., Inc.*, 772 A.2d 154, 158-159 (Conn. App. Ct. 2001) (citing *Clean Corp. v. Foston*, 634 A.2d 1200, 1202-1203 (Conn. App. Ct. 1993)); *R.I. Marine Transp. Co. v. Interstate Nav. Co.*, 161 A. 108, 109 (R.I. 1932); *Thiokol Chemical Corp. v. Morris County Bd. of Taxation*, 197 A.2d 176, 182 (N.J. 1964); *Uthus v. Valley Mill Camp, Inc.*, 246 A.3d 378, 390 (Md. 2021); *Power v. Tazewells*, 66 Va. 786, 788 (Va. 1875).

Table 1 Aquaculture space allocations offered at the state level

	Commercial Space Allocation Type	Size Limits on Individual Space Allocations	Duration
Connecticut (waters under state jurisdiction)²⁷	Lease (shellfish)	50 acres (minimum)-200 acres (maximum)	3-10 years, renewable
	License (seaweed)	Not specified	Up to 5 years, renewable
	Branford Initiative Area License (shellfish)	5 acres	Annually renewable for up to five years
Massachusetts²⁸	Licenses [see Table 2]	None at state level; municipalities may impose limits [see Table 2]	Up to 10 years for initial term
Rhode Island²⁹	Standard lease	3 acres in upper Narragansett Bay, no limit specified for other areas	Up to 15 years, renewable for 10-year terms
	Experimental permit	1,000 sq. ft.	Up to 3 years, non-renewable
	Commercial viability permit	1,000 sq. ft.	Up to 3 years, non-renewable
Maine³⁰	Standard lease	100 acres	20 years, renewable
	Experimental lease	4 acres	3 years, renewable if for scientific purposes
	Limited-purpose aquaculture license	400 sq. ft.	1 year, annually renewable
New Jersey³¹	Standard lease	3 acres	Annually renewable with payment of lease fee
	Intertidal ADZ	1.5 acres, opportunity to expand to 3 acres	5 year pilot program, then annually with payment of lease fee
	Offshore ADZ	10 acres, opportunity to expand to 20 acres	5 year pilot program, then annually with payment of lease fee
Virginia³²	Standard lease	250 acres	10 years, renewable for 10-year terms
Maryland³³	Submerged land lease	None	20 years, renewable for two 10-year terms
	Water column lease	None	20 years

²⁷ CONN. GEN. STAT. § 22-11j; Conn. Dep’t of Agric., Leasing Shellfish Grounds, <https://perma.cc/XMA4-4FYX>; Jan Ellen Spiegel, How to Seed the Clam Fleet, N.Y. Times, Jan. 29, 2006; Conn. Aquaculture Permitting Guide, *supra* note 24, at 12.

²⁸ MASS. GEN. LAWS ch. 130, §§ 57, 64.

²⁹ R.I. GEN. LAWS §§ 20-10-3, 20-10-6(b); 650 R.I. CODE R. §§ 20-00-1.1.12(E)(1), 20-00-1.3(K)(5)(a)(11, 13-14); Coastal Res. Mgmt. Council, Guide to Aquaculture Applications 6, <https://perma.cc/LBJ3-62GB>.

³⁰ ME. STAT. tit. 12, §§ 6072, 6072-A, 6072-C; 13-188 ME. CODE R. § 2.43.

³¹ N.J. Div. of Fish & Wildlife, Shellfish Aquaculture Leasing Policy of the Atlantic Coast Section of the New Jersey Shellfisheries Council 6, 9, 10, (Mar. 18, 2019), <https://perma.cc/Z8M6-SKFD> [hereinafter N.J. Atlantic Shellfish Aquaculture Leasing]; N.J. ADMIN. CODE §§ 7:25-24.5(e), 7:25-24.6; 7:25-24.8; N.J. Dep’t of Env’t. Prot., Aquaculture Development Zone Lease Application, <https://perma.cc/PC64-QY82>.

³² VA. CODE ANN. §§ 28.2-609, 28.2-612, 28.2-613.

³³ MD. CODE ANN., NAT. RES. §§ 4-11A-07, 4-11A-08(d), 4-11A-09; Md. Dep’t of Nat. Res., Joint Application for State Commercial Shellfish Aquaculture Lease and Corps of Engineers Federal Permit (2017), <https://perma.cc/MAU4-E8BK>.

5.1 State Space Allocations

5.1.1 Standard Leases

A standard lease is a common way to allocate space for aquaculture operations. Connecticut offers leases for shellfish aquaculture in state waters, which has counterparts in standard leases in Rhode Island, Maine, New Jersey, and Virginia. Maryland offers standard leases, too, although it divides them into submerged land leases and water column leases. Standard leases are intended for long-term commercial aquaculture operations. They generally last for multiple years, are renewable, and offer enough acreage to sustain a commercial operation.

5.1.2 Experimental Aquaculture Authorizations

Maine and Rhode Island offer a variety of short-term authorizations for aquaculture producers to test aquaculture gear and techniques or to determine if an area is suitable for aquaculture.

Rhode Island offers experimental permits for testing new gear or techniques and a commercial viability permit for determining if a site is suitable for commercial aquaculture.³⁴ Unlike leases or licenses, shellfishing authorities typically issue permits for aquaculture activity, such as planting or harvesting. In Rhode Island, however, CRMC may issue experiment permits without the need for a lease, at the discretion of CRMC.³⁵ Commercial viability permits and experimental permits have similar application requirements as an application for a lease.³⁶ For commercial viability permits, however, the process is less time-consuming because it consists of a letter of authorization from CRMC for the first eighteen months and then a CRMC assent for extension of the permit for an additional eighteen months.³⁷ Aquaculture producers cannot sell aquaculture products produced under an experimental permit, but under a commercial viability permit they can sell aquaculture products one time during the permit term.³⁸ Through these permits, aquaculture producers can experiment with different techniques, gear, or locations without committing to a full-length lease.

Maine's experimental leases also act as test sites for commercial aquaculture, new gear, or aquaculture techniques.³⁹ Experimental leases do not require a public scoping session, and a public hearing is only required if five or more people request it.⁴⁰ A thirty-day public comment period is still required.⁴¹ Experimental leases are limited in time and non-renewable because their purpose can be achieved within a few years, at which point an aquaculture producer must switch to a standard lease.

³⁴ 650 R.I. CODE R. § 20-00-1.3(K)(5)(a)(13-14).

³⁵ 250 R.I. CODE R. § 40-00-1.7(A)(5).

³⁶ Coastal Res. Mgmt. Council, Guide to Aquaculture Applications 6, <https://perma.cc/LBJ3-62GB>.

³⁷ *Id.*

³⁸ 650 R.I. CODE R. § 20-00-1.3(K)(5)(a)(13-14).

³⁹ Antonina Pelletier, Aquaculture Leases – Understanding the Process, Me. Lobstermen's Cmty. All. (July 5, 2019), <https://perma.cc/PYP8-EXT7>.

⁴⁰ ME. STAT. tit. 12, § 6072-A(6).

⁴¹ *Id.*

Under Maine and Rhode Island law, experimental authorizations generally allow aquaculture producers to get approval for experimental activities in shorter amounts of time and through briefer processes. Experimental aquaculture authorizations may be good options for new entrants to the aquaculture industry to experiment before committing to a larger standard lease or license. They also encourage innovation among experienced aquaculture producers who want to try new gear or techniques or expand to a new area.

5.1.3 Small-Scale Aquaculture

Maine is unique in offering a limited-purpose aquaculture license (“LPA license”).⁴² LPA licenses are issued for very small areas for recreational, experimental, or small-scale commercial aquaculture.⁴³ LPA licensees may only apply to grow sea urchins, seaweed, or shellfish in the license area.⁴⁴ LPA licenses are used by hobby farmers, by small businesses, or to supplement income from aquaculture leases or commercial fishing activities.⁴⁵ Because LPA licenses are smaller, they do not require a public hearing, although riparian landowners must be notified and may submit comments.⁴⁶

LPA licenses promote the use of small-scale commercial aquaculture, and they can also be used to test a new location, similar to an experimental lease. Small-scale aquaculture may not be as profitable as the aquaculture performed under leases, but it has proven popular in Maine, with over 230 individuals holding at least one LPA license.⁴⁷ LPA licenses could also be a way to make use of smaller areas that are suitable for aquaculture.

Connecticut has created a small-scale license to utilize the bottom in the Branford Initiative Area. This is a more affordable, non-competitive option focusing on entry for new and small-scale producers. To utilize cultivation gear on these sites, applicants must still apply for state and federal authorizations.

5.1.4 Pre-Permitted Leases

In addition to its standard leases, New Jersey has aquaculture development zones (“ADZs”). In ADZs, the state obtained the federal and state permits for aquaculture activities prior to leasing, which streamlines the permitting process for leaseholders.⁴⁸ New Jersey is the only state in this review that created pre-permitted parcels to promote aquaculture development.⁴⁹

⁴² See MAINE STAT. tit. 12, § 6072-C.

⁴³ Antonina Pelletier, Aquaculture Leases – Understanding the Process, Me. Lobstermen’s Cmty. All. (July 5, 2019), <https://perma.cc/PYP8-EXT7>.

⁴⁴ *Id.*

⁴⁵ *Id.*

⁴⁶ See *id.*

⁴⁷ Me. Dep’t of Marine Res., Table of Active Limited Purpose Aquaculture (LPA) Licenses, <https://perma.cc/D8NF-QDUT>.

⁴⁸ N.J. Atlantic Shellfish Aquaculture Leasing, *supra* note 31, at 8-9, 11; N.J. Dep’t of Env’tl. Prot., Aquaculture Development Zone Lease Application, <https://perma.cc/PC64-QY82>.

⁴⁹ N.J. Dep’t of Env’tl. Prot., Aquaculture Development Zone Lease Application, <https://perma.cc/PC64-QY82>.

Permitting can be a lengthy part of starting an aquaculture operation, and the development of areas like New Jersey’s ADZs can greatly reduce the time required for that part of the process.⁵⁰ If a state needs to stimulate the growth of its aquaculture industry, programs like ADZs could be a way to simplify permitting and encourage people to enter the industry. However, compared to typical permitting in other states, undertaking the creation of pre-permitted leases shifts the burden from the applicant to the state agencies. A state would need time and resources to create a system for pre-permitted leases.

5.2 Municipal Space Allocations

Most states charge a state authority with space allocations for aquaculture, but in Massachusetts and Connecticut, municipalities have some authority to issue space allocations. In Massachusetts, the municipalities issue licenses for all aquaculture operations, which are certified by the Massachusetts Division of Marine Fisheries (DMF).⁵¹ Many Connecticut municipalities have allocation authority only in town waters, from the shore to the shellfish jurisdiction line.⁵²

Three Connecticut shellfish commissions – East Lyme, Groton, and Stonington – have published aquaculture regulations, which are reviewed here with a sample of Massachusetts municipalities’ licensing regulations in Table 2:⁵³

Table 2 Leases and licenses offered at the municipal level

	Space Allocation Type	Size Limits on Individual Space Allocations	Duration
East Lyme (CT) ⁵⁴	Standard lease	None	5 years, renewable
Groton (CT) ⁵⁵	Standard lease	20 acres	10 years, renewable for 10-year terms

⁵⁰ See, e.g., Matt Parker et al., Ne. Reg’l Aquaculture Ctr., Barriers to Entry in the Northeast US Aquaculture Industry, <https://perma.cc/WN3P-KCVF>.

⁵¹ MASS. GEN. LAWS ch. 130, § 57.

⁵² CONN. GEN. STAT. § 26-257.

⁵³ This table applies to current space allocation schemes. In some municipalities, there may be people who hold different shellfishing rights that predate current regulations.

⁵⁴ East Lyme Shellfish Comm’n, Shellfish Management Plan 24, 26-28 (2005).

⁵⁵ Groton Shellfish Comm’n, Shellfish Management Plan 61, 70 (2020).

Stonington (CT) ⁵⁶	Standard license	20 acres	10 years, renewable for up to 10 years
Wellfleet (MA) ⁵⁷	Standard license	7 acres	2 years, then renewable for 5 years, then renewable for 10-year term
Duxbury (MA) ⁵⁸	Standard license	3 acres	3 years, renewable for up to 3-year terms
Barnstable (MA) ⁵⁹	Standard license	2 acres	5 years, renewable up to 10 years
Nantucket (MA) ⁶⁰	Standard license	1-4 acres for first three years, can expand up to 6 more acres	2 years, renewable for up to 10-year terms
Falmouth (MA) ⁶¹	Standard license	Inshore: 3 acres, can expand to 5 acres Offshore: ⁶² 10 acres	5 years, renewable for 15 years
Truro (MA) ⁶³	Aquaculture development area license	1 acre, based on applicant's experience and needs	2 growing seasons, renewable for 5-year periods

The municipalities primarily offer standard leases and licenses.

Two Massachusetts municipalities, including Truro, offer aquaculture development areas (“ADAs”), which are similar to New Jersey’s ADZs. ADAs are areas suitable for aquaculture for which the municipality has obtained block permits.⁶⁴ This allows for a streamlined permitting process for aquaculture producers.⁶⁵

The various space allocations offered by municipalities have similar advantages and disadvantages to their state-level counterparts. A primary difference is the sizing of municipal leases and licenses. Most of Connecticut’s municipalities offer allocations less than half the size of aquaculture in state waters. Many Massachusetts municipalities are constrained to less than ten acres. The smallest acreage limitations may affect the profitability of a site,⁶⁶ but they may also reduce use conflicts and require less capital, which may appeal to new aquaculture producers.⁶⁷ However, size may not be a

⁵⁶ Stonington Shellfish Comm’n, Shellfish Management Plan 4, 13 (2005).

⁵⁷ Wellfleet, Mass., Shellfishing Regs. §§ 7.3, 7.8.2, 7.8.5.

⁵⁸ Duxbury, Mass. Shellfish Aquaculture Grant Regs. §§ 5, 9, App’x A.

⁵⁹ Barnstable, Mass. Code §§ 407-48, 407-56.

⁶⁰ Nantucket, Mass. Shellfishing Policy & Regs. §§ 5.3, 5.9, 5.11.

⁶¹ Falmouth, Mass. Code §§ 275-25, 275-27, 275-29.

⁶² Offshore sites are “located in the coastal zone outside of the ponds, rivers, and bays out to three miles offshore. . .” Falmouth, Mass. Code § 275-29(B).

⁶³ Truro, Mass. Regs. for Aquaculture Licenses §§ 6, 10; Truro, Mass., Aquaculture Development Area (Sept. 11, 20212), <https://perma.cc/7UYU-9T7M>.

⁶⁴ Owen C. Nichols, et al., Site Selection for Sustainable Shellfish Aquaculture Development Areas: A Practical Mapping Approach, 6 J. of Ocean Tech. 59, 62 (2011).

⁶⁵ *Id.* at 63.

⁶⁶ *See, e.g.*, Coastal Enterprises, Inc., Opportunities for Aquaculture on the Massachusetts South Coast: A Sector Analysis 6 (April 1, 2018), <https://perma.cc/49JQ-R7SN>. One estimate suggests an average of six acres is required for a commercial-scale aquaculture operation on the South Coast of Cape Cod. *Id.* at 31.

⁶⁷ *Id.* at 31.

dissuasive factor in Connecticut, as local shellfish commissions currently allocate approximately 12,000 acres for commercial aquaculture production.⁶⁸

5.3 Size Limits on Space Allocations

Most standard leases offer enough acreage to sustain a commercial operation, although the sustainability of sizes may depend in part on whether bottom culture or more intensive aquaculture with gear is used. Although many states either do not limit the size of commercial space allocations or have relatively high limits, in practice most space allocations are much smaller than the allotted limit. In Maine, for example, where leases may be up to 100 acres, about 80% of standard shellfish leases are under fifteen acres, and no leases are more than ninety acres.⁶⁹ In Rhode Island the average operator leases 4.19 acres,⁷⁰ and in Massachusetts, many municipalities limit licenses to less than ten acres. In Maryland, the average lease is approximately sixteen acres.⁷¹ Virginia averages roughly 225 acres per active operator,⁷² but unlike the northeastern states, Virginia is not constrained by spatial availability.⁷³

Compared to other New England states, Connecticut's leases in state waters, which are a minimum of fifty acres, are large. The minimum size in Connecticut is larger than the average sizes of leases space allocations in Maine, Massachusetts, and Rhode Island leases.

Larger space allocations may reflect Connecticut's history and present as a primarily bottom culture aquaculture industry, which requires more area than aquaculture with gear.⁷⁴ Currently, there are fifty-one aquaculture businesses in Connecticut. Seven of them hold over 1,000 acres of shellfishing grounds, and of those, two hold about half of the total shellfishing grounds in the state. Although most of the operations are under 1,000 acres, a few businesses control the majority of shellfishing grounds in the state. Larger leases grant each leaseholder enough shellfishing grounds to sustain a profitable business, but may limit the diversity of aquaculture producers because the available shellfishing grounds are divided into larger blocks that can be granted to fewer aquaculture producers. In the limited cases in which town waters are managed by DA/BA, the fifty-acre minimum may increase social conflict because any proposed aquaculture operation will be for a relatively large area, potentially visible from shore or near locations where people recreate.

⁶⁸ Conn. Dep't of Agric., Connecticut Shell Fishing Industry Profile, <https://perma.cc/Y26U-8A35>.

⁶⁹ See Me. Dep't of Marine Res., Table of Standard and Experimental Aquaculture Leases, <https://perma.cc/TP4L-N68B>.

⁷⁰ See David Beutel, Coastal Res. Mgmt. Council, Aquaculture in Rhode Island 2019 3, <https://perma.cc/7N5S-MC8V>.

⁷¹ See Jennifer Beckensteiner et al., Barriers to Eastern Oyster Aquaculture Expansion in Virginia, 7 *Frontiers in Marine Sci.* 1, 14 (2020).

⁷² See *id.* at 14, 16 (Of the approximately 130,000 acres leased for aquaculture, two-thirds were unused. There were 191 active operators.)

⁷³ See *id.*

⁷⁴ Roger Mann et al., Va. Inst. of Marine Sci., Expanding Virginia's oyster industry while minimizing user conflict 8, (Dec. 16, 2019), <https://perma.cc/STP4-NJFX>.

Smaller space allocations on the scale of Rhode Island’s average four-acre farms or Massachusetts licenses under ten acres may not be ideal for profitable bottom culture operations. In Connecticut, where businesses in state waters must currently lease at least fifty acres, an aquaculture producer attempting to lease a similar number of acres through smaller leases would potentially go through multiple rounds of leasing and permitting, which could be time-consuming and expensive for the applicant and DA/BA. However, if DA/BA leased smaller areas, it could lease to more applicants.

5.4 Policy Options

5.4.1 Decrease the minimum lease size in state waters

Many states that Connecticut competes with offer smaller space allocations to their aquaculture producers. If Connecticut wanted to increase the number of aquaculture producers or offer smaller leases, it could eliminate the fifty-acre minimum lease size in state waters. With smaller leases, space can be allocated to more applicants. Throughout New England, most aquaculture leases tend to be much smaller than fifty acres. Even at the municipal level in Connecticut, some leases are limited to ten or twenty acres, which potentially allows for the operation of smaller aquaculture businesses. Because shellfishing grounds in Connecticut state waters are not always available, eliminating the size minimum could create the potential for more leases, which can be granted to a higher number of qualified applicants. However, the larger leases can operate at economies of scale and may allow for more profitable businesses.

5.4.2 Create experimental lease or LPA license options

Several states have short-term authorizations for aquaculture producers to cultivate shellfish to determine whether the location, species, gear, or technique is suitable for their commercial interests. This could promote experimentation and innovation with gear or new techniques on a smaller scale and with a quicker approval process. Because Connecticut aquaculture is primarily traditional bottom culture operations, there may not be much interest in an experimental lease in state waters. State waters also do not always have site availability, and the state may want to put available leases in the hands of commercial aquaculture producers who can support industry growth and production. Additionally, the time-saving benefits may not apply to experimental leases for aquaculture with gear, which would likely still be required to undergo a thorough and lengthy review.

LPA licenses, or a similar authorization, could be suitable for many aquaculture producers in Connecticut, such as recreational aquaculture producers, start-ups, or small businesses. With their small size, they may trigger fewer use conflicts and make use of limited shellfishing grounds acreage. With modern aquaculture techniques, smaller aquaculture plots can be more productive. LPA licenses are a tool to grant more people the opportunity to start aquaculture farms, even with limited shellfishing grounds.

6 What space allocation mechanisms do states use to allocate their waters and submerged lands for aquaculture?

States and municipalities in this review allocate shellfishing grounds for aquaculture space allocations through competitive bidding, a lottery, a preference system, or a first-come, first-served system. Each method has different advantage and disadvantages. For example, DA/BA uses a competitive bidding method to allocate shellfishing grounds in state waters and town waters it manages.⁷⁵ It does not use this method for the Branford Initiative Area. Competitive bidding maximizes the rent fees annually paid to the state, but it can also allow the strongest businesses to repeatedly outbid new entrants to the industry or smaller commercial operations.⁷⁶ The space allocation method adopted by different states and municipalities may reflect different values, different aquaculture histories, or differing availabilities of shellfishing grounds.

Tables 3 and 4 indicate the space allocation method used by the states and municipalities in this review.

⁷⁵ CONN. GEN. STAT. § 26-194.

⁷⁶ See Project Launched to Spur New Generation of Aquaculture Around Thimble Islands, Connecticut Weekly Agricultural Report (Sept. 20, 2016), <https://perma.cc/TQ8R-7DVW>.

Table 3 Aquaculture space allocation method by state

	Space Allocation Method	# of Operators/Operations	Annual Space Allocation Fees
Connecticut (state waters) ⁷⁷	Competitive bidding	51 operations	Minimum: \$4/acre, can reach hundreds of dollars per acre
Massachusetts ⁷⁸	[see Table 4]	395 growers ⁷⁹	\$5-\$25/acre (set by municipality)
Rhode Island ⁸⁰	First-come, first-served	81 farms	≤ ½ acre: \$75 ½-1 acre: \$150 Additional acres: \$100/acre
Maine ⁸¹	First-come, first-served, preference system applies	97 leaseholders	Leases: \$100/acre LPA licenses: \$50 for residents, \$300 for non-residents
New Jersey ⁸²	First-come, first-served; ADZs originally leased by lottery	60 farms	Standard lease: \$2/acre Intertidal ADZ: \$100/acre Offshore ADZ: \$25/acre
Virginia ⁸³	First-come, first-served	191 farms with sales	\$1.50/acre
Maryland ⁸⁴	First-come, first-served	429 leases	Submerged land lease: \$3.50/acre Water column lease: \$25/acre

Making direct comparisons between the states is difficult because each state tracks data differently. Massachusetts, for example tracks the number of unique growers, while New Jersey tracks the number of farms, and Maryland tracks the number of leases. In Connecticut, there are fifty-one operations, but many of the operations make use of multiple leases or other space allocations. The

⁷⁷ *Id.*; Conn. Dep’t of Agric., Connecticut’s Shellfish Industry (Dec. 5, 2018), <https://perma.cc/V87Q-6Q4B>.

⁷⁸ Mass. Dep’t of Fish & Game, 2019 Annual Report 46, <https://perma.cc/E3RP-D8AQ>; MASS. GEN. LAWS ch. 130, § 60.

⁷⁹ This number may overvalue the number of growers in Massachusetts because growers with licenses in different municipalities are counted in each municipality.

⁸⁰ 650 R.I. CODE R. § 20-00-1.1.12(E)(1); David Beutel, Coastal Res. Mgmt. Council, Aquaculture in Rhode Island 2019 3, <https://perma.cc/7N5S-MC8V>; Coastal Res. Mgmt. Council, Guide to Aquaculture Applications 7, <https://perma.cc/LBJ3-62GB>.

⁸¹ ME. STAT. tit. 12, §§ 6072(8), 6072-C(4-A); Me. Dep’t of Marine Res., Table of Standard and Experimental Aquaculture Leases, <https://perma.cc/TP4L-N68B>. The number of leaseholders was calculated by number of unique names.

⁸² Andrew S. Lewis, Oyster buyback program revitalizes growers, rebuilds reefs, NJ Spotlight News, Dec. 24, 2020, <https://perma.cc/7P5X-57ZQ>; N.J. Atlantic Shellfish Aquaculture Leasing, *supra* note 31, at 9; N.J. STAT. ANN. § 50:1-25.

⁸³ VA. CODE ANN. § 28.2-603; Press Release, Va. Dep’t of Agric. & Consumer Servs., Virginia Ranks 4th in the U.S. for Aquaculture Sales (Dec. 20, 2019), <https://perma.cc/9F9B-HKXZ>.

⁸⁴ Jonathan van Senten et al., Analysis of the Economic Benefits of the Maryland Shellfish Aquaculture Industry 9 (Dec. 31, 2019), <https://perma.cc/P2J4-HC7A>; MD. CODE ANN., NAT. RES. §§ 4-11A-06, 4-11A-07, 4-11A-09.

inconsistency between the data makes it difficult to draw precise conclusions about the impact of space allocation methods. However, comparing the different space allocation methods and identifying their potential consequences for the aquaculture industry in each state is still a useful exercise. Each method promotes some values, whether economies of scale, income for the state or municipality, or business diversity, among others.

Table 4 Aquaculture space allocation by municipality

	Space Allocation Method	Annual Space Allocation Fees	Notes on Current Status
East Lyme (CT) ⁸⁵	First-come, first-served	Determined by commission	None
Groton (CT) ⁸⁶	First-come, first-served	Determined by commission	None
Stonington (CT) ⁸⁷	First-come, first-served	Determined by commission	None
Wellfleet (MA) ⁸⁸	Lottery	\$25/acre	None
Duxbury (MA) ⁸⁹	First-come, first-served	\$25/acre	Moratorium in place; waitlist for applicants who may apply in chronological order once moratorium is lifted
Barnstable (MA) ⁹⁰	First-come, first-served	\$25/acre	Shellfishing grounds full, waitlist for applicants who may apply in chronological order when there is availability
Nantucket (MA) ⁹¹	First-come, first-served	\$25/acre	None
Falmouth (MA) ⁹²	First-come, first-served	\$25/acre	None

6.1 Competitive Bidding

DA/BA is the only shellfishing authority in this review that uses a competitive bidding system to allocate shellfish leases. When DA/BA determines there is site availability in state waters or the town waters which it manages (but not the Branford Initiative Area), it holds a competitive lease sale. Applicants submit private sealed bids for the shellfishing grounds, which will be awarded to the highest responsible bidder.⁹³ The minimum annual lease fee is statutorily set at \$4/acre.⁹⁴ Currently,

⁸⁵ East Lyme Shellfish Comm'n, Shellfish Management Plan 23 (2005).

⁸⁶ Groton Shellfish Comm'n, Shellfish Management Plan 61 (2020).

⁸⁷ Stonington Shellfish Comm'n, Shellfish Management Plan 4 (2005).

⁸⁸ Wellfleet, Mass., Shellfishing Regs. §§ 7.2, 7.8.

⁸⁹ Duxbury, Mass. Shellfish Aquaculture Grant Regs. §§ 4,8; Duxbury Board of Selectmen, *Duxbury Aquaculture Management Plan* 11 (2009), <https://perma.cc/3694-MPPD>.

⁹⁰ Barnstable, Mass. Code §§ 407-47, 407-48, 407-50; Michael Low, Cape Cod Aquaculture Profile and Opportunity 2016 3 <https://perma.cc/8N2Z-3RYL> (as of 2016, there were 110 people on the waiting list for an aquaculture site); Marine Affairs Inst., Roger Williams Univ. Sch. Of L., Shellfish Aquaculture Licensing, Navigation, and Wetlands Requirements in Massachusetts Coastal Municipalities 5 (June 2018), <https://perma.cc/YKM6-599C>.

⁹¹ Nantucket, Mass. Shellfishing Policy & Regs. §§ 1, 5.6.

⁹² Falmouth, Mass. Code § 275-24.

⁹³ CONN. GEN. STAT. § 26-194(a).

⁹⁴ *Id.*

the state allocates greater than 48,000 acres of shellfishing grounds in state waters and town waters over which the state has jurisdiction (New Haven, West Haven, Milford, and Westport).⁹⁵ New lease opportunities in state waters are dependent on an applicant requesting a specific area,⁹⁶ and competition when grounds become available can push bids up to hundreds of dollars.⁹⁷

A competitive bidding system ensures the state obtains the highest value for its shellfishing grounds at the time of bidding, which is beneficial for state revenues. Connecticut can now allocate its state shellfishing grounds for hundreds of dollars per acre, but if there is minimal competition, DA/BA may be required to rent the acres for much lower prices. More than thirty thousand acres are currently allocated for \$4/acre.⁹⁸ A lessee that has fulfilled their obligations has “preference in the reletting of such ground for a like term to that granted in the original lease, excluding the rental fee, which shall not be less than” \$4/acre.⁹⁹ Therefore, a lessee who leases shellfishing grounds for a low lease fee can continue to lease shellfishing grounds for low lease fees in subsequent renewals of the lease. Leases can now go for hundreds of dollars during competitive bidding, but some lessees may hold shellfishing grounds worth hundreds of dollars for much less because the state allocated it to them when competition was less intense.

Where shellfishing grounds are limited, the competitive bidding system can inhibit the ability of new businesses to enter the industry or the ability of smaller operations to expand because the larger businesses can outbid them.¹⁰⁰ The ability to outbid smaller business can result in a few businesses dominating shellfishing grounds.¹⁰¹ However, with multiple large space allocations, businesses can operate at economies of scale and potentially maximize the production of shellfish. The competitive bidding system results in the highest revenues for the state when competition is high, but it has consequences for the distribution of acreage among aquaculture businesses.

6.2 Lottery

Lotteries are not a common space allocation method among the states and municipalities in this review. When New Jersey ADZs were introduced, the New Jersey Department of Environmental Protection held a lottery to allocate the parcels to interested aquaculture producers.¹⁰² If there were fewer applications than available parcels, the ranking from the lottery was to determine the priority

⁹⁵ Conn. Dep’t of Agric., Shellfish Grounds Leasing Opportunities, <https://perma.cc/3EP6-V7LB>.

⁹⁶ Matt Parker et al., Ne. Reg’l Aquaculture Ctr., Barriers to Entry in the Northeast US Aquaculture Industry 6, <https://perma.cc/WN3P-KCVF>.

⁹⁷ Jan Ellen Spiegel, How to Seed the Clam Fleet, N.Y. Times, Jan. 29, 2006.

⁹⁸ Gregory B. Hladky, Legislature Now A Battleground For Big Shellfish Companies And State Regulators, Hartford Courant, April 17, 2015.

⁹⁹ CONN. GEN. STAT. § 26-194(a).

¹⁰⁰ See Conn. Dep’t of Agric., Connecticut’s Shellfish Industry (Dec. 5, 2018), <https://perma.cc/V87Q-6Q4B>.

¹⁰¹ Gregory B. Hladky, Legislature Now A Battleground For Big Shellfish Companies And State Regulators, Hartford Courants (April 17, 2015) (ten companies hold 90% of shellfishing grounds).

¹⁰² N.J. Dep’t of Env’tl. Prot., Aquaculture Development Zone Lease Application 5, <https://perma.cc/PC64-QY82>.

of the applicants to choose their parcel.¹⁰³ (Remaining ADZ parcels are currently allocated through a first-come, first-served system.¹⁰⁴)

At the municipal level, Wellfleet, Massachusetts is the only municipality considered here that uses a lottery method. In Wellfleet, the shellfish constable identifies appropriate sites for shellfish aquaculture and posts their availability.¹⁰⁵ If more than one qualified applicant who does not currently have a license applies for the site, a lottery is held to impartially choose the licensee.¹⁰⁶

The lottery method gives every qualified applicant an equal opportunity to use shellfishing grounds, regardless of whether they can offer the highest fee or submit the first application. Lotteries may be suitable where there are limited shellfishing grounds for many interested and qualified applicants and the shellfishing authority has an interest in allocating shellfishing grounds to a variety of applicants. However, lotteries are based on luck and the shellfishing authority may be missing out on an opportunity to maximize the space allocation value or promote other aspects of its aquaculture industry.

6.3 First-Come, First-Served

The first-come, first-served method is the most common among these states and municipalities. Under the first-come, first-served method, shellfishing authorities review applications in the order in which they were received. The states that use this method have a high number of unique leaseholders or aquaculture operations, all of which exceed Connecticut's fifty-one aquaculture operations. Higher numbers of leaseholders and aquaculture operations indicate more industry diversity.

Most municipalities also use the first-come, first-served method, although several Massachusetts municipalities have imposed moratoriums on licensing due to limited space.¹⁰⁷

The first-come, first-served method may be suitable when an industry is early in its development, before most of the grounds have been allocated, or where the availability of shellfishing grounds is not a limitation on the aquaculture industry. When most of a state or municipality's shellfishing grounds have been allocated, the first-come, first-served method may be ill-suited to accommodate new entrants to the industry because space shellfishing grounds are unavailable or highly competitive. When shellfishing grounds become available, the first-come, first-served method may technically work because a shellfish authority can accept the first application, but the method may encourage a rush to apply among the interested applicants. At some point, whoever is technically first to apply may be arbitrary.

¹⁰³ *Id.* at 11

¹⁰⁴ *Id.* at 11.

¹⁰⁵ Wellfleet, Mass., Shellfishing Regs. § 7.1.

¹⁰⁶ *Id.* § 7.2.

¹⁰⁷ *See, e.g.,* Duxbury Board of Selectmen, *Duxbury Aquaculture Management Plan 1* (2009), <https://perma.cc/3694-MPPD>; Quinn Kelly, Aquaculture fight looming, *Wicked Local*, May 19, 2020, <https://perma.cc/67YM-CF5J>.

6.4 Preference System

Maine primarily uses a form of the first-come, first-served method supplemented by a preference system, which is unique among the shellfishing authorities in this review. Under Maine's first-come, first-served system, the Department of Marine Resources (DMR) cannot review additional applications in the six months after the public scoping session of the original draft application or until a final application is submitted, whichever comes first.¹⁰⁸ If multiple applicants apply for a lease or have interest in the lease area before that time, the preference system applies to resolve the conflict.¹⁰⁹

The preferences for a lease are as follows, beginning with most preferred: a person who holds a standard lease for the area or a portion of the area already; a person who holds an LPA license for the area or a portion of the area already; DMR; a riparian owner of the intertidal zone within the leased area; a commercial fisherman who has traditionally fished on or near the proposed lease area; riparian owner within 100 feet of the waters to be leased.¹¹⁰ If the competing applications fall into the same category or no category, the applications will be considered in the order in which they were submitted.¹¹¹ Similarly, if a person applies to lease an area that is covered in a current limited-purpose aquaculture license, the licensee is given the first opportunity to apply for a lease in the area.¹¹² If the licensee does not lease the area, then the initial lease applicant may lease the area.¹¹³

Maine's preference system tackles the issue of wide interest in shellfishing grounds by attempting to allocate grounds to the people with the strongest interests in the area. It also has the potential to reduce social conflict, such as by including a riparian owner within 100 feet of the proposed site in the preference system, which could reduce some "not in my backyard" complaints. The preference system may cause uncertainty for some applicants because they may be unable to lease their preferred area, or it may prompt someone who previously had no intention of claiming the area to lease the preferred area, such as a commercial fisherman or a riparian landowner within 100 feet.

6.5 Waitlists

States and municipalities use waitlists as a tool to organize applicants when shellfishing grounds are full. New Jersey planned to use waitlists to organize applicants who did not win an ADZ parcel in the initial lottery.¹¹⁴ Several Massachusetts municipalities also use waitlists. In Duxbury and Barnstable, where shellfishing grounds are full or a moratorium is in place, the municipalities have waitlists of interested applicants who will be given the opportunity to license shellfishing grounds

¹⁰⁸ 13-188 ME. CODE R. § 2.08(4).

¹⁰⁹ ME. STAT. tit. 12, § 6072(8).

¹¹⁰ *Id.*

¹¹¹ 13-188 ME. CODE R. § 2.41(3).

¹¹² ME. STAT. tit. 12, § 6072-C(4-A).

¹¹³ *Id.*

¹¹⁴ *Id.*

that become available. Duxbury holds a lottery to add names to its waitlist when space on the waitlist becomes available.¹¹⁵ Massachusetts waitlists for aquaculture licenses can be years out.¹¹⁶

Waitlists are useful to organize interested applicants so the municipality can easily identify the next applicant when shellfishing grounds becomes available for aquaculture. Waitlists can also give applicants certainty as to their likelihood of obtaining a space allocation, as well as a general prediction of when they will be eligible. However, applicants on waitlists may have to wait years for a space allocation to become available. Waitlists are also limiting because an applicant cannot amass multiple space allocations to create a large business, as many businesses do in Connecticut. Waitlists may be best where small space allocations are common or where applicants can only hold one space allocation or a small number of acres.

6.6 Space Allocation Fees

Connecticut is the only state where space allocation fees vary by individual lease. There is a wide range of lease fees for state shellfishing grounds, from the statutory minimum of \$4/acre to hundreds of dollars per acre.¹¹⁷ Space allocation fees in town waters vary by municipality, but they are generally higher than the minimum fee in state waters. In Rhode Island and Maine, aquaculture leases are between \$75/acre and \$150/acres. Many Massachusetts municipalities licenses are \$25/acre. The Mid-Atlantic states tend to allocate aquaculture acres for prices closer to Connecticut's \$4/acre minimum.

For Connecticut, the competitive bidding process attempts to lease aquaculture acres for the highest value, and some acres are leased for up to hundreds of dollars. But thousands of acres are also leased at \$4/acre.¹¹⁸ The current competition for shellfishing grounds may make it unlikely that grounds will be leased below their fair value, but there will be some inconsistency in the lease fees based on the individual competitive bidding events. Other states are able to consistently obtain what their lawmakers have determined is a fair value for allocated shellfishing grounds. A fixed price also allows a wider variety of aquaculture producers to obtain space allocation because the applicant wins shellfishing grounds not by having the highest bid, but by some other criteria, such as being the first to apply for shellfishing grounds for aquaculture, or winning a lottery among qualified applicants, or being the preferred applicant for the area.

6.7 Policy Options

¹¹⁵ Duxbury, Mass. Shellfish Aquaculture Grant Regs. §§ 4, 8.

¹¹⁶ *See, e.g.*, Aquaculture Is Booming on the Cape, But Some Towns Are Running Out of Space, CAI News, April 24, 2018, <https://perma.cc/CMP3-CEWU> (some people have been on a waitlist for almost a decade in Dennis).

¹¹⁷ Jan Ellen Spiegel, How to Seed the Clam Fleet, N.Y. Times, Jan. 29, 2006.

¹¹⁸ Connecticut Shellfishers Demand New State Leasing Rules Be Revoked, Hartford Courant, Sept. 10, 2014.

The space allocation methods at both the state and municipal level serve different purposes, such as maximizing payments to the state, allocating grounds among many different parties, limiting social conflicts, or promoting the highest production of shellfish. Some of these values may be mutually exclusive, as in Connecticut where maximizing lease payments to the state through competitive bidding has resulted in the domination of shellfishing grounds by a few businesses. The best method for each state or municipality depends on the values a shellfishing authority wants to promote, the availability of shellfishing grounds, and the makeup of the aquaculture industry.

If Connecticut was to reconsider how to allocate state shellfishing grounds, it could look to other shellfishing authorities that are similarly tackling the high demand for shellfishing grounds and the low availability of grounds to determine a way to allocate grounds to more interested applicants.

6.7.1 Consider a new method to allocate shellfishing grounds

Connecticut's aquaculture industry has developed so that many shellfishing grounds have been allocated, primarily to a handful of businesses. If Connecticut wanted to balance the interest in aquaculture leases with the remaining available shellfishing grounds, it could consider switching its allocation method. A lottery would give all applicants an equal opportunity to win a lease in state waters. If Connecticut developed a preference system, it could define the various rankings of the different interests it wants to protect. For example, if Connecticut wanted to increase the diversity of its industry, there may be a preference level for applicants who do not currently hold shellfishing grounds. If Connecticut wanted to give existing businesses opportunities to expand, there could also be a preference for aquaculture producers with other space allocations within some distance. Developing a preference system could be contentious and time-consuming, but it could result in a system tailored to the needs of Connecticut's aquaculture industry. A shift from the competitive bidding system would be a drastic change and could disrupt the development of Connecticut aquaculture. It could also result in lower lease fees for the state, which is a primary benefit of competitive bidding. Whether Connecticut should adopt a new allocation method depends on the type of industry it wants to promote.

6.7.2 Establish fixed space allocation fees

If Connecticut switched to a new leasing method, it would need to set fixed fees. A benefit of competitive bidding is that the highest lease fees can be achieved for shellfishing grounds, and a shift from competitive bidding would deprive Connecticut of the highest possible fees. If Connecticut set fixed lease fees, it could determine the fair value of shellfishing grounds. The fair value may be \$100/acre or up to \$150/acre, as is common in Maine and Rhode Island. Connecticut could also consider whether to establish different fees for bottom culture and aquaculture with gear. Maryland, for example, imposes a higher fee for leases for more intensive aquaculture with gear than bottom culture leases. Rhode Island and Maine also in part set pricing based on the use of the aquaculture

site and the types of structures used.¹¹⁹ Setting fees like those in Rhode Island, Maine, or Maryland would allow Connecticut to consistently collect high lease payments for any future leases. Fixed fees, along with a different leasing method, could diversify the industry because shellfishing grounds would no longer be allocated to the highest bidder, but by some other criteria. Fixed fees would be a major shift for the Connecticut aquaculture industry, but if Connecticut wanted to promote diversity in business, fixed fees could be a tool to accomplish that while maintaining high leasing fees for state revenues.

7 What limits exist around consolidation of shellfishing grounds?

Connecticut law does not limit the number of acres of shellfishing grounds DA/BA can allocate to a single aquaculture producer, which has allowed a few large companies to dominate the state aquaculture industry.¹²⁰ Consolidation of shellfishing grounds can allow for economies of scale and higher profitability for a few aquaculture businesses, but it can also limit competition and opportunity because the large companies can continually add to their shellfishing grounds at the expense of new or prospective entrants. Some of the states and municipalities in this review impose limitations on the number of acres or space allocations an aquaculture producer can hold in order to allocate shellfishing grounds to more people.

The tables below describe the consolidation limits adopted by states and municipalities. Residency restrictions are included as a consolidation limit because they may indirectly pose a check on the consolidation of shellfishing grounds by limiting the expansion of businesses within a municipality or state. Because shellfishing authorities produce varied statistics, the fifth column records either how many aquaculture leaseholders and licensees, farms, or leases there are in the state. Although these measures are not directly comparable, they give an indication of how diversely shellfishing grounds are allocated.

¹¹⁹ See 650 R.I. CODE R. § 20-00-1.1.12(E)(1) (lease fees varying by size), Me. Stat. tit. 12, § 6072(9); ME. STAT. tit. 12, §§ 6072(8), 6072-C(4-A) (lease fees vary by potential intensity – LPA licenses are less expensive than leases), Governor’s Task Force on the Planning and Development of Marine Aquaculture in Maine (2004), <https://perma.cc/2D33-S7DG>.

¹²⁰ Gregory B. Hladky, State Opening New Shellfishing Grounds to Encourage Small Oyster, Clam Operators, Hartford Courant (Mar. 27, 2017).

Table 5 Consolidation of shellfishing grounds

State	State Restrictions on Consolidation	State Residency Requirement	Acres Leased	Division of Operators or Operations	Average Acreage/Operator
Connecticut * ¹²¹	None	State residents and residents of states that will allocate shellfishing grounds to Connecticut residents	≈60,000 (≈48,000 managed by DA/BA, ≈12,000 managed by municipalities)	51 aquaculture operations	1,176.5 Note: seven companies hold over 1,000 acres, and two of these companies hold ≈30,000 acres
Massachusetts ** ¹²²	None	None	1,240	395 growers ¹²³	3.14
Rhode Island ** ¹²⁴	None	None	339.08	81 farms	4.19
Maine *** ¹²⁵ (excluding finfish aquaculture)	Lease: maximum 500 acres/operator	None	1,035.78	97 leaseholders	10.68
	LPA licenses: maximum 400 sq. ft., licensees can hold up to 4	None, but non-residents pay higher license fees	Data unavailable (662 licenses)	232 commercial LPA licensees	-
New Jersey ¹²⁶	None	State residents or New Jersey corporations	Data unavailable	60 farms	-
Virginia * ¹²⁷	Maximum 5,000 acres/operator in Chesapeake Bay, 3,000 acres/operator acres outside Chesapeake Bay	Virginia residents or Virginia corporation if ≥60% of stock is owned by Virginia residents	> 130,000	191 active farms (up to 2/3 of leases are unused)	680.6
Maryland ** ¹²⁸	none	Submerged grounds leases only: Maryland corporation if ≥50% of stock is owned by residents	6,930	429 leases (unknown leaseholder number)	16.15

(* based on 2018 statistics, ** based on 2019 statistics, *** based on current statistics)

¹²¹ CONN. GEN. STAT. § 26-194; Conn. Dep’t of Agric., Connecticut’s Shellfish Industry (Dec. 5, 2018), <https://perma.cc/V87Q-6Q4B>; Conn. Dep’t of Agric., Leasing Shellfish Grounds, <https://perma.cc/Y26U-8A35>.

¹²² Mass. Dep’t of Fish & Game, 2019 Annual Report 46, <https://perma.cc/E3RP-D8AQ>.

¹²³ There may be some overlap between growers with licenses in different municipalities.

¹²⁴ David Beutel, Coastal Res. Mgmt. Council, Aquaculture in Rhode Island 2019 3, <https://perma.cc/7N5S-MC8V>.

¹²⁵ Me. Dep’t of Marine Res., Table of Active Limited Purpose Aquaculture (LPA) Licenses, <https://perma.cc/D8NF-QDUT>; Me. Dep’t of Marine Res., Table of Standard and Experimental Aquaculture Leases, <https://perma.cc/TP4L-N68B> (number of leaseholders and licensees calculated by number of unique names).

¹²⁶ N.J. STAT. ANN. § 50:1-25; Andrew S. Lewis, Oyster buyback program revitalizes growers, rebuilds reefs, NJ Spotlight News, Dec. 24, 2020, <https://perma.cc/7P5X-57ZQ>.

¹²⁷ VA. CODE ANN. §§ 28.2-604, 28.2-610, 28.2-611; Beckensteiner, *supra* note 71, at 1, 9; Press Release, Va. Dep’t of Agric. & Consumer Servs., Virginia Ranks 4th in the U.S. for Aquaculture Sales (Dec. 20, 2019), <https://perma.cc/9F9B-HKXZ>.

¹²⁸ MD. CODE ANN., NAT. RES. §§ 4-11A-06, 4-11A-07; van Senten, *supra* note 84, at 9.

Table 6 Consolidation restrictions in selected Massachusetts municipalities

Municipality	Municipal Restriction on Consolidation	# of Growers ¹²⁹	# of Acres Licensed ¹³⁰	Average Acreage/Licensee	Local Residency Restriction
Wellfleet ¹³¹	Licensee can hold up to 7 acres	93	261	3.13	Yes
Duxbury ¹³²	Licensee can hold 1 license, up to 3 acres	28	77.5	2.77	Yes
Nantucket ¹³³	Licensee can hold up to 10 acres	8	73	9.125	Yes
Barnstable ¹³⁴	Licensee can hold up to 2 acres on Northside of Cape Cod and 2 acres on Southside of Cape Cod in inner bays (unless license granted prior to current regulations)	49	158	3.22	Yes
Falmouth ¹³⁵	Inshore: 3 acres, can expand to 5 acres Offshore: 10 acres ¹³⁶	9	54	6	No

As the tables indicate, the states and municipalities vary in whether and to what degree they limit the consolidation of shellfishing grounds. At the municipal level, Massachusetts municipalities place the strictest consolidation limits on their shellfishing grounds, which range from three to ten acres among the sample municipalities. The small sizes may reflect the limited shellfishing grounds municipalities have to license, yet it has also resulted in a high rate of diversity among shellfish growers. After Maryland, which leases five times the amount of acreage as Massachusetts licenses, Massachusetts has the most shellfish growers among these states.

At the state level, Virginia and Maine both place relatively high limits on the shellfishing grounds an aquaculture producer can operate, yet the operations are, on average, well below the limit. Even in Virginia, when considering only active farms (up to two-thirds of Virginia's leases are unused¹³⁷), the average number of acres held is well below the acreage limit and half the size of Connecticut's average farm size. Connecticut has the second highest allocated acres and the lowest number of aquaculture operations, giving it the highest average acreage per operation in these states. Although most of the forty-five aquaculture operations are under 1,000 acres, a few have consolidated vast

¹²⁹ Mass. Dep't of Fish & Game, 2019 Annual Report 46, <https://perma.cc/E3RP-D8AQ>.

¹³⁰ *Id.*

¹³¹ Wellfleet, Mass. Shellfish Regulations §§ 2, 7.8.5.

¹³² Duxbury, Mass. Shellfish Aquaculture Grant Regs. §§ 4, 5, 15.

¹³³ Nantucket, Mass. Shellfishing Policy & Regs. §§ 1, 4.1, 5.11.

¹³⁴ Barnstable, Mass. Code §§ 407-47, 407-57.

¹³⁵ Falmouth, Mass. Code § 275-29.

¹³⁶ *Id.*

¹³⁷ Beckensteiner, *supra* note 71, at 9.

amounts of acreage. Although these numbers do not account for the fact that Connecticut does not track inactive versus active acreage, the numbers indicate that Connecticut has a high rate of consolidation and low rate of industry diversity compared to the other states reviewed here, which aligns with an estimate that 90% of Connecticut shellfishing grounds are controlled by ten companies.¹³⁸ However, because most states do not publish statistics on individual space allocations, the true distribution of acres to operators is unclear, and it may be possible that the states' shellfishing industries are more or less consolidated or diverse than these tables indicate.

There are benefits to a consolidated aquaculture industry. In a consolidated industry, some businesses may be able to work at economies of scale to maximize efficiency and profitability, especially in state waters beyond the shellfish jurisdiction line, which require more expensive equipment to cultivate shellfish in deeper waters.¹³⁹ Larger companies may also weather disease outbreaks or economic downturns better than smaller companies.¹⁴⁰

Consolidation can also limit some growth metrics in the aquaculture industry. For example, shellfishing grounds in Connecticut's state waters are infrequently available,¹⁴¹ and Connecticut's large businesses can lease the state shellfishing grounds when they become available because there is no limit to the number of acres they can hold. The unavailability of grounds to lease and the possibility of being outbid by established businesses can make it difficult for new businesses to enter the industry and can affect the diversity and competition in the industry.

7.1 Policy Options

The consolidation limits in other states and municipalities provide options Connecticut could consider if it wanted to encourage new entrants to the aquaculture industry and increase diversity among aquaculture producers.

7.1.1 Adopt consolidation limits

In Connecticut, most state shellfishing grounds are currently allocated, although new grounds are periodically available. Consolidation limits could help Connecticut allocate shellfishing grounds that become available to new or smaller businesses. Some Massachusetts municipalities also face the problem of high interest in aquaculture and low availability of shellfishing grounds, and their consolidation limits spread the acreage among many aquaculture producers. If Connecticut were to adopt consolidation limits, it would need to determine what limit to impose. The right limit is dependent on the state, its aquaculture history, the economics of the state's shellfishing industry, its

¹³⁸ Gregory B. Hladky, *Legislature Now A Battleground For Big Shellfishing Companies And State Regulators*, Hartford Courant (Apr. 13, 2015).

¹³⁹ Jan Ellen Spiegel, *How to Seed the Clam Fleet*, N.Y. Times, Jan. 29, 2006.

¹⁴⁰ *See, e.g.*, Fred Musante, *Oysters R Not in Season Because of Parasites . . .*, N.Y. Times, Nov. 29, 1998 (large numbers of oystermen left the business due to the 1990s outbreak of Dermo and MSX parasites).

¹⁴¹ Matt Parker et al., *Ne. Reg'l Aquaculture Ctr., Barriers to Entry in the Northeast US Aquaculture Industry* 6, <https://perma.cc/WN3P-KCVF>.

industry diversity goals, and many other factors. If Connecticut decided on a limit smaller than the acreage currently leased by aquaculture producers, it could add a provision grandfathering in existing leases, like in Barnstable. A consolidation limit would give the smaller businesses an opportunity to grow and new businesses an opportunity to enter the industry, but at the cost of limiting the continued growth of larger companies.

8 How do states ensure productive use of public submerged lands and waters allocated for aquaculture?

Some states and municipalities require aquaculture producers who hold space allocations for shellfishing grounds to meet specified productivity standards. Productivity standards can have a role in allocating shellfishing grounds to aquaculture producers able and willing to cultivate shellfish. Some aquaculture productive may obtain space allocations for unproductive purposes, such as for excluding competition, speculative purposes, or preventing aquaculture development near their property.¹⁴² Productivity requirements can help shellfishing authorities avoid nonproductive uses of public resources while increasing aquaculture output.

Productivity standards among these states and municipalities are measured qualitatively, quantitatively, or not at all. As Table 7 illustrates, Connecticut, which has a lenient productivity standard requiring an annual showing of any cultivation or sales, ranks in fifth place in productivity measured in oyster production per acre and farm gate value per acre among the states reviewed here. The states ranking above Connecticut are split between quantitative requirements (Massachusetts, Rhode Island, and Maryland) and qualitative requirements (Maine). These data do not reflect the varying efficiencies of bottom culture aquaculture compared to aquaculture using gear, which is an important factor when comparing the numbers of oysters produced per acre. However, differences in primary cultivation alone cannot explain why Connecticut produces fewer oysters per acre than most other states considered in this review.

¹⁴² Beckenstein, *supra* note 71, at 1.

Table 7 State oyster production and farm gate value per acre (based on data from 2017)¹⁴³

State	Productivity (oysters/acre)	Licensed areas (acres)	Farm gate value (\$)	Average Farm gate value per acre
Massachusetts	36,836	1,299	27,015,107	\$20,797/acre
Rhode Island	28,495	296	5,771,436	\$19,498/acre
Maine	15,862	676	7,193,925	\$10,642/acre
Maryland	3,266	6,803	6,000,000	\$882/acre
Connecticut	519	61,421	16,306,096	\$265/acre
Virginia	309	125,928	15,900,000	\$126/acre
New Jersey	54	37,368	1,370,060	\$37/acre

A comparison with Maryland may be helpful. Maryland’s aquaculture industry, like Connecticut’s, is primarily composed of bottom culture operations,¹⁴⁴ but Maryland’s productivity, measured by farm gate value per acre, is three times higher than Connecticut’s productivity. The difference in this productivity measure between Maryland and Connecticut cannot be attributed solely to different methods of cultivation because their industries both primarily use bottom culture operations; however, there is insufficient data to precisely determine the cause for the difference. A scientist at the Chesapeake Bay Foundation suggests that Maryland’s increased oyster production, which increased from 3,340 bushels in 2012 to over 55,000 bushels in 2018, is due in part to the 2010 legal reforms of the state aquaculture regime, which include strict enforcement of Maryland’s quantitative productivity requirement, among many other provisions.¹⁴⁵ Due to strict enforcement, Maryland terminated many leases, totaling about half the number of shellfish acreage,¹⁴⁶ which was likely a major factor in their average increased productivity. If Connecticut were to adopt stricter quantitative standards and strictly enforce against unproductive uses, like Maryland, it might increase the output and farm gate value of its aquaculture allocations.

¹⁴³ *Id.* at 14.

¹⁴⁴ Matt Parker et al., *Impact financing and aquaculture: Maryland oyster aquaculture profitability*, 51 *J. of World Aquaculture Society* 874, 875 (2020); see Conn. Dep’t of Agric., *Connecticut’s Shellfish Industry* (Dec. 5, 2018), <https://perma.cc/V87Q-6Q4B>. Ninety-three percent of Maryland aquaculture uses bottom culture methods. Matt Parker & Suzanne Bricker, *Sustainable Oyster Aquaculture, Water Quality Improvement, and Ecosystem Service Value Potential in Maryland’s Chesapeake Bay*, 39 *J. of Shellfish Research* 269 (2020).

¹⁴⁵ See Press Release, Chesapeake Bay Found., *New Economic Report Details Growth of Oyster Aquaculture in Maryland* (April 2, 2020); van Senten, *supra* note 84, at 9; Md. Dept’ of Natural Res., *Oyster Management Review: 2010-2015* 35 (2016), <https://perma.cc/FUL7-ECX3>.

¹⁴⁶ van Senten, *supra* note 84, at 36.

The next section reviews (a) the states' productivity requirements, (b) any exceptions to productivity requirements, and (c) enforcement of the productivity requirements.

8.1 State Productivity Requirements

Every state reviewed here, except New Jersey, requires aquaculture leases or licenses to be used productively. Most states establish this requirement through legislation, although Rhode Island establishes it through regulations. Connecticut has legislation imposing a duty on lessees “to make a good faith effort to cultivate and harvest shellfish” from the leased area.”¹⁴⁷ The lease agreement for farms in state waters expands on the requirement. Connecticut municipalities may also impose standards, as in Groton, which requires the site to be “actively worked and/or used” as described in the lease agreement.¹⁴⁸

Productivity requirements can be divided into qualitative and quantitative measures. Most states have a qualitative measure that is further defined by a quantitative measure. For example, Connecticut requires aquaculture producers “to make a good faith effort to cultivate and harvest shellfish,” and the lease agreement holds that aquaculture producers demonstrate good faith efforts through evidence of “wholesale transaction(s) of shellfish and/or the planting or cultivation of shellfish.”¹⁴⁹ The qualitative and quantitative productivity requirements of each state are shown in Table 8.

¹⁴⁷ CONN. GEN. STAT. §§ 26-194(a) (state waters), 26-240(a) (town waters).

¹⁴⁸ Groton Shellfish Comm'n, *Groton Shellfish Management Plan* 69 (2020).

¹⁴⁹ Conn. Dep't of Agric., Shellfish Lease Template 2, <https://perma.cc/NL8S-RE6F>.

Table 8 State productivity requirements

State	Qualitative Productivity Requirement	Quantitative Productivity Requirement
Connecticut	State waters: “good faith effort to cultivate and harvest shellfish” ¹⁵⁰ Town waters: “good faith effort to cultivate and harvest shellfish” ¹⁵¹	State waters: evidence of “wholesale transaction(s) of shellfish and/or the planting or cultivation of shellfish.” ¹⁵² Town waters: varies by municipality ¹⁵³
Maine	“substantial aquaculture ... over the course of the lease” ¹⁵⁴	n/a
Massachusetts	“substantial use of the licensed area” ¹⁵⁵	Varies by municipality; has been measured by certain levels of investment in seed or gear, ¹⁵⁶ production value of shellfish product, ¹⁵⁷ or amount of inventory maintained by acre ¹⁵⁸
Rhode Island	“actively farmed” ¹⁵⁹	“the yearly monetary investment in the farm (e.g., the purchase of seed and supplies and/or proof of sales)” ¹⁶⁰
Virginia	“significant production,” “reasonable plantings of [shellfish]” or “significant ... operation” of aquaculture activities during the lease term ¹⁶¹	n/a
Maryland	“active use of a lease” ¹⁶²	annual planting of at least ¼ of their lease with a minimum ¹⁶³ density of 1,000,000 shellfish seed per acre ¹⁶⁴
New Jersey	n/a	n/a

¹⁵⁰ CONN. GEN. STAT. § 26-194(a).

¹⁵¹ *Id.* § 26-240(a).

¹⁵² Conn. Dep’t of Agric., Shellfish Lease Template 2, <https://perma.cc/NL8S-RE6F>.

¹⁵³ *See, e.g.*, Groton Shellfish Comm’n, *Groton Shellfish Management Plan* 69 (2020) (requiring the site to be “actively worked and/or used” as described in the lease agreement).

¹⁵⁴ ME. STAT. tit. 12, § 6072(11).

¹⁵⁵ MASS. GEN. LAWS ch. 130, § 57.

¹⁵⁶ *See, e.g.*, Wellfleet, Mass. Shellfish Regulations § 7.12.1.

¹⁵⁷ *See, e.g.*, Barnstable, Mass. Code § 407-59.

¹⁵⁸ *See, e.g.*, Falmouth, Mass. Code § 275-3; Nantucket, Mass. Shellfish Policy & Regulations § 5.16.

¹⁵⁹ 650 R.I. CODE R. § 20-00-1.3(K)(1)(f).

¹⁶⁰ *Id.*

¹⁶¹ VA. CODE ANN. § 28.2-613.

¹⁶² MD. CODE ANN., NAT. RES. § 4-11A-09.

¹⁶³ *Id.*

¹⁶⁴ *Id.*

Quantitative measures can be divided by the specificity of their requirement. In Massachusetts municipalities and Maryland, the quantitative measures have numeric requirements. Maryland aquaculture producers must plant a certain number of shellfish, and aquaculture producers in Massachusetts must either invest a specific dollar amount in seed or gear, harvest a specific value of shellfish, or maintain a specific number of shellfish on site, depending on the municipality. By contrast, Rhode Island and Connecticut both have more lenient standards. They require evidence of sales, plantings, or investment in the leases, but do not specify a minimum value. Quantitative standards are clearer than qualitative standards and provide a stronger and less arbitrary basis for enforcement. However, Connecticut’s quantitative standard, as described in the lease agreement, is relatively lenient. While aquaculture producers must provide evidence of planting or sales, Connecticut’s lease agreement does not set a minimum that defines productivity. The lease agreement may allow for minimal use of shellfishing grounds.

8.2 Exceptions to Productivity Requirements

There are valid reasons shellfish producers choose not to make full use of their leases, including fallowing the area for the future health and productivity of the area and the crop, creating a buffer against other leaseholders or public shellfishing areas, rehabilitating the shellfish beds, or using the area periodically for transplanting, relaying, or depurating product. Some shellfishing grounds may also be used to exclude competition, for speculative purposes, or to prevent aquaculture development near a property. The state may want to protect some of these purposes, while others may be discouraged.

Several states have provisions to account for practical reasons an aquaculture producer may not meet productivity standards, such as fallowing. Maine DMR accounts for the utility of fallow ground when determining whether substantial aquaculture has occurred,¹⁶⁵ and the Virginia Marine Resources Commission (VMRC) may renew a lease that fails the “significant production” standard if the failure “is directly related to and beneficial to the production of oyster-planting grounds immediately adjacent” to the lease.¹⁶⁶ These provisions allow aquaculture producers discretion to use their space allocations in the way that most benefits the productivity of their farms.

Some states also allow exceptions for good cause or events outside of an aquaculture producer’s control. Many Massachusetts municipalities have adopted exceptions for events beyond the licensee’s control,¹⁶⁷ including “unforeseen personal misfortune,”¹⁶⁸ natural disasters,¹⁶⁹ or “catastrophic losses.”¹⁷⁰ Rhode Island and Virginia will also allow exceptions if the lessee shows “good cause” for aquaculture that does not meet productivity standards.¹⁷¹ Connecticut has

¹⁶⁵ ME. STAT. tit. 12, § 6072(13-A).

¹⁶⁶ VA. CODE ANN. § 28.2-613.

¹⁶⁷ Wellfleet, Mass. Shellfish Regulations § 7.12.3; Nantucket, Mass. Shellfish Policy & Regulations §§ 5.17, 5.18.

¹⁶⁸ Barnstable, Mass. Code § 407-59.

¹⁶⁹ Barnstable, Mass. Code § 407-59.

¹⁷⁰ Falmouth, Mass. Code § 275-34.

¹⁷¹ 650 R.I. CODE R. § 20-00-1.3(K)(1)(f); VA. CODE ANN. § 28.2-613.

discretion to renew a lease if lessee provides a “hardship exception.”¹⁷² This exception is likely important for farming, which is susceptible to natural conditions beyond the complete control of aquaculture producers.

Both reasons are important and may be worth protecting through legislation or through the space allocation agreement. Connecticut protects aquaculture producers who fail to actively farm a shellfish lease due to hardship, but not for reasons of fallowing for the future success of the farm. In Connecticut and other states with quantitative productivity measures, exceptions may be particularly important because quantitative standards alone do not account for fallowing, unforeseen events, and other reasons why producers may not meet productivity standards.

8.3 Enforcement of Productivity Requirements

Productivity standards are most effective when the state enforces them. If a state goal is to maximize productivity of shellfishing grounds, productivity requirements can advance the goal, but they will be most effective if there is an enforcement mechanism. Most states can enforce by revoking space allocations or refusing to renew space allocations if aquaculture producers do not meet the productivity standards.

States vary in whether revocation or non-renewal of space allocations is required by law or if shellfishing authorities have discretion over the revocation or non-renewal. Virginia and Rhode Island both require that authorities shall not renew leases that fail to meet productivity standards, subject to any exceptions the state has adopted.¹⁷³ In Virginia, however, there is little enforcement.¹⁷⁴ From 2006 to 2016, two-thirds of Virginia’s leases were unused, and although rotational farming was considered as a factor, it does not fully explain why a majority of leases were unused for that decade.¹⁷⁵ Rhode Island does not publish data on the productivity of their aquaculture producers or their enforcement. Virginia exemplifies how productivity requirements, without enforcement, do little to ensure shellfishing grounds meet productivity standards.

Massachusetts, Maine, Maryland, and Connecticut give discretion to their shellfishing authorities to determine whether to revoke space allocations or not to renew space allocations when productivity standards are unmet.¹⁷⁶ Most states, like Maine and Connecticut, do not publish enforcement statistics, so it is difficult to directly compare them with other states. From 2015-2020, no Massachusetts municipalities reported enforcement actions for productivity violations, although the statistics do not reveal whether municipalities are reluctant to enforce or whether productivity violations did not occur.¹⁷⁷ On the other hand, the Maryland Department of Natural Resources (DNR) actively enforces the productivity requirement and will terminate leases that do not meet the

¹⁷² Conn. Dep’t of Agric., Shellfish Lease Template 2, <https://perma.cc/NL8S-RE6F>.

¹⁷³ VA. CODE ANN. § 28.2-613; 650 R.I. CODE R. § 20-00-1.3(K)(1)(f).

¹⁷⁴ Beckensteiner, *supra* note 71, at 16.

¹⁷⁵ *Id.* at 1, 12.

¹⁷⁶ MASS. GEN. LAWS ch. 130, § 65; ME. STAT. tit. 12, § 6072(11); MD. CODE ANN., NAT. RES. § 4-11A-10.

¹⁷⁷ Mass. Shellfish Initiative, 2020 Assessment Report 229, <https://perma.cc/H7DY-YLWC>.

state productivity standard.¹⁷⁸ When Maryland began strictly enforcing the standard in 2010, DNR revoked nearly half the number of shellfish leases and acreage.¹⁷⁹ Since then, its acreage and number of leases have been increasingly used for productive aquaculture, which may help explain why Maryland’s oyster aquaculture productivity per acre is high compared to Connecticut and Virginia, which also primarily use bottom culture methods. Maryland exemplifies how strong enforcement can lead to more productivity and value in its shellfishing grounds, although it may require more funding for enforcement and a willingness to upset the status quo of non-enforcement.

New Jersey is the only state that does not have a productivity standard, so it also lacks an enforcement mechanism for unproductive leases. New Jersey has identified “lack of turnover of unused leases” as a barrier to entry into its aquaculture industry.¹⁸⁰ Without statutory provisions allowing the enforcement against the unproductive use of leases, New Jersey cannot revoke leases for unused or unproductive aquaculture, and potential aquaculture producers will struggle to find available shellfishing grounds.

Of these states, only Maryland is known to actively and strictly enforce productivity violations. Aquaculture enforcement statistics are not widely available, so it is difficult to ascribe other states’ non-enforcement to a specific cause. Some may not struggle with unproductive space allocation holders, and others may use their discretion not to enforce. Enforcement can be costly and time-consuming, but the example of Maryland indicates it could be a factor in creating a more valuable, more productive aquaculture industry.

8.4 Policy Options

Production requirements attempt to promote the productivity of shellfishing grounds allocated by the state or municipality, and if defined and enforced, they can be a factor in a strong aquaculture industry. Maryland, which is primarily a bottom culture aquaculture industry like Connecticut, has been able to greatly increase oyster production with legal reforms that include strict enforcement of the productivity requirement. If Connecticut wanted to increase its productivity by addressing the productivity requirement, it could consider the following amendments to its law:

8.4.1 Define “good faith” aquaculture cultivation with more specific quantitative measures

If Connecticut wanted to create more stringent productivity requirements, which could provide clearer directives for productivity expectations of shellfish aquaculture space allocations, it could consider stricter, numeric-based requirements like those used in Massachusetts municipalities and Maryland.

¹⁷⁸ See Md. Dept’ of Natural Res., Oyster Management Review: 2010-2015 35 (2016), <https://perma.cc/FUL7-ECX3>.

¹⁷⁹ See *id.* at 36.

¹⁸⁰ Ne. Reg’l Aquaculture Ctr., Barriers to Entry in the Northeast US Aquaculture Industry 43 (2020), <https://perma.cc/WN3P-KCVF>.

In Connecticut, a stricter productivity standard could require a specific value of investment or harvest or a specific number of plantings. Connecticut would need to consider which, if any, of these ways would best suit its aquaculture industry goals. Any new standard would likely include an exception for aquaculture producers who grow shellfish in restricted areas that are then relayed to conditional or approved waters for depuration before sale. Evidence of this use of space allocations would allow a productivity standard to better fit into Connecticut's aquaculture practices.

Connecticut has several paths to adopting a more specific quantitative standard. First, the state legislature could amend the law to establish a quantitative standard, which could be a lengthy and political process. Second, DA/BA can promulgate regulations defining "good faith" with a quantitative standard. This option places the decision within the hands of an agency that has expertise with aquaculture but must go through the administrative process.¹⁸¹ Thirdly, DA/BA could amend its lease agreement. The lease agreement contains the current quantitative standard. Although DA/BA must obtain the state attorney general's approval for changes to the lease agreement,¹⁸² it would likely be a quicker process than the other options. Changing the standard is possible, but if DA/BA is unwilling to enforce a productivity standard, there may be little use in adjusting productivity expectations.

If applied to existing space allocations, Connecticut could face claims that a new quantitative requirement is a regulatory taking. Connecticut aquaculture law grants a lessee preference in the "reletting of such [shellfishing] ground for a like term to that granted in the original lease, excluding the rental fee. . . ."¹⁸³ If Connecticut adds a new condition of productivity, it could infringe on private expectations of reletting the shellfishing grounds with the same productivity standards. However, the lease holds that lessees have no claim against the state "for any damage . . . disturbed or interfered with or affected in any manner . . . by reason of the enactment or adoption of any law, ordinance or regulation"¹⁸⁴ Connecticut recognizes that "parties are free to contract for whatever terms on which they may agree."¹⁸⁵ Although Connecticut has not expressly addressed whether parties can contract around eminent domain, courts in other jurisdictions have found so.¹⁸⁶ Takings litigation could be excessively expensive and time-consuming for the state to deal with. However, it is likely that the lease agreement provision will protect Connecticut from takings claims.

With quantitative measures, Connecticut could more easily determine how productively its shellfishing grounds are used and enforce against unproductive leaseholders. Although there is a risk of litigation, stronger productivity standards could lead to greater production.

¹⁸¹ CONN. GEN. STAT. § 26-194(a) (giving the Commissioner of the Department of Agriculture the ability to promulgate regulations related to shellfish aquaculture leasing).

¹⁸² *Id.* § 26-240.

¹⁸³ *Id.*

¹⁸⁴ Conn. Dep't of Agric., Shellfish Lease Template 5, <https://perma.cc/NL8S-RE6F>.

¹⁸⁵ BRJM, LLC v Output Systems, Inc., 917 A.2d 605, 610 (Conn. App. Ct. 2007).

¹⁸⁶ See City of Roeland Park v. Jasan Trust, 132 P.3d 943, 949 (Kan. 2006); City of Vista v. Fielder, 919 P.2d 151, 156 (Cal. 1996); United States v. 1.377 Acres of Land, 352 F.3d 1259, 1269 (9th Cir. 2003).

9 What statutory provisions exist to protect the aesthetic values and rights of landowners abutting proposed aquaculture sites?

The aesthetics of aquaculture operations are a community concern that arise in every state where aquaculture is permitted. The “not in my backyard,” or NIMBY, opposition to aquaculture often arises over the visual impacts that aquaculture will have or is perceived to have on the character of a place.¹⁸⁷ Floating gear in particular may attract NIMBY criticism because it is more visible than bottom or off-bottom aquaculture operations. Most states and municipalities have legal provisions in place to include aesthetic considerations in their aquaculture decision-making and to accommodate comments from the general public and nearby landowners.

9.1 Legal Provisions Including Aesthetic Concerns in Aquaculture Decision-Making

Shellfishing authorities consider many factors when reviewing aquaculture lease applications and gear permit applications. Some states have legal provisions requiring the authorities to consider the aesthetics or visual impacts that aquaculture has on a community or view. Of the states in this review, Connecticut, Rhode Island, and Maine each expressly require consideration of visual impacts or aesthetics in either the leasing of shellfishing grounds or permitting of gear.

In Connecticut, DA/BA and some shellfish commissions must consider the aesthetic impacts of aquaculture. With the recent approval of the Long Island Sound Blue Plan (Blue Plan), DA/BA considers “[s]cenic and visual resources” when leasing in state and town waters.¹⁸⁸ At the municipal level, shellfish management plans or municipal regulations may require the shellfish commission to consider visual impacts of aquaculture during the leasing process, as is the case in Groton, Stonington, and East Lyme.¹⁸⁹ Even if a municipality does not require its shellfish commission to consider visual impacts when leasing shellfishing grounds, DEEP must consider aesthetics when permitting gear for aquaculture operations.¹⁹⁰ If a prospective aquaculture producer intends to use gear, agencies will review the visual impacts of the proposed aquaculture farm. Aesthetic considerations may be particularly important in town waters because they extend from the mean high-water line to the shellfish jurisdiction line and are more visible to the general public and landowners.

Rhode Island and Maine also expressly require consideration of visual impacts at various points in the leasing and gear permitting processes. In Maine, DMR must consider visual impacts when it

¹⁸⁷ See generally George Lapointe, Northeast Regional Ocean Council, Overview of the Aquaculture Sector in New England 21 (2013).

¹⁸⁸ CONN. GEN. STAT. § 25-157t(b).

¹⁸⁹ Groton Shellfish Comm’n, Groton Shellfish Management Plan 74 (2020); Stonington Shellfish Comm’n, Commercial Aquaculture License Information Package and Application 17 (2020); East Lyme Harbor Mgmt. & Shellfish Comm’n, East Lyme Shellfish Management Plan 26 (2005).

¹⁹⁰ CONN. GEN. STAT. § 25-157t(b), (h); Conn. Dep’t of Energy & Env’tl. Prot., Long Island Sound Blue Plan – Final Draft, <https://perma.cc/8RWD-VCAT>.

reviews lease applications.¹⁹¹ In Rhode Island, in keeping with CRMC policy to “preserve, protect, and, where possible, restore the scenic value of the coastal region,” all applications for a Category B assent must “[d]emonstrate that measures have been taken to minimize any adverse scenic impact.”¹⁹² In addition to this requirement, commercial aquaculture in coastal salt ponds is limited to 5% of the total open water surface area,¹⁹³ which reduces the visibility of gear, as well as conflicts with other uses.

Massachusetts, Maryland, New Jersey, and Virginia do not expressly require consideration of aesthetic impacts when reviewing an application. However, in New Jersey and Virginia, impacts to or conflicts with adjacent landowners may be considered.¹⁹⁴ Landowner conflicts can include many concerns, including visual impacts. However, if landowners do not express concerns about aesthetics, the shellfishing authorities may not consider aesthetics as strongly in their decision-making processes.

Because Connecticut, Rhode Island, and Maine are required to consider aesthetics or visual impacts of aquaculture, they can proactively address major aesthetic concerns and perhaps limit public criticism of the proposed operation. Although aesthetics is only one factor of many weighed by these states, it is a common public concern. Early consideration of aesthetics may help the states and prospective aquaculture producers plan to avoid an issue or minimize the visual impacts.

9.2 Restrictions on Aquaculture Gear and Space

Some laws place restrictions on the gear aquaculture producers use or how much space they can use, which may preemptively address potential aesthetic concerns. Although the laws were not all codified for solely aesthetic reasons, they all reduce aesthetic concerns about visual impacts associated with the size of an aquaculture operation or the visibility of gear used in an aquaculture operation.

Connecticut and Massachusetts state law do not have gear restrictions that affect aesthetic concerns, but other New England states do. Rhode Island limits commercial aquaculture in coastal salt ponds to 5% of the total open water surface area, which may address many social conflicts, including concerns over visual impacts.¹⁹⁵ New aquaculture operations in coastal salt ponds using gear are limited to three acres, compared to less-visible bottom planting, which is limited to ten acres.¹⁹⁶ These restrictions limit the use of aquaculture on the salt pond as a whole, and by limiting each

¹⁹¹ 13-188 ME. CODE R. § 2.37.

¹⁹² 650 R.I. CODE R. §§ 20-00-1.3.1(A)(1)(k), 20-00-1.3.5.

¹⁹³ *Id.* § 20-00-1.3.1(K)(4)(f). This limit was based on a study theorizing the ecological carrying capacity of coastal ponds was 5%. Although now the ecological carrying capacity is believed to be higher, social conflict arises even at the 5% level, indicating the social carrying capacity is much lower than the ecological carrying capacity. *See* R.I. Coastal Res. Mgmt. Council, CRMC’s 5 percent aquaculture rule seeks to balance use of salt ponds (June 4, 2018), <https://perma.cc/XF3G-7XGM>.

¹⁹⁴ *See* N.J. Atlantic Shellfish Aquaculture Leasing, at 8-9; VA. CODE ANN. § 28.2-1205.

¹⁹⁵ 650 R.I. CODE R. § 20-00-1.3.1(K)(4)(f); Tracey Dalton et al., Using normative evaluations to plan for and manage shellfish aquaculture development in Rhode Island coastal waters, 83 *Marine Policy* 194, 202 (2017).

¹⁹⁶ 650 R.I. CODE R. § 20-00-1.3.1(K)(17).

operation's use of gear to three acres, it limits the visibility of the aquaculture that takes place on the pond. In Maine, regulations require the minimization of the visual impact of aquaculture structures by requiring, for example, that structures and equipment be painted specified colors to blend in with the surrounding areas, or that materials used not be reflective or glossy.¹⁹⁷ Although Massachusetts state law does not have restrictions, some Massachusetts municipalities ban floating gear or restrict the size of gear to reduce visual impacts,¹⁹⁸ and at least one Massachusetts municipality limits commercial aquaculture to one percent of a pond or bay.¹⁹⁹ These states have restrictions on the area aquaculture can occupy, the types or size of gear that can be used, and the color of gear. All of these restrictions can limit the visual impact of aquaculture, but statutory or regulatory restrictions on aquaculture gear and space are rigid limitations that may restrict aquaculture development. Connecticut does not have legal restrictions on site-specific aquaculture space use like other New England states do, which may express stronger state support of aquaculture development. Even so, an application to use gear on an aquaculture site undergoes a stringent review. With site-specific limitations, as opposed to broad statutory restrictions, Connecticut can adapt to the varying needs of individual aquaculture operations and the public in different areas. In state waters beyond the shellfish jurisdiction line, for example, visual concerns may not be prevalent because there are no abutting landowners. Site-specific limitations may allow Connecticut to be more flexible and respond to the concerns of individual sites without restricting aquaculture across the state.

9.3 Notification to the General Public and Nearby Landowners

Public notice and notice to nearby landowners of pending aquaculture applications alert potentially interested parties to government action. Shellfishing authorities may publish notice to the general public or individually to nearby landowners, or both, of pending applications for space allocations or pending applications to use gear. New Jersey is the only state that does not require public notice or landowner notice of pending aquaculture space allocations.

The states' notification requirements for pending space allocation applications are below, excluding New Jersey. Most states post notifications for the general public and for landowners within a specified distance from the proposed aquaculture site. Notification at the space allocation phase of regulatory review is important because it is an early opportunity for potentially affected landowners and the members of the public to learn about an aquaculture operation that may affect their use or enjoyment of waters. Notification at this stage also informs interested parties of the application's existence so they can follow along with the regulatory process and potentially offer comments for agencies to consider.

¹⁹⁷ 13-188 ME. CODE § 2.37(10).

¹⁹⁸ *See, e.g.*, Edgartown, Mass. Regulations for the Taking and Culture of Shellfish § 11(G); Marine Affairs Inst., Roger Williams Univ. School of L., Shellfish Aquaculture Licensing, Navigation, and Wetlands Requirements in Massachusetts Coastal Municipalities (2018).

¹⁹⁹ *See, e.g.*, Edgartown, Mass. Regulations for the Taking and Culture of Shellfish § 2(G) (limiting licensed area to one percent of the area of a pond or bay).

Table 9 State notification requirements for space allocations

State	Notice to General Public	Notice to Nearby Landowners
Rhode Island ²⁰⁰	Yes	Notice sent to adjacent landowners as part of concurrent assent process
Massachusetts ²⁰¹	Yes – posted in 3 or more public places and published in local newspaper at least ten days before hearing	Varies by municipality
Maine ²⁰²	Standard lease: yes, published twice in local newspaper, and in industry or trade publications LPA license: no	Standard lease: yes – riparian owners within 1,000 feet LPA license: yes – landowners within 300 feet
Virginia ²⁰³	Yes – published on VRMC website for at least 30 days and at least once a week for two weeks in local newspaper	Yes – riparian owners within 200 feet and any contiguous shellfish lessees
Maryland ²⁰⁴	Yes – on DNR website and in local newspaper once a week for two weeks	Yes – owners “directly in front of the proposed activity”
Connecticut ²⁰⁵	State waters: yes – on DA/BA website before the 15 th of the month before bidding begins, and for one day in a local newspaper at least 10 days before bidding Town waters: yes – published twice in local newspaper in the fifteen days preceding the hearing	State waters: no Town waters: varies by municipality

Connecticut and its local shellfish commissions have similar public notice requirements for leasing shellfishing grounds. State law does not require shellfish commissions to notify landowners within

²⁰⁰ See 650 R.I. CODE R. § 20-00-1.1.3(E)(3); R.I. Coastal Res. Mgmt. Council, Guide to Aquaculture Applications 7, 15 (2020), <https://perma.cc/LB13-62GB> (assent application requiring names and addresses of adjacent property owners for notification purposes).

²⁰¹ See MASS. GEN. LAWS ch. 130, § 60 (requiring posting notice in three public places and in a local newspaper); see, e.g., Barnstable, Mass. Code § 407-48 (notice to landowners within 300 feet), Duxbury, Mass. Shellfish Aquaculture Grant Regulations § 6 (notice to landowners within 700 feet).

²⁰² See ME. STAT. tit. 12, § 6072(6); ME. STAT. tit. 5, § 9052(3) (notice published twice in an area newspaper); ME. STAT. tit. 12, § 6072(5) (riparian landowners within 1,000 feet of a proposed standard lease); 13-188 ME. CODE R. § 2.90 (riparian landowners within 300 feet of proposed LPA license).

²⁰³ See VA. CODE ANN. § 28.2-606.

²⁰⁴ See MD. CODE ANN., NAT. RES. § 4-11A-09.

²⁰⁵ CONN. GEN. STAT. §§ 22a-6g, 26-240(a), 26-257 (requiring DoAg to use state leasing process for town waters under state control); Conn. Dep’t of Agric., Leasing Shellfish Grounds <https://perma.cc/8E3W-K3H9>; see, e.g., Groton Shellfish Comm’n, Shellfish Management Plan 72 (2020) (requiring notice to landowners within 500 feet of the proposed aquaculture site); Stonington Shellfish Comm’n, Shellfish Management Plan 5 (2005) requiring notice to landowners within 500 feet of the proposed aquaculture site).

some distance of a proposed aquaculture lease, although some municipalities do.²⁰⁶ Notification may be especially important in town waters because landowners may own property near aquaculture sites.

When an aquaculture producer plans to use gear, they must provide additional notice to the public. The use of gear typically requires USACE authorization, and USACE will issue public notice of the proposed application.²⁰⁷ In addition, state agencies may also require additional public notice for gear permit applications. Landowners in municipalities that do not require direct notification to landowners must rely on the public notice or a notice from DEEP and USACE during the Joint State Federal Agency permitting process for use of aquaculture gear. State waters, which are beyond the shellfish jurisdiction line, do not have nearby landowners. However, in town waters under DA/BA administration, nearby landowners do not receive direct notice of proposed aquaculture sites, which may interfere with their learning of the proposed site and their ability to submit comments at public hearings.

9.4 Public Opportunities to Comment

Public notice informs the community and nearby landowners when an aquaculture project is under consideration. Most shellfishing authorities also allow interested parties to offer comments on the proposed aquaculture space allocations. Comments allow the public to express their support or concerns and help the shellfishing authorities make decisions. Public opportunities to comment generally consist of public comment periods, public hearings, or both.

Rhode Island and Virginia are the only states that hold thirty-day public comment periods,²⁰⁸ in which the public can submit comments on the specifics of the application.²⁰⁹ A public comment period gives interested parties a longer period of time to submit written comments. It may be easier for all parties to submit written comments in a thirty-day period rather than attend a public hearing.

Most states invite the public to offer comments on the shellfish aquaculture space allocations in a public hearing. Massachusetts, New Jersey, Maine, and Connecticut's local shellfish commissions hold public hearings on all proposed shellfish aquaculture space allocations (except Maine's limited-purpose aquaculture license),²¹⁰ and in Rhode Island, CRMC will hold a public hearing if at least one

²⁰⁶ See, e.g., Groton Shellfish Comm'n, Shellfish Management Plan 72 (2020) (requiring notice to landowners within 500 feet of the proposed aquaculture site); Stonington Shellfish Comm'n, Shellfish Management Plan 5 (2005) requiring notice to landowners within 500 feet of the proposed aquaculture site).

²⁰⁷ See U.S. Army Corps of Eng'rs, Permitting Process Information, <https://perma.cc/22YX-JXL6>; see, e.g., U.S. Army Corps of Eng'rs, Public Notice NAE-2020-01780, <https://perma.cc/5SSE-2Z2E>; U.S. Army Corps of Eng'rs, Public Notice NAE-2007-02555, <https://perma.cc/2CXM-H6FC>.

²⁰⁸ See R.I. Coastal Res. Mgmt. Council, *Guide to Aquaculture Applications* 8 (2020), <https://perma.cc/LBJ3-62GB>; 650 R.I. CODE R. § 20-00-1.1.3(E)(3); VA. CODE ANN. § 28.2-606.

²⁰⁹ *Id.*

²¹⁰ See MASS. GEN. LAWS ch. 130, § 60; Coastal Res. Mgmt. Council, *Guide to Aquaculture Applications* 7-8 (2020), <http://www.crmc.ri.gov/applicationforms/AquaApp.pdf> (at the preliminary determination stage, when the full application is submitted, and when CRMC makes a final decision); 13-188 ME. CODE R. § 2.30; N.J. ADMIN. CODE § 7:25-24.6; CONN. GEN. STAT. § 26-240(a).

substantive objection is filed during the comment period.²¹¹ Because public hearings typically take place on one day, it may be harder for all interested parties to attend and be heard. However, public hearings allow for face-to-face conversations between affected members of the public, the proposed aquaculture lessee, and the leasing authority. The government or the proposed lessee can address questions and concerns, and members of the public may feel heard if they can voice their concerns to decisionmakers in person.

Maryland has a unique method to acquire public comments. In Maryland, any person may request a public informational meeting or protest the issuance of an aquaculture lease, which may require resolution through a state administrative hearing.²¹² The state administrative hearing process can resolve complaints, but it can be a lengthy process that delays the leasing process.²¹³

Among these states, Connecticut's leasing process in state waters and the town waters under its jurisdiction is unique because it does not require solicitation of public comments. Every other shellfishing authority has at least one opportunity for public comment, and DA/BA's ability to lease waters without public comment is uncommon. The distance of state waters beyond the shellfish jurisdiction line and the prevalence of bottom culture operations may be reasons for the absence of a public comment requirement. However, even if the general public on shore cannot see aquaculture in state waters from shore, there may still be environmental, navigational, recreational, or other impacts on which the public wants to comment. In town waters under state jurisdiction, the absence of a public commenting mechanism is more significant because the general public and landowners are geographically closer to aquaculture sites and visual impacts will be greater.

In Connecticut state waters, the only opportunity for public comment on a proposed aquaculture operation arises if the aquaculture producer applies for permits to use gear. The Joint State Federal Agency permitting process for the use of aquaculture gear may include public hearings during which interested people can comment. As with landowner notification, an application for a permit to use gear may fill the gap and give the public an opportunity to comment at a public hearing.

9.5 Policy Options

The aesthetics of aquaculture are a common NIMBY concern that public commenters raise. Addressing aesthetics preemptively and giving the public the opportunity to offer comments on aesthetics are ways for shellfishing authorities to engage with and address the concerns in decision-making processes. If Connecticut wanted to give more protection to visual resources or grant the public more opportunities to raise concerns, including, but not limited to, aesthetics, there are several ways it could achieve this.

9.5.1 Give notice to nearby landowner of lease applications

²¹¹ 650 R.I. CODE R. § 20-00-1.1.3(E)(3).

²¹² MD. CODE ANN., NAT. RES. § 4-11A-09; MD. CODE ANN., STATE GOV'T § 10-206.

²¹³ See MD. CODE ANN., STATE GOV'T § 10-206.

Connecticut differs from most states because it does not require nearby landowners to be notified when a lease application is under consideration. Some, but not all, municipalities have adopted a landowner notification requirement for leases in their town waters. Notifying nearby landowners may give direct notice to people who might be most affected by an aquaculture operation,²¹⁴ but it may also be an unnecessary supplement to the general public notice. Notifying landowners within some distance could result in increased public engagement, some of which may be more NIMBY commenters that could impede aquaculture development. Under current law, DEEP must notify landowners within 500 feet if the aquaculture producer applies for a DEEP gear permit, which may result in landowner notification in many cases and make a leasing notification repetitive. However, if a proposed aquaculture farm will not use gear, the landowner would not receive notification beyond the public notice. If adopted, Connecticut would have to determine to what distance from the lease landowners deserve to be notified.

9.5.2 Adopt statutory gear restrictions

Unlike other New England shellfishing authorities, some of which have adopted limits on aquaculture through gear restrictions or area restrictions, Connecticut has not adopted statutory gear restrictions with respect to site-specific aquaculture space use, although it does stringently review aesthetics during its review process. Statutory restrictions could preempt some aesthetic concerns and lead to higher public tolerance of aquaculture. However, statutory restrictions are inflexible and could unduly burden the aquaculture industry. DA/BA, DEEP, and USACE can make site-specific restrictions on gear to protect values, such as the environment, aesthetics, or navigation. Combined with the requirement to consider aesthetics in aquaculture leasing and permitting decisions, site-specific restrictions may be sufficient to address aesthetic concerns as they arise.

10 Do state or municipal laws or policies regulate the location or type of aquaculture gear that can be used?

States and municipalities might regulate aquaculture gear for a variety of reasons, including to protect the environment, recreation, and navigation or to reduce social conflicts. Some states and municipalities have laws describing the types of permissible gear or the areas where gear can be used. State, local, and federal agencies may also impose site-specific restrictions based on the qualities of a particular site and the impact of the proposed aquaculture activity.²¹⁵

²¹⁴ Lapointe, *supra* note 187, at 22.

²¹⁵ See ME. STAT tit. 12, § 6072(7-B); 13-188 ME. CODE R. § 2.37(1)(B)(4); 4 VA. ADMIN. CODE § 20-1130-30 (VMRC can add conditions to gear approved under general permit); N.J. ADMIN. CODE § 7:7-3.2(d) (DEP can include site-specific conditions to GP); R.I. GEN. LAWS § 20-10-6; R.I. Coastal Res. Mgmt. Council, Aquaculture training brings users, conflicts into focus (Nov. 28, 2019), <https://perma.cc/E84H-47LF> (CRMC often adds stipulations to leases); MASS. GEN. LAWS ch. 130, § 57.

The states in this review each have laws that broadly contemplate the potential use of a wide range of aquaculture gear²¹⁶ and will generally permit the gear in a case-by-case basis.²¹⁷ (A rare exception is in Virginia, where cages, racks, trays, and similar devices that extend less than twelve inches off the ground do not require permits.²¹⁸) However, some states and municipalities establish prohibitions on the type of gear that can be used or where aquaculture with gear can occur.

10.1 Prohibitions on Gear Types

States and municipalities vary in how they restrict gear. Most commonly, municipalities ban the use of particular types of gear that they do not want in their jurisdictions. Maine offers a different approach in its limited-purpose aquaculture licenses. Rather than banning gear, Maine lists the types of aquaculture gear that aquaculture producers may apply to use in the licensed area. However, most jurisdictions do not use either approach and make gear decisions on a case-by-case basis.

In these states, the bans on types of gear primarily take place at the municipal level. For example, in Connecticut, East Lyme prohibits the use of open water upwellers.²¹⁹ In Massachusetts, Wellfleet prohibits metal gear that rises more than eighteen inches above the grade and plastic equipment that rises more than twenty-four inches above the grade, except for spat collection devices,²²⁰ which greatly restricts the use of floating or suspended gear. In Edgartown, floating grow-out and related gear is not permitted at all.²²¹ Although most municipalities allow gear to be permitted on a case-by-case basis,²²² these municipalities decided that, aquaculture operations should not use types of aquaculture gear in their waters. Reasons might include the reduction of social conflict, protection of sensitive marine environments, assurance of safe navigation, or other reasons. A prohibition on particular types of gear is an effective way to ensure certain types of gear are not used in municipal waters, but it can restrict the aquaculture industry in that municipality.

Unlike the municipalities, Maine limits aquaculture gear by enumerating the gear that DMR may approve in limited-purpose aquaculture licenses. For these licenses, DMR will only permit gear detailed in the regulations: upwellers, shellfish rafts, predator nets, spat collectors, shellfish tray racks, over wintering cages, soft bags, semi-rigid bags, floating trays, lantern nets, pearl nets, fencing

²¹⁶ See CONN. GEN. STAT. §§ 22-11c, 22-11h(c); MASS. GEN. LAWS ch. 130, § 57; 650 R.I. CODE R. § 20-00-1.3(K)(5); ME. STAT. tit. 12, § 6072(13)(G); Me. Dep't of Marine Res., Conducting Aquaculture in Maine, available at: <https://perma.cc/37Z4-Y25A>; MD. CODE ANN., NAT. RES., §§ 4-11A-06, 4-11A-07, 4-11A-08; N.J. ADMIN. CODE § 7:7-6.30; 4 VA. ADMIN. CODE §§ 20-1130-20, 20-1130-50; Va. Marine Res. Comm'n, Shellfish Aquaculture, Farming and Gardening, <https://perma.cc/A6RM-E6ML>.

²¹⁷ See CONN. GEN. STAT. § 22-11h; R.I. GEN. LAWS § 20-10-04; MASS. GEN. LAWS ch. 130, § 57; N.J. ADMIN. CODE § 7:12-9.15; MD. CODE REGS. 08.02.14.04; VA. CODE ANN. § 28.2-1205.

²¹⁸ 4 VA. ADMIN. CODE § 20-335-30; Va. Marine Res. Comm'n, Shellfish Aquaculture, Farming and Gardening, <https://perma.cc/A6RM-E6ML>.

²¹⁹ East Lyme Shellfish Comm'n, Shellfish Management Plan 27 (2005).

²²⁰ Wellfleet, Mass., Shellfishing Regulations § 7.19.2.

²²¹ Edgartown, Mass. Regs. for the Taking and Culture of Shellfish § 11(G).

²²² East Lyme Shellfish Comm'n, Shellfish Management Plan 23 (2005); Groton Shellfish Comm'n, Shellfish Management Plan 11 (2020).

and brushing, moorings, long lines, rope grids, and bottom anti-predator netting.²²³ A list of potentially approved gear may be useful because it limits an aquaculture producer to the gear the shellfishing authority has deemed suitable for the space allocation type. However, when the list of potentially permitted gear is so comprehensive that it covers the majority of gear that would likely be used, as for Maine’s limited-purpose aquaculture licenses, a list of gear may not have much practical value in limiting gear.

Codified gear restrictions can preemptively prevent the introduction of controversial gear or gear that the shellfish commission has deemed unsuitable for its shellfishing grounds. Outright prohibitions, such as East Lyme’s ban on open water upwellers or Edgartown’s ban on floating grow-out gear, can reduce social conflict and prevent gear permit applications that are likely to be denied. Restrictions can also set expectations for space allocation applicants by directing them to plan around gear that the public would likely oppose. However, the laws may be unduly restrictive because there may be individual sites where gear may be suitable.

10.2 Demarcation of Aquaculture Areas Suitable for Gear

Another way jurisdictions regulate aquaculture is by restricting the locations of aquaculture with gear. Although uncommon, some municipal shellfishing authorities delineate areas suitable for aquaculture.²²⁴ The East Lyme Shellfish Commission has gone further by delineating areas where it may permit any aquaculture and specific areas where it will consider leasing for aquaculture with gear.²²⁵ The identification of areas suitable for aquaculture and specifically the identification of areas suitable for aquaculture with gear may help aquaculture producers easily determine where aquaculture with gear will be tolerated and enable them to plan their proposed operations with a higher likelihood of efficient approvals. Identifying areas suitable for aquaculture with gear shifts the burden of identifying suitable aquaculture grounds from the applicant to the shellfishing authority, which likely has a better understanding of the areas where aquaculture with gear is most appropriate and will face the least resistance. By locating the proposed aquaculture farms in areas where the municipality deems it appropriate, the siting of the farm may face reduced social conflicts and thus a potentially shorter permitting process.

10.3 Seasonal Restrictions

Municipalities in Massachusetts, which has an oyster industry that primarily uses gear,²²⁶ often regulate the use and storage of gear in winter. For example, Wellfleet requires the removal of stackable cages and secure attachment of all other gear flat on the bottom “by January 15 or before ice prevents removal, whichever comes first.”²²⁷ Aquaculture producers can leave up to 100 racks in

²²³ 13-188 ME. CODE R. § 2.90(2)(F).

²²⁴ *See, e.g.*, Groton Shellfish Comm’n, Shellfish Management Plan 11 (2020); Nantucket, Mass. Shellfishing Regs. § 5.4.

²²⁵ East Lyme Shellfish Comm’n, Shellfish Management Plan 23 (2005).

²²⁶ *See* Se. Mass. Aquaculture Ctr., Best Management Practices for the Shellfish Culture Industry in Southeastern Massachusetts 3, <https://perma.cc/VZ47-TQQW>.

²²⁷ Wellfleet, Mass. Shellfishing Policy & Regs. § 7.19.5.

the water, but will pay a fee for any additional racks left on the site.²²⁸ Any other unused gear must be removed.²²⁹ Nantucket, too, requires the removal of unused gear and the securing of floating gear on the bottom by December 15 or before ice prevents removal.²³⁰

Seasonal requirements to remove gear may ease social conflict by reducing the risk of dislodged gear and by improving aesthetics.²³¹ It can also protect navigation and reduce entanglement with marine animals.²³² Restrictions can also reduce the likelihood that aquaculture producers lose gear. Although Connecticut's bottom culture aquaculture industry may not be highly affected by seasonal gear restrictions, regulations or statutes requiring the seasonal removal of unused gear could reduce social conflicts and concerns over aquaculture that uses gear.

10.4 General Permits

Distinct from other states which require site-specific gear permitting (and distinct from USACE general permits), New Jersey and Virginia have adopted state general permits for some aquaculture gear. General permits simplify the permit review process because they apply to multiple users who can meet specified standards for certain activities, typically with a shorter review time than individual permits that are reviewed on a case-by-case basis. In New Jersey, the state general permit covers “floating upwellers, shellfish rafts, racks and bags, lantern nets, and cages.”²³³ In Virginia, “cage[s], rack[s], tray[s], or other similar device[s]” that extend more than twelve inches off the bottom may qualify for a general permit.²³⁴ Aquaculture gear covered in general permits in Virginia and New Jersey do not have to undergo a public hearing,²³⁵ so state shellfishing authorities can authorize gear more quickly and aquaculture producers can obtain authorization from state agencies more quickly than if they applied for an individual permit. Without a public hearing, however, the public does not have an opportunity to express support for or opposition to the aquaculture gear that may impact their use and enjoyment of public waters. If the aquaculture sites are far from commonly used areas, it may be less problematic, but for sites closer to areas the public uses, state general permits may not adequately address social conflict concerns.

10.5 Policy Options

²²⁸ *Id.*

²²⁹ *Id.*

²³⁰ Nantucket, Mass. Shellfishing Policy & Regs. §§ 5.33, 5.31.

²³¹ Se. Mass. Aquaculture Ctr., Best Management Practices for the Shellfish Culture Industry in Southeastern Massachusetts 65, 66, <https://perma.cc/VZ47-TQQW>.

²³² *Id.*

²³³ N.J. ADMIN. CODE §§ 7:7-6.30; 7:7-3.3.

²³⁴ 4 VA. ADMIN. CODE § 20-1130-50; Va. Marine Res. Comm'n, Shellfish Aquaculture, Farming and Gardening, <https://perma.cc/A6RM-E6ML>.

²³⁵ See Ctr. for Coastal Res. Mgmt., Permit Information, <https://perma.cc/ZM8B-HJUZ>; N.J. ADMIN. Code § 7:7-3.3.

Connecticut is similar to other states in that aquaculture is permitted on a case-by-case basis. At the state level, the site-specific reviews that Connecticut engages in now are comparable to the site reviews of other states that determine whether aquaculture gear is appropriate for the site. If Connecticut wanted to promote aquaculture with gear in state waters, it could consider ideas used by other shellfishing authorities.

10.5.1 Identify areas suitable for aquaculture with gear consistent with the Blue Plan

If Connecticut wanted to ease the conflict over permitting aquaculture gear, it could follow the example of East Lyme and identify areas suitable for aquaculture with gear and areas suitable for aquaculture without gear. The Blue Plan, with its exhaustive catalog of different uses of Long Island Sound, has the capacity to identify locations where aquaculture operations and aquaculture gear will result in fewer use and resource conflicts. In East Lyme, for example, the areas appropriate for aquaculture with gear are further from shore and so are less visible to landowners and the general public. In state waters, DA/BA could consult with DEEP, USACE, the U.S. Coast Guard, and other agencies to identify shellfishing grounds where aquaculture operations and aquaculture with gear would result in the fewest impacts with other users of Long Island Sound. However, if most space has been allocated already or if there is minimal interest in aquaculture with gear, identifying areas suitable for aquaculture gear may be difficult or unnecessary.

11 How do Connecticut’s regulations governing the size of wild-caught shellfish and aquaculture-reared shellfish compare to competitor states?

Most states regulate the minimum size of harvestable shellfish, often with different standards for aquaculture-reared shellfish and wild-caught shellfish. The minimum size of oysters and clams has implications for the sustainability of natural shellfish populations and the market competitiveness of a state’s aquaculture industry. Compared to other states, Connecticut tends to have stricter size minimums for oysters and laxer size minimums for clams.

11.1 Commercial Minimum Sizes of Shellfish

There are two primary factors informing states’ minimum shellfish sizes: natural reproduction and market competition. Shellfish are broadcast spawners that start reproducing when they reach a certain age or size.²³⁶ Laws that require aquaculture-reared shellfish to reproduce before harvest help propagate the natural shellfish stock.²³⁷ The shellfish market, which is largely divided by size, also plays a role. Consumers can buy Eastern oysters as petite oysters (2.5 – 3”), market oysters (3 – 4”),

²³⁶ Organisms that reproduce by broadcast spawning release millions of gametes into the water for fertilization. Element Seafood, *The Life Cycle of Oysters in the Wild* (June 14, 2016), <https://perma.cc/Q7Z3-QVN8>.

²³⁷ Sandwich, Mass. Dep’t of Natural Res., *Why and How to Measure Shellfish*, <https://perma.cc/A6EJ-STJR>.

extra-large oysters (4 – 5”), and jumbo oysters (5” and up).²³⁸ Hard-shell clams are sold as littleneck clams (1.25 – 2”), topneck clams (2 – 2.75”), cherrystone clams (2.75 – 3”), and chowder clams (greater than 3”).²³⁹ Most soft-shell clams are harvested when between one and one-half inches and three inches in diameter.²⁴⁰ To compete in the petite oyster and littleneck clam market, states must allow shellfish to be harvested at those small sizes. State law governing the minimum size of shellfish must adopt the minimum size that best balances both interests for the state.

Most states have adopted minimum sizes for some of their shellfish, and multiple states have also adopted tolerance rates allowing the possession of some undersized shellfish during harvest. The tolerance rate accounts for potential harvesting errors and the need for efficient harvesting.

²³⁸ See, e.g., Connie Lu, *The Culling Process: Oyster Grades and Sizes*, Pangea Shellfish Co. (Aug. 2, 2015), <https://perma.cc/KGM3-N2HE>.

²³⁹ Emily Brooks, Connecticut Farmer & Feast 7 (Global Pequot Press 2011); [Pangea Shellfish, Hard Shell Clams](https://www.pangeashellfish.com/products/hard-shell-clams), <https://www.pangeashellfish.com/products/hard-shell-clams>.

²⁴⁰ Greg Lofts, A Buyer’s Guide to the 7 Clams Everyone Should Know, MarthaStewart.com (July 6, 2016), <https://perma.cc/6ERM-S4JN>.

Table 10 Commercial Minimum Sizes of Oysters

State	Minimum Size – Wild	Minimum Size – Aquaculture	Exceptions
Connecticut ²⁴¹	3” length	3” length	None
Massachusetts ²⁴²	3” length	2.5” length	Tolerance of 5% undersized oysters
Rhode Island ²⁴³	3” length	Not specified	Tolerance of 10% undersized oysters
Maine ²⁴⁴	2.5” length	Not specified	Tolerance of 10% undersized oysters
New Jersey ²⁴⁵	3” length	ADZ 2: 3” length ADZ 3: 3” length Other: not specified	Tolerance of 10% undersized oysters
Virginia ²⁴⁶	3” length	Not specified	None
Maryland ²⁴⁷	3” length	Water column lease: 2” length Submerged land lease: 2” length April to September and 3” length October to March	5% undersized oysters, exempting marketable oysters attached to undersized oyster that cannot be removed without destroying smaller oyster

Most states adjust their minimum size requirements for harvestable oysters depending on whether the oyster was harvested from a natural bed or from an aquaculture site. Connecticut is the only state that does not exempt any aquaculture-raised oysters from the three-inch minimum, which prevents most Connecticut oysters from legally entering the petite oyster market. Most other states have no minimum size or smaller minimum sizes for aquaculture-reared oysters, which allows their aquaculture producers to enter the petite oyster market. The market demand for petite oysters has greatly grown,²⁴⁸ but currently, the legal Connecticut petite oyster market is greatly restricted by the three-inch minimum.

²⁴¹ CONN. GEN. STAT. § 26-234b.

²⁴² 322 MASS. CODE REGS. 6.20(2).

²⁴³ 20 R.I. GEN. LAWS §§ 20-6-11(a), 20-10-13.1.

²⁴⁴ ME. STAT. tit. 12, § 6073-D; *see* 13-188 Me. Code R. § 14.30.

²⁴⁵ N.J. STAT. ANN. §§ 50:3-15.1, 50:3-16.18.

²⁴⁶ 4 VA. ADMIN. CODE § 20-260-30.

²⁴⁷ MD. CODE REGS. 08.02.23.04(E)(2), 08.02.23.04(F), 08.02.04.11.

²⁴⁸ Conn. Gen. Assembly Env’t Comm. Bill 805, 2021 Reg. Sess., available at <https://perma.cc/ERU9-5GLM>; Carole Engle, *Aquaculture Businesses: A Practical Guide to Economics and Marketing* §§ 3.2.3, 5 (5M Publishing Ltd. 2020).

There may be a market loss in restricting the harvest of petite oysters, but there are benefits to the three-inch minimum. Larger oysters can provide more ecosystem benefits, such as filtering water at a higher rate.²⁴⁹ Larger oysters also have more productive spawning events, so a three-inch minimum can help to sustain the natural oyster beds in the Long Island Sound.²⁵⁰ Reducing the minimum size of oysters could mean less productive spawning events, which would disadvantage the public oyster beds that benefit from the spawning. A state representative who helped enact the three-inch minimum size has stated that at the time of enactment in the early 2000s, the goal of the three-inch minimum size was to rebuild oyster stocks after they were decimated by catastrophic diseases in the 1990s.²⁵¹ Now, two decades later with a strong oyster industry, that aim may not be as compelling. Connecticut is unique among its neighboring oyster competitors in its strict three-inch minimum size, and while it may be beneficial for wild oyster stocks and the environment, it may come at the cost of Connecticut's ability to freely and fully compete in the oyster market, including the petite oyster market.

In addition to its unique three-inch size minimum for all aquaculture-reared oysters, Connecticut is also distinct because it has not adopted a tolerance rate for harvesting undersized oysters. Connecticut and Virginia are the only two states here that have not established tolerance levels for undersized oysters. The other states have tolerances of 5% or 10% that protect harvesters from fines for the incidental harvest of smaller oysters. The absence of a tolerance rate considers incidental harvest of undersized oysters as legal violations. The absence of a tolerance is comparatively strict and may interfere with the efficient harvest of oysters, regardless of whether Connecticut strictly enforces the three-inch minimum.

²⁴⁹ *Id.*; Jon G. Stanley & Mark A. Sellers, U.S. Fish & Wildlife Serv., American Oyster 10 (1986), available at <https://perma.cc/Y9RW-BMCU>.

²⁵⁰ *Id.* at 3.

²⁵¹ Conn. Gen. Assembly Env't Comm. Bill 805, 2021 Reg. Sess., available at <https://perma.cc/ERU9-5GLM>; see Fred Musante, Oysters R Not in Season Because of Parasites . . . , N.Y. Times, Nov. 29, 1998.

Table 11 Commercial minimum sizes of hard shell clams

State	Minimum Size – Wild	Minimum Size – Aquaculture	Exceptions
Connecticut ²⁵²	Not specified, but DA/BA policy imposes 1.5” length minimum	Not specified, but DA/BA policy imposes 1.5” length minimum	None
Massachusetts ²⁵³	1” hinge width	7/8” hinge width	Tolerance of 5% undersized hard-shell clams
Rhode Island ²⁵⁴	1” hinge width	1” hinge width	Tolerance of 10% undersized hard-shell clams
Maine ²⁵⁵	1” hinge width	Not specified	Tolerance of 5% undersized hard-shell clams
New Jersey ²⁵⁶	1.5” shell length	1.5” shell length	Tolerance of 3% undersized hard-shell clams
Virginia	Not specified	Not specified	None
Maryland ²⁵⁷	1” hinge width	1” hinge width	Tolerance of 10% undersized hard-shell clams

Like for oysters, policy makers likely strongly consider the market and the propagation of natural stock when implementing a minimum size for hard-shell clams. Most hard-shell clams begin reproducing when they reach one inch to one and one-quarter inch in length.²⁵⁸ Typically, the hinge width is smaller than the length of the clam, so maintaining a minimum hinge width of one and one-half inch generally allows the clams “‘protected time’ to breed” at least once, which should fertilize and increase the natural clam stock.²⁵⁹ Connecticut has not enacted laws establishing minimum sizes for harvesting hard-shell clams commercially, unlike most of the other states here. However,

²⁵² Municipalities may apply stricter standards. *See, e.g.,* Groton Shellfish Comm’n, *Groton Shellfish Management Plan 9* (2020) (minimum size for hard-shell and soft-shell clams is 2” length); Conn. Sea Grant, *2020 Guidance for Recreational Shellfish Harvesting in Connecticut 4* (2020).

²⁵³ 322 MASS. CODE REGS. 6.20(2).

²⁵⁴ 20 R.I. GEN. LAWS § 20-6-11(a).

²⁵⁵ ME. STAT. tit. 12, § 6073-D; 13-188 ME. CODE R. § 10.04.

²⁵⁶ N.J. ADMIN. CODE § 7:25-9.5.

²⁵⁷ MD. CODE REGS. 08.02.07.03.

²⁵⁸ Gef Flimlin, Barnegat Bay Shellfish, The life cycle of the hard calm [sic], available at <https://perma.cc/AX83-AYRX>.

²⁵⁹ *Id.*; Rutgers Coop. Research & Extension, *Hard Clam Aquaculture in New Jersey* (2003), available at <https://perma.cc/P2JW-2HRQ>.

through license restrictions a minimum size of one and one-half inches is set for hard clams. Most states require harvested clams to be one inch at hinge width, although New Jersey, which has a robust clam industry, is slightly more restrictive.²⁶⁰ While the licensing does pose a minimum size, Connecticut may not need to implement a regulatory change for the commercial minimum size for hard clams because the smallest sector of the hard clam market begins at one and one-half inches, so the smallest clams a commercial harvester will likely harvest are littleneck clams, starting at one and one-half inch. However, if Connecticut wanted to implement greater protections for its natural hard-shell clam stock, it could implement a commercial minimum through regulation, like most other states, without interfering with the littleneck clam market.

Again, Connecticut and Virginia are the only two states here that have not established regulatory tolerance levels for undersized hard-shell clams. In other states, harvesters can harvest between 3% and 10% of undersized hard-shell clams without violating harvest restrictions. New Jersey has the smallest tolerance, 3%, which aligns with its interest in maintaining its strong hard-shell clam industry by ensuring the clams reach reproducing sizes. Without a minimum, Connecticut has no need for a tolerance rate for undersized hard-shell clam harvests. If Connecticut adopted a minimum size regulation in the future, it could also consider whether to create an exception for the incidental harvest of undersized clams.

Table 12 Commercial minimum sizes of soft shell clams

State	Minimum Size – Wild	Minimum Size – Aquaculture	Exceptions
Connecticut ²⁶¹	Not specified	Not specified	None
Massachusetts ²⁶²	2” length	Not specified	Tolerance of 5% undersized soft-shell clams
Rhode Island ²⁶³	2” length	Not specified	Tolerance of 10% undersized soft-shell clams
Maine ²⁶⁴	2” length	Not specified	Tolerance of 10% undersized soft-shell clams
New Jersey	Not specified	Not specified	None
Virginia	Not specified	Not specified	None
Maryland ²⁶⁵	2” length	Not specified	Tolerance of 5% undersized soft-shell clams

²⁶⁰ Tara Nurin, Oysters, Clams and More: Future of Green Farming in Garden State?, NJ Spotlight News, Nov. 1, 2016.

²⁶¹ CONN. GEN. STAT. § 26-235.

²⁶² 322 MASS. CODE REGS. 6.20(2).

²⁶³ 20 R.I. GEN. LAWS §§ 20-6-11(a), 20-10-13.1.

²⁶⁴ ME. STAT. tit. 12, §§ 6073-D, 6681.

²⁶⁵ MD. CODE REGS. 08.02.02.05.

Like for hard-shell clams, Connecticut has not established regulatory size minimums for commercially harvested soft-shell clams. The other New England states have a two-inch minimum for wild soft-shell clams. Soft-shell clams reach sexual maturity at around one and one-half inches, so a two-inch minimum allows the clams to reproduce and propagate the wild soft-shell clam stock.²⁶⁶ No state here has a minimum for aquaculture-reared soft-shell clams, perhaps because soft-shell clam aquaculture is uncommon in these states and regulating minimum sizes is unnecessary. Connecticut may be missing out on the benefits of requiring soft-shell clams to reach maturity and reproduce for the benefit of the propagation of natural soft-shell clams. However, this aligns with most other states. Soft-shell clams are not a major industry and most states do not regulate their minimum sizes.²⁶⁷

Without a minimum size, Connecticut does not need a tolerance limit. If it adopted a soft-shell clam minimum size in the future, it could consider whether to implement a tolerance limit, as well.

11.2 Policy Options

The commercial minimum sizes for shellfish dictate when aquaculture producers harvest their shellfish. Connecticut does not distinguish between regulating the minimum sizes of aquaculture-reared shellfish and wild-caught shellfish, which differs from the other states' treatment of aquaculture-reared shellfish. The disparity is especially relevant for oysters, Connecticut's most valuable aquaculture product. Aquaculture-reared oysters are subject to the same three-inch minimum as oysters harvested from natural beds, excluding them from the petite oyster market. If Connecticut wanted to expand its existing oyster industry, it could consider the following options.

11.2.1 Adopt smaller commercial minimum oyster size for aquaculture-reared oysters

If Connecticut wanted its aquaculture-reared oysters to compete in the petite oyster market, it would need to reduce the current three-inch minimum size. Smaller oysters could be sold in the petite oyster market, which could stimulate oyster farming and increase the economic value of the oyster industry.²⁶⁸

There are various ways in which Connecticut could implement a reduction in minimum size. First, it could reduce the minimum size for all oysters, both wild stock and aquaculture-reared oysters. If it wanted to preserve some of the benefit of spawning oysters, it could reduce the minimum size for aquaculture-reared oysters only. Wild oysters would still be subject to a three-inch minimum and would propagate the wild stock. Most states use a version of this method to maintain some propagation of wild stock while also allowing their aquaculture producers to enter the petite oyster market. However, this method is hard to enforce because of the difficulty in ascertaining where the

²⁶⁶ CSI-Maine, The Clam Lifecycle, <https://perma.cc/RA3Q-9253>.

²⁶⁷ See, e.g., Muriel Hendrix, Maine's first soft-shell clam farm thriving, *Aquaculture North America*, Mar. 1, 2016 (Maine has one soft-shell clam farm).

²⁶⁸ John Burgeson, Oysters: A complicated economy and ecology, *CTPost*, May 25, 2013.

product came from. Some companies sell products from both sources. Enforcement would likely be costly and burdensome for regulators.

Alternatively, Connecticut could limit when the minimum size is reduced. For example, Maryland, which also has a primarily bottom culture oyster aquaculture industry, has implemented a two-inch minimum for most aquaculture-reared oysters in response to the “strong market demand” for smaller oysters and to prevent their growers from working at a competitive disadvantage.²⁶⁹ Maryland reduced the minimum size for oysters grown on submerged bottoms from April to September, when the public oyster fishery is closed (to prevent confusion among those harvesting wild oysters, commercially and recreationally).²⁷⁰ Connecticut could consider a seasonal limit, but it may not be as effective as in Maryland because Connecticut recreational shellfishers do not harvest in the deeper waters seaward of the shellfish jurisdiction line where many oyster farms are located.

Connecticut could also delineate areas where petite oysters may be harvested by zone. Implementing a two-inch minimum beyond the shellfish jurisdiction line, in deeper waters, may be a clear and workable delineation for a two-inch size minimum in Connecticut, and it would encompass the majority of Connecticut’s allocated shellfishing grounds. Delineation by area is similar to New Jersey’s delineation by ADZ. However, the ADZs were created out of shellfishing grounds granted with those rights attached. In Connecticut, most of the shellfishing grounds are already allocated and determining regions in which space allocations are granted the ability to harvest petite oysters could be difficult.

Alternately, in Maryland, unlike the bottom culture leases subject to seasonal changes, the water column leases are always subject to a two-inch minimum. Connecticut could grant aquaculture space allocations using gear to grow oysters in the water column the ability to harvest smaller oysters. Recreational shellfishers would have no confusion over permissible sizes because they can clearly see where a space allocation using gear exists, and it could promote the growth of off-bottom culture in Connecticut. However, much of Connecticut aquaculture is bottom culture and large swathes of the industry would be excluded from the minimum size reduction and the petite oyster market.

If Connecticut wanted to give its oyster aquaculture producers the opportunity to legally enter the petite market, it would need to change its minimum size laws. There are multiple ways it could do that without completely negating the beneficial impact the three-inch minimum size has on the propagation of wild oysters.

11.2.2 Adopt tolerance rate for undersized shellfish

Most states have exceptions for harvest sizes to account for smaller shellfish that are incidentally harvested with the legally-sized shellfish. Connecticut and Virginia are the only states reviewed here

²⁶⁹ Proposed Action on Reg. Text, 2013 Md. Reg. Text 325415 May 3, 2013.

²⁷⁰Md. Dep’t of Natural Res., Recreational Oystering in Maryland, <https://perma.cc/Z4TA-ADXX>.

that do not have tolerance limits for oysters, hard-shell clams, or soft-shell clams. New Jersey also has not adopted a tolerance for undersized soft-shell clams.²⁷¹

When harvesting, it can be difficult to maintain accuracy while sorting out shellfish, and the tolerance limit can give harvesters a range of error so they do not incidentally violate the size requirements.²⁷² Connecticut could join with most other states and adopt a tolerance limit for shellfish. Determining the ideal tolerance limit for shellfish in Connecticut could be difficult. Connecticut would have to consider multiple factors, such as a fair error rate and how much incidental cultch and undersized shellfish removal the oyster population could handle.²⁷³ Additionally, enforcement could be more time-consuming and costlier for both law enforcement and harvesters because the tolerance limits require a calculation of the percentage of undersized shellfish, which could involve counting or weighing the shellfish.²⁷⁴ Allowing any undersized shellfish to be harvested also reduces the ecosystem services provided by shellfish.²⁷⁵ However, most states acknowledge that incidental harvesting errors occur during efficient harvesting by using a tolerance limit to account for those factors. Connecticut could join its neighboring states and adopt a law giving its shellfish harvesters similar protections.

11.2.3 Adopt statutory minimum size for commercially-harvested hard shell clams

There is no statutory minimum size for commercially-harvested hard shell clams in Connecticut, although there is a one and one-half inch minimum for recreationally-harvested hard shell clams.²⁷⁶ DA/BA has adopted the one and one-half inch minimum for commercially-harvested hard shell clams through policy. If DA/BA wanted to establish the one and one-half inch minimum as binding law for commercially-harvested hard shell clams, it could promulgate a regulation adopting the minimum. Alternatively, it could work with the legislature to amend existing statutes to adopt the minimum.

12 Which regulatory authorities have established seaweed aquaculture space allocation provisions?

Seaweed is a \$12 billion global industry, and the United States is a relatively new player in the commercial industry.²⁷⁷ Seaweed aquaculture in the Northeast, primarily of sugar kelp (*Saccharina*

²⁷¹ See N.J. Aquaculture Advisory Council, Opportunities and Potential for Aquaculture in New Jersey (2011), <https://perma.cc/N23Y-WZY3>. (discussing New Jersey oysters, hard clam, and marine baitfish aquaculture but not soft-shell clams).

²⁷² Proposed Action on Reg. Text, 2013 Md. Reg. Text 325415 May 3, 2013.

²⁷³ See N.C. Marine Fisheries Comm'n, Fiscal Note for Proposed Amendments to the Oyster and Hard Clam Fishery Management Plans 5 (2016), <https://perma.cc/2AFH-CAHB>.

²⁷⁴ See *id.* at 5, 6.

²⁷⁵ *Id.* at 6.

²⁷⁶ CONN. GEN. STAT. § 26-235.

²⁷⁷ Food and Agric. Org. of the United Nations, *The State of World Fisheries and Aquaculture* 17 (2018), available at <https://perma.cc/YL53-2VC8>; JangKyun Kim et al., Opportunities, challenges and future directions of open-water seaweed aquaculture in the United States, 58 *Phycologia* 446, 446 (2019).

latissima), is small but growing because of its potential for use in food, cosmetics, biofuels, and other products.²⁷⁸ Seaweed cultivation can bring environmental and economic benefits to a state, and introducing seaweed to an existing shellfish aquaculture space allocation is a way for aquaculture producers to make use of a shellfish aquaculture space allocation in winter, adding value to the space allocation and creating income diversification for producers who were previously reliant on their shellfish crop.²⁷⁹ Because seaweed is a new aquaculture product, many states have begun to incorporate it into their aquaculture regulatory schemes, but there are still challenges implementing legal changes for an evolving industry. Currently, seaweed producers in Connecticut and surrounding states can cultivate seaweed within existing shellfish aquaculture space allocations or in standalone seaweed farms.²⁸⁰ New Jersey, Virginia, and Maryland currently do not have seaweed aquaculture operations and will not be considered in this section.

12.1 Seaweed Aquaculture Space Allocations

In the last decade, aquaculture producers have begun to cultivate seaweed in Connecticut, Rhode Island, Maine, and Massachusetts. With a new class of aquaculture product, states have approached the spatial allocation of seaweed farms in different ways.

Most northeastern states, including Rhode Island, Maine, and Massachusetts, have largely integrated seaweed aquaculture into their existing legal framework for shellfish aquaculture. Maine DMR and Rhode Island CRMC issue leases for seaweed aquaculture through the same processes as for shellfish aquaculture leases.²⁸¹ In Maine, a standard lease is up to \$200 per acre, and in Rhode Island a lease ranges from \$75 to \$150 per acre, depending on the size of the farm.²⁸² Maine also issues limited-purpose licenses for seaweed cultivation, which are \$100 annually for residents and \$400 annually for non-residents.²⁸³ Limited-purpose licenses are annually renewable, 400 square foot plots that undergo a streamlined review process.²⁸⁴ They are often used for small commercial efforts or experimentation in new areas or with new species.²⁸⁵ In Massachusetts, municipalities can grant a license for seaweed aquaculture in the same way as for shellfish aquaculture, for fees ranging from

²⁷⁸ Anoushka Concepcion et al., *Seaweed Production and Processing in Connecticut: A Guide to Understanding and Controlling Potential Food Safety Hazards* 1 (2020), <https://perma.cc/WZZ9-PZUZ>.

²⁷⁹ Liza Mayer & Lynn Fantom, *Researchers lay groundwork for emerging US seaweed industry*, Aquaculture North America (March 11, 2020), <https://perma.cc/UL72-XZRA>.

²⁸⁰ See, e.g., Me. Dep't of Marine Res., *Springtide Seaweed LLC [Standard Lease Application] Findings of Fact, Conclusions of Law, and Decision* (May 14, 2019), <https://perma.cc/Q3CR-GDB8> (approved application for standard aquaculture lease to grow varieties of seaweed); Me. Dep't of Marine Res., *Joe Larrabee [Aquaculture Lease Renewal Application] Findings of Fact, Conclusions of Law & Decision* (Oct. 7, 2014), <https://perma.cc/HTH5-UM88> (approved application for standard aquaculture lease to grow seaweed and mussels); R.I. Coastal Res. Mgmt. Council, Application 2019-12-055 (approved application to grow oysters and kelp), R.I. Coastal Res. Mgmt. Council, Application 2015-07-027 (approved application for kelp farm).

²⁸¹ Me. Aquaculture Innovation Ctr., *Leasing Options*, <https://perma.cc/5J64-2DKB>; see Press Release, R.I. Coastal Res. Mgmt. Council, CRMC permits first exclusive kelp farm in RI (June 6, 2016), <https://perma.cc/KUC6-W6TT>.

²⁸² ME. STAT. tit. 12, § 6072(9); 650 R.I. CODE R. § 20-00-1.1.12(E)(1).

²⁸³ See ME. STAT. tit. 12, § 6072(6).

²⁸⁴ See *id.*

²⁸⁵ Antonina Pelletier, *Aquaculture Leases – Understanding the Process*, Me. Lobstermen's Cmty. All. (July 5, 2019), <https://perma.cc/PYP8-EX17>.

\$5 to \$25 per acre, depending on the municipality.²⁸⁶ These states have simply integrated seaweed into existing aquaculture space allocation mechanisms.

In contrast to those states, Connecticut created a new mechanism for spatial allocation of seaweed farms. Connecticut enacted a new law to “address[] the absence of that administrative framework required to advance seaweed cultivation as an industry”²⁸⁷ in order to “regain competitiveness and bolster [its] agricultural markets.”²⁸⁸ Although Connecticut commonly leases lands for shellfish aquaculture, Connecticut General Statutes (CGS) § 22-11j created a licensing system for seaweed. The Connecticut seaweed licensing system has two major differences from Connecticut shellfish aquaculture leasing. First, unlike the leases issued for shellfish aquaculture, DA/BA issues licenses for a five-year term for an annual fee of \$25 per acre, although licenses issued in existing shellfish leases are exempt from the fee.²⁸⁹ Secondly, DA/BA is the exclusive seaweed licensing authority in both state and town waters,²⁹⁰ as opposed to the division of authority between DA/BA and local shellfish commissions for shellfish aquaculture leases.

*Table 13 Comparing Connecticut aquaculture leases and licenses*²⁹¹

	Leases	Licenses
Product	Shellfish	Seaweed
Authority	State waters: DA/BA Town waters: shellfish commissions	DA/BA
Fee	State waters: varies by bid Town waters: varies by municipality	\$25/acre; waived if part of a shellfish aquaculture lease
Term	State waters: up to 10 years Town waters: varies by municipality	Up to 5 years
Residency Requirement	State waters: Connecticut residents and residents of states that lease shellfishing grounds to Connecticut residents	None
Transferability	Transferable upon approval of DA/BA	Not transferable

²⁸⁶ MASS. GEN. LAWS ch. 130, § 60; Marine Affairs Inst., Roger Williams Univ. Sch. of Law, Legal and Regulatory Context for Shellfish Aquaculture Siting and Permitting in Massachusetts 9 (June 2018). <https://perma.cc/VG3A-S3K2>.

²⁸⁷ *Hearing on H.B. 6318 Before the Joint Envtl. Committee*, 2013 Gen. Assemb. Veto Sess. 16 (Conn. 2013) (statement of Commissioner Steven Reviczky), <https://perma.cc/S9CN-6UNZ>.

²⁸⁸ *Id.* at 17.

²⁸⁹ CONN. GEN. STAT. § 22-11j(a).

²⁹⁰ *Id.*

²⁹¹ *Id.*, *id.* §§ 26-194, 26-257a.

Some growers have commended Connecticut for its foresight enacting the licensing process to support the new industry.²⁹² Shellfish leases in state waters can exceed \$100 per acre, which, if applied to seaweed aquaculture, would likely chill experimentation with new seaweed aquaculture products because the market for seaweed is not yet fully established and profits are not assured.²⁹³ The adoption of a specified license fee and a shorter term allows seaweed producers to experiment with seaweed aquaculture at a lower cost and for a limited time, reflecting the uncertainty of a new crop.

Seaweed aquaculture in the Northeast is still developing, and the states vary in how they are supporting the seaweed industry. Most states have incorporated seaweed into their existing aquaculture regulatory regime, with the same space allocation options and fees as for shellfish aquaculture. Connecticut is the only one that created a separate space allocation system specific to the needs of its seaweed aquaculture industry. By giving seaweed producers a clear legal framework that reflects the needs of the seaweed industry, Connecticut indicates it is responsive to the needs of a changing aquaculture industry.

12.2 Adding Seaweed to a Shellfish Aquaculture Operation

Most states require aquaculture producers to amend the space allocation or permit if they want to supplement their shellfish aquaculture operation with seaweed. In Maine, Massachusetts, and Rhode Island, amendments to add seaweed follow the same amendment procedures that apply for other changes in species or gear. When a lease amendment is proposed in Maine, DMR must notify landowners within 1,000 feet of the lease and hold a fourteen day public comment period.²⁹⁴ DMR may approve the amendment as long as it does not “materially [alter] the findings of the original decision, or . . . result in a change to the original lease conditions.”²⁹⁵ In Rhode Island, CRMC can modify an assent if a majority of CRMC members vote in favor of the modification.²⁹⁶ Alternatively, the director of CRMC may modify an assent at their discretion if it is “consistent with the prior approval” and the impact will “be less than or equal to the existing Assent or decision.”²⁹⁷ In Massachusetts, the process to amend licenses varies by municipality. For example, in Duxbury, a “significant” license amendment that changes “the form . . . or category of aquaculture” goes through a public hearing, after which the board of selectmen approve or deny the amendment.²⁹⁸ In Barnstable, all proposed changes or additions of “material investments” such as gear must be submitted to the Natural Resources Program, which will review the amendment before the town manager approves or denies the change.²⁹⁹ These processes can be lengthy, and opening up the

²⁹² Kevin Zimmerman, Kelp harvesting on the upswing in Connecticut’s waters, Westchester & Fairfield Cty. Bus. Js. (Mar. 25, 2018), <https://perma.cc/6TVT-245D>.

²⁹³ See Alan Yu, Kelp Has Been Touted As The New Kale, But It Has Been Slow To Catch On, NPR (June 3, 2019), <https://perma.cc/A79S-H5GW>.

²⁹⁴ *Id.*

²⁹⁵ 13-188 ME. CODE R. § 2.44.

²⁹⁶ 650 R.I. CODE R. § 10-00-1.8.

²⁹⁷ *Id.*

²⁹⁸ See Duxbury, Mass., Shellfish Aquaculture Grant Regs. §§ 6, 7, 27.

²⁹⁹ Barnstable, Mass., Code § 407-55.

amendment to the general public through comment periods or public hearings can obstruct a quick resolution of the request.

In Connecticut, by contrast, a seaweed producer does not amend an existing lease. Rather, the seaweed producer applies for a seaweed license, which can be applied to an existing lease. To authorize seaweed on an existing lease, the leaseholder must submit a seaweed license application to DA/BA, which will review the application for use conflicts before executing a Seaweed Area License Agreement with the applicant.³⁰⁰ Public hearings and comment periods are not required for the license. By consolidating decision making with DA/BA, aquaculture producers can obtain a license efficiently. However, the USACE and DEEP permitting processes to use gear and begin cultivation can be a significant obstacle to commencing seaweed aquaculture.³⁰¹ Depending on the size, scope, scale and location of the proposed project, this process may involve public hearings and comment periods.

Unlike the other states where space allocation fees are set, Connecticut could not incorporate seaweed into its existing leasing structure in state waters if it wanted to encourage seaweed cultivation because the competition and high lease prices determined by bidding would deter investment in experimental seaweed aquaculture. With the seaweed licensing system that complements shellfish aquaculture leasing, Connecticut created an effective way to allocate seaweed licenses. Unlike other states, public hearings and public comment periods are not required, so the licensing process can be quicker and easier for potential seaweed producers.

12.3 Policy Options

One of Connecticut's strengths is its responsiveness to the changing needs and trends of the aquaculture industry, as evidenced by its enactment of a seaweed aquaculture statute in 2014. To continue fostering the growth of the industry, Connecticut could consider the following options.

12.3.1 Maintain a responsive and flexible legal framework

The seaweed aquaculture industry in northeastern states is still in its infancy. As the industry develops, its legal needs may change. The Connecticut legislature has already demonstrated its interest in developing a competitive seaweed industry with the 2014 seaweed law. Maintaining the ability to legislate in response to the industry will be important for Connecticut to continue providing a legal environment for the industry to grow.

³⁰⁰ Conn. Aquaculture Permitting Guide, *supra* note 24, at 11.

³⁰¹ Conn. Dep't of Agric., A New Sea Vegetable Is Poised for Growth, if These New Farmers Can Develop a Market (Feb. 28, 2018), <https://perma.cc/YB6W-WVZN>.

12.3.2 Consider fee structure for seaweed license on shellfishing grounds leased for under \$25/acre

Connecticut could consider whether to establish a fee structure for seaweed and shellfish aquaculture operations. Connecticut's \$25/acre seaweed license is waived for seaweed licenses in existing shellfish leases. The minimum lease price for shellfishing grounds in state waters is \$4/acre, although leases can now go for hundreds of dollars in the competitive bidding process.³⁰² If leaseholders who pay less than \$25/acre for shellfish leases apply for a seaweed license, they will pay less than \$25/acre to lease and license the area for both shellfish and seaweed aquaculture. A fee structure maintaining the \$25/acre seaweed license fee for aquaculture producers who lease shellfishing grounds for under \$25/acre could ensure DA/BA recoups a fair licensing fee for its lease and license of waters. By charging the extra \$25/acre for seaweed on top of shellfish aquaculture leases below \$25/acre, Connecticut would still be allocating its grounds at much lower values than Rhode Island and Maine and sometimes at a comparable fee to the \$25/acre license fee many Massachusetts municipalities have adopted. However, if Connecticut is seeking to establish a competitive seaweed industry, waiving the fee for all seaweed licensing in shellfish leases may help encourage as many new producers as possible.

12.3.3 Adopt a residency requirement for seaweed aquaculture licenses

Connecticut could consider whether to adopt a residency requirement for seaweed aquaculture licenses similar to its residency requirements for shellfish aquaculture leases in state waters. Currently, shellfish aquaculture leases in state waters are restricted to Connecticut residents and residents of states which will allocate shellfishing grounds to Connecticut residents.³⁰³ However, there is no similar restriction for seaweed aquaculture licenses. If Connecticut wanted to restrict its seaweed aquaculture licenses to residents and residents of states that allocate aquaculture shellfishing grounds to Connecticut residents, it could amend the existing seaweed aquaculture legislation to include this requirement. By doing so, Connecticut residents and residents of states with reciprocal aquaculture rights would enjoy the same protections in both seaweed and shellfish aquaculture.

13 How have Connecticut municipalities utilized their authority to regulate commercial aquaculture space allocations in town waters?

With a few exceptions,³⁰⁴ Connecticut municipalities are authorized to allocate their local shellfishing grounds through the local selectmen or local shellfish commissions, yet few of the municipalities have established publicly available commercial aquaculture regulations and policies. Although state law does not require municipalities to establish regulations, it requires shellfish commissions to

³⁰² See Jan Ellen Spiegel, *How to Seed the Clam Fleet*, N.Y. Times (Jan. 29, 2006).

³⁰³ CONN. GEN. STAT. § 26-194(a).

³⁰⁴ See CONN. GEN. STAT. § 26-257 (the shellfishing grounds in town waters in West Haven, New Haven, Milford, and Westport are leased by DA/BA.)

develop shellfish management plans.³⁰⁵ Thirteen of Connecticut’s shellfish commissions have published shellfish management plans, and among those, three have adopted commercial aquaculture regulations. The information included in shellfish management plans varies by town, so some towns have published more information about their aquaculture resources, laws, and policies than others.

13.1 Authority Granted to Municipalities

Connecticut and Massachusetts are the only states in this review that grant some aquaculture space allocation authority to municipalities. There are many similarities in the types of activities Massachusetts and Connecticut municipalities can regulate, as well as some differences.

The bounds of municipal shellfishing authority are similar in the two states. Connecticut municipalities may establish shellfish commissions, which “shall have charge of all the shellfisheries and shellfish grounds lying in such municipality”³⁰⁶ In municipalities that do not establish shellfish commissions, the local selectmen have charge of shellfishing grounds in town waters.³⁰⁷ The shellfishing grounds in four towns – New Haven, West Haven, Milford, and Westport – are managed by DA/BA and thus do not have commercial shellfishing authority.³⁰⁸ In Massachusetts, municipal selectmen or municipal councils have licensing authority over shellfishing grounds in their municipality.³⁰⁹ Both states require municipalities to follow certain procedures to allocate aquaculture grounds, including giving public notice and holding a public hearing,³¹⁰ staking out the area,³¹¹ and recording all space allocations.³¹² However, Massachusetts state law sets restrictions on local authority. State law sets a residency requirement,³¹³ a ten-year limit on licenses,³¹⁴ and an annual license fee range between \$5/acre and \$25/acre, to be decided by the municipality.³¹⁵ Although the municipality regulates the majority of the licensing process, Massachusetts DMF must certify that the licensing and operation of aquaculture in that location will “cause no substantial adverse effect on the shellfish or other natural resources of the city or town” before the municipality can issue the license.³¹⁶ In Connecticut, most municipalities have authority over town waters that affect their waters and are visible from the shore. In Massachusetts, municipalities have authority over all waters – unlike Connecticut, the state does not license waters far from shore. Connecticut’s division of authority between DA/BA and the shellfish commissions places space allocation authority in local hands. Like in Massachusetts, giving local governments decision-making authority is likely important

³⁰⁵ *Id.* § 26-257a.

³⁰⁶ *Id.*

³⁰⁷ *See id.* § 26-240(a).

³⁰⁸ CONN. GEN. STAT. § 26-257

³⁰⁹ MASS. GEN. LAWS. ch. 130, § 57.

³¹⁰ *Id.*; CONN. GEN. STAT. § 26-240.

³¹¹ *See* CONN. GEN. STAT. § 26-240; MASS. GEN. LAWS ch. 130, § 61.

³¹² CONN. GEN. STAT. § 26-243, MASS. GEN. LAWS ch. 130, § 62.

³¹³ MASS. GEN. LAWS ch. 130, § 55.

³¹⁴ *Id.* § 57.

³¹⁵ *Id.* § 64.

³¹⁶ *Id.* § 57.

because local governments and local citizens will interact with the aquaculture farms on a regular basis, either because the farms are visible to the general public or interfere with recreation or improve local water quality. Giving the municipalities authority to allocate shellfishing grounds for aquaculture farms gives them a voice in the sometimes-controversial aquaculture siting process. However, in both states, the state agencies have complementary authority to ensure aquaculture aligns with state goals.

13.2 Municipal Application of Aquaculture Space Allocation and Planning Authority

Most Connecticut municipalities have the authority to regulate the allocation of shellfishing grounds for aquaculture, usually through establishing aquaculture regulations and shellfish management plans. In practice, however, few municipalities have established regulations, and shellfish management plans are irregularly updated.

Stonington, Groton, and East Lyme are the only local authorities that have created publicly-available aquaculture leasing regulations, found in their shellfish management plan.³¹⁷ In contrast to these few Connecticut municipalities that developed regulations as part of policy documents, most Massachusetts municipalities have codified their shellfishing and aquaculture regulations as by-laws or in the municipal code.³¹⁸ Massachusetts' approach may make it easier for aquaculture producers and citizens to access space allocation regulations because many are published online in the municipal code, instead of within a potentially lengthy policy document.

Connecticut requires shellfish commissions to “prepare and periodically update a shellfish management plan,” which will be reviewed by DA/BA and the local board of selectmen or mayor.³¹⁹ Most shellfish commissions have created shellfish management plans, although the plans vary in their content and how recently they have been developed or updated. Among the thirteen existing plans, Groton, East Lyme, and Stonington have more comprehensive plans that includes goals, resource assessments, and regulations. Other municipal plans include less information. Some, like the one-page plan for Greenwich, have only goals.³²⁰ Guilford's plan includes goals and assessments of the local industry.³²¹ Waterford's plan includes rules for the shellfish commission and an assessment of local resources.³²² In general, the shellfish management plans are dated. In 2016, Connecticut Sea Grant and DA/BA developed a template for shellfish management plans for municipalities to use. A few shellfish commissions have since updated their plans recently, including Groton, which updated its shellfish management plan in 2020. However, most others date from the

³¹⁷ See Stonington Shellfish Comm'n, Commercial Aquaculture License Information Package and Application 4-14 (2020); Groton Shellfish Comm'n, Shellfish Management Plan 60-71 (2020); East Lyme Shellfish Comm'n, East Lyme Shellfish Management Plan 14-33 (2005).

³¹⁸ See, e.g., Falmouth, Mass., Code §§ 275-23 – 275-35; Barnstable, Mass., Code §§ 407-46 – 407-68; Orleans, Mass., Shellfish Grant Regulations (2000); Marion, Mass., Rules & Regulations for Aquaculture Licenses (1996), <https://perma.cc/2BUK-BFV6> (twenty-six out of sixty municipalities have adopted aquaculture regulations).

³¹⁹ CONN. GEN. STAT. § 26-257a.

³²⁰ See generally Greenwich Shellfish Comm'n, *Shellfish Management Plan* (2005).

³²¹ See generally Guilford Shellfish Comm'n, *Shellfish Management Action Plan* (2006).

³²² See generally Waterford Shellfish Comm'n, *Shellfish Resource Management Plan* (2005).

early to mid-2000s. The municipalities may meet the requirement to have a shellfish management plan, but the contents of the plans are inconsistent because the law does not specify what information must be included or how often they should be updated. If updated regularly, the shellfish management plans can be a resource for interested aquaculture producers and for local citizens who might be affected by aquaculture activities. However, the shellfish management plans that have not been updated for over a decade may not be as helpful to interested parties.

13.3 Policy Options

Although not all Connecticut municipalities choose to establish shellfish and aquaculture regulations, all local shellfish commissions must develop and periodically update a shellfish management plan. The existing shellfish management plans contain varying types of information, and some plans have not been updated in over a decade. Amending state law to define the state's expectation for shellfish management plans could clarify municipal policies and ensure management plans stay up-to-date.

13.3.1 Amend the law to clarify the contents of a shellfish management plan and how often municipalities should update the plans

If Connecticut wanted shellfish management plans to contain consistent and updated information across municipalities, the statute requiring the plans could be amended to give municipalities more specific directives to follow. Currently, the shellfish management plans must be updated “periodically,” and there are no formal guidelines as to the content that should be included in a plan. In 2016, Connecticut Sea Grant and DA/BA developed a template for shellfish management plans. However, because there was no official mandate for updating plans, only three municipalities took advantage and updated their respective plans. Amending the statute to direct the municipalities to update their plans at specified time intervals and with specified information could ensure that the plans in each municipality include up-to-date information valuable to the state, local shellfishermen, and other interested parties.

13.3.2 Require shellfish management plans to be published online

At least thirteen shellfish commissions have prepared shellfish management plans, but not all of the plans are easily accessible online. Amending the law to require the shellfish commissions to post the shellfish management plans on the shellfish commission website or municipal website could make them more accessible to the public, which could allow local shellfishermen access to the information regulating their business and provide an opportunity for citizens to learn about the local shellfishing and aquaculture industries.

14 Do Connecticut’s commercial aquaculture laws and authority as written accurately reflect the practices now?

This section identifies provisions of Connecticut aquaculture laws that are inconsistent with current aquaculture practices. Some legal aquaculture concepts date from the 1800s and have not been properly updated for the modern aquaculture regulatory system. Historic laws and laws that do not correspond to the state of aquaculture in Connecticut today could be amended to respond to new practices in the industry, renew the intent of the statutes, or clarify the greater statutory scheme.

There are six primary areas in which the legislature could review state law to ensure consistency between aquaculture practice and law. Updating the laws could provide a clearer and more precise statement of aquaculture law and practice.

14.1 Defining Terms of Art

Several frequently used terms are not defined in the statutes or regulations, such as “franchise” and “lease.” Defining these and other common terms could assist in interpretation and regulatory certainty.

Connecticut’s aquaculture statutes contain multiple terms of art with specific histories that are not apparent to a reader. For example, CGS § 26-240 holds that “. . . [the local shellfish] commission or selectmen may make such designation” for a person to cultivate shellfish.³²³ Although not clear from the statutory language, “designations” of land historically refers only to the grant of perpetual franchises.³²⁴ Franchises were issued until 1915, when the state adopted a leasing system for shellfishing grounds. Now municipalities only exercise leasing or licensing authority. However, existing law does not clearly delineate between the different types of space allocations or the rights and histories of each.³²⁵ Defining the terms could clarify the differences between franchising, licensing, and leasing, as well as when statutes using the term “designation” or its derivatives apply to all types of space allocations.

In addition to switching away from franchising for shellfish aquaculture, Connecticut has more recently adopted a licensing system for seaweed aquaculture. Most shellfish aquaculture occurs on leased or franchised lands, but DA/BA has introduced licenses for seaweed cultivation.³²⁶ Leases, franchises, and licenses have different rights under Connecticut case law, but the differences are not laid out in the aquaculture laws. Defining the different rights offered in a license compared to a lease could clarify the different property rights in each for aquaculture producers.

³²³ CONN. GEN. STAT. § 26-240(a).

³²⁴ See CONN. REV. STAT. § 2348 (1887).

³²⁵ The biggest difference is that franchises grant ownership rights to the right to cultivate shellfish, while leases issue rights only for specified periods of time. See *Shoreline Shellfish, LLC v. Town of Branford*, 246 A.3d 470, 478 (Conn. 2020).

³²⁶ See CONN. GEN. STAT. § 22-11i(c).

The law could also define designated natural beds and undesignated natural beds. Shellfishermen have used natural oyster beds since colonial times, but with overuse, the beds were quickly depleted.³²⁷ To protect the resource, the largest and most important beds were mapped and designated as public natural beds to be used as a source of seed for the oyster industry.³²⁸ Various laws were established to protect the beds so they could sustain the industry in the future. However, the designated natural beds and the associated regulations protecting them do not encompass all natural shellfish beds in Connecticut. DA/BA and Connecticut Sea Grant are currently in the process of mapping undesignated natural shellfish beds. Statutorily defining the difference between designated natural beds and undesignated natural beds would clarify which laws apply to specific beds.

Connecticut law currently defines some terms,³²⁹ but a more comprehensive section defining these terms and other terms of art could facilitate a more precise statement of Connecticut aquaculture and laws.

14.2 Updating Provisions Regarding Municipal Authority

Connecticut law contains provisions regarding the municipal authority of individual municipalities, including some which have since ceded their shellfishing authority back to the state. Updating the statutes could more accurately represent the existing balance of authority in town waters and remove inaccurate provisions.

Most municipalities have shellfishing authority in their town waters, but Milford, West Haven, New Haven, and Westport have each ceded shellfishing authority to the state.³³⁰ The state also has authority over the Branford Initiative Area, which is 900 acres of shellfishing grounds off of Branford owned by DA/BA and licensed to new and small-scale aquaculture businesses.³³¹ However, some provisions describing municipal authority of these municipalities remain. CGS § 26-260 describes West Haven and Milford's authority to prohibit the taking of long clams or soft shell clams, yet the state has jurisdiction over recreational shellfishing in those areas. Similarly, CGS § 26-244 directs owners who lost evidence of their titles in West Haven to apply to the selectmen of West Haven, even though the state has charge of the records in West Haven now. Amendments to the statutes to remove extraneous historic provisions of municipal authority could better represent the law and clarify the state-municipal division of authority.

14.3 Updating Permitting Authority Provisions

³²⁷ Pew Trusts, A Small State Plans to Go Big With Oyster Restoration (Aug. 5, 2021), <https://perma.cc/ULT4-43Y6>.

³²⁸ *Id.*, CONN. GEN. STAT. § 26-193.

³²⁹ *See, e.g.*, CONN. GEN. STAT. § 22-11i (defining “aquaculture producer,” “aquatic animals,” “aquatic plants,” “seaweed,” and “seaweed producer”).

³³⁰ CONN. GEN. STAT. §§ 26-192, 26-257.

³³¹ *See* Gregory B. Hladky, *State Opening New Shellfishing Grounds to Encourage Small Oyster, Clam Operators*, Hartford Courant, Mar. 27, 2017, <https://perma.cc/L8PW-CEBF>.

The allocation of permitting authority among state agencies, local authorities, and the federal government has shifted over time, yet not all the state statutes reflect the changes. Some statutes could be revised and updated to match the current division of authority.

The state and federal agencies have complementary authority to approve aquaculture projects, but some statutes inaccurately state the agencies' roles. For example, CGS § 22-11h gives DoAg (which exercises aquaculture authority through DA/BA), "exclusive authority" for granting or denying aquaculture permits, except for the water discharges under DEEP authority. While DA/BA is the primary permitting authority, its authority is not exclusive. Aquaculture operations often also require permits from DEEP and USACE, especially for operations using aquaculture gear. Revising the language could state the law more accurately.

Other provisions are affected by changes in the division of authority. CGS § 22-11k states that DoAg must make a final determination on an aquaculture application within ninety days, and if it fails to make a timely decision, the application is deemed to be approved. However, Connecticut and the federal government have joined together to create a joint agency application for aquaculture operations to be submitted to DA/BA, DEEP, and USACE, who concurrently review the application.³³² This allows for a streamlined and more straightforward application process, but with the permitting authority spread among three agencies, it may not be possible for DA/BA to make a final determination in ninety days because some of the permitting decision-making is outside of DA/BA jurisdiction. Connecticut could reconsider whether DA/BA should be held to the timeline.

14.4 Distinguishing between Recreational and Commercial Shellfishing

State statutes regulate both commercial and recreational shellfishing, but the statutes are sometimes unclear as to whether they apply to recreational shellfishing, commercial shellfishing, or both. For example, CGS § 26-285 has size laws specific to clamming in Old Lyme, CGS § 26-287 has laws specific to taking scallops, oysters, and clams in the Niantic River, and CGS § 26-291a has laws regarding the taking of clams and oysters in Stonington. Although not clear from the statutory language, these sections are understood to apply only to recreational shellfishing. Another example is in CGS § 26-257a, which has a mix of sentences applicable to commercial and recreational shellfishing. However, the language does not clearly distinguish between the clauses that apply to recreational fishing and the clauses that apply to commercial shellfishing. For example, in CGS § 26-266 discusses shellfishing in Branford but does not disentangle the clauses that apply individually to commercial shellfishing or recreational shellfishing. Some statutes could use clearer, more definite language to clarify their application to the types of shellfishing.

There are multiple provisions addressing recreational shellfishing by municipality, but there is no section establishing baseline laws applicable to recreational shellfishing in all municipalities. Some sections may have substance that could be applicable to all recreational shellfisheries, such as CGS § 26-260, which has size limits for long and soft shell clams in Milford and West Haven. Adopting a

³³² Conn. Aquaculture Permitting Guide, *supra* note 24, at 4.

statute specifically for recreational shellfishing laws would consolidate recreational-specific laws applicable across all municipalities. Laws that should apply to only one municipality could be in subsequent sections. A recreational shellfishing-specific law would disentangle recreational laws from commercial laws and clarify the basic recreational laws that should apply to every municipality.

14.5 Removing Obsolete Provisions

There are some provisions that are obsolete, whether because they have never been used and are unlikely to be used or because they are outdated. For example, provisions regarding the procedures to dam a creek and injuries to dams have not been used and are unlikely to be used,³³³ and some municipal provisions are no longer applicable because the authority has been ceded to the state.³³⁴ Connecticut may want to remove these obsolete provisions from law to clear away laws that are no longer applicable to the regulatory regime.

14.6 Updates to Management Plans

There are two provisions for progress and planning that have been accomplished and could be renewed for continuous growth and development in the aquaculture industry. First, state law requires each local shellfish commission to develop a shellfish management plan, to be updated “periodically.”³³⁵ Some shellfish management plans have not been updated for almost two decades.³³⁶ Second, state law directed the Interagency Aquaculture Coordinating Committee, which consists of DA/BA, DEEP, and the Department of Economic and Community Development, to create an aquaculture development strategy by 1995.³³⁷ Beyond the 1995 strategy, the law did not require the committee to revisit and update its strategy plan.

However, in 2014 the Connecticut Shellfish Initiative was established to grow shellfish aquaculture, recreational shellfisheries, revitalize natural shellfish beds and increase public awareness about the economic, environmental and cultural importance of bivalve shellfish. A stakeholder-based process that included industry, regulatory agencies, environmental advocacy groups, academia, coastal community residents and others produced the Connecticut Shellfish Initiative Vision Plan in 2016.³³⁸ According to the report authors, many accomplishments and impacts have been made.

For both local and state plans, there are no defined expectations for updates to the plans. The “periodic” update for shellfish plans is vague and multiple towns update their plans less than once per decade. Amending these sections to include a requirement for updates to management plans at defined intervals would renew the intent of the statute and require the Committee and local shellfish commissions to regularly review and plan for the comprehensive development of aquaculture in

³³³ CONN. GEN. STAT. §§ 26-248, 26-256.

³³⁴ *See supra* § 13.1.

³³⁵ CONN. GEN. STAT. § 26-257a(c).

³³⁶ *See, e.g.*, Fairfield Shellfish Comm’n, Shellfish Management Plan (2003); Waterford Shellfish Comm’n, Shellfish Resource Management Plan (2005).

³³⁷ CONN. GEN. STAT. §§ 22-11e, 26-257a(c).

³³⁸ Connecticut Shellfish Initiative Vision Plan (2016), <https://perma.cc/5ZU6-VHBM>.

their jurisdictions at specified time intervals. Further, it may be desirable to amend the law to mandate the revision of the state Shellfish Vision Plan at specified time intervals.

15 How can Connecticut better identify the locations of jurisdictions, shellfish beds, and other geographically significant places?

Connecticut created GIS maps incorporating geographic boundaries relevant to shellfishing and aquaculture in order to make the data more accessible to the public. Many of these boundaries are also described in Connecticut law, but are not clear or easy to map for a lay person. Official acknowledgement of the GIS maps could confirm DA/BA's acceptance of the user-friendly shellfish mapping resource.

There are numerous provisions in Connecticut law that describe state and municipal jurisdictions, historic oyster beds, natural clam beds, and space allocations by listing the geographic markers of the boundaries.³³⁹ Some of those provisions can be lengthy and difficult to visualize. For example, the first coordinate of the shellfish jurisdiction line is described as “[c]ommencing at Byram point, the westernmost limit of the state at high-water mark, at a rock covered by the outermost clump of cedars,” while another coordinate is “then seven and nine-tenths miles to the center of a large oval-shaped boulder lying on Hatch’s rock and about south of O.L. Roberts’ white barn at Sachem’s Head.”³⁴⁰ The statutory language is descriptive, but may be outdated or difficult to trace for most members of the public.

Recently, Connecticut has been among numerous states converting geographic data on their aquaculture systems into GIS maps.³⁴¹ DA/BA worked with Connecticut Sea Grant and the University of Connecticut Center for Land Use Education and Research to create the *Aquaculture Mapping Atlas* for educational and planning purposes.³⁴² The geographic data captured in the GIS maps is a visual representation of jurisdictions, existing space allocations, the shellfish jurisdiction line, navigation indicators, and other features that is easier to work with than the statutory language. The map is a useful tool because it provides a visual aid to understanding aquaculture and shellfishing geography.

The GIS maps are useful representations of statutory information that may be helpful to supplement some of the statutory language, but the statute also contains dispute resolution provisions for contested geographic markers that could be maintained. For example, CGS § 26-246 identifies the procedure to resolve disputed boundaries of designations in town waters. Although DA/BA has largely resolved disputes over town designations, preserving the dispute resolution process could be

³³⁹ See, e.g., CONN. GEN. STAT. §§ 26-192 (shellfish jurisdiction line), 26-192e(b) (boundaries of conditional-closed, conditional-restricted, restricted, and prohibited areas), 29-193 (locations of natural oyster beds), 26-240 (locations of leases in town waters), 26-257 (shellfish franchises in town waters under state control).

³⁴⁰ CONN. REV. STAT. § 3294 (1918).

³⁴¹ See Conn. Env'tl. Conditions Online, Aquaculture Mapping Atlas, <https://perma.cc/SKC6-AVZY>.

³⁴² *Id.*

a contingency option if there are inconsistencies or errors in the maps. Maps could supplement the parts of statutes with geographic coordinates, but the dispute resolution provisions are useful as statutory language to resolve any geographic conflicts.

15.1 Policy Options

With the new GIS maps, DA/BA has made shellfishing data available to the public in an easily understandable way. *The Aquaculture Mapping Atlas* is currently only for educational and planning purposes, but it could have added value if DA/BA authorizes it as an accurate representation of shellfishing and aquaculture data.

15.1.1 Adopt the shellfish mapping tool through law or guidance documents

Adopting a statutory provision or guidance document recognizing the GIS maps DA/BA created could clarify the established coordinates of various elements of Connecticut aquaculture, as well as provide a visual depiction of those coordinates that is easier for the public to work with. A provision incorporating the *Aquaculture Mapping Atlas* by reference could supplement the existing statutory language and acknowledge the work done so far to clarify boundaries. A guidance document adopting the *Aquaculture Mapping Atlas* could similarly signal DA/BA's authorization its use. The *Aquaculture Mapping Atlas* is useful, and if adopted through legislation or guidance documents, DA/BA would likely want to ensure its accuracy through regular updates to reflect any changes, such as new or expired space allocations. Additional updating needs would likely require consistent funding.

Appendix A List of Acronyms

ADA:	aquaculture development areas (Massachusetts)
ADZ:	aquaculture development zone (New Jersey)
Blue Plan:	Long Island Sound Blue Plan (Connecticut)
CGS:	Connecticut General Statutes
CRMC:	Rhode Island Coastal Resources Management Council
DA/BA:	Connecticut Department of Agriculture, Bureau of Aquaculture
DEEP:	Connecticut Department of Energy and Environmental Protection
DMR:	Maine Department of Marine Resources
DNR:	Maryland Department of Natural Resources
DoAg:	Connecticut Department of Agriculture
LPA license:	limited-purpose aquaculture license (Maine)
USACE:	United States Army Corps of Engineers
VMRC:	Virginia Marine Resources Commission

Appendix B Minimum Sizes for Recreational Shellfishing

	Oysters	Hard Shell Clams	Soft Shell Clams
Connecticut ³⁴³	3” (municipalities may be more restrictive)	1” hinge width (municipalities may be more restrictive)	1.5” longest axis (municipalities may be more restrictive)
Massachusetts ³⁴⁴	3” length	1” hinge width	2” longest axis
Rhode Island ³⁴⁵	3” length	1” hinge width	2” longest axis
Maine ³⁴⁶	2.5” length	1” hinge width	2” longest axis
New Jersey ³⁴⁷	3” length (except in areas specified in statute)	1.5” hinge width	Not specified
Virginia ³⁴⁸	3” length	Not specified	Not specified
Maryland ³⁴⁹	3” length	1” hinge width	Not specified

³⁴³ Conn. Dep’t of Agric., Recreational Shellfishing, <https://perma.cc/3BAV-MEWK>; Conn. Sea Grant, 2020 Guidance for Recreational Shellfish Harvesting in Connecticut, <https://perma.cc/9VML-JMJG> (minimum size by municipality).

³⁴⁴ Mass. Div. of Marine Fisheries, Recreational saltwater fishing regulations, <https://perma.cc/224C-QB2E>.

³⁴⁵ R.I. Dep’t of Env’tl. Mgmt., Marine Fisheries Minimum Sizes & Possession Limits, <https://perma.cc/787C-NYPH>.

³⁴⁶ Me. Dep’t of Marine Res., Shellfish and Snail Identification and Recreational Limits, <https://perma.cc/S62V-SBY6>.

³⁴⁷ N.J. Dep’t of Env’tl. Prot. Div. of Fish & Wildlife, 2021 NJ Recreational Minimum Size, Possession Limits, & Seasons, <https://perma.cc/SR62-TN8W>; N.J. STAT. ANN. §§ 50:3-15.1

³⁴⁸ 4 VA. CODE ANN. § 20-260-30.

³⁴⁹ Md. Dep’t of Nat. Res., Recreational Oystering in Maryland, <https://perma.cc/3NVW-VUR2>; eRegulations, Oysters & Clams, <https://perma.cc/87L6-4LNL>.