Perspective

Testing the waters: the state of U.S. shellfish permitting regulations

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Implications

- Permitting and regulatory hurdles are still major barriers to aquaculture expansion.
- There are tradeoffs between improved regulatory efficiency/economic outcomes and environmental oversight.
- Existing approaches to shellfish permitting have received mixed criticisms, but identifying an optimal approach to permitting reform requires further research.

Key words: aquaculture, mariculture, marine spatial planning, permitting, shellfish

Introduction

Aquaculture produces roughly half of the seafood consumed worldwide, yet in the United States, the industry remains strikingly limited relative to its potential capacity (Lester et al., 2021). At present, U.S. marine aquaculture (mariculture) consists mostly of small-scale shellfish farming within state waters, with some states boasting well-established shellfish industries and others having entered the industry in earnest only in the last decade. As states deploy a diverse range of strategies to foster and govern their nascent industries, their experiences can yield valuable insights as to how regulations can best balance industry growth with environmental protection.

Permitting is an essential tool to minimize mariculture's environmental impact and interference with other land and water uses, but overly onerous permitting processes can also impede the progress of a potentially profitable industry. Overcoming these regulatory barriers poses several benefits. For a country heavily reliant on seafood imports, an expanded aquaculture industry offers new economic opportunities and a seafood supply more resilient to fluctuations in imports and catch from wild-capture fisheries. Aquaculture may also serve as an additional income source for members of the fishing sector and coastal communities. Reducing regulatory costs and uncertainty would open aquaculture to a wider, more diverse set of potential shellfish farmers. Finally, addressing barriers within aquaculture's regulatory landscape may facilitate other forms of industry expansion currently constrained by regulatory uncertainty, such as offshore aquaculture (Lester et al., 2021) and seaweed farming.

In an effort to understand bureaucratic constraints on aquaculture development, the National Marine Fisheries Service (NMFS) commissioned a landmark report on shellfish aquaculture permitting systems nationwide in 2018 ("O'Connell Report"). The O'Connell Report described fifteen recommendations, addressed to NMFS, other federal agencies, and state agencies and partners, to improve aquaculture permitting efficiency. In this article, we consider how the shellfish permitting landscape has developed since, and we highlight a recent challenge to traditional approaches for streamlining the permitting process.

Permitting Developments and Challenges

The O'Connell Report's recommendations, each of which had already been successfully employed to reduce permitting barriers by one or more states, varied in the degree to which they would alter permitting procedures (O'Connell, 2018). Some—such as developing comprehensive guides to the state permitting process—fill information gaps and reduce the perceived complexity of the process for prospective growers. Other recommendations—such as declaring a lead agency or delegating review responsibilities to the states—streamline the permitting process itself and reduce its length. Still others—such as creating state programs for experimental aquaculture—encourage a more adaptable permitting process altogether. The O'Connell Report demonstrates that federal and state agencies have responded to permitting barriers from multiple angles. We thus explore aspects of modern regulatory barriers that have persisted despite these innovations.

Six years since the O'Connell Report, two central issues remain unresolved. First, the continued implementation of

permitting recommendations has been spotty. Second, the federal regulatory foundation underpinning those recommendations has turned out to be shakier than assumed.

Inconsistent implementation

Advancements continue to be made in reducing the burden of permitting, such as Delaware's streamlined, preapproved Shellfish Aquaculture Development Areas (O'Connell, 2018) or Florida's extension of a state-run Programmatic General Permit which includes numerous Best Management Practices (Division of Aquaculture, 2023). However, shellfish permitting and regulatory hurdles are still cited as a major barrier to aquaculture. In some cases, applicants struggle to understand the permitting process due to its complexity or a lack of information (Ehrhart and Doerr, 2022). In others, states lack the comprehensive legislation, spatial planning, or basic regulatory infrastructure to guide the industry and provide a stable business environment (Lester et al., 2021). These conditions impose tangible costs on farmers: the resources required to obtain necessary permits can be substantial, and delays may result in lost revenues (van Senten et al., 2020).

Given these difficulties, it is unclear why some states have not continued implementing solutions proposed by the O'Connell Report. Possible reasons include lack of funding or staffing (e.g., developing siting resources and permitting guides), lack of inter-agency coordination (e.g., designating a lead permitting agency), and need for state-specific policy procedures to comply with environmental regulations. It is also possible that implementation has simply been delayed due to the time required to analyze and produce appropriate, state-specific policy recommendations. Oregon, for instance, recently conducted an extensive policy needs assessment and produced several recommendations to reduce state permitting barriers to aquaculture (Ehrhart and Doerr, 2022).

These resource constraints suggest that advocates for state-level permitting reform should focus on advancing the most cost-effective solutions; however, such efforts are still hampered by uncertainties. Gaps in knowledge on aquaculture's environmental impacts constrain opportunities to develop more efficient permitting. Data on aquaculture itself (e.g., revenues, methods, and species) remain inconsistent, preventing a full understanding of each state's industry (O'Connell, 2018; Froelich et al., 2022). Improved data will serve regulators and growers alike in identifying cost-effective avenues of reform.

Limitations to federal permitting procedures

In addition to applicable state and local permits, all mariculture must comply with a patchwork of federal regulations (Figure 1) administered by the U.S. Army Corps of Engineers (the Corps). The Corps permits aquaculture operations nationwide via two pathways. Projects expected to have adverse impacts on U.S. waters must complete the rigorous application process for Individual Permits. However, certain projects may be permitted via abbreviated Nationwide Permits (NWPs), which are renewed nationally every 5 yr and apply to broad classes of similar activities with minimal expected environmental impacts. Shellfish aquaculture operations in many states are therefore permitted via a Nationwide Permit (NWP 48) or analogous, state-specific Regional General Permits. Obtaining an Individual Permit involves steps absent for an NWP, such as a public review process and examination under the National Environmental Policy Act. Consequently, permitting under an NWP is faster, but environmental oversight is reduced.

A stark example of the vulnerabilities in this system occurred in 2019, when a court in Washington (the state with the most shellfish aquaculture operations) overturned the 2017 version of NWP 48 and vacated all permits authorized by it in Washington. The court found that, in authorizing NWP 48, the Corps had provided insufficient evidence that shellfish aquaculture did not have adverse effects on the surrounding environment, such as submerged aquatic vegetation like eelgrass. Furthermore, as Washington shellfish aquaculture comprises myriad cultured species and farming methods, the court found NWP 48 inadequate in accounting for possible adverse impacts across the diverse range of activities it covered. Following the vacatur, the hundreds of commercial shellfish farms in Washington were required to apply for Individual Permits in order to continue operating. NWP 48 was updated and renewed in 2021. While the Corps attempted to correct the issues raised by the 2017 version's vacatur, the 2021 NWP 48 was similarly challenged in Washington and was again revoked in the state.

Even as Washington's court argued that NWP 48 overreached in its scope, others might argue that it was not efficient enough; under NWP 48, Washington's regulatory web still imposed high costs on its shellfish farmers (van Senten et al., 2020). Thus, in attempting to balance environmental protection with regulatory efficiency, shellfish aquaculture's existing permitting infrastructure instead demonstrated limits in both aims.

While states newer to mariculture can learn from others' successes, Washington's vacatur demonstrates the fragility of existing processes. Washington's large industry and sensitive ecosystems presented unique challenges perhaps unsuited to a one-size-fits-all NWP system. As other states expand their shellfish industries, it may be necessary to establish guidelines for tailoring permits to local conditions. New ecosystems, species, or culture methods will present still further challenges to review processes, and advancing altogether new industries (such as seaweed or multitrophic aquaculture) will demand innovative solutions to permitting inefficiencies.

Conclusions

The aquaculture industry faces a known problem: regulatory inefficiency. While many states have made notable improvements in reducing permitting barriers, continued implementation of recent policy recommendations has lagged. Limitations in funding, awareness, and data may all be barriers to adopting seemingly straightforward reforms. Furthermore, defaulting to traditional solutions, such as NWP 48, may fail to balance efficiency with appropriate standards of environmental review,

A. Forms of Army Corps of Engineers permits used for shellfish aquaculture

Individual Permits: Projects with <u>more than minimal</u> adverse effects
Indicated states require an individual permit for all shellfish aquaculture

SIP Standard Individual Permit: Most stringent level of review, including public notice period requirement

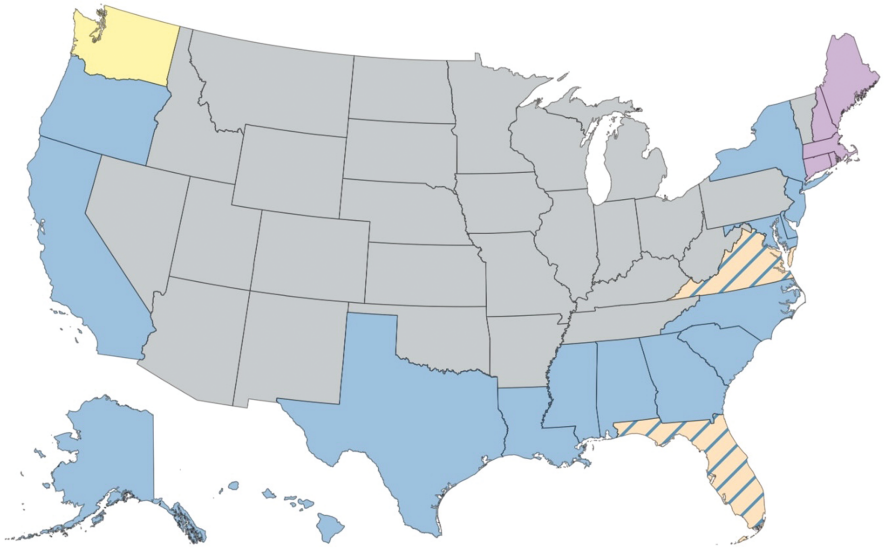
LOP Letter of Permission: Abbreviated review process in coordination with federal and state agencies

General Permits: Projects with <u>minimal</u> adverse effects
Types of general permits available to permit shellfish aquaculture vary by state

NWP Nationwide Permit: Implemented on a national level
Indicated states use NWP 48 to permit shellfish aquaculture

RGP Regional General Permit: Cover activities in a geographic area
Indicated states use an RGP instead of NWP 48 for shellfish aquaculture

PGP Programmatic General Permit: Based on existing local, state, or federal permit program to avoid regulatory duplication
Indicated states offer both a PGP and NWP 48 for shellfish aquaculture



B. A permit's review process includes:

SIP	• Clean Water Act 404(b)(1) guidelines review • National Environmental Protection Act review • Public notice and comment period *In addition to the following:*
LOP	• Public interest factor review • Section 401 Water Quality Certification † • Coastal Zone Management Consistency determination † *In addition to the following:*
NWP	• Endangered Species Act compliance • National Historic Preservation Act compliance • Mitigation of impacts (as needed)

† Some states may require these steps for projects using NWPs

Figure 1. Army Corps permits used for shellfish aquaculture in each coastal state. (A) Most states offer Nationwide Permit 48 for projects with minimal adverse impacts. Florida and Virginia also use Programmatic General Permits to permit many projects through state-run programs, and New England uses state-specific Regional General Permits. In Washington, NWP 48 has been revoked. (B) Individual permits and nationwide permits require different review processes for applicants.

resulting in increased burdens on the industry. More effective solutions will require a better understanding of what changes are feasible and compatible with state environmental laws. Further research is needed to fill data gaps on aquaculture's scope and impacts, assess the tradeoffs of permitting reform, and inform regulation of this nascent U.S. industry.

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Conflict of interest statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Author Contributions

Benjamin M. Hurley wrote the original draft and conducted the original research. All authors contributed to the conception of the project, as well as writing, reviewing, and editing. Anna M. Birkenbach and Kimberly L. Oremus supervised the project. All authors contributed to the article and approved the submitted version.

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