Evaluation of U.S. Shellfish Aquaculture Permitting Systems

Recommendations to Improve Permitting Efficiencies and Industry Development

A Report to NOAA Fisheries

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FOREWORD

The National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA Fisheries) has a long history of supporting shellfish aquaculture development. NOAA Fisheries recognizes that sustainable aquaculture development is critical to the nation's food security. Currently, more than 90% of the seafood consumed in the United States is imported. Studies have shown that the United States should not expect to obtain a substantial increase in production from our nation's wild fisheries. While U.S. aquaculture production is increasing, there remain significant bureaucratic and social constraints. Unless these can be addressed, our nation's dependency on imported seafood will only increase as the U.S. population grows from 321 million in 2015 to 398 million by 2050. In addition, the 2015-2020 Dietary Guidelines for Americans, issued by the Department of Health and Human Services and the Department of Agriculture, recommend Americans eat twice as much seafood to improve health.

In 2011, NOAA Fisheries launched the National Shellfish Initiative to increase commercial shellfish aquaculture production (or farming) and restoration of native shellfish, in conjunction with the release of a new NOAA Marine Aquaculture Policy. Recognizing the need to improve coordination among federal agencies, NOAA Fisheries chaired an interagency task force with the U.S. Army Corps of Engineers (Corps), U.S. Fish and Wildlife Service (FWS), U.S. Environmental Protection Agency (EPA), and other agencies that prepared a Fact Sheet as a common reference on "Corps, NMFS, and FWS Opportunities for More Efficient Permitting of Commercial Shellfish Aquaculture under General Permits" in February 2016 (https://www.fisheries.noaa.gov/topic/aquaculture/regulation-policy). In an effort to review progress to date, what is working and not working, NOAA Fisheries contracted this study to evaluate the effectiveness and efficiency of shellfish aquaculture permitting throughout the United States.

This report provides 15 recommendations based upon a review of 22 federal / state / local shellfish aquaculture permitting systems in 2016 covering all coastal states on the continental United States (East Coast, West Coast, Gulf of Mexico, and Alaska). Permitting systems in Hawaii/Pacific Islands or Puerto Rico/Caribbean are not addressed in this report. Implementation of these recommendations will require an executive level commitment at the federal and state level. This study also revealed the need for improved communication among federal and state shellfish aquaculture coordinators and regulators across the nation. The 'stage' of each state's shellfish aquaculture development varies significantly. In many instances, problems which exist for one state have already been experienced and addressed by another. Establishing, sharing and maintaining a depository of shellfish aquaculture permitting information will enable coordinators to more quickly identify proven solutions. Using research obtained to support this study, a state-by-state spreadsheet summarizing shellfish permitting systems and industry characterization information for 22 states was prepared.

The United States stands at a unique point in time to facilitate aquaculture development. The public's historical view of aquaculture is improving as a result of industry's use of safe and sustainable farming practices. There is a public with a growing interest to purchase local, sustainable seafood. Capital and financing assistance programs are more readily available now

than ever. And, this is all motivating government agencies to work more closely together to implement more effective and efficient permitting systems while still ensuring protection of natural resources and balance with other interests.

It should be noted that Corps general permits and associated regional conditions are periodically reviewed and reissued. As an example, the Corps reissued Nationwide Permit 48 (NWP 48) in March 2017 with some changes from the version in effect at the time of this study. Regional conditions in Corps Districts may have also changed. In addition, Corps Districts ultimately decide whether or not to use NWP 48 or another type of general permit, or to require individual permits (for example, in Maryland, the Baltimore District decided to transition from a regional general permit to NWP 48 in August 2016 after research for this report was completed). Permitting and leasing procedures and rules may have also changed in some state and local governments. Lastly, the report links to online resources on multiple websites, which are also updated periodically.

RECOMMENDATIONS

Recommendation 1 - Coordinate/consolidate: Improve coordination within and between state and federal shellfish aquaculture permitting agencies fostered by a state aquaculture coordinator and a commitment from agency leadership, and consolidate state agency responsibilities where feasible [NOAA and federal/state partners].

Inter-agency coordination and consolidation of state agency responsibilities is a primary element in those states which have developed more efficient and effective shellfish aquaculture permitting systems. Noticeable improvements have occurred in several states during the past few years due in large part to gubernatorial leadership and/or the creation of 'Shellfish Initiatives' to advance both commercial production and shellfish restoration. However, there remains a need to improve, and in some instances establish, the necessary level of coordination for more efficient permitting systems. Based on past successes, further achievements toward this objective will require a top down commitment from state and federal agency executives.

Joint agency permit applications and shellfish interagency permit review teams have been principal drivers in improving interagency coordination. Use of a joint agency permit application reduces the number of forms to be completed by the permit applicant and helps to streamline the permit review process by facilitating interagency review. Interagency permit review teams typically meet monthly with some meeting more or less frequently depending on the number of applications received. California is in the process of developing a virtual 'shellfish aquaculture application permit counter' to allow state and federal agencies to review applications and exchange questions and comments simultaneously as well as allow the applicant to more efficiently track the status of their application (https://permits.aquaculturematters.ca.gov/). Encouraging and assisting the remaining 9 of 22 states reviewed to establish a joint agency permit application and 12 of 22 states to convene an interagency permit review team is essential to improving interagency coordination and permitting efficiencies.

States with Interagency Permit Review Team Meetings

ME, NH, MA, RI, CT, MD, CA, OR, WA (FL n/a due to State Programmatic Permit)

States without Interagency Permit Review Team Meetings

NY, NJ, DE, VA, NC, SC, GA, AL, MS, LA, TX, AK

States with Joint Federal / State Permit Application

ME, NH, MA, RI, CT, NY, MD, VA, SC, AL, MS, WA, (FL n/a due to State Programmatic Permit)

States without Joint Federal / State Permit Application

NJ, DE, NC, GA, LA, TX, CA, OR, AK

Further coordination efficiencies can be achieved by designating the responsibility of reviewing applications for completeness to one agency (e.g., state aquaculture coordinator). This will prevent multiple agencies from investing limited human resources on reviewing incomplete applications. Once an application is determined complete, it can be forwarded to the interagency permit review team and reviewed more efficiently consistent with agreed upon processes.

Included below are two examples of effective and efficient systems for inter-agency coordination. While each state needs to tailor the system to individual needs based upon certain factors (e.g., permitting rules, permitting activity and human resource capabilities), these examples highlight key components of successful inter-agency coordination programs.

- Rhode Island's requirement for a preliminary determination meeting with involved federal and state agencies, applicant and public has shown to be successful in clarifying proposal concerns and challenges prior to the full application process being undertaken. Note that Rhode Island currently receives about 8-10 applications annually. Such an extensive stakeholder and public involvement process may be challenging for states which receive a higher number of applications without additional staff.

RI's Preliminary Determination (PD) System

1) Applicant submits PD application to RI Coastal Resources Management Council (CRMC)
2) Application is made available to public
3) Preliminary surveys of proposed lease site conducted to assess potential impacts
4) PD meeting is scheduled with state, federal and local government agencies and stakeholders
5) RI CRMC provides advice (not requirements) to applicant within 30 days of meeting
6) Applicant submits full application

- Connecticut's interagency pre-screening of proposed aquaculture activities allows agencies to quickly determine if the location and activity place the project within the guidelines for the general aquaculture permitting process and State of Connecticut exemption or if the project will require a more extensive application and review process. This screening tool results in acknowledgement and written response to the producer, usually within 10 days, that identifies the necessary application(s) to complete and an expected timeframe from application submittal to final project approval. The pre-application screening process is meant to provide the prospective applicant with better information and the flexibility to adapt project plans without first completing an extensive application.

  Unlike the Rhode Island example, the system in Connecticut limits this early review to the involved federal and state agencies. The opportunity for public input does not occur until after the full application is submitted. This process is better suited for states which receive a higher number of applications and/or have staffing limitations. However, the ability to address stakeholder and/or public concerns prior to submitting an application is more limiting.

Recommendation 2 - Delegate federal authority: Consider strategies to incorporate state verification authority into Corps general permits [Corps and state agencies].

The Corps uses three types of general permits for shellfish aquaculture. This general permit program allows the Corps to authorize activities with only minimal adverse environmental impacts in a timely manner. Thus, the Corps is able to better protect the aquatic environment by focusing its limited resources on more extensive evaluations through the individual permit process focused on more rigorous evaluation of activities that have the potential for causing more severe adverse environmental effects.

Incorporating state verification authority and accountability measures into the relevant general permit, where appropriate, can provide further permitting efficiencies, reduce the burden of the federal government, and allow the Corps and other agencies to focus more time on individual permits. This strategy was recommended in a May 2014 document prepared by the Corps, NOAA Fisheries and U.S. Fish and Wildlife Service on improving shellfish aquaculture permitting efficiencies. Despite this however, Corps Districts have only provided state verification authority to the States of Florida and New Hampshire. In Virginia, the Corps is operating under state verification authority for all shellfish lease activities with the exception of float culture but this practice has not been formalized in a permit agreement. In each of these instances, the efficiency of the permitting process has improved.

Types of Corps General Permits

1. Nationwide Permit 48 (NWP) – NWP 48 is promulgated at Corps Headquarters following a public interest review (which includes opportunity for public comment and coordination with other agencies); documentation of the environmental considerations necessary to comply with the National Environmental Policy Act (NEPA); and an impact analysis consistent with the requirements of Environmental Protection Agency (EPA) Section 404(b)(1) Guidelines, if applicable. General Conditions for the NWPs are developed at Corps Headquarters and apply to the entire NWP Program. Division commanders in cooperation with district engineers may then develop regional conditions based on regional resources of concern to ensure use of the NWP in particular areas does not result in more than minimal adverse effects. Through public notices, Districts solicit comments and feedback on the proposed conditions from state and federal agencies and the public before submitting them to the Division Engineer for approval.
2. Regional General Permits (RGPs) – RGPs are developed by districts or divisions in coordination with the public and other agencies and can be designed for a category of activities that are specific to a certain part of the region (e.g., waterbody, watershed, county, state, etc.). Districts may suspend the use of NWP 48 and develop a RGP instead. Documentation procedures for issuance of an RGP are similar to those described above for NWP 48.
3. Programmatic General Permits (PGPs) – PGPs are developed jointly by the Corps and a state or local regulatory agency wherein the state or local agency evaluates actions covered by the PGP and verifies on behalf of the Corps that activities meet the terms and conditions of that PGP. In some cases, notification to the Corps may still be required if certain thresholds/triggers are reached.

There do exist some challenges with incorporating state verification authority into a Corps general permit, including but not limited to: 1) available science to develop programmatic biological opinions, best management practices and/or permit conditions to ensure minimal adverse impact to protected resources and essential fish habitat; and 2) adequate information to ensure minimal interference with federal navigation projects and navigation in general. This information is necessary for the Corps to establish the necessary permit conditions for state compliance.

This challenge also presents an opportunity for the Corps and NOAA Fisheries to work with state partners to prioritize and fund the needed science to advance state verification authority. In the interim, the Corps and NOAA Fisheries should explore the feasibility of establishing state verification permit conditions for shellfish aquaculture, even if initially limited to certain culture methods, using the best available science, precautionary and adaptive management approaches, and accountability practices.

Recommendation 3 - Establish categories for review levels: Consider strategies to utilize a tiered project level activity approach in general permits with categories linked to impact thresholds that determine the level of review necessary from the Corps [Corps].

The New England Corps District recognizes that certain shellfish aquaculture operations (e.g., small operations with bottom culture or transient gear) will fall within the minimum adverse impact threshold of a general permit compared to larger and/or more intensive cage and float culture methods. Accordingly, the New England Corps District suspended NWP 48 and incorporated a tiered project level activity approach with two categories in separate regional

general permits for Maine, Massachusetts, Rhode Island and Connecticut and a programmatic general permit for New Hampshire.

The Corps notification requirement for a regional general permit Category 1 project varies by state from being a non-reporting activity to requiring an applicant to submit a 'self-voluntary notification form'. In addition, the New England District considers bottom culture (shell and seed) in Maine a traditional fishing practice, and as such, does not require any notification by the applicant. Applicants proposing a regional general permit Category 2 project are required to submit a pre-construction notification or joint permit application.

This tiered project level activity approach is not used by any other Corps district. Such an approach could also be useful in identifying project categories for which the Corps can provide state verification authority (Recommendation 2) as a regional condition to the NWP, or in a regional or programmatic general permit.

Recommendation 4 - Provide adequate staffing: Conduct a human resource needs assessment of agencies responsible for shellfish aquaculture development, and identify and implement strategies to address limitations [NOAA and federal/state partners].

The adequacy of state and federal human resources to efficiently process shellfish aquaculture permit applications was not a factor explicitly evaluated in this project, but was frequently identified as an impediment. The recent success of national and state level shellfish initiatives that support commercial aquaculture and shellfish restoration has rapidly increased the number of permit applications in several states. In many cases, however, staffing resources have not been adequately adjusted.

In Virginia, among the largest shellfish producing states in the United States, the number of shellfish aquaculture lease applications has increased from a 10-year running average of about 100 per year to about 300 per year during the past few years. Staffing levels have not increased accordingly and the number of pending shellfish aquaculture lease applications has increased to over 350 (about 25% of which have been pending for over one year). These pending lease applications amount to 22,000 acres of additional shellfish production areas, and if approved, have the potential to provide significant ecological and economic benefits.

The Corps Norfolk District in Virginia is not currently experiencing staffing shortages but would likely be if existing general permit conditions were strictly followed. A potential solution for the Corps Norfolk District is to develop a general permit condition that provides state verification authority for all shellfish aquaculture lease applications with the exception of float culture.

New Jersey is also experiencing an increase in the number of pending shellfish aquaculture lease applications, which now exceeds 50. This is attributed to an insufficient level of staff resources to complete required hydrographic and biological assessment surveys. Currently, the New Jersey Department of Environmental Protection, Marine Fisheries Division, Shellfish Bureau has 6 staff responsible for shellfish aquaculture permitting and management as well as public shellfish monitoring and management. In comparison, Maryland's shellfish aquaculture development program consists of 8 dedicated program staff. In addition, staff support from outside the

program are assigned responsibilities to assist with pre-screening applications for environmental concerns, conducting hydrographic surveys and preparing lease plats, and performing any necessary biological surveys. This level of staff support has proven to be sufficient for processing an average of 60 shellfish aquaculture lease applications per year. Due to required state budget cuts, however, this program recently lost two positions. Staffing concerns now exist because the number of lease applications has not decreased, and responsibilities with inspecting farms for permit compliance are increasing. In addition, the Corps Baltimore District which receives all shellfish aquaculture permit applications has experienced delays in processing applications due to staffing issues.

The aquaculture permitting process in Washington illustrates that staffing constraints occur not only because of the time required to process permit applications and assess permit compliance but also to respond to the exorbitant attention aquaculture gets compared to other shoreline uses (e.g., permit appeals).

The staffing resource challenges provided above are not intended to present the full breadth of the issue but rather a few examples which arose during this evaluation. Recognizing that insufficient staffing resources can be a major impediment to efficiently processing shellfish aquaculture lease applications it is recommended that a human resource needs assessment be completed. Results can then be used to identify and prioritize problem areas, and develop and implement solutions. Solutions should not be limited to adding more staff resources, but examining how the implementation of recommendations to improve the efficiency of shellfish aquaculture permitting can reduce staff demands.

Recommendation 5 - One-stop permitting website for each state: Develop a centralized shellfish aquaculture permitting website in each state [State agencies].

Developing a centralized, 'one-stop shopping' website with information about federal, state and local (where applicable) shellfish aquaculture permitting can be a tremendous asset to facilitating aquaculture development. This, however, rarely occurs now.

The permitting of shellfish aquaculture consists of a complexity of rules and processes across multiple state and federal, and sometimes local, agencies and tribes. An individual interested in shellfish aquaculture can easily be intimidated and/or get frustrated trying to understand the process of getting started. Meeting with a state aquaculture coordinator is very beneficial but having an online resource of information is invaluable to a potential applicant. It allows an individual to better prepare for a meeting with an aquaculture coordinator, and provides a follow-up resource afterwards. An effective website can also reduce the amount of staff time answering questions by applicants, and allow more time for other permitting priorities.

The most effective shellfish aquaculture website will be well integrated with all involved agencies (e.g., Corps of Engineers, NOAA Fisheries, Sea Grant, all involved state and local agencies). This will allow an individual to easily locate the centralized website despite which agency website they first access.

Some of the better designed shellfish aquaculture websites include:

- Washington: https://ecology.wa.gov/Water-Shorelines/Shoreline-coastal-management/Shoreline-coastal-planning/Aquaculture
- Alaska: http://www.adfg.alaska.gov/index.cfm?adfg=fishingaquaticfarming.programinfo
- California: https://www.wildlife.ca.gov/Aquaculture
- Florida: http://www.freshfromflorida.com/Divisions-Offices/Aquaculture
- Connecticut: http://www.ct.gov/doag/cwp/view.asp?a=3768&q=451508&doagNav=|
- Maine: http://www.maine.gov/dmr/aquaculture/forms/index.html
- Maryland: http://dnr.maryland.gov/fisheries/pages/aquaculture/index.aspx

Recommendation 6 - State guides: Develop a shellfish aquaculture leasing and permitting guide for each state [State agencies and federal partners].

Incomplete shellfish aquaculture applications are often cited as a reason for delays in the lease and permit application process. These delays result in an inefficient use of time by both the applicant and agency (ies) reviewing the application. Half of the states which permit shellfish aquaculture lack an effective shellfish aquaculture leasing and permitting guide.

An effective shellfish aquaculture leasing and permitting guidebook should include, but is not limited to:

1) an overview of the leasing and permitting process or processes
2) what application(s) and/or pre-construction notification are needed
3) application form(s) and instructions
4) information to evaluate potential impact(s) to protected resources, critical habitat designations, essential fish habitat, navigation, historic places, user conflicts, etc.
5) aquaculture rules
6) frequently asked questions (FAQs)
7) business planning tools and resources
8) agency contact information
9) information to encourage applicants to schedule a pre-application meeting with the state's aquaculture coordinator with an explanation that this is successfully being used in several states to reduce the number of incomplete applications.

The Corps, NOAA Fisheries and EPA should work together to provide state and industry partners relevant Federal regulatory and contact information to include in a comprehensive and user friendly shellfish aquaculture permitting guide.

Some good state shellfish aquaculture guide examples include:

- Connecticut: http://www.nae.usace.army.mil/portals/74/docs/regulatory/StateGeneralPermits/CT/Aquaculture_permitguide_2014_update.pdf
- Alaska: http://www.adfg.alaska.gov/index.cfm?adfg=fishingaquaticfarming.forms
- Washington: https://ecology.wa.gov/Water-Shorelines/Shoreline-coastal-management/Shoreline-coastal-planning/Aquaculture/Shellfish-Interagency-Permitting-Team
- Maryland: Under revision and when updated can be found at: http://dnr.maryland.gov/fisheries/Pages/aquaculture/getting-started.aspx
- Rhode Island: http://www.crmc.ri.gov/applicationforms/AquaApp.pdf.

- Florida: Overview information and application process at: https://www.freshfromflorida.com/content/download/76600/2214244/FDACS-P-01758_final_5-2017_2_(1).pdf https://www.flrules.org/gateway/RuleNo.asp?title=SOVEREIGNTY SUBMERGED LANDS MANAGEMENT&ID=18-21.021

Some innovative tools to assist an applicant with completing an application include:

- Corps Districts in Texas and Arkansas have a permit application module (not interactive).
  - Texas: http://w3.saj.usace.army.mil/permits/RDAvatarPRV201203/index.html
  - Alaska: http://www.poa.usace.army.mil/Missions/Regulatory.aspx
- The following Corps Districts have developed separate documents for each NWP with applicable regional conditions and other pertinent information.
  - Corps District in Wilmington, North Carolina: http://www.saw.usace.army.mil/Portals/59/docs/regulatory/regdocs/NWP2012/NWP48_3-23.pdf
  - Corps Districts in Los Angeles, San Francisco and Sacramento, California: http://www.spk.usace.army.mil/Portals/12/documents/regulatory/nwp/2012_nwps/2012-NWP-48.pdf
  - Corps District in Seattle, Washington: http://www.nws.usace.army.mil/Portals/27/docs/regulatory/NWPs/2012%20NWP%20Users%20Guide.pdf
- Corps District in Charleston, South Carolina developed a pre-construction notification (PCN) determination checklist to assist applicants with submitting complete information: http://www.sac.usace.army.mil/Portals/43/docs/regulatory/Checklists_NWPs/NWP_48_Checklist_Sept_2017.pdf?ver=2017-12-11-090321-520
- Three Corps Districts had an interactive permit application module at the time this study was conducted which explained why the Corps is involved in permitting shellfish aquaculture, FAQs, and instructions to complete application. However, the 'avatar' module has since been discontinued.

Recommendation 7 - Siting tools: Develop shellfish aquaculture siting tools [State agencies and NOAA/NCCOS].

Data visualization siting tools have been developed by a few states to overcome the following grower identified obstacles which are limiting the growth of the shellfish aquaculture industry:

1) Regional and local restrictions on water body use
2) Lack of information regarding feasible site locations
3) Trouble identifying growing areas with long-term suitability
4) Potential conflicts with navigation and other user groups
5) Potential overlap with other marine resources (i.e., SAV)
6) Lack of comprehensive mapping of existing farm operations

Additionally, such data visualization tools could be used to better examine the cumulative effects issue with shellfish aquaculture which is becoming more prevalent (e.g., Washington State).

These state siting tools would be useful to review and build upon:

- Maryland: http://dnrweb.dnr.state.md.us/fisheries/aquatool/aquatool.asp
- Connecticut: http://clear3.uconn.edu/aquaculture/
- North Carolina: http://uncw.edu/benthic/sitingtool/
- Louisiana: http://gis.wlf.la.gov/oystermap/map.html
- NY Suffolk County: http://gis3.suffolkcountyny.gov/shellfish/
- Southern California: https://www.seasketch.org/#projecthomepage/50b71caa68e746412201fd9f/about

In additional, NOAA's National Centers for Coastal and Ocean Science maintains a Coastal Aquaculture Planning Portal (CAPP) with a toolbox of coastal planning tools designed to assist managers, planners, and industry with sustainable aquaculture development: https://coastalscience.noaa.gov/research/marine-spatial-ecology/coastal-aquaculture-planning-portal-capp/

Recommendation 8 - Local government authority: Examine existing state aquaculture permitting programs which include some level of authorization by a local government to identify ways to improve permitting efficiencies [State agencies].

The shellfish aquaculture permitting process becomes more complex and potentially time consuming when authorization or involvement by a local government is required in addition to state and federal authorizations. Permitting rules can vary among a state's local municipalities making it more critical for a state to develop a well-coordinated permitting system among involved agencies and provide an applicant permit guide.

Some level of local government authority currently exists in six of the twenty-two continental U.S. states (MA, NY, CA, OR, WA and AK). This authority varies from statewide to a specific water body for which a state ceded shellfish leasing authority to a local government. Additionally, local municipalities in Connecticut which lack leasing authority play an integral role in the lease review process.

Accessible information about local government shellfish aquaculture permitting rules and processes is lacking for most of the aforementioned local municipalities with the exception of Massachusetts, Suffolk County in New York and Connecticut. Washington and Alaska worked with the local municipalities to incorporate their information needs into the federal / state joint application. This is beneficial to the applicant as it reduces the number of forms to complete as well as facilitates interagency review. Opportunities which allow agencies to review applications on a more parallel track with each other could improve permitting efficiencies.

A brief summary of the permitting process which involves these local municipalities is included below.

- Massachusetts: Statewide authority. Applicants submit lease application to local government which has 60 days to act upon application. If application is granted preliminary approval following a public hearing, the local government sends a request to the MA Department of Fish and Game, Division of Marine Fisheries (DMF) for certification that the license will have no substantial adverse effect on any of the state's

shellfish or other natural resources. If the MA DMF determines that the issuance of the license and operation thereunder will have no substantial adverse effects, a certification letter is sent to the local government. The applicant can then submit a general permit pre-construction notification to the Corps and request a shellfish propagation permit from the MA DMF. This process typically takes 6-7 months with best and worst case being 3 months to 2 years, respectively.

- New York: Limited to Suffolk County where state ceded shellfish leasing authority. Applicants are required to have a pre-application meeting with Suffolk County's Department of Planning (DOP). Applicant submits application to DOP during the annual application period established by the county. The DOP issues a public notice and allows 60 days for public comment. The Suffolk County Aquaculture Lease Board reviews comments and holds a public meeting. Subsequent to this meeting, the Board convenes to make a final determination on each lease application. A lease may be conditionally approved until a benthic survey is completed to confirm that the minimum hard clam density threshold is not exceeded. The applicant also needs to submit a pre-construction notification to the Corps, and obtain a culture permit and harvester license from the NY Department of Environmental Conservation, Bureau of Marine Fisheries. The permit process typically takes 9-12 months.

- California: Limited to Humboldt Bay Harbor, Recreation & Conservation District (HBHRCD) and one location in San Diego County: Applicants need to first contact NRG Energy which controls Agua Hedionda Lagoon at the power plant in San Diego County to determine if the proposed activity would be considered as well as the local county office to determine if mariculture is zoned a permitted or conditional use. The applicant then needs to follow standard permit requirements with the Corps, aquaculture registration with CA Department of Fish and Wildlife, and product certification for the growing area with CA Department of Public Health.

  The HBHRCD obtained shellfish aquaculture leasing authority after the State of California ceded its authority for managing the waters of Humboldt Bay several decades ago. The HBHRCD is required by the California Environmental Quality Act (CEQA) to prepare an Environmental Impact Report (EIR) prior to granting shellfish mariculture permits. A final EIR was completed by the HBHRCD in February 2016.

- Oregon: Local land use planning agencies are asked to provide comment and verify that a proposed shellfish aquaculture project is consistent with their comprehensive land use plan. The applicant can seek this verification prior to submitting a lease application, or the OR Department of Agriculture will request it during the application review process.

- Washington: Statewide authority. There are 260 towns, cities and counties that are required to have an updated Shoreline Master Program. Shoreline Master Programs are local land use policies and regulations designed to manage shoreline use. These local programs protect natural resources for future generations, provide for public access to public waters and shores, and plan for water-dependent uses. They are created in partnership with the local community and WA Department of Ecology, and must comply

with the state Shoreline Management Act and Shoreline Master Program Guidelines. Through these, local governments can (or in some cases must) require a Substantial Development Permit and/or a Conditional Use Permit.

Applicants are encouraged to have a pre-submission conference meeting with the local government as the local review process can be the most detailed and time consuming part of an application. Local officials help applicants understand what information must be included in the interagency Joint Aquaculture Review Permit Application (JARPA). Local counties conduct a comprehensive application review including a public notice / comment period, tribal notification, and a site visit and evaluation. County staff recommend a shoreline Substantial Development Permit or Conditional Use Permit (CUP) and forward it to the WA Department of Ecology. Multiple appeal opportunities exist during this local review process which can cause significant delays.

The Department of Natural Resources, Aquatic Resources Program issues aquatic use authorization (lease) for State-Owned Aquatic Lands (not required for privately owned tidelands). The Department of Fish and Wildlife issues permits for shellfish harvest, sales and transfers. The Corps of Engineers reviews to determine if a verification letter can be issued under the NWP or if an individual permit decision is needed. An existing Shellfish Interagency Permit Team provides significant coordination support. The permit process typically takes 6-12 months but can be considerably longer if appeals occur especially during the local review process.

- Alaska: First class cities and boroughs (e.g., Ketchikan Gateway Borough, City of Craig, City and Borough of Juneau, City and Borough of Sitka, City of Thome Bay, City and Borough of Yakutat, and Kenai Peninsula Borough) typically have planning sections that issue permits for aquatic farm operations. A state / federal joint permit application provides applicants with agency contact information for local municipalities requiring an additional authorization.

  While Alaska has an excellent aquatic farm website, local government websites lack sufficient information for an applicant to understand what authorization and permit application is needed. Applicants are encouraged to request a pre-application meeting through the Departments of Natural Resources and Fish and Game and/or to contact the local government for information on how to request authorization. The time to complete the state / federal application review process typically takes approximately 9 months after the application period that ends April 30th for suspended culture projects and could take up to a year for a near-bottom or on-bottom culture project.

- Connecticut: Statewide review of lease applications in town waters by municipal shellfish commission. Although these local decision-makers do not have legal authority to permit aquaculture structures, these commissions play an important role in the review process for identifying and assisting to mitigate potential social and use conflicts. Applicants submit a federal / state joint permit application to the CT Department of Agriculture, Bureau of Aquaculture (DA/BA). The DA/BA reviews the application for completeness and then forwards the application to the CT Department of Environmental

Planning, Corps of Engineers and local shellfish commission if proposed activity is within town waters. Comments received from the local shellfish commission are submitted to the DA/BA, and are then forwarded to DEP/OLISP and USACE for consideration in making a final permit decision.

Recommendation 9 - Address scientific uncertainties/unknowns: Develop and implement prioritized list of science needs to improve shellfish aquaculture permitting efficiencies [NOAA and federal/state partners].

The federal, state and local (where applicable) governments are required to evaluate many factors when determining if a shellfish aquaculture project can be authorized. At the federal level, significant focus is directed towards areas of public interest including but not limited to potential impacts to protected resources, critical habitat designations, essential fish habitat and navigation. State and local governments also focus on these factors, but also invest substantial resources towards minimizing user conflicts (e.g., riparian landowners, fishermen, boaters).

When sufficient scientific information exists, programmatic biological opinions, shellfish aquaculture Best Management Practices (BMPs) and / or permit conditions can be developed and used to obtain permitting efficiencies. This requires a significant investment of 'upfront' time, but when developed, can reduce or eliminate the amount of federal staff resources involved in reviewing every permit application / authorization request. In Florida, for example, BMPs were developed for several protected resources and critical habitat, and included as a Corps general permit compliance requirement. This has enabled the Corps Jacksonville District to issue a Programmatic General Permit to the Florida Department of Consumer Affairs. Under this PGP, Florida is provided the authority to approve shellfish aquaculture projects that comply with the conditions of the PGP, including the BMPs. Because the BMPs and permit conditions of the PGP adequately address federal interests of the Corps, NOAA Fisheries and U.S. Fish and Wildlife Service, these agencies do not have to invest limited staff resources in reviewing individual permit applications under the PGP.

A significant amount of federal, state and local (where applicable) staff resources are involved in evaluating potential impacts of a shellfish aquaculture project to beds of submerged aquatic vegetation (SAV). The criteria established across the United States to protect SAV varies widely. In Maryland and Virginia, there is an annual survey and delineation of SAV beds in Chesapeake Bay. No leases are approved in these delineated areas, and the need for an additional buffer area in Maryland is reviewed on an individual project basis with SAV biologists. It does not appear that such an extensive SAV survey is conducted in any other state, although Washington does conduct annual eelgrass surveys. Most states conduct a biological assessment survey to evaluate the presence and potential impact to SAV using quantitative (e.g., North Carolina, New Hampshire) or qualitative criteria. Where standard buffer requirements exist, they range from 10 feet in Washington, a minimum of 25 feet in Massachusetts and Connecticut, 30 feet in New Hampshire and 1,500 feet in Mississippi. The Corps Seattle District is the only District with a special condition that prohibits the positioning of shellfish culturing (e.g., culturing by rack and bag, raft, long-line, ground methods) within 10 horizontal feet (currently proposed to increase from 10 to 16 horizontal feet with the new programmatic

consultations) of eelgrass or kelp within an already approved lease area where aquaculture is not currently located and has not previously occurred.

The status and importance of eelgrass in California recently prompted NOAA Fisheries to adopt a California Eelgrass Mitigation Policy (CEMP) and Implementing Guidelines report. The CEMP recommends no net loss of eelgrass habitat function in California. Compensatory mitigation is recommended for the loss of existing eelgrass habitat function, but only after avoidance and minimization of effects to eelgrass have been pursued to the maximum extent practical. Compensation mitigation options include comprehensive management plans, in-kind mitigation, mitigation banks and in-lieu-fee programs, and out-of-kind mitigation. Further, it is the intent of this policy to ensure that there is no net loss of habitat functions associated with delays in establishing compensatory mitigation. To achieve this, NOAA Fisheries, in most instances, recommends compensatory mitigation at a ratio of at least 1.2:1 mitigation area to impact area. As eelgrass stressors and growth characteristics differ between southern to northern California and there are gaps in scientific knowledge, a precautionary policy was adopted which has resulted in a major point of contention. Furthermore, this policy being limited to California has raised issues in other west coast states which face similar SAV problems.

While biological factors may justify some regional differences in shellfish aquaculture standards for protecting SAV, a regional or national scientific review is recommended. Such a review could provide agencies with the necessary scientific information to protect SAV while affording sustainable shellfish aquaculture opportunities, and develop more uniform standards across the United States. For example, there might be certain types of culture with minimal impacts that could be recommended in locations with SAV (i.e., properly spaced longlines and flip bags).

NOAA Fisheries Aquaculture Coordinators should work with state aquaculture coordinators and NOAA Fisheries scientists including Protected Resources staff to develop a strategic plan to identify a prioritized list of science needs to improve shellfish aquaculture permitting efficiencies while providing adequate protection to natural resources and navigation, and minimizing user conflicts. NOAA Fisheries should then use its resources (staff, Sea Grant, research grants, financial assistance programs) and encourage its federal, state, and private sector partners to collaborate using their respective authorities and resources to address these science needs.

Recommendation 10 - One-stop national "dashboard": Prepare and maintain a national state-by-state depository of shellfish aquaculture permitting systems and industry related information [NOAA coordinate with Corps and State agencies].

Unlike inter-jurisdictional fisheries management which involves regular meetings (e.g., interstate commissions, regional councils), interaction and information sharing among state, territory and federal fisheries managers and scientists, interactions between state and federal shellfish aquaculture coordinators and scientists are very limited. As a result, the understanding of permitting systems beyond a coordinator's own state is not common. The diversity and complexity of permitting systems from state to state and absence of a well prepared permitting guide book in most states presents a further challenge for coordinators to acquire this knowledge efficiently. And, while the Corps has Nationwide Permit 48 to guide shellfish aquaculture, permitting systems can differ significantly among Corps Districts.

Shellfish aquaculture permitting programs across the United States range from long-standing programs, to being in their infancy (<10 years), and others currently under development or reform. Permitting systems may vary from state to state, but the issues and challenges are similar. The establishment of a depository of shellfish aquaculture permitting systems and other industry related information will facilitate information sharing and networking among shellfish aquaculture coordinators. States developing or expanding a shellfish aquaculture program can more easily research systems in other states to build upon existing successes. States with existing challenges can examine how other states worked to resolve similar challenges. States looking to improve the efficiency and effectiveness of their programs can examine if there are innovative tools and/or permitting strategies being used successfully across the nation. And, this sharing of information can be used to improve Corps, NOAA, FWS, EPA, and state permitting consistencies (where appropriate).

The information obtained from this evaluation is provided in a state-by-state spreadsheet which can be obtained by contacting NOAA Fisheries Aquaculture Program at cynthia.sandoval@noaa.gov. It is essential that this information be routinely reviewed to ensure accuracy is maintained. It is recommended that NOAA Fisheries' regional offices and Corps' District office counterparts work with state aquaculture coordinators on an annual basis to keep this information up-to-date and useful.

Examples on how this information can be useful have been discussed earlier in this report (e.g., permitting systems, permit guides, websites, siting tools). This spreadsheet also includes key state and federal contact persons with their contact information, web links to state and federal websites and aquaculture support tools, and a range of on and off-bottom definitions. Information on application fees, annual rent and lease term limits can be evaluated to determine their influence on shellfish aquaculture development.

- Application fees range from $25 to $1,500.
- Annual rent ranges from $1.50 to >$1,375 / acre.
- Lease terms range from 1 to 30 years to no maximum.
- The range of public notice requirements, and riparian ownership notification and special conditions can be examined to determine the most efficient and effective approaches.
- The use of business plan and/or active use requirements, and the range of active use criteria used across the nation can provide insight on ways to maximize business success and improved production from public bottom.

State-by-State Shellfish Aquaculture Permitting Summary

This project established a spreadsheet summary including, but not limited to: each state's permitting agency contacts and websites, web links to permits, permit applications, aquaculture laws and regulations, siting tools, business planning tools and industry statistics (e.g., leased acreage, production, farm-gate value).

This information should be made available to federal, state and local aquaculture coordinators and be maintained on at least an annual basis.

Data is also included on the number of shellfish leases, acreages, harvest, farm-gate value, timeframes for processing applications, and the number of pending lease applications. This information could be useful in conducting an annual status and trends review of the shellfish aquaculture industry and permitting systems across the nation, identify permitting systems working well and not working well, and evaluating and addressing resource needs.

Effective permitting tools and conditions used across the nation to address protected resources, fish habitat, migratory fish and navigation can also be examined. Some noteworthy items are included below.

Protected resources and critical habitat designations (CHD):

- A range of strategies is used among Corps Districts to ensure an applicant complies with ESA permit conditions during the application process. Some include: requiring applicants to contact the USFWS and NOAA Fisheries, utilizing and documenting their use of ESA and CHD informational tools, sending a PCN to the Corps who coordinates review with USFWS and NOAA Fisheries, or sending a PCN directly to the USFWS and NOAA Fisheries. An examination of these different approaches could assist in identifying a process which can facilitate submittal of a complete application, an applicant's compliance and protection of protected resources and CHD.
- South Carolina Corps Charleston and George Savannah Districts have an ESA Condition 18 compliance checklist (e.g., list of protected species in region, regional conditions, CHD information).
- North Carolina Corps Wilmington District has a website with useful ESA species information.
- Florida has a well-developed Best Management Practices (BMP) document for shellfish aquaculture, and standard in-water work PGP conditions to address conservation needs of manatee, smalltooth sawfish, sea turtles and Gulf green sturgeon.
- New Jersey has BMPs for red knots.
- New York Corps District established a sea turtle incidental take reporting form and promotes use of the US FWS' protected resource national mapping tool to applicants.
- Maryland is the only state with a vessel buffer distance requirement for listed species.

Submerged Aquatic Vegetation (SAV): There exists a range of conditions used across the nation to protect SAV from the impacts of shellfish aquaculture. Some are justified due to regional differences in the status of SAV beds and others result from the political influence by stakeholders who argue that the available science is not adequate to address their issues.

Developing and implementing a science strategy (Recommendation 9) to address critical information gaps to develop shellfish aquaculture best management practices for protecting SAV should be a priority. An emerging science need is to examine the implications to SAV beds when it colonizes or increases in shellfish lease sites after shellfish farming begins. Obtaining this information will potentially increase the amount of area for shellfish aquaculture while ensuring adequate protection of SAV. Furthermore, it will better enable the Corps to establish state verification programs (Recommendation 2).

It is also recommended that the impacts to SAV from other permitted and non-permitted activities on the land (e.g., development, point and non-point pollution) and in the water (e.g., crab scraping in SAV, hydraulic clam dredging with no SAV buffer, boating / jet skis) be compared to shellfish aquaculture restrictions to ensure standards in conservation and the best use of public resources are being fairly applied.

A summary of shellfish aquaculture permitting conditions and information pertaining to SAV is included below:

- New Hampshire does not allow bottom culture in an SAV bed of at least 1/20 of an acre in size and requires a 10 m buffer.
- Massachusetts requires a 25' buffer from SAV.
- Connecticut requires a 25' buffer from SAV and utilizes an SAV survey guide developed by NOAA Fisheries regional Habitat Conservation Division, U.S. Environmental Protection Agency Region 1, and the New England District U.S. Army Corps of Engineers (USACE New England) to assist applicants when an assessment of SAV is needed to evaluate impacts of a waterway development project: http://www.nae.usace.army.mil/LinkClick.aspx?fileticket=pJQSl6ElQ1M%3d&portalid=74.
- New Jersey will not permit shellfish aquaculture in areas with any level of SAV present.
- Maryland and Virginia use a Chesapeake Bay SAV survey to guide permit decisions. Maryland works with state SAV biologist to determine appropriate buffer distance.
- North Carolina only allows leasing in areas where the presence of SAV is 15% or less, or SAV density is very sparse (10% or less).
- Mississippi regulation does not allow leasing within 1,500' of SAV but current regulatory reforms may modify this restriction.
- California: Corps Districts require lease holder to comply with NOAA Fisheries California Eelgrass Mitigation Policy (CEMP) and Implementing Guidelines report which goes beyond the more general EFH considerations in MSA. The CEMP recommends no net loss of eelgrass habitat function in California. Applicants are required to include with PCN a compensatory mitigation plan, habitat assessment, and description of proposed project's impact to eel grass beds. NOAA Fisheries, in most instances, recommends compensatory mitigation at a ratio of at least 1.2:1 mitigation area to impact area. This NOAA Fisheries policy is limited to California.
- Oregon's NWP 48 is exempt from a general regional condition that would preclude any loss of high value aquatic habitat (e.g., eel grass). The ESA Programmatic consultation requires a 5 m buffer around native eelgrass for new and newly positioned operations. Newly positioned longlines that are properly spaced are allowed in eelgrass.
- Washington: Seattle Corps District does not allow applicant to expand new activity in an existing lease within 10' of eel grass or kelp. Fallow areas are at risk to be taken out of production if SAV becomes established. The ESA Programmatic consultation requires a 5 m buffer around native eelgrass for new operations. Properly spaced longlines are allowed in eelgrass that has recovered in fallow areas of existing farms.

Migratory fish: Permit conditions for migratory fish are usually generic but some with detailed conditions are included below.

- New Hampshire established a BMP for migratory fish which includes critical migratory routes of natural finfish populations (as for example; river herring, shad, salmon, smelt, etc.) which should not be blocked by extensive arrays of buoys, floats or rafts and the product suspended from them. Any such blockage of a water course greater than 25% of the total cross-sectional area available would be unacceptable.
- Washington Seattle Corps District has proposed special minimum water clearance conditions and work windows for certain migratory fish:

http://www.nws.usace.army.mil/Portals/27/docs/regulatory/NWPs/Existing%20Aquaculture%20Activities%20-%20Special%20Conditions.pdf.

Federal Navigation Project (FNP) setbacks: Where a setback to a FNP is included in a permit condition, there exists with one exception (Mississippi) a narrow range of setbacks (CT: 200'; NY: 100'; MD: 150'; FL: 100'; MS: 0.5 mile). If a setback is not specified, projects are evaluated on the basis of whether or not the project will cause more than a minimal adverse effect on navigation. When a setback is required, including this buffer in a state's shellfish aquaculture siting tool would be useful to applicants in identifying suitable areas.

Another strategy to minimize navigation conflicts which only appears to be utilized by the Baltimore District Corps in Maryland is requiring the state to send information on the shellfish aquaculture project to NOAA for inclusion on nautical charts and to USCG requesting issuance of a Local Notice to Mariners.

Recommendation 11 - Support for aquaculture businesses: Provide shellfish aquaculture industry with business planning tools and expertise through new resources and partnerships [NOAA, Corps and State agencies].

It has been reported that more aquaculture businesses fail because of poor management than poor production practices. Like farmers and others who run risky businesses, shellfish aquaculturists will need to contend with a number of challenges. Taking time to develop a well-thought out business plan can help a business owner anticipate potential problems and minimize risk to improve the chance of operating a successful business. A comprehensive written business plan will also assist in obtaining financing, if needed, as most investors remain unfamiliar with aquaculture. By developing a realistic plan, a factual case can be presented on why someone's investment has a good prospect of return with a satisfactory profit.

As most shellfish aquaculture takes place on public land, it is important that aquaculture operations provide a public benefit. While it is known that proper business planning improves the chances for success, there are limited business planning resources available and less than one-third of the states require a business plan to be submitted along with their permit application.

Business planning is not easy and can take months of research and assessment – a reason why it is often avoided. Recognizing its importance for building a successful business, federal, state and local aquaculture coordinators can assist shellfish aquaculture entrepreneurs by directing them to existing business resources, and work directly or through partnerships (e.g., NOAA / State Sea Grant Programs) to develop new and/or enhanced tools.

Some useful shellfish aquaculture business planning tools identified during this project include:

- AK Sea Grant Marine Advisory Program's fishery business planning tool – http://fishbiz.seagrant.uaf.edu/ and general business planning information https://seagrant.uaf.edu/map/aquaculture/shellfish/index.html.
- MD Sea Grant Extension program's business plan guidance document: http://www.marbidco.org/Business%20Plan%20Development%2019%20Oct%2010.pdf;

and business planning spreadsheet and instructions for remote setting operation - http://www.mdsg.umd.edu/topics/oysters/assistance-aquaculture-businesses.

- VA Sea Grant's aquaculture enterprise spreadsheet to estimate costs and earnings - https://vaseagrant.org/budget-spreadsheets-help-crunch-the-aquaculture-numbers/.
- AL has an agricultural and fisheries small business planning website tool - https://www.agtransitions.umn.edu/PublicPages/GettingStarted.aspx.
- CT Sea Grant's web link to the Northeastern Regional Aquaculture Center (NRAC) Publication No. 101-2008 which includes business planning information and balance sheet template - https://agresearch.umd.edu/sites/agresearch.umd.edu/files/_docs/101-2008%20Planning%20for%20success.pdf.

Examples of state rules and/or applications which require business plan information:

- DE's new aquaculture rules require significant amount of business planning documentation - See regulation 4.4 for SADA: http://regulations.delaware.gov/AdminCode/title7/3000/3800/3801.shtml#TopOfPage
- NC's application requires basic business management plan information to be submitted - http://portal.ncdenr.org/c/document_library/get_file?uuid=d648793b-3202-470a-a3a5-12b719c5de9e&groupId=38337.
- AK DNR and F&W joint agency aquatic farm application includes basic business planning questions; http://dnr.alaska.gov/mlw/forms/land/aqua_part2.pdf.

Examples of shellfish aquaculture loan programs offered by states and federal agencies:

- MD's shellfish aquaculture loan program - http://www.marbidco.org/loans/msal.html.
- AK mariculture loan program - https://www.commerce.alaska.gov/web/ded/FIN/LoanPrograms/Mariculture.aspx.
- NOAA- Fisheries Finance Program – www.fisheries.noaa.gov/national/funding-and-financial-services/fisheries-finance-program
- USDA – Loan Guarantees - https://www.fsa.usda.gov/programs-and-services/farm-loan-programs/index

Recommendation 12 - Encourage innovation: Establish expedited permitting program for small-scale 'experimental' shellfish aquaculture operations [Corps and State agencies].

The existing time and costs (in some states) for obtaining a shellfish aquaculture permit can deter someone interested in exploring their interest in starting a shellfish farm. Additionally, existing shellfish farmers interested in exploring the feasibility of a new production area and/or culture method are often deterred for the same reason. The States of Maine and Rhode Island have developed an expedited permitting program for small-scale, experimental shellfish aquaculture operations to address this obstacle. These programs are summarized below. It is recommended that other states explore the establishment of similar programs.

- Maine: A Limited Purpose Aquaculture (LPA) license is available for prospecting new areas. The LPA license costs $50 and expires at the end of the calendar year but can be renewed. The permitted area can be up to 400 ft^2 and an individual can have up to four licensed areas. Certain culture gear is allowed. Public notice is provided to shoreline

property owners. The Maine Department of Marine Resources (ME DMR) conducts a site review with applicant, and determines if public scoping or a hearing is needed. The ME DMR Commissioner shall make a final decision within 60 days of the public hearing or close of public comment. The LPA license is governed by an administrative process and can be issued if all information is provided, including approval by the local harbor master who verifies that the project will not impede safe navigation, and the project will not unreasonably interfere with commercial or recreational fishing and riparian ingress and egress. A license for bottom culture with no gear can be obtained in 4-12 weeks. Additional time may be needed to obtain Corps authorization for gear culture. The Corps does not authorize bottom culture with no gear in Maine because they consider this a traditional harvest practice. More information can be found at: http://www.maine.gov/dmr/aquaculture/documents/CONDUCTINGAQUACULTUREINMAINErev2-22-17.pdf

- Rhode Island: A Commercial Viability Permit (CVP) costs $25 and allows a prospective farmer to conduct a limited study for up to three years of a proposed site to determine if it is suitable for a commercial venture. The application requirements for obtaining a commercial viability site are essentially the same as a full application. However, the process is simpler and less time consuming because it is an administrative permit for the first year and a half, then requires RI Coastal Resources Management Council approval for the second year and a half. The permitted area cannot exceed 1,000 ft^2. Projects that do not exceed 1,000 ft^2 are eligible for a Category 1 project under the Corps General Permit, and if eligible, do not require Corps notification. An applicant can obtain a CVP in 2-3 months compared to 8-9 months on average for a standard lease. More information can be found at: http://www.crmc.ri.gov/applicationforms/AquaApp.pdf

Recommendation 13 - Transition from bottom fishery to aquaculture: Increase the availability of traditional shellfish fishery bottom to shellfish aquaculture [State agencies – may require legislation and/or regulation].

Access to traditional shellfish fishery bottom by shellfish aquaculture businesses is often not available or very restrictive throughout the United States. This is largely due to opposition from the commercial fishing (not limited to shellfish) industry which maintains strong political influence over state officials, and is concerned about competition for space and market. An exception to this is in the Commonwealth of Virginia where shellfish bottom has historically been available for private leases. It is not coincidental that Virginia is the second largest shellfish producing state in the United States (Washington, where private leases are also available, is first) due to the harvest of private beds which comprises the majority of Virginia's shellfish harvest (https://www.agcensus.usda.gov/Publications/2012/Online_Resources/Aquaculture/aqua_1_019_019.pdf).

It is recommended that NOAA Fisheries work cooperatively with state partners to develop information, which justifies the need and benefit for facilitating aquaculture development and increasing the amount of traditional shellfish bottom available for aquaculture leasing. For example, if shellfish aquaculture can provide higher productivity it may be argued that there is a greater public benefit. Currently, the majority of states have very conservative rules to preserve

traditional shellfish beds for the public fishery. A criteria used in several states is the requirement that a proposed lease area does not exceed a shellfish productivity threshold deemed viable for the public industry. These thresholds are often set at a level well below what the area could produce if allowed to be farmed. Examples of such productivity thresholds include: NC – 10 bu/acre (~0.8 oysters/m^2 assuming 275 oysters / bu), MD – 1 oyster/m^2, TX – any oyster harvest in past 8 years, NH – 10 oysters/m^2, and MA – 3 oyster/ft^2 (32/m^2).

The State of Maryland prohibits leasing on Public Shellfish Fishery Areas (PSFA) (oyster bottom deemed still viable to public industry) unless an individual petitions the State to declassify the area. If a state survey results in a density of oysters less than 1 oyster / m^2 the state can declassify the area for leasing. This, despite the fact that shellfish farms in Maryland which use hatchery spat on shell can yield well above 50 oysters / m^2 – a density scientists and managers have established as a restoration target for Chesapeake Bay sanctuaries.

The utilization of state waters for the 'public's best interest' should also be examined by comparing the yield / acre between public and private (lease) oyster grounds. During the past ten years, the average harvest of Maryland's public oyster fishery is 208,569 bushels on 176,000 acres, or 1.2 bushels / acre. On-bottom hatchery spat on shell culture in Maryland is projected to yield between 431 and 1,389 bushels / acre depending on salinity (personal communications with Oyster Recovery Partnership). At this yield, it would only take 150-483 acres to produce a harvest similar to the past ten year average harvest from the public fishery. Maryland's shellfish aquaculture industry could produce a one million bushel harvest, a level not seen in Maryland for thirty years (1985-86 season), using hatchery spat on shell bottom culture on 720-2,320 acres, depending on salinity. Even with a three year rotation which requires four planting areas the amount of area to sustain a one million bushel harvest would be 2,880-9,280 acres or 1.6%-5.3% of what is currently protected for the public fishery. In addition to the increased economic benefit from shellfish aquaculture, there are increased ecological benefits (e.g., water filtration, habitat) from the higher oyster densities which can exceed restoration target levels.

Recommendation 14 - Address the opposition: Consider existing strategies being used to address opposition / appeals from shoreline property owners and other user groups (e.g., boaters, fishermen) [NOAA and State agencies].

Appeals can extend the permitting process timeline significantly. As agencies explore ways to make the permitting process more efficient, strategies to reduce the number of appeals should also be examined.

Shoreline property owners and other competing water users (e.g., fishermen, boaters, and waterfowl hunters) are not often familiar with how shellfish farms operate, and sometimes, their opposing concerns are unfounded. To reduce the likelihood for an appeal it is important to identify and communicate with those who may have a concern about a project early in the process. This will allow a prospective shellfish farmer to describe their proposed project, understand any concerns, and potentially identify ways to address concerns without compromising the project.

The process for informing shoreline property owners and other stakeholders about proposed shellfish aquaculture projects varies substantially across the United States. As described under Recommendation 1, Rhode Island has a preliminary determination meeting which provides an opportunity for stakeholders and the public to obtain details of a proposal and provide input on any concerns prior to submitting a full application. More common approaches to obtain this input occur after a proposed project application is submitted. These approaches include requiring an applicant to obtain the signature from all riparian owners adjacent to the project area to acknowledge their notification. This has proven effective in fostering a working relationship between the shellfish farmer and adjacent property owners, but can also exacerbate problems if the landowner is not approached in a courteous and professional manner. Some agencies require the applicant to send a public notice to adjacent riparian owners, or the agency will send a notice on the applicant's behalf. If the applicant is required to send the notification, the agency will often assist the applicant. And, other agencies rely on a general public notice for adjacent riparian owners to find out about the proposed project. This latter approach is prone to the greatest number of issues and appeals. The amount of time a public notice needs to be advertised varies from one day to four consecutive weeks. Aquaculture coordinators should collaborate to evaluate the range of approaches used across the nation to notify adjacent riparian owners to a proposed shellfish farm, and consider developing standard notification practices which are most likely to reduce the number of appeals.

Small-scale shellfish farm permitting programs like those described for Maine and Rhode Island in Recommendation 12 as well as Maine's 'experimental permit' have proven to be a good community acceptance tool. These programs which are permitted for a short term and limited to a small area provide an opportunity for adjacent riparian owners and other competing water users to obtain more knowledge on the operation of the shellfish farm. This is also an opportunity for a shellfish farmer to demonstrate his or her willingness to be a good neighbor by understanding any concerns and attempting to mitigate these concerns where practicable. More details on Maine's experimental permit program which allows for no more than 4 acres and up to 3 years can be found at:
http://www.maine.gov/dmr/aquaculture/documents/CONDUCTINGAQUACULTUREINMAINErev2-22-17.pdf.

Another strategy used in Rhode Island and New York to facilitate shellfish aquaculture development in areas where there is high shoreline residency and water use activity, is the use of a lease acreage cap as a social capacity limit within a specified water body. This strategy addresses a common concern that shellfish farms will eventually occupy the majority of the water body and create significant conflicts and ecological harm. An acreage cap allows an opportunity for shellfish farming to get started or expand while also providing time for the community to become more familiar with the operation of shellfish farms, and determine what, if any, of their concerns are realized. If realized, they are better suited to present these concerns to the permitting agencies during any future consideration to increase the acreage cap. Current examples of this approach are summarized below:

- New York Suffolk County: In 2004, the State of New York ceded title to approximately 110,000 acres of underwater lands in Peconic Bay and Gardiners Bay to Suffolk County for the purpose of shellfish cultivation, and authorized the County to prepare, adopt and implement a shellfish aquaculture lease program for this region. In 2009, the County

adopted a shellfish aquaculture management plan based on an Environmental Impact Statement which assessed the impacts of a lease program on the environment, socio-economics and maritime traditions. The plan established a Shellfish Cultivation Zone consisting of 29,969 acres where leases could be issued. In order to mitigate user conflicts and address unforeseen issues, the plan limits new leases to 5- or 10-acre parcels, and caps new leases at 60 acres per year, for a maximum of 300 acres during the first five years of the program, and a total of 600 acres by the tenth year of program implementation. Including existing leases which were given the opportunity to grandfather into the program, the maximum area that potentially could be leased during the first 10 years of the program is 3,173 acres. This is less than 2.9% of the area under County lease jurisdiction. More details about this program can be found at: http://www.suffolkcountyny.gov/Portals/0/planning/EnvPlanning/Aquaculture/ALPAC_PMP_082009.pdf.

Rhode Island: Shellfish farming is particularly suited for salt ponds in RI because of the shallow water and longer growing season. While the general sentiment across the state is that aquaculture is good for the economy, resistance has come from certain groups who are accustomed to enjoying salt ponds without restriction. In an effort to support RI's growing aquaculture industry consistent with the best public interest, the RI Coastal Resources Management Council adopted a 'social capacity' rule which established a 5% lease area cap in salt pond areas. More information on carrying capacity concepts and tools for aquaculture can be found in a presentation by RI Sea Grant Program: http://www.ecologicalaquaculture.org/Costa-Piercecarryingcapacity(2011).pdf. Research on social carrying capacity for aquaculture is also ongoing by the University of Rhode Island: http://seagrant.gso.uri.edu/community-aquaculture-support-in-ri/

Existing rules in Virginia allow a shellfish aquaculture lease holder to obtain a lease for a project proposed as on-bottom shell and seed, and once permitted, to use off-bottom culture without further agency review and approval as long as the leaseholder's culture gear does not extend more than 18-inches off the bottom. This rule has resulted in an increased number of protests primarily from shoreline property owners but also fishermen who lack certainty that the operation will continue to be used as the proposed on-bottom shell and seed culture method. While this rule initially provided additional flexibility and efficiency to the shellfish aquaculture industry, it is now creating significant permitting delays, in part because the Virginia Marine Resources Commission typically does not explain the requirement to notify the Norfolk District Corps when there is a change in culture methods.

Conflicts with commercial fishermen are also common and usually occur because of competition for space and markets. States often lack accurate and spatially explicit commercial harvest data making it difficult to screen proposed projects without investing significant resources in conducting a field survey (e.g., examine shellfish density thresholds). Delays in the permitting process can occur when a state lacks sufficient resources to complete such field surveys in a timely manner. Obtaining accurate commercial harvest data at a sufficient spatial scale would allow states to identify important commercial fishing areas where leasing is not encouraged. Including such information in an aquaculture siting tool will help an applicant to avoid these areas and avoid unnecessary permitting delays, and also allow aquaculture staff to screen applications using the siting tool and reduce the demand for field surveys.

Recommendation 15 - Expand shellfish initiatives: Establish additional state / regional shellfish initiatives [NOAA and state/federal partners].

This evaluation has clearly demonstrated the benefits of establishing a shellfish initiative. Shellfish initiatives can provide the necessary leadership at the gubernatorial level to overcome long-standing obstacles (e.g., laws, regulations, permitting process, staffing and financial resources, and enforcement) to shellfish farming.

New partnerships (e.g., state natural resource agencies and universities, sea grant programs, and industry institutes) increase the amount of focus and resources directed towards shellfish aquaculture program development. This has enabled states to develop effective shellfish aquaculture websites and permit guides which is a basic, but not common, need of a successful shellfish aquaculture program. Shellfish initiatives have also resulted in improved coordination among permitting agencies, however, challenges with permitting processes and policies still exist.

Opportunities to establish new shellfish initiatives should be considered where there is interest at the gubernatorial level. NOAA Fisheries should also examine the need for additional staffing for regional aquaculture coordinators to support such initiatives. For example, one region for which a new shellfish initiative and additional NOAA Fisheries aquaculture coordinator support should be considered is the mid-Atlantic region where there is tremendous interest and growth potential. Currently, there are about 600 pending shellfish aquaculture lease applications in New Jersey, Delaware, Maryland and Virginia. Each state has its own challenges for which the attention of a shellfish initiative and support from federal staff could be extremely helpful in addressing. The current location and work load of NOAA's current aquaculture coordinators in the Greater Atlantic and Southeast regions (one in Gloucester, MA and one in St. Petersburg, FL) make it difficult to provide this support.

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