

SHELLFISH AQUACULTURE UPDATE

Study On How to Reduce User Conflict Related to Shellfish Cultivation Leases



N.C. Department of Environmental Quality, Division of Marine Fisheries
and
N.C. Marine Fisheries Commission

November 8, 2019

TABLE OF CONTENTS

I. Introduction	3
II. Background.....	5
A. North Carolina’s Shellfish Lease Program	5
B. Federal Permitting - U.S. Army Corps of Engineers’ Nationwide Permit 48	11
C. Increased Review of Shellfish Lease Applications and Resulting User Conflicts	11
D. Recent Increase in Legal Challenges to DMF’s Shellfish Lease Decisions	12
E. DMF’s Shellfish Lease Program is Under-Resourced.....	14
III. Sources of Information Concerning User Conflicts	15
A. Previous Legislative Studies	15
1. 2016 - Shellfish Aquaculture Plan Report.....	15
2. 2018 - N.C. Strategic Plan for Shellfish Mariculture: A Vision to 2030	15
B. Collaboration and Public Outreach	17
C. User Conflict Information from Other States	18
1. Leasing Authorities.....	18
2. Siting Authorities.....	19
3. The Permit Process	19
4. Shellfish Lease Size and Acre Caps	20
5. Education	20
D. Future Studies and Directives	21
IV. Recommendations	22
A. Recommendation #1: Regulatory Reform	23
B. Recommendation #2: Program Evaluation	23
C. Recommendation #3: Collaboration	23
D. Recommendation #4: Resource Assessment	23

I. INTRODUCTION

The North Carolina General Assembly passed Session Law (“S.L.”) 2019-37 effective July 1, 2019. The General Assembly noted that the purpose of the bill is “to provide further support to the shellfish aquaculture industry in the State of North Carolina.”¹ Section 9 of the bill requires the North Carolina Department of Environmental Quality (“NCDEQ”), Division of Marine Fisheries (“DMF”) and the North Carolina Marine Fisheries Commission (“MFC”) to study how to reduce user conflict related to shellfish cultivation leases, and to adopt rules and reform internal operating procedures consistent with the findings of the study.

User conflicts are generally described as disagreements that arise between multiple users of areas leased for private shellfish cultivation purposes, commonly referred to as shellfish aquaculture or shellfish leases. Individuals use public trust waters in a variety of ways including navigating, swimming, hunting, fishing, and other recreational activities. The increase in coastal populations coupled with the growth of the shellfish aquaculture industry, particularly with respect to utilizing floating gear, has led to user conflicts regarding the use of coastal and estuarine waters.²

DMF and MFC address topics pertinent to user conflicts in the shellfish aquaculture industry in this study. The study also discusses the existing regulatory framework governing shellfish leases in North Carolina. DMF anticipates future amendments to shellfish lease regulations and internal changes to improve operating procedures with the objective of reducing user conflict issues. Efforts are also made to identify challenges and inefficiencies in the existing Shellfish Lease Program with suggested measures to remedy these deficiencies. The deadline for completing this study is January 1, 2020. The deadline to adopt new rules is March 1, 2021.

Some of the recommendations in this study will likely be included in future studies and directives mandated by S.L. 2019-37. These studies include:

- Shellfish Aquaculture Enterprise Areas (“SEA”) (Section 1.(a) – 1.(c));
- SEAs: Moratorium Areas (Section 1.(d));
- Pamlico Sound Shellfish Aquaculture Pilot Project (Section 2);
- Administrative Remedy for Shellfish Leasing Appeals (Sections 6.(a), 6.(b)).

DMF staff compiled information for this report from its own ongoing work, stakeholder groups, shellfish and aquaculture experts, shellfish growers, non-governmental organizations, and internal DMF shellfish staff with expertise in this area. DMF also drew upon the findings and recommendations from previous legislative studies related to shellfish leases and aquaculture. Cumulatively, the recommendations listed in this study include the provisions mandated in S.L. 2019-37, as well as considerations for enhancing existing procedures for managing the shellfish aquaculture industry and the resulting user conflicts.

¹ <https://www.ncleg.gov/EnactedLegislation/SessionLaws/PDF/2019-2020/SL2019-37.pdf>

² Overcoming Impediments to Shellfish Aquaculture through Legal Research and Outreach: Case Studies (National Oceanic and Atmospheric Administration, U.S. Department of Commerce), 2019
<http://nsglc.olemiss.edu/projects/shellfishaquaculture/index.html>

The success of shellfish aquaculture operations and the high-demand for new shellfish leases exceeds traditional DMF permitting and site selection capabilities. Achieving and sustaining a successful shellfish aquaculture industry will depend on, among other things, resolution of these user conflicts. DMF envisions approaching and addressing these issues in collaboration with multiple user groups to provide outreach and feedback to ensure shellfish aquaculture operations are consistent with sound science, public trust uses, business planning, marketing, and training. The DMF Shellfish Lease Program may not be sufficiently staffed or funded to accomplish the recommendations made in this study.

II. BACKGROUND

A. North Carolina's Shellfish Lease Program

DMF administers the Shellfish Lease Program through its Habitat and Enhancement Section. Shellfish leases using public trust bottom areas for shellfish aquaculture (in brackish and higher salinity waters) have existed in North Carolina for over 150 years. Shellfish leases are divided into two types: bottom and water column. You must have a bottom lease to have a water column lease. The water column lease can be granted over the entire footprint of a bottom lease, or on a portion of the lease. A shellfish franchise is similar to a bottom lease except that they are recognized submerged lands claims. Shellfish growers traditionally employed cultch on bottom leases or bed clams under netting. In 1989, the General Assembly expanded traditionally based growing methods by authorizing the leasing of the water column for shellfish aquaculture for areas above a shellfish bottom lease which allow for intensive gear to be used. Extensive shellfish culture means shellfish grown on the bottom without the use of cages, racks, bags, or floats. Intensive shellfish culture means shellfish grown on the bottom or in the water column using cages, racks, bags, or floats. The General Assembly amended the shellfish leasing statutes to allow the use of gear up to 18 inches off the bottom for bottom leases in 2015.³

While shellfish water column leases have been authorized since 1989, their use has only recently increased in popularity. The large growth in shellfish water column leases has increased the use of intensive gear leading to a rise in user conflicts. DMF has observed a substantial growth in submission of shellfish lease applications in the past several years with the caveat of a slight decrease in 2018 due to Hurricane Florence and Tropical Storm Michael (Table 1; Figure 1). There are eight coastal counties which have shellfish leases (Figures 2 - 4). As of October 8, 2019, there were 50 shellfish franchises, 224 shellfish bottom leases, and 88 shellfish water column leases in North Carolina covering 1,736 acres (Table 2; Figure 5). Carteret County has 127 shellfish leases, the largest of any North Carolina county (Table 2; Figure 5). Onslow County has the most acres covered by shellfish leases at 527 acres (Table 2; Figure 5). The number of shellfish lease applications in North Carolina has increased exponentially (1,491 percent) from the period of 2005 to 2011 (22 lease applications) compared to the period of 2012 to 2019 (350 lease applications). This is an increase from 2011 (two lease applications) to 2019 (106 lease applications) of 5,200 percent (Table 1; Figure 4).

By way of comparison, the Commonwealth of Virginia has a much larger shellfish lease industry, with 5,400 leases covering 122,000 acres. Currently, Virginia has hundreds of pending applications with a staff capability to process approximately 100 applications per year.

³ N.C.G.S. § 113-202(r)

Table 1. Total shellfish lease applications for bottom leases and water column leases from 2005 through 2019.

Year	Applications	
	Bottom Lease	Water Column
2005	3	1
2006	5	1
2007	3	0
2008	5	0
2009	0	0
2010	1	1
2011	1	1
2012	8	6
2013	6	10
2014	8	7
2015	9	2
2016	10	11
2017	52	46
2018	36	33
2019	58	48
Total	205	167

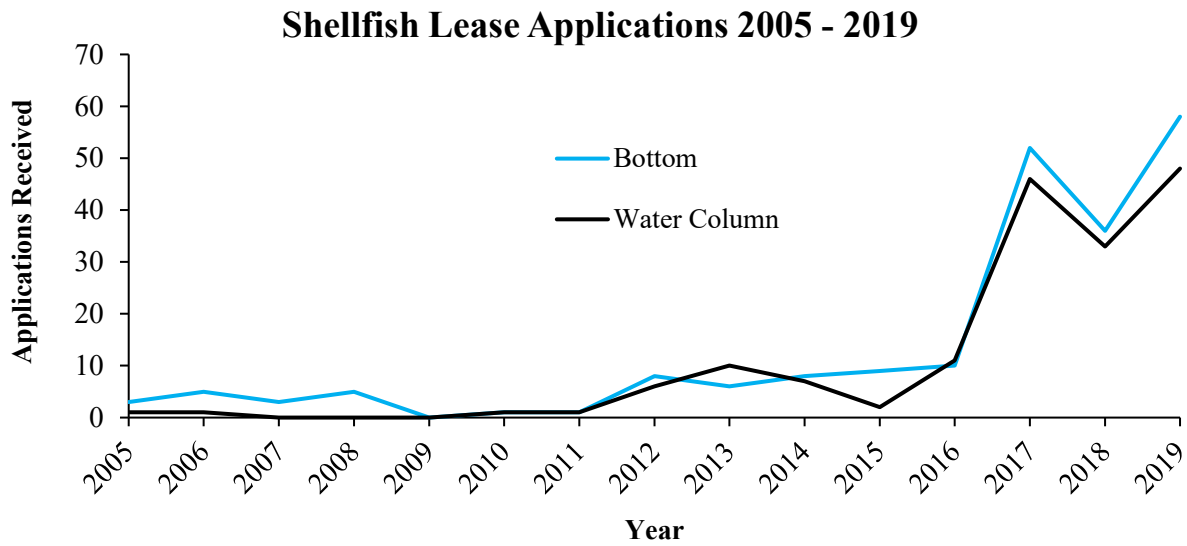


Figure 1. Total shellfish lease applications for bottom leases and water column leases from 2005 through 2019.

Table 2. Total number and acres of shellfish aquaculture leases per county and lease type sorted by total number of leases (highest to lowest).

County ¹	Bottom		Water Column		Franchise		Total	
	Number	Acres	Number	Acres	Number	Acres	Number	Acres ²
Carteret	87	318	38	98	2	2	127	417
Onslow	43	323	11	29	28	204	82	556
Pender	43	225	9	10	0	0	52	236
Hyde	26	255	11	40	9	236	46	531
Pamlico	9	52	8	48	10	71	27	171
N. Hanover	7	17	5	12	1	3	13	33
Dare	7	24	5	18	0	0	12	42
Beaufort	2	6	1	1	0	0	3	6
Total	224	1,219	88	255	50	517	362	1,736

¹ Current as of October 8, 2019

² Total only includes bottom and franchise because water column leases are over bottom lease

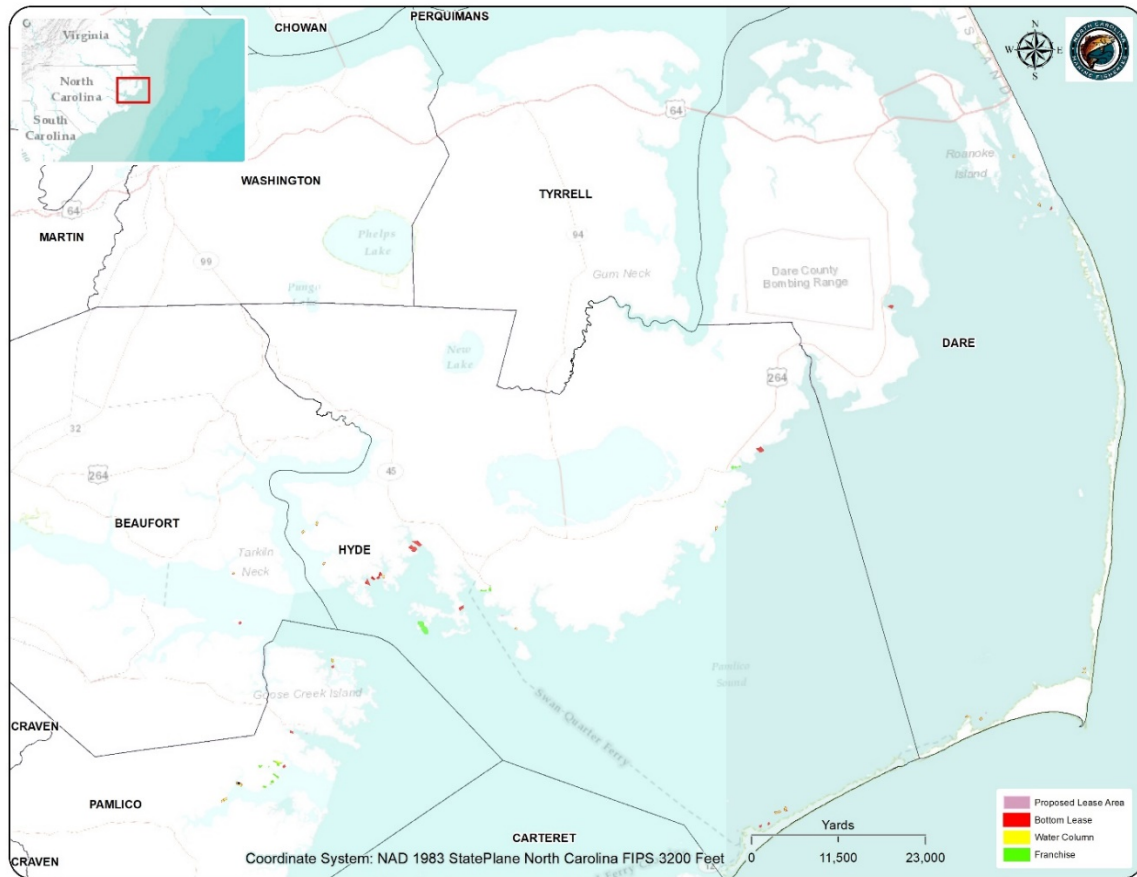


Figure 2. Active and proposed shellfish leases (bottom, water column, and franchise) in the northern region of the state.

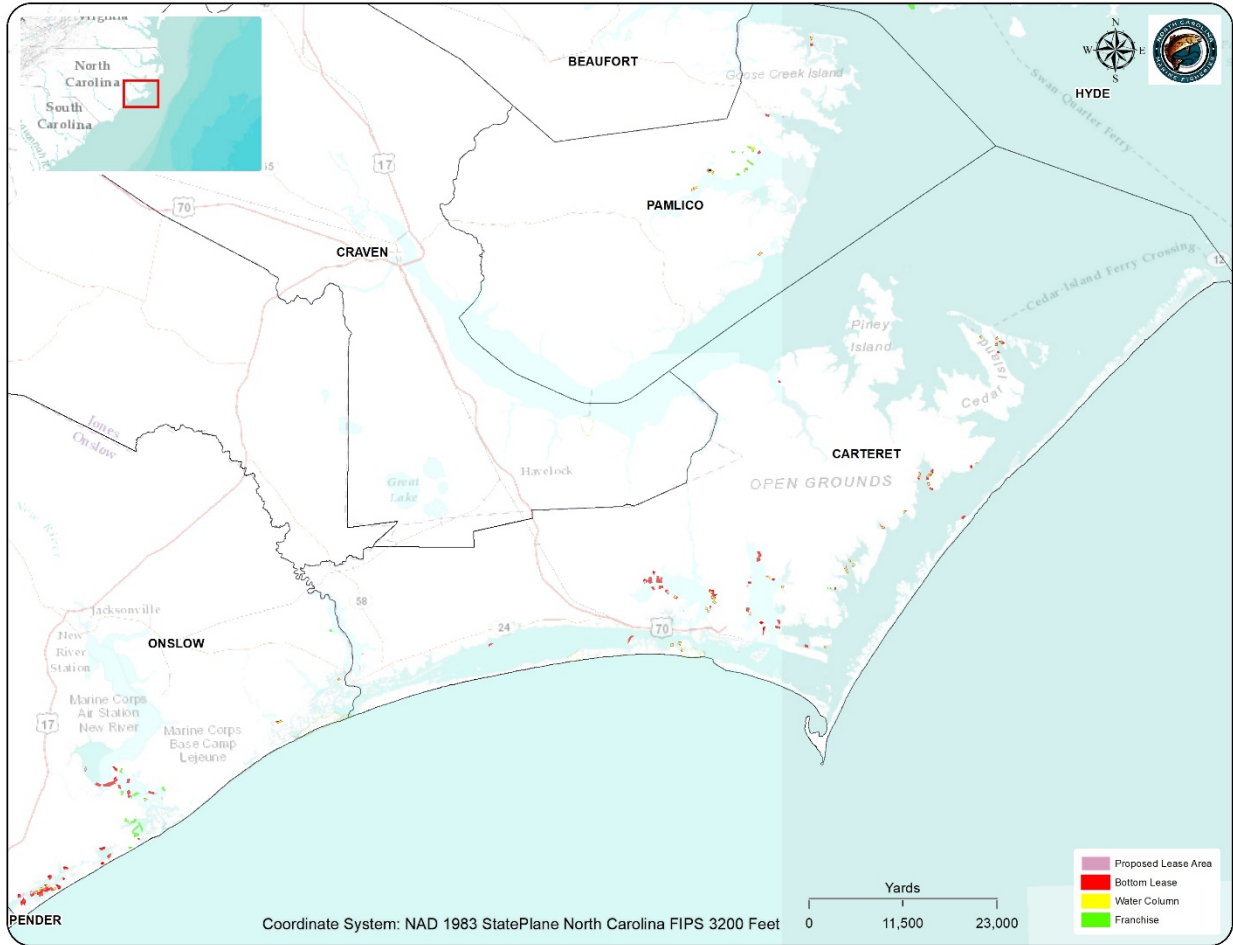


Figure 3. Active and proposed shellfish leases (bottom, water column, and franchise) in the central region of the state.

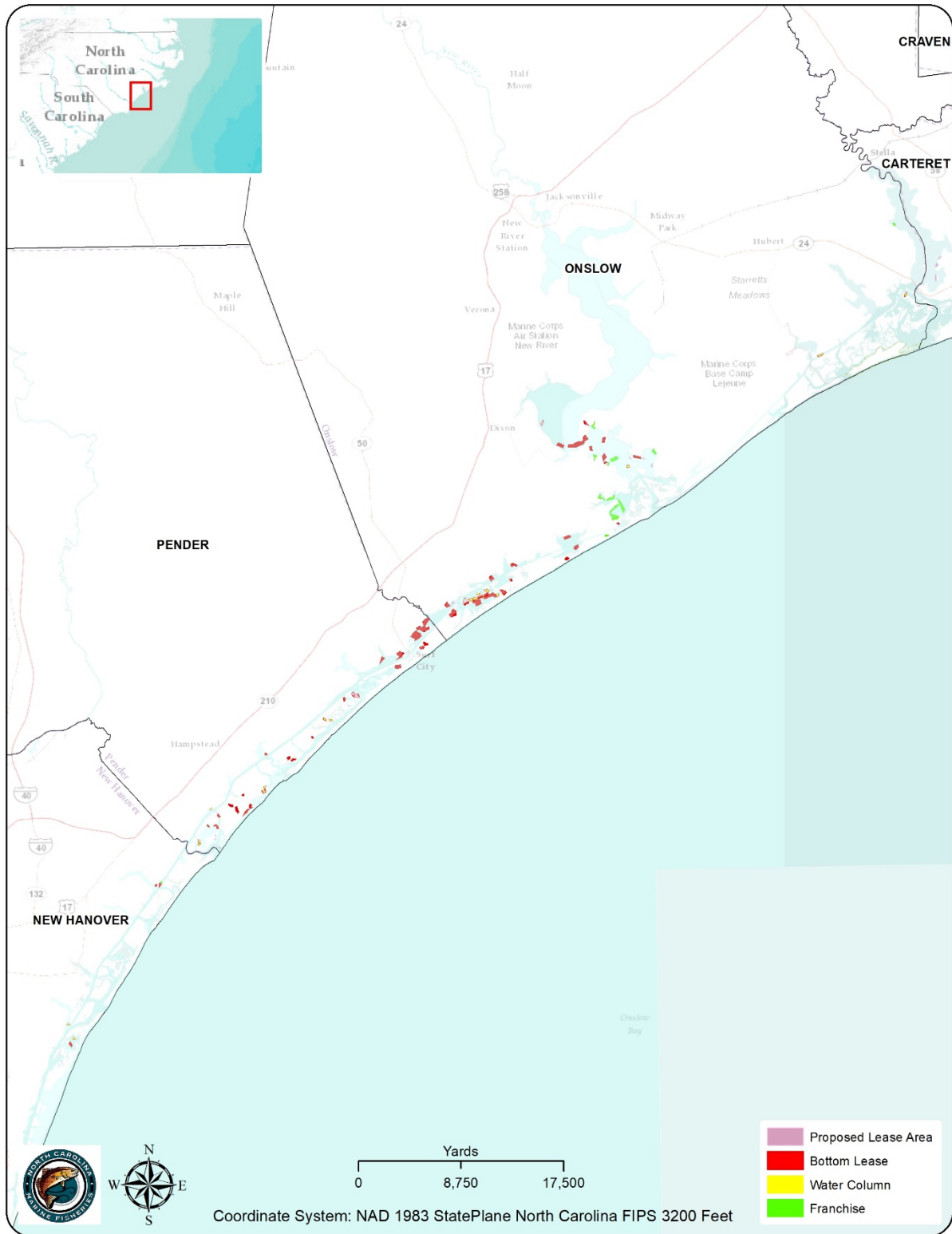


Figure 4. Active and proposed shellfish leases (bottom, water column, and franchise) in the southern region of the state.

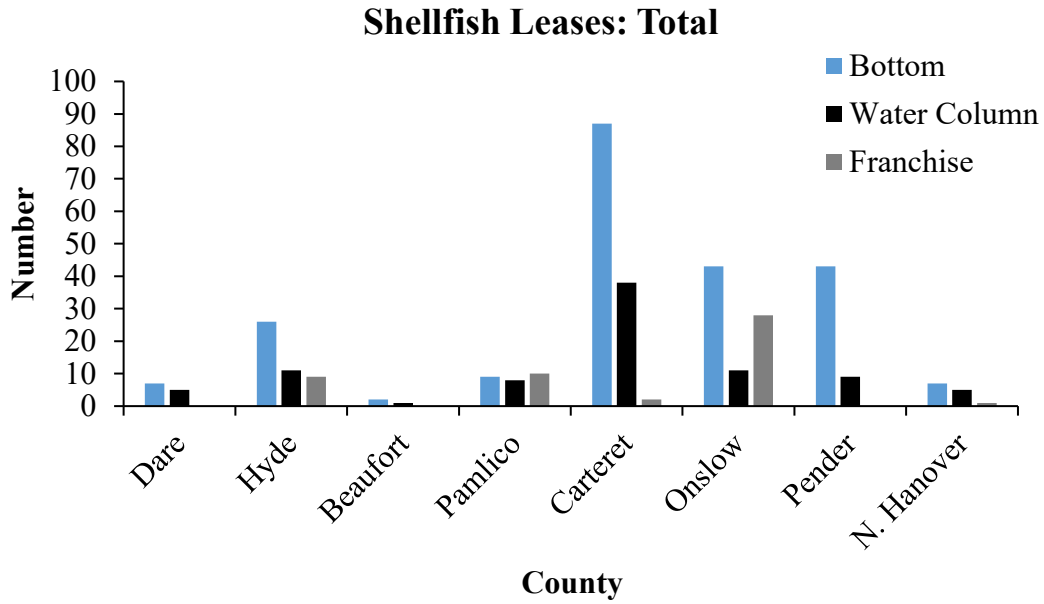


Figure 5. Total shellfish leases (bottom, water column, franchise) in North Carolina by county (north to south) and lease type.

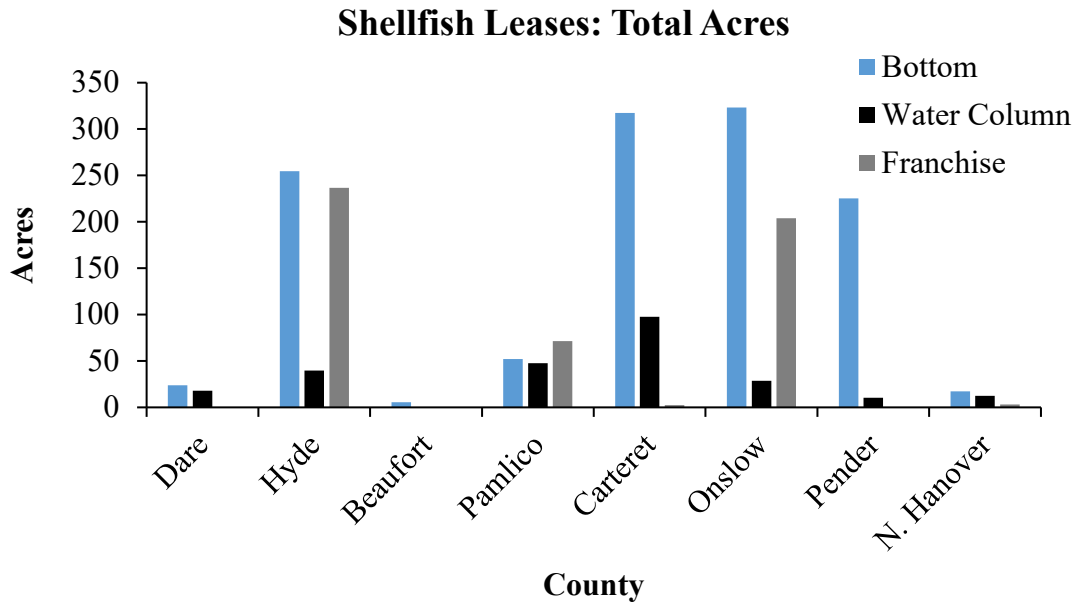


Figure 6. Total shellfish lease acres (bottom, water column, franchise) in North Carolina by county (north to south) and lease type.

DMF grants shellfish aquaculture leases in North Carolina in public trust waters. Public trust resources are land and water areas, whether publicly or privately owned, which are subject to Public Trust Rights as defined under North Carolina law. Public Trust Rights are held in trust by the state for the use and benefit of all citizens of North Carolina in common. Public Trust Rights include, but are not limited to, the right to “navigate, swim, hunt, fish, and enjoy all recreational activities in” North Carolina waters.⁴ Public Trust Rights cannot be conveyed in a manner that adversely affects public trust uses. The General Assembly charged NCDEQ with the stewardship of the public trust marine and estuarine resources of the state. The NCDEQ Secretary may delegate that authority to the DMF Director.⁵

B. Federal Permitting - U.S. Army Corps of Engineers’ Nationwide Permit 48

Permitting for shellfish aquaculture leasing is accomplished both by statute, in part under N.C.G.S. § 113-202, and through the U.S. Army Corps of Engineers’ (“USACE”) Nationwide Permit 48 (“NWP 48”) process - Commercial Shellfish Aquaculture Activities.⁶ The USACE re-issued NWP 48 in 2017. NWP 48 encompasses activities related to commercial shellfish aquaculture in waters of the United States. A recent federal court decision in the State of Washington could have an impact on future use of NWP 48 in North Carolina.⁷ NCDEQ’s Office of the General Counsel will continue to monitor the potential impacts of this decision and any related case law.

C. Increased Review of Shellfish Lease Applications and Resulting User Conflicts

A substantial increase in the number of user conflicts coincides with the recent expansion of the shellfish aquaculture industry and its use of intensive gear in water column leases (Table 2; Figure 1). The General Assembly promulgated several legislative changes affecting the Shellfish Lease Program in recent years in order to help address these conflicts.⁸ The MFC in 2018 also attempted to impose a moratorium for shellfish leases to pause processing of applications long enough to address user conflict issues related to navigation, waterbody carrying capacity, hunting, waterfront development, and applicant experience. Additionally, DMF increased its staff review of shellfish aquaculture lease applications, enlarged notice processes for public hearings on proposed leases, and directed more focus on possible conflicting uses in proposed lease areas. These efforts have resulted in more quality information, both in terms of technical facts and stakeholder opposition, reaching the DMF Director to better inform a decision on whether to grant a shellfish lease application.

The General Assembly’s legislative findings and declaration of policy for cultivation of shellfish in North Carolina states that “shellfish cultivation provides increased seafood production and long-term economic and employment opportunities” and “provides increased

⁴ N.C.G.S. § 1-45.1

⁵ N.C.G.S. § 113-131(b)

⁶ Nationwide Permit 48 - Commercial Shellfish Aquaculture Activities Effective Date: March 19, 2017; Expiration Date: March 18, 2022 (NWP Final Notice, 82 FR 1860)

⁷ The Coalition to Protect Puget Sound Habitat v. U.S. Army Corps of Engineers et al., No. 17-1209RSL, 2019 WL 5103309 (W.D. Wash. Oct. 10, 2019)

⁸ S.L. 2015-263; S.L. 2017-190; S.L. 2019-37

ecological benefits to the estuarine environment . . .”⁹ Further, to enhance shellfish cultivation, the policy of the State is to encourage the development of private, commercial shellfish cultivation in ways that are compatible with other public uses of marine and estuarine resources such as navigation, fishing, and recreation.¹⁰ Enhancing private shellfish cultivation includes granting shellfish cultivation leases that benefit the public interest.¹¹ Minimum standards for compatibility are provided to discern suitable areas for shellfish cultivation based on numerous factors, including but not limited to water quality, ability to cultivate shellfish, existing shellfish resources on the proposed lease, and other public trust uses in the area.¹² Shellfish aquaculture leases can often conflict with public trust uses, which makes balancing these issues and determining compatibility challenging and somewhat subjective.

D. Recent Increase in Legal Challenges to DMF’s Shellfish Lease Decisions

User conflict issues have resulted in an increase in contested cases filed by potentially aggrieved petitioners in the N.C. Office of Administrative Hearings (“OAH”), as well as other legal challenges. The N.C. Department of Justice represents DMF in defending DMF’s shellfish leasing decisions. Many user conflict cases brought by riparian owners adjacent to lease locations seem to be driven by a concern for impairment of view, also known as “viewshed.” Viewshed generally means the natural environment that can be seen from nearby riparian property. Viewshed is not a public trust right traditionally acknowledged under North Carolina common law. Discussion of several recent cases may be helpful in understanding user conflict concerns.

In 2016, a petitioner in Pender County challenged DMF’s denial of a bottom lease and associated water column lease based on findings by DMF that public trust user conflicts would result.¹³ The Administrative Law Judge’s (“ALJ”) decision states:

At issue in this particular contested case is whether or not the proposed shellfish lease is ‘compatible’ with the other uses of the area for navigation, fishing and recreation. Neither the general statutes nor associated Marine Fisheries Commission regulations define or indicate how much use within a proposed lease site must be present in order for the lease to warrant denial as being incompatible with those public uses. There is no definition to define what constitutes the area of the lease, or how it might actually impact navigation, fishing or recreational use. The evidence shows that certain areas close to the proposed site are more heavily used than the exact footprint of the proposed lease site. Fact that there is heavy traffic nearby the proposed lease does NOT necessarily make that area inappropriate for leasing . . . The law does not require an area to be traffic free to be approvable because it would not make any sense and would be an almost impossible requirement to meet. It is the policy of the State of North Carolina to encourage the development of private and commercial shellfish cultivation so long

⁹ N.C.G.S. § 113-201(a)

¹⁰ N.C.G.S. § 1-45.1

¹¹ N.C.G.S. § 113-202(a)

¹² *Id.*

¹³ *Ronald Sheffield v. NCDEQ/DMF*, 16 EHR 02397 (Pender County)

as it is done in a manner compatible with other public uses of the marine and estuarine resources.¹⁴

Ultimately, the ALJ overturned DMF's denial of the lease application. DMF contemplated appealing the decision to Superior Court, but after further consideration simply decided to issue the lease.

A second contested case was filed in 2018 by a Homeowner's Association ("HOA") located along a nearby shoreline. The appeal challenged DMF's issuance of a shellfish bottom lease and associated water column lease. The HOA alleged public trust user conflicts, though much of the witness testimony indicated that "viewshed" was the significant concern for the HOA's members. The ALJ noted that "[o]ne minimum statutory criteria of particular relevance to this case is that '[c]ultivation of shellfish in the leased area will be compatible with lawful utilization by the public of other marine and estuarine resources.'" ¹⁵ The ALJ went on to state that:

[t]he proper interpretation of a law or rule is a question of law, and an agency interpretation of a statute or rule is not binding on the undersigned. Nevertheless: It is a tenet of statutory construction that a reviewing court should defer to the agency's interpretation of a statute it administers 'so [] long as the agency's interpretation is reasonable and based on a permissible construction of the statute. The phrase 'compatible with' under N.C.G.S. § 113-202(a)(3) is not further defined by statute or regulation.' DMF does not interpret this standard to mean there can be no impact to other public uses. Instead, DMF interprets this minimum standard to mean that existing uses must be able to exist along with the shellfish lease within the general area at the same time.

Ultimately, in upholding DMF's granting of the shellfish lease, the ALJ stated "that DMF's interpretation of the phrase 'compatible with' is reasonable, is consistent with, and supported by the plain language of the statute and statutory framework." The ALJ then went further, finding that "[e]ven in the absence of deference, the undersigned independently adopts DMF's interpretation of this minimum standard. The DMF does not consider impacts on viewshed as a basis for denying a shellfish lease, as this is not a criterion in the relevant statutes or rules pertaining to shellfish leases."¹⁶

A group of riparian owners brought suit in OAH challenging a shellfish bottom lease and water column lease granted in Myrtle Grove Sound in 2018. The owners claimed the action was brought to "protect the right to a view they are entitled to as a result of their riparian property ownership."¹⁷ The complaint stated, among other things, that "[o]peration of the commercial shellfish cultivation in the area . . . also has caused significant deterioration in Plaintiffs' water

¹⁴ Ronald Sheffield v. NCDEQ/DMF, 16 EHR 02397 (Pender County)

¹⁵ 8.5 Marina Village John F Matthews VP v. NCDEQ and Samuel G. Boyd, 17 EHR 01382 (Carteret County)

¹⁶ Id.

¹⁷ Hormoze Goudarzi and wife, Suzanne Gourdarzi, Oak Forest Properties, LLC, Billy King and Barbara King v. NCDEQ et al., 18 CVS 1470 (New Hanover Superior Court)

views, resulting in substantial devaluation of Plaintiffs' properties."¹⁸ Ultimately, the dispute was resolved based on an unrelated submerged lands claim issue. As part of the case disposition, the grantee of the previously approved shellfish lease moved his operation to a newly approved lease area in Pender County.

Three additional petitions for contested cases were filed challenging the approval of two shellfish bottom leases and associated water column leases located near each other in Myrtle Grove Sound in 2019. The Petitioners claimed "the leases are incompatible with lawful utilization by the public of other marine and estuarine resources" and that "the right of the public to utilize marine and estuarine resources includes the right to view and enjoy species . . . whose habitat Petitioners believe may be threatened by operation of the shellfish leases."¹⁹ These cases were resolved by virtue of the New Hanover moratorium area established by S.L. 2019-37, Section 7, that went into effect July 1, 2019.

E. DMF's Shellfish Lease Program is Under-Resourced

North Carolina's shellfish aquaculture leasing program is implemented by DMF's Shellfish Lease Program which is currently staff and resources limited. A significantly increasing volume of work may require additional resources. By comparison, other states shellfish aquaculture programs have significant staff and operation funds for administration.

Virginia's shellfish lease program is staffed by eight dedicated employees, including two managers, one mapper and draftsman, one clerical position and four surveyors. The State of Maine has substantially fewer shellfish leases and acreage than North Carolina but has over six full time positions dedicated to administering its shellfish lease program. The State of Maryland has eight full time positions dedicated to administering its program. DMF believes the Shellfish Lease Program's small staff and low budget significantly inhibits the industry by increasing the time needed to evaluate whether to grant a lease or defend lease decision appeals. DMF staff believes this delay will be further exacerbated by the mandated but unfunded future studies and directives from the General Assembly in S.L. 2019-37.

¹⁸ Hormoze Goudarzi and wife, Suzanne Gourdarzi, Oak Forest Properties, LLC, Billy King and Barbara King v. NCDEQ et al., 18 CVS 1470 (New Hanover Superior Court)

¹⁹ Masonboro Island Club and Gary W. Ahlberg v. NCDEQ/DME, 19 EHR 00991; Sandra A. Fisher v. NCDEQ/DME, 19 EHR 00983; John A. Marriott v. NCDEQ/DME, 19 EHR 01057; The Tides Homeowners Association, Inc. v. NCDEQ/DME, 19 EHR 01055 (New Hanover County)

III. SOURCES OF INFORMATION CONCERNING USER CONFLICTS

A. Previous Legislative Studies

There have been previous legislative studies concerning shellfish aquaculture over the past few years in North Carolina. Each study has included recommendations for increased resources and positions, regulatory reform, program evaluations, and collaboration. While previous recommendations have been considered, many have not yet been adopted. Details of each report are outlined below.

1. 2016 - Shellfish Aquaculture Plan Report²⁰

The legislatively mandated 2016 Shellfish Aquaculture Plan Report recommended funding four full-time positions and recurring resources to adequately operate the Shellfish Lease Program. The report also included recommendations to form a taskforce comprised of diverse stakeholder and experts from industry, academia, and state agencies in order to develop a comprehensive North Carolina Shellfish Aquaculture Plan. Other recommendations from the report included:

- In partnership with N.C. Sea Grant (“NCSG”), develop a detailed proposal for a Shellfish Propagation and Aquaculture Training Program to be enacted with NCSG;
- Modify the initial shellfish bottom lease application fee from \$200 to \$400, which is non-refundable, to help offset the cost of lease administration, mapping and marking;
- Change statutes to allow rent, renewal and production notices to be mailed to lease holders in mid-April to allow previous year production reporting in the division trip ticket program to be finalized. Allow older leases expiring in April to be extended until June 30 to bring all shellfish leases into the same renewal period;
- To simplify the application process for shellfish growers, develop one application and combine the aquaculture permits and package with a shellfish lease;
- Strengthen statutes to increase the penalties for theft on shellfish leases;
- Policy and statutory changes needed to support the recommendations.

2. 2018 - N.C. Strategic Plan for Shellfish Mariculture: A Vision to 2030²¹

The North Carolina Policy Collaboratory (“Collaboratory”) was directed to convene stakeholder meetings in 2016 aimed at advancing efforts to bolster and promote North Carolina’s shellfish industry.²² Legislation was amended, adding a mandate for the Collaboratory to prepare a Shellfish Aquaculture Plan by December 31, 2018.²³ To fulfill the mandates laid out in Senate Bill 257, the Collaboratory formed the Shellfish Mariculture Advisory Committee (“SMAC”) to generate a report of findings and recommendations to the General Assembly. The final report was submitted on December 30, 2018.²⁴

²⁰ https://ncseagrant.ncsu.edu/ncseagrant_docs/oysters/DEQ%202016%20Shellfish%20Aquaculture%20Plan%20Report.pdf

²¹ <https://collaboratory.unc.edu/files/2019/01/NC-Strategic-Plan-for-Shellfish-Mariculture-Final-2018.pdf>

²² S.L. 2016-94, Section 14.11.(d)

²³ Senate Bill 257, Section 13.13.(b)

²⁴ North Carolina Strategic Plan for Shellfish Mariculture: A Vision to 2030 (Drs. Joel Fodrie, Charles Peterson, Christine Voss, and Christopher Baillie on behalf of the North Carolina Shellfish Mariculture Advisory Committee)

The SMAC's principal goal was to leverage a broad base of expertise to create a comprehensive plan for the shellfish aquaculture industry while balancing the needs of other citizens of North Carolina who utilize the public trust resources of the coast. The recommendations generated were intended to inform the General Assembly on possible legislative actions that could address many of the current user conflict issues in the industry. The report detailed 21 recommendations including, among others:

- Vision for industry development - Achieve \$100 million annual shellfish mariculture value (\$33 million dockside sales) by 2030;
- Appropriate recurring funding to establish a new section, the Shellfish Leasing Section, at the DMF. Defraying costs of Shellfish Leasing Section: Increase non-refundable shellfish lease application filing fee to \$500 dollars; establish a fee schedule for lease surveys payable to the DMF; shift financial responsibility for advertising for public scoping from agency to the applicant; and increase annual rent;
- Statutory changes - Amend North Carolina General Statute §113-202 to afford the Secretary of the NCDEQ substantial discretion in balancing public trust uses;
- The DMF should designate appropriate tracts as SEAs containing multiple, connected parcels available for shellfish mariculture and managed by the DMF;
- In Pamlico Sound, the Secretary of the NCDEQ should be granted discretion to grant up to three (total) 50-acre (each contiguous) water column or bottom leases, each obtained by a single lease application. These lease tracts must be separated from each other, and from shore, by at least 250 yards. Otherwise, current lease size maximums, including overall acreage possession limits for any single entity, should be retained throughout the state, and no more than three large water column or bottom leases may be established in Pamlico Sound until 2025;
- Increase utilization requirement and strictly monitor and enforce "use it or lose it" policy for shellfish leases;
- Institute higher minimum fines and mandatory restitution for those convicted of stealing or damaging property on shellfish leases. Elevate charges for theft from any contained culture (e.g. cages, bags) or free-on-bottom operation (including clams under netting) to a felony with a minimum fine of \$2,500 and mandatory restitution to the property owner. For those convicted who hold a commercial license, first offenses will result in a one-year loss of license, and second offenses will result in a permanent loss of license;
- Amend North Carolina General Statute §113-203 to allow nursery of shellfish in waters classified as prohibited.

The report addressed the need for further understanding of the ecological and societal implications of shellfish aquaculture which hinder the ability of government agencies to determine where shellfish aquaculture is most suitable. The report explains the need for regionally specific information on social carrying capacity of shellfish aquaculture and other tools to minimize user conflict. While research into the social effects of the expanding shellfish aquaculture industry cannot ensure there will be no user conflict issues, these inquiries can facilitate a better understanding of user conflicts and stakeholder perceptions which ultimately inform lawmakers on future legislation and policy.

Research efforts can help identify social sustainability and conflict resolution approaches that will be important to developing an overall understanding of the relationship of the shellfish aquaculture industry and the surrounding coastal communities. Social carrying capacity is inherently location specific and the amount of shellfish aquaculture that is socially acceptable within an area will vary among regions of the coast.

Another recommendation from the report included appropriate funding and positions for the Shellfish Lease Program. The report recommended recurring funding for three additional full-time equivalent positions for the Shellfish Lease Program. Additionally, the recommendation included increased recurring appropriations to the DMF for the purposes of administering shellfish leasing. The report concluded that additional positions will provide much needed assistance with field operations (e.g. mapping, sampling, and marking leases), a need that will continue to increase as the industry grows and as DMF develops and manages SEAs.

B. Collaboration and Public Outreach

DMF staff has collaborated closely with local stakeholders to help identify and address user conflicts, most recently through the 2018 SMAC process discussed above. DMF has also been working to address user conflict issues with the National Ocean and Atmospheric Administration - National Centers for Coastal Ocean Science specifically on the Bogue Sound Pilot Study which was completed this year. The result of this partnership was a spatial analysis tool and random sampling grids tool used for shellfish lease siting. The Shellfish Lease Program meets with internal DMF reviewers to ensure the lease review process is thorough and efficient. In 2015, DMF also began coordinating with the North Carolina Division of Coastal Management (“DCM”) as a review and commenting agency for shellfish lease applications, based on their expertise with user conflicts in coastal development. Finally, DMF collaborated with the USACE on the 2017 update of the NWP 48.²⁵

The University of North Carolina Wilmington (“UNCW”) created a tool in 2014 to assist new or current shellfish growers in siting areas for shellfish leases.²⁶ The online tool maintained by UNCW is designed as an interactive decision-support tool to provide information on site suitability when determining potential areas for shellfish leases. The data provided by the tool include salinity, depth, shellfish growing area classifications, boat access areas, surrounding land cover, and current shellfish aquaculture operations.

Public outreach takes place in a variety of ways including numerous presentations to local municipalities, educational institutions, and professional conferences to better inform stakeholder groups and interested parties about the Shellfish Lease Program. For example, DMF is currently collaborating with NCSG and the North Carolina Shellfish Growers Association on regional shellfish aquaculture workshops scheduled for December 3-5, 2019. These workshops are intended to solicit input from shellfish growers about their experiences including user conflicts issues.

²⁵ Nationwide Permit 48 - Commercial Shellfish Aquaculture Activities. Effective Date: March 19, 2017; Expiration Date: March 18, 2022. (NWP Final Notice, 82 FR 1860)

²⁶ <https://uncw.edu/benthic/sitingtool/>

DMF staff have also been working on new web-based solutions to more widely inform the public, shellfish growers, potential shellfish lease applicants, and other stakeholders about pending shellfish lease applications to allow for a more robust notification and comment process. DMF staff implemented new temporary marking requirements for proposed shellfish leases to increase visibility to ensure better notification to other area public trust users. DMF staff found that notification efforts beyond those required by the shellfish lease law were helpful in getting more information regarding objections and concerns to property owners and user groups near a proposed lease. Feedback, in turn, provides additional information for the DMF Director to consider as part of a shellfish lease decision.

C. User Conflict Information from Other States

Although the concept of public trust waters somewhat differs among states, the larger user conflict issues created by shellfish aquaculture seems to remain constant. Like North Carolina, most other states which permit shellfish aquaculture require that those operations not unreasonably interfere with other public trust uses. The National Sea Grant College Program in 2019 produced several case studies concerning impediments to shellfish aquaculture across the country.²⁷ DMF looks forward to examining these recent studies to determine if there are approaches and lessons learned elsewhere that could be applied in North Carolina.

1. Leasing Authorities

The leasing of public waters for aquaculture goes through an established public process in all states.²⁸ This public process ensures that concerned stakeholders receive both sufficient notification of proposed leases and an opportunity to raise and address their concerns publicly, though the specifics of these processes vary among states. There are various governmental frameworks among states created to manage the shellfish aquaculture industry. Some states have treated shellfish aquaculture as a form of agriculture, while other states include shellfish aquaculture in agencies managing natural resources.

Numerous states, including Florida, Maine, Maryland, New Jersey, and the Commonwealth of Virginia, have established aquaculture advisory councils which provide managers expert guidance through the council membership. In most states, shellfish applications are processed and decided by the same state-level agency, though Massachusetts and New York make lease decisions at the local level. For example, oyster aquaculture in New York is only approved on private lands or on submerged lands granted by the state to local municipalities which are then charged with developing and managing leasing programs. Similarly, in Massachusetts the city council or mayor of each municipality has authority to issue shellfish aquaculture licenses (or leases). While the aquaculture lease decisions in New York and Massachusetts are made by local

²⁷ Overcoming Impediments to Shellfish Aquaculture through Legal Research and Outreach: Case Studies (National Oceanic and Atmospheric Administration, U.S. Department of Commerce), 2019

²⁸ http://www.ct.gov/deep/cwp/view.asp?a=2705&q=431902&depNav_GID=1622; <https://www.freshfromflorida.com/Divisions-Offices/Aquaculture>; <https://www.maine.gov/dmr/aquaculture>; <http://dnr.maryland.gov/fisheries/pages/aquaculture/index.aspx>; <https://www.capecodextension.org/marine/semac/>; https://www.nj.gov/dep/fgw/pdf/marine/shellfish_leasing_policy_atlantic.pdf; http://assembly.state.ny.us/leg/?default_fld=&bn=A07120&term=2011&Summary=Y&Actions=Y&Votes=Y&Memo=Y&Text=Y; <http://www.shellfishri.com/ri-shellfish-initiative/>; http://www.mrc.state.va.us/Shellfish_Aquaculture.shtm

municipalities, state and federal statutory requirements are still a large component in determining the policy affecting the industry participants.²⁹

2. Siting Authorities

Siting authorities review proposed lease sites and are tasked with addressing and balancing potential conflicts during the shellfish aquaculture lease application review process.³⁰ Florida, Maryland, New Jersey, and Virginia manage siting bodies that, when reviewing applications, provide notice to applicants if potential issues are identified, and provide recommendations or set conditions on leases if issued. Some states, however, take a more proactive front-end approach, such as Maine and Rhode Island.

In Maine, the Department of Marine Resources mandates that applicants have a pre-application meeting to discuss proposed operations with the Department, harbor master, and/or the municipal officers of the town in which the applicant wishes to apply. Similarly, in Rhode Island, the Coastal Resources Management Council requires applicants to complete a Preliminary Determination process which involves meeting with regulating agencies, town officials, and the Rhode Island Department of Environmental Management to discuss proposed plans. In both states, meetings allow officials who are familiar with competing uses in the area to advise applicants of potential user conflict issues to give them an opportunity to modify applications before submittal.

3. The Permit Process

The permitting process for shellfish aquaculture leases can be complicated, lengthy and represent a considerable barrier to entry for some potential applicants.³¹ Many states have been dealing with similar issues much longer than North Carolina. To streamline the process, reduce the cost of permitting, and mitigate user conflict issues, states such as Maryland, Florida, Delaware, Massachusetts, New Jersey, New York, and California have established SEAs where state agencies perform aquaculture lease siting, including environmental and public trust suitability review, as well as acquisition of necessary Federal permits. These states then sub-lease smaller parcels within the SEA to shellfish growers. This makes the process more efficient on the back-end, where states only have to verify the suitability of an applicant and issue a permit to operate within those pre-approved SEAs.

Streamlined permitting encourages industry development by shifting the approval burden to the state, eases the state's lease back-end application burden, and helps mitigate user conflict issues. This process also gives individual states greater authority to regulate the activities conducted within the designated area.

²⁹ http://www.ct.gov/deep/cwp/view.asp?a=2705&q=431902&depNav_GID=1622; <https://www.freshfromflorida.com/Divisions-Offices/Aquaculture>; <https://www.maine.gov/dmr/aquaculture>; <http://dnr.maryland.gov/fisheries/pages/aquaculture/index.aspx>; <https://www.capecodextension.org/marine/semac/>; https://www.nj.gov/dep/fgw/pdf/marine/shellfish_leasing_policy_atlantic.pdf; http://assembly.state.ny.us/leg/?default_fld=&bn=A07120&term=2011&Summary=Y&Actions=Y&Votes=Y&Memo=Y&Text=Y; <http://www.shellfishri.com/ri-shellfish-initiative/>; http://www.mrc.state.va.us/Shellfish_Aquaculture.shtm

³⁰ *Id.*

³¹ *Id.*

4. Shellfish Lease Size and Acre Caps

A common component in user conflicts with shellfish aquaculture revolves around the fear that shellfish aquaculture will eventually take over the majority of a waterbody.³² In New York and Rhode Island, acreage caps have been used to curb fears in areas of high residency and water use. Suffolk County (New York) established an acreage cap of 60 acres that can be leased each year for new leases. In Rhode Island, a maximum of five percent of a coastal salt pond can be leased for shellfish aquaculture. In North Carolina, individual leases are restricted to 10 acres with no more than 50 acres held by an individual or corporation. Beyond size caps and residency requirements, leases are subject to a variety of parameters in different states that limit their expansion such as lease terms, physical restrictions, and other parameters.³³

5. Education

In North Carolina, Carteret Community College offers the Aquaculture Technology Program which provides courses in shellfish aquaculture along with hands on experience working on shellfish farms.³⁴ Currently, North Carolina requires shellfish lease applicants to complete an examination scoring a minimum of 70 percent based on an educational package provided by the DMF. DMF established the examination to demonstrate the applicant's knowledge of:

- Shellfish lease application process;
- Shellfish lease planting and production requirements;
- Lease marking requirements;
- Lease fees;
- Shellfish harvest area closures due to pollution;
- Safe handling practices;
- Lease contracts and renewals;
- Lease termination criteria;
- Shellfish cultivation techniques.

Many states have cooperative extension programs which provide classes and training that introduce potential applicants to the fundamentals of shellfish aquaculture.³⁵ The University of Florida IFAS Shellfish Aquaculture Extension Program, the University of Maryland Extension's Oyster Aquaculture and Education Program, and Southeastern Massachusetts' Aquaculture

³² http://www.ct.gov/deep/cwp/view.asp?a=2705&q=431902&depNav_GID=1622; <https://www.freshfromflorida.com/Divisions-Offices/Aquaculture>; <https://www.maine.gov/dmr/aquaculture>; <http://dnr.maryland.gov/fisheries/pages/aquaculture/index.aspx>; <https://www.capecodextension.org/marine/semac/>; https://www.nj.gov/dep/fgw/pdf/marine/shellfish_leasing_policy_atlantic.pdf; http://assembly.state.ny.us/leg/?default_fld=&bn=A07120&term=2011&Summary=Y&Actions=Y&Votes=Y&Memo=Y&Text=Y <http://www.shellfishri.com/ri-shellfish-initiative/>; http://www.mrc.state.va.us/Shellfish_Aquaculture.shtm

³³ Id.

³⁴ <https://www.carteret.edu/programs/aquaculture-technology/>

³⁵ http://www.ct.gov/deep/cwp/view.asp?a=2705&q=431902&depNav_GID=1622; <https://www.freshfromflorida.com/Divisions-Offices/Aquaculture>; <https://www.maine.gov/dmr/aquaculture>; <http://dnr.maryland.gov/fisheries/pages/aquaculture/index.aspx>; <https://www.capecodextension.org/marine/semac/>; https://www.nj.gov/dep/fgw/pdf/marine/shellfish_leasing_policy_atlantic.pdf; http://assembly.state.ny.us/leg/?default_fld=&bn=A07120&term=2011&Summary=Y&Actions=Y&Votes=Y&Memo=Y&Text=Y <http://www.shellfishri.com/ri-shellfish-initiative/>; http://www.mrc.state.va.us/Shellfish_Aquaculture.shtm

Center all offer online classes and/or in person workshops to educate potential applicants. These programs are federally funded through the Cooperative State Research, Education, and Extension Service and other federal agencies. Some states such as Virginia, Rhode Island, and Florida have developed mandatory training requirements. These requirements tend to focus on sanitation issues and harvest procedures as they help states comply with the National Shellfish Sanitation Program.³⁶

D. Future Studies and Directives

Future studies and directives mandated by S.L. 2019-37 include: the development of SEAs, potential SEAs in moratorium areas, and a Pamlico Sound Shellfish Aquaculture Pilot Project for a few larger-size leases. These studies require the development and implementation of new methods and procedures for the shellfish lease process. DMF is currently exploring possible ways to complete large-scale shellfish lease investigations required by both the SEA and Pamlico Sound Pilot studies.

Currently, a large-scale shellfish lease investigation would require the effort of the entire Shellfish Lease Program staff for approximately three months leaving no time to review lease applications or perform other work of the program. DMF is exploring the use of drone technology to aid in the lease investigation process and exploring Habitat Suitability Index modeling as a tool for siting shellfish aquaculture leases. DMF is also evaluating various sampling techniques including dredge sampling and using the spatial analysis from the Bogue Sound Pilot Project.

³⁶ Id.

IV. RECOMMENDATIONS

A multifaceted approach is required to address user conflict issues related to shellfish aquaculture leases in North Carolina. This approach envisions regulatory reform, program evaluation, collaboration, and resource assessment. Previous and current work should be built upon to avoid duplication and expending extra resources.

Existing shellfish lease and franchise statutes³⁷ and rules³⁸ require revisions to effect execution of the recommendations in this study. DMF is drafting suggested revisions to existing shellfish lease statutes and rules to address user conflict issues and incorporate mandated revisions from S.L. 2019-37. The deadline for adoption of rule revisions is March 1, 2021. In discussions with DCM and the North Carolina Coastal Resources Commission (“CRC”) regarding potential user conflict concerns specific to shellfish lease gear and navigation impacts, DMF intends to develop rule language to address these concerns. Recommendations will be made regarding rule revisions based off the findings in this study. Additional recommendations for statute and rule revisions addressing user conflict issues will be developed through the additional studies and directives mandated by S.L. 2019-37.

DMF will evaluate the Shellfish Lease Program and Aquaculture Permitting Program to identify challenges and inefficiencies and recommend ways to improve existing programs. DMF staff believes this focus will result in further modification of internal operating procedures. Areas for further collaboration were identified in this study along with likely participating partners.

Other directives mandated by S.L. 2019-37 include the development and implementation of SEAs similar to those employed by other states. One of the obstacles North Carolina shellfish regulators face is a limited ability to stay informed regarding the aquaculture efforts of other states. DMF recommends collaborating with other states to facilitate a joint interstate discussion. This effort will be of mutual benefit to participating states in compiling and evaluating information relevant to each states’ respective aquaculture regulation and permitting processes.

The Shellfish Lease Program is tasked with implementing the recommendations from this study. It is imperative that DMF have sufficient dedicated staff to manage the program. DMF may not be adequately funded or staffed to implement the recommendations in this study. The lack of funding and dedicated staff significantly inhibits the program’s administrative support for lease holders, drastically increases the time to acquire a lease, and impairs the DMF’s ability to address user conflict issues efficiently and effectively. The additional legislative mandates put further burden on the already limited amount of staff and resources of the Shellfish Lease Program. DMF will evaluate current staff and funding levels of the Shellfish Lease Program to estimate the resources needed for the program to implement the recommendations of this study.

³⁷ N.C.G.S. § 113-201 et seq.

³⁸ 15A NCAC 03O.0201.0211

A. Recommendation #1: Regulatory Reform

- Incorporate riparian area owner notification standards to include certified mail notification (15A NCAC 03O.0201);
- Add language to include MFC's authority to limit total acres leased in a waterbody (15A NCAC 03O.0201);
- Add a 250 feet setback requirement between any shellfish leases (15A NCAC 03O.0201(a));
- Modify the setback requirement of 100 feet from a developed shoreline to 250 feet to help alleviate user conflict with riparian owners (15A NCAC 03O.0201(a)(3));
- Modify marking requirements for shellfish leases and franchises to include a maximum of eight corner lease corner markers and additional requirements to ensure visibility to alleviate navigation concerns. More noticeable shellfish lease markings have been a safety concern (15A NCAC 03O.0202(b); 15A NCAC 03O.0204);
- Modify training requirements for shellfish lease applicants to include information about user conflicts and the public trust (15A NCAC 03O.0202(d));
- Add administrative remedy language from statute (15A NCAC 03O.0206);
- Add clearance requirement of three feet between the top of the cage and the water level at mean low tide to the amended shellfish leasing statute allowing the use of gear up to 18 inches off of the bottom (N.C.G.S. § 113-202(r)).

B. Recommendation #2: Program Evaluation

- Best management practices for the industry should be practiced and publicized, best available science should be incorporated into the permitting process, and stakeholders should work together to collect data and analyze facts to reach shared decisions on the user conflict issues;
- Synchronize all reporting and renewal requirements for shellfish leases and aquaculture permits.

C. Recommendation #3: Collaboration

- Form an interstate aquaculture workgroup and have an in-person meeting;
- Create an inventory with aquaculture information from each state, including site selection, permitting, public trust issues, business planning and economics, seed and nursery options, grow out methods and equipment, consumer safety and marketing;
- Develop a standing interstate aquaculture workgroup in partnership with NCSG with adequate funding and support;
- In partnership with NCSG, continue developing a Shellfish Aquaculture Training Program.

D. Recommendation #4: Resource Assessment

- Evaluate the Shellfish Lease Program's staff and funding levels to determine whether they are adequate to administer the current and increasing volume and complexity to similar levels of other state's aquaculture programs.



ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

STEPHEN W. MURPHEY
Director

January 31, 2020

MEMORANDUM

TO: N.C. Marine Fisheries Commission
FROM: Jacob Boyd, Section Chief Habitat and Enhancement
SUBJECT: Relay Program Evaluation

Issue

A thorough evaluation of the Relay Program was undertaken by the division to determine if the current structure of the program is in line with the original concept and to propose solutions to issues identified in the process including:

- Sufficient staff and resources to implement current National Shellfish Sanitation Program (NSSP) requirements requiring the division to also observe relayed oyster transport and placement on shellfish leases which will need to be implemented in the coming 2020 relay season and will require more staff and resources.
- Concerns received related to the habitat/water quality benefits that are at least temporarily lost in one area, usually polluted, when relayed shellfish are removed and relayed onto a shellfish lease where the product is ultimately removed from the water after depuration.
- Concerns received related to the relay of public trust product for the benefit of a leaseholder.

Action Needed

The commission's input is sought on short- and long-term management options for the Relay Program based on the findings of the evaluation.

Findings

Based on the program evaluation, potential management options include:

- Shorter relay season, limited days per week
- Limited areas open for relay, rotational open areas
- Discontinuation of relay from polluted areas
- Evaluate potential relay from open areas
- No further action necessary

Overview

Summary

The relaying of shellfish from certain polluted areas is authorized by the Polluted Area Relay Permit and is explained in detail in the N.C. Oyster FMP Amendment 4. The oyster relay program continues as a small-scale relay project with the number of relay permits and relayed oysters declining considerably from 2002 – 2018. Clam relay requires the division to observe relayed clam transport

and placement on a shellfish lease which requires resources and efforts by Marine Patrol and other staff. Due to the increased burden of observing clam relay, the division developed policies which require at least five people in an area to be relaying before opening the area. In 2018, Hurricanes Florence and Michael caused damage to oyster populations which led to only a few areas being open for relay during the 2019 relay season. Since 2014, there have been a total of 190 unique participants (average 57 per season) in the relay program averaging 70 permits per season with some participants utilizing multiple shellfish leases.

A notable increasing trend has been documented for the number of seed import permits issued and amount of seed imported from 2009 – 2019. This may be indicative of the shift from extensive to intensive shellfish aquaculture techniques occurring over the last few years. Intensive shellfish aquaculture techniques utilize bottom or floating cages rather than historical cultch on bottom methods. Therefore, more growers are choosing to plant seed on their shellfish lease rather than cultch material for production requirements.

For more information, please refer to the full document that is included in this Briefing Book.

[Relay Program Evaluation Memo](#)



ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

STEPHEN W. MURPHEY
Director

MEMORANDUM

TO: Stephen Murphey, Director; Dee Lupton, Deputy Director
FROM: Jacob Boyd, Section Chief Habitat and Enhancement
CC: Shannon Jenkins, Section Chief Shellfish Sanitation
DATE: September 11, 2019
SUBJECT: Relay Program Evaluation

Summary

The relaying of shellfish from certain polluted areas is authorized by the Polluted Area Relay Permit and is explained in detail in the N.C. Oyster FMP Amendment 4. The oyster relay program continues as a small-scale relay project with the number of relay permits and relayed oysters declining considerably from 2002 – 2018 (Figures 1 and 2). Clam relay requires the division to observe relayed clam transport and placement on a lease which requires resources and efforts by Marine Patrol and other staff. Due to the increased burden of observing clam relay, the division developed policies which require at least 5 people in an area to be relaying before we will allow relay of clams. In 2018, Hurricanes Florence and Michael caused damage to oyster populations which led to only a few areas open for relay during the 2019 relay season. While relayed product has been allowed to be used towards shellfish lease production, new legislation (S648, Session Law 2019-37) enacted on July 1, 2019 does not allow for relayed shellfish to be included in calculating lease production for leases granted or renewed after July 1, 2019.

Since 2014, there have been a total of 190 unique participants (average 57 per season) in the relay program averaging 70 permits per season with some participants utilizing multiple leases (Tables 1 and 2). Data were analyzed for lease holders previously participating in the relay program to determine a timeline for when new production requirements would begin based on when leases are up for renewal. The participants utilized 113 leases for relaying shellfish from 2014 – 2019. Of these 113 leases, 23 are up for renewal in 2020, 51 are up for renewal between 2024 and 2029, and 13 have been terminated (Table 2).

A notable increasing trend has been documented for the number of seed import permits issued and amount of seed imported from 2009 – 2019 (Figure 3). This may be indicative of the shift from extensive to intensive shellfish aquaculture techniques occurring over the last few years. Intensive shellfish aquaculture techniques utilize bottom or floating cages rather than historical cultch on bottom methods. Therefore, more growers are choosing to plant seed on their lease rather than cultch material for production requirements.

Issues

Current NSSP guidelines require the division to also observe relayed oyster transport and placement on leases which will need to be implemented in the coming 2020 relay season. This will take a tremendous amount of resources and staff to stay in compliance with the NSSP requirements. Another concern is the habitat/water quality benefits that are at least temporarily lost in one area, usually polluted, when relayed shellfish are removed and relayed onto a lease where the product is ultimately removed from the water. Like the lease areas themselves, the relay of public trust product for the benefit of a leaseholder has also had a lot of controversy. The division has had problems with permit holders reporting accurate information pertaining to their relaying activities in a timely manner.

Proposed Actions

A thorough evaluation of the relay program is recommended to determine if the current structure is in line with the original concept. The following are potential items for consideration for the evaluation process:

- NSSP requirements to observe all shellfish relay
 - Fiscal analysis of additional staff time and resources required for oyster relay
- New production requirements
- Relay study update
- Amount of closed areas
- Environmental effects
- Reporting issues/non-compliance
- Public trust issues
- Fiscal analysis based on resources needed to administer program, participation, economic value, spatial coverage needed, etc.

Based on the program evaluation, potential management options which should be considered include but are not limited to:

- Shorter season, limited days per week, rotational open areas
- Using existing clam relay permit requirements for oysters
- Termination of the relay program
- Relay using shellfish management area open to open (i.e., Cultch Program)

If rule changes are deemed necessary through the relay program evaluation, the evaluation will be used as a basis for any resulting issue papers. In order to make any changes for the upcoming 2020 relay season, it is important to begin work on the evaluation. Please let us know if you would like to discuss this further and how to move forward.

Table 1. Summary of the relay program showing the number of oysters (bu), participants, and permits per season from 2014 - 2018.

Year	Oysters (bu)	Participants ¹	Permits	Oysters (bu)	
				Per Participant	Per Permit
2014	12,335	60	102	206	121
2015	15,128	60	73	252	207
2016	8,130	60	67	136	121
2017	15,158	53	53	286	286
2018	5,335	52	55	103	97
Total	56,086	285	350	197	160

¹ Includes individuals participating multiple years with a total of 190 unique participants

Table 2. Total number and type of leases utilized for the relay program and when they are up for renewal from 2014 - 2019

Renewal	Total
2020	23
2024	1
2025	13
2026	10
2027	13
2028	13
2029	1
Franchise	16
Terminated	13
Transfer	10
Total	113

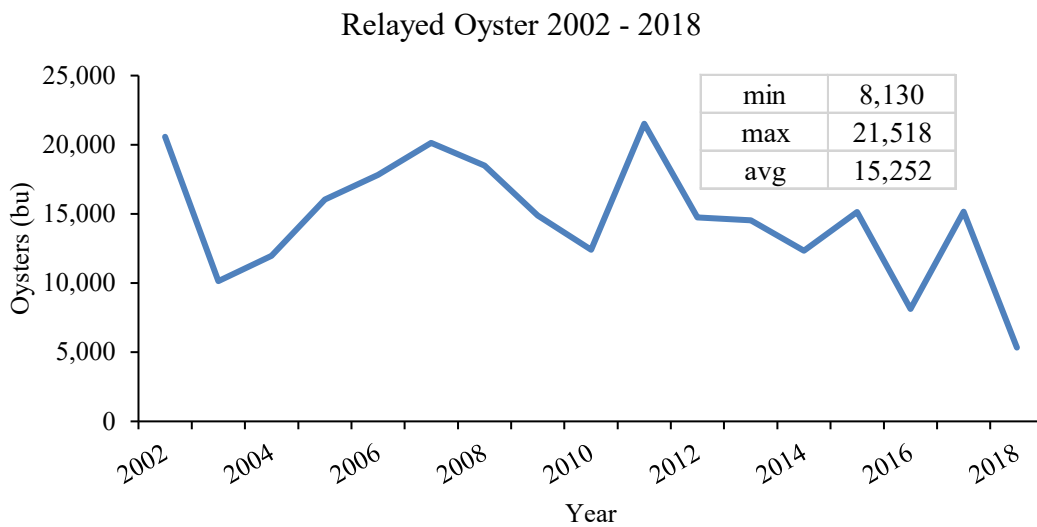


Figure 1. The number of oysters (bushels) relayed from 2002 – 2018.

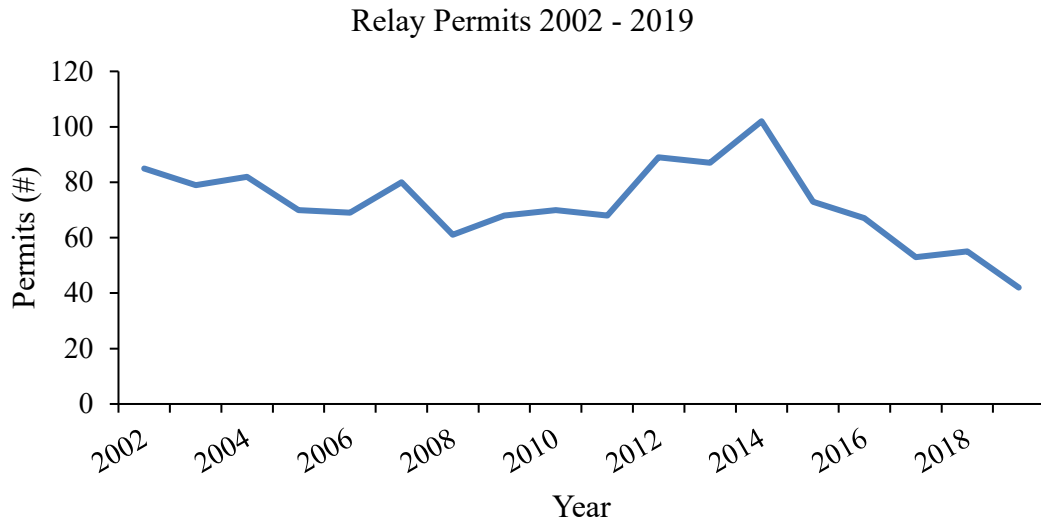


Figure 2. The number of relay permits issued from 2002 – 2019.

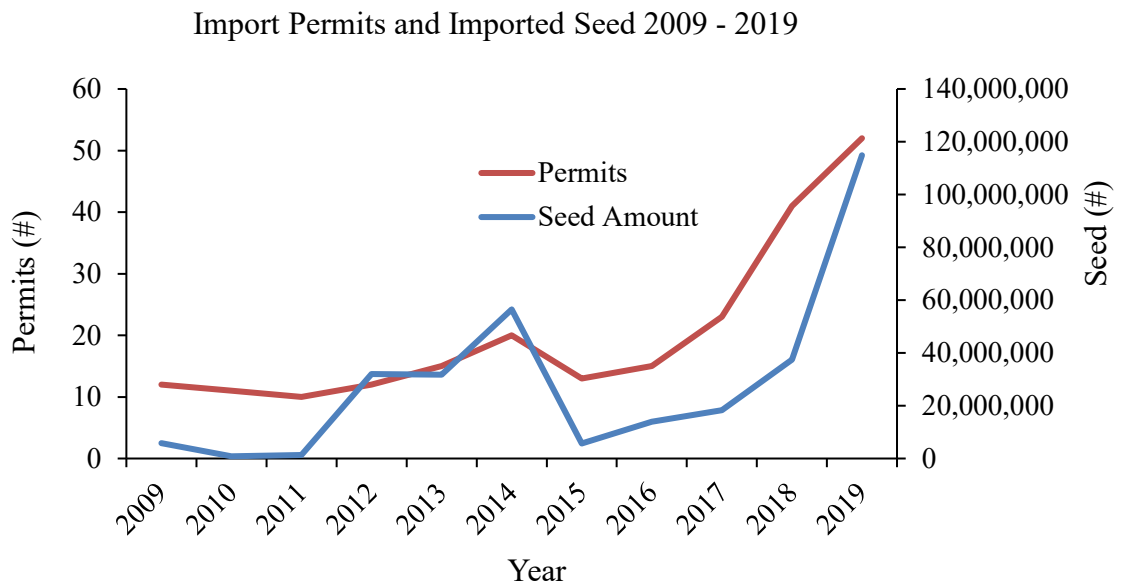


Figure 3. The number of import permits issued and amount of seed imported from 2009 – 2019.