



Introduction to the next edition of the Blueprint

Erin Fleckenstein, NC Coastal Federation

NC Oyster Restoration Efforts

- ➤ 1915: NC DMF started cultch plantings
 - 1915-2020 ~22 million bushels of cultch material planted
- ➤ 1947: Shellfish Rehabilitation Program began
- ➤ 1995: Blue Ribbon Advisory Council on Oysters
- ➤ 1996: Oyster sanctuary program initiated
- > 1997: Fisheries Reform Act
- ➤ 2001: Oyster Fishery Management Plan
- ≥2003: NGOs & research institutions ramp up efforts
- ≥2004: Coastal Habitat Protection Plan



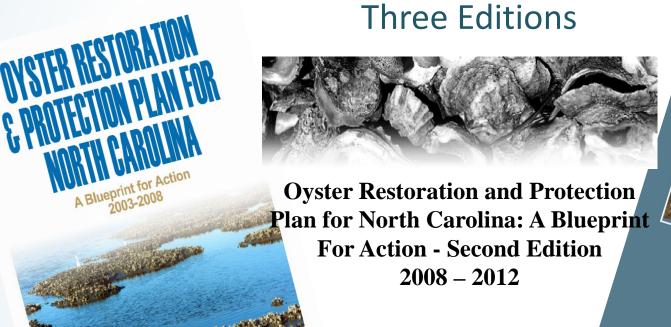
Oyster Restoration and Protection Plan for North Carolina: A Blueprint For Action

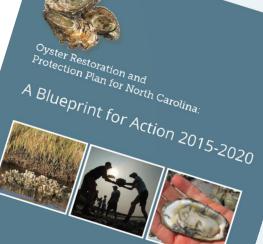
- ≥2003 Oyster Forum yielded compilation of suggested actions
- ➤ Incorporated recommendations from:
 - Blue Ribbon Advisory Council on Oysters
 - Fisheries Reform Act
 - Oyster Fishery Management Plan
 - Coastal Habitat Protection Plan
 - Basinwide Water Quality Plans
- ➤ Drafted into comprehensive, concerted & bold effort to take place over five years
 - **2**003-2008; 2008-2012; 2015-2020
- ➤ Steering Committee and Regional Workgroups engaged



Oyster Restoration and Protection Plan for North Carolina:

A Blueprint for Action





Prepared by: N.C. Coastal Federation

Partnerships and Collaborations are Key to Success







































US Army Corps of Engineers®



















National Estuar

Partnership









NC Restaurant & Lodging Association

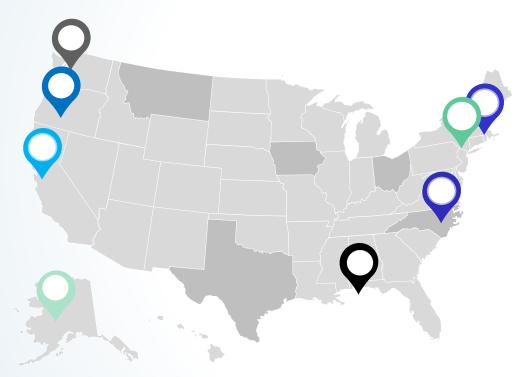


Major Accomplishments 2003-2013

- Government, private agencies and other shellfish stakeholders coordinated habitat, water quality and fisheries management activities.
- Funding for oyster related programs increase by a factor of ten from 2003-2013.
- Nearly 200 acres of oyster habitat were enhanced and restored, annual oyster harvests increased during this time, and a greater number of watershed restoration projects were implemented along the coast.



Major Accomplishments 2015-2020



Oyster Restoration and Growing are good for both the economy and environment

North Carolina joined NOAA's National Shellfish Initiative

Developed Strategic Mariculture Plan

Shellfish aquaculture grew from \$1 million to nearly \$5 million industry

Built ~50 acres of reef through oyster sanctuaries, living shorelines and patch reefs

Built ~200 acres of harvestable reef

Water quality degradation continues to be a concern but some localized improvements were observed

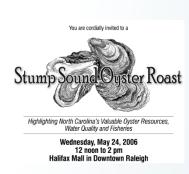
Researchers developed and refined tools to guide restoration, growing and enhancement efforts



Blueprint Summits, Roasts & Forums

- ► 2003 Oyster Forum, Ocean
- ➤ 2004 Encore for Oysters Summit, Morehead City
- ➤ 2005 Oyster Summit & Legislative Reception, Raleigh
- ➤ 2006 Regional Public Oyster Forums, Wilmington, Beaufort & Manteo
- ➤ 2006 Legislative Oyster Roast, Raleigh
- ► 2007 Legislative Oyster Roast, Raleigh
- ➤ 2007 Oyster Summit, Pine Knoll Shores
- ➤ 2014 Oyster Restoration Workshop, Beaufort
- ➤ 2015 Oyster Summit & Legislative Reception, Raleigh
- ► 2017 Oyster Summit & Legislative Reception, Raleigh
- >2019 Oyster Summit & Legislative Reception, Raleigh







Annual State of the Oyster Report



STATE OF THE OYSTER: 2015 Progress Report

on the Oyster restoration and Protection P



STATE OF THE OYSTER: 2016 Progress Report



Prepared by the North Carolina Coastal Federation



on the Oyster restoration and protection plan for North Carolina

Prepared by the North Carolina Coastal Federation Published September 2019





WHO WE ARE ABOUT OYSTERS THE BLUEPRINT NEWS & RESOURCES PROGRESS EVENTS Q



Since 2003, a diverse group of stakeholders involved in growing, harvesting, studying, educating, managing and eating oysters have voluntarily and productively worked together to protect and restore North Carolina's oyster habitats and fisheries. This website links their efforts to present a holistic approach to advancing the vision of North Carolina becoming "the Napa Valley of Oysters."

NCOysters.org is North Carolina's clearinghouse for oyster habitat restoration, planning, education/outreach and research. It is designed to:

News

Grower Profile: Ryan Bethea

Grower Profile: Katherine McGlade

Senate Mulls Fisheries, Shellfish Overhauls

Coastal Review Online

Genetic impacts of a commercial

aquaculture lease

2019 Oyster Summit Held in Raleigh

SUBSCRIBE FOR UPDATES HERE



@NcOysters @NorthCarolinaOysters www.ncoysters.org

Blueprint Focus Areas

- Education and Outreach
- Research
- Fishery & ShellfishAquaculture Development
- Oyster Habitat Protection & Restoration
- Water Quality Protection & Restoration
- Link to Ongoing Planning Efforts















Seven Goals of the Blueprint

Link Restoration of Oysters and Water Quality to an Economic Development Strategy

Establish 500 acres of Oyster Sanctuaries

Plant Cultch to Provide for Ample Sustainable Wild Oyster Harvest

Build the Mariculture Oyster Industry to Meet or Exceed
Wild Harvest Limits

Sustainably Manage Oyster Harvest on Public Bottom

Protect and Improve Water Quality in Priority Shellfish Growing Areas

Document Oyster Status and Trends Resulting from Successful Implementation of the *Blueprint*

Economic Development

Protect Shellfish Waters

Oyster Sanctuaries

Shellfish Aquaculture

Wild Harvest

Cultch Planting

Vision for 4th Edition of the Oyster Blueprint

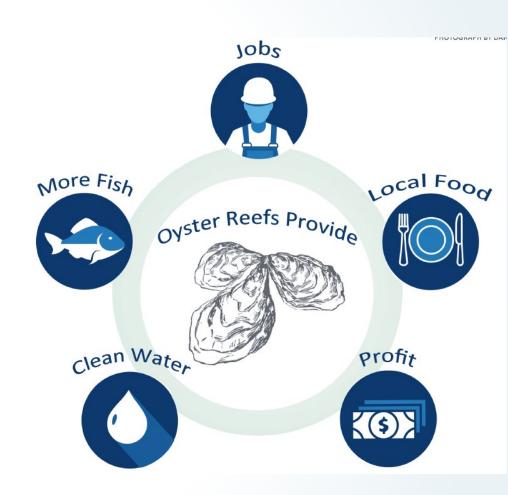


The vision of the Blueprint is to foster collaboration among partners, ensuring oysters in N.C. perpetuate a healthy and robust environment and economy.

Ecosystem Services

Ecosystem Services defined as Benefits people gain from thriving coastal habitats and clean waters.

Setting goals based on Ecosystem Services.



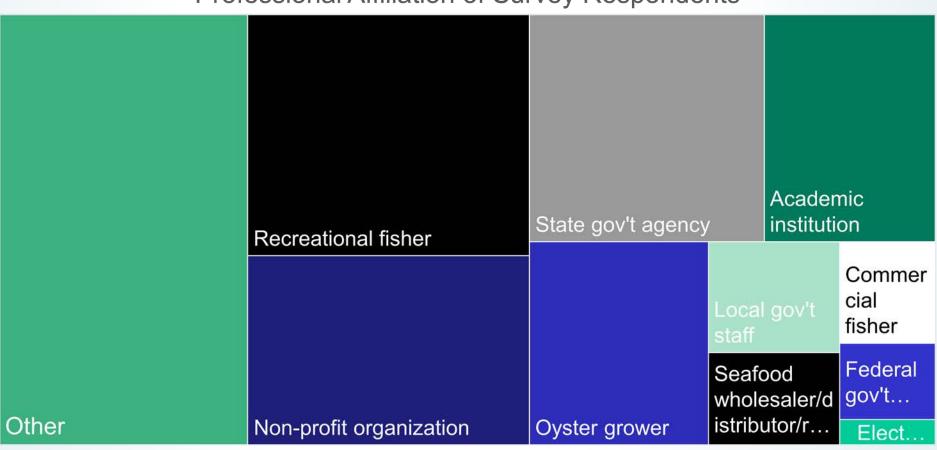
Stakeholder Survey



o Benefits o Threats o Actions

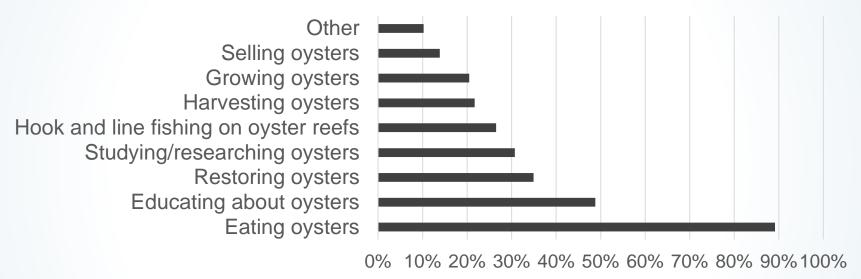
Results of Stakeholder Survey

Professional Affiliation of Survey Respondents



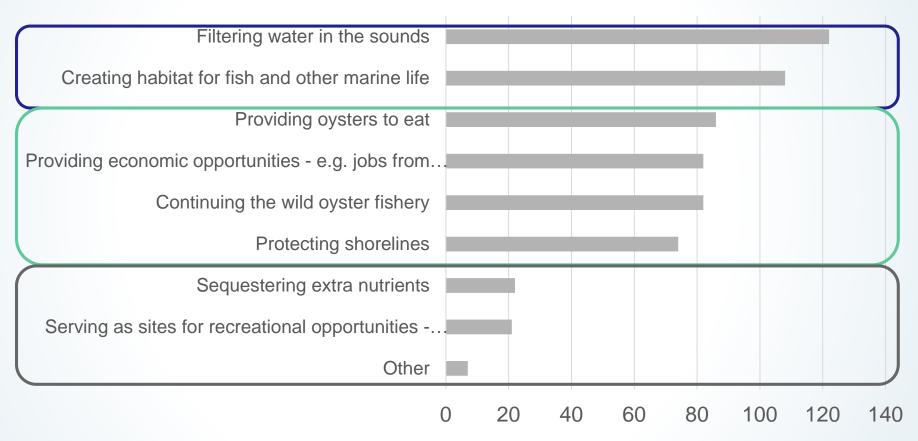
166 Respondents

Survey Respondents' Oyster Related Activities



Survey respondents' participation in oyster related activities as a percent of all respondents

Survey Respondents Selected the Benefits of Oysters that were Most Important to Them



Number of Times an Oyster Benefit was Selected by Survey Respondents

Direct Threats to Oysters Most to Least Concerning

Physical Destruction to Reefs from Human Related Activities (other than harvest)

Overharvest of Resource

Siltation/Burying of Reefs

Incompatible Fishing Practices (e.g. dredging)

Low Dissolved Oxygen

Lack of Spawning due to Low Oyster Population

Shellfish Diseases

Salinity Changes (too high/too low)

Lack of Settlement due to Low Substrate Availability

Introduced Invasive Species

Ocean Acidification

Physical Destruction to Reefs from Storms or Natural Causes

Predation

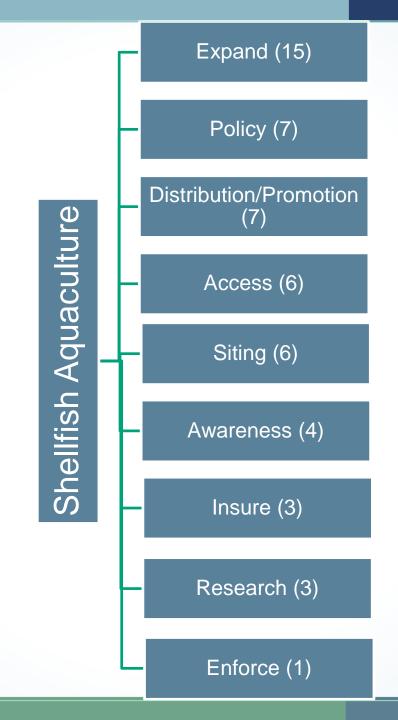
Lack of Sufficient Food for Oysters

What do you consider to be the single greatest threat to oysters in North Carolina in the next 5-10 years and why?

Threat	# of Times
	Selected
Water Quality	11
Incompatible Fishing Practices	8
Overharvest of Resource	5
Land-based Development	4
Storms	4
Ocean Acidification	3
Shellfish Diseases	3
Physical Destruction to Reefs	3
Management	3
Lack of Spawning	2
Lack of Substrate	2
Siltation	2
Swings in Salinity	1
Lack of Awareness	1
Multiple Threats/Interactions	66

Respondents provided 241 actions to be considered for Oysters

Action Related to:	Number of Times Made
Habitat Enhancement	85
Water Quality Improvements	52
Shellfish Aquaculture	52
Fisheries Management	38
Education/Awareness	6
Other	8







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DELIVERING SUSTAINED ECONOMIC DEVELOPMENT, COASTAL RESILIENCE AND CLEAN COASTAL WATERS FOR NORTH CAROLINA

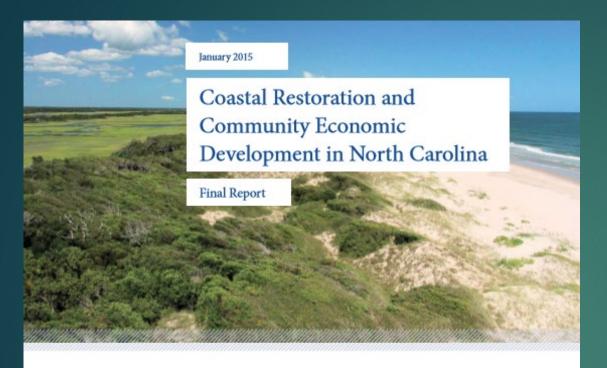
BUILDING A \$100M OYSTER MARICULTURE INDUSTRY

MAY 5, 2020

TOM LOONEY 919-423-1059







Prepared for-

North Carolina Coastal Federation

3609 N.C. 24 (Ocean) Newport, North Carolina

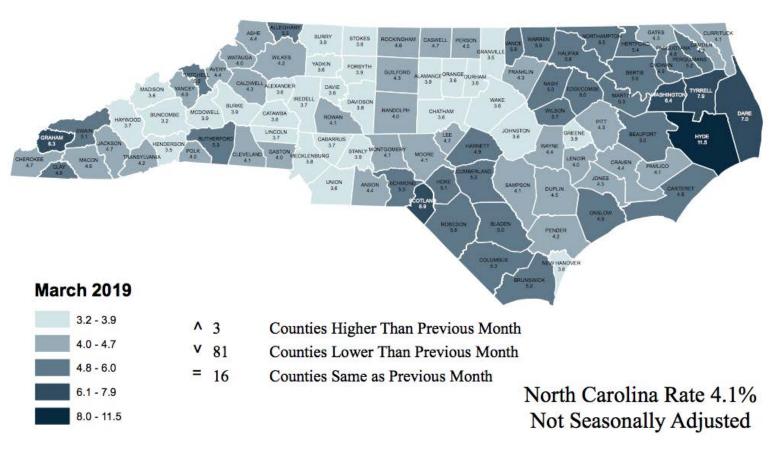
Prepared by-

Sara Lawrence Travis Beaulieu Ashley Green Alyce Kanabrocki Alan O'Connor Zack Oliver

RTI International 3040 E. Cornwallis Road Research Triangle Park, NC 27709



North Carolina Unemployment Rates by County March 2019



Oyster Value Proposition

▶Economic Value

► Oyster demand doubling 5 Years

▶US Annual Consumption 35,000,000 LBS.

▶ WW Consumption 2 Billion lbs.

▶Year Round Production- Triploid

►Environmental Value

- ►One Acre Oyster Reef Cleans 24M gal/day or 36 Olympic Pools
- ► Living shore lines reduce 88-93% wave action
- ▶One acre supports1.5 tons of other seafood



NC Oyster Mariculture Strategic Plan



Phase One

Build Case- Facts

- Identify Best Practices
- Build Business Case and Broaden Support
- Validate Barriers to Entry



Phase Two

Secure Champions

- Executive Branch , Cabinet Support & Elected Officials
- Establish End to End Ownership-Regulation to Distribution



Phase Three

Execute Strategy & Funding

- Leverage Legislative Support
- Optimize Funding & Resources
- Scale Business
- Support Water Quality

Oyster Mariculture Roadmap 2015















Hatchery Capacity
Disease Resistance
Water Quality Testing
Hatchery



Skills development Mentors

Investment

Low Cost Loans Insurance Investors

Mktg/Distribution

Build Brand
Distribution Plan
Community
Engagement
Tourism Opportunity

Regulation

Leasing Process
Ltd. Resources DMF
Enforcement
Conflict

Barriers to entry!



Duke NICHOLAS SCHOOL of the ENVIRONMENT







People, Partnerships & Collaboration















NOAA



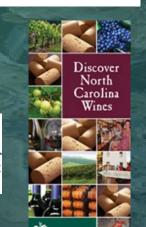




















January, 2019

NC Strategic Plan for Shellfish Mariculture: A Vision to 2030





Regulatory /Statutory Actions

NCDMF Shellfish Governance Committee Increase Lease Production Requirements Nurseries Approved in Prohibited Waters



Regulatory/ Statutory Actions

Establish Shellfish Enterprise Zones Stronger Theft & Poaching Laws

DMF Shellfish Leasing Section Resources (V)
Three 50 Acre Tracks in Pamlico Sound



Grower Support

Low interest loans (Plan complete)

Crop Insurance Plan(V)

AG Shellfish Advisory Panel



Research/Support

Aquaculture Business Agent- Sea Grant
Multiple Shellfish Grant Programs-Sea Grant



Marketing & Distribution

Oyster Trail- Sea Grant Driving Regionally NC Oyster Market Study (V) (NCCF)

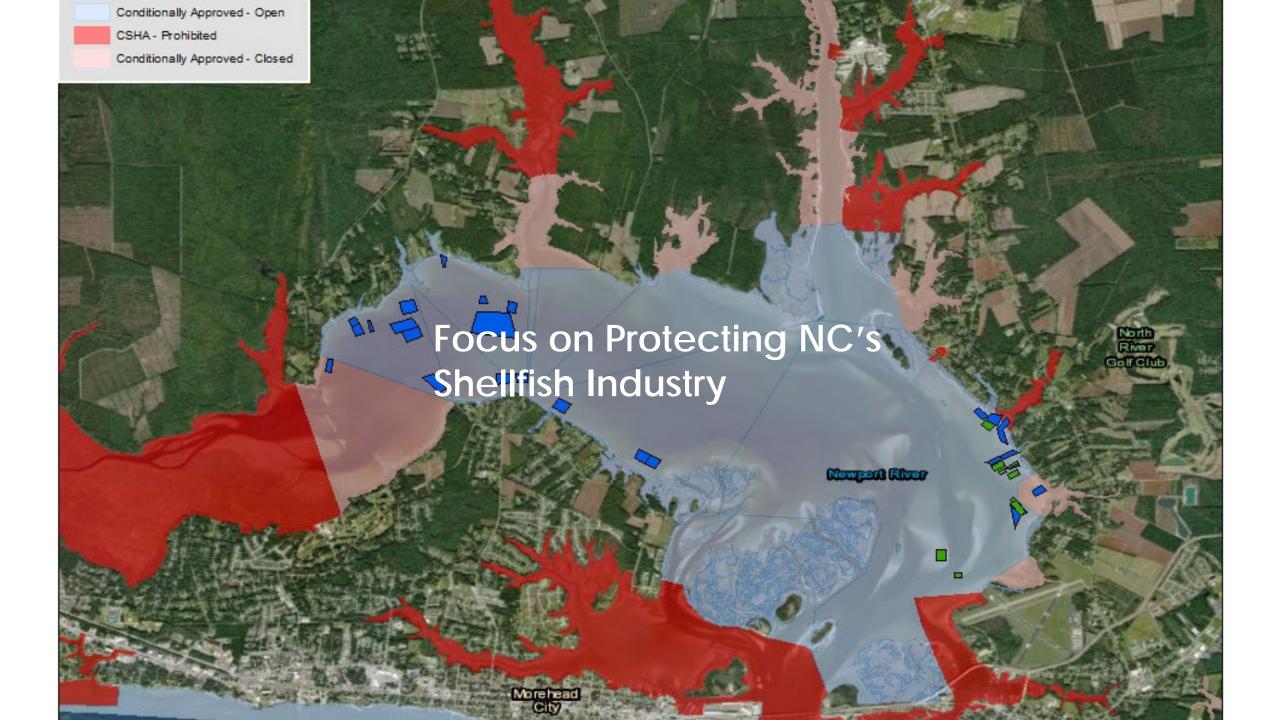


Water Quality

DEQ Staff to Monitor Stormwater Systems

Revise Grant Scoring Criteria in Prime Shellfish Areas (NCCF) Low Impact Development- State Funded Projects (NCCF)

Green- Moving Forward/ Implemented Yellow- In process/vetoed Red- Not supported



Success Breeds Success

EDA Incubators

- Access to water
- Storage
- Refrigeration
- Distribution
- Mentors /Education



Low Cost Loans

- Small Business Loans-State Subsidized
- Rural Center /Thread Capital
- Natural Capital Investment

SHELLFISH MARICULTURE INFRASTRUCTURE STUDY

Summary as of August 7, 2019

Challenges and Opportunities for NC Shellfish Mariculture Industry

Challenges	No. of	Opportunities	No. of
	Interviewee		Interviewee
	s		s
Storm/rain events	18	Processing and distribution centers	21
Lease establishment	17	Hatcheries and nurseries	16
Waterfront access	15	Cooperatives	12
Financial capital	13	Public awareness	12
Product distribution	12	Working waterfront dock	8
Seed source	11	Shellfish grower connections	6
Processing and distribution	10	Crop insurance	6
centers			













Oysters Delivering for NC!

Jobs

Tourism

Habitat

Clean Water

Pride Coastal Culture Financial Return



"NC will be the Napa Valley of oysters."

Rowan Jacobsen

Rowan is the author of <u>A Geography of Oysters</u>, <u>Fruitless Fall</u>, <u>The Living Shore</u>, <u>American Terroir</u>, <u>Shadows on the Gulf</u>, <u>Apples of Uncommon Character</u> and <u>The Essential Oyster</u>.





Shellfish Aquaculture Recommendations

Ana Zivanovic-Nenadovic
Assistant Director of Policy
North Carolina Coastal Federation

Oyster Blueprint 2021-2025 Shellfish Aquaculture Committee Members

- Jacob Boyd, N.C. DMF
- Bill Cary, Brooks Pierce
- Susan Hill- Downeast Mariculture Supply
- Tom Looney, North Carolina Coastal Federation Board Member
- Katherine McGlade N.C.
 Shellfish Growers Association

- Ken Riley NOAA
- Jay Styron Carolina Mariculture
- Ami Wilbur, UNC-Wilmington
- Todd Miller North Carolina Coastal Federation
- Ana Zivanovic-Nenadovic North Carolina Coastal Federation



Overarching N.C. Shellfish Aquaculture Goal

Build the shellfish aquaculture industry to create a \$100 million industry and 1,000 jobs by 2030



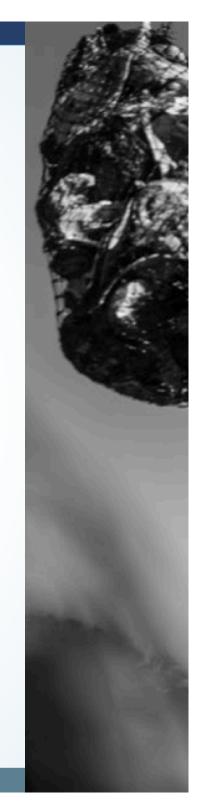
Oyster Blueprint 2021-2025 Shellfish Aquaculture Major Recommendations

- 1. Important yet achievable in 5 years
- 2. Timeline (Y1-5)
- 3. What did we miss?



Oyster Blueprint 2021-2025 Shellfish Aquaculture Major Recommendations

- 1. Monitor and Report on Industry Growth
- 2. Support and Assist the Shellfish Growers Economically
- Improve Marketing, Promotion and Distribution of Shellfish Products
- 4. Modernize Regulatory Scheme and Reduce User Conflicts
- 5. Support Shellfish Aquaculture-Related Research



1. Monitor and Report on Industry Growth

 Ensure the 2030 goal. Report shellfish aquaculture landings each year and report progress in State of the Oyster Report.

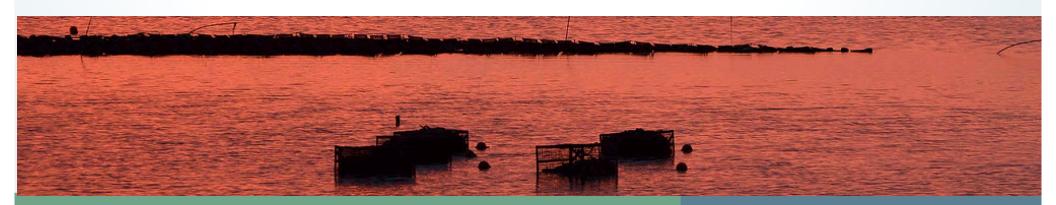
Estimated Landings Range (in millions)





2. Support and Assist the Shellfish Growers Economically

- Develop low-interest loan program for shellfish growers (Y1)
- Develop federal crop insurance (Y2)
- Include farmed shellfish in disaster relief funds (Y2)
- Implement theft penalties (Y3)
- Develop nutrient reduction mitigation payment program (Y4)
- Establish Aquaculture Resource Grant Program N.C. Sea Grant (Y5)
- Establish an Aquaculture Business Agent N.C. Sea Grant (Y5)



3. Improve Marketing, Promotion and Distribution of Shellfish Products

- Develop shellfish aquaculture incubator hubs (Y2-3)
- Perform a shellfish aquaculture market study (Y3)
- Establish Shellfish Aquaculture Advisory Panel at the NCDA&CS (Y3)
- Secure funding for the NCDA&CS and NCDOC to develop NC Oyster Trail
 (Y3)



4. Modernize Regulatory Scheme and Reduce User Conflicts

- Reduce user conflicts (Begin by Y2)
- Create Shellfish Enterprise Areas (Y2)
- Amend NCGS § 113-202 afford the Sec. of the DEQ discretion in balancing public trust uses (Y3)
- Increase the duration of leases from 10 to 20 years (Y3)



5. Support Shellfish Aquaculture-Related Research

- Develop list of research needs and progress for annual report (Y2)
- Fund a Shellfish Aquaculture Grant Program administered by N.C. Sea Grant (Y4)
- Support efforts for the UNCW Shellfish Research Hatchery (Y4)
- Research environmental and economic benefits of shellfish aquaculture (Y4)





Thank you

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Wrap up and Next Steps

Erin Fleckenstein, NC Coastal Federation

Process of Updating the Blueprint



Assessing

Blueprint Stakeholder Survey Strategy Workgroup Recommendations

Planning

- Public Review of Draft Plan
- Oyster Steering Committee Review
- Virtual Meeting Input
- Workgroup Recommendations



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