

OYSTER RESTORATION & PROTECTION PLAN FOR NORTH CAROLINA

A Blueprint for Action
2003-2008



2007 UPDATE

BLUEPRINT'S OVERARCHING GOALS

- To restore and protect North Carolina's native oyster populations and habitat so that estuaries are again robust, diverse and resilient ecosystems.
- To build broad public awareness and support for the value of estuarine conservation and sustainable fisheries.
- To work with a strong coalition to make significant, demonstrable and meaningful progress towards oyster restoration in the next five years.



GOAL #1

Organize and lead a coalition of interested partners to achieve oyster protection and restoration objectives.

Objective #1.1

Form and maintain a steering committee to provide leadership to achieve oyster restoration and protection goals.

Actions

1. Continue to maintain an active and diverse steering committee comprised of key representatives working to restore and protect oysters in North Carolina.
2. Hold meetings of the steering committee as necessary to oversee implementation of the Oyster Restoration and Protection Plan.
3. Maintain northern, central and southern regional workgroups that are chaired by members of the steering committee that involve broad cross sections of people and groups in the implementation of the Oyster Restoration and Protection Plan.
4. Ensure that the Oyster Plan supports the implementation of other ongoing federal- and state-sponsored major coastal environmental planning, management, and protection and

restoration initiatives.

5. Work with stakeholders to utilize the Oyster Plan as the groundwork for the development of a long-term oyster protection and restoration plan, and integrate the plan into the 2006-07 revision of the DMF Oyster Fishery Management Plan.

Objective #1.2

Organize oyster summits to receive a progress report on the plan objectives, and to conduct collaborative strategic planning for further plan implementation.

Actions

1. Beginning in 2005 organize and hold a biannual oyster summit for invited participants and stakeholders in the *Blueprint For Action*.
2. Issue a written report summarizing the presentations and agreed upon actions resulting from the summits.

GOAL #2

Restore and increase healthy oyster populations and habitat as a means to improve water quality, provide critical habitat for marine life and support a sustainable fishery.

Objective #2.1

Establish specific short-term protection and restoration objectives for

significant oyster growing areas and their watersheds to focus and coordinate management actions.

Actions

1. Utilize the NC Clean Water Management Trust Fund (CWMTF) planning grant to develop measurable objectives for oyster habitat restoration or creation and watershed protection for identified priority growing areas in each of the three regions (northern, central, and southern). This will initially result in at least one acquisition and/or easement proposal submitted to the CWMTF from each of the regions.
2. Support and utilize Division of Environmental Health Shellfish Sanitation Section (DEH SS) and Division of Marine Fisheries (DMF) resources to update, correlate and incorporate existing and future data layers into GIS analyses of DEH SS Shellfish Growing Areas (SGA). Data layers include historic oyster habitat; shellfish closures, NPDES pollution sources, substrate type, cultch plantings, and water classifications.
3. Expand scope of sanitary shoreline survey pilot project of EPA/DWQ/DEH/NCCF beyond initial growing areas and time frame. Secure funding for the completion for all 55 SGAs. The project aims to assist in coordinating and

determining on-going compliance with permits issued by regulatory agencies throughout growing area watersheds.

4. Ensure adequate resources are designated for Coastal Habitat Protection Plans (CHPPs) strategic habitat mapping, and utilize CHPPs maps and DMF shellfish bottom maps to coordinate Oyster Plan mapping and SGA prioritization.

Objective #2.2

Develop and implement a research program to assess the success of restoration efforts and to better understand the ecological framework in which oysters function; the location, amount and types of habitat needed; the status of larval supply and spat-fall index; and the best methods to manage, preserve and restore oysters in different settings.

Actions

1. Prioritize research needs and coordinate with restoration efforts for regionally based oyster habitat protection and restoration. Utilize appropriate identified research priorities established through CHPPs and DMF Oyster FMP.
2. Gather information to identify critical oyster habitat by: coordinating, completing, and maintaining habitat mapping, including DMF substrate mapping and Winslow maps; using the most appropriate technology, monitoring the status of those habitats, and assessing effects of land use and human activities on those habitats (CHPPs).
3. Utilize NCDMF substrate mapping, CHPPs Strategic Habitat Areas mapping, and historical Winslow maps and ground truthing to measure gains in restored/created oyster habitat.
4. Conduct research on regionally specific and appropriate reef design and siting for optimal water quality and habitat functions.
5. Determine the potential of utilizing closed waters, especially in the central and southern regions, to establish sanctuaries containing healthy oyster habitat.

6. Conduct a larval transport study and hydrodynamic study, prioritized for sub-tidal areas, to determine benchmarks for larval supply; need and protocols for establishing sanctuaries; and reef siting and seeding efforts.
7. Develop a protocol for placing and evaluating remote spat-set shell at restoration sites.
8. Develop and apply scientifically rigorous methods to evaluate restoration success, including project monitoring, changes in oyster biomass, spatial coverage, spawning and recruitment success, survival, biological community development (i.e., expansion of SAV habitat), growth and complexity, use by other economically valuable species, and enhancement of water quality.
9. Examine whether smaller, basin-level restoration efforts, i.e., Hewlett's Creek Watershed Initiative, are suitable models for replication on a larger scale.
10. Test the appropriateness of using other material types and a combination of shell and non-shell materials to restore oyster reefs.
11. Evaluate initial research and current testing for aquaculture use of non-spawning, non-native oysters (*C. ariakensis*) introduction into NC waters. Promote widespread discussion of the biological, cultural and economic pros and cons of introducing non-native oysters in North Carolina.
12. Develop a research program to determine and quantify key ecological attributes of the native oyster population; the stresses and sources of stress that threaten the native oyster and cause habitat loss; and develop strategies and guidelines to eliminate/mitigate those stresses.
13. Conduct research on shellfish genetics, genetic selection of disease-resistant native oysters, regional brood stock development and the use of hatchery-reared oyster stock.

Objective #2.3

Restore a healthy population of native oysters by: focusing and coordinating management actions; expanding the

protection and restoration of oyster reef habitat; establishing new oyster sanctuaries as research indicates; and working with shellfish growers and harvesters.

Actions

1. Greatly expand oyster habitat restoration through: enhancing artificial reefs with cultch; planting oyster seed as research indicates; and coordinating federal, state, university and conservation organization habitat restoration projects.
2. Support implementation of and link Oyster Plan restoration goals to DMF Fishery Management Plan for Oysters and CHPPs.
3. Engage shellfish growers and harvesters in planning, research, restoration efforts and establishment of sanctuaries (CHPPs).
4. Support DMF expansion and creation of new oyster sanctuaries utilizing a regionally appropriate approach (large sanctuaries in northern waters; smaller sanctuaries, management areas and utilization of closed waters in southern waters).
5. Evaluate and initiate the development of state-operated oyster hatcheries to develop a reliable source of native oyster seed.
6. Increase capabilities for Division of Marine Fisheries' Shellfish Rehabilitation Program so that 250,000 bushels can be planted in 2005 and 400,000 bushels can be planted in succeeding years.
7. Identify/develop a consistent source of oyster shells and other cultch materials, including statewide implementation of the DMF-led shell-recycling initiative, to ensure an adequate source of cultch for restoration needs.
8. Identify strategic sites for stockpiling oysters and deploying large-scale oyster restoration activities.
9. Work with the Ecosystem Enhancement Program to prioritize mitigation in priority shellfish waters' watersheds affected by road building projects, and develop the appropriate mitigation credit.

Objective #2.4

Make recommendations to and facilitate the coordination and adoption of state laws, policies and regulations that support the restoration and conservation of oyster habitat and native oyster populations and make recommendations to the Coastal Resources Commission (CRC), Environmental Management Commission (EMC) and Marine Fisheries Commission (MFC).

Actions

1. Develop a prioritized list of the most important legal and regulatory issues that will promote and/or inhibit success of this plan and then tackle these issues in a coordinated fashion. Link with CHPPs and DMF Oyster Management Plan recommendations.
2. Protect oyster habitat from fishing gear effects through improved enforcement, establishment of protective buffers around habitats, and further restriction of mechanical shellfish harvesting (CHPPs).
3. Develop and implement a comprehensive coastal marina and dock management plan and policy to prevent closures of shellfish harvest waters and minimize cumulative impacts on oyster habitat (CHPPs).
4. Examine existing laws and regulations regarding the lease of public trust bottoms for conservation and promotion of enhancement of oyster habitat.
5. Develop and implement a DMF “under-dock oyster gardening” permit, and evaluate the pros and cons of citizen-based “oyster gardening.”
6. Evaluate the current extent of channel dredging projects coastwide and determine potential impacts on oyster habitat.

Objective #2.5

Promote and expand the use of natural alternatives to preserve and/or restore estuarine shorelines to protect and restore oyster habitat.

Actions

1. Revise estuarine and public trust shoreline stabilization rules and permits using best available

information, considering estuarine erosion rates, and the development and promotion of incentives for use of alternatives to vertical shoreline stabilization measures (CHPPs).

2. Reactivate the estuarine shoreline science panel formed by the Division of Coastal Management.
3. Ensure implementation of a general Coastal Area Management Act (CAMA) permit for using restored marsh or a combination of restored marsh and stone sills to protect estuarine shorelines in 2005.
4. Conduct and complete a demonstration project to determine the effectiveness of oyster reefs in protecting estuarine shorelines by 2006.

GOAL #3

Increase public awareness of the ecological and economic roles, values and importance of a healthy oyster population, and expand citizen support and participation in the protection and restoration of water quality and oyster habitat efforts.

Objective #3.1

Enhance and expand public support and participation in the restoration and protection of water quality and oyster habitat through educational outreach on the value of oysters and the threat that water quality declines pose to oysters.

Actions

1. Organize broad public support for new rules that protect water quality.
2. Provide increased opportunities and guidelines for citizen participation in protection and restoration activities.
3. Utilize non-profit conservation organizations, in cooperation with regulatory agencies, to train and coordinate volunteers to help identify and report illicit discharges and environmental violations.
4. Develop and implement education component of the under-dock oyster gardening program, and utilize the participants for oyster outreach efforts.
5. Increase public outreach, support

and participation in the oyster shell recycling program.

6. Identify outreach needs, develop them and conduct an outreach campaign for the public, using all available agencies and organizations, on the ecological and economic values of oysters, the factors affecting them and the opportunities for public involvement in water quality and oyster habitat protection and restoration.
7. Develop and incorporate an education component for oyster hatcheries at NC Aquariums if implemented.
8. Develop a media plan for outreach efforts and conduct periodic press tours to highlight successes, progress of restoration and protection efforts, benefits of oysters, and public involvement.
9. Ensure communication occurs among agencies and organizations working on the education and volunteer involvement components.
10. Facilitate the communication between educators and researchers and other groups so that research efforts are incorporated into public outreach efforts.
11. Incorporate the economic benefits, from DMF reports and CHPPs, of protection and restoration of water quality and oyster habitat into the outreach campaign.

Objective #3.2

Organize public forums to keep the public and their elected officials informed and excited about positive progress being made to protect and restore oysters in North Carolina.

Actions

1. Beginning in 2004 organize and hold a biannual public forum on protecting and restoring oysters and provide a report highlighting areas of progress and resource needs.
2. Issue a written report summarizing the presentations offered at the forums.
3. Utilize the CWMTF planning grant to hold one regional workshop for each of the three regions to involve the public and develop support for the regional workgroups' efforts.

GOAL #4

Develop and market a sustainable native oyster fishery.

Objective #4.1

Develop the resources to ensure a sustainable oyster fishery.

Actions

1. Determine a sustainable level of oyster harvest incorporating the limits of wild harvest and the potential and limits of oyster mariculture.
2. Create incentives for oyster mariculture and support the transition of wild harvesters into mariculture.
3. Evaluate the need for and implement the restructuring of components of a lease system to support mariculture.
4. Develop a set of mariculture BMPs and a training/continuing education program for NC.
5. Utilize community colleges with aquaculture programs and the NC Aquaculture Development Conference and Trade Show to support and increase awareness and involvement in oyster mariculture.
6. Determine the role of potential new oyster NC hatcheries to support mariculture, while ensuring the hatcheries meet the needs for oyster restoration efforts.
7. Support the oyster relay, seed relay and shell recycling programs.
8. Support the use of North Carolina Sea Grant FRGs and SRGs for mariculture purposes.
9. Involve oyster growers and harvesters in oyster restoration and protection efforts, including establishing no-take sanctuaries, to increase support for a sustainable fishery of native, wild oysters.

Objective #4.2

Ensure a viable market for North Carolina oysters.

Actions

1. Evaluate the current and potential market for NC oysters.
2. Identify niche markets for

sustainable-harvest wild oysters and for mariculture oysters.

3. Increase public awareness and support for oyster mariculture.
4. Utilize marketing to support sustainable harvest methods and the conservation and restoration of NC's oysters.
5. Utilize the NC DA&CS seafood marketing program, North Carolina Sea Grant FRGs/SRGs, and NC Restaurants Association to support marketing efforts.
6. Create a workgroup and develop a marketing plan for an ecologically sustainable NC oyster industry, creating brand identification, i.e., NC Department of Agriculture's "Freshness From NC Waters" campaign. Utilize economists to assist in the effort.

GOAL #5

Protect and restore water quality throughout coastal waters and especially near areas designated as oyster habitat.

Objective #5.1

Enhance the enforcement of, and compliance with, Coastal Resources Commission (CRC), Environmental Management Commission (EMC), Sedimentation Control Commission, Health Services Commission (HSC) and Marine Fisheries Commission (MFC) rules and permit conditions.

Actions

1. Strengthen DENR enforcement mechanisms.
2. Reevaluate forestry and agriculture exemptions for ditching wetlands.
3. Improve land-based strategies to reduce non-point pollution and minimize cumulative losses to wetlands and streams through rule making, including: larger vegetated buffers, more stringent impervious surface limits, expansion of Areas of Environmental Concern (AECs) upstream and landward, and establishment of setbacks along estuarine and public trust shorelines (CHPPs).
4. Strengthen enforcement and compliance and increase penalties

for NPDES permits for chronic violations of water quality standards.

5. Require National Pollution Discharge Elimination System (NPDES) discharge permittees to clean up existing sources of stormwater pollution.
6. Prohibit new or expanded stormwater outfalls to coastal shellfishing waters (EMC surface water classifications SA and SB), and continue to phase out existing outfalls by implementing alternative stormwater management strategies (CHPPs).
7. Develop special development rules for watersheds of priority growing areas under the current regulatory framework in NC DENR.
8. Develop CAMA Land Use Plan template through DCM and CRC for protecting priority shellfish waters and watersheds in urban and non-urban areas, in addition to ensuring effective CAMA land use plan design, implementation and enforcement currently.
9. Seek changes to the state revolving fund criteria that (a) allow stormwater retrofits and (b) do not require the lowest cost method for wastewater projects to allow flexibility for alternative strategies.

Objective #5.2

Protect water quality in areas suitable for oyster habitat (CHPPs).

Actions

1. Increase and coordinate water quality monitoring efforts, including stationary platforms.
2. Identify pollution sources resulting in shellfish closures in priority waters.
3. Implement a prioritized and coordinated plan of land acquisition and conservation easements to preserve pristine and threatened watersheds adjacent to productive shellfish growing areas.
4. Reduce point source pollution by developing and updating a list of all point sources discharges in estuarine waters; increasing inspections of sewage treatment facilities, collection infrastructure, and land

disposal sites and providing incentives for upgrading all types of wastewater treatment systems (CHPPs).

5. Strongly encourage land application, where appropriate, rather than direct discharge of point source discharges to estuarine waters.
6. Improve land-based strategies to reduce non-point pollution and minimize cumulative losses to wetlands and streams through voluntary actions, Best Management Practices (BMPs), and incentives, including: improved methods to reduce sediment pollution from construction sites, agriculture, and forestry, increased on-site infiltration of stormwater, documentation and monitoring of small but cumulative impacts to wetlands and streams resulting from un-permitted/un-mitigated activities, incentives for low impact development, enhanced inspections of onsite wastewater treatment facilities, and increased use of innovative approaches to wastewater discharges, i.e., water re-use and recycling, and biofiltration (CHPPs).
7. Develop a prioritized list of the most important legal and regulatory issues that will promote and/or inhibit success of this plan.

Objective #5.3

Restore water quality in areas suitable for oyster habitat.

Actions

1. Establish benchmarks for improvement for selected water quality parameters in targeted waters.
2. Identify areas where stormwater discharges can be removed and seek funding and permits to remove them.
3. Identify wetland, stream, tidal creek and other coastal habitat restoration projects to implement resulting in the restoration of water quality in shellfish waters.

GOAL #6

Link and coordinate Oyster Restoration and Protection Plan activities to ongoing planning efforts.

Objective #6.1

Make implementation of the Oyster Restoration and Protection Plan integral to accomplishing the objectives of other ongoing major federal and state sponsored coastal environmental planning initiatives.

Actions

1. Link to DMF Oyster Fishery Management Plan.
2. Link to Coastal Habitat Protection Plans.
3. Link to Basinwide Water Quality Plans.
4. Link to CAMA Land Use Plans.
5. Link to Albemarle-Pamlico Estuary Program.
6. Link to Ecosystem Enhancement Program Basinwide Wetlands Restoration Plans.
7. Link to State of North Carolina/ Corps of Engineers Neuse River, Tar River and Pamlico Sound Basins Studies.
8. Link to Onslow Bight Initiative.
9. Link to One North Carolina Naturally, Land for Tomorrow/Horizon 2100.
10. Link to Sea Grant Strategic Plan and Fishery Resource Grants (FRGs).
11. Link to Pew Charitable Trust's Ocean Report.

GOAL #7

Secure funding for full implementation of the goals, objectives and actions of the Oyster Restoration and Protection Plan for North Carolina.

Objective #7.1

Identify and secure funding for the management and operation of the Oyster Restoration and Protection Plan and the fulfillment of its objectives.

Actions

1. Support efforts to create and introduce state and federal

legislative packages to fund identified actions of the Oyster Plan.

2. Obtain funds to support Steering Committee and Regional workgroups.
3. Identify and secure funding for oyster summits.

Objective #7.2

Provide funding for an expanded oyster habitat restoration programs and a comprehensive oyster research program.

Actions

1. Prioritize and seek funding to implement a comprehensive oyster research program.
2. Fund DMF expansion and creation of new oyster sanctuaries.
3. Fund planning and construction of a state-operated oyster hatchery to develop a reliable source of native oyster seed.
4. Increase funding for Division of Marine Fisheries' Shellfish Rehabilitation Program so that 250,000 bushels can be planted in 2005 and 400,000 bushels can be planted in succeeding years.
5. Fund statewide implementation of DMF-led shell-recycling initiative.
6. Acquire sites for stockpiling oysters and deploying large-scale oyster restoration activities.
7. Develop a plan to use the Ecosystem Enhancement Program compensatory mitigation funds to compensate for the loss of habitat and oyster production in hydrologic units affected by road building and maintenance projects.
8. Promote, provide funding and expand the use of natural alternatives to preserve and/or restore estuarine shorelines to protect and restore oyster habitat.
9. Seek funding to implement CHPPs and OFMP.
10. Fund DMF and CHPPs, DEH positions to complete GIS-based shellfish substrate and SGA mapping projects.
11. Leverage private and federal funds, i.e., UASCE watershed planning projects and TNC Shellfish

Restoration Network to support research and restoration projects.

12. Encourage citizen groups to coordinate with each other and agencies to apply for funding for restoration and protection projects, i.e., 319, NOAA, FWF, FAF.

Objective #7.3

Develop strategic planning for securing \$100 million a year in funding for projects that will protect and restore shellfishing waters.

Actions

1. Improve enforcement mechanisms by expanding DENR funding to maintain existing staff levels and hire Division of Water Quality (DWQ), Division of Coastal Management (DCM) Division of Environmental Health (DEH) and Division of Land Resources (DLR) permit and enforcement staff.
2. Increase and coordinate water quality monitoring efforts, including stationary platforms.
3. Prioritize and pursue land acquisition and conservation easement grants to preserve pristine and threatened watersheds adjacent to productive shellfish growing areas (CWMTF, DOT mitigation/EEP funds, NOAA, USFWS and other funding sources).
4. Pursue grants and loans directed at cleaning up existing sources of point and non-point pollution in priority shellfish waters and watersheds (CWMTF, APNEP, DOT mitigation/EEP, EPA 319, State Revolving Fund, NOAA and other sources).
5. Pursue grants and develop private partnerships to restore drained watersheds (CWMTF, Farm Bill, CREP, NOAA and others).
6. Secure additional state and federal funding for estuarine restoration/conservation in combination with wetland/upland projects.
7. Provide funding and encourage the use of incentives for local governments for protection and improvement of local oyster habitat; i.e., community stormwater ordinances.

8. Encourage the NC General Assembly to fully fund conservation and protection programs such as the CWMTF at \$100 million annually, Natural Heritage Trust Fund, and Parks and Recreation Trust Fund.
9. Hold a forum of funding agencies to coordinate and prioritize target areas and facilitate interagency communication and shared resources.

Objective #7.4

Provide funding for an outreach and education program to enhance and expand public support and participation in the restoration and protection of water quality and oyster habitat.

Actions

1. Fund the development of outreach needs and distribution of materials and resources.
2. Fund the education component for oyster hatcheries at the NC Aquariums (if implemented).
3. Fund biannual public forums on the status of water quality and oyster habitat efforts.

Objective #7.5

Fund the creation of resources to support and market a sustainable oyster fishery.

Actions

1. Fund incentives for oyster mariculture.
2. Fund a training/continuing education program for mariculture and the implementation of BMPs.
3. Fund a marketing plan for an ecologically sustainable NC oyster industry, creating brand identification.



STEERING COMMITTEE 2007

Troy Alphin, UNC Wilmington
Bill Crowell, Albemarle-Pamlico National Estuary Program
Louis Daniel, NC Division of Marine Fisheries
Jeff DeBlieu, The Nature Conservancy
Michele Duval, Environmental Defense
Patricia K. Fowler, NC Division of Environmental Health – Shellfish Sanitation Section
David Griffin, NC Aquariums
JoAnne Harcke, NC Aquariums
Craig Hardy, NC Division of Marine Fisheries
Patricia Hughes, NC Division of Water Quality
Jimmy Johnson, NC Division of Marine Fisheries – CHPPs Coordinator
Jim Gregson, NC Division of Coastal Management
Phillip (Skip) S. Kemp Jr., Carteret Community College and Shellfish Gardeners of NC
Sarah King, NC Clean Water Management Trust Fund
Coleen Sullins, NC Division of Water Quality
Tancred Miller, NC Division of Coastal Management
Todd Miller, NC Coastal Federation
Wayne Mobley, NC Division of Environmental Health – Shellfish Sanitation Section
Matt Parker, NCDCA and CS Aquaculture Division
Charles “Pete” Peterson, UNC Chapel Hill Institute of Marine Sciences
Martin Posey, UNC Wilmington
Secretary Bill Ross, NC Department of the Environment and Natural Resources
Bill Kirby-Smith, Duke University Marine Laboratory
Jim Swartzenberg, J&B AquaFood and NC Shellfish Growers Association
Damon Tatem, NC Clean Water Management Trust Fund
Michael P. Voiland, North Carolina Sea Grant Program
Chuck Wilson, US Army Corps of Engineers, Wilmington District

INVITED GUESTS AND STAFF

Jan DeBlieu, NC Coastal Federation
Andy Haines, NC Division of Environmental Health – Shellfish Sanitation Section
Jess Hawkins, NC Aquarium at Pine Knoll Shores
Lucy Henry, Albemarle-Pamlico National Estuary Program
Ronald Hodson, North Carolina Sea Grant Program – Emeritus
Lauren Kolodij, NC Coastal Federation
Andrew McDaniel, NC Division of Highways
Sara Mirabilio, North Carolina Sea Grant Program
Steve Rebach, North Carolina Sea Grant, NC State University
Jim Stephenson, NC Coastal Federation
Lexia Weaver, NC Coastal Federation
Ted Wilgis, NC Coastal Federation

BLUEPRINT PARTICIPANTS

The organizations represented here are just a few of those involved with water quality and oyster protection and restoration in North Carolina. Many others serve as active participants in the plan, including shellfish growers and harvesters and members of the public.



For a full copy of the Oyster Blueprint and additional information please visit:

www.nccoast.org/publication/oysterplan or call NCCF at 252-393-8185