Primary Nursery Areas and Tidal Creek Protection in North Carolina

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Background

North Carolina's extensive estuarine systems serve as a nursery ground supporting the vast majority of the state's important fishery species. These areas provide protection, foraging opportunities, and suitable environmental conditions for the growth and development of young finfish and crustaceans during critical stages in their life history. Failure to adequately protect these areas could result in a recruitment bottleneck to multiple fisheries.

Nursery areas in North Carolina are categorized based on various stages of juvenile development and life history strategy (see box below). Since 1978, Primary Nursery Areas (PNAs) have been designated by the Marine Fisheries Commission to protect areas where initial post-larval development takes place. Sampling programs confirmed that this occurs mostly in upper portions of estuaries in tidal creeks and shallow bays. The PNA designation is intended to maintain these habitats, as much as possible, in their natural state allowing juvenile populations to develop in a normal manner with as little interference from man as possible. Approximately 80,000 acres have been designated as PNAs in North Carolina. The N.C. Wildlife Resources Commission designated Inland PNAs for inland waters under their jurisdiction. Since fish are most vulnerable during the earliest life stage, these "primary" nursery areas are the focus of regulatory protections.

Definitions

Nursery areas: Those areas in which for reasons such as food, cover, bottom type, salinity, temperature and other factors, young finfish and crustaceans spend the major portion of their initial growing season [15A NCAC 03N .0102 (a)].

Primary nursery area (PNA): Those areas of the estuarine system where initial post-larval development takes place. These areas are located in the uppermost sections of a system where populations are uniformly very early juveniles [15A NCAC 03N .0102 (b)].

Secondary nursery area (SNA): Those areas of the estuarine system where later juvenile development takes place. Populations are usually composed of developing sub-adults of similar size which have migrated from upstream primary nursery areas to the secondary nursery area located in the middle portion of the estuarine system [15A NCAC 03N .0102 (c)].

[Inland] primary nursery area (IPNA): Those [inland] areas inhabited by the embryonic, larval, or juvenile life stages of marine or estuarine fish or crustacean species due to favorable physical, chemical or biological factors
[15A NCAC 10C.0502].

Anadromous fish spawning area (AFSA): Those areas where evidence of spawning of anadromous fish has been documented by direct observation of spawning, capture of running ripe females, or capture of eggs or early larvae [15A NCAC 03I .0101 (b) (20) (C)].

Anadromous fish nursery areas: Those areas in the riverine and estuarine systems utilized by post-larvae and later juvenile anadromous fish [15A NCAC 03I .0101 (b) (20) (D)].

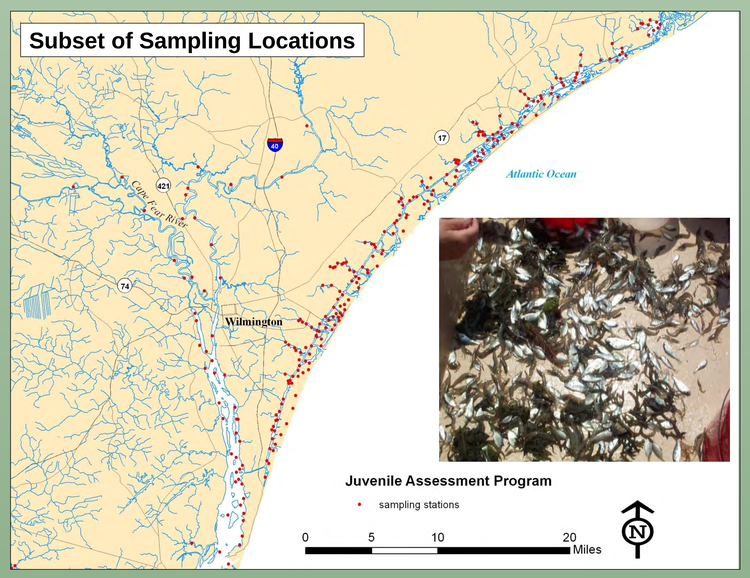
Designating PNAs

Sampling

- Use trawls
- Potential sites sampled for three years
- Proposed site compared to similar areas nearby to see if there is a notable difference in terms of species abundance, size distribution, and diversity.

Criteria

- Abundance of selected recreationally and commercially important fish and shellfish species: brown shrimp, blue crab, spot, croaker, southern flounder.
- Size composition – presence of early juvenile stages
- Species diversity
- Bottom type – clay, course silt, detritus
- Depth usually < 6 ft



Protecting PNAs

Threats to PNAs are mostly in the form of either physical modification to the substrate or activities that degrade water quality. Examples of potential substrate disturbing activities include dredging, boating activity, channelization, use of bottom-disturbing fishing gear, construction of jetties and groins, obstructions such as dams and culverts, and shoreline stabilization. Water quality can be degraded by land use practices that cause runoff and by water uses such as marinas, docks, and other point and non-point sources of toxins, nutrients, sediment, and saline discharge.

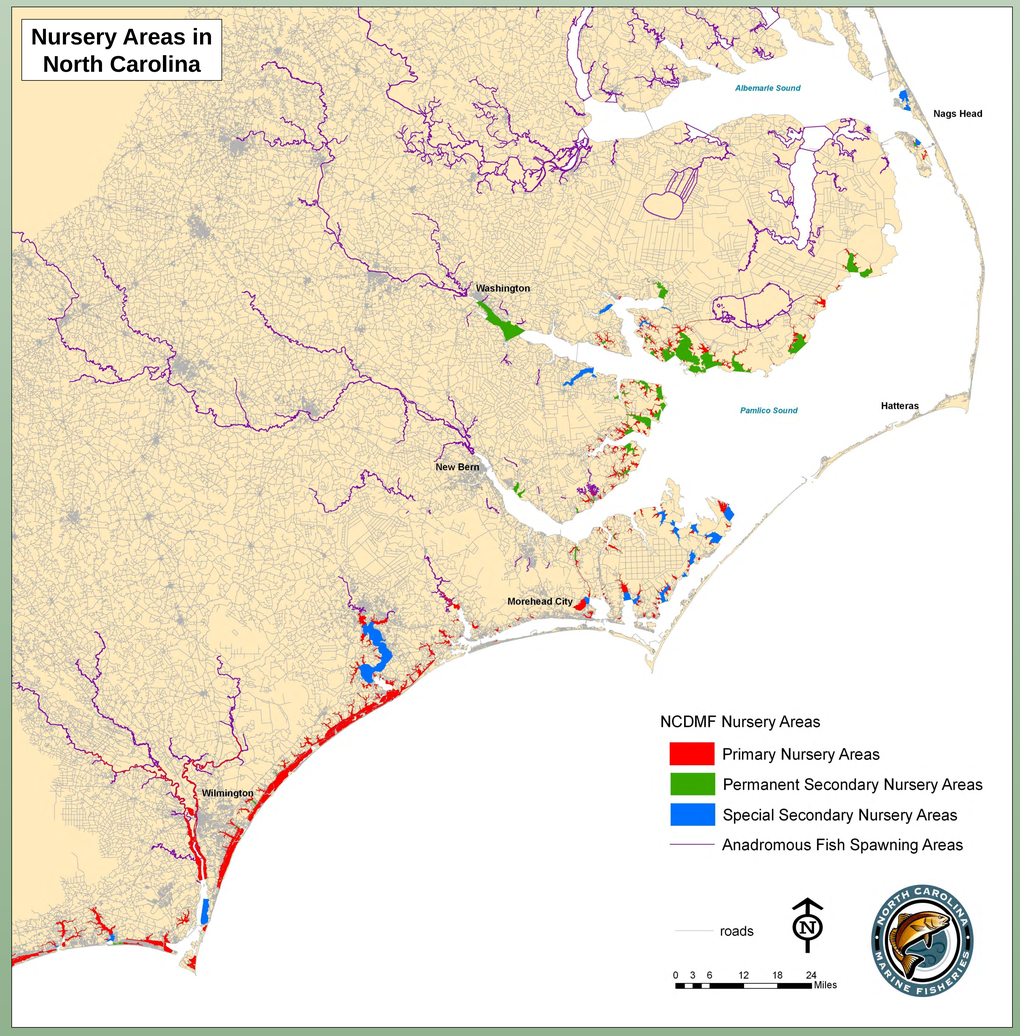
Multiple state agencies use the PNA designation to protect tidal creeks and their dependent fisheries from these threats. To protect these sensitive areas, the N.C. Division of Marine Fisheries (DMF) prohibits the use of bottom-disturbing fishing gear in PNAs, the N.C. Division of Coastal Management prohibits new dredging in PNAs, and the N.C. Division of Water Quality requires higher standards on wastewater discharge and prohibits new dredging in PNAs.

The Division of Marine Fisheries reviews permit applications for impacts to fisheries and fish habitats.

The DMF permit reviewers ensure that there is:

- No new dredging in PNAs
- No new boat slips or floating docks in shallow water to prevent boats and docks from resting on the substrate and causing "prop dredging"
- Minimal impact to shellfish and submerged aquatic vegetation (SAV)
- No harmful discharge into PNAs
- No significant impacts to wetlands surrounding PNAs

Reviewers regularly conduct site surveys and request additional information from the applicants including detailed depth surveys, shellfish surveys, SAV surveys, and flow/sedimentation models to determine if the proposed activity will impact fishery habitats. In addition to protecting PNAs, modifications or objections to projects are often requested due to impacts to submerged aquatic vegetation, anadromous fish spawning areas, or water quality in open shellfish harvest areas. **In 2010, 539 projects were reviewed by DMF permit reviewers with 42 of those projects having potential to impact PNA. Of the 42, 15 were designed to have no impacts on PNA and required no comment, 21 incorporated DMF recommended modifications to eliminate impacts to PNA, and six were denied.**



PNA Threats

Coastal Habitat Protection Plan

This multi-agency effort to protect PNAs is supported by the Coastal Habitat Protection Plan (CHPP), which is authored and updated by DMF. The CHPP describes the status and threats of North Carolina's coastal fisheries habitats, the latest scientific information on habitat issues and the ecosystem, and highlights the relationship of each habitat type to our coastal fisheries. Recommendations of the CHPP resulted in an increase in the role of the Division of Marine Fisheries in the permit review process. Two positions were created in 2008 that are dedicated to permit review and habitat protection. The CHPP also promotes the protection of tidal creeks by including recommendations to:

- Enhance water quality, habitat, and fisheries monitoring
- Protect fish habitat from harmful fishing gear
- Protect and enhance habitat for migratory fishes
- Promote alternatives to vertical shoreline stabilization
- Develop policies that address sea-level rise
- Reduce point sources of discharge
- Improve strategies to reduce non-point pollution through voluntary actions and rulemaking
- Support Strategic Habitat Area assessments

The CHPP recommended the identification, designation, and protection of Strategic Habitat Areas (SHAs). Strategic Habitat Areas are specific locations of individual fish habitats that have been identified to provide exceptional habitat functions or that are particularly at risk due to imminent threats, vulnerability, or rarity. Primary Nursery Areas are an important factor in designating SHAs, thus tidal creeks may receive additional protection, enhancement, or restoration if they are designated as a SHA. SHAs have been designated along the northern coastal region. Designation of the southern half of the state is currently in progress.