I. Introduction

Artificial reefs and Oyster Sanctuaries are supported by N.C. Division of Marine Fisheries staff who develop, maintain, evaluate and administer the reef system. As of 2018, the division maintains 43 ocean artificial reefs and 25 estuarine reefs, 15 of which serve as oyster sanctuaries. The goals of North Carolina's Artificial Reef and Oyster Sanctuary Programs are to develop, maintain, evaluate, and administer a system of artificial reefs to enhance habitat and increase recreational fishing and diving opportunities, and a system of oyster sanctuaries to enhance habitat availability and connectivity in the Pamlico Sound respectively.

II. Existing Reefs

In 2017, reef boundaries were updated and corrected to reduce confusion between permitting agencies and create defined boundaries. Material locations are obtained by side-scan sonar and digitization. This effort was to reduce confusion and completely encompass all material deployed around reef sites. The updated reef boundaries have been approved and accepted by Division of Coastal Management and USACE. Ocean reef boundaries are circular, delineated by a center point and a radius of 1500 or 3000 feet, depending on amount of and distance between material. Estuarine reefs are more variable in size, but are rectangular shaped, marked by four corner points. Once new boundaries were established, Private Aid to Navigation (PATON) permits were revised to match the changes. The reef boundary document and PATON permits are available in the link below. All artificial reefs are required to maintain minimum navigation clearance on an individual basis according to each permit. Locations of all artificial reefs are documented in USCG charts and are compiled in the online interactive reef guide here: http://portal.ncdenr.org/web/mf/artificial-reefs-program. Artificial reefs in estuarine waters are required by the USCG and the USACE to maintain buoys marking corners. These reefs, including oyster sanctuaries, are marked with white pencil buoys or pilings with signs on each corner.

BoundaryPackageFinal.pdf

III. Permitting Process

Reef projects are permitted by multiple agencies, including the North Carolina Division of Coastal Management and US Army Corps of Engineers. Projects that occur in estuarine and coastal ocean (0 - 3 nautical miles) are authorized via the use of a Coastal Area Management Act (CAMA) permit and authorization by USACE general permit 198000291 or 198500194. Reef projects that occur outside of the 3-nautical mile limit require only authorization under a USACE general permit. Conditions in these permits may dictate appropriate materials, construction methods, or other special conditions related to interactions with protected species.

IV. Site Selection

Proper siting is vital to the success of an artificial reef. The initial focus should be to enhance or create habitat and a diversity of fishery resources, while not impeding or interfering with navigation. In addition to the goals of any artificial reef project, social and economic considerations, along with environmental and biological concerns should be identified early in the planning stages. Effectiveness of existing reefs and their unique traits, location, salinity, material type, etc., are used to select future reef sites. Improperly sited reefs can result in a number of negative impacts, including hazards to navigation, damage to bottom habitat, and deleterious environmental effects.

V. Materials

Artificial reef materials are selected on four primary considerations: Function, compatibility, durability, and stability. Accepted materials include concrete, vessels, and natural materials and were chosen based on the above criteria, using guidance from internal program studies, The ASMFC/GSMFC Guidelines for Marine Artificial Reef Materials (Second Ed., 2004), The Environmental Protection Agency's (EPA) National Guidance: Best Management Practices (BMPs) for Preparing Vessels Intended to Create Artificial Reefs, and the NOAA/NMFS National Artificial Reef Plan. Concrete structures include recycled pre-fabricated materials, crushed concrete, and pre-designed concrete reef material. These concrete structures must be free of protruding rebar and any open bottomed structure must have an opening in the top equal to the bottom opening or 3-feet in diameter (whichever is lesser) to allow listed species to escape. Vessels consist of preferably large steel hulled vessels for longevity. Examples of natural material include calcium carbonate shells, limestone marl, granite and basalt. All materials must be cleaned and prepared in accordance with United States Corps of Engineers General (Regional) Permits (#GP198500194 or #GP19000291), applicable NC Division of Coastal Management permits, Division of Water Resources permits, and conform to site-specific navigational clearance requirements published by the United States Coast Guard and NOAA Office of Coast Survey. This includes the removal of all pollutants and tangle hazards such as railings, antennas, etc., from vessels.