



GEAR RESTRICTIONS AS A **MANAGEMENT** TOOL FOR ARTIFICIAL REEFS IN STATE OCEAN WATERS

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WATERS MEMO

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WATERS INFORMATION PAPER



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November 3, 2020

MEMORANDUM

TO: N.C. Marine Fisheries Commission

FROM: Jason Peters, Enhancement Program Supervisor, Habitat and Enhancement
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SUBJECT: Gear Restrictions as a Management Tool for Artificial Reefs in State Ocean Waters

Issue

During its August 2020 business meeting the Marine Fisheries Commission (MFC) passed a motion asking the Division of Marine Fisheries (DMF) to study making North Carolina's artificial reefs in nearshore ocean waters Special Management Zones (SMZs) bringing recommendations back to the MFC at its November 2020 meeting. An information paper is included in the briefing materials and provides an overview of the recent actions taken by the SAMFC including the use of gear restrictions as a management tool for artificial reefs, and a discussion of how the MFC might take similar actions on nearshore ocean artificial reefs.

Action Needed

The division requests the MFC review options provided in the information paper and provide guidance on how to proceed. If rulemaking action is taken, the MFC should provide guidance on: 1) the scope of the management options to be developed, 2) the potential timeline, and 3) the prioritization of any actions taken.

Findings

While the SMZs pursued in the action taken at the SAFMC were specific to the Snapper-Grouper Fishery Management Plan (FMP), the MFC may consider broader action by utilizing similar gear restrictions but with benefits to all species that utilize artificial reef habitat. The DMF manages 43 ocean artificial reef sites located between 0.5 – 38 nautical miles (nm) off the coast of North Carolina in the Atlantic Ocean. The majority of these artificial reef sites (30) are located in the federally managed Exclusive Economic Zone (EEZ; 3-200 nm) and the remaining artificial reefs sites (13) are located in nearshore state managed ocean waters (0-3 nm). The following is a synopsis of information on using gear restrictions as a management tool for artificial reefs in North Carolina including information on: recent federal action to restrict highly efficient fishing gears at artificial reef sites in the EEZ and recommendations on how the MFC could proceed with similar actions at nearshore artificial reefs sites:

- The historical purpose of artificial reefs is to create habitat for fish that is publicly accessible for fishing and diving opportunities.
- Implementation of gear restrictions is an effective management tool for artificial reefs.
- Restricting the use of highly efficient fishing gears on artificial reefs can decrease overexploitation of the reefs and increase protection of protected species.
- The 2016-2019 results from the Access Point Angler Intercept Survey (APAIS) show that trips made with private vessels to artificial reefs make up approximately 12-15% of all private vessel ocean trips in North Carolina.
- North Carolina is awaiting final approval of its request to the SAFMC to add the 30 artificial reefs in the EEZ off the coast of North Carolina to the SAFMC Snapper Grouper FMP as SMZs with gear restrictions.
- If approved, these 30 SMZs will restrict the use of all gears except hand line, rod and reel, and spearfishing to harvest snapper-grouper species and hold spearfishing harvest to the recreational limits.
- While the MFC's current artificial reef rule grants proclamation authority to implement gear restrictions for North Carolina's 13 nearshore artificial reefs, those restrictions are subject to conditions that cannot be met because the rule is obsolete.

Options for consideration by the MFC include:

- Remain under status quo:
 - This option does not require any rulemaking but as a result, neither the MFC nor the DMF Director will have the ability to implement gear restrictions for nearshore artificial reefs.
- Implement gear restrictions for nearshore artificial reefs through its rulemaking process that are:
 - Similar to the SAFMC SMZ gear restrictions, which would offer protection to snapper-grouper species, but not state species or other interjurisdictional species.
 - Different from the SAMFC SMZ gear restrictions, which would offer protection to additional species, including state-managed species, but there could be enforcement challenges from having different regulations than those on EEZ artificial reefs.
 - On an individual state FMP basis, just as the SAFMC implemented gear restrictions for a particular FMP (snapper-grouper).
- The MFC could also wait until the final decision by the Department of Commerce Secretary on the North Carolina SMZ request before deciding how to proceed.

For more information please refer to the [full document](#) included in this Briefing Book.

GEAR RESTRICTIONS AS MANAGEMENT TOOL FOR ARTIFICIAL REEFS IN STATE WATERS INFORMATION PAPER

Oct. 28, 2020

I. ISSUE

Study subject matter that supports gear restrictions as a management tool for artificial reefs including information on actions recently initiated by the South Atlantic Fishery Management Council (SAFMC). The recent actions taken by the SAFMC were to restrict gear that have the potential to over exploit the resource at these sites and affect access to other users. Since the purpose of artificial reefs is to create habitat for fish that is publicly accessible for fishing and diving opportunities, pursuing similar action for artificial reefs in North Carolina's state ocean waters is likely beneficial. While the actions by the SAFMC provide an example for how gear restrictions may be used as a management tool, similar action by the Marine Fisheries Commission (MFC) must be considered within the framework of the MFC's authority. In addition, the SAFMC actions are specific to the snapper-grouper species complex, while actions by the MFC will likely impact other state and interjurisdictionally managed species. The information provided here is a review of the SAFMC action and how it relates to artificial reefs in North Carolina's state ocean waters. It also includes recommendations on how to proceed with actions that the MFC could take to modify their management of the state artificial reefs to complement the restrictions if they so choose.

II. ORIGATION

A presentation titled, "Special Management Zones in State Waters" was delivered during the MFC meeting on Aug. 20, 2020. The presentation included a summary of artificial reefs in North Carolina and the status of the North Carolina Division of Marine Fisheries' (DMF) gear restriction request to the SAFMC. Following the presentation, the MFC passed a motion asking the DMF to study making North Carolina's artificial reefs in nearshore ocean waters Special Management Zones (SMZs), possibly limiting the allowable gear, and to bring recommendations back to the MFC at its November 2020 meeting.

III. BACKGROUND

The DMF manages 43 ocean artificial reef sites located between 0.5 – 38 nautical miles (nm) off the coast of North Carolina in the Atlantic Ocean (Figure 1). The majority of these artificial reef sites (30) are located in the federally managed Exclusive Economic Zone (EEZ; 3-200 nm) and the remaining artificial reefs sites (13) are located in nearshore state managed ocean waters (0-3nm; Figure 1).

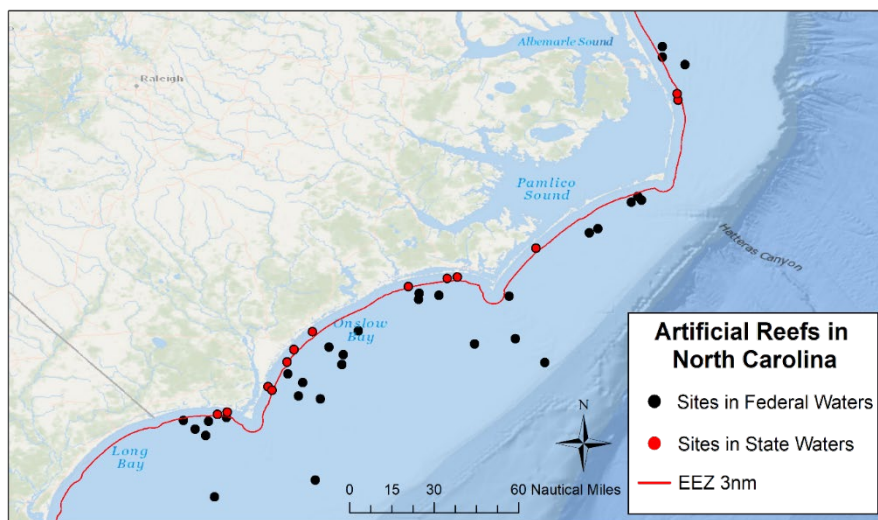


Figure 1: North Carolina ocean artificial reefs separated by state (13 sites; 0-3 nm) and federally (30 sites; 3-200 nm) managed waters.

Federal fisheries executed off the North Carolina coast in the EEZ are managed under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (MSA; 16 U.S.C. § 1801 et. seq.). The responsibility for decision making for many of these fisheries is delegated from the United States Secretary of Commerce to the SAFMC, with the final decisions made by the Secretary. The MSA, along with creating regional councils to manage federal fisheries, authorized the creation of SMZs. These SMZs are designated marine areas in the EEZ where specific restrictions can be implemented through an existing Fishery Management Plan (FMP). As of October 2020, SMZs are currently designated off the coasts of Florida, Georgia, and South Carolina (SAFMC 2020). Delaware and New Jersey, who are member states of the Mid-Atlantic Fishery Management Council, also have artificial reef sites designated as SMZs that were requested under the black sea bass provisions of the Summer Flounder, Scup, and Black Sea Bass FMP (50 CFR Part 646, 50 CFR Part 648). The first sites to attain SMZ designation were artificial reefs off of South Carolina's coast which, through amendments to the Snapper Grouper FMP, have restricted snapper grouper fishing to handheld gear and recreational limits since the 1980s. The goals of these restrictions were to avoid depletion of the species on artificial reefs, promote equitable fishing on the artificial reef sites, and reduce derelict gear.

As part of the framework provided by the SAFMC Snapper Grouper FMP for designating artificial reefs as SMZs, states may request restrictions on specific fishing gear used to fish for snapper grouper species. Therefore, not all states and subsequent SMZs have the same gear restrictions. The FMP expresses that highly efficient fishing gears, or gears that offer "exceptional advantages," reduce or eliminate the incentive of users with other fishing gears to fish on or promote artificial reefs (SAFMC 1983). Highly efficient fishing gears offer these exceptional advantages through increased catch per effort. Therefore, in this context, gears with this characteristic may be considered all those other than hand line, rod and reel, and spearfishing gear (which includes bang sticks and powerheads).

In March 2019, under the SAFMC framework described above and at the DMF Director's request, the DMF submitted a letter to the SAFMC requesting SMZ designation and gear restrictions at 30 artificial reef sites off of North Carolina's coast in the EEZ. The letter acknowledged the potential for artificial reefs to aggregate fishery resources and requested the SMZ designation with restrictions intended to prevent overexploitation of the resources by use of highly efficient gears. Specifically, DMF requested that fishing gear other than hand line, rod and reel, and spear be prohibited within the proposed SMZs and that harvest of snapper grouper species with spearfishing gear be limited to the appropriate recreational bag limit. The letter also provided the rationale that limitations on highly efficient fishing gears, as proposed, also moderate the potential for disproportionate user access and reduce the potential for negative interactions with protected species listed under the Endangered Species Act (ESA). A similar letter was sent during the same time by South Carolina to designate four additional SMZs, adding to the 29 already existing off of South Carolina's coast.

In June 2019, the SAFMC began development of Regulatory Amendment 34 to the Snapper Grouper FMP. This document details North Carolina's and South Carolina's proposed actions and the potential biological, ecological, economic, social, and fishery management effects of those actions. Public scoping was held in the fall of 2019 and public hearings were held in the spring of 2020, leading to two revisions before final SAFMC approval in June 2020. Following final SAFMC approval, the text was subsequently transmitted to the US Department of Commerce (USDOC) for Secretary of Commerce review in August 2020. If codified into the Code of Federal Regulations (CFR), all 30 ocean artificial reefs off of North Carolina's coast in the EEZ will be designated as SMZs with harvest and gear restrictions. These harvest and gear restrictions will apply only within the boundaries of reef sites and specify that: harvest of snapper-grouper species is only allowed by hand line, rod and reel, and spearfishing gear with spearfishing gear being limited to the applicable recreational bag and possession limits (SAFMC 2020). If given final Secretarial approval, the SMZ designation and the associated harvest and gear restrictions would only apply to the snapper-grouper fishery within the boundary of the 30 ocean artificial reefs in the EEZ off of North Carolina and not to the remaining 13 artificial reef sites located in North Carolina's nearshore ocean waters.

The artificial reef sites located within North Carolina's nearshore ocean waters are managed under the authority of the MFC. Currently, the MFC has one rule specifically pertaining to artificial reefs (15A NCAC 03I .0109). This rule does not contain specific gear restrictions. It delegates authority to the DMF director who may issue a proclamation to prohibit or restrict the taking of fish and the use of equipment in and around artificial reefs, but such a proclamation is dependent on measurements from buoys that no longer exist due to lack of funding and equipment to maintain them. As a result, no special restrictions are presently in place on artificial reef sites in nearshore ocean

waters. The rule is subject to readoption per G.S. 150B-21.3A by June 30, 2022 and will be amended as part of that process.

Like those in the EEZ, artificial reefs in North Carolina's nearshore ocean waters are designed as publicly accessible fish aggregation areas, susceptible to overexploitation and potentially having negative interactions with protected species listed under the ESA. The use of gear restrictions as a management tool for artificial reefs in the EEZ could be complemented by MFC implementation of similar gear restrictions for artificial reefs in the nearshore ocean waters through the rulemaking process.

IV. AUTHORITY

North Carolina General Statutes

G.S. § 113-134.	Rules.
G.S. § 113-182.	Regulation of fishing and fisheries.
G.S. § 143B-289.51.	Marine Fisheries Commission – creation; purposes.
G.S. § 143B-289.52. (b) (10)	Marine Fisheries Commission – powers and duties. [artificial reefs]

Marine Fisheries Commission Rules

15A NCAC 031 .0109 Artificial Reefs and Research Sanctuaries

V. DISCUSSION

The SAFMC's proposed designation of artificial reefs as SMZs represents the first gear or harvest restrictions ever placed on ocean artificial reef sites off of North Carolina's coast. This action presents an opportunity for the MFC to consider similar gear restrictions at the 13 artificial reef sites in North Carolina's nearshore ocean waters. The following discussion provides information on the potential effects of restricting highly efficient fishing gears at nearshore artificial reef sites, similar to the information that informed the SAFMC deliberation of Regulatory Amendment 34, and is meant to help inform the MFC in its consideration of taking a similar action.

Highly Efficient Fishing Gears

The purpose of state artificial reef programs is to develop hard bottom habitat that aggregate fishery resources and improves user access to fisheries. Fish aggregating on artificial reefs may be subject to overexploitation, particularly when highly efficient fishing gears are used for harvest. Highly efficient fishing gears are those that offer advantages over other gears through increased catch per effort. Gears with this characteristic may be considered all those other than hand line, rod and reel, and spearfishing gear and can lead to overly exploited artificial reefs. Spearfishing gear is considered efficient but differs from other gears with this characteristic because its efficiency is derived from visually selective harvest of individual fish; catch per unit effort does not differ much from hand line and rod and reel gear.

By restricting the use of highly efficient fishing gears on artificial reefs, the likelihood of overexploitation is reduced. Overly exploited artificial reefs may have negative biological and social effects, including locally reduced user access and disrupted reproductive strategies of certain species that may rely on larger individuals that occur in lower abundance that may be disproportionately exploited by efficient gear or complex social structure that can be disrupted by excessive harvest (SAFMC 2020, Jennings et al. 1998; Jennings et al. 1999; Lloret et al. 2008).

Fisheries and Regulations

As discussed, the mechanism for designating SMZs on artificial reefs in the EEZ is provided in the Snapper Grouper FMP and only applies while fishing for and possessing snapper-grouper complex species. Restrictions on highly efficient fishing gears for artificial reefs in North Carolina's nearshore ocean waters can have a broader application and provide benefits for all state managed species rather than just snapper-grouper complex species. North Carolina's artificial reefs, both in nearshore ocean waters and in the EEZ, are home to a myriad of resident and migratory species. The species abundance, biomass and richness of fish assemblages found on artificial reefs vary according to the type of reef construction and water depth of the site (Paxton et al. 2018). Therefore, the composition of species at artificial reefs in nearshore ocean waters is likely different than that of artificial reefs in

the EEZ. While sub-tropical species, like those in the snapper-grouper complex, are less likely to be observed at nearshore artificial reefs, a variety of other frequently targeted species such as flounder (*spp.*) are common and subject to overexploitation by highly efficient gears. These nearshore artificial reefs are important habitat for state managed species, including spotted seatrout (*Cynoscion nebulosus*), red drum (*Sciaenops ocellatus*), sheepshead (*Archosargus probatocephalus*), and southern flounder (*Paralichthys lethostigma*). Among recreational fishermen, flounder (*spp.*), red drum, and spotted seatrout are the top three most targeted species, according to a 2018 survey (Table 1; Stemle and Condon 2018). Federally and interjurisdictionally managed species are also found inhabiting North Carolina’s nearshore artificial reefs including black seabass (*Cetropristis striata*), summer flounder (*Paralichthys dentatus*), and cobia (*Rachycentron canadum*) to name a few.

Table 1. Species targeted by recreational anglers in North Carolina surveyed with percentages reflecting the proportion of anglers who responded that they target a certain species (Stemle and Condon 2018).

Nearshore Species	% Who Target
Flounder	47
Red drum	40
Spotted Sea Trout	37
Black Drum	29
Weakfish	26
Spot	25
Bluefish	25
Spanish Mackerel	24
Croakers	23
Sea Mullet/Whiting	20
Striped Bass	19
Other	18
Sheepshead	15
Pompano	15
Cobia	13

Many artificial reef sites in the ocean are in relatively close proximity to one another (<10 nm) and as a result, users often visit multiple sites in a single trip, including nearshore and EEZ sites. Gear restrictions at nearshore artificial reef sites applicable to state managed species would be different than those at SMZ-designated artificial reef sites, which could present compliance and enforcement issues. A way to address these issues is to implement gear restrictions for all nearshore artificial reef sites that are identical to the SMZ gear restrictions, but applicable to the artificial reef, not just a single species complex. This would reduce confusion and potentially decrease unintentional non-compliance among users.

Presently, there is insufficient data to determine the frequency of various fishing gear types used on artificial reefs in nearshore ocean waters. Therefore, the economic impacts from potential gear restrictions for these artificial reefs are difficult to quantify. Excluding gear from an area may result in loss of revenue for those participating in related fisheries. However, exclusion of highly efficient fishing gears is intended to maintain abundance of the resource at these areas and may translate to a net positive economic impact over time (SAFMC 2020).

Protected Species

Artificial reefs have also been found to play important roles as habitat and foraging areas for protected species, which are managed by the National Oceanic and Atmospheric Administration (NOAA) Fisheries under the ESA and the Marine Mammal Protection Act (MMPA). There are 29 species of fish, mammals, sea turtles, and corals listed under the Southeast United States ESA region. While not all of these species occur in North Carolina, notable species of fish that do occur include the Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) and scalloped hammerhead (*Sphyrna lewini*). Additionally, populations of several endangered whales, including the highly endangered North Atlantic right whale (*Eubalaena glacialis*), occur in North Carolina waters for a portion of the year (Hayes et al. 2017).

Sea turtles, all of which are protected species under the ESA, are known visitors to artificial reefs and utilize them for shelter and foraging in the same way they utilize natural reefs (Barnette 2017). Artificial reef sites can pose risks of entanglement with fishing line, entrapment inside material or vessels that can lead to drownings, and if in close proximity to newly hatched sea turtle’s shoreline sites, may lead to increased predation on the turtles once they enter the water (Barnette 2017). Fishing gear restrictions can reduce the likelihood of gear entanglement and therefore may provide a benefit to sea turtles relative to the current baseline (SAFMC 2020).

Recently, NOAA Protected Resources Division’s (PRD) performed an ESA Section 7 programmatic consultation and rendered a biological opinion regarding the effects of North Carolina artificial reefs on protected species. In their biological opinion, NOAA PRD recommended that the DMF Artificial Reef Program take all measures possible to reduce derelict fishing gear on artificial reef material. This directive is intended to prevent entanglement and death of protected species, especially sea turtles that are exposed and may be vulnerable to fisheries gear including trawls, gillnets, purse seines, longlines, bandit gear, hand lines, pound nets, and traps (NOAA PRD 2019). Like those proposed for SMZs, highly efficient fishing gear restrictions at nearshore artificial reefs may be necessary to ensure permitting for future artificial reef enhancement in North Carolina.

Economic effects

While empirical data on fishing activity at artificial reefs are limited, the Marine Recreational Information Program (MRIP) and observational data suggests the artificial reefs in nearshore ocean waters do experience fishing effort. The MRIP seeks to survey recreational fishing effort and estimate catch on the state’s resources, including fishing effort on artificial reefs. The MRIP uses an array of sampling techniques including mail and telephone surveys, vessel logbooks, and the Access Point Angler Intercept Survey (APAIS). Field technicians interview fishermen at fishing access points (e.g. piers, boat ramps) and obtain information from the fisherman such as demographics, where they fished, and what they caught. Notably, one of the questions asks whether the fisherman fished on an artificial reef. The 2016-2019 results from the APAIS show that trips made with private vessels to artificial reefs make up approximately 12-15% of all private vessel ocean trips (Table 2). The MRIP surveys do not gather specific information on which artificial reefs were visited, however on average, a greater proportion of trips were made to artificial reefs in nearshore waters than in the EEZ. This is noteworthy because there are considerably fewer artificial reef options in nearshore ocean waters, suggesting individual nearshore reefs may be visited more frequently and therefore receive more fishing effort than individual artificial reef sites in the EEZ.

Table 2. Access Point Angler Intercept Survey (APAIS) results from ocean artificial reef trips in private vessels only.

Year	Percent (%) of Trips to Artificial Reefs		
	<3nm	>3nm	Total
2016	8.78	6.29	15.07
2017	5.86	8.34	14.19
2018*	UNKNOWN	UNKNOWN	UNKNOWN
2019	7.06	5.74	12.80

*Data from 2018 are not known due to a categorization error from the artificial reef survey question.

Currently, there are not enough data to accurately quantify the economic value of artificial reefs (SAFMC 2020). Estimating economic impacts of gear restrictions at these locations is also difficult to quantify due to limited data on artificial reefs including: use, gear use, harvest, and other direct or indirect expenditures. However, restricting allowable gears on artificial reefs is likely to have a direct impact on fisheries which rely on those gears, through loss of revenue. The 13 artificial reefs in nearshore ocean waters have a cumulative area of approximately 3.45 nm² (Table 3). Given the relative size of these sites, maximum revenue losses may be low, as was forecasted for the snapper grouper fishery in Regulatory Amendment 34 (SAFMC 2020). However, gear restriction as an action to maintain abundance of the resource may offer an offsetting positive economic impact through increased user access and subsequent expenditures.

Table 3. Size (nautical miles squared) of all 13 nearshore artificial reefs in North Carolina. *Area of Material* is a representation of two-dimensional area of actual reef materials (vessels, bridge rubble, pipe, etc.) within the reef site boundaries. *Total Reef Area* represents the total permitted area of the reef site.

Site	Area Of Material (nm ²)	Total Reef Area (nm ²)
AR-160	0.00169	0.19146
AR-165*	--	0.19146
AR-275	0.00095	0.19146
AR-315	0.00960	0.76584
AR-320	0.00791	0.19146
AR-342	0.00387	0.19146
AR-360	0.00202	0.19146
AR-364	0.00197	0.19146
AR-370	0.00382	0.76584
AR-378	0.00391	0.19146
AR-378B	0.00022	0.19146
AR-425	0.00235	0.19146
AR-430	0.01987	0.19146
Total	0.05819	3.44630

*Area of material at AR-165 has not been calculated due to how recently material has been deployed.

VI. SUMMARY OF FINDINGS

The following is a synopsis of information on using gear restrictions as a management tool for artificial reefs in North Carolina including information on: recent federal action to restrict highly efficient fishing gears at artificial reef sites in the EEZ and recommendations on how the MFC could proceed with similar actions at nearshore artificial reefs sites:

- The DMF maintains 43 artificial reef sites in the Atlantic Ocean (13 nearshore; 30 EEZ).
- The 13 artificial reefs in North Carolina’s nearshore ocean waters are under the authority of the MFC.
- The purpose of artificial reefs is to create habitat for fish that is publicly accessible for fishing and diving opportunities.
- Implementation of gear restrictions is an effective management tool for artificial reefs.
- Restricting the use of highly efficient fishing gears on artificial reefs can decrease overexploitation of the reefs and increase protection of protected species.
- The 2016-2019 results from the APAIS show that trips made with private vessels to artificial reefs make up approximately 12-15% of all private vessel ocean trips in North Carolina (Table 2).
- North Carolina is awaiting final approval of its request to the SAFMC to add the 30 artificial reefs in the EEZ off the coast of North Carolina to the SAFMC Snapper Grouper FMP as SMZs with gear restrictions.
- If approved, these 30 SMZs will restrict the use of all gears except hand line, rod and reel, and spearfishing to harvest snapper-grouper species and hold spearfishing harvest to the recreational limits.
- Current MFC rules do not provide a mechanism to implement gear restrictions for North Carolina’s 13 nearshore artificial reefs; a rule change is required.
- Options for the MFC include:
 1. Remain under status quo. This option does not require any rulemaking but as a result, neither the MFC nor the DMF Director will have the ability to implement gear restrictions for nearshore artificial reefs.
 2. Implement gear restrictions for nearshore artificial reefs through its rulemaking process that are:
 - a. Similar to the SAFMC SMZ gear restrictions, which would offer protection to snapper-grouper species, but not state species or other interjurisdictional species.
 - b. Different from the SAMFC SMZ gear restrictions, which would offer protection to additional species, including state-managed species, but there could be enforcement challenges from having different regulations than those on EEZ artificial reefs.

- c. On an individual state FMP basis, just as the SAFMC implemented gear restrictions for a particular FMP (snapper-grouper).
3. The MFC could also wait until the final decision by the Department of Commerce Secretary on the North Carolina SMZ request before deciding how to proceed.

VII. LITERATURE CITED

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