Environmental Assessment
Regulatory Impact Review
Regulatory Flexibility Analysis

To consider Special Management Zone (SMZ) Designation for 13 Artificial Reef Sites
in the Exclusive Economic Zone
based upon management measures specified in [Amendment 9 of]
the Fishery Management Plan for Summer Flounder, Scup, and Black Sea Bass FMP

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Table of Contents

1.0 Introduction 7

1.1 Basis/Justification for SMZ Request 7

1.2 Development History of New Jersey Reef Sites 8

1.3 New Jersey Reef Sites Description 10

1.3.1 *Materials Allowed on the Reefs* 10

1.3.2 *Description of Reef Sites for which the NJ DEP seeks SMZ designation* 10

2.0 Purpose and Need of the Action 12

3.0 Proposed Action and Alternatives for Designation of New Jersey Permitted Artificial Reef Sites with Associated Gear Restrictions 12

3.1 Alternative 1 - No Action 12

3.2 Alternative 2 - Designate all 13 reef sites as SMZ (preferred alternative) 12

3.3 Alternative 3 - Designate 11 reef sites as SMZs, eliminating Shark River Reef and Wildwood Reef 13

4.0 Affected Environment 13

4.1 Description of the Managed Resource (Target Species) 13

4.1.1 *Description of the Fisheries* 13

4.1.2 *Description of the Stock (Including Status, Stock Characteristics, and Ecological Relationships)* 16

4.2 Non-Target Species and Bycatch 19

4.3 Habitat (Including Essential Fish Habitat) 20

4.3.1 *Physical Environment* 20

4.3.2 *Essential Fish Habitat (EFH)* 21

4.3.3 *Fishery Impact Considerations* 22

4.4 Protected Resources 23

4.4.1 *ESA and MMPA Protected Species* 23

4.4.2 *Species and Critical Habitat Not Likely to be Affected by the Proposed Action* 23

4.4.3 *Species Potentially Affected by the Proposed Action* 25

4.4.4 *Gear Interactions and Protected Species* 27

4.5 Human Communities and Economic Environment 35

4.5.1 *Recreational Fishery at the Artificial Reef Sites* 35

4.5.2 *Commercial Fishery at the Artificial Reefs* 40

4.5.3 *Recreational and Commercial Fishery Summary* 50
5.0 Impacts of Proposed Action and Alternatives 51
5.1 Impact Assessment 51
5.1.1 *Impacts to Target Species* 51
5.1.2 *Impacts to Non-Target Species and Bycatch* 54
5.1.3 *Impacts to Habitat* 56
5.1.4 *Impacts to Protected Resources* 57
5.1.5 *Impacts to Human Communities* 59
5.2 Cumulative Effects Analysis 62
5.2.1 *Consideration of the VECs* 62
5.2.2 *Geographic Boundaries* 62
5.2.3 *Temporal Boundaries* 62
5.2.4 *Actions Other Than Those Proposed in this Amendment* 62
5.2.5 *Magnitude and Significance of Cumulative Effects* 64
5.2.6 *Preferred Action on All the VECS* 82
6.0 Applicable Laws 83
6.1 Magnuson-Stevens Fishery Conservation and Management Act (MSA) 83
6.1.1 *National Standards* 83
6.2 National Environmental Policy Act (NEPA) 84
6.2.1 *Finding of No Significant Impact* 84
6.3 Endangered Species Act 89
6.4 Marine Mammal Protection Act 89
6.5 Coastal Zone Management Act 90
6.6 National Fisheries Enhancement Act of 1984 90
6.7 Federal Aid in Sport Fish Restoration Act 90
6.8 Clean Water Act 91
6.9 Administrative Procedure Act 91
6.10 Section 515 (Data Quality Act) 92
6.11 Paperwork Reduction Act 93
6.12 Impacts of the Plan Relative to Federalism/Executive Order 13132 93
6.13 Essential Fish Habitat Assessment 93
6.14 Regulatory Impact Review 93

6.14.1 Introduction 93
6.14.2 Description of the Management Objectives 93
6.14.3 Description of the Fishery 94
6.14.4 A Statement of the Problem 94
6.14.5 A Description of Each Alternative 94
6.14.6 RIR Impacts 94
6.15 Initial Regulatory Flexibility Analysis (IRFA) 95
6.15.1 Description of the Reasons Why Action by the Agency is being Considered 96
6.15.2 The Objectives and Legal Basis of the Proposed Rule 96
6.15.3 Estimate of the Number of Small Entities 96
6.15.4 Description of the Projected Reporting, Record-Keeping, and Other Compliance Requirements of the Proposed Rule 98
6.15.5 Federal Rules Which May Duplicate, Overlap, or Conflict with this Proposed Rule 98
6.15.6 Description of Significant Alternatives to the Proposed Action Which Accomplish the Stated Objectives of Applicable Statues and Which Minimize Any Significant Economic Impact on Small Entities 98
7.0 List of Preparers and Points of Contact 99
8.0 List of Agencies and Persons Consulted 100
9.0 Literature Cited 100
10.0 Appendix 1 113
11.0 Appendix 2 114

Table of Tables

Table 1: Species protected under the ESA and/or MMPA that may occur in the affected environment of the black sea bass fisheries. marine mammal species (cetaceans and pinnipeds) italicized and in bold are considered MMPA strategic stocks. 24
Table 2. Commercial fisheries classification based on 2017 list of fisheries (82 fr 3655, january 12, 2017). An (*) indicates those species driving the fisheries classification. 33
Table 3. 2015 Angler Trips in New Jersey and the Percentage that Occurred at Artificial Reefs 37
Table 4. Estimated Number of Angler Trips by Reef Site in 2015..... 38
Table 5. 2015 Angler Trip Expenditures ($'s) in New Jersey and the Percentage Associated with Trips that Occurred at Artificial Reefs..... 40
Table 6. Frequency of VTR Mapped Commercial Fishing Trips for Pot/Trap Vessels where the Estimated Spatial Footprint of the Trip Includes One or More of Reef Sites..... 42
Table 7. Percentage of VTR Mapped Commercial Fishing Trips by Reef Site for Pot/Trap Vessels where the Estimated Spatial Footprint of the Trip Includes One or More Reef Sites 43
Table 8. Ex-Vessel Revenue of VTR Mapped Commercial Fishing Pot/Trap Trips where the Estimated Spatial Footprint of the Trip Includes One or More Reef Sites 48
Table 9. Total Pot/Trap Gear Ex-vessel Revenue ($'s) for Vessels with Reef Landings and the Percentage Derived from the Reef Sites 49
Table 10. Total Pot/Trap Gear Ex-vessel Revenue ($'s) in New Jersey and the Percentage Derived from the Reef Sites..... 49
Table 11. Total Ex-vessel Revenue ($'s) in New Jersey (all gears) and the Percentage Derived from the Reef Sites..... 49
Table 12. Number of Pot/Trap Vessels by Percent of Total Annual Ex-vessel Revenue Derived from the Reef Sites..... 50
Table 13. Number of Vessels with Landings within the Coordinates of the Reef Sites by Homeport State 50
Table 14. Impacts of Past (P), Present (Pr), and Reasonably Foreseeable Future (RFF) Actions on the five VECs (not including those actions considered in this document). 65
Table 15. Summary of the effects of past, present, and reasonably foreseeable future actions on the managed resource..... 72
Table 16. Summary of the effects of past, present, and reasonably foreseeable future actions on the non-target species..... 74

Table 17. Summary of the effects of past, present, and reasonably foreseeable future actions on the habitat. 76
Table 18. Summary of the effects of past, present, and reasonably foreseeable future actions on the habitat. 78
Table 19. Summary of the effects of past, present, and reasonably foreseeable future actions on human communities. 81
Table 20. Magnitude and significance of the cumulative effects; the additive and synergistic effects of the preferred action, as well as past, present, and future actions. 83
Table 21. Number of Potential Business Entities Affected by Percent of Total Average Annual Gross Revenue Landed within the Coordinates of the Reef Sites 98

Table of Figures

Figure 1. Location of artificial reefs in the Atlantic Ocean permitted to the State of New Jersey (includes reef sites located in NJ state waters and the EEZ). Note: the two Del-Jerseyland sites are not included in this SMZ request. 9
Figure 2. Summer Flounder Commercial and Recreational Landings, 1980-2014. 14
Figure 3. Scup Commercial and Recreational Landings, 1980-2014, 1981-2014. 15
Figure 4: Black Sea Bass Commercial and Recreational Landings, 1980-2014, 1981-2015. 16
Figure 5: Spawning Stock Biomass, both mature male and female biomass, of black sea bass from 1989 to 2015 and biomass reference points from the 2016 benchmark stock assessment (nefsc 2017). The 2015 retro-adjusted spawning stock biomass value was generated to correct for the retrospective bias present in the assessment model and is used as the estimate to compare to the reference points. 19
Figure 6. Estimated Number of Angler Trips in New Jersey by Mode 37
Figure 7. Ex-vessel Revenue Concentrations of Commercial Fishing Vessels using Pot/Trap Gear, 2011 44
Figure 8. Ex-vessel Revenue Concentrations of Commercial Fishing Vessels using Pot/Trap Gear, 2012 45
Figure 9. Ex-vessel Revenue Concentrations of Commercial Fishing Vessels using Pot/Trap Gear, 2013 46
Figure 10. Ex-vessel Revenue Concentrations of Commercial Fishing Vessels using Pot/Trap Gear, 2014 47

1.0 Introduction

1.1 Basis/Justification for SMZ Request

In a letter to Dr. Chris Moore dated November 6, 2015 (11.0 Appendix 1), the New Jersey Department of Environmental Protection (NJDEP) formally requested that the Mid-Atlantic Fisheries Management Council (MAFMC) designate its 13 artificial sites currently permitted in federal waters (as defined by the Army Corps of Engineer [COE] permit number CENAP-OP-R-200401135-1) under the Special Management Zone (SMZ) provisions of Amendment 9 to the Summer Flounder, Scup and Black Sea Bass Fishery Management Plan (FMP). In the SMZ request letter it was noted that "Since the inception of New Jersey's Reef Program in 1984, and increasingly as reef development intensified and habitat increased, we have received complaints from individuals, head boat and charter boat captains, grassroots organizations and state legislators on behalf of their constituents that there is too much commercial gear on our reefs. The deployment of this gear severely limits recreational access to these reefs and makes unviable the intended hook-and-line use of these sites."

In its SMZ request letter, the NJDEP also noted that "New Jersey's Reef Program was funded primarily through the U.S. Fish and Wildlife Service's (USFWS) Sport Fish Restoration Program (SFR), which is a "user pays, user benefits" program. Following several requests by the USFWS to resolve these user conflict and access issues, SFR funding for the Reef Program and all reef construction and monitoring activities was discontinued on April 12, 2011. USFWS officials stated that funding to the Reef Program would be restored once these issues are resolved. The USFWS stated position is that when gear conflicts occur, pot fishing on reef sites is not consistent with the objectives of their Sportfish Restoration Program. State reef programs must be able to limit gear conflicts by regulations in state waters or by way of SMZ's for sites in the EEZ in order to comply with the goals of the Sportfish Restoration Program.

This theme was also articulated during a presentation to the MAFMC by the USFWS entitled *Dingell – Johnson Sport Fish Restoration Program (SFRP) - Recreational and Commercial Fishing Conflicts on Artificial Reefs - Implications for Federal Funding.* That presentation described the artificial reef grant objectives of USFWS to be "to increase diversity, abundance and availability of reef-dependent species sought by recreational fishermen through creation of artificial reefs and to provide increased fishing opportunities for recreational anglers ….". The major issues from the USFWS perspective include 1) proliferation of commercial fishing traps/pots on artificial reefs constructed with Dingell-Johnson Sport Fish Restoration (SFR) funds, 2) commercial/recreational gear conflict interferes with accomplishment of artificial reef grant objectives and 3) absence of mechanisms to manage commercial fishing on reefs located in State-controlled waters and the Exclusive Economic Zone. The USFWS noted the following

implications for SFR funding in cases where commercial/recreational gear conflicts are not remedied: 1) replacement of expended funds 2) suspension or termination of project for noncompliance and 3) declare the State ineligible to participate in SFR program.

1.2 Development History of New Jersey Reef Sites

Since 1984, the NJDEP Bureau of Marine Fisheries has been involved in an intensive program of artificial reef construction and biological monitoring along the New Jersey coastline. The stated purpose of the NJ Reef Program is to create a network of artificial reefs in the ocean waters along the New Jersey coast to provide a hard substrate for fish, shellfish and crustaceans, fishing grounds for anglers, and underwater structures for scuba divers (http://www.state.nj.us/dep/fgw/artreef).

Artificial reefs are constructed by intentionally placing dense materials, such as old ships and barges, concrete and steel demolition debris and dredge rock on the sea floor within designated reef sites. At present, the division holds permits for 15 artificial reef sites encompassing a total of 25 square miles of sea floor. The reefs are strategically located along the coast so that one site is within easy boat range of 12 New Jersey ocean inlets. The subjects of this SMZ request are the 13 reef sites located in the EEZ.

Within each reef site, which range in size from one-half to over four square miles, numerous "patch reefs" have been constructed. A patch reef is a one-half to 5-acre area where one barge load of material has been deployed. In total, over 1,200 patch reefs have been constructed on the state's 15 reef sites since the program began. Anglers and divers who catch sea bass, blackfish, porgy and lobster are now using reefs extensively.

FIGURE 1. LOCATION OF ARTIFICIAL REEFS IN THE ATLANTIC OCEAN PERMITTED TO THE STATE OF NEW JERSEY (INCLUDES REEF SITES LOCATED IN NJ STATE WATERS AND THE EEZ). NOTE: THE TWO DEL-JERSEYLAND SITES ARE NOT INCLUDED IN THIS SMZ REQUEST.

1.3 New Jersey Reef Sites Description

1.3.1 *Materials Allowed on the Reefs*

Under the U.S. Army Corps of Engineers permit for the New Jersey reef program, artificial reef materials permitted for use on the sites are in two separate categories. The first are specifically designed reef materials. These design materials are constructed to maximize surface area for attracting organisms to provide specific habitat requirements for targeted reef fish and other marine species. The second category of reef materials allowed is identified as "materials of opportunity." Materials of opportunity that could be used for construction of artificial reef structures include, but are not limited to, concrete, rock, surplus ships, barges, tanks, armored personnel carriers, and obsolete subway cars. In accordance with the National Artificial Reef Plan, and the US Army Corps of Engineers, all materials of opportunity must be properly cleaned, dismantled where necessary, and inspected prior to deployment to assure that they are clean and free of contaminants.

1.3.2 *Description of Reef Sites for which the NJ DEP seeks SMZ designation*

1. Sea Girt Reef site (permitted: 1978, construction began: 1973, area=1.3 nm^2) is located approximately 3.4 miles east of Sea Girt, in Monmouth County New Jersey. The Sea Girt site requires a minimum vertical clearance of 50 feet below mean low water.

2. Shark River Reef site (permitted: 1986, construction began: 1987, area=0.72 nm^2) is located approximately 15.6 Nautical miles and at a direction of 100 degrees from the Manasquan Inlet, in Monmouth/Ocean County, New Jersey. The Shark River site requires a minimum vertical clearance of 50 feet below mean low water.

3. Barnegat Light Reef site (permitted: 1992, construction began: 1993, area=0.85 nm^2) is located approximately 3.1 Nautical miles east of Barnegat Light in Ocean County, New Jersey. This site is approximately 3.1 miles from Barnegat Inlet at a direction of 103 degrees. The Barnegat Light site requires a minimum vertical clearance of 50 feet below mean low water.

4. Garden State North Reef site (permitted: 1979, construction began: 1984, area=1.1 nm^2) is located approximately 6.5 nautical miles east of Harvey Cedars in Ocean County, New Jersey. This site is approximately 7.7 nautical miles at a direction of 172 degrees from Barnegat Inlet. The Garden State North site requires a minimum vertical clearance of 52 feet below mean low water.

5. Garden State South Reef site (permitted: 1980, construction began: 1984, area=0.6 nm^2) is located approximately 5.1 nautical miles east of Spray Beach in Ocean County, New Jersey. This site is located approximately 9.1 nautical miles at a direction of 64 degrees from Little Egg Inlet. The Garden State South site requires a minimum ve1tical clearance of 52 feet below mean low water.

6. Little Egg Reef site (permitted: 1992, construction began: 1994, area=1.5 nm^2) is located approximately 3.8 nautical miles east of Holgate in Ocean County, New Jersey. This site is located approximately 5.05 nautical miles at a direction of 93 degrees from Little Egg Inlet. The Little Egg site requires a minimum vertical clearance of 50 feet below mean low water.

7. Atlantic City Reef site (permitted: 1984, construction began: 1985, area=4.0 nm^2) is located approximately 12.2 nautical miles east of Atlantic City in Atlantic County, New Jersey. This site is located approximately 8.5 nautical miles at a direction of 142 degrees from Absecon Inlet. The Atlantic City site requires a minimum vertical clearance of 50 feet below mean low water.

8. Great Egg Reef site (permitted: 1992, construction began: 1993, area=1.0 nm^2) is located approximately 7 nautical miles southeast of Atlantic City in Atlantic County, New Jersey. This site is located approximately 9.2 miles at a direction of 110 degrees from Great Egg Harbor Inlet. The Great Egg site requires a minimum vertical clearance of 50 feet below mean low water.

9. Ocean City Reef site (permitted: 1983, construction began: 1993, area=0.8 nm2) is located approximately 4.5 nautical miles southeast of Ocean City in Cape May County, New Jersey. This is located 4.3 nautical miles at a direction of 131 degrees from Carson's Inlet. The Ocean City site requires a minimum vertical clearance of 50 feet below mean low water.

10. Townsends Inlet Reef site (permitted: 2005, construction began: 2005, area=0.52 nm^2) is located approximately 3.8 nautical miles southeast of Townsends Inlet in Cape May County, New Jersey. The Townsends Inlet Reef site requires a minimum vertical clearance of 30 feet below mean low water.

11. Wildwood Reef site (permitted: 1992, construction began: 1993, area=2.1 nm^2) is located approximately 4.4 nautical miles southeast of Wildwood in Cape May County, New Jersey. This site is located 4.5 nautical miles at a direction of 135 degrees from Hereford Inlet. The Wildwood site requires a minimum vertical clearance of 30 feet below mean low water

12. Cape May Reef site (permitted: 1986, construction began: 1986, area=4.5 nm^2) is located approximately 8.5 nautical miles southeast of Wildwood in Cape May County, New Jersey. It is located 9.1 nautical miles at a direction of 128 degrees from Cape May Inlet. The. Cape May site requires a minimum vertical clearance of 30 feet below mean low water.

13. Deepwater Reef site (permitted: 1992, construction began: 1994, area=0.72 nm^2) is located approximately 25.1 nautical miles southeast of Avalon in Cape May County, New Jersey. This site is located 31.5 nautical miles at a direction of 99 degrees from Cape May Inlet. The Deepwater site requires a minimum vertical clearance of 50 feet below mean low water.

2.0 Purpose and Need of the Action

The purpose of this action is [for NMFS] to consider the request of the New Jersey Department of Environmental Protection (NJDEP) to the MAFMC to designate 13 artificial reef sites in the EEZ as Special Management Zones (SMZ) under provisions of Amendment 9 to the Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan. States or other entities with an Army Corps of Engineers permit for an artificial reef can request SMZ designation for artificial reef sites so that fishing gear used in the area is compatible with the intent of the reef. These management measures need to be consistent with the National Standards of the MSA, state laws and regulations, and other applicable federal laws, and the request must be reviewed by the SMZ Monitoring Team.

This action is needed to ameliorate gear conflicts at those sites. The gear conflicts are primarily between hook and line fishermen and fixed pot/trap gear. These gear conflicts caused the NJ reef program to lose USFWS SFR funding in 2011, which halted reef construction and monitoring as well. Funding was only partially restored in 2016 following a compromise developed by NJ DEP to balance reef access between commercial and recreational sectors in state waters.

3.0 Proposed Action and Alternatives for Designation of New Jersey Permitted Artificial Reef Sites with Associated Gear Restrictions

The following sections describe the proposed action and other alternatives considered in this assessment. The proposed action is that NMFS would designate the SMZs as described in Amendment 9 to the Summer Flounder, Scup and Black Sea Bass FMP. Provisions of Amendment 9 allow NMFS to prohibit or restrain the use of specific types of fishing gear that are not compatible with the intent of the artificial reef or fish attraction device or other habitat modification within the SMZ.

3.1 Alternative 1 - No Action

Under this alternative NMFS would take no action and the New Jersey artificial reef sites in the EEZ would remain open to all gear types year round. This alternative would deny the New Jersey and MAFMC request to grant SMZ status for the EEZ reef sites and allegations of gear conflicts would likely continue. New Jersey could potentially lose a portion or all of its funding for maintenance and construction of artificial reef sites in the EEZ under the Dingell-Johnson Sportfish Restoration Program if no action is taken.

3.2 Alternative 2 - Designate all 13 reef sites as SMZ (preferred alternative)

Under this alternative NMFS would designate all 13 New Jersey reef sites as SMZs. The SMZ designation would prohibit any fishing vessel or person on a fishing vessel from fishing in the 13

New Jersey SMZs with any gear except hook and line and spear fishing (including the taking of fish by hand).

3.3 Alternative 3 - Designate 11 reef sites as SMZs, eliminating Shark River Reef and Wildwood Reef

Under this alternative, NMFS would designate 11 of the reef sites as SMZs, eliminating Shark River Reef and Wildwood Reef. A reef site that is more valuable to the recreational fleet than it is to the commercial fleet is more suitable for SMZ designation. The Shark River Reef site has almost no recreational effort in this area (0.20%) (Table 4). Therefore, SMZ destination may not benefit the recreational fleet and would not effectively reduce gear conflicts.

The Wildwood Reef is responsible for 15.68% of the commercial revenue from all the reefs, while only 5.00% of the recreational effort (Table 4). In addition, this area is very close to several other areas (Cape May and Townsend Inlet) which would give recreational anglers nearby SMZ options.

4.0 Affected Environment

4.1 Description of the Managed Resource (Target Species)

The affected environment consists of those physical, biological, and human components of the environment expected to experience impacts if any of the actions considered in this document were to be implemented. This document focuses on five aspects of the affected environment, which are defined as valued ecosystem components (VECs).
The VECs include:

- Managed species
- Non-target species
- Physical habitat
- Protected species
- Human communities

4.1.1 *Description of the Fisheries*

Since NMFS would designate the SMZs as described in Amendment 9 to the Summer Flounder, Scup and Black Sea Bass FMP, this EA considers these three species to be the “target species” for this action.

The management unit for summer flounder (*Paralichthys dentatus*) is the U.S. waters in the western Atlantic Ocean from the southern border of North Carolina northward to the U.S.-Canadian border. The management unit for both scup (*Stenotomus chrysops*) and black sea bass (*Centropristis striata*) is the U.S. waters in the western Atlantic Ocean from Cape Hatteras, North Carolina northward to the U.S.-Canadian border.

The commercial and recreational fisheries for summer flounder, scup, and black sea bass are fully described in section 3.3.2 of Amendment 13 to the FMP (MAFMC 2002) and are also outlined by principal port in section 3.4.2 of that document. Otter trawls are used in the commercial fisheries for all three species; however, trawl vessels generally avoid the rough bottom of small artificial reef areas. In addition, floating traps and pots/traps are used to capture scup and black sea bass, respectively. An overview of commercial and recreational fisheries landings for each of the FMP species is provided below. The commercial landings are based on Dealer Weighout Data and recreational landings are based on Marine Recreational Fisheries Statistical Survey (MRFSS) and Marine Recreational Information Program (MRIP) data. Additional information on these fisheries can be found in MAFMC meeting materials available at: http://www.mafmc.org.

Summer Flounder

The relative contributions of commercial and recreational summer flounder landings are shown in Figure 2.

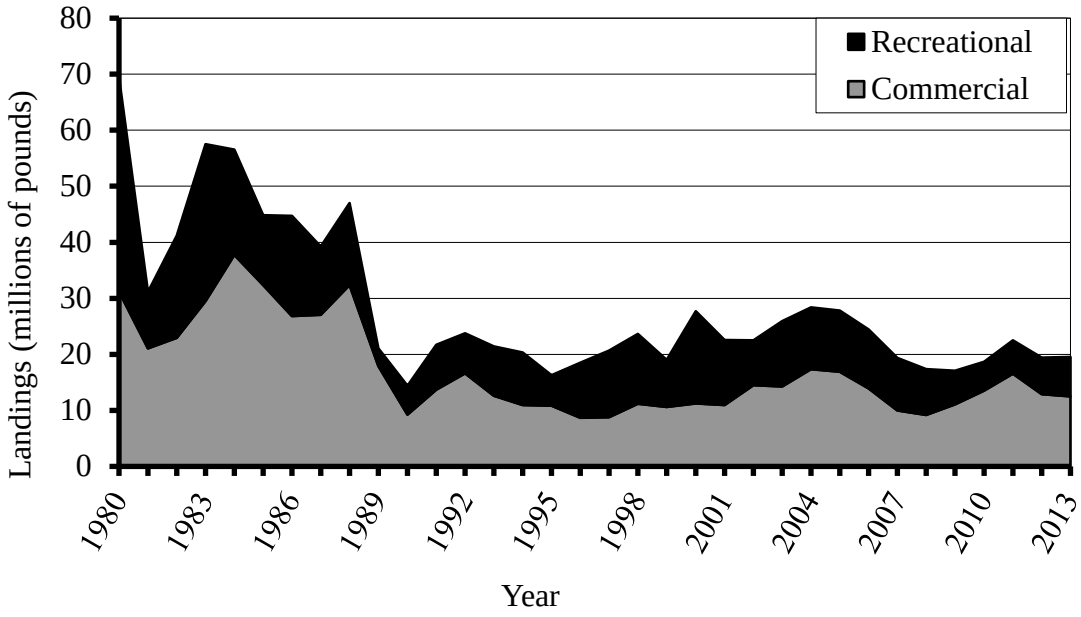

FIGURE 2. SUMMER FLOUNDER COMMERCIAL AND RECREATIONAL LANDINGS, 1980-2014.

Scup

The relative contributions of commercial and recreational scup landings are shown in Figure 3.

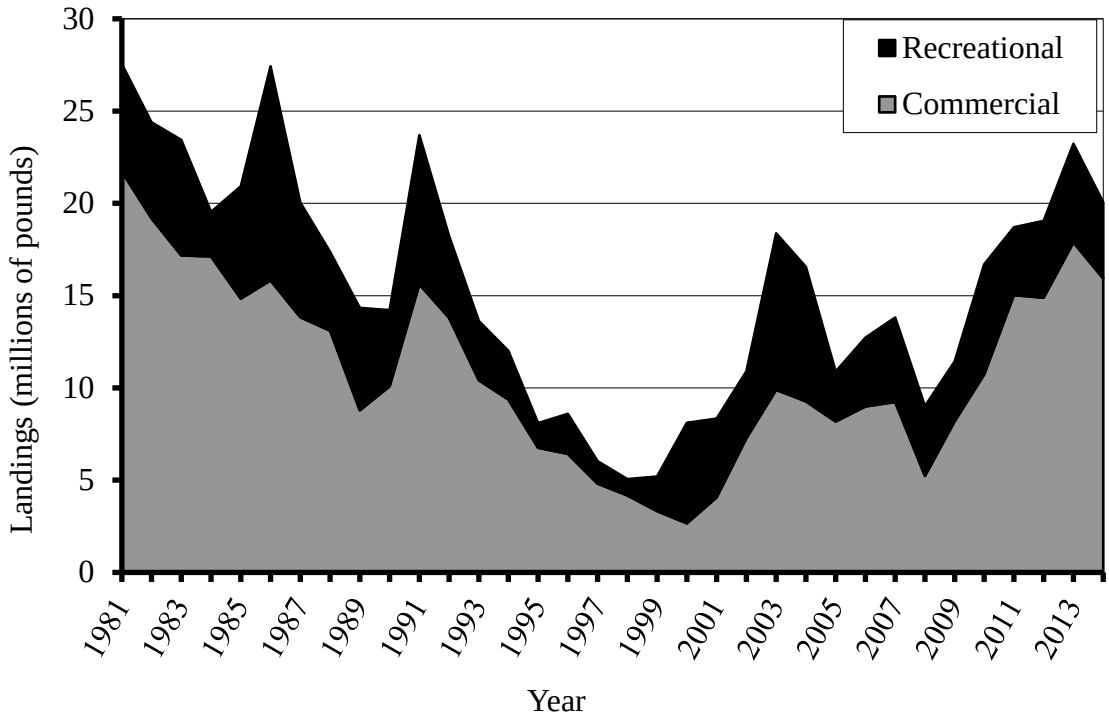

FIGURE 3. SCUP COMMERCIAL AND RECREATIONAL LANDINGS, 1980-2014, 1981-2014.

Black Sea Bass

The relative contributions of commercial and recreational black sea bass landings are shown in Figure 4.

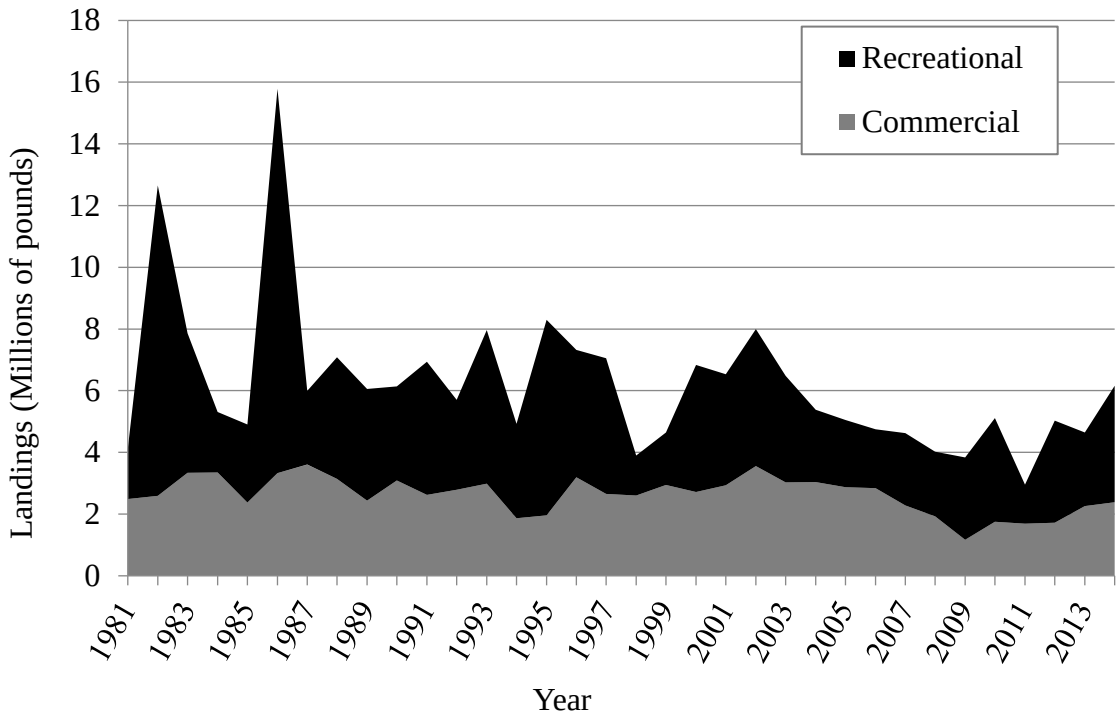

FIGURE 4: BLACK SEA BASS COMMERCIAL AND RECREATIONAL LANDINGS, 1981-2014.

4.1.2 *Description of the Stock (Including Status, Stock Characteristics, and Ecological Relationships)*

Reports on stock status, including annual assessment and reference point update reports, Stock Assessment Workshop (SAW) reports, Stock Assessment Review Committee (SARC) reports, and Data Poor Stocks Working Group (DPSWG) reports and peer-review panelist reports are available online at the NEFSC website: http://www.nefsc.noaa.gov/. EFH Source Documents, which include details on stock characteristics and ecological relationships, are available at the following website: http://www.nefsc.noaa.gov/nefsc/habitat/efh/.

Summer Flounder

The Council received an assessment update from the NEFSC in July 2016 (NEFSC 2016). This update incorporated data through 2015 into the model from the 2013 benchmark stock

assessment, which is an age-structured assessment model called ASAP ("age-structured assessment program").

The results of the 2016 assessment update indicate that the summer flounder stock was not overfished, but overfishing was occurring in 2015 relative to the biological reference points from the 2013 assessment. The fishing mortality rate in 2015 was estimated to be 0.390, 26% above the fishing mortality threshold reference point of 0.309.

The model-estimated spawning stock biomass (SSB) was estimated to be 79.90 million pounds in 2015, 58% of the spawning stock biomass at maximum sustainable yield, (SSB_{MSY} = 137.56 million pounds), and 16% above the minimum stock size threshold (½ $SSB_{35\%}$ = 68.78 million pounds). If the stock were to fall below the minimum stock size threshold, the stock would be considered overfished, which, under the MSA, would require the implementation of a rebuilding plan to reduce fishing mortality rates and rebuild stock biomass. NMFS previously declared the summer flounder stock rebuilt based on the 2011 assessment update, which included stock status determinations using data through 2010.

There are consistent, moderate internal model and historical assessment retrospective patterns that have adjusted fishing mortality rate estimates upward and SSB estimates downward since the 2011 assessment update. The retrospective patterns combined with estimation of recent (2010-2015) recruitment of below average year classes has resulted in projected F being exceeded and projected SSB not being reached, even though projected ABCs have not been substantially exceeded (NEFSC 2016).

Because this new assessment represents new best available scientific information, the SSC, Council, and Board revised their 2017 and 2018 recommendations for catch.

Scup

Scup was under a formal rebuilding plan from 2005 through 2009. NMFS declared the scup stock rebuilt in 2009 based on the findings of the Data Poor Stocks Working Group (DPSWG), which completed a benchmark stock assessment for scup in 2008 (DPSWG 2009).

The most recent benchmark stock assessment for scup took place in 2015 as part of the 60th Stock Assessment Work Group and Stock Assessment Review Committee (SAW/SARC 60). This assessment found that the scup stock was not overfished and overfishing was not occurring in 2014 relative to the new biomass reference points. SSB was estimated to be 403 million pounds in 2014, about 210% of the SSB_{MSY} proxy (i.e., $SSB_{40\%}$) of 192 million pounds. F in 2014 was estimated to be 0.127, about 57% of the F_{MSY} proxy (i.e., $F_{40\%}$) of 0.220.

Black Sea Bass

Black sea bass are protogynous hermaphrodites, meaning the majority are born females and some individuals later transition to males. Black sea bass are commonly associated with physical

structures such as reefs, although they use a variety of habitats including open bottom. Both their protogynous life history and structure-orienting behavior have posed challenges for prior analytical assessments of this species. The 2016 benchmark stock assessment working group (NEFSC 2017) spent a great deal of time analyzing and simulating various datasets to gain a better understanding on how these life history characteristics impact the assessment and the black sea bass population.

Regarding the protogynous life history, results indicate the stock may be more robust to exploitation than previously thought due to factors such as a sex ratio that is not highly skewed and the contribution of secondary males to spawning success. Typical protogynous hermaphrodites start as nearly all females and transition with age and size to nearly all males. This makes these species highly susceptible to overexploitation as a fishery selectively removes the larger males, therefore altering sex change rates and reducing productivity. Age data from the NEFSC winter and spring trawl survey indicates sex ratios within the north Atlantic black sea bass stock (Cape Hatteras, NC to Canada) are not as highly skewed with a female to male ratio of 70/30 at the youngest and smallest sea bass and a 45/65 ratio at the largest and oldest sea bass. A simulation model was also developed (Blaylock and Shepherd 2016) that evaluated black sea bass vulnerability to fisheries exploitation given its unique life history characteristics. Results from this analysis highlight the importance of secondary males, and therefore less reliance on dominant males, in the spawning success of sea bass. This spawning characteristic of north Atlantic black sea bass is more similar to a typical gonochoristic species (e.g., summer flounder or scup) and therefore improves its resiliency to exploitation compared to other species with a typical protogynous life history. As a result of this information and previous analysis (Brooks et al. 2008), SSB calculations were defined as combined male and female mature biomass. Most stock assessments of mid-Atlantic species rely heavily on data collected during the NEFSC's biannual bottom trawl survey and other state conducted fishery independent trawl surveys. A closer examination of trawl catches from these surveys shows there is no significant difference in the number or length frequency of sea bass caught right near physical habitat (e.g. reefs) or up to distances 11 miles from the physical habitat, indicating trawl surveys are viable surveys that can be appropriately used as tuning indices in the stock assessment.

The northern stock of black sea bass (i.e., black sea bass north of Cape Hatteras, North Carolina) was under a rebuilding plan from 2000 until 2009. Black sea bass were declared rebuilt based on the findings of the Data Poor Stocks Working Group (DPSWG), which performed a benchmark stock assessment for black sea bass in 2008 (DPSWG 2009).

The most recent benchmark stock assessment for black sea bass was completed in December 2016. This assessment indicated that the black sea bass stock north of Cape Hatteras, NC was not overfished and overfishing was not occurring in 2015. SSB averaged around 6 million pounds from the late 1980s and early 1990s and then steadily increased from 1997 to 2002 when it reached 18.7 million pounds. There was then a decline in SSB until 2007 (8.9 million pounds), followed by a steady increase through 2015 with SSB at its highest level estimated (Figure 5).

The model-estimated SSB in 2015 was 48.89 million pounds (22,176 mt), 2.3 times SSB at maximum sustainable yield, SSB_{MSY} = 21.31 million pounds (9,667 mt).

The fishing mortality rate (F) in 2015 was 0.27, below the fishing mortality threshold reference point ($F_{MSY\ PROXY}$ = F40%) of 0.36 (NEFSC 2017). Fishing mortality was very high in the early 1990s, typically greater than 1.0, but declined and stabilized after 1997 once black sea bass was added to the summer flounder and scup management plan. Fishing mortality has been below the $F_{MSY\ PROXY}$ reference point for the last five years. Model estimated recruitment was relatively constant throughout the time series except for large peaks from the 1999 and 2011 year classes. Average recruitment from 1989 – 2015 equaled 24.3 million fish with the 1999 year class estimated at 37.3 fish and the 2011 year class estimated at 68.9 million fish. Since 2012, recruitment has been average with the latest cohort (2014 year class) estimated to be 24.9 million fish. There is some evidence there may be a strong 2015 year class but additional catch and survey information is needed to determine its status.

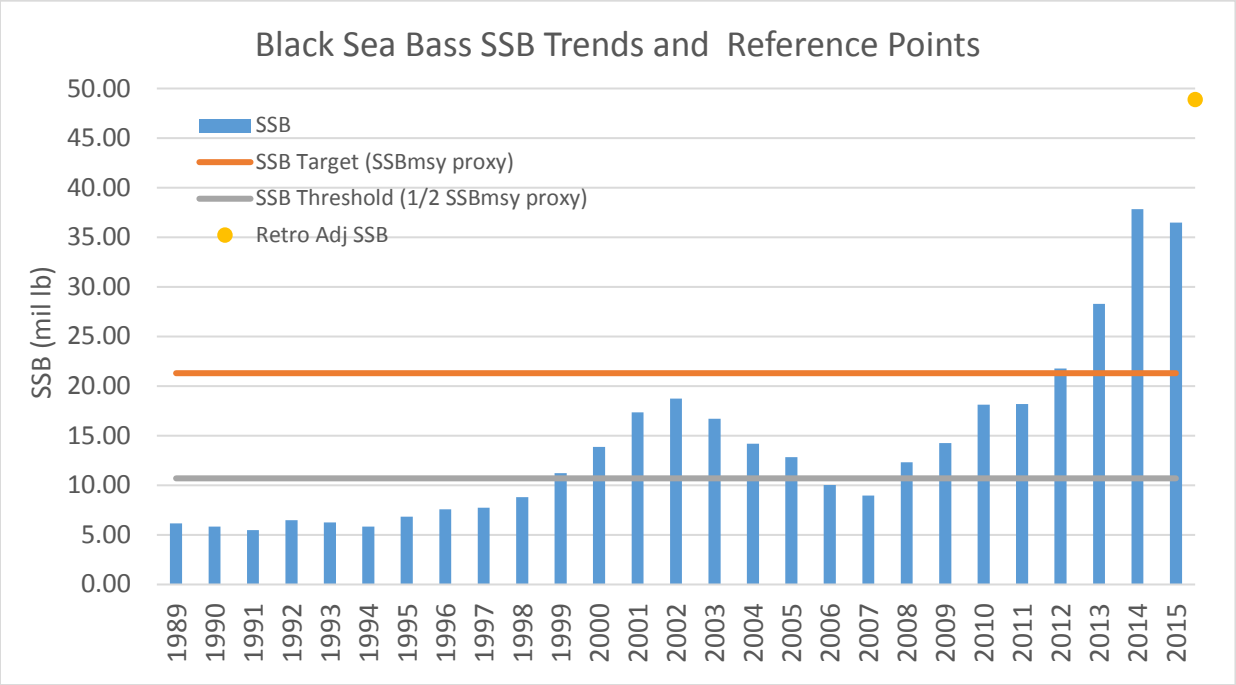

FIGURE 5: SPAWNING STOCK BIOMASS, BOTH MATURE MALE AND FEMALE BIOMASS, OF BLACK SEA BASS FROM 1989 TO 2015 AND BIOMASS REFERENCE POINTS FROM THE 2016 BENCHMARK STOCK ASSESSMENT (NEFSC 2017). THE 2015 RETRO-ADJUSTED SPAWNING STOCK BIOMASS VALUE WAS GENERATED TO CORRECT FOR THE RETROSPECTIVE BIAS PRESENT IN THE ASSESSMENT MODEL AND IS USED AS THE ESTIMATE TO COMPARE TO THE REFERENCE POINTS.

4.2 Non-Target Species and Bycatch

The MSA defines bycatch as fish that are harvested but are not sold or kept for personal use. Bycatch includes discards of whole fish at sea or elsewhere, including economic and regulatory

discards, and also includes fishing mortality due to an encounter with fishing gear that does not result in capture of fish. Bycatch does not include fish released alive under a recreational catch-and-release fishery management program.

Section 5.1.9 of Amendment 13 to the FMP (MAFMC 2002) includes a description of bycatch and non-target species in the summer flounder, scup, and black sea bass fisheries. These fisheries are mixed fisheries. Squid (*Doryteuthis (Amerigo) pealeii* and *Illex illecebrosus*), Atlantic mackerel (*Scomber scrombus*), silver hake (*Merluccius bilinearis*), Atlantic croaker (*Micropogonias undulates*), skates [thorny skate (Amblyraja radiata), barndoor skate (*Dipturus laevis*), smooth skate (*Malacoraja senta*), little skate (*Leucoraja erinacea*), winter skate (*L. ocellata*), rosette skate (*L. garmani*), and clearnose skate (*Raja eglanteria*)], spiny dogfish (*Squalus acanthias*), and other species are harvested with summer flounder, scup, and black sea bass (MAFMC 2001; personal communication with Dr. Mark Terceiro, NEFSC, October 22, 2015). More recent information on bycatch and non-target species associated with the Mid-Atlantic large and small mesh trawl fisheries (the dominant gears used to land summer flounder, scup, and black sea bass) can be found in the Standardized Bycatch Reporting Methodology Amendment (NMFS 2015).

To address the impact of these fisheries on other managed species, accountability measures (AMs) for some species managed by the New England Fishery Management Council also affect the summer flounder, scup, and black sea bass fisheries. The Northeast Multispecies FMP uses a system of annual catch limits (ACLs) and sub-ACLs allocated to different portions of the fishing industry. Sub-ACLs are allocated to the fisheries that catch groundfish incidentally. The sub-ACLs are typically gear-based and are not fishery specific. The Southern New England/Mid-Atlantic windowpane flounder (*Scophthalmus aquosus*) sub-ACL could impact the summer flounder, scup, and black sea bass fisheries if incidental bycatch of windowpane results in the sub-ACL or the overall ACL being exceeded. NMFS determines the appropriate AM and implements it when applicable. More information on this AM can be found in section 648.90(a)(5)(D) of the regulations.

4.3 Habitat (Including Essential Fish Habitat)

A description of the habitat associated with the summer flounder, scup, and black sea bass fisheries is presented in section 3.2 of Amendment 13 to the FMP (MAFMC 2002). This description remains largely unchanged. A brief summary of that information is given here. The impact of summer flounder, scup, and black sea bass fisheries on habitat of target and non-target species can be found in Amendment 13 to the FMP (section 3.2; MAFMC 2002). Potential habitat impacts associated with the measures proposed in this document are discussed in section 5.1.3.

4.3.1 *Physical Environment*

Detailed information on the affected physical and biological environments inhabited by the managed resources is available in Stevenson et al. (2004). Summer flounder, scup, and black sea bass inhabit the Northeast U.S. Shelf Ecosystem, which includes the area from the Gulf of Maine

south to Cape Hatteras, extending from the coast seaward to the edge of the continental shelf, including the slope sea offshore to the Gulf Stream. The continental slope includes the area east of the shelf out to a depth of 2000 meters. The NOAA Fisheries Northeast Region contains four distinct sub-regions: the Gulf of Maine, Georges Bank, the Mid-Atlantic Bight, and the continental slope. The Gulf of Maine is an enclosed coastal sea, characterized by relatively cold waters and deep basins, with a patchwork of various sediment types. Georges Bank is a relatively shallow coastal plateau that slopes gently from north to south and has steep submarine canyons on its eastern and southeastern edge. It is characterized by highly productive, well-mixed waters and strong currents. The Mid-Atlantic Bight is comprised of the sandy, relatively flat, gently sloping continental shelf from southern New England to Cape Hatteras, North Carolina. The continental slope begins at the continental shelf break and continues eastward with increasing depth until it becomes the continental rise. It is fairly homogenous, with exceptions at the shelf break, some of the canyons, the Hudson Shelf Valley, and in areas of glacially rafted hard bottom.

The environment that could be affected by the actions described in this document overlaps with EFH for the managed resources. The following sections describe where to find detailed information on EFH.

4.3.2 *Essential Fish Habitat (EFH)*

Information on summer flounder, scup, and black sea bass habitat requirements can be found in the documents titled, "Essential Fish Habitat Source Document: Summer Flounder, *Paralichthys dentatus*, Life History and Habitat Characteristics" (Packer et al. 1999), "Essential Fish Habitat Source Document: Scup, *Stenotomus chrysops*, Life History and Habitat Characteristics" (Steimle et al. 1999a), "Essential Fish Habitat Source Document: Black Sea Bass, *Centropristis striata*, Life History and Habitat Characteristics" (Steimle et al. 1999b) and an update of that document titled, "Essential Fish Habitat Source Document: Black Sea Bass, *Centropristis striata*, Life History and Habitat Characteristics" (Drohan et al. 2007). Electronic versions of these documents are available at: http://www.greateratlantic.fisheries.noaa.gov/hcd/list.htm. The current designations of EFH by life history stage for summer flounder, scup, and black sea bass are provided in the appendix to this document. A summary description of EFH for summer flounder, scup, and black sea bass is provided here.

Summer flounder spawn during the fall and winter over the open ocean areas of the continental shelf. Their planktonic larvae are often found in the northern part of the Mid-Atlantic Bight from September to February and in the southern part from November to May. Larvae and post-larvae migrate inshore, entering coastal and estuarine nursery areas from October to May. Juveniles are distributed inshore and in many estuaries throughout the species' range during the spring, summer, and fall. Summer flounder exhibit strong seasonal inshore-offshore movements. Adult summer flounder normally inhabit shallow coastal and estuarine waters during the warmer months and remain offshore during the colder months. EFH includes pelagic and demersal waters, saltmarsh creeks, seagrass beds, mudflats, and open bay areas, from the Gulf of Maine through North Carolina.

Scup spawn once annually over weedy or sand-covered areas in the spring. Scup eggs and newly hatched larvae are found in open water in bays and sounds of Southern New England during the spring and summer. Juvenile and adult scup are demersal, using inshore waters in the spring and moving offshore in the winter. Scup EFH includes demersal waters, sands, mud, and mussel and seagrass beds, from the Gulf of Maine through Cape Hatteras, North Carolina.

The northern population of black sea bass (i.e., black sea bass north of Cape Hatteras, North Carolina) spawns in the Mid-Atlantic Bight continental shelf, primarily between Cape Hatteras, North Carolina, and Cape Cod, Massachusetts, during the spring. Spawning begins in the spring off North Carolina and Virginia, and progresses north into southern New England waters in the summer through the fall. The duration of larval stage and habitat-related settlement cues are unknown. Distribution and habitat use of this pelagic stage may only partially overlap with that of the egg stage. Adult black sea bass are very structure-oriented, especially during their summer coastal residency. Unlike juveniles, they tend to enter only larger estuaries and are most abundant along the coast. Larger fish tend to be found in deeper water than smaller fish. A variety of coastal structures are known to attract black sea bass, including shipwrecks, rocky and artificial reefs, mussel beds and other objects or source of shelter on the bottom. In the warmer months, inshore, resident adult black sea bass are usually found associated with structured habitats. EFH for black sea bass includes pelagic waters, structured habitat (e.g., sponge beds), rough bottom shellfish, sand and shell, from the Gulf of Maine through Cape Hatteras, North Carolina.

4.3.3 *Fishery Impact Considerations*

The bottom otter trawl is the predominant gear type in the commercial fisheries for all three species. Pots and traps are also used in the black sea bass commercial fishery, and to a small extent in the scup commercial fishery. In recent years, offshore lobster traps have accounted for a relatively small amount of the black sea bass commercial catch. Other gear types, including handlines, gillnets, beam trawls, and scallop trawls, have accounted for minor amounts of the commercial catches of all three species in recent years, as shown in unpublished NMFS Vessel Trip Report data.

Any actions implemented in the FMP that affect species with overlapping EFH were considered in the EFH assessment for Amendment 13 to the FMP (MAFMC 2002). Amendment 13 included alternatives to minimize the adverse impacts of fishing gear on EFH (as required by section 303(a)(7) of the MSA). As stated in section 3.2 of Amendment 13, the MAFMC determined that both mobile bottom tending and stationary gear could adversely impact EFH. The analysis in that document also indicated that no management measures were needed, because in federal waters the fisheries are conducted primarily in high-energy mobile sand habitats, where gear impacts are minimal and/or temporary in nature. On that basis, the MAFMC selected the no action alternative from among the suite of alternatives to minimize fishing gear impacts on EFH in Amendment 13. There have been no significant changes to the manner in which the summer flounder, scup, and black sea bass fisheries are prosecuted since Amendment 13. None of the alternatives considered in this document would adversely affect EFH, when considered in comparison to the *status quo* alternative (section 7.0); therefore, the effects of fishing on EFH have not been re-evaluated since

Amendment 13, and no alternatives to minimize adverse effects on EFH are presented in this document.

The principal gears used in the recreational fishery for all three species are rod and reel and handline. The potential adverse impacts of these gears on EFH for any of the federally managed species in the region are minimal (Stevenson et al. 2004).

4.4 Protected Resources

4.4.1 *ESA and MMPA Protected Species*

Numerous protected species inhabit the affected environment of the Summer Flounder, Scup, and Black Sea Bass FMP (Table 1). These species are under NMFS jurisdiction and are afforded protection under the Endangered Species Act (ESA) of 1973 and/or the Marine Mammal Protection Act (MMPA) of 1972.

Cusk, alewife, and blueback herring are NMFS "candidate species" under the ESA. Candidate species are those petitioned species for which NMFS has determined that listing may be warranted under the ESA and those species for which NMFS has initiated an ESA status review through an announcement in the Federal Register. If a species is proposed for listing the conference provisions under Section 7 of the ESA apply (see 50 CFR 402.10); however, candidate species receive no substantive or procedural protection under the ESA. As a result, these species will not be discussed further in this and the following sections; however, NMFS recommends that project proponents consider implementing conservation actions to limit the potential for adverse effects on candidate species from any proposed action. Additional information on cusk, alewife, and blueback herring can be found at: http://www.nmfs.noaa.gov/pr/species/esa/candidate.htm.

4.4.2 *Species and Critical Habitat Not Likely to be Affected by the Proposed Action*

Based on available information, it has been determined that this action is not likely to affect blue whales, sperm whales, shortnose sturgeon, Atlantic spotted dolphins, striped dolphins, pygmy sperm whales, dwarf sperm whales, or hawksbill sea turtles. Further, this action is not likely to adversely affect any critical habitat for the species listed in Table 1. This determination was made because either the occurrence of the species is not known to overlap with the summer flounder, scup, and black sea bass fisheries and/or there have never been documented interactions between the species and these fisheries (Waring et al. 2014a, 2015a, 2016; NMFS 2013; NMFS NEFSC FSB 2015, 2016; see http://www.nefsc.noaa.gov/fsb/take_reports/nefop.html). In the case of critical habitat, this determination has been made because the summer flounder, scup, and black sea bass fisheries will not affect the essential physical and biological features of North Atlantic right whale or loggerhead (Northwest Atlantic Distinct Population Segment, or DPS) critical habitat and, and therefore, will not result in the destruction or adverse modification of critical habitat (NMFS 2013; NMFS 2014a; NMFS 2015a,b).

Table 1: SPECIES PROTECTED UNDER THE ESA AND/OR MMPA THAT MAY OCCUR IN THE AFFECTED ENVIRONMENT OF THE SUMMER FLOUNDER, SCUP, AND BLACK SEA BASS FISHERIES. MARINE MAMMAL SPECIES (CETACEANS AND PINNIPEDS) ITALICIZED AND IN BOLD ARE CONSIDERED MMPA STRATEGIC STOCKS.

Species	Status	Potentially affected by this action?
Cetaceans		
North Atlantic right whale (Eubalaena glacialis)	***Endangered***	***Yes***
Humpback whale, West Indies DPS (Megaptera novaeangliae)	Protected (MMPA)	Yes
Fin whale (Balaenoptera physalus)	***Endangered***	***Yes***
Sei whale (Balaenoptera borealis)	***Endangered***	***Yes***
Blue whale (Balaenoptera musculus)	***Endangered***	***No***
Sperm whale (Physeter macrocephalus	***Endangered***	***No***
Minke whale (*Balaenoptera acutorostrata*)	Protected (MMPA)	Yes
Pilot whale (Globicephala spp.)[2]	***Protected (MMPA)***	***Yes***
Pygmy sperm whale (*Kogia breviceps*)	Protected (MMPA)	No
Dwarf sperm whale (*Kogia sima*)	Protected (MMPA)	No
Risso's dolphin (*Grampus griseus*)	Protected (MMPA)	Yes
Atlantic white-sided dolphin (*Lagenorhynchus acutus*)	Protected (MMPA)	Yes
Short Beaked Common dolphin (*Delphinus delphis*)	Protected (MMPA)	Yes
Atlantic Spotted dolphin (*Stenella frontalis*)	Protected (MMPA)	No
Striped dolphin (*Stenella coeruleoalba*)	Protected (MMPA)	No
Bottlenose dolphin (Tursiops truncatus)[3]	***Protected (MMPA)***	***Yes***
Harbor porpoise (*Phocoena phocoena*)	Protected (MMPA)	Yes
Sea Turtles		
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered	Yes
Kemp's ridley sea turtle (*Lepidochelys kempii*)	Endangered	Yes
Green sea turtle, North Atlantic DPS (*Chelonia mydas*)	Threatened	Yes
Loggerhead sea turtle (*Caretta caretta*), Northwest Atlantic Ocean DPS	Threatened	Yes
Hawksbill sea turtle (*Eretmochelys imbricate*)	Endangered	No
Fish		
Shortnose sturgeon (*Acipenser brevirostrum*)	Endangered	No
Atlantic salmon (*Salmo salar*)	Endangered	Yes
Atlantic sturgeon *(Acipenser oxyrinchus)*		
Gulf of Maine DPS	Threatened	Yes
New York Bight DPS, Chesapeake Bay DPS, Carolina DPS & South Atlantic DPS	Endangered	Yes
Cusk (*Brosme brosme)*	Candidate	Yes
Alewife *(Alosa pseudoharengus)*	Candidate	Yes
Blueback herring *(Alosa aestivalis)*	Candidate	Yes
Pinnipeds		
Harbor seal (*Phoca vitulina*)	Protected (MMPA)	Yes
Gray seal (*Halichoerus grypus*)	Protected (MMPA)	Yes
Harp seal (*Phoca groenlandicus*)	Protected (MMPA)	Yes
Hooded seal (*Cystophora cristata*)	Protected (MMPA)	Yes
Critical Habitat		
North Atlantic Right Whale	ESA (Protected)	No
Northwest Atlantic DPS of Loggerhead Sea Turtle	ESA (Protected)	No

Species	Status	Potentially affected by this action?

[1] A strategic stock is defined under the MMPA as a marine mammal stock for which: (1) the level of direct human-caused mortality exceeds the potential biological removal level; (2) based on the best available scientific information, is declining and is likely to be listed as a threatened species under the ESA within the foreseeable future; and/or (3) is listed as a threatened or endangered species under the ESA, or is designated as depleted under the MMPA (Section 3 of the MMPA of 1972).

[2] There are 2 species of pilot whales: short finned (*G. melas melas*) and long finned (*G. macrorhynchus*). Due to the difficulties in identifying the species at sea, they are often just referred to as *Globicephala spp*.

[3] This includes the Western North Atlantic Offshore, Northern Migratory Coastal, and Southern Migratory Coastal Stocks of Bottlenose Dolphins. See Waring *et al*. (2016) and Hayes et al. 2017 for further details.

4.4.3 *Species Potentially Affected by the Proposed Action*

Sea Turtles

This section contains a brief summary of the occurrence and distribution of sea turtles in the affected environment of the summer flounder, scup, and black sea bass fisheries. Additional background information on the range-wide status of affected sea turtles species, as well as a description and life history of each of these species, can be found in a number of published documents, including sea turtle status reviews and biological reports (NMFS and USFWS 1995; Hirth 1997; TEWG 1998, 2000, 2007, 2009; NMFS and USFWS 2007a, 2007b; Conant et al. 2009; NMFS and USFWS 2013), and recovery plans for the loggerhead sea turtle (Northwest Atlantic DPS; NMFS and USFWS 2008), leatherback sea turtle (NMFS and USFWS 1992, 1998a), Kemp's ridley sea turtle (NMFS et al. 2011), and green sea turtle (NMFS and USFWS 1991, 1998b).

Hard-shelled sea turtles: In U.S. Northwest Atlantic waters, hard-shelled turtles commonly occur throughout the continental shelf from Florida to Cape Cod, MA, although their presence varies with the seasons due to changes in water temperature (Braun-McNeill et al. 2008; Braun & Epperly 1996; Epperly et al. 1995a,b; Mitchell et al. 2003; Shoop & Kenney 1992; TEWG 2009; Blumenthal et al. 2006; Braun-McNeill & Epperly 2004; Griffin et al. 2013; Hawkes et al. 2006; Hawkes et al. 2011; Mansfield et al. 2009; McClellan & Read 2007; Mitchell et al. 2003; Morreale & Standora 2005). As coastal water temperatures warm in the spring, loggerheads begin to migrate to inshore waters of the southeast United States and also move up the Atlantic Coast (Braun-McNeill & Epperly 2004; Epperly et al. 1995a,b,c; Griffin et al. 2013; Morreale & Standora 2005), occurring in Virginia foraging areas as early as late April and on the most northern foraging grounds in the Gulf of Maine (GOM) in June (Shoop & Kenney 1992). The trend is reversed in the fall as water temperatures cool. The majority leave the Gulf of Maine by September, but some remain in Mid-Atlantic and Northeast areas until November. By December, sea turtles have migrated south to waters offshore of North Carolina, particularly south of Cape Hatteras, and further south, although hard-shelled sea turtles can occur year-round in waters off Cape Hatteras and south (Epperly et al. 1995b; Griffin et al. 2013; Hawkes et al. 2011; Shoop & Kenney 1992).

Leatherback sea turtles: Leatherback sea turtles engage in routine migrations between northern temperate and tropical waters (Dodge et al. 2014; James et al. 2005; James et al. 2006; NMFS & USFWS 1992). Leatherbacks, a pelagic species, are also known to use coastal waters of the U.S. continental shelf (Dodge et al. 2014; Eckert et al. 2006; James et al. 2005; Murphy et al. 2006).

Leatherbacks have a greater tolerance for colder water in comparison to hard-shelled sea turtles. They are also found in more northern waters later in the year, with most leaving the Northwest Atlantic shelves by mid-November (Dodge et al. 2014; James et al. 2005; James et al. 2006).

Large Whales

Large whales, such as humpback, North Atlantic right, fin, sei, and minke whales are found throughout the waters of the Northwest Atlantic Ocean. In general, these species follow an annual pattern of migration between low latitude (south of 35°N) wintering/calving grounds and high latitude spring/summer foraging grounds (primarily north of 41°N; Waring et al. 2016; Hayes et al. 2017; NMFS 1991, 2005, 2010, 2011a, 2012). This is a simplification of whale movements, particularly as it relates to winter movements. It is unknown if all individuals of a population migrate to low latitudes in the winter, although increasing evidence suggests that for some species (e.g., right and humpback whales), some portion of the population remains in higher latitudes throughout the winter (Brown et al. 2002; Clapham et al. 1993; Cole et al. 2013; Khan et al. 2010, 2011, 2012; Khan et al. 2009; NOAA 2008; Swingle et al. 1993; Vu et al. 2012; Waring et al. 2016). Although further research is needed to provide a clearer understanding of large whale movements and distribution in the winter, the distribution and movements of large whales to foraging grounds in the spring/summer is well understood. Large whales consistently return to these foraging areas each year, therefore these areas can be considered important areas for whales (Baumgartner et al. 2003; Baumgartner & Mate 2003; Brown et al. 2002; Kenney 2001; Kenney et al. 1986; Kenney et al. 1995; Mayo & Marx 1990; Payne et al. 1986; Payne et al. 1990; Schilling et al. 1992). For additional information on the biology, status, and range wide distribution of each whale species please refer to: Waring et al. 2016; Hayes et al. 2017; NMFS 1991, 2005, 2010, 2011a, 2012.

Small Cetaceans and Pinnipeds

Table 1 lists the small cetaceans and pinnipeds that may occur in the affected environment of the summer flounder, scup, and black sea bass fisheries. Small cetaceans can be found throughout the year in the Northwest Atlantic Ocean; however, within this range, there are seasonal shifts in species distribution and abundance. Pinnipeds are primarily found throughout the year or seasonally from New Jersey to Maine; however, increasing evidence indicates that some species (e.g., harbor seals) may be extending their range seasonally into waters as far south as Cape Hatteras, North Carolina (35°N). For additional information on the biology and range wide distribution of each species of small cetacean and pinniped provided in **Error! Reference source not found.**, please refer to the marine mammal stock assessment reports provided at: http://www.nmfs.noaa.gov/pr/sars/region.htm

Atlantic Sturgeon

The marine range of U.S. Atlantic sturgeon extends from Labrador, Canada, to Cape Canaveral, Florida. All five DPSs of Atlantic sturgeon have the potential to be located anywhere in this marine range (ASSRT 2007; Dovel and Berggren 1983; Dadswell et al. 1984; Kynard et al. 2000; Stein et al. 2004a; Dadswell 2006; Laney et al. 2007; Dunton et al. 2010, 2015; Erickson et al. 2011; Wirgin et al. 2012; Waldman et al. 2013; O'Leary et al. 2014; Wirgin et al. 2015a,b).

Based on fishery-independent and dependent data, as well as data collected from tracking and tagging studies, in the marine environment, Atlantic sturgeon appear to primarily occur inshore of the 50 m depth contour (Stein et al. 2004 a,b; Erickson et al. 2011; Dunton et al. 2010); however, Atlantic sturgeon are not restricted to these depths, as excursions into deeper continental shelf waters have been documented (Timoshkin 1968; Collins and Smith 1997; Stein et al. 2004a,b; Dunton et al. 2010; Erickson et al. 2011). Data from fishery-independent surveys and tagging and tracking studies also indicate that Atlantic sturgeon may undertake seasonal movements along the coast (Dunton et al. 2010; Erickson et al. 2011); however, there is no evidence to date that all Atlantic sturgeon make these seasonal movements and therefore, may be present throughout the marine environment throughout the year. For additional information on the biology, status, and range wide distribution of each distinct population segment (DPS) of Atlantic sturgeon please refer to 77 FR 5880 and 77 FR 5914, as well as the Atlantic Sturgeon Status Review Team's (ASSRT) 2007 status review of Atlantic sturgeon (ASSRT 2007).

Atlantic Salmon

The wild populations of Atlantic salmon are listed as endangered under the ESA. Their freshwater range occurs in the watersheds from the Androscoggin River northward along the Maine coast to the Dennys River, while the marine range of the GOM DPS extends from the GOM (primarily northern portion of the GOM), to the coast of Greenland (NMFS and USFWS 2005; Fay et al. 2006). In general, smolts, post-smolts, and adult Atlantic salmon may be present in the GOM and coastal waters of Maine in the spring (beginning in April), and adults may be present throughout the summer and fall months (Baum 1997; Fay et al. 2006; USASAC 2004; Hyvarinen et al. 2006; Lacroix and McCurdy 1996; Lacroix et al. 2004, 2005; Reddin 1985; Reddin and Short 1991; Reddin and Friedland 1993; Sheehan et al. 2012; NMFS and USFWS 2005; Fay et al. 2006). For additional information on the on the biology, status, and range wide distribution of the GOM DPS of Atlantic salmon please refer to NMFS and USFWS 2005; Fay et al. 2006.

4.4.4 *Gear Interactions and Protected Species*

Recreational Fisheries Interactions

The recreational components of the summer flounder, scup, and black sea bass fisheries are primarily prosecuted with rod and reel and handline (i.e., hook and line gear). In the absence of an observer program for recreational fisheries, records of recreational hook and line interactions with protected resources are limited. However, as a dedicated observer program exists for all commercial fisheries, there is a wealth of information on observed protected species interactions with all fishing gear types and years of data assessing resultant population level effects of these interactions. Other sources of information, such as state fishing records, stranding databases, and marine mammal stock assessment reports, provide additional information that can assist in better understanding hook and line interaction risks to protected species.

Large whales are known to interact with hook and line gear; however, in the most recent (2010-2014) mortality and serious injury determinations for baleen whales, the majority of cases identified with confirmed hook and line or monofilament entanglement did not result in the

serious injury or mortality to the whale (89.5% observed/reported whales had a serious injury value of 0; 10.5% had a serious injury value of 0.75; none of the cases resulted in mortality; Henry et al. 2016).[1] In fact, 85.0% of the whales observed or reported with a hook/line or monofilament entanglement were re-sighted gear free and healthy; confirmation of the health of the other remaining whales remain unknown as no re-sightings had been made over the timeframe of the assessment (Henry et al. 2016). Based on this information, while large whale interactions with hook and line gear are possible, there is a low probability that an interaction will result in serious injury or mortality to any large whale species.

Error! Reference source not found. provides a list of small cetaceans and pinnipeds that will occur in the affected environment of the summer flounder, scup, and black sea bass fisheries. Of these species, only bottlenose dolphin stocks have been identified (primarily through stranding records/data) as entangled in hook and line gear. In some cases, these entanglements have resulted in the serious injury or mortality to the animal. Specifically, based on stranding data from 2007-2013, estimated mean annual mortality for each bottlenose stock due to interactions with hook and line gear was approximately one animal (Waring et al. 2014a; Waring et al. 2016).[2] Based on this and the best available information, although interactions with hook and line gear are possible, there is a low likelihood that such an interaction will result in the serious injury or mortality to any small cetacean or pinniped species.

ESA listed species of sea turtles are known to interact with hook and line gear, particularly in nearshore southern waters (e.g., Virginia, south; Sea Turtle Disentanglement Network (STDN); NMFS 2013). Serious injury and mortality to sea turtles can be incurred by hook and line gear interactions, and can pose a risk to these species. The impacts of these interactions on sea turtle populations is still under investigation, thus no conclusions can currently be made on the impact of hook and line gear on the continued survival of sea turtle populations.

ESA-listed species of Atlantic sturgeon are known to interact with hook and line gear, particularly in nearshore waters from the Gulf Maine to Southern New England (NMFS 2013). Injury and mortality to Atlantic sturgeon can be incurred by hook and line gear interactions, and therefore, can pose a risk to these species. However, the extent to which these interactions are impacting Atlantic sturgeon DPSs is still under investigation and therefore, no conclusions can

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[1] Any injury leading to a significant health decline (e.g., skin discoloration, lesions near the nares, fat loss, increased cyamid loads) is classified as a serious injury (SI) and will result in a SI value set at 1 (Henry *et al*. 2015).

[2] Stranding data provided in Waring *et al*. 2015 was not considered in estimating mean annual mortality as not all bottlenose dolphin stocks are addressed in this stock assessment report. As all bottlenose dolphin stocks are considered in Waring *et al.* (2014a) and Waring *et al*. (2016), these stock assessment reports were used to estimate mean annual mortality. Estimates of mean annual mortality were calculated based on the total number of animals that stranded between 2007-2013, and that were determined to have incurred serious injuries or mortality as result of interacting with hook and line or trap/pot gear. Please note, for bottlenose dolphin stocks, Waring *et al*. (2014a) and Waring *et al*. (2016) provides two categories for trap/pot gear: (Atlantic Blue) Crab Pot, and Other Pot gear. We combined the two to get an overall number of interactions associated with trap/pot gear in general. In addition, any animals released alive with no serious injuries were not included in the estimate. Also, if maximum or minimum number of animals stranded were provided, to be conservative, we considered the maximum estimated number in calculating our mean annual estimate of mortality.

currently be made on the impact of hook and line gear on the continued survival of Atlantic sturgeon DPSs (NMFS 2013; NMFS 2011b).

In regards to Atlantic salmon, there have been no observed/documented interactions with hook and line gear (NMFS NEFSC FSB 2015, 2016). Based on this information, hooks and line, are not expected to pose an interaction risk to any Atlantic salmon and therefore, are not expected to be source of injury or mortality to this species.

Commercial Fisheries Interactions

The commercial summer flounder, scup, and black sea bass fisheries are prosecuted primarily with bottom otter trawl and trap/pot gear. Protected species listed in Table 1 are known to interact with one or more of these gear types. Available information on gear interactions with a given species (or species group) is provided in the sections below. These sections are not a comprehensive review of all fishing gear types known to interact with a given species; emphasis is only being placed on the primary gear types used in the summer flounder, scup, and black sea bass fisheries and their associated interaction risk to the species under consideration.

4.4.4.1.1 *Sea Turtles*

Bottom Trawl Gear: Sea turtles are known to interact with bottom trawl gear. Most of the observed sea turtle interactions with bottom trawl gear have occurred in the Mid-Atlantic, although there have been some sea turtle interactions with trawl gear observed on Georges Bank. As few sea turtle interactions have been observed outside the Mid-Atlantic, there is insufficient data available to conduct a robust model-based analysis of sea turtle interactions with trawl gear to produce a bycatch estimate for these regions. As a result, the following bycatch estimates are based on observed sea turtle interactions in trawl gear in the Mid-Atlantic.

Green, Kemp's ridley, leatherback, loggerhead, and unidentified sea turtles have been documented interacting with bottom trawl gear. However, estimates are available only for loggerhead sea turtles. Warden (2011a) estimated that from 2005-2008, the average annual loggerhead interactions in bottom trawl gear in the Mid-Atlantic[3] was 292 (CV=0.13, 95% CI=221-369), with an additional 61 loggerheads (CV=0.17, 95% CI=41-83) interacting with trawls, but released through a Turtle Excluder Device (TED). Of the 292 average annual observable loggerhead interactions, approximately 44 of those were adult equivalents (Warden 2011a).[4] Most recently, Murray (2015) estimated that from 2009-2013, the total average annual loggerhead interactions in bottom trawl gear in the Mid-Atlantic[5] was 231 (CV=0.13, 95% CI=182-298). Of the 231 average annual observable loggerhead interactions, approximately 33

[3] Warden (2011a) defined the Mid-Atlantic as south of Cape Cod, Massachusetts, to approximately the North Carolina/South Carolina border.

[4] Adult equivalence considers the reproductive value (i.e., expected reproductive output) of the animal (Warden 2011a.b, Murray 2013, Wallace et al. 2008).

[5] Murray (2015) defined the Mid-Atlantic as the boundaries of the Mid-Atlantic Ecological Production; roughly waters west of 71ºW to the North Carolina/South Carolina border)

of those were adult equivalents (Murray 2015). Bycatch estimates provided in Warden (2011a) and Murray (2015) represent a decrease from the average annual loggerhead bycatch in bottom otter trawls during 1996-2004, which Murray (2008) estimated at 616 sea turtles (CV=0.23, 95% CI over the nine-year period: 367-890). This decrease is likely due to decreased fishing effort in high-interaction areas (Warden 2011a). Warden (2011b), also estimated total loggerhead interactions (with bottom otter trawl gear) attributable to managed species from 2005-2008. Using Northeast Fisheries Observer Program (NEFOP) data, Warden (2011b) developed a generalized additive model of loggerhead interaction rates, which were then applied to Vessel Trip Reports (VTRs) to estimate total interactions on each VTR trip. The total loggerhead interactions on each trip were then assigned to the individual managed species that were landed on the trip (as reported in VTR data; Warden 2011b). For instance, an estimated average annual take of 108 loggerheads (95% CI=81-136; estimated observable, and unobservable but quantifiable) were attributed to the summer flounder fishery, 1 loggerhead (95% CI=1-3) to the scup fishery, and 1 loggerhead (95% CI=0-1) to the black sea bass fishery. Murray (2015) provided similar estimates of loggerhead interactions by managed fished species from 2009-2013. Specifically, estimated average annual take of 50 loggerheads (95% CI=26-84) were attributed to the summer flounder fishery, 4 loggerheads (95% CI=2-7) to the scup fishery, and 1 loggerhead (95% CI=1-2) to the black sea bass fishery (Murray 2015).

As described above, the summer flounder fishery has a high incidence of sea turtle takes in bottom trawl gear, particularly in waters off Virginia and North Carolina. To address this issue, Turtle Excluder Devices (TEDs) have been required in the summer flounder fishery since 1992, specifically in the summer flounder fishery sea turtle protection area.[6] This area is bounded on the north by a line extending along 37°05'N (Cape Charles, VA) and on the south by a line extending out from the North Carolina-South Carolina border. Vessels north of Oregon Inlet, NC, are exempt from the TED requirement from January 15 through March 15 each year (50 CFR 223.206); while vessels operating south of Oregon Inlet, NC, are required to have TEDs year round.[7] In 2003, NMFS issued a final rule to amend the TED regulations to enhance their effectiveness in the Atlantic and Gulf Areas of the southeastern United States by requiring an escape opening designed to exclude leatherbacks as well as large loggerhead and green turtles (68 FR 8456).

Pot/Trap Gear: Leatherback, loggerhead, green and Kemp's ridley sea turtles are known to interact with trap/pot gear. Interactions are primarily associated with entanglement in vertical lines, although sea turtles can also become entangled in groundline or surface systems. Records of stranded or entangled sea turtles indicate that fishing gear can wrap around the neck, flipper, or body of the sea turtle and severely restrict swimming or feeding (Balazs 1985; Sea Turtle Disentanglement Network (STDN) and Sea Turtle Stranding and Salvage Network (STSSN)

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[6] TEDs allow sea turtles to escape the trawl net, reducing injury and mortality resulting from capture in the net.

[7] For a map delineating the summer flounder fishery-sea turtle protection area, please see: http://www.greateratlantic.fisheries.noaa.gov/educational_resources/gis/data/shapefiles/Summer_Flounder_Fishery-Sea_Turtle_Protection_Area/Summer_Flounder_Fishery-Sea_Turtle_Protection_Area_MAP.pdf.

unpublished data). As a result, sea turtles can incur serious injuries and in some cases, mortality immediately or at a later time.

NMFS Northeast Region Sea Turtle Disentanglement Network's (STDN) database, a component of the Sea Turtle Stranding and Salvage Network, provides the most complete dataset of sea entanglements. Based on information provided in this database, a total of 333 sea turtle entanglements in vertical line gear were reported to the STDN and NMFS Greater Atlantic Regional Fisheries Office (GARFO) between 2002 and 2016 (STDN 2016).[8] Of the 333 reports, 316 were classified as probable or confirmed vertical line gear entanglement. Out of the 316 confirmed and probable entanglement events, there were 147 cases in which the gear type associated with the entanglement could be assigned to a specific fishery. The majority of interactions involved leatherback sea turtles (130) followed by loggerhead (16), and green (1) sea turtles. Of the 130 leatherbacks, 68.5 % of the vertical line interactions involved gear associated with the lobster fishery (vertical line), 17.7 % the whelk fishery, 7.7% the sea bass fishery, 2.3 % the crab fishery, 1.5 % the conch fishery, 1.5% research, and 0.77 % whelk and lobster fishery (both trap/pots present). Of the 16 loggerheads, 56.3% involved interactions with vertical line associated with the whelk fishery and 43.8% the crab fishery. The one green sea turtle case involved an interaction with vertical line associated with the whelk fishery.

4.4.4.1.2 *Atlantic Sturgeon*

Bottom Trawl Gear: Atlantic sturgeon are known to interact with bottom trawl gear and have been observed (NEFOP and At-Sea Monitoring Program (ASM)) in this gear type over the last 26 years (NMFS NEFSC FSB 2015, 2016). Reviewing NEFOP and ASM observed data, since 1989, six Atlantic sturgeon have been observed in bottom otter trawl gear where the primary species being targeted was black sea bass (NMFS NEFSC FSB 2015, 2016). To understand the interaction risk between bottom otter trawls and Atlantic sturgeon, there are three documents that use data collected by the NEFOP to describe bycatch of Atlantic sturgeon: Stein et al. (2004b); ASMFC (2007); and Miller and Shepard (2011). None of these provide estimates of Atlantic sturgeon bycatch by DPS. Information provided in all three documents indicate that sturgeon bycatch occurs in bottom otter trawl gear, with the most recent document estimating, based on fishery observer data and VTR data from 2006-2010, that annual bycatch of Atlantic sturgeon in bottom trawl gear was 1,342 animals (Miller and Shepard 2011). Specifically, Miller and Shepard (2011) observed Atlantic sturgeon interactions in trawl gear with small (< 5.5 inches) and large (≥ 5.5 inches) mesh sizes.[9] Although Atlantic sturgeon were observed to interact with trawl gear with various mesh sizes, based on observer data, Miller and Shepard (2011) concluded that, in general, trawl gear posed less of a mortality risk to Atlantic sturgeon than gillnet gear. Estimated mortality rates in gillnet gear were 20.0%, while those in otter trawl gear were 5.0% (Miller and Shepard 2011; NMFS 2013). Similar conclusions were reached in Stein et al. 2004b and ASMFC 2007. Although Atlantic sturgeon deaths have rarely been reported in otter trawl gear (ASMFC 2007), effects of an interaction may occur long after the interaction; therefore,

[8] Data for 2016 was only available through September; data through the remainder of 2016 is still being processed.
[9] The minimum mesh size bottom otter trawls targeting summer flounder, scup and black sea bass are 5.5", 5.0", and 4.5" respectively.

until additional studies are conducted, it is remains uncertain what the overall impacts to Atlantic sturgeon survival are from trawl interactions (Beardsall et al. 2013). As a result, trawls should not be completely discounted as a form of gear that poses a mortality risk to Atlantic sturgeon. Further, even if an animal is released alive, pursuant to the ESA, any Atlantic sturgeon interaction with fishing gear is considered take.

Pot/Trap Gear: To date, there have been no documented pot/trap interactions with Atlantic sturgeon (NMFS NEFSC FSB 2015, 2016;).

4.4.4.1.3 *Atlantic Salmon*

Bottom Trawl Gear: The NEFOP and ASM Program documented a total of 15 individual salmon incidentally caught on over 60,000 observed commercial fishing trips from 1989 through August 2013 (NMFS 2013; Kocik et al. 2014). Four out of the 15 individual salmon were observed bycaught in bottom otter trawl gear, the remainder were observed in gillnet gear (Kocik, personal communication; NMFS 2013). This suggests that interactions with Atlantic salmon are rare events (NMFS 2013; Kocik et al. 2014).

Pot/Trap Gear: To date, there have been no documented pot/trap interactions with Atlantic salmon (NMFS NEFSC FSB 2015, 2016).

4.4.4.1.4 *Marine Mammals*

Some species of marine mammals have also been observed seriously injured or killed in trap/pot or bottom trawl gear. Pursuant to the MMPA, NMFS publishes a List of Fisheries (LOF) annually, classifying U.S. commercial fisheries into one of three categories based on the relative frequency of incidental serious injuries and/or mortalities of marine mammals in each fishery (i.e., Category I=frequent; Category II=occasional; Category III=remote likelihood or no known interactions; 82 FR 3655, January 12, 2017). The summer flounder, scup, and black sea bass fisheries are categorized within the LOF based on gear type (Table 2).

TABLE 2. COMMERCIAL FISHERIES CLASSIFICATION BASED ON 2017 LIST OF FISHERIES (82 FR 3655, JANUARY 12, 2017). AN (*) INDICATES THOSE SPECIES DRIVING THE FISHERIES CLASSIFICATION.

Resource	Gears	LOF	Species Observed Seriously Injured/Killed
Summer flounder, scup, and black sea bass	Mid-Atlantic bottom trawl fishery	Cat. II	Bottlenose (offshore stock), short beaked common*, Risso's*, and white-sided dolphins; short- and long-finned pilot whales; gray seal and harbor seals
	Northeast bottom trawl	Cat. II	Bottlenose (offshore stock), Risso's, short beaked common, and white-sided* dolphins; harbor porpoise; harbor, gray, and harp seals; long-finned pilot whales; minke whale.
Scup and black sea bass	Atlantic mixed species trap/pot fishery	Cat. II	Fin and humpback whales

4.4.4.1.5 *Large Whales*

Bottom Trawl Gear: Aside from minke whales, large whale interactions with bottom trawl gear have never been observed. Minke whale interactions with bottom trawl gear have been observed (strictly northeast bottom trawl fishery to date); however, the frequency of bottom trawl interactions has declined since 2008 (estimated annual mortality=7.8 whales), with an estimated annual mortality of zero minke whales from 2009-2012 and no serious injuries reported during this time (Henry et al. 2015; Waring et al. 2014a; Waring et al. 2015a; Waring et al. 2016; Lyssikatos 2015). Although minke whales have the potential to interact with this gear type, the likelihood of interactions in the summer flounder, scup, and black sea bass fisheries is likely to be low for this or any other species of large whale.

Pot/Trap Gear: The greatest entanglement risk to large whales is posed by fixed fishing gear (e.g., trap/pot gear, sink gillnet gear) with vertical or ground lines that rise into the water column (Johnson *et al*. 2005; NMFS 2014b; Kenney and Hartley 2001; Hartley *et al*. 2003; Whittingham *et al*. 2005a,b; Waring *et al*. 2016). Interactions resulting in serious injury to and mortality of large whales have been observed in this gear type (Waring et al. 2014a, Waring et al. 2015a; Waring et al. 2016; NMFS 2014b; Henry et al. 2016). Due to the incidences of interactions with vertical lines associated with fixed fishing gear, such as trap/pot gear, in addition to the endangered status of the species being affected most by these gear types (North Atlantic right

whale and fin), pursuant to the MMPA, these large whale species were designated as strategic stocks.[10]

Section 118(f)(1) of the MMPA requires the preparation and implementation of a Take Reduction Plan (TRP) for any strategic marine mammal stock that interacts with Category I or II fisheries. As a result, to address and mitigate the risk of large whale entanglement in fixed fishing gear comprised of vertical line, including gillnet gear and trap/pot gear, the Atlantic Large Whale Take Reduction Plan (ALWTRP) was implemented.[11]
The ALWTRP identifies gear modification requirements and restrictions for Category I and II trap/pot fisheries in the Northeast, Mid-Atlantic, and Southeast regions of the U.S. (designated management areas); these fisheries must comply with all regulations of the ALWTRP.[12] For further details on the gear modification requirements, restrictions, and management areas under the ALWTRP please see: http://www.greateratlantic.fisheries.noaa.gov/Protected/whaletrp/.

4.4.4.1.6 *Small Cetaceans and Pinnipeds*

Bottom Trawl Gear: Small cetacean and pinniped species have been observed seriously injured and killed in bottom trawl gear and have been observed taken in this gear type on trips targeting summer flounder, scup, or black sea bass (Lyssikatos 2015, Waring et al. 2014a,b; Waring et al. 2015a,b; Waring et al. 2016; http://www.nefsc.noaa.gov/fsb/take_reports/nefop.html). Total annual bycatch mortality in Northeast and Mid-Atlantic commercial bottom trawl trips (considers all FMPs) from 2008-2013 is provided in Lyssikatos (2015). The highest annual bycatch mortality in bottom trawl gear (Northeast and Mid-Atlantic combined) was observed for short beaked common dolphins, followed by Atlantic white-sided dolphins, gray seals, risso's dolphins, long-finned pilot whales, bottlenose dolphins, harbor seals, harbor porpoise, and harp seals (Lyssikatos 2015).

In 2006, based on observed mid-water trawl interactions with long-finned pilot whales, short - finned pilot whales, common dolphins, and white sided dolphins, the Atlantic Trawl Gear Take Reduction Team (ATGTRT) was convened to address the incidental mortality and serious injury of these species incidental to bottom and mid-water trawl fisheries operating in both the Northeast and Mid-Atlantic regions. Because none of the marine mammal stocks of concern to

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[10] A strategic stock is defined under the MMPA as a marine mammal stock: for which the level of direct human-caused mortality exceeds the potential biological removal level; which, based on the best available scientific information, is declining and is likely to be listed as a threatened species under the ESA within the foreseeable future; or which is listed as a threatened or endangered species under the ESA, or is designated as depleted under the MMPA.

[11] The ALWTRP was implemented in 1997. Since 1997, the ALWTRP has been modified several times, including the Sinking Groundline Rule and Vertical Line Rules (72 FR 57104, October 5, 2007; 79 FR 36586, June 27, 2014; 79 FR 73848, December 12, 2014; 80 FR 14345, March 19, 2015; 80 FR 30367, May 28, 2015).

[12] The fisheries currently regulated under the ALWTRP include: Northeast/Mid-Atlantic American lobster trap/pot; Atlantic blue crab trap/pot; Atlantic mixed species trap/pot; Northeast sink gillnet; Northeast anchored float gillnet; Northeast drift gillnet; Mid-Atlantic gillnet; Southeastern U.S. Atlantic shark gillnet; and Southeast Atlantic gillnet (NMFS 2014b).

the ATGTRT are classified as a "strategic stock", nor do they currently interact with a Category I fishery, it was determined at the time that development of a take reduction plan was not necessary. In lieu of a take reduction plan, the ATGTRT agreed to develop an Atlantic Trawl Gear Take Reduction Strategy (ATGTRS). The ATGTRS identifies informational and research tasks, as well as education and outreach needs, to provide the basis for decreasing mortalities and serious injuries of marine mammals to insignificant levels approaching zero mortality and serious injury rates. The ATGTRS also identifies several voluntary measures that can be adopted by certain trawl fishing sectors to potentially reduce the incidental capture of marine mammals. For additional details, visit: http://www.greateratlantic.fisheries.noaa.gov/Protected/mmp/atgtrp/

Pot/Trap Gear: Over the past several years, observer coverage has been limited for trap/pot fisheries. In the absence of extensive observer data for these fisheries, stranding data provides the next best source of information on species interactions with trap/pot gear. Stranding data underestimates the extent of human-related mortality and serious injury because not all of the marine mammals that die or are seriously injured in human interactions are discovered, reported, or show signs of entanglement. Additionally, if gear is present, it is often difficult to definitively attribute the animal's death or serious injury to the gear interaction, or to a specific fishery. Therefore, the conclusions below should be taken with these considerations in mind.
Table 1 provides the list of small cetacean and pinniped species that may occur and be affected by the summer flounder, scup, and black sea bass fisheries. Of these species, only several bottlenose dolphin stocks have been identified as species at risk of becoming seriously injured or killed by trap/pot gear. Stranding data provides the best source of information on species interaction history with these gear types. Based on stranding data from 2007-2013, estimated mean annual mortality for each stock was less than one animal (Waring et al. 2014a; Waring et al. 2016).[13] Interactions with trap/pot gear, resulting in the serious injury or mortality to small cetaceans or pinnipeds are believed to be infrequent (for bottlenose dolphin stocks) to non-existent (for all other small cetacean and pinniped species).

4.5 Human Communities and Economic Environment

4.5.1 *Recreational Fishery at the Artificial Reef Sites*

Recreational Fishery Description

Three sources of marine recreational fishing data were considered for describing recreational fishing activity at the 13 NJ artificial reefs in question. The strengths and weaknesses of all three are discussed below.

[13] Stranding data provided in Waring *et al*. 2015a were not considered in estimating mean annual mortality as not all bottlenose dolphin stocks are addressed in this stock assessment report. As all bottlenose dolphin stocks are considered in Waring *et al.* (2014a) and Waring *et al*. (2016), these stock assessment reports were used to estimate mean annual mortality. Estimates of mean annual mortality were calculated based on the total number of animals that stranded between 2007-2013, and that were determined to have incurred serious injuries or mortality as result of interacting with trap/pot gear. Please note, for bottlenose dolphin stocks, Waring *et al*. (2014a) and Waring *et al*. (2016) provides two categories for trap/pot gear: (Atlantic blue) crab pot, and other pot gear. We combined the two to get an overall number of interactions associated with trap/pot gear in general. In addition, any animals released alive with no serious injuries were not included in the estimate. Also, if maximum or minimum number of animals stranded were provided, to be conservative, we considered the maximum estimated number in calculating our mean annual estimate of mortality.

Marine recreational fishing data collected through NMFS' Marine Recreational Information Program (MRIP), provides estimates of recreational catch, effort, and participation across states, fishing modes, and two-month waves. The MRIP data is also post-stratified spatially to provide estimates of catch and effort according to area fished. The MRIP spatial estimates, however, are limited to inland waters, state waters, and the federal exclusive economic zone. Thus, the spatial estimates provided by MRIP are not sufficient for describing private boat and for-hire recreational fishing activity occurring at an artificial reef. Please see http://www.st.nmfs.noaa.gov/st1/recreational/index.html for further information on the MRIP program.

Vessel trip reports (VTRs) submitted by for-hire recreational fishing vessels include the latitude/longitude of where most of the effort on a trip occurred, but the vast majority of the for-hire reports include only the nearest latitude/longitude degrees and not the latitude/longitude minutes and seconds necessary for pinpointing actual fishing locations. In addition, the VTR instructions state that fishermen must "enter a single set of latitude [longitude] bearings where most of your effort occurred." Thus, the entirety of a trip's effort is represented by a single set of points within each NMFS statistical area, regardless of how many different locations were fished during the trip. Given that the area of each artificial reef under SMZ consideration is generally less than one square mile, the precision of the self-reported VTR points was deemed inadequate for identification of for-hire activity occurring at a reef site.

The final data source was obtained from a reef creel survey conducted by the New Jersey Department of Environmental Protection (NJDEP) in 2000 (Figley 2001). This survey focused on determining the level of participation, effort, and catch in New Jersey's recreational boat wreck/reef fisheries. The 2000 survey was a follow-up to two previous reef creel surveys conducted by the NJDEP in 1991 and 1995. Unfortunately, the 2000 survey was the last one conducted by the NJDEP. While the data collected from the 2000 survey are over 15 years old, in combination with more recent NMFS data on fishing effort and angler expenditures in New Jersey, estimates of angler trips and expenditures at the 13 artificial reef sites under SMZ consideration can be derived.

The 2000 NJDEP survey was conducted to assess the effectiveness of the State's artificial reef construction program and to collect information necessary for management of reef fisheries. A combination of telephone and onboard surveys was used. A full description of the methods can be found in Figley (2001). Results of the survey indicated that 105,160 private boat angler fishing trips and 97,013 party/charter angler fishing trips occurred at the artificial reef sites during 2000. According to MRIP data, this represents 2.8% of total New Jersey private boat angler fishing trips in 2000 (3,727,384), and 18.7% of total New Jersey party/charter boat angler fishing trips in 2000 (517,954). Since 2000, private boat angler effort in New Jersey has generally declined and reached its lowest level in 2015 (Figure 6). Party/charter angler effort in New Jersey has remained relatively stable over the past 15 years.

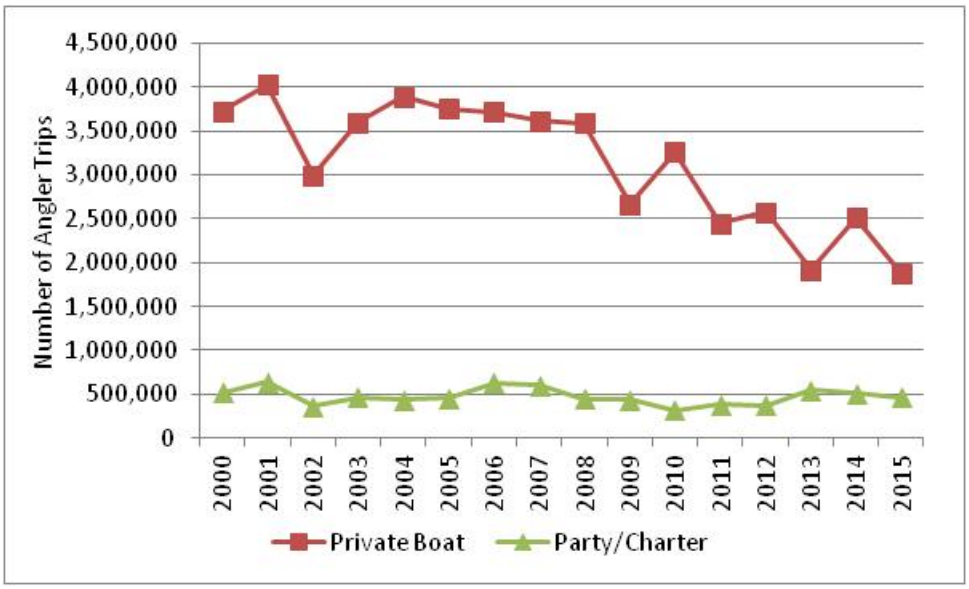

FIGURE 6. ESTIMATED NUMBER OF ANGLER TRIPS IN NEW JERSEY BY MODE

If it is assumed that the same proportions of angler fishing trips that occurred at the reef sites in 2000 has remained constant, then 52,930 private boat angler trips and 87,234 party/charter angler trips took place at the reef sites in 2015 (Table 3).

Table 3. 2015 Angler Trips in New Jersey and the Percentage that Occurred at Artificial Reefs

	Total Angler Trips		Angler Trips at Artifical Reefs	% of Total
Private Boat	1,876,955		52,930	2.8%
Charter/Party	465,745		87,234	18.7%

In light of the fact that decisions must be made that involve differential treatment of the 13 reefs, Table 4 shows the estimated number of angler trips at each of the reef sites by mode in 2015. These estimates should be viewed with caution since they were calculated by extrapolating from results found in Figley (2001). The importance of the reef sites to anglers, in terms of number of angler trips to a particular reef, may have changed during the past 15 years. Nonetheless, the estimates in Table 4 provide the best available approximation of the current distribution of angler effort at the reef sites.

The highest percentage of private boat angler effort at the artificial reefs is estimated to occur at the Barnegat Light site, followed closely by Little Egg, and then Sea Girt, Garden State South, Cape May, and Garden State North. These sites account for over 85% of angler private boat effort at the artificial reefs. The majority of charter and party boat angler trips occur at three reef sites: Cape May, Sea Girt, and Garden State North. These three sites account for over 63% of charter/party angler trips. In total, the reef sites that attract the most angler effort aboard private

boats and charter/party boats are Barnegat Light, Little Egg, Sea Girt, Cape May, and Garden State North and South.

TABLE 4. ESTIMATED NUMBER OF ANGLER TRIPS BY REEF SITE IN 2015

	Private			Charter/Party			Total	
	Trips	%		Trips	%		Trips	%
Atlantic City Reef Site	2,334	4.4%		7,122	8.2%		9,456	6.7%
Barnegat Light Reef Site	9,906	18.7%		3,786	4.3%		13,691	9.8%
Cape May Reef Site	6,372	12.0%		30,190	34.6%		36,562	26.1%
Deepwater Reef Site	*	*		*	*		*	*
Garden State North reef Site	6,309	11.9%		12,160	13.9%		18,468	13.2%
Garden State South Reef Site	6,687	12.6%		3,786	4.3%		10,473	7.5%
Great Egg Reef Site	1,641	3.1%		6,481	7.4%		8,122	5.8%
Little Egg Reef Site	8,516	16.1%		3,786	4.3%		12,302	8.8%
Ocean City Reef Site	1,703	3.2%		1,893	2.2%		3,596	2.6%
Sea Girt Reef Site	7,382	13.9%		12,801	14.7%		20,183	14.4%
Shark River Reef Site	252	0.5%		-	0.0%		252	0.2%
Townsends Inlet Reef Site	*	*		*	*		*	*
Wildwood Reef Site	1,829	3.5%		5,230	6.0%		7,059	5.0%
	52,930	100.0%		87,234	100.0%		140,164	100.0%

* Too few trips at Deepwater to estimate angler effort and the Townsend Inlet reef site was constructed after the Figley (2001) report so angler effort at the Townsend site could not be estimated.

Black sea bass comprised the majority of anglers' catches at the New Jersey artificial reefs in 2000, followed by scup, summer flounder, and tautog (Figley 2000). When contrasted with MRIP data, about 13% of the total number of fish caught in New Jersey in 2000 were caught at artificial reefs. Additionally, the reefs accounted for approximately 53% of the total catch of the species encountered at artificial reefs (black sea bass, scup, summer flounder, tautog, cunner, and red hake). Thus, in relative terms, the reef sites contributed to the recreational catch of several species, particularly black sea bass and scup, at a much higher rate than the non-reef ocean environment in 2000. While recreational fishing activity at the artificial reefs may have changed somewhat since the Figley (2001) report, the importance of the artificial reefs to many recreational fishermen has likely remained strong.

Recreational Fishery Social and Economic Assessment

Anglers spend money to fish at the reef sites and they obtain non-monetary benefits associated with satisfaction. In other words, anglers incur expenses to fish (purchases of gear, bait, boats, fuel, etc.), but do not pay for the fish they catch or retain nor for the enjoyment of many other attributes of the fishing experience (socializing with friends, being out on the water, etc.). Despite the obvious value of these fish and other attributes of the experience to anglers, no direct expenditures are made for them, hence the term "non-monetary" benefits. In order to determine

the magnitude of non-monetary benefits associated with fishing at the 13 reef sites, demand curves for recreational fishing must be constructed. Unfortunately, data limitations preclude the ability to construct these demand curves for recreational fishing at the reef sites. Therefore, the angler assessment provided here is limited to describing only actual expenditures by anglers fishing at the reef sites.

Anglers' expenditures generate and sustain employment and personal income in the production and marketing of fishing-related goods and services. In 2014, an economic study of marine recreational fishermen (NMFS 2016) estimated that average trip expenditures in New Jersey in 2014 were $66.34 for anglers fishing from a private/rental boat and $111.45 for anglers that fished from a party/charter boat. Trip-related goods and services included expenditures on private transportation, public transportation, food, lodging, boat fuel, private boat rental fees, party/charter fees, access/boat launching fees, equipment rental, bait, and ice.

Apart from trip-related expenditures, anglers also purchase fishing equipment and other durable items that are used for many trips (i.e., rods, reels, clothing, boats, etc.). Although some of these items may have been purchased specifically to fish at one of the artificial reef sites, the fact that these items can be used for multiple trips creates difficulty when attempting to associate durable expenditures with the artificial reefs. Therefore, only trip-related expenditures are used in this assessment.

Assuming that the average trip expenditures estimated in NMFS (2016) are equivalent to the expenditures of anglers fishing at the artificial reef sites, total angler expenditures at the reef sites can be estimated by multiplying the average expenditure estimates by the estimated number of angler trips fished at the reef sites by mode. Based on the Figley (2001) report and MRIP data it is estimated that 2.8% of angler private boat fishing trips and 18.7% of angler party/charter boat fishing trips in New Jersey occur at the artificial reefs. Thus, according to the most recent year of available MRIP data (2015), 52,930 private boat and 87,234 charter/party boat angler trips occurred at the reef sites in 2015.

Table 5 shows the estimated total trip expenditures incurred by anglers to fish at the artificial reef sites in 2015. Across all reef sites, charter/party boat angler expenditures were almost three times higher than private boat angler expenditures. Private boat anglers spent an estimated $3.5 million on trip expenditures while charter/party boat anglers spent over $9.7 million to fish at the reef sites. In total, anglers are estimated to have spent over $13.2 million on trip expenditures to fish at the 13 artificial reefs in 2015.

TABLE 5. 2015 ANGLER TRIP EXPENDITURES ($'S) IN NEW JERSEY AND THE PERCENTAGE ASSOCIATED WITH TRIPS THAT OCCURRED AT ARTIFICIAL REEFS

	Total Angler Trip Expenditures	Artifical Reef Expenditures	% of Total
Private Boat	124,517,195	3,511,376	2.8%
Charter/Party	51,907,280	9,722,229	18.7%
Total	176,424,475	13,233,605	7.5%

If designation of the artificial reefs as SMZs reduces gear conflicts, some level of positive social and economic benefits would accrue to recreational fishermen. Lost recreational fishing gear due to interactions with commercial gear in the water would be eliminated, saving anglers' and party/charter businesses money and lost time, and could actually result in higher catches per angler. Anglers may even take more trips to these areas raising angler expenditures and party/charter revenues. Although sufficient data to evaluate these potential changes in social and economic benefits to anglers is unavailable, designation of the artificial reefs as SMZs would likely result in positive benefits to both anglers and party/charter businesses fishing at the reef sites relative to taking no action.

A component of angler trip expenditures when fishing aboard a charter/headboat is the passenger access fee. Access fees, in turn, are the primary income generator for for-hire businesses. Lovell, Steinback, and Hilger (2013) show that the average for-hire passenger fee in New Jersey was $74.14 in 2011. Multiplying this fee by the number of charter/headboat angler trips fished at the 13 reef sites provides an estimate of gross earnings by for-hire businesses from the reef sites. In 2015, for-hire boats earned an estimated $6.9 million in gross revenue from fishing at 13 reef sites.[14]

4.5.2 *Commercial Fishery at the Artificial Reefs*

Commercial Fishery Description

Impacts to commercial fishing were analyzed by mapping and quantifying recent fishing effort relative to the 13 artificial reefs. A Technical Memorandum outlining the mapping methodology was published by the NEFSC in 2014 (DePiper 2014) and a summary is provided here. Federally permitted commercial and party/charter vessels are required to submit a VTR for each trip, the requirements of which include indicating a general fishing location as a set of geographic coordinates. These self-reported coordinates do not precisely indicate the location of fishing effort, given that only one point is provided regardless of trip length or distance covered during the trip. As indicated above, this means that the self-reported VTR points are generally inadequate for identification of party/charter or commercial fishing activity occurring at a reef site. The mapping approach used here assesses the spatial precision of the commercial fishing VTR points and derives probability distributions for actual fishing locations. This allows for more robust analysis of the commercial fishing VTR data by taking into account some of the

[14] The consumer price index was used to adjust 2011 dollars ($74.14) to 2015 dollars ($78.68) prior to multiplying by the number of angler trips.

uncertainties around each reported point. The mapping approach is applied only to commercial fishing VTR data and not party/charter VTR data, because it requires use of Northeast Observer Program data that are not available for party/charter fishing trips.

Using observer data, for which precise fishing locations are available, a model was developed to derive probability distributions for actual fishing locations around a provided VTR point. Other variables likely to impact the precision of a given VTR point, such as trip length, vessel size, and fishery, were also incorporated into the model. The model allows for generation of out-of-sample predictions for the spatial footprint of a fishing trip, covering the universe of VTR data available. The model-generated dataset can be understood as a repeated measure of the distance on a single trip between observed hauls and the self-reported VTR location of fishing. The distance is equivalent to a radius of a circle centered around the self-reported fishing location within which there is a certain confidence of all a trip's hauls falling. For example, a one-day trip employing pot/trap gear in the Mid-Atlantic region has a 25% confidence interval extending 1.02 nautical miles from the self-reported centroid of the circle. This means that on average we would expect 25% of a one-day pot/trap trip's hauls to fall within a 1.02 nautical miles of a self-reported location. The 50% confidence interval for a one-day pot/trap gear trip extends out 2.51 nautical miles, the 75% confidence interval extends out 6.18 nautical miles, and the 90% confidence interval extends out 14.0 nautical miles.

This analysis includes all VTR commercial fishing trips employing pot/trap gear where the model-generated spatial footprint of a trip (using the 90% confidence interval) included one or more of the 13 artificial reef sites from 2011 through 2015. While commercial fishing vessels employing gear other than pot/trap gear will technically be regulated if the artificial reefs are granted SMZ status, only pot/trap gear vessel trips are included in this analysis. Hand gear and dive gear activities will continue to be allowed under SMZ designation, and vessels using other mobile gears and fixed gears are assumed to avoid the reef site areas because of the known potential for bottom hang-ups with reef materials.

Price information from Northeast Dealer Weighout data was used to transform all VTR catches on trips employing pot/trap gear into revenues. Reef site dependence was then assessed by calculating the percentage of total ex-vessel revenue derived from the reef site areas.
The mapping model does have important caveats. The probability distributions generated from each reported VTR point create a likelihood of actual fishing locations in all directions from a given point, and do not take into account any specific directionality that may be associated with specific fishing methods or specific locations. For example, the model does not take into account fishing behavior along depth contours or other specific habitat features such as an artificial reef. Thus, for self-reported VTR points located on the reefs the model-estimated distribution of fishing effort would tend to be expanded beyond the reef to areas that may not actually be fished. In contrast, for self-reported VTR points located outside of the reef areas the model-estimated distribution of fishing effort may attribute a portion of the effort to the reef areas. As such, given the uncertainty of the initial self-reported coordinates, it is difficult to determine if the overall model-estimated activity at the reef sites would tend to be over or under

estimated. Nonetheless, since the model-estimated spatial footprint of a pot/trap trip is considerably larger than a reef site area, the model likely tends to underestimate reef activity on trips where most or all of the trip's landings occurred at a reef site. While the extent of this underestimation is unknown, given that each reef site is generally less than one square mile it's unlikely that a significant number of trips concentrate most or all of their hauls on a reef site. The number of VTR mapped commercial fishing trips during 2011 through 2015 that overlapped one or more of the reef sites for vessels employing pot/trap gear is shown in Table 6. In 2015, the model attributes a portion of the hauls on 826 pot/trap trips to the reef site areas. This means that there were an estimated 826 trips in 2015 where at least a portion of the landings on those trips was attributed to one or more reef site areas. Given the close proximity of some of the reef sites many pot/trap trips overlap more than one reef site. The model also estimates that vessels with reef site landings made an additional 1,234 pot/trap trips to areas that did not overlap with any of the reef sites. The percentage of trips that overlapped with one or more reef sites each year has remained relatively stable over the past five years. Although, in 2015 the number of reef site trips declined to its lowest level during the time series shown.

TABLE 6. FREQUENCY OF VTR MAPPED COMMERCIAL FISHING TRIPS FOR POT/TRAP VESSELS WHERE THE ESTIMATED SPATIAL FOOTPRINT OF THE TRIP INCLUDES ONE OR MORE OF REEF SITES

	2011		2012		2013		2014		2015	
	Trips	% of Total	Trips	% of Total	Trips	% of Total	Trips	% of Total	Trips	% of Total
Reef Site Trips	971	43.9%	986	47.9%	933	39.2%	954	41.4%	826	40.1%
Other Site Trips	1,240	56.1%	1,074	52.1%	1,445	60.8%	1,352	58.6%	1,234	59.9%
	2,211		2,060		2,378		2,306		2,060	

Table 5 shows the percentage of mapped pot/trap trips by reef site. The reefs with the highest percentage of mapped pot/trap effort over the past five years are Shark River, Sea Girt, Cape May, Wildwood, Ocean City, and Townsends Inlet. In 2015, these six reef sites comprised approximately 80% of the mapped reef site effort along the New Jersey coast. The six reef sites are located in close proximity to areas along the northern and southern New Jersey coast where the vast majority of New Jersey commercial pot/trap activity takes place. Figure's Figure 7, Figure 8, Figure 9, and Figure 10 show the model-estimated spatial concentrations of total ex-vessel revenue from commercial pot/trap gear along New Jersey's coast from 2011 to 2014.

Comparing the mapped commercial pot/trap effort by reef site in Table 7 to estimates of recreational fishing effort at each reef site (Table 4), points to potential gear conflicts at the Cape May and Sea Girt reef sites, particularly between commercial pot/trap vessels and party/charter vessels. A relatively high proportion of VTR mapped commercial pot/trap fishing trips overlapped the Cape May and Sea Girt reef sites in 2015. Given that approximately half of the party/charter reef effort in 2015 was estimated to occur at the Cape May and Sea Girt reef sites, gear interactions may be occurring at these reef sites. The probability of gear conflicts at the other 11 reef sites is low, based on the recreational and commercial effort estimates shown in Table 4 and Table 7, respectively.

TABLE 7. PERCENTAGE OF VTR MAPPED COMMERCIAL FISHING TRIPS BY REEF SITE FOR POT/TRAP VESSELS WHERE THE ESTIMATED SPATIAL FOOTPRINT OF THE TRIP INCLUDES ONE OR MORE REEF SITES

	2011	2012	2013	2014	2015
	% of Total Reef Trips				
Atlantic City Reef Site	7.4%	6.6%	5.4%	2.8%	3.6%
Barnegat Light Reef Site	3.2%	2.5%	3.1%	1.8%	2.4%
Cape May Reef Site	7.3%	9.7%	7.9%	10.3%	11.2%
Deepwater Reef Site	1.6%	1.8%	2.3%	1.8%	2.4%
Garden State North reef Site	0.9%	1.1%	2.0%	0.5%	1.2%
Garden State South Reef Site	0.7%	0.9%	2.5%	0.5%	1.0%
Great Egg Reef Site	11.7%	9.1%	7.9%	6.5%	7.3%
Little Egg Reef Site	3.4%	5.1%	3.3%	1.4%	2.2%
Ocean City Reef Site	13.7%	9.7%	8.7%	10.1%	7.3%
Sea Girt Reef Site	15.9%	18.3%	19.7%	20.8%	20.5%
Shark River Reef Site	14.7%	18.9%	21.2%	21.7%	22.0%
Townsends Inlet Reef Site	10.2%	6.2%	8.6%	10.5%	8.1%
Wildwood Reef Site	9.4%	10.1%	7.4%	11.3%	10.8%

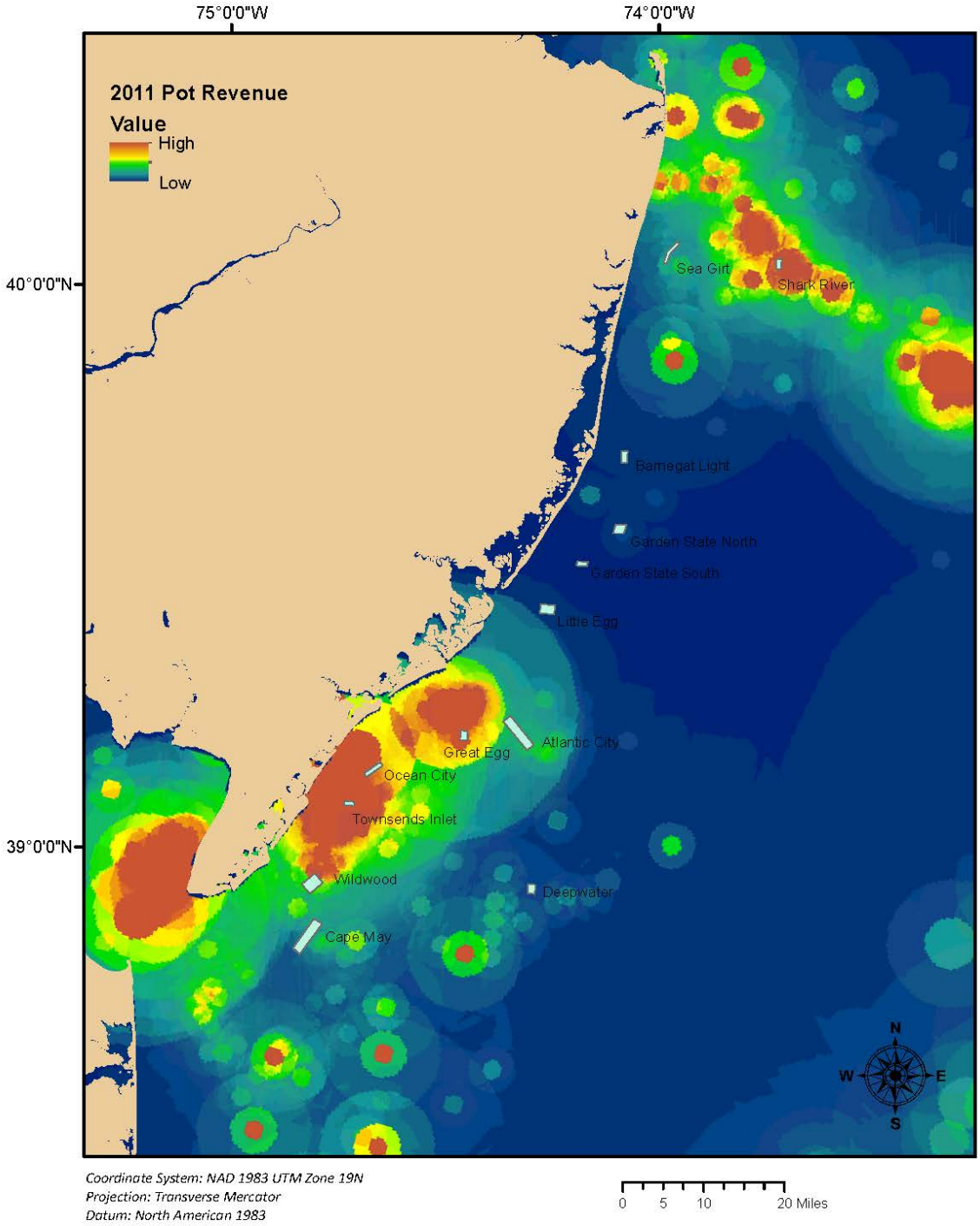

FIGURE 7. EX-VESSEL REVENUE CONCENTRATIONS OF COMMERCIAL FISHING VESSELS USING POT/TRAP GEAR, 2011

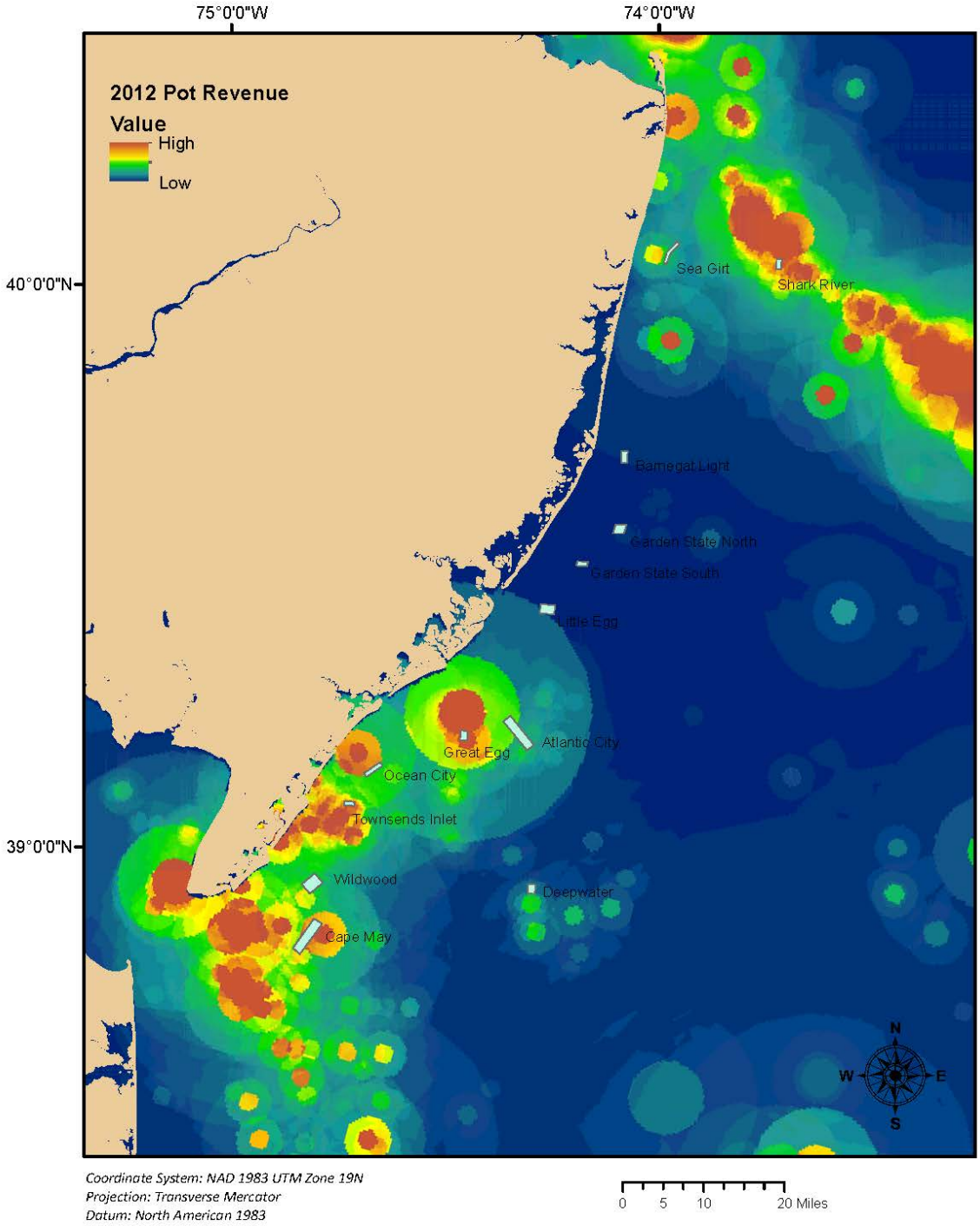

FIGURE 8. EX-VESSEL REVENUE CONCENTRATIONS OF COMMERCIAL FISHING VESSELS USING POT/TRAP GEAR, 2012

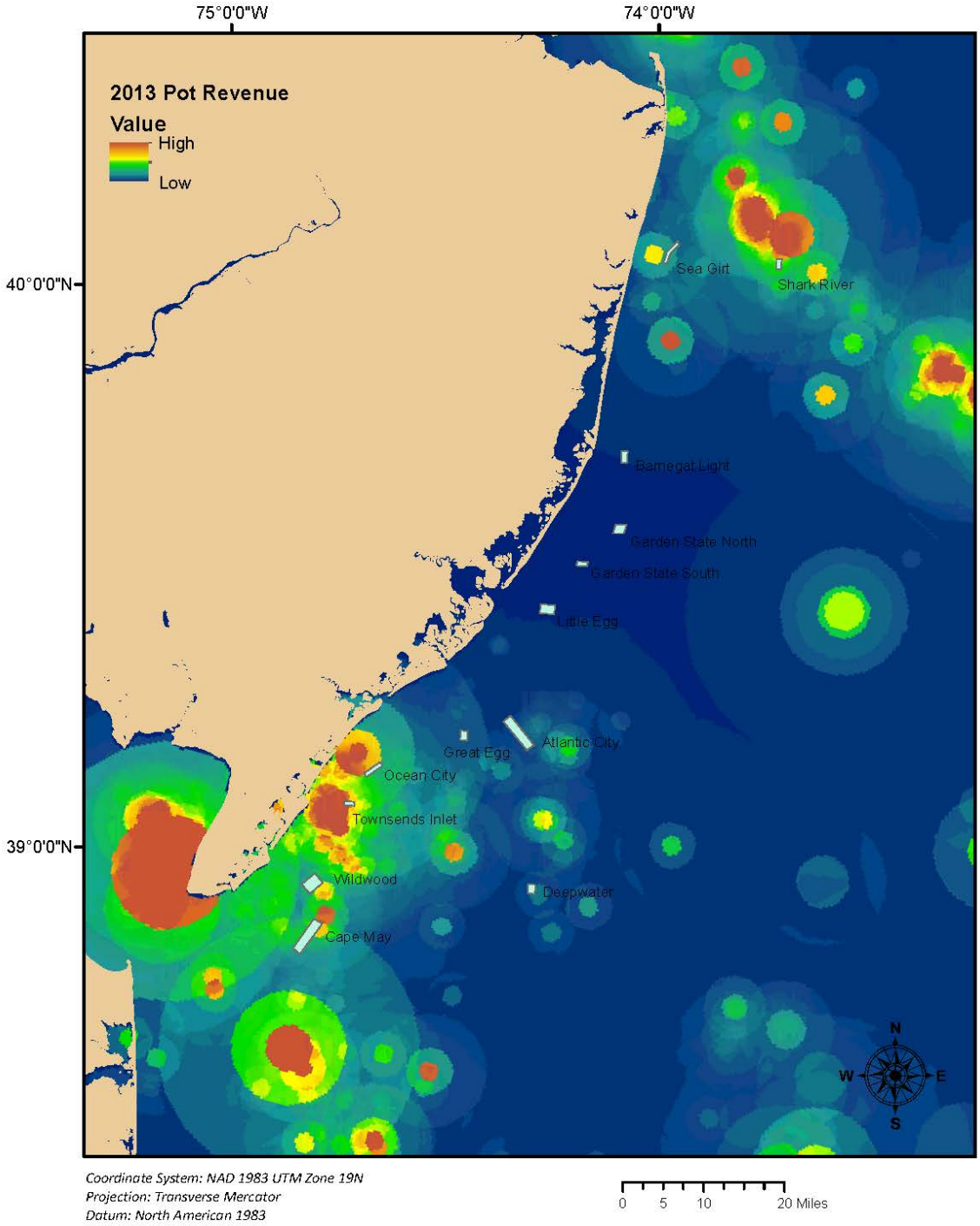

FIGURE 9. EX-VESSEL REVENUE CONCENTRATIONS OF COMMERCIAL FISHING VESSELS USING POT/TRAP GEAR, 2013

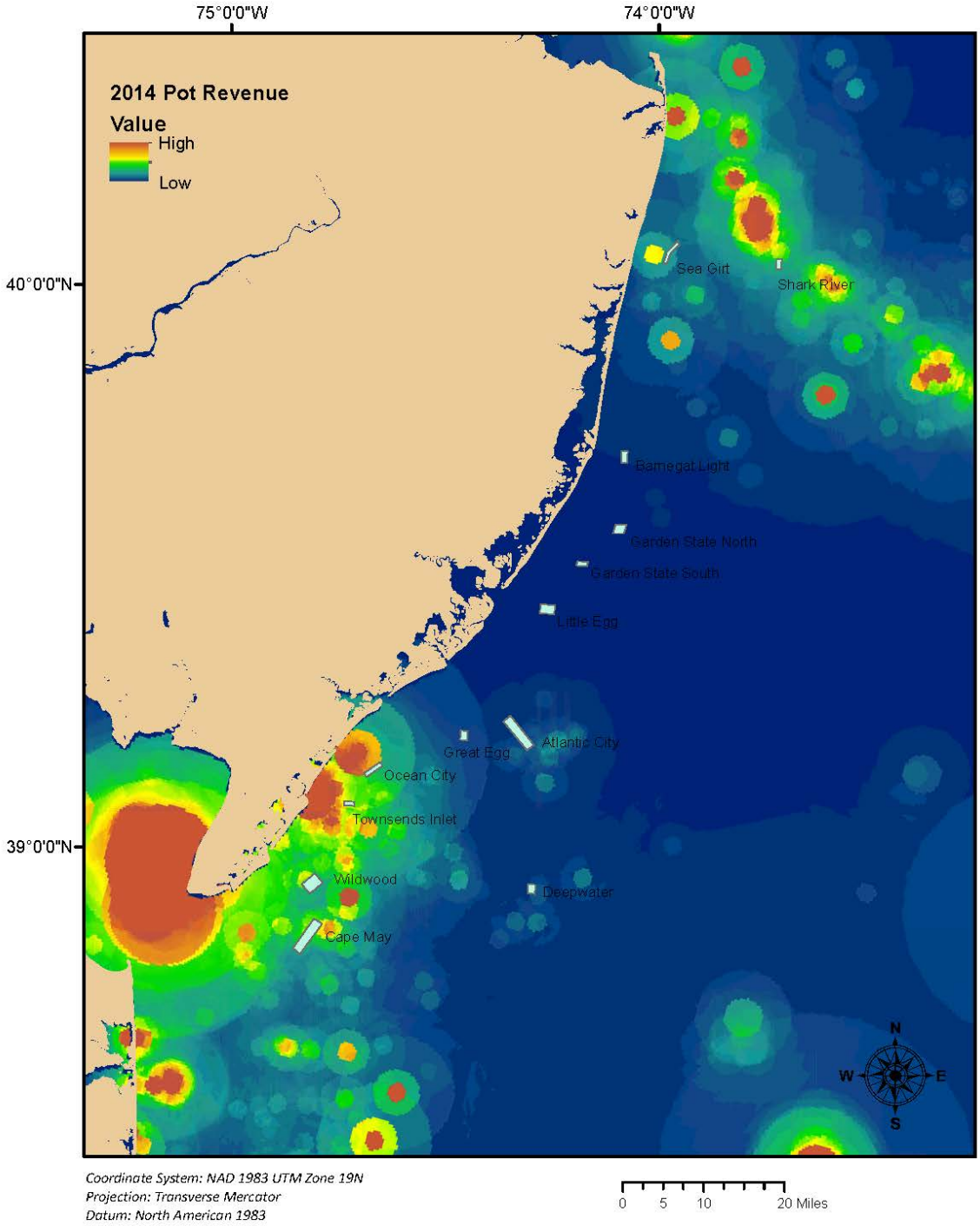

FIGURE 10. EX-VESSEL REVENUE CONCENTRATIONS OF COMMERCIAL FISHING VESSELS USING POT/TRAP GEAR, 2014

Commercial Fishery Social and Economic Assessment

The estimated ex-vessel value of landings at each reef site provides an indication of the importance of the sites to commercial pot/trap fishermen. The VTR mapping approach attributed pot/trap gear ex-vessel revenue to all 13 of the reef sites in 2011, 2012, 2013, 2014, and 2015 (Table 8). Since 2012, the highest ex-vessel revenues were from landings at the Cape May reef site, which constituted almost half of the total ex-vessel revenue obtained from the 13 reef sites in 2015. Two other reef sites with measurable pot/trap ex-vessel revenue over the past few years include the Wildwood reef site and Ocean City reef site.

TABLE 8. EX-VESSEL REVENUE OF VTR MAPPED COMMERCIAL FISHING POT/TRAP TRIPS WHERE THE ESTIMATED SPATIAL FOOTPRINT OF THE TRIP INCLUDES ONE OR MORE REEF SITES

	2011		2012		2013		2014		2015	
	$'s	%	$'s	%	$'s	%	$'s	%	$'s	%
Atlantic City Reef Site	3,002	13.4%	5,090	12.5%	1,224	4.8%	894	3.8%	1,422	5.7%
Barnegat Light Reef site	51	0.2%	41	0.1%	44	0.2%	35	0.2%	50	0.2%
Cape May Reef Site	2,086	9.3%	13,682	33.5%	9,757	38.3%	9,347	40.1%	11,761	47.2%
Deepwater Reef Site	103	0.5%	384	0.9%	373	1.5%	234	1.0%	2,273	9.1%
Garden State North reef Site	103	0.5%	35	0.1%	25	0.1%	8	0.0%	62	0.2%
Garden State South Reef Site	6	0.0%	2	0.0%	13	0.1%	2	0.0%	26	0.1%
Great Egg Reef Site	2,914	13.0%	9,602	23.5%	363	1.4%	257	1.1%	246	1.0%
Little Egg Reef Site	100	0.4%	104	0.3%	45	0.2%	11	0.0%	35	0.1%
Ocean City Reef Site	3,809	17.0%	2,313	5.7%	2,965	11.6%	3,025	13.0%	2,467	9.9%
Sea Girt Reef Site	680	3.0%	1,499	3.7%	1,314	5.2%	1,161	5.0%	1,605	6.4%
Shark River Reef Site	2,247	10.0%	2,391	5.9%	1,863	7.3%	1,052	4.5%	1,028	4.1%
Townsends Inlet Reef	3,607	16.1%	2,002	4.9%	3,204	12.6%	1,833	7.9%	832	3.3%
Wildwood Reef site	3,749	16.7%	3,684	9.0%	4,318	16.9%	5,458	23.4%	3,097	12.4%
Total	22,457		40,830		25,507		23,317		24,903	

It is important to point out, however, that since the size of each reef site is generally less than one square mile, the amount of pot/trap activity occurring at each reef site is limited. Ex-vessel revenue from pot/trap landings at all 13 reef sites combined approached only $25 thousand in 2015. This represents less than one percent of total ex-vessel revenue (i.e., reef revenue and non-reef revenue combined) obtained by vessels with pot/trap reef landings in 2015 (Table 9). Over the past 5 years, ex-vessel reef revenue from pot/trap landings has remained below 1% of total ex-vessel revenue for vessels with pot/trap reef landings.

TABLE 9. TOTAL POT/TRAP GEAR EX-VESSEL REVENUE ($'S) FOR VESSELS WITH REEF LANDINGS AND THE PERCENTAGE DERIVED FROM THE REEF SITES

Year	Total Revenue	Total Reef Value	Reef %
2011	3,072,121	22,457	0.73%
2012	4,173,844	40,830	0.98%
2013	3,838,313	25,507	0.66%
2014	2,761,648	23,317	0.84%
2015	3,597,491	24,903	0.69%

When all pot/trap activity occurring in New Jersey is considered (i.e., ex-vessel revenue from vessels with and without reef landings), reef site ex-vessel revenue represented between 0.19% and 0.31% of total ex-vessel revenue from New Jersey pot/trap landings (Table 10).

TABLE 10. TOTAL POT/TRAP GEAR EX-VESSEL REVENUE ($'S) IN NEW JERSEY AND THE PERCENTAGE DERIVED FROM THE REEF SITES

	Total Revenue	Total Reef Value	Reef %
2011	12,029,983	22,457	0.19%
2012	13,288,816	40,830	0.31%
2013	11,520,749	25,507	0.22%
2014	9,401,312	23,317	0.25%
2015	9,530,137	24,903	0.26%

If all commercial fishing activity occurring in New Jersey is considered, reef site ex-vessel revenue by pot/trap gear represents 0.02% or less of total New Jersey commercial fishing ex-vessel revenue from 2011 – 2014 (Table 11).

TABLE 11. TOTAL EX-VESSEL REVENUE ($'S) IN NEW JERSEY (ALL GEARS) AND THE PERCENTAGE DERIVED FROM THE REEF SITES

	Total Revenue	Reef %
2011	220,376,924	0.01%
2012	187,706,784	0.01%
2013	132,859,932	0.02%
2014	151,930,102	0.01%

Table 12 shows the estimated number of commercial fishing vessels that deploy pot/trap gear at the reef sites and the percent of their total annual gross revenue landed at the 13 reef sites. The number of vessels with landings at the reef sites ranged from a high of 50 in 2012 to a low of 36 in 2015. Approximately 80% to 89% of these vessels were estimated to land less than 1% of their total annual revenue from the reef sites during 2011 to 2015. All but one of the remaining vessels were estimated to land between 1% to 5% of their total annual revenue at the reef sites

during 2011 to 2015. One vessel was estimated to have reef site landings equivalent to about 7% of its total annual revenue in 2014. However, total annual revenue for this vessel in 2014 was only $2,763, of which $185 (6.7%) was estimated to have been landed at one of the reef sites. Based on the results shown in Table 12 commercial fishing vessels deploying pot/trap gear off the coast of New Jersey would likely face minimal to no losses in ex-vessel revenue if the artificial reefs are designated as SMZs. In addition, commercial pot/trap fishing effort at the reefs would shift to other open areas mitigating potential revenue losses. An important point to consider though is that pot/trap vessels likely fish at the reef sites because catch rates are higher and because conflicts with mobile gear vessels are reduced. Forcing pot/trap vessels out of these sites may increase the likelihood of conflicts with vessels fishing mobile gear.

TABLE 12. NUMBER OF POT/TRAP VESSELS BY PERCENT OF TOTAL ANNUAL EX-VESSEL REVENUE DERIVED FROM THE REEF SITES

	<=1.0%	1.0 to 5.0%	5.0 to 10.0%	>=10.0%	Total
2011	34	9	0	0	43
2012	39	11	0	0	50
2013	32	5	0	0	37
2014	32	5	1	0	38
2015	32	4	0	0	36

The number of vessels with landings within the coordinates of the reef sites by homeport state in 2015 are shown in Table 13.

TABLE 13. NUMBER OF VESSELS WITH LANDINGS WITHIN THE COORDINATES OF THE REEF SITES BY HOMEPORT STATE

	Home Port State			
	NJ	MA	NY	DE
2015	30	3	2	1

4.5.3 *Recreational and Commercial Fishery Summary*

In summary, the reef sites that attract the most angler effort aboard private boats and charter/party boats are Barnegat Light, Little Egg, Sea Girt, Cape May, and Garden State North and South. In 2015, 2.8% of private boat trips and 18.7% of charter/party trip in New Jersey occurred on artificial reef sites, respectively. Thus, according to the most recent year of available MRIP data (2015), 52,930 private boat and 87,234 charter/party boat angler trips occurred at the reef sites in 2015. Private boat anglers spent an estimated $3.5 million on trip expenditures while charter/party boat anglers spent over $9.7 million to fish at the reef sites. In total, anglers are estimated to have spent over $13.2 million on trip expenditures to fish at the 13 artificial reefs in 2015. If designation of the artificial reefs as SMZs reduces gear conflicts, some level of positive social and economic benefits would accrue to recreational fishermen.

There were low levels of commercial pot/trap activity at all 13 of the reef sites from 2011 to 2015. Ex-vessel revenue from pot/trap landings at all 13 reef sites combined was less than $25 thousand in 2015, and averaged $27.4 thousand from 2011 to 2015. The combined value of the landings at the reef sites comprised less than 0.31% of the total annual ex-vessel value landed by all pot/trap gear in New Jersey from 2011 to 2015.

The number of vessels with landings at the reef sites ranged from a high of 50 in 2012 to a low of 36 in 2015. Approximately 80% to 89% of these vessels obtained less than 1% of their total annual gross revenue from the reef sites during 2011 to 2015. All but one of the remaining vessels earned between 1% and 5% of their total annual revenue at the reef sites during 2011 to 2015. One vessel was estimated to have landings at the reef site equivalent to about 7% of its total annual revenue in 2014. This vessel's total annual revenue in 2014 amounted to only $2,763 though, of which $185 (6.7%) was estimated to have been landed at one of the reef sites.

5.0 Impacts of Proposed Action and Alternatives

5.1 Impact Assessment

5.1.1 *Impacts to Target Species*

Alternative 1 – No Action

The No Action alternative maintains the status quo. As mentioned previously, no SMZs would be designated at any of the artificial reef sites. There would be no direct impacts on the targeted populations of fish taken on the artificial reefs, and no change to the operation of the commercial or recreational fisheries. However, under the No Action alternative, gear conflicts between the recreational and commercial fishery would likely continue in some of the areas within the artificial reef sites. This could have could have some indirect, slight negative impacts on the target species because gear conflicts can restrict efficient management of the fishery and the ability to control overall fishery effort between the recreational and the commercial fisheries. Additionally, the program to maintain the artificial reefs would be in jeopardy of losing its USFWS funding because the USFWS will cease to fund (via the SFR) artificial reefs that do not have a mechanism to allow for recreational fishing access. Without continued funding for maintenance, the artificial reefs would lose productivity over time. This would result in localized slight negative impacts to the target species that use the artificial reefs.

Compared to Alternative 2 and Alternative 3, this alternative would have slightly negative impacts on the target species because of continued gear conflicts (which inhibit orderly management) and fishing pressure from both the commercial and recreational fisheries. These impacts would occur mainly at the artificial reef locations. The lack of USFWS funding under this alternative would also lead to slight negative impacts due to the fact the site would not be maintained due to the termination of restoration funding. These slightly negative impacts are more negative compared to Alternative 2 than compared to Alternative 3 because Alternative 2 would designate all reef sites as SMZs, while Alternative 3 would only designate 11 reef sites as SMZs. Overall though, the relative negative impacts of the No Action alternative on the target resource are very slight compared to the other alternatives because such small areas compared to

the entire area of the EEZ off New Jersey – 19.71 nm^2 under Alternative 2 and 16.89 nm^2 under Alternative 3 – are being considered for SMZ status.

In summary, the No Action would have very slight negative impacts on the overall population of target species due to the small areas under consideration, but it could have more localized slight negative impacts on target species at the artificial reef sites.

Alternative 2 – Designate reef Sites 1-13 as SMZs (preferred alternative)
Alternative 2 would implement SMZs at all 13 reef sites. Under this SMZ designation, no fishing vessel or person on a fishing vessel may fish in the 13 New Jersey Special Management Zones with any gear expect hook and line and spear fishing (including the taking of fish by hand). Commercial fishing (not done via rod and reel) that would have taken place on the sites would likely shift out of the SMZs and take place next to the SMZs or in other areas.

For recreational fishermen, 13% of total fish caught in New Jersey in 2000 were caught on artificial reefs. Landings of fish caught on the reefs were 53% of the total catch of species often encountered there, including black sea bass, scup, summer flounder (which fall under this Fishery Management Plan), as well as tautog, cunner, and red hake. Therefore, reef sites are highly important for catch of target species.

Alternative 2 would not affect any ACLs so there would be no direct biological effects on the overall target species populations. While there may be some indirect slight positive impacts at the reefs associated with a more orderly managed fishery with less gear conflict, the area designated for the 13 artificial reef sites is a very small area (19.71 nm^2) compared to where the fisheries take place for the target species found near the reef sites. Therefore, would be no noticeable impact of Alternative 2 on the overall target species population.

Under Alternative 2, the program to maintain the artificial reefs would not be in jeopardy of losing its USFWS funding. The USFWS would allow continued use of the SFR funding for the artificial reefs because they would have a mechanism to allow for recreational fishing access throughout the year (by restricting commercial fishing access to the reefs). With continued funding for upkeep, the artificial reefs would maintain productivity over time. This would have localized slight positive impacts on the target species inhabiting the SMZ reefs. This maintenance and subsequent continued productivity could lead to slight positive impacts on target species.

Since Alternative 2 would designate the most SMZs, it would have the most localized slight positive impacts on target species compared to Alternatives 1 and 3. The most positive impacts would be seen compared to Alternative 1, where no sites would be considered for SMZ designation. There would still be more positive impacts on the target resource compared to Alternative 3, but since only two less sites will be designated as SMZ sites under Alternative 3, the potential benefits are relatively smaller.

In summary, Alternative 2 would have almost no impact on the overall population of target species, but there could be localized positive impacts at the reef sites due to continued maintenance and small decrease in fishing effort due to the lack of commercial fishing at the sites.

Alternative 3 – Designate all reef sites as SMZs except sites 2 and 11

Alternative 3 would implement SMZs at all reef sites except for Shark River (site 2) and Wildwood (site 11), which would still be open to commercial use. This alternative would designate 16.89 nm^2 of the EEZ off New Jersey as SMZ sites, open only to hook and line fishing (as opposed to 19.71 nm^2 under Alternative 2). Compared to the rest of the sites under consideration for SMZ designation, these two sites stood out as sites with low importance to the recreational fishery but high importance to the commercial fishery in terms of both revenue and fishing effort. Location also played a role – Shark River is located in the northern portion of New Jersey's coastal waters and Wildwood is located in the southern portion. Both reefs are located relatively close to SMZ designated reefs.

For recreational fishermen, 13% of total fish caught in New Jersey in 2000 were caught on artificial reefs. Landings of fish caught on the reefs were 53% of the total catch of species often encountered there, including black sea bass, scup, summer flounder (which fall under this Fishery Management Plan), as well as tautog, cunner, and red hake. Therefore, reef sites are highly important for catch of target species.

It is likely that commercial fishing that would have taken place on the sites would shift out of the SMZs and take place next to them or move to other areas. Since this alternative would not affect ACLs, there will be no direct biological effects on target fish stocks inhabiting artificial reefs. However, there could be low positive impacts localized at the SMZ sites because fishery will be managed better on these 11 sites due to a decrease in gear conflict. But because the SMZ area is such a small area (16.89 nm^2) compared to where fisheries for the target species take place near the reef sites and in the region in general, and if commercial effort simply shifts, there would be no impact on the overall target species population.

It is questionable whether funding would continue because two reefs would still have gear conflicts. Even if funding continues for the other 11 reefs, these two reefs will potentially decrease in productivity if their funding is lost. Wildwood is the third largest reef of the thirteen total at 2.1 nm^2. Therefore, there would be localized low negative impacts on the target species inhabiting Wildwood and Shark River reefs due to decreasing productivity and steady fishing pressures from both fisheries.

This alternative would have less localized positive impacts on the target species at SMZ reefs than Alternative 2, which designates all 13 artificial reefs sites as SMZs, but more localized positive benefits than the No Action alternative, which does not designate any sites as SMZs.

5.1.2 *Impacts to Non-Target Species and Bycatch*

Alternative 1 – No Action

This No Action alternative maintains the status quo. No SMZs would be designated at any of the artificial reef sites. There would be no direct impacts to the non-target and bycatch species populations on the artificial reefs because fishing pressure would continue as it has. However, the present gear conflicts between the commercial and recreational fisheries at the reef sites will also continue, which has slight, indirect negative impacts on non-target species and bycatch because gear conflicts make it more difficult to manage the fishery in an orderly way and control fishing effort across the competing fisheries. There is also a chance that removing pots from the area under SMZ designation would minimize bycatch, meaning that a continuation of pot fishing could have slight negative impacts on non-target species. However, because the reef areas are so small (19.71 nm^2) compared to the broader range of these species, this impact on the overall population of non-target species is very small.

Choosing this alternative would likely mean that the reef sites would lose USFWS funding from the SFR because of continued conflicts between the fisheries. Without this funding, the reefs would not be maintained and would slowly decrease in productivity. This loss of productivity could lead to localized slight negative impacts on non-target and bycatch species that use the reef habitat.

The localized slight negative impacts of this alternative related to gear conflicts and continued pressure from both fisheries would be slightly less negative compared to Alternative 3 than Alternative 2, because Alternative 3 only designates 11 sites as SMZs instead of all 13 sites.

Alternative 2 – Designate reef sites 1-13 as SMZs (preferred alternative)

Alternative 2 would implement SMZs at all 13 reef sites. Under this SMZ designation, no fishing vessel or person on a fishing vessel may fish in the 13 New Jersey Special Management Zones with any gear expect hook and line and spear fishing (including the taking of fish by hand). Commercial fishing (not done via rod and reel) that would have taken place on the sites would shift out of the SMZs and take place next to the SMZs or in other areas.

Because this action does not affect ACLs, there would be no direct biological effects on the non-target and bycatch species populations, assuming there are no large changes in ratio of target species to non-target and bycatch species and recreational fishing effort stays consistent. There could be indirect slight positive impacts associated with a more orderly managed fishery at the reef sites since they will all be SMZs under this alternative. There could also be a slight reduction in bycatch on the reef sites due to the fact there would be no pots or traps at the site, which would have a slight positive impact on non-target and bycatch species. However, the reef sites make up a small area (19.71 nm^2) compared to where fisheries take place for the major non-target species on or near the reef site, so the impact on non-target and bycatch species as a whole would be very small.

Under this alternative, USFWS funding would continue because recreational access would be preserved at all reefs, all year round. This continuation of funding means that reefs will be productive over time, leading to localized slight positive impacts on the non-targets species that live on the reefs.

This alternative would have a very small impact on the overall population of non-target species and bycatch, but would have localized slight positive impacts on non-target species at the reef site because the reefs would have continued maintenance. Since this alternative designates the most SMZs, it has the most localized slight positive impacts compared to Alternative 1 and Alternative 3. The impacts of this alternative are only slightly more positive than those of Alternative 3, because just two more sites, for a total of 2.82 nm^2 are designated SMZs under Alternative 2 compared to Alternative 3. These impacts are even more positive compared to the No Action, which does not designate any reef sites as SMZs.

Alternative 3 – Designate all reef sites as SMZs except sites 2 and 11

Alternative 3 would implement SMZs at all reef sites except for Shark River (site 2) and Wildwood (site 11), which would still be open to commercial use. This alternative would designate 16.89 nm^2 of the EEZ off New Jersey as SMZ sites, open only to hook and line fishing (as opposed to 19.71 nm^2 under Alternative 2).

The impacts of this alternative are similar to those under Alternative 2, but a smaller area would be considered for SMZ designation. As previously mentioned, commercial fishing effort would likely shift next to and out of the SMZs. Since this alternative would not affect ACLs, there will be no direct biological effects on non-target fish stocks inhabiting artificial reefs, assuming recreational fishing effort stays consistent and there is not a large change in the ratio of target species to non-target or bycatch species. There could be low positive impacts localized at the SMZ sites because fishery will be managed better on these 11 sites due to a decrease in gear conflict. There could also be a slight reduction in bycatch on the reef sites due to the fact there would be no pots or traps at the site, which would have a localized slight positive impact on non-target and bycatch species. However, because the SMZ area is such a small area (16.89 nm^2) compared to where fisheries for the target species take place near the reef sites and in the region in general, and if commercial effort simply shifts, there would only be a very small impact on the overall target species population.

The rest of the reefs besides Wildwood and Shark River would likely still be covered by USFWS SFR funding because they guarantee recreational access to the reefs. This continued funding for the reefs means they will stay maintained, leading to a slight positive impact for non-target species that live on the reefs.

Alternative 3, which designates 11 artificial reef sites as SMZs, will have less localized positive impacts on non-target and bycatch species than Alternative 2, which designates all 13 artificial reefs sites as SMZs, but more localized positive benefits than the No Action alternative, which does not designate any sites as SMZs.

5.1.3 *Impacts to Habitat*

Alternative 1 – No Action

The No Action alternative maintains the status quo. No SMZs would be designated, meaning commercial and recreational fishermen would both still be able to access the reefs. Habitat damaging commercial gear such as trawls and dredges, if any do so currently, would be able to continue fishing on the artificial reef sites and gear conflicts between the two fisheries would persist. However; vessels using trawls and dredges generally avoid the rough bottom of small artificial reef areas.

The USFWS would most likely cease funding to maintain all of the reefs because of continued gear conflicts. Without maintenance of the reefs, the habitat quality of those sites would degrade and productivity would decrease.

However, these localized slight negative impacts are a small area compared to the compared to the entire habitat of the species that inhabit the reefs and area near the reefs. Therefore, this alternative would only have a very small impact on the overall habitat.

The localized slight negative impacts would be slightly less negative compared to Alternative 3 rather than Alternative 2 because Alternative 3 only designates 11 reefs sites as SMZs, while Alternative 2 would designate all sites as SMZs.

Alternative 2 – Designate Reef sites 1-13 as SMZs (preferred alternative)

Alternative 2 would implement SMZs at all 13 reef sites. Under this SMZ designation, no fishing vessel or person on a fishing vessel may fish in the 13 reef sites with any gear expect hook and line and spear fishing (including the taking of fish by hand). Commercial fishing (not done via rod and reel) that would have taken place on the sites would shift out of the SMZs and take place next to the SMZs or in other areas.

This alternative would have slight positive impacts on the habitat at the artificial reef sites because fishing activity would be restricted to rod and reel fishing, which does not interact with the habitat. This decrease in gear interaction would allow the habitat to recover and flourish under SMZ designation. The USFWS would continue SFR funding because this alternative would guarantee recreational access to the reefs. Continued funding ensures that the reef is consistently maintained, which upholds the productive reef habitat. This would result in localized slight positive impacts on habitat within all 13 artificial reef sites.

However, this alternative would only protect 19.71 nm^2 of habitat in the greater habitat of the range of the target fishery and commercial fishing would likely just be displaced to along the edge of the reef or to nearby areas, so overall there would be little impact to habitat, because pots and traps would not be removed from the water.

The slight positive impacts localized at and around the artificial reef sites would be the most positive compared to Alternative 1 and Alternative 3. Alternative 3 is only slightly less positive than Alternative 2 because it designates almost as many artificial reef sites as SMZs (only two less than Alternative 2). The most positive impact would be seen compared to the No Action alternative because the No Action alternative would not designate any reef sites as SMZs.

Alternative 3 – Designate all reef sites as SMZs except sites 2 and 11

Alternative 3 would implement SMZs at all reef sites except for Shark River (site 2) and Wildwood (site 11), which would still be open to commercial use. This alternative would designate 16.89 nm^2 of the EEZ off New Jersey as SMZ sites, open only to hook and line fishing (as opposed to 19.71 nm^2 under Alternative 2).

The impacts under this alternative are similar to those of Alternative 2, except a slightly smaller area would be considered for SMZ designation. Therefore, the slight positive impacts on the habitat of only allowing rod and reel fishing would be applied to 11 sites instead of all 13 artificial reef sites. However, the overall there would be only be very slight impacts on the habitat due to the small area that would be protected under the SMZ status compared to the entire habitat range of the target species.

However, this alternative would only protect 16.89 nm^2 of habitat in the greater habitat of the range of the target fishery and commercial fishing would likely just be displaced to along the edge of the reef or to nearby areas, so overall there would be little impact to habitat, because pots and traps would not be removed from the water.

Under this alternative, USFWS SFR funding would probably continue, but would not be applied to the two excluded reefs. This means that slightly less habitat would be maintained under this alternative compared to Alternative 2, but again, compared to the overall habitat this is a minute difference.

Alternative 3 would have less localized positive impacts on the habitat at artificial reef sites than Alternative 2, which designates all 13 artificial reefs sites as SMZs. However, it would have more localized positive benefits than the No Action alternative, which does not designate any sites as SMZs.

5.1.4 *Impacts to Protected Resources*

Alternative 1 – No Action

The No Action alternative maintains the status quo. No SMZs would be designated, meaning commercial and recreational fishing on reefs would remain unrestricted. Gear conflicts between the two fisheries would continue to be an issue and fishing behavior would remain consistent. This could lead to a slight negative impact on protected species as the continued use of pots and traps with vertical lines at the artificial reef sites could result in takes of protected species, specifically marine mammals. Rod and reel fishing, which would also continue to occur, has a

low potential for risk of interaction with protected species, which has a very slight negative impact on protected species.

Compared to Alternative 2 and Alternative 3, there would be a more negative impact on protected resources under this alternative, because of the continued use of gear with vertical lines at all the sites, as well as sustained recreational fishing. However, if that commercial fishing effort under Alternatives 2 and 3 was simply shifted to areas near the SMZs or other areas in the region, there would be no impact on the overall population of protected species and no impact relative to each of the alternatives, compared to current conditions.

Alternative 2 – Designate reef sites 1-13 as SMZs (preferred alternative)
Alternative 2 would implement SMZs at all thirteen reef sites. Under this SMZ designation, no fishing vessel or person on a fishing vessel may fish in the 13 reef sites with any gear expect hook and line and spear fishing (including the taking of fish by hand).

Black sea bass pot or trap fishing is the most common commercial gear on New Jersey's artificial reefs. Under this alternative, pots and traps will be restricted from the reef site. However, pot and trap effort will likely shift to areas outside the reefs, where a majority of pot and trap effort already occurs. Therefore, the potential for interaction between protected resources and vertical lines associated with pots and traps still exists, at similar to levels to those of Alternative 1, because the same amount of pots and traps would still be in the water in the region. Rod and reel fishing, which is the only fishing that will occur at the reef sites and could occur throughout the region, has a very low potential risk for interaction with protected species. There is a chance that with the removal of gear conflicts, recreational (hook and line) effort could increase at the SMZ reef sites, which would increase the potential for interactions, which has a slight negative impact on protected species.

While Alternative 2 has the least negative effects on protected species within the SMZs compared to Alternative 1 and Alternative 3 because it prohibits the use of pots and traps at all of the artificial reef sites, the minor shifts in gear placement to surrounding areas would not increase or decrease interactions with the overall population of protected resources in the area, so there would be no impact compared to No Action and relative to each alternative, at least on a general scale. The potential increase in rod and reel fishing at the SMZ reef sites due to a decrease in gear conflicts is slightly negative compared to the No Action, where gear conflicts would continue to occur, and Alternative 3, where two reef sites would still allow commercial fishing.

Alternative 3 – Designate all reef sites as SMZs except sites 2 and 11
Alternative 3 would implement SMZs at all reef sites except for Shark River (site 2) and Wildwood (site 11), which would still be open to commercial use. This alternative would designate 16.89 nm^2 of the EEZ off New Jersey as SMZ sites, open only to hook and line fishing (as opposed to 19.71 nm^2 under Alternative 2).

The localized impacts of this alternative are similar those of Alternative 2, no vertical lines in the water at the SMZ sites; however, a slightly smaller area is being considered for SMZ status under this alternative, so the impacts are slightly more negative at the SMZ sites than Alternative 2 because there would still be pots/traps at 2 reef sites. However, the commercial fishing on the 11 reef sites to be designated as SMZs would likely shift to areas near the artificial reef sites or to other open areas. Since these minor shifts in gear with vertical lines would not really change overall interactions with protected resources, there would be no impact on the wider population of protected resources in the area compared to the No Action alternative. Rod and reel fishing, which is the only fishing that will occur at the reef sites and could occur throughout the region, has a very low potential risk for interaction with protected species, therefore, there is a very slight negative impact. There is a chance that with the removal of gear conflicts, recreational (hook and line) effort could increase at the reef sites, which would increase the potential for interactions, which has a slight negative impact on protected species.

Alternative 3 would have slightly more negative impacts on protected resources at artificial reef sites than Alternative 2, which designates all 13 artificial reefs sites as SMZs. But it would have less negative impacts than the No Action alternative, which does not designate any sites as SMZs. But because the commercial fishing effort would likely shift to nearby areas off the reef, the overall impact of SMZ designation at 11 artificial reefs sites would have no impact on the protected resources in the region as a whole because the number of vertical lines would remain the same, and there would be no impact on that population relative to each alternative. The potential increase in rod and reel fishing at the reef sites due to a decrease in gear conflicts is slightly negative compared the No Action, but would have less negative impacts than Alternative 2, where all sites would be restricted to rod and reel fishing, instead of just 11 under this alternative.

5.1.5 *Impacts to Human Communities*

Alternative 1 – No Action

The No Action alternative maintains the status quo. No SMZs would be designated and no gear or seasonal restrictions would be implemented on any of the artificial reef sites.

Recreational and commercial gear conflicts would continue on some of the artificial reefs and could increase in incidence and spread to all the reefs in the future. With continued gear conflicts on the artificial reef sites some recreational fishing effort would shift away from the artificial reefs because commercial gears on the reefs can restrict recreational fishing access. The economic and social benefits the artificial reefs provide to the recreational fleet would be reduced.

Fewer than 40 commercial pot/trap vessels were estimated to have set traps within the coordinates of the artificial reef sites under consideration in this action each year from 2013

through 2015. Landings from these vessels at the 13 artificial reef sites under consideration totaled $25,507 in 2013, $23,317 in 2014, and $24,903 in 2015. Of the total pot/trap gear ex-vessel revenue obtained in New Jersey during this time period, only approximately 0.22% to 0.26% was obtained each year from the 13 artificial reef sites. All but one of the potentially affected vessels earned less than 5.0% of their total ex-vessel revenue from the reef sites.
The No Action would have negligible to no impacts on vessels that conduct pot/trap fishing at the artificial reef sites in the short term as their fishing activities would not be altered. Under No Action, the recreational fleet would likely shift to other areas, and lose some of its prime fishing area on the artificial reefs. If catch rates away from the productive artificial reefs are lower, this could lead to a reduction in recreational fishing trips and angler expenditures associated with those trips. Anglers fishing aboard private boat and charter/party vessels spent over $13.2 million to fish at the 13 artificial reefs in 2015.

The program to maintain the artificial reefs would also be in jeopardy of losing its USFWS funding because USFWS policy is not to continue to use SFR funding for artificial reefs that do not have a mechanism to allow for recreational fishing access. Without continued funding for maintenance the artificial reefs would lose productivity over time. This would reduce the recreational and the commercial catch on and near them, and result in slight negative economic impacts to both the recreational and commercial vessels that fish them.

In summary, No Action would have slight negative social and economic impacts on the recreational fleet in both the short and long term. The No Action would have negligible social and economic impacts on the commercial fishery in the short term as their fishing activities would not be altered. However, No Action may have some slight negative impacts on the commercial fleet in the long term because the reefs may lose their maintenance funding and become less productive.

Alternative 2 – Designate Reef Sites 1-13 as SMZs (preferred alternative)
Alternative 2 would implement SMZs with gear restrictions at all 13 artificial reef sites. Approximately 40 commercial pot/trap vessels are estimated to be setting traps each year within the coordinates of the artificial reef sites under consideration in this action. However, ex-vessel revenue from these vessels at all 13 reef sites combined approaches only $25 thousand each year (2013 to 2015). This represents less than one percent of total ex-vessel revenue (i.e., reef revenue and non-reef revenue combined) obtained by these vessels each year. When all pot/trap activity occurring in New Jersey is considered (i.e., ex-vessel revenue from vessels with and without reef landings), reef site ex-vessel revenue represents less than 0.30% of total ex-vessel revenue from New Jersey pot/trap landings.

From 2013 to 2015, all but one of the pot/trap gear vessels with landings at the reef sites earned less than 5.0% of their total ex-vessel revenue from the reef sites each year. One vessel was estimated to have reef site landings equivalent to about 7% of its total annual revenue in 2014, but since total 2014 ex-vessel revenue for this vessel was $2,763 reef site landings amounted to only $185.

Based on these results, Alternative 2 would likely have slight negative impacts on vessels that conduct pot/trap fishing at the artificial reef sites. However, these vessels would likely shift to fishing areas near the artificial reef sites or other open areas mitigating potential revenue losses. Compared to the No Action, the recreational fleet would be provided better access to the artificial reef site areas as prime fishing areas under this alternative. The economic effects generated from recreational fishing trips to the artificial reefs would continue or be enhanced. Under Alternative 2, the program to maintain the artificial reefs would not be in jeopardy of losing its USFWS funding. The USFWS would allow continued use of SFR funding for the artificial reefs because they would have a mechanism to allow for recreational fishing access throughout the year. With continued funding for upkeep, the artificial reefs would maintain productivity over time. This would maintain or enhance the recreational catch on and around the reefs.

Overall, Alternative 2 would result in slight positive economic impacts to the recreational fleet and likely have slight negative to negligible economic effects on the commercial fishery compared to the No Action. Since it designates all 13 SMZ sites it would have the greatest positive impacts on the recreational fleet and would be most likely to have some slight negative impacts on the commercial fleet.

Alternative 3 – Designate all reef sites as SMZs except sites 2 and 11

Alternative 3 would implement SMZs at 11 reef sites (Shark River and Wildwood reef sites would remain open to commercial fishing). The Shark River Reef site has almost no recreational effort in this area (0.20%) (Table 4). Therefore, SMZ destination at that reef may not benefit the recreational fleet and would not effectively reduce overall gear conflicts. The Wildwood Reef is responsible for 15.68% of the commercial revenue from all the reefs, while only 5.00% of the recreational effort (Table 4). Wildwood Reef is very close to several other areas (Cape May and Townsend Inlet), which would give recreational anglers nearby SMZ options.

Average total pot/trap ex-vessel revenue derived from the Shark River and Wildlife reefs is estimated to be approximately $5,600 a year (2013 to 2015). Thus, Alternative 2 would have similar but slightly lower slight negative to negligible impacts than Alternative 2 on commercial vessels that conduct pot/trap fishing at the artificial reef sites because commercial fishing would continue to occur at these sites.

Compared to the No Action, this alternative would provide the recreational fleet with better access to 11 of the 13 artificial reef site areas as prime fishing. The economic effects generated from recreational fishing trips to 11 of the 13 artificial reefs would continue or be enhanced. However, the slight positive economic effects would be lower than those under Alternative 2 because only 11 of the 13 reefs would be designated as SMZs and maintenance and productivity may be jeopardized if SFR funding is lost for the Shark River and Wildwood reef sites.

5.2 Cumulative Effects Analysis

5.2.1 *Consideration of the VECs*

The VECs that exist within the summer flounder, scup, and black sea bass fishery environment are identified in the Affected Environment section (Section 4.0). Therefore, the significance of the cumulative effects will be discussed in relation to the VECs listed below.

1. Target Species (summer flounder, scup, and black sea bass)
2. Non-target species and bycatch
3. Habitat including EFH
4. Protected resources
5. Human Communities

5.2.2 *Geographic Boundaries*

The core geographic scope for each of the VECs is focused on the Western Atlantic Ocean. The core geographic scopes for the managed resources are the range of the management units (Section 4.1.1). For non-target species, those ranges may be expanded and would depend on the specific biological range of each individual non-target species in the Western Atlantic Ocean. In terms of habitat, the core geographic scope is focused on EFH within the EEZ, but includes all habitat utilized by summer flounder, scup, black sea bass, and other non-target species in the Western Atlantic Ocean. The core geographic scope for endangered and protected resources can be considered the overall range of those VECs in the Western Atlantic Ocean. For human communities, the core geographic boundaries are defined as those U.S. fishing communities directly involved in the harvest or processing of the managed resources, which were found to occur in coastal states from Maine through North Carolina.

5.2.3 *Temporal Boundaries*

The temporal scope of past and present actions for VECs is primarily focused on actions that have occurred after FMP implementation (1988 for summer flounder; 1996 for scup and black sea bass). For endangered and protected resources, the scope of the past and present actions is on a species by species basis (Section 4.3.3) and is largely focused on the 1980s and 1990s through the present, when NMFS began generating stock assessments for marine mammals and sea turtles that inhabit the waters of the U.S. EEZ. The temporal scope of future actions for all five VECs extends about three years (~2020) into the future beyond the analyzed timeframe of the alternatives described in this document. This period was chosen because of the dynamic nature of resource management for these three species and lack of information on projects that may occur in the future, which makes it very difficult to predict impacts beyond this timeframe with certainty. This is also the timeframe of a specifications cycle for the FMP.

5.2.4 *Actions Other Than Those Proposed in this Amendment*

The impacts of each of the alternatives considered in this document are analyzed in sections 5.1.1 through 5.1.5. This section presents meaningful past (P), present (Pr), or reasonably

foreseeable future (RFF) actions to be considered other than those actions being considered in this document (Table 14). These impacts are described in chronological order and qualitatively, as the actual impacts of these actions are too complex to be quantified in a meaningful way. When any of these abbreviations occur together (i.e., P, Pr, RFF), it indicates that some past actions are still relevant to the present and/or future actions.

Past and Present Actions

The historical management practices of the MAFMC have resulted in positive impacts on the health of summer flounder, scup, and black sea bass stocks (Section 4.1). Numerous actions have been taken to manage the commercial and recreational fisheries for these three species through amendment and framework adjustment actions. In addition, the specifications process provides the opportunity for the MAFMC and NMFS to regularly assess the status of the fishery and to make necessary adjustments to ensure that there is a reasonable expectation of meeting the objectives of the FMP and the targets associated with any rebuilding programs under the FMP. The statutory basis for federal fishery management is the MSA. To the degree with which this regulatory regime is complied with, the cumulative impacts of past, present, and reasonably foreseeable future federal fishery management actions on the VECs should generally be associated with long-term positive outcomes. Constraining fishing effort through regulatory actions can often have negative short-term socioeconomic impacts. These impacts are usually necessary to bring about long-term sustainability of a given resource, and as such, promote positive effects on human communities in the long term, especially those that are economically dependent on the summer flounder, scup, and black sea bass stocks.

Non-fishing activities that introduce chemical pollutants, sewage, changes in water temperatures, salinity, dissolved oxygen, and suspended sediment into the marine environment pose a risk to all of the identified VECs. Human-induced non-fishing activities tend to be localized in nearshore areas and marine project areas where they occur. Examples of these activities include, but are not limited to port maintenance, beach nourishment, coastal development, marine transportation, marine mining, dredging, and the disposal of dredged material. Wherever these activities co-occur, they are likely to work additively or synergistically to decrease habitat quality, and as such, may indirectly constrain the sustainability of the managed resources, non-target species, and protected resources. Decreased habitat suitability would tend to reduce the tolerance of the VECs to the impacts of fishing effort. Mitigation of this outcome through regulations that would reduce fishing effort could then negatively impact human communities. The overall impact to the affected species and their habitats on a population level is unknown, but likely no impact or slight negative, since many of these species have a limited or minor exposure to these local non-fishing disturbances.

In addition to guidelines mandated by the MSA, NMFS reviews these types of effects through the review process required by Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act for certain activities that are regulated by federal, state, and local authorities. The jurisdiction of these activities is in “waters of the U.S.” and includes both riverine and marine habitats. There was also an EFH consultation between the US Army Corps of Engineers

and NMFS for the construction and maintenance of NJ's artificial reefs. This was completed as part of the Army Corps' permitting process and will be reinitiated when the permit is reviewed every ten years.

Reasonably Foreseeable Future Actions

Non-fishing activities permitted under other federal agencies (e.g. beach nourishment, offshore wind facilities, etc.) require examinations of potential impacts on the VECs. The MSA imposes an obligation on other federal agencies to consult with the Secretary of Commerce on actions that may adversely affect EFH (50 CFR 600.930). The eight regional fishery management councils engaged in this review process by making comments and recommendations on Federal or state actions that may affect habitat for their management species and by commenting on actions likely to substantially affect habitat.

Under section 662 of the Fish and Wildlife Coordination Act, "whenever the waters of any stream or other body of water are proposed or authorized to be impounded, diverted, the channel deepened, or the stream or other body of water otherwise controlled or modified for any purpose whatsoever, including navigation and drainage, by any department or agency of the U.S., or by any public or private agency under federal permit or license, such department or agency first shall consult with the USFWS, Department of the Interior, and with the head of the agency exercising administration over the wildlife resources of the particular state wherein" the activity takes place. This act provides another avenue for review of actions by other federal and state agencies that may impact resources that NMFS manages in the reasonably foreseeable future. NMFS and USFWS share responsibility for implementing the ESA. The ESA requires NMFS to designate critical habitat (i.e. areas that contain physical or biological features essential for conservation, which may require special management considerations or protection) for any species it lists under the ESA and to develop and implement recovery plans for threatened and endangered species. The ESA provides another avenue for NMFS to review actions by other entities that may impact endangered and protected species whose management units are under NMFS jurisdiction.

5.2.5 *Magnitude and Significance of Cumulative Effects*

In determining the magnitude and significance of the cumulative effects, the additive and synergistic effects of the proposed action, as well as past, present, and future actions, must be taken into account. The following section discusses the effects of these actions on each of the VECs.

TABLE 14. IMPACTS OF PAST (P), PRESENT (PR), AND REASONABLY FORESEEABLE FUTURE (RFF) ACTIONS ON THE FIVE VECS (NOT INCLUDING THOSE ACTIONS CONSIDERED IN THIS DOCUMENT).

Action	Description	Impacts on Managed Resource	Impacts on Non-target Species	Impacts on Habitat and EFH	Impacts on Protected Species	Impacts on Human Communities
P, Pr Original FMP and subsequent Amendments and Frameworks to the FMP	Established commercial and recreational management measures	**Indirect Positive** Regulatory tool available to rebuild and manage stocks	**Indirect Positive** Reduced fishing effort	**Indirect Positive** Reduced fishing effort	**Indirect Positive** Reduced fishing effort	**Indirect Positive** Benefited domestic businesses
P, Pr, RFF Summer Flounder, Scup, and Black Sea Bass Specifications	Establish quotas, RHLs, other fishery regulations (commercial and recreational)	**Indirect Positive** Regulatory tool to specify catch limits, and other regulation; allows response to annual stock updates	**Indirect Positive** Reduced effort levels and gear requirements	**Indirect Positive** Reduced effort levels and gear requirements	**Indirect Positive** Reduced effort levels and gear requirements	**Indirect Positive** Benefited domestic businesses
P, Pr, RFF Developed, Applied, and Redo of Standardized Bycatch Reporting Methodology	Establishes consistent approach to monitoring bycatch in fisheries	**Neutral** May improve data quality for monitoring total removals of managed resource	**Neutral** May improve data quality for monitoring removals of non-target species	**Neutral** Will not affect distribution of effort	**Neutral** May increase observer coverage and will not affect distribution of effort	**Potentially Indirect Negative** May impose an inconvenience on vessel operations

P, Pr, RFF Omnibus Amendment ACLs/AMs	Apply and reevaluate ACLs and AMs for all three plan species	**Indirect Positive** Regulatory tool to specify catch limits, allows response to stock updates	**Indirect Positive** Potentially reduced effort levels	**Indirect Positive** Potentially reduced effort levels	**Indirect Positive** Potentially reduced effort levels	**Indirect Positive** Restricts overage paybacks, removes in-season closures
P, Pr, RFF Port maintenance	Dredging of coastal, port and harbor areas for port maintenance	**Likely Indirect Negative** Dependent on mitigation effects	**Likely Indirect Negative** Dependent on mitigation effects	**Likely Direct Negative** Dependent on mitigation effects	**Likely Indirect Negative** Dependent on mitigation effects	**Likely Mixed** Dependent on mitigation effects

TABLE 14 (CONTINUED). IMPACTS OF PAST (P), PRESENT (PR), AND REASONABLY FORESEEABLE FUTURE (RFF) ACTIONS ON THE FIVE VECS (NOT INCLUDING THOSE ACTIONS CONSIDERED IN THIS DOCUMENT).

Action	Description	Impacts on Managed Resource	Impacts on Non-target Species	Impacts on Habitat and EFH	Impacts on Protected Species	Impacts on Human Communities
P, Pr, RFF Offshore disposal of dredged materials	Disposal of dredged materials	**Indirect Negative** Reduced habitat quality	**Indirect Negative** Reduced habitat quality	**Direct Negative** Reduced habitat quality	**Indirect Negative** Reduced habitat quality	**Indirect Negative** Reduced habitat quality negatively affects resource viability
P, Pr, RFF Beach nourishment	Offshore mining of sand for beaches	**Direct Negative** Localized decreases in habitat quality, takes of eggs and larvae	**Direct Negative** Localized decreases in habitat quality, takes of eggs and larvae	**Direct Negative** Reduced habitat quality, takes of eggs and larvae	**Direct Negative** Localized decreases in habitat quality, takes of protected species	**Mixed** Positive for mining companies, possibly negative for fishing industry
	Placement of sand to nourish beach shorelines	**Indirect Negative** Localized decreases in habitat quality	**Indirect Negative** Localized decreases in habitat quality	**Direct Negative** Reduced habitat quality	**Indirect Negative** Localized decreases in habitat quality	**Positive** Beachgoers like sand; positive for tourism
P, Pr, RFF Marine transportation	Expansion of port facilities, vessel operations and recreational marinas	**Indirect Negative** Localized decreases in habitat quality	**Indirect Negative** Localized decreases in habitat quality	**Direct Negative** Reduced habitat quality, loss of habitat	**Indirect Negative** Localized decreases in habitat quality,	**Mixed** Positive for some interests, potential

					increased vessel strikes	displacement for others
P, Pr, RFF Installation of pipelines, utility lines and cables	Transportation of oil, gas and energy through pipelines, utility lines and cables	**Uncertain – Likely Indirect Negative** Dependent on mitigation effects	**Uncertain – Likely Indirect Negative** Dependent on mitigation effects	**Uncertain – Likely Direct Negative** Reduced habitat quality	**Potentially Direct Negative** Dependent on mitigation effects	**Uncertain – Likely Mixed** Dependent on mitigation effects
P, Pr, RFFA Ocean acidification and warming	The acidification and warming of the Earth's oceans due to rising levels of carbon dioxide	**Likely Indirect Negative** Changes in food webs may occur but are not well understood	**Likely Indirect Negative-** Changes in food webs may occur but are not well understood	**Likely Indirect Negative-** Coral are particularly sensitive to increasing acidity	**Likely Indirect Negative-** Changes in food webs may occur but are not well understood	**Likely Indirect Negative-** if loss of fishing opportunities occur

TABLE 14 (CONTINUED). IMPACTS OF PAST (P), PRESENT (PR), AND REASONABLY FORESEEABLE FUTURE (RFF) ACTIONS ON THE FIVE VECS (NOT INCLUDING THOSE ACTIONS CONSIDERED IN THIS SPECIFICATIONS DOCUMENT).

Action	Description	Impacts on Managed Resource	Impacts on Non-target Species	Impacts on Habitat and EFH	Impacts on Protected Species	Impacts on Human Communities
RFF Offshore Wind Energy Facilities (within 3 years)	Construction of wind turbines to harness electrical power	**Uncertain – Likely Indirect Negative** Dependent on mitigation effects	**Uncertain – Likely Indirect Negative** Dependent on mitigation effects	**Potentially Direct Negative** Localized decreases in habitat quality or loss of habitat possible	**Uncertain – Likely Indirect Negative** Dependent on mitigation effects, potential for increased vessel strikes	**Uncertain – Likely Mixed** Dependent on mitigation effects
Pr, RFF Liquefied Natural Gas (LNG) terminals (within 3 years)	Transport natural gas via tanker to terminals offshore and onshore	**Uncertain – Likely Indirect Negative** Dependent on mitigation effects, could harm early life stages	**Uncertain – Likely Indirect Negative** Dependent on mitigation effects, could harm early life stages	**Potentially Direct Negative** Localized decreases in habitat quality possible	**Uncertain – Likely Indirect Negative** Dependent on mitigation effects, potential for increased vessel strikes	**Uncertain – Likely Mixed** Dependent on mitigation effects
RFF Convening of Gear Take Reduction Teams (within next 3 years)	Recommend measures to reduce mortality and injury to marine mammals	**Indirect Positive** Will improve data quality for monitoring total removals	**Indirect Positive** Reducing availability of gear could reduce bycatch	**Indirect Positive** Reducing availability of gear could reduce gear impacts	**Indirect Positive** Reducing availability of gear could reduce encounters	**Indirect Negative** Reducing availability of gear could reduce revenues

RFF Strategy for Sea Turtle Conservation for the Atlantic Ocean and the Gulf of Mexico Fisheries (w/in next 3 years)	May recommend strategies to prevent the bycatch of sea turtles in commercial fisheries operations	**Indirect Positive** Will improve data quality for monitoring total removals	**Indirect Positive** Reducing availability of gear could reduce bycatch	**Indirect Positive** Reducing availability of gear could reduce gear impacts	**Indirect Positive** Reducing availability of gear could reduce encounters	**Indirect Negative** Reducing availability of gear could reduce revenues

Managed Resources (Target Species)
Those past, present, and reasonably foreseeable future actions, whose effects may impact the managed resources and the direction of those potential impacts, are summarized in Table 15. The indirectly negative actions described in Table 15 are localized in nearshore areas and marine project areas where they occur. Therefore, the magnitude of those impacts on the managed resources is expected to be limited due to lack of exposure to the population at large.

As previously described, NMFS has several means under which it can review non-fishing actions of other federal or state agencies that may impact NMFS' managed resources prior to permitting or implementation of those projects. This serves to minimize the extent and magnitude of indirect negative impacts those actions could have on resources under NMFS' jurisdiction. Additionally, there are some actions, which are beyond the scope of NMFS and MAFMC management such as coastal population growth and climate changes, which may indirectly impact the managed resources.

Past fishery management actions taken through the FMP and annual specifications process have had a positive cumulative effect on the managed resources. It is anticipated that the future management actions, described in Table 15, will result in additional indirect positive effects on the managed resources through actions which reduce and monitor bycatch, protect habitat, and protect ecosystem services on which summer flounder, scup, and black sea bass productivity depends. Overall, the past, present, and reasonably foreseeable future actions that are truly meaningful to summer flounder, scup, and black sea bass have had a positive cumulative effect. 2013 was the first year of implementation for an amendment which requires specification of ACLs/AMs and catch accountability in the recreational fluke, scup, and black sea bass fisheries (among the other recreational fisheries managed by the MAFMC). This action will be in effect indefinitely. The amendment requires the MAFMC and the Atlantic States Marine Fisheries Commission to use a rolling three-year average comparison of catch to the average of the same three years' ACLs. If that average shows that catch exceeded the ACLs during those years, an AM is applicable to the next full fishing year. The specifics of the AM is considered through the recreational measures setting process, where the MAFMC takes into account the overage and performance of the management measures when setting a subsequent year's management measures. Catch limits, commercial quotas, and recreational harvest limits for each of the managed resources have been specified to ensure that these rebuilt stocks are managed in a sustainable manner, and measures are consistent with objectives of the FMP under the guidance of the MSA. The impacts from annual specification of management measures established in previous years on the managed resources are largely dependent on how effective those measures were in meeting their intended objectives (i.e., preventing overfishing, achieve OY) and the extent to which mitigating measures were effective. The proposed action in this document would have negligible impacts on target species overall. Therefore, the proposed action would not have any significant effect on the managed resources individually or in conjunction with the other anthropogenic activities (see Table 15).

TABLE 15. SUMMARY OF THE EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS ON THE MANAGED RESOURCE.

Action	Past to the Present		Reasonably Foreseeable Future
Original FMP and subsequent Amendments and Frameworks to the FMP	**Indirect Positive**		
Summer Flounder, Scup and Black Sea Bass Specifications	**Indirect Positive**		
Developed, Apply, and Redo Standardized Bycatch Reporting Methodology	**Neutral**		
Amendment to address ACLs/AMs implemented		**Indirect Positive**	
Port maintenance	**Likely Indirect Negative**		
Offshore disposal of dredged materials	**Indirect Negative**		
Beach nourishment – Offshore mining	**Direct Negative**		
Beach nourishment – Sand placement	**Indirect Negative**		
Marine transportation	**Indirect Negative**		
Installation of pipelines, utility lines and cables	**Uncertain – Likely Indirect Negative**		
Offshore Wind Energy Facilities (within 3 years)			**Uncertain – Likely Indirect Negative**
Liquefied Natural Gas (LNG) terminals (within 3 years)		**Uncertain – Likely Indirect Negative**	
Convening Gear Take Reduction Teams (within 3 years)			**Indirect Positive**
Strategy for Sea Turtle Conservation for the Atlantic Ocean and the Gulf of Mexico Fisheries (within next 3 years)			**Indirect Positive**
Summary of past, present, and future actions excluding those proposed in this document	**Overall, actions have had, or will have, positive impacts on the managed resources** *** See section 0 for explanation.**		

Non-Target Species and Bycatch

Those past, present, and reasonably foreseeable future actions, whose effects may impact non-target species and the direction of those potential impacts, are summarized in Table 16. The effects of indirectly negative actions described in Table 16 are localized in nearshore areas and marine project areas where they occur. Therefore, the magnitude of those impacts is expected to be limited due to the lack of exposure to the population at large.

As previously described, NMFS has several means under which it can review non-fishing actions of other federal or state agencies that may impact NMFS' managed resources prior to permitting or implementation of those projects. At this time, NMFS can consider impacts to non-target species (federally managed or otherwise) and comment on potential impacts. This serves to minimize the extent and magnitude of indirect negative impacts those actions could have on resources within NMFS' jurisdiction. Additionally, there are some actions, which are beyond the scope of NMFS and MAFMC management such as coastal population growth and climate changes, which may indirectly impact non-target species and bycatch.

Past fishery management actions taken through the FMP and annual specification process have had a positive cumulative effect on non-target species. The standardized bycatch reporting methodology (SBRM) was most recently updated in 2014. SBRM particularly impacts non-target species by improving the methods which can be used to assess the magnitude and extent of a potential bycatch problem. The redevelopment of the SBRM in 2014 resulted in better assessment of potential bycatch issues as well as more effective and specific management measures to address the bycatch problem.

It is anticipated that future management actions, described in Table 16, will result in additional indirect positive effects on non-target species through actions which reduce and monitor bycatch, protect habitat, and protect ecosystem services on which the productivity of many of these non-target resources depend. The impacts of these future actions could be broad in scope, and it should be noted the managed resources and non-target species are often coupled in that they utilize similar habitat areas and ecosystem resources on which they depend. Overall, the past, present, and future actions that are truly meaningful have had a positive cumulative effect on non-target species.

Catch limits, commercial quotas, and recreational harvest limits for each of the managed resources have been specified to ensure these rebuilt stocks are managed in a sustainable manner, and measures are consistent with the objectives of the FMP under the guidance of the MSA. The proposed action in this document would have negligible impacts on non-target species, and would not change the past and anticipated positive cumulative effects on non-target species. Thus, the proposed action would not have any significant effect on these species individually or in conjunction with other anthropogenic activities (Table 16).

TABLE 16. SUMMARY OF THE EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS ON THE NON-TARGET SPECIES.

<table>
<tr><th>Action</th><th>Past to the Present</th><th>Reasonably Foreseeable Future</th></tr>
<tr><td>Original FMP and subsequent Amendments and Frameworks to the FMP</td><td colspan="2">Indirect Positive</td></tr>
<tr><td>Summer Flounder, Scup and Black Sea Bass Specifications</td><td colspan="2">Indirect Positive</td></tr>
<tr><td>Developed, Apply, and Redo Standardized Bycatch Reporting Methodology</td><td colspan="2">Neutral</td></tr>
<tr><td>Amendment to address ACLs/AMs implemented</td><td></td><td>Indirect Positive</td></tr>
<tr><td>Port maintenance</td><td colspan="2">Uncertain – Likely Indirect Negative</td></tr>
<tr><td>Offshore disposal of dredged materials</td><td colspan="2">Indirect Negative</td></tr>
<tr><td>Beach nourishment – Offshore mining</td><td colspan="2">Indirect Negative</td></tr>
<tr><td>Beach nourishment – Sand placement</td><td colspan="2">Indirect Negative</td></tr>
<tr><td>Marine transportation</td><td colspan="2">Indirect Negative</td></tr>
<tr><td>Installation of pipelines, utility lines and cables</td><td colspan="2">Uncertain – Likely Indirect Negative</td></tr>
<tr><td>Offshore Wind Energy Facilities (within 3 years)</td><td></td><td>Uncertain – Likely Indirect Negative</td></tr>
<tr><td>Liquefied Natural Gas (LNG) terminals (within 3 years)</td><td></td><td>Uncertain – Likely Indirect Negative</td></tr>
<tr><td>Convening Gear Take Reduction Teams (within 3 years)</td><td></td><td>Indirect Positive</td></tr>
<tr><td>Strategy for Sea Turtle Conservation for the Atlantic Ocean and the Gulf of Mexico Fisheries (within next 3 years)</td><td></td><td>Indirect Positive</td></tr>
<tr><td>Summary of past, present, and future actions excluding those proposed in this document</td><td colspan="2">Overall, actions have had, or will have, positive impacts on the non-target species
* See 0 for explanation.</td></tr>
</table>

Habitat (Including EFH)
Those past, present, and reasonably foreseeable future actions, whose effects may impact habitat (including EFH) and the direction of those potential impacts, are summarized in Table 17. The direct and indirect negative actions described in Table 17 are localized in nearshore areas and marine projects where they occur.

As previously described, NMFS has several means under which it can review non-fishing actions of other federal or state agencies that may impact NMFS' managed resources and habitat on which they rely prior to permitting or implementation of those projects. This serves to minimize the extent and magnitude of direct and indirect negative impacts those actions could have on habitat utilized by resources under NMFS' jurisdiction.

Past fishery management actions taken through the FMP and annual specification process have had a positive cumulative effect on habitat and EFH. The actions have constrained fishing effort at a large scale and locally, and have implemented gear requirements, which may reduce habitat impacts. As required under these FMP actions, EFH and HAPCs were designated for the managed resources. It is anticipated that the future management actions, described in Table 17, will result in addition direct or indirect positive effects on habitat through actions which protect EFH for federally-managed species and protect ecosystem services on which these species' productivity depends. These impacts could be broad in scope. All of the VECs are interrelated; therefore, the linkages among habitat quality and EFH, managed resources, and non-target species productivity and associated fishery yields should be considered. For habitat and EFH, there are direct and indirect negative effects from actions which may be localized or broad in scope; however, positive actions that have broad implications have been, and it is anticipated will continue to be, taken to improve the condition of the habitat. There are some actions, which are beyond the scope of NMFS and MAFMC management such as coastal population growth and climate changes, which may indirectly impact habitat and ecosystem productivity. Overall, the past, present, and reasonably foreseeable future actions that are truly meaningful to habitat have had a neutral to positive cumulative effect.

Catch limits, commercial quotas, and recreational harvest limits for each of the managed resources have been specified to ensure these rebuilt stocks are managed in a sustainable manner, and measures are consistent with the objectives of the FMP under the guidance of the MSA. The proposed action in this document would have no impact on the habitat overall. It would not change the past and anticipated cumulative effects on habitat and thus, would not have any significant effect on habitat individually or in conjunction with other anthropogenic activities (Table 17).

TABLE 17. SUMMARY OF THE EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS ON THE HABITAT.

Action	Past to the Present	Reasonably Foreseeable Future
Original FMP and subsequent Amendments and Frameworks to the FMP	**Indirect Positive**	
Summer Flounder, Scup and Black Sea Bass Specifications	**Indirect Positive**	
Developed, Apply, and Redo Standardized Bycatch Reporting Methodology	**Neutral**	
Amendment to address ACLs/AMs implemented		**Indirect Positive**
Port maintenance	**Uncertain – Likely Direct Negative**	
Offshore disposal of dredged materials	**Direct Negative**	
Beach nourishment – Offshore mining	**Direct Negative**	
Beach nourishment – Sand placement	**Direct Negative**	
Marine transportation	**Direct Negative**	
Installation of pipelines, utility lines and cables	**Uncertain – Likely Direct Negative**	
Offshore Wind Energy Facilities (within 3 years)		**Potentially Direct Negative**
Liquefied Natural Gas (LNG) terminals (within 3 years)		**Potentially Direct Negative**
Convening Gear Take Reduction Teams (within 3 years)		**Indirect Positive**
Strategy for Sea Turtle Conservation for the Atlantic Ocean and the Gulf of Mexico Fisheries (within next 3 years)		**Indirect Positive**
Summary of past, present, and future actions excluding those proposed in this document	**Overall, actions have had, or will have, neutral to positive impacts on habitat, including EFH** *** See section 0 for explanation.**	

Protected Resources

Those past, present, and reasonably foreseeable future actions, whose effects may impact the protected resources and the direction of those potential impacts, are summarized in Table 18. The indirectly negative actions described in Table 18 are localized in nearshore areas and marine project areas where they occur. Therefore, the magnitude of those impacts on protected resources, relative to the range of many of the protected resources, is expected to be limited due to a lack of exposure to the population at large. As previously described, NMFS has several means, including ESA, under which it can review non-fishing actions of other federal or state agencies that may impact NMFS' protected resources prior to permitting or implementation of those projects. This serves to minimize the extent and magnitude of indirect negative impacts those actions could have on protected resources under NMFS' jurisdiction. Additionally, there are some actions, which are beyond the scope of NMFS and the MAFMC management such as coastal population growth and climate changes, which may indirectly impact protected resources.

Past fishery management actions taken through the FMP and annual specifications process have had a positive cumulative effect on ESA-listed and MMPA protected species through the reduction of fishing effort (which decreases potential interactions with fishing gear) and implementation of gear requirements targeted towards reducing interactions with or increasing the survival rates of protected species. It is anticipated that that future management actions, specifically those recommended by the ALWTRT and the development of strategies for sea turtle conservation described in Table 18, will result in additional indirect positive effects on the protected resources. These impacts could be broad in scope. Overall, the past, present, and reasonably foreseeable future actions that are truly meaningful to protected resources have had a positive cumulative effect.

Catch limits, commercial quotas, and recreational harvest limits for each of the managed resources have been specified to ensure these rebuilt stocks are managed in a sustainable manner, and measures are consistent with the objectives of the FMP under the guidance of the MSA. The proposed action in this document would have very slight negative impacts on protected resources. However, it would not change the past and anticipated cumulative effects on ESA-listed and MMPA protected species, and thus, would not have any significant effect on protected resources individually or in conjunction with other anthropogenic activities (Table 18).

TABLE 18. SUMMARY OF THE EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS ON THE HABITAT.

Action	Past to the Present		Reasonably Foreseeable Future
Original FMP and subsequent Amendments and Frameworks to the FMP	**Indirect Positive**		
Summer Flounder, Scup and Black Sea Bass Specifications	**Indirect Positive**		
Developed, Apply, and Redo Standardized Bycatch Reporting Methodology	**Neutral**		
Amendment to address ACLs/AMs implemented		**Indirect Positive**	
Port maintenance	**Uncertain – Likely Indirect Negative**		
Offshore disposal of dredged materials	**Indirect Negative**		
Beach nourishment – Offshore mining	**Indirect Negative**		
Beach nourishment – Sand placement	**Indirect Negative**		
Marine transportation	**Indirect Negative**		
Installation of pipelines, utility lines and cables	**Potentially Direct Negative**		
Offshore Wind Energy Facilities (within 3 years)			**Uncertain – Likely Indirect Negative**
Liquefied Natural Gas (LNG) terminals (within 3 years)		**Uncertain – Likely Indirect Negative**	
Convening Gear Take Reduction Teams (within 3 years)			**Indirect Positive**
Strategy for Sea Turtle Conservation for the Atlantic Ocean and the Gulf of Mexico Fisheries (within next 3 years)			**Indirect Positive**
Summary of past, present, and future actions excluding those proposed in this document	**Overall, actions have had, or will have, positive impacts on protected resources * See section 0 for explanation.**		

Human Communities

Those past, present, and reasonably foreseeable future actions, whose effects may impact human communities and the direction of those potential impacts, are summarized in Table 19. The indirectly negative actions described in Table 19 are localized in nearshore areas and marine project areas where they occur. Therefore, the magnitude of those impacts on human communities is expected to be limited in scope. It may, however, displace fishermen from project areas. This may result in indirect negative impacts on the human community by reducing resource availability; however, this effect is unquantifiable.

As previously described, NMFS has several means under which it can review non-fishing actions of other federal or state agencies prior to permitting or implementation of these projects. This serves to minimize the extent and magnitude of indirect negative impacts those actions could have on human communities. Additionally, there are some actions, which are beyond the scope of NMFS and MAFMC management such as coastal population growth and climate changes, which may indirectly impact human communities.

Past fishery management actions taken through the FMP and annual specifications process have had both positive and negative cumulative effects by benefitting domestic fisheries through sustainable fishery management practices, while at the same time potentially reducing the availability of the resource to all participants. Sustainable management practices are however, expected to yield broad positive impacts to fishermen, their communities, businesses, and the nation as a whole. It is anticipated that the future management actions, described in Table 19, will result in positive effects for human communities due to sustainable management practices, although additional indirect negative effects on the human communities could occur through management actions that may implement gear requirements or area closures and thus, reduce revenues. Overall, the past, present, and reasonably foreseeable future actions that are truly meaningful to human communities have had an overall positive cumulative effect.

Catch limits, commercial quotas, and recreational harvest limits for each of the managed resources have been specified to ensure these rebuilt stocks are managed in a sustainable manner, and measures are consistent with the objectives of the FMP under the guidance of the MSA. The impacts from annual specification measures established in previous years on the managed resources are largely dependent on how effective those measures were in meeting their intended objectives and the extent to which mitigating measures were effective. Overages may alter the timing of commercial fishery revenues (revenues realized a year earlier), and there may be impacts on some fishermen cause by unexpected reductions in their opportunities to earn revenues in the commercial fisheries in the year during which the overages are deducted. Similarly, recreation fisheries may have decreased harvest opportunities due to reduced harvest limits as a result of overages, or more restrictive recreational management measures that must be implemented (i.e, minimum fish size, possession limits, fishing seasons).

Despite the potential for negative short-term effects on human communities, the expectation is that there would be a positive long-term effect on human communities due to the long-term

sustainability of summer flounder, scup, and black sea bass. Overall, the proposed actions in this document would have no impact to slight negative impacts on the commercial fleet and slight positive impacts on the recreational fleet. It would not change the past and anticipated cumulative effects on human communities, and thus, would not have any significant effect on human communities individually, or in conjunction with other anthropogenic activities (Table 19).

TABLE 19. SUMMARY OF THE EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS ON HUMAN COMMUNITIES.

Action	Past to the Present		Reasonably Foreseeable Future
Original FMP and subsequent Amendments and Frameworks to the FMP	**Indirect Positive**		
Summer Flounder, Scup and Black Sea Bass Specifications	**Indirect Positive**		
Developed, Apply, and Redo Standardized Bycatch Reporting Methodology	**Potentially Indirect Negative**		
Amendment to address ACL/AMs implemented		**Indirect Positive**	
Port maintenance	**Uncertain – Likely Mixed**		
Offshore disposal of dredged materials	**Indirect Negative**		
Beach nourishment – Offshore mining	**Mixed**		
Beach nourishment – Sand placement	**Positive**		
Marine transportation	**Mixed**		
Installation of pipelines, utility lines and cables	**Uncertain – Likely Mixed**		
Offshore Wind Energy Facilities (within 3 years)			**Uncertain – Likely Mixed**
Liquefied Natural Gas (LNG) terminals (within 3 years)		**Uncertain – Likely Mixed**	
Convening Gear Take Reduction Teams (within 3 years)			**Indirect Negative**
Strategy for Sea Turtle Conservation for the Atlantic Ocean and the Gulf of Mexico Fisheries (within next 3 years)			**Indirect Negative**
Summary of past, present, and future actions excluding those proposed in this document	**Overall, actions have had, or will have, positive impacts on human communities** *** See section 0 for explanation.**		

5.2.6 *Preferred Action on All the VECS*

NMFS has identified its preferred action alternative in Section 5.0. The cumulative effects of the range of actions considered in this document can be considered to make a determination if significant cumulative effects are anticipated from the preferred action. The direct and indirect impacts of the proposed action on the VECs are described in Section 5.2. The magnitude and significance of the cumulative effects, which include the additive and synergistic effects of the proposed action, as well as past, present, and future actions, have been taken into account. The action proposed in this document builds off the action taken in the FMP and subsequent amendment and framework documents.

When this action is considered in conjunction with all the other pressures placed on fisheries by past, present, and reasonably foreseeable future actions, it is not expected to result in any significant impacts, positive or negative. Based on the information and the analyses presented in these past FMP documents and this document, there are no significant cumulative effects associated with the action proposed in this document (Table 14).

The regulatory atmosphere within which federal fishery management operates requires that management actions be taken in a manner that will optimize the conditions of managed species, habitat, and human communities. Consistent with NEPA, the MSA requires that management actions be taken only after consideration of impacts to the biological, physical, economic, and social dimensions of the human environment. Given this regulatory environment, and because fishery management actions must strive to create and maintain sustainable resources, impacts on all VECs from past, present, and reasonably foreseeable future actions have generally been positive and are expected to continue in that manner for the foreseeable future. This is not to say that some aspects of the VECs are not experiencing impacts, but rather that when considered as a whole and as a result of management measures implemented in these fisheries, the overall long-term trend is positive (Table 14).

There is no significant cumulative effects associated with the preferred alternatives based on the information and the analyses presented in this document and in past FMP documents (Table 14). Cumulatively, through 2020, it is anticipated that the preferred alternatives will result in generally positive impacts on all the VECs. Overall, the past, present, and reasonably foreseeable future actions that are truly meaningful to the VECs have had no impact to a positive cumulative effect.

TABLE 20. MAGNITUDE AND SIGNIFICANCE OF THE CUMULATIVE EFFECTS; THE ADDITIVE AND SYNERGISTIC EFFECTS OF THE PREFERRED ACTION, AS WELL AS PAST, PRESENT, AND FUTURE ACTIONS.

VEC	Status in 2017	Net Impact of P, Pr, and RFF Actions	Impact of the Preferred Action for 2017-2020	Significant Cumulative Effects
Managed Resource	Complex and variable (Section 5.1.1)	Positive (Sections 5.2.4 and 0)	Negligible overall; Localized low positive on artificial reefs (Section 5.1)	**None**
Non-target Species	Complex and variable (Section 5.1.2)	Positive (Sections 5.2.4 and 0)	Negligible overall; Localized low positive on artificial reefs (Section 5.1)	**None**
Habitat	Complex and variable (Section 5.1.3)	Neutral to positive (Sections 5.2.4 and 0)	Negligible overall; Localized low positive on artificial reefs (Section 5.1)	**None**
Protected Resources	Complex and variable (Section 5.1.4)	Positive (Sections 5.2.4 and 0)	Negligible (Section 5.1)	**None**
Human Communities	Complex and variable (Section 5.1.5)	Positive (Sections 5.2.4and 0)	Low positive on recreational fleet; negligible to low negative impacts on commercial fleet (Section 5.1)	**None**

6.0 Applicable Laws

6.1 Magnuson-Stevens Fishery Conservation and Management Act (MSA)

6.1.1 *National Standards*

Section 301 of the MSA requires that FMPs contain conservation and management measures that are consistent with the ten National Standards. This SMZ action is proposed under the Black Sea Bass Provisions of the Summer Flounder, Scup and Black Sea Bass FMP. The most recent amendments to the Summer Flounder, Scup and Black Sea Bass FMP address how the management actions implemented comply with the National Standards. First and foremost, the obligations of National Standard 1 are met by adopting and implementing conservation and management measures under the FMP that will continue to prevent overfishing, while achieving, on a continuing basis, the optimum yield (OY) for summer flounder, scup, and black sea bass and the U.S. fishing industry. Controlling overfishing is carried out through the annual specification process for the FMP. To achieve OY, both scientific and management uncertainty need to be addressed when establishing catch limits that are less than the OFL. Controlling overfishing is carried out through the annual specification process for the FMP, and the annual specifications do not exceed the ABC recommendations of the council's SSC which have been

developed to explicitly address scientific uncertainty. In addition, relevant sources of management uncertainty and other social, economic, and ecological factors have been considered which resulted in recommendations for annual catch targets for all three managed resources. The implementation of the SMZs does not alter the OFLs. Therefore, they have no positive or negative effects on ability to manage to National Standard 1 requirements. The best scientific information available was used (National Standard 2) and the FMP manages all three species throughout their range (National Standard 3). These management measures do not discriminate among residents of different states (National Standard 4), they do not have economic allocation as their sole purpose (National Standard 5), the measures account for variations in these fisheries (National Standard 6), they avoid unnecessary duplication (National Standard 7), they take into account the fishing communities (National Standard 8) and they promote safety at sea (National Standard 10). Finally, actions taken are consistent with National Standard 9, which addresses bycatch in fisheries. Through the FMP many regulations have been implemented by NMFS that have indirectly acted to reduce fishing gear impacts on EFH. By continuing to meet the National Standards requirements of the MSA through future FMP amendments, framework actions, and the annual specification setting process, NMFS will insure that cumulative impacts of these actions will remain positive overall for the ports and communities that depend on these fisheries, the Nation as a whole, and certainly for the resources.

6.2 National Environmental Policy Act (NEPA)

6.2.1 *Finding of No Significant Impact*

The Council on Environmental Quality (CEQ) Regulations state that the determination of significance using an analysis of effects requires examination of both context and intensity, and lists ten criteria for intensity (40 CFR 1508.27). In addition, the Companion Manual for National Oceanic and Atmospheric Administration Administrative Order 216-6A provides sixteen criteria, the same ten as the CEQ Regulations and six additional, for determining whether the impacts of a proposed action are significant. Each criterion is discussed below with respect to the proposed action and considered individually as well as in combination with the others.

1. Can the proposed action reasonably be expected to cause both beneficial and adverse impacts that overall may result in a significant effect, even if the effect will be beneficial?

Response: The proposed action is not expected to have significant impacts. Section 5.0 describes the expected impacts of the proposed action.

- Impacts to Target Species (Section 0)
    - The proposed action would have almost no impact on the overall population of target species, but there could be localized, low positive impacts at the reef sites due to continued maintenance and small decrease in fishing effort due to the lack of commercial fishing at the sites.
- Impacts to Non-Target Species and Bycatch (Section 0)
    - The proposed action would have no impact on the overall population of non-target species and bycatch, but would have localized low positive impacts on non-target species at the reef site because the reefs would have continued maintenance.

- Impacts to Habitat (Section 0)
    - The proposed action would have slight positive impacts on the habitat at the artificial reef sites because fishing activity would be restricted to rod and reel fishing, which does not interact with the habitat. However, because it would only protect 19.71 nm^2 within the range of the target fishery, and because commercial fishing would likely just be displaced to along the edge of the reef or to nearby areas these positive impacts would be very slight.
- Impacts to Protected Resources (Section 0)
    - The proposed action would have a slight positive impact on protected species at the artificial reef sites because it would limit fishing gear to rod and reel, eliminating the potential for takes from vertical lines associated with pots and traps. However, pot and trap effort will likely shift to areas outside the reefs meaning the potential for interaction between protected resources and vertical lines associated with pots and traps still exists at similar levels to current conditions. Recreational (hook and line) effort could increase at the SMZ reef sites with the removal of gear conflicts, which would increase the potential for interactions, which also has a slight negative impact on protected species.
- Impacts to Human Communities (Section 0)
    - Overall, the proposed action would result in low positive economic impacts to the recreational fleet due to reduced gear conflicts and likely have low negative to negligible economic effects on the commercial fishery due to displacement over this small area (19.71 nm^2).

2. Can the proposed action reasonably be expected to significantly affect public health or safety?

Response: The proposed action is not expected to significantly affect public health or safety. The proposed action would likely improve safety at sea by reducing gear conflicts between recreational and commercial vessels.

3. Can the proposed action reasonably be expected to result in significant impacts to unique characteristics of the geographic area, such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas?

Response: The proposed action is not expected to result in significant impacts to unique characteristics of the geographic area, such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas. These restrictions only cover a very small portion of the greater habitat in the region and do not overlap with geographic areas with unique characteristics.

4. Are the proposed action's effects on the quality of the human environment likely to be highly controversial?

Response: The impacts of the proposed measures on the human environment are described in Section 5.1 of the EA. Some aspects concerning the economic data used to formulate the preferred alternatives on the quality of human environment could be slightly controversial because they are outdated or extrapolated. However, they are currently the best data available for

analysis. In addition, the area designated as a SMZ under the proposed action is a very small fraction of the EEZ, so the proposed impacts of the action on the quality of the human environment are very small compared to the overall economic status of the commercial and recreational fisheries. Therefore, the proposed action's effects on the quality of the human environment are not likely to be highly controversial.

5. Are the proposed action's effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

Response: The impacts of the proposed measures on the human environment are described in Section 5.1.5 of the EA. This action merely designates 13 artificial reefs as SMZs. The proposed action is based on provisions contained in the FMP. Fishermen are not expected to substantially change their behavior. Overall, their effort will likely remain constant, but there will likely be some spatial shifts in effort; specifically, commercial pots and traps will likely be moved off the reefs to surrounding areas. Therefore, the effects of the proposed action on the human environment are not expected to be highly uncertain or involve unique or unknown risks.

6. Can the proposed action reasonably be expected to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?

Response: The proposed action was initiated in response to requests by the NJDEP and the Council to limit gear conflicts on New Jersey artificial reef sites. This action does not affect the status or future status of any other artificial reef site in the region. A special management zone designation action was implemented on the Delaware EEZ artificial reefs in 2015 , without significant impacts, so it is not the first time this type of action has been proposed in the region. Therefore, the proposed action is not likely to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration.

7. Is the proposed action related to other actions that when considered together will have individually insignificant but cumulatively significant impacts?

Response: The CEA presented in Section 5.2 of this document considers the impacts of the proposed action in combination with relevant past, present, and reasonably foreseeable future actions and concludes that no significant cumulative impacts are expected from the implementation of the proposed action. Further, the proposed action would not have any significant impacts when considered individually or in conjunction with any of the other actions presented in Section **Error! Reference source not found.**(fishing related and non-fishing related).

8. Can the proposed action reasonably be expected to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources?

Response: This action would only designate the reef sites as SMZs (19.71 nm^2) and these sites are not listed in the National Register of Historic Places. Therefore, this action has no risk of affecting significant scientific, cultural, or historical resources as well as National Register of Historic Places sites.

9. Can the proposed action reasonably be expected to have a significant impact on endangered or threatened species, or their critical habitat as defined under the Endangered Species Act of 1973?

Response: The proposed action is not expected to have a significant impact on endangered or threatened species, or critical habitat of these species. Under the proposed action, a small amount of commercial fishing would likely shift from the SMZs to areas near the artificial reef sites or move to other open areas. Minor shifts in placement of commercial gears should not increase or decrease interactions with protected resources (December 16, 2013 Biological Opinion on the Summer Flounder, Scup, and Black Sea Bass Fishery). Therefore, as discussed in Section 5.1.4 the proposed action would have negligible impacts on protected resources.

10. Can the proposed action reasonably be expected to threaten a violation of Federal, state, or local law or requirements imposed for environmental protection?

Response: The proposed action is not expected to alter fishing methods or activities such that they threaten a violation of federal, State, or local law or requirements imposed for the protection of the environment. In fact, the proposed measures have been found to be consistent with other applicable laws, such as the MSA, NEPA, MMPA, ESA, etc. (see below). Further, all 13 of the reef sites are currently permitted in federal waters by the Army Corps of Engineers (permit number CENAP-OP-R-200401135-1). An EFH consultation at the reef sites will be re-initiated every 10 years when the permit is renewed.

11. Can the proposed action reasonably be expected to adversely affect stocks of marine mammals as defined in the Marine Mammal Protection Act?

Response: The proposed action is not expected to have an adverse impact on marine mammals. Under the proposed action a small amount of commercial fishing would likely shift from the SMZs to areas near the artificial reef sites or move to other open areas. Minor shifts in placement of commercial gears should not increase or decrease interactions with protected resources. Therefore, as discussed in Section 0 the proposed action would have no impact on marine mammals compared to current conditions. There is a chance recreational fishing could increase at the reef sites due to decrease in gear conflicts with the removal of commercial gear, but that slight negative impact is not significant to stocks of marine mammals.

12. Can the proposed action reasonably be expected to adversely affect managed fish species?

Response: The proposed action is not expected to jeopardize the sustainability of any managed fish species identified in Sections 4.1 and 4.2. The proposed action would minimally shift fishing effort of a few vessels and not affect any ACLs so there would be no direct biological

effects on the overall managed species populations. While there may be some indirect low positive insignificant impacts associated with a more orderly managed fishery, the area designated for the 13 artificial reef sites is a small area compared to where the fisheries take place for the major managed species found on or near the reef site. Therefore, the impact of the proposed action on the overall managed species population would be negligible. The biological impacts of the proposed action on managed species are analyzed in Sections 4.1 and 4.2.

13. Can the proposed action reasonably be expected to adversely affect essential fish habitat as defined under the Magnuson-Stevens Fishery Conservation and Management Act?

Response: The proposed action is not expected to allow substantial habitat conversion to EFH as defined under the Magnuson-Stevens Act and identified in the FMP. The proposed action may result in some adverse effect to EFH for some federally managed species, particularly demersal species, that prefer sandy substrates. However, there might be some benefits to some federally managed species through the enhancement and creation of EFH for species that prefer structural habitat. The proposed action may have some minor benefits for habitat at the to the SMZ reef sites due to restrictions on damaging commercial gear. However, this alternative would only protect 19.71 nm^2 of habitat in the greater habitat of the range of the target fishery and commercial fishing would likely just be displaced to along the edge of the reef or to nearby areas, so overall there would be little impact to habitat, because pots and traps would not be removed from the water.

14. Can the proposed action reasonably be expected to adversely affect vulnerable marine or coastal ecosystems, including but not limited to, deep coral ecosystems?

Response: The proposed action is not expected to allow substantial habitat conversion to vulnerable marine or coastal ecosystems, including deep coral ecosystems. This action would only designate the reef sites(19.71 nm^2) as SMZs ,and this region off the coast of New Jersey consists of mostly sandy bottom (see Section **Error! Reference source not found.**). The proposed action may have some minor benefits for coastal ecosystems at the to the SMZ reef sites due to restrictions on damaging commercial gear. However, these restrictions only cover a very small portion of the greater habitat in the region and commercial fishing effort would likely still occur adjacent to the SMZ or other areas. Further, there would be no impacts to deep coral ecosystems because these reef sites do not occur in waters deep enough to support deep coral ecosystems. Therefore, as discussed in Section 05.1.3 the proposed action would negligible impacts on vulnerable marine or coastal ecosystems.

15. Can the proposed action reasonably be expected to adversely affect biodiversity or ecosystem functioning (e.g., benthic productivity, predator-prey relationships, etc.)?

Response: The proposed action is not expected to have a substantial impact on biodiversity and ecosystem function within the affected area. Minor shifts in placement of commercial gear out of the relatively small SMZ areas could occur under the proposed action. However, this would

not increase fishing effort or substantially change the spatial and/or temporal distribution of current fishing effort.

16. Can the proposed action reasonably be expected to result in the introduction or spread of a nonindigenous species?

Response: The proposed action would not increase fishing effort or substantially change the spatial and/or temporal distribution of current fishing effort. Therefore, it is highly unlikely that the proposed action would be expected to result in the introduction or spread of a non-indigenous species.

DETERMINATION

In view of the information presented in this document and the analysis contained in the supporting Environmental Assessment prepared for SMZ Designation for 13 Artificial Reef Sites in the EEZ, , it is hereby determined that the SMZ Designation for 13 Artificial Reef Sites in the EEZ will not significantly impact the quality of the human environment as described above and in the supporting Environmental Assessment. In addition, all beneficial and adverse impacts of the proposed action have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an environmental impact statement for this action is not necessary.

_____ _____

John Bullard Date
Regional Administrator for GARFO, NMFS, NOAA

6.3 Endangered Species Act

Sections 5.1.4 and 0 should be referenced for an assessment of the impacts of the proposed action on endangered species and protected resources. None of the proposed measures in this document are expected to significantly alter fishing methods or activities. Therefore, this action is not expected to affect endangered or threatened species or critical habitat in any manner not considered in previous consultations on the fisheries.

6.4 Marine Mammal Protection Act

Sections 5.1.4 and 0 should be referenced for an assessment of the impacts of the proposed action on marine mammals. None of the proposed measures in this document are expected to significantly alter fishing methods or activities. Therefore, this action is not expected to affect marine mammals or critical habitat in any manner not considered in previous consultations on the fisheries.

6.5 Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) of 1972, as amended, provides measures for ensuring stability of productive fishery habitat while striving to balance development pressures with social, economic, cultural, and other impacts on the coastal zone. It is recognized that responsible management of both coastal zones and fish stocks must involve mutually supportive goals. NMFS has developed this document and must determine whether this action is consistent to the maximum extent practicable with the CZM programs for each state (Maine through North Carolina).

6.6 National Fisheries Enhancement Act of 1984

Purpose of the National Fisheries Enhancement Act of 1984 is to promote and facilitate responsible and effective efforts to establish artificial reefs. It established permitting and material standards for artificial reefs. It directs the Secretary of Commerce, in consultation with the Secretary of the Interior, the Secretary of Defense, the Administrator of the Environmental Protection Agency, the Secretary of the Department in which the Coast Guard is operating, the Regional Fishery Management Councils, interested states, interstate fisheries commissions, and representatives of the private sector shall develop and publish a long term plan for artificial reefs. The plan must include measures to insure that artificial reefs should be based on the best scientific information, be constructed and monitored and managed to: (1) Enhance fisheries resources to the maximum extent practicable; (2) facilitate access and utilization by United States recreational and commercial fishermen; (3) minimize conflicts of competing uses; (4) minimize environmental risk and risk to personal health and property; and, (5) be consistent with generally acceptable principles of international law and shall not create any unreasonable obstruction to navigation. On behave of the Secretary of Commerce, NMFS published a National Artificial Reef Plan in 1985, and updated the plan in in 2007. The 2007 update included recognition that SMZ designation as an alternative for maintaining compatibility of reef development with fisheries management objectives. It offered guidance that artificial reefs designated as SMZs provide reef mangers much more flexibility to effectively utilize reefs as fishery management tools by providing a degree of regulatory control that otherwise would not exist, and allow artificial reefs to be used as non-traditional fishery management tools. This action establishes 13 artificial reef SMZs to reduce user gear conflicts on the artificial reefs and allow for the reefs intended use to enhance recreational fisheries.

6.7 Federal Aid in Sport Fish Restoration Act

Commonly called the Dingell-Johnson Act or Wallop-Breaux Act it provides Federal aid to the States for management and restoration of fish having "material value in connection with sport or recreation in the marine and/or fresh waters of the United States." Funds distributed to states for the various programs funded in the Act are collected in an account known as the Sport Fish Restoration Account, Funds are derived from a 10-percent excise tax on certain items of sport fishing tackle (Internal Revenue Code of 1954, sec. 4161), a 3-percent excise tax on fish finders and electric trolling motors, import duties on fishing tackle, yachts and pleasure craft, interest on the account, and a portion of motorboat fuel tax revenues and small engine fuel taxes.

The 13 artificial reefs proposed for SMZ status were built and maintained through SFR account funds. NJDEP also noted that "New Jersey's Reef Program was funded primarily through the USFWS SFR, which is a "user pays, user benefits" program. Following several requests by the USFWS to resolve these user conflict and access issues, on April 12, 2011, SFR funding for the Reef Program and all reef construction and monitoring activities was discontinued for failure to address the issue. USFWS officials stated that funding to the Reef Program would be restored once these issues are resolved. The USFWS stated position is that that when gear conflicts occur, pot fishing on reef sites is not consistent with the objectives of their Sportfish Restoration Program. State reef programs must be able to limit gear conflicts by regulations in state waters or by way of SMZ's for sites in the EEZ in order to comply with the goals of the Sportfish Restoration Program. The proposed action would allow funding and maintenance of the artificial reefs to be restored because it resolves gear conflicts on the artificial reefs that would limit recreational fishing access to the reef and thus jeopardize the basis for the reefs to receive continued Sportfish Restoration Account funding.

6.8 Clean Water Act

Placement of fill material or structures, such as those used to create artificial reefs, is subject to Corps permitting authority under Section 404 of the Clean Water Act (CWA). CWA Section 404 applies to “waters of the United States,” which as a general matter include most inland waterbodies as well as the territorial seas (which for CWA purposes extend three miles from the baseline). In issuing CWA Section 404 permits, the Army Corps of Engineers (Corps) applies the Section 404(b)(1) guidelines, which were developed by the Environmental Protection Agency (EPA) in conjunction with the Corps. The guidelines prohibit issuance of 404 permits that would cause or contribute to violations of applicable water quality standards and also generally preclude discharges that would cause or contribute to significant degradation of waters of the United States. In addition, CWA Section 404(c) authorizes EPA to prohibit, withdraw, or restrict the use of defined areas as a dredged or fill material disposal site in any waters of the U.S., including the Territorial Sea, if EPA determines that the discharge will have unacceptable adverse effects. This action merely prohibits the use of most types of commercial fishing gears on 13 comparatively small artificial reef SMZs. It should have no effect on water quality.

6.9 Administrative Procedure Act

Sections 551-553 of the Federal Administrative Procedure Act establish procedural requirements applicable to informal rulemaking by federal agencies. The purpose is to ensure public access to the federal rulemaking process and to give the public notice and opportunity to comment before the agency promulgates new regulations.

The Administrative Procedure Act requires solicitation and review of public comments on actions taken in the development of an FMP and subsequent amendments and framework adjustments. Development of the Council’s SMZ Monitoring Team report (Appendix 2, Section 11.0) provided the majority of information for this EA and the basis for much of the opportunities for public review, input, and access to the rulemaking process. This action was

developed through a multi-stage process that was open to review by affected members of the public. The public had the opportunity to review and comment on management measures during the Council's meetings held October, 4-6 2016, held in Galloway, NJ and December 12-15 in Baltimore, Maryland and three Council public hearings on the proposed SMZs (November 15, 2016, in Brooklyn NY, November 16, 2016, in Toms River, NJ, and November 17, 2016, in Cape May, NJ. In addition, the public will have further opportunity to comment on this document once NMFS publishes a request for comments notice in the Federal Register (FR).

6.10 Section 515 (Data Quality Act)

Utility of Information Product

This action proposes SMZs with gear restrictions around 13 artificial reefs. This document includes: A description of the alternatives considered, the preferred action and rationale for selection, and any changes to the implementing regulations of the FMP. As such, this document enables the implementing agency (NMFS) to make a decision on implementation of annual specifications (i.e., management measures) and this document serves as a supporting document for the proposed rule.

The action contained within this document was developed to be consistent with the FMP, MSA, and other applicable laws, through a multi-stage process that was open to review by affected members of the public. The public had the opportunity to review and comment on management measures during two public meetings (see section 6.9). In addition, the public will have further opportunity to comment on this specifications document once NMFS publishes a request for comments notice in the FR.

Integrity of Information Product

The information product meets the standards for integrity under the following types of documents: Other/Discussion (e.g., Confidentiality of Statistics of the MSA; NOAA Administrative Order 216-100, Protection of Confidential Fisheries Statistics; 50 CFR 229.11, Confidentiality of information collected under the Marine Mammal Protection Act).

Objectivity of Information Product

The category of information product that applies here is "Natural Resource Plans." This section (section 6.0) describes how this document was developed to be consistent with any applicable laws, including MSA with any of the applicable National Standards. The analyses used to develop the alternatives (i.e., policy choices) are based upon the best scientific information available and the most up to date information is used to develop the EA which evaluates the impacts of those alternatives (see Section 5.0 of this document for additional details). The specialists who worked with these core data sets and population assessment models are familiar with the most recent analytical techniques and are familiar with the available data and information relevant to the summer flounder, scup, and black sea bass fisheries.

The review process for this document involves MAFMC, NEFSC, GARFO, and NMFS headquarters. The NEFSC technical review is conducted by senior level scientists with specialties in fisheries ecology, population dynamics and biology, as well as economics and social anthropology. The MAFMC review process involves public meetings at which affected stakeholders have the opportunity to comments on proposed management measures. Review by GARFO is conducted by those with expertise in fisheries management and policy, habitat conservation, protected resources, and compliance with the applicable law. Final approval of the document and clearance of the rule is conducted by staff at NOAA Fisheries Headquarters, the Department of Commerce, and the U.S. Office of Management and Budget.

6.11 Paperwork Reduction Act

The Paperwork Reduction Act (PRA) concerns the collection of information. The intent of the PRA is to minimize the federal paperwork burden for individuals, small businesses, state and local governments, and other persons as well as to maximize the usefulness of information collected by the Federal government. There are no changes to the existing reporting requirements previously approved under this FMP for vessel permits, dealer reporting, or vessel logbooks. This action does not contain a collection-of-information requirement for purposes of the PRA.

6.12 Impacts of the Plan Relative to Federalism/Executive Order 13132

This specifications document does not contain policies with federalism implications sufficient to warrant preparation of a federalism assessment under Executive Order (EO) 13132.

6.13 Essential Fish Habitat Assessment

Consistent with guidance provided in the EFH Final Rule, no essential fish habitat assessment is required because none of the proposed management measures in this action would have any adverse impact on essential fish habitat (Section 5.1.3)

6.14 Regulatory Impact Review

6.14.1 Introduction

The NMFS prepares a Regulatory Impact Review (RIR) to ensure that the regulatory agency systematically and comprehensively considers all available alternatives so that the public welfare can be enhanced in the most efficient and cost-effective way. The RIR includes an analysis of the economic effects of the preferred and alternative actions, in contrast to taking “no action.”

6.14.2 Description of the Management Objectives

A complete description of the purpose and objectives of this action is presented in section’s 1.0 and 2.0.

6.14.3 Description of the Fishery

A description of affected fisheries and protected resources is presented in Section 4.0. Section 0 describes recreational fisheries interactions, commercial fisheries interactions, and marine mammal interactions. A description of ports and human communities is shown in Section 0. An analysis of permit data is found in Section 4.5.2. The estimated number of angler private boat trips and recreational for-hire boat trips at each of the artificial reefs is shown in Section 4.5.1. Angler expenditures associated with the reef sites and recreational for-hire revenue earned by for-hire businesses is presented in Section 4.5.1. Commercial fishing trips and comparisons of ex-vessel revenue earned at the reef sites to total ex-vessel revenue earned from all fishing activity is provided in Section 4.5.2. Identification of the number of commercial fishing vessels with recent activity at the reef sites and by homeport is also shown in Section 4.5.2.

6.14.4 A Statement of the Problem

A statement of the problem for resolution is presented in Section 1.1.

6.14.5 A Description of Each Alternative

A full description of the alternatives analyzed in this RIR is presented in Section 3.0.

6.14.6 RIR Impacts

Evaluation of Executive Order 12866 Significance

The purpose of Executive Order (E.O.) 12866 is to enhance planning and coordination with respect to new and existing regulations. This E.O. requires the Office of Management and Budget (OMB) to review regulatory programs that are considered to be "significant." This section of the document includes an analysis of the costs and benefits of the proposed action in accordance with the guidelines established by E.O. 12866. E.O. 12866 requires a review of proposed regulations to determine whether the expected effects would be significant, where a significant action is any regulatory action that may:

• Have an annual effect on the economy of $100 million or more, or adversely affect in a material way the economy, a sector of the economy, productivity, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;
• Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
• Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
• Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

The analysis shows that this action is not a "significant regulatory action" because it will not affect in a material way the economy or a sector of the economy. Further, the action does not overlap or conflict with other Federal rules, materially alter the budgetary impact of entitlements, or raise novel legal or policy issues. The measures considered in this regulatory action will not affect gross revenues or indirect and induced effects generated by the commercial, party/charter, private/rental, or other sectors offering goods and services to anglers or commercial fishing businesses to the extent that an annual $100 million economic impact will occur in the economy.

For purposes of this analysis, maximum ex-vessel revenue losses associated with SMZ designation of the 13 reef sites (Alternative 2, preferred) is assumed to equal the combined value of pot/trap landings at those sites in recent years. Gross pot/trap fishing revenue earned from the 13 reef sites was $25.5 thousand in 2013, $23.3 thousand in 2014, and $24.9 thousand in 2015 (see section 0 and Table 10). Maximum ex-vessel revenue losses under Alternative 3 (designate 11 reefs as SMZs, excluding Shark River and Wildwood) would be lower.

In the absence of a regional input-output model, the multiplier effects of reduced ex-vessel revenues on sales to indirectly affected businesses are assumed to be in the range of 2.0 to 3.0.[15] That is, each foregone dollar of ex-vessel revenue results in additional losses of $1.0 to $2.0 dollars in sales to businesses that supply goods and services either directly or indirectly to commercial fishermen. This multiplier also includes downstream losses to seafood dealers and processers and the foregone sales from lower personal consumption expenditures by employees of the directly and indirectly affected businesses. Applying the 2.0 to 3.0 sales multiplier to the revenue earned by commercial pot/trap fishermen while fishing within the designated 13 SMZ sites in 2013, 2014, and 2015, results in total potential losses of $51.0 to $76.5 thousand in 2013, $46.6 to $69.9 thousand in 2014, and $49.8 to $74.7 thousand in 2015.

Considering that maximum potential losses to the economy from reduced commercial pot/trap fishing activity range up to $76.5 thousand under the slightly more restrictive preferred alternative proposed in the EA, this action is not considered significant under E.O. 12866. In addition, if the artificial reefs are designated as SMZs through this action, it is likely that commercial fishing effort in the SMZs would shift to other open areas mitigating potential revenue losses. An important point to consider though is that fixed gear vessels likely fish at the reef sites because catch rates are higher and because conflicts with mobile gear vessels are reduced. Forcing fixed gear vessels out of these sites may increase the likelihood of conflicts with vessels in other areas, and expose them to additional costs if their gear is dragged through by vessels fishing mobile gear.

6.15 Initial Regulatory Flexibility Analysis (IRFA)

[15] The sales multiplier values of 2.0 to 3.0 are derived from Steinback, Scott R. and Eric M. Thunberg. (2006). Northeast Region Commercial Fishing Input-Output Model. NOAA Technical Memorandum NMFS-NE-188.

Also included is an Initial Regulatory Flexibility Analysis (IRFA) to evaluate the economic impacts of the alternatives on small business entities. This analysis is necessary to satisfy the requirements of the Regulatory Flexibility Act and provides decision-makers and the public with reasonable estimates of the economic impacts of proposed actions and of their alternatives

The Regulatory Flexibility Act (RFA) requires the Federal rule maker to examine the impacts of proposed and existing rules on small businesses, small organizations, and small governmental jurisdictions. In reviewing the potential impacts of proposed regulations, the agency must either: (A) certify that the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities; or (B) prepare an IRFA.

6.15.1 Description of the Reasons Why Action by the Agency is being Considered

A complete description of the purpose and need for this action is presented in Section 2.0.

6.15.2 The Objectives and Legal Basis of the Proposed Rule

A complete description of the objectives of this proposed rule is found under Sections 1.0 and 2.0. This action is taken under the authority of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) and regulations at 50 CFR part 648.

6.15.3 Estimate of the Number of Small Entities

The Small Business Administration (SBA) defines a small commercial finfishing or shellfishing business as a firm with annual receipts (gross revenue) of up to $11.0 million. A small for-hire recreational fishing business is defined as a firm with receipts of up to $7.5 million.

Having different size standards for different types of fishing activities creates difficulties in categorizing businesses that participate in multiple fishing related activities. For purposes of this assessment business entities have been classified into the SBA-defined categories based on which activity produced the highest percentage of average annual gross revenues from 2012 - 2015. This classification is now possible because vessel ownership data has been added to Northeast permit database. The ownership data identifies all individuals who own fishing vessels. Using this information, vessels can be grouped together according to common owners. The resulting groupings were treated as a fishing business for purposes of this analysis. Revenues summed across all vessels in a group and the activities that generate those revenues form the basis for determining whether the entity is a large or small business.

This rule would apply to all federal permit holders except recreational for-hire permit holders and commercial permit holders using hand gear or dive gear. Thus, while virtually all commercial fishing permit holders employing gear other than pot/trap gear will technically be regulated if the artificial reefs are granted SMZ status, only pot/trap gear vessel trips are considered in this analysis. Hand gear and dive gear activities will continue to be allowed under SMZ designation, and vessels using other mobile gears and fixed gears stay clear of the reef site

areas to avoid bottom hang-ups with reef materials. Additionally, not all business entities that hold federal fishing permits fish in the areas identified as potential SMZs. Those who actively participate, i.e., land fish, in the areas identified as potential SMZs would be the group of business entities that are directly impacted by the regulations.

The affected entities are described at the vessel level in Section 4.5. Commercial fishing pot/trap trips and comparisons of ex-vessel revenue earned at the reef sites to total ex-vessel revenue earned from all fishing activity is shown in Section 3.0, as well as an enumeration of the number of commercial fishing pot/trap vessels with recent activity at the 13 reef sites, by gear type, and homeport. In summary, Section 3.0 shows that during 2013, 2014, and 2015 24 vessels reported landings at the reef sites in all three of those years, 10 vessels reported landings in two of the three years, and 18 vessels reported landings in only one of the three years. A total of 52 unique commercial vessels reported landings estimated to be from within the coordinates of the 13 reef sites from 2013 – 2015.

Based on the ownership data classification process described above, the 52 directly affected participating commercial fishing vessels were found to be owned by 45 unique fishing business entities. All revenue earned by these businesses was derived from finfishing or shellfishing – no revenue was earned from for-hire recreational fishing. Thus, all 45 of the potentially affected businesses are classified as commercial fishing business entities.

According to the SBA size standards small commercial finfishing or shellfishing businesses are defined as firms with annual receipts of up to $11.0 million. Average annual gross revenue estimates calculated from 2013-2015 Northeast region dealer data indicate that only one of the potentially affected business entities under the preferred alternative would be considered large according to the SBA size standards. In other words, one business, classified as a commercial fishing business, averaged more than $11 million annually in gross revenues from all of its fishing activities during 2013 – 2015. Therefore, under the preferred alternative, 44 of the 45 potentially affected business entities are considered small and one business entity is considered large.

Under the slightly less restrictive Alternative 3 that designates 11 of the 13 artificial reefs as SMZs (excludes Shark River and Wildwood), 41 unique fishing business entities were estimated to have landings within the coordinates of the 11 reef sites from 2013 – 2015. One of the potentially affected business entities under this alternative would be considered large (the same entity identified as large under the preferred alternative).

Table 21 shows the number of potentially affected business entities by percent of total average annual gross revenue landed within the actual latitude and longitude coordinates of the proposed SMZ sites. Under both Alternative 2 (preferred) and Alternative 3 all commercial fishing businesses categorized as small in this assessment obtained less than 5% of their total average annual gross revenues from landings within the coordinates of the reef sites. The only business

entity defined as large for this assessment earned less than 0.5% of its total average annual gross revenues from landings at the reef sites.

TABLE 21. NUMBER OF POTENTIAL BUSINESS ENTITIES AFFECTED BY PERCENT OF TOTAL AVERAGE ANNUAL GROSS REVENUE LANDED WITHIN THE COORDINATES OF THE REEF SITES

	Percent of Total Average Annual Gross Revenue (2013-2016)			
	< 0.5%	0.5% to 1.0%	1.0% to 5.0%	> 5.0%
Alternative 2 (preferred)				
Commercial Fishing (Small)	35	2	7	0
Commercial Fishing (Large)	1	0	0	0
Alternative 3				
Commercial Fishing (Small)	32	2	6	0
Commercial Fishing (Large)	1	0	0	0

6.15.4 Description of the Projected Reporting, Record-Keeping, and Other Compliance Requirements of the Proposed Rule

This action does not introduce any new reporting, recordkeeping, or other compliance requirements.

6.15.5 Federal Rules Which May Duplicate, Overlap, or Conflict with this Proposed Rule

This proposed action will not duplicate, overlap, or conflict with any other Federal rules.

6.15.6 Description of Significant Alternatives to the Proposed Action Which Accomplish the Stated Objectives of Applicable Statutes and Which Minimize Any Significant Economic Impact on Small Entities

The Council only considered the proposed action (Alternative 2) and the No Action alternative (Alternative 1). However, NMFS also considered a slightly less restrictive alternative after receiving the Council's recommendation (Alternative 3). Under the No Action alternative, vessels would still be able to fish with pot/trap gear on the 13 artificial reef sites. Alternative

3would designate 11 of the 13 artificial reefs as SMZs (excludes Shark River and Wildwood); 41 unique fishing business entities were estimated to have landings within the coordinates of the 11 reef sites from 2013–2015. The Shark River and Wildwood reef site were excluded under this alternative because these sites had higher percentage of commercial effort when compared to the percentage of recreational effort. One of the potentially affected business entities under this alternative would be considered large (the same entity identified as large under the preferred alternative).

Table 21 compares the number of potentially affected business entities by percent of total average annual gross revenue landed within the actual latitude and longitude coordinates of the two alternatives. Under both the preferred alternative and the Alternative 3, all commercial fishing businesses categorized as small in this assessment obtained less than 5 percent of their total average annual gross revenues from landings within the coordinates of the reef sites. The only business entity defined as large for this assessment earned less than 0.5 percent of its total average annual gross revenues from landings at the reef sites. Section 5.1.5 has a full discussion of the impacts of each alternative on human communities.

Alternative 2 was selected as the preferred alternative because it would reduce gear conflicts on all 13 of the artificial reefs. For Alternatives 1 and 3, gear conflicts would remain on all reefs not designated as SMZs. Further, Alternative 2 would result in slight positive economic impacts to the recreational fleet and likely have slight negative to negligible economic effects on the commercial fishery compared to the No Action alternative. Further, under Alternative 2, the program to maintain the artificial reefs would not be in jeopardy of losing its USFWS funding.

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8.0 List of Agencies and Persons Consulted

Staff members of NMFS Greater Atlantic Regional Fisheries Office and Northeast Fisheries Science Center were also consulted in preparing this EA. Additionally, Peter Clarke of New Jersey Department of Environmental Protection was consulted.

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10.0 Appendix 1

11.0 Appendix 2

Monitoring Report