



Unmanaged Forage Omnibus Amendment

Public Hearing Document

May 2016

1. INSTRUCTIONS FOR PROVIDING PUBLIC COMMENTS

The Council will collect public comments on the Unmanaged Forage Omnibus Amendment during seven public hearings to be held in May and June 2016, and during a written public comment period.

Written comments may be sent through mail, email, or fax through 11:59 pm on Friday June 17, 2016. Comments may be mailed to: Dr. Chris Moore, Executive Director, Mid-Atlantic Fishery Management Council, 800 North State Street, Suite 201, Dover, DE, 19901. Comments may be faxed to: Dr. Chris Moore, Executive Director, Mid-Atlantic Fishery Management Council at fax number 302-674-5399. Comments may be emailed to Julia Beaty, Fishery Management Specialist, at jbeaty@mafmc.org.

If sending comments through the mail, please write “unmanaged forage public hearing comments” on the outside of the envelope. If sending comments through email or fax, please write “unmanaged forage public hearing comments” in the subject line.

Interested members of the public are encouraged to attend any of the following seven public hearings and to provide oral or written comments at these hearings:

- Tuesday May 17, 2016. 6:00 pm – 7:30 pm. North Carolina Department of Marine Fisheries Washington Regional Office Hearing Room. 943 Washington Street, Washington, NC, 27889. Telephone: 252-946-6481.
- Wednesday May 18, 2016. 6:30 – 8:00 pm. Hilton Virginia Beach Oceanfront. 3001 Atlantic Avenue, Virginia Beach, VA, 23451. Telephone: 757-213-3000.
- Thursday May 19, 2016. 6:30-8:00 pm. Stockton Seaview Hotel and Golf Club. 401 South New York Road, Galloway, NJ 08205. Telephone: 855-894-8698.
- Monday May 23, 2016. 6:00 pm – 7:30 pm. University of Rhode Island Bay Campus Corless Auditorium. 215 South Ferry Road, Narragansett, RI, 02882. Telephone: 401-874-6222.
- Tuesday May 24, 2016. 6:30 pm – 8:00 pm. New York Department of Environmental Conservation Bureau of Marine Resources Hearing Room. 205 North Bell Mead Road, Suite 1, East Setauket, NY, 11733. Telephone: 631-444-0430.
- Monday June 6, 2016. 6:30 – 8:00 pm. Hilton Suites Oceanfront. 3200 North Baltimore Avenue, Ocean City, Maryland, 21842. Telephone: 410-289-6444.
- Wednesday June 8, 2016. 6:30 pm – 8:00 pm. Webinar. Webinar link: http://mafmc.adobeconnect.com/forage_public_hearing/. Phone connection: 1-800-832-0736, room number 5068871.

2. EXECUTIVE SUMMARY

Forage species are small, low to mid trophic level species which are subject to extensive predation throughout their lifespan and serve as important conduits of energy from low to high trophic levels. Forage species play an important role in sustaining the productivity and structure of marine ecosystems by linking low trophic level species such as phytoplankton and zooplankton to higher trophic level species, including predatory species sought after by many commercial and recreational fisheries.

The Mid-Atlantic Fishery Management Council (the Council) is developing an omnibus amendment which will prohibit the development of new and expansion of existing directed commercial fisheries on unmanaged forage species in Mid-Atlantic Federal waters until the Council has had an adequate opportunity to both assess the scientific information relating to any new or expanded directed fisheries and consider potential impacts to existing fisheries, fishing communities, and the marine ecosystem. This action is needed to protect the structure and function of marine ecosystems in the Mid-Atlantic from the potential threat of unregulated, unsustainable levels of commercial harvest of unmanaged forage species and to advance an ecosystem approach to fisheries management in the Mid-Atlantic.

The Council has approved a range of management alternatives for the amendment for public consideration (Table 1). These include alternatives which:

- Regulate landings and/or possession of certain unmanaged forage species,
- Address data collection and reporting of landings,
- Establish a process to allow new fisheries for currently unmanaged forage species to develop or existing fisheries to expand,
- Define the geographic scope of the amendment, and,
- Other alternatives

These alternatives are described in detail in later sections of this document. The potential biological, habitat, protected species, and socioeconomic impacts of the alternatives are also briefly described.

The Council is soliciting public comments on this amendment through June 17, 2016. (See section 1 for instructions for how to provide comments.) The Council plans to select from the alternatives described in this document after considering public comments and other relevant information at its August 2016 meeting.

Table 1: Summary of draft management alternatives for the Unmanaged Forage Omnibus Amendment.

Issue	Alternative	Sub-Alternative
1: No action	1: No Action	--
2: Alternatives for species other than chub mackerel	2A: Designate forage species (other than chub mackerel) as Ecosystem Components (ECs) and prohibit possession	--
	2B: Designate forage species (other than chub mackerel) as ECs and implement an incidental possession limit	--
3: Alternatives for chub mackerel	3A: Manage chub mackerel as an EC	3Ai: Prohibit possession once an annual fishery-wide landings limit is met
		3Aii: Enforce an incidental possession limit once an annual fishery-wide landings limit is met
	3B: Manage chub mackerel as a stock in the fishery	3Bi: Prohibit possession once an annual fishery-wide landings limit is met
		3Bii: Enforce an incidental possession limit once an annual fishery-wide landings limit is met
	3C: Manage chub mackerel as neither an EC nor a stock in the fishery through the Council's discretionary authority under MSA Section 303(b)(12)	3Ci: Prohibit possession once an annual fishery-wide landings limit is met
		3Cii: Enforce an incidental possession limit once an annual fishery-wide landings limit is met
4: New fisheries and expansion of existing fisheries for unmanaged forage species	4A: No action on new fisheries and expansion of existing fisheries	--
	4B: No new or expanded fisheries for EC species	--
	4C: Require Exempted Fishing Permit (EFP) prior to development of new or expansion of existing fisheries for ECs	4Ci: <i>Status quo</i> EFP process
		4Cii: New policy for Council review of EFP applications relating to ECs
4D: Consideration of stock in the fishery designation prior to new fisheries or expansion of existing fisheries for ECs	--	

Table 1, continued: Summary of draft management alternatives.

Issue	Alternative	Sub-Alternative
5: Administrative alternatives	5A: Update list of fisheries and authorized gear types (50 CFR 600.725)	--
	5B: Require GARFO permit for possession of EC species	--
	5C: Monitoring /reporting	5Ci: Develop a process that provides the Council with data on landings of EC species in its jurisdiction
		5Cii: Add EC species to required reporting mechanisms (e.g. SAFIS, VTRs)
	5D: Management unit	5Di: Federal waters, bounded by seaward lines extending from CT/NY boundary and VA/NC boundary
		5Dii: Federal waters, bounded by seaward lines extending from CT/NY boundary and Cape Hatteras, NC
	5E: Frameworkable items	5Ei: List of EC species
		5Eii: Possession limits and landings limits
		5Eiii: Spatial and seasonal closures
		5Eiv: Recreational fishing regulations

3. LIST OF ACRONYMS

ASMFC	Atlantic States Marine Fisheries Commission
EA	Environmental Assessment
EAFM	Ecosystem approach to fisheries management
EC	Ecosystem Component
EEZ	Exclusive Economic Zone
EFP	Exempted Fishing Permit
FMAT	Fishery Management Action Team
FMP	Fishery Management Plan
GARFO	Greater Atlantic Regional Fisheries Office
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NEFOP	Northeast Fisheries Observer Program
NEFSC	Northeast Fisheries Science Center
NOAA	National Oceanic and Atmospheric Administration
SAFIS	Standard Atlantic Fisheries Information System
SSC	Scientific and Statistical Committee
VTR	Vessel Trip Report

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5. INTRODUCTION

The Ecosystems Subcommittee of the Mid-Atlantic Fishery Management Council's Scientific and Statistical Committee (SSC) defines forage species as small, low to mid trophic level species which are subject to extensive predation throughout their lifespan and serve as important conduits of energy from low to high trophic levels (see Table 2 for the complete definition). Forage species play an important role in sustaining the productivity and structure of marine ecosystems by linking low trophic level species such as phytoplankton and zooplankton to higher trophic level species, including predatory species sought after by many commercial and recreational fisheries.

Table 2: Definition of forage fish developed by the Ecosystems Subcommittee of the Mid-Atlantic Fishery Management Council's Scientific and Statistical Committee (Clay et al. 2014).

Forage is defined as a species that:

- Is small to moderate in size (average length of ~5-25 cm) throughout its lifespan, especially including adult stages;
- Is subject to extensive predation by other fishes, marine mammals, and birds throughout its lifespan;
- Comprises a considerable portion of the diet of other predators in the ecosystem in which it resides throughout its lifespan (usually >5% diet composition for > 5 yrs.);
- Has or is strongly suspected to have mortality with a major element due to consumptive removals;
- Is typically a lower to mid trophic level (TL) species; itself consumes food usually no higher than TL 2-2.5 (typically zooplankton and or small benthic invertebrates);
- Has a high number of trophic linkages as predator and prey; serves as an important (as measurable by several methods) conduit of energy/biomass flow from lower to upper TL;
- Often exhibits notable (pelagic) schooling behavior;
- Often exhibits high variation in inter-annual recruitments; and
- Relative to primary production and primary producers, has a ratio of production and biomass, respectively, to those producers not smaller than on the order of 10^{-3} to 10^{-4}

Recent scientific studies highlight the importance of forage species to marine ecosystems and suggest that these species warrant special consideration in fisheries management (e.g. Alder et al. 2008, Smith et al. 2011, Pikitch et al. 2012a, Pikitch et al. 2014).

The Council identified forage species and their management as a key area of focus under its Ecosystem Approaches to Fisheries Management (EAFM) guidance document, which is currently in development.¹ The Council defines EAFM as a fishery management approach which recognizes the biological, economic, social, and physical interactions among the components of ecosystems and attempts to manage fisheries to achieve optimum yield while taking those interactions into account.

In 2011 and 2012 the Council undertook a visioning and strategic planning process, which included extensive outreach to key stakeholder groups and the general public. Surveys, roundtable sessions, and position letters collected as part of this process revealed that management of fisheries for forage species is a key concern for many Council constituents (MAFMC 2012).

Some forage species, including Atlantic herring (*Clupea harengus*), Atlantic menhaden (*Brevoortia tyrannus*), Atlantic mackerel (*Scomber scombrus*), butterfish (*Peprilus triacanthus*), longfin squid (*Doryteuthis pealeii*), and *Illex* squid (*Illex illecebrosus*), are the target of important commercial fisheries in the Mid-Atlantic. These fisheries supply markets for human food, bait, and poultry and livestock feed. These fisheries are managed by the Mid-Atlantic Fishery Management Council, the New England Fishery Management Council, and the Atlantic States Marine Fisheries Commission (ASMFC).

Some forage species, including silversides (multiple species in the family atherinopsidae), sand lances (*Ammodytes americanus* and *A. dubius*), and chub mackerel (*Scomber colias*) are harvested in commercial fisheries which supply bait for recreational fishing, feed for aquariums, food for human consumption, and other uses, but are not currently managed by a regional Fishery Management Council, the ASMFC, or by state fisheries management agencies.

Many forage species are not currently subject to directed commercial fisheries in the Mid-Atlantic; however, increasing global demand for fish for human consumption, for bait, and for fishmeal and fish oil could encourage the development of new commercial fisheries for some of these species. In recognition of this potential, the Council voted in December 2014 to “initiate a regulatory action to prohibit the development of new, or expansion of existing, directed fisheries on unmanaged forage species until adequate scientific information is available to promote ecosystem sustainability”. Since that time the Council decided that this action will take the form of an omnibus amendment to the

¹ More information is available at: www.mafmc.org/eafm

Council's existing Fishery Management Plans (FMPs) and will address only commercial fisheries in Mid-Atlantic Federal waters. For the purposes of this amendment, "unmanaged" species are those which are not currently managed in any way by the Mid-Atlantic, New England, or South Atlantic Fishery Management Councils, or by the ASMFC. The Council does not intend to prohibit development of new and expansion of existing fisheries for unmanaged forage species indefinitely, but rather only until the Council has had an adequate opportunity to assess the scientific information relating to any new or expanded fisheries and consider potential impacts to existing fisheries, fishing communities, and the marine ecosystem.

The Council approved a range of management alternatives for the amendment for public consideration. These include alternatives to regulate landings and/or possession of certain unmanaged forage species, alternatives to address data collection and reporting of landings, alternatives for a process to allow new fisheries to develop or existing fisheries to expand, alternatives to define the geographic scope of the amendment, and other alternatives (Table 1). The alternatives are described in detail in later sections of this document. The potential biological, habitat, protected species, and socioeconomic impacts of the alternatives are also briefly described.

The Council is soliciting public comments on this amendment through June 17, 2016. (See section 1 for instructions for how to provide comments.) The Council plans to select from the alternatives described in this document after considering public comments and other relevant information at its August 2016 meeting. The Council may modify the alternatives as long as sufficient information and rationale exists to support the final selected options. The Council will recommend the selected alternatives to the NOAA Fisheries Greater Atlantic Regional Fisheries Office (GARFO). NOAA Fisheries will then publish a proposed rule along with an Environmental Assessment (EA) for additional public comment. After considering public comments on the proposed rule, and determining that the recommended management measures are consistent with statutory requirements, NOAA Fisheries will then publish a final rule to implement the new regulations.

5.1. Goal of amendment

The goal of the amendment is to prohibit the development of new and expansion of existing directed commercial fisheries on unmanaged forage species in Mid-Atlantic Federal waters until the Council has had an adequate opportunity to both assess the scientific information relating to any new or expanded directed fisheries and consider potential impacts to existing fisheries, fishing communities, and the marine ecosystem. This action is needed to protect the structure and function of marine ecosystems in the Mid-Atlantic from the potential threat of unregulated, unsustainable levels of commercial

harvest of unmanaged forage species and to advance an ecosystem approach to fisheries management in the Mid-Atlantic.

5.2. Classification of forage species in amendment and regulatory authority

The Council is considering regulating landings of several unmanaged forage species by designating them as Ecosystem Components (ECs) in the Council's existing FMPs and implementing landings and/or possession limits for those species. The Council is considering three alternative designations for chub mackerel, the first of which is the EC designation. The second would designate chub mackerel as a stock in the fishery. The third would use neither the EC nor the stock in the fishery designation but would use the discretionary provisions of FMPs allowed for under the Magnuson-Stevens Fishery Conservation and Management Act (MSA). Each of these designations, as well as the associated regulatory authority, are described in more detail in the following sections.

5.2.1. Ecosystem Components

Section 303(b) of the MSA lists discretionary provisions of FMPs. The EC designation is considered a discretionary provision of FMPs. Section 303(b)(12) of the MSA states that Councils may "include management measures in [FMPs] to conserve target and non-target species and habitats, considering the variety of ecological factors affecting fishery populations".

The EC designation is defined and described in the National Standards Guidelines (50 CFR 600.310). The National Standards Guidelines allow Councils to designate EC species in FMPs for data collection purposes, as considerations in the development of conservation and management measures in Council-managed fisheries, and to address other ecosystem issues. To be designated as an EC species, a species or stock should: 1) be a non-target species, 2) not be subject to overfishing, not be overfished or approaching overfished, 3) not be likely to become subject to overfishing or overfished in the absence of conservation and management measures, and 4) not generally be retained for sale or personal use.² If a stock is likely to become overfished or subject to overfishing in the absence of conservation and management measures, then the Council should include that stock as a stock in the fishery (section 5.2.2), rather than as an EC. The National Standards Guidelines also state that Councils should monitor EC species to determine if they should be re-classified as stocks in the fishery and that

² The NOAA Fisheries has proposed revisions to the National Standards Guidelines. These revisions include changes to the language describing EC species. If implemented, these revisions would still allow the Council to use the EC designation as described in this document. More information is available at: http://www.nmfs.noaa.gov/sfa/laws_policies/national_standards/ns1_revisions.html

Councils should consider whether the use of the EC classification is consistent with MSA conservation and management requirements.

An important component of the EC definition is that the species or stock should “not be likely to become subject to overfishing or overfished in the absence of conservation and management measures”. The MSA defines conservation and management as:

“all of the rules, regulations, conditions, methods, and other measures

(A) which are required to rebuild, restore, or maintain, and which are useful in rebuilding, restoring, or maintaining, any fishery resource and the marine environment; and

(B) which are designed to assure that –

(i) a supply of food and other products may be taken, and that recreational benefits may be obtained, on a continuing basis;

(ii) irreversible or long-term adverse effects on fishery resources and the marine environment are avoided; and

(iii) there will be a multiplicity of options available with respect to future uses of these resources.”

The National Standards Guidelines provide guidance on how to determine if a stock is in need of conservation and management and thus should be managed through an FMP. This guidance can be used to help determine if the EC designation is an appropriate management tool or if a species could be better managed as a stock in the fishery (section 5.2.2). The National Standards Guidelines recommend that the following criteria be considered when deciding whether a fishery needs conservation and management:

- The importance of the fishery to the Nation and to the regional economy.
- The condition of the stock or stocks of fish and whether an FMP can improve or maintain that condition.
- The extent to which the fishery could be or is already adequately managed by states, by state/Federal programs, by Federal regulations pursuant to FMPs or international commissions, or by industry self-regulation, consistent with the policies and standards of the MSA.
- The need to resolve competing interests and conflicts among user groups and whether an FMP can further that resolution.
- The economic condition of a fishery and whether an FMP can produce more efficient utilization.
- The needs of a developing fishery, and whether an FMP can foster orderly growth.
- The costs associated with an FMP, balanced against the benefits.

5.2.2. Stock in the fishery

If a stock is deemed to be in need of conservation and management through an FMP, that stock should be designated as a stock in the fishery and the required provisions of FMPs listed in the MSA would apply. The National Standards Guidelines state that “as a default, all stocks in an FMP are considered to be ‘in the fishery’, unless they are identified as EC species through an FMP amendment process” (50 CFR 600.310). Stocks in the fishery can be either target or non-target stocks. For all stocks that are in the fishery, the MSA requires that the Council evaluate and describe maximum sustainable yield (MSY)³, specific and measurable criteria to determine if the stock is overfished or if overfishing is occurring (i.e. status determination criteria), optimum yield (OY)⁴, a control rule for acceptable biological catch (ABC)⁵, mechanisms for specifying annual catch limits (ACLs) in relation to the ABC, and accountability measures (AMs) for when the ACLs are exceeded. Councils are also required to describe essential fish habitat (EFH)⁶ for stocks in the fishery (50 CFR 600.310). Councils are required to use the best available scientific information when assessing these measures. These measures are not required for ECs because ECs are not considered stocks in the fishery.

5.3. Forage species under consideration

The Council does not intend to address all unmanaged forage species in the Mid-Atlantic through this amendment. The Council instead intends to focus the amendment on those species with high ecological importance and/or a high potential for the development of a large-scale targeted commercial fishery.

³ The National Standards Guidelines (50 CF 600.310) define MSY as “the largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological, environmental conditions and fishery technological characteristics (e.g., gear selectivity), and the distribution of catch among fleets.”

⁴ The MSA defines OY as “the amount of fish which (A) will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems; (B) is prescribed as such on the basis of the maximum sustainable yield from the fishery, as reduced by any relevant economic, social, or ecological factor; and (C) in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the maximum sustainable yield in such fishery.”

⁵ The National Standards Guidelines (50 CF 600.310) define ABC as “a level of a stock or stock complex’s annual catch that accounts for scientific uncertainty in the estimate of the OFL and any other scientific uncertainty...and should be specified based on the ABC control rule”. The OFL is the overfishing limit and is the level of annual catch above which overfishing is occurring.

⁶ EFH is defined in the MSA as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity”.

In April 2016 the Council approved a list of taxa (i.e. species and higher-level classifications such as families and orders) for possible inclusion in the amendment (Table 3). The list of species under consideration is not a management alternative; however, it may be modified by the Council in the future based on public input, as well as recommendations from the Council's advisory bodies and from NOAA Fisheries.

GARFO has advised the Council that any forage species included in the amendment must be linked to the species and fisheries in the FMPs which are amended. Forage species could be linked to FMP species as prey or they could be linked to FMP fisheries if they are caught in those fisheries. To date, a link has been identified for all species under consideration with the exception of frigate mackerel and halfbeaks in the family hemiramphidae. Each species or taxa under consideration is described in more detail below, including a description of the link to existing FMPs, if a link has been identified.

The species (and associated fisheries) managed by the Mid-Atlantic Council include: summer flounder (*Paralichthys dentatus*), scup (*Stenotomus chrysops*), black sea bass (*Centropristis striata*), Atlantic mackerel (*Scomber scombus*), longfin squid (*Doryteuthis pealeii*), *Illex* squid (*Illex illecebrosus*), butterfish (*Peprilus triacanthus*), Atlantic surfclam (*Spisula solidissima*), Ocean quahog (*Arctica islandica*), bluefish (*Pomatomus saltatrix*), golden tilefish (*Lopholatilus chamaelonticeps*)⁷, spiny dogfish (*Squalus acanthias*), and monkfish (*Lophius americanus*).⁸ More information on each of these species, fisheries, and FMPs can be found on the Council's website (www.mafmc.org).

⁷ The Council is developing an amendment to add blueline tilefish (*Caulolatilus microps*) to the Golden Tilefish FMP. More information is available at: <http://www.mafmc.org/actions/blueline-tilefish>.

⁸ Spiny dogfish and monkfish are managed jointly with the New England Fishery Management Council.

Table 3: Taxa under consideration for inclusion in the Unmanaged Forage Omnibus Amendment. Only unmanaged species found in Mid-Atlantic Federal waters will be included in the amendment.

Taxa	Examples of unmanaged species or groups found in Mid-Atlantic federal waters
Engraulidae The anchovy family	<ul style="list-style-type: none"> • Striped anchovy, <i>Anchoa hepsetus</i> • Dusky anchovy, <i>Anchoa lyolepis</i> • Bay anchovy, <i>Anchoa mitchilli</i> • Silver anchovy, <i>Engraulis eurystole</i>
Clupeidae The herring family	<ul style="list-style-type: none"> • Round herring, <i>Etrumeus teres</i> • Scaled sardine, <i>Harengula jaguana</i> • Atlantic thread herring, <i>Opisthonema oglinum</i> • Spanish sardine, <i>Sardinella aurita</i>
Argentinidae The argentine family	<ul style="list-style-type: none"> • Striated argentine, <i>Argentina striata</i> • Pygmy argentine, <i>Glossanodon pygmaeus</i>
Atherinopsidae The neotropical silverside family	<ul style="list-style-type: none"> • Rough silverside, <i>Membras martinica</i> • Inland silverside, <i>Menidia beryllina</i> • Atlantic silverside, <i>Menidia menidia</i>
Ammodytidae The sand lance family	<ul style="list-style-type: none"> • American sand lance, <i>Ammodytes americanus</i> • Northern sand lance, <i>Ammodytes dubius</i>
Sternoptychidae The pearlside and marine hatchetfish family	<ul style="list-style-type: none"> • Muller's pearlside, <i>Maurolicus muelleri</i> • Weizman's pearlside, <i>Maurolicus weitzmani</i>
Chlorophthalmidae The greeneye family	<ul style="list-style-type: none"> • Shortnose greeneye, <i>Chlorophthalmus agassizi</i> • Longnose greeneye, <i>Parasudis truculenta</i>
<i>Scomber colias</i> Atlantic chub mackerel	
<i>Auxis rochei</i> Bullet mackerel	
<i>Auxis thazard</i> Frigate mackerel	
<i>Euthynnus alletteratus</i> Little tuna/false albacore	
<i>Scomberesox saurus</i> Atlantic saury	
Hemiramphidae The halfbeak family	<ul style="list-style-type: none"> • Flying halfbeak, <i>Euleptorhamphus velox</i> • Balao, <i>Hemiramphus balao</i> • Ballyhoo, <i>Hemiramphus brasiliensis</i> • False silverstripe halfbeak/American halfbeak/Meek's halfbeak, <i>Hyporhamphus meeki</i>

Table 3, continued: Taxa under consideration for inclusion in the Unmanaged Forage Omnibus Amendment. Only unmanaged species found in Mid-Atlantic Federal waters will be included in the amendment.

Taxa	Examples of unmanaged species or groups found in Mid-Atlantic federal waters
<p>Ophidiiformes The cusk-eel order</p>	<ul style="list-style-type: none"> • Chain pearlfish, <i>Echiodon dawsoni</i>, carapidae family • Fawn cusk-eel, <i>Lepophidium profundorum</i>, ophidiidae family • Striped cusk-eel, <i>Ophidion marginatum</i>, ophidiidae family
<p>Pelagic molluscs</p>	<ul style="list-style-type: none"> • Ommastrephidae (the arrow squid family) <ul style="list-style-type: none"> - Neon flying squid, <i>Ommastrephes bartramii</i> - Oceanic squid, <i>Todarodes sagittatus</i> • Loliginidae (the pencil squid family) <ul style="list-style-type: none"> - Atlantic brief squid, <i>Lolliguncula brevis</i> • Sepiolidae (the bobtail squid family) <ul style="list-style-type: none"> - Odd bobtail squid, <i>Heteroteuthis dispar</i> - Big fin bobtail squid, <i>Rossia megaptera</i> - Warty bobtail squid, <i>Rossia palpebrosa</i> - Lesser shining bobtail squid, <i>Semirossia tenera</i> - Butterfly bobtail squid, <i>Stoloteuthis leucoptera</i> • Cranchiidae (the glass or bathyscaphoid squid family) • Order Octopoda (octopods) <ul style="list-style-type: none"> - Tuberculate pelagic octopus, <i>Ocythoe tuberculata</i>, family Ocythoidea • Pteropods <ul style="list-style-type: none"> - Order Gymnosomata (sea angels) - Order Thecosomata (sea butterflies)
<p>Myctophidae The lanternfish family</p>	<ul style="list-style-type: none"> • Horned lanternfish, <i>Ceratoscopelus maderensis</i> • Dumril's headlightfish, <i>Diaphus dumerilii</i> • Crocodile lanternfish, <i>Lampanycuts crocodilus</i> • Doflein's false headlightfish, <i>Lobianchia dofleini</i> • Spotted lanternfish, <i>Myctophum punctatum</i>
<p>Copepods, krill, amphipods and any other species under one inch as adults</p>	<ul style="list-style-type: none"> • Calanidae (the copepod family) • Euphausiidae (the euphausiid krill family) • Order Amphipoda (amphipods) • Class ostracoda (ostracods) • Order Isopoda (isopods) • Pteropods <ul style="list-style-type: none"> - Order Gymnosomata (sea angels) - Order Thecosomata (sea butterflies)

5.3.1. Engraulidae (the anchovy family)

The anchovy family contains several small, schooling fishes. Most species are found in shallow coastal waters and estuaries and feed mostly on plankton. Four unmanaged species in the engraulidae family can be found in Federal waters in the Mid-Atlantic.

Striped anchovy, *Anchoa hepsetus*

Striped anchovy are a pelagic marine species which often form schools. They can tolerate a wide range of salinities and mostly inhabit coastal waters close to shore. They mainly feed on zooplankton. They are prey for many fish species. They are found from New York to Florida, in the Gulf of Mexico, and as far south as Brazil. They are most abundant from Chesapeake Bay to Florida. They can reach up to six inches in length (Collette and Klein-MacPhee 2002, Kells and Carpenter 2011).

Dusky anchovy, *Anchoa lyolepis*

Dusky anchovy are found from New York to Florida, as well as in the Gulf of Mexico and south to Venezuela. They are found in coastal waters to depths of about 75 feet and feed on plankton. They can reach about 5 inches in length (Kells and Carpenter 2011).

Bay anchovy, *Anchoa mitchilli*

Bay anchovy are a small (typically not exceeding 4 inches in length), schooling, pelagic fish, found in nearshore coastal waters from Maine to Florida. They are most abundant in shallow estuaries and can tolerate a range of salinities. They are seldom found at depths greater than about 115 feet. They move to the inner continental shelf in the fall and winter and return to estuaries in the spring. They feed on zooplankton. Copepods typically comprise a large component of their diet. They are prey for many fish species, as well as seabirds (Collette and Klein-MachPhee 2002, Kells and Carpenter 2011).

Silver anchovy, *Engraulis eurystole*

Silver anchovy are a schooling pelagic species found from Massachusetts to Florida in shallow coastal waters to about 200 feet. They can reach about five inches in length (Kells and Carpenter 2011).

Links to Mid-Atlantic Council FMPs

The Northeast Fisheries Observer Program (NEFOP) database includes records of striped anchovy, bay anchovy, and unclassified anchovies caught in trawl tows which resulted in landings of several Council-managed species including longfin squid, summer flounder, butterfish, and others. A small amount of unclassified anchovies were observed on gillnet sets which resulted in landings of spiny dogfish.

Unclassified anchovies were found in the stomachs of bluefish, summer flounder, Atlantic mackerel, and spiny dogfish caught in Northeast Fisheries Science Center (NEFSC) bottom trawl survey tows in Mid-Atlantic or southern New England offshore

strata⁹. Striped anchovy were found in the stomachs of bluefish. Bay anchovy were found in the stomachs of bluefish and spiny dogfish.

5.3.2. Clupeidae (the herring and sardine family)

The family clupeidae contains commercially-important managed species such as Atlantic menhaden (*Brevoortia harengus*) and Atlantic herring (*Clupea harengus*), as well as several unmanaged species. Most species in this family are coastal marine schooling fishes, though some are anadromous. There are at least four unmanaged species in the clupeidae family that are commonly found in Mid-Atlantic Federal waters.

Round herring, *Etrumeus teres*

Round herring are a marine, pelagic, schooling species. They are commonly found in deep waters along the continental shelf and slope. They are distributed from the Bay of Fundy to Florida but they are rarely seen north of Cape Cod. They are typically eight to ten inches long as adults. They feed mostly on zooplankton and larval fish. They are preyed upon by a wide variety of fish, sea birds, and marine mammals. They are the target of commercial fisheries in other parts of the world, including Japan (Houde 1977, Collette and Klein-MacPhee 2002).

Scaled sardine, *Harengula jaguana*

Scaled sardine are a schooling, pelagic species, found along the coast and in bays and estuaries from New Jersey to Florida. They are typically about seven inches long as adults. They are caught in both targeted fisheries and as bycatch (Kells and Carpenter 2011).

Atlantic thread herring, *Opisthonema oglinum*

Atlantic thread herring are named for the long ray that extends from their dorsal fin. They are a coastal, pelagic, migratory, schooling species and can reach up to about twelve inches in length. They are commonly found near the surface. They are filter feeders and mostly consume plankton. They are mostly a tropical and subtropical species and are not common north of Cape Hatteras (Collette and Klein-MacPhee 2002). They are the target of commercial and recreational fisheries in the South Atlantic and Gulf of Mexico (FL FWCC 2010a).

Spanish sardine, *Sardinella aurita*

Spanish sardine are a migratory, schooling, pelagic species found from Massachusetts to Florida. They are distributed from inshore waters to the edge of the continental shelf. They can reach fifteen inches in length (Kells and Carpenter 2011). They are the target

⁹ Mid-Atlantic and southern New England offshore strata for the NEFSC bottom trawl survey roughly correspond to Federal waters.

of directed fisheries for bait in the South Atlantic and in the Gulf of Mexico (FL FWCC 2010b).

Links to Mid-Atlantic Council FMPs

The NEFOP database includes records of unclassified herring caught in trawl tows which resulted in landings of every Council-managed species except surfclams and ocean quahogs. Unclassified herring were also observed in gillnet sets which resulted in landings of several Council-managed species. Round herring were caught in trawl tows which resulted in landings of butterfish, summer flounder, scup, spiny dogfish, longfin squid, and *Illex* squid.

Unclassified herrings were found in the stomachs of monkfish, bluefish, summer flounder, black sea bass, and spiny dogfish caught in NEFSC bottom trawl survey tows in Mid-Atlantic or southern New England offshore strata. Round herring were found in the stomachs of monkfish, bluefish, summer flounder, and spiny dogfish.

Scaled sardine, Atlantic thread herring, and Spanish sardine were not present in the NEFOP data for trawl tows, gillnet sets, and hook and line trips which resulted in landings of Council-managed species. They were not identified in stomachs of Council-managed species in NEFSC survey tows in Mid-Atlantic or southern New England offshore strata.

5.3.3. Argentinidae (the argentine family)

Argentines are found on the outer shelves and upper slopes of tropical and warm temperate seas throughout the world. Two species are found in Mid-Atlantic Federal waters. Neither species is managed.

Striated argentine, *Argentina striata*

Striated argentine are found from Nova Scotia to Florida in depths of about 300 to 2,000 feet. They commonly reach six inches in length as adults (Froese and Pauly 2016).

Pygmy argentine, *Glossanodon pygmaeus*

Pygmy argentine are a marine, bathypelagic species found in depths of about 300 to 1,500 feet. They are most commonly found south of Cape Hatteras, but can also be found in the Mid-Atlantic and southern New England (Froese and Pauly 2016).

Links to Mid-Atlantic Council FMPs

Argentines were not reported in observer data for trawl tows, gillnet sets, or hook and line trips which resulted in landings of Council-managed species. Unclassified argentines and striated argentines were identified in the stomachs of monkfish caught in NEFSC bottom trawl survey tows in Mid-Atlantic or southern New England offshore strata.

5.3.4. Atherinopsidae (the neotropical silverside family)

The family atherinopsidae includes several marine and freshwater species. None of these species are managed by the New England, Mid-Atlantic, or South Atlantic Fishery Management Councils or by the ASMFC. At least three species are found in Mid-Atlantic Federal waters.

Rough silverside, *Membras martinica*

Rough silversides are found from New York to Mexico in coastal marine and estuarine waters. They commonly form schools near the surface and are prey for a variety of fish and seabirds. They can reach about four inches in length (Kells and Carpenter 2011).

Inland silverside, *Menidia beryllina*

Inland silversides are found along the coast in fresh and brackish water from the Gulf of Maine to Florida. They are most abundant from Cape Cod to South Carolina. They typically reach about three inches in length and can form large schools. They prey on a variety of small marine animals including copepods, mysids, amphipods, and other zooplankton. In the early 20th century they were marketed for human consumption as “whitebait” (Collette and Klein-MacPhee 2002, Kells and Carpeneter 2011).

Atlantic silverside, *Menidia menidia*

Atlantic silversides typically reach about four to five inches in length. They tend to form schools of similarly sized individuals. They are mostly found nearshore in brackish and marine environments from Nova Scotia to Chesapeake Bay. They are found in depths of about six feet in the summer and depths of 30 to 160 feet in colder months. They are omnivorous, feeding on copepods, mysids, shrimp, amphipods, fish eggs, and other items. They are prey for many species. They have been commercially harvested in the past. In the 19th and early 20th centuries they were commercially harvested at a small scale in the Gulf of Maine for human consumption. For a brief period, ending in the 1980s, they were harvested in Canada, canned, and exported to Japan (Collette and Klein-MacPhee 2002).

Links to Mid-Atlantic Council FMPs

The NEFOP database includes records of unclassified silversides and Atlantic silversides caught in trawl tows which resulted in landings of butterfish, scup, spiny dogfish, and other Council-managed species.

Unclassified silversides were found in the stomachs of monkfish, Atlantic mackerel, and spiny dogfish caught in NEFSC bottom trawl survey tows in Mid-Atlantic or southern New England offshore strata.

5.3.5. Ammodytidae (the sand lance family)

Sand lances are sometimes called sand eels due to their eel-like appearance. Two species of sand lance are found in the Mid-Atlantic Federal waters. Both have been commercially harvested in New England in the past. Sand lances have supported a fishmeal industry in the North Sea. Their abundance is thought to be partly regulated by the abundance of Atlantic mackerel and Atlantic herring, which prey upon sand lances (Collette and Klein-MacPhee 2002).

American/inshore sand lance, Ammodytes americanus

American sand lance are generally found along the shore between the high and low water marks and on the shoaler portions of offshore banks. They are distributed from Newfoundland and northern Labrador to Chesapeake Bay. They are occasionally found as far south as North Carolina. They are known for burrowing in the sand. They are generally four to six inches in length as adults and can form dense schools. They mostly feed on crustaceans, but consume a variety of small marine animals. They are important prey for a variety of fish and marine mammals (Collette and Klein-MacPhee 2002, Kells and Carpenter 2011).

Northern/offshore sand lance, Ammodytes dubius

Northern sand lance tend to be found in areas further offshore than American sand lance. Like American sand lance, they can be found on the shoaler areas of offshore banks and they are also commonly found over soft substrates that are conducive to burrowing. They are distributed from Greenland to Cape Hatteras. They can reach up to twelve inches in length and feed mostly on macrozooplankton, especially copepods. They can form dense schools and are important prey for a variety of fish and marine mammal species. Fin and humpback whales can consume large quantities of northern sand lance (Collette and Klein-MacPhee 2002).

Links to Mid-Atlantic Council FMPs

The NEFOP database includes records of unclassified sand lances caught in trawl tows which resulted in landings of butterfish, summer flounder, scup, golden tilefish, longfin squid, and other Council-managed predators.

Unclassified sand lances were identified in the stomachs of monkfish, bluefish, summer flounder, Atlantic mackerel, black sea bass, and spiny dogfish caught in NEFSC bottom trawl survey tows in Mid-Atlantic or southern New England offshore strata.

5.3.6. Sternoptychidae (the marine hatchetfish family)

Members of the marine hatchetfish family resemble lanternfish. Like lanternfish, they have bioluminescent organs. They are mostly found in the open ocean and are rarely seen in nearshore areas. No species of marine hatchetfish are managed. At least four

species are found in Mid-Atlantic Federal waters: silver hatchetfish, *Argyropelecus aculeatus*; Muller's pearlside, *Maurolicus muelleri*; Weizman's pearlside, *Maurolicus weizmani*; and slope hatchetfish, *Polyipnus clarus*. These species are all typically less than 2.5 inches in length. They are all found in deep water (up to 2,000 feet) but undergo diel vertical migrations, moving closer to the surface at night and to greater depths during the day. They are widely distributed throughout the Atlantic. They mostly feed on zooplankton (Collette and Klein-MacPhee 2002).

Links to Mid-Atlantic Council FMPs

No members of the family sternoptychidae were recorded in the NEFOP data for trawl tows, gillnet sets, or hook and line trips which resulted in landings of Council-managed species.

Weizman's pearlsides were found in the stomachs of spiny dogfish caught in NEFSC bottom trawl survey tows in Mid-Atlantic or southern New England offshore strata.

5.3.7. Chlorophthalmidae (the greeneye family)

Greeneyes are found worldwide in moderately deep marine waters. Two greeneye species are found in Mid-Atlantic Federal waters. No species of greeneyes are managed.

Shortnose greeneye, *Chlorophthalmus agassizi*

Shortnose greeneyes are found on the continental slope and in deep coastal waters from Nova Scotia to the Gulf of Mexico. They can reach up to six inches in length and prey on small benthic invertebrates (Collette and Klein-MacPhee 2002).

Longnose greeneye, *Parasudis truculenta*

Longnose greeneyes are found from southern New England to Brazil. They are mostly found in depths of 400-600 feet. They commonly reach about nine inches in length and prey mostly on other fish (Froese and Pauly 2016).

Links to Mid-Atlantic Council FMPs

Greeneyes were not recorded in the NEFOP data for trawl tows, gillnet sets, or hook and line trips which resulted in landings of Council-managed species.

Unclassified greeneyes were found in the stomachs of monkfish caught in NEFSC bottom trawl survey tows in Mid-Atlantic or southern New England offshore strata. Shortnose greeneyes were found in the stomachs of monkfish, Atlantic mackerel, and spiny dogfish.

5.3.8. *Scomber colias* (Atlantic chub mackerel)

Chub mackerel are a schooling, migratory, pelagic species. They resemble Atlantic mackerel, but are slightly smaller, generally reaching eight to fourteen inches in length, and have a more mottled coloration than Atlantic mackerel. Their distribution is more southerly than that of Atlantic mackerel, spanning from Nova Scotia and the Gulf of St. Lawrence to Florida, the Bahamas, and Venezuela. They are found on both sides of the Atlantic, as well as in the Mediterranean and the southern Black Sea. They are replaced by a closely related species, *Scomber japonicas*, in the Indo-Pacific. Both *S. colias* and *S. japonicas* are the subject of targeted commercial fisheries throughout the world (Collette and Klein-MacPhee 2002, Kells and Carpenter 2011, Froese and Pauly 2016).

Landings of chub mackerel in the northeast have increased in recent years, reaching a high of 5.25 million pounds in 2013 (Table 8). The bulk of these landings were from vessels that also participated in the *Illex* squid, longfin squid, and butterfish fisheries.

Links to Mid-Atlantic Council FMPs

The NEFOP database includes records of chub mackerel caught in trawl tows which resulted in landings of bluefish, butterfish, summer flounder, scup, black sea bass, longfin squid, and *Illex* squid. Chub mackerel were also caught in gillnet sets which resulted in landings of Atlantic mackerel and spiny dogfish.

No chub mackerel were identified in the stomachs of Council-managed species caught in NEFSC bottom trawl survey tows in Mid-Atlantic or southern New England offshore strata.

5.3.9. *Auxis rochei* (frigate mackerel)

Frigate mackerel are also called frigate tuna. They can reach two feet in length and can form large schools. They feed on a variety of fish species, squids, and small crustaceans and are preyed upon by larger fishes. In the western North Atlantic they are mostly found from North Carolina to Florida (Kells and Carpenter 2011, Froese and Pauly 2016).

Links to Mid-Atlantic Council FMPs

Frigate mackerel were not found in NEFOP records of catch in trawl tows, gillnet sets, or hook and line trips which resulted in landings of Council-managed species. Frigate mackerel were not identified in the stomachs of any Council-managed species caught in NEFSC bottom trawl survey tows in Mid-Atlantic or southern New England offshore strata.

5.3.10. *Auxis thazard* (bullet mackerel)

Bullet mackerel are also called bullet tuna. They can reach about 20 inches in length and closely resemble frigate mackerel. They feed on a variety of prey, especially clupeoids (i.e. herrings and sardines), crustaceans, and squids. They are preyed upon by tunas and billfish. Bullet mackerel are found nearly world-wide in warm waters. In the western Atlantic, they are found from Cape Cod to the Gulf of Mexico and the Caribbean (Collette and Klein-MacPhee 2002).

Links to Mid-Atlantic Council FMPs

The NEFOP database includes records of bullet mackerel caught in trawl tows which resulted in landings of longfin squid.

Bullet mackerel were not identified in the stomachs of Council-managed species caught in NEFSC bottom trawl survey tows in Mid-Atlantic or southern New England offshore strata.

5.3.11. *Euthynnus alletteratus* (little tuna/false albacore)

Little tuna resemble skipjack tuna (*Katsuwonus pelamis*, a managed species). They can reach 40 inches in length. They are opportunistic predators and prey on a variety of fish species, as well as squids, amphipods, shrimp, and other invertebrates (Collette and Klien-MacPhee 2002). They form schools and are mostly found from North Carolina to Florida, though they can also be found in the Mid-Atlantic and southern New England (Kells and Carpenter 2011).

Links to Mid-Atlantic Council FMPs

The NEFOP database includes records of false albacore caught in trawl tows which resulted in landings of bluefish, butterfish, summer flounder, spiny dogfish, and longfin squid. False albacore were also caught in gillnet sets which resulted in landings of bluefish, butterfish, summer flounder, Atlantic mackerel, scup, and spiny dogfish.

False albacore were not identified in the stomachs of Council-managed species caught in NEFSC bottom trawl survey tows in Mid-Atlantic or southern New England offshore strata.

5.3.12. *Scomberesox saurus* (Atlantic saury)

Atlantic saury are sometimes called halfbeaks due to their elongated jaws, the bottom of which is slightly longer than the top. They can be distinguished from halfbeaks in the family hemiramphidae by their top jaw; in members of the hemiramphidae, only the bottom jaw is elongated. Atlantic saury are also called skippers because they can leap above the surface to escape predation. They are widely distributed on both sides of the Atlantic. In the western North Atlantic they range from the Gulf of St. Lawrence to Cape

Hatteras. They are a migratory, oceanic, schooling species, often forming large schools close to the surface. Atlantic saury are omnivorous, feeding on algae, zooplankton, and fish larvae. Schools of Atlantic saury are predated upon by many fish and marine mammal species. They have been targeted both for bait and human consumption in other parts of the world, including the Mediterranean; however, they are not targeted in the northwest Atlantic (Collette and Klein-MacPhee 2002, Froese and Pauly 2016).

Links to Mid-Atlantic Council FMPs

The NEFOP database includes records of very small amounts (i.e. 31 or fewer pounds in total over a 26 year time period) of Atlantic saury caught in trawl tows which resulted in landings of several Council-managed species, including longfin squid, Atlantic mackerel, and butterfish.

Atlantic saury were identified in the stomachs of bluefish caught in NEFSC bottom trawl survey tows in Mid-Atlantic or southern New England offshore strata.

5.3.13. Hemiramphidae (the halfbeak family)

Members of the family hemiramphidae are found in warm temperate and tropical waters. They are called halfbeaks due to their elongated lower jaw. At least four species of halfbeak are found in Mid-Atlantic Federal waters. All are prey for a variety of fish, including tunas and billfish. None of these species are managed by the Mid-Atlantic, New England, or South Atlantic Fishery Management Councils, or by the ASMFC.

Flying halfbeak, *Euleptorhamphus velox*

Flying halfbeaks are found from Rhode Island to Florida, as well as in the Gulf of Mexico and Caribbean Sea. They are found in coastal and offshore waters. They can reach eleven inches in length (Kells and Carpenter 2011).

Balao, *Hemiramphus balao*

Balao are found from New York to Florida, as well as in the Gulf of Mexico and the Caribbean Sea. They form large surface schools in inshore waters and feed on plankton. They are harvested for bait for recreational fishing. They can reach about fourteen inches in length (Kells and Carpenter 2011).

Ballyhoo, *Hemiramphus brasiliensis*

Ballyhoo are found from Massachusetts to Florida, as well as in the Gulf of Mexico and the Caribbean Sea. Like balao, they form large surface schools in inshore waters and are harvested for bait for recreational fishing. They feed on seagrasses and small invertebrates. They can reach about fourteen inches in length (Kells and Carpenter 2011).

False silverstripe halfbeak/American halfbeak/Meek's halfbeak, *Hyporhamphus meeki*

False silverstripe halfbeaks reach about seven inches in length. They are a migratory, schooling species. They migrate seasonally between inshore and offshore waters, though their migration patterns vary with latitude. They can be found in shallow coastal waters in Long Island Sound and off of New England in warm months. They are rarely seen north of Cape Cod, but have been documented as far northern as New Brunswick, Canada. Their range extends to Florida and the Gulf of Mexico in the south (Collette and Klein-MacPhee 2002).

Links to Mid-Atlantic Council FMPs

Members of the family hemiramphidae were not found in NEFOP records of catch in trawl tows, gillnet sets, or hook and line trips which resulted in landings of Council-managed species. They were also not identified in the stomachs of any Council-managed species caught in NEFSC bottom trawl survey tows in Mid-Atlantic or southern New England offshore strata.

5.3.14. Ophidiiformes (the cusk-eel order)

The Ophidiiformes order contains two families which can be found in the Mid-Atlantic: the ophidiidae, or cusk-eel family, and the carapidae, or pearlfish family. Members of the Ophidiiformes resemble true eels but can be distinguished by the presence of pelvic fins and a large opercular opening (Collette and Klein-MacPhee 2002). Cusk-eels in the family ophidiidae resemble cusk (*Brosme brosme*), in the family gadidae (the cod family), both in name and in appearance. The Council is considering including cusk-eels (order Ophidiiformes) in the amendment, but is not considering including cusk (*Brosme brosme*). At least three species in the Ophidiiformes order can be found in Mid-Atlantic Federal waters. None of these species are managed.

Chain pearlfish, *Echiodon dawsoni*, family carapidae

Chain pearlfish are a marine, demersal species, found in depths of about 200 to 600 feet. They are present, but rare in the Mid-Atlantic (Froese and Pauly 2016).

Fawn cusk-eel, *Lepophidium profundorum*, family ophidiidae

Fawn cusk-eels are distributed from Georges Bank to Florida. They are mostly found on the outer continental shelf between Cape Cod and Cape Hatteras. They can grow to about ten inches in length and feed mostly on polychaete worms, amphipods, decapods, and fish (Collette and Klein-MacPhee 2002).

Striped cusk-eel, *Ophidion marginatum*, family ophidiidae

Striped cusk-eels can grow to about ten inches in length and are found in bays, estuaries, and nearshore marine environments from New York to Florida. They burrow in soft substrates. They are most active at night and mostly feed on crustaceans and fish (Collette and Klein-MacPhee 2002).

Links to Mid-Atlantic Council FMPs

The NEFOP database includes records of unclassified cusk-eels caught in trawl tows which resulted in landings of bluefish, butterfish, summer flounder, Atlantic mackerel, scup, black sea bass, spiny dogfish, golden tilefish, longfin squid, and *Illex* squid. They were also caught in gillnet sets which resulted in landings of bluefish and spiny dogfish.

Unclassified cusk-eels were found in the stomachs of monkfish, summer flounder, black sea bass, and spiny dogfish caught in NEFSC bottom trawl survey tows in Mid-Atlantic or southern New England offshore strata. Fawn cusk-eels were identified in the stomachs of monkfish, bluefish, summer flounder, black sea bass, and spiny dogfish. Striped cusk-eels were identified in the stomachs of monkfish, summer flounder, and spiny dogfish.

5.3.15. Pelagic molluscs

The molluscan phylum is extremely large, containing at least 50,000 extant species (Pechenik 2005). Pelagic members of the molluscan phylum include squids, some species of octopus, and pteropods¹⁰. Many pelagic molluscs are found in Mid-Atlantic Federal waters, only some of which are described below.

Ommastrephidae (the arrow squid family)

This family includes both managed species (i.e. *Illex* squid, *Illex illecebrosus*) and unmanaged species. Unmanaged species which can be found in Mid-Atlantic Federal waters include sharptail shortfin squid (*Illex oxygonius*), neon flying squid (*Ommastrephes bartramii*), and oceanic squid (*Todarodes sagittatus*). The range of *Illex* squid (a managed species) and sharptail shortfin squid overlap and the two species can be difficult to distinguish; therefore, the Council will likely not include sharptail shortfin squid in this amendment.

Neon flying squid (*Ommastrephes bartramii*) are a relatively large, migratory, oceanic squid species found in the Atlantic, Pacific, and Indian Oceans. They have been commercially harvested in other parts of the world (DFO 1999).

Loliginidae (the pencil squid family)

The family loliginidae contains both managed and unmanaged species. The slender inshore squid (*Doryteuthis plei*), an unmanaged species in the family loliginidae, cannot be visually distinguished from longfin inshore squid (*Doryteuthis pealeii*), a managed species (Cohen 1976) and therefore will likely not be included in the amendment.

¹⁰ Cuttlefish are also in the molluscan phylum; however, they are not found in the Mid-Atlantic (Young et al. 1998).

The Atlantic brief squid (*Lolliguncula brevis*) is found in shallow coastal waters from Maryland to the Caribbean and northern South America.

Sepiolidae (the bobtail squid family)

The family sepiolidae contains several small squid species, none of which are managed. Species found in Mid-Atlantic Federal waters include: odd bobtail squid (*Heteroteuthis dispar*), big fin bobtail squid (*Rossia megaloptera*), warty bobtail squid (*Rossia palpebrosa*), lesser shining bobtail squid (*Semirossia tenera*), and butterfly bobtail squid (*Stoloteuthis leucoptera*).

Order octopoda (octopods)

Most species of octopus are benthic, and thus would not fall into the category of “pelagic molluscs”. At least one pelagic mollusc may be found in Mid-Atlantic Federal waters: the tuberculate pelagic octopus, *Ocythoe tuberculata*. The pelagic tuberculate octopus are the only cephalopods known to have a gas bladder for buoyancy regulation, like fish. This swim bladder is found only in the female tuberculate pelagic octopus (Pechenik 2005).

Pteropods (orders Gymnosomata and Thecosomata)

Pteropods are very small pelagic gastropods which use a modified “foot” to swim. Pteropods in the order Gymnosomata are known as sea angels and do not have a shell, while pteropods in the order the order Thecosomata, also known as sea butterflies, do have shells.

Links to Mid-Atlantic Council FMPs

The NEFOP database includes records of unclassified octopods and unclassified squids caught in trawl tows which resulted in landings of several Council-managed species, including *Illex* squid, longfin squid, butterfish, Atlantic mackerel, summer flounder, black sea bass, and other species.

Unclassified cephalopods (squids and octopods) were found in the stomachs of monkfish, bluefish, butterfish, summer flounder, Atlantic mackerel, scup, black sea bass, spiny dogfish, longfin squid, and *Illex* squid caught in NEFSC bottom trawl survey tows in Mid-Atlantic or southern New England offshore strata. Atlantic brief squid were identified in the stomachs of summer flounder and spiny dogfish. Bobtail squids were identified in the stomachs of monkfish, summer flounder, black sea bass, and spiny dogfish. Shelled pteropods were found in the stomachs of Atlantic mackerel, black sea bass, and spiny dogfish.

Some of the records of catch and stomach contents of unclassified cephalopods likely refer to managed squid species.

5.3.16. **Myctophidae (the lanternfish family)**

Lanternfish are small, deep-sea fish known for their light-producing organs. They are found throughout the world. As a group, they are “among the most numerous fishes on the high seas” and are heavily preyed upon by many fish and marine mammal species (Froese and Pauly 2016). No species of lanternfish are managed. At least five species can be found in Mid-Atlantic Federal waters.

Horned lanternfish (*Ceratoscopelus maderensis*)

Horned lanternfish are widely distributed throughout the world’s oceans. They are typically found in depths of 160 to over 4,000 feet. They migrate between deeper depths during the day and shallower depths at night. They feed mostly on planktonic crustaceans (Froese and Pauly 2016).

Dumril’s headlightfish (*Diaphus dumerilii*)

Dumril’s headlightfish are mostly found in tropical waters but they can be found as far north as the Gulf of Maine. They typically inhabit depths of about 160 to 1,600 feet (Collette and Klein-MacPhee 2002).

Crocodile lanternfish (*Lampanycuts crocodilus*)

Crocodile lanternfish are the largest lanternfish species and can exceed twelve inches in length. They feed on a variety of pelagic and benthopelagic invertebrates, as well as small fish (Collette and Klein-MacPhee 2002).

Doflein’s false headlightfish (*Lobianchia dofleini*)

Doflein’s false headlightfish are found throughout much of the Atlantic Ocean. They are typically smaller than two inches in length and can be found at depths of 700 to 2,000 feet (Collette and Klein-MacPhee 2002).

Spotted lanternfish (*Myctophum punctatum*)

Spotted lanternfish commonly reach about four inches in length. In the western North Atlantic they are typically found north of the Gulf of Maine, though they are occasionally found as far south as Cape Hatteras. They are found in depths of up to at least 3,000 feet (Collette and Klein-MacPhee 2002, Froese and Pauly 2016).

Links to Mid-Atlantic Council FMPs

The NEFOP database includes records of unclassified lanternfish caught in trawl tows which resulted in landings of *Illex* squid and longfin squid.

Unclassified lanternfish were found in the stomachs of black sea bass, monkfish, spiny dogfish, summer flounder, and bluefish caught in NEFSC bottom trawl survey tows in Mid-Atlantic or southern New England offshore strata.

5.3.17. Copepods, krill, amphipods, and any other species under one inch as adults

The Council wishes to include copepods, krill, amphipods, and any other species under one inch as adults in the amendment. This is a very diverse group of species which is not defined by a single taxonomic group.

Copepods (subclass copepod)

Copepods are very abundant, small (i.e. usually less than a tenth of an inch in length) marine crustaceans. Most copepod species are free-swimming and feed on phytoplankton. Several copepod species are parasitic on fish and are known as sea lice. Copepods can form a major component of the zooplankton in some areas. They are a major prey item for many predatory fishes and other species (Pechenik 2005).

Krill (order Euphausiacea)

Krill are small, marine crustaceans. They are found throughout the world and make up a major component of the diet of several whale, fish, squid, shrimp, and seabird species (Pechenik 2005).

Amphipods (order Amphipoda)

There are approximately 6,000 species of amphipods. The order Amphipoda contains several sub-orders, which include gammarid amphipods, hyperiid amphipods, capprellid amphipods, and others. They are small crustaceans and can be found in fresh, brackish, and marine waters. Some species are parasitic. Some species are major prey items for marine fish and marine mammals (Pechenik 2005).

Ostracods (subclass ostracoda)

Ostracods are small crustaceans which can be found in both marine and freshwater environments. Most ostracod species are benthic, though some are planktonic (Pechenik 2005).

Isopods (order Isopoda)

Isopods are small crustaceans. There are about 10,000 isopod species and they can be found in marine, estuarine, freshwater, and terrestrial environments. Some species are parasitic.

Shrimp

The term “shrimp” refers to several types of decapod crustaceans, a classification which also includes crabs and lobsters. Most shrimp species in the Mid-Atlantic reach lengths of greater than one inch. Some shrimp species, including, mysid shrimp (order Mysidacea) do not typically exceed one inch in length, and thus could be included in the amendment. Mysid shrimp are heavily preyed upon by some fish species (Pechenik 2005). Five species of shrimp are managed by the South Atlantic Fishery Management

Council (white shrimp, *Litopenaeus setiferus*; pink shrimp, *Farfantepenaeus duorarum*, brown shrimp, *Farfantepenaeus aztecus*, rock shrimp, *Sicyonia brevirostris*, and royal red shrimp, *Pleoticus robustus*). The ASMFC manages one species of shrimp (northern shrimp, *Pandalus borealis*).

Pteropods (orders Gymnosomata and Thecosomata)

Pteropods fit into two classifications in the list of taxa approved by the Council: they are pelagic molluscs and they do not exceed one inch in length as adults. Pteropods are very small pelagic gastropods which use a modified “foot” to swim. Pteropods in the order Gymnosomata are known as sea angels and do not have a shell, while pteropods in the order Thecosomata, also known as sea butterflies, do have shells.

Links to Mid-Atlantic Council FMPs

Copepods, krill, amphipods, and other species under one inch as adults were not found in NEFOP records of catch in trawl tows, gillnet sets, or hook and line trips which resulted in landings of Council-managed species.

Amphipods were found in the stomachs of bluefish, butterfish, summer flounder, Atlantic mackerel, scup, black sea bass, spiny dogfish, longfin squid, and *Illex* squid caught in NEFSC bottom trawl survey tows in Mid-Atlantic or southern New England offshore strata. Copepods were identified in the stomachs of butterfish, summer flounder, Atlantic mackerel, scup, black sea bass, and longfin squid. Eupahusid krill were found in the stomachs of monkfish, bluefish, butterfish, summer flounder, Atlantic mackerel, scup, black sea bass, spiny dogfish, longfin squid, and *Illex* squid. Isopods were identified in the stomachs of butterfish, Atlantic mackerel, scup, black sea bass, and spiny dogfish. Shelled pteropods were found in the stomachs of Atlantic mackerel, black sea bass, and spiny dogfish. Mysid shrimp were identified in the stomachs of monkfish, butterfish, summer flounder, Atlantic mackerel, scup, black sea bass, and spiny dogfish.

5.4. Management unit and scope of alternatives

The management unit defines the fish stock to which FMP regulations apply. Management units are typically defined as the species in question within a defined geographic area. For example, the management unit of the Bluefish FMP is “bluefish in U.S. waters in the western Atlantic Ocean”.

The Council agreed that the Unmanaged Forage Omnibus Amendment will apply to Mid-Atlantic Federal waters. The Council is considering two alternative ways of defining the boundaries of Mid-Atlantic Federal waters. These alternatives are described in section 6.5.4.

6. MANAGEMENT ALTERNATIVES

The Council has proposed several management alternatives for public consideration in this proposed amendment. Each alternative is described in more detail in the following sections.

6.1. Alternative 1: No action

Alternative 1 is the no action or *status quo* alternative. Under this alternative, there would be no new regulations to prohibit the development of new or expansion of existing directed commercial fisheries on unmanaged forage species in Mid-Atlantic Federal waters. Vessels participating in managed fisheries would continue to be limited in their ability to target some unmanaged forage species by existing regulations such as gear regulations and spatial and seasonal closures.

6.2. Alternative Set 2: Alternatives for species other than chub mackerel

Chub mackerel has a separate set of alternatives from the other species under consideration. There is an existing commercial fishery for chub mackerel which landed over one million pounds in each of the past three years. There have been commercial landings of some of the other species under consideration; however, these landings were much lower than recent landings of chub mackerel (

Table 5 - Table 10). Management alternatives for all other species under consideration are described in this section.

6.2.1. Alternative 2A: Designate as ECs and prohibit possession

Under alternative 2A, all unmanaged forage species included in the amendment, with the exception of chub mackerel, would be designated as ECs (section 5.2) and new regulations would be implemented to prohibit possession of those species by commercial fishing vessels in Mid-Atlantic Federal waters.

6.2.2. Alternative 2B: Designate as ECs and implement an incidental possession limit

Under alternative 2B, all unmanaged forage species included in the amendment, with the exception of chub mackerel, would be designated as ECs and new regulations would be implemented to restrict landings of those species by commercial vessels in the Mid-Atlantic to incidental levels. This alternative is intended to allow vessels which catch ECs incidentally while pursuing managed species to land small amounts of ECs, while also discouraging targeting of ECs.

The Council is considering two options for incidental possession limits for ECs. The first option would limit commercial landings of any EC (besides chub mackerel) to 1,500

pounds per trip. This option was initially recommended by some members of the Council's Ecosystems and Ocean Planning Advisory Panel. These advisors recommended that frigate mackerel, bullet mackerel, and false albacore not be included in the amendment. They said that most of the other species under consideration (with the exception of chub mackerel) are small, low-value species and vessels would not make a large profit from 1,500 pounds of landings. These advisors were not aware of any small-scale commercial fisheries for these species; however, they said such fisheries could exist; for example, to supply bait for recreational fisheries. According to these advisors, a 1,500 pound trip limit could allow small-scale commercial harvest, but would effectively prohibit large-scale commercial fisheries. They recommended that this trip limit apply to each EC species individually; therefore, total landings of all EC species (besides chub mackerel) could exceed 1,500 pounds per trip under this alternative. The advisors who proposed this alternative thought this would be a rare occurrence.

The second incidental possession limit option would limit commercial landings to 1,700 pounds of all ECs (besides chub mackerel) combined per trip. This was also recommended by several members of the Ecosystems and Ocean Planning Advisory Panel. This number is roughly equivalent to the 99th percentile of dealer-reported trip-level landings in the northeast between 1996 and 2015 for bay anchovy, argentine, sand eel, harvestfish¹¹, octopus, and Atlantic silverside. This alternative is intended to cap landings of EC species at their recent historical levels and is expected to prevent large-scale directed commercial harvest.

6.3. Alternative set 3: Alternatives for chub mackerel

The Council has approved a separate range of alternatives for chub mackerel. Chub mackerel is different from the other species under consideration because it is the target of an existing commercial fishery which landed over one million pounds in each of the past three years (Table 8). According to advisors and public comments, some of the other species under consideration have been landed in directed fisheries; however, landings of all other species were much lower than chub mackerel landings in recent years.

The Council has expressed an intent to use the EC designation for the species included in the amendment. As described in section 5.2.1, ECs should be non-target species and should not generally be retained for sale or personal use. GARFO is responsible for implementing any regulations recommended by the Council through this amendment. GARFO has not advised against using the EC designation for chub mackerel. However, because chub mackerel landings in recent years have been so much higher than the

¹¹ Harvestfish (*Peprilus paru*) were previous under consideration for inclusion in the amendment. The Council removed them from the list under consideration in April 2016.

other species under consideration, the Council is considering two alternative designations for chub mackerel, each of which are described in more detail in the following sections. With any of these three designations, the Council is considering management actions which would cap landings based on historical landings. The Council is also considering allowing an incidental possession limit after the annual landings limit is met.

6.3.1. Alternative 3A: Manage chub mackerel as an EC

Under alternative 3A, chub mackerel would be designated as an EC (section 5.2.1). Simply designating chub mackerel as an EC would not impose any limitations on harvest; therefore, in order to meet the goal of the amendment under this alternative, the Council would designate chub mackerel as an EC and use an annual landings limit with or without an incidental possession limit to regulate chub mackerel landings. The alternatives approved by the Council for annual landings limits and possession limits are described in the following sections.

At their April 2016 meeting, the Council suggested that if they were to use the EC designation to regulate chub mackerel landings, they would do so as a temporary measure, potentially for three years, while the analyses necessary to determine if chub mackerel could be better managed as a stock in the fishery are completed (section 5.2.2).

6.3.1.1. Alternative 3Ai: Manage chub mackerel as an EC and prohibit possession once an annual fishery-wide landings limit is met

Under alternative 3Ai, the Council would designate chub mackerel as an EC, establish an annual chub mackerel landings limit, and prohibit possession of chub mackerel after that limit is met. The Council is considering the following four alternatives for annual landings limits, all of which are based on historical Federal dealer-reported landings of chub mackerel in the northeast region:

- 900,127 pounds per year. This is equivalent to the average landings from 2006-2015.
- 1.75 million pounds per year. This is equivalent to the average landings from 2011-2015.
- 2.86 million pounds per year. This is equivalent to the average landings from 2013-2015.
- 5.25 million pounds. This is the amount of chub mackerel landed in 2013, the year with the highest reported landings over the past 20 years.

These are intended to be fishery-wide landings limits, as opposed to per-vessel landings limits. They would apply to all commercial landings of chub mackerel within the

management unit of the amendment (section 6.5.4). Under this alternative, landings of chub mackerel would be prohibited after the annual landings limit is met.

6.3.1.2. Alternative 3Aii: Manage chub mackerel as an EC and enforce an incidental possession limit after an annual fishery-wide landings limit is met

Under alternative 3Aii, the Council would designate chub mackerel as an EC, implement an annual fishery-wide landings limit, and enforce an incidental possession limit once the annual landings limit is met. The annual landings limit is intended to apply to all commercial landings of chub mackerel within the management unit of the amendment (section 6.5.4). The incidental possession limit would be a per-vessel limit. Under this alternative, vessels would be allowed to land up to the incidental possession limit after the annual landings limit is met.

The Council is considering the four annual landings limits described in section 6.3.1.1 and is considering incidental possession limits of either 10,000 pounds or 40,000 pounds per vessel. The 10,000 pound alternative represents approximately the average dealer reported trip-level landings of chub mackerel in the northeast region between 1996 and 2015. The 40,000 pound alternative was proposed by a Council member who is familiar with the chub mackerel fishery. The vessels which were responsible for most of the chub mackerel landings in recent years also participate in the *///ex* fishery. This Council member said these vessels will only retain chub mackerel if they have not already caught *///ex* on the same trip, otherwise product quality will suffer. At 40,000 pounds of chub mackerel per trip, this Council member said, a vessel could bring in enough chub mackerel to fill a truck; thus enabling them to make a profit, which could encourage vessels to land, rather than discard, chub mackerel.

6.3.2. Alternative 3B: Manage chub mackerel as a stock in the fishery

As described in section 4.2, the MSA lists several required provisions of FMPs for stocks that are “in the fishery”. The National Standards Guidelines state that “as a default, all stocks in an FMP are considered to be ‘in the fishery’, unless they are identified as EC species through an FMP amendment process”. For all stocks that are “in the fishery”, the Council must evaluate and describe MSY, status determination criteria, OY, a control rule for ABC, mechanisms for specifying ACLs in relation to the ABC, and AMs for when the ACLs are exceeded. Councils are also required to describe EFH for stocks in the fishery (50 CFR 600.310). The Council has not begun to evaluate any of these measures for chub mackerel. None of these measures are required for ECs. Due to these requirements for stocks in the fishery, alternative 3B would require much more analysis and therefore much more time to implement, compared to alternatives 3A and 3C.

As with alternative 3A, the Council is considering using annual landings limits and incidental possession limits of chub mackerel through alternative 3B. These measures are described in more detail in the following sections.

If the Council were to designate chub mackerel as a stock in the fishery, it would likely do so through a single amendment to the Mackerel, Squid, and Butterfish FMP, rather than through an omnibus amendment to all of the Council's FMPs. Chub mackerel could be considered a stock in the mackerel, squid, and butterfish fishery because a substantial amount of the chub mackerel landed over the past twenty years were landed on trips which also landed *lllex* squid, longfin squid, or butterfish.

6.3.2.1. Alternative 3Bi: Manage chub mackerel as a stock in the fishery and prohibit possession once an annual fishery-wide landings limit is met

Under alternative 3Bi, the Council would designate chub mackerel as a stock in the fishery and would implement an annual landings limit for chub mackerel. Possession of chub mackerel would be prohibited after the landings limit is met. The Council has approved a range of alternatives for an annual fishery-wide landings limit for chub mackerel (section 6.3.1.1). If the Council were to designate chub mackerel as a stock in the fishery, these limits could not be set higher than the ABC. The Council's SSC is required to consider the best scientific information available when recommending an ABC and the ABC must have a biological basis. The alternatives for annual landings limits described in section 6.3.1.1 are based solely on historical landings and have not been evaluated in relation to chub mackerel stock status and population trends. The Council and the SSC have not yet evaluated the scientific information available to determine an appropriate ABC for chub mackerel. The annual landings limits described in section 6.3.1.1 may not be appropriate if chub mackerel were to be designated as a stock in the fishery.

6.3.2.2. Alternative 3Bii: Manage chub mackerel as a stock in the fishery and enforce an incidental possession limit of chub mackerel once an annual fishery-wide landings limit is met

Under alternative 3Bii, the Council would designate chub mackerel as a stock in the fishery, implement an annual fishery-wide landings limit, and enforce an incidental possession limit once the annual landings limit is met. As described in section 6.3.2, if chub mackerel were to be designated as a stock in the fishery, the Council would be required to adopt an ABC and measures to restrict catch to the ABC. Under alternative 3Bii, chub mackerel would be designated as a stock in the fishery, an annual fishery-wide landings limit would be implemented, and an incidental possession limit would be enforced after the annual landings limit is met. The Council is considering the landings

limit alternatives described in section 6.3.1.1 with an incidental possession limit of either 10,000 or 40,000 pounds (section 6.3.1.2). However; the Council and the SSC have not begun to evaluate the information available to set an ABC for chub mackerel; therefore, the landings and possession limits proposed in this document may not be appropriate if chub mackerel were to be designated as a stock in the fishery.

If the Council were to use an incidental possession limit to regulate landings after an annual landings limit is met, the combination of the two measures must not be expected to result in catch exceeding the ABC; therefore, the annual landings limit would have to be set lower than the ABC to account for continued landings due to the incidental possession limit after the annual landings limit is met.

6.3.3. Alternative 3C: Manage chub mackerel as neither an EC nor a stock in the fishery through the Council’s discretionary authority under MSA Section 303(b)(12)

The National Standards Guidelines state that “as a default, all stocks in an FMP are considered to be ‘in the fishery’, unless they are identified as EC species through an FMP amendment process” (50 CFR 600.310). The Council is not bound by these guidelines. The Council has in the past managed catch of some species without designating them as either a stock in the fishery or an EC. For example the Council developed a catch cap for river herring and shad caught in the Atlantic mackerel fishery without designating river herring and shad as either an EC or a stock in the fishery.

Under alternative 3C, the Council would designate chub mackerel as neither an EC nor a stock in the fishery and would implement an annual fishery-wide landings limit for chub mackerel, with or without an incidental possession limit.

At their April 2016 meeting, the Council suggested that if they were to manage chub mackerel without designating it as either an EC or a stock in the fishery, they would do so as a temporary measure, potentially for three years, while the analyses necessary to determine if chub mackerel could be better managed as a stock in the fishery are completed (section 5.2).

6.3.3.1. Alternative 3Ci: Manage chub mackerel as neither an EC nor a stock in the fishery and prohibit possession once an annual fishery-wide landings limit is met

Under alternative 3Ci, the Council would designate chub mackerel as neither an EC nor a stock in the fishery and would implement an annual fishery-wide chub mackerel landings limit. Possession of chub mackerel would be prohibited once the annual landings limit is met. The Council is considering the following four alternatives for annual

landings limits, all of which are based on historical dealer-reported landings of chub mackerel in the northeast region:

- 900,127 pounds per year. This is equivalent to the average landings from 2006-2015.
- 1.75 million pounds per year. This is equivalent to the average landings from 2011-2015.
- 2.86 million pounds per year. This is equivalent to the average landings from 2013-2015.
- 5.25 million pounds. This is the amount of chub mackerel landed in 2013, the year with the highest reported landings over the past 20 years.

These are intended to be fishery-wide landings limits, as opposed to per-vessel landings limits. They would apply to all commercial landings of chub mackerel within the management unit of the amendment (section 6.5.4). Under alternative 3Ci, landings of chub mackerel would be prohibited after the annual landings limit is met.

6.3.3.2. Alternative 3Cii: Manage chub mackerel as neither an EC nor a stock in the fishery and enforce an incidental possession limit once an annual fishery-wide landings limit is met

Under alternative 3Cii, the Council would designate chub mackerel as neither an EC nor a stock in the fishery, implement an annual fishery-wide landings limit, and enforce an incidental possession limit once the annual landings limit is met. Under this alternative, vessels would be allowed to land up to the incidental possession limit after the annual landings limit is met.

The Council is considering the four annual landings limits described in section 6.3.3.1 and is considering incidental possession limits of either 10,000 pounds or 40,000 pounds per vessel. As described in section 6.3.1.2, 10,000 pounds is roughly equivalent to the average dealer-reported trip-level landings of chub mackerel in the northeast region between 1996 and 2015. The 40,000 pound limit was recommended by a Council member who is familiar with the recent chub mackerel fishery.

6.4. Alternative set 4: Alternatives for new fisheries and expansion of existing fisheries

6.4.1. Alternative 4A: No action on new fisheries and expansion of existing fisheries

Under alternative 4A the Council would not develop any new regulations relating to new fisheries or expansion of existing fisheries for those species included in the amendment. Individuals would continue to be able to temporarily pursue new fisheries or land higher

amounts in existing fisheries if they obtain an Exempted Fishing Permit (EFP) from GARFO allowing them do so (section 6.4.3). EFPs are typically issued for one year at a time, but can be renewed annually. EFPs would not be a practical way to pursue a new fishery over the long-term. The Council could implement future amendments or framework actions to allow new fisheries or expansion of existing fisheries for those species included in the amendment. Under alternative 4A, the Council would undertake no such actions as part of this amendment.

6.4.2. Alternative 4B: No new or expanded fisheries for EC species

Under this alternative the Council would not allow any new fisheries for EC species or any expansion of existing fisheries for EC species. The Council has stated that it does not intend to prohibit new fisheries or expansion of existing fisheries indefinitely, but rather only until the Council has had an opportunity to both assess the scientific information relating to any new or expanded directed fisheries and consider potential impacts to existing fisheries, fishing communities, and the marine ecosystem. This language is reflected in the stated goal of this amendment (section 5.1). Alternative 4B is not consistent with the goal of the amendment.

6.4.3. Alternative 4C: Require EFP prior to development of new or expansion of existing fisheries for ECs

An EFP is a permit issued by GARFO that authorizes a vessel to conduct fishing activities that are otherwise prohibited under the regulations at 50 CFR part 648 or part 697. EFPs are typically issued for activities in support of fisheries-related research, including seafood product development and/or market research. Anyone who intends to engage in an activity that is not considered scientific research but that would be otherwise prohibited under these regulations is required to obtain an EFP prior to commencing the activity. An EFP exempts a vessel only from those regulations specified in the EFP. All other applicable regulations remain in effect. The Council is considering two management alternatives which would require use of an EFP as a first step in a process to allow new fisheries for ECs to develop, or as a first step towards allowing landings beyond those allowed for in the amendment.

6.4.3.1. Alternative 4Ci: *Status quo* EFP application process

Under alternative 4Ci, the Council would require use of an EFP prior to allowing any new fisheries for ECs, or landings of ECs beyond what is allowed for through this amendment, once it is implemented. Under this alternative, there would be no changes to the existing process for applying for and obtaining an EFP. Under the current EFP application process, individuals wishing to obtain an EFP must submit an application to GARFO. The GARFO Regional Administrator consults with the executive director of the Mid-Atlantic Council regarding exemptions from Mid-Atlantic Council FMP regulations.

The Regional Administrator may not grant an exemption unless he or she determines that the purpose, design, and administration of the exemption is consistent with the management objectives of the respective FMP, the provisions of the MSA, and other applicable law, and that granting the exemption will not have a detrimental effect on the respective resources and fishery, cause any quota to be exceeded; or create significant enforcement problems.¹²

6.4.3.2. Alternative 4Cii: Council review of EFP applications relating to ECs

Under alternative 4Cii, the Council would require use of an EFP prior to allowing any new fisheries for ECs, or landings of ECs beyond any landings limits implemented through this amendment. Under alternative 4Cii, the Council would develop a new policy for Council review of EFP applications. Under the current EFP application review process, the GARFO Regional Administrator consults with the Executive Director of the Mid-Atlantic Council regarding exemptions from Mid-Atlantic Council FMP regulations. The Council has expressed a desire for more involvement in the review process. Under this alternative, the Council would develop a new policy for Council review of EFP applications. Under current regulations, the Council cannot prevent individuals from submitting EFP applications directly to GARFO; however, the Council could encourage individuals to do so. Council review and approval of an EFP application could be considered beneficial prior to submission to GARFO. The Pacific Fishery Management Council has established a process which encourages individuals to submit EFP applications to the Council prior to submission to the NFMS West Coast Regional Office. These applications are reviewed by the Pacific Council and its advisory bodies, including its SSC, at regular intervals. The requirements are outlined in Council Operating Procedures. The process and requirements for Pacific Council review of EFP applications relating to their regulations on unmanaged forage species are described in Council Operating Procedure 24.¹³ Under alternative 4Cii, the Mid-Atlantic Council may decide to develop a policy similar to the Pacific Council's Operating Procedure 24.

6.4.4. Alternative 4D: Consideration of stock in the fishery designation prior to development of new or expansion of existing fisheries for ECs

Under alternative 4D, the Council would not allow landings of ECs beyond those allowed for in the amendment until the Council has considered whether or not the stock

¹² More information on the requirements for EFPs and the process for review of EFP applications is available at:

www.greateratlantic.fisheries.noaa.gov/aps/permits/forms/efploaeeaaapossessionloaguidance.pdf

¹³ Available at: <http://www.pcouncil.org/council-operations/operating-procedures/>

in question should be a stock in the fishery. Section 5.2 describes considerations and requirements related to stocks in the fishery.

6.5. Alternative Set 5: Administrative alternatives

6.5.1. Alternative 5A: Update the list of authorized fisheries and gear types at 50 CFR 600.725

All federally authorized fisheries and gear types for the Mid-Atlantic region are listed in the Code of Federal Regulations (50 CFR 600.725). If an individual intends to pursue a fishery or use gear that is not on this list, he or she must first notify the Council of this intent in writing. If the Council believes the new fishery or the use of the new gear could be detrimental to conservation and management efforts, the Council may take action to prohibit the new development through an emergency action, an FMP amendment, or development of a new FMP (50 CFR 600.747).

The regulations regarding the list of authorized fisheries and gear types align with the goal of the Unmanaged Forage Omnibus Amendment by ensuring that the Council is notified of and has the opportunity to address new fisheries as they arise. This could be useful in helping the Council determine if new species should be added to the regulations implemented through the amendment (section 6.5.5.1). However; the list of authorized fisheries and gear types currently includes three general categories of fisheries which may allow individuals to pursue fisheries for unmanaged forage species without first notifying the Council of their intent to do so (Table 4).

The Council could request that NMFS update the list of approved fisheries and gear types to modify one or more of these general categories to ensure that individuals intending to target currently unmanaged forage species in Federal waters first notify the Council of their intent to do so. This would enable the Council to address these new fisheries on a case-by-case basis.

Table 4: The fisheries and authorized gear types listed in 50 CFR 600.725 which limit the Council’s ability to address new fisheries for unmanaged forage species as they develop.

Fishery	Authorized gear type
16. Coastal Gillnet Fishery (Non-FMP)	Gillnet
17. Recreational Fishery (Non-FMP)	Rod and reel, handline, spear, hook and line, hand harvest, bandit gear, powerhead, gillnet, cast net.
27. Commercial Fishery (Non-FMP)	Trawl, pot, trap, gillnet, pound net, dredge, seine, handline, longline, hook and line, rod and reel, spear.

6.5.2. Alternative 5B: Permitting

The Council approved a management alternative which would require commercial fishing vessels to obtain a commercial fishing permit from GARFO in order to possess any species designated as ECs in the amendment. As with other aspects of this amendment, this alternative is intended to apply to Mid-Atlantic Federal waters and is not intended to apply to vessels fishing only in state waters. Federal permits are typically required to fish for, possess, or land managed species. Federal permits also generally require that vessels sell their catch to a federally-permitted dealer.

Federal dealer-reported landings show many instances of landings of the species under consideration by vessels which did not have GARFO permits. For example, 95% of the dealer-reported landings of sand eels, and virtually 100% of the dealer-reported landings of silversides in the northeast region from 2006 through 2015 were from vessels which did not have GARFO permits. Over the past twenty years, more than 25% of the dealer-reported landings of argentinies, octopus, and false albacore were from vessels that did not have GARFO permits. These landings likely came from vessels fishing in state waters, though some landings may be associated with vessels that had permits through the NOAA Fisheries Southeast Regional Office, but landed their catch in the northeast region.

6.5.3. Alternative 5C: Monitoring/reporting

6.5.3.1. Alternative 5Ci: Council notification of EC landings

Under alternative 5Ci, the Council would work with GARFO to develop a process that provides the Council with data on annual catch of EC species in its jurisdiction on a regular basis.

6.5.3.2. Alternative 5Cii: Reporting of EC landings

Federally-permitted commercial fishermen are required to report everything they catch and federally-permitted dealers are required to report everything they purchase. The Council has heard some public comments that the codes used for reporting some of the species under consideration are not available when individuals attempt to report landings through a system such as SAFIS (an online system used to fulfill state and Federal reporting requirements). Under alternative 5Cii, the Council would require that the codes for all species included in the amendment be added to SAFIS and other platforms used to report landings. There are codes for every species under consideration; however, not all codes are activated in programs such as SAFIS.

6.5.4. Alternative 5D: Management unit

The Council agreed to limit the management unit of this amendment to Mid-Atlantic Federal waters. The Council is considering two alternative ways of defining the boundaries of Mid-Atlantic Federal waters.

6.5.4.1. Alternative 5Di: Southern boundary defined by Virginia/North Carolina border

Under alternative 5Di, the management unit for this amendment would consist of the Exclusive Economic Zone (EEZ; i.e. the area extending from the coast to 200 miles from shore) from the state line separating New York and Connecticut (extended seaward) to the state line separating Virginia and North Carolina (extended seaward). This is the jurisdiction of the Mid-Atlantic Fishery Management Council, as defined in the MSA (section 302(a)(1)(B)). The management unit would not include state waters.

6.5.4.2. Alternative 5Dii: Southern boundary at Cape Hatteras

Under alternative 5Dii, the management unit for this amendment would consist of the EEZ from the state line separating New York and Connecticut (extended seaward) to Cape Hatteras, North Carolina. The management unit would not include state waters.

Cape Hatteras is the southern extent of the management units for scup and black sea bass.

6.5.5. Alternative 5E: Frameworkable items

Framework actions facilitate expedient modifications to certain management measures. Framework actions can modify existing measures and/or those that have been previously considered and analyzed in an FMP or amendment. While amendments may take several years to complete and address a variety of issues, frameworks generally can be completed in 6-8 months and address one or a few issues in a fishery. An omnibus framework may address similar issues across multiple FMPs.

If the measures proposed through a framework action represent significant departures from previously contemplated measures (i.e. measures analyzed through previous FMP actions), or if it could have significant impacts, then an FMP amendment may be required, even if the action was previously identified as a frameworkable item.

The Council is considering several items relevant to this amendment for possible future frameworks.

6.5.5.1. Alternative 5Ei: List of Ecosystem Components

This alternative would give the Council the option to modify the list of ECs included in the amendment through future framework actions. The Council has repeatedly stated its intent to allow future frameworks to modify the list of ECs in order to adapt to changing species distributions, changing fish abundances, and emerging fisheries in the Mid-Atlantic. The Council also expressed a desire to include a relatively concise list of ECs in the initial amendment in an attempt to minimize unintended negative impacts to existing managed fisheries which catch unmanaged forage species incidentally. By allowing future framework actions to modify the list of ECs in the amendment, the Council will be able to both add and remove species from the amendment in a relatively efficient manner (compared to an FMP amendment) in response to new information on fish abundances, emerging fisheries, and impacts to existing managed fisheries.

6.5.5.2. Alternative 5Eii: Possession limits and landings limits

This alternative would give the Council the option to use future framework actions to modify any possession or landings limits implemented through the amendment.

6.5.5.3. Alternative 5Eiii: Spatial and seasonal closures

Under alternative 5Eiii, the Council would allow future framework actions to add spatial and seasonal closures for the species included in this amendment. Spatial and seasonal closures are currently only listed under frameworkable items and are not associated with a standalone alternative. For this reason, spatial and seasonal closures will not be fully analyzed in the EA for the amendment.

6.5.5.4. Alternative 5Eiv: Recreational fishing regulations

The Council agreed that the intent of this amendment is to address the potential threat of future unregulated large-scale commercial harvest of currently unmanaged forage species. The Council is not considering recreational management measures through this amendment, but agreed to implement recreational measures through future frameworks actions, if needed. Recreational management measures are currently only listed under frameworkable items and are not associated with a standalone alternative. For this reason, they will not be fully analyzed in the EA for the amendment.

6.6. Considered but rejected from further analysis

6.6.1. Prohibit possession of some ECs and allow an incidental possession limit of others

As described in section 6.2, the Council is considering management alternatives which would either prohibit all possession of the species included in the amendment as ECs

(with the exception of chub mackerel), or allow an incidental possession limit of those species. The Council previously considered an alternative that would prohibit possession of some ECs and allow an incidental possession limit of others. The Council removed this alternative from consideration in April 2016 due to enforcement concerns. There was concern that if possession of some species were prohibited and possession of others were allowed, it would require the species to be identified and sorted on deck during Coast Guard boardings, which could significantly increase the time required for boardings. This could be burdensome for both the Coast Guard and for commercial fishing vessels, and could pose challenges for Coast Guard Officers in terms of species identification.

6.6.2. Spatial and seasonal closures

Spatial and seasonal closures were previously considered as a standalone alternative in the amendment. In April 2016 the Council decided to retain spatial and seasonal closures as a frameworkable item, but remove them from consideration as a full alternative in favor of landings and possession limits, which are expected to be more effective in regulating harvest of unmanaged forage species, simpler to analyze, implement, and enforce, and likely to have fewer negative consequences for existing managed fisheries.

6.6.3. Gear regulations

The Council decided to remove gear regulations from further consideration in April 2016. Fishermen already catch several of the species under consideration while using gear allowed for in managed fisheries. The Council wishes to minimize negative impacts to existing managed fisheries as a result of this amendment.

7. DESCRIPTION OF THE AFFECTED ENVIRONMENT

The affected environment consists of those physical, biological, and human components of the environment that are expected to experience impacts if the actions under consideration in this amendment are implemented. This section describes the recent conditions of the physical, biological, and human components of the environment that may be impacted by the actions under consideration in this amendment.

7.1. Physical environment

The Council intends for any new regulations implemented through this amendment to apply to Mid-Atlantic Federal waters. The physical environment of this region is defined by the Mid-Atlantic Bight. The Mid-Atlantic Bight includes shelf and slope waters from Georges Bank to Cape Hatteras, with the eastern boundary defined by the Gulf Stream. In this area, the shelf gradually descends from shore to about 100-200 meters in depth,

where it becomes the shelf break. Characteristic features of the Mid-Atlantic Bight include mostly sandy substrates, numerous canyons which incise the slope, some of which extend onto the shelf, and artificial reefs formed by shipwrecks, shoreline jetties and groins, submerged pipelines and cables (Stevenson et al. 2004).

7.2. Biological environment

The affected biological environment primarily consists of those unmanaged species under consideration for inclusion in the amendment (Table 3). The Council has not yet considered any data on stock status or abundance trends for these species. Some data are available from the NEFSC biannual bottom trawl survey, NEFOP data on catch, and dealer-reported landings; however, there are no stock assessments for any of these species. As described in section 7.3, there have been commercial landings of some of these species in recent years; therefore, the baseline conditions for some of these species includes some level of fishing pressure. It is not known how recent landings have impacted the abundances of these species, if at all.

The biological environment of this amendment also includes managed species and species afforded protection under the Endangered Species Act or the Marine Mammal Protection Act. These aspects of the affected environment are not described in detail in this document, but will be considered more thoroughly in a draft EA which will be published with a proposed rule after the Council selects preferred alternatives. The EA and proposed rule will be subject to further public comment

7.3. Human communities and economic environment

Several of the taxa under consideration have been landed and sold in commercial fisheries in the northeast region over the past twenty years. Federal commercial fishing permit holders are required to report all of their landings and dealers are required to report everything they purchase, whether or not those landings or purchases are of managed species. Federal dealer-reported data on landings and value of the species under consideration over the past twenty years in the northeast region are summarized in the following sections.

There were no Federal dealer-reported landings of round herring, striped anchovy, dusky anchovy, silver anchovy, scaled sardine, Spanish sardine, rough silverside, inland silverside, pearlsides, greeneyes, bullet mackerel, halfbeaks, Atlantic saury, cusk-eels, unmanaged squids, lanternfish, pteropods, copepods, krill, amphipods, and other species under one inch as adults in the northeast region between 1996 and 2015. It is not clear if there were no reported landings of these species because they truly were not landed, because they were landed but not reported, or because they were landed but reported under a different name or under a general category such as

“herring NK” or “other fish”. Mis-reporting is especially likely for species which are difficult to distinguish from other species.

7.3.1. Landings and value of anchovies (family engraulidae)

As previously described, four species in the family engraulidae can be found in Mid-Atlantic Federal waters. Of these four species, only bay anchovy had Federal dealer-reported landings in the northeast region over the past twenty years. These landings averaged 634 pounds per year (

Table 5).

Table 5: Dealer-reported landings and value of bay anchovy in the northeast region, 1996-2015. Landings in some years are combined to protect confidential information. Prices are not adjusted to account for inflation.

Year	Landings (pounds)	Revenue	Average price per pound
1996-1997	1,769	\$110	\$0.06
1998	5,451	\$2,738	\$0.50
1999-2002	148	\$48	\$0.32
2004-2007	1,293	\$533	\$0.41
2008	82	\$104	\$1.27
2009-2010	224	\$103	\$0.46
2011-2012	467	\$321	\$0.69
2013-2015	716	\$463	\$0.65

7.3.2. Landings and value of argentines (family argentinidae)

As previously described, at least two species of argentines can be found in Mid-Atlantic Federal waters. None of these species are managed. Federal dealer data from 1996-2015 do not differentiate between the different species but list all landings under the family name “argentine”. Landings of argentines were not reported in every year between 1996 and 2015. Landings of argentines in several years were associated with only one fishing permit. Dealer-reported landings of argentine in the northeast region averaged 1,545 pounds per year between 1996 and 2015 (

Table 6).

Table 6: Dealer-reported landings and value of argentine in the northeast region, 1996-2015. No landings were reported in several years between 1996 and 2015. Landings in some years are combined to protect confidential information. Prices are not adjusted to account for inflation.

Year	Landings (pounds)	Revenue	Average price per pound
1996-1998	0	\$0	--
1999-2004	2,797	\$901	\$0.32
2005-2006	5,300	\$1,478	\$0.28
2007	18,905	\$7,080	\$0.37
2008	2,404	\$1,672	\$0.70
2009-2015	1,495	\$598	\$0.40

7.3.3. Landings and value of silversides (family atherinopsidae)

As previously described, three species of silversides can be found in Mid-Atlantic Federal waters. Federal dealer-reported landings in the northeast region include landings only of Atlantic silverside. Atlantic silverside landings averaged 24,119 pounds per year between 1996 and 2015. About 99.6% of Federal dealer-reported landings of Atlantic silverside over this time period were associated with vessels that did not have GARFO permits. These landings likely came from state waters (Table 7).

During public scoping hearings for this amendment, the Council received comments from a few individuals who said they commercially harvest silversides and sell them for bait and to zoos and aquariums.

Table 7: Dealer-reported landings and value of Atlantic silverside in the northeast region, 1996-2015. Data in some years are combined to protect confidential information. Prices are not adjusted to account for inflation.

Year	Landings (pounds)	Revenue	Average price per pound
1996	41,421	\$25,558	\$0.62
1997	45,278	\$33,374	\$0.74
1998	52,432	\$31,969	\$0.61
1999	54,653	\$44,039	\$0.81
2000	33,054	\$27,854	\$0.84
2001	34,237	\$23,816	\$0.70
2002	31,899	\$22,061	\$0.69
2003	71,542	\$40,159	\$0.56
2004-2005	4,081	\$4,858	\$1.19
2006-2008	21,119	\$23,304	\$1.10
2009-2010	9,970	\$10,328	\$1.04
2011-2012	25,607	\$42,880	\$1.67
2013-2015	57,079	\$53,151	\$0.93

7.3.4. Landings and value of sand lances (family ammodytidae)

Two species of sand lance are found in Mid-Atlantic Federal waters. Federal dealer-reported landings are listed under “eel, sand (launce)” and do not differentiate between the two species. According to this data, 81,034 pounds of sand lance were landed in the northeast region between 1996 and 2015. In most years, landings were associated with fewer than three dealers and/or permit holders and are thus considered confidential. About 96% of Federal dealer-reported landings of sand lance were not associated with GARFO permits. These landings likely came from state waters.

During public scoping hearings for this amendment, the Council received comments from a few individuals who said they commercially harvest sand lances and sell them for bait and to zoos and aquariums.

7.3.5. Landings and value of chub mackerel, frigate mackerel, and little tuna (family scombridae)

The Council is considering including three species in the family scombridae in the Unmanaged Forage Omnibus Amendment: chub mackerel, frigate mackerel, bullet mackerel, and little tuna.

Chub mackerel landings averaged about 172,000 pounds per year between 1996 and 2015 and reached a peak of 5.25 million pounds in 2013 (Table 8). In recent years (i.e. 2006-2015) chub mackerel were mostly landed on trips which also landed *lllex* squid, longfin squid, and/or butterfish, all of which are managed by the Mid-Atlantic Council. On trips which landed at least 10,000 pounds of chub mackerel, the majority of landings were *lllex* squid. Chub mackerel landings between 1996 and 2015 totaled about 9.6 million pounds, which is more than double the dealer-reported landings of all the other species under consideration combined. Chub mackerel landings in the northeast region have increased notably over the past three years. Advisors and members of the public have reported that some vessels targeted chub mackerel in recent years and chub mackerel landings formed an important part of their annual income, especially in years when availability of *lllex* squid was low.

Federal dealer-reported landings of frigate mackerel in the northeast averaged about 182,000 pounds per year between 1996 and 2015 (Table 9). From 2006 through 2015, frigate mackerel were commonly landed on trips which also landed larger scombrid species such as false albacore and bonito. On trips which landed at least 100 pounds of frigate mackerel, bonito tended to be landed in higher quantities than frigate mackerel. Frigate mackerel were landed on very few trips which also landed Atlantic mackerel or chub mackerel, suggesting that frigate mackerel may not mix with these species.

There were no dealer-reported landings of bullet mackerel between 1996 and 2015. Bullet mackerel and frigate mackerel are very similar in appearance. It is possible that some landings of bullet mackerel may have been mistakenly reported as frigate mackerel.

Table 8: Dealer-reported landings and value of chub mackerel in the northeast region, 1996-2015. Data from 2004 through 2011 are combined to protect confidential information. Prices are not adjusted to account for inflation.

Year	Chub mackerel landings (pounds)	Revenue	Average price per pound
1996-1997	24,064	\$4,959	\$0.21
1998	40,219	\$7,354	\$0.18
1999	6,443	\$2,291	\$0.36
2000	16,246	\$5,218	\$0.32
2001	4,384	\$4,339	\$0.99
2002	471	\$205	\$0.44
2003	488,316	\$24,429	\$0.05
2004-2012	412,836	\$110,056	\$0.27
2013	5,249,686	\$997,378	\$0.19
2014	1,230,411	\$334,121	\$0.27
2015	2,108,337	\$485,472	\$0.23

Table 9: Dealer-reported landings and value of frigate mackerel in the northeast region, 1996-2015. Landings in some years are combined to protect confidential information. Prices are not adjusted to account for inflation.

Year	Landings (pounds)	Revenue	Average price per pound
1996-1997	5,724	\$1,043	\$0.18
1998	2,989	\$462	\$0.15
1999	36,485	\$4,153	\$0.11
2000	19,682	\$7,032	\$0.36
2001	6,344	\$4,937	\$0.78
2002	1,714	\$1,322	\$0.77
2003	9,260	\$3,438	\$0.37
2004-2005	982	\$832	\$0.85
2006-2007	1,184	\$869	\$0.73
2008-2010	4,292	\$3,336	\$0.78
2011	3,467	\$2,787	\$0.80
2012-2013	342	\$378	\$1.11
2014-2015	5,866	\$6,373	\$1.09

7.3.6. Landings and value of unmanaged pelagic molluscs

The Council is considering including unmanaged pelagic molluscs in the Unmanaged Forage Omnibus Amendment. The molluscan phylum contains thousands of pelagic species in many orders.

There are several unmanaged squid species in the Mid-Atlantic (section 5.3.15); however there are no dealer-reported landings of these species. Between 2003 and 2015, dealer-reported landings of unclassified squids averaged 4,954 pounds per year. It is likely that some of these landings were of managed squid species such as longfin and *Illex* squid.

Dealer-reported landings of octopods in the northeast region averaged 1,781 pounds per year between 1996 and 2015 (Table 10). Most octopods are benthic (Pechenik 2005); however, there is at least one pelagic octopus in the Mid-Atlantic: the tuberculate pelagic octopus (*Ocythoe tuberculata*). Most dealer-reported landings of octopods in the northeast region likely represent benthic, rather than pelagic, species.

Table 10: Dealer-reported landings and value of octopus in the northeast region, 1996-2015. Landings in some years are combined to protect confidential information. Prices are not adjusted to account for inflation.

Year	Landings (pounds)	Revenue	Average price per pound
1996	1,388	\$1,223	\$0.88
1997	99	\$137	\$1.38
1998	639	\$712	\$1.11
1999	306	\$306	\$1.00
2000	4,261	\$5,399	\$1.27
2001	2,548	\$2,681	\$1.05
2002	16,625	\$22,402	\$1.35
2003	3,381	\$5,428	\$1.61
2004	1,360	\$2,267	\$1.67
2005-2006	1,645	\$2,748	\$1.67
2007	1,207	\$1,852	\$1.53
2008	1,144	\$1,703	\$1.54
2009	229	\$240	\$1.05
2010-2011	84	\$108	\$1.29
2012	258	\$469	\$2.05
2013	161	\$235	\$1.48
2014	82	\$119	\$1.45
2015	212	\$428	\$2.02

8. IMPACTS OF THE ALTERNATIVES

This section briefly summarizes the expected impacts of the alternatives on unmanaged forage species, managed species, protected species (i.e. species afforded protection under the Endangered Species Act or the Marine Mammal Protection Act), habitat, and human communities. The impacts of each alternative are described in relation to the no action alternative (alternative 1).

These impacts will be examined in further detail in a draft EA which the Council will submit to GARFO after selecting preferred alternatives. The draft EA will be subject to an additional public comment period when NOAA Fisheries undertakes the rulemaking process.

8.1. Impacts of alternative 1 (no action)

Alternative 1 is the no action alternative. Under this alternative, no measures relating to catch and landings of currently unmanaged forage species would be implemented.

Limited information is available on the status of many of the species which may be included in the amendment. The Council has not yet considered any information on stock status or abundance trends for these species. The Council is developing this amendment in order to proactively protect the important ecosystem role of forage species from the potential threat of unsustainable, unregulated commercial harvest. If recent patterns in fishing effort and fishing behavior remain relatively unchanged in the near future, alternative 1 would be expected to have impacts that are similar to existing impacts.

8.2. Impacts of alternative set 2 (alternatives for species other than chub mackerel)

The Council received public comments indicating that some of the species which may be addressed through alternative set 2, including silversides and sand eels, are harvested in directed fisheries. These fisheries mostly occur in state waters and will, for the most part, only be impacted by the amendment if the vessels which participate in these fisheries have Federal commercial fishing permits for other species.¹⁴

Several of the other species under consideration in alternative set 2 have been landed in commercial fisheries (section 7.3); however, they are thought to be largely caught

¹⁴ In instances where state and Federal regulations for a given species differ, the more restrictive measure generally applies. For example, if the Council were to develop regulations to prohibit possession of sand eels, and if a vessel had both Federal and state commercial fishing permits, that vessel would not be able to commercially harvest sand eels in state waters because that vessel would be bound by the Federal regulations. This would not be the case if the vessel did not have a Federal commercial fishing permit and only fished in state waters.

incidentally in other fisheries, rather than in targeted fisheries. Other species under consideration have no dealer-reported landings over the past twenty years.

Alternative 2A would prohibit possession of the unmanaged forage species under consideration and would prevent directed fisheries for those species in Mid-Atlantic Federal waters. To the extent to which this leads to a decrease in fishing effort for those species, alternative 2A could have positive biological impacts by reducing fishing mortality for those species. It may also have positive impacts for habitat and protected species by decreasing the amount of fishing gear that is in the water and the amount of time that the gear is in the water, thus decreasing the potential for interactions between fishing gear and habitat and between fishing gear and protected species. As previously described, most of these forage species are predominantly landed in incidental, rather than directed fisheries; therefore, a prohibition on possession may not result in a substantial change in overall fishing effort.

Alternative 2A could have some negative socioeconomic impacts by preventing fishermen from catching and selling certain forage species. As shown in section 7.3, some of these species have been landed and sold in the past. Alternative 2A could also have indirect positive socioeconomic impacts if it reduces fishing pressure on unmanaged forage species, allows abundances of those species to increase, and in turn allows for an increase in the abundance of other commercially important managed species which prey on those species.

Alternative 2B is intended to restrict landings of several species to incidental levels. Both of the incidental possession limits under consideration would have constrained less than one percent of trips with dealer-reported landings in the northeast region over the past twenty years (section 6.2.2). For this reason, alternative 2B is not expected to constrain commercial fishermen if fishing practices in the future are similar to those over the past twenty years. Current fishery conditions are not expected to change under alternative 2B; therefore, alternative 2B is expected to result in similar biological, habitat, protected species, and social and economic impacts as the no action alternative (alternative 1). Alternative 2B could have positive biological, habitat, and protected species impacts to the extent that it has the potential to constrain fishing effort for these forage species beyond current levels and could prevent increased fishing mortality and increased interactions between fishing gear and habitat and fishing gear and protected species. It should be noted that these forage species are a small component of total landings and are not large drivers of overall fishing effort in the Mid-Atlantic.

8.3. Impacts of alternative set 3 (alternatives for chub mackerel)

Alternative set 3 includes three ways of implementing landings limits for chub mackerel: by designating them as an EC (alternative 3A), as a stock in the fishery (alternative 3B),

or by using neither designation but using the Council's authority under MSA section 303(b)(12). The designation used to regulate chub mackerel landings is largely administrative in nature. The expected biological, habitat, protected species, and socioeconomic impacts would depend on the catch and landings limits implemented under each alternative, not on the designation used. However, if chub mackerel were designated as a stock in the fishery, the Council would be required to set ABCs based on the best scientific information available, and would also be required to establish ACLs, AMs, and other provisions (section 5.2.2). These would not be required under alternatives 3A and 3C. The actual measures implemented under a stock in the fishery designation would be based on a series of decisions by the Council and the Council's advisory bodies, including its SSC. The actual landings limits implemented if chub mackerel were to be a stock in the fishery cannot be determined without additional analysis and discussion by the SSC and other groups. However, implementing catch and landings limits and requiring that those limits be based on biological information would be expected to have positive impacts for the chub mackerel stock. It could have positive socioeconomic impacts by ensuring a sustainable chub mackerel fishery. The impacts to habitat and protected species would depend on the extent to which chub mackerel landings would increase or decrease when compared to recent chub mackerel landings.

Under alternatives 3A and 3C, the Council would implement landings limits for chub mackerel without establishing an ABC. The Council has proposed four alternatives for fishery-wide landings limits and two incidental possession limit alternatives which could be implemented under alternative 3A or 3C. The landings limit alternatives range from 900,127 pounds per year for the entire chub mackerel fishery to 5.25 million pounds per year. A 900,127 pound annual fishery-wide landings limit could constrain the fishery, given recent patterns in landings (Table 8: Dealer-reported landings and value of chub mackerel in the northeast region, 1996-2015. Data from 2004 through 2011 are combined to protect confidential information. Prices are not adjusted to account for inflation. Table 8). This landings limit could cause a decrease in fishing effort for chub mackerel and could have positive impacts to the chub mackerel stock, positive habitat and protected species impacts, and negative socioeconomic impacts. It could have indirect positive socioeconomic impacts if a decrease in fishing mortality on chub mackerel leads to an increase in a food source for other commercially and recreationally important fisheries. At the other extreme, if the Council chooses a 5.25 million pound per year landings limit, fishing effort could increase beyond recent levels if this full amount were landed in multiple consecutive years. This could lead to negative impacts to the chub mackerel stock by increasing fishing mortality when compared to recent levels. There are no stock assessments for chub mackerel in the western North Atlantic and the Council has not yet considered information on chub mackerel abundance and stock status; therefore, it is not known if a 5.25 million pound per year landings limit would be

expected to result in a change in the abundance of chub mackerel or a change in chub mackerel stock status. If this landings limit leads to an increase in fishing effort, it could have negative habitat and protected species impacts by increasing the potential for interactions with fishing gear. It could have positive socioeconomic impacts by allowing for increased landings of chub mackerel. However, if this level of harvest causes chub mackerel abundances to decrease, or if it reduces the availability of chub mackerel to predators sought in other commercial and recreational fisheries, it could also have indirect negative socioeconomic impacts.

8.4. Impacts of alternative set 4 (new fisheries and expansion of existing fisheries)

The sub-alternatives under alternative set 4 describe the process which the Council would use to determine if any new fisheries should be allowed for the species included in the amendment, or if landings limits for those species could be increased beyond the levels allowed for under alternatives 2B, 3A, or 3C. Alternative 4B would not allow any new or expanded fisheries for those species included in the amendment as ECs, and would therefore be expected to have positive biological impacts. The other alternatives under alternative set 4 are administrative in nature because they simply specify the process which the Council would use to determine if any new fisheries or expansion of existing commercial fisheries would be allowed for the species included in the amendment.

8.5. Impacts of alternative set 5 (administrative alternatives)

Alternative set 5 contains administrative alternatives. These alternatives are expected to have largely neutral biological, protected species, habitat, and socioeconomic impacts because they relate to processes for permitting, monitoring, reporting, and modifying certain aspects of this amendment. Alternative 5E (list of frameworkable items) is expected to have some positive impacts because frameworks allow the Council to respond to changing conditions in a fishery in a relatively efficient and timely manner, compared to an amendment process. Measures implemented through future frameworks will be analyzed in future framework documents.

9. REFERENCES

- Alder, J., B. Campbell, V. Karpouzi, K. Kaschner, and D. Pauly. 2008. Forage fish: from ecosystems to markets. *Annual Reviews in Environment and Resources*. 33: 153-166.
- Clay, P. M., G. DePiper, S. Gaichas, J. Hare, E. Houde, and R. Seagraves. 2014. Managing forage fishes in the Mid-Atlantic Region: a white paper to inform the Mid-Atlantic Fishery Management Council. Available at: www.mafmc.org/actions/unmanaged-forage.
- Cohen, A. 1976. The systematics and distribution of *Loligo* (Cephalopoda, Myopsida) in the western North Atlantic, with descriptions of two new species. *Malacologia*. 15(1): 299-367.
- Collette, B. B. and G. Klien-MacPhee. 2002. *Bigelow and Schroeder's Fishes of the Gulf of Maine*. Third edition. Smithsonian Books.
- DFO (Canadian Department of Fisheries and Oceans). 1999. Neon flying squid stock status report. DFO Science Stock Status Report C6-12. Available at: <http://www.dfo-mpo.gc.ca/csas/Csas/status/1999/C6-12e.pdf>.
- Drohan, A.F., J. P. Manderson, and D. B. Packer. 2007. Essential fish habitat source document: black sea bass, *Centropristis striata*, life history and habitat characteristics, 2nd edition. NOAA Technical Memorandum NMFS NE 200; 68 p.
- FL FWCC (Florida Fish and Wildlife Conservation Commission). 2010a. Spanish sardine, *Sardinella aurita* (Valenciennes, 1847). Available at: http://myfwc.com/media/195536/spanish_sardine.pdf
- FL FWCC (Florida Fish and Wildlife Conservation Commission). 2010b. Atlantic thread herring, *Opisthonema oglinum* (Lesueur, 1871). Available at: http://myfwc.com/media/194720/atlantic_thread_herring.pdf
- Froese, R. and D. Pauly (editors). 2016. FishBase. <http://www.fishbase.org/search.php>.
- Houde, E. D. 1977. Abundance and potential yield of the round herring, *Etrumeus teres*, and aspects of its early life history in the eastern Gulf of Mexico. *Fishery Bulletin*. 75(1): 61-89.
- Kells, V. and K. Carpenter. 2011. *A Field Guide to Coastal Fishes from Maine to Texas*. The Johns Hopkins University Press.
- MAFMC (Mid-Atlantic Fishery Management Council). 2012. Vision and strategic planning project stakeholder input report, appendix A: survey results. Available at: www.mafmc.org/strategic-plan/.
- Packer, D. B, S. J. Griesbach, P. L. Berrien, C. A. Zetlin, D. L. Johnson, and W.W. Morse. 1999. Essential fish habitat source document: summer flounder, *Paralichthys dentatus*, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-151.
- Pechenik, J. A. 2005. *Biology of the Invertebrates*. Fifth edition. McGraw-Hill.
- Pikitch, E., P. D. Boersma, I. L. Boyd, D. O. Conover, P. Cury, T. Essington, S. S. Heppell, E. D. Houde, M. Mangel, D. Pauly, , É. Plagányi, K. Sainsbury, and R. S. Steneck. 2012. Little fish, big impact: managing a crucial link in ocean food webs. Lenfest Ocean Program. Washington, DC. Available at: <http://www.lenfestocean.org/en/research-projects/lenfest-forage-fish-task-force>
- Pikitch, E. K., K. J. Rountos, T. E. Essington, C. Santora, D. Pauly, R. Watson, U. R. Sumaila, P. D. Boersma, I. L. Boyd, D. O. Conover, P. Cury, S. S. Heppell, E. D. Houde, M. Mangel, É. Plagányi, K. Sainsbury, R. S. Steneck, T. M. Geers, N. Gownaris, and S. B. Munch. 2014. The global contribution of forage fish to marine fisheries and ecosystems. *Fish and Fisheries*. 15 (1): 43-64.

Smith, A. D. M., C. J. Brown, C. M. Bulman, E. A. Fulton, P. Johnson, I. C. Kaplan, H. Lozano-Montes, S. Mackinson, M. Marzloff, L. J. Shannon, Y. Shin, and J. Tam. 2011. Impacts of fishing low-trophic level species on marine ecosystems. *Science*. 333: 1147-1150.

Steimle, F.W, C. A. Zetlin, P. L. Berrien, D. L. Johnson, and S. Chang. 1999. Essential fish habitat source document: scup, *Stenotomus chrysops*, life history and habitat characteristics. NOAA Technical Memorandum NMFS-NE-149.

Stevenson, D., L. Chiarella, D. Stephan, R. Reid, K. Wilhelm, J. McCarthy, and M. Pentony. 2004. Characterization of the fishing practices and marine benthic ecosystems of the northeast US shelf, and an evaluation of the potential effects of fishing on essential habitat. NOAA Technical Memorandum NMFS NE 181; 179 p.

Young, R. E., M. Vecchione, and D.T. Donovan. 1998. The evolution of coleoid cephalopods and their present biodiversity and ecology. *South African Journal of Marine Science*. 20: 393-420.