Mid-Atlantic Fishery Management Council
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Richard B. Robins, Jr., Chairman | Lee G. Anderson, Vice Chairman
Christopher M. Moore, Ph.D., Executive Director

MEMORANDUM

Date: April 1, 2016

To: Chris Moore

From: Julia Beaty

Subject: April 2016 briefing materials on Unmanaged Forage Omnibus Amendment

The following materials are attached:

1) List of taxa approved by the Council for possible inclusion in the Unmanaged Forage Omnibus Amendment

2) Summary of March 2016 Unmanaged Forage Fishery Management Action Team meeting

3) Dealer-reported landings of species on Council-approved list, 1996-2015

4) Summary of March 2016 Ecosystems and Ocean Planning Advisory Panel meeting

5) Summary of March 2016 Ecosystems and Ocean Planning Committee meeting

6) Public comments received since the February 2016 Council meeting

A draft public hearing document will be posted to the April 2016 meeting page (http://www.mafmc.org/briefing/april-2016) by 5pm on Wednesday April 6, 2016.

Unmanaged Forage Taxa

As approved by the Council on 2/10/16

The table below contains a list of unmanaged forage taxa approved by the Mid-Atlantic Fishery Management Council for potential inclusion in the Unmanaged Forage Omnibus Amendment. The right-hand column includes examples of species and groups which are encompassed by each taxonomical grouping. This list will be presented during public hearings and may be modified in the future based on public input and recommendations from the Council's advisory bodies and NOAA Fisheries.

Unmanaged Forage Taxa	**Examples of unmanaged species or groups found in Mid-Atlantic federal waters**
Engraulidae The anchovy family	• Striped anchovy, *Anchoa hepsetus* • Dusky anchovy, *Anchoa lyolepis* • Bay anchovy, *Anchoa mitchilli* • Silver anchovy, *Engraulis eurystole*
Clupeidae The herring family	• Round herring, *Etrumeus teres* • Scaled sardine, *Harengula jaguana* • Atlantic thread herring, *Opisthonema oglinum* • Spanish sardine, *Sardinella aurita*
Argentinidae The argentine family	• Striated argentine, *Argentina striata* • Pygmy argentine, *Glossanodon pygmaeus*
Atherinopsidae The neotropical silverside family	• Rough silverside, *Membras martinica* • Inland silverside, *Menidia beryllina* • Atlantic silverside, *Menidia menidia*
Ammodytidae The sand lance family	• American sand lance, *Ammodytes americanus* • Northern sand lance, *Ammodytes dubius*
Sternoptychidae The pearlside/marine hatchetfish family	• Muller's pearlside, *Maurolicus muelleri* • Weizman's pearlside, *Maurolicus weitzmani*
Chlorophthalmidae The greeneye family	• Shortnose greeneye, *Chlorophthalmus agassizi* • Longnose greeneye, *Parasudis truculenta*
Trichiuridae The cutlassfish family	• Atlantic cutlassfish (also referred to as ribbonfish), *Trichiurus lepturus*
Scombridae The tuna and mackerel family	The Council specified the following species: • Atlantic chub mackerel, *Scomber colias* • Bullet mackerel, *Auxis rochei* • Frigate mackerel, *Auxis thazard* • Little tunny/false albacore, *Euthynnus alletteratus*

Scomberesox saurus Atlantic saury	
Hemiramphidae The halfbeak family	• Flying halfbeak, *Euleptorhamphus velox* • Balao, *Hemiramphus balao* • Ballyhoo, *Hemiramphus brasiliensis* • False silverstripe halfbeak/American halfbeak/Meek's halfbeak, *Hyporhamphus meeki*
Peprilus paru Harvestfish	
Tautogolabrus adspersus Cunner	
Ophidiiformes The cusk eel order	• Chain pearlfish, *Echiodon dawsoni*, carapidae family • Fawn cusk-eel, *Lepophidium profundorum*, ophidiidae family • Striped cusk-eel, *Ophidion marginatum*, ophidiidae family
Pelagic molluscs	• Ommastrephidae (the arrow squid family) - Sharptail shortfin squid, *Illex oxygonius* - Neon flying squid, *Ommastrephes bartramii* - Oceanic squid, *Todarodes sagittatus* • Loliginidae (the pencil squid family) - Atlantic brief squid, *Lolliguncula brevis* • Sepiolidae (the bobtail squid family) - Odd bobtail squid, *Heteroteuthis dispar* - Big fin bobtail squid, *Rossia megaptera* - Warty bobtail squid, *Rossia palpebrosa* - Lesser shining bobtail squid, *Semirossia tenera* - Butterfly bobtail squid, *Stoloteuthis leucoptera* • Cranchiidae (the glass or bathyscaphoid squid family) • Sepiidae (the cuttlefish family) • Order octopoda (octopods) - Tuberculate pelagic octopus, *Ocythoe tuberculate*, family Ocythoidae • Pteropods - Order gymnosomata (sea angels) - Order thecosomata (sea butterflies)
Copepods, krill, amphipods and any other species under 1 inch as adults	• Calanidae (the copepod family) • Euphausiidae (the euphausid krill family) • Order amphipoda (amphipods) • Class ostracoda (ostracods) • Order ispoda (isopods)

Unmanaged Forage Fishery Management Action Team

March 2, 2016 Meeting Summary

The Unmanaged Forage Fishery Management Action Team (FMAT) met via webinar on Wednesday March 2, 2016. The goal of this meeting was to further develop management alternatives for the Unmanaged Forage Omnibus Amendment.

FMAT members in attendance: Carly Bari (GARFO), Julia Beaty (MAFMC), Jay Hermsen (GARFO), Min-Yang Lee (NEFSC), Shanna Madsen (ASMFC), Katie Richardson (GARFO), Laurel Smith (NEFSC), David Stevenson (GARFO).

Others in attendance: Katie Almeida, Purcie Bennett-Nickerson, Greg DiDomenico, Warren Elliott, Joseph Gordon, Pam Lyons Gromen, Jeff Kaelin, Meghan Lapp, Genny Nesslage, Rick Robins, Ryan Silva, Kate Wilke.

Exempted Fishing Permits

The Council is interested in the use of Exempted Fishing Permits (EFPs) as a first step in a process to allow new fisheries to develop for the forage species which are ultimately included in the amendment. The process for applying for an EFP and the necessary components of an EFP application are described in detail in NMFS' Research Documentation Guidance.

Ryan Silva, Cooperative Research Specialist with GARFO, discussed the process for obtaining EFPs from GARFO. Ryan explained that EFPs allow vessels to pursue activities (usually research activities) that are otherwise prohibited by regulations. He noted that EFPs are intended to be discrete tools to look at focused issues and are not meant to become operational components within FMPs. Most EFPs are issued for one year, but can be renewed annually.

As with other fisheries actions, NMFS is required to evaluate the impacts of EFPs on managed species, protected species, habitat, and human communities. EFPs must be in line with the applicable management program (e.g., the FMP from which the exemption is being requested).

GARFO attempts to process EFP applications within 60 days. Applications are first reviewed to ensure that they are complete. They are then subject to a public comment period, which usually lasts 15 days. After the public comment period, GARFO decides whether or not to approve the application. Councils are generally notified of EFP applications relevant to their FMPs prior to the public comment period.

The regulations which describe how to apply for an EFP and which give NMFS Regional Administrators the authority to approve or disapprove EFPs are codified at 50 CFR 600.745. These are national regulations and the Council does not have the authority to modify them. Regulations for EFPs in the Greater Atlantic Region can be found at 50 CFR 628.12. The Council does have the authority to modify these regulations; however, these regulations cannot supersede the national regulations at 50 CFR

600.745. For example, if the Council were to develop an additional process for Council review of EFP applications, this would not prevent individuals from submitting applications directly to GARFO, as is allowed in the regulations.

The Pacific Council developed a process for Council, SSC, and advisory panel review of EFP applications. Council approval of EFP applications prior to submission to NMFS is considered beneficial; however, it is not required. Their process does not prevent individuals from submitting EFP applications directly to NMFS.

Ryan Silva stated that GARFO processes EFP applications as efficiently as possible; however, the agency is nonetheless criticized for the amount of time needed. The Council may want to be cautious of adding additional steps which would significantly increase the time needed to review EFPs.

List of Unmanaged Forage Species

In February 2016, the Council approved a list of unmanaged forage taxa for potential inclusion in the Unmanaged Forage Omnibus Amendment. The FMAT has some concerns about this list, namely that it is not clear why certain taxa are on the Council-approved list and others are not. For example, as described later in this document, it appears that only a small percentage of sand lance, harvestfish, and Atlantic silverside landings in the Mid-Atlantic over the past 20 years were caught in Federal waters. The Unmanaged Forage Amendment will impose new regulations on Federally-permitted vessels in the Greater Atlantic Region; therefore there may be little benefit to including these species in the amendment.

Bullet mackerel and frigate mackerel are on the Council's list, but are not found in the diets of Council-managed predators and have not yet been identified as bycatch in Council-managed fisheries (though the FMAT has to date only examined bycatch in bottom trawl fisheries). Because the Unmanaged Forage Omnibus Amendment will be an amendment to the Council's existing FMPs, the forage species which are included in the amendment must be linked to one or more FMP fisheries, either as prey for the managed species or as bycatch in the managed fisheries. The FMAT recognized that some Council members are concerned about expanding fisheries for little tuna; however, they did not think it was appropriate to add little tuna as an Ecosystem Component to existing FMPs through the Unmanaged Forage Amendment, both because little tuna are not a forage species and because no link to the Council's FMPs has yet been identified.

Management Alternatives

The Council is currently considering the following management alternatives for the Unmanaged Forage Omnibus Amendment:

1: No Action
2: Alternatives to regulate harvest
    2A: Prohibit all possession
    2B: Allow an incidental possession limit
    2C: Prohibit possession once a catch limit (e.g. a directed fishery possession limit or an annual landings limit) is met
    2D: Allow an incidental possession limit once an annual catch limit is met
3: Administrative alternatives

3A: Modify list of approved fisheries and gear types (50 CF 600.725)
3B: Frameworkable items

- List of Ecosystem Component species
- Spatial and seasonal closures
- Gear regulations
- Possession limits
- Recreational fishing regulations

The FMAT recommended that Alternatives 2C and 2D focus on landings limits, rather than catch limits. The FMAT agreed that catch limits have a higher likelihood of creating negative unintended consequences, compared to landings limits. The FMAT also noted that the amendment is focused on directed fisheries for unmanaged forage species and that landings, not discards, define a directed fishery.

One FMAT member clarified that just because an item is listed as frameworkable, doesn't necessarily mean it can be completed more efficiently than if it were implemented through an amendment. The level of NEPA analysis required for a framework depends on the analysis included in the initial action documentation and on the alternatives considered through the framework. As the management alternatives are currently written for this amendment, spatial and seasonal closures, gear regulations, and recreational fishing regulations would not be analyzed as full alternatives; therefore the final amendment document may not contain sufficient analysis to support framework actions for these items. The Magnuson Act contains requirements for frameworkable items and it is generally left to NMFS General Counsel to determine if a particular item meets those requirements.

Landings Data

The FMAT discussed landings data for certain species on the list approved by the Council and discussed how these data could be used to develop recommendations for possession limits and landings limits. The FMAT examined landings data from Maine through North Carolina from 1996 through 2015. Landings data were only available for 14 species on the list approved by the Council. In some cases, landings data were not available because there were no associated species codes in the dealer data base. In other cases, there were codes but no reported landings. One FMAT member noted that it is a relatively simple process to add codes to the dealer database and that dealers are required to report all species they purchase, though it is not always possible to identify every species to the species level.

The landings data were presented in four categories:

1) Species for which the majority of landings were from non-GARFO-permitted vessels
2) Species with relatively low landings
3) Highly migratory species
4) Species with relatively large amounts of landings by GARFO-permitted vessels

Majority of landings from non-GARFO-permitted vessels

From 1996 through 2015, four species of interest (sand lance, harvestfish, ribbonfish[1], and Atlantic silverside) were landed predominantly by vessels which did not have GARFO permits (Table 1, Figure 1). These vessels may have had state permits or South Atlantic permits. This implies that most of these landings came from state waters or from the South Atlantic; however, one FMAT member cautioned that under the permitting requirements in the 1990s, some vessels may have been able to harvest these species in Mid-Atlantic Federal waters without a GARFO permit. Council staff reproduced Table 1 for the years 2006-2015 after the FMAT meeting. These data show a similar pattern as the data for 1996-2015 (Table 2).

If most of these landings were in fact from state waters or the South Atlantic, as the data imply, then possession limits or landings limits implemented through the Unmanaged Forage Amendment would likely have a minimal impact on overall landings of these species as the amendment is intended to apply to Mid-Atlantic Federal waters.

Table 1: Dealer reported landings of sand eel, harvestfish, ribbonfish, and Atlantic silverside, 1996-2015.

Pounds landed by vessel permit type, 1996-2015	**Permit type**		
Row Labels	**GARFO**	**non-GARFO**	**Grand Total**
EEL, SAND (LANCE)	2,898 (4%)	78,136 (96%)	81,034
HARVEST FISH	448,881 (16%)	2,291,872 (84%)	2,740,753
RIBBONFISH	75,586 (25%)	229,405 (75%)	304,991
SILVERSIDE, ATLANTIC	18,674 (4%)	463,698 (96%)	482,372
Grand Total	**546,039**	**3,063,111**	**3,609,150**

[1] Ribbonfish (family trachipteridae) are not on the list of species approved by the Council in February 2016. One Council member noted that cutlassfish (family trichiuridae), which are on the Council's list, are often called ribbonfish; therefore, the FMAT decided to examine landings data for both "cutlassfish" and "ribbonfish".

Table 2: Dealer reported landings of sand eel, harvestfish, ribbonfish, and Atlantic silverside, 2006-2015.

Pounds landed by vessel permit type, 2006-2015	Permit type		
Row Labels	**GARFO**	**non-GARFO**	**Grand Total**
EEL, SAND (LANCE)	2,798 (5%)	56,516 (95%)	59,314
HARVEST FISH	335,688 (17%)	1,638,335 (83%)	1,974,023
RIBBONFISH	61,546 (26%)	175,050 (74%)	236,596
SILVERSIDE, ATLANTIC	490 (0.4%)	113,285 (99.6%)	113,775
Grand Total	**400522**	**1983186**	**2,383,708**

Species with relatively low landings

Four species on the Council's list – argentine, bay anchovy, and octopus – had relatively low dealer-reported landings (i.e., less than 40,000 pounds) from 1996-2015 (Table 3).

Table 3: Dealer reported landings of argentine, bay anchovy, and octopus, 1996-2015.

Pounds landed by vessel permit type, 1996-2015	Permit type		
Row Labels	**GARFO**	**non-GARFO**	**Grand Total**
ARGENTINE	19,111 (62%)	11,790 (38%)	30,901
BAY ANCHOVY	8,486 (84%)	1,668 (16%)	10,154
OCTOPUS	23,880 (67%)	11,688 (33%)	35,568
Grand Total	**51,477**	**25,146**	**76,623**

Highly Migratory Species

The FMAT considered landings data for three highly migratory species – bonito, blackfin tuna, and little tuna (Table 4). The FMAT examined these data because the list of species approved by the Council includes: "Scombridae (chub, bullet, frigate, little tuna)". The Council likely intended to include only chub mackerel, bullet mackerel, frigate mackerel, and little tuna (also known as false albacore). Council staff will clarify this in the future.

Table 4: Dealer reported landings of bonito, blackfin tuna, and little tuna 1996-2015.

Pounds landed by vessel permit type, 1996-2015	Permit type		
Row Labels	**GARFO**	**non-GARFO**	**Grand Total**
BONITO	1,441,875 (75%)	491,872 (25%)	1,933,747
TUNA, BLACKFIN	79,630 (49%)	83,325 (51%)	162,955
TUNA, LITTLE	2,331,151 (60%)	1,526,234 (40%)	3,857,385
Grand Total	**4,092,179**	**2,226,083**	**6,318,262**

Species with relatively high landings by GARFO-permitted vessels

The FMAT noted that, compared to the other species with available landings data, there were relatively high dealer-reported landings of cunner, Atlantic cutlassfish, chub mackerel, and frigate mackerel from 1996-2015 (Table 5). Bullet mackerel did not have a species code in the dealer database. An internet search revealed that bullet mackerel and frigate mackerel can be very difficult to distinguish.

The FMAT examined dealer reported landings of chub mackerel by year (Table 6, Figure 1). Chub mackerel had much higher landings over the 1996-2015 time series than any other species on the Council's list.

Table 5: Dealer reported landings of cunner, Atlantic cutlassfish, chub mackerel, and frigate mackerel, 1996-2015.

Pounds landed by vessel permit type, 1996-2015	Permit type		
Row Labels	**GARFO**	**non-GARFO**	**Grand Total**
CUNNER	155,898 (86%)	26,359 (14%)	182,257
CUTLASSFISH, ATLANTIC	438,995 (73%)	164,882 (27%)	603,877
MACKEREL, CHUB	9,575,371 (99%)	6,137 (1%)	9,581,508
MACKEREL, FRIGATE	77,774 (79%)	20,557 (21%)	98,331
Grand Total	**10,248,038**	**217,935**	**10,465,973**

Table 6: Dealer-reported chub mackerel landings, 1997-2015. Landings from 2004 through 2011 were summed for confidentiality.

Year	Chub mackerel landings (pounds)	Revenue (dollars)	Price per pound
1997	5,013	824	$0.16
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
2004-2011	247,989	47,198	$0.19
2012	164,847	62,858	$0.38
2013	5,249,686	997,378	$0.19
2014	1,230,411	334,121	$0.27
2015	2,108,337	485,472	$0.23

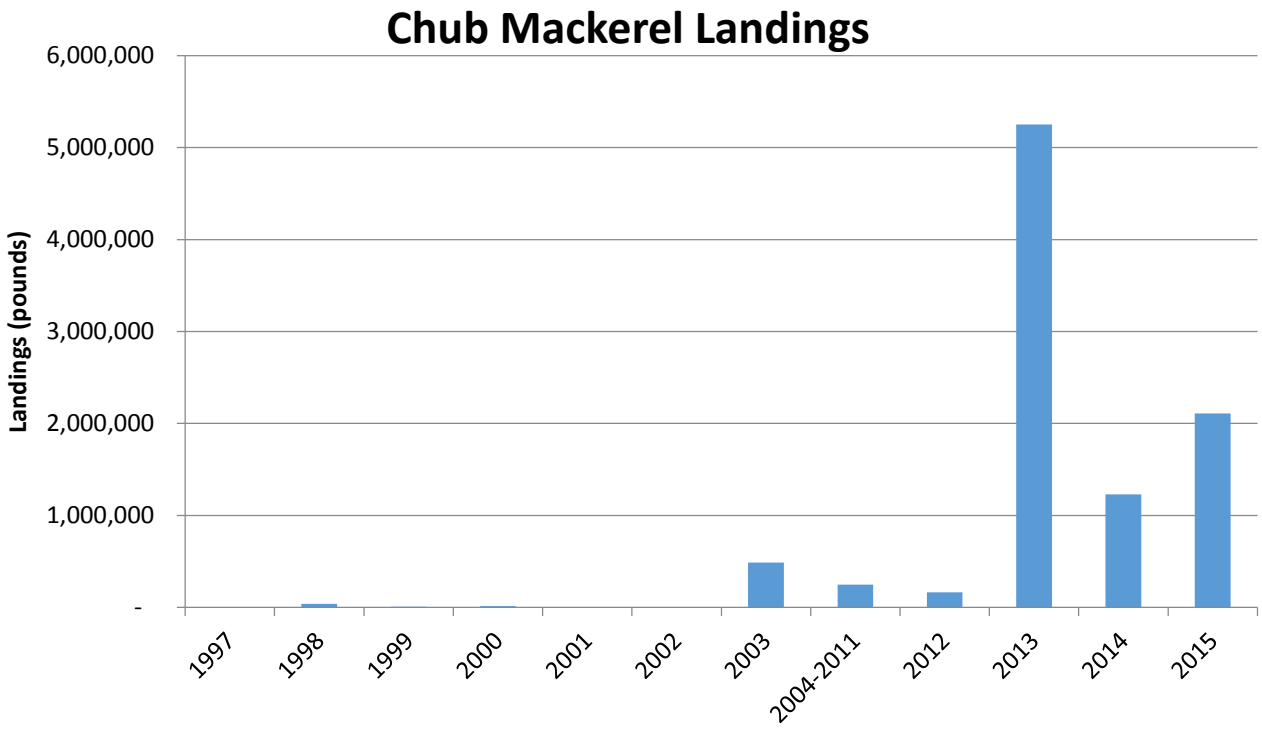

Figure 1: Dealer-reported chub mackerel landings, 1997-2015. Landings from 2004 through 2011 were summed for confidentiality.

Summary statistics for all species with dealer-reported landings

The FMAT examined summary statistics for trip-level landings from 1996-2015 (Table 7). Trip-level landings of most species showed highly skewed distributions, with the vast majority of trips landing relatively small amounts and a very small percentage of trips landing high volumes. This is illustrated in Table 7 for Atlantic cutlassfish, chub mackerel, ribbonfish, and other species where the mean is much higher than the median. Frequency distributions were not shown to protect confidentiality.

Table 7: Summary statistics (in pounds) for trip-level landings, 1996-2015. Numbers in parentheses are the number of trips which landed at least the number of pounds shown. Confidential data is labeled "C" (in cases where the number of dealers and/or vessels which purchased or landed more than the amount of landings shown is confidential).

Species	Median	Mean	75th percentile	90th percentile	95th percentile	99th percentile	Total Landings	Total Trips
Argentine	207 lb *(35 trips)*	441 lb *(22 trips)*	C	C	C	C	30,901	70
Atlantic cutlassfish	10 lb *(1,303 trips)*	238 lb *(464 trips)*	100 lb *(635 trips)*	718 lb *(254 trips)*	1,509 lb *(128 trips)*	3,247 lb *(26 trips)*	603,878	2,535
Atlantic silverside	175 lb *(967 trips)*	251 lb *(584 trips)*	300 lb *(482 trips)*	480 lb *(203 trips)*	680 lb *(98 trips)*	C	482,372	1,920
Bay anchovy	5 lb *(88 trips)*	62 lb *(20 trips)*	15 lb *(45 trips)*	90 lb *(18 trips)*	428 lb *(9 trips)*	C	10,154	164
Chub mackerel	16 lb *(485 trips)*	9,919 lb *(93 trips)*	114 lb *(242 trips)*	7,815 lb *(97 trips)*	C	C	9,581,508	966
Cunner	4 lb *(5,491 trips)*	18 lb *(1,950 trips)*	12 lb *(2,609 trips)*	38 lb *(1,040 trips)*	68 lb *(521 trips)*	247 lb *(103 trips)*	182,260	10,220
Frigate mackerel	11 lb *(594 trips)*	84 lb *(189 trips)*	37 lb *(296 trips)*	154 lb *(118 trips)*	300 lb *(61 trips)*	1,403 lb *(12 trips)*	98,331	1,167
Harvest fish	8 lb *(21,722 trips)*	66 lb *(6,378 trips)*	32 lb *(10,667 trips)*	108 lb *(4,195 trips)*	233 lb *(2,095 trips)*	868 lb *(404 trips)*	2,740,767	41,820
Little tuna	36 lb *(14,814 trips)*	127 lb *(6,071 trips)*	100 lb *(7,490 trips)*	260 lb *(2,964 trips)*	468 lb *(1,473 trips)*	1,479 lb *(295 trips)*	3,751,024	29,439
Octopus	12 lb *(511 trips)*	35 lb *(290 trips)*	39 lb *(257 trips)*	90 lb *(102 trips)*	145 lb *(51 trips)*	298 lb *(11 trips)*	35,638	1,010
Ribbonfish	19 lb *(566 trips)*	271 lb *(163 trips)*	100 lb *(287 trips)*	532 lb *(113 trips)*	1,306 lb *(57 trips)*	4,480 lb *(12 trips)*	304,991	1,125
Sand eel	25 lb *(1,215 trips)*	36 lb *(744 trips)*	43 lb *(574 trips)*	65 lb *(233 trips)*	84 lb *(114 trips)*	C	81,034	2,258

Management alternatives to regulate harvest

The FMAT agreed that developing and implementing separate possession and/or landings limits for each species ultimately included in the amendment could create an undue burden on fishermen, dealers, and GARFO. Depending on which species are included, some of them may be difficult to distinguish, which will pose challenges for reporting. It could also be burdensome in terms of monitoring and implementing in-season actions, if any are necessary. GARFO already monitors landings of many species on a weekly basis and adding several more landings limits for individual forage species could significantly increase this workload. The FMAT recommended that the Council consider options for a small number of groupings of forage species, each with their own possession and/or landings limits. The FMAT wished to examine additional data on which species co-occur in terms of catch and landings before recommending possible landings limits. The FMAT also recommended that the advisors and the public provide advice on how the species should be grouped in such a way that the landings limits would not create undue burdens or unintended negative consequences.

The FMAT decided to compile additional data on which species are landed together, starting with the species shown in Table 5. The FMAT will meet again via webinar on March 14, 2016, to discuss this data and to discuss possible possession and landings limits in more detail. The FMAT brainstormed some ideas of how to develop these recommendations. They discussed the idea of implementing an overall annual landings limits to account for the highest level of landings in recent years (as a way of "freezing the footprint"), with an incidental possession limit enforced once the annual landings limit is reached. The incidental possession limit could be based on a certain percentile of trip-level landings in recent years. The FMAT also discussed the idea of having no landings cap for those species with minimal or no reported landings. If this idea were to be implemented, the FMAT recommended monitoring these landings on an annual or biannual basis so the Council and GARFO could react to increases in landings if necessary. The FMAT also recommended that only key species of concern be monitored on a weekly basis and that others be monitored on an annual or biannual basis to prevent creating an undue burden on GARFO. If annual or biannual landings reports show a substantial increase in landings, weekly monitoring could then be implemented.

The FMAT did not recommend adding a species code to SAFIS for every species which may be included in the amendment. Rather, they recommended that new codes be added as they are needed, noting that it should be a relatively simple process for a dealer to request that a new code be added by calling the SAFIS help desk.

Public comment

One individual said that if the Council reviews EFP applications prior to submission to GARFO, then the Science and Statistical Committee and advisory panels should review the applications as well.

Two individuals said only a small number of vessels commercially target chub mackerel and there is little potential for expansion of this fishery. One individual said that possession limits in the chub mackerel fishery would effectively prevent the fishery from operating, as the few boats which target them rely on very high catches.

One individual commented that landings limits (as opposed to catch limits) would allow forage species to be caught in the Mid-Atlantic but landed in a different region.

One individual requested that HMS, harvestfish, and cutlassfish be removed from the amendment. He said that harvestfish and cutlassfish are harvested with fixed gear such as pound nets and weirs and that there is no potential for those fisheries to expand. He said that little tuna, bonito, and frigate mackerel are commercially targeted with gill nets and that they are caught together. He said this fishery is highly regulated, difficult to pursue, and also has no potential to expand. Another individual commented that little tuna and bonito are targeted together in a gillnet exemption area off Rhode Island in Federal waters.

Dealer-Reported Landings and Value of Species on Council-Approved List

For consideration at March 17, 2016 EOP AP meeting and March 18, 2016 EOP Committee meeting

Annual Landings

Chub mackerel

From 2006 through 2015, chub mackerel were mostly landed on trips which also landed *Illex* squid, longfin squid, and/or butterfish. On trips which landed at least 10,000 pounds of chub mackerel, the majority of landings were *Illex* squid.

Table: Dealer-reported landings and value of chub mackerel, 1997-2015. Data from 2004 through 2011 are combined to protect confidential data.

Year	Chub mackerel landings (pounds)	Revenue (dollars)	Price per pound
1997	5,013	824	$0.16
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
2004-2011	247,989	47,198	$0.19
2012	164,847	62,858	$0.38
2013	5,249,686	997,378	$0.19
2014	1,230,411	334,121	$0.27
2015	2,108,337	485,472	$0.23

Cunner

Over 60 species were landed on trips which landed at least 10 pounds of cunner from 2006 through 2015. Species commonly landed with cunner included cod, haddock, silver hake, scup, and black sea bass. Only 0.6% of the trips which landed any amount of cunner from 2006-2015 landed more than 250 pounds of cunner. This suggests that cunner is likely targeted infrequently, if at all, and is more commonly landed incidentally in other fisheries.

Table: Dealer-reported landings and value of cunner, 1996-2015.

Cunner			
Year	**Landings (pounds)**	**Revenue ($)**	**Average price per pound**
1996	3,142	2,076	$ 0.66
1997	3,545	4,169	$ 1.18
1998	6,632	10,093	$ 1.52
1999	8,422	13,625	$ 1.62
2000	6,768	15,546	$ 2.30
2001	20,567	50,526	$ 2.46
2002	28,274	82,047	$ 2.90
2003	15,518	41,187	$ 2.65
2004	3,896	9,079	$ 2.33
2005	5,727	8,565	$ 1.50
2006	5,378	10,242	$ 1.90
2007	6,760	14,463	$ 2.14
2008	9,563	29,830	$ 3.12
2009	6,753	16,893	$ 2.50
2010	4,985	13,465	$ 2.70
2011	13,795	60,272	$ 4.37
2012	11,374	38,607	$ 3.39
2013	10,394	35,165	$ 3.38
2014	5,710	13,052	$ 2.29
2015	4,637	11,317	$ 2.44

Atlantic Cutlassfish

No landings of Atlantic cutlassfish were reported from 1996 through 2003. Most dealer-reported landings of cutlassfish are from North Carolina.

Table: Dealer-reported landings and value of Atlantic cutlassfish, 2004-2015. Landings and revenue in 2004 and 2005 were summed to protect confidential data.

Atlantic cutlassfish			
Year	**Landings (pounds)**	**Revenue ($)**	**Average price per pound**
2004-2005	261	259	$ 0.99
2006	5,180	3,984	$ 0.77
2007	26,820	25,834	$ 0.96
2008	42,622	34,083	$ 0.80
2009	24,591	15,553	$ 0.63
2010	6,926	4,876	$ 0.70
2011	2,028	2,163	$ 1.07
2012	21,448	25,550	$ 1.19
2013	116,457	174,636	$ 1.50
2014	169,687	234,397	$ 1.38
2015	183,313	341,390	$ 1.86

Frigate mackerel

From 2006 through 2015, frigate mackerel were commonly landed on trips which also landed highly migratory species, including 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 Atlantic or chub mackerel. Two percent of trips which landed any amount of frigate mackerel from 2006 through 2015 landed more than 300 pounds of frigate mackerel.

Table: Dealer-reported landings and value of frigate mackerel, 1996-2015. Landings in some years are combined to protect confidential data.

Frigate mackerel			
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

Argentine

Table: Dealer-reported landings and value of argentine 1996-2015. No landings were reported in several years between 1996 and 2015. Landings in some years are combined to protect confidential data.

Argentine			
Year	**Landings (pounds)**	**Revenue ($)**	**Average price per pound**
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

Bay Anchovy

Table: Dealer-reported landings and value of bay anchovy 1996-2015. Landings in some years are combined to protect confidential data.

Bay anchovy			
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

Sand eel/sand lance

81,034 pounds of sand lance were landed between 1996 and 2015. About 96% (78,136 pounds) of these landings were not associated with GARFO permits. These landings likely came predominantly from state waters. It is unclear from the data considered by the FMAT how many dealers and fishermen landed sand lance in several of the years between 1996 and 2015; therefore, landings by year are not shown in order to protect what could be confidential data.

Harvestfish

Between 1996 and 2015, 83% of dealer-reported landings of harvestfish were from vessels that did not have GARFO permits. These landings could have come from state waters or they could be associated with permits from the NMFS Southeast Regional Office.

Table: Dealer-reported landings and value of harvestfish, 1996-2015.

Harvestfish			
Year	**Landings (pounds)**	**Revenue ($)**	**Average price per pound**
1996	30,343	26,247	$ 0.87
1997	84,755	73,044	$ 0.86
1998	64,200	51,923	$ 0.81
1999	88,842	80,093	$ 0.90
2000	101,906	83,487	$ 0.82
2001	50,134	48,018	$ 0.96
2002	64,029	66,304	$ 1.04
2003	54,648	62,162	$ 1.14
2004	102,729	91,411	$ 0.89
2005	121,635	118,692	$ 0.98
2006	139,452	112,132	$ 0.80
2007	287,568	265,547	$ 0.92
2008	272,992	240,897	$ 0.88
2009	176,564	190,514	$ 1.08
2010	133,190	134,023	$ 1.01
2011	148,329	174,805	$ 1.18
2012	338,678	311,009	$ 0.92
2013	175,353	156,926	$ 0.89
2014	138,602	130,109	$ 0.94
2015	163,295	170,529	$ 1.04

Atlantic Silverside

Between 1996 and 2015, 99.6% of dealer-reported landings of Atlantic silverside were from vessels that did not have GARFO permits. These landings likely came predominantly from state waters.

Table: Dealer-reported landings and value of Atlantic silverside, 1996-2015. Data in some years are combined to protect confidential data.

Atlantic silverside			
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

Little tuna

Table: Dealer-reported landings and value of little tuna, 1996-2015.

Little Tuna			
Year	**Landings (pounds)**	**Revenue ($)**	**Average price per pound**
1996	50,072	14,632	$ 0.28
1997	185,674	26,926	$ 0.14
1998	219,741	46,104	$ 0.20
1999	306,060	62,255	$ 0.20
2000	206,514	44,908	$ 0.20
2001	214,550	42,591	$ 0.18
2002	274,375	56,692	$ 0.19
2003	191,213	46,508	$ 0.23
2004	99,734	22,753	$ 0.22
2005	103,421	34,594	$ 0.33
2006	130,762	47,452	$ 0.36
2007	190,980	72,557	$ 0.38
2008	292,829	110,666	$ 0.38
2009	128,985	60,046	$ 0.46
2010	101,496	58,396	$ 0.57
2011	118,727	75,641	$ 0.62
2012	196,727	113,702	$ 0.57
2013	178,601	115,440	$ 0.64
2014	319,611	170,300	$ 0.53
2015	211,325	125,611	$ 0.59

Trip-level landings summary statistics

Summary statistics (in pounds) for trip-level landings, 1996-2015. Numbers in parentheses are the number of trips which landed at least the number of pounds shown. Confidential data is labeled "C" (in cases where the number of dealers and/or vessels which purchased or landed more than the amount of landings shown is confidential).

Species	Median	Mean	75th percentile	90th percentile	95th percentile	99th percentile	Total Landings	Total Trips
Argentine	207 lb *(35 trips)*	441 lb *(22 trips)*	C	C	C	C	30,901	70
Atlantic cutlassfish	10 lb *(1,303 trips)*	238 lb *(464 trips)*	100 lb *(635 trips)*	718 lb *(254 trips)*	1,509 lb *(128 trips)*	3,247 lb *(26 trips)*	603,878	2,535
Atlantic silverside	175 lb *(967 trips)*	251 lb *(584 trips)*	300 lb *(482 trips)*	480 lb *(203 trips)*	680 lb *(98 trips)*	C	482,372	1,920
Bay anchovy	5 lb *(88 trips)*	62 lb *(20 trips)*	15 lb *(45 trips)*	90 lb *(18 trips)*	428 lb *(9 trips)*	C	10,154	164
Chub mackerel	16 lb *(485 trips)*	9,919 lb *(93 trips)*	114 lb *(242 trips)*	7,815 lb *(97 trips)*	C	C	9,581,508	966
Cunner	4 lb *(5,491 trips)*	18 lb *(1,950 trips)*	12 lb *(2,609 trips)*	38 lb *(1,040 trips)*	68 lb *(521 trips)*	247 lb *(103 trips)*	182,260	10,220
Frigate mackerel	11 lb *(594 trips)*	84 lb *(189 trips)*	37 lb *(296 trips)*	154 lb *(118 trips)*	300 lb *(61 trips)*	1,403 lb *(12 trips)*	98,331	1,167
Harvest fish	8 lb *(21,722 trips)*	66 lb *(6,378 trips)*	32 lb *(10,667 trips)*	108 lb *(4,195 trips)*	233 lb *(2,095 trips)*	868 lb *(404 trips)*	2,740,767	41,820
Little tuna	36 lb *(14,814 trips)*	127 lb *(6,071 trips)*	100 lb *(7,490 trips)*	260 lb *(2,964 trips)*	468 lb *(1,473 trips)*	1,479 lb *(295 trips)*	3,751,024	29,439
Octopus	12 lb *(511 trips)*	35 lb *(290 trips)*	39 lb *(257 trips)*	90 lb *(102 trips)*	145 lb *(51 trips)*	298 lb *(11 trips)*	35,638	1,010
Ribbonfish	19 lb *(566 trips)*	271 lb *(163 trips)*	100 lb *(287 trips)*	532 lb *(113 trips)*	1,306 lb *(57 trips)*	4,480 lb *(12 trips)*	304,991	1,125
Sand eel	25 lb *(1,215 trips)*	36 lb *(744 trips)*	43 lb *(574 trips)*	65 lb *(233 trips)*	84 lb *(114 trips)*	C	81,034	2,258

Ecosystem and Ocean Planning Advisory Panel Meeting
March 17, 2016
Meeting Summary

Advisory Panel members in attendance: Fred Akers, Bonnie Brady, Greg DiDomenico, Joseph Gordon, Meghan Lapp, Carl LoBue, Pam Lyons Gromen, Peter Moore, Timothy O'Brien, Robert Ruhle, David Wallace, Judith Weis

Others in attendance: Katie Almeida, Carly Bari, Julia Beaty (Council staff), Purcie Bennet-Nickerson, Warren Elliot (Council member), Erica Fuller, Anne Hawkins, Ken Hinman, Jeff Kaelin (Council member), John McMurray (Council member), Rick Robins (Council chair), Tom Rudolph, David Sikorski, Kate Wilke

Meeting Summary

The Ecosystem and Ocean Planning (EOP) Advisory Panel (AP) met in Linthicum Heights, Maryland on March 17, 2016 to discuss the Unmanaged Forage Omnibus Amendment and to develop recommendations for the EOP Committee and the full Council on several aspects of the amendment.

Goal Statement

The AP discussed the following goal statement, which was approved by the Council in February 2016: "The goal of this 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, in order to advance ecosystem approaches to fisheries management in the Mid-Atlantic."

Multiple AP members agreed that the goal statement establishes a good intent. One AP member said the amendment is important because it shifts the burden of proof to those individuals who wish to develop a new fishery, or expand an existing fishery; otherwise, he said, the public pays the costs if unintended negative ecological consequences occur when a fishery is developed before potential impacts are assessed. A few AP members were concerned about unintended negative consequences resulting from a well-meaning amendment. For example, a few AP members were worried about impacts to existing fisheries if vessels are required to avoid catching unmanaged forage species while pursuing managed fisheries. One AP member

said the goal statement should specify that the intent is not to constrain or constrict existing managed fisheries. A few AP members said that with shifting fish distributions, the amendment could pose challenges for fishermen wishing to pursue new species that move into an area or become more abundant. One AP member said the standard process of developing a stock assessment and implementing regulations is three to five years behind the life cycle of the species pursued. He thought the Council should be clear on the process for assessing and considering new fisheries in an efficient manner, otherwise new fisheries might never be allowed to develop and existing fisheries might never be allowed to expand.

List of Species

In February 2016 the Council approved a list of unmanaged taxa for possible inclusion in the Unmanaged Forage Omnibus Amendment.[1] The NOAA Fisheries Greater Atlantic Regional Office (GARFO) has advised that all forage species included in the amendment must be linked to the Council's existing Fishery Management Plans (FMPs) either as prey for Council-managed predators or as bycatch in Council-managed fisheries.

One AP member said the Council should be able to include species in the amendment which play an important role in the larger ecosystem, even if they cannot be linked to an FMP as prey or bycatch, because Council-managed species will benefit if the larger ecosystem is protected. Specifically, she said that the Council manages forage species in the Atlantic Mackerel, Squid and Butterfish FMP. Protecting unmanaged forage species could prevent increased predation pressure on these managed forage species, since many predators of squid, mackerel and butterfish also prey on the unmanaged species in the Council's list.

All AP members present agreed to recommend that the Council add **lanternfish** (family Myctophidae) to the list. One AP member pointed out that the FMAT identified lanternfish as an ecologically-important forage species which was missing from the list approved by the Council. The FMAT identified lanternfish as prey for several Council-managed species. Lanternfish were included in the Pacific Council's Comprehensive Ecosystem-Based Amendment 1, which is similar in intent to the Mid-Atlantic Council's Unmanaged Forage Omnibus Amendment. Two AP members said that lanternfish could become the target of a future directed fishery, noting that such fisheries have been explored in other parts of the world and that global demand for fishmeal for aquaculture is increasing. Other AP members disagreed and said that there is little potential for a lanternfish fishery to develop in the Mid-Atlantic and successfully compete with other sources of aquaculture feed. One AP member said that lanternfish are a deep water species and are not caught in existing fisheries in the Mid-Atlantic. He also pointed out that the Deep Sea Corals Amendment would effectively prevent fishermen from catching lanternfish. Multiple AP members agreed that if the amendment prohibited harvest of lanternfish, existing fisheries would not be impacted.

[1] Available at: http://www.mafmc.org/s/2016-03-02_Unmanaged-Forage-Taxa.pdf

A few AP members thought the Council should include a comprehensive list of species in the amendment in order to provide the greatest ecosystem benefits. Several other AP members thought the list should be focused on those species with the highest ecosystem importance and/or the greatest potential for large-scale directed commercial fisheries. Those who supported a shorter list cited a lack of information on stock status of most unmanaged forage species and the potential for negative unintended consequences and enforcement challenges if a long list of species were to be managed through the amendment.

Several AP members recommended that the Council remove harvestfish, Atlantic cutlassfish, bullet mackerel, frigate mackerel, little tunny/false albacore, cunner, and sharptail shortfin squid from the list. Summaries of AP comments on each of these species are presented below. Not all AP members agreed with this recommendation.

Multiple AP members recommended that **harvestfish** (*Peprilus paru*) not be included in the amendment because they are mostly an inshore species and the Council has agreed that the amendment will focus on Federal waters. One AP member said there was once a directed beach seine fishery for harvestfish in North Carolina state waters. One AP member said there was limited potential for growth of the harvestfish fishery.

A few AP members recommended that **Atlantic cutlassfish** (*Trichiurus lepturus*) not be included in the amendment because they can grow to several feet in length and are not a low trophic level species as adults. The FMAT has not yet identified a link between cutlassfish and the Council's existing FMPs. One AP member said he generally doesn't catch many cutlassfish in his trawl nets. He occasionally catches 15 or 20 pounds of cutlassfish in a tow and on rare occasions can catch a thousand pounds of adult cutlassfish. He said there have been anomalous instances of high abundance of adult ribbonfish for a few years in a row. One AP member said that because cutlassfish are sometimes referred to as ribbonfish, the landings data for cutlassfish may not be entirely accurate.

Several AP members recommended that **bullet mackerel** (*Auxis rochei*), **frigate mackerel** (*Auxis thazard*), **little tunny/false albacore** (*Euthynnus alletteratus*), and other unmanaged species in the family scombridae (with the exception of chub mackerel, *Scomber colias*) not be included in the amendment. Most of these species are considered highly migratory species (HMS). The FMAT has not yet identified a link to existing FMPs for frigate mackerel, bullet mackerel, or little tunny. A few AP members said there are NOAA Fisheries Atlantic HMS regulations for little tunny and bonito, including a gillnet exemption area off of Rhode Island and other gear regulations. One AP member said that if the Council were to include these species in the amendment, it could potentially create conflicting regulations. No AP members knew of HMS regulations other than gear restrictions for these species.

One AP member said that **cunner** (*Tautogolabrus adspersus*), also known as bergall, are targeted with hook and line on party boats and sold to live markets and are also landed in trawl fisheries in Narraganset Bay. Another AP member said they are caught in fish pots and sold live

to Asian markets. One AP member said he occasionally catches cunner in his trawl nets in Federal waters, but not in high volumes. One AP member said cunner should not be included in the amendment because they are not considered a low-trophic level species and also because there is little potential for development or expansion of targeted cunner fisheries. One AP member said cunner are an example of how the ecosystem is changing because they are now found in the Gulf of Maine, where they had been absent for several years.

A few AP members recommended that **sharptail shortfin squid** (*Illex oxygonius*) not be included in the amendment because they can be difficult to distinguish from *Illex* squid (*Illex illecebrosus*, a managed species*)*, which could pose problems for enforcement.

Other AP members disagreed with any removals from the list approved by the Council, arguing that the full list should be included in the Public Information Document with a complete analysis before they were eliminated from consideration.

Management Measures

The Council intends to use the Ecosystem Component (EC) designation to regulate fisheries for unmanaged forage species. Most AP members expressed concern about the use of the EC designation, especially for chub mackerel. The National Standard Guidelines say that ECs should "not be subject to overfishing, not be overfished or approaching overfished" and should "not be likely to become subject to overfishing or overfished in the absence of conservation and management measures". One AP member questioned whether NOAA Fisheries could be sued if it is not proven that the species included in the amendment are not likely to become overfished or subject to overfishing.

Most AP members agreed that chub mackerel does not meet the definition of ECs outlined in the National Standard Guidelines. The National Standard Guidelines say that ECs should be non-target species and should not generally be retained for sale or personal use. Chub mackerel is the target of a directed commercial fishery which landed over two million pounds in two of the past three years. Many AP members thought chub mackerel should not be managed as an EC due to the discrepancy between the reality of the chub mackerel fishery and the EC definition. Many AP members thought that chub mackerel should be managed as a stock in the fishery, either in its own FMP or in the Mackerel, Squid, and Butterfish FMP.

One AP member said that chub mackerel does not need to be managed as either a stock in the fishery or an EC, arguing that the Council developed regulations for river herring and shad bycatch without designating them as stocks in the fishery or ECs. Another AP member noted that river herring and shad were managed under National Standard 9, which states that "Conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch". She argued that this would not be appropriate for chub mackerel because there is a directed chub mackerel fishery and they not primarily a bycatch species.

One AP member said there is scientific information from chub mackerel fisheries in other parts of the world which could be used to inform the assessments required to manage chub mackerel as a stock in a fishery. Several AP members argued that if the Council were to initially manage chub mackerel as an EC, they should work with the SSC and immediately begin to pursue analysis in support of a stock in the fishery determination and should set a deadline for such a determination. One AP member said the Council should plan for proper management and a long-term vision for the fishery. One AP member said that if the Council were to pursue a stock in the fishery designation, the vessels with a history of chub mackerel landings should be exempted from any restrictions on landings until the stock in the fishery determination is complete.

A few AP members said that only four vessels in the Mid-Atlantic have the capacity, horsepower, and freezing capability to successfully target chub mackerel. These vessels also target *Illex* squid. When *Illex* are not abundant, the vessels sometimes switch to chub mackerel. In this way, chub mackerel provides these vessels with flexibility and can be an important "bailout" species when *Illex* are not abundant. One AP member said he has switched between targeting *Illex* squid and chub mackerel on the same trip. Another AP member said that there are no vessels in the South Atlantic which are capable of successfully targeting chub mackerel.

A few AP members said there is a developing market for chub mackerel caught in the Mid-Atlantic. One AP member said NOAA Fisheries encouraged development of the fishery and growth of the market by funding an experimental fishery through the Saltonstall-Kennedy grant program in the early 2000s. At the time, chub mackerel was seen as an underutilized fishery. Now that the fishery and market have grown, she argued, fishermen must continue to supply the market, otherwise it will be filled with imports. There are much larger chub mackerel fisheries in other parts of the world, which could easily replace the growing market for chub mackerel caught in the Mid-Atlantic.

One AP member thought chub mackerel should have a separate range of management alternatives from the other species under consideration. He said the draft alternatives for annual landings limits were intended for chub mackerel and were not appropriate for the other species under consideration.

A few AP members recommended different options for annual landings limits and for incidental possession limits for chub mackerel, but there was little agreement on recommended limits. The AP members who recommended incidental possession limits for chub mackerel intended for them to be in effect only after an annual landings limit was met. The AP did not recommend the use of directed fishery possession limits for chub mackerel. One AP member said that if the Council were to implement a directed fishery possession limit, it should be set at 600,000 pounds, which is approximately the maximum trip-level landings for the vessels that currently target chub mackerel.

One AP member recommended annual chub mackerel landings limit alternatives based on mean, median, 75th percentile, and maximum annual landings over the past 5 or 10 years. One AP member recommended an annual landings limit of 10 million pounds, which is nearly double the highest annual landings over the past 20 years. He argued that chub mackerel abundance might be correlated with temperature and that abundances in the Mid-Atlantic might increase with climate change. He did not want to limit the opportunity for fishermen to land chub mackerel. Another AP member argued that any alternative that allowed an increase in chub mackerel catch would be inconsistent with the goals of the amendment. Several AP members supported 5.25 million pounds as the highest option for a chub mackerel annual landings limit, arguing that this is the equivalent to the highest historical landings and would fit with the goal of the amendment. A few AP members argued that, compared to chub mackerel fisheries in other parts of the world, and to managed fisheries for other species in the Mid-Atlantic, 5.25 million pounds per year is very low. Other AP members noted that we have no scientific information to judge the ecological effects of these large-scale removals.

The AP recommend an alternative to prohibit possession of anchovies, argentines, silversides, sand lances, pearlsides/marine hatchetfishes, greeneyes, lanternfish, cusk eels, copepods, krill, amphipods, and other species under 1 inch as adults. Every AP member present agreed to this recommendation. The AP agreed that some of these species, including sand lances and lanternfish, are very important forage species and should be protected from fishing impacts. Several AP members said pearlsides, greeneyes, and lanternfish are found in deep water and are not caught by existing fisheries, so a prohibition on harvest would have minimal, if any, negative impacts.

There are existing state waters fisheries for sand lances and silversides. A few AP members said that vessels with both state and Federal permits could be prevented from targeting these species in state waters because of this amendment; however, they did not think this would be a major issue as they thought few, if any, vessels with Federal permits would target these species in state waters.

The AP recommended an incidental possession limit for unmanaged herrings, sardines, Atlantic saury, halfbeaks, and pelagic molluscs (with the exception of sharptail shortfin squid). Most, but not all, AP members agreed to this recommendation. Those who did not support the recommendation expressed concern about the lack of information to assess the impacts of an incidental possession limit and to determine an appropriate limit. The FMAT compiled dealer-reported landings from 1996 through 2015 of all species on the list approved by the Council. There were no dealer-reported landings for any of the species for which the AP recommended incidental possession limits. Several AP members said these species are small in size, mostly found inshore, and/or are low value; therefore, although they are caught in existing fisheries, it is unlikely that vessels would target them. For example, one AP member said that thread herring (*Opisthonema oglinum*) are caught on trips targeting longfin squid (*Doryteuthis [Amerigo] pealeii*, a managed species). He said thread herring are not generally retained, but it is not always possible to separate them from longfin squid when they are caught together. He argued that it would be beneficial to allow incidentally-caught species to be landed and sold

rather than discarded. Most AP members were not familiar with cusk eels; however, some AP members said they are not commonly caught in existing fisheries. One AP member said that, depending on which pelagic molluscs are included in the amendment, it could be difficult for enforcement agents to distinguish between different squid species.

After discussing available landings data, the AP recommended two options for incidental possession limits for unmanaged herrings, sardines, Atlantic saury, halfbeaks, and pelagic molluscs (with the exception of sharptail shortfin squid). The first option was 1,500 pounds per species per trip. Several AP members said this level of harvest would effectively prohibit large-scale targeting of these species, however, it would allow small-scale fisheries to exist. The AP was not aware of any small-scale fisheries for these species; however, they thought some might exist. Several AP members said the price for any of these species would be very low; therefore few vessels would target them with a 1,500 pound trip limit. Some AP members thought it would be very rare for a vessel to catch 1,500 pounds of more than one of these species at a time; therefore a limit of 1,500 pounds per species per trip would not result in substantial landings.

At the request of the AP, Council staff calculated summary statistics for trip-level landings of the species on the Council-approved list with dealer-reported landings between 1996 and 2015 (i.e. argentine, bay anchovy, cunner, cutlassfish, sand eels, harvestfish, frigate mackerel, octopus, silversides, and little tunny). Based on this information, the AP recommended an incidental possession limit option of 1,700 pounds per trip of unmanaged herrings, sardines, Atlantic saury, halfbeaks, and pelagic molluscs (with the exception of sharptail shortfin squid). This limit would apply to all of these species combined and is approximately the 99th percentile of trip-level landings for those species on the Council-approved list with dealer-reported landings from 1996 through 2016. One AP member said a 1,700 pound possession limit for all species combined could create bycatch problems; however, other AP members thought that bycatch issues would be minimal. A few AP members supported this approach because it is similar to the approach used by the Pacific Council and is intended to reflect historical landings.

A few AP members cautioned that historical landings data, especially from the 1990s and earlier, may not be accurate. For example, chub mackerel may have been reported as frigate mackerel, cutlassfish may have been reported as ribbonfish, and harvestfish may have been reported as star butters. Some AP members said the landings data from the 1990s may be substantially lower than actual landings.

One AP member said that any landings limits implemented through the amendment should be based on science and an understanding of the population size and reproductive rate of the species in question. This data is largely lacking for the species currently under consideration.

One AP member cautioned that the Council should carefully consider the details of how any landings or possession limits are implemented. Since the Council intends to only regulate fisheries in Mid-Atlantic Federal waters, the Council should think carefully about how the regulations will be enforced (e.g. by permit type or by geographical area) to avoid negatively impacting fisheries in state waters or in areas outside of the Mid-Atlantic.

A few AP members opposed the FMAT recommendation to remove the word "incidental" from Option 2B, arguing that restricting catch to incidental catch is consistent with the EC species definition and with the Pacific Council's approach, and is consistent with the amendment's goal of prohibiting the development of new directed commercial fisheries.

Process for New Fisheries

The AP agreed that the Council should outline a process for considering and approving new fisheries for unmanaged forage species, or expansion of existing fisheries. Several AP members thought the Council should develop a process for efficient consideration of new fisheries so fishermen can have the flexibility to target species that are abundant. Most AP members agreed that if Exempted Fishing Permits (EFPs) were used as a first step in a process to allow new fisheries, then the Council should have greater involvement in the EFP application review process.

The AP briefly discussed the process established by the Pacific Fishery Management Council for review of EFPs relating to their forage species regulations. Under this process, individuals are encouraged, but not required, to submit EFP applications to the Council prior to submission to the NOAA Fisheries West Coast Office. The Pacific Council and its advisory bodies, including the SSC, review EFP applications. Council endorsement of EFP applications is seen as beneficial when the application is ultimately submitted to NOAA Fisheries for approval.

One AP member said he has applied for many EFPs and that review by NOAA Fisheries can take a considerable amount of time. He argued that if an EFP is used for market research, a consistent supply of the species in question is needed to assess the market potential and that the time needed for consideration of EFP applications and renewals can pose challenges for this type of research. This AP member recommended that the Council pursue other ways to consider new fisheries. A few AP members wondered if initial review by the Council could expedite the process of review and approval at GARFO. One AP member also said that the EFP application review process would seem more transparent if the Council were involved. One AP member said that EFPs are useful because they can be used for cooperative research and allow fishermen to have greater input in the management process.

Ecosystem and Ocean Planning Committee Meeting
March 18, 2016
Meeting Summary

Committee members in attendance: Warren Elliott, John McMurray, Peter deFur, Jeff Kaelin, Mike Luisi, Laurie Nolan, Adam Nowalsky, Rob O'Reilly, Sara Winslow, Patricia Bennet

Others in attendance: Katie Almeida, Carli Bari, Julia Beaty, Purcie Bennett-Nickerson, Bonnie Brady, Douglas Christel, R Fleming, Erica Fuller, Joseph Gordon, Ken Hinman, Meghan Lapp, Shanna Madsen, Tom Rudolph, Robert Ruhle, David Wallace, Kate Wilke

Meeting Summary

The Ecosystem and Ocean Planning (EOP) Committee met in Linthicum Heights, Maryland on March 18, 2016 to discuss the Unmanaged Forage Omnibus Amendment. The Committee considered the advice of the Unmanaged Forage Fishery Management Action Team (FMAT) and the EOP Advisory Panel (AP) and developed recommendations for the full Council on several aspects of the amendment.

List of Species

In February 2016 the Council approved a list of unmanaged taxa for possible inclusion in the Unmanaged Forage Omnibus Amendment[1]. After considering FMAT and AP comments, the Committee passed a motion to recommend that the Council add lanternfish and remove harvestfish, Atlantic cutlassfish, bullet mackerel, frigate mackerel, little tunny/false albacore, cunner, and sharptail shortfin squid from the list. This recommendation mirrors a recommendation made by several members of the EOP AP. The modified list of taxa recommended by the Committee is shown in Table 1.

The FMAT, the EOP AP, and the Committee agreed that lanternfish are an important prey item for Council-managed predators and for other species. Some AP members said lanternfish are found in deep water and are rarely caught in existing fisheries; therefore, including them in the amendment would have minimal impacts to existing fisheries.

The AP recommended, and several Committee members agreed, that, because bullet mackerel, frigate mackerel, and little tunny are highly migratory species (HMS), they may be better managed by the NOAA Fisheries Atlantic HMS Management Division than by the Council.

[1] Available at: http://www.mafmc.org/s/2016-03-02_Unmanaged-Forage-Taxa.pdf

Several AP and Committee members agreed that little tunny and Atlantic cutlassfish are not considered forage species as adults and thus may not fit well in the Unmanaged Forage Omnibus Amendment.

The FMAT has not yet identified a link to the Council's existing Fishery Management Plans (FMPs) for bullet mackerel, frigate mackerel, little tunny, or Atlantic cutlassfish. The NOAA Fisheries Greater Atlantic Regional Office (GARFO) has advised that all forage species included in the amendment must be linked to the Council's existing FMPs in some way. Some Committee members thought it could be misleading to present a list containing species which may not ultimately be approved during public hearings. One member reminded the Committee that GARFO has not yet officially ruled on which species they would or would not approve for inclusion in the amendment.

One Committee member said cunner are highly structure-oriented and are mostly caught with hook and line and pots, which limits the potential for a large-scale commercial fishery. Some AP and Committee members recommended that harvestfish be excluded from the amendment because they are mostly harvested in state waters and the amendment will focus on Federal waters. One AP member said sharptail shortfin squid are difficult to distinguish from *Illex* squid, which could pose challenges for enforcement if sharptail shortfin squid were included in the amendment.

Some AP members said there are already gear regulations designed to minimize catch of little tunny and other HMS. It was not clear whether the Atlantic HMS Management Division actively manages harvest of little tunny, frigate, or bullet mackerel through landings limits. The Committee recommended that the Council write a letter to the Atlantic HMS Management Division to request that NOAA Fisheries manage little tunny, bullet mackerel, frigate mackerel, and other unmanaged scombrid species.

Table 1: List of taxa recommended by the EOP Committee for possible inclusion in the Unmanaged Forage Omnibus Amendment.

- Engraulidae (anchovies)
- Clupeidae (herrings, sardines)
- Argentinidae (argentines)
- Atherinopsidae (silversides)
- Ammodytidae (sand lances)
- Sternoptychidae (pearlsides)
- Chlorophthalmidae (greeneyes)
- *Scomber colias* (chub mackerel)
- *Scomberesox saurus* (Atlantic saury)
- Hemiramphidae (halfbeaks)
- Ophidiiformes (cusk eels)

- Pelagic molluscs (squids, cuttlefish etc.; with the exception of sharptail shortfin squid, *Illex oxygonius*)
- Copepods, Krill, Amphipods and any other species under 1 inch as adults
- Myctophidae (lanternfish)

Management Measures

The Committee recommended that chub mackerel be given a separate set of management alternatives from the other forage species under consideration. The Committee thought chub mackerel should be treated differently than the other species due to the scale of the existing directed chub mackerel fishery. Dealer-reported chub mackerel landings totaled about 9.58 million pounds from 1996 through 2015, which is more than ten times the combined reported landings of all the other species recommended by the Committee (Table 2). Some Committee members said the draft management alternatives for an annual landings limit were intended only for chub mackerel and were not appropriate for the other species under consideration.

The Council has agreed to use the Ecosystem Component (EC) designation to regulate harvest of the species ultimately included in the amendment. The FMAT, the AP, and several Committee members agreed that chub mackerel does not fit well with the definition of ECs outlined in the National Standard Guidelines. Specifically, the National Standard Guidelines say that ECs should be non-target species and should not generally be retained for sale or personal use. Chub mackerel is the target of a directed commercial fishery which landed over two million pounds in two of the past three years. Because of this discrepancy, the Committee recommended that the Council consider a management alternative to manage chub mackerel as a stock in the fishery and an alternative which would manage chub mackerel through the Council's discretionary authority under section 1853(b)(12) and National Standard 9. National Standard 9 states that "Conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch." The Council used National Standard 9 to address bycatch of river herring and shad. Some Committee members stated that because there is a targeted fishery for chub mackerel, National Standard 9 may not be the best mechanism for managing chub mackerel landings, especially if the Council were to do so through annual landings limits.

One Committee member noted that the National Standard Guidelines are simply guidelines and do not have the effect of law. The National Standard Guidelines are written in such a way as to provide the Councils with considerable flexibility in the use of the EC designation. GARFO has not cautioned the Council against using the EC designation for chub mackerel.

The Committee briefly discussed the idea of pursuing an emergency action to regulate landings of chub mackerel while longer-term solutions are sought. For example, managing chub mackerel as a stock in the fishery would require establishment of status determination criteria, allowable biological catch, annual catch limits, and a description of essential fish habitat. This

would be a timely process. One Committee member wondered if an emergency action could be used to implement temporary management measures while the required assessments for a stock in the fishery are pursued. Another Committee member said an emergency action would not be appropriate because the directed chub mackerel fishery has existed for several years and in the absence of scientific information to suggest that the fishery is having a substantial negative impact, the fishery should not be considered an emergency situation. The Committee did not recommend that the Council pursue an emergency action for chub mackerel.

One Committee member recommended that if the Council were to manage chub mackerel as an EC or through National Standard 9, that it commit to doing so for a maximum of three years while a stock assessment and analyses of ecosystem and socioeconomic impacts are undertaken to evaluate whether chub mackerel would be better managed as a stock in the fishery. Several Committee members supported this idea, but some cautioned against committing to a hard deadline of three years.

The Committee agreed that whether chub mackerel is managed as an EC, as a stock in the fishery, or through neither category using the Council's discretionary authority, the Council should consider the following range of alternatives for an annual fishery-wide landings limit: 2.86 million pounds (average annual dealer-reported landings, 2013-2015); 1.75 million pounds (average annual landings, 2011-2015); 900,127 pounds (average annual landings, 1996-2015); and 5.25 million pounds (landings in 2013, the year with the highest dealer-reported landings of chub mackerel). The Committee recommended that the Council consider the following range of alternatives for an incidental possession limit once the annual landings limit is met: 0 pounds (i.e. no incidental limit); 10,000 pounds (approximately the average trip-level landings, 1996-2015); and 40,000 pounds. The 40,000-pounds option was recommended by a Committee member who said that a vessel could make a profitable trip with 40,000 pounds of chub mackerel, but could not have a profitable season at that level.

One Committee member said that only four vessels have the capacity, horsepower, and freezing capability to effectively harvest chub mackerel in large volumes. These vessels target chub mackerel when *Illex* squid are not available. He said that 5.25 million pounds of chub mackerel (the amount landed in 2013 and the highest proposed annual landings limit) is low compared to allowable landings for other species such as menhaden and Atlantic herring. In his opinion, there was no indication of negative ecosystem impacts from an annual harvest of 5.25 million pounds of chub mackerel.

The Committee agreed to follow the AP's recommendation for a management alternative which would prohibit possession of anchovies, argentines, silversides, sand lances, pearlsides/marine hatchetfishes, greeneyes, lanternfish, cusk eels, copepods, krill, amphipods, and other species under 1 inch as adults. The Committee also supported the AP's recommendation for a management alternative for an incidental possession limit for unmanaged herrings, sardines, Atlantic saury, halfbeaks, and pelagic molluscs (with the exception of sharptail shortfin squid). The Committee supported the AP's recommendation for

an incidental possession limit alternative of 1,500 pounds of any species per trip and an alternative for an incidental possession limit of 1,700 pounds of all species combined per trip. The 1,500 pound option was based on AP advice. The 1,700 pound limit was based on the 99th percentile of trip-level landings of bay anchovy, argentine, sand eel, harvestfish, octopus, and Atlantic silverside. There are no dealer-reported landings of the species for which the AP and Committee recommended an incidental possession limit; therefore, the 1,700 pound alternative is based on species for which there are landings data.

Table 2: Summary statistics (in pounds) for dealer-reported trip-level landings, 1996-2015, for species recommended by the EOP Committee for possible inclusion in the Unmanaged Forage Omnibus Amendment. Numbers in parentheses are the number of trips which landed at least the number of pounds shown. Confidential data are labeled "C" (in cases where the number of dealers and/or vessels which purchased or landed more than the amount of landings shown is confidential).

Species	Median	Mean	75th percentile	90th percentile	95th percentile	99th percentile	Total Landings	Total Trips
Argentine	207 lb *(35 trips)*	441 lb *(22 trips)*	C	C	C	C	30,901	70
Atlantic silverside	175 lb *(967 trips)*	251 lb *(584 trips)*	300 lb *(482 trips)*	480 lb *(203 trips)*	680 lb *(98 trips)*	C	482,372	1,920
Bay anchovy	5 lb *(88 trips)*	62 lb *(20 trips)*	15 lb *(45 trips)*	90 lb *(18 trips)*	428 lb *(9 trips)*	C	10,154	164
Chub mackerel	16 lb *(485 trips)*	9,919 lb *(93 trips)*	114 lb *(242 trips)*	7,815 lb *(97 trips)*	C	C	9,581,508	966
Octopus	12 lb *(511 trips)*	35 lb *(290 trips)*	39 lb *(257 trips)*	90 lb *(102 trips)*	145 lb *(51 trips)*	298 lb *(11 trips)*	35,638	1,010
Sand eel	25 lb *(1,215 trips)*	36 lb *(744 trips)*	43 lb *(574 trips)*	65 lb *(233 trips)*	84 lb *(114 trips)*	C	81,034	2,258

In February 2016 the Council approved a range of management alternatives which listed gear regulations as a frameworkable item, but not as a standalone alternative. The Committee recommended that gear regulations be removed from the list of frameworkable items. Some Committee members saw limited potential for the use of gear regulations to meet the goals of the amendment. Others were concerned that if gear regulations were listed as a frameworkable item but not given their own alternative, and thus not fully analyzed in the amendment, it may not be possible to implement gear regulations through future frameworks.

The Council previously agreed to limit the scope of the amendment to Mid-Atlantic Federal waters. There are existing directed fisheries in state waters for some species on the list recommended by the Committee, including silversides and sand lances. The Council does not intend to regulate state-waters fisheries through this amendment. The Committee recommended that the Council include alternatives in the amendment to define Mid-Atlantic Federal waters. The Committee recommended two such alternatives, both of which would define the northern boundary of Mid-Atlantic Federal waters as the state line separating New York and Connecticut, extended seaward. One alternative would define the southern boundary

as the state line separating Virginia and North Carolina, extended seaward, and the other alternative would define the southern boundary at Cape Hatteras, North Carolina. The first alternative is based on the Council's authority as defined in the Magnuson-Stevens Act. The second alternative is meant to match the southern boundary of the management unit for several of the Council's managed species.

The Committee briefly discussed the benefits of adding species codes to the reporting mechanisms used by fishermen and dealers (e.g. SAFIS, VTRs) for the species included in the amendment. Some committee members thought codes should only be added for species with the potential for directed fishing in the near future. For example, some Committee members agreed that copepods, krill, amphipods, and other species under 1 inch as adults are not likely to be landed in the near future and adding codes for those species could make reporting of other species more cumbersome by requiring fishermen and dealers to sort through many codes. The committee recommended two additional administrative alternatives that would address reporting for EC species in this amendment. To facilitate monitoring and reporting of EC landings, the committee recommended a third administrative alternative to require that any vessel possessing the EC species included in the amendment obtain a GARFO permit.

The draft management alternatives, as modified by the Committee's recommendations, are summarized in Table 3.

Table 3: Draft management alternatives for the Unmanaged Forage Omnibus Amendment, as recommended by the EOP Committee. "EC species" refers to the unmanaged forage species ultimately included in the amendment.

Issue	Alternative	Sub-Alternative	AP/Committee Recommended Range of Alternatives
1: No action	**1:** No Action	--	--
2: Alternatives for forage species other than chub mackerel (to be included in amendment as EC species)	**2A:** Prohibit possession	2Ai: Prohibit possession of all EC species (besides chub mackerel)	--
		2Aii: Prohibit possession of some EC species	Prohibit possession of Engraulidae, Argentinidae, Atherinopsidae, Ammodytidae, Sternoptychidae, Chlorophtalmidae, Myctophidae, Ophidiiformes, copepods, krill, amphipods, and other species <1 inches as adults.
	2B: Allow an incidental possession limit	2Bi: Allow an incidental possession limit for all EC species (besides chub mackerel)	Incidental possession limit alternatives: - 1,500 pounds of any species per trip or - 1,700 pounds of all species combined per trip
		2Bii: Allow an incidental possession limit for some EC species	Allow an incidental limit of 1,500 pounds of any species per trip or 1,700 pounds of all species combined per trip for Clupeidae, Argentinidae, Atlantic saury, Hemiramphidae, and pelagic molluscs
3: Chub mackerel alternatives	**3A:** Manage chub mackerel as an EC species	3Ai: Prohibit possession of chub mackerel	--
		3Aii: Prohibit possession of chub mackerel once an annual fishery-wide landings limit is met	Annual landings limit alternatives: - 2.86 million pounds/year - 1.75 million pounds/year - 900,127 pounds/year - 5.25 million pounds/year
		3Aiii: Allow an incidental possession limit for chub mackerel once an annual fishery-wide landings limit is met	Incidental possession limit alternatives: - 10,000 pounds - 40,000 pounds
	3B: Manage chub mackerel as a stock in the fishery	3Bi: Prohibit possession of chub mackerel	--
		3Bii: Prohibit possession of chub mackerel once an	Annual landings limit alternatives: - 2.86 million pounds/year - 1.75 million pounds/year

		annual fishery-wide landings limit is met	- 900,127 pounds/year - 5.25 million pounds/year
		3Biii: Allow an incidental possession limit for chub mackerel once an annual fishery-wide landings limit is met	Incidental possession limit alternatives: - 10,000 pounds - 40,000 pounds
	3C: Manage chub mackerel through the Council's discretionary authority under 1853(b)(12) and National Standard 9	3Ci: Prohibit possession of chub mackerel	--
		3Cii: Prohibit possession of chub mackerel once an annual fishery-wide landings limit is met	Annual landings limit alternatives: - 2.86 million pounds/year - 1.75 million pounds/year - 900,127 pounds/year - 5.25 million pounds/year
		3Ciii: Allow an incidental possession limit for chub mackerel once an annual fishery-wide landings limit is met	Incidental possession limit alternatives: - 10,000 pounds - 40,000 pounds
4: Administrative alternatives	**4A:** List of fisheries and gear types (50 CFR 600.725)	--	--
	4B: Permit for incidental possession of EC species	--	Any vessel that retains any EC species in Federal waters must obtain a GARFO permit.
	4C: Monitoring /reporting	4Ci: Develop and implement an annual process that provides the Council with data related to annual catch of EC species in its jurisdiction.	--
		4Cii: Add EC species to SAFIS, VTRs, CDFRs, and other required reporting mechanisms.	
	4D: Geographic scope of amendment	4Di: Federal waters, bounded by seaward lines extending from CT/NY boundary and VA/NC boundary	--
		4Dii: Federal waters, bounded by seaward lines extending from CT/NY boundary and Cape Hatteras, NC	--
		4Ei: List of EC species	--

	4E: Frameworkable items	4Eii: Possession limits and landings limits	--
		4Eiii: Spatial and seasonal closures	--
		4Eiv: Recreational fishing regulations	--

Process for new fisheries

The Committee discussed the idea of adding alternatives for a pathway to a new fishery as part of the range of management alternatives for the amendment. The Committee did not agree to draft language for management alternatives for new fisheries. Some Committee members suggested discussing the issue further over email and during the Council meeting.

The Committee discussed the use of exempted fishing permits (EFPs) as a first step in a process to allow new fisheries, or expansion of existing fisheries, for the species ultimately included in the amendment. The Committee recommended that the Council establish a process for Council review of EFP applications relating to the amendment. The Committee briefly discussed the Pacific Fishery Management Council's Council Operating Procedure 24[2], which outlines a process by which EFP applications relating to the Pacific Council's Comprehensive Ecosystem-Based Amendment 1 are submitted to the Council and reviewed by the Council, the SSC, and other advisory bodies prior to submission to the NOAA Fisheries West Coast Regional Office. Individuals are not precluded from submitting EFP applications directly to the Regional Office; however, review and approval by the Pacific Council is seen as beneficial as it can strengthen applications prior to review by the Regional Office. The EOP Committee recommended that the Mid-Atlantic Council establish a similar process for EFPs for the Unmanaged Forage Omnibus Amendment. Some Committee members suggested that the Council state that in order for a new fishery to be allowed, or for an existing fishery to expand, the Council must first have considered an EFP application and reviewed the data resulting from use of the EFP. The Committee did not approve language for a draft alternative relating to EFPs. Council staff agreed to explore the possibilities for coordination with GARFO on EFPs prior to the April Council meeting. One Committee member suggested that a memorandum of understanding between the Council and GARFO could be sufficient to ensure that the Council has the opportunity to review EFP applications relating to the Unmanaged Forage Omnibus Amendment.

[2] Available at: http://www.pcouncil.org/wp-content/uploads/2015/12/cop24.pdf

Motions

Recommend to the Council to remove the following species to a considered but rejected list: Atlantic cutlassfish, bullet mackerel, frigate mackerel, little tunny/false albacore, harvestfish, cunner, and sharptail shortfin squid. Nolan/Nowalsky (5/3/0) Motion carries

Recommend that the Council write a letter to NMFS HMS to request that the HMS office manage the HMS species on list (little tuna/false albacore, bullet mackerel, and frigate mackerel) and other unmanaged scombrid species – approved by consensus

Move to add lanternfish – approved by consensus

Move to create chub mackerel alternatives, separate from alternatives for other species in the amendment McMurray/deFur (8/0/0) motion carries

Remove gear regulations from list of frameworkable items – by consensus

Move to move forward with AP recommended incidental possession limit options
McMurray/Luisi (8/0/0) motion carries

The following management alternatives were approved by consent, with the understanding that staff would modify the wording and structure prior to the April 2016 Council meeting:

ALTERNATIVE 2: Alternatives to regulate harvest

A. Prohibit possession of all EC species
B. Prohibit possession of all EC species, but allow an incidental possession with trip limits of:
    I. 1,500 pounds per trip for each EC species
    II. 1,700 pounds/trip – 99th percentile of trip-level landings for all the species with documented catch for 1996-2015
C. Prohibit possession of all EC species but allow incidental possession of some EC species EC species with a per trip possession limit.
    I. Prohibit possession of:
        a. Families: *Engraulidae* (anchovies), *Argentinidae* (argentines), *Atherinopsidae* (silversides), *Ammodytidae* (sand lances), *Sternoptychidae* (pearlsides, marine hatchetfishes), *Chlorophtalmidae* (greeneyes), and Myctophidae (lanternfish)
        b. Orders: *Ophidiiformes* (cusk eels).
        c. Groups: Copepods, krill, amphipods, and other species under 1 inch as adults: including the families of *Calanidae* (copepods) and *Euphausiidae* (euphausid krill), the orders: *Amphipoda* (amphipods) and *ispoda* (isopods), and the class *Ostracoda* (ostracods).[3]
    II. Limited possession of all remaining EC species (round herring, scaled sardine, thread herring, Spanish sardine, halbeaks, Atlantic saury, pelagic molluscs except sharptail shortfin squid) with a per trip possession limit of:
        a. 1,500 pounds per trip for each EC species

[3] This list was taken directly from the staff evaluation of the EC Species list passed by the EOP committee and the MAFMC.

b. 1,700 pounds/trip – 99th percentile of trip-level landings for all the species with documented catch for 1996-2015

ALTERNATIVE 3: (Chub option 1) Limit harvest of chub mackerel as EC species

A. (Previous 2c) Classify chub mackerel as an EC species and limit the annual harvest of chub mackerel using one of the following methodologies for a maximum of three (3) years while a stock assessment and analyses of predator, ecosystem, and socioeconomic impacts are completed to add chub mackerel as a stock in the fishery (SIF):
   i. 3 year catch average (2.86 million pounds)
   ii. 5 year catch average (1.75 million pounds)
   iii. 10 year catch average (900,127 pounds)
   iv. Highest catch in the past 10 years (5.25 million pounds)
B. (Previous 2d) Classify chub mackerel as EC species and limit the annual harvest of chub mackerel using one of the following methodologies with an incidental possession limit of 10,000 pounds after the annual limit/cap is met, for a maximum of three (3) years while a stock assessment and analyses of predator, ecosystem, and socioeconomic impacts are completed to add chub mackerel as a stock in the fishery (SIF):
   i. 3 year catch average (2.86 million pounds)
   ii. 5 year catch average (1.75 million pounds)
   iii. 10 year catch average (900,127 pounds)
   iv. Highest catch in the past 10 years (5.25 million pounds)
C. 2B with 40,000 incidental limit
D. Immediately add chub mackerel as a stock in the fishery to either the MSB FMP or its own FMP using proxy status determination criteria while a stock assessment and analyses of predator, ecosystem, and socioeconomic impacts are completed. Set one of the following as a temporary landings cap for a maximum of three years:
   i. 3 year catch average (2.86 million pounds)
   ii. 5 year catch average (1.75 million pounds)
   iii. 10 year catch average (900,127 pounds)
   iv. Highest catch in the past 10 years (5.25 million pounds)

ALTERNATIVE 3: (Chub option 2) Limit the catch of chub mackerel as NON-EC species

A. (Previous 2c) Limit the annual harvest of chub mackerel using one of the following methodologies for a maximum of three (3) years while a stock assessment and analyses of predator, ecosystem, and socioeconomic impacts are completed to add chub mackerel as a stock in the fishery (SIF):
   i. 3 year catch average (2.86 million pounds)
   ii. 5 year catch average (1.75 million pounds)
   iii. 10 year catch average (900,127 pounds)
   iv. Highest catch in the past 10 years (5.25 million pounds)
B. (Previous 2d) Limit the annual harvest of chub mackerel through a catch cap using one of the following methodologies for a maximum of three (3) years with an incidental possession limit of 10,000 while a stock assessment and analyses of predator, ecosystem, and socioeconomic impacts are completed to add chub mackerel as a stock in the fishery (SIF):
   i. 3 year catch average (2.86 million pounds)
   ii. 5 year catch average (1.75 million pounds)
   iii. 10 year catch average (900,127 pounds)
   iv. Highest catch in the past 10 years (5.25 million pounds)

ALTERNATIVE 4: Pathway to a fishery for EC species with prohibited or limited harvest.

A. No action
B. No new or expanded fishing on EC forage species.
C. Persons or companies seeking directed fishing on a prohibited EC forage species must first seek endorsement of an exempted fishing permit (EFP) through the MAFMC EFP review process in Council Policy for Review of EFPs for fishing EC species (EC/EFP Policy – Appendix XX), and then through the NOAA/GARFO EFP application process. The MAFMC EC/EFP Policy was created

specifically to implement an MAFMC and SSC review process for EFP applications to collect data for a future fishery on a species prohibited from harvest in this amendment prior to EFP application submission to NMFS/GARFO.

D. Persons or companies seeking directed fishing on a prohibited EC forage species must petition the Council and NMFS to add that species as a "stock in the fishery."

ALTERNATIVE 5: This amendment applies to all mid-Atlantic federal waters (exclusive economic zone - EEZ). The boundaries of that jurisdiction are as follows:

A. The northern boundary is the state line separating New York and Connecticut. The southern boundary is the state line separating Virginia and North Carolina.

B. The northern boundary is the state line separating New York and Connecticut. The southern boundary extends from Cape Hatteras, North Carolina.

Administrative alternatives motions:

Move to add three alternatives the administrative range of alternatives:

A. Any vessel that will retain or incidentally possess any EC species protected in this amendment in federal waters must obtain a GARFO permit.

B. Develop and implement an annual process that provides the MAFMC with data related to annual catch of EC species in its jurisdiction.

C. Update species reporting requirements by adding EC species to SAFIS, VTRs, CDFRs, and other required reporting mechanisms

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March 14, 2016

Dear Ecosystem and Ocean Planning Committee Members,

In order to provide context to the Council's discussion of the Mid Atlantic chub mackerel fishery, I have put together this brief document that focuses on the worldwide chub mackerel fishery, characteristics of the stock, and the history of the fishery in the Mid Atlantic region. The Council has acknowledged the unique situation of the Mid Atlantic chub mackerel fishery, particularly in recent years, and its economic importance to vessels such as ours. That economic potential was recognized by National Marine Fisheries Service in 2004, when the agency funded a study for the development of chub mackerel as an underutilized species. Rather than relegate the current fishery to an incidental limit or average annual catch, there is a need for an FMP. Due to the fact that chub mackerel is one of the world's largest fisheries, significant information exists to form the fundamental scientific basis of an FMP.

The chub mackerel fishery worldwide is active on every continent except Australia and Antarctica, takes place in the Atlantic, Pacific and Indian Oceans, and exists in 13 of the 19 United Nations FAO marine fishing areas.[1] The species is harvested primarily by purse seining but also by set nets, trap nets, gillnets, lift nets, balance nets, spoon nets, lampara nets, trolling gear, stake lines, longlines, and trawls.[2] Trawls and gear types other than purse seine are "mostly used in small scale-fisheries"[3], because they are a less effective way of harvest. Worldwide chub mackerel landings reached a high of over 7.5 billion pounds in 1978, but have remained roughly between 3.5 and 4.5 billion pounds over the past ten years.[4] Chub mackerel is Portugal's second largest fishery by tonnage,[5] an important fishery in Eastern Central Atlantic, [6] a staple in Arab nations such as Yemen, [7] an established fishery in the Mediterranean,[8] and

[1] For a Species Distribution Map by FAO Marine Area, see http://www.fao.org/figis/geoserver/factsheets/species.html. See also http://www.fao.org/fishery/species/3277/en and http://www.fao.org/fishery/cwp/handbook/h/en.
[2] Food and Agriculture Organization of the United Nations, Species Fact Sheets, Chub Mackerel, available at: http://www.fao.org/fishery/species/3277/en.
[3] Ibid.
[4] Ibid.
[5] European Commission, Maritime Affairs and Fisheries, "Facts and Figures on the Common Fisheries Policy", 2010, p. 20.
[6] See http://www.fao.org/fishery/species/3277/en and http://www.oceantrawlers.com/species/atlantic-chub-mackerel/
[7] See http://www.trade-seafood.com/directory/seafood/country/yemen.htm .
[8] See http://www.fishbase.us/summary/Scomber-colias.html .

sold to almost all African countries,[9] but with highest fishery catches occurring in Asia and South America,[10] where Peru, Chile, Ecuador, Brazil and Argentina have well established fisheries. In many areas, it is a year round fishery,[11] and is a staple, main stream food source distributed through well-known suppliers.[12] Chub mackerel is one of the world's highest volume fisheries with the potential to support higher fishing pressure.[13] Despite high harvest levels and the fact that not every directed fishery is managed or assessed, there are no indications of long term declines, and the International Union for the Conservation of Nature has listed the species as a species of "Least Concern", both worldwide and in the Atlantic.[14]

The United States also has a very active commercial chub mackerel fishery on the West Coast. As of 2013, West Coast chub mackerel was identified by National Marine Fisheries Service as a nationally "Important Species", with commercial landings of nearly 23.8 million pounds, 75% of which were landed in California.[15] Chub mackerel is also an important recreational fish, and has been the "most frequently caught species on hook and line in California waters in recent years" for California sportfishermen. [16] In the 1970s, there were several years where more chub mackerel were harvested recreationally than commercially off the coast of California.[17]

Chub mackerel found in the Atlantic are the same species found elsewhere in the Pacific, Atlantic and Indian Oceans,[18] and as such has been studied extensively. In the Western Atlantic, the species is widespread and its range runs nearly the length of the entire North American and South American continents.[19] The warm water species "is frequent from Massachusetts to Florida (USA), the Bahamas, the Gulf of Mexico and southern Venezuela…off Brazil, Uruguay and Argentina."[20] Spawning season varies between global regions, but in the northwestern Atlantic, chub mackerel spawn in offshore waters south of Cape Hatteras during winter and spring, well south of Mid Atlantic fishing efforts and not during the Mid Atlantic

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[9] See http://www.oceantrawlers.com/species/atlantic-chub-mackerel/.

[10] See n 2.

[11] See http://www.oceantrawlers.com/species/atlantic-chub-mackerel/ and http://www.fishwatch.gov/profiles/pacific-mackerel.

[12] See for example, Chicken of the Sea canned chub mackerel: http://chickenofthesea.com/products/mackerel/mackerel-in-water .

[13] King, Michael, *Fisheries Biology, Assessment and Management, 2nd edition,* Blackwell Publishing, 2007. As of 2007, of the top ten species accounting for about 30% of the world's catch, chub mackerel was one of the ten not considered to be fully exploited. Other fisheries such as Alaskan Pollock, Atlantic herring, Japanese anchovy and Chilean jack mackerel were considered as having reached full utilization.

[14] International Union on the Conservation of Nature, " The ICUN Red List of Threatened Species", 2015, see http://www.iucnredlist.org/search.

[15] National Marine Fisheries Service, "Fisheries of the United States 2013", 2014, p. ix.

[16] California Department of Fish and Wildlife, "California Marine Sportfish Identification: Tuna and Mackerels", 2015.

[17] See n 2.

[18] Crone and Hill, NOAA Fisheries Southwest Fisheries Science Center, "Pacific mackerel (scomber janponicus) Stock Assessment for USA Managament in the 2015-16 Fishing Year", 2015, p. 11.

[19] Hernandez, Jose J Castro and Ana T. Santana Ortega, "Synoposis of Biological Data on the Chub Mackerel (*Scomber japonicus* Houttuyn, 1782)" FAO Fisheries Synopsis No. 157, 2000, p. 9.

[20] Ibid p. 9.

fishing season, typically in surface temperatures between 20.4 to 25.4 degrees Celsius.[21] Significant literature and studies exist on sexual maturity, fecundity, aging, growth rates, age/length relationships, life cycles, natural mortality rates, habitat, prey/diet and competitors by region.[22] Chub mackerel are opportunistic, non-selective feeders, with an extensive diet. [23]

Chub mackerel are a cyclical fish. Recruitment is highly variable over space and time, not likely related to spawning stock biomass size, [24] and not tightly linked to parent abundance levels within the historical range of estimated spawning stock biomass levels.[25] Population is driven primarily by large scale environmental factors.[26] They undergo significant seasonal migrations related to temperature[27] and life cycle, migrating both on and off the outer continental shelf.[28] Such migrations may limit availability to a fishery.[29] Extensive movements can be caused by climatic conditions (for example, El Nino) which may move the fish out of traditional survey ranges, and warm oceanic regimes may cause northward movement in the northern hemisphere.[30] They also migrate nocturnally/diurnally throughout the water column,[31] forming fast swimming schools during the day and dispersing at night.[32] Swimming speed is dependent on water temperature and length, and chub mackerel have been recorded at speeds of over 2 meters per second.[33] Chub mackerel "react sharply to fishing gear and vessel noise by attempting to escape from noisy areas" as well as the noise from other potential predators.[34]

The history of the chub mackerel fishery on the East Coast of the United States is nothing new. However, the history of the East Coast fishery generally supports the analysis of the Southwest Fisheries Science Center that the species experiences high biomass levels on average about once every 60 years, with high recruitment success no more frequently than

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[21] Ibid, p. 12.
[22] N. 19.
[23] Ibid; n. 2. Chub mackerel prey include squids and other cephalopods, fish including anchovy, sardine , jack mackerel and other chub mackerel, copepods, euphasids, jellyfish, benthic fauna, salps, mysids, decapods and crustaceans, etc.
[24] N. 18, p. 12.
[25] Crone et al, NOAA Fisheries Southwest Fisheries Science Center, "Pacific mackerel (scomber janponicus) Stock Assessment for USA Managament in the 2009-10 Fishing Year", 2009, p. 12.
[26] N. 18, p. 12. For example, oceanic oscillations.
[27] Perrotta, Ricardo, et. al., "Temperature conditions in the Argentine chub mackerel (Scomber japonicus) fishing ground: Implications for fishery management", Fisheries Oceanography 10(3):275-283, December 2001. Available at: https://www.researchgate.net/publication/229610222_Temperature_conditions_in_the_Argentine_chub_mackerel_Scomber_japonicus_fishing_ground_Implications_for_fishery_management.
[28] N. 19, p. 30, 36, 42. Chub mackerel have been observed spending entire life stages/year classes off of the continental shelf and in the open ocean. In addition, Russian vessels have fished the species outside the 200 mile limit. In 1996, the estimated total biomass of chub mackerel in the open ocean area 100 to 150 miles west of the 200 mile EEZ off the California/Mexico coast was 1.7 million tons.
[29] N. 27.
[30] N. 19, p. 31, 52.
[31] Ibid.
[32] Ibid., p. 32.
[33] Ibid p. 33.
[34] Ibid.

every few decades, primarily due to oceanic conditions.[35] Chub mackerel, or hardhead, catches were "tremendously abundant during the last of the eighteenth century and early years of the nineteenth, down to 1820-1830" as far north as Provincetown, Cape Cod; but the species "practically disappeared from the United States coast some time between 1810 and 1850."[36] The disappearance of the species could not be blamed on fishing pressure, as it preceded the introduction of traps, pounds or purse seines.[37] The disappearance was so complete and significant that the Smithsonian "tried in vain for 10 years prior to 1879 to obtain a single specimen."[38] However, species showed up again in the catches of the Georges Bank mackerel fleet in August of 1896 and Block Island Sound that September, before subsequently becoming less common until 1908.[39] The mackerel fleet "found great schools of hardheads on Georges Bank in 1909, when vessels brought in fares of 50,000 to 100,000 of them during the first week of July, their small size…suggesting that there had been a great production of hardheads a year or two previous."[40]

Landings data is difficult to obtain from the East Coast for the mid-1900s, which may be in part due to misreported/nonreported/lost landings, foreign fishing efforts, availability, or a combination of these things. In the 1990s, an IWP (Internal Waters Processing Permits) arrangement operating off NJ and RI with Russian vessels landed chub mackerel, along with Atlantic mackerel, but identification of the separate species in documentation is uncertain.[41] This could pose a problem for accurate landings data by foreign or domestic fleets, particularly considering the foreign fishing activity during the middle of the century. However, in the 1990s, the fishery was considered "ephemeral" and not consistent.[42]

In 2003-4, National Marine Fisheries Service authorized, with Saltonstall Kennedy Program funding, a study on "Development of the 'Chub' Mackerel Fishery, An Underutilized Species"[43]. The purpose, as reported to Congress in the 2004 Saltonstall-Kennedy Grant Program Report, was to "develop a fishery for chub mackerel" in the Atlantic by testing towing configurations and evaluating the availability of the species during the summer season, particularly as an alternative to the illex fishery.[44] Results concluded that an economically viable fishery could probably be developed, which may be an option for freezer/RSW trawl vessels in the Mid Atlantic Bight during poor years of illex fishing, but that to do so would require a

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[35] N. 18, p. 13.
[36] Gulf of Maine Research Institute, "The Mackerels. Family Scombridae: Chub Mackerel", p. 333-334. Available at: http://www.gma.org/fogm/Pneumatophorus_colias.htm.
[37] Ibid.
[38] Ibid.
[39] Ibid. See also Department of Commerce and Labor, "Bulletin of the Bureau of Fisheries", Vol XXXI, 1911. Available at: https://books.google.com/books?id=ZXiu77MinRoC&pg=PA749&lpg=PA749&dq=goode+chub+mackerel&source=bl&ots=fbnVcGw5Mv&sig=vZKsR5oJwkdoFPhAF09NgMmVKBc&hl=en&sa=X&ved=0ahUKEwjzxf6Kg7TLAhVB0h4KHVSSC3EQ6AEIIzAB#v=onepage&q=goode%20chub%20mackerel&f=false.
[40] N. 36.
[41] Peter Moore, Ecosystems and Ocean Planning Advisory Panel Meeting, January 11, 2016 Meeting Summary.
[42] Ibid.
[43] Grant Number NA03NMF4270275, 2003-2004, Rutgers.
[44] U.S. Department of Commerce, NOAA, National Marine Fisheries Service, "The Saltonstall-Kennedy Grant Program: Fisheries Research and Development Report 2004", p. 8.

considerable amount of time and economic investment in learning how to catch the species, nets and electronics.[45] The fishery has been limited on the East Coast due to a mismatch in vessel horsepower and fish swimming speed, as well as underdeveloped markets.[46] In other countries where trawl fisheries for chub mackerel have been successful, the vessels are much larger with greater horsepower, which is prohibited on the East Coast.[47] Vessel characteristics are in themselves a limiting factor, and the speed of chub mackerel gives them a decisive advantage over trawl vessels which are limited in horsepower/towing speed. Therefore, East Coast catch is only a fraction of actual availability. [48] The study also recorded information on catches and discards of non-target species to identify impacts on other commercial, recreational, or environmentally sensitive species, and found that the "chub mackerel fishery appears to have minimal bycatch in comparison to other fisheries."[49]

In conclusion, the chub mackerel fishery is a well-developed fishery worldwide. As such, a significant amount of science exists on chub mackerel, which can be utilized by the Mid Atlantic Council for aiding management decisions, including development of an FMP. The fishery has existed on the East Coast of the US historically for hundreds of years, in a cyclical manner consistent with the life characteristics of the species. In recent years as availability in the Mid Atlantic has been on the upswing, Mid Atlantic vessels were encouraged by NMFS to develop a chub mackerel fishery as an underutilized species fishery. As the 2004 study acknowledged, this would take considerable time, finances and effort. It is inequitable to restrict access now that investment has been made by vessels such as ours. Limiting the fishery to an average catch or incidental limits would also be inconsistent with the life cycle of the species. Flexible management is necessary for extremely cyclical fish, because availability is what determines catch levels. That availability is limited by a number of factors including natural cycles, water temperature, environmental conditions, vessel characteristics, seasonality, and the fact that chub mackerel spend significant time off of the continental shelf. Treating an existing fishery as an ecosystem component species is also inconsistent with the definition/treatment of EC species, which by definition are non-target species not generally retained for sale or commercial use. Seafreeze supports the creation of a chub mackerel FMP, to allow the fishery to continue to operate and develop, with Council management.

Sincerely,
Meghan Lapp
Fisheries Liaison, Seafreeze Ltd.

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[45] N 43, p. 1.
[46] Ibid, p. 2.
[47] For example, most trawl fishing for chub mackerel occurs off of northwest Africa. Vessels fishing off Morrocco and Mauritania, as an example, are up to 393 feet long with high horsepower. See http://www.oceantrawlers.com/production/vessels/. On the US East Coast, vessels are restricted to a maximum 165 feet length, and horsepower can only be increased 20% from the original vessel baseline and length 10% from the original baseline, which limits expansion of capacity, see Omnibus Amendment to Simplify Vessel Baselines at https://www.federalregister.gov/articles/2015/08/26/2015-21143/magnuson-stevens-fishery-conservation-and-management-act-provisions-fisheries-of-the-northeastern .
[48] "We don't even catch a fraction of what's there"(on the sounder). Captain Kyle Goodwin. Personal conversation.
[49] N. 43, p. 3, 5.

NA03NMF4270275

Development of the 'Chub' Mackerel Fishery, An Underutilized Species

6/1/03 - 10/31/04

Funded by

The Saltonstall Kennedy Program

By

Haskin Shellfish Research Laboratory, Rutgers, The State University

Project Summary

Two freezer trawlers from Cape May, New Jersey that can also operate as refrigerated seawater vessels participated in the experimental chub mackerel fishery using Atlantic mackerel nets. Eight paired tows were conducted in depths ranging from 56.7 to 84.5 fa off of southern New Jersey and the Eastern Shore of Virginia in 2003. Average search time before starting a tow was 13.17 hrs. When towing the net, the two boats were 0.11 nm apart and tow time averaged 2.73 hr. Chub mackerel were caught in five of eight tows and averaged 5,589.07 kg per tow. Total catch of chub mackerel was 44,712.7 kg. Mean catch per trip ranged from 88.45 kg for the June trip to 14,837.03 kg for the first August trip. A total of three tows did not catch chub mackerel. *Illex* squid was the dominant bycatch species with 12,505.1 kg caught and averaged 1,563.14 kg per tow. The remaining bycatch species were caught in small quantities. An economically viable fishery can probably be developed. However, vessels must learn how to catch these fish, which requires a considerable amount of time and investment in nets and electronics. The processor can also make a profit on the purchase and sale of chub mackerel and markets are readily available. During years of poor *Illex* fishing, targeting chub mackerel may be a viable option for vessels in the Mid-Atlantic Bight.

Introduction

Scomber japonicus, chub mackerel, occur throughout much of the Pacific Basin. In the Atlantic Ocean, a similar fish has sometimes been termed *Scomber colius*, but is probably a variant of *S. japonicus*. In the Red Sea and Indian Oceans, the ecological equivalent is *Scomber eustralusicus*. For simplicity, we will use the scientific name *S. japonicus* in this report. *S. japonicus* is an important commercial species that produces FAO landings. This fish is present every summer along the shelf edge of the Mid-Atlantic Bight and has been caught as bycatch in the *Illex illecebrosus* fishery for many years. *S. japonicus* is a high volume, low value species, very similar to *Scomber*

scombrus, the Atlantic mackerel that supports the primary mackerel fishery conducted today in the Mid-Atlantic Bight.

Chub mackerel is well studied and is a widely fished scombrid species. Recent investigations include temperature control of spatial distribution (Perrotta et al, 2001), swimming speeds (Sepulveda and Dickson 2000; Gluyas-Millan and Quinonez-Velazquez, 1997), development of midwater gear (Dotson and Griffith, 1996), and feeding and prey preference (Molina et. al., 1993). Most of the scientific effort has occurred in the Pacific Basin.

The main resources being fished and markets present in today's chub mackerel fishery are 1) The U.S. West Coast fishery supplies markets primarily in the Philippines and Far East; 2) South American fisheries occur on both coasts and supply markets in Brazil, the Far East, West Africa, and Russia; 3) Japanese and Korean fisheries provide fish for local consumption and other Far Eastern markets; and 4) Fisheries off of Morocco and Mauritania supply West Africa, Europe, the Baltic States, and Russia. These fish are sold for canning as either whole round or headed and gutted and for fresh consumption by smoking or grilling.

As indicated previously this fish is taken throughout most of the world's oceans, including the south Atlantic, with the exception of waters off the East Coast of the U.S. Discarding in the *Illex* fishery bears evidence of the presence of this fish in our waters. Nevertheless, whether the fish is sufficiently abundant to sustain a new fishery is unknown. However, persistent reports from fishermen in the *Illex* fishery suggest that an opportunity exists. Large freezer trawlers from the Port of Cape May, New Jersey have reported observing large concentrations of these fish periodically during the summer season when harvesting *Illex* squid. Occasionally, the largest boats have caught significant quantities that were normally discarded. These catch reports have come from the region from Wilmington to Norfolk Canyons in 60-100 fathoms between June 1 and September 30. The anecdotal evidence indicates that a directed effort towards these fish might meet with some success.

The reason there is not yet a directed summer chub mackerel fishery in the Mid-Atlantic Bight is because the fishing vessels target *Illex illecebrosus* at this time, under-developed markets, and a mismatch in vessel horsepower and fish swimming speed. *Illex* squid is a high volume, low value fish whose availability to the fishery varies from year to year and market conditions also fluctuate. Mid-Atlantic freezer trawlers and RSW (refrigerated seawater) vessels target *Illex* squid in the summer and need an alternative fishery to target when the *Illex* squid are not available. A chub mackerel fishery could be the alternative fishery. Chub mackerel is a relatively fast swimming fish (e.g. Sepulveda and Dickson, 2000). Vessels fishing for this species typically tow mid-water trawls at 4-5 knots (Dotson and Griffith, 1996). This requires vessels of considerable horsepower to tow nets large enough to economically capture this low-value fish. Vessels available on the East Coast for this fishery due not have the horsepower necessary to consistently capture these fish. Towing speeds for vessels in the *Illex* squid fishery, for example, average about 3 knots (Powell et. al., 2003[a]). Therefore, development of a chub mackerel fishery requires a new approach using presently available vessels to achieve towing speeds necessary for efficient capture of *S. japonicus*.

Objectives of this study were to:

1. Test a pair trawl configuration to improve catchability;

2. Evaluate the availability of chub mackerel during the summer season; and
3. Record information on catches and discards of non-target species to identify unwanted impacts on other commercially, recreationally, or environmentally sensitive species.

Methodology

We proposed conducting three 5-day experimental fishing trips using two trawlers capable of running as freezer or RSW trawlers from the Port of Cape May, New Jersey. The East Coast Atlantic mackerel *(Scomber scombrus)* fishery uses several different nets that could be used to capture chub mackerel such as the Dan Trawl which is sometimes called a Clupea mid-water or pelagic trawl net that was used by Boat 1 in our study and the Swan pelagic trawl or Swan net that was used by Boat 2 in our study. Net configurations for both boats are presented in Table 1. Lengths and tonnage for these boats were 145 ft and 199 ton for Boat 1 and 126 ft and 190 ton for Boat 2 (Table 2).

Tow speed must be increased to catch S. *japonicus*. However, the current boats do not have sufficient horsepower to accomplish this. Therefore, two vessels were used to tow the net at the required speed and this technique is called pair trawling. This project tested the feasibility of using pair trawling to catch chub mackerel at a tow speed of about 5 knots.

The purpose of this project was to develop an alternative summer fishery to the *Illex* squid fishery. The origin of this initiative was four years of very low *Illex* catches that had considerably impacted squid fishermen and the lack of an alternative during the summer season. In 2003, the *Illex* fishery was again limited and the two vessels participating in this project carried out one trip in June and two 5-day cruises in August conducting experimental chub mackerel tows. At season's end, we had a few days left and, after some consideration, decided to request a one-year extension to evaluate the potential of this fishery in a second year.

In 2004, the *Illex* fishery was arguably the best in history. For only the second time, the quota was caught. As a consequence, vessel time was not available for this project. To put this in perspective, our budget permitted the payment of two vessels fishing simultaneously at a day rate of $3,000, a total outlay of $6,000 per day. In 2004, on an average trip, vessels participating in our program grossed $22,000 (Boat 1 over 1.5 days) and $32,000 (Boat 2 per day). Obviously, our project could not compete and the limited earnings of the last four years prevented us from arguing that either vessel should take a $19,000-$29,000 per day loss in order to carry out the remainder of the chub mackerel project. As a consequence, we did not go to sea in 2004.

The following protocol was used to set, tow, and haul the net. One vessel shot the net part of the way out and tied the four wing ends on the stern. The towing bridles were then coiled on deck along with the drum rope. A heaving line was attached to the drum rope and the paired vessel came alongside to receive the heaving line. After receiving the heaving line, the second vessel then pulled the drum rope, towing bridles, and two wing ends alongside and attached the net to its towing wires. The net was then fully released. Net sounder electronics were utilized to station the net in the water column at the desired depth. Sonar and sounding electronics were utilized to locate and capture the fish (Table 2). During hauling, the operation was reversed to enable one vessel to haul the net. The contents of the cod end were either pumped on board or lifted aboard.

The vessels would freeze fish on board if catches were moderate, as might be anticipated from test tows that occur when the trawler is searching. The vessels would switch to RSW mode if catch rate exceeded freezing capacity.

Scientists were placed on each vessel during every trip and used standard NMFS (National Marine Fisheries Service) observer protocols to collect data on catch and discard weights for each species. Motion-compensated scales were used to obtain the weights. A maximum of 100 individual length measurements to the nearest cm and 100 weight measurements to nearest one thousandth of a g were made on the target fish and selected recreationally and commercially important bycatch species.

A data logger was used to provide a 1-min time series of vessel position and time. The data log was annotated with information on ship activity, including towing, setting, hauling, searching, processing, and etc. Economic data were also collected from the vessels and the processor to determine the economic feasibility of developing a chub mackerel fishery.

Results

Fishing Characteristics

Three chub mackerel trips consisting of eight total tows were observed in the summer of 2003. The first trip was in June and the second and third trips occurred in August (Table 3a). Figure 1 shows the cruise track for the first trip in June and third trip in August and the location of the chub mackerel tows taken off of southern New Jersey and the Eastern Shore of Virginia. Tows occurred in areas of high *Illex* squid abundance as indicated by NMFS observer data (Figure 1). Average search time before starting a tow was 13.17 hrs. Time per trip spent steaming back to port after the last tow was 4.83 hr. When towing the net, the two boats were 0.11 nm apart, fished in depths ranging from 56.7 to 84.5 fa with an average depth of 66.29 fa. Tow times averaged 2.73 hr (Tables 3a and 3b).

Catch and Effort

Chub mackerel were caught in five of eight tows and averaged 5,589.07 kg per tow (Table 4). Total catch of chub mackerel was 44,712.7 kg and ranged from 88.45 kg for the June trip to 14,837.03 kg for the first August trip. No chub mackerel were caught in three tows with one of the tows occurring on June 25 and the remaining tows occurring on August 20 and 21. When chub mackerel were caught in large enough quantities, the vessel kept the fish as in tows 1-3 occurring on August 12 and 13.

Mean individual chub mackerel weight per tow ranged from 290.35 to 346.14 g per tow (Table 5). The overall length frequency distribution and length frequency distribution per trip are presented in Figure 2. For the overall length frequency distribution, the 28-30 cm sizes dominated the catch. Lengths ranged from 26 to 36 cm (Figure 2).

The length-weight relationship for chub mackerel measured from all tows is presented in Figure 3. The r^2 value is 0.74.

Bycatch

Illex squid was the dominant bycatch species (Tables 4 and 6) with 12,505.1 kg caught and averaged 1,563.14 kg per tow. The majority of *Illex* squid were kept and only

discarded on tows with minimal catches. *Illex* squid catches ranged from 105.3 kg to 6,803.9 kg (Table 4). The length frequency distribution for *Illex* squid catch is presented in Figure 4. Fourteen, 16, and 17 cm lengths dominated the catch. Length ranged from 10 to 23 cm (Figure 4).

Other minor bycatch species were *Loligo* squid and Atlantic mackerel. Deepbody boarfish, buckler dory, monkfish, and butterfish were caught in minimal amounts (Table 6). The remaining bycatch species were caught in very small quantities. The chub mackerel fishery appears to have minimal bycatch in comparison to other fisheries.

Economics

Table 7 presents the costs involved in catching, processing, and selling chub mackerel. Prior to fishing, each vessel must purchase a net that costs $45,000 to $60,000 and a sonar package that costs $125,000/unit. Each vessel incurs a fuel cost and burns from 1,000 to 1,400 gallons/day. The vessels must catch from 300-500 MT per trip to be profitable. The processor purchases the fish from the vessels for $0.05 per pound. The cost to process the fish is $0.13/lb and to ship is $0.055/lb. Fish can be sold for on average $0.25/lb. The processor can sell any size chub mackerel. For the processor to make a profit, their factory needs similar volumes as the vessels in order to target bulk markets.

Markets can be developed for human consumption, hook bait, and tuna feed. The countries that will purchase chub mackerel are West Africa, Egypt, Romania, Bulgaria, Spain, and Haiti. Volume that can be sold is about 25,000-35,000 MT per year.

Conclusions

Overall, chub mackerel can be captured by pair trawling with an Atlantic mackerel net in the Mid-Atlantic Bight and probably in large enough quantities to be profitable to the vessel. However, vessels must learn how to catch these fish, which requires a considerable amount of time, to make a profit and invest in nets and electronics. The processor can also make a profit on the purchase and sale of chub mackerel and markets are readily available. In addition, bycatch appears to be low, based upon the few experimental tows observed. Therefore, the chub mackerel fishery may be a viable option for fishermen when *Illex* squid are not available in the Mid-Atlantic Bight.

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Figure 1. Chub mackerel cruise tracks, chub mackerel tows (green X) and areas of high *Illex* squid catch from the NMFS Observer database. The blue line is the cruise track for the first trip (June 23-27, 2003) and the red line is the cruise track for the third trip (August 19-23, 2003). Cruise track for the second trip is unavailable. The yellow symbols represent the location and abundance of *Illex* squid catch from the NMFS observer database for June, July, and August. The largest symbol represents abundance ≥1,000 kg/tow, the next smaller symbol represents abundance between 100-999 kg/tow, the next smaller symbol represents abundance between 10-99 kg/tow, and the smallest symbol represents abundance between 0-9 kg/tow.

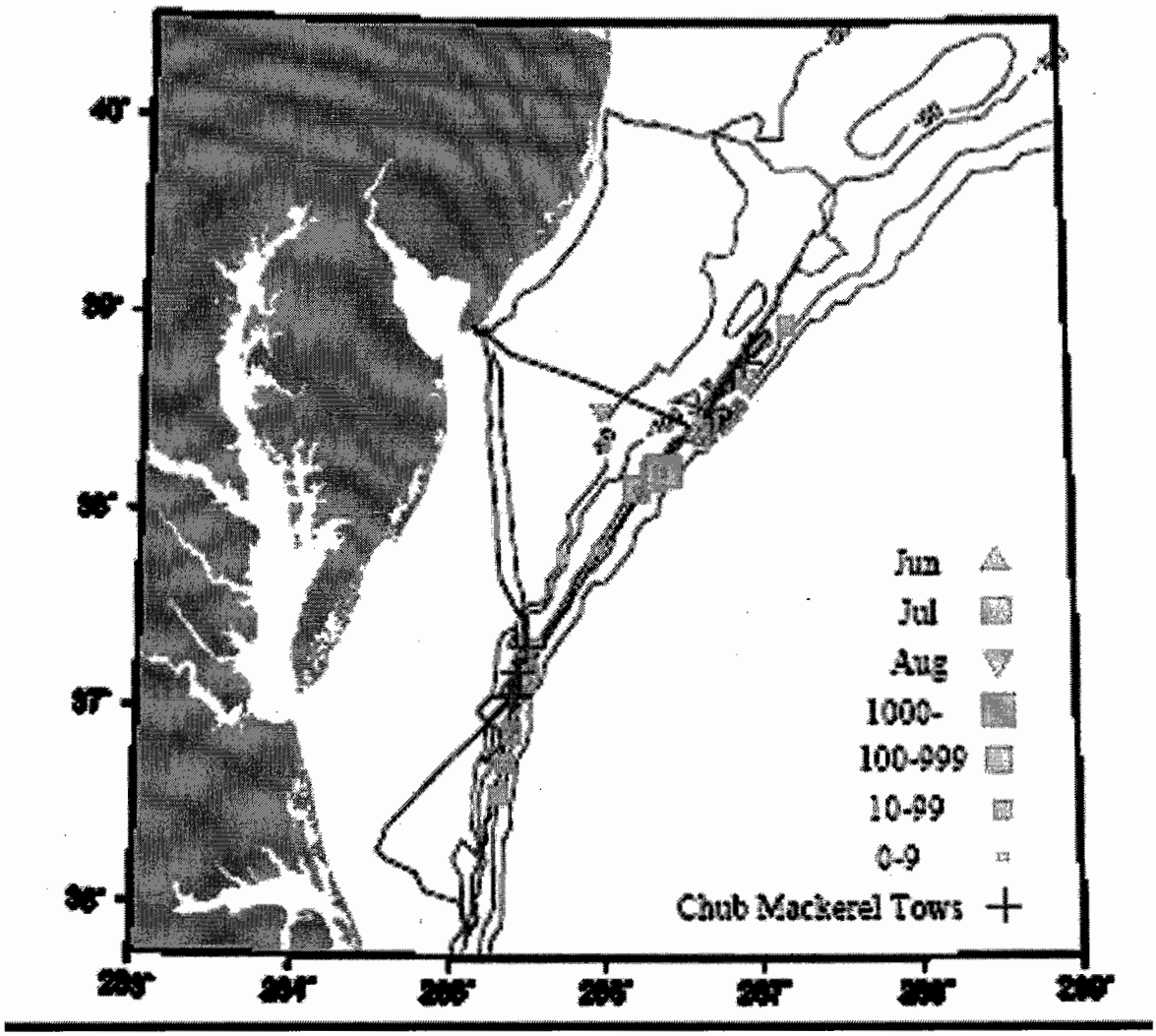
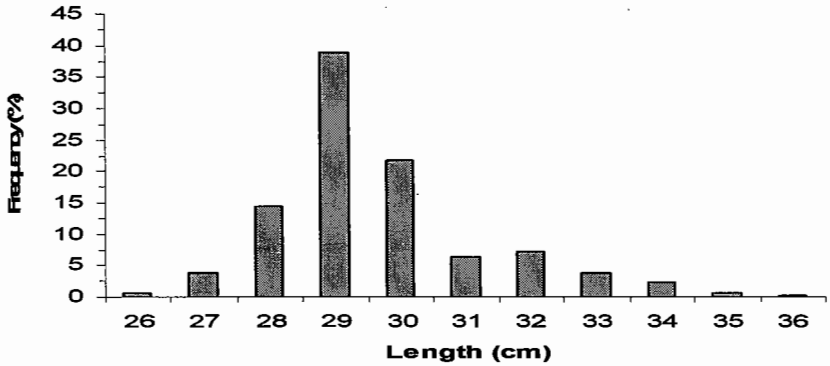
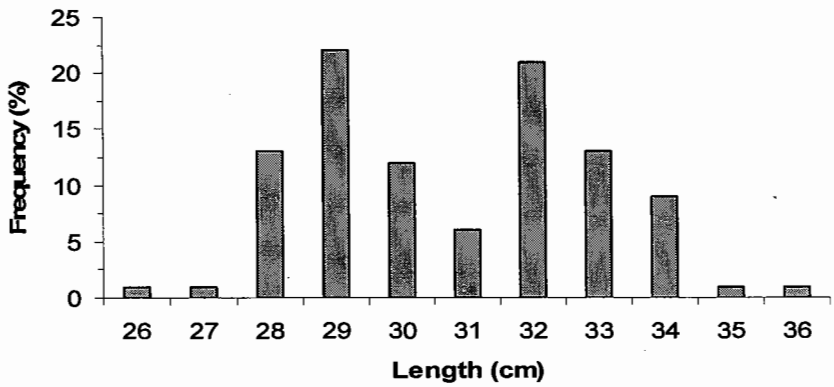


Figure 2. Length frequency distribution of chub mackerel for all trips combined and by trip.

Length frequency distribution of chub mackerel for all trips combined



Length frequency distribution of chub mackerel from the first trip (June 24 Tow 1)



Length frequency distribution of chub mackerel from the second trip (August 12 Tow 1 and August 13 Tows 2 and 3)

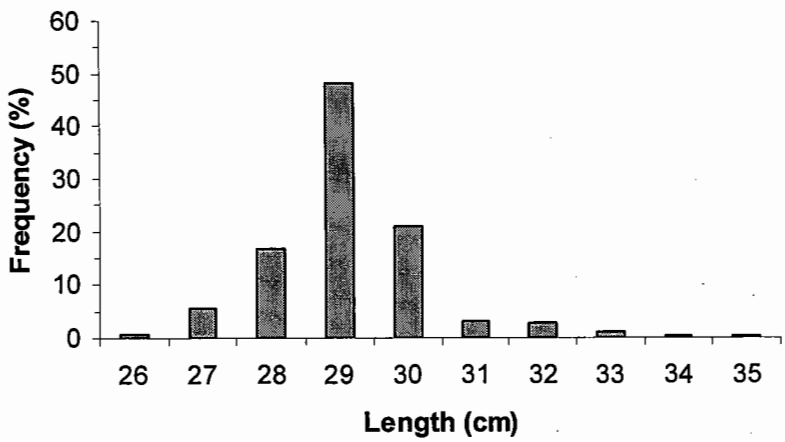


Figure 2. Continued.

Length frequency distribution of chub mackerel from the third trip (August 22 Tow 3)

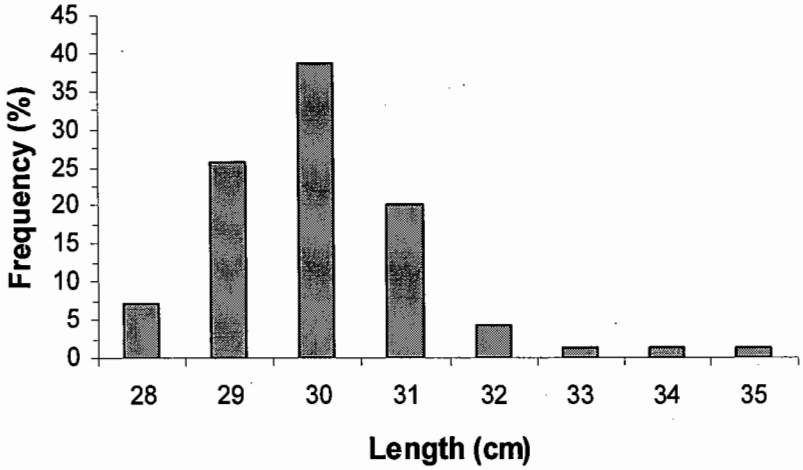


Figure 3. Length-Weight relationship for chub mackerel measured from all tows.

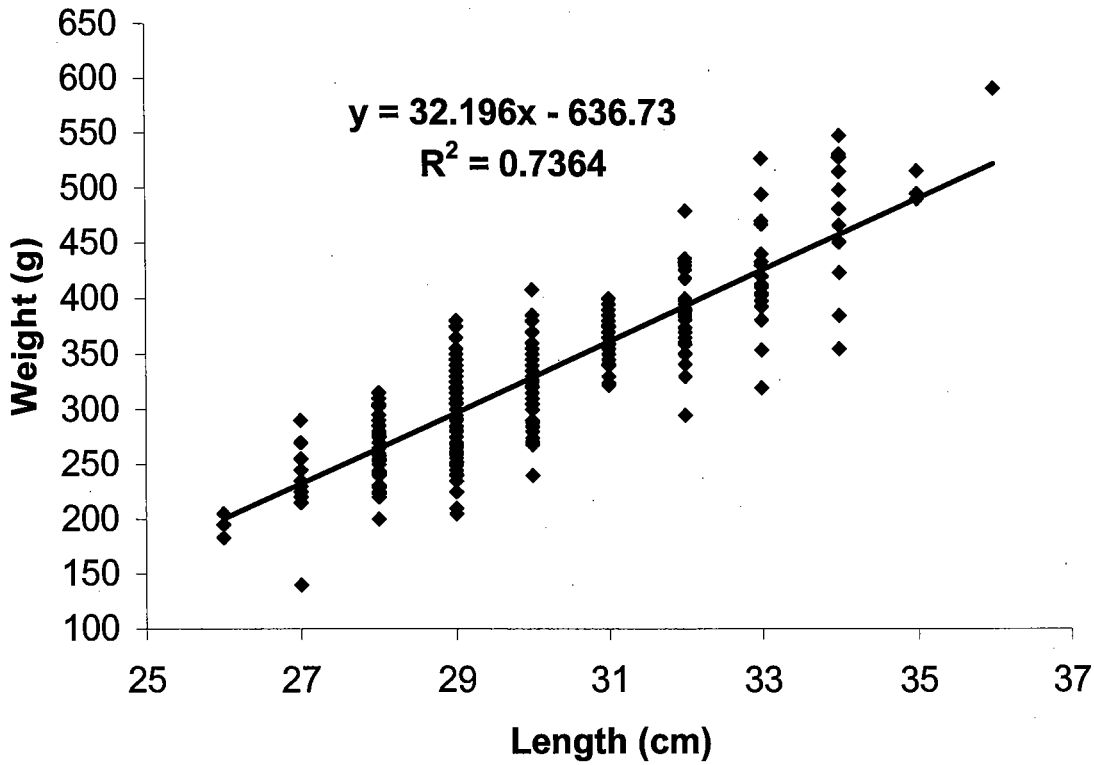


Figure 4. Length frequency distribution of *Illex* squid catch for all tows combined.

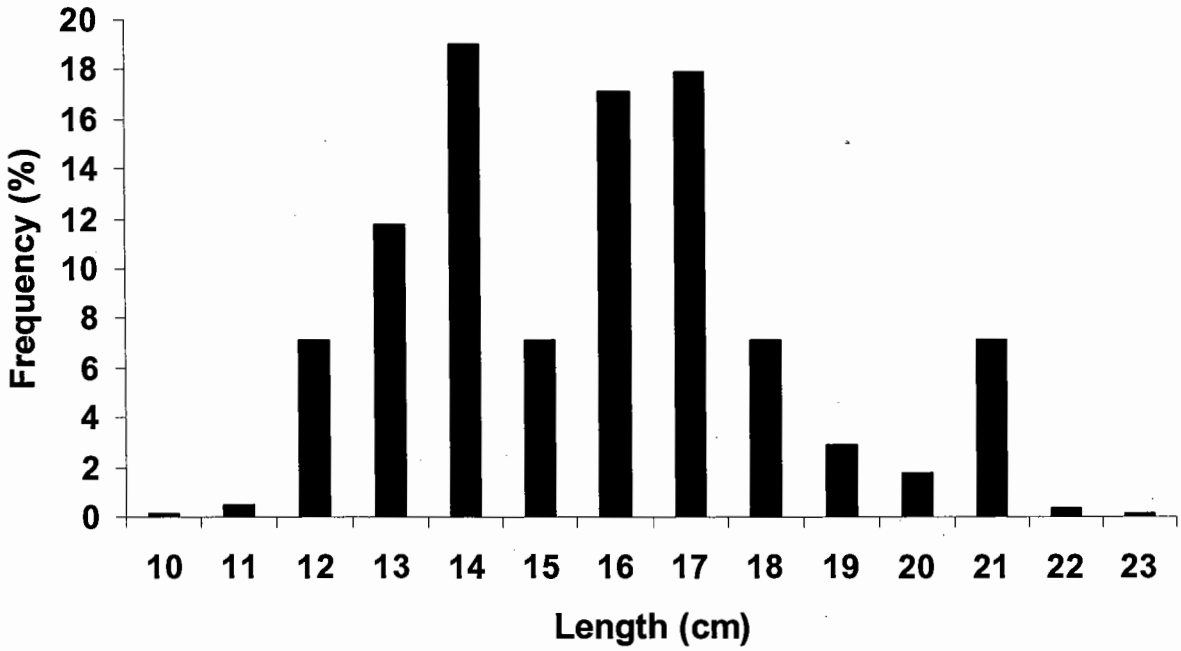


Table 1. Net characteristics for the two boats.

Vessel	Net Style	Net Builder	Construction	Headrope	Footrope	Bridles	Fishing Circle	Codend	Sweep	Opening Height
Boat 1	Clupea pelagic trawl	Dan-trawl	Rope/large mesh net, 4-seam unequal panels, net body is nylon and polypropylene with 40 foot mesh, 3,500 pounds of weight per side	420 ft	420 ft	2 bridles per side, top bridle 20 fm, bottom bridle 20 fm	38 meshes of 40 foot mesh	Double twine, diamond hung, 1.5 inch mesh, nylon, a strengthener, no liner, no chaffing gear	500 ft	25-30 fa
Boat 2	Swan Pelagic trawl	Swan Net	Rope/large mesh net, 4-seam unequal panels, net body is nylon with 129 inch mesh, 3,500 pounds of weight per side	440 ft	460 ft	Bridles/warp 20 fa	126 meshes of 10 foot mesh	double twine, diamond hung, 3 inch mesh, polyethylene, a strengthener, no liner, no chaffing gear		

Table 2. Fishing vessel and gear characteristics.

Boat	Length	Tonnage	Gear Mounted Electronics	Miscellaneous
Boat 1	145 ft	199 tons	2 catch indicators and depth sensors, 1 transducer located on headrope and codend	Top/bottom panels open ~50%, side panels open ~30%
Boat 2	126 ft	190 tons	Two transducers, wired and wireless located on headrope and codend	

Table 3a. Number of trips, date sailed and landed, total number of hauls, beginning position fished, depth fished, hours fished, and hours searching for fish during pair trawling for chub mackerel in 2003.

Trip No.	Date Sailed	Date Landed	Total No. Hauls	Haul No.	Begin Lat. (dd mm sss)	Begin Long (dd mm sss)	Depth Fished (fa)	Hours Fished	Hours Searched
1	6/23/03	6/27/03	2	1	37 04.304	74 37.687	84.5	1:57	11:40
1	6/23/03	6/27/03	2	2	38 46.864	73 05.864	57.2	2:55	10:50
2	8/11/03	8/14/03	3	1	37 11.681	74 33.596	67.0	3:46	10:30
2	8/11/03	8/14/03	3	2	37 04.816	74 35.530	60.0	3:42	0:15
2	8/11/03	8/14/03	3	3	37 06.056	74 34.831	70.0	2:30	17:45
3	8/20/03	8/23/03	3	1	37 20.158	74 30.626	63.3	1:47	11:00
3	8/20/03	8/23/03	3	2	37 11.596	74 34.290	56.7	1:03	23:44
3	8/20/03	8/23/03	3	3	38 32.204	73 18.180	71.6	4:11	19:36

Table 3b. Average per tow for vessel search time before a tow, time fished, and water depth fished and average per trip for unspecified search time. Unspecified search time is the time spent steaming back to port when no subsequent tow was made.

	Search Time Before Tow (hr)	Tow Time (hr)	Unspecified Search Time (hr)	Water Depth (fa)
Mean/tow	13.17	2.73		66.29
Mean/trip			4.83	

Table 4. Catch (kg) of chub mackerel and *Illex* squid by date of tow and the disposition of the catch in 2003. –Disposition of catch unknown.

Haul Date and Tow number	Chub mackerel catch	Disposition of chub mackerel catch	*Illex* squid catch (kg)	Disposition of *Illex* squid Catch
June 24 Tow 1	176.9	Discarded*	339.4	Discarded*
June 25 Tow 2	0		473.5	Unknown
Mean catch/trip	88.45		406.45	
August 12 Tow 1	25,310.5	Kept	2,812.3	Kept
August 13 Tow 2	12,396.7	Kept	1,188.0	Kept
August 13 Tow 3	6,803.9	Kept	6,803.9	Kept
Mean catch/trip	14,837.03		3,601.40	
August 20 Tow 1	0		302.4	Kept
August 21 Tow 2	0		480.4	--
August 22 Tow 3	24.7	--	105.3	--
Mean catch/trip	8.23		296.03	
Total catch	44,712.7		12,505.2	
Mean catch/tow	5,589.07		1,563.14	

*Discarded because of small quantity caught, but fish were of marketable size.

Table 5. Average weight (g) of individual chub mackerel and *Illex* squid per tow by the boat that set the gear, tow date, and tow number. Standard deviation in parentheses. NA=not applicable. Overall average chub mackerel weight (g) = 317.16(61.851) Overall average *Illex* squid weight (g) = 78.79(27.398)

Boat Set Gear	Trip and Tow Date	Tow Number	Chub mackerel mean individual weight/tow	Number of individuals weighed	*Illex* squid mean individual weight/tow	Number of individuals weighed
Boat 2	1st Trip 6/24/03	1	346.14(89.956)	100	95.33(16.906)	100
Boat 2	1st Trip 6/25/03	2	NA	0	NA	0
Boat 2	2nd Trip 8/12/03	1	290.35(50.698)	100	104.71(34.987)	100
Boat 1	2nd Trip 8/13/03	2	312.72(31.633)	81	72.33(18.050)	100
Boat 2	2nd Trip 8/13/03	3	304.15(35.683)	100	89.64(20.495)	100
Boat 1	3rd Trip 8/20/03	1	None caught		58.29(15.375)	100
Boat 2	3rd Trip 8/21/03	2	None caught		62.09(13.462)	100
Boat 2	3rd Trip 8/22/03	3	343.71(49.928)	70	69.08(26.481)	100

Table 6. Total catch and mean catch/tow for each bycatch species captured during chub mackerel fishing. A total of 8 tows were observed. Only *Illex illecebrosus* data were recorded in 8 tows. The remaining bycatch species data are from 6 tows.

Bycatch	Species Name	Total Catch (kg)	Mean catch per tow (kg)
Illex squid	*Illex illecebrosus*	12,505.1	1,563.14
Loligo squid	*Loligo pealei*	159.1	26.51
Atlantic mackerel	*Scomber scombrus*	123.4	20.57
Deepbody boarfish	*Antigonia capros*	30.9	5.16
Buckler dory	*Zenopsis conchifera*	15.5****	1.93****
Monkfish	*Lophius americanus*	3.9	0.49
Butterfish	*Peprillus triacanthus*	2.1	0.26
Spotted hake	*Urophycis regia*	0.5	0.06
Four-spot flounder	*Paralichthys oblongus*	0.4	0.06
Spiny dogfish	*Squalus acanthias*	0.1****	0.01****
Silver hake	*Merlucius bilinearus*	0.3	0.04
Ocean sunfish	*Mola mola*	4 fish*	
Thresher shark	*Alopias* sp.	2 fish*	
Unknown shark	Squaliformes	5.8	0.96
Unknown dogfish	*Mustelus, Squalus* sp.	2 fish*	
Beardfish	*Polymixia lowei*	0.05	0.06
Rough scad	*Trachurus lathami*	0.05	0.005
Redtail scad	*Decapterus tabl*	0.1	0.01
Yellowfin tuna	*Thunnus albacares*	1 fish*	
Rock crab	*Cancer irrortus*	***	

*No weight data just number of fish captured for that species.
**No bycatch data for tow number 2 on August 13, 2003.
***No number given or weight listed.
****Observed in one additional tow, but no weight or number of fish given.

Table 7. Cost to the vessel to harvest chub mackerel and processor costs.

Vessel Costs		Processor Costs	
Fuel Consumption[1]	1,000-1,400 gal/day	Purchase fish	$0.05/lb
Purchase a net[2]	$45,000-60,000/net	Process fish	$0.13/lb
Sonar[3]	$125,000/unit	Ship fish	$0.055/lb
Crew wages	Percentage of catch	Avg. Sale Price[4]	$0.25/lb

[1]For each vessel
[2]Need 2-3 nets.
[3]One for each vessel
[4]Based on cost/freight/profit