Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201, Dover, DE 19901-3910
Phone: 302-674-2331 | FAX: 302-674-5399 | www.mafmc.org
Richard B. Robins, Jr., Chairman | Lee G. Anderson, Vice Chairman
Christopher M. Moore, Ph.D., Executive Director

MEMORANDUM

Date: January 29, 2015

To: Council

From: Kiley Dancy, Staff

Subject: February Council Meeting Deep Sea Corals Amendment Discussion

The Council is scheduled to review public hearing comments and select preferred alternatives for the deep sea corals amendment on Wednesday, February 11 from 1:00-5:00 p.m. The following materials are enclosed for the Council's consideration:

1. Fishery Management Action Team (FMAT) January 20th call summary, with comments and recommendations on the amendment.
2. Compiled public hearing and written comments collected during the public comment period.
3. Final revised Public Information Document (PID) containing the range of alternatives and supporting analyses.

MAFMC Deep Sea Corals Fishery Management Action Team (FMAT)
1/20/15 Call Summary

FMAT Attendees: Kiley Dancy (MAFMC), Katie Richardson (NMFS GARFO), Carly Bari (NMFS GARFO), David Stevenson (NMFS GARFO), David Packer (NMFS NEFSC), Drew Kitts (NMFS NEFSC)

Additional Participants: Jason Didden (MAFMC), Martha Nizinski (NMFS National Systematics Lab), Fan Tsao (NOAA DSCRTP), Michelle Bachman (NEFMC)

The FMAT met via webinar at 1:30 p.m. on Tuesday, January 20, 2015 to discuss recommendations for the MAFMC's Deep Sea Corals Amendment. The following summarizes FMAT guidance and recommendations for the Council's selection of preferred alternatives, as well as additional comments and clarifications regarding some questions and concerns that the FMAT has received during the public hearing process.

Broad coral zone designation

Regarding the alternatives in the document for broad coral zone designation, the FMAT noted the following for the Council to consider:

- The additional coral protections gained by moving from a deeper broad zone (400 or 500 meters) to a shallower broad zone (200 or 300 meters) may not be enough to justify the increased negative economic impacts to the affected fisheries given that the 400m and 500m broad zones would cover 97% and 93% respectively of high/very high coral likelihood areas. If the Council's intention is to "freeze the footprint" of current fishing effort in the broad zones, it appears that besides red crab fishing, most fishing effort drops off by 400 meters. For coral impacts in broad zones, see Table 21 in the Public Information Document (PID), as well as description of the coverage of suitable habitat for each proposed broad zone on page 68. For economic impacts in broad zones, see section 7.3 of the PID.
- The FMAT discussed the depth profiles of recent research expeditions and noted that there were few recent dives conducted at depths less than 500 meters. However, there are a few exceptions. For example, in Wilmington Canyon, high coral abundance and diversity was observed at depths of approximately 300 meters. This indicates that discrete zones would be particularly important in some areas if the Council chose a deeper broad zone alternative and also wished to provide increased protection in canyon areas with high coral abundance. In general, the FMAT felt there was not enough recent information to draw additional conclusions about the protection value for corals at shallower depths.
- In response to public hearing comments regarding broad zone depth contours not having been finalized (since they need to be translated into enforceable points and lines on a map), the FMAT agreed that the Council and public should have an understanding of how the depth contours will be approximated. The FMAT decided that Council staff would create a boundary (or methodology for creating a boundary) to approximate the various depth contours, and that the FMAT would review that product via email. The FMAT also suggested that Council members and advisors could provide input on specific areas along the shelf break where it is more critical that the lines be better defined (i.e., more complex).

Broad coral zone management measures

- In terms of management measures within a potential broad zone, the FMAT noted that restricting <u>all</u> bottom tending-gear is more proactive and more in line with the purpose and need of the amendment as well as the "freeze the footprint" approach. Given that gear types beyond trawling can have an impact on corals, the FMAT recommended that the "freeze the footprint" approach include all bottom tending gear types, with exceptions as discussed below.
- For exemption sub-alternatives (applicable only if "prohibit <u>all</u> bottom-tending gear," alternative 2B, is selected), the FMAT recommended the following:

- If the Council selects a 400 or 500 meter broad zone as a preferred alternative, there does not appear to be a strong case for exempting the golden tilefish bottom longline fishery according to the fishery effort information analyzed in the PID. If a shallower broad zone (200 or 300 meters) is chosen, there would be some justification for exempting the golden tilefish fishery under the "freeze the footprint" principle. The FMAT also noted the relatively small amount of tilefish longlining activity that appears to be occurring beyond 300 meters (see Figure 33; Tables 34 and 43 in PID).
- For all potential broad zones, the FMAT agreed that an exemption for the red crab trap fishery is justified. Almost all fishing activity for red crab occurs deeper than 550 meters, and thus would be severely impacted by any of the proposed broad zones. The red crab fishery is a limited access fishery consisting of only four vessels.

- The FMAT supports requiring VMS for all vessels fishing within broad zones, in order to enforce any restrictions.

Discrete coral zone designations

- The FMAT noted that the map for Wilmington Canyon and North Heyes-South Wilmington Canyons was inadvertently left out of the PID. It is provided here in Figure 1.
- The FMAT noted that if the Council designates a broad coral zone, this would simplify prioritization of discrete zones, given that significant portions of the proposed discrete zone areas would be covered by a broad zone. If a broad zone is designated, the FMAT recommends that the Council prioritize the five canyons that significantly incise the shelf/slope break and extend into shallower water on the shelf, and consider them separately from the other 14 discrete zones that are in deeper water on the continental slope. These areas include Wilmington, Norfolk, Baltimore, Hudson, and Washington Canyons.
- In the absence of a broad zone, prioritization of discrete zones is more difficult. However, the FMAT agreed that the previously mentioned five canyons that incise the shelf still stand out as being higher priorities for coral protection. The number of coral observations (recent and historic) in these canyons is generally higher (with the exception of Hudson Canyon), as is the total amount of suitable habitat. There are a good number of recent observations of corals in Wilmington, Norfolk, Baltimore, and Washington Canyons. The FMAT indicated a preference for prioritizing canyons with high total area of high/very high habitat suitability, and thus considered the Mey-Lindenkohl and Warr-Phoenix slope areas to be additional priority candidates for discrete zone protection in the absence of a broad zone alternative.
- The FMAT considered the question of how much area of high habitat suitability falls <u>within</u> the discrete broad zones but <u>outside</u> of the proposed broad zones, given that the broad zone areas overlap much of the proposed discrete zone areas. The FMAT felt it was important to take a closer look at the locations and extent of discrete areas and suitable coral habitat falling outside broad zones to better inform the Council in choosing broad and discrete alternatives. Tables 1 and 2 provide the total area and area of high habitat suitability for each discrete zone extending beyond each of the proposed broad zones, and these areas are also mapped in Figures 2-9.

Discrete zone management measures

The FMAT did not come to an agreement on a recommendation for gear restrictions to be applied within discrete zones. Because these areas are not proposed under the "freeze the footprint" objective and are associated with more fishing effort in the heads of the canyons, the FMAT indicated that this decision should be based on the Council's priorities for balancing tradeoffs. Additionally, different canyon areas have more or less importance for different gear types and fisheries, which the Council could consider when specifying management measures.

Framework provisions

The FMAT supports the proposed framework alternatives in the document (alternatives 5B through 5E). These alternatives would simplify any future modifications to deep sea coral measures.

Vessel Monitoring Systems requirement for *Illex* squid vessels

The FMAT supports the proposed requirement for *Illex* squid moratorium vessels to use VMS.

Additional Comments

Questions and concerns have been raised about the following issues during the public hearing process, as well as through inquiries directed to the FMAT:

- Questions regarding the inputs and outputs associated with the habitat suitability model produced by NOAA's Northeast Fisheries Science Center (NEFSC) and the National Ocean Service's National Centers for Coastal and Ocean Science (NOS/NCCOS)[1]
- Questions about the validity and accuracy of the historical deep sea coral database maintained by NOAA's Deep Sea Coral Research and Technology Program (DSCRTP)
- Provisions for "haulback zones" for squid trawlers in key areas where gear is deployed and retrieved
- Transit provisions for any potential deep sea coral zones

The following section provides some additional background information, clarifying comments, or suggestions regarding these issues.

Habitat Suitability Model

The deep sea corals habitat suitability model is a MaxEnt model.[2] This approach takes known deep sea coral locations (from the DSCRTP historical database), and combines this data with environmental predictor inputs such as depth, slope, temperature, substrate type, and many more variables to generate predictive models of deep sea coral distribution. The model developers selected this type of model because of its usefulness for data sets that are presence-only. The project description and links to the full digital data package can be found at: http://coastalscience.noaa.gov/projects/detail?key=35.

The FMAT notes that the model has performed well in initial groudtruthing, and represents the best relevant scientific information available to the Council at this time since it incorporates established factors supporting coral presence. Historical coral records, including from observer data, are limited, and much of the region has not been explored for the presence of deep sea corals. Where coral presence is suspected but not confirmed, the best tool for determining where corals are likely to be located is a predictive model. The project page for the model states that: "The distribution of deep-sea coral is poorly understood because of the logistical difficulty and expense of surveying the deep ocean. Predictive modeling of deep-sea coral habitats is essential for supporting conservation planning and for targeting areas for future mapping and exploration. Modeling can also lead to insights into the environmental factors driving the distribution of deep-sea corals, helping to build our knowledge base of how these unique ecosystems function."

The habitat suitability model has been internally reviewed by NCCOS and NEFSC to meet technical standards for data quality, and detailed metadata have been produced and made publicly available as part of the full data package (see link above). The model output package was subsequently provided to the NOAA Coastal Services Center/Bureau of Ocean Energy Management's Multipurpose Marine Cadastre, where it underwent another review

[1] Kinlan BP, Poti M, Drohan A, Packer DB, Nizinski M, Dorfman D, Caldow C. 2013. Digital data: Predictive models of deep-sea coral habitat suitability in the U.S. Northeast Atlantic and Mid-Atlantic regions. Downloadable digital data package. Department of Commerce (DOC), National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), National Centers for Coastal Ocean Science (NCCOS), Center for Coastal Monitoring and Assessment (CCMA), Biogeography Branch. Released August 2013. Available at: <http://coastalscience.noaa.gov/projects/detail?key=35>. Funding for this research was provided by the National Marine Fisheries Service - Northeast Fisheries Science Center, the NOAA Deep Sea Coral Research and Technology Program, and the National Ocean Service - National Centers for Coastal Ocean Science.

[2] http://www.cs.princeton.edu/~schapire/maxent/

process with internal and external reviewers. The model description and results are being prepared for submission to a journal in the near future.[3]

Preliminary data indicate that the habitat suitability model has performed extremely well when field-tested during recent research expeditions. That is, a subset of locations that the model has predicted as highly likely to contain suitable deep sea coral habitat has been explored using towed cameras and Remotely Operated Vehicles, and most of these tested sites were found to contain deep sea corals and/or suitable habitat. This process, referred to as "groundtruthing," was conducted on recent expeditions on both the *Bigelow* and on the *Okeanos Explorer*. Groundtruthing results are incomplete and have not been peer reviewed; however, preliminary results indicate strong model performance in predicting areas with high habitat suitability for deep sea corals. Some research dives have also tested areas where the model predicted low habitat suitability, and found few or no corals. A technical memo and/or peer-reviewed journal article on these groundtruthing efforts is expected in 2016.

As new information becomes available from recent deep sea research expeditions, the predictive habitat suitability model will be improved by incorporating this information over the next few years. There are also plans to improve the spatial resolution of the model (from the current 370 meter grid cell size to 25 meters). The Council may choose to consider new information as it becomes available and potentially modify any designated measures for deep sea corals.

Deep sea coral historical database

There are two main types of deep-sea coral data for the northeast and mid-Atlantic regions: geo-referenced presence records and non-geo-referenced presence records (i.e., "observations"). There is also a small amount of deep-sea coral density or abundance data, but it is too problematic to be useful. Coral geo-referenced presence data from Maine to Cape Hatteras was derived from the Cold-water Coral Geographic Database (CoWCoG)[4] developed by the USGS with support from NOAA's DSCRTP. The geodatabase consolidates the known locations of deep-sea corals from this area, with records from the late 1800s to the present coming from previous peer-reviewed databases,[5,6] museum archives, field surveys, deep-sea coral data mining projects, and historical and recent literature. As an example: the Watling et al. (2003) database obtained records of alcyonacean coral occurrences from a variety of sources, including Verrill, Deichmann,[7] Hecker and collaborators,[8,9,10] Yale Peabody museum collections, the NEFSC benthic database of identified coral taxa,[11] and observations from recent National Undersea

[3] Kinlan, B.P., M. Poti, A.F. Drohan, D.B. Packer, D.S. Dorfman, and M.S. Nizinski. 2015. Predictive modeling of suitable habitat for deep-sea corals offshore of the northeast United States. *Deep Sea Research Part I: Oceanographic Research Papers.* In prep.

[4] Scanlon K.M., Waller R.G., Sirotek A.R., Knisel J.M., O'Malley J.J., Alesandrini S. (2010) USGS cold-water coral geographic database - Gulf of Mexico and Western North Atlantic Ocean. Version 1.0. USGS Open File Report 2008-1351. http://pubs.usgs.gov/of/2008/1351/

[5] Theroux, R.B. & Wigley, R.L. (1998) Quantitative composition and distribution of the macrobenthic invertebrate fauna of the continental shelf ecosystems of the northeastern United States. US Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Scientific Publications Office.

[6] Watling, L., Auster, P., Babb, I., Skinder, C., Hecker, B. (2003). A geographic database of deepwater alcyonaceans of the northeastern U.S. continental shelf and slope. Version 1.0 CD-ROM. Nat. Undersea Res. Cent., Univ. Conn., Groton.

[7] Deichman, E. (1936). The Alcyonaria of the western part of the Atlantic Ocean. Harvard University, Memoirs of the Museum of Comparative Zoology 53: 1-317.

[8] Hecker, B., Blechschmidt, G. (1980). Final historical coral report for the canyon assessment study in the Mid- and North Atlantic areas of the U.S. outer continental shelf: epifauna of the northeastern U.S. continental margin. Appendix A. In: Canyon Assessment Study. U.S. Dep. Int., Bur. Land Manage., Washington, DC, No. BLM-AA551-CT8-49.

[9] Hecker, B., Blechschmidt, G., Gibson, P. (1980). Final report for the canyon assessment study in the Mid- and North Atlantic areas of the U.S. outer continental shelf: epifaunal zonation and community structure in three Mid- and North Atlantic canyons. In: Canyon Assessment Study. U.S. Dep. Int., Bur. Land Manage., Washington, DC, No. BLM-AA551-CT8-49. p. 1-139.

[10] Hecker, B., Logan, D.T., Gandarillas, F.E., Gibson, P.R. (1983). Megafaunal assemblages in Lydonia Canyon, Baltimore Canyon, and selected slope areas. In: Canyon and slope processes study: Vol. III, biological processes. Final report for U.S. Dep. Int. Mineral Manage. Ser. No. 14-12-001-29178. p. 1-140.

[11] Theroux, R.B. & Wigley, R.L. (1998) Quantitative composition and distribution of the macrobenthic invertebrate fauna of the continental shelf ecosystems of the northeastern United States. US Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Scientific Publications Office.

Research Center (NURC) field studies.[12] The geodatabase has been vetted and has undergone quality assurance/quality control by the authors and the DSCRTP; for details on the sources of the geo-referenced presence records in the database, see Packer et al. (2007)[13] and Packer et al. (in review).[14] The habitat suitability model was run using additionally vetted and corrected georeferenced records from the historical database (e.g., taxonomies were recertified, questionable entries were removed). Although some of the older records may have positional inaccuracies due to more imprecise navigation techniques used at the time of observation, the habitat suitability upon which the proposed alternatives are based has a fairly broad resolution (370 meter grid cell size), lessening the effects of any minor positional inaccuracies in the underlying data.

Haulback zones

The "Considered but Rejected" section of the PID describes the previous FMAT recommendation that comments be solicited during the public hearing process regarding the issue of haulback zones. Haulback zones would be areas in and around the proposed discrete zones where vessel operators would be permitted to set and retrieve their gear, if that gear is off the seafloor and not actively fishing. Trawl gear can extend significantly behind a vessel, and thus a vessel may need to drift or move into and around a discrete coral zone in order to set or haul their gear for fishing just outside of a designated area.

To date, several public comments received on this issue have indicated a need for development of haulback zones, but there have been no specific proposals on how these would be designated or enforced.

Transit Provisions

Transit provisions would lessen the impact of the discrete areas on vessels (otherwise vessels would be required to transit around them), but these provisions complicate enforcement of area-based management. The Council could also consider VMS declarations for transiting. Current regulations specify the following definition for gears that are not available for immediate use, which is often included when allowing for transit:

Not available for immediate use means that the gear is not being used for fishing and is stowed in conformance with one of the following methods:

(1) Nets—(i) Below-deck stowage. (A) The net is stored below the main working deck from which it is deployed and retrieved;
(B) The net is fan-folded (flaked) and bound around its circumference.
(ii) On-deck stowage. (A) The net is fan-folded (flaked) and bound around its circumference;
(B) The net is securely fastened to the deck or rail of the vessel; and
(C) The towing wires, including the leg wires, are detached from the net.
(iii) On-reel stowage. (A) The net is on the net reel;
(B) The codend of the net is removed from the net and stored below deck; and
(C) The entire surface of the net is covered and securely bound by:
(1) Canvas of other similar opaque material; or
(2) A highly visible orange or yellow mesh material that is not capable of catching fish or being utilized as fishing gear. An example of highly visible orange or yellow mesh includes but is not limited to the orange fence material commonly used to enclose construction sites.

---

[12] For more information about the Watling and Auster database, see: Watling L., Auster P. (2005) Distribution of deep-water Alcyonacea off the northeast coast of the United States. In: Freiwald A., Roberts J.M. (eds) Cold-water corals and ecosystems. Springer-Verlag, Berlin, p 259-264.

[13] Packer D.B., Boelke D., Guida V., McGee L-A. (2007) State of deep coral ecosystems in the Northeastern US region: Maine to Cape Hatteras. In: Lumsden S.E., Hourigan T.F., Bruckner A.W., Dorr G. (eds) The state of deep coral ecosystems of the United States. NOAA Tech Memo CRCP-3, p. 195-232

[14] Packer, D.B., Nizinski, M.S., Bachman, M.S., Drohan, A.F., Poti, M., Kinlan, B.P. (In Review) State of deep coral ecosystems in the Northeastern US region update: Maine to Cape Hatteras.

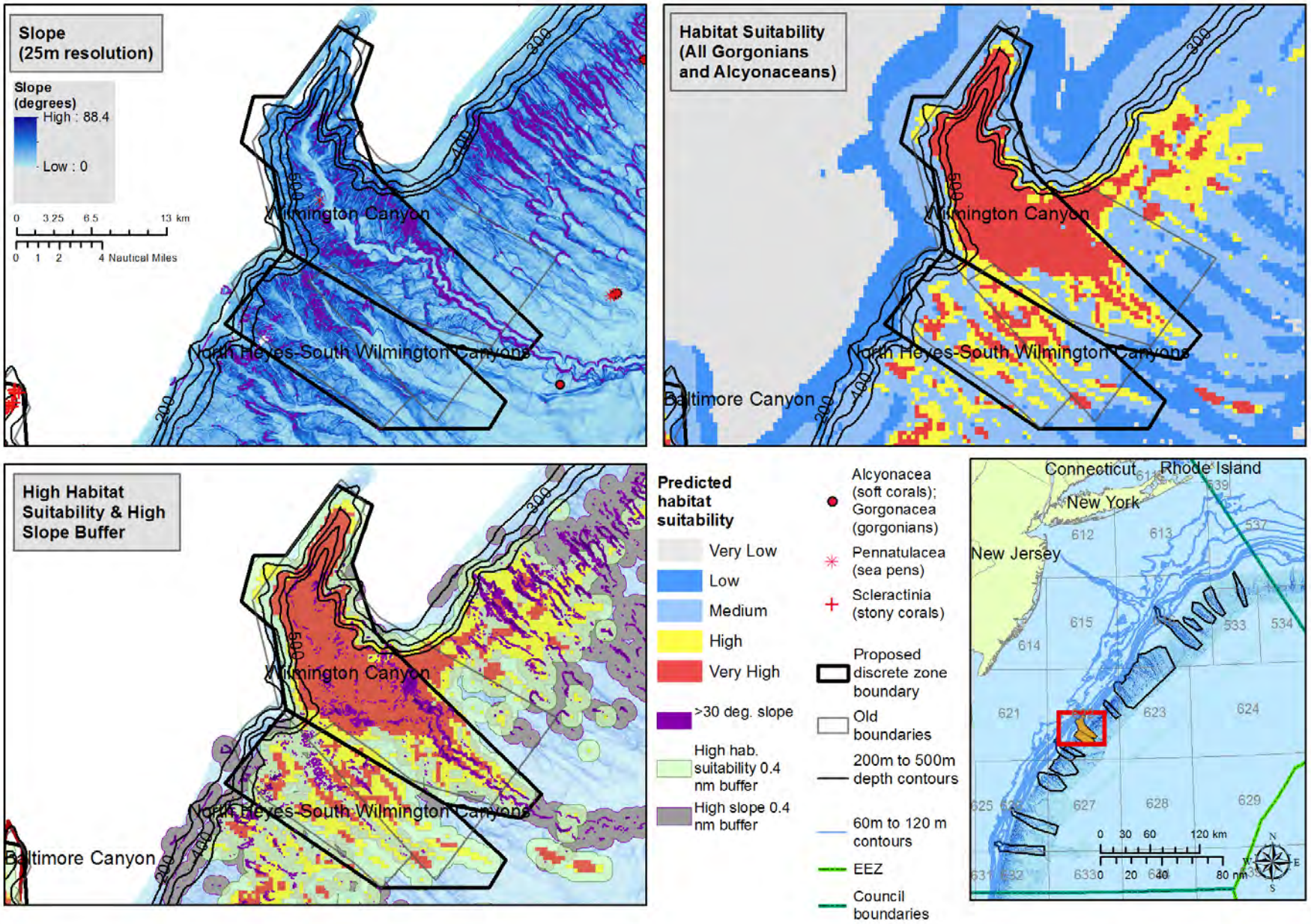


Figure 1: Wilmington and North Heyes-South Wilmington Canyons (two separate proposed discrete zones under alternative 3B).

Table 1: Total area and total area of high habitat suitability falling within proposed discrete zones (Alt 3B) but outside proposed broad zones.

	Total area (km^2) falling outside 200 meter broad zone	Area (km^2) of high/very high habitat suitability outside 200 m broad zone	Total area (km^2) falling outside 300 meter broad zone	Area (km^2) of high/very high habitat suitability outside 300 m broad zone	Total area (km^2) falling outside 400 meter broad zone	Area (km^2) of high/very high habitat suitability outside 400 m broad zone	Total area (km^2) falling outside 500 meter broad zone	Area (km^2) of high/very high habitat suitability outside 500 m broad zone
Block Canyon	0.1	0.0	8.1	0.0	20.4	1.5	36.4	1.8
Ryan-McMaster Canyons	0.0	0.0	0.0	0.0	2.5	0.1	27.3	5.5
Emery-Uchupi Canyons	0.0	0.0	0.4	0.0	5.1	0.1	18.9	2.7
Jones-Babylon Canyons	0.0	0.0	0.0	0.0	0.5	0.0	5.2	0.1
Hudson Canyon	29.7	0.1	80.7	5.2	132.5	31.1	178.8	66.9
Mey-Lindenkohl Slope	34.2	7.7	101.4	12.4	201.7	25.5	301.7	62.6
Spencer Canyon	0.9	0.0	8.6	0.0	17.3	0.7	23.2	3.3
Wilmington Canyon	24.8	1.9	49.8	12.0	71.5	30.1	89.1	50.1
North Heyes-South Wilmington Canyons	0.0	0.0	1.3	0.0	5.2	0.1	11.8	0.5
South Vries Canyon	1.6	0.0	7.7	0.0	12.4	0.0	16.2	0.0
Baltimore Canyon	26.0	2.8	47.4	8.6	65.2	20.0	79.0	33.4
Warr-Phoenix Canyon Complex	0.4	0.0	4.5	1.0	17.5	2.2	33.6	3.5
Accomac-Leonard Canyons	12.3	4.7	25.9	12.8	47.0	20.2	65.5	24.7
Washington Canyon	8.5	0.0	19.9	1.6	30.2	7.8	38.7	14.2
Norfolk Canyon	41.6	10.1	62.3	21.0	80.8	36.3	93.4	47.9
TOTAL	**180.2**	**27.3**	**417.8**	**74.7**	**709.9**	**175.7**	**1018.8**	**317.1**

Table 2: Total area and area of high habitat suitability falling within advisor-proposed discrete zones (Alt 3B-1) but outside proposed broad zones.

	Area (km^2) falling outside 200 meter broad zone	Area (km^2) of high/very high habitat suitability outside 200 m broad zone	Area (km^2) falling outside 300 meter broad zone	Area (km^2) of high/very high habitat suitability outside 300 m broad zone	Area (km^2) falling outside 400 meter broad zone	Area (km^2) of high/very high habitat suitability outside 400 m broad zone	Area (km^2) falling outside 500 meter broad zone	Area (km^2) of high/very high habitat suitability outside 500 m broad zone
Mey-Lindenkohl Slope Straight	7.1	0/0	30.0	3.5	56.6	6.5	100.4	16.2
Mey-Lindenkohl Slope Depth-based	0.0	0.0	0.0	0.0	0.0	0.0	46.0	19.6
Baltimore Canyon	1.7	0.0	10.8	2.3	20.6	10.5	29.9	20.8
Norfolk Canyon	4.6	0.2	18.4	8.8	35.0	10.5	46.6	35.0
TOTAL	**13.5**	**0.2**	**59.2**	**14.7**	**112.2**	**27.5**	**222.8**	**91.6**

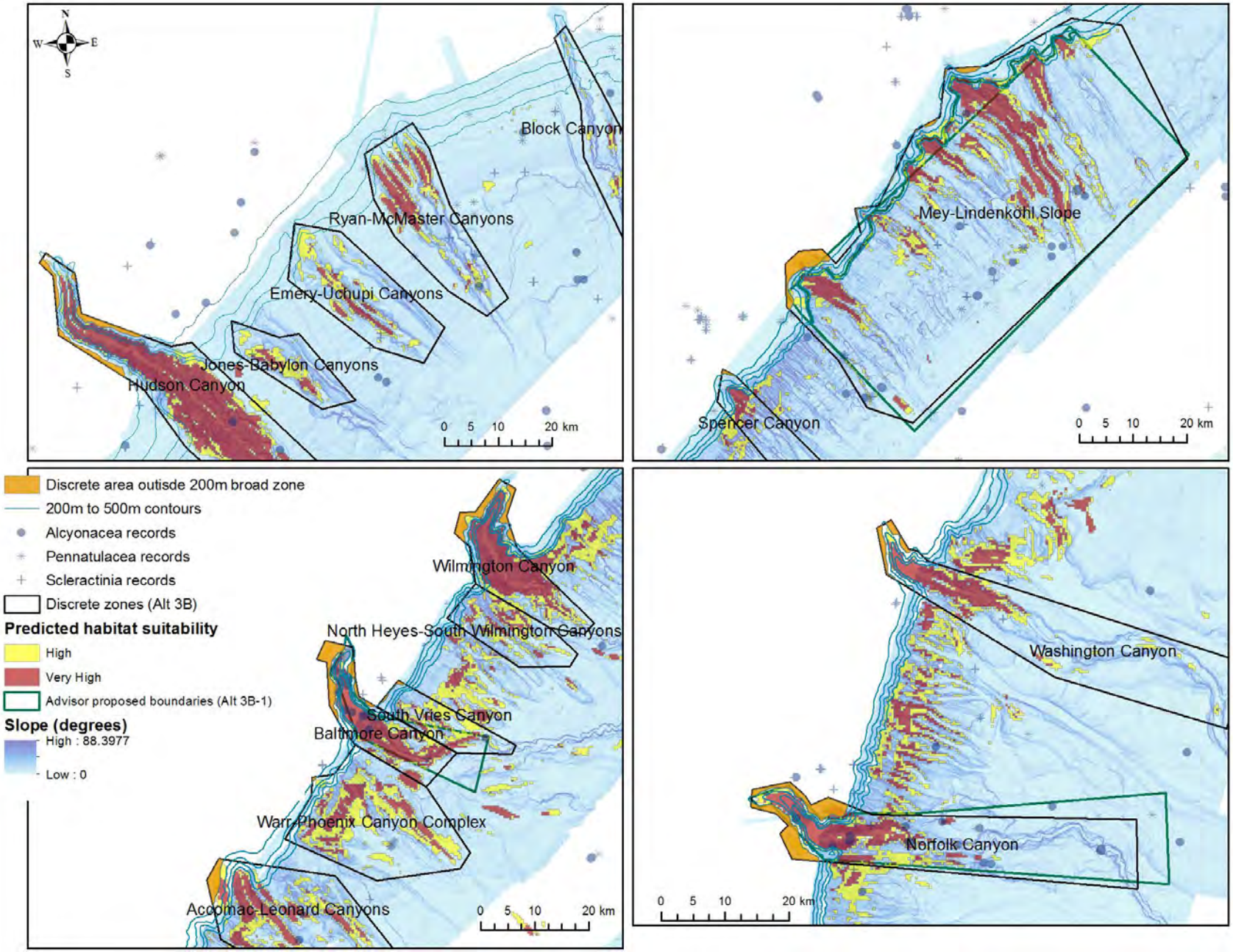


Figure 2: Proposed discrete areas falling outside the 200 meter broad zone.

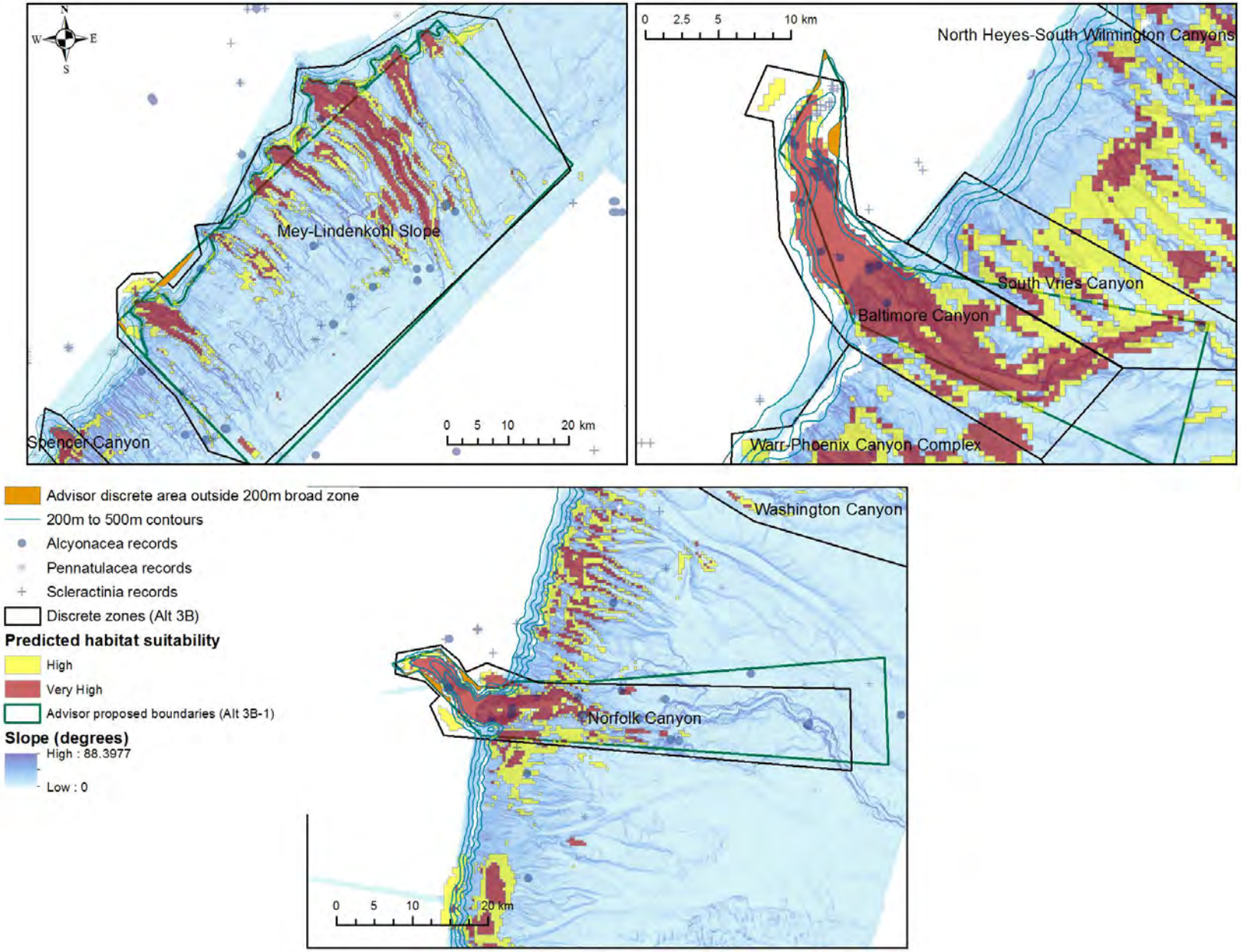


Figure 3: Advisor-proposed discrete areas falling outside the 200 meter broad zone.

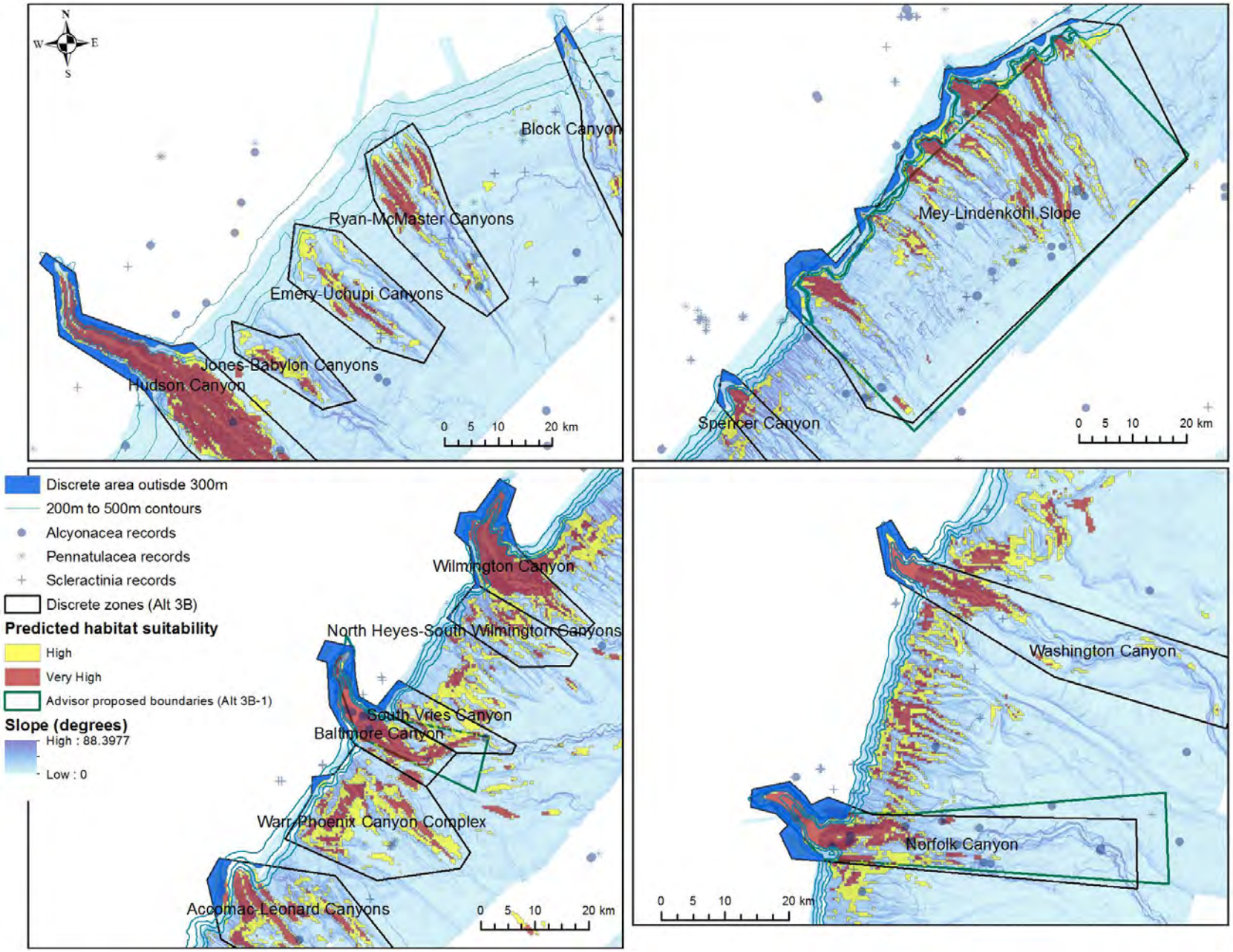


Figure 4: Proposed discrete areas falling outside the 300 meter broad zone.

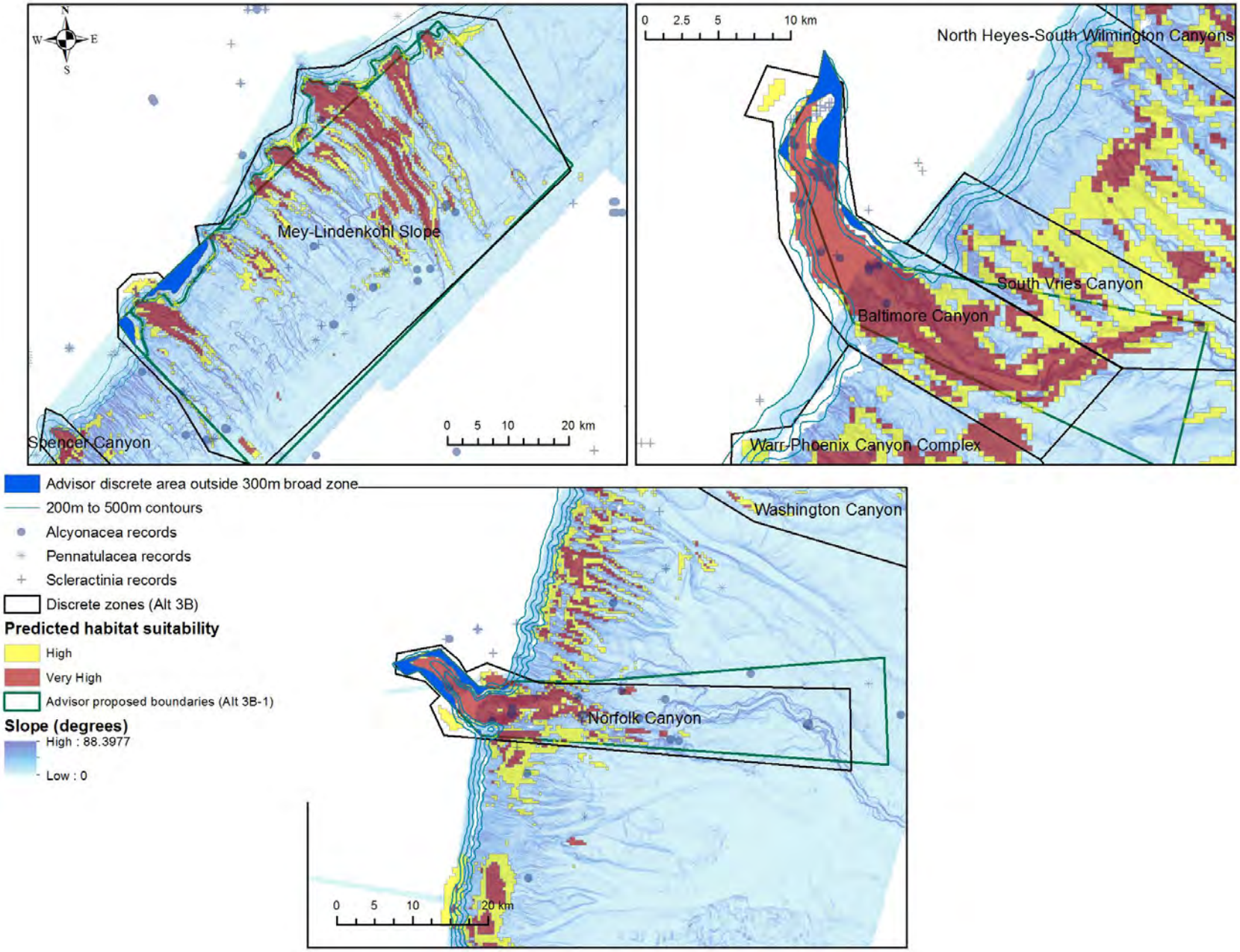


Figure 5: Advisor-proposed discrete areas falling outside the 300 meter broad zone.

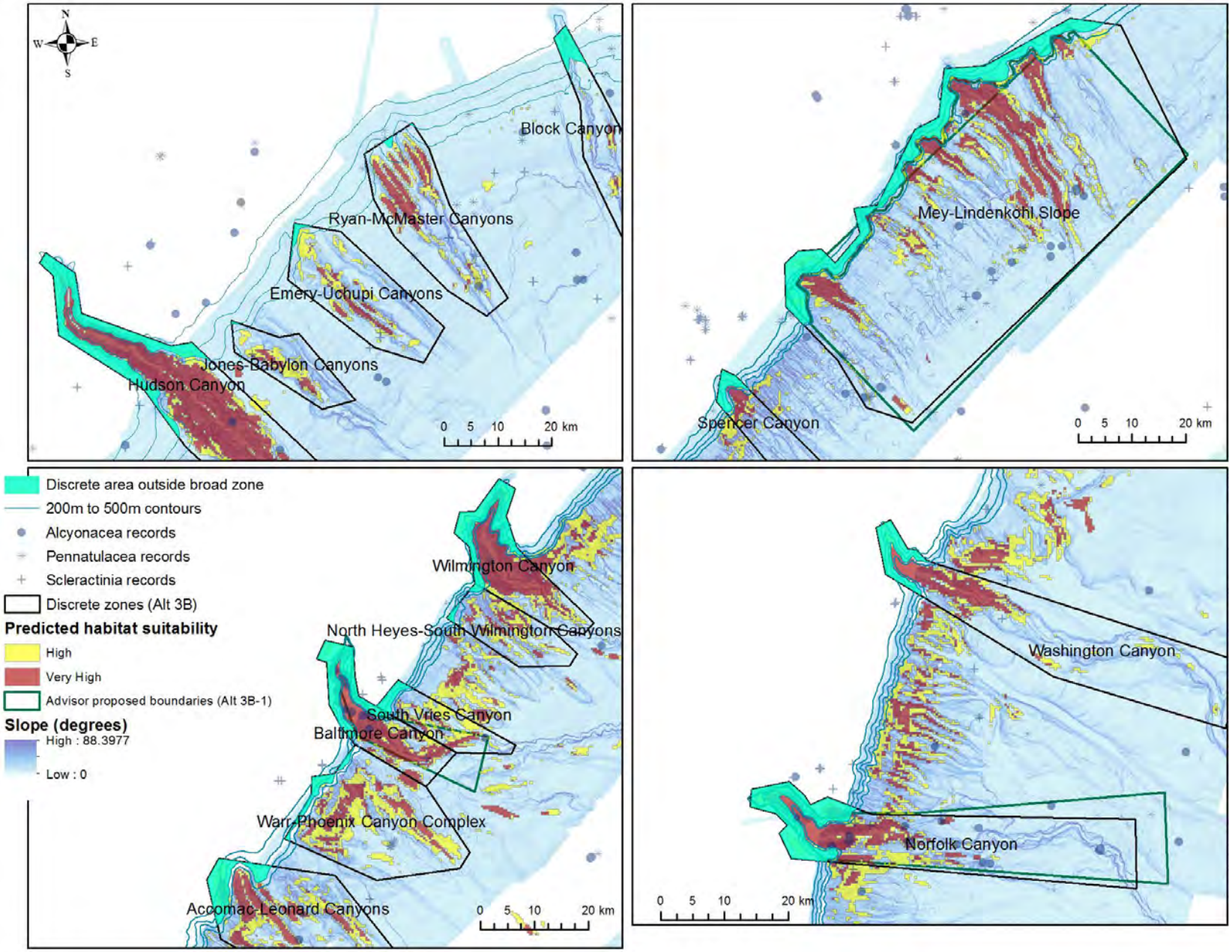


Figure 6: Proposed discrete areas falling outside of the 400 meter broad zone.

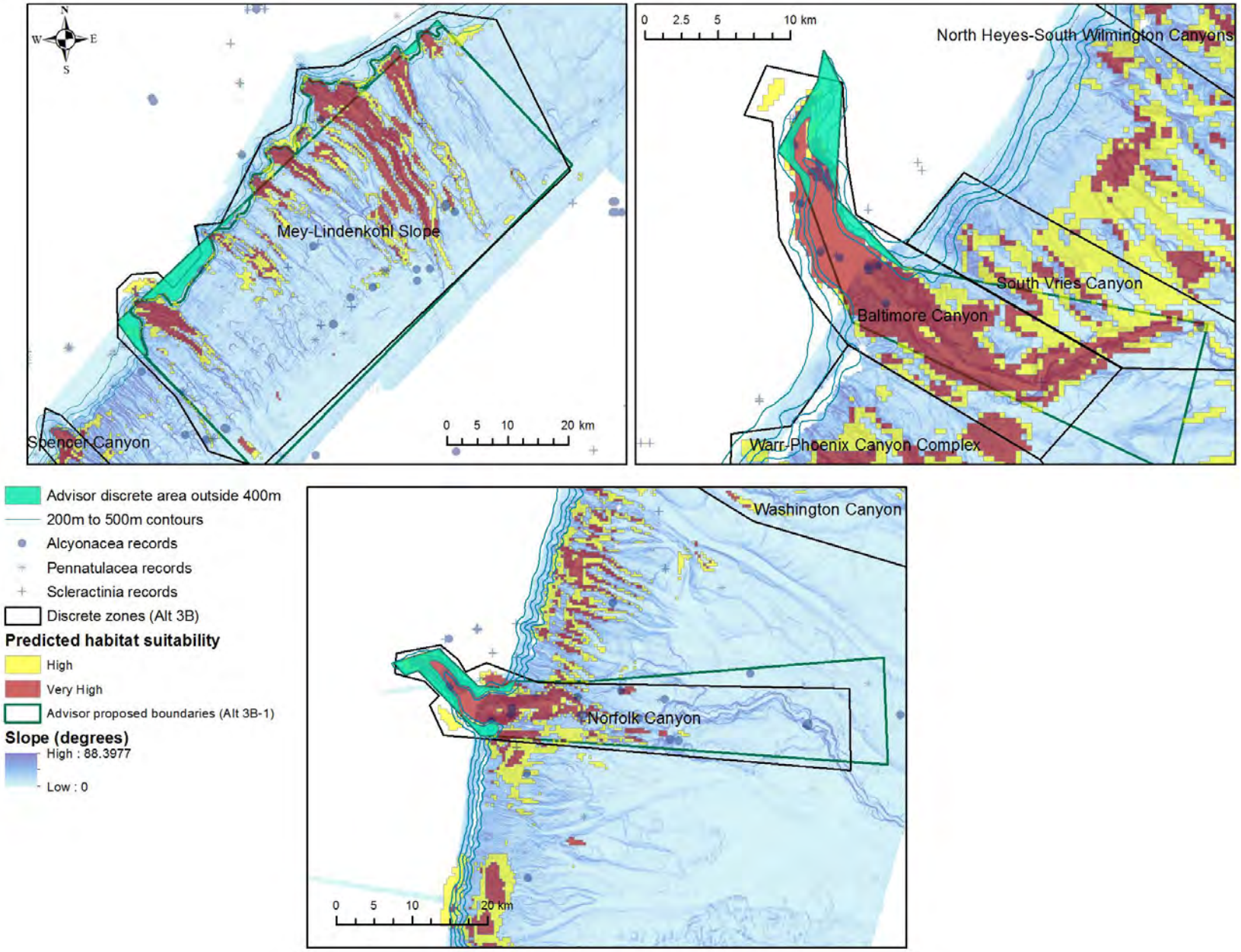


Figure 7: Advisor-proposed discrete areas falling outside the 400 meter broad zone.

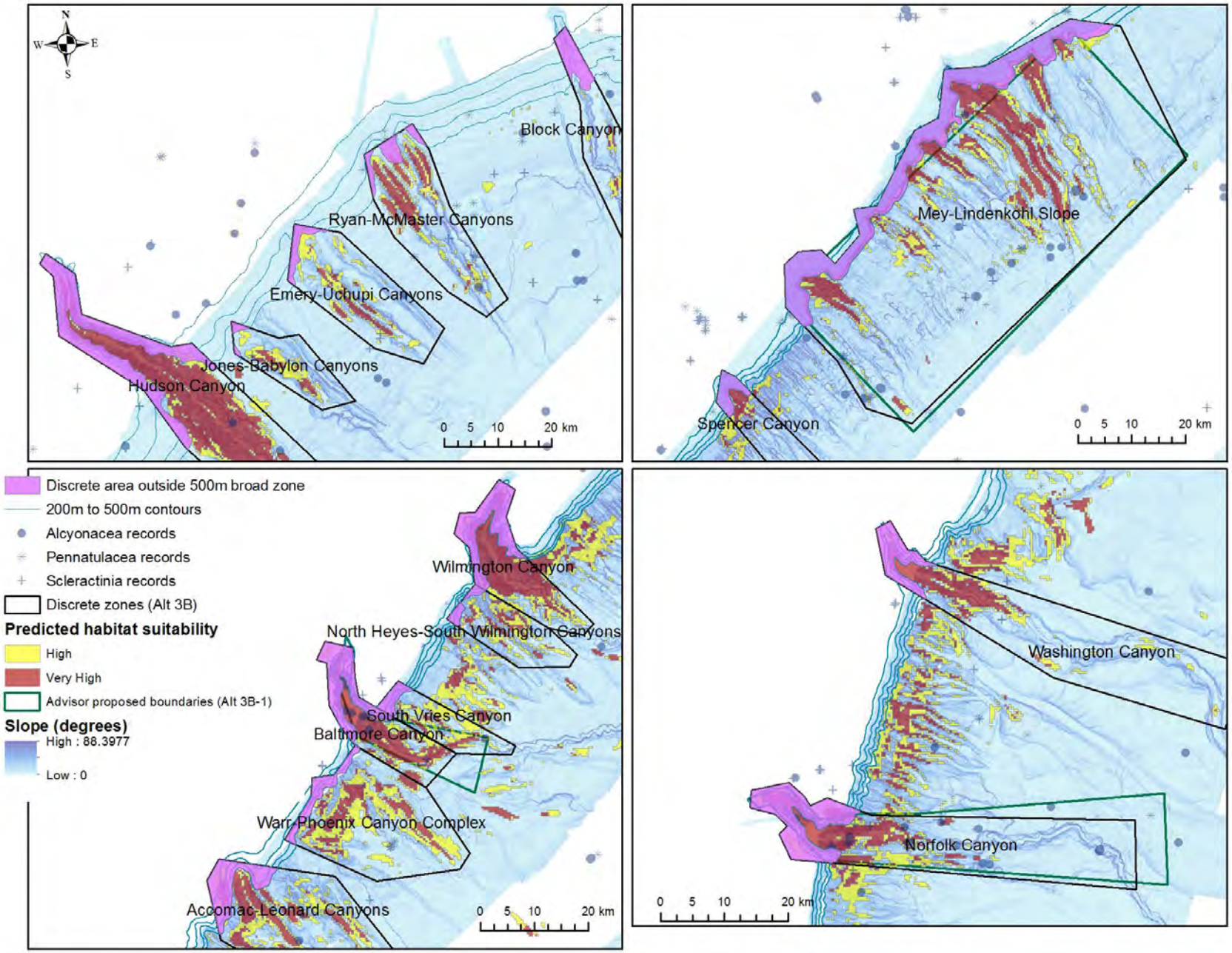


Figure 8: Proposed discrete area falling outside the 500 meter broad zone.

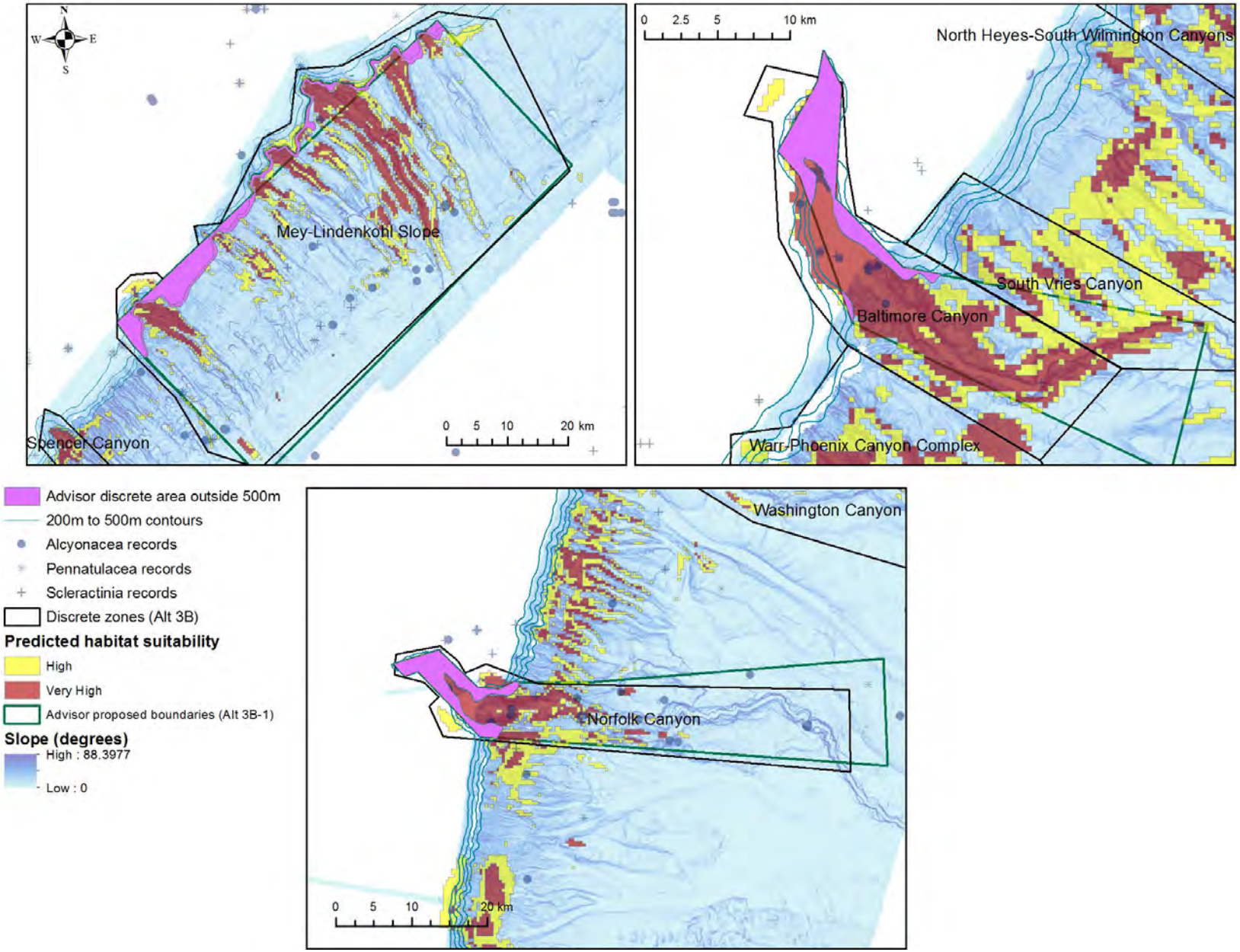


Figure 9: Advisor-proposed discrete areas falling outside the 500 meter broad zone.

DEEP SEA CORALS AMENDMENT
TO THE MID-ATLANTIC FISHERY MANAGEMENT COUNCIL'S ATLANTIC MACKEREL, SQUID, AND BUTTERFISH FISHERY MANAGEMENT PLAN

Measures to Protect Deep Sea Corals from Impacts of Fishing Gear

Written and Public Hearing Comments

JANUARY 2015

MID-ATLANTIC FISHERY MANAGEMENT COUNCIL

CONTENTS

INTRODUCTION

The Mid-Atlantic Fishery Management Council (MAFMC or Council) initiated the Deep Sea Corals Amendment to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan in 2012 to consider measures to protect deep sea corals from the impacts of fishing gear. After reviewing initial scoping comments from the public, the Council developed a range of alternatives and associated analyses. In January 2015, a final Public Information Document for this amendment was made available to the public, and the Council held a series of public hearings. In addition, written comments were accepted until January 28, 2015. Compiled hearing comments and written comments are provided in this document for the Council's consideration. More information and additional background documents, including the Public Information Document, can be found on the Council's website at: http://www.mafmc.org/actions/msb/am16.

Six public hearings were held from January 12 through January 20, 2015 (Table 1). A total of approximately 80 people attended the public hearings, and 34 provided public comments.

Table 1: Deep sea corals amendment public hearing schedule, January 2015.

Date and Time	Location
Monday, January 12, 7 p.m.	Hyatt Place Long Island/East End, Riverhead, NY
Tuesday, January 13, 7 p.m.	The Grand Hotel, Cape May, NJ
Wednesday, January 14, 7 p.m.	Washington Marriott at Metro Center, Washington, DC
Thursday, January 15, 7 p.m.	Hilton Virginia Beach Oceanfront, Virginia Beach, VA
Friday, January 16, 7 p.m.	Ocean Pines Library, Berlin, MD
Tuesday, January 20, 7 p.m.	Internet webinar

The Council received a total of 120,035 written comments from a variety of individuals and organizations. These comments included 119,974 comments consisting of signed or modified form letters, petition signatures, or other signatures to several sets of identical comments. In addition, the Council received 44 unique comments from individuals, and 17 unique comments from organizations, groups of organizations, or government entities.

Note that due to the large volume of comments received, not all individual signatures and additional comments from form letters and petitions are included in this document. However, **all** comments and signatures for each letter are available on the Council's website. This document contains at least one example letter indicating the number of copies or signatures received.

PUBLIC HEARING COMMENTS

RIVERHEAD, NY

January 12, 2015, 7 p.m.

Name	Company/Organization	City, State
Vic Vecchio	NOAA Fisheries	E Hampton, NY
Arnold Leo	Town of East Hampton	East Hampton, NY
Hank Lackner	Jason & Danielle	Montauk NY
Rebecca Kwa	Dock to Dish	Montauk NY
Meghan Lapp	Seafreeze	Davisville, RI
Jake LaBelle	Wildlife Conservation Society	New York, NY
Noah Cheskin	Wildlife Conservation	NY, NY
Eric Reid	Seafreeze Shoreside	Narragansett RI
Glenn Goodwin	F/V Persistance/Relentless	Davisville RI
John Nolan	F/V Serenade	Montauk, NY
Jamie Pollack	Shark Angels	NY NY
Avi Chase	NRDC	NY NY
Dan Farnham	Blue Water Fisheries	Montauk NY
Emerson Hasbrouck	Cornell	
Mina Innes	NYS Dept of State	Albany, NY
Tom Spoto	Personal	Albany, NY
Stephen W. Heins	NYS DEC/MAFMC	E. Setauket, NY
Name	**Company/Organization**	**City, State**
Jamie Pollack	Shark Angels	NY NY
Raymond Liverios	The Town Dock Inc	Narr. RI

Hank Lackner – F/V Jason and Danielle

I target deepwater illex, loligo, sea bass, scup, monkfish, whiting, dogfish, skates, and anything else in deep water. I recently watched a show on the Discovery Channel where hardworking guys were mowing down thousand year old trees in some of the most pristine areas in America, in quest of personal profit. This is appalling and the exact opposite of what occurs in our waters. Offshore trawlers tow where there's nothing but fish. Our fishermen are highly trained professionals who are acutely aware of the ecosystem, and conscientiously tow around coral and other sensitive habitat. Meanwhile, fishermen are being crucified by certain other businesses and NGOs. This amendment seems to be a last ditch attempt to halt a group of professionals second to none. Is it a coincidence that the Mid-Atlantic has the best performing fisheries in U.S.? Of course not – the fishermen here deserve a lot of credit.

I'm 100% opposed to the broad zones. I'm in favor of any alternative that keeps things *status quo*, but a second choice would be something like Alternative 3B-1 for industry created and modified discrete zones. Most coral observations presented by the Service are obsolete and unverified at best. Most sightings were from the 1960s and 1970s and we don't know how the data was collected. If this is to be used, a strong

argument could be made to make any discrete areas outside of 600 meters. The best available science says coral is very deep.

The industry is willing to do almost anything necessary to avoid coral, but they will not give up bottom. Coral is already protected by hard bottom, steep slopes and extremely deep water. This amendment seems to have been fast-tracked without proper analysis. In fact, the Advisory Panel was promised a second meeting, and has not been given the chance. The industry should be given further opportunities to revise boundaries. The Coast Guard has said that lines can be quite complex.

The objective of this amendment should be not only to protect coral but also to sustain the fishing industry as we know it. There should also be some allowances made for setting/hauling along the canyon edges. The economic analysis done by Council should be thrown out the window. It was done with VTRs, which are imprecise. They were told that the economic analysis would be redone and presented to industry, and that has not happened.

No one user group should be singled out. The lobster industry, red crab fishery, and sport fishing vessels anchoring in canyon heads can be devastating. The recreational sector was excluded from this amendment without doing any analysis. If the Council is truly concerned about coral habitat, it would redirect efforts where they're truly needed.

It should be noted that industry has never reached out to the Council to such an extent during the development of an amendment. What does it take for fishermen to gain credibility in this process?

The alternatives in this amendment are way beyond the goals and objectives of this Council. Some of these alternatives can completely close mid-Atlantic fishing as we know it. Lastly, final action cannot take place in February. The amendment is not ready.

Eric Reid – Seafreeze Shoreside; MAFMC Mackerel, Squid, and Butterfish Advisory Panel

I'm offended that the Advisory Panel has been left out of this process. I would like to voice my concern with the potential direction Council may take given the range of alternatives proposed in this document. The broad zone alternatives, 1B through 1E, and 2B through 2D, threaten the future of fishing both commercial and recreational in the mid-Atlantic region. These alternatives also go outside the objectives and goals of the very Council that proposes them. The pace that this amendment is taking is counterproductive, is not in the best interest of all stakeholders.

There is little or no science or industry-generated data – recent data, not before 2002 or 1874. There's no data that would justify the potential closure of huge broad swaths of ocean fishing. Your counterparts at the New England Council have already rejected some portions of this broad approach. The U.S. Coast Guard states categorically that it feels it is "challenging and doubtful" to enforce such big areas. As for the precautionary nature of this broad zone methodology, to protect corals from future fishing, your previous actions to protect unmanaged forage species already goes a long way to protect corals in the future. This broad zone approach represents total disregard of the strategic goals and objectives of this Council. I do not expect you to turn a blind eye to the science, management, and governance you profess to follow by adopting any of the broad zone alternatives.

Both NOAA and industry have provided information to support the existence of areas with a high degree of natural protection for corals. These include habitat where little or no fishing effort takes places - extreme depths, hard bottom, high slopes that already shelter much current and potential habitat. It would be counterproductive to ignore the data and science available to this Council in adopting future management

strategies at such a fast pace. You have to take time, because this document is not up to snuff and that's not fair to anybody – not to industry, not to corals, not to the rest of the stakeholders.

The Advisory Panel for MSB has not been given sufficient opportunity to provide input on the development of this amendment. The designation of discrete coral zones has the strongest basis in fact from which this Council can develop fair and equitable protections for all user groups and the corals themselves. If you look in the Public Information Document on Table 25, inside of 1,000 m, there's less than 1% corals. Outside of 1,000 it's a little bit more problematic. This data supports the development of discrete zones with input from all stakeholders and a depth contour of no less than 500 meters to provide adequate protection for corals, sponges, existing fishery operations and communities.

Critical data being used to develop this amendment is outdated, including information on coral encounters, economic analysis, and fishing effort. The pace at which the Council is pursuing this amendment must be slowed in order to develop a more effective amendment. The Advisory Panel must be allowed to provide critical input to produce educated document.

At this point, I cannot support anything other than alternative 3B-1, to be modified by the industry and user groups that actually have the knowledge of those areas. History has proved that the only people who know what's going on out there is the fishing community.

Greg DiDomenico – Garden State Seafood Association

The data used to develop this amendment are inconsistent with the Information Quality Guidelines from the Office of Management and Budget. It's inconsistent with NOAA's Data Quality Act. We feel strongly that it does not meet performance standards for data used by the agency, and is not of the quality, utility, or integrity that would justify potential management actions. In addition, it has not been accessible for affected persons to obtain access and review. I say that from my observations of the last ten years and ten amendments to the squid, mackerel, and butterfish FMP. We've been through this before, and I do not think that this particular amendment nor what's contained in it, nor its analyses really are what is consistent with what we've seen in the past. In a lot of ways, this amendment can be more potentially harmful to us than the previous ten.

The habitat suitability model is old, it's inaccurate, and it's from unknown sources. It's a presence only model, not an absence-presence model. It presumes that everywhere below a certain depth ranges, these sub-orders of corals exist. I would much rather see a percentage based analysis for the areas where there were no corals. The habitat suitability index also presumes that habitat is the same as it was 50 years ago. To think that is foolish. It presumes that habitat is suitable – that organisms will recruit to full grown deep sea corals. There's no way of telling the ages of these organisms, there's no way of telling if settling larvae will recruit to an adult organism.

Let me read a few things that describe the data used for the habitat suitability index, based on direct correspondence with some of the people in charge of this database. We're talking about the national deep coral geodatabase. "Records span from 1873 to 2002, and were compiled from journal articles, reports, museum collections, direct communications with original observers, and PIs to obtain unpublished records. Potential accuracy is of variable quality. Positioning methods ranged from sextants, to dead reckoning, to LORAN and GPS. We believe most records to be accurate within a few hundred meters, but some positions may have as much as 600 meters of error or more." This is important because within those possible inaccuracies are exactly where industry makes a living. If we're inaccurate about where we draw lines, you'd be taking bread off table of people in those fisheries. It's unjustifiable, unscientific, and it's

unfair. I went back through the database, which uses several different surveys over a broad range, but their collection methods to my knowledge are unknown. I'm left with direct communications of observers, but I don't know who they were.

The other part I don't understand is that many of these historical records have not been groundtruthed. Many of these areas are well beyond the location of surveys that were done in the last 10 years. So the observations from the 60s and 70s – are those corals still there? I have no idea.

Is the industry to assume that there are sub-orders of corals that are in museum collections? So I have a feeling that the methodology by which they were collected took them out of the bottom of the ocean and put them somewhere in Washington, DC. Maybe researchers took them all in the 60s when they tried to collect them. This type of information makes it very difficult to support the amendment.

From the surveys over the last several years – the data is unfinished. And, they've been surveying in deep areas beyond 500 meters. The economic analysis is a very broad analysis. It doesn't comprehend or estimate the potential loss of income from a single individual. Single individuals are in this fishery – there are very few people that are in these deep water fisheries, especially for illex. How much is the disruption to those vessels that make 30% of their income from one fishery? That's the type of analysis we'd like to see.

The illex fishery is approximately 17 vessels. It's not overfished, overfishing is not occurring. The fishing mortality is very light. We rarely catch the quota because it's a difficult fishery to be in. To make it more difficult by taking areas away is unacceptable. An Advisory Panel meeting 2 years ago in Virginia, and not one since, is not a very prudent way to do this. We've come a long way in the last ten years, and a lot of things that the industry has said that is contrary to what the agency has said has come true, and I believe this another one of those instances. Another AP meeting to make some discrete zones or to have some alternatives that accurately reflect both fishing and where coral is, is essential. Having final action in February is both surprising – it's shocking, it's in Raleigh where few affected will attend. I would ask that the Council not take final action in February. I cannot support any depth ranges for the broad zones. I can support refining the industry alternatives for discrete areas by convening an MSB AP meeting.

Emerson Hasbrouck – Cornell Marine Program; Governor's Appointee to ASMFC; MSB Advisory Panel member

I have two comments. One, it would be helpful to the public and to the Council to know what the variance is on the output of the model to have some statistical grasp on variability. Second, I would like to offer an additional alternative for consideration. It's a modification of sub-alternative 3B-1. That would be to develop discrete zones with industry and Advisory Panel input for each of discrete zone canyons under alternative 3B. Specifically only for those areas greater than 500 meters and greater than a 30 degree slope. Further, Council action should be deferred until this activity can take place.

As an AP member I was very encouraged when this issue was brought to the AP. There was some discussion about it and we were informed that there would be continued discussion with the AP as the amendment was developed and unfortunately that has not happened. It was commendable to meet with industry to develop sub-options, so it would be great if the Council could expand on that and take advantage of that relationship and move this forward in a cooperative way. My recommendation for modified discrete areas deeper than 500 meters and greater than 30 degree slope is based on the presentation that Dr. Nizinski gave at the last Council meeting.

Glenn Goodwin – F/V Persistence/Relentless

I have a couple shore based freezer facilities and 3 boats that participate in the illex fishery, 2 of which have been participating for almost 30 years. We employ about 65 people, seasonally that goes up to almost 95. We had to live with tilefish closures, GRAs, lobster pot GRAs -- basically we've had a lot of fishing grounds already fenced off. Any broad zone approach for closing down additional fishing area would be economically devastating to our operation. There are no new fisheries that are going to suddenly appear where these corals would be in danger. There are no gears being created that would enable someone to make more money by blasting through corals. This broad brush approach won't be acceptable to industry. If we need to go along with anything, alternative 3B-1 with some lines put in that we can be a part of creating would be more economically acceptable for our operation.

Raymond Livernois – Town Dock, Narragansett, RI

We have a fleet of about 6 fishing boats. I have to say that considering Magnuson says use the best available science, it seems like science in the document is pretty flawed considering it goes back 150 years. It seems like fishermen avoid most of the corals, because we don't tear our nets up – we avoid most of that stuff. Boats keep getting pushed into smaller and smaller boxes all the time. The lobstermen have a certain area. When we lose squid, we have to move out in deeper waters and chase monkfish. It sounds like that would be taken away with this, especially if you use a broad brush approach. I don't see how you can keep kicking fishermen in the ass and expecting us to smile and say this is great. The document seems flawed and needs to be revisited.

Dan Farnham – Blue Water Fisheries

I'm appalled that some of these options are even in the document. If we took the harshest of these options and put them in place right now, half the guys in the room would be out of business. It's a real slap in the face that they're even available to comment on. You want to protect corals on the one hand, which is a noble idea, but somehow this got convoluted and into a grab to push commercial fishermen out the door. We as fishermen want to protect corals. All those areas are what we call hangs – we can't fish there. And the ones in the deep water – we've never been out there and won't be out there.

I agree with Emerson's comments. I would propose a modified option of 3B-1 and push the depth out to 750 meters. I also question the science – the "best available science" from over a century ago. If NMFS wanted to use that science to manage tilefish, it would be absurd. Same goes for corals. I'm not in favor of broad zones at all, but if broad zones are going to be used, and the discrete zones are going to be used, I really feel that there should be public and industry input to make sure that the depth contours are followed exactly. The tilefish zones were drawn on a napkin at lunchtime – they're now a legal standard we have to abide by. For any depth contours, industry should be involved with determining those.

I own a dragger and a longliner. If these zones are just to get rid of bottom trawls, there should be no fishing there. When a sport boat anchors in Hudson Canyon – those things are right in what we're trying to protect now. Their anchors drift along the bottom - they're doing a controlled drift. If you're going to do a no-fishing zone, make it no fishing for everybody. There are no proposed exemption options for tilefish gear in the discrete zones, and that should be in there as well.

Hank Lackner – F/V Jason and Danielle (2)

When going to Council meetings the words "buffer zone" come up all the time. Somewhere when we talk about buffer zone - coral doesn't really need a buffer zone, the fishermen do. These boats need room and flexibility to get around each other. We can be very precise with our technology and draw these lines very

close to coral, giving the boats a buffer zone to get around each other and still not interact with coral. There's no need for buffer zones for coral – give them to the fishermen.

Glenn Goodwin – F/V Persistence/Relentless (2)

The economic analysis or modeling that was done for the economic impacts…some years we caught 80% of what was landed in the illex fishery and I never once had someone from the Science Center ask me anything economically about what was happening in fishery. I don't know how they came to that conclusion. I realize there's a lot of people standing around watching someone else work at the Science Center, but I'm pretty sure they don't have a good handle on how these specific places along the shelf impact the fishing industry> I've never heard anyone ask about the economic impact of an area being closed, nor have I ever participated in the process.

Arnold Leo – Town of East Hampton

We should really postpone final action. February is coming up much too quickly. Dr. Nizinski is supposedly doing another survey. The data seems to be very much in question – so the more current data that can be accumulated, the better. As has been pointed out, the research so far has indicated the coral is in quite deep water – deeper than 500 meters. It seems as though there's too much in question about the data, about the effects of the proposals on the fishing industry for there to be final action in February.

Ali Chase – Natural Resources Defense Council

We would like to see alternatives 3B and 4B combined for the discrete zones, in order to provide these core areas where we're seeing the greatest abundance and density of corals the greatest extent of protections. What we're learning is that every canyon is a little bit different and unique. We need to respect that.

In terms of the broad zones, we are looking for alternatives 1B and 2B combined. In terms of the gear exemptions, they shouldn't extend beyond the ones that are currently proposed, for red crab and tilefish. We would also like to require the use of electronic Vessel Monitoring Systems, including alternative 6B, in terms of helping with implementation of the measures.

We've heard a lot about the model, but the model is the best available science for corals that we have right now. It addresses the reality that we've only been able to explore a small percentage of the ocean floor so far. It has been field tested, and it is a good predictor. As we learn more about where corals are, it will be updated. In terms of protecting deep sea coral zones, it's important to protect them until we show that fishing is not causing an impact. Once they're gone, it's hundreds or thousands of years before they come back.

Annie McClellan – Citizens Campaign for the Environment

I'd like to thank the Council for taking the initiative to develop this precedent-setting amendment. Citizen's Campaign urges the Council to develop the strongest conservation measures possible, specifically this amendment should first of all prohibit all bottom tending gear from all the canyon areas, which is alternative 4B, in areas identified as discrete protection zones, alternative 3B. This should be based on the best available science, using NOAA's national coral habitat model. I would echo Ali's comments on the model, that it was developed through a highly scientific process and has been field tested.

We request that alternative 4B be modified to include mid-water trawl gear, which is mobile and known to contact the sea floor. We would also like the council adopt a broad coral zone from the 200 meter depth

contour and deeper, broad zone alternative 1B. This would protect corals that fall outside the canyon areas from all bottom tending gear. So alternative 1B and 2B combined would provide the largest conservation benefit by protecting the largest conservation benefit by protecting nearly 1--% of areas predicted to have ancient deep sea corals, while still allowing existing fisheries access to most of their current fishing grounds. We also request that alternative 2B be modified to include mid-water trawl gear.

Lastly, we would like to see the use of electronic VMS required aboard fishing vessels to help ensure effective implementation. Thank you for the opportunity to comment.

Noah Chesnin – Policy Program Manager, New York Seascape Program, Wildlife Conservation Society

Wildlife Conservation Society not only works globally but also locally. We run the New York Aquarium at Coney Island as well as the four zoos in New York City. We see that this work happening at the Council is incredibly important, and we applaud you for using the authority that congress has established for NOAA and the Councils. We are working on the floor of the aquarium and the floor of the Central Park Zoo to raise awareness about this policy decision to inspire visitors to learn about it and to make public comments. In addition to comments that we'll be submitting, we hope that our visitors will be providing their own comments.

We would encourage the Council to take the strongest possible conservation measures not only in the discrete but also in the broad zones, by prohibiting all gear that scrapes the sea floor, in all of the canyons in alternative 3B. We believe that those are based on the best available science that NOAA has at this point, and the coral model that has been the subject of conversation tonight is strong enough to move forward.

In terms of the broad zones, we would encourage Council to adopt the 200 meter depth contour zone, alternative 1B. This is meant to protect corals that fall outside of the canyons in the inter-canyon zones. The level of protection should be as strong as possible, or alternative 2B. Finally, as a means to enforce these measures, we would recommend that Council adopt the VMS requirements for these fisheries.

John Nolan – F/V Seacapture

I've been fishing offshore since 1971. I've fished from 40 to 160 fathoms from Hudson Canyon to Veatches. I started tilefishing in 1978, and have been at it ever since. I've never seen a piece of coral, ever.

Hank Lackner – F/V Jason and Danielle (3)

I've been dragging for 30 years and the only coral ever seen is on the NMFS webpage. We know where the coral is and we do not fish there.

CAPE MAY, NJ

January 13, 2015, 7 p.m.

Asm. Andrzejczak

Name	Company/Organization	City, State
Tom Baum	NJ DFW	Port Republic, NJ
Jonathan Atwood	Sen. Van Drew	CMCH, NJ
Lars Axelsson	F/V "Flicka" F/V "Dynasten"	Cape May, N.J.
Josh O'Connor	NOAA Port Agent	Cape May, N.J.
Erling Berg		Cape May
Brady Lybarker	LMNS	NJ Cape May
Jake Wiscott	Five Fathoms	NJ Cape May
Stefan Axelsson	Hal Axelsson F/V Flicka	Cape May NJ
Andrew Axelsson	Atlantic Cape Fishing	Cape May NJ
Jason Dawson	Atlantic Cape Fisheries	Cape May NJ
Paul Thomson	United Boatmen	Cape/MA/NJ
Greg DiDomenico	GSSA	

Andrew Axelsson – Atlantic Cape Fisheries

I would like to thank the Council for the opportunity to make comments in regards to the deep sea corals amendment. My company has significant concerns with ambitious timeline for voting on final action. We are particularly concerned that final action will occur at the February Council meeting prior to the Advisory Panel and Committee fully vetting the potential harm that this amendment may do to our region's fisheries, including the vibrant squid fisheries that are dependent on access to the offshore shelf break. Final action should take place after the AP and committee fully understand the ramifications associated with current fisheries, and it is our hope that final action will not take place until at least the April Council meeting. Thank you for the opportunity to voice my company's concerns on the record.

Jonathan Atwood – Offices of Senator Jeff Van Drew and Assemblyman Bob Andrzejczak

First, thank you for the opportunity to comment regarding this very complex but important plan to protect deep sea corals. On behalf of Cape May's commercial fishing fleets, we look forward to working with the Council and staff throughout this process. Preliminary comments that we are offering are based upon discussions with local fishermen and commercial docks here in Cape May, and we'll be submitting written comments as well. First, the habitat suitability index which the document uses to project where the coral may be located, we would argue should be peer reviewed by the Council's Scientific and Statistical Committee in order to determine its usefulness in protecting deep sea coral, while also considering the importance of continuing to provide access to the fisheries that take place along the shelf break.

The existing footprint of fishery should be maintained with this action. Reviewing Table 25 on page 50 of the Public Information Document, doing so would seem to protect the vast majority of deep sea coral known to exist, since most is found deeper than 500 meters. This recommendation follow the objective of NOAA's strategic plan for deep sea corals, which as stated on page 15 of the Public Information Document, takes a precautionary approach to freeze the footprint of fishing.

Finally, we ask that the Council take ample time to further revise the discrete zone options with additional industry collaboration. Thank you for allowing us to comment.

Paul Axelsson

Its oil and natural gas, that's what they want. They want to push us off that bottom so they can have that oil. We've been here since the 40's towing on it. Obama has just opened up from Hatteras to the Hague Line to research and develop oil and gas. Basically they want to kick us off the bottom and take what we've got. What will be left of us? There are not many of us left.

Lars Axelsson – F/V Flicka and F/V Dyrsten

I would like to give you bit of history, legacy wise, in my 40 years' worth of fishing. I'm not happy with what I'm seeing here occurring with the coral. It's probably the final nail in the coffin for my business. My dad came here in '55 with absolutely nothing, from Sweden. I started fishing at 12 and have been full time since I graduated high school. My dad built a legacy here.

A word picture that people on land can understand: the illex fishery on the edge is virtually 100% of our income now, due to regime shifts of mackerel and herring. I had virtually every permit except for scallops, but the Councils over time have made rules and regulations, very small trip limits, that frankly won't support our boats. We've been pigeonholed to the two species of squid and to the pelagic species of herring and mackerel. With this amendment, people on land are using their computer models to put me out of business. That's not the intent, but in reality that's what will happen. I have been fishing edge from about 80-175 fathoms, in virtually all the proposed discrete areas, and I myself have never caught a coral. Pictures from research vessels dipping around the canyons is the most coral I've ever seen in my life. In my mind's eye, the research vessel has killed more coral than I have.

We fish a very narrow band. Our tows are like airports, and we have one near most of the proposed discrete zones. Nearly as narrow as a runway is to an airport. Just like an airport, we have threshold numbers where we land and take off. Anywhere outside of that, we could do damage to our 75 to 100 thousand dollars' worth of equipment. Our nets are tender, they are not meant to be on hard bottom at all. We have, between several advisors, we have plotters with about 30,000 coordinates that represent areas where we cannot tow. For the past 40 years, building on people before and after us, we've garnered this information. In essence, coral is already being protected by snag books and plotters. We have electronics on our boats that rival research vessels. We can see bottom contours, kind of bottom, what's near the bottom. Our gear is often referred to as bottom tending gear. It started as otter trawls back in 50s. Later it was referred to as then flynet, or the Philly Ruhle net. Since then, we have gone to finer nets and bigger diameter frames, and our nets have become semi-pelagic. Even our trawl doors now seldom or never come into contact with the seafloor. This has taken years and hundreds of thousands of dollars' worth of investment, which in today's dollars would be millions. We put the Flicka in service in 1998. We should have paid for our boats in 7 years, based on conditions then. The very year we put them in, the illex quota got dropped. Because of precautionary measures.

In the mid-80s, we were told that if we could clean up our act and get less than 4% bycatch, we'd be considered a clean fishery. We geared our boats and did joint ventures…they taught us how to properly catch and handle squid. The cleaner you can catch them, the better they are for market. We didn't want to mix with other species and bottom dwellers. Squid get virtually destroyed when you catch them with other fish. We would fish responsibly. The Scup GRA was then instated and we were kicked out of those areas. On the inshore of our "airports," we have an area where we can't even go, as long as our nets are deployable. Loligo squid is there, but we have been kept out of there for 15 years.

Now another box will be put on our east side. Discrete zones that'll be in the head of each canyon, so now we're being boxed. If we're going to freeze the footprint and allow to fish as normal, we're going to be, much like an airport with planes flying over the public, flying nets over coral bottom as we land on the threshold of runways. People on land that are making these models do not believe that fishermen can be responsible, they believe they're out to destroy corals every chance they get. Boats are being boxed in so tightly they can't do what they're supposed to do. The NGOs, or Greenpeace people are going to use any means possible to kick fishermen off the edge. With this coral amendment, if you don't allow us to fish the way we've been fishing responsibly for at least 30 years… and the improvements we've made in past 5 years have made it better. Our nets no longer plow the bottom like they did 20 years ago. We fly our nets and dance close to the ocean floor. We can't get that into the heads of the people that have never been out there to do it.

Most people understand the way airports work. A certain length runway is needed for certain size airplanes. What the Council's proposing is putting discrete zones on north and south ends of our airports. You're going to put a broad zone east of where we fish. We already have the scup GRA on the inside. So when you draw a line, you take a very productive piece of bottom that will make or break a particular trip.

I represent about 20 families between our two boats, just out to sea, that's not including shoreside support. The docks can speak to that. Every rule and regulation hinders fishermen. In essence, you're creating loss of jobs, inadvertently. We're trying to keep the entrepreneur alive so we can make money and pay our taxes, and yet every new item that comes to bear on the Council's table is one more thing to take it away from a person that's got everything tied on the line. Virtually, the illex fishery is much like the red crab and the tilefish fishery is – if you do anything that wouldn't allow them to continue as they are…Maybe look at it like this. The foreign trawlers were here in 60s. When I fished in the 70s, I went through fleets of Russian and East German trawlers with motherships and feeder vessels, dragging the edge. We couldn't go there. Based on science, corals are slow-growers. If a foreign vessel cleaned the bottom where we fished in the 80s, would there be coral there today?

Can we go and grow stalks of corn on runway of Atlantic City airport? No. That area of asphalt and concrete is made for airplanes. So why can't I, which have been fishing since the mid-80s full time on that edge, have that footprint and continue to fish responsibly like we have been? If you don't allow me to have that footprint as is, anything cut off on either end is directly proportional to my income. When they decided to put in sanctuaries in the mid-80s and 90s – the argument is that if the sanctuary is only a very small percentage of the total ocean area, it doesn't matter – but that 1/1000th of a percent of the bottom is where I fish. For every part you cut off, you're increasing my chances of going broke. Because of the hurricanes that went by recently, and the regime shifts of fish, fishing has not been the same in the past 3 or 4 years as it was the previous 15. As an owner of the business, I'm not even able to take out 1% to put in my pocket. Last year I made $15,000. The year before, I made $17,000. That's what I take home to feed my family. With this coral amendment being fast tracked, I head that the APs were going to be used again, but they were not. I've had to restructure loans for my boat. They were supposed to be paid for in 7 years, in 1985. In 2015, they are still not paid for. If the Council does this and draws a line, slams it in to be precautionary…instead of saying, these people have been doing this in the same area for the past 35 or 40 years. That damage, if we did it…I submit that the foreigners did it long before we did. Our hang books, our plotters, and our machines will keep us off the bottom. But if it's another source of revenue for enforcement to come in and say we crossed that imaginary line…and then we end up in a $200,000 lawsuit.

The data shows we've gotten cleaner and cleaner in our fisheries, but are given absolutely zero credit for all of it. If the Council goes ahead and does this, they've decided they no longer want an illex fishery.

They've a little grace to the tilefish and red crab fisheries. They're alongside of me, I know what kind of gear they pull. Research vessels can snag coral. If our rigs snag on anything, it's done, $100,000 down the tubes. You're making more and more laws, more and more rules. The Council needs to decide whether they want to have the 12 entities running up and down the coast catching illex or not. Or you're going to do away with one more industry.

Wayne Reichle – Lund's Fisheries

Lund's fisheries is one of the largest shoreside processors of illex squid on the eastern seaboard. We own and operate 13 fishing vessels, 7 of those have illex permits. We handle from 5 to 25 million lbs. of illex squid annually. It's the only high volume fishery left in mid-Atlantic, with the exception of menhaden, after the disappearance of the herring and mackerel fisheries over the past few years. It's a critical part of our business. We've worked over past 30 years to produce a superior quality product, and that took a lot of investment. We've got tens of millions of dollars invested in our factory to produce the volume of squid that comes in when they are abundant. We've got a lot of years in developing markets, and we have a lot of customers that depend on this fishery around the world, as well as the domestic markets for here for bait and a growing market for food.

The Council is trying to fast track this amendment. We ask that the Council back up a bit here. We're not trying to stall anything, but the industry has reached a hand out here and provided information. We need to back up here and make sure that that information is being looked at to benefit everybody, both the coral and the squid fishermen.

Greg DiDomenico – Garden State Seafood Association

We firmly believe that the data used to develop the amendment is inconsistent with the Information Quality Guidelines developed by the Office of Management and Budget, and inconsistent with NOAA's Data Quality Act. We feel strongly that it does not meet performance standards for data used by the agency, and is not of the quality, utility, or integrity that would justify potential management actions. In addition, it has not been accessible by the affected public. To obtain access to the data and review it has been difficult and in some cases costly to our organization.

The habitat suitability is based on old, inaccurate data, in some cases from unknown sources. I want to read into the record a statement from one of the people who manages the database: "Records span from 1873 to 2002, and were compiled from journal articles, reports, museum collections, direct communications with original observers, and PIs to obtain unpublished records. Potential accuracy is of variable quality. Positioning methods ranged from sextants, dead reckoning, to LORAN and GPS. We believe most records to be accurate within a few hundred meters, but some positions may have as much as 600 meters of error or more." It's discouraging that potentially management actions based on this data is going to be potentially harmful to these people in this fishery.

We've been through ten amendments to this FMP in ten years. I think that's unheard of. We've made it through based on hard work of staff and good data. In the past, we've contributed, come to the table, supported a lot of things, understood when we had to be regulated. This we cannot support.

The habitat suitability model is a presence model only, not presence-absence. It appears that everywhere they looked there was coral. I know that's not exactly how the model was analyzed, but the little I know about this type of analysis - you have to do presence/absence. There were times when the surveys didn't find anything. That has to be understood by the public – that everywhere where they did surveys, they didn't always find something. That issue has skewed the data and the analysis currently in the amendment.

The habitat suitability model also presumes that habitat is as suitable as it was 50 years ago. I doubt it's the case in these dynamic areas. It also presumes that all these areas that are supposedly suitable, will have one of these organisms settle in and grow to an adult size. That's a great presumption.

The surveys done in the last five or seven years have primarily been done outside of 500 fathoms, and they did not groundtruth historical observations that are already in the database.

On the economic analysis: the percentages of possible loss to revenue in the document are not representative of the people and the vessels who rely almost fully on the fishery. It can't be a few percentages or a few hundred thousands of pounds of landings – to Lars, his family, their two vessels, it's 30%, 40%, or 50% or more of their revenue. I want to remind the Council that the people in the fishery, a lot of people rely on them for safety and livelihood. These guys have to go out and produce in a fishery that's very difficult. The more that regulations impinge on their ability, the more likely they are to have unprofitable trips – that means someone's living will be impacted. There are multiple families involved and they need every possible bit of leeway in this amendment.

We are completely opposed to the broad area approach. It is possible to still refine the industry discrete area alternatives, and I would urge the Council to delay final action and to convene an AP meeting as soon as possible.

WASHINGTON, DC

January 14, 2015, 7 p.m.

Rick Martis	ROMFA	Wash DC
Gregory P. DiDomenico	GSSA	
Alexandra Adams	NRDC	D.C.
Joseph Gordon	Pew	DC
Aaron Kuntzleth	Pew	DC
Victoria Bell	Marine Conservation Institute	
Alexandra Keledjian	Oceana	DC

Alexandra Adams – Natural Resources Defense Council

The deep sea corals amendment is one of the most exciting and precedent setting marine habitat protection initiatives anywhere in the country and we'd like to thank the Council for taking the initiative to protect deep sea corals. Deep sea corals are fragile and slow growing, and one pass of trawl gear can destroy corals that have been growing for hundreds or thousands of years. With this amendment we can protect the deep sea corals and the ecosystems they support before irreversible damage is done. We urge you to adopt the strongest conservation measures possible.

First, prohibit all fishing gear that hits or scrapes the seafloor from all canyons areas, alternative 4B, that have been identified as discrete zones based on the best available science, the NOAA coral habitat model discrete zones, alternative 3B. The NOAA habitat model used to delineate canyon areas was developed through a deliberate, inclusive, and highly science-driven process that has been field tested. Using this model to determine canyon areas will safeguard the highest valuable habitat.

We need 3B and 4B combined to provide canyon areas with the strongest level of protection. We request that alternative 4B be modified to include mid-water trawl gear, which is mobile and has been documented to contact the seafloor.

Second, we urge you adopt a broad coral protection zone with a depth of 200 m and deeper, broad zone alternative 1B, to protect corals that fall outside the canyon areas from all bottom contacting fishing gear, alternative 2B. Alternatives 1B and 2B combined will provide the highest conservation benefit by protecting nearly 100% of the areas predicted to have ancient and fragile deep sea corals, while still allowing current fisheries to access the vast majority of their current fishing grounds.

Alternative 2B should also be modified to include mid-water trawl gear, which is mobile and has been documented to contact the seafloor. Any broad zone gear exemption should not extend beyond those currently proposed as alternatives (alternatives 2B-1 and 2B-2). No further exemptions should be allowed, and hose initially proposed exemptions that have been categorized as considered but rejected should remain omitted. If the Council does exempt the red crab and tilefish fisheries, the alternatives should be amended to prevent any increase in impacts. For example, through a significant expansion in the number of vessels or intensity of the footprint of current fishing effort.

Third, we urge the requirement of VMS aboard fishing vessels to help ensure the plan is effectively implemented on the water. Under alterative 6B, squid vessels would be required to install and operate

VMS. Many vessels already have this equipment, and for those that do not, there are funds available to reimburse their purchase. VMS has shown to be highly effective in ensuring compliance with deep sea coral protections, such as in the South Atlantic.

Again, we thank Council for their efforts to protect deep sea coral ecosystems.

Victoria Bell – Marine Conservation Institute

Marine ecosystems are essential for human survival, wealth and well-being, and are the earth's biggest life support system. As a leader in the global movement to protect and recover the integrity of vast ocean areas, Marine Conservation Institute uses the latest science to identify important marine ecosystems around the world and advocate for their protection.

The ocean is vast and assessing what is on the bottom is an expensive and time consuming process. Unlike on land, much of what is on the ocean's bottom is unknown other than the depth and contours. It would be as if all we know about Yellowstone National Park was its topography, and very little about the trees, plants, or animals that live within.

In order to overcome the lack of visual evidence of important habitats, scientists, like Marine Conservation Institute's biogeographer John Guinotte, have developed techniques to predict where important benthic marine life is likely to exist. For many areas of ocean, these Predictive Habitat Models are the "best available science" for determining what habitat lies beneath the waves. Unfortunately, many councils are reluctant to use these habitat models regardless of their apparent value. We applaud the Mid-Atlantic Council for being a leader on this issue.

As with the shallow coral reefs people are more familiar with, deep sea corals provide essential habitat for many commercially and recreationally significant fish populations and are host to a vast array of biodiversity of other sorts. Deep sea coral communities in the Mid-Atlantic greatly enhance local biodiversity. Typically at depths greater than 50 meters, these deep sea corals are fragile, slow-growing and are easily damaged by bottom trawling and other bottom tending gear. Unless protected, we stand to lose vital, diverse ecosystems, which not only support the surrounding ocean life but also human livelihoods.

We commend many of the Council's proposed alternatives. We favor the following: alternative 3B, which calls for designation of discrete zones where corals are present or predicted. Alternative 4B, which calls for the prohibition of all bottom-tending gear such as bottom trawls, bottom longlines, and dredges within these discrete coral zones. We also recommend alternatives that create a broad coral protection zone. Alternative 1B combined with 2B, which calls for the prohibition of all bottom tending gear in these areas, would provide vital protection.

Together, these alternatives will allow for the protection and preservation of regions with known coral habitat and those likely to have coral habitat for current and future generations, while still allowing existing fisheries to carry on in the majority of their current fishing grounds. These are excellent initial steps for the Council to preserve the sensitive deep sea corals, the canyon environments, and contribute to fisheries sustainability.

Amanda Keledjian – Oceana

We would like to thank the Council for their hard work on this amendment. Briefly, we support protective measures including both broad and discrete coral zones. At Oceana, we believe these corals are important to protect and thank the Council for their hard work.

Joseph Gordon – Pew Charitable Trusts

Would like to thank the Council for the opportunity to comment and for the efforts to consider a bold proposal to protect deep sea corals. Deep sea ocean ecosystems are the earth's last frontier. Protecting these relatively pristine ecosystems is an investment in the future, not unlike what was done with the national parks, which future generations benefitted from. They're a sanctuary for ocean wildlife, and they're also an investment in the future in the sense that they provide ecosystems that are unique and potential benefits to human health that we are only beginning to realize. A single pass from a bottom trawl could damage ecosystems and individual species that live hundreds or thousands of years. These are some of the oldest known organisms on Earth.

We appreciate the Council taking the time now to get out in front of problems and act before destruction happens. So many other places in the world have ecosystems like these that have already been destroyed, but they haven't off our coast. We support the same measures that many of the speakers before have discussed. There's a small number of people in the room and coming to hears, but many of our groups represent vast networks of people who care about these issues. We urge the Council members to not discount these comments and names, because these are real people who care, and it is really their public resource. They really want to see these areas protected for future generations.

We support protections for both broad and discrete zones. For the discrete zones, we support alternatives 3B and 4B combined. The canyons are home to the greatest abundance and diversity of deep sea corals and are crucial places to protect. Each canyon's ecology is different and unique. In Baltimore Canyon, they found corals 15 feet tall, in Block Canyon, 6 feet tall and 10 feet wide. There's been some criticism about the science and model in some hearings. It's important to understand that this is different kind of science - we're talking about areas that no one's ever been to for the most part. It's a frontier science. These are millions of dollars in investments in projects that are discovering corals. These cruises have found that the models are fairly accurate. What makes this challenging for Council is that largely, the shallower depths were not studied. Most of these cruises went to much greater depths than the 200-500 meters being considered. We also ask that mid-water trawl gear be included in 4B. In the industry alternative for the canyons, it isn't consistent with a lot of the most recent research. For example, in Baltimore and Norfolk Canyons, some of the more recently discovered canyons would be excluded.

We support a broad zone at a depth of 200 m and deeper, with prohibition for all bottom contacting fishing gear. So, alternatives 1B and 2B combined.

As far as exemptions, consistent with some other comments made, if the Council were to move forward with 2B-1 and 2B-2, we hope that no additional exemptions be given and that significant thought be given to not allowing those fisheries to expand beyond their current impact on the bottom.

Lastly, we support the requirement for VMS for the illex squid fishery, alternative 6B. We thank the Council for being leaders in a way that future generations and all of us can be proud of. They key now is to protect as much as possible of the remaining, intact deep sea coral habitat.

Greg DiDomenico – Garden State Seafood Association

Industry is looking for two things: they would like another Advisory Panel meeting to be convened before final action, and we'd like the habitat suitability model to have a full review by the Council's SSC. We feel strongly that the habitat suitability model is not compliant with the Data Quality Act from NOAA, from the Office of Management and Budget. The data is old, it's from unknown sources, and it's inaccurate. Records span from 1873 to 2002 and were compiled from journal articles, reports, museum

collection, direct communications with original observers, and PIs to obtain unpublished records. Positional accuracy is of variable quality. Positioning methods range from sextant, from dead reckoning, to Loran and GPS. We believe most records to be accurate within a few hundred meters, but some records may have as much as 600 meters of error or more." This is interesting, because we have unknown sources, we have personal direct communications with whom the industry has no idea, we can't even look it up. The affected industry can't even figure out the data, the source of the data, or the integrity of the data, or barely even access the data. This is completely out of compliance with the Data Quality Act. It's also not what the industry is used to from the professionals at the Council and the agency. This fishery and this FMP has been through 10 amendments in 10 years. We've gotten through it because industry has come to the table and provided science, provided modifications, and when needed, supported measures that hurt us when the science said so.

This amendment is not of the quality that we're used to. We think it's deficient in its social impact analysis and its economic impacts analysis. About the economic impacts – there are illex vessels, which primarily will be affected by this amendment – there are probably 12-17 people in the fishery. They have relatively few permits, but they rely almost 20%, 30%, 50% on one fishery. It's not a small matter that it's 3% or 4% of the landings. To the vessel owner and his family, it's extremely important, and it is bread off of people's tables. This fishery is not overfished, overfishing is not occurring, it's lightly exploited, and it provides protein that's needed throughout the entire world. U.S. vessels like these are feeding people who are poor and needy, and we're providing that.

It's off-putting to some of the commercial fishermen that the records and the specimens were actually collected and put in a museum. They're probably not going to grow back. Fishermen have been avoiding these areas for over 40 years. They're highly technical, and they can't afford to drag their gear over these areas. They're not doing it, they're not going to do it.

I want to re-iterate to the Council members – one of the things the Council will have to come to grips with is that it is a mobile bottom tending prohibition, but there will have to be some acknowledgement that where the line is drawn, fishermen will go over the line. Their gear, as soon as they start to haul back, comes off the bottom, and they are not fishing. That's going to have to be resolved. This fishery takes place in time and space in an area that's a quarter mile, maybe a half mile at some points. Fish are there for a very important reason – they get pushed over the side of the continental shelf into shallower areas by currents. Fishermen cannot fish anywhere else – this is where the fish are. People rely on them for safety and livelihood. Consider that when you ask for such extensive closed areas – they harm people and their livelihoods.

Our organization and fishing industry has come to the table in good faith. We acknowledge a need for some protection – we've acknowledged needs for bycatch reduction, quotas, etc. We have done them by the letter of the law. We have no fisheries overfished, and we have succeeded in staying in business. This amendment fails in that. For the last 10 years, fishermen from the AP and different companies have come to the table and contributed in a very serious manner with professionalism. We're only asking for a bit more time to get it correct – not to delay the amendment.

Rick Marks – On behalf of Garden State Seafood Association and Seafreeze

Appreciate the Council holding a hearing here. My clients will be submitting more comments in writing. I associate myself with Greg's comments, but want to emphasize one thing about process. Going from a Public Information Document to a final decision in 30 days without any recent AP activity is concerning from a process standpoint. Having been appointed to the Mid-Atlantic Council in 1997, we worked

through the gear restricted area issue, worked through the monkfish process, and more recently worked through the Atlantic sturgeon ESA process. A more transparent and open process leads to some good things. I would hope that the AP would have an opportunity to meet again and work with you in the process.

It's important to realize that these are small margin fisheries. Even minor economic impacts can really affect these fisheries. Council has a mandate under the Act to protect the sustainability of the fishing industry as well. I would ask that you consider that as the process goes forward. There will be industry participants interested in working with you to find a path forward under Alt 3B-1, and I hope you can allow that process to go forward in the right kind of time frame to make that happen.

VIRGINIA BEACH, VA

January 15, 2015, 7 p.m.

Name	Company/Organization	City, State
Skip Feller	Rudee Angler	Virginia Beach, VA
Kenneth Stoute	Fisherman	Virginia Beach, VA
Jacqueline Stoute	Fisherwoman	
Evan Culberson	Virginia Aquarium	Virginia Beach, VA
Tyler Harman		Norfolk, VA
Melinda Truslow	MCAF/TerraScapes	Norfolk, Va
Alex Ceil	Industrial Floor Systems, Inc.	Roanoke, VA
Zach Jarjoura	Sierra Club (VA Chapter)	Norfolk, VA
Sarah Pettit		Va Beach, VA
Mark Swindle	Virginia Aquarium	Virginia Beach, VA
JAMES LATCHAW	Fisherman	Virginia Beach, VA
GARY MEDLIN	Sierra Club	Virginia Beach, VA
BRITTANY CANNON		VB, VA
John Haworth		Virginia Beach, VA
Ryan Whited		Va Beach, VA
TERRA PASCAROSA	TERRASCAPES	VA BEACH, VA
Steve Ellis	NOAA Fisheries	Hampton, VA
Dan Barshis	Old Dominion Univ.	Norfolk, VA
Rob O'Reilly	VMRC - MAFMC	Newport News, VA

Terra Pascarosa – TerraScapes Environmental Consulting

I'm here on behalf of locals throughout the community here that live in coastal communities, to urge you to adopt the strongest conservation measures: to adopt a broad coral protection zone, to include the discrete protection zones, and prohibit all fishing gear that trawls the sea floor, from all canyon areas. In addition, we support the requirement for the use of electronic Vessel Monitoring Systems on all the fishing vessels as well.

Dan Barshis – Professor of Biology, Old Dominion University

I'm a coral researcher working primarily on tropical corals, but I'm familiar with deep sea corals and used to work for NMFS on the west coast. I support the recommendation to protect these resources, and echo the sentiment that they're irreplaceable once they're gone. To answer the question of what happens if we don't have them, we're not sure. We know there are benefits in terms of providing structure for fish and maintaining a dynamic bottom for fish habitat, but also applications for pharmaceutical industries and other things that are unexplored to their maximum extent. If we don't have the resources to even investigate, we're not sure what we're going to lose at this point.

Ronnie Gannon

There are currently NOAA videos online that have captured some corals that have been impacted by bottom trawling, and it looks like a desolate landscape that's been pretty wiped out. I know that we don't fully know everything to do with it yet, but for the long term we should try to protect our corals. They are a habitat that's very important for marine life that we're very dependent on. If we focus on the long term instead of just the short term, we have a lot to protect there.

John Haworth – Virginia Tech Alumni, Environmental Management

In the past with some of our exploitation of resources, we've reached out at the surface. We're getting into deep sea and bottom areas, which ultimately are the foundation for a lot of these fisheries and other ecosystem services that are still being found out. It's worth considering that these resources may need to be protected to protect our own future and our own values and for our children's benefits. There may be future benefits we're not even pursuing yet, like medical research.

Melinda Truslow – TerraScapes Environmental Consulting

These are delicate, fragile, ecosystems, and they are in our back yard. They're right here off your beach. We don't know the impact that could occur because of the removal of these corals from deep sea fishing, but we would see the impact that would occur. We would feel that because it's in our backyard. We need to pass these restrictions to protect them.

BERLIN, MD

January 16, 2015, 7 p.m.

Name	Company/Organization	City, State
Buddy Seigel	ASMEC of Anglers, MSSA, AES P	Berlin MD
Ron Smith	MSSA	Bishopville MD
Jennifer Rafter		Pocomoke MD

Buddy Seigel – Ocean Pines Anglers, Maryland Saltwater Sport Fishermen's Association

There are large ocean stretches where if structure is not there, there are no fish. When structure is there, the fish will come to it. The best thing we can have is natural sea life. Coral is a big part of it. How do we spread it out and grow it? For me, this is about the more structure you have, the more marine life you have.

Ron Smith - Maryland Saltwater Sport Fishermen's Association

I believe in this action. I believe the philosophy has always been that once the damage is done, you guys try to make corrections in regards to things like biomass, cutting the fish size down, cutting the season – but nobody's addressing the problem with habitat. Finally, we're talking about protecting the habitat that's out there. But most of the damage is inshore. I'm glad to see you guys are doing something, but it's the inshore waters that have been just utterly destroyed. We need to work on that, and if we do replace it, make sure it's not destroyed again.

WEBINAR

January 20, 2015, 7 p.m.

Attendees:

Rick Robins	Katie Almeida	Brad Sewell
Kiley Dancy	Pam Lyons Gromen	Sandra Brooke
Aaron Kornbluth	Tom Hoff	Chris Batsavage
Daniela Pierro	Heidi Henninger	David Stevenson
Kai	Stew Michels	
Mary Clark	Jason Didden	

Pam Lyons Gromen – Wild Oceans, MAFMC Ecosystems and Ocean Planning Advisory Panel

Thank you for holding hearing via webinar and making it more accessible for people in locations where it was hard to be at a hearing in person. I was asked to write an article for our newsletter about the Council's action. I was reminded of one of my favorite books by Rachel Carson, *The Sea Around Us*. In it she writes "We can only sense that in the deep and turbulent recesses of the sea are hidden mysteries far greater than any we have solved." That book was written in 1951, and here we are a few decades later watching live, high definition feeds of those recesses of the ocean. One thing that struck me about the recent Okeanos Explorer expeditions were how the scientists were saying that all of the canyons were diverse, and different, and dramatic, with no two canyons being the same. That's important to keep in mind when looking at the options in the amendment. Some of the options present a "pick and choose" for the Council, and I think that he whole complex, all 15, warrant protection.

I think it's commendable that this Council recognizes the importance of protecting habitat for productive fisheries, and has taken this action. I was there when the amendment was started and I appreciate your efficiency in getting this done. There has been a lot of information fed into this process, and I'm impressed that we're now heading into the final stage.

I want to talk about the options that we support. I want to draw on NOAA 2010 Strategic plan for Deep Sea Coral and Sponge Ecosystems, which is mentioned in the document and put out during scoping. I support the approach and objectives outlined in that document. In particular, the objectives for conservation and management, of protecting areas of known deep sea coral or sponge communities from the impacts of bottom tending fishing gear, and another more precautionary approach to protect areas which may support deep sea coral and sponge communities where fishing gear has not been recently used. Those are objectives from the plan and they're reflected in the purpose and need of the amendment document and I'm glad they're there. The Council needs both. That's one of the issues for comment – I think absolutely you need both discrete and broad zones.

For discrete zones, we support designating all 15 canyon and slope systems as described in the public information document, which is alternative 3B. We would endorse the most stringent protections you could offer for those discrete zones, which is prohibiting all bottom tending gear, or alternative 4B. For the broad zones, they're designed to be more precautionary in nature. Even so, they still need to work with the discrete zones as a continuous system. A broad zone at the 200 meter contour would certainly envelop all discrete zones and encompass the canyon heads, but I understand that the economic impacts associated would be the greatest. If all the discrete zones were designated and protected, a 300 meter broad zone would be acceptable to us and would still protect a very high percentage of highly suitable coral habitat.

In saying that, there's caution needed. The distance needed for gear deployment and haulback is an important consideration that the advisors raised, and it's an issue that needs to be fleshed out. How gear drops when it is deployed could also warrant some additional buffering when a broad zone is selected. Even with the most conservative option of the 200 meter depth contour, you're still excluding 25% of the historical presence records. There's tradeoffs with all these alternatives for broad zones.

In terms of regulations within the broad zones, we would support alternative 2B, prohibiting all bottom tending gear, but we think the exemptions for tilefish and red crab are reasonable given the size of these fisheries and their footprint that exists in the broad zone options. We also would want to see alternative 2D put forward, requiring vessels to use VMS in the broad zones. That would entail having the illex moratorium vessels required to use VMS as well, which is alternative 6B.

Finally, the amendment needs to establish an adaptive process. The process should continue to be an adaptive one, as we continue to explore these areas. I support basically the flowchart in NOAA's strategic plan, which makes a lot of sense. As the unknown areas are explored and new corals discovered, this should trigger expedient action to incorporate those corals into a discrete zone. For this reason, we would support alternatives 5B and 5D.

I know the idea of this amendment is to protect corals, but I'm trying to think of an instance where we've realized habitat has been damaged or a fish stock depleted, and we just protect what's left. There's certainly nothing wrong with looking at a loftier goal for this amendment of protecting highly suitable habitat, if the corals aren't there now – maybe not in our generation, but corals could certainly repopulate highly suitable areas. I will be submitting written comments, and I appreciate your time.

Tom Hoff – Former MAFMC staff member

Staff has done a very nice job on this. I wish staff and the Council the best of luck in 2015 on finalizing this amendment.

Daniela Pierro – 8th grader at LREI, the Little Red Schoolhouse, NYC

I am a part of a social justice group which we call "No Water, No Life" and we're focusing on water issues, especially coral destruction. Recently, we created a petition on change.org. Its goal was to see how strong public support of the amendment is. We found that many people strongly support the passage of the amendment to conserve corals. We published the petition on Sunday, and in 3 days, the petition has gained over 200 signatures. The people who signed were showing their support for the conservation of deep sea corals and for management measures in both broad and discrete coral zones, and for the 200 meter depth to be implemented, and to prohibit all bottom fishing gear.

The signers of the petition also acknowledged that it was important for these measures to be enforced. We strongly encourage you to pass the Deep Sea Corals Amendment to the Atlantic Mackerel, Squid, and Butterfish FMP. We will send in the petition on the 28th to show you the amount of signatures it will have acquired by then. We strongly encourage you to listen to the many voices of the concerned public.

WRITTEN COMMENTS

1/2/2015 10:33:01
JEAN PUBLI
JEANPUBLIC1@YAHOO.COM

WHAT TOOK YOU 60 YEARS TO TAKE ANY ACTION AT ALL IN THE LEAST LITTLE WAY TO START ANY SUCH PROTECTION. YOU HAVE ALLOWED COMMERCIAL FISH MARAUDERS TO SHOOT DOLPHINS FROM THEIR BOATS, SHOOT WHALES FROM THEIR BOATS, ALLOW FISHING LINE TO KILL WHALES, ETC FOR 60 YERAS OR MORE AND NOT LIFTED A FINGER. NOW YOU HAVE LIFTED A FINGER BUT STILL HAVE NOTHING IN PLACE. ANYONE RESPONSIBLE WONDERS WHY IT TAKES Y6-0 YEARS FOR HTIS CORRUPT AGENCY TO LIFT A FINGER TO PROTECT ANY MARINE SPECIES AT ALL. WE WANT MORE ACTION FOR PROTECTION. ITS A SHAME WE ONLY GET REPRSENTATION AT THESE FISHING COUNCILS FROM THOSE WH PROFIT FROM THE FISHING INDUSTRY. THEY LET IN NOBODY WHO REPRESENTS THE ENVIRONMENT. THOSE FROM THE ENVIRONMETN ARE PRIMARILY BLACBALLED. WHAT A SAD SITUATION FOR A NON REPRSENTIATVE IN FACT GOVT.

From: Quinn, Stephen <Stephen.Quinn@imoutdoors.com>
Sent: Monday, January 05, 2015 10:07 AM
To: Dancy, Kiley
Subject: Deep Sea Corals Amendment Comments

Dear Members of the M-AFMC and other parties,

I am writing to urge the Council to initiate and enforce protections to areas known to contain deep-sea corals, to prevent damage by bottom-fishing gear. These vulnerable organisms are critical pieces of marine ecosystems and have been heavily damaged in some areas. It is vital to fully protect remaining colonies.

Hopefully, vested fishing interests will not oppose these measures, as they are able to shift operations to areas without corals or other vulnerable marine life.

Thanks for the opportunity for comment.

Best wishes,

Steve

- - - -

- Steve Quinn
- 1704 S. 7th St.
- Brainerd, MN 56401
- 218-828-3627

Name: edward burke

Email Address: fishined34@verizon.net

City, State, Zip Code: 11420

Comments: as a fisherman for 65 years we must stop the impact of fishing nets dragging over coral reefs.all fish breed and grow on these reefs.

Name: Robert Cavagna

Email Address: cavros1@optonline.net

City, State, Zip Code: Southold NY 11971

Comments: These three fish are the food supply (a good part of it) for all the larger predators in the western Atlantic. Save them, along with the bunker, spearing etc., and you save the fishing industry and the recreational fishing as well. We don't have much time. Since 2000, the fishing off Long Island has declined dramatically. I don't claim to know all the reasons for this, I just know it happened. You can't believe the "Long Island Fisherman" or the newspaper columnists, they are trying to stay in business, so they always tell how wonderful the fishing is.....take my word for it, it's dying a fast death. Do something or it will be to late.

Name: ron smith

Email Address: smitty3894@aol.com

City, State, Zip Code: bishopville md 21813

Comments: It is imperative that we start to protect the deep sea corals in our waters. The long term damage from bottom trawlers has devastated the inshore areas of our coastal waters. The damage to bottom structure due to various fishing methods has already been documented. The fisheries have already suffered, and changed because of this destruction. It is time that our fishery stewards realize that the various fish bio mass's that populate our area need structure for their habitat. We have a chance to be proactive by protecting these very slow growing natural habitats before they are destroyed by draggers or other various fishing methods that affect the bottom condition.

Name: Alexandra Stote

Email Address: stote.al@gmail.com

Comments: As an young emerging marine scientist and a seasoned commercial fisherwoman, I find this ammendment to be highly important to improving the overall health of our oceans. I hope you truly consider this petition.

Name: Robert Ruhle

Email Address: robertptcapt@aol.com

City, State, Zip Code: NorthCarolina

Comments: As an Illex industry member, as well as an MSB & Ecosystem AP member, i belive that this a manufactured issue. There has been a definite LACK of data showing the areas where Deep water coral exsist, and NO data to support that the current fishing practices have any impact on deep water coral at all. There IS a vast amount of data provided by the industry to prove that there is no interaction, as well as the agencys own data from the illex realtime managment program going back to the mid 1990s.
But these data where not used or even concidered for the proposed restricted areas.

Name: Robert Ruhle

Email Address: roberthdn@yahoo.com

City, State, Zip Code: nc

Comments: (cont) I personally gave the agency my own illex tow data at the meeting in Baltimore over 2 yrs ago, and was told as an ap member that we would be having "many more meetings" before the document would be finalized and presented to the councils. To my knowledge, that was the ONLY meeting. The other aspect that i find totally baffling is that the omitting of fixed gear to this action, yes a single lobster or red crab trap has a small impact on the bottom, but apparently you forgot that there are 100s of pots in a "trawl" and 100s of trawls along the shelf edge. How much damage do they inflict to coral when a trawl gets washed over the edge and falls down the slope with miles of warp?As both an industry member and an AP member, i cannot support any aspect of this amendment, but if given no other option 1E would be the only viable choice in order to sustain the domestic harvest of illex.

Name: Steven ruhle

Email Address: ssruhle@aol.com

City, State, Zip Code: nc

Comments: As an illex fisherman , the proposed amendment will effectively destroy this fishery. there is no data to support such an action and plenty of data to the contrary. Clearly the concerns of the industry have fell on deaf ears, its apparent that the ultimate goal is to ban all fishing and destroy a way of life just so somebody can look at a picture on a wall and feel they accomplished something. This just proves that fisheries management in the us is a joke.

Name: Paul Thompson

Email Address: judyvthompson@comcast.net

City, State, Zip Code: 59 Acorn Lane, Cape May Court House, NJ 08210

Comments: I recently attended a hearing concerning the recent and historical findings of Deep Sea Corals and I represented United Boatmen of NJ.

As owners of a passenger fishing boat in Cape May, NJ, we realize the importance of maintaining and preserving a healthy natural habitat.

I have been in the business over 40 years and witnessed many changes. Many changes were regulations and others were improved fishing technology.
I have witnessed commercial fisherman fishing smarter and more efficiently. They too realize the importance of maintaining a healthy resource and habitat. They can not afford to fish near hazardous bottom.

After reviewing the document, we see no need to take any action so quickly as the February meeting.

We recommend assessments of known Deep Sea Coral areas periodically. Look for degradation due to bottom trawl activity. Most locations have probably been learned from bottom trawl information. Bottom trawl fisherman avoid these areas. Severe slopes we don't believe can be fished anyway.

If surveys indicate damage is occurring, take measures at a later date. Right now, the issue is identified and recognized. No action is required at this time, in our opinion.

On behalf of the United Boatmen of New Jersey, we recommend status quo, no action at this time, but continue to do evaluations.

Sincerely,

Paul H. Thompson, Representative of the United Boatmen of NJ
59 Acorn Lane
Cape May Court House, NJ 08210
(609)884-1214

Name: Derek McLaughlin

Email Address: derekmclau@yahoo.com

City, State, Zip Code: Port Hueneme, CA

Comments: None of the fisheries should be allowed to damage coral reefs at any depth anywhere in the world. Please put in strong measures and do what you feel is necessary to stop all damage that fishing is doing to coral ecosystems.

Name: Rachel Skubel

Email Address: rskubel@gmail.com

Comments: Regarding the Deep Sea Corals amendment, I fully support the courses of action protecting corals to the highest degree from bottom trawling damage. For both broad and discrete zones, increasing the zones of coral designation, prohibiting all bottom-tending gear, and enabling enforcement via vessel monitoring are commendable, practical ways to improve the ecosystems' outlook in the face of increasing human use and potentially stressful environmental change.

Name: Brian Reckenbeil

Email Address: breckenbeil@verizon.net

City, State, Zip Code: Marathon, FL, 33050

Comments: Protect ALL the corals, not just deep sea ones!

Name: Clinton Edwards

Email Address: clint@ucsd.edu

City, State, Zip Code: 92037

Comments: Fishing over deep sea coral habitat is tantamount to clear cutting a seqoiua forest in order to harvest grubs. I know that this sounds like an exaggerated statement, but in fact it is probably conservative. Deep sea corals are known to live as long or longer than the oldest trees on earth.

We long ago realized that the wholesale clear cutting of any area of forest is unacceptable. However, we use the veil of depth to obscure the effects of deep sea fishing. Until large scale evidence that we are not destroying these habitats is available these practices should be severely limited or banned. We can no longer let the absence of data be proof for lack of effects...that is counter intuitive and an assault on basic reason. Loggers have had massive advancements but selective harvest, and this has been proven as we can see large tracts of forest from space with satellites...that is how they figured out their sceince and enabled a new outlet for their industry. In light of the abscence of similar data CONTINUOUS AND HIGHLY RESOLVED data from the deep sea we cannot and should not allow any fishing in these areas.

Name: Manuel Nieve

Email Address: manuel.nieves1@upr.edu

Comments: Please do! I could start talking about the ecological, economical, and cultural importance of these ecosystems, but I am sure you know all of this. Do it so that when we give the planet back to our kids they will have something to be proud of.

Name: David Bryan

Email Address: drbryan02@yahoo.com

City, State, Zip Code: Miami, FL

Comments: We know very little about deep water corals, their associated fauna and their larger role in the marine ecosystem. We do know that deep sea trawling kills them, possibly forever destroying an ecosystem that we have just begun to learn about. Please take action to protect these resources from destructive deep water trawling.

Name: Liz Allyn

Email Address: lizallyn@uw.edu

Comments: This amendment has the potential to go a long way towards protecting the fragile marine environment. Not only will it protect these specific at risk areas, but it could also inspire other areas to adopt similar rules. Thank you for caring about this issue.

Name: Liv Bly

Email Address: Livbly@hotmail.com

Comments: This amendment is instrumental in the crucial effort to minimize damage to the coral reefs, an entire ecosystem that will be lost entirely in the near future unless mitigation strategies are ramped up.
Thank you

Name: Alicia Lloyd

Email Address: Alicia2lloyd@gmail.com

Comments: I agree with the proposed amendment to protect deep sea corals from fishing damage. Ensuring that these areas are agreed by the fishers will assist with compliance to the new rules. The public hearings and stakeholder consultation should help achieve this goal.

Name: Jennifer Salerno

Email Address: jleesalerno@gmail.com

City, State, Zip Code: Alexandria, VA, 22314

Comments: I'm a coral biologist. It's pretty simple. No corals = no fish. We are currently destroying deep-sea coral habitats before we even have a chance to explore and understand them. These valuable resources need to be managed responsibly.

Name: Tara Dolan

Email Address: dolan.tara.e@gmail.com

City, State, Zip Code: New York, NY

Comments: I support the amendment.

Name: Jacqueline Padilla-Gamino

Email Address: jpgamino@csudh.edu

City, State, Zip Code:

Comments: Please protect deep sea coral, they are invaluable ecosystems on Earth and new sources of future discoveries.

Name: Franziska Elmer

Email Address: franziskaelmer@hotmail.com

City, State, Zip Code:

Comments: Deep-sea corals and their ecosystems are increasingly recognized as a new frontier in scientific research, from their value as ocean sinks for carbon dioxide to their potential use in biomedical products. Around the world, many similar deep-sea biodiversity hotspots have already been destroyed, and because numerous fish assemblages are expected to shift deeper, away from warming waters, fisheries are expected to follow. The Council's plan will represent the first use of a new discretionary authority specifically designed to protect deep-sea corals under the Magnuson-Stevens Act. The extent to which the plan prioritizes coral conservation will set the course for future actions throughout the nation's waters, and add to the growing global network of deep-sea protected areas.

Name: Cheryl Morrison

Email Address: c.morrison52@yahoo.com

City, State, Zip Code: Charles Town, WV, 25414

Comments: I highly support this amendment to protect the deep sea corals in the mid-Atlantic.

Name: Ari Halperin

Email Address: ah1012@nova.edu

City, State, Zip Code: Ft Lauderdale, Florida

Comments: Please support the deep sea corals amendment!

Name: Amanda Hodo

Email Address: hodoaman@grinnell.edu

City, State, Zip Code: Bradenton, FL 34210

Comments: Help save the corals!

Name: Iliana Baums

Email Address: baums@psu.edu

City, State, Zip Code:

Comments: Dear colleagues,

I am a scientist working on the population genetic structure and response to oil of the black coral, Leiopathes glaberrima. Like many deep-sea coral species, Leiopathes grows extremely slowly and lives to be several thousand years old. Its intricate branches provide habitat for a myriad of other organisms. Because of their importance in providing habitat to other species and their life history characteristics, it is vital to protect deep-sea corals from direct physical impact that would uproot the colonies or break them. I would thus urge you to implement protective measures that either eliminate physical impact or reduce recurrence to very long time intervals.

With best regards,

Iliana Baums
Assoc Prof
PSU

Name: Alex Medina

Email Address: a3miller@gmail.com

City, State, Zip Code: Tumon, Guam, 96931

Comments: Please protect the deep-sea coral species. They are some of the oldest organisms on earth and there is so much we don't know about them yet. It will be very hard to study them if they are all destroyed.

Thank you for considering future generations.

Name: Bonnie Brady

Email Address: greenfluke@optonline.net

City, State, Zip Code: Montauk, NY 11954

Comments: On behalf of the Long Island Commercial FIshing Association , we support the following alternatives

Re Broad Coral Zone Alternatives, we support 1A- It is our belief that there should be no CPZ- Coral Protection zone. A 98,444 km2 swath of the ocean is called the "smallest" option, when in actuality it is anything but small and is purely to create a future MPA, under the guise of corals.

Over the last five years a total of seven surveys have been conducted to explore the deep canyons in the mid – Atlantic region. Nearly all of these recent surveys have been conducted at depth beyond 500 meters and the observations and data collected from these surveys have yet to be analyzed to their fullest capabilities. There is simply not any analysis to make an appropriate and educated decision.

Why is that? Isn't it possible that the best protection would be in areas where there is not competition between fishing and corals to begin with?

The socio-economic effects to the commercial fishing industry, and the shoreside business coastwide that depend on them, have been a farce, not been fully gathered, interpreted, or reviewed. This is a rush job to get something done without concern for the multitudes of small businesses that depend on that very productive area of the ocean, and have been fishing there for decades. Closing huge, ahem, even the "smallest" swaths may displace some of the fleet, but fishermen tend to fish in specific areas, for specific species. Displacement may bring added effort to other fisheries but without specific limited access permits, they may not happen. Closing an area will more than likely have the effect of shutting businesses.

Fishermen go where the fish are, the areas of the canyons are the prime offshore location for many of the various mid-Atlantic and Northeastern fisheries in the food chain. You cannot just shift effort, their (the species caught in that area) migratory patterns are very specific, based on water temperature. They don't move until temperature tells them to do so. When they do, the fishermen follow them.

Coral, as we know, is very slow growing. Because of its slow growth, rushing through an amendment without all of the appropriate analysis really won't benefit the coral, and will definitely not benefit fishing communities, both of whom, this council has been tasked to protect and balance. There should not be a rush to create/designate areas based on a feeling and without the facts

Consequently, we also believe Broad Coral Zone restrictions, Alternative 2A is appropriate. Again, fishing which has existed in those areas should not have to worry about losing valuable, prime fishing grounds. Mobile tending bottom gear avoids things like coral, so that nets, which are almost prohibitively expensive ($10-20,000), are not destroyed. There is no need to create a zone, as fishermen consciously avoid them.

Re 2.2 it hard to to craft management measures without appropriate data. The data used to create the Habitat Suitability Index and the analyses contained in Amendment 16 are inconsistent with Information

Quality Guidelines developed by the Office of Management and Budget(OMB) and does not meet the performance standards of NOAA's Data Quality Act. This data is not of the quality, utility or integrity that would justify potential management alternatives.

In lieu of the lack of appropriate, useful and accurate data, we support for 2.2- 2A, 2.3- 3A, 2.4- 4A, 2.5-5A, 2.6-6A

Any action that the council could take should allow for commercial fishing, in all it's forms, to continue in the areas where fishing historically occurs. Fishermen would be more than glad to work with the council and staff to specify the areas that are useful to protect both coral and fishermen. If there are areas of coral growth that can be determined, such as past 500 meters, to not have fisheries prosecuted, that would be the best solution for both the coral and the fishermen, allowing coral to grow (slowly) in an area where historic interaction does not exist.

Sincerely
Bonnie Brady
Long Island Commercial Fishing Association

Name: Peter deFur

Email Address: pldefur@igc.org

City, State, Zip Code: Henrico VA 23238

Comments: January 28, 2015

Re: Deep Sea Coral Amendments to the SMB Fishery Management Plan

The Council is commended for taking up this measure to protect the valuable resources represented by the Deep Sea Corals in the regions of the Mid-Atlantic and for the fisheries under MAFMC management. I heartily support this action now, as I have when the Council began this process several years ago when I sat on the Council.

The goals of protecting the corals and habitats serves the resources and the fisheries. Fisheries will benefit from this protection through maintenance of high quality habitat resources on which commercial (and recreational) fisheries depend.

As the Council knows, Deep Sea Corals are at least among the oldest living resources on the planet, and data from the South Atlantic suggest some of these resources are the oldest living resources on the planet. These corals are slow growing and depend on the limited resources in the sloped areas of the eastern slopes and canyons. Experience and survey indicate that the only effective means of protecting these resources is preventing damage to existing coral systems. And the best way to protect them is by preventing physical damage from fishing activities. Bottom tending gear is the greatest threat to deep sea corals, of all the human, fishery activities. Thus, keeping bottom tending gear out of the deep sea coral habitats is the most effective, if not the only real means available to the Council to protect deep sea corals.

I urge the Council to support the following alternatives as the most protective and practical:
Alternative 1B- a 200 m depth exclusion zone
Alternative 2 B prohibit all bottom tending gear
Alternative 2 D- this provision is largely duplicative of existing requirements
Alternative 3 B- adopt discrete zones in the canyons as high quality coral habitat
Alternative 4 B prohibit bottom tending gear in canyon coral zones
Alternative 5B, 5C and 5D to allow adjustments as new data are available.

These measure provide the maximum protection. The best reason for implementing the maximum protection is that once damaged, the corals are lost for the foreseeable future, owing to the nature of the resource. New data can and may improve the information on boundaries, location of corals and nature of habitat suitability. If ti turns out that a different boundary than the 200 m is suitable, then that boundary can be moved, as with the zones around the canyons.

Thank you for the opportunity to participate in the Council process.

Dear Chairman Robins and Members of the Mid-Atlantic Council,

I wish to commend the Mid-Atlantic Fishery Management Council for being the first of the federal councils to use the authority granted under the Magnuson-Stevens Act to protect valuable and fragile deep sea coral communities from the impacts of fishing. I support the implementation of both discrete and broad zones to effectively conserve deep sea corals.

Discrete protection zones around the canyons and slopes where corals have been found or are likely to occur must go beyond "freezing the footprint" of fishing and should rightly eliminate the use of fishing gears that could damage corals, even if the gear has operated in these areas in the past. I urge you to adopt Alternative 3B, designating all 15 canyon systems described in the Public Information Document as discrete coral protection zones. All bottom-tending commercial gears should be prohibited in the discrete zones (Alternative 4B).

Because many areas of the deep Atlantic remain unexplored, a broad zone will prevent the expansion of bottom-tending commercial gears that could damage undocumented deep sea corals. For this purpose, I support establishing a landward broad zone boundary no farther from shore than the 300 meter depth contour (Alternative 1B or 1C), which would encompass 99% or more of highly suitable deep sea coral habitat. Bottom-tending commercial gears should be prohibited from the broad zone with limited exemptions for existing red crab and tilefish fisheries, as long as these fisheries do not increase their effort or expand their footprint within the zone (Alternative 2B with Sub-alternatives 2B-1 and 2B-2). New discoveries of coral communities in the broad zone should trigger expedient action to incorporate these communities into a discrete zone to enhance their protection (Alternative 5D).

Thank you for prioritizing the protection of deep sea coral communities in the Mid-Atlantic and for recognizing the importance of habitat to the future of fishing.

Nancy Smith
1507 7th St
Santa Monica, CA 90401

barry holeve
1731 se 15 st
502
ft lauderdale, FL 33316

Dean Kelley
11 Prairieview Ln
Ormond Beach, FL 32174

Paul Huffard
20 Juniper Road
Darien, CT 06820

simon barrett
24
BALLANCE STREET
BATH, ot BA1 2RP

Stephen Smith
4713 Altha St
Raleigh, NC 27606

Antar Pushkara
85091 Larson Rd
Eugene, OR 97405

phil kline
3924 ingomar st nw
washington, DC 20015

Norman Baker
3789 Lost Moountain Road
Sequim, WA 98382

Robert Keiser
6131 SW 85 St.
S. Miami, FL 33143

Dear Chairman Robins and Members of the Mid-Atlantic Council,

I am very excited about the Mid-Atlantic Fishery Management Council's progress towards protecting the deep sea coral canyons off the coast. We know little about these canyons, but we do know that they host a delicate, fragile deep water coral ecosystem. I wish to commend the Mid-Atlantic Fishery Management Council for being the first of the federal councils to use the authority granted under the Magnuson-Stevens Act to protect valuable and fragile deep sea coral communities from the impacts of fishing. I support the implementation of both discrete and broad zones to effectively conserve deep sea corals.

Discrete protection zones around the canyons and slopes where corals have been found or are likely to occur must go beyond "freezing the footprint" of fishing and should rightly eliminate the use of fishing gears that could damage corals, even if the gear has operated in these areas in the past. I urge you to adopt Alternative 3B, designating all 15 canyon systems described in the Public Information Document as discrete coral protection zones. All bottom-tending commercial gears should be prohibited in the discrete zones (Alternative 4B).

Because many areas of the deep Atlantic remain unexplored, a broad zone will prevent the expansion of bottom-tending commercial gears that could damage undocumented deep sea corals. For this purpose, I support establishing a landward broad zone boundary no farther from shore than the 300 meter depth contour (Alternative 1B or 1C), which would encompass 99% or more of highly suitable deep sea coral habitat. Bottom-tending commercial gears should be prohibited from the broad zone with limited exemptions for existing red crab and tilefish fisheries, as long as these fisheries do not increase their effort or expand their footprint within the zone (Alternative 2B with Sub-alternatives 2B-1 and 2B-2). New discoveries of coral communities in the broad zone should trigger expedient action to incorporate these communities into a discrete zone to enhance their protection (Alternative 5D).

Thank you for prioritizing the protection of deep sea coral communities in the Mid-Atlantic and for recognizing the importance of habitat to the future of fishing.

Theresa Labriola
1503 Morgensen Road
Mosier, OR 97040

Dear Chairman Robins and Members of the Mid-Atlantic Council,

As an angler and conservationnist, I wish to commend the Mid-Atlantic Fishery Management Council for being the first of the federal councils to use the authority granted under the Magnuson-Stevens Act to protect valuable and fragile deep sea coral communities from the impacts of fishing. I support the implementation of both discrete and broad zones to effectively conserve deep sea corals.

Discrete protection zones around the canyons and slopes where corals have been found or are likely to occur must go beyond "freezing the footprint" of fishing and should rightly eliminate the use of fishing gears that could damage corals, even if the gear has operated in these areas in the past. I urge you to adopt Alternative 3B, designating all 15 canyon systems described in the Public Information Document as discrete coral protection zones. All bottom-tending commercial gears should be prohibited in the discrete zones (Alternative 4B).

Because many areas of the deep Atlantic remain unexplored, a broad zone will prevent the expansion of bottom-tending commercial gears that could damage undocumented deep sea corals. For this purpose, I support establishing a landward broad zone boundary no farther from shore than the 300 meter depth contour (Alternative 1B or 1C), which would encompass 99% or more of highly suitable deep sea coral habitat. Bottom-tending commercial gears should be prohibited from the broad zone with limited exemptions for existing red crab and tilefish fisheries, as long as these fisheries do not increase their effort or expand their footprint within the zone (Alternative 2B with Sub-alternatives 2B-1 and 2B-2). New discoveries of coral communities in the broad zone should trigger expedient action to incorporate these communities into a discrete zone to enhance their protection (Alternative 5D).

Thank you for prioritizing the protection of deep sea coral communities in the Mid-Atlantic and for recognizing the importance of habitat to the future of fishing.

Bill Francois
Herran
Paris, ot 75116

Dr. Christopher Moore, Executive Director January 19, 2015

Mid Atlantic Fisheries Management Council

800 North State St. Suite 201

Dover, DE 19901

Re: Deep Sea Corals Amendment

Dr. Moore,

On behalf of Trawlworks, Inc., which supplies nets, hardware, wire and other gear to the New England and Mid Atlantic fishing fleet, we the undersigned oppose taking action in February on the Deep Sea Corals Amendment. The Amendment as it now stands offers the options of closing huge areas of fishing ground to vessels we supply. This jeopardizes our future as a company.

Most options of the Amendment have not been designed with any industry participation. We request delaying the scheduled Final Action in February until there has been an Advisory Panel meeting to discuss the Alternatives. Currently, we support No Action Alternatives 1A, 2A, 3A, 4A, 5A and 6A. In the future, we could support Sub-alternative 3B-1, after more industry development.

Thank you,

Stephen Taber, Vice President

Peter Klenk

Mary O'Rourke

James Cordice

Richard Boiteau

David Cinquegrana

Kristen Flynn

January 24,2015

Comments on the Deep Sea Coral Amendment :

All concerned parties,

My name is Hank Lackner, I am the owner and operator of the fishing vessel Jason & Danielle. I fish primarily from Montauk NY and Cape May NJ. My target species are DEEP water squids (both illex and loligo), DEEP water fluke, DEEP water seabass, DEEP water butterfish, DEEP water monkfish as well as DEEP water dogfish and DEEP water whiting.. I guess you have got it by now, Every fishery in the Mid Atlantic will/can be effected by this amendment.

I ask each and everyone of you who reads these comments to ask themselves a few very important questions .. The first being, Is it the goal and intention of this amendment to protect coral or eliminate fishing as we know it in the mid-atlantic region? One might also ask themselves, has the best available science been used? We might also wonder, if this amendment process were to be slowed down and the advisory panel been used in the proper manner , could we do a far superior job protecting coral while not destroying the footprint of the mid-atlantic trawl fleet. Final question , why was the recreational sector , as well as other sectors left out of this amendment??

Please remember the Mid-Atlantic has the best performing fishery in the USA and that is not by accident!! Did we not rebuild these stocks to harvest them and feed the people of this country?

I would like to open my statements by saying:

1. I am 100% opposed to broad zones. A discrete zone developed by both the AP and industry would be best.
2. Most coral encounters presented by the service are obsolete and unverified at best. In fact we don't even know how the data was collected. If this is the best available data, a strong argument can be made that any discrete zones should be outside 600meters.The best available science says the coral is very deep,,,lets use it!!
3. There is no way we should be generating closed area based upon a coral prediction. I equate that to weather forcast. The industry can not afford to give up any more bottom.
4. Coral is already protected by steep slope hard bottom as well very deep unfished water.
5. This amendment has been fast tracked without proper analysis.. In fact the AP was promised at least a second meeting, but it never occurred. The work that was supposed to be accomplished has not been done!!
6. Should the chosen alternative be a discrete zone, the industry must be given a chance to refine it.. It should be noted ,the USCG, has stated these lines can be quite complex as long as straight lines are connected.
7. The objective of this amendment should not only protect coral ,but protect the sustainability of the industry as we see it.. FISHING practices must be maintained
8. The economic analysis should be completely disregarded..In fact we were promised a revision that we never got
9. I believe the council should take a long hard look at the impact other user groups can have on deep water corals. The lobster industry , red crab fishery and most importantly the sport/commercial-Party/charter boats can all have devastating impacts on corals.. The later groups anchoring practices in the heads of canyons is devastating to corals. .NO ONE USER GROUP SHOULD

BE SINGLED OUT !! If the objective is to protect coral, Why don't you make them prove their gear doesn't impact coral and include them in any closed areas.

10. FINAL ACTION SHOULD NOT TAKE PLACE IN FEBRUARY..YOU ARE NOT READY!!!!

It should be noted that the industry has never before reached out to the council in such a manner in preperation for an amendment. With that being said ,what does it take for mobile gear fisherman to gain credibility within the process.. The alternatives go way beyond the goals and objectives of the council. Some of these alternative could potentially close Mid Atlantic fishing down.. If that is the goal and objective you are on target..

Thanks ,

Hank Lackner

Fishermans Dock Co-operative

Point Pleasant, NJ 08742

Dr. Chris Moore

MAFMC 1/25/15

Comments on Deep water coral amendment

The Fishermans Dock Co-op submits these comments on the MAFMC's proposed Deep Water Corals amendment. Our dock has been in existence since 1952 and is one of the country's oldest fishing Co-op's. We are still in existence because of our fishermens ability to adapt to changing fishery migrations, market conditions, and the governments management plans. We have 11 member owned boats and service dozens more throughout the year. Dockside sales average 8 to 12 million a year.

While our boats do very little fishing in the deep waters anymore, we have probably more experience then anybody in fishing those waters. Starting in the mid 1960's our boats created a deep water lobster trawl fishery in the waters from 50 miles east of the Hudson canyon down past Tom's canyon. The water we trawled were from 90 to 250 fathoms deep, and by the mid 70's we had about 20 boats from Point Pleasant working those grounds full and part time. This fishery was the first casualty of the new Magnuson Act. A new England lobster trap company [Prelude] decided to expand its operation into the deep waters west of their traditional grounds and encountered our thriving trawl fishery, After losing thousands of pots due to our boats running them down [we're supposed to just give up our fishery to a new comer?] Prelude decided to get a little congressional help to protect themselves from the bad draggers who were costing them so much lost gear, so since apparently they had one or possibly two congressmen as investors in Prelude it was easy to pass a law protecting their pots and basically putting our fishery out of business. A few years later when they went bankrupt they left all their pots [thousands] out there to ghost fish, Nice guys. In the 1980's we created a fishery for both silver hake [whiting] and deep water Blackeye whiting. This fishery took place on the exact same grounds with regular whiting being caught from 80 to 160 fathoms, and blackeye Whiting being caught from 90 to 260 fathoms. None of our boats have fished those waters for whiting in close to 10 years, as the regular Whiting have moved east, and the Black Water whiting just was not plentiful enough to pursue.

My point here is that if you're are trying to protect coral in that area, if there was any there, it isn't anymore as it was subjected to extensive trawling over the years. I can say from my own experience that there were very few spots where we actually tore up and knew it was coral. The edges of the Hudson canyon are very sharp, with the east wall being almost impossible to fish deeper then 100 fathoms. The west side we did fish over 200 fathoms although we tried to hold about 150, the turns would force you over the edge in places. We have pretty much given up fishing in the deep [deeper then 150 fathoms] because one, Its plastered by lobster and crab pots, two there is not much financial incentive to fish there, and three it is very difficult to fish there due to the depth.

There are still fisheries we pursue though in the swallower areas of the deep, including Loligo squid, Butterfish, and whiting, and still occasional will fish down to 150 fathoms.

Therefore we are very concerned about some of the proposed management measures and how they can negatively affect our fisheries and income, and how some of the proposed protected areas could possibly be enforced. Therefore we support the no action alternative for the whole plan, as we see no way to enforce depth based protected areas, without just closing off large swaths of prime fishing grounds as NMFS is so prone to do. We do see a possible solution to this problem, and could support the 500 meter alternative along the whole shelf if it did not include the canyon areas. This would close a huge area of the bottom in deep and mostly unfished bottom, but still allow fishing in the canyons which are the prime fishing areas, so the economic impacts would be small. I will temper that statement with the point that there is an Illex squid fishery that works the deep water, and we are not sure how they would be effected by this, and even if their gear fishes the bottom out there or is Mid water. Not including the canyons would recognize the difficulty of trying to enforce a depth based closure and reduce economic impacts of this plan, while still protecting a huge area of bottom from future disruption. I can tell you that it is hard fishing the edges of the canyons, and many of them we can't fish deeper then 100 fathoms so their very geologic structure protects them from mobile gear. So the point is any areas of the canyons we can fish on we have already extensively fished so you would not save any coral, just cost enormous financial losses on the industry, as there are many fisheries that fish along the top of the edge.

With the still in existence southern gear restricted area, the proposed plan would create a narrow strip between that and the proposed coral plan that could be a nightmare to enforce. Since that GRA does nothing anymore it needs to be eliminated. Now for some nitpicking, This plan is NGO driven to destroy more fishing families in the name of "conservation". Unfortunetly the MAFMC is buying into it, as proved by the location of the public hearings. One in NY and NJ, None in North Carolina, one in Virginia, and two in Maryland, where there is no offshore fishery at all. In total there are 3 public hearings within 50 miles of the NGO's home base of Washington DC, while fishermen from northern NJ, western long island or North Carolina would have to travel 2 or more hours to a meeting. Also no meeting in Rhode Island which has an extensive amount of boats that work that area, besides the New England waters. I will point out what has been the result of the last NGO driven management plan that the MAFMC bought into and that was Dogfish. Sonja Fordham ran a crusade to save a fish that didn't need saving, whose spawning stock biomass was exactly where it was in an unfished stock in the 1960's, yet she convinced the council and NMFS that they were on the verge of extinction. Amazingly the stock was rebuilt within a few years of NEFSC claiming it may never recover, or at a minimum not until 2035, and it presently stands at a level 3 or more times higher than it was in the 1960's the level that should have been used as the baseline of the SSB. What has that huge biomass of hungry mouths done? They have retarded the rebuilding of every species on the atlantic coast, and caused enormous economic damage to our country, yet NMFS and the MAFMC thought what Sonja did was so great that they declared her an environmental hero. Her actions have done more to destroy the balance of the atlantic ecosystem then any other thing with the exception of the foreign fishing fleets decimation of our stocks with the state departments permission.

These same groups that are pushing what would be the largest closed area on the east coast also hypocritically support marine protected areas, where there would be no fishing at all, yet oil companies could drill to their hearts content. I guess they can't bite the hand that feeds them, which would be the Sunoco Fortune created PEW charitable trusts, who they will tell you have almost none of their 5 billion dollars invested in oil. Unfortunetly none of these environmental frauds seem to be smart enough to realise that the PEW group is not acting out of the goodness of their heart, they are simply using a non profit entity to do their dirty work by greenwashing and disguising their true intentions. Destroy the fishing

industry on the east coast so they can drill for oil. It is not the investment portfolio of the PEW charitable trusts that stands to benefit from the destruction of the fishing industry, it is the Board of Directors of that trust, who are the ones who decide what to fund and why. Lets have them, [who are all mostly Pew family members] release all of their personal investment information so we can see who is really trying to profit from our destruction. I bet that they are personally heavily invested in oil, and gas companies. So council members keep this in mind when these frauds come up with some more brilliant idea's to save the ocean from the bad fishermen.

Thanks,

James Lovgren

BOD Fishermans dock Co-op

January 26th, 2015

Richard Robins
Mid-Atlantic Fishery Management Council
800 North State Street
Suite 201
Dover, Delaware 19901

Dear Mr. Robins,

I am writing on behalf of the *F/V Lightning Bay* to comment on the proposed Deep Sea Corals Amendment.

Regarding the broad coral zone alternatives, I support Alternative 1A: No Action/Status Quo. I own an offshore dragger that fishes for monkfish in the 100-250 fathom range. We have been pushed into fishing in these depths from the Lobster GRA set in the 70-150 fathom range. Preventing us from fishing in these depths would prevent us from harvesting monkfish. Due to the loss of the summer flounder RSA program we have heavily invested in RSA monkfish days to make up that monetary loss. The closure would render those days useless to us and would effectively result in a huge financial loss. Until more studies have been done in these areas, I cannot support any other of the broad zone alternatives. According to Dr. Nizinski's research aboard NOAA's research ship *Okeanos Explorer,* most of the coral they found were in depths over 500 meters. They weren't finding many corals within the 200-300 meter range at all.

For the discrete coral zones, I support Sub-alternative 3B-1. If discrete zone are going to be formed the fishing industry should be part of the panel that proposes the boundaries for these zones. Buffer zones for the fisherman should be built in as they may be setting or hauling in gear near these boundaries.

If the Agency does choose to adopt closures, I would ask that the closed areas are off limits to ALL activities that could pose a risk to the coral. These activities include but are not limited to: recreational fishing, the crab fishery, the tile fishery, and the oil, mining and wind industry.

I greatly appreciate the opportunity to provide a comment regarding this proposed Amendment.

Sincerely,

Donald Fox owner of *F/V Lightning Bay*

Wednesday, January 28, 2015

Dr. Christopher M. Moore
Executive Director
Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201
Dover, Delaware 19901

Subject: Protect the Atlantic's Unexplored Depths and Deep-Sea Corals from Destruction -- Deep Sea Corals Amendment Comments

Dear Chairman Robins and Council Members:

I am encouraged that the Mid-Atlantic Fishery Management Council is taking proactive steps to protect vulnerable and poorly understood deep-sea coral ecosystems. I wish to commend the Mid-Atlantic Fishery Management Council for being the first of the federal councils to use the authority granted under the Magnuson-Stevens Act to protect valuable and fragile deep-sea coral communities from the impacts of fishing. The Council has an opportunity now to "freeze the footprint" of bottom fishing, which would prevent the expansion of fishing into areas that remain largely pristine. Such protections would be in line with the objectives of the National Oceanic and Atmospheric Administration's Strategic Plan for Deep-Sea Coral and Sponge Ecosystems, and with the Council's recent efforts to advance ecosystem-based fisheries management.

"Our duty to the whole, including to the unborn generations, bids us to restrain an unprincipled present-day minority from wasting the heritage of these unborn generations. The movement for the conservation of wildlife and the larger movement for the conservation of all our natural resources are essentially democratic in spirit, purpose and method."

-- *Theodore Roosevelt*

Deep-water corals live in total darkness. Absent light, these corals lack the symbiotic algae that produce nutrients to feed shallow water coral. Instead, deep water corals feed themselves by capturing passing food. In the mid-Atlantic region, corals were found to favor steep slopes of 30% or more and outcropping peaks—two habitats not conducive for fishing.

"As we peer into society's future, we—you and I, and our government—must avoid the impulse to live only for today, plundering for our own ease and convenience the precious resources of tomorrow. We cannot mortgage the material assets of our grandchildren without risking the loss also of their political and spiritual heritage. We want democracy to survive for all generations to come, not to become the insolvent phantom of tomorrow."

-- *Dwight D. Eisenhower*

Deep sea coral communities are considered to be biodiversity hotspots and essential habitats for commercially valuable fish stocks. Yet, until recently, only redfish were frequently seen with specific deep sea corals. It was, therefore, big news that deep sea corals were observed with skate and hake on a recent survey. That these two relatively abundant, commercially valuable fish were seen with corals below 500 feet gives hope for the importance of deep sea coral communities for less numerous ground fish populations.

"Then I say the Earth belongs to each generation during its course, fully and in its own right, no generation can contract debts greater than may be paid during the course of its own existence."

-- *Thomas Jefferson*

The most essential fish habitats with corals are the shallower slope waters. That fewer corals are found in waters shallower than 500 feet does not mean that the habitat is not suitable for corals. It may instead be indicative of more trawler and dredging disturbances. Below 200 meters is up on the continental shelf where most of the fishing occurs and slow growing corals have little chance of survival.

For example, across the Atlantic Ocean, Science AAAS reports marine biologist Jason Hall-Spencer of the University of Glasgow, United Kingdom, and two colleagues found large chunks of coral in the catch hauled up by two French vessels fishing off West Ireland. Radiocarbon dating of these fragments indicates the reefs are at least 4500 years old. Although only five of 229 hauls included substantial amounts of coral, Hall-Spencer says the extremely slow-growing coral can't recover from frequent trawling.

"An unwritten compact between the dead, the living and the unborn requires that we leave the unborn something more than…depleted natural resources."

-- *A Washington State Court decision*

I urge you to safeguard these ecological treasures now and for future generations by establishing a strong and enduring plan that would serve as an example for similar protections in New England and around the country and the world, where scientists are discovering extensive, beautiful, and previously unknown deep-sea coral gardens.

"The nation behaves well if it treats the natural resources as assets which it must turn over to the next generation increased, and not impaired, in value."

-- *Theodore Roosevelt*

I support the implementation of both discrete and broad zones to effectively conserve deep-sea corals. Discrete protection zones around the canyons and slopes where corals have been found or are likely to occur must go beyond "freezing the footprint" of fishing and should eliminate the use of fishing gear that could damage corals, even if the gear has operated in these areas in the past.

"Sustainable development is...development that meets the needs of the present without compromising the ability of further generations to meet their own needs."

-- *World Commission on Environment and Development, Our Common Future, 1987*

Specifically, please adopt Alternative 3B, designating all 15 canyon systems described in the Public Information Document as discrete coral protection zones. All bottom-tending commercial gear should be prohibited in the discrete zones (Alternative 4B). Because many areas of the deep Atlantic remain unexplored, a broad zone will prevent the expansion of bottom-tending commercial gear that could damage undocumented deep-sea corals. For this purpose, I support establishing a landward broad zone boundary no farther from shore than the 200-meter depth contour (Alternative 1B or 1C), which would encompass 99 percent or more of highly suitable deep-sea coral habitat. There is currently no ground fishing in waters more than 200 meters. Alternative 1B would not diminish currently fished areas and would in essence freeze current fishing zones with no add-ons. The far-away canyon waters over 200 meters have outcropping and are steeply inclined. These are areas not easily fished. Let's give refuge to

the fish that dwell with deep sea corals and not disturb the ancient marine life that dwells in waters below 200 meters by choosing Alternative 1B.

Bottom-tending commercial gear should be prohibited from the broad zone, with limited exemptions for existing red crab and tilefish fisheries, as long as these fisheries do not increase their effort or expand their footprint within the zone (Alternative 2B with Sub-alternatives 2B-1 and 2B-2). This restriction should include mid-water trawl gear, which has been documented to contact the sea floor. There should be no new exemptions beyond those in Amendment 16, as the risk of opening up these sensitive areas to new fisheries or gear types would undermine the document's objectives. Safeguarding waters in this "broad zone"—200 meters and seaward—and in the canyons will provide the highest conservation benefit while allowing current fisheries access to the areas upon which they most rely.

"It is our task in our time and in our generation, to hand down undiminished to those who come after us, as was handed down to us by those who went before, the natural wealth and beauty which is ours."

-- *John F. Kennedy*

Furthermore, new discoveries of coral communities in the broad zone should trigger expedient action to incorporate these communities into a discrete zone to enhance their protection (Alternative 5D). I also support the use of new technologies—such as vessel monitoring systems—aboard fishing vessels to help ensure the plan is effectively implemented on the water.

"Every man who appreciates the majesty and beauty of the wilderness and of wild life, should strike hands with the farsighted men who wish to preserve our material resources, in the effort to keep our forests and our game beasts, game-birds, and game-fish—indeed, all the living creatures of prairie and woodland and seashore—from wanton destruction. Above all, we should realize that the effort toward this end is essentially a democratic movement."

-- *Theodore Roosevelt*

Thank you for prioritizing the protection of deep-sea coral communities in the Mid-Atlantic and for recognizing the importance of habitat to the future of fishing. We are only beginning to learn about these biological communities and their importance to other components of ocean ecosystems, as well as their values to humans. Please pass and implement the strongest possible management measures in Amendment 16 in order to better protect deep sea coral reefs.

"A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise."

-- *Aldo Leopold*

Thank you for your consideration of my comments. Please do NOT add my name to your mailing list. I will learn about future developments on this issue from other sources.

Sincerely,

Christopher Lish
Olema, CA

John Nolan
F/V Seacapture
PO Box 2124
Montauk, New York 11954

RE: COMMENTS ON DEEP SEA CORAL AMENDMENT

Dear Dr. Moore(Chris) and Kiley,

I would like to thank the Council for moving forward in an effort to protect "Deep Sea Corals." Having said that, I need to express my concerns regarding the range of alternatives in this document. I feel many, if not most of the alternatives go well beyond the effort to protect "Deep Sea Corals". In fact, those alternatives would eliminate fishing in the Mid-Atlantic region. All the stocks that managers and industry worked so hard to rebuild would be off limits to the commercial fishing industry. Is that the intent of the Council?

I have been an offshore fisherman since 1970. I lobstered offshore from 1970 - 1977 and then switched over to bottom longlining for Golden Tilefish from 1977 until 2007, when my son took over. In those years, 1970 - 2007, in my 37 years of fishing experience in the Mid-Atlantic region, fishing from 40 fathoms to 170 fathoms, 12 months of the year, I have never seen or come in contact with a piece of coral. While many consider this anecdotal information, my 37 years of fishing observations have been ground truthed by the findings presented by Dr. Martha Nizinksi (NMFS National Systematics Laboratory) at the December 2014 Council meeting. Deep Sea Corals can be found in very deep water OUTSIDE of 500 meters.

5.1 BROAD CORAL ZONE DESIGNATION ALTERNATIVES

Alternative 1E: Landward boundary approximating 500 meter depth contour

5.2 RESTRICTIONS WITHIN BROAD CORAL ZONES

No comment at this time.

5.3 DISCRETE CORAL ZONE DESIGNATION ALTERNATIVES

Sub-Alternative 3B-1: Advisor-proposed boundaries for specific canyons

5.4 RESTRICTIONS WITHIN DISCRETE CORAL ZONES

Alternative 4C: Prohibit <u>mobile</u> bottom-tending gear

5.5 FRAMEWORK PROVISIONS TO ALLOW FUTURE MODIFICATIONS TO MANAGEMENT MEASURE

Alternative 5B, Alternative 5C, Alternative 5D and Alternative 5E

Thank you,

John Nolan (Owner)

Seafreeze Shoreside

Dr. Christopher M. Moore, Executive Director

12 January 2015

Mid Atlantic Fisheries Management Council

800 North State St. Suite 201

Dover, DE 19901

REF: COMMENTS ON DEEP SEA CORALS AMENDEMENT AT PUBLIC HEARING RIVERHEAD, NY

Dr. Moore,

I would like to voice my concern at the potential direction your Council may take given the range of alternatives proposed in this document. The "Broad Zone Alternatives" (Alternatives 1 B-E and 2B-D) threaten the future of fishing, both commercial and recreational, in the Mid Atlantic region. These Alternatives also go outside the Objectives and Goals of the very Council that proposes them. The fast track pace at which is Amendment is taking is counterproductive and is not in the best interest of all stakeholders.

There is little or no scientific or Industry generated data that would justify the potential closure of huge "Broad" swaths of ocean to fishing. Your counterparts at NEFMC have already rejected some portions of this broad approach and the USCG states that it feels it is "challenging" and "doubtful" from an enforcement standpoint.

As for the "precautionary" nature of this broad zone methodology to "protect corals from future fishing", your previous "Action to Protect unmanaged forage species" already goes a long way to protect corals, etc. in the future.

This Broad Zone approach would be a total disregard for the Strategic Goals and Objectives of this Council. I do not expect that you will turn a blind eye to the Science, Management and Governance you profess to follow by adopting any of the Broad Zone Alternatives mentioned above.

With respect to the development of the other Alternatives in the document, I cannot understand why the Council would present options using such out dated information. The majority of the coral observation data is at least 13 years old. In fact, some is from the 1800's. Also, a good portion was taken from anecdotal sources (unpublished) and museum artifacts. Coral locations that where plotted with Sextants and Loran A are not the "best available science". It borders on insulting to think that commercial fishing as we know it is being put at risk by the use of such unreliable data.

The economic data is also questionable. VTR data is only an estimate of the value of the fisheries at stake. To my knowledge, no attempt to gather accurate economic data from key players was made. It certainly appears that a large component of the Industry (shoreside operations and the associated

Seafreeze Shoreside, Inc.
Plant – 75 State Street, Narragansett, RI 02882 Ph - 401-267-4470 Fax 401-522-5087
Corporate Mailing Address – 100 Davisville Pier, N. Kingstown, RI 02852
Payment Address: P.O. Box 3293 Narragansett, RI 02882

1/4

support industries) has been left out of the economic data. How is it possible that the Council would overlook, or avoid, developing the best available science on such a critical issue?

As a member of the Advisory Panel for MSB, I must also question why the AP has not been consulted in the evolution of this Amendment and the Alternatives it proposes. This group exists for exactly the purpose of assisting the Council in making educated and viable options for public discussion. The Council was sorely remiss in not enlisting the knowledge and experience of the AP in drafting this Amendment. The public must be made aware of this shortfall as well.

Both NOAA and Industry have provided information to support the existence of areas of a high degree of natural protection for corals. These include "habitat where little or no fishing effort takes place". Extreme depths, severe slope of canyon walls and hard bottom already shelter much of the current or potential coral habitat. Existing historical and current fishing operations prove out the "footprint" that this amendment is so keen to "freeze". It would be counterproductive to ignore the data and science available to this council in adopting future management strategies.

The Designation of Discrete Coral Zones has the strongest basis in fact for which this Council can develop fair and equitable protection for all user groups and the corals themselves. The Towcam Survey by R/V Henry Bigelow currently shows the basis for "modifying the alternatives as long as sufficient information exists". Please note Table 25 (attached) and the presence, or lack thereof, of corals and sponges both deeper and shallower than 1050m (574 fathoms). The results show that the presence of corals and sponges shallower than 1050 meters is minimal where their existence deeper than 1050 meters becomes more problematic. Dr. Nizinski made a presentation in December 2014 to the Council that also showed very few coral inside at least 500m. This data supports the development of Discrete Coral Zones, with input from all stakeholders, at a depth contour of no less than 500m that would easily provide adequate protection for corals, sponges, existing fishing operations and the economies and communities that depend on them.

Critical data being used to develop this Amendment is outdated including information on coral encounters, economic analysis and fishing effort. The Industry has provided this Council, in an open and transparent manner, the information and the willingness to develop workable and effective solutions in this matter. Fishermen, fishing gear and modern technology promotes the avoidance of areas that corals prefer. The pace at which the Council is pursuing this Amendment must be revisited in order to develop a more effective Amendment. The Advisory Panel must be allowed to provide input critical to the development of a realistic and viable Alternative.

I am more than willing to work with this Council to develop, and FULLY SUPPORT A MORE DETAILED VERSION OF ALTERNATIVE 3-B-1 using a landward boundary of at least 500m and shelf/canyon wall slope of <30 degrees. This Alternative would maximize the protection of all stakeholders and the corals themselves.

Thank you for the opportunity to comment on this issue.

Kind regards,

Eric Reid, Operations Manager

Eric@SeafreezeLtd.com

Table 25: Preliminary image survey of NE canyon fauna from TowCam surveys, 2012-2013. Images were captured at 10 second intervals through each dive. Each bottom image was visually screened for hard and soft corals, sponges, and fish fauna. Presence/absence information was logged for each image.

TowCam Dive #	Canyon Location	Date	Launch Lat N	Launch Lon W	Recovery Lat	Recovery Lon	No. of Images on bottom	No. images with corals	No. images with sponges	% images with corals	% images with sponges	Nominal Depth (m)
HB1204-01	Toms Canyon SE	7/7/2012	38 56.3823	72 25.7944	38 55.5772	72 25.6275	1734	828	2	47.75	0.12	1802
HB1204-02	Toms Canyon Lower West	7/8/2012	38 57.1788	72 27.2815	38 57.5213	72 27.5442	2067	557	121	26.95	5.85	1736 to 1694
HB1204-03	Toms Canyon Canyon Head	7/8/2012	39 06.2975	72 38.0914	39 05.8721	72 38.1695	1226	11	16	0.90	1.31	553 to 861
HB1204-04	Hendrickson Canyon Lower East Scarp	7/9/2012	38 57.6673	72 26.3203	38 57.5940	72 26.5532	1148	291	264	25.35	23.00	175 to 1705
HB1204-05	Middle Toms Canyon Mid	7/10/2012	38 56.9385	72 35.3163	38 56.8551	72 35.0058	1963	1016	522	51.76	26.59	1337 to 1591
HB1204-06	Toms Canyon Mid-East	7/10/2012	39 01.6231	72 33.2098	39 01.7749	72 33.1740	1781	154	83	8.65	4.66	1115 to 1216
HB1302-001	Ryan Canyon	6/10/2013	39 46.4979	71 41.9049	39 46.3115	71 41.9738	649	0	0	0.00	0.00	599
HB1302-002	Ryan Canyon	6/11/2013	39 43.8514	71 42.6188	39 43.9435	71 41.9149	420	2	0	0.48	0.00	771
HB1302-003	Ryan Canyon	6/12/2013	39 43.8357	71 42.1705	39 43.3885	71 41.3225	2262	48	497	2.12	21.97	992
HB1302-004	Ryan Canyon	6/12/2013	39 42.3582	71 38.6827	39 41.5694	71 38.3807	2079	62	496	2.98	23.86	1135
HB1302-005	Ryan Canyon	6/13/2013	39 34.7145	71 33.3316	39 35.317	71 32.6441	1358	584	9	43.00	0.66	1965
HB1302-006	Ryan-McMaster Inter-canyon area	6/13/2013	39 47.5719	71 42.7850	39 47.3285	71 40.5977	2230	1	52	0.04	2.33	498

ANALYSIS OF TOTAL TOWS AT NOMINAL DEPTH LESS THAN 1050 METERS (<574 fathoms)

No. of images on bottom: 6,787

No. of images with Corals: 62 % images with Corals: 0.92%

No. of images with Sponges: 565 % images with sponges: 8.33%

No. of images with Fish Fauna: none reported

Please note TowCam Dive #HB1204-04 has been omitted from this calculation due to the high variability in nominal depth.

Table 25: Preliminary image survey of NE canyon fauna from TowCam surveys, 2012-2013. Images were captured at 10 second intervals through each dive. Each bottom image was visually screened for hard and soft corals, sponges, and fish fauna. Presence/absence information was logged for each image.

TowCam Dive #	Canyon Location	Date	Launch Lat N	Launch Lon W	Recovery Lat	Recovery Lon	No. of Images on bottom	No. images with corals	No. images with sponges	% images with corals	% images with sponges	Nominal Depth (m)
HB1204-01	Toms Canyon SE	7/7/2012	38 56.3823	72 25.7944	38 55.5772	72 25.6275	1734	828	2	47.75	0.12	1802
HB1204-02	Toms Canyon Lower West	7/8/2012	38 57.1788	72 27.2815	38 57.5213	72 27.5442	2067	557	124	26.95	5.85	1736 to 1694
HB1204-03	Toms Canyon Canyon Head	7/8/2012	39 06.2975	72 38.0914	39 05.8721	72 38.1695	1226	11	16	0.90	1.31	553 to 861
HB1204-04	Hendrickson Canyon Lower East Scarp	7/9/2012	38 57.6673	72 26.3203	38 57.5940	72 26.5532	1148	291	264	25.35	23.00	175 to 1705
HB1204-05	Middle Toms Canyon Mid	7/10/2012	38 56.9385	72 35.3163	38 56.8551	72 35.0058	1963	1016	522	51.76	26.59	1337 to 1591
HB1204-06	Toms Canyon Mid-East	7/10/2012	39 01.6231	72 33.2098	39 01.7749	72 33.1740	1781	154	83	8.65	4.66	1115 to 1216
HB1302-001	Ryan Canyon	6/10/2013	39 46.4979	71 41.9049	39 46.3115	71 41.9738	649	0	0	0.00	0.00	599
HB1302-002	Ryan Canyon	6/11/2013	39 43.8514	71 42.6188	39 43.9435	71 41.9149	420	2	0	0.48	0.00	771
HB1302-003	Ryan Canyon	6/12/2013	39 43.8357	71 42.1705	39 43.3885	71 41.3225	2262	48	497	2.12	21.97	992
HB1302-004	Ryan Canyon	6/12/2013	39 42.3582	71 38.6827	39 41.5694	71 38.3807	2079	62	496	2.98	23.86	1135
HB1302-005	Ryan Canyon	6/13/2013	39 34.7145	71 33.3316	39 35.317	71 32.6441	1358	584	9	43.00	0.66	1965
HB1302-006	Ryan-McMaster Inter-canyon area	6/13/2013	39 47.5719	71 42.7850	39 47.3285	71 40.5977	2230	1	52	0.04	2.33	498

ANALYSIS OF TOTAL TOWS AT NOMINAL DEPTH GREATER THAN 1050 METERS (>574 fathoms)

No. of Images on bottom: 10,982

No. of images with Corals: 3,201 % images with Corals: 29.15%

No. of images with Sponges: 1,233 % images with Sponges: 11.23%

No. of images with Fish Fauna: none reported

Please note TowCam Dive # HB1204-04 has been omitted from this calculation due to the high variability in nominal depth.

January 12, 2015

RECEIVED
JAN 20 2014
Mid-Atlantic Fishery Management Council

Chairman Rick Robins
Council Members
Mid-Atlantic Fishery Management Council
800 N. State St., Suite 201
Dover, DE 19901

RE: Deep Sea Corals Amendment Comments

I am writing to thank the Mid-Atlantic Fishery Management Council (Council) for considering taking strong steps to protect vulnerable deep-sea coral ecosystems here in the Mid-Atlantic.
Just off the Mid-Atlantic Coast, the bottom of the ocean and deep-sea canyons are home to centuries-old corals, colorful sea anemones, and countless fish. But this rich array of life is facing a severe new threat - commercial bottom fishing.

Canyons are coral hotspots and provide important habitat for diverse concentrations of marine life, including sperm whales, tunas, and sharks.

-I urge the Council to protect the discrete coral zones in all fifteen canyons from all bottom fishing gears.

-I urge the Council to take action and restrict the use of all bottom-fishing gear by establishing a broad coral zone below 200 meters.

Protecting both the discrete and broad coral zones is critical because once these fragile and ecologically important coral communities are disturbed it can take centuries for them to recover.

-Finally, I urge the Council to require the use of electronic vessel monitoring systems aboard fishing vessels to ensure the plan is effectively implemented on the water.

We are only beginning to learn about these amazing deep-sea ecosystems and their importance to the healthy functioning of our ocean, as well as their values to humans. These deep canyons at the bottom of the ocean are teeming with creatures like glowing lantern fish, burrowing tilefish, colorful anemones, and deep-sea corals hundreds of years old.

Until now, fishermen were not able to access these deep-sea canyons off the Mid-Atlantic coast with their destructive gear, but recent advances in technology could soon make these formerly untouched waters vulnerable.

In the process known as bottom trawling, commercial fishing boats drag heavy nets along the ocean floor, ripping apart corals and other marine life as they go. And other deep-sea fishing techniques are just as harmful.

Fishing gear such as bottom trawl nets can remove in minutes what took nature centuries to build, leaving barren, scarred mud and rock where rich gardens of corals, sponges, and anemones once thrived. When that happens, the marine wildlife that depend on coral communities are left vulnerable as well. We cannot afford to lose such great biodiversity at the bottom of the ocean.

Now, the Council has the opportunity to become a global leader in the protection of deep sea corals by passing and implementing the strongest possible management measures.

Thank you for your help on behalf of healthy oceans and marine life by regulating destructive practices.

Yours truly,
J. Capozzelli, New York

Linn D. Barrett
4305 29th Street Road
Greeley, CO 80634

RECEIVED
JAN 20 2014
Mid-Atlantic Fishery Management Council

Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201
Dover, DE 19901

January 13, 2015

Re: Deep Sea Corals Amendment

Dear Chairman Robins and Council Members,

I am pleased to see the Mid-Atlantic Fishery Management Council acting proactively to protect vulnerable and poorly understood deep-sea coral ecosystems, and thank you for the opportunity to provide my comments.

Please designate all waters from the proposed 200-meter depth contour to the edge of the U.S. Exclusive Economic Zone and each of the defined canyons as off-limits to all destructive bottom fishing gears. This restriction should include mid-water trawl gear, which has been documented to contact the sea floor. Additionally, I ask that you ensure that no new exemptions are permitted beyond those detailed in Amendment 16. I support the use of new technologies, such as vessel monitoring systems, to help ensure the plan's effective implementation on the water.

Thank you for your consideration. With utmost conviction and sincerity,

Linn D. Barrett

The Council received a total of 22 copies of the letter below (see supplemental briefing materials).

Seafreeze Ltd.

100 Davisville Pier
North Kingstown, R.I. 02852 U.S.A.
Tel: (401) 295-2585 Telex: 325114
FAX: (401) 295-5825

Dr. Christopher Moore, Executive Director

Mid Atlantic Fisheries Management Council

800 North State St. Suite 201

Dover, DE 19901

January 13, 2015

Re: Deep Sea Corals Amendment

Dr. Moore,

I am writing to express my deep concern about the possible implementation of the current Deep Sea Corals Amendment. We at Seafeeze Ltd. are entering our 29th year of participation in the Mid Atlantic Illex squid fishery with our vessels the F/V Relentless, F/V Persistence and F/V Prevail. We as a company have pioneered this fishery, developed it markets, and helped successfully manage healthy stock levels. Illex squid represents a large portion of our landings, and therefore revenue.

My job depends on the future successful management of this fishery and its fishing grounds. This Amendment proposes closing huge areas of our historic and current Illex fishing grounds, with little or no industry input, threatening irreversible loss to the Illex fishery. Much of the area that the Amendment proposes for closure is proved by the document itself to contain miniscule or no coral presence. Therefore, devastating economic impact is paired with little or no conservation value. The Council cannot disregard these facts.

A more equitable and practical approach to addressing these issues would be to allow industry professionals to help the Council develop Discrete Coral Zones that both protect known deep water corals while allowing the Illex fishery to continue to operate effectively. I support delaying the scheduled February Final Action until after an Advisory Panel meeting and the incorporation of necessary industry data. I support the No Action Alternatives 1A, 2A, 3A, 4A, 5A and 6A at this time. In the future, I would support a modified Sub-Alternative 3B-1 developed closely with industry members.

Sincerely, Benjamin Troger
F/V persistence
Relentless

The Council received 2 separate copies of the letter below (both signatures included below).

Dr. Christopher Moore, Executive Director

Mid Atlantic Fisheries Management Council

800 North State St. Suite 201

Dover, DE 19901

January 13, 2015

Re: Deep Sea Corals Amendment

Dr. Moore,

I am an employee of Seafreeze Shoreside in Point Judith, RI. At Seafreeze Shoreside we service our own as well as other privately owned vessels by purchasing, selling and freezing Illex squid, Loligo squid, butterfish, mackerel, and monkfish, among others. All of these species are caught in deep water Coral Zones proposed by the Council's Deep Sea Corals Amendment. Restricting or closing these Zones to mobile bottom tending gear will potentially eliminate the fisheries, businesses and jobs that depend on these fishing grounds.

According to the information found in the Amendment, as well as that in Dr. Nizinski's own presentation, there is no substantial deep sea coral presence in any depth shallower than 500 meters, and in actual fact shallower than 1050 meters. Yet the Amendment proposes to close areas as shoal as 200 meters. This is not supported in any way by scientific fact. The research also shows that deep sea corals prefer to live in gradients of greater than 30 degrees, in deepwater canyons. Mobile bottom tending gear cannot be used on these steep slopes, ensuring coral protection from gear by virtue of habitat.

However, missing from the Amendment is analysis of accurate fishing ground "habitat". Human habitat must be given equal consideration as coral habitat. The VTR data contained in the Amendment analysis is incomplete and inaccurate, as can be proven by the detailed tow information logged over time by fishing vessel operators. Yet industry has not been given adequate opportunity to collaborate with the Council in developing Coral Zones that both protect our livelihoods and historic fishing grounds as well as the corals.

I therefore support No Action Alternatives 1A, 2A, 3A, 4A, 5A and 6A, as well as a delay in Final Action, at this time. In the future I would be willing to support Sub-alternative 3B-1 after extensive industry collaboration and revision, as well as an Advisory Panel meeting.

Sincerely,

Sincerely,

The Council received a total of 9 copies of the letter below (see supplemental briefing materials).

Seafreeze Ltd.

100 Davisville Pier
North Kingstown, R.I. 02852 U.S.A.
Tel: (401) 295-2585 Telex: 325114
FAX: (401) 295-5825

Dr. Christopher Moore, Executive Director

Mid Atlantic Fisheries Management Council

800 North State St. Suite 201

Dover, DE 19901

January 13, 2015

Re: Deep Sea Corals Amendment

Dr. Moore,

I am writing as an industry member who stands to be greatly affected by the adoption of the Council's Deep Sea Coral Amendment, but has been completely ignored in the process of its development. I work for Seafreeze Ltd., in North Kingstown, RI. We own and operate the fishing vessels F/V Relentless, F/V Persistence and F/V Prevail. As a company, a large portion of our income is generated by the Illex squid fishery, which operates largely in the areas which the Deep Sea Corals Amendment seeks to close to mobile gear fishing.

My job, alongside many others, has not been considered in the economic analysis put forward in this document. We, the stakeholders in this fishery, have not once been invited to the table to discuss possible economic impacts on our jobs and our future. The economic impact data included in the document is outdated, imprecise and incomplete, despite the fact that accurate industry records and data exist. This Amendment puts my job at stake, and to do so without including any consideration of or opportunity for cooperative industry development is insupportable.

I support delaying the scheduled Council Action in February until there has been an Advisory Panel meeting where industry input and information have been taken into account. I support No Action Alternatives 1A, 2A, 3A, 4A, 5A and 6A. As a secondary choice, I support an industry modified Sub-alternative 3B-1, following an Advisory Panel meeting.

Sincerely,

Crew of F/V Persistence:
Kyle Goodwin, Sal Carlino Sr., Sal Carlino Jr., Ed Clarke, Mike Burgess
Edward Clarke, Manuel Dos Santos, Kevin Hillman, Brendan Hindle
Rosario Lara, Cass Martin, Chris Mercado, Mike Ross, Brian
Stacey, Matt Terry, Paul Weyland, Chris Weisenseel

The Council received a total of 8 copies of the letter below (see supplemental briefing materials).

Seafreeze Ltd.

100 Davisville Pier
North Kingstown, R.I. 02852 U.S.A.
Tel: (401) 295-2585 Telex: 325114
FAX: (401) 295-5825

Dr. Christopher Moore, Executive Director

Mid Atlantic Fisheries Management Council

800 North State St. Suite 201

Dover, DE 19901

January 13, 2015

Re: Deep Sea Corals Amendment

Dr. Moore,

I am writing as an affected party under the Mid Atlantic Deep Sea Corals Amendment. I work for Seafreeze, the Nation's number one producer of Illex squid. Our vessels, the F/V Relentless, F/V Persistence and F/V Prevail not only employ crew to catch and process Illex on board, but they also employ numerous individuals shoreside to handle, sell and distribute the catch. In its present state, this Amendment threatens the very existence of a future Illex fishery. Almost every Alternative contained in this document would prevent Illex vessels from operating in the entirety of our fishing grounds, either now and/or in the future. Despite the Amendment's claim that "some degree of revenue loss is expected to be offset by effort shifts to non-restricted areas", this is impossible when the restricted areas would encompass virtually the whole fishery.

This Amendment is purportedly designed to protect deep sea corals, yet the proposed coral zones and the coral distribution/abundance data do not coincide. NOAA's DSCRTP records are outdated, ranging anywhere from 1874 to the 1960s to early 2000s. It is not reasonable to expect that coral presence is the same today as it was hundreds or even tens of years ago, considering ever changing ecological ocean conditions. The current data from the 2012-2013 Tow Cam surveys show less than 1% coral presence in areas shallower than 1050 meters, yet the proposed Coral Zones range anywhere from 200-500 meters. There is no reason for this Council to close productive fishing grounds to protect non-existent corals.

I cannot support any Council action that would be economically detrimental to the Illex fishery, and therefore myself, if there is not sufficient justification for so doing. I believe industry data, both economic and fishery related, need to be incorporated into this Amendment, since we have the most at stake. I support No Action Alternatives 1A, 2A, 3A, 4A, 5A and 6A. As a secondary choice, I support an industry modified Sub-alternative 3B-1, but only after an Advisory Panel meeting and extensive industry input can be obtained. Therefore, I also support delaying Final Action until this can be accomplished.

Sincerely,

Crew of the F/V Relentless:
Greg Bray, David Fletcher, Mike Fogan, Billy Hay, Jason Goldman,
Thomas Tiger, Thomas Marshall, David Weeks, Jordan, Pelock,
David Gross, Aziz Benscicka, James Hudson, Sam Tucker

Dr. Christopher Moore, Executive Director

Mid Atlantic Fisheries Management Council

800 North State St. Suite 201

Dover, DE 19901

January 13, 2015

Re: Deep Sea Corals Amendment

Dr. Moore,

I am writing as an affected party under the Mid Atlantic Deep Sea Corals Amendment. I work for Seafreeze Shoreside. Seafreeze Shoreside is one of the East Coast's foremost facilities for handling Illex squid, Loligo squid, mackerel, butterfish, and other species fished in areas addressed by the Amendment. We service not only Seafreeze vessels but also many other privately owned vessels. Seafreeze Shoreside employs numerous individuals to handle, sell and distribute the catch. We also provide employment to maintenance personnel, office personnel, and help keep others in the fishing industry employed by providing a place for them to unload their catch.

In its present state, this Amendment threatens all of the aforementioned fisheries. Almost every Alternative contained in this document would prevent vessels from operating in the entirety of their fishing grounds, either now and/or in the future. Despite the Amendment's claim that "some degree of revenue loss is expected to be offset by effort shifts to non-restricted areas", this is impossible when the restricted areas would encompass virtually all viable fishing areas.

This Amendment is purportedly designed to protect deep sea corals, yet the proposed coral zones and the coral distribution/abundance data do not coincide. NOAA's DSCRTP records are outdated, ranging anywhere from 1874 to the 1960s to early 2000s. It is not reasonable to expect that coral presence is the same today as it was hundreds or even tens of years ago, considering ever changing ecological ocean conditions. The current data from the 2012-2013 Tow Cam surveys show less than 1% coral presence in areas shallower than 1050 meters, yet the proposed Coral Zones range anywhere from 200-500 meters. There is no reason for this Council to close productive fishing grounds to protect non-existent corals.

I believe industry data, both economic and fishery related, need to be incorporated into this Amendment, since we have the most at stake. I support No Action Alternatives 1A, 2A, 3A, 4A, 5A and 6A. As a secondary choice, I support an industry modified Sub-alternative 3B-1, but only after an Advisory Panel meeting and extensive industry input can be obtained. Therefore, I also support delaying Final Action until this can be accomplished.

Sincerely,

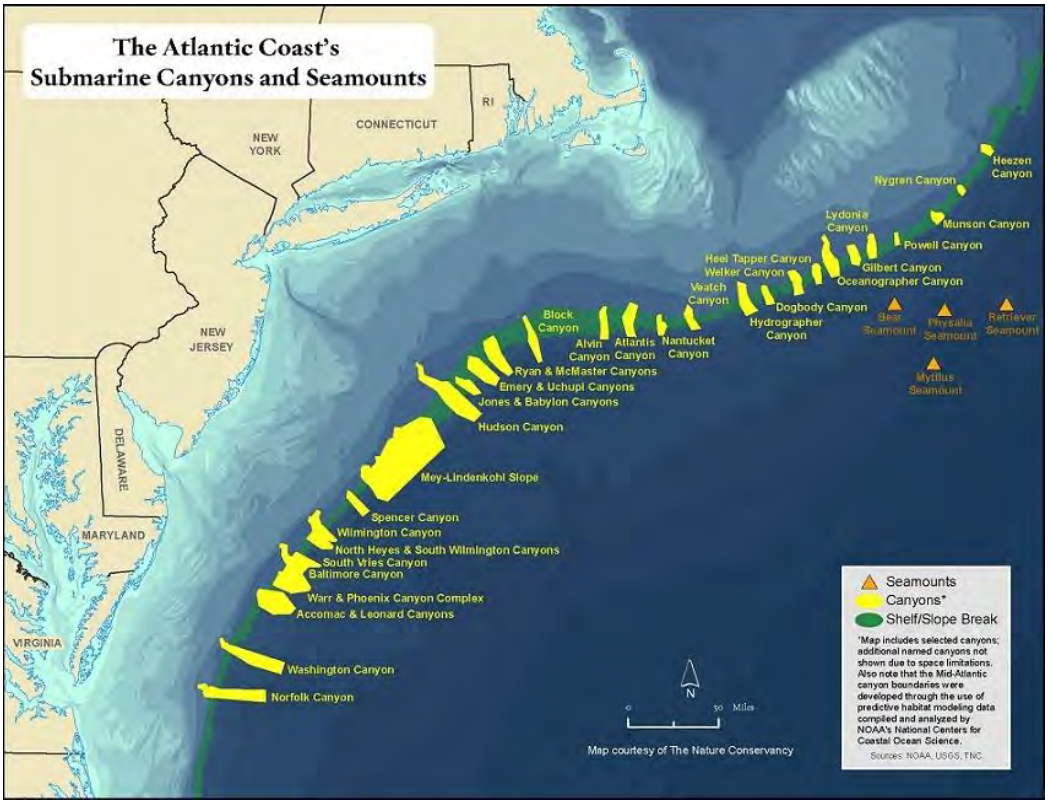
Thomas E. McVey

To whom it may concern at the Mid-Atlantic Fisheries Management Council,

I am writing this letter on behalf of myself, the general public, and many of the concerned staff members, whom I have worked with at Old Dominion University in Norfolk, Virginia as a graduate student. Over my past years of study as a geographer / writer, I have become increasingly interested / concerned about the current state of our world's one ocean.

With the United Nations Food and Agriculture Organization insisting that two thirds of all the world's commercial fisheries have collapsed since the 1950s, and that all rates are further accelerating, **NOW** is the time to take aggressive action to conserve marine life and underwater habitat (the way the 1976 Magnuson-Stevens Act originally called for, in addition to further amendments). This will ensure the long-term health and sustainability of fish stocks and the habitat that they are dependent on for survival, as well as the survival of the commercial fishing industry, and most importantly, the public interest in these marine resources.

With that being said the internet map that I have selected and inserted below (from Google Images) addresses concern for the deep sea corals that are found in and around the canyons along the Mid-Atlantic region (and beyond), which you are partly in charge of managing. This also brings me to the proposed **Amendment 16**.



With strong backing, I please, please, please urge you to take the most aggressive approaches to ensure that these deep sea corals are protected and conserved for current and future generations of humans and marine life alike. **(Continued =>)**

We are now only beginning to understand how significantly important it is to protect these corals, and yet, scientists are still discovering new species and uses for all species. Not protecting these corals before their ever-growing potential is fully understood would be human ignorance, driven by nothing more than short term profits.

It would also be equal to biting the hand that feeds, as they provide habitat and food for many significantly important forms of marine life, including those that are commercially / publically valuable. With deep sea coral communities providing a safe-haven for young forms of marine life to grow, leaving them unprotected and vulnerable to the destructive realities of fishing gear, which drags, scraps, or hits the bottom, would show that we, as a human species have learned nothing from our past mistakes.

If two words could be used to sum up a dark chapter in human history, they would be Atlantic Cod (and many more species too). Though severely overfished before the establishment of the Regional Fishery Management Councils, and not under the management of the MAFMC, the over-exploitation of cod, clearly shows how bottom trawlers can unsustainably exhaust a fishery to the point of collapse, thus leaving nothing in the wake of their nets, but a destroyed bottom habitat that is absent of life.

To repeat these actions by destroying ancient / centuries old coral is disturbing. More disturbing though are internet videos (by NOAA & others) that already capture the destruction of coral communities from trawl gear.

Amongst the many books, academic journal articles, and documentaries that I have read / watched, most suggest that that many of the 8 Regional Fishery Management Councils in the U.S. have fallen victim to private interests. To say the least, I know for a fact that many people would change their opinions significantly if Amendment 16 was put into force.

But this Amendment would only work if destructive fishing gear (that impacts the ocean bottom) were to be banned from all of the canyons where deep sea corals are found, what NOAA calls discrete protection zones. Vessels should also have electronic monitoring systems that should be inspected and **ON** at all times when fishing. Also, as corals are not only found in canyons, those found outside should be protected too. In order to do so, many scientists suggest that seafloors of 656.17 feet (200 meters) and deeper would be acceptable.

I am currently working on a book that focuses on fisheries. I would like to be able to add in a chapter or section that applauds the MAFMC for strictly taking these conservation measures to promote the long-term health and sustainability of our public / common resources. Please make the right choices. I know you are all capable of doing so.

Thank you for your time and concern about public opinion! **(From: Ronnie Gannon)**

The Great Egg Harbor Watershed Association

P.O. Box 109
Newtonville, NJ 08346

856-697-6114
Fred_akers@gehwa.org

OFFICERS

Julie Akers
President

Ed Curry
Vice President

Dick Colby
Treasurer

TRUSTEES

Steve Eisenhauer

Elmer Ripley

Sarah Summerville

Jamie Cromartie

Clark Sprigman

Pat Sprigman

Clay Emerson

STAFF

Lynn Maun
Secretary & Coordinator

Fred Akers
Administrator

January 16, 2015

Dr. Christopher M. Moore, Executive Director
Kiley Dancy, Fishery Management Specialist
Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201,
Dover, Delaware 19901

RE: Deep Sea Corals Amendment Comments.

Dear Dr. Moore and Ms. Dancy:

On behalf of the Great Egg Harbor Watershed Association, and as an active member of the MAFMC Ecosystem Advisory Panel, I offer you the following comments regarding the Deep Sea Corals Amendment to the MSB FMP.

In summary, we support the following management options:

Alternative 1B: Landward boundary approximating 200 meter depth contour
Alternative 2B: Prohibit all bottom-tending gear
Alternative 3B: Designation of Discrete Coral Zones
Alternative 4B: Prohibit all bottom-tending gear
Alternative 5B: Option to modify coral zone boundaries via framework action
Alternative 5C: Option to modify management measures within zones via framework action
Alternative 5D: Option to add additional discrete coral zones via framework action
Alternative 5E: Option to implement special access program via framework action
Alternative 6B: Vessel Monitoring Systems (VMS) requirement for *Illex* squid moratorium vessels

In recognition of the potential serious adverse impacts to both the deep sea ocean ecosystem and the MSB commercial fishing industry economics from these amendment to protect deep sea corals, we offer the following detailed comments summarizing our rational for our alternative recommendations:

Comment: Recently guided by the Forage Fish White Paper and Ecosystem Approaches to Fisheries Management, the MAFMC took action to "freeze the footprint" for the opening of any new fisheries for unfished forage fish. It was also recognized that the MSB FMP is an existing fishery that has historically taken forage fish without all of the adverse impacts to the ecosystem being known or considered.

Recognizing that there are known and unknown adverse impacts to the ecosystem from the MSB fishery, it is a prudent action to employ the largest designation of Broad Deep Sea Coral Zones to "freeze the footprint" of adverse impacts to the ocean ecosystem. Therefore we recommend the following option:

Alternative 1B: Landward boundary approximating 200 meter depth contour
Under this alternative, a broad coral zone would be designated with the landward boundary approximating the 200 meter (~s109 fathom) depth contour and extending out to the northern and southern boundaries of the MAFMC management region, and to the edge of the EEZ.

Comment: To actually implement the "freeze the footprint" of the MSB in the Broad Deep Sea Coral Zones to the greatest extent practical, we recommend the following option:

Alternative 2B: Prohibit all bottom-tending gear
Under this alternative, vessels would be prohibited from using any bottom-tending gear within designated broad coral zones. "Bottom-tending gear" includes any mobile bottom-tending gear (as defined in Alternative 2C below), as well as any stationary or passive gear types that contact the bottom, including bottom longlines, pots and traps9, and sink or anchored gill nets.

Comment: Given that there was no "look before you leap" considerations given to adverse ecosystem impacts for the startup and investment of the MSB fishery, and that new science and research has now identified a serious potential for adverse ecosystem impacts to deep sea corals and their habitats, we recommend the following option to maximize ecosystem protection:

Alternative 3B: Designation of Discrete Coral Zones
Under this alternative, specific submarine canyons and slope areas would be designated as discrete coral zones based on observed coral presence or highly likely coral presence indicated by modeled suitable habitat. Proposed discrete zones are listed in Table 1 as sub-options to this alternative (see also: Figure 3). The Council could select any combination of these specific areas to designate as discrete coral zones.

Comment: Once Discrete Coral Zones are established in accord with Alternative 3B, we recommend the following option to maximize their protection:

Alternative 4B: Prohibit all bottom-tending gear
Under this alternative, vessels would be prohibited from using any bottom-tending gear within the designated discrete coral zones. This prohibition could include any or all of the discrete coral zones listed in Table 1. "Bottom-tending gear" includes any mobile bottom-tending gear (as defined in Alternative 4C below), as well as any stationary or passive gear types that contact the bottom, including bottom longlines, pots and traps,11 and sink or anchored gill nets.

Comment: Given that additional research is planned or ongoing and many data products will not be available within the planned timeline for this amendment, we agree that modifying the framework provisions of the FMP would allow the Council to modify deep sea coral zones or management measures in response to new information or issues arising after implementation of the amendment. Therefore we support and recommend the following options:

Alternative 5B: Option to modify coral zone boundaries via framework action
This alternative would give the Council the option to modify the boundaries of deep sea coral zones through a framework action.

Alternative 5C: Option to modify management measures within zones via framework action
This alternative would give the Council the option to modify fishing restrictions, exemptions, and other management measures within deep sea coral zones through a framework action.

Alternative 5D: Option to add additional discrete coral zones via framework action
This alternative would allow the Council to add discrete coral zones through a framework action.

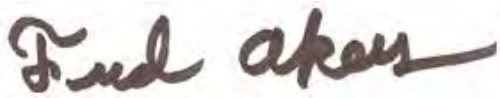
Alternative 5E: Option to implement special access program via framework action
This alternative would give the Council the option to design and implement a special access program for commercial fishery operations in deep sea coral zones through a framework action.

Comment: VMS should be required to monitor all commercial fishing activity, so we recommend the adoption of the following alternative:

Alternative 6B: Vessel Monitoring Systems (VMS) requirement for *Illex* squid moratorium vessels
This option would require use of VMS for all *Illex* squid moratorium vessels (regardless of whether fishing activity is occurring within or outside of any potential deep sea coral zones).

As always, we appreciate the opportunity to comment, and we appreciate your continued work to protect the public's ocean ecosystems and manage for sustainable fisheries.

Very Best Regards,



Fred Akers

OCEAN STATE OIL

123 Ocean State Drive, North Kingstown, RI 02852 800-554-4557

Dr. Christopher Moore, Executive Director
Mid Atlantic Fisheries Management Council
800 North State St. Suite 201
Dover, DE 19901

January 20, 2015

Comments for Deep Sea Corals Amendment

Dear Dr. Moore,

We at Ocean State Oil supply considerable amounts of oil to commercial fishing vessels in Rhode Island. This market represents a significant percentage of our annual income. Any Council action preventing these vessels from fishing hurts our business.

The Deep Sea Corals Amendment as written threatens to put the vessels we supply out of business. We cannot support this. We are confident that the Council can work with industry to produce an Alternative that works for everyone. We request that the Council delay Final Action and allow the Advisory Panel and industry members the chance to develop Sub-Alternative 3B-1. If this cannot be done, we can only support No Action Alternatives.

Regards,

Joseph Petrarca
General Manager
Ocean State Oil
123 Ocean State Dr.
North Kingstown, RI 02852

Dr. Christopher Moore, Executive Director

January 20, 2015

Mid Atlantic Fisheries Management Council

800 North State St. Suite 201

Dover, DE 19901

Re: Deep Sea Corals Amendment

Dear Dr. Moore,

We at Pray Trucking Inc. transport the catch of Rhode Island vessels catching Illex Squid, Loligo Squid, Mackerel, Butterfish and Herring. Although we do not work directly on fishing vessels, we supply the support services necessary to distribute their catch. Any action that threatens their continuing fishing operations also directly affects us.

The Deep Sea Corals Amendment proposes closures of the most productive areas of deepwater fishing activity. If this occurs, we will have no product to transport. Therefore, we support No Action Alternatives 1A, 2A, 3A, 4A, 5A, and 6A. If the Council is willing to collaborate with industry to produce a workable Sub-Alternative 3B-1, we will support that in the future.

Sincerely,

Ronald Reed

Pray Trucking Inc.

The Council received a total of 9 copies of the letter below (see supplemental briefing materials).

Dr. Christopher Moore, Executive Director

Mid Atlantic Fisheries Management Council

800 North State St. Suite 201

Dover, DE 19901

January 20, 2015

Re: Deep Sea Corals Amendment

Dr. Moore,

My name is Dwayne R Suggs and I work for Sokol Inc. I transport the catch of Rhode Island vessels catching Illex Squid, Loligo Squid, Mackerel, Butterfish and Herring. Although I do not work directly on fishing vessels, my job depends on these fisheries. I cannot support any Council action that threatens their sustainability or economic viability.

The Deep Sea Corals Amendment proposes closures of the most productive areas of deepwater fishing activity. If this occurs, I will have no product to transport. Therefore, I support No Action Alternatives 1A, 2A, 3A, 4A, 5A, and 6A. If the Council is willing to collaborate with industry to produce a workable Sub-Alternative 3B-1, I will support that in the future.

Sincerely,

Ocean River Institute letter - a total of 4,350 signatures were received (see supplemental briefing materials).

Ocean River
INSTITUTE
Protecting the Commons

"All at last return to the sea—to Oceanus, the ocean river, like the ever-flowing stream of time, the beginning and the end."
— Rachel Carson, *The Sea Around Us*

January 22, 2015

Christopher M. Moore, Executive Director
Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201
Dover, Delaware 19901

Dear Councilors,

We urge the Mid-Atlantic Fishery Management Council to protect deep sea corals and to practice responsible ocean stewardship by approving Alternative 1B to protect corals at and below 200 meters.

I recently attended the Mid-Atlantic Fisheries Management Council's presentation by Dr Nizinski on deep sea corals. In the canyons of the mid-Atlantic region they surveyed for corals below 500 meters. Deep-water corals live in total darkness. Absent light, these corals lack the symbiotic algae that produce nutrients to feed shallow water coral. Instead, deep water corals feed themselves by capturing passing food. In the mid-Atlantic region corals were found to favor steep slopes of 30% or more and outcropping peaks – two habitats not conducive for fishing.

Deep sea coral communities are called biodiversity hotspots. They are considered essential habitats for commercially valuable fish stocks. Yet, only redfish were frequently seen with specific deep sea corals. It was, therefore, big news to learn from Dr. Nizinski that deep sea corals were observed with skate and hake. That these two relatively abundant commercially valuable fish were seen with corals below 500 feet gives hope for the importance of deep sea coral communities for less numerous ground fish populations.

We urge the Mid-Atlantic Fishery Management Council to adopt Alternative 1B – "a broad coral zone would be designated with the landward boundary approximating the 200 meter depth contour. . ." We believe the most essential fish habitats with corals are the shallower slope waters. That fewer corals are found in waters shallower than 500 feet does not mean that the habitat is not suitable for corals. It may instead be indicative of more trawler and dredging

12 Eliot Street, Cambridge, MA 02138 • P.O. Box 380225, Cambridge, MA 02238
www.OceanRiver.org • tel 617-661-6647 • text ORI to 69866
Printed on 100% post-consumer recycled paper

disturbances. Below 200 meters is up on the continental shelf where most of the fishing occurs and slow growing corals have little chance of survival.

For example, across the Atlantic Ocean, Science AAAS reports marine biologist Jason Hall-Spencer of the University of Glasgow, United Kingdom, and two colleagues found large chunks of coral in the catch hauled up by two French vessels fishing off West Ireland. Radiocarbon dating of these fragments indicates the reefs are at least 4500 years old. Although only five of 229 hauls included substantial amounts of coral, Hall-Spencer says the extremely slow-growing coral can't recover from frequent trawling.

There is currently no ground fishing in waters more than 200 meters. Alternative 1B would not diminish currently fished areas and would in essence freeze current fishing zones with no add-ons. The far-away canyon waters over 200 meters have outcropping and are steeply inclined. These are areas not easily fished. Let's give refuge to the fish that dwell with deep sea corals and not disturb the ancient marine life that dwells in waters below 200 meters by choosing Alternative 1B.

Thank you for considerations of our interests and concerns.

Sincerely,

Rob Moir, Ph.D., Director

... and 4,350 individuals with comments

Rhode Island Department of Environmental Management

Office of the Director
235 Promenade Street
Providence, Rhode Island 02908-5767
401.222.6800
Rhode Island Relay 711

January 25, 2015

Dr. Christopher M. Moore
Executive Director, Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201
Dover, Delaware 19901

RE: Deep Sea Corals Amendment Comments

Dear Dr. Moore:

The Rhode Island Department of Environmental Management wishes to submit comments on the Deep Sea Corals Amendment (hereafter Amendment) currently out for public review. Before outlining the substantive remarks on the Amendment specifically, I wanted to take a moment to express the concern I have over not having had a hearing on this very important amendment in our state, nor was the state even aware of this plan until very recently. The resources impacted by this Amendment may have a very significant impact on the state of RI and its squid and monkfish fisheries, a fact which is even highlighted in your Amendment document in figures 25 – 30. We hope to rectify this situation in the future, and my staff will be reaching out to MAFMC staff to make sure our lines of communication are stronger as we progress in to the future.

At this point, the state of RI (hereafter the State) supports the option noted as **sub-alternative 3B-1** in the Amendment document. We support this option for a number of reasons. The State agrees that deep sea corals need special protection as a unique and important habitat, and we believe the goal of the Amendment is a good and important step towards protecting this habitat. We support this option as it appears to be the only alternative to directly incorporate industry input in to its development, which the State believes is a critical component to the plan development. The industry members that we have discussed the topic with also support the protection of deep sea corals, but felt that many of the options outlined in the Amendment far exceeded the areas needing closed area status. Given these comments and our review of the information in the Amendment document, we believe that sub-alternative 3B-1 will protect the areas with known high coral abundances based on the most up to date information without severe impacts to the industry prosecuting their fisheries in these offshore areas. As noted on page 44 of the document, the three areas contained in sub-alternative 3B-1 are "the areas of highest coral

observations", and this is also indicated in table 24, therefore we believe this alternative will provide very good protection to deep sea corals as the science is further developed.

The State is not opposed to further protections in the future as newer information is incorporated in to the habitat suitability models, but updating these models with newer information is critical. Position technology has advanced dramatically in the recent past and the advent of drop camera surveys will dramatically improve our understanding of the known areas where corals thrive, thereby allowing us to focus our protections, and not do unneeded damage to our important fishing industries. We support the adoption of sub-alternative 3B-1 with an eye towards continued research and monitoring of deep sea coral habitat, and as new data and modeling procedures are developed, the boundaries of the closed areas could be re-evaluated with future actions.

One additional note to consider as a research recommendation, the effects of ocean acidification should also be considered in the habitat suitability models. Factors like this may confound any efforts we seek to make to protect these organisms, therefore this should be an additional parameter considered in the habitat suitability models. We note that many environmental parameters are already captured and are included in the model, but for deep sea corals, seawater pH is another critical covariate that should be included in the models in the future. This parameter was not noted in the Amendment document as a field of data considered in the current model configuration.

While we support sub-alternative 3B-1, we also hope that before the final boundaries are drawn, the industry, through your existing Advisory Panel, would be consulted so that the lines will not only be meaningful for habitat protection, but also for manageability of fishing operations and clarity for enforcement purposes.

If you have any questions, please feel free to call me at 401.222.4700 x 2409 or at janet.coit@dem.ri.gov or Robert Ballou at 401.222.4700 x 4420 or robert.ballou@dem.ri.gov.

Thank you.

Sincerely

Janet Coit
Director

January 26, 2015

Dr. Christopher M. Moore, Executive Director
Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201
Dover, Delaware 19901
c/o email: kdancy@mafmc.org

Re: Deep Sea Corals Amendment Comments

On behalf of the Center for Biological Diversity, I am writing to support the Deep Sea Corals Amendment to the Mackerel, Squid, and Butterfish Fishery Management Plan.

Cold water corals are rich and diverse and provide important habitat for fish and other marine life. These corals grow slowly and are very long lived, thus susceptible to natural damage and human activities, with little potential for recovery. Scientists find that any damage occurring now may take many hundreds, if not thousands, of years to recover.

Deep sea corals in the Atlantic are imperiled by fishing that can result in habitat destruction and bycatch. Protecting deep sea corals from damaging bottom gear is an important step in sustainable management of fisheries and the Atlantic marine ecosystem.

I am writing to urge the Council to prohibit all bottom-contact fishing gear in all of the canyon areas (Alternative 4B) that have been identified as "discrete protection zones." Furthermore, the Council should include a buffer zone protecting seafloors 200 meters and deeper ("broad zone" Alternative 1B). Finally, fishing vessels should be required to use electronic vessel monitoring to enforce the deep sea coral protections.

Thank you for the opportunity to comment on this amendment.

Sincerely,

/s/ Miyoko Sakashita
Miyoko Sakashita
Oceans Director

January 27th, 2015

Richard Robins
Mid-Atlantic Fishery Management Council
800 North State Street
Suite 201
Dover, Delaware 19901

Dear Mr. Robins,

I am writing on behalf of the Town Dock to comment on the proposed Deep Sea Corals Amendment

Regarding the broad coral zone alternatives, I support Alternative 1A: No Action/Status Quo. As a seafood dealer that owns vessels that fish for monkfish in the 100-250 fathom range, I cannot support any broad zone closures. Our vessels have been pushed into fishing in these depths from the Lobster GRA set in the 70-150 fathom range. Preventing us from fishing in these depths would prevent us from harvesting monkfish. Due to the loss of the summer flounder RSA program our company has heavily invested in RSA monkfish days to make up for that monetary loss. The closure would render those days useless to us and would effectively result in a huge financial loss. One of our vessels also holds an Illex permit. Closing these areas to Illex fishing would be another financial loss that the Town Dock would have to bear.

According to Dr. Nizinski's research aboard NOAA's research ship *Okeanos Explorer,* most of the coral they discovered were in depths of over 500 meters. The research showed that not many corals were being found within the 200-300 meter range at all. Until more studies have been done in these areas, I cannot support any other of the broad zone alternatives.

Regarding the discrete coral zone alternatives, I support Sub-Alternative 3B-1. If discrete zone are going to be formed the fishing industry should be part of the panel that proposes the boundaries for these zones. Buffer zones for the fisherman should be built in as they may be setting or hauling in gear near these boundaries. Having the butter zones would prevent unintended violations.

I greatly appreciate the opportunity to provide a comment regarding this proposed Amendment.

Sincerely,

Katie Almeida
Fishery Policy Analyst

CC
Ryan Clark
VP of the Town Dock

The Town Dock: P.O. Box 608; 45 State St Narragansett, RI 02882
PH: 401-789-2200 FAX: 401-782-4421
Website: www.towndock.com

F/V Illusion

Mark S. Phillips
210 Atlantic Ave.
Greenport, New York 11944
516-361-3253

January 28, 2015

Mid-Atlantic Fisheries Management Council

Comments for the record – Deep Sea Corals Amendment to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan

---

Please enter the following comments into the record:

It seems that NGO hype is more important than science when dealing with deep sea corals. Even though there is no scientific basis for a 200 meter and deeper ban on trawling.

Your own information says that most if not all deep sea coral is deeper than 500 meters and most likely much deeper. Also it grows on steep slopes that can't be trawled on. Then NOAA wants to exempt everyone except trawlers. You require lobstermen to use sinking groundline to avoid whales, and then assume that the gear doesn't move, no one remembers the perfect storm when lobster gear moved extreme distances snagging everything in its path. NO one is saying that recreational and party/charter boats can't drop their anchors on the steep slopes that contain corals or anchor to lobster gear and drag the pots through coral.

Anyone that knows anything about trawling knows that if you tow across sharp objects you only do it once, your net comes back in shreds it is not something you repeat with nets costing 15 to 50 thousand dollars. The webbing in these nets is 1/16 to ¼ inch in diameter and highly susceptible to damage unlike the ¾ inch groundline of lobster and red crab gear.

I am 100 percent Opposed to broad zones. I am in favor of all alternatives that keep things status quo. Industry created discrete zones being second choice.

Most Coral encounters presented by the service are obsolete and unverified at best. In fact most of the sightings were in the 1960 and 1970's. We don't even know how this data was collected. And if this data is used, a strong argument can and will be made to make any discrete areas outside 600 meters...the best available data says the coral is very deep. Let's use it. Deep sea coral is already protected by hard bottom, steep slopes and extremely deep water.

I can't help but wonder why this is being pushed forward so hard is it because of oil and gas exploration that is being pushed, 2 articles U.S. Seen Limiting Oil Drilling in Arctic, May Open Atlantic **BY BLOOMBERG ON JANUARY 26, 2015 and** U.S. Proposes Opening Atlantic in 5-year Oil, Gas Drilling Plan **BY REUTERS ON JANUARY 27, 2015.**
There was little outcry from the major NGOs over the Deep Water Horizon accident and even Jane Lubchenco played the severity of the damage down trying to blame fishermen for the damage. How much deep sea coral was smothered by oil in that spill or killed by the dispersants.

It seems this is an NGO plan that needs a win that punishes fishermen after their failed attacks on butterfish and menhaden.

Thank you,
Mark S Phillips

Seafreeze Ltd.

100 Davisville Pier
North Kingstown, R.I. 02852 U.S.A.
Tel: (401) 295-2585 Telex: 325114
FAX: (401) 295-5825

January 27, 2015

Dr. Christopher Moore, Executive Director

Mid Atlantic Fisheries Management Council

800 North State St. Suite 201

Dover, DE 19901

Re: Deep Sea Corals Amendment

Dr. Moore:

I am writing on behalf of Seafreeze Ltd., to raise concerns that we have with the Council's recently released Public Information Document of the Deep Sea Corals Amendment. We at Seafreeze Ltd. are entering our 29th year of participation in the Mid Atlantic Illex squid, Loligo squid, Butterfish and Mackerel fisheries with our vessels the F/V Relentless, F/V Persistence and F/V Prevail. We are the largest producers of Illex, Butterfish, and Mackerel on the East Coast. We are also the third largest producer of Loligo. We as a company have pioneered these fisheries, developed their markets and helped successfully manage healthy stock levels. The Deep Sea Coral Amendment to the Atlantic Mackerel, Squid and Butterfish FMP threatens to exclude us from the very fisheries we have worked almost thirty years to establish. The majority of Amendment options will permanently close the entire Illex fishery and significant portions of the Loligo, Butterfish and Mackerel fisheries.

We have had difficulty reconciling the document's proposed action with both the Magnuson Stevens Act (MSA) and the Mid Atlantic Council's 2014-2018 Strategic Plan. This is especially troubling considering the potential economic and fishery impacts this Amendment will have.

1. The Council's Public Information Document Does Not Meet the Requirements of MSA Section 303(b).

   A. Under Section 303(b) of the MSA, this Deep Sea Corals Amendment is a "discretionary provision". It is not mandatory, and it has no required timeframe in which to be completed. Therefore, the Council has no legal obligation to move this Amendment through quickly. Yet it appears that by scheduling a Final Action in February, only a month after the Public Information Document has been released, the process of adoption is being fast tracked. This is a problem due to lack of industry participation in developing workable Alternatives, and

the fact that a second Advisory Panel meeting was promised to provide such participation but was never held. Lack of substantive Advisory Panel contribution would appear to be a procedural error on behalf of the Council.

B. Section 303(b)(2)(B) of the MSA reads that discretionary provisions may "designate such zones in areas where deep sea corals are identified...to protect deep sea corals from physical damage from fishing gear or to prevent such loss or damage to such fishing gear from interactions with deep sea corals, *after considering long-term sustainable uses of fishery resources in such areas*" (italics mine). Most of the Council's Broad and Discrete Coral Zone Alternatives would permanently shut down the fishing grounds of the East Coast Illex squid fishery, as well as a good portion of the deepwater Loligo, Butterfish, Whiting and Monkfish fisheries, leaving little or no long-term uses of fishery resources in these areas. Areas considered necessary for operation of traditional and current fisheries can easily be identified by industry professionals. However, industry and Advisory Panel members were never solicited by the Council to help determine how prospective Coral Zone Alternatives would impact the "uses of fishery resources in such areas". Accurate consideration cannot take place without this information.

C. MSA Section 303(b)(2)(B) is clear that designation of coral zones is to only take place in areas "where deep sea corals are *identified*" (italics mine). This means that if reliable data proving the identification of corals in an area is unavailable, the area cannot be closed as a Coral Zone. This also prohibits a predictive coral habitat model from being used as sole justification for the closure of an area. However, a good portion of the Coral Zones, i.e. 200-400 meter options, have been developed exactly in this manner. We submit that the Council needs to rethink its basis for any Alternatives inside 500 meters.

D. Section 303(b)(2)(C) states that "with respect to any close of an area under this Act that prohibits all fishing, ensure that such closure- (i) is based on the best scientific information available; (ii) includes criteria to assess the conservation benefit of the closed area; (iii) establishes a timetable for review of the closed area's performance that is consistent with the purposes of the closed area; and (iv) is based on an assessment of the benefits and impacts of the closure...including the benefits and impacts of limiting access to users of the area, overall fishing activity, fishery science, and marine conservation." It does not appear that the current Amendment meets any of these provisions.

(i) "Best scientific information available": Outdated records comprised of magazine articles and museum pieces collected long before the advent of GPS cannot be included in "the best science available" when detailed information collected from recent ROV and Tow Cam surveys exists. This is especially true considering NOAA's recent focus on warming ocean temperatures and climate change. Temperature and climate change have affected coral habitats since the 1870s and 1960s, rendering any coral presence data collected from such periods as inconclusive in today's changing oceans.

The Public Hearing Document's Table 25, which details almost 19,000 recent images of the ocean bottom in question, together with Dr. Nizinski's December 2014 presentation on deep sea corals, does not support the creation of any Coral Zones in areas shallower than 500 meters due to lack of coral presence. In fact, Table 25 does not support the creation of any Coral Zones inside 1000 meters due to lack of coral presence. Yet, the majority of Coral Zone Alternative options are comprised of areas inside 500 meters. We would then ask the Council how these Alternatives can claim to be based on the "best science available".

(ii) "Criteria to assess the conservation benefit of the closed area":

(a)The Public Hearing Document does not contain any such criteria. When most of the Coral Zone lack coral, how do they offer any conservation benefit to coral? What criteria have been used to assess conservation benefit in areas where no coral have been observed or identified? What criteria have been used to compare the conservation benefits of closure to non-closure?

(b) The document repeatedly advocates for the protection of coral from the impacts of fishing gear. It focuses primarily on prohibiting all mobile bottom tending gear because "mobile gears are believed to have the greatest negative impact on corals"(p.4). Closing productive fishing areas vital to mobile bottom tending gear vessels must be based on more than "belief". Have there been studies to prove that mobile bottom tending gear has any greater impact on corals than other bottom tending gear?

(c) Supporting science indicates that deep sea corals prefer habitats of steep slope, i.e. greater than 30 degrees, overhangs, and outcroppings-areas where mobile bottom tending gear cannot be deployed. This would indicate that coral habitat itself is a conservation measure and prevents damage from mobile bottom tending gear. This requires review.

(iii) There is no "timetable for review of the closed area's performance" presented as part of the Amendment.

(iv) "Assessment of the benefits and impacts of the closure...including the benefits and impacts of limiting access to the users of the area, overall fishing activity, fishery science, and fishery and marine conservation": This indicates a weighted assessment of coral protection benefits vs. fishery impacts, particularly impacts on current users of the areas in question. The document does not contain this assessment.

No balance can be found between users of the area and conservation of corals until all options shoaler than 500 meters are removed. Until that depth, no interaction even occurs. At depths of 500 meters or more, a weighted assessment can only take place once industry members are a part of the process, because only accurate industry generated data can identify user impact.

We request that a cost analysis per vessel, per fishery, be completed. A weighted economic assessment cannot detail fishery impacts until the Council, and indeed the public, is aware of a cost analysis per vessel, per fishery. The Public Information Document contains only vague VTR vs. overall fishery revenue analysis. This is not sufficient information. Stakeholders, Council members, and the commenting public need to know the average cost per year to a vessel, i.e. loss of income per fishery, that the various Alternatives would generate, so as to accurately assess the "impacts of the closure".

We do not need to remind the Council that until MSA standards and mandates are satisfied, this Amendment cannot go to Final Action.

1. The Public Information Document violates Mid Atlantic Fishery Management Council's own Strategic Plan. The Strategic Plan is designed to guide Council activities from 2014-2018. The Deep Sea Corals Amendment Public Information Document directly contradicts these objectives.

   A. "Communication": Commits to "engage, inform, and educate stakeholders to promote public awareness and encourage constructive participation in the Council process"; "[i]ncrease stakeholder trust and facilitate greater stakeholder engagement by making the Council process accessible and transparent"; and to "[i]ncrease stakeholder involvement in the development of fishery management actions." Industry has been willing to work with the Council by providing accurate economic and operational information, and has offered to help develop workable Alternatives, but has been denied that opportunity. With the exception of an underdeveloped Sub-Alternative 3B-1, not one Alternative includes any direct stakeholder input.

   B. "Science": Commits to ensuring "that the Council's management decisions are based on timely and accurate scientific data that are analyzed and modeled in a manner that improves management performance and build[s] stakeholder confidence". See above concerns concerning "best science available". The Council has assured industry that it will "[s]upport the collection of relevant economic and social data to produce analyses that meets current and future Council needs" and "[e]ncourage effective stakeholder participation in data collection and analisys". The Council has failed to solicit stakeholders for any economic or social data to meet assessment needs for this Amendment.

   C. "Management: Commits to "[d]evelop fishery management strategies that provide for productive, sustainable fisheries", and "[d]evelop management strategies that enable efficient operation of commercial...fishing businesses." Yet almost every Coral Zone Alternative will permanently close several deepwater fisheries, including the entire Atlantic Illex fishery.

   D. "Governance": "Ensure[s] that the Council's governance structures and practices fairly represent stakeholder interests", and "that stakeholder interests are accurately understood and meaningfully considered in the Council process". Why then has the Council denied the Advisory Panel a second opportunity to convene, and why have stakeholders have been denied opportunity for any meaningful input until this late in the Amendment process?

We respectfully request why the Council would adopt a Strategic Plan to which it does not intend to adhere.

2. Nowhere does the Public Information Document give GPS coordinates for any of the Coral Zone Alternatives. We are being asked to comment on completely undefined closures. As the Council is aware, depth contours are unenforceable. Any Broad or Discrete Coral Zones must be defined by straight lines that are comprised of GPS coordinates. Until these lines are drawn and provided for every Alternative, this document is not only incomplete but entirely spurious. As an industry which lives or dies based on detailed GPS coordinates, we are not even sure what exactly is being proposed. Does the Council plan to decide these monumental details after Final Action? We submit that for the Council to do so would be arbitrary and unauthorized. Therefore, Final Action must be delayed until this work can be completed.

We conclusively request that Final Action be delayed until Coral Zones have been accurately defined, MSA requirements met, industry participation and data incorporated, and an Advisory Panel meeting convened. Until that time, we support No Action Alternatives 1A, 2A, 3A, 4A, 5A and 6A. Subsequently, we would support an industry refined version of Sub-alternative 3B-1, including no less than a 500 meter landward boundary and a greater than 30 degree slope.

Respectfully,

Meghan Lapp, Fisheries Liaison, Seafreeze Ltd.

Meghan@Seafreezeltd.com

January 28, 2015

Richard Robins, Chairman
Mid-Atlantic Fishery Management Council
Suite 201, 800 North State St.
Dover, DE 19901

RE: DEEP SEA CORALS AMENDMENT COMMENTS

Dear Chairman Robins and Members of the Mid-Atlantic Council,

Wild Oceans works to advance ecosystem-based fisheries management, recognizing that the future of fishing depends on our ability to maintain resilient ecosystems, especially in light of the imminent threats posed by climate change.[1] The completion of the Deep Sea Corals Amendment to the Atlantic Mackerel, Squid and Butterfish Fishery Management Plan will be a milestone for advancing ecosystem approaches to fisheries management in the Greater Atlantic Region. As a stakeholder organization in the mid-Atlantic, we are pleased to have played a role in the development of the Deep Sea Corals Amendment and to provide recommendations to the Mid-Atlantic Council for the selection of final alternatives. Measures that we strongly support include:

- **Designation of all 15 canyon and slope systems listed in the Public Information Document[2] as discrete coral protection zones (Alternative 3B). All bottom-tending gear should be prohibited from operating within the discrete zones with no exemptions (Alternative 4B).**

- **A broad coral protection zone that is no farther from shore than the 300 meter depth contour boundary (Alternative 1B or 1C.) All bottom-tending gear should be prohibited (Alternative 2B) with limited exemptions for red crab and golden tilefish fishery (Sub-alternatives 2B-1 and 2B-2) *as long as these fisheries do not increase their effort or expand their footprint in the zone*.**

- **The required use of Vessel Monitoring Systems (VMS) as a condition for allowing vessels to operate within the broad zone (Alternative 2D). For VMS to be effective in monitoring activity within the broad zone, the Council should extend the requirement to carry VMS to its *Illex* moratorium fleet (Alternative 6B).**

- **Framework provisions that would enable the Council to take expedient action to modify zone boundaries or create new discrete zones in response to newly discovered deep sea coral communities that are in need of protection (Alternatives 5B and 5D).**

[1] Fogarty, M., Incze, L., Wahle, R., Mountain, D., Robinson, A., Pershing, A., Hayhoe, K., Richards, A., Manning, J. 2007. Potential climate change impacts on marine resources of the northeastern United States. Report to Union of Concerned Scientists.
[2] See Table 1 on p. 20 of the Deep Sea Corals Amendment Public Information Document.

P.O. BOX 258 • WATERFORD, VA 20197
WWW.WILDOCEANS.ORG

Rationale supporting our preferred alternatives and additional recommendations (underlined for emphasis) follow.

I. **Designate all 15 canyon and slope systems listed in the Public Information Document[3] as discrete coral protection zones (Alternative 3B).**

The discrete zone alternatives, drawn tightly around the canyon and slope systems, indicate areas where corals occur or are very likely to occur based on a habitat suitability model that has been validated through direct observation.[4] Because of the difficulties and costs associated with deep water exploration, habitat modeling is a necessary tool for targeting discrete areas that warrant heightened conservation, and the Greater Atlantic Region is fortunate that a robust model has been developed to inform management measures.

Biological diversity is a major factor in maintaining ecosystem resilience.[5] Therefore, the ecology of the biological communities in each canyon and slope system must be taken into account when developing management strategies to protect these vulnerable habitats in perpetuity. To date, each research cruise to the Atlantic's canyons and slopes has revealed unique biological communities in many of the sites visited, with some coral species like the reef-building *Lophelia pertusa* reported in the mid-Atlantic region for the first time.[6] Summarizing the 2013 NOAA Okeanos Explorer expedition to 12 submarine canyons in the Atlantic, NOAA reports, "Submarine canyons investigated were diverse and dramatic environments, with no two canyons appearing to be exactly alike in geology or biology."[7]

Because researchers are only just beginning to understand the species composition and ecology of deep water communities in the Atlantic, the canyon and slope systems in the Mid-Atlantic Council's area of jurisdiction must be protected as a whole (Alternative 3B). Given the state of the current science, the Council must avoid making an uninformed decision to prioritize the protection of some systems over others.

II. **A broad coral protection zone should be established that is no farther from shore than the 300 meter depth contour boundary (Alternative 1B or 1C).**

Combining discrete protection zones and a broad zone offers the strongest protection for deep sea corals and is consistent with the 2010 *NOAA Strategic Plan for Deep Sea Coral and Sponge Ecosystems.*[8] NOAA's strategic plan outlines conservation and management objectives to protect corals where they are known to occur and to apply a precautionary approach to areas that are inadequately surveyed.

---

[3] See Table 1 on p. 20 of the Deep Sea Corals Amendment Public Information Document.

[4] Images from the 2014 Towed Camera Study and also from the 2012 WHOI TowCam expedition have been used to verify the outputs of the habitat suitability model. Deep Sea Corals Amendment Public Information Document, pp. 50 & 54.

[5] Gjerde, K. M. (2006). Ecosystems and biodiversity in deep waters and high seas (No. 178). UNEP/Earthprint; "…loss of diversity can make oceanic ecosystems more vulnerable and less resilient to climate change and other environmental shifts caused by disease, alien invasive species and the cascading effects of overexploitation."

[6] Brooke, S., and Ross, S.W. In press. First observations of the cold-water coral *Lophelia pertusa* in mid-Atlantic canyons of the USA. Deep-Sea Res. II.

[7] NOAA. (2014). Deep sea coral research and technology program 2014 report to congress. NOAA, Silver Spring, MD. 54pp.

[8] National Oceanic and Atmospheric Administration, Coral Reef Conservation Program. (2010). NOAA strategic plan for deep-sea coral and sponge ecosystems: research, management, and international cooperation. Silver Spring, MD: NOAA Coral Reef Conservation Program. NOAA Technical Memorandum CRCP 11. 67 pp.

The broad zone alternatives constitute the precautionary approach, with the primary objective being to prevent the expansion of bottom-tending gears into inadequately surveyed areas that may be home to deep water coral communities. It is important to note that the broad zone alternatives encompass a significant area of modeled "likely" or "highly likely" deep water coral habitat that is between canyon systems and would not be protected by the discrete zones.[9]

Broad zones and discrete zones should function together as a unified system to be effective. A fragmented network of discrete zones alone would not only exclude valuable habitat and a number of documented coral locations,[10] it would allow the operation and even expansion of destructive bottom-tending gears up to the edge of the discrete zones, weakening protections if the discrete zones are not adequately buffered to address issues with gear haul back and deployment. Geographic fragmentation of coral protection zones could also disrupt the biological connectivity among the canyon and slope systems.

A broad zone landward boundary at the 200 meter depth contour (Alternative 1B) would envelop nearly all the area of the discrete zones and would protect nearly 100% of highly suitable coral habitat.[11] Even this most conservative option excludes 27% of known coral locations, including a disproportionate amount of stony corals and sea pens,[12] which are more often encountered at shallower depths. Another important consideration is that the habitat suitability model produced outputs for Gorgonian and Alcyonacean habitat, so the discrete zone boundaries may well indeed exclude shallower habitat that is highly suitable for stony corals and sea pens.

Goals for the alternatives must also be considered. Broad zones "would limit and prevent expansion of commercial gear use where little or no fishing has historically occurred," whereas discrete zones "would mainly reduce or eliminate current fishing activities rather than just prevent their expansion."[13] The Council is challenged to define areas of "little to no fishing" while striking an appropriate balance between conservation and economics. A broad zone landward boundary at the 300 meter depth contour (Alternative 1C) *combined with the designation of all 15 discrete zones* (Alternative 3B) would entail less economic impact while still protecting 99% of highly suitable coral habitat.[14]

Recent expeditions to the canyons have documented a number of impressive coral colonies between 300 and 400 meters in depth. For example, in Wilmington Canyon, researchers found a high abundance, high diversity and high density of corals in depths of 370-520 meters.[15] However, it is important to emphasize that in order to make the best use of limited exploration resources, ROVs and cameras are not typically deployed in shallow areas within the canyons (shallower than 300 meters) so that the cameras can climb through a wide range of depths to

[9] *See* Figures 13-24 (pp.55-66) in the Deep Sea Corals Amendment Public Information Document.
[10] *See* Table 22 (p. 45) in the Deep Sea Corals Amendment Public Information Document.
[11] Deep Sea Corals Amendment Public Information Document, p. 68.
[12] A broad zone established at the 200 meter depth contour would exclude 10% of known soft coral and gorgonian locations from protection compared to 38% of stony corals and 27% of sea pens. (See Table 21 on p. 45 of the Deep Sea Corals Amendment Public Information Document.)
[13] Deep Sea Corals Amendment Public Information Document, p.15.
[14] Fishing patterns revealed by examining 14 years of observer records (2000-2013) indicate that 6% of observed bottom trawl hauls in the mid-Atlantic region intersect the 300 meter broad zone compared with 14% of observed hauls intersecting the 200 meter broad zone. *See* the Deep Sea Corals Amendment Public Information Document, pp. 68 & 78.
[15] Nizinski, Martha. (2014 Dec 10). Deep sea coral occurrence and distribution in the mid-Atlantic canyons: exploration, discovery and species diversity. (presentation). NOAA/NMFS.

record information.[16] The 300 meter broad zone alone, without discrete zones, would exclude shallower depths at the heads of the canyons which may very well support deep sea coral communities.

III. Bottom-tending gear should be prohibited from both discrete and broad zones, with limited broad zone exemptions for red crab and golden tilefish fisheries as long as these fisheries do not increase their effort or expand their footprint within the zone (Alternatives 4B and 2B with Sub-Alternatives 2B-1 and 2B-2).

While bottom trawling is recognized as the greatest threat to deep sea corals, non-mobile bottom gears can and have damaged corals.[17] Describing threats to corals, NOAA's Coral Reef Conservation Program web site explains, "Although not as destructive as bottom trawls and dredges, other types of fishing gear can also have detrimental effects on deep-sea corals. Bottom-set gillnets, bottom-set longlines, pots and traps all impact the seafloor."[18] Since discrete zones are designed to protect corals by reducing or eliminating current fishing activities rather than just preventing their expansion, all bottom tending gears should be prohibited from these areas (Alternative 4B).

However, with its narrow focus on the regulatory definitions of "bottom-tending gear" and "mobile bottom-tending gear," the Deep Sea Corals Amendment alternatives and analyses neglect the potential for mid-water trawls to make contact with the bottom and irreparably damage corals. While the Council purports to be striving for consistency among the New England Council and the South Atlantic Council through the signed Memorandum of Understanding,[19] there is no discussion of the action taken by the South Atlantic Council to prohibit mid-water trawls from operating in its deep water Coral Habitat Areas of Particular Concern (CHAPCs). The South Atlantic Council's Comprehensive Ecosystem-Based Amendment 1 for the South Atlantic Region (p. 4-3) provides the following rationale for their action:

> *Mid-water trawls fished with weights in the footrope and chaffing gear in the cod end of the trawls will remove or significantly damage coral and live bottom habitat (Auster and Langton 1999; P. Auster 2009 pers. comm.) Mid-water trawls have been documented to impact benthic habitat (NRC 2002) and are more effective when fished very close to, or even lightly touching, the bottom (Clark et al 2006).*

Alternatives 2B and 4B should be amended to include mid-water trawls in the list of prohibited gears in both the discrete and broad coral protection zones.

The broad zones are intended to protect corals by "freezing the footprint" of fishing. The limited access red crab pot fishery, consisting of only a handful of permitted vessels, is heavily

[16] Brooke, Sandra. (2014 Aug 12). Exploring hidden treasures of the mid-Atlantic canyons. (presentation). Florida State University.
[17] Heifetz J, Stone RP, Shotwell SK. (2009). Damage and disturbance to coral and sponge habitat of the Aleutian Archipelago. MEPS 397:295-303.
[18] http://coralreef.noaa.gov/deepseacorals/threats/
[19] Memorandum of Understanding Regarding the Management of Deep Sea Corals. Section E encourages Council coordination on deep sea corals issues: "The Councils will seek continuity among coral-related management measures in all three Council regions, especially where there are fisheries that overlap between regions. This may include: Consideration of similar management alternatives in fishery management plans for adjacent regions."

dependent on fishing within the proposed broad zones,[20] and it is reasonable and consistent with the amendment objectives to allow an exemption for this fishery.

While the golden tilefish fishery is not as dependent on the broad zones for fishing grounds, an estimated 9.3% and 16.5% of trips take place in the 300 meter broad zone and 200 meter broad zone, respectively.[21] The golden tilefish bottom longline fishery currently operates under an Individual Fishing Quota (IFQ) program, with 13 IFQ permits issued after the program was implemented in 2010. Historically, the directed fishery has consisted of a small number of participants.[22]

For both the red crab and tilefish fisheries, the Council should constrain fishing effort in the broad zone to recent levels, establishing a threshold that would trigger action to reduce fishing effort if needed to "freeze the footprint" until areas are investigated for the presence of deep sea corals.

Lobster pots are one of the primary gear types reported with the proposed coral protection zones.[23] Because the lobster fishery is not a federally-managed fishery, alternatives and analyses to reduce the impact of this fishery on deep sea corals are not provided. To ensure that the operation of the lobster fishery does not negate efforts of the Mid-Atlantic Council to protect deep sea corals, the Council should formally request the Atlantic States Marine Fisheries Commission to take complementary action by prohibiting the lobster fishery from operating in the discrete zones and by freezing the fishery's footprint within the broad zone.

IV. Require the use of Vessel Monitoring Systems (VMS) as a condition for allowing vessels to operate within the broad zone (Alternative 2D). For VMS to be effective in monitoring activity within the broad zone, the Council should extend the requirement to carry VMS to its *Illex* moratorium fleet (Alternative 6B).

Vessel Monitoring Systems (VMS) facilitate the compliance, monitoring and enforcement of area-based management measures and would greatly enhance the effectiveness of coral protection zones. Neither the red crab nor tilefish fishery currently use VMS[24] but should be required to do so as a condition for exemption. To adequately monitor fishing activity near the protection zones, *Illex* vessels, which operate along the shelf edge, must also use VMS. Amendment 14 to the Atlantic Mackerel, Squid and Butterfish FMP instituted a VMS requirement for mackerel and longfin squid vessels.[25] Because many *Illex* vessels also fish for mackerel or longfin squid, they already carry VMS, and economic impacts to the fishery would be low.

V. Framework provisions should enable the Council to take expedient action to modify zone boundaries or create new discrete zones in response to newly discovered deep sea coral communities that are in need of protection (Alternatives 5B and 5D).

---

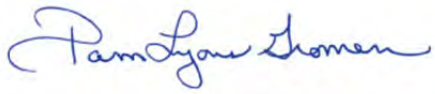
[20] "These vessels focus effort along the center of a narrow range of depth (from approximately 550 to 750 meters." Deep Sea Corals Amendment Public Information Document p. 18.
[21] *See* Table 34 in the Deep Sea Corals Amendment Public Information Document, p. 77.
[22] Poon, S. E. (2013). Catch Shares in Action: United States Mid-Atlantic Golden Tilefish Individual Fishing Quota Program. Environmental Defense Fund.
[23] Deep Sea Corals Amendment Public Information Document, p.70.
[24] 50 CFR § 648.10, http://www.gpo.gov/fdsys/pkg/CFR-2013-title50-vol12/pdf/CFR-2013-title50-vol12-sec648-10.pdf
[25] MAFMC. (2014). Amendment 14 to the Atlantic mackerel, squid and butterfish fishery management plan and final environmental impact statement.

The Deep Sea Corals Amendment needs to establish an adaptive process that responds efficiently to new information. As new areas of the deep are explored, the discovery of coral communities outside of discrete zones should trigger action to either create a new discrete zone (Alternative 5D) or to modify an existing discrete zone boundary (Alternative 5B), so these corals are afforded the strongest level of protection. Given the wealth of information that has emerged in just the last two years and the many new coral observations that have not yet been recorded in the Deep Sea Coral Research and Technology Program (Program) database, the Council should plan for periodic updates from the Program, and should establish criteria that would trigger a framework adjustment to incorporate new findings into management measures.

While we are not opposed to either Alternative 5C (Option to modify management measures within zones via framework action) or to Alternative 5E (Option to implement special access program via framework action), we caution that these options could potentially weaken coral conservation. <u>We suggest that the Council clarify that framework adjustments must enhance the purpose of the amendment, "to identify and implement measures that reduce, to the extent practicable, impacts of fishing gear on deep sea corals in the Mid-Atlantic region." Framework adjustments should not be used to relax regulations necessary for the protection of corals. In addition, standards for a limited access program should be created prior to the creation of such a program, and these standards should be used to evaluate a program's merit and potential costs and benefits before proceeding with a framework action.</u>

Deep sea coral communities are biodiversity hotspots, attracting a wide variety of fish and invertebrates seeking nursery, refuge and feeding habitat. Although the science of deep water corals remains in its infancy, scientists widely recognize their great potential for advancing our knowledge in the fields of climate change, fisheries ecology and medicine,[26] potential that will not be realized unless we take action now to protect these fragile habitats for the future. Recognizing the importance and vulnerability of deep sea coral habitat, the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act of 2006 authorizes the regional councils to designate protection zones to limit or prohibit fishing in order to protect corals from physical damage.[27] As the first council to draw on this authority, the Mid-Atlantic Council is breaking new ground in fisheries management while moving toward its vision of "healthy and productive marine ecosystems supporting thriving, sustainable marine fisheries that provide the greatest overall benefit to stakeholders."

Sincerely,



Pam Lyons Gromen
Executive Director

[26] Foley, Naomi S., van Rensburg, Tom M., and Claire W. Armstrong. (2010). The ecological and economic value of cold-water coral ecosystems. Ocean & Coastal Management 53:313-326.
[27] 16 U.S.C. 1853(b)(2)(A)&(B).

Pew Charitable Trusts letter - a total of 12,201 signatures were received (see supplemental briefing materials). Note that the text of this letter is duplicated in letters from other organizations. Some signatures may overlap across organizations.

The Pew Charitable Trusts submits this document representing 12,201 public comments to the Mid-Atlantic Fishery Management Council in response to "DEEP SEA CORALS AMENDMENT TO THE ATLANTIC MACKEREL, SQUID, AND BUTTERFISH FISHERY MANAGEMENT PLAN: Measures to Protect Deep Sea Corals from Impacts of Fishing Gear."

Dear Chair Robins and council members:

I am encouraged that the Mid-Atlantic Fishery Management Council is taking proactive steps to protect vulnerable and poorly understood deep-sea coral ecosystems. Such protections would be in line with the objectives of the National Oceanic and Atmospheric Administration's Strategic Plan for Deep-Sea Coral and Sponge Ecosystems and with the council's recent efforts to advance ecosystem-based fisheries management.

Specifically, I urge the council to designate all waters from the proposed 200-meter depth contour to the edge of the U.S. Exclusive Economic Zone and each of the defined canyons as off-limits to all destructive bottom fishing gears. This restriction should include mid-water trawl gear, which has been documented to contact the sea floor. Safeguarding waters from this "broad zone"—200 meters and seaward—and the canyons will provide the highest conservation benefit while allowing current fisheries access to the areas that they most rely upon. No new exemptions should be permitted beyond those detailed in Amendment 16, as the risk of opening up these sensitive areas to new fisheries or gear types would undermine the document's objectives. Furthermore, I support the use of new technologies, such as vessel monitoring systems, to help ensure the plan's effective implementation on the water.

I urge you to safeguard these ecological treasures now and for future generations by establishing a strong and enduring plan that would serve as an example for similar protections in New England and around the country and the world, where scientists are discovering extensive, beautiful, and previously unknown deep-sea coral gardens.

We are only beginning to learn about these biological communities and their importance to other components of ocean ecosystems, as well as their values to humans. Please pass and implement the strongest possible management measures in Amendment 16.

Thank you for your consideration.

Sincerely,

(See list of signatories and their personal comments – if applicable – below)

Endangered Species Coaliation letter - a total of 13,203 copies were received (see supplemental briefing materials). Note that the text of this letter is duplicated in letters from other organizations. Some signatures may overlap across organizations.

Mid-Atlantic Fishery Management Council

Dear Chair Robins and council members:

I am encouraged that the Mid-Atlantic Fishery Management Council is taking proactive steps to protect vulnerable and poorly understood deep-sea coral ecosystems. Such protections would be in line with the objectives of the National Oceanic and Atmospheric Administration's Strategic Plan for Deep-Sea Coral and Sponge Ecosystems and with the council's recent efforts to advance ecosystem-based fisheries management.

Specifically, I urge the council to designate all waters from the proposed 200-meter depth contour to the edge of the U.S. Exclusive Economic Zone and each of the defined canyons as off-limits to all destructive bottom fishing gears. This restriction should include mid-water trawl gear, which has been documented to contact the sea floor. Safeguarding waters from this "broad zone"—200 meters and seaward—and the canyons will provide the highest conservation benefit while allowing current fisheries access to the areas that they most rely upon. No new exemptions should be permitted beyond those detailed in Amendment 16, as the risk of opening up these sensitive areas to new fisheries or gear types would undermine the document's objectives. Furthermore, I support the use of new technologies, such as vessel monitoring systems, to help ensure the plan's effective implementation on the water.

I urge you to safeguard these ecological treasures now and for future generations by establishing a strong and enduring plan that would serve as an example for similar protections in New England and around the country and the world, where scientists are discovering extensive, beautiful, and previously unknown deep-sea coral gardens.

We are only beginning to learn about these biological communities and their importance to other components of ocean ecosystems, as well as their values to humans. Please pass and implement the strongest possible management measures in Amendment 16.

Thank you for your consideration.

Mitch Merry
113 Southview Ave
Charles City, IA 50616

646-770-1072

Save Our Environment letter - a total of 10,482 copies were received (see supplemental briefing materials). Note that the text of this letter is duplicated in letters from other organizations. Some signatures may overlap across organizations.

Mid-Atlantic Fishery Management Council
MAFMC

Dear Chairman Robins and Council Members:

I am encouraged that the Mid-Atlantic Fishery Management Council is taking proactive steps to protect vulnerable and poorly understood deep-sea coral ecosystems. The Council has an opportunity to prevent the expansion of fishing into areas that remain largely pristine. Such protections would be in line with the objectives of the National Oceanic and Atmospheric Administration's Strategic Plan for Deep-Sea Coral and Sponge Ecosystems, and with the Council's recent efforts to advance ecosystem-based fisheries management.

Specifically, I urge the Council to designate the proposed 200-meter broad zone and each of the defined canyons as off-limits to all destructive bottom fishing gears. This should include mid-water trawl gear, which has been documented to contact the sea floor. Safeguarding the 200-meter broad zone and canyons will provide the highest conservation benefit while allowing current fisheries access to the areas that they most rely upon. There should be no new exemptions beyond those in the document, as the risk of opening up these sensitive areas to new fisheries or gear types would undermine the objectives of Amendment 16. Furthermore, I support the use of new technologies, such as vessel monitoring systems, aboard fishing vessels to help ensure the plan is effectively implemented on the water.

I urge you to safeguard these ecological treasures now and for future generations by establishing a strong and enduring plan to serve as an example for similar protections in New England and around the U.S. and world, where scientists are discovering extensive, beautiful, and previously unknown deep-sea coral gardens.

We are only beginning to learn about these biological communities and their importance to other components of ocean ecosystems, as well as their values to humans. Please pass and implement the strongest possible management measures in Amendment 16.

Thank you for your consideration.

Sincerely,

Devon Brown
465 8th Ave
Salt Lake City, UT 84103

Oceana Petition - a total of 5,076 signatures were received (see supplemental briefing materials).

Dear Chairman Robins and Members of the Mid-Atlantic Fishery Management Council,

Please find below the petition comment text to the Deep Sea Corals Amendment to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan (FMP). A total of 5,076 Oceana supporters signed this petition, endorsing this comment on the Amendment. These signatures are attached to the accompanying email in the file Oceana-Signers_MAFMC_protect-deep-seal-corals.csv.

On their behalf I would like to submit the below comment for your consideration.

Petition comment text:

Dear Chairman Robins and Members of the Mid-Atlantic Fishery Management Council,

I wish to commend the Mid-Atlantic Fishery Management Council for being the first of the federal councils to use the authority granted under the Magnuson-Stevens Act to protect valuable and fragile deep-sea coral communities from the impacts of fishing.

I support the implementation of both discrete and broad zones to effectively conserve deep-sea corals. Discrete protection zones around the canyons and slopes where corals have been found or are likely to occur must go beyond "freezing the footprint" of fishing and should eliminate the use of fishing gears that could damage corals, even if the gear has operated in these areas in the past.

Please adopt Alternative 3B, designating all 15 canyon systems described in the Public Information Document as discrete coral protection zones. All bottom-tending commercial gears should be prohibited in the discrete zones (Alternative 4B). Because many areas of the deep Atlantic remain unexplored, a broad zone will prevent the expansion of bottom-tending commercial gears that could damage undocumented deep-sea corals. For this purpose, I support establishing a landward broad zone boundary no farther from shore than the 300-meter depth contour (Alternative 1B or 1C), which would encompass 99 percent or more of highly suitable deep sea coral habitat. Bottom-tending commercial gears should be prohibited from the broad zone with limited exemptions for existing red crab and tilefish fisheries, as long as these fisheries do not increase their effort or expand their footprint within the zone (Alternative 2B with Sub-alternatives 2B-1 and 2B-2). New discoveries of coral communities in the broad zone should trigger expedient action to incorporate these communities into a discrete zone to enhance their protection (Alternative 5D).

Thank you for prioritizing the protection of deep-sea coral communities in the Mid-Atlantic and for recognizing the importance of habitat to the future of fishing.

Thank you for this opportunity to comment on the Deep Sea Corals Amendment to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan (FMP).

Alex Gray
Digital Campaigner
Oceana

Earthjustice Letter- a total of 52,309 signatures were received, including 3,415 with additional comments (see supplemental briefing materials).

EARTHJUSTICE

ALASKA CALIFORNIA FLORIDA MID-PACIFIC NORTHEAST NORTHERN ROCKIES
NORTHWEST ROCKY MOUNTAIN WASHINGTON, D.C. INTERNATIONAL

January 28, 2015

Dr. Christopher M. Moore, Executive Director
Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201
Dover, Delaware 19901

Appended below are the names of 52,309 individuals who have submitted public comments urging the Mid-Atlantic Fishery Management Council to protect vulnerable deep-sea coral ecosystems. In addition to signing on in support of the following letter, 3,415 individuals of the total number have submitted personalized comments. The personalized comments start on page 2 and end on page 188.

Deep Sea Corals Amendment Comments

Dear Dr. Christopher Moore and staff,

I am encouraged that the Mid-Atlantic Fishery Management Council is taking proactive steps to protect vulnerable and poorly understood deep-sea coral ecosystems. The Council has an opportunity now to "freeze the footprint" of bottom fishing, which would prevent the expansion of fishing into areas that remain largely pristine. Such protections would be in line with the objectives of the National Oceanic and Atmospheric Administration's Strategic Plan for Deep-Sea Coral and Sponge Ecosystems, and with the Council's recent efforts to advance ecosystem-based fisheries management.

Specifically, I urge the Council to designate all waters from the proposed 200-meter depth contour to the edge of the U.S. Exclusive Economic Zone and each of the defined canyons as off-limits to all destructive bottom- fishing gears. This should include mid-water trawl gear, which has been documented to contact the sea floor. Safeguarding waters in this "broad zone"--200 meters and seaward--and in the canyons will provide the highest conservation benefit while allowing current fisheries access to the areas they most rely upon. There should be no new exemptions beyond those in the document, as the risk of opening up these sensitive areas to new fisheries or gear types would undermine the objectives of Amendment 16. Furthermore, I support the use of new technologies, such as vessel monitoring systems, aboard fishing vessels to help ensure the plan is effectively implemented on the water.

I urge you to safeguard these ecological treasures now and for future generations by establishing a strong and enduring plan to serve as an example for similar protections in New England and around the United States and the world, where scientists are discovering extensive, beautiful, previously unknown deep-sea coral gardens.

We are only beginning to learn about these biological communities and their importance to other components of ocean ecosystems, as well as their values to humans. Please pass and implement the strongest possible management measures in Amendment 16.

Thank you for your consideration,
The Undersigned

HEADQUARTERS 50 CALIFORNIA STREET, SUITE 500 SAN FRANCISCO, CA 94111
T: 415.217.2000 F: 415.217.2040 INFO@EARTHJUSTICE.ORG WWW.EARTHJUSTICE.ORG

Wildlife Conservation Society letter - The Council received a total of 12,011 signatures (see supplemental briefing materials).

Subject: Please protect ancient corals from destructive deep-sea fishing

Dear Chairman Robins and Council Members:

I am pleased that the Mid-Atlantic Fishery Management Council (Council) is considering taking strong steps to protect vulnerable deep-sea coral ecosystems here in the Mid-Atlantic. I urge you to protect the discrete coral zones in all fifteen canyons from all bottom fishing gears. Canyons are coral hotspots and provide important habitat for diverse concentrations of marine life, including sperm whales, tunas, and sharks.

In addition, I also urge the Council to take action and restrict the use of all bottom fishing gear by establishing a broad coral zone below 200 meters. Protecting both the discrete and broad coral zones is critical because once these fragile and ecologically important coral communities are disturbed it can take centuries for them to recover. Finally, I urge you to require the use of electronic vessel monitoring systems aboard fishing vessels to ensure the plan is effectively implemented on the water.

We are only beginning to learn about these amazing deep-sea ecosystems and their importance to the healthy functioning of our ocean, as well as their values to humans. The Council now has the opportunity to become a global leader in the protection of deep-sea corals by passing and implementing the strongest possible management measures...

Thank you for your consideration.

Wildlife Conservation Society petition - The Council received a total of 772 signatures, collected at the New York Aquarium and Central Park Zoo (see supplemental briefing materials for all signatures).

WILDLIFE CONSERVATION SOCIETY

SIGN THE PETITION

DEAR CHAIRMAN ROBINS AND COUNCIL MEMBERS,

I urge you to:

- Protect the discrete coral zones in all fifteen canyons from all bottom-fishing gears;
- Restrict the use of all bottom-fishing gear by establishing a broad coral zone below 200 meters;

and

- Require the use of electronic vessel monitoring systems aboard fishing vessels to ensure effective enforcement.

NAME (print)	ADDRESS (street, city, state, zip code)	EMAIL
Assel	306 West 94 street 3/4	am3926@columbia.edu
James Martindale	61. Viaduct Brice Eccles Wolverhampton UK	jamesmartindale@live.com
Diego Carbonari	Luis Antonio dos Santos ST. Zip: 02460-000 BRAZIL	diego@summeal.com.br
Samuel Caballero S	Alabama #77 int 304 Col Nopales Cd. México	sperezc@centro.edu.mx
Maaike Kuiters	Oranjestraat 16 the Netherlands	maaikekuiters@gmail.com
MARIA FRANIS.	ORLANDO ALONSO 40. 28724 POZUELO, MADRID	mary franis@hotmail.es
Solange Scorsato	77 Random Hall Princeton, NJ	Solange.Scorsato@gmail.com
Kevin Schulze	7109 Arborough Ct, Wake Forest, NC, 27587	kschulze@live.unc.edu
Lou Andreas	Am Blauen Garten 17a ~~55252~~ 55246 Mz-Kostheim	Germany
Christi Russell	512 NW 7th St Stuart, IA Iowa	christi1@hotmail.com
ANA ELENA REYES	Albrook Gardens, #15 Clayton, Ancon	inciorreyes@cablenet.net
Carla Thanley	62 Irwell Street Radcliffe Manchester M26 1LR	Carlaenzabein@live.co.uk
Lydia Mulcco	65 Hillcrest Ave Scarsdale NY 10708	nlu@lydiasdance.com
Daniel Mullins	1255 Longwood Dr Gallatin, TN	pmullins7890@gmail.com
Logan Snow	925 Redstone Dr. Gallatin, TN	Logan.snow13@gmail.com

Wildlife Conservation Society drawings - The Council received a total of 117 drawings and messages from children visiting the New York Aquarium and Central Park Zoo (see supplemental briefing materials for all drawings).

WILDLIFE CONSERVATION SOCIETY

DEAR CHAIRMAN ROBINS AND COUNCIL MEMBERS,

I just visited the Central Park Zoo and learned about the beautiful deep sea corals we have in our ocean backyard. Please do everything you can to protect these animals and the places where they live in the Mid-Atlantic.

TELL US WHY YOU CARE ABOUT CORALS: I care because they are beautiful and protect fish.

DRAW A CORAL OR YOUR FAVORITE OCEAN ANIMAL HERE:

NAME: Xolani Bonnet

CITY: NYC STATE: NY

January 28, 2015

Dr. Christopher M. Moore
Executive Director
Mid-Atlantic Fishery Management Council
800 North State Street
Suite 201
Dover, Delaware 19901

Submitted electronically

Re: Deep Sea Corals Amendment Comments

Dear Dr. Moore,

Roughly 80 miles offshore of our most populous coastline, where the continental shelf drops off to the pitch-black abyss of the deep Atlantic Ocean, vivid and fragile cold-water corals – some the size of small trees and taking centuries to grow – take hold on the walls and floors of a series of submarine canyons and the nearby continental slope. These coral communities form the foundation of deep-sea ecosystems, providing food, spawning habitat, and shelter for an array of invertebrate and fish species, and helping to fuel biodiversity hotspots in the canyons and along the shelf break.

Together, we represent 33 ocean conservation groups, coastal businesses, and scientists and thank you and the rest of the Mid-Atlantic Fishery Management Council for your efforts to protect our region's ecologically valuable deep-sea corals and the marine life they support. This is the moment to act – limited fishing currently occurs in these generally rugged and deep areas. Extremely slow-growing with lifespans in the hundreds – even thousands – of years, deep-sea corals are highly vulnerable to fishing gear interactions. The Deep Sea Corals Amendment offers us an unprecedented opportunity to protect the deep-sea corals, anemones, and sponges, and the valuable hard, structured bottom habitat these organisms grow on, from long-term damage. Deep-sea corals protection would benefit the health of the broader marine ecosystem and the fisheries that rely on it, as well as other economic and social interests, like biotechnological innovation.

We urge you to adopt the strongest conservation measures possible in the Deep Sea Corals Amendment, and support alternatives that would:

- Prohibit all bottom-tending fishing gear (Alternative 4B) from all of the canyon and inter-canyon areas that have been identified by the Council's technical team as discrete coral protection zones based on the National Oceanic and Atmospheric Administration (NOAA) coral habitat model and slope criteria (Alternative 3B).

- Prohibit bottom-tending gear (Alternative 2B) from a broad coral protection zone with the landward boundary at the 200 meter depth contour (Alternative 1B) in order to protect corals outside of the discrete zones. Any gear exemptions should not extend beyond those currently proposed as alternatives in the public hearing document – for red crab and tilefish – and should seek to limit and reduce harmful impacts from such gear over time.

- Require the use of electronic vessel monitoring systems aboard fishing vessels (Alternative 6B) to help ensure the plan is effectively implemented on the water.

Again, we congratulate the Council on developing one of the most exciting and precedent-setting marine habitat protection initiatives in the country. Our groups appreciate this opportunity to offer our support for alternatives that will protect the region's deep-sea corals and the marine life they support for future generations.

Sincerely,

Brad Sewell
Senior Attorney
Natural Resources Defense Council

Joseph Gordon
Manager, U.S. Oceans, Northeast
The Pew Charitable Trusts

Gib Brogan
Fisheries Campaign Manger
Oceana

Dr. Merry Camhi
Director, New York Seascape
Wildlife Conservation Society
New York Aquarium

Adrienne Esposito
Executive Director
Citizens Campaign for the Environment

Eric Schwaab
Senior Vice President / Chief Conservation Officer
National Aquarium

Greg Cunningham
Program Director, Clean Energy and Climate Change
Conservation Law Foundation

Rob Weltner
President
Operation SPLASH

W. Mark Swingle
Director of Research & Conservation
Virginia Aquarium & Marine Science Center

Mary M. Hamilton
Executive Director
SandyHook SeaLife Foundation

Dr. Carl Safina
President
The Safina Center

Daniel Barshis, Ph.D.
Assistant Professor of Biology
Old Dominion University

Benjamin Cuker, Ph.D.
Professor of Marine and Environmental Science
Hampton University

Bob Lewis
Executive Director
St. Mary's River Watershed Association

Arthur H. Kopelman, Ph.D.
President
Coastal Research and Education Society
of Long Island

Roger Fleming
Attorney
Earthjustice

John Rumpler
Senior Attorney
Environment America

Ben Steele, Ph.D.
Professor, Department of Natural Sciences
Colby-Sawyer College

Thomas D. Lee, Ph.D.
Associate Professor
Department of Natural Resources &
the Environment
University of New Hampshire

Jennifer Rafter
Programs Manager
Maryland Coastal Bays Program

Van R. Reiner
President and CEO
Maryland Academy of Sciences at
The Maryland Science Center

Christine Santora
Assistant Director for Policy and Outreach
Institute for Ocean Conservation Science
Stony Brook University

Terra Pascarosa Duff
Environmental Director
TerraScapes and
Regional Manager, Moms Clean Air Force
Virginia

Brian Winslow
Executive Director
Delaware Nature Society

Renata Rojas
President
Sea Gypsies

Arin Smith
Owner
The Dive Shop

Bob Bak
Board Member
The Scuba Sports Club and
Director
Aquatic Explorers Inc. of Poughkeepsie

Jamie Pollack
Managing Director
Shark Angels

Cliff Diamond
Owner
Empire Divers

Michael Feld
President and Founder
Oceanblue Divers

Michael Mashack
President
Bronx Diver

Christopher M. Moore, Ph.D.
Executive Director
Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201
Dover, DE 19901

Re: Deep Sea Corals Amendment Comments

Dear Dr. Moore:

After reviewing the Mid-Atlantic Fishery Management Council (Council) proposed Amendment to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan and the proposed measures and information provided in the Council's January 2015 Public Information Document "Measures to Protect Deep Sea Corals from Impacts of Fishing Gear", the New York State Department of State (DOS) offers the following suggestions for consideration.

DOS recognizes the value of deep sea corals and sponges as marine life, and the important ecological benefits of preserving and protecting areas where they thrive. We appreciate all the work done by NOAA to explore and map these unique natural areas. We also wish to express gratitude for the Council's effort planning for management measures designed to afford protection for sensitive deep sea habitats. DOS's concern, however, is that the proposed measures could apply sweeping restrictions on fishing activities across an extensive geographic area, while opportunities exist to better tailor the measures to focus on discrete areas of documented or suspected significance for corals. Specifically, the measures were developed without the incorporation of available deep sea coral data that have been collected on recent federally-supported expeditions that would directly address the proposed coral zone designations. These expeditions include NOAA's Deep Sea Coral Research and Technology Program's cruises aboard the *Henry Bigelow* that used TowCam, a specialized digital camera system to photograph the seafloor and organisms that were encountered, and NOAA's Office of Ocean Exploration and Research's *Okeanos Explorer* expeditions that collected various data including imagery and video data of organisms. Data analysis currently is underway for some of these data, particularly for the TowCam data collected aboard the Bigelow. Deep sea coral locations, presence, and distribution, plus at least first-order taxonomic identification, will be available following this data analysis. The TowCam data being analyzed from the 2013 and 2014 Bigelow surveys focused on a number of different Mid-Atlantic Canyons, including several currently proposed as discrete zones. The number of TowCam images to be analyzed from data collected for Mid-Atlantic Canyons numbers in the tens of thousands, and potentially will result in a huge quantity of recent, known coral location data points to be added to the NOAA Deep Sea Coral Research and Technology Program records and inform the Council's deep sea coral broad and discrete zone alternatives.

In keeping with the requirements of the Magnuson-Stevens Act and National Standard 2, "conservation and management measures shall be based upon the best scientific information available" in developing and amending fishery management plans. DOS believes that the Council should strive to incorporate the best available science into development of their proposed range of management measures and the decision-making process regarding the preferred alternative. Both the Council's decision, and NOAA's Deep Sea Coral Research and Technology Program's database and deep sea coral habitat suitability model would benefit greatly from analysis and addition of available data. DOS requests that the Council also formally incorporate existing uncertainty estimates and other information on the model's performance into consideration of the proposed alternatives.

The proposed measures also would be significantly enhanced by increased input from the fishers affected by the proposed restrictions, to minimize the impact to the fishing industry while achieving optimal coral protection. DOS encourages the Council to build upon prior efforts and collaborate with the Mackerel, Squid, and Butterfish Advisory Panel and other fishers continuously throughout the process.

Allowing for thorough analysis and incorporation of the recently collected deep sea coral data into the Council's amendment decision-making process, and close coordination and consultation with the fishing community would materially improve the likelihood of achieving the desired protection of sensitive benthic habitats. Integrating these two sources of information would lead to more focused measures within a better defined geographic area. DOS urges the Council to reconsider the current timeline for finalizing its decision and to use the recent deep sea coral data to hone in, with far better confidence, on the discrete locations where corals are most likely to occur, and where protections will result in the greatest ecosystem benefits, to ensure prudent and effective management.

Sincerely,

Gregory Capobianco
Office of Planning and Development
New York State Department of State

Mid-Atlantic Fishery Management Council
Council Meeting in Raleigh, NC: 10-12 February 2015
Comments Related to Deep-Sea Corals Amendment
Dr. Steve W. Ross (28 Jan 2015)

First, thank you for allowing someone to read my comments into the meeting record, and I apologize for not being here to present this myself.

I will not belabor my credentials except to say I have spent many years conducting research on marine fishes and their environments from the Gulf of Mexico to the US middle Atlantic. This includes research on deep-sea corals and submarine canyons. Recently, I help co-lead the five year, multidisciplinary investigation of Baltimore and Norfolk canyons and surroundings. This and other recent surveys have significantly improved our understanding of Atlantic submarine canyon, coral and seep communities. Analyses of our Canyons data are nearing completion, and our team can make several summary statements about these ecosystems. Ocean physics, biogeochemistry, and ecology differ in several ways in the canyons compared with the surrounding open slope: 1) Canyons contain strong currents which impact food delivery and the communities. 2) They have generally higher organic matter content in the sediments. 3) Canyon configurations promote complex habitats that support higher fish diversity and different fish communities. This is important as complex habitat is relatively rare in the middle Atlantic. 4) Deep-sea corals are abundant in the canyons and an important part of the habitat complexity. 5) Newly discovered methane seeps near the canyons also provide increased habitat complexity and support increased biodiversity. 6) Canyons differ from one another in various aspects of physics, chemistry and biology. 7) Canyons appear to serve as refugia for some species, like economically important cusk (*Brosme brosme*), which are common in canyons, but not elsewhere. Canyons likely shelter other species, especially those preferring complex habitats (like conger eel, roughies, wreckfish, goosefish, blackbelly rosefish). 8) Canyons, associated coral and other complex habitats enhance trophic pathways that serve not only the bottom community but also the water column communities above. For example, midwater fishes and squid make daily migrations from near surface to bottom providing an important energy conduit.

The list of important discoveries is much longer, but the points to make are that these canyons are very productive, contain important complex habitat, diverse communities, and are important refugia for vulnerable species. Additionally, in both canyons, we observed larger amounts of human generated trash than seen elsewhere at similar depths, and on nearly every dive we encountered lost fishing gear (lines, traps, nets). In some areas this lost gear and trash impacted coral, other habitats and some species.

I strongly encourage the protection of mid-Atlantic canyons from any bottom related disturbances. All major canyons in the region should be included as canyons exhibit a variety of differences. Discrete zones around each canyon including appropriate buffer areas should be the minimum level of protection, but broader zone protection will include many important seep habitats as well as allow for protected migration pathways. I support a shallow depth limit of 200 m (contains important canyon head habitat and communities, like tilefish) and a lower depth limit of at least 1500 m.

I am available at any time to contribute further to this process, if needed.

Comments to the Mid-Atlantic Fishery Management Council

Deep Sea Coral Amendment to the Atlantic Mackerel, Squid and Butterfish Fishery Management Plan: Measures to Protect Deep Sea Corals from Impacts of Fishing Gear

MAFMC members: January 28, 2015

I am writing this letter in support of the Council's proposed amendment to protect deep sea corals from the impacts of fishing gear.

Background

I am an Associate Research Faculty at the Florida State University Coastal and Marine Lab. Since 1998, my research has focused on the biology and ecology of deep sea corals (stony corals, octocorals, black corals and hydrocorals) in the Gulf of Mexico, southeastern US, Europe and Alaska. I am currently co-Principle Investigator on the Atlantic Deepwater Canyons project, which is a five-year multi-disciplinary project (funded by BOEM/NOAA-OER/USGS) to study sensitive habitats in the mid-Atlantic canyons. Two of the research cruises associated with this project were equipped with sophisticated remotely operated vehicles (ROVs) that allowed us to gather high definition, geo-referenced video and images of benthic communities and make collections for numerous biological, geological and physical oceanography objectives. Prior to these research cruises, coral records in the mid-Atlantic region came primarily from scientific trawling and a few submersible or towed camera cruises in the 1980s and 1990's. While these provided some information, they do not reflect the wide distribution and abundance of deep sea corals. Our efforts during this project focused on two major canyons in the mid-Atlantic region: Baltimore Canyon and Norfolk Canyon. Over the course of two years, we conducted 18 coral-targeted ROV dives in Baltimore Canyon and 11 in Norfolk Canyon. We found corals during 15 of those dives in Baltimore Canyon and all of the Norfolk Canyon dives. From the ROV dives alone we documented over 2100 records of octocorals and stony corals. The DSCRTP database documented just 635 records for the entire MAFMC region from 200 m depth to the EEZ; of these records 40% were sea pens, which only grow on soft sediment. Within the MAFMC discrete zones, the coral database contains 146 records of octocorals and stony corals. Our 26 ROV dives in just two canyons increased the number of octocoral and soft coral records in the DSCRTP database across all canyons by almost 1500%. Many additional specimens of cup corals, bamboo corals and sea pens were collected during bottom trawls over soft sediment. Other recent expeditions in the area have added even further to the number of coral records. Since the coral records used in the Council's public information document severely under-reports the true coral abundance, then the benefit of the various alternatives to coral habitat is similarly under represented. Restriction of damaging activities within the canyons will protect vast numbers of corals and their associated communities.

Most of the coral species found in the mid-Atlantic region require hard substrate, so are found within the canyons rather than on the slope; however there are a number of species that colonize soft substrate. These can be very abundant, but little is known of their distribution or any other aspect of their biology. Adoption of protective measures in both broad (slope) and discrete

(canyon) zones is therefore necessary to ensure some level of protection for deep sea corals in the mid-Atlantic region.

It is well-known that some deep sea corals are extremely long lived and grow slowly, but very few species have been studied in detail, and our understanding of reproductive biology, larval dispersal, colonization rates and population connectivity is very sparse. Since we know so little about the vulnerability of these communities and their ability to recover from disturbance, management efforts should be precautionary and apply the highest possible levels of protection.

Fishing impacts on deep sea corals

The majority of corals within the canyons are octocorals, with the most common species being the bubblegum coral (*Paragorgia arborea*). This species can become very large (we measured a single colony at 5 m tall) and like other corals were generally found on the rugged walls of the canyons where the currents are accelerated. These large exposed colonies are highly vulnerable to entanglement by trash and fishing gear. There were several observations during the ROV cruises of these and other corals entangled in lines, nets, traps, monofilament and plastic debris. All bottom-tending gear has the potential to entangle, dislodge or break the coral colonies, particularly mobile gear. The impact of bottom trawling on stony coral reefs has been well-documented, but these large tree corals are also vulnerable to other gear such as dredges, bottom longlines and traps. A single trap footprint is small, but some trap fisheries (e.g. red crab) deploy traps in series; on recovery, these traps can drag across the seafloor, potentially causing damage if dragged over coral habitat.

Broad Zone Alternatives

Alternative 1: The Council Broad coral zones primarily cover soft sediment so are not prime habitat for most deep sea corals; however there are several species of both stony corals and octocorals that can be locally abundant and may provide habitat for other fauna, including fishery species. The abundance, distribution and ecological importance of these soft sediment corals are not well understood, so measures should be applied to protect at least some of their habitat. Hecker (1990[1]) studied faunal distribution on the continental slope of southern New England, and noted a dense filter feeder assemblage on the upper slope between 300 and 700 m depth. According to this data, the optimal broad zone for protection of soft sediment corals is Alternative 1B (200 m and deeper), but Alternative 1C would also protect much of the coral habitat.

Alternative 2: A prohibition on all bottom tending gear is the preferred option for coral protection. Red crab traps can potentially cause damage to deep sea corals; however given the operating depth of the fishery (37- 42% of revenues come from within the proposed broad zones), it would be a clear hardship to restrict the fishery to the upper slope. For this reason, and because the fishery is currently small, Alternative 2B-1 (exemption of red crab fishery) would be the best option.

Discrete Zone Alternatives

Alternative 3: Over the past 3 years a number of research cruises have shown that the canyons of this region have large areas of exposed hard substrate that supports extensive and diverse coral and sponge communities. Fishing gear has been observed entangled in the rocky outcrops, and frequently also wrapped around corals. The loss of time, gear and catch are good reasons for the fishing industry to want to avoid this kind of interaction as much as conservation groups, but the

[1] Hecker, B. 1990. Variation in megafaunal assemblages on the continental margin south of New England. *Deep-Sea Res.* 37:37-57.

difficulty comes from trying to maximize protection, minimize economic impact and generate sensible boundaries in areas that are data-poor and that do not conform to square boxes. The discrete zones in the proposal are based on outputs from NOAA's predictive habitat model and encompass all areas with high probability of coral presence. This is a precautionary approach to protection, but has created rather complex boundaries which may be confusing to follow and difficult to enforce. I support Alternative 3B, but suggest that the Council work with Law Enforcement, and other stakeholders to see whether the boundaries can be simplified and still maintain adequate protection for deep sea coral habitats.

Note: Alternative 1B would encompass the majority of the coral discrete zones without the need for additional boundaries, assuming the regulations for the two areas were the same.

Alternative 4: Since these discrete zones contain the most valuable coral habitat and high abundance of coral/sponge communities, the preferred alternative would be prohibition of all bottom-tending gear, which is Alternative 4B. Unlike the broad zone alternative (2B-1), this alternative would also prohibit red crab fishing; however, it seems unlikely that this would be an undue hardship since red crab fishers would probably not deploy traps inside the canyons due to their complex topography. Several of the canyons are fished to some degree, but most fishing is prosecuted on the surrounding slope areas. According to the Council public information document, only 0.6-9% of total revenue (depending on the fishery) comes from within the discrete zones. This level of fishing could presumably be offset by shifting effort into the open zones.

Alternative 5: Not qualified to assess

Alternative 6: I support the use of VMS as an enforcement tool and although most of the *Illex* vessels already use this system, a fishery wide requirement would allow enforcement of all vessels with little economic impact to the industry. Alternative 6B is therefore the preferred option.

I wish to thank the Council for their pro-active management efforts to protect deep sea coral habitats and hope that together the Council and stakeholders will come to an agreement that will preserve these ecologically important and vulnerable habitats without undue economic burden to the regional fishing industry.

Sincerely

Sandra Brooke Ph.D.
Associate Research Faculty

Florida State University Coastal and Marine Lab
St Teresa, Florida 32358

40 West 20th Street
New York, NY 10011
(212) 727-2700
Fax (212) 727-1773

January 28, 2015

Dr. Christopher M. Moore
Executive Director
Mid-Atlantic Fishery Management Council
800 North State Street
Suite 201
Dover, Delaware 19901

Submitted electronically

Re: <u>Deep Sea Corals Amendment Comments</u>

Dear Dr. Moore,

We are submitting 5,837 comment letters from Natural Resources Defense Council members and activists in response to the Mid-Atlantic Fishery Management Council's Deep Sea Corals Amendment.

Of the 5,837 comments, 5,653 commenters made no edits to the form letter below. An Excel sheet with all form letter responders' contact information is also attached as DeepSeaCoralsAmendmentComment_unedited.xls. In addition, please find DeepSeaCoralsAmendmentComments_unique.pdf which contains 184 unique comments collected by NRDC.

Please contact me at 212.727.4551 or achase@nrdc.org with any questions regarding this comment submission.

Sincerely,

Alison Chase
Policy Analyst
Natural Resources Defense Council

NRDC letter - The Council received a total of 5,837 signatures (see supplemental briefing materials).

Dr. Christopher M. Moore
Executive Director, Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201
Dover, Delaware 19901

Subject: Deep Sea Corals Amendment Comments

Dear Dr. Christopher M. Moore,

Thank you for the opportunity to help shape your historic effort to protect our ecologically valuable and vulnerable deep-sea corals and the marine life they support.

I urge you to adopt the strongest conservation measures possible and:

* Prohibit all fishing gear that hits or scrapes the seafloor from all of the canyon areas that have been identified by Council staff as discrete protection zones based on the National Oceanic and Atmospheric Administration coral habitat model.

* Adopt a broad coral protection zone with the landward boundary at the 200 meter depth contour to protect corals that fall outside the canyon areas from bottom-contacting fishing gear. Any gear exemptions should not extend beyond those currently proposed as alternatives in the public hearing document--for red crab and tilefish--and should seek to limit and reduce harmful impacts from such gear over time.

* Require the use of electronic vessel monitoring systems aboard fishing vessels to help ensure the plan is effectively implemented on the water.

Together, these measures will protect this unique deep-sea habitat for marine life and for future generations to discover and enjoy.

Sincerely,

Citizens Campaign for the Environment letter - The Council received a total of 183 signatures (see supplemental briefing materials).

Dear Mid-Atlantic Fishery Management Council Members,

I strongly support the historic effort to protect our ecologically valuable and vulnerable deep sea corals and the marine life they support.

I urge you to adopt the strongest conservation measures possible:

- Prohibit all fishing gear that hits or scrapes the seafloor from all of the canyon areas that have been identified by Council staff as discrete protection zones based on the National Oceanic and Atmospheric Administration coral habitat model.

- Adopt a broad coral protection zone with a boundary of 200 meters.

- Require the use of electronic vessel monitoring systems aboard fishing vessels to help ensure that the plan is effectively implemented on the water.

Together, these measures will protect this unique deep sea habitat for marine life and for future generations to discover and enjoy.

Marine Conservation Institute letter - The Council received a total of 800 signatures (see supplemental briefing materials).

1/28/2015

Ms. Kiley Dancy
Mid-Atlantic Fishery Management Council
800 North State St.
Suite 201
Dover, DE 19901

Dear Ms. Dancy,

I commend your progressive suggestions in the Deep Sea Corals Amendment and your use of protective habitat models for the conservation of deep-sea coral ecosystems.

Specifically, I support alternatives 1B, 2B, 3B, and 4B, the creation of both broad and discrete coral zones in which ALL bottom touching gear is prohibited. As you know, bottom trawlers and sometimes even mid-water trawlers drag heavy nets across the bottom as they seek to catch fish that live on or near the bottom of the ocean. To ensure maximum protection, I also support alternatives 2D and 6B, requiring electronic vessel monitoring on every ship, making enforcement of restricted regions easier.

Using the best available science to determine specific submarine canyons and slope areas as discrete coral protection zones will allow for maximum protection of these slow growing, ancient corals. I applaud the council's use of predictive habitat modeling to determine areas in which corals are highly likely to be present, especially in places which are difficult and costly to survey.

Designating a broad coral zone with a landward boundary at the 200 meters depth contour which extends to the edge of the exclusive economic zone and prohibiting ALL bottom tending gear in this region will create a protective buffer area while still allowing existing fisheries to carry on in the majority of their current fishing grounds.

I urge you to defend these thriving, yet fragile, ecosystems against current threats. Combined, the above alternatives will secure regions of known or likely coral habitat for current and future generations. Unless protected, we stand to lose vital, diverse ecosystems, which not only support the surrounding ocean life but also human livelihoods.

Thank you for the opportunity to comment.

Sincerely,

Michael Gravitz

Director of Policy and Legislation
Marine Conservation Institute

Review of the Public Information Document regarding the proposed Deep Sea Corals Amendment to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan (MAFMC, January 2015)

Prepared by:
Dr. Guillermo E. Herrera
Fisheries Economist[1]
A.B., Biology; M.Sc., Quantitative Ecology & Resource Mgmt.; M.A., Ph.D., Economics
January 28, 2015

Dr. Christopher M. Moore, Executive Director
Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201
Dover, DE 19901
Attn: Deep Sea Corals Amendment Comments

Dear Dr. Moore and Council Members:

I write to provide comments on the economic analyses in the Mid-Atlantic Fishery Management Council's ("MAFMC's") January 2015 Public Information Document ("PID") for the proposed Deep Sea Corals Amendment to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan. I am a fisheries economist specializing in bioeconomic modeling of multispecies and spatially structured resources – the latter including the theory surrounding the role of marine protected areas in optimal management.

I seek to highlight two significant ways in which the PID reflects a distinct upward bias in its analysis of the economic impact of the proposed closures:

(a) The use of the Vessel Trip Report (VTR) and VTR revenue mapping algorithms systematically overstate the actual intersection between the proposed deep sea coral protection zones and currently fished areas; and

(b) The PID largely ignores – except for a very brief, tangential mention – the likelihood that harvesters will reallocate effort displaced from closed areas so as to substantially offset any lost revenues from the closures.

Consideration of these two factors, on which I elaborate below, demonstrates that the likely costs associated with the proposed closures are significantly lower than those discussed in the PID. Given that the costs (from reduced fishing revenue) of the proposed closures are likely to be much lower than those discussed in the PID, I believe that the benefits of implementing the closures should be all the more compelling to the MAFMC.[2]

---

[1] [1] Dr. Herrera is also Associate Professor of Economics, and Chair of the Department of Economics, Bowdoin College, Brunswick, ME. His involvement with the DSC Amendment review process falls outside the scope of his responsibilities in this academic position.

[2] "Measures in this amendment will be considered in light of their benefit to corals as well as the cost to commercial fisheries." (p. 2, 11 of PID)

(a) Bias in the estimation of fishing conflicts and proposed closures

The PID provides two different sets of estimates of economic impacts of the proposed closures: one based directly on Vessel Trip Report (VTR) point estimates, and one based on the output of the VTR revenue mapping (VTRRM) model, which is intended to refine VTR point estimates using observer data. Both of these estimation techniques exaggerate the spatial correlation between current fishing locations and the discrete and broad zones. Although the PID does acknowledge in the text (on page 71) that the VTRRM model in particular may overestimate revenue losses, it fails to do so forcefully enough, so MAFMC members may overlook it and focus primarily on the PID's data tables. The PID also neglects to discuss the likely extent of the overestimation.

VTR Point Estimates

I first address the impact estimates generated directly from the VTR point estimates, focusing on impacts on the squid fishing sector, which appears to be the primary sector of concern. The algorithm described in the PID assumes that if the point estimate (the general fishing location required to be reported by the vessel operator) falls within the discrete or the broad protection zone in question, then *all* of the harvest from that trip should be counted as a loss due to that protection zone. Specifically, Table 34 says that the percentage of catch attributed to each zone "assume[s] that all of the catch from a given trip occurred in the area encompassed by the reported VTR location."

At this point, it is important to elaborate on what a VTR point estimate represents. A VTR point estimate is the:

> … reporting of a single spatial position that looks to represent the totality of fishing conducted on a trip. For reporting purposes these trips are defined as a single statistical area/gear combination, with individuals required to report a new VTR whenever either the gear or statistical area fished changes.[3]

In other words, a single point estimate is intended to represent the location of multiple hauls, as long as the gear and statistical area do not change. Significantly, "previous studies have identified that the self-reporting underreports these switches in gear and statistical area" (Palmer and Wigley 2007, 2009) and that use of VTRs results in an "upper bound for the actual cost of a management alternative, and likely overestimates the final cost of a management alternative."[4]

For it to be reasonable to attribute all the harvest associated with a VTR point estimate to a prospective protection zone, all or at least most of the fishing activity associated with that VTR must occur in the zone. Alternatively, the portion of fishing activity occurring within

---

[3] NEFMC, Omnibus Habitat Amendment 2 Draft EIS-Volume 3, at 192 (October 1, 2014); *see also* Northeast Fisheries Science Center, Statistically Assessing the Precisions of Self-reported VTR Fishing Locations, NOAA Technical Memorandum NMFS-NE-229, p. 1 ("The precision issue associated with VTR is inherent in the attempt to represent the entirety of a trip's effort by a single set of latitude and longitudinal points for each gear and statistical area fished, regardless of the length of that trip.").
[4] NEFMC, Omnibus Habitat Amendment 2 Draft EIS-Volume 3, pp. 192, 195.

the zone must be such that its prohibition acts to *eliminate all or most of the remaining fishing activity associated with that trip*. Neither of these assumptions is valid, based on the information in the PID.

With respect to the broad zones, the observer data in Tables 37-39 shows that the average haul starts at a depth significantly less than the broad zone boundary (e.g., for the 400 m alternative, the average squid haul starts at around 180 m), at least for boundaries 300 m and deeper. Moreover, as the zone boundary increases in depth, fewer hauls intersect with that depth boundary, demonstrating that squid bottom trawling decreases with depth, at least beyond 200 m. Observer data indicates that hauls intersecting these deeper zones primarily take place in shallower waters (recall also that the shelf drops off quickly after 200 m, with slope increasing with depth, meaning the greatest areal extent of bottom is at shallower depths). Even if a protection zone were put in place that precluded the deeper portion of the haul, at least some portion of the haul in shallower waters – and potentially most of it, depending on the specific protection zone – could still occur.

Moreover, there are likely *entire* hauls associated with the VTR point estimate occurring in shallower waters that would not be precluded by a given closure. For example, if ten hauls were reported under one VTR, and only one of those hauls crossed over into the 400 m zone, the PID would attribute the catch from *all ten hauls* as catch from the 400 m zone. This would clearly be unreasonable as at least the nine hauls that did not intersect with the 400 m zone would be unaffected by its closure. In the case of the Loligo and Illex shelf break squid fisheries, it is virtually certain that multiple, and potentially many, hauls are represented on each VTR. Both these fisheries appear to be large volume, long trip fisheries. Both are also concentrated in certain statistical areas; for example, 68% of the Illex harvest in 2010 was in statistical area 622.[5] One Illex vessel owner described his typical trip as taking five days, with hauls every one to three hours.[6]

Even in the case of the 200 m broad zone, multiple hauls are generally associated with each VTR and some are likely to occur in whole or in part in shallower waters. These hauls would not be eliminated by virtue of a 200 m protection zone, causing upward bias in the PID estimates of impacts from such a management measure.

Similarly with the discrete zones, Figure 31 (tracks of observed hauls) and Tables 37-39 (observed hauls in different zones) indicate that when a squid haul intersects with a discrete zone, it is usually only for a small portion of the haul and/or during gear deployment/retrieval. For a haul associated with a VTR point estimate that intersects with a discrete zone, it is likely that at least a portion of that haul, and the resulting catch, could still occur. Moreover, as with the broad zones, there will likely be entire hauls associated with the VTR point estimate that would still be possible.

The PID's use of VTR point data helps explain the inconsistency between the VTR point data and the observer data regarding the relative amount of squid bottom trawling in the different broad zones. According to the observer data, there were approximately 2500 hauls on squid trips that intersected the zones 200 m and deeper (Table 36). Of these,

[5] MAFMC, Amendment 14 FEIS, p. 256.
[6] MAFMC, Amendment 9 FSEIS, at 162.

approximately 250, or 10%, intersected the 500 m zone (Table 39). This relatively low number of trips intersecting the 500 m zone appears consistent with the observer track information provided in Figure 31 and the bathymetric information in Figures 13-24, which shows the 500 m depth to be well off the shelf and down the slope as well as significantly down the canyon walls. By contrast, the VTR point data in Table 34 indicates that trips deeper than 500 m constitute 28% of all trips deeper than 200 m, a much higher percentage than suggested by the observer data. The likely reason for this discrepancy is discussed above: if a trip includes any haul that touches a zone, the entire trip (and, correspondingly, all the revenues from that trip) is attributed to that zone.

VTR Revenue Mapping Model

The VTR Revenue Mapping Model was developed to address the shortcomings of the VTR data, i.e., that the latter fails to show fishing location precisely and therefore provides a poor basis for analyzing impacts of area closures. The PID contains an abbreviated description of the model; a more extensive discussion is available in NOAA Technical Memorandum NMFS-NE-229.[7] In brief, the model integrates VTR information with observer data, which are more precise. The result is a likelihood, or probability distribution, associated with the actual location of a given VTR point estimate. These probability distributions are represented visually on a map as concentric circles, or probability contours around the point, each representing a level of probability that the actual fishing location was within the circle.

But, as the PID recognizes at page 71, the model does not account for directionality, such as based on depth. Rather, it assumes a symmetrical, or "white noise" probability distribution, in which it is equally likely for the actual fishing location to be in any given one direction from the point estimate. This makes the model wholly inadequate for examining shelf break fishing, which is highly directional and dictated by depth and slope. The observer track information in Figure 31 shows this very well; the vast majority of hauls are along the same depth contour. In other words, if you have a VTR point estimate on the edge of a canyon, it is not equally likely (not *at all* likely, in fact) that the fishing occurred 2 miles into the depths of the canyon as opposed to occurring two miles farther away from the canyon into shallower waters. But this is what the model does; points that are implausible locations of fishing effort are assigned likelihood equal to that of plausible sites.

For the reasons discussed above, Tables 31 and 32 overestimate revenue impacts from the coral zones because they assume positive probability of fishing in locations where there is actually negligible probability of fishing. For example, even though the PID says (p. 18) that the red crab fishery is prosecuted in a "narrow range of depth" from 550 m – 750 m, Table 32 reports that almost 58% of cumulative revenue in this fishery is from fishing at depths 200 m and shallower. Similarly, Table 32 shows very little difference in the revenue impacts to the squid industry between the different broad zone alternatives. The revenue impacts of the 200 m broad zone are only 6% higher than the revenue impacts associated with the 500 m zone. As discussed above, however, this is inconsistent with the observer data, which indicate that a small fraction of the trips that intersected the 200 m zone also intersected the 500 m zone. The small difference in revenue impacts in Table 32 across the different protection zones is likely because only distance, and not depth change, is accounted for in

[7] Available at: http://www.nefsc.noaa.gov/publications/tm/tm229/.

the VTR model. Figures 25-30 illustrate this problem graphically, although it is not easy to make out in all locations because of the scale of the figures.

To get a more realistic sense of the impacts of the proposed closures, no likelihood should be attributed to areas that are technologically unfishable or economically undesirable. There are modeling techniques that facilitate this kind of analysis; however, additional detailed modeling effort is not necessary to make a decision about the closures. It is enough to acknowledge that the current estimates of revenue losses are significant overstatements. The effort mapping and revenue estimates emerging from the VTR and VTRRM are not just noisy; these techniques make erroneous simplifying assumptions that lead to large upward biases in the estimates of opportunity costs of closures.

(b) Effort redistribution

The primary assumption of the PID seems to be that revenue earned in areas considered for closure will be lost from the system: "The potential for revenue losses at gross fleet-wide levels should be proportionate to the relative reduction in areas that can be fished." (PID, p. 88). However, when an area, or a portion of an area, where fishermen currently fish is closed, fishermen will *not* just cease exerting, or retire, the units of effort they had been exerting in that area. They will instead move to other areas that *are* compatible with the closures, and the resulting net revenues *may not be very far at all* from current net revenues. In short, analysis that assumes rigid, or inflexible, fishing practices leads to an upward – potentially dramatically so – bias in estimate of the opportunity costs of closures.

There is a large literature on the impact of marine protected areas on fishery yields and dynamic efficiency.[8,9] Where closed areas are arbitrarily located – meaning the closures are not specifically designed or located to protect areas of particular importance to a fishery – they tend to be yield-neutral, having neither positive nor negative effect on economic rents from the fishery.[10] That is, fishermen can redirect their effort and catch the target just outside the close area's boundaries.

The areas proposed for closure in the Deep Sea Coral Amendment are – in this way – "arbitrarily located." The choices for the closures are designed to protect deep sea corals and are largely independent of the location and spatial dynamics of the commercial target (e.g., squid) stocks. The main target species affected by the closures, Illex and Loligo squid, are mobile. As these species are not expected to remain inside the closed areas for very long, we would expect the opportunity costs of closures will be lower than that for sessile species dependent on benthic substrate (such as oysters or urchins) or even many demersal species. Fishermen may increase their intensity of effort in locations outside (even on the

---

[8] Sanchirico, J. and J. Wilen, 2001. A bioeconomic model of marine reserve creation. *J. Env. Econ. & Mgmt.* **42**(3):257-276.
[9] Neubert, M.G. and G.E. Herrera, 2007. Triple benefits from spatial resource management. *Theoretical Ecology* **1**(1):5-12.
[10] Hastings, A. and L. W. Botsford, 1999. Equivalence in yield from marine reserves and traditional fisheries management. *Science* **284**:1537-1538.

edges of) the closures, and the catch per unit effort ("CPUE") from these shifted units of effort will likely come very close to what they would have obtained inside the closed area.

This type of redistribution of effort is sometimes of concern to those proposing marine protected areas. But in the case of the proposed deep sea coral protections, such "fishing the line" behavior is exactly the effort redistribution we would hope for, allowing commercial net revenues to remain roughly the same while achieving coral protection. The PID allows for the possibility of effort redistributions, but only in passing:

> "… in general, effort would be expected to shift near/around other areas/canyons not impacted by the proposed measures. This effect would reduce both the negative socio-economic impacts to commercial fishermen and the protections to corals from closing particular areas." (PID, p. 88)

This kind of effort redistribution does not, however appear to be incorporated into estimates of economic impacts, as the data given (e.g., Tables 31-34) only present displaced revenues.

The correct depiction of the opportunity costs to the squid fisheries of the closures is the *difference* between current (net) revenues, prior to regulation, and those that would be earned in the *next best pattern* of fishing effort that would be chosen once an area or set of areas is closed. So the projected loss in net revenues depends on how much worse this next best option is. If the profit surface is very "flat," i.e., the drop-off in profit between current and 2nd-best profits is small, then fishermen will be largely indifferent to whether they fish in the area slated for closure and somewhere else; the economic (opportunity) cost of the closure will be very close to zero. The net revenue currently arising from the closure itself is *only a useful estimate of opportunity costs if the effort cannot be exerted anywhere else* in the system, which is very unlikely to be true.

Harvesters would of course prefer to keep fishing where they are currently. But because (a) much less effort is likely actually being exerted in the areas being considered for closure than the current estimation techniques suggest, and because (b) fishermen likely have other locations they can exploit and earn similar levels of profit, the economic costs of the deep sea coral protection zones is likely being significantly overestimated (i.e., the "practicability" of the closures is being underestimated).

Figure 1 shows the disparity between the current assessment of opportunity costs and a more correct estimate that reflects more plausible revenue mapping and net revenue offsetting through effort redistribution.

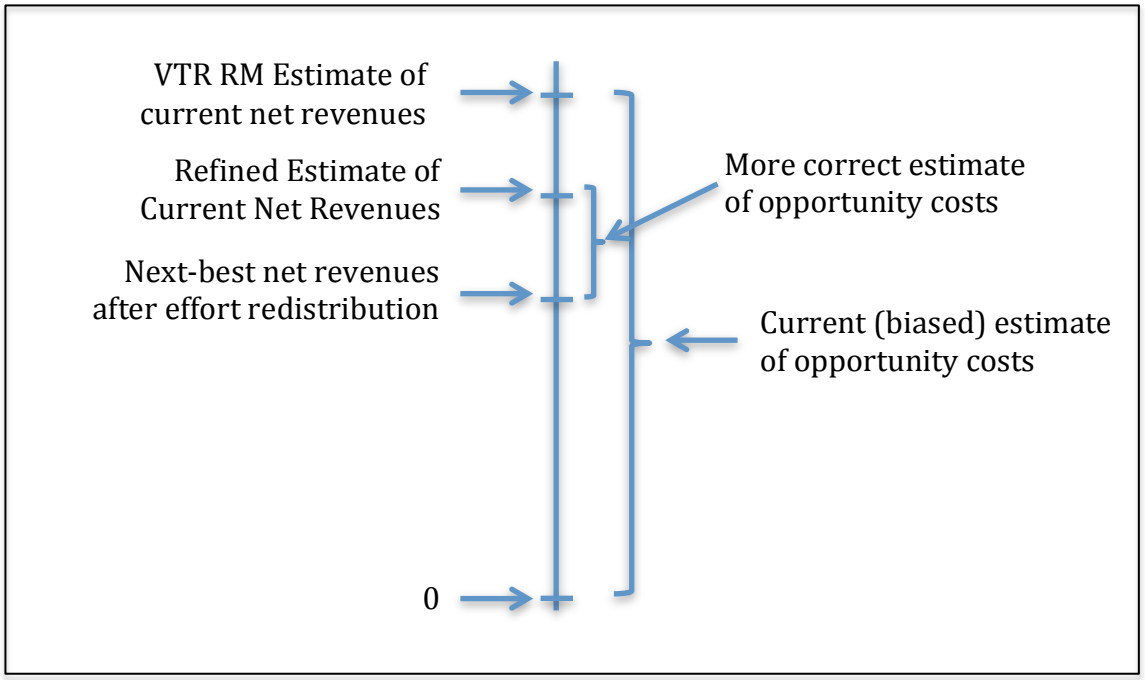


Figure 1: The relationship between current and improved estimates of the opportunity costs of DSC closures.

How the PID likely overstates the economic opportunity costs of deep sea coral protected zones is highlighted in the following steps showing how economic opportunity costs of an action should be understood:

1) Estimate the extent to which these closures actually impinge upon *current fishing practices*, because of overlap with currently fished zones or impediments to the deployment of fishing gear to areas proximal to the closures. This step currently utilizes VTR data or the improved revenue-mapping VTR procedure, which overstate these conflicts, as we discuss above
2) Estimate the *gross* loss in net revenues resulting from the closure: fishing revenues, less effort costs, for the effort that would be precluded by the closures. One can think of this as the gross cost of the closure to the fishing industry. [Note: It seems that this value is what is currently being used, at least implicitly, as the "opportunity cost" of the closures.]
3) Characterize, at least in a coarse way, the resultant distribution of fishing effort that will arise after the closures are imposed. Fishermen have a strong incentive to maximize profits, so presumably they will, after some searching, find the next best alternative to the areas precluded by the closure. With mobile target species such as squid, it may very well be that what is required is a redistribution of effort in time as well as space, i.e., so as to allow the target species to move out of the closed areas into fishable waters. An easy way to assign the displaced effort units assigns some CPUE that is slightly below that observed in fished areas proximal to the closure.

4) Estimate, as in (2), the net revenues associated with the new distribution (in space and time) of the displaced effort. This can be thought of as the gross benefit arising from the closure (i.e., new net revenue that did not exist prior to the change). [Note: the literature suggests that redistribution of effort in situations like that here where closed areas are "arbitrarily located" may offset completely revenues lost as a result of the closures, set forth in (2) above.]
5) Calculate the net cost of the closure to the fishing industry as the difference between the gross costs and the gross benefits, i.e., the difference (2) – (4) as described above.

In summary, the PID skews upward its estimates of economic opportunity costs of the proposed deep sea coral protections in two significant ways. My hope is that the MAFMC will recognize the bias in both the VTR and VTRRM depictions of the conflicts between fishing and these protections as well as the likelihood of revenue-restoring effort redistributions by fishermen in response to closures. Understanding and accounting for these biases underscores the practicability of the proposed closures for the protection of deep sea corals.

With thanks for your consideration,

Guillermo E. Herrera, M.Sc., Ph.D.
Fisheries Economist
gherrera@bowdoin.edu

KELLEY DRYE & WARREN LLP
A LIMITED LIABILITY PARTNERSHIP

WASHINGTON HARBOUR, SUITE 400
3050 K STREET, NW
WASHINGTON, DC 20007

(202) 342-8400

NEW YORK, NY
LOS ANGELES, CA
CHICAGO, IL
STAMFORD, CT
PARSIPPANY, NEW JERSEY

BRUSSELS, BELGIUM

AFFILIATE OFFICE
MUMBAI, INDIA

FACSIMILE
(202) 342-8451
www.kelleydrye.com

DAVID E. FRULLA
DIRECT LINE: (202) 342-8648
EMAIL: dfrulla@kelleydrye.com

January 28, 2015

Dr. Christopher M. Moore, Executive Director
Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201
Dover, Delaware 19901

Re: <u>Deep Sea Corals Amendment Comments</u>

Dear Dr. Moore:

As you know, we represent the Fisheries Survival Fund ("FSF"). FSF's participants include over 250 full-time Atlantic scallop limited access permit holders. These are all actively working fishing vessels. FSF respectfully submits these comments regarding the Mid-Atlantic Fishery Management Council's ("Council's") consideration of alternatives in its Deep Sea Corals Amendment to the Mackerel, Squid, and Butterfish Fishery Management Plan ("Amendment 16").

The Mid-Atlantic region contains scallop access areas that are critical to the success of the fishery. Because the fishery operates with a combination of "open areas" subject to a days-at-sea regime and controlled "access areas" of high abundance, a constriction of scallop fishing areas not only limits fishing opportunities in that area, but contributes to effort displacement and decreases overall allowable catch levels. FSF therefore strongly urges the Council to closely tailor its management of deep sea corals to protect areas in which such corals are actually documented to occur, while taking existing fishing activity into consideration.

I. BROAD ZONE DESIGNATIONS ARE UNNECESSARY AND PROVIDE NO ADDITIONAL PROTECTION TO CORALS

In its corals amendment, the Council is considering two major alternatives: the designation of, and restrictions within, either broad or discrete "coral zones" in order to achieve the amendment's goals of protecting deep sea corals. The record simply does not support the

broad coral zone alternatives, especially in productive fishing grounds near lucrative scallop fishery access areas.

As the amendment acknowledges, there is limited data on where corals actually occur in the Mid-Atlantic. However, in order to develop the most effective possible document alternatives, the Fishery Management Action Team ("FMAT") reviewed all interactions between deep sea corals and fishing gear recorded in several databases. It then used sophisticated mapping and analyses to predict where corals are occurring and where they are likely to occur based on substrate, depth, and other relevant factors. The discrete zones in Alternative 3 were carefully refined to cover these areas where corals were either observed to be present, or where the habitat is highly likely to support corals. Indeed, the amendment unequivocally states that "the revised discrete zone boundaries were drawn based on the best available scientific information about coral presence and suitable habitat."[1] The broad zones, in contrast, were simply delineated based on arbitrary depth contours, which do not match data on coral presence and habitat suitability.[2]

Moreover, the scallop fishery poses virtually no risk to deep sea corals. Even within the largest of the broad coral zones under consideration as an alternative, there were no interactions between scallop gear and coral in the 1994-2014 Northeast Fisheries Observer Program database.[3] Scallops typically occur only to a depth of 200 meters, so some scallop beds are likely to be near the boundaries of certain of the coral zones under consideration. However, any scallops growing around that 200 meter line are in areas that are already regularly fished, and there are therefore demonstrably no corals in these areas. The amendment states that "many of the proposed measures are precautionary in nature and are designed to protect corals from future expansion of fishing effort."[4] The scallop fishery is certainly not exploratory in nature. Rather, information gained in extensive annual dredge and video surveys, the nature of the rotational management program, and mature scallops' sessile life history clearly limit the fishery's mobility and render its behavior entirely predictable.

---

[1] Mid-Atlantic Fishery Management Council and NOAA Fisheries, *Deep Sea Corals Amendment to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan: Public Information Document* (January 2015), at 26.

[2] "Given the differences across canyon and slope areas, there was additionally no consistent depth contour across proposed areas which would approximate areas of high coral habitat suitability." *Id.* at 26-27.

[3] *Id.* at 51.

[4] *Id.* at 67.

II. THE COUNCIL MUST CONSIDER PRACTICABILITY WHEN ADOPTING CLOSURES

The Magnuson-Stevens Fishery Management and Conservation Act requires a balanced approach to the designation of deep sea coral zones.[5] As with the law's practicability standards for habitat conservation,[6] this means the Council does not hold unlimited discretion to enact closures in the name of precaution and experimentation. A more balanced approach forces consideration of impacts to the fishery in addition to those to protected resources.

Although scallop fishing occurs only in small portions of even the largest closures under consideration in the amendment, that activity is valuable to the fleet. As stated previously, the Mid-Atlantic scallop access areas, particularly the Hudson Canyon area, are immensely important to the prosecution of the fishery. The largest zone under consideration, the 200 meter contour broad designation, would cover an area that generates 0.7% of the fishery's revenues. The fishery earned approximately $550 million in revenue in 2012[7]—translating to $3.8 million in revenue from the potentially closed area. This is simply too great a loss to impose, based solely on conjecture that is not supported in the record.

* * * * *

Again, we urge the Council to select narrowly-tailored and balanced Amendment 16 alternatives based on the best scientific information available. We appreciate the opportunity to provide these comments. Please do not hesitate to contact us if you have any questions or need additional information.

Sincerely,

David E. Frulla
Andrew E. Minkiewicz
Anne Hawkins
Counsel for Fisheries Survival Fund

---

[5] "[Such closure] is based on an assessment of the benefits and impacts of the closure, including its size, in relation to other management measures (either alone or in combination with such measures), including the benefits and impacts of limiting access to: users of the area, overall fishing activity, fishery science, and fishery and marine conservation." 16 U.S.C. § 1853(b)(2)(C)(iv).

[6] 16 U.S.C. § 1853(a)(7).

[7] *Public Information Document* at 43.

212 West State Street
Trenton, NJ 08628
Phone: (609) 898-1100

www.gardenstateseafood.org

Gregory P. DiDomenico, Executive Director

609-675-0202 / **gregdi@voicenet.com**

January 28th, 2014

Chris Moore, Ph.D., Executive Director
Mid Atlantic Fishery Management Council
800 North State Street, Suite 201
Dover, DE 19901

Dear Dr. Moore:

Please accept these comments on behalf of the Garden State Seafood Association (GSSA); GSSA is comprised of commercial fishermen, shore-based processors, commercial dock facilities, seafood markets, restaurants, and various industry support businesses from New Jersey.

Over the past few months a small group of fishing industry members with intimate knowledge of the offshore canyons of the mid – Atlantic has attempted to address the Council's concerns regarding deep water corals and interpret the public interest, while preserving viable fishing opportunities and maintaining current fishing practices. This group includes the individuals responsible for the vast majority of the *illex* fishery.

The following comments are a result of careful consideration and numerous deliberations by these individuals. They include both our critique of the Deep Sea Corals Amendment and our suggestions for a path forward.

Issue #1: The data used to create the Habitat Suitability Index (HSI) and the analyses contained in Amendment 16 are inconsistent with Information Quality Guidelines developed by the Office of Management and Budget and do not meet the performance standards of NOAA's own

Information Quality Guidelines. We feel strongly that the data are not of the quality, utility or integrity that would justify potential management alternatives. In particular, the following statement that refers to the data used in the HSI is troubling:

> *"These data were extracted from an early prototype of the National Deep Coral Geodatabase on Dec 2, 2011. Records spanned 1873 to 2002 and were compiled from journal articles, reports, museum collections, and direct communications with original observers and PI's to obtain unpublished records. Positional accuracy is of variable quality; positioning methods ranged from sextants and dead reckoning to LORAN and GPS. We believe most records to be accurate to within a few hundred meters, but some positions may have as much as 600m error or more."(email communication Brian Kinlan)*

Recommendation #1: We request that the Council's Scientific and Statistical Committee conduct a review of the HSI and the analyses contained in the Amendment and perform a Management Strategy Evaluation.

Issue #2: Over the last 5 years a total of 7 surveys have been conducted to explore the deep canyons in the mid – Atlantic region. Nearly all of these recent surveys have been conducted at depths beyond 500 meters. Unfortunately, the observations and data collected from these surveys have yet to be analyzed to the fullest extent possible. The failure to analyze these observations and data is inconsistent with the requirements of Sections 301(a)(2) and 303(b)(2)(C)(i) of the Magnuson-Stevens Act that management actions be based upon the "best scientific information available."

Recommendation #2: We request that the Council have full access to these data to consider the potential relevance these surveys might have for management.

Issue #3: The charts that depict the proposed closed areas and current fishing effort are of such coarse resolution that the potential impacts to the industry are severely underestimated. In addition, the fishing practices and operational elements of the fishery are misunderstood and largely ignored. The Council needs to consider that: (A) the *illex* trawl fishery is viable only in a tight temporal and spatial paradigm; and (B) profitability is on a very tight margin; such that even subtle management restrictions could make a significant difference on a single vessel. Furthermore, the charts cannot illustrate that in the discrete areas the linear distance between depths of 400 and 500 meters in some areas can be as little as 100 meters. In fact, this small linear distance means that the Council decisions needs to carefully weigh and justify the insignificant conservation impact with unknown benefits versus significant economic consequences.

Recommendation #3: We request a meeting of the Squid, Mackerel and Butterfish Advisory Panel to develop alternatives that appropriately account for the operational elements of the trawl fisheries.

Issue #4: Section 303(b)(2)(C) of the Magnuson-Stevens Act imposes significant analytical requirements on the Council, including, in Subsection (C)(iv), the requirement that closures be "based on an assessment of the benefits and impacts of the closure, including its size, in relation to other management measures (either alone or in combination with such measures), including the benefits and impacts of limiting access to: users of the area, overall fishing activity, fishery science, and fishery and marine conservation."

The "Impacts to Deep Sea Corals" 7.2 section of the Public Information Document contains insufficient assessments of the cumulative conservation, economic and social impacts of the closures under consideration. It poorly describes the possibility of effort shifts and assumes incorrectly that vessels will shift to other areas to offset the loss of productive fishing areas. In addition, it does not account for impacts to fisheries under the jurisdiction of the New England Fishery Management Council. Lastly, it estimates protection for the depth alternatives with a 7% difference (from 93% to 100%) between the most severe and least restrictive options. This difference is statistically insignificant and does not justify restrictions shallower than 500 meters.

Recommendation #4: We request that a sufficient Impact analysis, consistent with the requirements of the Magnuson-Stevens Act, be conducted and all broad zone alternatives be rejected from the Amendment.

Issue #5: Should the Council decide, despite the deficiencies in the current analysis, to move the Amendment forward, we have developed discrete alternatives for the Baltimore, Washington, Wilmington and Norfolk canyons. We created these areas by considering slope, historical records and accommodating the potential needs of industry. These charts are available at the following dropbox website:

https://www.dropbox.com/sh/jlsd5unf8f4da9x/AABpKBylFsywqrslsTj2kbUfa?dl=0

Recommendation #5: We request that the SMB Advisory Panel meet to develop discrete alternatives for the additional canyons not included in our recommendations.

Thank you for your consideration of these comments. We would be happy to provide any additional information you may wish or answer any questions you may have.

Sincerely,

Gregory P. DiDomenico

Gregory P. DiDomenico

Executive Director
Garden State Seafood Association

January 28, 2015

Dr. Christopher M. Moore, Executive Director
Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201
Dover, DE 19901

Re: Deep Sea Corals Amendment Comments

Dear Dr. Moore and Council Members:

Our organizations are pleased to provide these comments on our preferred alternatives for the Deep Sea Corals Amendment to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan ("Deep Sea Corals Amendment" or "Amendment"). We congratulate the Mid-Atlantic Fishery Management Council ("Council") on developing the Amendment, which we consider one of the most exciting and precedent-setting marine habitat protection initiatives anywhere in the country. As you know, the Deep Sea Corals Amendment has been three years in the making—it had the benefit of extensive involvement of the Fishery Management Advisory Team ("FMAT"), was discussed at four prior Council meetings, an advisory panel meeting, and a workshop, and has been the subject of multiple public comment periods, as well as a recent round of public hearings. We look forward to the Council's consideration of the Amendment and its vote on preferred alternatives for submission to the National Oceanic and Atmospheric Administration ("NOAA") at your upcoming February meeting.

To sufficiently protect the Mid-Atlantic's valuable and vulnerable deep sea coral habitat, our groups ask the Council to select the following as preferred alternatives:

- Alternative 1B (Designation of a broad coral zone with the landward boundary approximating the 200 meter depth contour);
- Alternative 2B (Bottom-tending gear prohibition in broad zone);
- Alternative 3B (Designation of discrete coral zones for all 15 canyon/slope areas based on the FMAT-proposed boundaries, not the industry-proposed boundaries;
- Alternative 4B (Bottom-tending gear prohibition in discrete zones); and
- Alternative 6B (Vessel Monitoring System (VMS) requirement for *Illex* vessels)

With respect to the alternatives for frameworkable actions, we recommend that the Council make clear that such framework adjustments must further the purpose of the Deep Sea Corals Amendment, "to identify and implement measures that reduce, to the extent practicable,

impacts of fishing gear on deep sea corals in the Mid-Atlantic region."[1] Frameworks should not be used to undo or weaken necessary coral protections put in place through this Amendment. This concern specifically applies to Alternative 5B (to modify zone boundaries), Alternative 5C (to modify management measures), and Alternative 5E (to implement special access programs).

Our organizations would also like to direct the Council's attention to the comment letter provided by Dr. Guillermo Herrera, Associate Professor of Economics and Chair of Economics Department at Bowdoin College and a fisheries economics expert, including on the impacts of spatial management actions. In his letter, Dr. Herrera explains why the economic impact analyses contained in Section 7.3 of the Amendment, and specifically the values in Tables 31, 32, and 34, convey a significantly exaggerated view of the likely impacts of the proposed protection zones, including because (1) the Vessel Trip Report (VTR) revenue mapping model discussed in Section 7.3.1 does not account for the depth-and slope-based nature of bottom trawling at the shelf break, and hence projects the displacement of fishing that would not or was unlikely to occur anyway (i.e., in canyons and at deep depths); (2) the analysis based on VTR point data discussed in Section 7.3.2 attributes <u>all</u> catch from a VTR to a protection zone if the point estimate happens to fall in the zone, even if the catch is primarily from areas outside the zone, as the observer data in Section 7.3.3 demonstrates will usually be the case; and (3) none of the analyses explicitly account for compensating behavior by fishermen in response to implementation of protection zones, such as aggressively pursuing a similar level of catch and revenues by reconfiguring fishing activity. We recommend that the Council take Dr. Herrera's comments into account in considering the potential economic impacts of the proposed alternatives in the Amendment.

<u>The Value and Vulnerability of Deep Sea Corals</u>

The region's deep sea coral communities warrant the Council's special attention and a high level of protection because they are:

- <u>Ecologically important.</u> Deep sea corals, and associated anemones and sponges, form the foundation of deep-sea ecosystems, providing food, spawning habitat, and shelter for an array of invertebrate and fish species, and helping to fuel biodiversity hotspots in the canyons and along the shelf break. Deep sea corals are considered comparable to shallow-water reefs in promoting biodiversity.[2] In Baltimore and Norfolk canyons, researchers found coral richness to be positively related to demersal fish diversity and that corals are contribute to highly-complex habitat areas favored by fish.[3]

---

[1] Amendment at 2.

[2] Watling, L., France, S.C., Pante, E., and Simpson, A. 2011. Biology of Deep-Water Octocorals. *Advances in Marine Biology*, *60*, 41–122.

[3] Quattrini, A.M. and Ross, S.W. 2015. Fishes associated with deep reefs in the western North Atlantic: New Species, Rare Observations, and a Characteristic Fauna. Webinar presentation; Ross, S., et al. Fish Distribution and Habitat Use Within and Near Baltimore and Norfolk Canyons, U.S. Middle Atlantic Slope, Unpublished.

- Beneficial to fisheries. The ecological benefits of deep sea corals extend directly and indirectly to managed species. As noted above, studies have found that deep sea corals provide: spawning habitat and shelter for developing larvae and juveniles; structure for shelter-seeking fishes; and enhanced rates of prey capture.[4] Correlative studies and habitat models have shown that adult fish densities are often higher and average fish size larger around deep sea corals compared to areas devoid of corals.[5] Further, research suggests that "fish larvae shelter around soft corals, [thus creating] a strong argument for classifying those [deep sea corals] as essential fish habitat and as vulnerable marine ecosystems."[6] According to a recent scientific review, "studies to date indicate that functional values in support of commercial fisheries probably represent the most important service provided by cold-water corals."[7] In this region, coral communities have been observed to provide habitat for various species of flounders, shrimp, hake, skates, redfish, lobster, eels, tilefish, and crabs, among others. Growth rate and carrying capacity in redfish specifically has been correlated to the extent of available coral habitat.[8] We also note that the complex hardbottom that deep sea corals inhabit is exceedingly rare in the region and considered generally of high value as fish habitat.

- Of high scientific interest and social utility. The region's deep sea coral communities have been a subject of intense NOAA-led scientific study in recent years. New and rare species, new understandings about ecological relationships within these habitats, and new appreciation of these deep sea organisms continue to emerge from these investigations. The public has been highly engaged in these explorations as well—in the summer of 2013, the live video feed from the Okeanos Explorer drew approximately 660,000 viewers. Deep sea coral communities have social utility beyond their ecological importance: they provide a carbon sink, a means to study changing ocean circulation patterns, and contribute to biomedical and biotechnological innovations, such as bone grafting, cancer treatment, pharmaceuticals, and antifoulants.[9]

---

[4] Auster, P. 2005. Are Deep-Water Corals Important Habitats for Fishes? In A. Freiwald and J.M. Roberts (Eds.), *Cold-Water Corals and Ecosystems, Erlangen Earth Conference Series*,. Springer Berlin Heidelberg.

[5] Baillon, S., Hamel, J., Wareham, V.E., and Mercier, A. 2012. Deep Cold-Water Corals as Nurseries for Fish Larvae. *Front Ecol Environ*, *10*(7), 351-356.

[6] Id. at 355.

[7] Foley, N.S., van Rensburg, T.M., and Armstrong, C.W.. 2010. The Ecological and Economic Value of Cold-Water Coral Ecosystems. *Ocean and Coastal Management*, *53* (7), 313-326.

[8] Foley N.S., Kahui, V., Armstrong, C.W., and van Rensburg, T.M. 2010. Estimating linkages between redfish and cold water coral on the Norwegian coast. *Mar Resour Econ*, *25*, 105–120.

[9] Foley, N.S., et al. *The Ecological and Economic Value of Cold-Water Coral Ecosystems*,, 315; The National Research Council. 2009. Oceans and Human Health. In *Ocean Science Series: Set of 5 Booklets.* Washington, DC: The National Academies Press; Corneloup, I. 2013. A Series of Papers on Policy Options, Prepared for the Third Meeting of the Global Ocean Commission, November 2013, Policy Options Paper #4: Bioprospecting and Marine Genetic Resources in the High Seas; Rocha, J., Peixe, L., Gomes, N.C.M. and Calado, R. 2011. Cnidarians as a Source of New Marine Bioactive Compounds—An Overview of the Last Decade and Future Steps for Bioprospecting. *Marine Drugs*, *9*(10), 1860-1886.

- Highly vulnerable to disturbance. Deep sea ecosystems are extremely vulnerable to human disturbance. Compared to shallow-water counterparts, deep-water species tend to have a longer lifespan, later sexual maturity, slower growth rates and lower natural mortality, all of which generally make them slow to recover from disturbance.[10] Deep sea corals in particular are both fragile and exceptionally long-lived and slow-growing, on the order of only several millimeters per year.[11] [12] Fishing gear that scrapes along a canyon wall or floor can destroy and damage corals that have been growing for centuries, eliminating these deep sea communities for any ecologically relevant period of time.[13] We also note that addressing fishing impacts will increase the resilience of deep sea coral communities to other disturbances that are not as readily mitigated, including ocean acidification and changing ocean temperatures.

Our Recommendations for Preferred Alternatives

We strongly recommend that the Council implement both discrete and broad coral zones. The discrete zones would provide the highest level of protection to the deep sea coral habitat hotspots in the region's submarine canyons, with boundaries that extend into shallower known or highly suitable coral habitat areas. The broad coral zone would provide protection for significant known and highly likely coral habitat in inter-canyon areas and assist in maintaining connectivity between these biological communities along the shelf break. Many of these areas, and therefore these coral communities, are not encompassed within any of the discrete zones. This hybrid approach is consistent with the 2010 NOAA "Strategic Plan" for the conservation of deep sea corals and should receive the support of the Council.[14]

(1) The Council should designate a broad coral zone with a landward boundary approximating the 200 meter depth contour (Alternative 1B).

Alternative 1B would provide protection for the greatest number and diversity of known deep sea coral occurrences and the greatest areal extent of modeled suitable coral habitat, protecting nearly 100% of the modeled highly suitable coral habitat. Numerous coral observations have occurred shallower than 300 meters.[15] Stony corals, in particular, are found

[10] Morato, T., Cheung, W.W.L. and Pitcher, T.J.. 2006. Vulnerability of seamount fish to fishing: fuzzy analysis of life-history attributes. *Journal of Fish Biology*, *68*, 209-221.
[11] Risk, M.J., Heikoop, J.M., Snow, M.G. and Beukens, R. 2002. Lifespans and growth patterns of two deep-sea corals: *Primnoa resedaeformis* and *Desmophyllum cristagalli*. *Hydrobiologica*, *471*(1-3), 125-131.
[12] Roark, E.B., Guilderson, T.P., Dunbar, R.B., Fallon, S.J. and Mucciarone, D.A. 2009. Extreme Longevity in proteinaceous deep-sea corals. *PNAS, 106*(13), 5204-5208.
[13] National Oceanic and Atmospheric Administration. 2014. Deep-Sea Coral Research & Technology Program 2014 Report to Congress; Auster, P. *Are deep-water corals important habitats for fishes?*
[14] National Oceanic and Atmospheric Administration, Coral Reef Conservation Program. 2010. NOAA Strategic Plan for Deep-Sea Coral and Sponge Ecosystems: Research, Management, and International Cooperation. Silver Spring, MD: NOAA Coral Reef Conservation Program. NOAA Technical Memorandum CRCP 11. 67 pp.
[15] Amendment at 45, Table 21.

at shallower depths with 44% of stony coral observations in the region shallower than 300 meters.[16] Thirty-three percent of sea pen observations also occur shallower than 200 meters.[17] In addition, the coral habitat model, which is discussed more below, predicts suitable habitat to be shallower than 300 meters. Finally, the 200 meter boundary would provide the greatest benefit to fish of economic importance in the region since interactions of corals with these species declines as depth increases.

Moreover, because the discrete zones are based on predicted non-stony coral habitat, these zones cannot be relied on to adequately protect stony corals.[18] Further, because squid gear can extend a significant distance from the vessel, a 200 meter-based broad zone provides a buffer to protect deep sea corals in the discrete zones from fishing on or close to the discrete zone boundaries, including with respect to gear haul back and deployment.

(2) The Council should prohibit all bottom-tending gear within the broad coral zone (Alternative 2B).

We support a prohibition on all bottom-tending gear within the broad coral zone. Contact with bottom longlines, traps, and gillnets, as well as mobile gear like trawls, can damage or kill fragile corals. Scientists participating in the *Okeanos* expeditions observed track marks that they believed were the result of fishing lines; traps were also a common sight in recent expeditions.[19] In addition, Alternative 2B would help address the threat that a new fishery, or expansion of an existing fishery, using non-mobile bottom gear would pose to these fragile deep sea habitats.

If any broad zone gear exemptions are considered, they should not extend beyond those currently proposed as alternatives. If the Council chooses to adopt one or both of the listed broad zone exemptions (i.e., Alternative 2B-1 for red crab and Alternative 2B-2 for tilefish), we ask that measures, including improved monitoring, be adopted to prevent any increase in impacts, such as from an expansion in the number of vessels, intensity, and/or footprint of current fishing effort.

(3) The Council should designate the 15 proposed canyon/slope discrete zones based on the FMAT-proposed boundaries (Alternative 3B).

The 15 canyon/slope discrete zones designated by the FMAT are deep sea coral "hotspots," home to the region's greatest diversity and abundance of cold-water corals, sponges, and anemones. In investigations from 2012-2014, at least 60 species of coral were identified in the

[16] Id.
[17] Id.
[18] Id. at 19, 53.
[19] Ross, S. and Brooke, S. 2012. The End of Leg 1 (two more to go). Logs, Deepwater Canyons 2012, NOAA Ocean Explorer Program. Accessed January 28, 2015, http://oceanexplorer.noaa.gov/explorations/12midatlantic/logs/leg1sum/leg1sum.html.

region's submarine canyons.[20] It is worth noting that the canyons are also well-known biodiversity hotspots, supporting diverse and abundant populations of invertebrates and fishes as well as sea birds and marine mammals, such as endangered sperm, fin, and right whales. Three hundred and twenty six species have been identified in the region's canyons; researchers found 123 fish species in Baltimore and Norfolk Canyons alone.[21]

The discrete zone boundaries are based on the best scientific information available, as required by National Standard 2 of the Magnuson-Stevens Act.[22] The boundaries were developed by the FMAT based on detailed slope data and the NOAA coral habitat model. In setting the boundaries, the FMAT also took into account new coral observations from the last several years of exploration.[23] With respect to the coral habitat model specifically, it was developed over a number of years by scientists and deep sea coral experts through an extensive, cross-NOAA effort, including involvement of researchers from National Centers for Coastal Ocean Science (NCCOS), the National Marine Fisheries Service (NMFS), and the Office of Ocean Exploration and Research (OER). The model predicts coral habitat suitability based on coral observations and environmental and geological predictor variables, including depth, depth change, aspect ratio, rugosity, salinity, oxygen, substrate, temperature, and turbidity. The NOAA coral habitat model addresses the problem that it is impossible to identify all coral communities in the region's more than two dozen canyons, each hundreds of square miles in size, as well as adjacent slope areas.

The FMAT's methodology for delineating the discrete zone boundaries is supported by recent field research and empirical data. As stated in the Amendment, "[r]ecent research has indicated that the coral habitat suitability model has been very successful in predicting coral habitat, and additionally has confirmed that areas of slope greater than 30 degrees almost always contain hardbottom habitat and deep sea corals."[24] In 2012-2014, extensive calibration surveys for the model were conducted in the field in a range of canyons, and the model was considered to have "strong predictive power."[25] Significant effort has also gone into confirming the geographic and bathymetric information associated with historical coral observations, with

---

[20] Quattrini, A.M. 2015. Personal Communication (January 21, 2015).

[21] Kelly, N.E., Shea, E.K., Metaxas, A., Haedrich, R.L. and Auster, P.J. 2010. Biodiversity of the Deep-Sea Continental Margin Bordering the Gulf of Maine (NW Atlantic): Relationships among Sub-Regions and to Shelf Systems. *PLoS ONE, 5*(11), e13832; Ross, S., et al. Fish Distribution and Habitat Use Within and Near Baltimore and Norfolk Canyons, U.S. Middle Atlantic Slope, Unpublished.

[22] 16 USC § 1851(a)(1).

[23] Amendment at 46.

[24] Id. at 19, 53.

[25] Clarke, L.M. (ed.). 2013. Proceedings of the 2nd National Habitat Assessment Workshop: Fisheries Science to Support NOAA's Habitat Blueprint. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-F/SPO-132, 89 p.; see also Nizinski, M.S., Hey, T.P., Kinlan, B.P. and Shank, T.M. 2014. An Integrated Approach to Predictive Habitat Suitability Modeling and Field Surveys in Northwest Atlantic Submarine Canyons: Model Validation and Habitat/Faunal Characterization. Presentation at the 2nd International Symposium on Submarine Canyons, Edinburgh 2014.

any problems encountered with the museum data considered to be only "minor."[26] Ongoing ocean exploration, model refinement, and other new information will continue to shape our understanding of where corals are found and likely to be found, and allow us to modify the boundaries of the discrete zones accordingly. But it is important to take protective steps now to help ensure that we do not lose coral communities that have not yet been documented.

We want to note that the methodology used by the FMAT to delineate the discrete zone boundaries is likely to result in zones that are under-inclusive of suitable coral habitat in several notable ways (the proposed zones are also 12% smaller than those originally developed by the FMAT and considered by the Council in the Amendment's earlier iterations). The FMAT based the zone boundaries on high and very high suitability classifications, and not the medium suitability classification. As noted above, the FMAT also sought to protect highly suitable habitat for the Gorgonian and Alcyonaceans orders of corals, and not for modeled suitable habitat for stony corals or sea pens.[27] Finally, in developing the boundaries for the discrete zones, the FMAT was constrained by the canyon areas specifically identified by the Council and did not extend zone boundaries to encompass all adjacent slope areas otherwise meeting the habitat suitability and slope criteria. For example, significant highly suitable coral habitat on the north side of South Vries Canyon (Figure 20), to the north and south of Washington Canyon (Figure 23), and to the north and south of Norfolk Canyon (Figure 24) are left out of their respective discrete zones.[28]

The Council considered a depth-based boundary for discrete zones as an option, but appropriately rejected this approach for further analysis in the Amendment.[29] Each canyon has a unique bathymetric shape. Researchers have also found that each canyon has a unique biological identity, with prevalence of different coral species, abundance, colony depth, and a host of other characteristics that vary widely from canyon to canyon.[30] It is impossible, as the FMAT determined, to select a single depth zone or set of depth zones that would not be either significantly over- or under-inclusive of known coral presence and highly suitable habitat across the different canyons. The deeper depth contours (300-500 meters) specifically would cut off certain canyon heads and their shallower portions, excluding these areas from protection zones irrespective of known coral presence and highly suitable habitat and contrary to the best available scientific information.

<u>Our groups oppose the industry-proposed boundaries for Baltimore Canyon, Norfolk Canyon, and the Mey-Lindenkohl Slope (Sub-alternative 3B-1).</u> These boundaries were based on the input of what we understand was one participant in the affected fisheries as to where that participant does or does not fish. Our groups have consistently opposed efforts such as this to revise the discrete zone boundaries in ways that are inconsistent with the NOAA's coral habitat

---

[26] Ross, S.W., Carlson, M.C.T., and Quattrini, A.M. 2012. The utility of museum records for documenting distributions of deep-sea corals off the southeastern United States. *Marine Biology Research*, *8*(2), 101-114.
[27] Amendment at 19, 53.
[28] Amendment at 62, 65-67.
[29] Amendment at 26-27.
[30] E.g., NOAA, *Deep Sea Coral Research and Technology Program 2014 Report to Congress*.

model and with the best available science as required by National Standard 2, including with respect to known coral presence and highly suitable coral habitat, as areas with known corals or highly suitable habitat would be excluded from the protection zones.

The industry proposed boundaries would fail to protect high value deep sea coral habitat in the three canyon areas. The Baltimore Canyon, Norfolk Canyon, and the Mey-Lindenkohl Slope discrete zones are the three discrete zones with the highest numbers of historical coral records.[31] For both the Mey-Lindenkohl Slope and Baltimore Canyon, observed coral occurrences would fall outside the industry boundaries.[32] For all three discrete zones, areas of high/very high coral suitability and/or high slope would shrink by as much as 32% (in the case of Baltimore Canyon).[33] In addition, the areas excluded in Baltimore Canyon and Norfolk Canyon under this alternative include areas where Lophelia coral colonies were recently found.[34] These observations of Lophelia, a reef-forming species, were the first in the Mid-Atlantic.[35] In recent investigations of Norfolk Canyon and Baltimore Canyon, scientists have identified high abundance of corals in Norfolk Canyon, with 1315 new coral observations, and in Baltimore Canyon, with 791 new coral observations, including dense areas *of Paragorgia, Anthothela, Primnoa, and Acanthogorgia.*[36] In Norfolk Canyon, corals were observed on 100% of dives; in Baltimore Canyon, corals were observed on 83% of dives.[37]

(4) <u>The Council should prohibit all bottom-tending gear in discrete zones (Alternative 4B).</u>

The discrete zones encompass the highest value coral habitat and deserve the highest level of protection. In addition, we recommend that the Council and NOAA include an analysis of the potential impacts of mid-water trawl gear, which is mobile and has been documented to contact the sea floor, in the Environmental Assessment that will be developed for this action.[38] We note that the South Atlantic Fishery Management Council has prohibited mid-water trawls from operating in the region's deepwater coral protection areas.[39]

---

[31] Amendment at 69, Table 29.
[32] Id.
[33] Id.
[34] Id. at 62, Figure 20, and 66, Figure 24 (showing Lophelia observations, as well as other coral observations, immediately adjacent to industry boundaries).
[35] Brooke, S. and Ross, S.W. 2014. First Observations of the Cold-Water Coral *Lophelia pertusa* in mid-Atlantic Canyons of the USA. *Deep Sea Research Part II: Topical Studies in Oceanography*, *104*, 245–251.
[36] Brooke, S. 2014. Exploring Hidden Treasures of the Mid-Atlantic Canyons. Presentation to the Mid-Atlantic Fishery Management Council (August 12, 2014); Amendment at 47.
[37] Brooke, S., *Exploring Hidden Treasures of the Mid-Atlantic Canyons*.
[38] South Atlantic Fishery Management Council (SAFMC). 2009. Comprehensive Ecosystem-Based Amendment 1 for the South Atlantic Region; New England Fishery Management Council. 2013. Amendment 5 to the Fishery Management Plan for Atlantic Herring including a Final Environmental Impact Statement, Volume I, at ix.
[39] SAFMC, *Comprehensive Ecosystem-Based Amendment 1*..

(5) The Council should require the use of VMS for *Illex* squid vessels (Alternative 6B).

Under Alternative 6B, *Illex* (shortfin) squid vessels would be required to install and operate VMS, which would greatly assist implementation and enforcement of the protection zones. It is our understanding that VMS has been highly effective in ensuring compliance with deep sea coral protections in the South Atlantic. We note that many of the boats participating in the *Illex* fishery are already required to use these monitoring devices.[40]

* * *

The Deep Sea Corals Amendment represents a historic opportunity to adopt reasonable measures that will protect ecologically-important and highly vulnerable deep sea coral communities in the region. Habitat conservation measures such as those proposed in the Amendment are a vital part of maintaining productive and resilient marine ecosystems, systems capable of providing abundant fish and supporting fisheries and fishing communities. Our groups are excited to see the Council take taking this step and greatly appreciate the opportunity to provide these comments.

Sincerely,

Bradford H. Sewell
Fisheries Policy Director & Senior Attorney
Natural Resources Defense Council

Adrienne Esposito
Executive Director
Citizens Campaign for the Environment

Greg Cunningham
Program Director, Clean Energy and Climate Change
Conservation Law Foundation

Gib Brogan
Fisheries Campaign Manager
Oceana

Merry Camhi, PhD
Director, New York Seascape
Wildlife Conservation Society
New York Aquarium

[40] Amendment at 5.

January 28, 2015

Dr. Christopher M. Moore
Executive Director
Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201,
Dover, Delaware 19901

Mr. Richard Robins
Chairman
Mid-Atlantic Fishery Management Council
800 North State Street, Suite 201
Dover, DE 19901

RE: Deep-Sea Corals Amendment to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan: Measures to Protect Deep-Sea Corals from Impacts of Fishing Gear

Dear Dr. Moore and Chairman Robins,

We write on behalf of Earthjustice to express our support for the Mid-Atlantic Fishery Management Council's (Council) development of comprehensive protections for deep-sea corals under the Deep-Sea Corals Amendment (Amendment) to the Mackerel, Squid, and Butterfish Fishery Management Plan (FMP). We are encouraged that the Council intends to protect unique and fragile deep-sea bottom communities that provide ecosystem services for countless fish and invertebrates, including commercially valuable species that depend on these areas as habitat. This Amendment is needed to advance these important policy goals and must be consistent with the Magnuson-Stevens Fishery Conservation and Management Act's (MSA) requirement to minimize the adverse effects of fishing on habitat to the extent practicable and be based on the best scientific information available.[1] Specifically, the Council should take the following actions:

1. Protect deep-sea coral ecosystems by prohibiting all bottom-tending gear (including mid-water trawls) (*Alternative 2B*) within the 200-meter broad zone (*Alternative 1B*);
2. Protect deep-sea corals ecosystems by prohibiting all bottom-tending gear (including mid-water trawls) (*Alternative 4B*) within each of the 15 designated discrete zones (*Alternative 3B*);
3. Require the use of Vessel Monitoring Systems on *Illex* squid vessels to ensure enforceability (*Alternative 6B*);
4. Prohibit exemptions beyond those analyzed in the draft Amendment (*Alternatives 2B-1 and 2B-2*) and, if either should pass, amend them to prevent any increase in impacts and/or footprint of current bottom-fishing effort; and,

[1] 16 U.S.C. §§ 1851(a)(2), 1853(a)(7).

5. Require that a plan be established to effectively monitor and enforce the measures adopted through this Amendment, as well as to inform fishermen who may be affected by them.

Around the world, many similar deep-sea biodiversity hotspots have already been destroyed by bottom fishing. As the oceans warm, numerous fish assemblages are expected to shift deeper, and fisheries are expected to follow, so these places will be of greater importance and at greater risk in the future.

The Council Has A Legal Requirement To Minimize The Adverse Effects Of Fishing On Habitat To The Extent Practicable Based On The Best Available Science

Under the MSA, the Council is required to minimize the adverse effects of fishing on habitat using the best available science, and has broad authority to protect important fish habitat in its fishery management plans. The Council has stated that it is doing this Amendment under the MSA's discretionary provision to designate deep sea coral zones and to prevent physical damage to deep sea corals from fishing gear in those zones. *Id.* § 1853(b)(2)(B). The Council may also use discretionary provisions to protect habitat by closing areas to fishing, limiting the types of fishing, vessels, or gear that can be allowed in designated zones, establishing limitations on the catch, sale, or transport of fish, and prohibiting or limiting the specific types and quantities of fishing gear, vessels or equipment that fishers can use. *See, e.g.*, 16 U.S.C. § 1853 (b)(2)-(5); (12); (14). Discretionary provisions also exist to conserve target and non-target fishery habitats. *Id.* § 1853(b)(12).

The Council has a mandatory duty to "describe and identify essential fish habitat" in each fishery management plan.16 U.S.C. § 1853(a)(7). "Essential fish habitat" ("EFH") is broadly defined as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." 16 U.S.C. § 1802(10). NMFS has interpreted the word "necessary" to mean "the amount of habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem."[2] NMFS has also stated that linking EFH to healthy ecosystems is important in order to conserve the habitats of all marine resources which depend on the same ecosystem and that councils should consider the inter-relationships between and among species, as a result.[3] Regulations implementing EFH provisions include detailed requirements the Council must follow when describing and identifying the habitats. Descriptions must clearly state the habitat for each life stage of the managed species and explain the physical, biological, and chemical characteristics of the habitat and how those characteristics influence the use of the habitat. 50 C.F.R. § 600.815(a). Councils must use information from the "best available sources" to describe and identify EFH. *Id.* § 600.815(a)(1)(ii)(B).

---

[2] 62 Fed. Reg. 66531, 66533 (Dec. 19, 1997); see also 50 C.F.R. 600.815(a)(1)(iv)(E) ("The extent of the EFH should be based on the judgment of the Secretary and the appropriate Council(s) regarding the quantity and quality of habitat that are necessary to maintain a sustainable fishery and the managed species' contribution to a healthy ecosystem.").

[3] 62 Fed. Reg. at 66533; *see also* 66531 ("Councils should strive to understand the ecological roles (e.g. prey, competitors, trophic links within food webs, nutrient transfer between ecosystems, etc.) played by managed species within their ecosystems. They should protect, conserve, and enhance adequate quantities of EFH to support a fish population that is capable of fulfilling all of those contributions that the managed species makes to maintaining a healthy ecosystem as well as supporting a sustainable fishery.").

In addition to identifying EFH, the Magnuson-Stevens Act also requires Councils to "minimize to the extent practicable" the adverse effects of fishing on EFH and "identify other actions to encourage the conservation and enhancement" of those habitats. 16 U.S.C. § 1853(a)(7). An "adverse effect" is "any impact which reduces the quality and/or quantity of EFH." 50 C.F.R. § 600.810(a). Councils "must act to prevent, mitigate, or minimize any adverse effects from fishing, to the extent practicable, if there is evidence that a fishing activity adversely affects essential fish habitat in a manner that is more than minimal and not temporary in nature." 50 C.F.R. § 600.815(a)(2)(ii). Thus, the Council is required to act, to the extent practicable, to prevent, mitigate, or minimize adverse effects from fishing once two things have been established: (1) fishing activity is reducing the quantity or quality of essential fish habitat, thereby causing an adverse effect, and (2) the adverse effect is more than minimal and not temporary in nature.

Once a Council has identified adverse fishing effects that need to be addressed, the Council should identify a range of potential actions and analyze the practicability of potential actions. *Id*. § 600.815(a)(2)(ii). The Council should adopt any new measures that are necessary and practicable. *Id*. In deciding whether it is practicable to minimize adverse effects, Councils must consider the nature and extent of the effect on EFH and the long and short-term costs and benefits of potential management measures. *Id*. § 600.815(a)(2)(iii).

Deep Sea Corals Face Numerous Threats

Deep-sea corals, also known as cold-water corals, face threats from climate change. These corals are long-lived, slow to reproduce, fragile, sessile animals that are generally considered to grow at depths greater than 50 meters, but they have been found deeper than 6,000 meters (~20,000 feet).[4] Some of the corals found in the Mid-Atlantic are likely thousands of years old, placing them among the oldest living animals on the planet.[5] They are known to promote biodiversity and are thought to be comparable in this regard to shallow-water reefs.[6] Studies have shown that even coral rubble promotes higher biodiversity levels than in nearby bottom sediment.[7] It is critically important to protect sensitive areas now because deep-sea corals are slow to recover from disturbance due to their slow growth rates, long lifespans, late sexual maturity, and low natural mortality.[8] As a result, they now face a number of climate change-induced threats like rising ocean temperatures and acidification, as well as natural ones, including underwater geological activity (*e.g.*, landslides), diseases, and strong ocean currents.

In addition to threats from climate change**,** all three Atlantic Fishery Management Councils have acknowledged that bottom fishing is the primary threat to deep-sea corals in a

---

[4] Adkins, J.F. *et al*. (1998). Deep-Sea Coral Evidence for Rapid Change in Ventilation of the Deep North Atlantic 15,400 Years Ago. *Science:* Vol. 280, No. 5364; pp. 725-728.
[5] Mid-Atlantic Regional Council on the Ocean (Sept. 12, 2014). MARCO Statement On A Course Of Action For The Conservation Of Mid-Atlantic Submarine Canyons.
[6] Watling, L. *et al*. (2011). Biology of Deep-Water Octocorals. *Advances in Marine Biology*: Vol. 60; pp. 41–123.
[7] Bongiorni, L. *et al*. Deep-Water Scleractinian Corals Promote Higher Biodiversity in Deep-Sea Meiofaunal Assemblages Along Continental Margins. *Biological Conservation*: Vol. 143, Issue 7: pp. 1687-1700.
[8] Morato, T., Cheung, W., & T.J. Pitcher (2006). Vulnerability of Seamount Fish to Fishing: Fuzzy Analysis of Life-History Attributes. *Journal of Fish Biology*: Vol. 68; p. 209-221; Auster, P.J. *et al*. (2013). Supplementary Comment: Conservation of Deep-Sea Corals off the Northeast United States. Biodiversity: Vol. 14, No. 4; p. 195.

Memorandum of Understanding (MOU) co-signed in mid-2013, stating that "…bottom tending fishing gear has been known to cause significant disturbance in many locations, and is considered to be the major threat to deep-sea corals in areas where such fishing occurs."[9] Because corals are slow-growing, immobile, and fragile, they are particularly vulnerable to fishing gears that contact the bottom.[10] When damaged or destroyed, recovery of deep-sea corals and their communities is expected to be slow (decades or centuries), if at all.[11] For example, in the Gulf of Alaska, a single tow of a bottom trawl that landed one metric ton of deep-sea coral showed that the vast majority of corals that were touched but not removed by the gear were still missing nearly all of their branches years after the event.[12]

Bottom fishing disrupts not only corals, but the species that depend on them, too, by limiting the ability of the affected populations to replace themselves, diminishing the long-term natural productivity of habitats, and reducing biodiversity.[13] In one study, scientists found that bottom trawling reduced the diversity and density of other species by 300 percent compared to nearby untrawled areas.[14] Numerous surveys have shed light on the impacts of fishing activity on deep-sea coral communities.[15] Along the Florida continental shelf, for example, "more than 90 percent of *Oculina* habitat in a reserve off the east coast of Florida has been reduced to unconsolidated rubble…" with evidence of recent trawling activities as a major cause of the damage.[16] And in the Gulf of Maine only a few decades ago, corals were commonly observed among hard-bottom communities, though their distribution is now thought to be greatly reduced, with documented tracks that are consistent with mobile bottom gear.[17]

As catches of groundfish stocks like cod and halibut have declined in the northeastern U.S., fisheries have sought to land other species like monkfish, which were once considered only bycatch, that live in deep waters of the Mid-Atlantic and New England. The Amendment rightly seeks "…to identify and implement measures that reduce, to the extent practicable, impacts of

---

[9] NEFMC, MAFMC, & SAFMC (2013). Memorandum of Understanding Regarding the Management of Deep Sea Corals Between New England Fishery Management Council, Mid-Atlantic Fishery Management Council, and South Atlantic Fishery Management Council.

[10] NOAA (2014). Deep-Sea Coral Research & Technology Program 2014 Report to Congress; Althaus, F. *et al*. (2009) Impacts of bottom Trawling on deep-Coral Ecosystems of Seamounts are Long-Lasting. Marine Ecology Progress Series: Vol. 397; pp. 279-294.

[11] NOAA (2014). Deep-Sea Coral Research & Technology Program 2014 Report to Congress; and, FAO (2009). International Guidelines for the Management of Deep-Sea Fisheries in the High Seas; Auster, P. (2005). Are Deep-Water Corals Important Habitats for Fishes? Cold-Water Corals and Ecosystems: *Erlangen Earth Conference Series* 2005; pp. 747-760.

[12] Krieger, K.J. (2001). Coral (*Primnoa*) Impacted by Fishing Gear in the Gulf of Alaska; in: Willison J.H.M. *et al*. (eds.) Proceedings of the First International Symposium on Deep-Sea Corals. Ecology Action Centre, Halifax; pp. 106-116.

[13] Food and Agriculture Organization of the United Nations (2009). International Guidelines for the Management of Deep-Sea Fisheries in the High Seas.

[14] Althaus, F. *et al*. (2009) Impacts of Bottom Trawling on Deep-Coral Ecosystems of Seamounts are Long-Lasting. *Marine Ecology Progress Series*: Vol. 397, pp. 279-294.

[15] Roberts, J.M. *et al*. (May 2009). Cold-Water Corals: The Biology and Geology of Deep-Sea Coral Habitats. *Cambridge University Press*.

[16] Koenig, C.C. *et al*. (2005). Habitat and Fish Populations in the Deep-Sea Oculina Coral Ecosystem of the Western Atlantic. *American Fisheries Society Symposium* 41: pp. 795–805.

[17] Auster, P. *et al*. (Oct. 2014). Imaging Surveys of Select Areas in the Northern Gulf of Maine for Deep-sea Corals and Sponges during 2013-2014. Report to the New England Fishery Management Council, October 30, 2014.

fishing gear on deep-sea corals in the Mid-Atlantic region."[18] Several other Councils have advanced deep-sea coral protections in their own jurisdictional waters. For example, in Alaska as of early 2012, the North Pacific Council had protected over 14,000 square miles of habitat from the impact of bottom contact gear.[19] The South Atlantic Council designated five areas (for a total area of over 23,000 square miles) as Coral Habitat Areas of Particular Concern (HAPC) in 2010,[20] and has recently expanded those protections by an additional 900 square miles under Coral Amendment 8.[21]

The Council Must Protect Discrete and Broad Zones

This Amendment contemplates the largest deep-sea coral protections ever conferred in the U.S. Atlantic (>100,000 square kilometers), and to be consistent with the MSA and the goals of the Amendment[22] it must protect both discrete and broad zones. Deep-sea corals provide habitat for many fish and invertebrates, including commercially valuable species like shrimp, crab,[23] tilefish, and summer flounder.[24] Specifically, studies have found that deep-sea corals provide: spawning habitat and shelter for developing larvae and juveniles; structure for shelter-seeking fishes; and, enhanced rates of prey capture.[25] In the Northwest Atlantic, deep reefs support higher abundances of fish than in the surrounding soft bottoms, likely because corals (and sponges) provide relief, rugosity, and overall enhanced complexity, which is thought to be an important factor for deep-sea fish and habitat associations.[26] Empirical studies and habitat models have shown that adult fish are often larger and exist at higher densities around deep-sea corals compared to areas devoid of corals.[27] Recent research suggests that fish larvae shelter in and around soft coral, which may provide a strong argument for designating those corals as essential fish habitat.[28] One meta-analysis of studies suggests that the "…functional values in

---

[18] MAFMC (Jan. 2015). Deep Sea Corals Amendment to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan: Measures to Protect Deep Sea Corals from Impacts of Fishing Gear: Public Information Document. p. 2.
[19] NOAA (2012). Habitat Areas of Particular Concern in the Alaska Region.
[20] SAFMC (2014). Deep-Water Corals.
[21] 79 Fed. Reg. 31907-31914, at 31908 (June 3, 2014).
[22] PID at p. 12 ("The management goals and objectives, as described in the current FMP are listed below: 1. Enhance the probability of successful (i.e., the historical average) recruitment to the fisheries; 2. Promote the growth of the U.S. commercial fishery, including the fishery for export; 3. Provide the greatest degree of freedom and flexibility to all harvesters of these resources consistent with the attainment of the other objectives of this FMP; 4. Provide marine recreational fishing opportunities, recognizing the contribution of recreational fishing to the national economy; 5. Increase understanding of the conditions of the stocks and fisheries; 6. Minimize harvesting conflicts among U.S. commercial, U.S. recreational, and foreign fishermen.").
[23] NOAA (2014). Deep-Sea Coral Research & Technology Program 2014 Report to Congress.
[24] Mid-Atlantic Regional Council on the Ocean (Sept. 12, 2014). MARCO Statement an a Course of Action for the Conservation of Mid-Atlantic Submarine Canyons.
[25] Auster, P. (2005). Are Deep-Water Corals Important Habitats for Fishes? *Erlangen Earth Conference Series*; pp. 747-760.
[26] Ross, S.W., Rhode, M., & A.M. Quattrini (2015, *in press*). Fish Distribution and Habitat Use Within and Near Baltimore and Norfolk Canyons, U.S. Middle Atlantic Slope. *Deep-Sea Research I.*
[27] Baillon, S. *et al*. (2012). Deep Cold-Water Corals as Nurseries for Fish Larvae. *Front. Ecol. Environ.*; Vol. 10, No. 7; pp. 351-356.
[28] *Id.* at p. 355.

support of commercial fisheries probably represent the most important service provided by cold-water corals."[29]

In order to protect this important marine habitat, the Council must adopt a dual approach that accounts for known deep-sea coral hotspots (largely found in the submarine canyons of the shelf's edge) as well as those areas in between the canyons where corals are also likely to live or reestablish. The Council should protect every canyon listed in the Amendment as strongly as possible. The Council should also select the 200-meter broad zone, which would protect nearly 100 percent of the areas predicted as having a high or very high likelihood of suitable deep-sea coral habitat, while still allowing current fisheries access to the vast majority of their current fishing grounds. The combination of these discrete and broad zone alternatives will achieve the goals of the Amendment, and raise the bar for stewardship of our ocean resources.

Earthjustice Supports Prohibiting All Bottom-Tending Gear In The 200-Meter Broad Zone (Alternatives 1A-1E and 2A-2D)

All bottom-tending gear (Alternative 2B) within the 200-meter broad zone (Alternative 1B) should be prohibited. Although there are numerous observed deep-sea corals[30] and other sensitive fauna that live on the continental shelf in more shallow areas that would not be protected under any of the alternatives currently in the Amendment, we support the landward boundary of the 200-meter broad zone, which will provide essential conservation benefits to areas that are largely pristine. Like terrestrial environments, the deep ocean is "patchy," with areas of high organism density and other areas more desert-like, with different biological communities adapted to those conditions. Research has shown, however, that "…protection of deep-water corals can be crucial to preserve the biodiversity of surrounding open slopes, and that the protection of dead corals, a so-far almost neglected habitat in terms of biological conservation, can further contribute to the maintenance of a high deep-sea biodiversity."[31] Designating the 200-meter broad zone as off-limits to bottom contact gear will protect not only the greatest numbers of observed deep-seas corals compared to the other proposed areas, but also the most hard substrate required for coral attachment.

Managers should also utilize NOAA's habitat suitability model, because it is a validated method to predict deep-sea coral locations. The agency has invested millions of dollars in developing and testing this deep-sea coral habitat suitability model, using data collected through numerous Federal, State, academic, non-profit organization, and industry efforts for many years. It uses 21st century technology as a tool to predict the distribution of corals on the seafloor.[32] This methodology represents the most advanced deep-sea science available, has been applied and shown to be predictive elsewhere,[33] and has "…already accurately identified previously

---

[29] Foley, N., van Rensburg, T.M., & C.W. Armstrong (2010). The Ecological and Economic Value of Cold-Water Coral Ecosystems. *Ocean and Coastal Management*; Vol. 53, No. 7; pp. 313-326.
[30] NOAA (2014). National Database of Deep-Sea Coral Locations.
[31] Bongiorni, L. *et al*. (Jul. 2010). Deep-Water Scleractinian Corals Promote Higher Biodiversity in Deep-Sea Meiofaunal Assemblages Along Continental Margins. *Biological Conservation*: Vol. 143, No. 7; pp. 687-1700.
[32] Kinlan, B.P., *et al*. (2013). Deep Coral Predictive Habitat Modeling in the U.S. Atlantic and Gulf of Mexico: Focusing on Uncharted Deep-Sea Corals.
[33] Yesson, C. *et al*. (2012). Global Habitat Suitability of Cold-Water Octocorals. *Journal of Biogeography*: Vol. 39, No. 7; pp. 1278-1292.

undiscovered deep-sea coral habitats."[34] The predictive validity of NOAA's model has been confirmed at sea, including during research cruises in 2012-13 in the Mid-Atlantic and Gulf of Maine.[35] Model-generated maps represent the predicted deep-sea coral locations with a spatial resolution of about 350 square meters, an area smaller than a basketball court. The areas of greatest overlap between observed corals and documented fishing effort are those near the landward boundary of this 200-meter broad zone. This best available science indicates that precluding bottom gear within this 200-meter broad zone would protect nearly 100% of the areas with a high or very high likelihood of suitable coral habitat.

As NOAA Fisheries Observer Program data show, there is already some bottom fishing that occurs on the landward edge of this area, but the extent of that fishing is as yet minimal in comparison to the fishing that occurs on the continental slope.[36] The 200-meter broad zone represents a compromise because it does not account for many corals know to occur in more shallow waters, a fact recognized in the MOU, which states that "Deep-sea corals are typically found at depths greater than 50 meters on the continental shelf and slopes, in offshore canyons, and near seamounts."[37] In its implementation of the South Atlantic's Comprehensive Ecosystem-Based Amendment 1, NOAA Fisheries recognized the value of protecting deep-water corals for the entire ecosystem: "…the intent of the Deepwater Coral HAPCs is to establish protection, not only for the deepwater coral species themselves, but for the entire deepwater coral ecosystem which encompasses individual coral colonies, deepwater coral reefs and hard live bottom habitats, and interconnected benthic and pelagic systems."[38]

To avoid the complications of fishing vessels potentially deploying gear in areas likely to have corals along the canyon heads and upper shelf break, the Council should adopt the 200-meter broad zone. This would help to diminish the impact of a vessel drifting into and hauling their gears from within more coral-dense areas. Nevertheless, the Council and NOAA Fisheries should examine closely the implications of gear deployment methods as they relate to coral protection areas. Should the Council approve one of the broad zone alternatives, it will be important to ensure that the boundaries of the chosen area be developed so as to facilitate effective enforcement and monitoring by the Coast Guard and NOAA's Office of Law Enforcement. The SAFMC did this by drawing the landward boundary of the Stetson/Miami Terrace HAPC by connecting rhumb lines between nearly 200 latitude/longitude points that approximate the 400-meter depth contour.[39] Coast Guard staff have informed the Council that it is possible to enforce protections established using this methodology.[40]

---

[34] NOAA (2014). Deep-Sea Coral Research & Technology Program 2014 Report to Congress. p. 32.
[35] NOAA (2014). Deep-Sea Coral Research & Technology Program 2014 Report to Congress. pp. 25 & 32.
[36] NEFMC, MAFMC, & SAFMC (2013). Memorandum of Understanding Regarding the Management of Deep Sea Corals Between New England Fishery Management Council, Mid-Atlantic Fishery Management Council, and South Atlantic Fishery Management Council.
[37] [37] NEFMC, MAFMC, & SAFMC (2013). Memorandum of Understanding Regarding the Management of Deep Sea Corals Between New England Fishery Management Council, Mid-Atlantic Fishery Management Council, and South Atlantic Fishery Management Council.
[38] 75 Fed. Reg. 35330-35335, at 35331 (June 22, 2010).
[39] 75 Fed. Reg. 35330 -35335 (July 22, 2010).
[40] Saunders, K. (U.S. Coast Guard), pers. comm., March 28, 2014.

Earthjustice Supports The Protection Of 15 Major Canyons (Discrete Zones) Along The Edge Of The Continental Shelf (Alternatives 3A-3B and 4A-4C)

Each of the 15 major canyons (Alternatives 3B) along the edge of the Mid-Atlantic continental shelf should be protected from all bottom-tending gear (Alternatives 4B). As the gems of the deep Mid-Atlantic, these are the areas where deep-sea corals are in highest abundance and density. With no two canyons exactly alike,[41] their morphologies make them hospitable to corals because they provide substantial rocky substrate to which corals can affix themselves and shelter from strong ocean currents. Many marine organisms inhabit these biologically and geologically diverse places, while others, like tuna, billfish, marine mammals, sea turtles, and seabirds, visit their nutrient-rich waters for sustenance. NOAA has documented a great diversity of fauna, from commercially important fish to chemosynthetic "cold-seep" communities,[42] and observations in 2012 in Baltimore and Norfolk Canyons revealed the coral *Lophelia pertusa*, a reef-forming coral that creates complex habitat supporting a diverse array of life.[43] Some evidence suggests that the canyons serve as refuges for fishes from trawling and other human impacts, including for cusk, whose numbers have declined so drastically in the western North Atlantic that they have been listed as threated in Canadian waters.[44]

We urge the Council to protect all 15 habitat model-delineated canyons under Alternatives 3B for the discrete zone boundaries. The current alternatives for protecting the canyons already represent a significant compromise of biologically important areas. There are numerous areas of high-to-very highly suitable coral habitat and high slope that fall outside the boundaries of the canyons. Amendment Figure 19 (above), for example, clearly shows significant area of high and very high habitat suitability and slopes >30 degrees to the northeast and southwest of Spencer Canyon. Other canyons exhibit similar patterns. These findings strongly suggest the need for a dual approach that accounts for coral ecosystems in both the canyons and inter-canyon areas (which are mostly included within the 200-meter broad zone).

Notably, we do not support *Sub-alternative 3B-1*, which would designate canyon boundaries based on those recommended by one member of the Council's Mackerel, Squid, Butterfish Advisory Panel after the 2013 Deep-Sea Coral Alternatives Development Workshop.[45] (The methods by which these substitute canyon boundaries were drawn have not been made publicly available to our knowledge.) As NOAA's Habitat Model shows, the advisor-proposed boundaries poorly account for the extent of high and very high coral habitat suitability of the Mey-Lindenkohl Slope and Baltimore and Norfolk Canyons, particularly in the landward edges of these areas. In comparing the total areas of high and very high coral habitat suitability for each of these three discrete zones, it should be noted that: (1) the total area of the Mey-Lindenkohl Slope would be vastly reduced under Sub-alternative 3B-1 (from 414 square miles to 383 or 318 square miles), failing to capture the areas most critical to corals, which are at the landward edge of the slope, and (2) although the total areas of Baltimore and Norfolk Canyons

[41] [41] NOAA (2014). Deep-Sea Coral Research & Technology Program 2014 Report to Congress.
[42] NOAA (2014). Exploring Atlantic Canyons & Seamounts: Mission Plan.
[43] Brooke, S. & S.W. Ross (June 2014). First Observations of the Cold-Water Coral *Lophelia pertusa* in Mid-Atlantic Canyons of the USA. *Deep Sea Research Part II: Topical Studies in Oceanography*: Vol. 104; pp. 245–251.
[44] Ross, S.W., Rhode, M., & A.M. Quattrini (2015, *in press*). Fish Distribution and Habitat Use Within and Near Baltimore and Norfolk Canyons, U.S. Middle Atlantic Slope. *Deep-Sea Research I*.
[45] MAFMC (Apr. 18, 2013). Deep-Sea Coral Alternatives Development Workshop.

would remain relatively similar under Sub-alternative 3B-1, the advisor-proposed boundaries would prioritize protection of areas not shown to have high or very high habitat suitability in much deeper (and largely unfished) waters. Additionally, there are corals, including *Lophelia*, that have been observed very near to the edges of the advisor-proposed boundaries.[46] Such proximity to these known corals, as well as extensive areas with high and very high coral habitat suitability, would suggest that the Council should designate and preclude bottom fishing in the NOAA habitat model-derived discrete zones to limit coral interactions.

Vessel Monitoring System Should Be Required In The *Illex* Fishery (*Alternative 6A-6B*)

Earthjustice supports Alternative 6B requiring the installation of vessel monitoring systems (VMS) for the *Illex* squid fishery, although this alternative is currently in the "considered but rejected" category. Three years after VMS was implemented in the rock shrimp fishery, implemented to protect Florida's first deep-sea coral area in federal waters, NOAA Fisheries documented 100-percent compliance (no incursions into the protected area) and noted that this measure was both cost-effective and time-saving for enforcement.[47] Here, NOAA Observer Program records demonstrate that the *Illex* squid fishery is the most active fishery within the proposed deep-sea coral protection zones based on documented numbers of hauls,[48] and as such, is among the fisheries most likely to encounter deep-sea corals.

Regardless of which areas are ultimately chosen, VMS would ensure compliance with restrictions on access to deep-sea coral protected areas. Vessel owners with limited access longfin squid and mackerel permits are already required to purchase, install, and operate VMS as of September 1, 2014, and the Council has acknowledged that "…few *Illex* moratorium vessels are not already required to use VMS related to other permits they possess."[49] The purchase of a VMS system can be subsidized through a fund managed by the Pacific States Marine Fisheries Commission,[50] pending the availability of funds, though Commission staff have indicated that they have historically had sufficient funding available for all those who request it.[51] NOAA budgetary concerns cannot be used as a basis to delay requiring VMS on the remaining vessels in a fishery with fewer than 20 participants, especially when funding is available.

Exemptions Are Contrary To The Purpose and Need of the Amendment

We agree with Council staff that an exemption of *Illex* and longfin squid fisheries from the conditions of the broad or discrete zones would be "…contrary to the 'purpose and need' of

[46] Brooke, S. & S.W. Ross (June 2014). First Observations of the Cold-Water Coral *Lophelia pertusa* in Mid-Atlantic Canyons of the USA. *Deep Sea Research Part II: Topical Studies in Oceanography*: Vol. 104; pp. 245–251.
[47] Chesler, R. (NOAA Fisheries Office of Law Enforcement), pers. comm., March 27, 2014.
[48] *See* Tables 36-39 (pg. 79-80) in: MAFMC (Jan. 2015). Deep Sea Corals Amendment to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan: Measures to Protect Deep Sea Corals from Impacts of Fishing Gear: Public Information Document.
[49] MAFMC (Jan. 2015). Deep Sea Corals Amendment to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan: Measures to Protect Deep Sea Corals from Impacts of Fishing Gear: Public Information Document. p. 5.
[50] *See* Pacific States Marine Fisheries Commission Vessel Monitoring System Reimbursement Program.
[51] Nenn, K. (Pacific States Marine Fisheries Commission), pers. comm., January 6, 2015.

the Amendment."[52] Allowing squid bottom otter trawls – among the more damaging gear types – to continue to fish in (or even expand within) the proposed coral zones would effectively nullify the value of the Amendment.

Given that damage from fishing gear to deep-sea corals is thought to be nearly permanent, we also encourage the Council to proceed with caution should it exempt the deep-sea red crab (Alternative 2B-1) and/or golden tilefish (Alternative 2B-2) fisheries from the proposed broad zones, and amend these alternatives to prevent the expansion of these fisheries including participants, vessels, and intensity. Longline gear has been observed to dislodge corals,[53] and crab pots are sometimes observed with coral bycatch.[54] Some NOAA research has shown that coral damage tends to be greater in areas fished with crab pots, fish pots, or longline gear than in unfished areas.[55] If lost at sea, fixed gears like crab pots can continue to do damage to bottom communities for many years.[56]

The deep-sea red crab fishery, with four active vessels that landed red crab as of December 2013,[57] operates entirely within a narrow range of depth (about 550 to 750 meters, according to the PID, although NOAA Fisheries Greater Atlantic Region Office states that the fishery operates between 400 – 600 meters[58]). If the Council chooses to exempt this fishery, no new participants should receive limited access permits (*i.e.*, no expansion of the fishery) in the future, especially given their relatively high total allowable landings of almost 4 million pounds per year and a lack of trip limits.[59] However, it is important that these vessels, which do not have specific fishery observer or VMS requirements,[60] should report any observed deep-sea coral interactions to NOAA through their required Catch Reporting and Vessel Trip Reports. NOAA should provide red crab vessels maps of predicted coral habitat to aid them in avoiding interactions with corals.

Finally, with 141 permitted vessels (plus an additional 25 party/charter vessels) that landed tilefish in fishing year 2013,[61] the tilefish fishery also has the potential to cause

---

[52] MAFMC (Jan. 2015). Deep Sea Corals Amendment to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan: Measures to Protect Deep Sea Corals from Impacts of Fishing Gear: Public Information Document. Pp. 11-12 ("This amendment contains alternatives that aim to protect corals by restricting fishing in select areas where fishing effort and prime coral habitats overlap, as well as by restricting expansion of effort into less heavily fished areas where corals are known or are highly likely to be present."), p. 26 ("these exemption alternatives would appear to be contrary to the "purpose and need" of the amendment if they would result in a lack of meaningful action in combination with other alternatives").
[53] Krieger, K.J. (2001). "Coral (*Primnoa*) Impacted by Fishing Gear in the Gulf of Alaska." in: Willison, J.H. *et al*. (2001). "Proceedings of the First International Symposium on Deep-Sea Corals." Ecology Action Center.
[54] Wareham, V.E. & E.N. Edinger (Nov. 2007).Distribution of Deep-Sea Corals in the Newfoundland and Labrador Region, Northwest Atlantic Ocean. *Bulletin of Marine Science:* Vol. 81, Supp. 1; pp. 289-313.
[55] Heifetz, J., Stone, R.P., & S.K. Shotwell (2009). Damage and Disturbance to Coral and Sponge Habitat of the Aleutian Archipelago. *Marine Ecology Progress Series*: Vol. 397; pp. 295–303.
[56] Auster, P.J. *et al*. (2013). Supplementary comment: Conservation of deep-sea corals off the northeast United States. *Biodiversity*: Vol. 14, No. 4; p. 195.
[57] 79 Fed. Reg. 13607-13609, at 13608 (Mar. 11, 2014).
[58] NOAA Fisheries, Greater Atlantic Region Office (2014). Atlantic Deep-Sea Red Crab.
[59] NOAA Fisheries, Greater Atlantic Region Office (2014). Atlantic Deep-Sea Red Crab 2014-2016 Final Specifications.
[60] NOAA Fisheries, Greater Atlantic Region Office (2014). Atlantic Deep-Sea Red Crab.
[61] 79 Fed. Reg. 64330-64333, at 64332 (Oct. 29, 2014).

significant damage to deep-sea coral. Council staff concluded that "…longline effort in these areas tends to be concentrated around the 200-meter depth contour or shallower at the heads of the canyon."[62] These vessels, too, have no specific fishery observer or VMS requirements,[63] and as such, should be required to report any observed deep-sea coral interactions to NOAA through their required Catch Reporting and Vessel Trip Reports. If this fishery shifts into deeper waters their exemptions should be reconsidered.

Mid-Water Trawl Gear Should Be Prohibited From Fishing In All Of The Designated Coral Protection Zones

Mid-water trawl (MWT) gear has been documented to contact the seafloor, and as such, should be included among the gear types prohibited from fishing in the designated coral protection zones. The original Amendment discussion document noted that "…mid-water trawls may also impact corals during periodic contact with the bottom…,"[64] although MWT gear seems to have dropped out of the list of analyzed gear. At the very least, MWT should be further analyzed for potential impacts to deep-sea corals before this Amendment is finalized because this gear has been documented to contact the bottom in the Atlantic herring fishery. *See* FEIS Amendment 5 to the Atlantic Herring FMP (2013), at p. 225 ("information provided by herring fishermen indicates that the footrope, the belly of the net, and/or the weights do occasionally contact the bottom. Sometimes, when herring are in deep water near the bottom, midwater trawls are intentionally fished close to or in contact with the bottom") and p.156 (listing groundfish as bycatch species in herring mid-water trawls in Table 12.

Additionally, because the MOU seeks to ensure "continuity among coral-related management measures in all three Council regions, especially where there are fisheries that overlap between regions," and the SAFMC has already chosen to prohibit MWT gear from its Coral HAPCs,[65] The MAFMC should also prohibit this gear in the deep coral protected areas in the Mid-Atlantic region. It is unfortunate that the Council has chosen not to prohibit this gear and Earthjustice intends to ask NOAA Fisheries to analyze the potential impacts of MWT gear to deep-sea coral communities during the development of the environmental assessment for this Amendment.

Future Actions Through Framework Adjustments Should Be Done In A Precautionary Manner (*Alternatives 5A-5E*)

Any future framework adjustment under alternatives 5A-5E, should be consistent with the MSA, the goals and objectives of the Amendment, and ensure that the action increases protection of sensitive habitat and does not negatively impact deep-sea corals. The Council must

[62] MAFMC (Jan. 2015). Deep Sea Corals Amendment to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan: Measures to Protect Deep Sea Corals from Impacts of Fishing Gear: Public Information Document. p. 86.
[63] NOAA Fisheries, Greater Atlantic Region (2014). Golden Tilefish.
[64] MAFMC (Jan. 2013). Scoping Document for Amendment 16 to the Atlantic MSB FMP: Measures to Protect Deep Sea Corals from Impacts of Fishing Gear.
[65] NEFMC, MAFMC, & SAFMC (2013). Memorandum of Understanding Regarding the Management of Deep Sea Corals Between New England Fishery Management Council, Mid-Atlantic Fishery Management Council, and South Atlantic Fishery Management Council.

pursue stewardship consistent with Strategy 15.5 ("Develop management approaches that minimize adverse ecosystem impacts") of its 2014-2018 Strategic Plan.[66] In that vein, because Council analyses thus far have focused on soft corals and sea fans/whips, future framework action should incorporate stony corals and sea pens into protected areas to account for their roles in supporting deep-sea ecosystems.

Alternative 5B would allow the Council to modify coral zone boundaries, though we feel that the discrete zone boundaries, as drawn, coupled with the 200-meter broad zone, do a sufficient job of protecting what we know to be area of known and likely coral presence. In the event that new observations of deep-sea coral are made in the future, those areas, too, should be protected using boundaries delineated based on the same 0.4-nautical mile buffer as was used to draw the discrete zones. This will help to limit fishery-coral interactions by accounting for: 1) the resolution of the habitat suitability analysis model, and 2) the distances that mobile gear are deployed behind a vessel.

Alternative 5C would allow the Council to modify management measures within zones via framework action. As mentioned previously, we support Alternatives 2B and 4B (to prohibit all bottom-tending gear within the 200-meter broad zone and all discrete zones, respectively). Based on both coral observations and NOAA's habitat suitability analysis model, there are likely deep-sea corals present in much of the 200-meter broad zone and canyons. Council members should not presume these coral ecosystems have been destroyed based on NOAA expeditions that largely did not survey this more shallow depth range. Future research may focus on these areas, and once that information is available, boundaries could be adjusted, but until then, these areas should be protected.

Alternative 5D would allow the Council to add additional discrete coral zones via framework action. There are numerous smaller, unnamed canyons along the shelf break in the Mid-Atlantic. If future research expeditions yield evidence that these areas are coral (or other deep-sea biological) hotspots, they should be clearly delineated and then made off-limits to any bottom-contacting gear.

Earthjustice agrees with Council staff recommendation to reject a special access program under Alternative 5E because, as noted in the PID, there is no specific objective set forth for such an action.

The Economics Analysis Likely Exaggerates The Economic Consequences

The economic impacts analysis used to implement management measures intended to protect deep-sea corals should be used cautiously. The point data based on vessel trip reports (VTR) is based on nonspecific fishing locations, and despite several workshops and opportunities for data-sharing, there remains an "…absence of spatially explicit fishery effort data for many fisheries."[67] The VTR-based revenue mapping model, a new and untested tool

[66] MAFMC (2013). 2014-2018 Strategic Plan.
[67] MAFMC (Jan. 2015). Deep Sea Corals Amendment to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan: Measures to Protect Deep Sea Corals from Impacts of Fishing Gear: Public Information Document. p. 70.

provided by NOAA's Northeast Fisheries Science Center, was used to generate maps that ascribe general fishing locations and effort with revenues, though we find the maps and data products misleading and counter to information from the NOAA Fisheries Observer Program. For example, the model does not account for fishing behaviors related to haul depth, which are provided in Observer Program data (*see* Amendment Figures 31-33). As a result, model-generated revenue maps (*see* Figures 25-30) seem to imply that fishing occurs in areas and at depths that are not actually fished, especially in the middle and along the steep edges of the canyons.

Further, the Amendment's Public Information Document (PID) warns that, "When interpreting the maps, the appropriate interpretation is that most revenues would be contained by the areas of intense color, but it would not be correct to interpret the model as saying high effort definitely occurred in all areas of intense color." We encourage the Council to review the caveats to these data described on page 71 of the PID ("the model likely overstates effort and revenue dependence in those deeper areas, suggesting that the values (i.e. contributions to overall revenue) in Tables 31 and 32 are overestimates."). Although we expect other public comments to cover this topic in more detail, based on our understanding, we feel that the economic analyses exaggerate the possible impacts.

Monitoring, Enforcement, and Education

In order to monitor and enforce the restrictions in these areas, the Council and NOAA should establish a process that jointly assesses the effectiveness of whatever deep-sea coral zones are designated as off-limits to bottom fishing, and the chosen metrics should be reviewed periodically to make adjustments as necessary. For example, coral bycatch should be identified and reported on annual NOAA Observer Program records and all NEFOP observers should be trained to identify deep-sea corals. In addition, coral interactions should be documented on Vessel Trip Reports, Captain's Daily Fishing Reports, VMS logs, and/or all relevant reports. NOAA should also brief the Council at least once annually with updates on: 1) the effectiveness of coral zone protections; 2) new coral observations and updates to the habitat model; and, 3) new understandings of ecosystem function and value.

Given that the current understanding of gear impacts on bottom communities is poor, NOAA and the Council should support scientific research efforts to assess the impact of deep-sea fishing on target and non-target species and their environment. In addition, because the Amendment seeks to protect deep-sea corals from all damaging bottom gear, NOAA and the Council should coordinate with the Atlantic States Marine Fisheries Commission to discuss the impacts that the lobster fishery – a fishery managed by that body – has on deep-sea corals in the Mid-Atlantic, and consider including them among the gear types that are restricted in the areas protected.

Once implemented, any actions taken to protect deep-sea corals through the Deep-Sea Corals Amendment may reduce commercial fishing effort to some degree, but "…some of this

effort is likely to be displaced to areas outside any implemented coral zones."[68] Thus, once the Amendment is in place, it will be essential for the Council and NOAA to communicate clearly to fishermen about the designated deep-sea coral protections. The SAFMC has taken the approach of providing free maps online[69] that fishermen can integrate into onboard navigation equipment. These maps are available as shapefiles, tab-delimited coordinates, and Google Earth files, all of which are available for anyone to use/visualize with free software. This approach could work in the Mid-Atlantic region to aid monitoring and enforcement in these protected areas.

Conclusion

To comply with its legal requirements and meet the conservation objectives of this Amendment, the Council should advance the most protective alternatives in this Amendment without delay. This would protect known deep-sea coral hotspots (*i.e.*, the canyons) and "freeze the footprint" of fishing where corals have suffered little or no damage (*i.e.*, in the broad zones). A combination of alternatives 1B, 2B, 3B, 4B, and 6B will achieve these goals and set a standard for stewardship. This approach also complements the Council's goal of managing fisheries using Ecosystem-Based Fisheries Management (EBFM).[70]

The three regional councils on the East Coast have all recognized that "…deep-sea coral habitats [are] an important component of the marine ecosystem needed to sustain fishery resources."[71] Designating each named canyon and the 200-meter broad zone as off-limits to bottom-contacting gear is consistent with the law, the goals and objectives of the Amendment, and will set a standard for future action by other Councils such as those contemplated by the Gulf Council and the New England Council. Because ecosystems are cross-jurisdictional, each management body operating with the Northeast Large Marine Ecosystem must approach EBFM in a coordinated fashion in order to succeed.

Based on its Habitat Blueprint,[72] Deep-Sea Coral 2014 Report to Congress,[73] and Strategic Plan for Deep-Sea Coral and Sponge Ecosystems,[74] we expect NOAA will support strong actions taken by the Council to protect deep-sea corals within the region. In the last few years, NOAA and its partners have increased their deep-sea research and exploration programs in the Mid-Atlantic substantially, including the Deep-Sea Coral Research and Technology Program's fieldwork to locate and characterize corals in the Northeast, and have made a commitment to translating that science into conservation measures.[75] The intent of EBFM is to foster a comprehensive approach to managing species within the context of the broader ecosystem. Leaving deep-sea corals and their communities intact under the Deep Sea Corals

---

[68] MAFMC (Jan. 2015). Deep Sea Corals Amendment To The Atlantic Mackerel, Squid, And Butterfish Fishery Management Plan: Measures To Protect Deep Sea Corals From Impacts Of Fishing Gear: Public Information Document. p. 27.
[69] *See* SAFMC: Deepwater Coral Habitat Areas of Particular Concern (Coral HAPCs).
[70] MAFMC (2014). What is an "Ecosystem Approach" to Fisheries Management?
[71] NOAA (2014). Deep-Sea Coral Research & Technology Program 2014 Report to Congress. p. 23.
[72] NOAA (2014). NOAA Habitat Blueprint.
[73] NOAA (2014). Deep-Sea Coral Research & Technology Program 2014 Report to Congress.
[74] NOAA Coral Reef Conservation Program (2010). NOAA Strategic Plan for Deep-Sea Coral and Sponge Ecosystems: Research, Management, and International Cooperation. Silver Spring, MD: NOAA Coral Reef Conservation Program. NOAA Technical Memorandum CRCP 11.
[75] NOAA (2014). Deep-Sea Coral Research & Technology Program 2014 Report to Congress.

Amendment is important for other species, including ones we know and depend upon, and promotes EBFM by recognizing that these organisms provide essential ecosystem services.

Thank you for considering these comments.

Roger Fleming
Erica Fuller
Attorneys
Earthjustice

Cc: John Bullard, Regional Administrator GARFO

Change.org petition - The Council received a total of 2,575 signatures to the petition below, started by 8th graders in Manhattan (see https://www.change.org/p/the-mid-atlantic-fishery-management-council-support-the-deep-sea-coral-conservation-amendment) for signatures and comments.

Support the Deep-Sea Coral Conservation Amendment

Daniela Pierro
New York, NY

There are deep canyons at the bottom of the ocean off the U.S. Mid-Atlantic coast, teeming with marine creatures as well as deep-sea corals that are hundreds of years old. Some of these corals are even thousands of years old; amongst the oldest living creatures on earth. These corals are in danger from commercial fishing.

In a process of commercial fishing known as bottom trawling, boats drag heavy, weighted nets along the ocean floor, destroying corals as they go. Fishing gear like bottom trawl nets destroy in minutes the coral that took nature centuries to build.

When that happens, the marine creatures that depend on coral reefs are left vulnerable as well. Coral reefs provide structure and a habitat for diverse marine life, are nurseries for fish, and are essential for the health of the entire ocean.

40% of coral worldwide have already been destroyed.

The coral off the U.S. Mid-Atlantic coast can easily be saved, if we act NOW.

The Mid-Atlantic Fisheries Management Council, which regulates fishing in these waters, is considering an amendment called the "Deep Sea Corals Amendment to the Atlantic Mackerel, Squid, and Butterfish Fishery Management Plan". It will protect coral in the following 3 ways:

1. By banning all destructive bottom fishing in the 15 Deep-Sea Canyons on the U.S. Mid-Atlantic coast; home to many deep-sea corals.

2. By banning the use of bottom-fishing gear deeper than 200 meters below sea-level

3. By providing means to enforce these restrictions.

With this amendment, the Council will protect an estimated 73% of documented corals off the Mid-Atlantic coast.

This is our chance to protect deep-sea corals and the marine life that depends on them! Let's encourage the Council to seize this opportunity become a global leader in the protection of deep-sea coral by passing this amendment and implementing these management measures.

January 28 is the final day for comments, but every **signature counts until they make a decision, sending the Council a clear message from those of us who value marine life and deep-sea corals and want to see them protected.** Sign this petition to say "NO!" to destructive bottom fishing and show your support for deep-sea coral conservation.

Sign this petition now to show the Council your support for the amendment!

Thank you,

Daniela Pierro

Kiyomi Johnson

Kai Tsurumaki

"No Water, No Life"

UCONN
UNIVERSITY OF CONNECTICUT

To: Mid-Atlantic Fishery Management Council

Date: 29 January 2015

Subject: Consideration of Issues Related to the Deep-Sea Corals Amendment

As background, I am a marine ecologist with a primary focus on questions both fundamental and applied regarding fish habitats and their role in mediating population and community processes. My publication record in the scholarly literature spans 35 years. Since 2001, a significant part of my time has been spent addressing the ecological role of deep sea corals and impacts to coral dominated communities by human activities in the northwest Atlantic region. As the Council deliberates alternatives for the Deep Sea Coral Amendment, I would greatly appreciate your consideration of the following:

1. The modeling work by Brian Kinlan and colleagues, used to predict coral distributions in the management region, is the best available science to serve as a foundation for decision-making:

Kinlan BP, Poti M, Drohan A, Packer DB, Nizinski M, Dorfman D, Caldow C. 2013. Digital data: Predictive models of deep-sea coral habitat suitability in the U.S. Northeast Atlantic and Mid-Atlantic regions. Downloadable digital data package. Department of Commerce (DOC), National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), National Centers for Coastal Ocean Science (NCCOS), Center for Coastal Monitoring and Assessment (CCMA), Biogeography Branch and NOAA National Marine Fisheries Service (NMFS), Northeast Fisheries Science Center (NEFSC). Released August 2013. Available at: http://coastalscience.noaa.gov/projects/detail?key=35

Using the most complete data set of coral observations available, coral locations were geographically linked to the underlying physical environment, with the model used to predict where corals from multiple taxonomic groups will occur, within a range of probabilities. There will never be enough funding to survey all the coral via direct observation. The model was then tested with new data. Much as we use population models to predict population size for harvested species of fish, this is the appropriate tool to develop management alternatives for deep sea corals. Of course modifying predictions based on ancillary data and observations is an important step.

2. The utility of using historical data to delineate areas of observed distribution and predict the spatial extent of coral distributions along the continental margin of the northeastern United States is justified along several lines of reasoning. First is the overlap of historic and recent observations in multiple canyons off the northeast. In general, where historic observations exist, recent observations enhance and refine our understanding of local distributions, they do not paint a different picture. These spatial co-occurrences also validate the adequacy of spatial precision of historic coral observations. Next, in the absence of recent surveys in areas where there have been few coral observations, and those existing

Avery Point Campus
NORTHEAST UNDERWATER RESEARCH TECHNOLOGY AND EDUCATION CENTER (NURTEC)
MARINE SCIENCES BUILDING, ROOM 207
1080 SHENNECOSSETT ROAD
GROTON, CT 06340
PHONE 860.405.9121
FAX 860.445.2969
www.nurtec.uconn.edu
An Equal Opportunity Employer

NURTEC

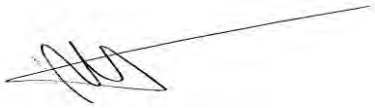
observations are from historic surveys, there is little justification to ignore those data solely on the basis of low numbers of coral occurrences. The coral database primarily is composed of presence data, where corals have been observed, not presence-absence data that would include locations where they have not been observed. This issue is sometimes difficult to apply when interpreting coral distribution maps but is critical when considering management alternatives. That is, absence of evidence is not evidence of absence. Here the results of habitat suitability models are much more informative, in the absence of any actual data to the contrary. Finally, I append to this communication a figure and analytical results from a manuscript I am working on with my colleagues that illustrates a high degree of stability in coral communities in an area of Oceanographer Canyon from 1978 to 2013. The example imagery and statistical analysis of transect data indicate community composition across years has not changed significantly.

3. Shallow corals (i.e., in canyon heads starting at approximately 200 m depths) function as habitat for fishes and their prey but that role is diminished at deeper depths and as fish assemblages shift in composition. Noteworthy is that deep sea corals have extremely low resilience and the recovery of coral habitat from spatially extensive impacts, if it occurs, would require time scales beyond anything ecologically relevant to fisheries today. Further, most structure forming corals serve as habitat for a diversity of commensal species throughout their depth ranges and are important components of canyon and slope ecosystems where fisheries do occur.

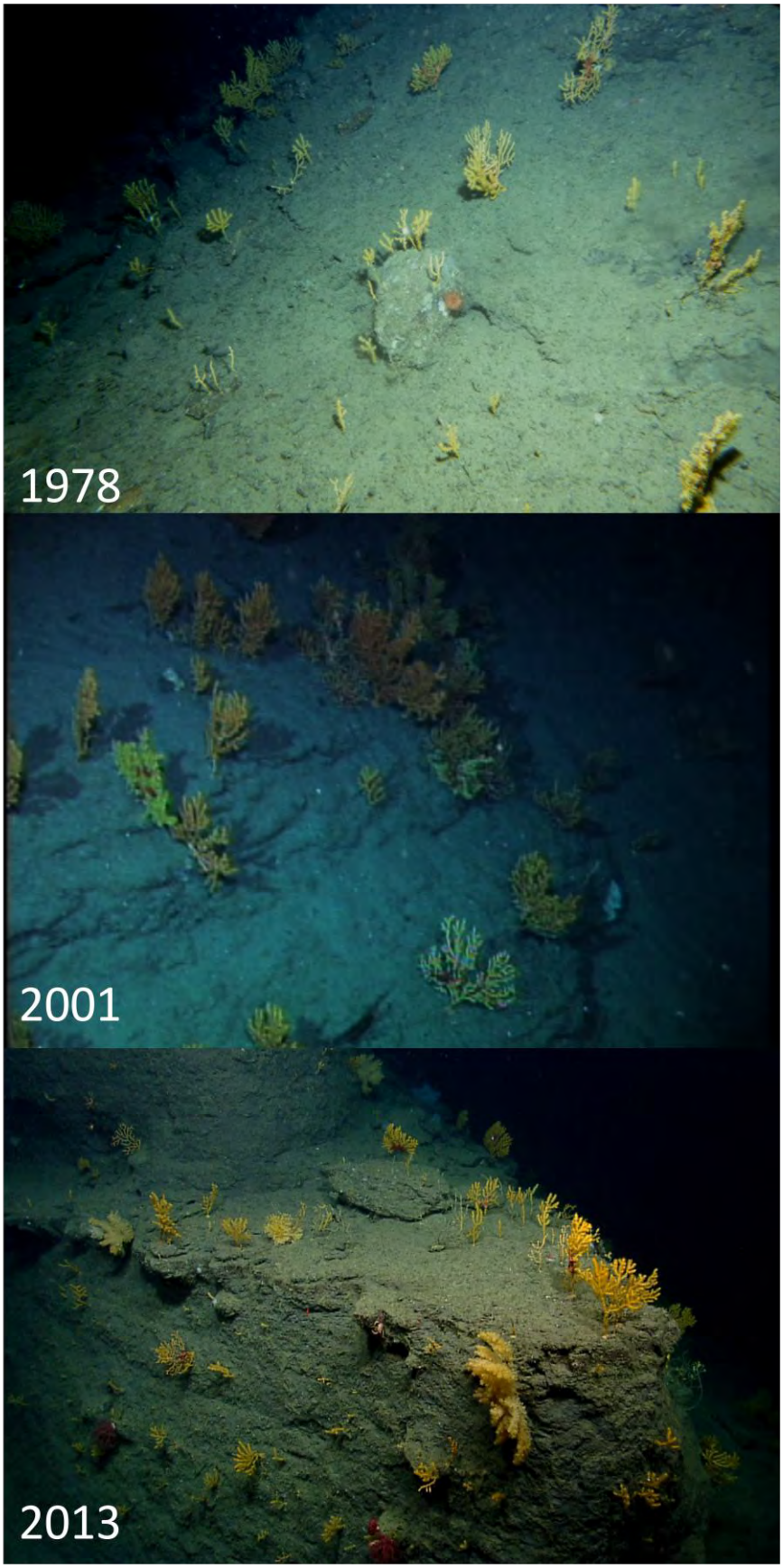
4. Shallower boundaries for coral conservation designations address our limited understanding of coral reproduction and population connectivity along the continental margin. Corals at depth reproduce and recruit on a schedule that is difficult to determine with sampling. That is, successful reproduction might take place once every two years, every 5 years, or more. Patterns of recruitment are extremely variable. Connectivity along the continental margin and across depths remains to be determined. The extreme longevity and intermittent reproductive output of deep sea corals as a whole suggest that the most successful conservation strategy will be to encompass as much of their distribution across depths and geographic range within the management area.

Thank you, in advance, for your consideration. I would be happy to discuss the details of any of this general guidance.

Sincerely,



Peter J. Auster, PhD
Research Professor Emeritus of Marine Sciences
and
Senior Research Scientist, Sea Research Foundation - Mystic Aquarium



Example images across time at approximately 1100 m on the east wall of Oceanographer Canyon. A quantitative analysis of species composition across all years (i.e., 1978, 1980, 2001, 2005, 2013), using the non-parametric Analysis of Similarities, resulted in no significant differences (ANOSIM, R=0.77, significance= 30.7 %). A resemblance matrix from a series of pairwise tests across years also revealed no significant differences.

Results from: Kilgour, M.J., P.J. Auster, D. Packer and L. Watling. In prep. Variation in seafloor communities across the western New England Seamounts and adjacent submarine canyons: implications for conservation. To be submitted to PLoS. (Contact Peter Auster for information results to be presented in this manuscript.)

Rhode Island Fishermen's Alliance
P.O. Box 337
East Greenwich, RI 02818

Dr. Christopher Moore, Executive Director
Mid Atlantic Fisheries Management Council
800 North State St. Suite 201
Dover, DE 19901

January 13, 2015

Re: Deep Sea Corals Amendment

Dr. Moore,

I am writing to express my deep concern at the possible implementation of the Council's Deep Sea Corals Amendment. According to the Amendment itself, Rhode Island ranks as the East Coast's number one state for Illex squid, Loligo squid, Scup, and Butterfish revenue. Rhode Island is also one of the top ranking states for Fluke revenue. All of these species are harvested within the proposed Coral Zones. However, Rhode Island and its fishing community have been completely bypassed in the development of this Amendment.

Data generated by the document includes the fact that less than 1% of recently observed deep sea corals were found in waters shallower than 1050 meters, yet the Amendment offers Coral Zone Alternatives encompassing only waters 200-500 meters and deeper. These areas comprise much of the fishing grounds for the species harvested by federally licensed Rhode Island vessels, and to even consider closing such productive fishing grounds for little to no conservation value is unthinkable. Any data collected by NOAA's Deep Sea Coral Research and Technology Program must be considered unreliable, as it is largely comprised of outdated data- collected anywhere from 1874 until the early 2000s- from sources such as magazine articles and museum pieces which are neither recent nor provide exact locations of coral.

What is reliable is the information Rhode Island vessels have not been invited to provide in the development of this Amendment. Although Rhode Island vessels land the majority of the aforementioned species, they have not been consulted for economic impact analysis, fishery information, or data that would be useful in drawing Coral Zone Boundaries that protect both deep sea corals and industry fishing grounds.

The Alliance and its member vessels are more than willing to work with the Mid Atlantic Council in order to accomplish these goals. Therefore, until an advisory panel meeting can be convened and industry input ~~be~~ is incorporated into this Amendment, the Alliance supports the No Action Alternatives 1A, 2A, 3A, 4A, 5A and 6A. In the future, the Alliance and its member vessels would be willing to support a modified or alternative measures after such collaboration has occurred.

Sincerely,

Gerald M Carvalho

Gerald M Carvalho
Vice President, RIFA

DEEP SEA CORALS AMENDMENT
TO THE ATLANTIC MACKEREL, SQUID, AND BUTTERFISH FISHERY MANAGEMENT PLAN

Measures to Protect Deep Sea Corals from Impacts of Fishing Gear

Public Information Document

JANUARY 2015

Prepared by the Mid-Atlantic Fishery Management Council
in cooperation with NOAA Fisheries

1.0 EXECUTIVE SUMMARY

Deep sea corals are fragile and slow-growing organisms that serve an important role in unique and diverse deep sea ecosystems. Given recent and historical findings of deep sea corals off the Mid-Atlantic Coast, the Mid-Atlantic Fishery Management Council (MAFMC or Council) initiated this Amendment in 2012 to consider measures to protect deep sea corals from the impacts of fishing gear. After reviewing initial public comments, the Council developed a range of alternatives and associated analyses. The Council currently intends to select from the alternatives described in this document at its February 2015 Council meeting. The Council will consider comments received during public hearings and a written comment period. A list of hearings and instructions for commenting may be found at the Council's website at www.mafmc.org. During the selection of alternatives, the Council can also modify the alternatives as long as sufficient information and rationale exists to support the final selected options.

The Council will then recommend the selected alternatives to NOAA Fisheries. Assuming the Council recommends some action alternatives, NOAA Fisheries will then publish a proposed rule along with an Environmental Assessment for public comment. After considering public comments on the proposed rule, NOAA Fisheries will publish a final rule with implementation details.

The purpose of this amendment is "to identify and implement measures that reduce, to the extent practicable, impacts of fishing gear on deep sea corals in the Mid-Atlantic region." The Council recognizes the value of deep sea corals and is exercising its authority under the reauthorized Magnuson-Stevens Act (MSA) to recommend management measures to minimize fishery impacts to deep sea corals in the Mid-Atlantic region. At the same time, the importance and value of commercial fisheries that operate in or near areas of deep sea coral habitat is also recognized by the Council. As such, measures in this amendment will be considered in light of their benefit to corals as well as the cost to commercial fisheries. The information presented in this document is designed to assist the public in commenting on the proposed measures and ultimately to support the Council in achieving an appropriate balance between protecting deep sea corals and minimizing negative economic impacts to fisheries.

Given this approach, this document first provides general background and describes the alternatives. It then describes the environment (including deep sea corals) and the fisheries that may be affected, and concludes with information about how corals and the relevant fisheries may be impacted by the alternatives under consideration. The public is encouraged to comment on both the alternatives and the related analyses.

The range of alternatives includes designations for "deep sea coral zones" in which fishing gear use would be restricted, including potential for both "broad" coral zones and "discrete" coral zones. Broad coral zones would consist of large, less heavily fished areas (especially the deeper broad zones) where measures would limit and prevent the expansion of commercial gear use. Discrete coral zones would consist of smaller areas of known coral presence or highly likely coral habitat. These areas primarily consist of offshore canyons or slope areas along the continental shelf edge.

The range of alternatives proposed in this document is associated with a range of potential impacts, both for deep sea corals and the relevant fisheries (Boxes ES-1 and ES-2). Generally, the more total area that is restricted and the more fishing activity that is restricted, the greater the predicted benefits are for corals. However, as more areas are restricted and more fishing activities are restricted, social and economic impacts to those who fish in these areas is also expected to increase.

Although some combinations of alternatives contained in this document would restrict current fishing activity in areas of high or highly likely coral presence, many of the alternatives, particularly the broad zone alternatives, are primarily precautionary in nature and are intended to protect corals from future expansion of fishing effort. Many deep sea corals exist in areas with some degree of natural protection from fishing gear, i.e., they inhabit areas where little or no fishing effort is currently taking place due to extreme depths or areas of very high seafloor slope. Corals also exist in some areas with hard bottom or structure that fishermen tend to avoid due to the potential for lost or damaged fishing gear. The coral protection zone alternatives proposed in this document would expand protections in and around some of these areas, as well as protect corals from expansion of effort into deeper water or areas of steeper slopes.

Additional alternative sets in this amendment include options to modify the Framework provisions of the Mackerel, Squid, and Butterfish (MSB) Fishery Management Plan (FMP), as well as the option to require use of Vessel Monitoring Systems (VMS) for *Illex* squid vessels. The impacts of these additional alternatives are expected to be primarily administrative in nature (Box ES-3).

Box ES-1. Summary comparison of the differences in Broad Coral Zone Alternatives in this amendment.

Issue	Alternatives	Main Differences in Alternatives
Broad Coral Zone Designation	Alternative 1A (No action/*Status Quo*)	No action. Neutral impacts expected (relative to *status quo*).
	Alternative 1B (Landward Boundary ~ 200 m Depth Contour)	*Size of Designation Area:* Largest (100,372 km^2); greatest number of coral records. *Impacts on Corals:* Designation alone affords some additional benefits/attention via project consultation by NMFS; greatest benefits. *Fishery Economic Impacts:* None (designation alone)
	Alternative 1C (Landward Boundary ~ 300 m Depth Contour)	*Size of Designation Area:* Second Largest (100,165 km^2) *Impacts on Corals:* Designation alone affords some additional benefits/attention via project consultation by NMFS; next to greatest benefits. *Fishery Economic Impacts:* None (designation alone)
	Alternative 1D (Landward Boundary ~ 400 m Depth Contour)	*Size of Designation Area:* Next to Smallest (99,218 km^2) *Impacts on Corals:* Designation alone affords some additional benefits/attention via project consultation by NMFS; next to least benefits. *Fishery Economic Impacts:* None (designation alone)
	Alternative 1E (Landward Boundary ~ 500 m Depth Contour)	*Size of Designation Area:* Smallest (98,444 km^2); smallest number of coral records *Impacts on Corals:* Designation alone affords some additional benefits/attention via project consultation by NMFS; least benefits. *Fishery Economic Impacts:* None (designation alone)

(Continued on next page)

Box ES-1, continued. Summary comparison of the differences in Broad Coral Zone Alternatives in this amendment.		
Issue	**Alternatives**	**Main Differences in Alternatives**
Broad Coral Zone Restrictions	Alternative 2A (No action/*Status Quo*)	No action. Neutral impacts expected (relative to *status quo*).
	Alternative 2B (Prohibit All Bottom-tending Gear)	*Impacts on Corals:* Greatest positive impacts on corals by reducing potential for gear impacts the most (when compared to alts. 2C or 2D) *Fishery Economic Impacts*: The larger the broad coral zone, the greater the impacts because of the number of historic hauls taken in the areas are greatest; impacts are expected to be greatest under this alternative (when compared to alts. 2C or 2D), because it prohibits the greatest numbers of gears and fisheries in the offshore fishing areas. <u>Sub-option 2B-1: Exempt red crab fishery</u> *Fishery Economic Impacts:* The larger the broad coral zone, the greater the impacts; primary gears impacted include bottom otter trawls, sea scallop dredges, crab pots and traps, lobster pots, and bottom longlines. Impacted species excluding red crab would be: longfin squid, *Illex* squid, sea scallops, summer flounder, silver hake (whiting), golden tilefish, Jonah crab, scup, and black sea bass. <u>Sub-option 2B-2: Exempt golden tilefish fishery</u> *Fishery Economic Impacts:* Impacts are similar to 2B-1, exempt the red crab fishery would be impacted, and the golden tilefish fishery would not.
	Alternative 2C (Prohibit Mobile Bottom-tending Gear)	*Impacts on Corals:* Smaller positive impacts to corals as just some gears are prohibited, although mobile gears are believed to have the greatest negative impact on corals. *Fishery Economic Impacts:* Impacts similar to alternative 2B but traps, sink gillnets and bottom longlines would not be impacted.
	Alternative 2D (Require VMS for Vessels Fishing in Broad Coral Zones)	*Impacts on Corals:* Indirect slight positive impacts likely due to increased ability to enforce gear-restricted coral zones (if gear restriction alternatives are also selected). *Fishery Economic Impacts:* Low fishery economic impacts; many vessels operating in these areas are already required to use VMS.

Box ES-2. Summary comparison of the differences in Discrete Coral Zone Alternatives under consideration in this amendment.		
Issue	**Alternatives**	**Main Differences in Alternatives**
Discrete Coral Zone Designation	Alternative 3A (No action/*Status Quo*)	No action. Neutral impacts expected (relative to *status quo*).
	Alternative 3B (Designation of Discrete Coral Zones)	*Impacts on Corals:* Designation alone affords some additional benefits/attention via potential project consultation by NMFS; Wilmington and Baltimore Canyons have the highest percentages of coral habitat; the Mey-Lindenkohl Slope and Hudson Canyon have the greatest areas of high/very high habitat suitability. *Fishery Economic Impacts:* None (designation alone)
Discrete Coral Zone Restrictions	Alternative 4A (No action/*Status Quo*)	No action. Neutral impacts expected (relative to *status quo*).
	Alternative 4B (Prohibit All Bottom-tending Gear)	*Impacts on Corals:* Greatest positive impacts on corals by reducing potential for gear impacts the most; impacts depend on the canyons selected. Some degree of coral benefits may be offset by effort shifts into non-restricted areas. *Fishery Economic Impacts:* Depends on total number of discrete zones selected and the economic importance of the selected zones. Hudson Canyon, Wilmington Canyon, and Mey-Lindenkohl Slope are the areas associated with the greatest fishery revenues. Some degree of revenue loss is expected to be offset by effort shifts into non-restricted areas.
	Alternative 4C (Prohibit Mobile Bottom-tending Gear)	*Impacts on Corals:* Smaller positive impacts to corals (compared to 4B) as just some gears are prohibited. Depends on the canyons selected (see section 5.0 for Canyon area sizes). *Fishery Economic Impacts:* Smaller fishery impacts as fewer gear types are prohibited.

Box ES-3. Summary comparison of the differences in Framework and Vessel Monitoring Alternatives under consideration in this amendment.

Issue	Alternatives	Main Differences in Alternatives
Framework Provisions	Alternative 5A (No action/*Status Quo*)	No action. Neutral impacts expected.
	Alternative 5B (Modify Zone Boundaries via Framework)	Administrative in nature; some time savings; neutral impacts expected; any proposed action will be analyzed through a separate NEPA process.
	Alternative 5C (Modify Management Measure via Framework)	
	Alternative 5D (Modify Add Additional Coral Zones via Framework)	
	Alternative 5E (Implement Special Access Program via Framework)	
Vessel Monitoring Alternatives	Alternative 6A (No action/*Status Quo*)	No action. Neutral impacts expected.
	Alternative 6B (VMS Requirement for *Illex* Squid Moratorium Vessels)	*Impacts on Corals:* No direct impacts on corals; indirect slight positive impacts likely due to increased ability to enforce gear-restricted coral zones. *Fishery Economic Impacts:* Low; few Illex moratorium vessels are not already required to use VMS related to other permits they possess.

THIS SPACE INTENTIONALLY LEFT BLANK

2.0 LIST OF ACRONYMS AND ABBREVIATIONS

ACUMEN	Atlantic Canyons Undersea Mapping Expedition
ASMFC	Atlantic States Marine Fisheries Commission (Commission)
BOEM	Bureau of Ocean and Energy Management
CEA	Cumulative Effects Assessment
CFR	Code of Federal Regulations
DEIS	Draft Environmental Impact Statement
DMNH	Delaware Museum of Natural History
DOC	Department of Commerce
DSCRTP	Deep Sea Coral Research and Technology Program
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EFP	Exempted Fishing Permit
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FMAT	Fishery Management Action Team
FMP	Fishery Management Plan
FR	Federal Register
GARFO	Greater Atlantic Regional Fisheries Office (formerly Northeast Regional Office/NERO)
GRA	Gear restricted area
IFQ	Individual Fishing Quota
LAGF	Limited Access General Category
LOA	Letter of Acknowledgement
MAFMC	Mid-Atlantic Fishery Management Council (Council)
MMPA	Marine Mammal Protection Act
MOU	Memorandum of Understanding
MSA	Magnuson-Stevens Fishery Conservation and Management Act (as currently amended)
MSB	Mackerel, Squid, and Butterfish
MT	Metric tons
NCCOS	National Centers for Coastal Ocean Science
NEFMC	New England Fishery Management Council
NEFOP	Northeast Fisheries Observer Program
NEFSC	Northeast Fisheries Science Center
NEPA	National Environmental Policy Act
NGOM	Northern Gulf of Maine
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOAA OER	NOAA Office of Exploration and Research
NOS	National Ocean Service
ROV	Remotely Operated Vehicle
TAL	Total Allowable Landings
US	United States
USD	U.S. Dollars
VMS	Vessel Monitoring System
VTR	Vessel Trip Report
WHOI	Woods Hole Oceanographic Institution

3.0 CONTENTS, TABLES, AND FIGURES

3.1 TABLE OF CONTENTS

3.2 LIST OF TABLES

3.3 LIST OF FIGURES

4.0 INTRODUCTION AND BACKGROUND

Deep sea corals are unique, fragile, slow-growing marine organisms that are valued for their function as habitat for many fish and invertebrates, as well as for a variety of ecosystem and cultural services they provide. These corals occupy deep, largely unexplored offshore areas that include the continental shelf break and marine canyons in the Mid-Atlantic, and are considered to be very vulnerable to human activities such as fishing.[1] When commercial fishing gears, such as trawls or pots, contact the sea floor in areas where deep sea corals occur, they become a potential threat to coral ecosystems through scarring, crushing or complete removal of corals. Deep sea corals can live for hundreds or even thousands or years, and damaged or destroyed deep sea corals may take many years to become re-established, if they are able to do so at all.

Deep sea coral habitats are among the most biologically diverse ecosystems in the deep sea, and may increase the resilience of deep water ecosystems to external shocks. Corals provide habitat for many species of fish and invertebrates including nursery grounds, protection, reproduction, and feeding. Additionally, deep sea corals may sequester atmospheric carbon dioxide, and can serve as long-term indicators of climate change by serving as a record for ocean temperature changes. Corals also offer opportunities for pharmaceutical, engineering, and medical research. Finally, deep sea corals have cultural value, including non-use benefits such as existence value.[2] The general public has seen increasing opportunities in recent years to view and appreciate deep sea ecosystems by engaging virtually in deep sea exploration streamed via the internet.

The Mid-Atlantic Fishery Management Council (Council) recognizes the value of deep sea corals and is exercising its authority under the reauthorized Magnuson-Stevens Act (MSA) to recommend management measures to minimize fishery impacts to deep sea corals in the Mid-Atlantic region. This amendment is a regulatory vehicle initiated by the Council to identify and develop fishery management measures that will limit the negative impacts of commercial fishing on deep sea corals. At the same time, the importance and value of commercial fisheries that operate in or near areas of deep sea coral habitat is recognized by the Council. As such, measures in this amendment will be considered in light of their benefit to corals as well as the cost to commercial fisheries. The information presented in this document is designed to assist the public in commenting on the proposed measures and ultimately to support the Council in achieving an appropriate balance between protecting deep sea corals and minimizing negative economic impacts to fisheries.

4.1 PURPOSE AND NEED FOR ACTION

The purpose of this amendment is to identify and implement measures that reduce, to the extent practicable, impacts of fishing gear on deep sea corals in the Mid-Atlantic region. The measures, or some subset of the measures, developed in the amendment are necessary to protect valued deep sea corals and their dependent ecosystem components while also considering the operational needs and long term sustainability of commercial fisheries.

Deep sea corals are fragile and slow-growing organisms that are highly vulnerable to various types of disturbance of the sea floor, including fishing activities. Corals are valued for their habitat, ecosystem,

---

[1] E.g., Hourigan 2009 - http://www.int-res.com/articles/theme/m397p333.pdf. Managing fishery impacts on deep-water coral ecosystems of the USA: emerging best practices. Marine Ecology Progress Series. Vol. 397: 333–340, 2009.

[2] Foley, Naomi S., van Rensburg, Tom M., and Claire W. Armstrong. 2010. The ecological and economic value of cold-water coral ecosystems. *Ocean & Coastal Management* 53:313-326.

cultural, and other values, yet remain largely unprotected from human disturbance in the Mid-Atlantic. Research on commercial fishing gear impacts to deep sea corals indicates that fishing gear can damage corals in variety of ways, including scarring, breaking, smothering, or complete destruction. This amendment contains alternatives that aim to protect corals by restricting fishing in select areas where fishing effort and prime coral habitats overlap, as well as by restricting expansion of effort into less heavily fished areas where corals are known or are highly likely to be present.

4.2 REGULATORY AUTHORITY

The range of alternatives in this document is based on application of discretionary provisions related to deep sea corals contained in the 2007 reauthorization of the MSA.[3] These provisions give the Regional Fishery Management Councils the authority to designate zones where, and periods when, fishing may be restricted in order to protect deep sea corals. Under the authority of the MSA, designated deep sea coral zones may include areas beyond known coral locations, if necessary, to ensure their effectiveness. Management measures applied to deep sea coral zones may include restrictions on the location and timing of fishing activity, allowing fishing for only certain vessel types, and/or complete closure to fishing. The Council seeks to balance the exercise of this authority with the management objectives of the Mackerel, Squid, and Butterfish (MSB) Fishery Management Plan (FMP) and the value of potentially affected commercial fisheries.

4.3 FMP HISTORY AND MANAGEMENT OBJECTIVES

Bottom trawls have been consistently identified as the gear type with the greatest potential to negatively affect deep sea corals. Any measures to protect deep sea corals will, therefore, likely include gear restrictions affecting bottom trawl fisheries, especially those operating near areas identified as prime deep sea coral habitat. Among the Council's management plans, the FMP that directly governs major offshore trawl fisheries operating in areas of likely coral habitat in the Mid-Atlantic is the MSB FMP. As such, measures to protect deep sea corals are being considered through an amendment to this plan. Nevertheless, and as detailed below (Section 4.4) alternatives developed in this amendment are not limited to the activities of the MSB fisheries, and may apply to other federally regulated fishing activities as well.

Management of the MSB fisheries began through the implementation of three separate FMPs (one each for mackerel, squid, and butterfish) in 1978. The plans were merged in 1983. Over time a wide variety of management issues have been addressed including stock rebuilding, habitat conservation, bycatch minimization, and limiting participation in the fisheries. The history of the plan and its amendments can be found at http://www.mafmc.org/fisheries/fmp/msb.

The management goals and objectives, as described in the current FMP are listed below.

1. Enhance the probability of successful (i.e., the historical average) recruitment to the fisheries.
2. Promote the growth of the U.S. commercial fishery, including the fishery for export.
3. Provide the greatest degree of freedom and flexibility to all harvesters of these resources consistent with the attainment of the other objectives of this FMP.
4. Provide marine recreational fishing opportunities, recognizing the contribution of recreational fishing to the national economy.
5. Increase understanding of the conditions of the stocks and fisheries.
6. Minimize harvesting conflicts among U.S. commercial, U.S. recreational, and foreign fishermen.

[3] http://www.nmfs.noaa.gov/msa2007/docs/act_draft.pdf#page=82.

4.4 MANAGEMENT UNIT AND SCOPE OF ALTERNATIVES

The management unit (fish stock definition) for the MSB FMP is all Atlantic mackerel (*Scomber scombrus*), Longfin squid (*Doryteuthis (Amerigo) pealeii*),[4] Illex squid (*Illex illecebrosus*), and butterfish (*Peprilus triacanthus*) under U.S. jurisdiction in the northwest Atlantic, with a core fishery management area from Maine to North Carolina.

Although gear restrictions are being developed within the MSB FMP, the alternatives listed in this document aim to achieve protection of deep sea corals and are not limited to the activities of the MSB fisheries. Management measures developed under the regulatory authority described in Section 4.2 and implemented via this amendment could be applied to any federally regulated fishing activity within the range of the MSB fisheries, including activity or gears that are not used in these fisheries.

Management measures developed in this amendment would not apply to any species managed solely by the Atlantic States Marine Fisheries Commission (Commission), such as American lobster, unless the Commission takes complementary action.

The Mid-Atlantic Fishery Management Council, the New England Fishery Management Council (NEFMC), and the South Atlantic Fishery Management Council have signed a Memorandum of Understanding (MOU) identifying areas of consensus and common strategy related to conservation of corals and mitigation of the negative impacts of fishery interactions with corals.[5] As per the terms of the MOU, the Mid-Atlantic Fishery Management Council has agreed to develop alternatives applicable only to areas within the Mid-Atlantic Council region boundary as defined in the current regulations (Figure 1).[6] The NEFMC has agreed to develop management measures applicable within the boundaries of their Council region, and the South Atlantic Fishery Management Council will continue to manage deep sea corals via its Coral, Coral Reef and Live/Hardbottom FMP.

To promote continuity and consistency in regional protection of deep sea corals, the alternatives contained in this document were developed with consideration of consistency in approach to deep sea coral protections to that being considered by the NEFMC. The NEFMC began developing deep sea coral alternatives as part of their Essential Fish Habitat Omnibus Amendment 2, which has since been split into a separate Omnibus Deep Sea Corals Amendment. [7]

---

[4] For longfin squid there was a scientific name change from *Loligo pealeii* to *Doryteuthis (Amerigo) pealeii*. To avoid confusion, this document will utilize the common name "longfin squid" wherever possible, but this squid is often referred to as "*Loligo*" by interested parties.

[5] The full Memorandum of Understanding is available on the Council's website, at http://www.mafmc.org/actions/msb/am16.

[6] Council boundaries are defined in the Code of Federal Regulations (CFR), at 50 C.F.R. §§ 600.105(a) and (b), available at http://www.gpo.gov/fdsys/granule/CFR-2001-title50-vol3/CFR-2001-title50-vol3-sec600-105/content-detail.html.

[7] For more information, see http://nefmc.org/habitat/index.html.

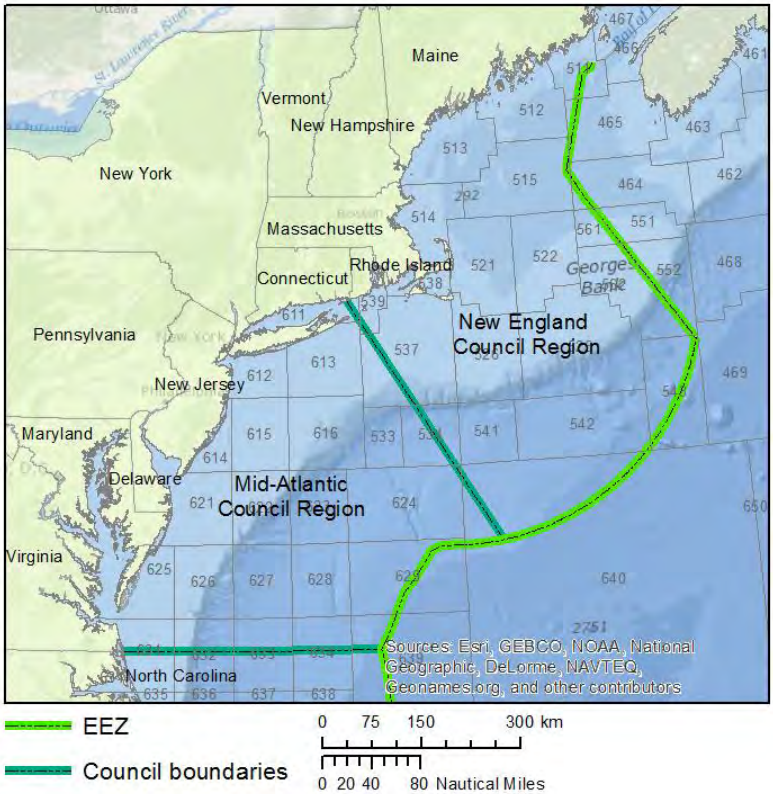


Figure 1: Mid-Atlantic and New England Council regions.

THIS SPACE INTENTIONALLY LEFT BLANK

5.0 MANAGEMENT ALTERNATIVES

This amendment attempts to achieve the Council's desired deep sea coral protections while considering the social and economic value of potentially affected fisheries. In recognition of the diversity of potential solutions to these two goals, a range of alternative management measures ("alternatives") has been developed so that each alternative's effectiveness and practicability can be considered. This approach also complies with the statutory requirements of the National Environmental Policy Act (NEPA) for a consideration of a "range of alternatives" in evaluating the environmental impacts of federal actions. The range of alternatives is presented below.

Deep Sea Coral Zones

In identifying and developing the alternatives, the general approach is to apply the discretionary provisions of the MSA for designating "deep sea coral zones." Once these zones have been designated, any federally regulated fishing activities within them could then be restricted, and those restrictions could be further modified in the future. Two types of deep sea coral zones are currently envisioned, as described below.

Broad deep sea coral zones would encompass large, mostly unfished and unexplored areas and measures would limit and prevent expansion of commercial gear use where little or no fishing has historically occurred. The concept of these broad coral zones is in line with the "freeze the footprint" approach outlined in NOAA's Strategic Plan for Deep Sea Corals:

> "The expansion of fisheries using mobile bottom-tending gear beyond current areas has the potential to damage additional deep-sea coral and sponge habitats. Potentially, many undocumented and relatively pristine deep-sea coral and sponge ecosystems may exist in unmapped areas untouched, or relatively untouched, by mobile bottom-tending gear. This objective takes a precautionary approach to "freeze the footprint" of fishing that uses mobile bottom-tending gear in order to protect areas likely to support deep-sea coral or sponge ecosystems until research surveys demonstrate that proposed fishing will not cause serious or irreversible damage to such ecosystems in those areas. Special emphasis is placed on mobile bottom-tending gear (e.g., bottom trawling), as this gear is the most damaging to these habitats. This objective applies to areas where use of such gear is allowed or might be allowed in the future. If subsequent surveys identify portions of these areas that do not contain deep-sea corals or sponges, NOAA may recommend that suitable areas be opened for fishing using such gear." [8]

Discrete deep sea coral zones would consist of smaller areas of known coral presence or highly likely coral habitat. These areas primarily consist of offshore canyons or slope areas along the continental shelf edge. Fishing activity occurs nearby these areas, and to some extent within them. Therefore, restrictions applied to these areas would mainly reduce or eliminate current fishing activities rather than just prevent their expansion.

These two types of deep sea coral zones could be implemented simultaneously. Depending on the alternatives selected by the Council, different types of zones could have different management measures or the same management measures applied within each type of zone. If both broad and discrete zones are

[8] National Oceanic and Atmospheric Administration, Coral Reef Conservation Program. 2010. NOAA Strategic Plan for Deep-Sea Coral and Sponge Ecosystems: Research, Management, and International Cooperation. Silver Spring, MD: NOAA Coral Reef Conservation Program. NOAA Technical Memorandum CRCP 11. 67 pp.

implemented and management measures differ between the two types, the more restrictive management measures would apply in any areas of overlap.

Six sets of alternatives are presented below:

1) Designation of broad deep sea coral zones,
2) Restrictions within broad zones,
3) Designation of discrete deep sea coral zones,
4) Restrictions within discrete zones,
5) Framework provisions for future refinements to deep sea coral zone measures,
6) Vessel Monitoring System (VMS) requirements.

5.1 BROAD CORAL ZONE DESIGNATION ALTERNATIVES

Alternative 1A: No Action/*Status Quo*

Under this alternative, no action would be taken to designate a broad deep sea coral zone. This option is equivalent to the *status quo*. Several canyons have been closed for tilefish habitat protection, and as was noted in the analysis for those actions, deep sea corals do receive some protection from those closures. In the Mid-Atlantic region, tilefish gear-restricted areas include part of Norfolk Canyon.

Alternative 1B: Landward boundary approximating 200 meter depth contour

Under this alternative, a broad coral zone would be designated with the landward boundary approximating the 200 meter (~s109 fathom) depth contour and extending out to the northern and southern boundaries of the MAFMC management region, and to the edge of the EEZ (Figure 2).

Alternative 1C: Landward boundary approximating 300 meter depth contour

Under this alternative, a broad coral zone would be designated with the landward boundary approximating the 300 meter (~164 fathom) depth contour and extending out to the northern and southern boundaries of the MAFMC management region, and to the edge of the EEZ (Figure 2).

Alternative 1D: Landward boundary approximating 400 meter depth contour

Under this alternative, a broad coral zone would be designated with the landward boundary approximating the 400 meter (~219 fathom) depth contour and extending out to the northern and southern boundaries of the MAFMC management region, and to the edge of the EEZ (Figure 2).

Alternative 1E: Landward boundary approximating 500 meter depth contour

Under this alternative, a broad coral zone would be designated with the landward boundary approximating the 500 meter (~273 fathom) depth contour and extending out to the northern and southern boundaries of the MAFMC management region, and to the edge of the EEZ (Figure 2).

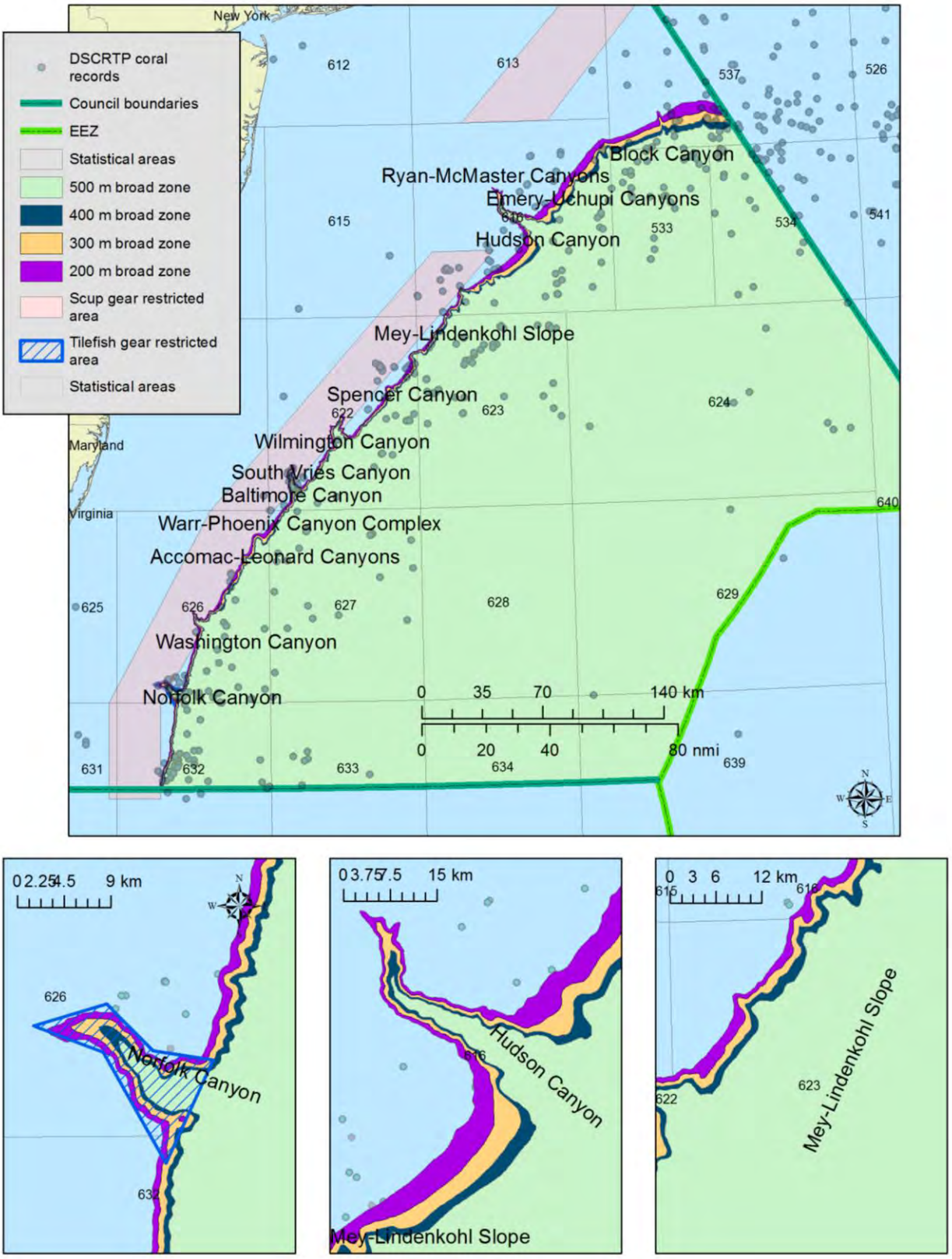


Figure 2: Broad coral zone alternatives.

5.2 RESTRICTIONS WITHIN BROAD CORAL ZONES

Alternative 2A: No Action

Under this alternative, no action would be taken to implement management measures in any designated broad deep sea coral zones. Several canyons have been closed for tilefish habitat protection, and as was noted in the analysis for those actions, deep sea corals do receive some protection from those closures. In the Mid-Atlantic region, tilefish gear-restricted areas include part of Norfolk Canyon.

Alternative 2B: Prohibit all bottom-tending gear

Under this alternative, vessels would be prohibited from using any bottom-tending gear within designated broad coral zones. "Bottom-tending gear" includes any mobile bottom-tending gear (as defined in Alternative 2C below), as well as any stationary or passive gear types that contact the bottom, including bottom longlines, pots and traps[9], and sink or anchored gill nets.

Sub-alternative 2B-1: *Exempt red crab fishery from broad zone restrictions*

If selected in conjunction with Alternative 2B, sub-alternative 2B-1 would exempt the red crab fishery from restrictions on all bottom-tending gear. The red crab fishery currently consists of only a few vessels, which harvest crabs using traps. These vessels focus effort along the center of a narrow range of depth (from approximately 550 to 750 meters). Thus, any prohibition on all bottom-tending gear within the proposed broad zones, absent an exemption, would impact all fishing activity for red crab within the Mid-Atlantic Council region.

Sub-alternative 2B-2: *Exempt golden tilefish fishery from broad zone restrictions*

If selected in conjunction with Alternative 2B, sub-alternative 2B-2 would exempt the golden tilefish fishery from restrictions on all bottom-tending gear. Golden tilefish are primarily harvested using bottom longlines. Selecting sub-alternative 2B-2 would allow the golden tilefish bottom longline fishery to continue operation within a designated broad zone, but prevent current or future use of stationary or passive bottom-tending gear targeting other species (with the exception of red crab trap gear if sub-alternative 2B-1 above is also selected).

Alternative 2C: Prohibit all mobile bottom-tending gear

Under this alternative, vessels would be prohibited from using any mobile bottom-tending gear within designated broad coral zones. Mobile bottom-tending gear (as defined at 50 C.F.R. §648.200 with respect to the Northeast multispecies and tilefish fisheries) means gear in contact with the ocean bottom, and towed from a vessel, which is moved through the water during fishing in order to capture fish, and includes otter trawls, beam trawls, hydraulic dredges, non-hydraulic dredges, and seines (with the exception of a purse seine).

Alternative 2D: Require VMS for vessels fishing in broad coral zones

Under this alternative, vessels would be required to use an approved Vessel Monitoring System (VMS) as a condition for operating within any broad coral zones. This alternative could be selected alone or in combination with any of the gear restriction alternatives above.

[9]As indicated in section 4.4, alternatives contained in this document would not apply to non-federally managed fisheries, including species managed solely by the Atlantic States Marine Fisheries Commission, such as American lobster.

5.3 DISCRETE CORAL ZONE DESIGNATION ALTERNATIVES

Alternative 3A: No Action/*Status Quo*

Under this alternative, no action would be taken to designate discrete deep sea coral zones. This option is equivalent to the *status quo*.

Alternative 3B: Designation of Discrete Coral Zones

Under this alternative, specific submarine canyons and slope areas would be designated as discrete coral zones based on observed coral presence or highly likely coral presence indicated by modeled suitable habitat. Proposed discrete zones are listed in Table 1 as sub-options to this alternative (see also: Figure 3). The Council could select any combination of these specific areas to designate as discrete coral zones.

Boundaries for each of the proposed discrete zones were drawn primarily on the basis of a NOAA-developed habitat suitability model for deep sea corals,[10] as well as areas of very high slope (>30 degrees). Recent research has indicated that the coral habitat suitability model has been very successful in predicting coral habitat, and additionally has confirmed that areas of slope greater than 30 degrees almost always contain hardbottom habitat and deep sea corals. Areas of high and very high habitat suitability and areas of high slope were buffered by approximately 0.4 nautical miles to account for spatial uncertainties associated with the current resolution of the habitat model. Specific locations of historical and recent coral observations were also considered when developing boundaries, especially where recent data was available for observations that have not yet been incorporated into the habitat model. The specific criteria for how the boundaries were developed are further detailed in **Appendix A**. The geographic coordinates of discrete zone alternatives are listed in **Appendix B**.

Sub-alternative 3B-1: *Advisor-proposed boundaries for specific canyons*

Under this sub-alternative, modified discrete zone boundaries would be implemented for Norfolk Canyon, Baltimore Canyon, and the Mey-Lindenkohl Slope, as proposed by a member of the Council's MSB Advisory Panel following a April 2013 Deep Sea Corals Alternatives workshop (Table 2; Figure 4).

[10] Kinlan BP, Poti M, Drohan A, Packer DB, Nizinski M, Dorfman D, Caldow C. 2013. Predictive models of deep-sea coral habitat suitability in the U.S. Northeast Atlantic and Mid-Atlantic regions. Downloadable digital data package. National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), National Centers for Coastal Ocean Science (NCCOS). August 2013. Available at: <http://coastalscience.noaa.gov/projects/detail?key=35>.

Table 1: Proposed discrete zones under alternative 3B. The Council could select any combination of the individual options listed below to designate as discrete coral zones.

	Canyon or Complex	Area (km^2)
1	Block Canyon	231.6
2	Ryan and McMaster Canyons	390.3
3	Emery and Uchupi Canyons	369.2
4	Jones and Babylon Canyons	166.1
5	Hudson Canyon	770.8
6	Mey-Lindenkohl Slope (encompassing several canyons, including Mey, Hendrickon, Toms, South Toms, Berkley, Carteret, and Lindenkohl Canyons, and the slope area between them)	2818.2
7	Spencer Canyon	163.3
8	Wilmington Canyon	268.1
9	North Heyes and South Wilmington Canyons	183.4
10	South Vries Canyon	142.6
11	Baltimore Canyon	231.0
12	Warr and Phoenix Canyon Complex	511.6
13	Accomac and Leonard Canyons	538.2
14	Washington Canyon	554.1
15	Norfolk Canyon	543.7

Table 2: Advisor-proposed boundaries for Norfolk Canyon, Baltimore Canyon, and the Mey-Lindenkohl Slope (sub-alternative 3B-1).

	Canyon or Complex	Area (km^2)
1	Mey-Lindenkohl Slope *(Advisor proposed; Straight line landward boundary)*	2445.3
2	Mey-Lindenkohl Slope *(Advisor proposed; Depth-based; landward boundary approximating 250 fathom/457 meter depth contour)*	2458.8
3	Baltimore Canyon *(Advisor proposed)*	220.7
4	Norfolk Canyon *(Advisor proposed)*	598.4

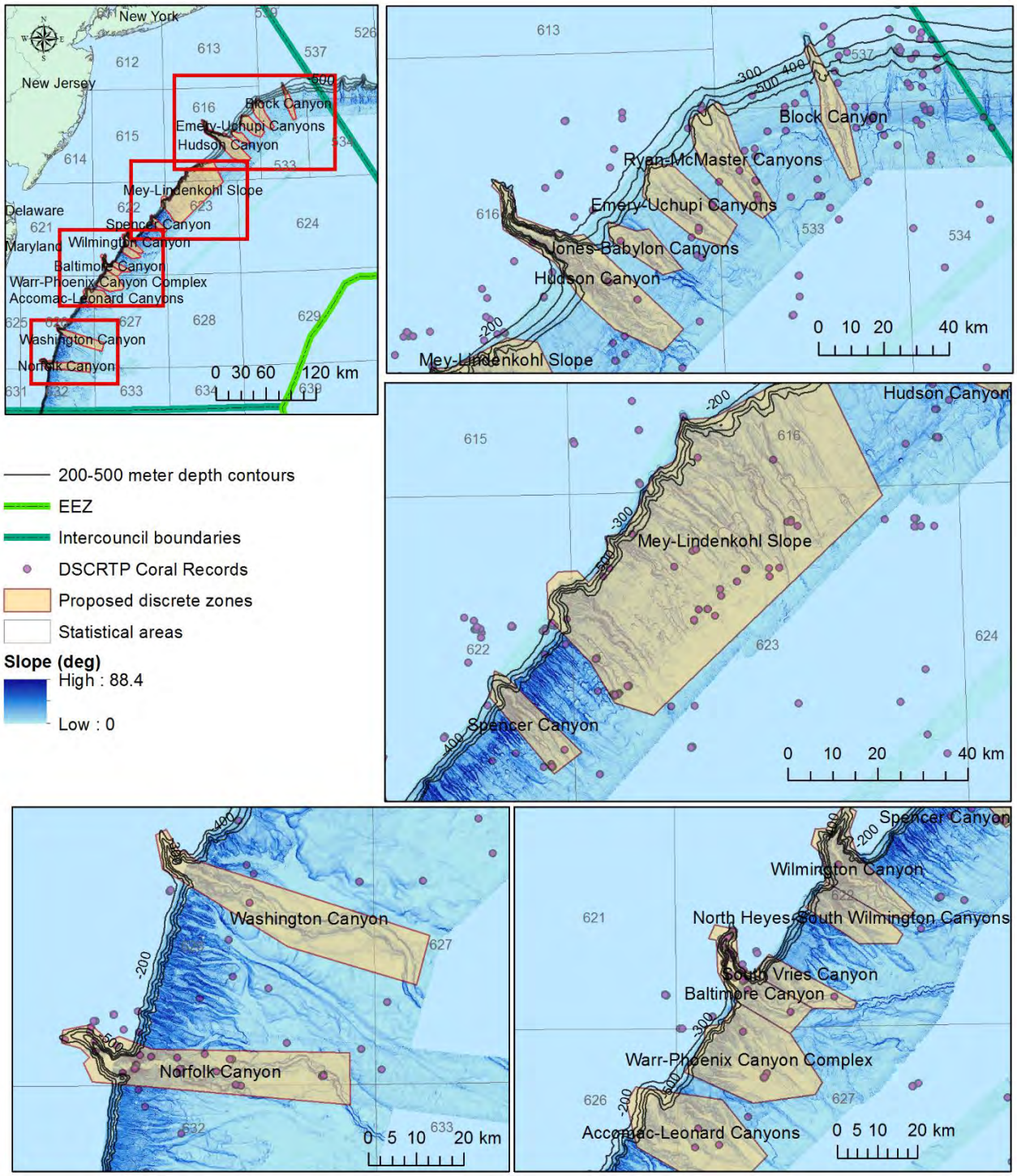


Figure 3: Discrete coral zone alternatives.

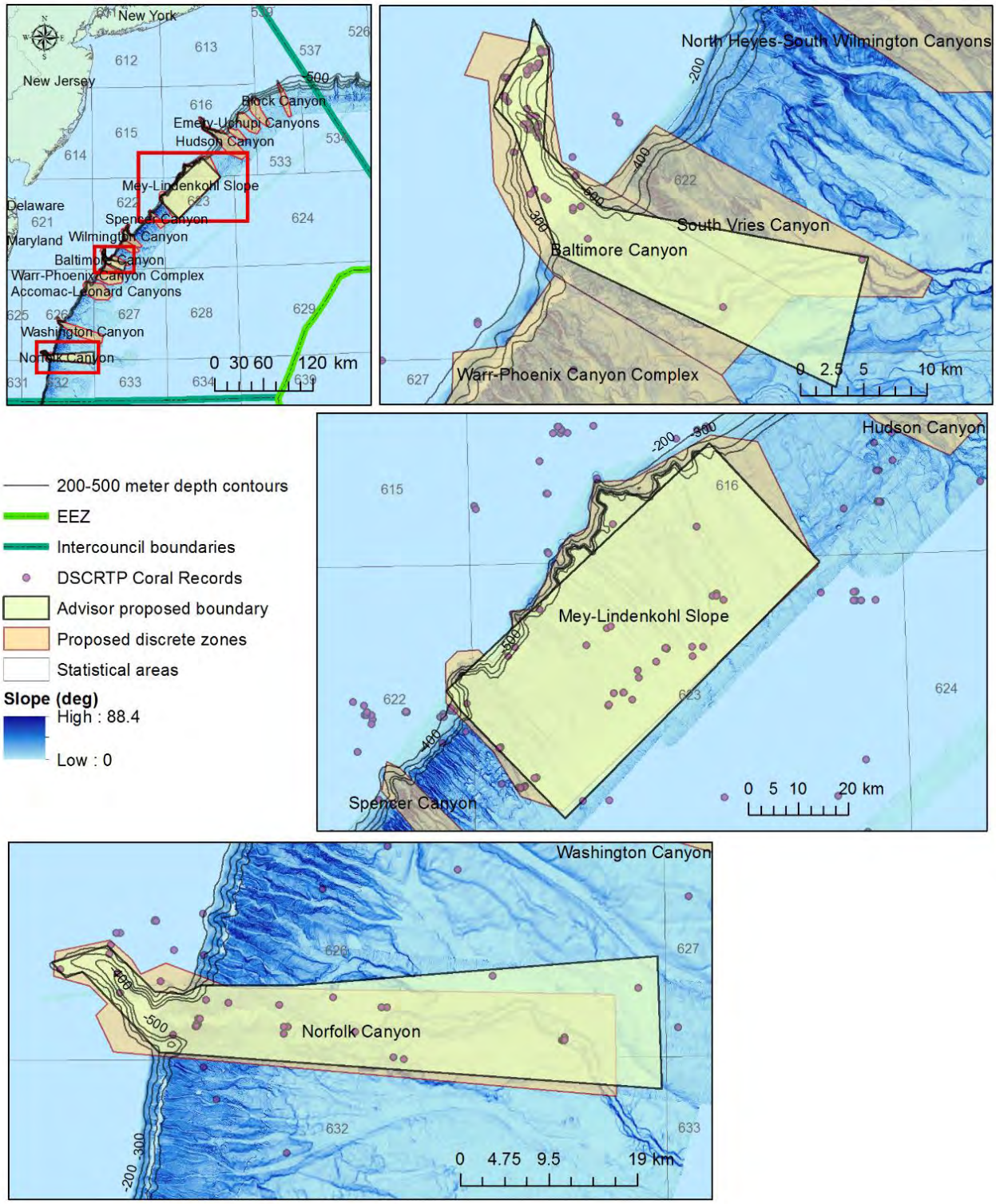


Figure 4: Advisor proposed boundaries (sub-alternative 3B-1).

5.4 RESTRICTIONS WITHIN DISCRETE CORAL ZONES

Alternative 4A: No Action

Under this alternative, no action would be taken to implement management measures in any potential discrete deep sea coral zones.

Alternative 4B: Prohibit all bottom-tending gear

Under this alternative, vessels would be prohibited from using any bottom-tending gear within the designated discrete coral zones. This prohibition could include any or all of the discrete coral zones listed in Table 1. "Bottom-tending gear" includes any mobile bottom-tending gear (as defined in Alternative 4C below), as well as any stationary or passive gear types that contact the bottom, including bottom longlines, pots and traps,[11] and sink or anchored gill nets.

Alternative 4C: Prohibit mobile bottom-tending gear

Under this alternative, vessels would be prohibited from using any mobile bottom-tending gear within designated discrete coral zones. This prohibition could include any or all of the discrete coral zones listed in Table 1. Mobile bottom-tending gear (as defined at 50 C.F.R. §648.200 with respect to the Northeast multispecies and tilefish fisheries) means gear in contact with the ocean bottom, and towed from a vessel, which is moved through the water during fishing in order to capture fish, and includes otter trawls, beam trawls, hydraulic dredges, non-hydraulic dredges, and seines (with the exception of a purse seine).

5.5 FRAMEWORK PROVISIONS TO ALLOW FUTURE MODIFICATIONS TO MANAGEMENT MEASURES

Framework actions facilitate expedient modifications to certain management measures. Framework actions can only modify existing measures and/or those that have been previously considered in an FMP amendment. While amendments may take several years to complete and address a variety of issues, frameworks generally can be completed in 5-8 months and address one or a few issues in a fishery. The MSB FMP contains a list of actions that are able to be taken via framework action. The following alternatives would modify that list to allow framework actions related to the proposed deep sea coral measures in this amendment.

Recently completed research surveys have observed deep sea corals in several submarine canyons within the Mid-Atlantic Council management area. Additional research is planned or ongoing and many data products will not be available within the planned timeline for this amendment. Modifying the framework provisions of the FMP would allow the Council to modify deep sea coral zones or management measures in response to new information or issues arising after implementation of the amendment.

Alternative 5A: No Action

Under this alternative, no changes would be made to the framework provisions of the MSB FMP. Any future modifications to the deep sea coral zones or associated management measures would likely have to be accomplished through an amendment to the FMP.

[11]As indicated in section 4.4, alternatives contained in this document would not apply to non-federally managed fisheries, including species managed solely by the Atlantic States Marine Fisheries Commission, such as American lobster.

Alternative 5B: Option to modify coral zone boundaries via framework action

This alternative would give the Council the option to modify the boundaries of deep sea coral zones through a framework action.

Alternative 5C: Option to modify management measures within zones via framework action

This alternative would give the Council the option to modify fishing restrictions, exemptions, and other management measures within deep sea coral zones through a framework action.

Alternative 5D: Option to add additional discrete coral zones via framework action

This alternative would allow the Council to add discrete coral zones through a framework action.

Alternative 5E: Option to implement special access program via framework action

This alternative would give the Council the option to design and implement a special access program for commercial fishery operations in deep sea coral zones through a framework action.

5.6 VESSEL MONITORING ALTERNATIVES

Alternative 6A: No Action

Under this alternative, no changes would be made to the VMS requirements for *Illex* squid moratorium vessels.

Alternative 6B: Vessel Monitoring Systems (VMS) requirement for *Illex* squid moratorium vessels

This option would require use of VMS for all *Illex* squid moratorium vessels (regardless of whether fishing activity is occurring within or outside of any potential deep sea coral zones).

5.7 CONSIDERED BUT REJECTED FROM FURTHER ANALYSIS

The following section contains options that were previously included in the range of alternatives, but have been removed from further consideration at this time.

1. Require Council review and approval for fishing within broad zones

- ***Sub-alternative:*** Implement special access program (for existing fisheries)
- ***Sub-alternative:*** Implement exploratory fishing access program (for potential new fisheries)
- ***Sub-alternative:*** Implement research/experimental access program (for scientific research)

The Fishery Management Action Team (FMAT) recommended moving this alternative set to considered but rejected primarily due to existing exemption and access programs that would serve essentially the same purpose as these proposed alternatives. Specifically, Exempted Fishing Permits (EFPs) issued through the Greater Atlantic Regional Fisheries Office (GARFO) would cover many of the intended activities described under the sub-alternatives above. An EFP is a permit that authorizes a fishing vessel to conduct fishing activities that would be otherwise prohibited under the regulations at 50 CFR part 648 or part 697. Generally, EFPs are issued for activities in support of fisheries-related research, including seafood product development and/or market research, compensation fishing, and the collection of fish for public display. **Exploratory fishing** as described in the sub-alternative above would be covered by the existing EFP program.

For a **special access** program within any potential broad zones, if the Council wishes to permit special access for any fishing activities, it is possible that such a system could be designed. However, the Council would need to give specific direction as to how such a system would operate, including who would be eligible, the types of fishing and species to be harvested. Because this alternative would need further development to be included in the amendment, the FMAT recommends moving this sub-alternative to "considered but rejected." However, a Council special access program could be considered at a later date via a framework action, provided that Alternative 5E, the option to implement a special access program via framework action, is selected by the Council.

For the purposes of **scientific research**, a statutory exemption is provided within the MSA, meaning scientific research activities are exempt from any and all MSA regulations. A Letter of Acknowledgement (LOA) can be obtained from the Regional Office that acknowledges certain activities as scientific research conducted from a scientific research vessel. An LOA is not required for scientific research, but serves as a convenience to the researcher and to law enforcement entities. To be considered a scientific research vessel, a vessel must be conducting scientific research activity under the direction of a foreign government agency, a U.S. government agency, a U.S. state or territorial agency, university or other accredited educational institution, international treaty organization, or scientific institution.

More information about EFPs, LOAs, and other exempted activity summarized above is available at:
http://www.nero.noaa.gov/permits/forms/EFPLOAEEAAPossessionLOAGuidance.pdf.

2. Require observers on vessels fishing in broad coral zones

The FMAT recommended moving this alternative to "considered but rejected" due to ongoing efforts to resolve issues related to observer coverage funding and industry cost-sharing. Specifically, an Omnibus Observer Coverage Funding Amendment is currently being developed jointly between the Mid-Atlantic and New England Councils, and is directly related to proposed requirements like the one under this alternative. The Omnibus amendment was initiated following NMFS's partial disapproval of both Amendment 5 to the Atlantic Herring FMP and Amendment 14 to the MSB FMP, which contained recommendations for 100 percent observer coverage for certain vessels and provisions for cost-sharing with industry participants. There is no current legal mechanism that allows NMFS and the fishing industry to share observer costs, and budget uncertainties have prevented NMFS from being able to commit to funding for increased observer coverage for particular fisheries. Without a clear and viable funding source for this requirement, this alternative is not practical at this time. Once the Omnibus Observer Coverage Funding Amendment is completed, the Council could address observer coverage requirements within broad coral zones through a future framework action (provided that Alternative 5C to modify management measures within coral zones via Framework is selected by the Council).

3. Require gear monitoring electronics on board to fish within broad or discrete zones (equipment monitoring gear distance from seafloor)

This alternative was proposed at the August 2013 Council meeting, and would require vessels operating in broad or discrete zones to have gear monitoring electronics on board that are able to read the distance from the seafloor at which the vessel's gear is operating. The FMAT recommended that this alternative be moved to "considered but rejected" due to the need for further development, including clarification on how such a requirement would work and the specific

purpose it would serve. Specifically, whether this alternative would serve as a tool for enforcement purposes, or simply as a tool for the vessel operator's knowledge (i.e., to facilitate avoiding bottom contact). More information is needed on how these systems would operate in the context of the proposed measures in this amendment, and the potential benefits to requiring them on board, including any potential intersection with enforcement.

The FMAT recognizes that this proposed alternative is at least partially related to concerns regarding vessel movement in and around zones when fishing gear is not fully deployed. The FMAT also recognizes the need for more information and development of measures to address these issues. Specifically, there is a need to consider vessel needs for deployment and haulback of gear (which for squid trawl vessels often extends significantly behind the vessel). Squid trawlers target specific high productivity areas in and around the heads of the canyons, near the continental shelf-slope break. If any of the proposed coral zones are implemented, future fishing activity near these zones would likely occur very near the coral zone boundaries, posing a potential problem for vessels when positioning for gear deployment or haulback, or drifting into closed areas during these processes. Additionally, there is a need to consider potential allowances and associated restrictions for transit through any potential coral zones (for example, transit allowances for vessels with stowed gear, etc.). The Council is soliciting feedback and suggestions from the public and the Council's advisors on these issues during the public hearing process.

4. Exempt *Illex* and longfin squid fisheries from broad zone restrictions AND
5. Exempt *Illex* and longfin squid fisheries from discrete zone restrictions

The FMAT recommended that the alternatives exempting the *Illex* and longfin squid fisheries from both broad and discrete zone be moved to "considered but rejected." If the Council wishes to avoid negative economic impacts to the squid fisheries, the FMAT believes that there is a sufficient range of options within the document that would allow this to occur, including the "no action" option under each alternative set as well as the option to designate the deepest depth-based broad zone (500m). For analysis purposes under the National Environmental Policy Act (NEPA), when the above exemption alternatives are included in any set of alternatives taken in combination, the result is essentially a *status quo* situation in terms of impacts to the affected environment. Thus, these exemption alternatives would appear to be contrary to the "purpose and need" of the amendment if they would result in a lack of meaningful action in combination with other alternatives.

6. Depth-contour based boundaries for discrete coral zones

Under this alternative, the landward boundary designations of the discrete coral zones would follow one of the following depth contours: 200 m, 300 m, 400 m, or 500 m. The boundary would follow the contour until the point at which the depth contour boundary intersects with the original boundaries of the sides of the canyon, and follow the original boundaries on the seaward side. The FMAT recommended that these options be moved to "considered but rejected" for several reasons. The discrete zones are intended to encompass areas of coral presence and highly likely coral habitat, and therefore the revised discrete zone boundaries were drawn based on the best available scientific information about coral presence and suitable habitat. In the course of re-drawing the boundaries, the FMAT attempted to align any landward boundaries with one of the proposed depth contours. The FMAT found that the vast majority of proposed depth-contour based boundaries did not meet or approximate the criteria for drawing the boundaries based on coral presence and habitat suitability (see Appendix A). Given the differences across canyon and slope areas, there was additionally no consistent depth contour across proposed areas which would approximate areas of

high coral habitat suitability. Finally, analysis of all proposed depth-contour based boundaries in combination with the model-based boundaries and additional advisor proposed boundaries would mean analyzing five to seven different sets of boundaries for each area. This would overly complicate any cumulative effects analysis given the need to analyze all alternatives in combination with each other alternative, and delay amendment development.

6.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT

The affected environment consists of those resources expected to experience environmental impacts if the actions under consideration in this amendment are implemented. The actions being considered are generally expected to reduce commercial fishing effort below current levels for some offshore fisheries that operate within or near potentially designated coral zones. However, some of this effort is likely to be displaced to areas outside any implemented coral zones. From this perspective, the affected environment consists of those physical, biological, and human components of the environment that are or will be meaningfully connected to commercial fishing operations in those zones. These environmental components are described below.

6.1 PHYSICAL ENVIRONMENT

The managed resources inhabit the Northeast U.S. Shelf Ecosystem, which has been described as including the area from the Gulf of Maine south to Cape Hatteras, extending from the coast seaward to the edge of the continental shelf, including the slope sea offshore to the Gulf Stream. The continental slope includes the area east of the shelf, out to a depth of 2000 m. Four distinct sub-regions comprise the NOAA Fisheries Northeast Region: the Gulf of Maine, Georges Bank, the Mid-Atlantic Bight, and the continental slope. The areas of interest in this action include the Mid-Atlantic Bight and the continental slope. The Mid-Atlantic Bight is comprised of the sandy, relatively flat, gently sloping continental shelf from southern New England to Cape Hatteras, NC. The continental slope begins at the continental shelf break and continues eastward with increasing depth until it becomes the continental rise.

The continental shelf slopes gently from shore out to between 100 and 200 km offshore where it transforms to the slope at the shelf break (100-200 m water depth), continuing eastward with increasing depth until it becomes the continental rise, and finally the abyssal plain. The width of the slope varies from 10-50 km, with an average gradient of 3-6°; however, local gradients can be nearly vertical. The base of the slope is defined by a marked decrease in seafloor gradient where the continental rise begins. The slope is cut by at least 70 large canyons between Georges Bank and Cape Hatteras and numerous smaller canyons and gullies, many of which may feed into the larger canyon systems.

On the slope, silty sand, silt, and clay predominate. A “mud line” occurs on the slope at a depth of 250-300 m, below which fine silt and clay-size particles predominate. Localized coarse sediments and rock outcrops are found in and near canyon walls, and occasional boulders occur on the slope because of glacial rafting. Sand pockets may also be formed because of downslope movements.

Submarine canyons are not spaced evenly along the slope, but tend to decrease in areas of increasing slope gradient. Canyons are typically “v” shaped in cross section and often have steep walls and outcroppings of bedrock and clay. The canyons are continuous from the canyon heads to the base of the continental slope. Some canyons end at the base of the slope, but others continue as channels onto the continental rise. Larger and more deeply incised canyons are generally significantly older than smaller ones, and there is evidence that some older canyons have experienced several episodes of filling and re-excavation.

Canyons can alter the physical processes in the surrounding slope waters. Fluctuations in the velocities of the surface and internal tides can be large near the heads of the canyons, leading to enhanced mixing and sediment transport in the area.

More information on the physical properties of the Northeast U.S. Shelf Ecosystem and the submarine canyon environments relevant to this action can be found in the NOAA Technical Memo "Characterization of the Fishing Practices and Marine Benthic Ecosystems of the Northeast U.S. Shelf, and an Evaluation of the Potential Effects of Fishing on Essential Fish Habitat" (Stevenson et al. 2004, available at: http://www.nefsc.noaa.gov/publications/tm/tm181/.)

6.2 BIOLOGICAL ENVIRONMENT

6.2.1 Description of the Managed Resource

Atlantic mackerel is a semi-pelagic/semi-demersal (may be found near the bottom or higher in the water column) schooling fish species primarily distributed between Labrador (Newfoundland, Canada) and North Carolina. Additional life history information is detailed in the Essential Fish Habitat (EFH) document for the species, located at: http://www.nefsc.noaa.gov/nefsc/habitat/efh/. The status of Atlantic mackerel is unknown with respect to being overfished or not, and unknown with respect to experiencing overfishing or not. Recent results from the Northeast Fisheries Science Center (NEFSC) Spring Trawl survey (the spring survey catches the most mackerel) are highly variable, and are graphed in the "NEFSC Biological Update" that is created as part of the annual quota setting process. These are available at: http://www.mafmc.org/ssc-meeting-documents/ (see May 2014 Meeting Materials).

Atlantic butterfish is a semi-pelagic/semi-demersal schooling fish species primarily distributed between Nova Scotia, Canada and Florida. Additional life history information is detailed in the EFH document for the species, located at: http://www.nefsc.noaa.gov/nefsc/habitat/efh/. The status of butterfish is not overfished (above target biomass) with no overfishing occurring according to a recently accepted assessment (NEFSC 2014, available at: http://nefsc.noaa.gov/publications/crd/crd1403/).

Longfin squid is a semi-pelagic/semi-demersal schooling cephalopod species primarily distributed between Georges Bank and Cape Hatteras, NC. Additional life history information is detailed in the EFH document for the species, located at: http://www.nefsc.noaa.gov/nefsc/habitat/efh/. Based on a new biomass reference point from a 2010 stock assessment, the longfin squid stock was not overfished in 2009, but overfishing status was not determined because no overfishing threshold was recommended (though the assessment did describe the stock as "lightly exploited'). The assessment documents are available at: http://www.nefsc.noaa.gov/saw/reports.html. Recent results from the NEFSC Trawl surveys are highly variable, and are graphed in the "NEFSC Biological Update" that is created as part of the annual quota setting process. These are available at: http://www.mafmc.org/ssc-meeting-documents/ (see May 2014 Meeting Materials).

***Illex* squid** is a semi-pelagic/semi-demersal schooling cephalopod species distributed between Newfoundland and the Florida Straits. Additional life history information is detailed in the EFH document for the species, located at: http://www.nefsc.noaa.gov/nefsc/habitat/efh/. The status of *Illex* is unknown with respect to being overfished or not, and unknown with respect to experiencing overfishing or not. Recent results from the NEFSC Trawl surveys are highly variable, and are graphed in the "NEFSC Biological Update" that is created as part of the annual quota setting process. These are available at: http://www.mafmc.org/ssc-meeting-documents/ (see May 2014 Meeting Materials).

6.2.2 Deep Sea Corals

Deep sea corals, or cold water corals, are generally defined as corals occurring at ocean depths below 50 meters. Deep sea corals are unlike shallow water corals in that they do not possess the symbiotic photosynthetic algae known as zooxanthellae, which produce food for corals found in shallow waters. Deep sea corals exist mainly in areas where photosynthesis cannot occur due to lack of light, and so instead they must obtain food from their environment. Several types of deep sea corals are found in U.S. waters of the northwestern Atlantic Ocean. The major orders of deep sea corals found in the Mid-Atlantic region include stony corals (Scleractinians), sea pens (Pennatulaceans), true soft corals and gorgonians (Alcyonaceans and Gorgonaceans), and black corals (Antipatharians). Types of deep sea corals observed to date in the Mid-Atlantic range from small, solitary corals to larger colonies including complex structure-forming corals. Deep sea corals, in particular types that form complex structures, provide habitat for many species of fishes and invertebrates.

Deep Sea Coral Distribution and Abundance Data

Records of deep sea coral observations are maintained in a database by NOAA's Deep Sea Coral Research and Technology Program (DSCRTP). These records include historical and current data from a variety of sources, including peer-reviewed literature, research surveys, museum records, and incidental catch records. The records contained in this database are mostly **presence-only**. **Many areas have not been adequately surveyed for the presence of deep sea corals.** There is very little absence or abundance information available for deep sea corals, although usable absence data may become available as data is processed from recent research.

Several recent research efforts have resulted in new observations of deep sea corals in the Mid-Atlantic. Some of this research is still ongoing, with plans for some work to continue into 2014 and 2015. Although some qualitative results are available, much of the processed/georeferenced data from recent cruises is not yet available. New information has been incorporated into the range of alternatives to the extent possible, and will be added to the analysis as it becomes available before the amendment is finalized. Available findings from these surveys, relative to proposed coral zones, are described in Section 7.1.2.

The Northeast Fishery Science Center's fishery independent surveys have been assessed for deep sea coral bycatch. Neither the NEFSC's trawl survey nor their scallop survey "catch" deep-sea corals in any meaningful quantities, nor is any catch of corals recorded in any meaningfully quantitative way. For example, prior to the year 2000, bycatch quantity in the Atlantic sea scallop surveys were estimated by cursory visual inspection or "eyeballing" only. Since that time, the survey has gathered more quantitative bycatch information. The bycatch data, referred to as "trash," is divided up into 3 categories: substrate, shell, and other invertebrates, but the log sheets still only record percent composition and total volume (bushels), and methods and accuracy of this quantification may vary. The NEFSC trawl surveys also have a "trash" component – trash being defined as any substrate or non-coded invertebrate species. The trash is loosely described and roughly quantified to the whole liter.

The general lack of deep-sea coral in both of these surveys may be due to the surveys fishing too shallow to encounter the larger deep-sea coral species (e.g., nearly all the scallop surveys fish < 100 m and all are < 140 m) and the possibility that some of these larger corals (e.g., *Paragorgia, Primnoa*) may have been "fished out" in the relevant areas earlier in the 19th and 20th centuries. Nevertheless, the NEFSC is planning to improve their quantification of invertebrate bycatch in their groundfish and scallop surveys, including the identification and enumeration of any deep-sea corals encountered.

Records of deep sea coral bycatch in the Northeast Fisheries Observer Program (NEFOP) data have historically been sparse and inconsistently recorded, although there has been an attempt to improve this in recent years. In the spring of 2013, NEFOP implemented database and protocol changes related to the documentation of deep sea coral interactions. The NEFOP Program Manual and NEFOP database now include more specific categories of coral, including: soft coral, hard coral, sea pens, and sponges (as opposed to several inconsistent, more generic categories applied in prior years).

A deep sea coral training module was developed based on a completed identification guide (Packer and Drohan 2013, unpublished), and has been successfully incorporated into all current observer certification programs offered at the NEFOP Training Center (including the At-Sea Monitor certification, Industry Funded Scallop Observer certification, and the NEFOP certification). This program includes basic coral identification skills, sampling protocols, and how corals interface with the NEFOP Species Verification Program (SVP). In addition to initial general identification, observers are now instructed on proper photographic logging of any deep sea coral bycatch. These photos are to be uploaded for species identification or confirmation by NOAA coral experts. All observer-issued reference materials are now uploaded with the most current Coral ID guide and sampling protocols. Additionally, all NEFOP editing staff have also been trained on the NEFOP Coral Program.

When reviewing observer data for deep sea coral interactions, it is important to keep in mind that the percentage of commercial fishing trips actually covered by observers or the observer program varies depending on the fishery (gear type, fishing area, target species, etc.). Additionally, because the observer program observes thousands of trips every year in dozens of different fisheries, with each fishery having its own regulations for mesh size and configuration, a reported absence of deep-sea coral at a location may simply be a function of the catchability of the gear used. This is also a problem with the NEFSC surveys; fishing gear is not designed to "catch" deep-sea corals. Some level of gear impacts may be occurring that do not result in corals or coral fragments being retained or entangled in the gear, able to be viewed by an observer or scientists on the NEFSC trawl surveys. Deep sea coral records from the NEFSC Fishery Independent Surveys, relative to proposed coral zones, are described in Section 7.

6.3 HUMAN COMMUNITIES AND ECONOMIC ENVIRONMENT

This section describes the socio-economic importance of the MSB fisheries, as well as the importance of several other fisheries that may be impacted by measures proposed in this action (see section 7 for more information on how these fisheries were identified). Information was compiled from various FMPs and associated documents to describe the human and economic environments of each fishery, and data presented for each fishery may vary based on the information source. The fisheries described below include the managed fisheries (MSB), as well as summer flounder/scup/black sea bass, golden tilefish, red crab, silver hake (whiting), and scallops. These are the fisheries that the analysis in section 7 suggested may be impacted by this action. (While a very small percentage of the scallop-dredge revenues may be impacted, this fishery is included given the high value of the scallop fishery.)

Recent Amendments to the MSB FMP contain additional information about the MSB fisheries, especially demographic information on ports that land MSB species. See Amendments 11 and 14 at http://www.mafmc.org/msb/ for more information or visit NMFS' communities page at: http://www.nefsc.noaa.gov/read/socialsci/community_profiles/. In general, the MSB fisheries saw high foreign landings in the 1970s followed by a domestication of the fishery, and domestic landings have been lower than the foreign landings. Detailed information on historical landings is available in the briefing

materials for the most recent SSC meeting on MSB, at http://www.mafmc.org/ssc-meetings/2014/may-7-8-2014.

6.3.1 Atlantic Mackerel

US commercial landings of mackerel increased steadily from roughly 3,000 metric tons (mt) in the early 1980s to greater than 31,000 mt by 1990. US mackerel landings declined to relatively low levels 1992-2000 before increasing in the early 2000s. The most recent years have seen a significant drop-off in harvest.

Nominal ex-vessel price has generally varied between about $200-$700 per mt, but when inflation is taken into account, erosion is observed in the ex-vessel per-pound value of mackerel from 1982-2010. The 2011 and 2012 prices increased substantially (near $700/mt), which is likely at least partially related to the low levels of mackerel landed. The 2013 ex-vessel prices were about $436/mt. Total ex-vessel value tracks both price and the quantity of fish landed (see Council's Advisory Panel Fishery Information Document at http://www.mafmc.org/ssc-meetings/2013/april-may). Landings in 2013 totaled 4,372 mt and generated $1.9 million in ex-vessel revenues.

The mackerel fishery became a limited access fishery in 2013, except for open-access incidental catch permits. The current numbers of permits are 32 Tier 1 permits, 24 Tier 2 permits, and 90 Tier 3 permits.

Table 3: 2013 vessel dependence on mackerel (revenue-based).

Dependence on Mackerel	Number of Vessels in Each Dependency Category
1%-5%	23
5%-25%	13
25%-50%	4
More than 50%	5

Source: Unpublished NMFS dealer reports. Not at state level due to data confidentiality issues.

Table 4: Recent mackerel landings by gear type (mt).

Year	Gill Nets	Bottom Trawl	Single Mid-Water Trawl	Pair Mid-Water Trawl	Trap/Pots/ Pound Nets/Weir	Other/ Unknown
2011	27	327	69	72	5	30
2012	4	3,059	576	1,488	24	181
2013	6	965	166	2,338	15	883

Source: Unpublished NMFS dealer reports.

Because of data confidentiality issues, details for port revenues from mackerel cannot be provided. Ports that had at least $100,000 in ex-vessel revenues from mackerel over 2011-2013 (combined) included (from more mackerel dollars to less): North Kingstown, RI; Gloucester, MA; New Bedford, MA; Cape May, NJ; Portland, ME, and Point Judith, RI. (*Source: Unpublished NMFS dealer reports.)* Additional information on this fishery can be found in the specifications' Environmental Assessment, available at http://www.greateratlantic.fisheries.noaa.gov/regs/2014/November/14msb2015174specspr.html.

6.3.2 *Illex* Squid

Landings of *Illex* squid are heavily influenced by year-to-year availability and world-market activity. Nominal ex-vessel price has increased from $200-$500 per metric ton in the 1980s to $600-$1,000 per mt in recent years. In inflation adjusted dollars, prices have varied from $600-$1,000 per mt without trend.

2013 ex-vessel prices were about $610/mt. Total ex-vessel value tracks both price and the quantity of fish landed (see Council's Advisory Panel Fishery Information Document at http://www.mafmc.org/ssc-meetings/2013/april-may for details). Landings in 2013 totaled 3,835 mt and generated $2.3 million in ex-vessel revenues.

The *Illex* fishery is a limited access fishery with 74 current permits except for open access incidental permits. As long as the fishery is open there is no trip limit for moratorium permits - open access incidental permits have a 20,000 pound per trip limit. Only a few vessels accounted for most *Illex* landings in 2013. Landings are usually provided by state but since there are few dealers that buy *Illex*, confidentiality rules do not allow precise descriptions. However, it can be reported that most *Illex* landings occur in New Jersey and Rhode Island.

Table 5: 2013 Vessel dependence on *Illex* squid (revenue-based).

Dependence on *Illex*	Number of Vessels in Each Dependency Category
1%-5%	9
5%-25%	5
25%-50%	2
More than 50%	0

Table 6: Recent *Illex* landings by gear type (mt).

Year	Bottom Trawl	Mid-Water Trawl	Other/ Unknown
2011	18,192	486	118
2012	11,390	319	0
2013	3,597	5	190

Source: Unpublished NMFS dealer reports.

Because of data confidentiality issues, details for port revenues from mackerel cannot be provided. Ports that had at least $100,000 in ex-vessel revenues from *Illex* over 2011-2013 (combined) included (from more mackerel dollars to less): North Kingstown, RI; May, NJ; Hampton, VA; and Wanchese, NC. (*Source: Unpublished NMFS dealer reports.)*

Table 7. Recent numbers of active dealers.

Year	Number of dealers buying at least $10,000 *Illex*	Number of dealers buying at least $100,000 *Illex*
2011	2	3
2012	2	2
2013	2	3

Source: Unpublished NMFS dealer reports.

Additional information on this fishery can be found in the specifications' Environmental Assessment at http://www.greateratlantic.fisheries.noaa.gov/regs/2014/November/14msb2015174specspr.html.

6.3.3 Longfin Squid

The development and expansion of the US squid fishery occurred relatively slowly as the US industry did not develop the appropriate technology to catch and process squid in offshore waters until the 1980's. Price has increased fairly steadily since 1982 to $2,365/mt in 2013, even taking inflation into account (see

Fishery Information Document at http://www.mafmc.org/ssc-meetings/2013/april-may for details). Landings in 2013 totaled 10,940 mt and generated $25.9 million in ex-vessel revenues.

Table 8: 2013 Vessel dependence on Longfin squid (revenue-based).

Dependence on Longfin	Number of Vessels in Each Dependency Category
1%-5%	49
5%-25%	68
25%-50%	35
More than 50%	31

Table 9: Recent Longfin landings by gear type (mt).

Year	Bottom Trawl	Unknown	Mid-Water Trawl	Dredge	Trap/Pots/ Pound Nets/Weir	Other
2011	8,051	1,319	91	54	13	26
2012	10,879	1,621	99	131	48	40
2013	9,890	990	19	184	1	5

Source: Unpublished NMFS dealer reports.

Table 10. Recent numbers of active dealers.

Year	Number of dealers buying at least $10,000 Longfin	Number of dealers buying at least $100,000 Longfin	Number of dealers buying at least $1,000,000 Longfin
2011	21	22	6
2012	20	25	8
2013	20	18	6

Source: Unpublished NMFS dealer reports.

Table 11. Recent Longfin squid ex-vessel revenues by port for all ports with at least $200,000 Longfin squid ex-vessel sales combined over last three years. CI = Confidential Information.

YEAR	POINT JUDITH, RI	MONTAUK, NY	CAPE MAY, NJ	HAMPTON BAYS, NY	NORTH KINGSTOWN, RI	NEW BEDFORD, MA	NEW LONDON, CT
2011	$8,206,277	$3,792,870	$2,932,800	$2,643,944	$2,321,291	$1,128,010	$141,030
2012	$10,661,735	$4,739,505	$3,666,660	$3,080,859	$1,837,346	$1,195,242	$998,311
2013	$9,842,003	$3,250,471	$4,390,149	$2,234,447	$3,251,086	$848,885	$725,914
YEAR	BARNSTABLE, MA	STONINGTON, CT	POINT LOOKOUT, NY	BELFORD, NJ	WOODS HOLE, MA	POINT PLEASANT, NJ	SHINNECOCK, NY
2011	$331,584	$360,612	$488,106	CI	CI	CI	CI
2012	$1,100,494	$689,303	$537,550	CI	CI	CI	CI
2013	$71,755	$403,915	$161,679	CI	CI	CI	CI
YEAR	NEWPORT, RI	HAMPTON, VA	FALMOUTH, MA	EAST LYME, CT			
2011	CI	CI	CI	CI			
2012	CI	CI	CI	CI			
2013	CI	CI	CI	CI			

Source: Unpublished NMFS dealer reports.

Additional information on this fishery can be found in the specifications' Environmental Assessment at http://www.greateratlantic.fisheries.noaa.gov/regs/2014/November/14msb2015174specspr.html.

6.3.4 Butterfish

During the period 1965-1976, US Atlantic butterfish landings averaged 2,051 mt. From 1977-1987, average US landings doubled to 5,252 mt, with a historical peak of slightly less than 12,000 mt landed in 1984. Since then US landings have declined sharply. Low abundance and reductions in Japanese demand for butterfish probably had a negative effect on butterfish landings in the 1990s-early 2000s but regulations kept butterfish catches low from 2005-2012. Price (nominal) has increased fitfully since 1982 to about $1481/mt in 2013, but taking inflation into account erodes most of that price increase (see Fishery Information Document at http://www.mafmc.org/ssc-meetings/2013/april-may for details). Landings in 2013 totaled 1074 mt and generated $1.6 million in ex-vessel revenues.

Table 12: 2013 vessel dependence on butterfish (revenue-based).

Dependence on Butterfish	Number of Vessels in Each Dependency Category
1%-5%	108
5%-25%	19
25%-50%	0
More than 50%	0

Table 13: Recent butterfish landings by gear type (mt).

Year	Bottom Trawl	Dredge	Unknown/ Other
2011	452	27	185
2012	456	20	163
20130	940	14	137

Table 14. Recent numbers of active dealers.

Year	Number of dealers buying at least $10,000 butterfish	Number of dealers buying at least $50,000 butterfish
2011	16	7
2012	13	6
2013	17	7

Source: Unpublished NMFS dealer reports.

Table 15: Recent butterfish ex-vessel revenues by port for all ports with at least $100,000 butterfish ex-vessel sales combined over last three years. CI = Confidential Information.

YEAR	POINT JUDITH, RI	MONTAUK, NY	NORTH KINGSTOWN, RI	NEW BEDFORD, MA	HAMPTON BAYS, NY	STONINGTON, CT	AMAGANSETT, NY
2011	373,268	281,011	31,224	58,929	47,095	CI	49,144
2012	302,847	231,844	27,466	75,764	59,724		35,268
2013	376,089	300,094	536,403	67,917	39,704		22,090

Source: Unpublished NMFS dealer reports.

Additional information on this fishery can be found in the specifications' Environmental Assessment at http://www.greateratlantic.fisheries.noaa.gov/regs/2014/November/14msb2015174specspr.html.

6.3.5 Summer Flounder, Scup, and Black Sea Bass

Otter trawls are utilized in the commercial fisheries for all three species. In addition, floating traps and pots/traps are used to capture scup and black sea bass, respectively. Information on commercial landings and economic value is provided below. Additional information on these fisheries can be found on the Council website at: http://www.mafmc.org.

Table 16: Landings (million lb) and revenues (millions of US dollars) for summer flounder, scup, and black sea bass, 2008-2013.

	Summer Flounder		Scup		Black Sea Bass	
	Landings	Ex-vessel value	Landings	Ex-vessel value	Landings	Ex-vessel value
2008	9.21	21.89	5.22	5.81	1.93	5.62
2009	11.05	21.05	8.20	6.27	1.17	3.52
2010	13.55	27.44	10.73	7.11	1.75	5.34
2011	16.57	29.86	15.03	8.23	1.69	5.40
2012	12.91	30.23	14.88	10.43	1.72	5.75
2013	12.49	29.17	17.87	9.79	2.26	7.36

Source: Unpublished NMFS dealer reports.

The ex-vessel value of summer flounder landings in 2013 was approximately $29.2 million resulting from commercial landings of 12.5 million lb, with an average ex-vessel price estimated at $2.33/lb. Based on VTR data for 2013, the bulk of the summer flounder landings were taken by bottom otter trawls (97 percent), followed by bottom scallop trawls (1 percent), with other gear types (e.g. hand lines, scallop dredges, sink gill nets) each accounting for 1 percent or less of landings. In Federal waters, commercial fishermen holding a moratorium permit may fish for summer flounder. Permit data for 2013 indicates that 824 vessels held commercial permits for summer flounder. Top ports of landing in 2013 included Newport News, VA (2.20 mil lb), Hampton, VA (1.92 mil lb), and Pt. Judith, RI (1.92 mil lb).

Commercial scup landings were approximately 17.9 million lb (from ME to Cape Hatteras, NC) and valued at $9.80 million in 2011 ($0.55/lb). Based on VTR data for 2013, the bulk of scup landings were taken by bottom otter trawls (97 percent), followed by pots and traps (~1.3 percent). In Federal waters, commercial fishermen holding a moratorium permit may fish for scup. Permit data indicate that 697 vessels held commercial permits for scup in 2013. The top ports of landing for scup in 2013 included Point Judith, RI (6.19 mil lb), Montauk, NY (3.38 mil lb), and Cape May, NJ (0.91 mil lb).

Commercial black sea bass landings were approximately 1.74 million lb (from ME to Cape Hatteras, NC) and valued at $5.7 million in 2012 ($3.30/lb). Based on VTR data for 2013, the majority of black sea bass landings were reported to be taken by bottom otter trawls (61 percent), followed by pots and traps (26 percent), offshore lobster pots (7 percent), and hand lines (5 percent). Other gear types each accounted for less than 1 percent of landings. In Federal waters, commercial fishermen holding a moratorium permit may fish for black sea bass. Permit data for 2013 indicate that 736 vessels held commercial permits for black sea bass. Top ports of landing for black sea bass in 2013 included Ocean City, MD (0.22 mil lb), Pt. Pleasant, NJ (0.21 mil lb), and Cape May, NJ (0.19 mil lb).

Additional information on this fishery can be found in the specifications' Environmental Assessment at http://www.greateratlantic.fisheries.noaa.gov/regs/2014/March/14sfsbsb20142015specspr.html.

6.3.6 Golden Tilefish

A detailed description of the social and economic aspects of the fishery for tilefish was presented in Amendment 1 to the FMP (2009; available at http://www.mafmc.org/fmp/pdf/Tilefish_Amend_1_Vol_1.pdf). Montauk, NY and Barnegat Light, NJ continue to be the ports with the most landings.

Commercial tilefish ex-vessel revenues have ranged from $2.5 to $5.5 million for the 1999 through 2013 period (calendar year). The mean price for tilefish (adjusted) has ranged from $1.03/lb in 2004 to $3.27/lb in 2013. The 2009 through 2013 coastwide average ex-vessel price per pound for all market categories combined was $2.98, $3.31 for extra large, $3.71 for large, $2.86 for medium, $2.21 for kittens, $1.92 for small-kittens; $1.83 for small, and $3.29 for unclassified.

Over 56 percent of the landings for 2013 were caught in statistical area 537, which includes Atlantis and Block Canyons. Statistical area 616, which includes Hudson Canyon, had 36 percent of the landings.

The ports and communities that are dependent on tilefish are fully described in Amendment 1 to the FMP available at: http://www.mafmc.org/fmp/pdf/Tilefish_Amend_1_Vol_1.pdf). Additional information on "Community Profiles for the Northeast U.S. Fisheries" can be found at http://www.nefsc.noaa.gov/read/socialsci/community_profiles/.

Table 17: Top ports of landing (in lb) for golden tilefish, based on NMFS 2012 - 2013 dealer data. Since this table includes only the "top ports," it may not include all of the landings for the year. (Note: values in parenthesis correspond to IFQ vessels). C=Confidential.

Port	2012		2013	
	Landings	# Vessels	Landings	# Vessels
MONTAUK, NY	1,193,294 (1,188,394)	17 (4)	1,183,535 (1,179,437))	14 (4)
BARNEGAT LIGHT/LONG BEACH, NJ	397,610 (396,054)	12 (9)	357,360 (355,845)	8 (6)
HAMPTON BAYS, NY	213,948 (C)	3 (C)	250,941 (C)	4 (C)
POINT JUDITH, RI	7,789 (0)	48 (0)	13,868 (0)	53 (0)

Source: Unpublished NMFS dealer reports.

Table 18: Dealer dependence on tilefish, 2009-2013.

Number of Dealers	Relative Dependence on Tilefish
82	<5%
3	5%-10%
2	10% - 25%
3	25% - 50%
1	50% - 75%
1	90%+

Source: Unpublished NMFS dealer reports.

Additional information on this fishery can be found in the specifications' Environmental Assessment at http://www.greateratlantic.fisheries.noaa.gov/regs/2014/September/14tilefish20152017specspr.html.

6.3.7 Red Crab[12]

The red crab fishery is a small, market-driven fishery, and landings are very closely tied to market demand. As a result, the landings have been lower than the Total Allowable Landings recently. Almost all red crab landings occur in New Bedford, MA. The few boats with limited access permits in the red crab fishery have overlapping ownership and operate as a voluntary cooperative. The cooperative relationship fosters a strong incentive to harvest red crab in a way that maximizes profits for the fleet as a whole. It is understood that primarily the current market conditions, not the landings limit, constrain the catch of red crab.

Since implementation of the FMP, four vessels have harvested the total red crab landings. Although this is a small fishery in terms of the number of vessels that participate, the individuals that are involved in this fishery have a very high dependence on the red crab resource. The handful of vessels that received limited access permits were surveyed during the development of the FMP, and the majority of harvesters reported that revenues from the red crab fishery make up the vast majority of their annual income. Since implementation of the FMP, vessel owners still report red crab as the primary fishery that supports their annual income. The figure and table below describe landings and revenues for red crab.

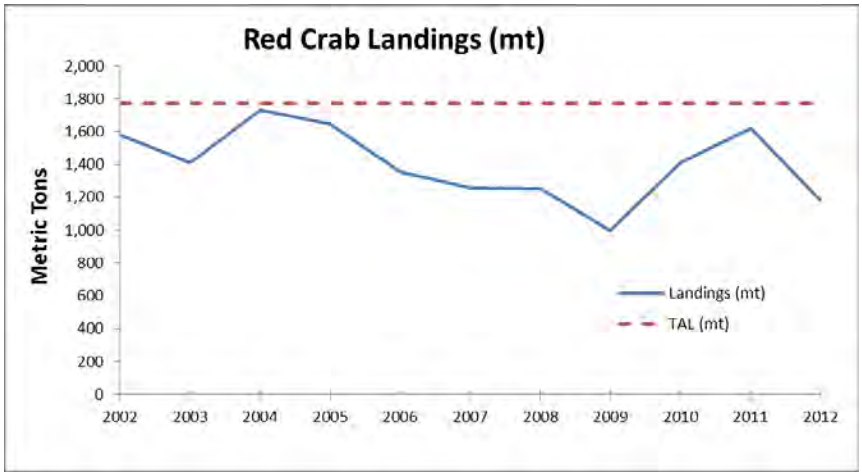


Figure 5. Red Crab Landings 2002-2012.

[12] Taken from 2013 Red Crab Specifications, available at http://www.nefmc.org/management-plans/red-crab.

Table 19. Red crab price per pound, inflation adjusted price (based on 2010 dollars), Vessel Trip Report (VTR) landings in pounds and estimated revenue, fishing years 2002-2012.

Fishing year	Price per Pound	* Inflation Adjusted Price	** VTR Reported Landings	*** Revenue
2002	$0.86	$1.04	3,484,283	$3,623,654
2003	$0.85	$1.00	3,111,953	$3,111,953
2004	$0.94	$1.08	3,815,415	$4,120,648
2005	$0.90	$1.00	3,631,754	$3,631,754
2006	$0.90	$0.97	2,984,084	$2,894,561
2007	$0.92	$0.96	2,777,723	$2,666,614
2008	$1.01	$1.03	2,763,519	$2,846,425
2009	$0.96	$0.97	2,202,021	$2,135,960
2010	$0.97	$0.97	3,111,892	$3,018,535
2011	$0.97	$0.95	3,575,278	$3,396,514
2012	$1.00	$0.97	2,602,352	$2,524,281
Average	$0.93	$0.99	3,096,389	$3,065,425

* The consumer price index (CPI) used to convert nominal dollars to 2010 equivalent dollars is from the Bureau of Economic Analysis Table 1.1.9 (www.bea.gov/iTable/iTable.cfm?ReqID=9&step=1).
** Landings data is from VTRs, which do not exactly match dealer data.
*** Revenue is estimated based on VTR reported landings and prices calculated from dealer data.

6.3.8 Silver Hake (Whiting)[13]

Prior to 1960, the commercial exploitation of silver hake in the Northwest Atlantic was exclusively by U.S. fleets. Distant water fleets reached the banks of the Scotian Shelf by the late 1950s, and by 1961, scouting/research vessels from the former USSR were fishing on Georges Bank. By 1962, factory freezer fleets (ranging from 500 to 1,000 GRT) intensively exploited the whiting and red hake stocks on the Scotian Shelf and on Georges Bank. Led by the former USSR, the distant water fleet landed an increasingly larger share of silver hake catch from the Gulf of Maine, Georges Bank, and northern Mid-Atlantic waters. In 1962, the distant water fleet landed 41,900 tons of silver hake (43% of the total silver hake landings), but that number had increased to 299,200 tons (85% of the total silver hake landings) in 1965. That year marked the year of the highest total commercial silver hake landings, 351,000 tons. Unable to sustain such high rates of fishing, the abundance of silver hake off the U.S. Atlantic coast began to decline. As a result, total commercial catches decreased significantly after 1965 and reached a 20-year low of 55,000 tons in 1970. U.S. recreational landings also dropped after 1965 to about half the levels of previous years.

After 1970, catches of silver hake by the distant water fleet in U.S. waters increased again, especially in southern New England and the Mid-Atlantic. Between 1971 and 1977, distant water fleet landings from the southern stock averaged 75,000 tons annually and accounted for 90% of the total harvest from the southern stock. The size and efficiency of distant water fleet factory ships also increased, many ranging between 1,000 and 3,000 GRT. In 1973, the International Commission for the Northwest Atlantic

[13] Taken from http://s3.amazonaws.com/nefmc.org/SAFE-Report-for-Fishing-Year-2013.pdf.

Fisheries established temporal and spatial restrictions that reduced the distant water fleet to small "windows" of opportunity to fish for U.S. silver hake. These windows restricted the distant water fleet to the continental slope of Georges Bank and the Mid-Atlantic. As effort control regulations increased, foreign fleets gradually left most areas of Georges Bank.

Although foreign fishing had ceased on Georges Bank by about 1980 and in the Mid-Atlantic by about 1986, the U.S. groundfish fleet's technologies and fishing practices began to advance, and between 1976 and 1986, fishing effort (number of days) increased by nearly 100% in the Gulf of Maine, 57% on Georges Bank, and 82% in southern New England (Anthony, 1990). Such increases in effort, although directed primarily towards principal groundfish species (cod, haddock, yellowtail flounder), were accompanied by a 72% decline in silver hake biomass. In turn, U.S. East Coast landings of silver hake began to decline, dropping to 16,100 tons in 1981. Since that time, landings have remained relatively stable, but at much lower levels in comparison to earlier years. U.S. East Coast silver hake catches are taken almost exclusively by otter trawls, either as bycatch from other fisheries or through directed fisheries targeting a variety of sizes of silver hake. The figures below describe silver hake landings, and vessel dependence on silver hake.

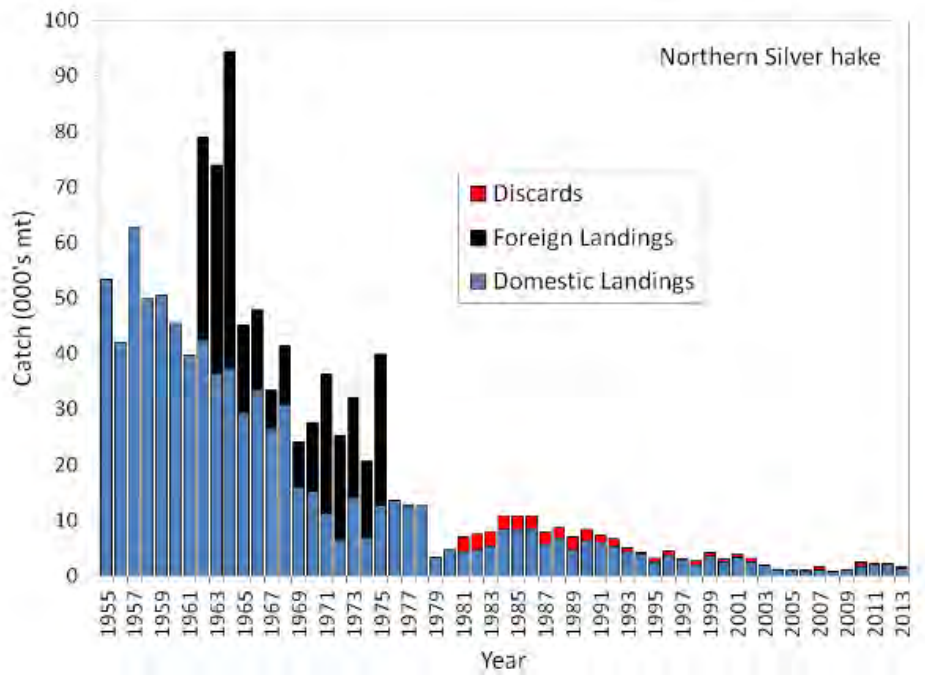


Figure 6. Northern Silver Hake Catch.

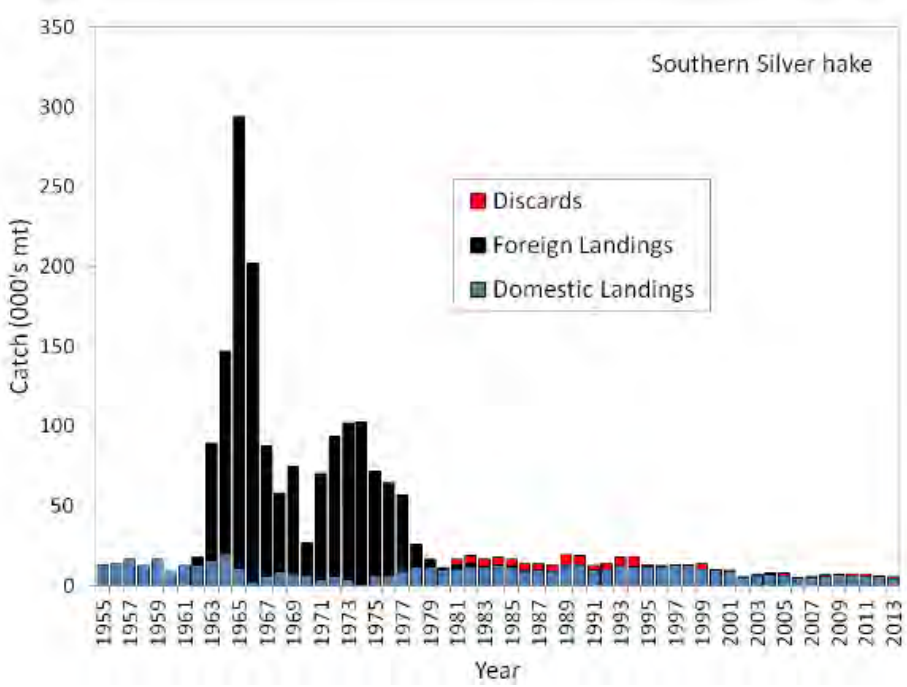


Figure 7. Southern Silver Hake Catch.

Table 20. Silver hake landings and revenues.

Year	Silver hake landings (mt)	Silver hake revenue ($)
1996	16,181	13,567,329
1997	15,565	15,045,264
1998	14,867	13,259,078
1999	14,020	14,243,589
2000	12,362	11,644,431
2001	12,908	13,211,153
2002	7,938	7,410,730
2003	8,643	9,326,001
2004	8,163	10,006,343
2005	6,902	8,493,180
2006	5,153	6,727,695
2007	6,217	7,880,472
2008	5,915	8,035,894
2009	7,441	8,602,262
2010	8,014	10,951,987

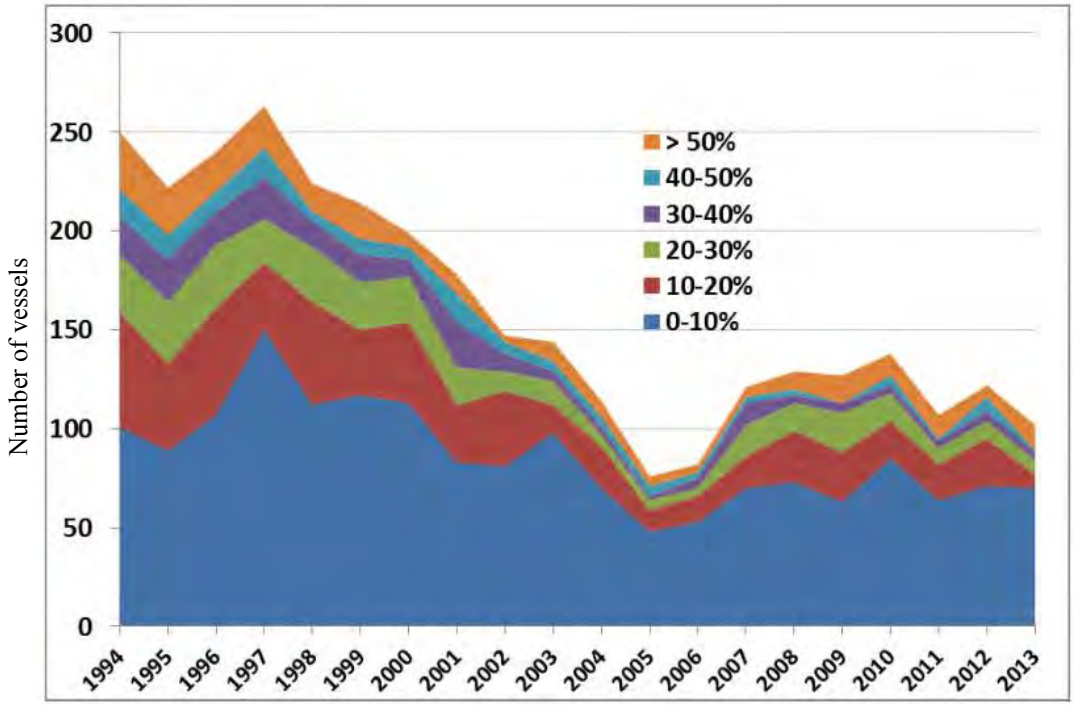


Figure 8. Total number of vessels, by dependence on small mesh (hake) multispecies fishery.

6.3.9 Sea Scallops[14]

In the fishing years 2003-2011, the landings from the northeast sea scallop fishery stayed above 50 million pounds, surpassing the levels observed historically. The recovery of the scallop resource and consequent increase in landings and revenues was striking given that average scallop landings per year were below 16 million pounds during the 1994-1998 fishing years, less than one-third of the present level of landings. Recent landings and revenues are described in the figures below.

The limited access scallop fishery consists of 347 vessels. It is primarily full-time, with 250 full-time dredge, 52 full-time small dredge vessels and 11 full-time net boats. Since 2001, there has been considerable growth in fishing effort and landings by vessels with general category permits, primarily as a result of resource recovery and higher scallop prices. Most limited access category effort is from vessels using scallop dredges, including small dredges. The number of vessels using scallop trawl gear has decreased continuously and has been at 11 full-time trawl vessels since 2006. In comparison, there has been an increase in the numbers of full-time and part-time small dredge vessels after 2002. About 80% of the scallop pounds are landed by full-time dredge and about 13% landed by full-time small dredge vessels since the 2007 fishing year. Both full-time and part-time limited access vessels had a high dependence on scallops as a source of their income. Full-time limited access vessels had a high dependence on scallops as a source of their income and the majority of the full-time vessels (94%) derived more than 90% of their revenue from the scallop fishery in 2011. Comparatively, part-time limited access vessels were less

[14] Taken from Framework 25, available at http://www.nefmc.org/management-plans/scallops

dependent on the scallop fishery in 2011, with only 37% of part-time vessels earning more than 90% of their revenue from scallops.

Amendment 11 implemented a limited entry program for the general category fishery reducing the number of general category permits after 2007. In 2011, there were 288 LAGC IFQ permits, 103 Northern Gulf of Maine (NGOM) and 279 incidental catch permits in the fishery totaling 670 permits. Although not all vessels with general category permits were active in the years preceding 2008, the number of vessels (and owners) that hold a limited access general category permit under the Amendment 11 regulations are less than the number of general category vessels that were active prior to 2008. Most general category effort is, and has been, from vessels using scallop dredge and other trawl gear. The percentages of scallop landings show that landings made with a scallop dredge in 2012 continue to be the highest compared to other general category gear types. General category permit holders (IFQ and NGOM) are less dependent on scallops compared to vessels with limited access permits. In 2011, less than half (43%) of IFQ permitted vessels earned greater than 50% of their revenue from scallops. Among active NGOM permitted vessels (that did not also have a limited access permit), 88% had no landings with scallops in 2011. Scallops still comprise the largest proportion of the revenue for IFQ general category vessels, accounting for 38.6% of these vessels revenue. Scallops still comprise the largest proportion of the revenue for IFQ general category vessels, accounting for 38.6% of these vessels revenue. For NGOM vessels (that did not also have a limited access permit) scallop landings accounted for less than 1% of revenue in 2011.

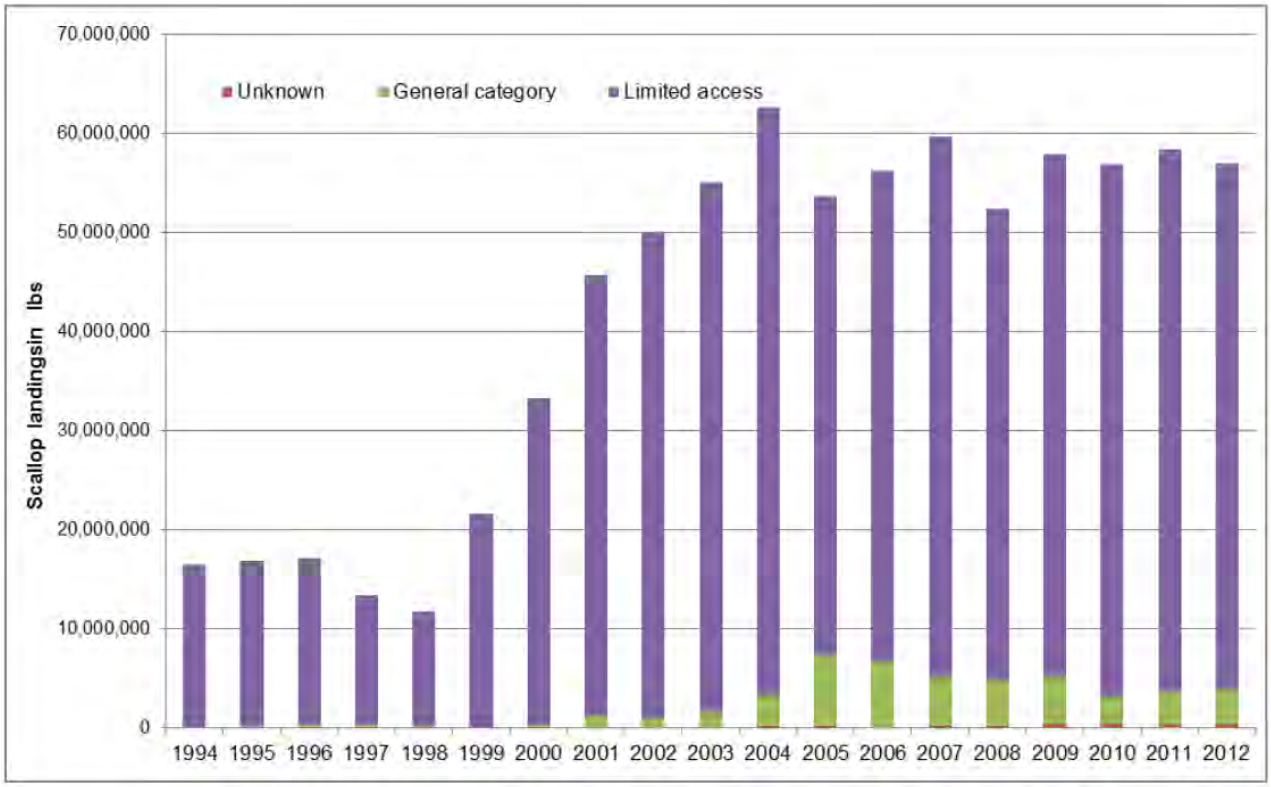


Figure 9. Scallop landings by permit category and fishing year (in lb., dealer data).

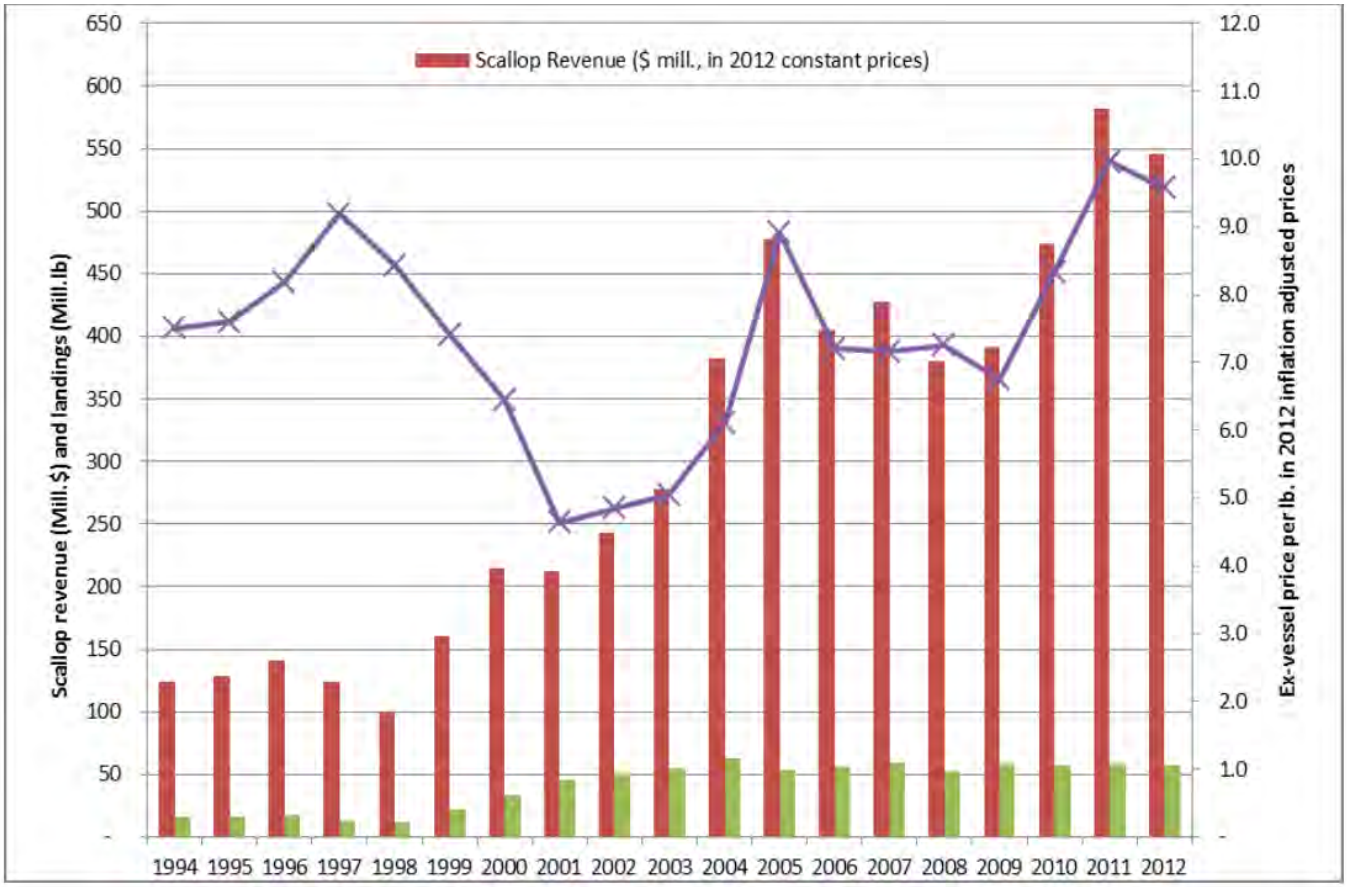


Figure 10. Trends in total scallop revenues (left bar, left axis), landings (right bar, left axis) and ex-vessel price (line, right axis) by fishing year (including limited access and general category fisheries, revenues and prices are expressed in 2011 constant prices.

THIS SPACE INTENTIONALLY LEFT BLANK

7.0 IMPACTS OF THE ALTERNATIVES

7.1 DEEP SEA CORALS IN THE MID-ATLANTIC

Impacts to deep sea corals were analyzed by mapping and quantifying available data for coral presence and suitable habitat relative to all proposed coral zones (broad and discrete). The sections below describe this analysis relative to several data sources for deep sea corals and their habitat, including historical records, observations from recent research surveys, Northeast Fisheries Observer Program (NEFOP) records, and modeled deep sea coral habitat.

7.1.1 Deep Sea Coral Research and Technology Program (DSCRTP) Records

Coral presence data from NOAA's Deep Sea Coral Research and Technology Program database were analyzed using ArcGIS software and Microsoft Excel to determine how records of known corals overlap with proposed management areas. The DSCRTP database[15] contains 870 records of deep sea corals within the MAFMC management region. Of these, 635 records are included within proposed broad coral zones (73%; Table 21). There is only one coral record in the database that is contained within a proposed discrete zone that is *not* also encompassed by a broad zone alternative (one observation of *Dasmosmilia lymani*, a stony coral, in Baltimore Canyon). Within the proposed discrete zones, the areas of highest coral observations are contained within Baltimore Canyon, Norfolk Canyon, and the Mey-Linedenkohl Slope (Table 24).

The coral records within the total area of the proposed zones are composed of sea pens (40%), soft corals/gorgonians (34%), and hard/stony corals (26%). Outside of the proposed zones, there are 232 total records, the majority of which are stony corals or sea pens (Table 23). However, the data below should be interpreted with caution. The data presented for coral records are presence-only, as little absence or abundance information is available. Many areas in the mid-Atlantic have not been explored for the presence of corals, thus, a lack of historical records does not necessarily indicate a lack of deep sea corals. Although each record is associated with a set of geographic coordinates, some historical records have uncertainties associated with their exact position. Furthermore, identifying deep sea coral taxa down to genus and species levels is difficult and problematic, especially through the use of photographs or video alone, and deep sea coral taxonomy is constantly evolving. Additionally, given the nature of this type of data collection, many of the records tend to be spatially clustered and may display a bias toward areas that have been more heavily sampled. This analysis does not include the results of recent survey work, as data from these cruises have not yet been added to the DSCRTP database (however, some information is available; see Section 7 for additional discussion of recent research findings).

[15] As of June 10, 2013.

Table 21: Deep sea coral presence records within proposed MAFMC broad coral zones, in number (a) and percent (b). Data from DSCRTP database as of June 2013.

a.		Total records (all types)	Soft corals and gorgonians	Stony corals	Sea pens
Broad zone (depth contour as landward boundary)	*[Shallower than 200 m]*	*235*	*24*	*118*	*93*
	200 meter broad zone	**635**	**214**	**167**	**255**
	[between 200 m and 300 m]	*40*	*1*	*17*	*23*
	300 meter broad zone	**595**	**213**	**150**	**232**
	[between 300 m and 400 m]	*51*	*10*	*26*	*15*
	400 meter broad zone	**544**	**203**	**124**	**217**
	[between 400 m and 500 m]	*25*	*15*	*4*	*6*
	500 meter broad zone	**519**	**188**	**120**	**211**
	TOTAL (MAFMC Region)	**870**	**238**	**285**	**348**

b.		% of total records (all types)	% Soft corals and gorgonians	% Stony corals	% Sea pens
Broad zone (depth contour as landward boundary)	*[Shallower than 200 m]*	*27%*	*10%*	*38%*	*27%*
	200 meter broad zone	**73%**	**90%**	**62%**	**73%**
	[between 200 m and 300 m]	*5%*	*0%*	*6%*	*7%*
	300 meter broad zone	**68%**	**89%**	**56%**	**67%**
	[between 300 m and 400 m]	*6%*	*4%*	*10%*	*4%*
	400 meter broad zone	**62%**	**85%**	**46%**	**62%**
	[between 400 m and 500 m]	*3%*	*6%*	*5%*	*2%*
	500 meter broad zone	**60%**	**79%**	**40%**	**61%**
	TOTAL (MAFMC Region)	**100%**	**100%**	**100%**	**100%**

Table 22: Composition of deep sea corals presence records by type within proposed broad and discrete zones. Data from DSCRTP database as of June 2013.

	Broad Zones		**Discrete Zones[a]**	
Coral Type	Number of Records within Broad Zones	% Composition of Broad Zone Records by Coral Type	Number of Records within Discrete Zones	% Composition of Discrete Zone Records by Coral Type
Soft corals and gorgonians	213	33.5%	82	35.6%
Stony corals	167	26.3%	64	27.8%
Sea pens	255	40.2%	84	36.5%
TOTAL	**635**	**100%**	**230**	**100%**

[a] All records within proposed discrete zones are also contained within the shallowest broad zone option (200 m), with the exception of two records in Norfolk Canyon (one sea pen and one stony coral).

Table 23: Deep sea coral presence records within the Mid-Atlantic region but NOT within any of the proposed zones. Data from DSCRTP database as of June 2013.

Coral Type	Number of Records OUTSIDE of proposed coral zones	% by Coral Type
Soft corals and gorgonians	23	10%
Stony corals	117	50%
Sea pens	92	40%
TOTAL	**232**	**100%**

Table 24: Deep sea coral historical presence records by proposed discrete zone. Note that these records reflect varying spatial concentrations of survey effort, and many areas have not been surveyed for corals. This data also does not contain any new records from recent research surveys (2012-2013).

	Coral Type (Order)				
Canyon or Complex	**Alcyonacea**	**Gorgonacea**	**Pennatulacea**	**Scleractinia**	**Total Records**
Block Canyon					**0**
Ryan-McMaster Canyons		5	7	4	**16**
Emery-Uchupi Canyons	1		3	2	**6**
Jones-Babylon Canyons				1	**1**
Hudson Canyon	1	1		3	**5**
Mey-Lindenkohl Slope	9	13	40	12	**74**
Spencer Canyon		1	9	2	**12**
Wilmington Canyon			2		**2**
North Heyes-South Wilmington Canyons					**0**
South Vries Canyon	1			1	**2**
Baltimore Canyon	7	21	1	25	**54**
Warr-Phoenix Canyon Complex			14		**14**
Accomac-Leonard Canyons	1		3	2	**6**
Washington Canyon				1	**1**
Norfolk Canyon	5	16	5	11	**37**
Grand Total	**25**	**57**	**84**	**64**	**230**

7.1.2 Coral Observations from Recent Research

As noted previously, deep sea corals have recently been observed within the boundaries of several proposed discrete coral zones, including Block Canyon, Ryan and McMaster Canyons, the Mey-Lindenkohl Slope, Spencer Canyon, Wilmington Canyon, Baltimore Canyon, Phoenix Canyon, Accomac and Leonard Canyons, Washington Canyon, and Norfolk Canyon. Although some qualitative results are available, much of the processed and/or georeferenced data from recent cruises is not yet available. However, new information has been incorporated into the range of alternatives to the extent possible. Findings from each survey relative to proposed coral zones are briefly described below.

2012 BOEM Survey

In 2012, research cruises funded by the Bureau of Ocean Energy Management (BOEM) explored Mid-Atlantic deepwater hard bottom habitat, focusing on canyon habitats and coral communities. This survey included many dives in Baltimore Canyon using a remotely operated vehicle (ROV), and a few dives in

Norfolk Canyon. Deep sea corals were locally abundant in both Baltimore and Norfolk Canyons, and the surveys resulted in the first observations of the species *Lophelia pertusa* in the Mid-Atlantic (Figure 11). *L. pertusa* is a structure-forming coral commonly found off the coast of the southeastern U.S., and occasionally observed in New England, but has not previously been observed in the Mid-Atlantic. In September 2012, *L. pertusa* was observed in live colonies on steep walls in both Baltimore and Norfolk Canyons, at depths between 381 and 434 m.[16] Several other coral types were observed in both Baltimore and Norfolk Canyons, including dense areas of *Paragorgia, Anthothela, Primnoa*, and *Acanthogorgia* communities (georeferenced data not yet available). Sightings of lost fishing gear were also recorded in the two canyons, including traps, fishing lines, and nets. Baltimore and Norfolk Canyons are currently included in the range of possible deep sea coral discrete zones under Alternative 3B.

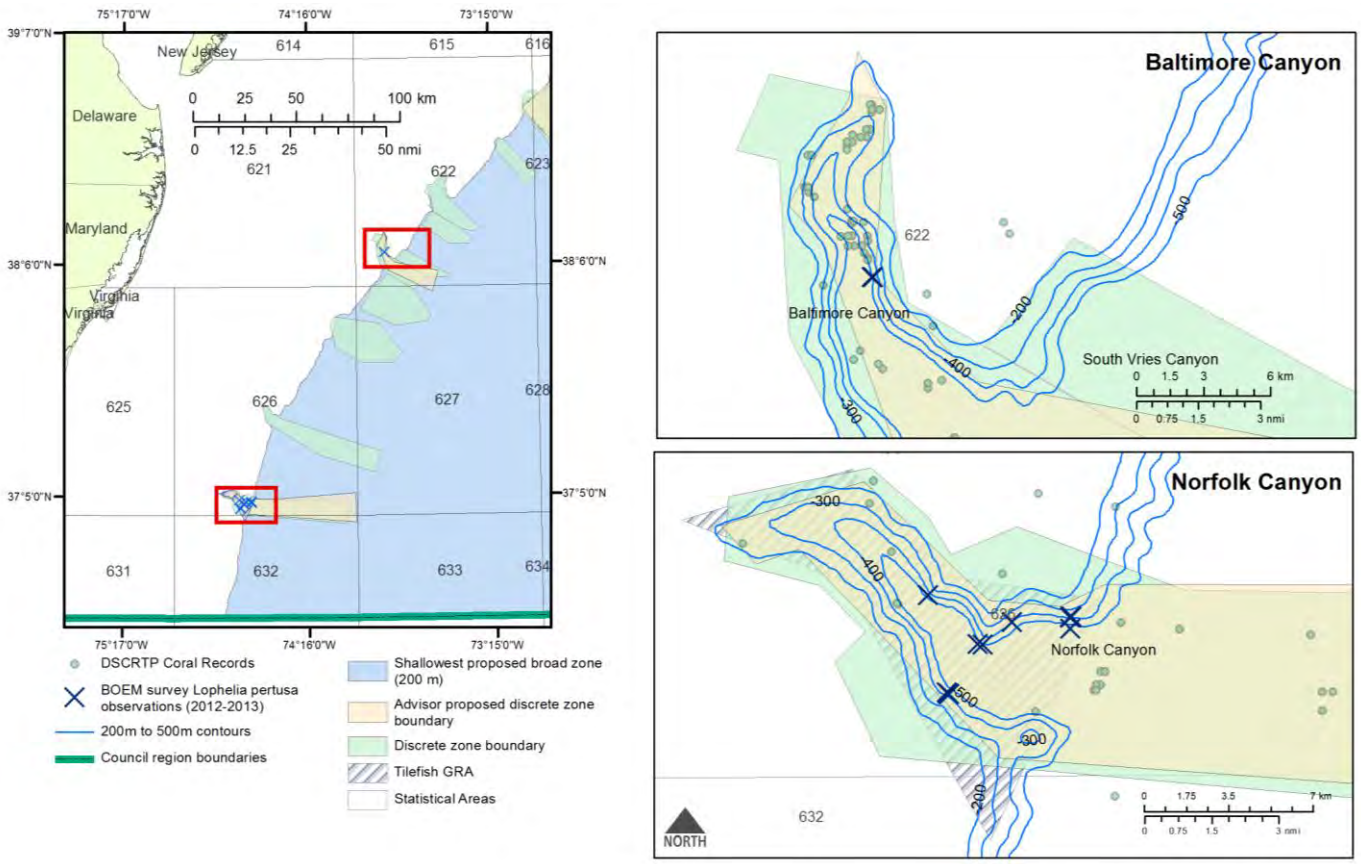


Figure 11: Observations of *Lophelia pertusa* from BOEM cruises in Baltimore and Norfolk Canyons, 2012 and 2013. Source: Brooke and Ross (2013).

2012 ACUMEN Survey

In the summer of 2012, the Atlantic Canyons Undersea Mapping Expeditions (ACUMEN) surveys concluded with a deep-sea coral survey funded by NOAA and the Deep-Sea Coral Research and

[16] Brooke, S., and Ross, S.W. In press. First observations of the cold-water coral *Lophelia pertusa* in mid-Atlantic canyons of the USA. Deep-Sea Res. II. http://dx.doi.org/10.1016/j.dsr2.2013.06.011.

Technology Program from aboard the NOAA ship *Henry Bigelow*.[17] Areas sampled in the Mid-Atlantic included Middle Toms Canyon, the edge of Hendrickson Canyon, the slope area between Toms and Hendrickson Canyons, and Toms Canyon. Using a towed camera system, high-resolution images were taken to collect data on deep-sea coral diversity, abundance, and distribution, as well as ground-truth locations of predicted deep-sea coral habitat (based on habitat suitability model outputs), historical records, and multibeam bathymetry collected by NOAA ships *Okeanos Explorer* and *Ferdinand Hassler*. Deep-sea corals were observed in many locations within the Toms Canyon complex, which is currently included in the range of proposed deep sea coral zones (the Mey-Lindenkohl slope area) under Alternative 3B. Corals were observed during every tow with fewest coral observations at the head of Toms Canyon and the most coral observations made in Middle Toms Canyon (Table 23). The majority of corals were octocorals, with fewer observations of stony corals and sea pens. Differences among individual canyons likely reflect differences in depth and substrate type in the area where tows were conducted. These factors are hypothesized to influence coral abundance and distribution.

2013 Deep Sea Coral Research and Technology Program Survey

In the summer of 2013, scientists from NOAA, Woods Hole Oceanographic Institution (WHOI), and the Delaware Museum of Natural History (DMNH) conducted another deep-sea coral survey cruise aboard NOAA ship *Henry Bigelow*. This cruise, a logical follow-on to the successful ACUMEN initiative, utilized the same towed camera system and methodologies as the previous cruise. Only one Mid-Atlantic canyon, Ryan Canyon, was surveyed during this cruise. Five tows were made, covering shallow, mid, and deeper depths within the canyon. Based on data collected from approximately 9,000 bottom images, corals were virtually nonexistent along the shallowest (closest to the canyon head) tow tracks. Corals were much more abundant at the deepest tow (Table 25). Similar to results from the 2012 expedition, in the areas surveyed, the majority of corals observed were octocorals and differences in coral distribution within Ryan Canyon likely reflect differences in depth and substrate type. One camera tow survey, following the 500 m contour, was made in the inter-canyon area between Ryan and McMaster canyon, where corals were observed in only one image.

2013-2014 Northeast Canyons and Seamounts Okeanos Explorer Expeditions

In the summer of 2013, the NOAA vessel *Okeanos Explorer* explored northeast submarine canyons using an ROV. In the Mid-Atlantic, this included work in and around Block Canyon, where deep sea corals were observed in July of 2013. This ROV dive began at approximately 1,870 meters depth and transitioned upslope, where numerous coral colonies were observed on the faces and tops of large hard features. Cup corals were also observed on the underside of ledges. The dominant species was *Acanella sp*., a type of bamboo coral that commonly occurs on both soft and hard substrates.[18]

Another *Okeanos Explorer* expedition was conducted in September and October of 2014.[19] This expedition included ROV dives in Lindenkohl and Hendrickson Canyons (within the Mey-Lindenkohl Slope proposed discrete zone), as well as in Washington, Norfolk, Phoenix, McMaster, and Ryan Canyons. In Washington Canyon, scientists observed colonies of deep sea including *Anthothela* and both white and pink bubblegum corals. In Norfolk Canyon, several colonies of octocorals (including *Acanthagorgia*, *Anthothela*, and bubble gum corals), were observed in addition to many species of fish and invertebrates, including monkfish, red crab, and several schools of squid. In Phoenix Canyon, the dive

[17] http://oceanexplorer.noaa.gov/okeanos/explorations/acumen12/bigelow/welcome.html.
[18] http://oceanexplorer.noaa.gov/okeanos/explorations/ex1304/dailyupdates/dailyupdates.html
[19] http://oceanexplorer.noaa.gov/okeanos/explorations/ex1404/welcome.html.

began at about 1,135 meters depth, and many large rocks and outcrops encrusted with corals were observed, as well as several species of squid, skate, and flounder. High densities of cup corals under ledges were also observed. In Hendrickson Canyon, the ROV began at about 1,670 meters and observed abundant cup corals during this dive, generally located under frequent overhangs and outcrops. Also noted were octocorals, black corals, stony corals, sea pens, and several species of fish. In McMaster canyon, octocorals were observed in high density, as well as groups of cup corals. Similar to Hendrickson Canyon, large groups of corals were observed living under overhangs and outcrops along the steep canyon walls. In Ryan Canyon, human debris was observed, in addition to shrimp, fish, eels, hake, dogfish, some cup corals, and coral rubble. Diversity of corals along the transect in Ryan Canyon was low. Photos, videos, logs, and maps from these dives are publicly available at:
http://oceanexplorer.noaa.gov/okeanos/explorations/ex1404/welcome.html.

2014 Towed Camera Survey

A research survey aboard the *Henry Bigelow* using towed cameras took place in August 2014. Data from this survey are still being processed. However, researchers have indicated that deep sea corals were observed in Lindenkohl, Toms, and Carteret Canyons (within the Mey-Lindenkohl Slope proposed discrete zone), as well as in Washington Canyon, Accomac and Leonard Canyons, Wilmington Canyon, and Spencer Canyon. These camera surveys are also being used to further ground truth NOAA's coral habitat suitability model. Scientists noted that the abundance, distribution, and diversity of deep sea corals varied between and within canyons, exhibiting different trends correlating with different geological characteristics.

THIS SPACE INTENTIONALLY LEFT BLANK

Table 25: Preliminary image survey of NE canyon fauna from TowCam surveys, 2012-2013. Images were captured at 10 second intervals through each dive. Each bottom image was visually screened for hard and soft corals, sponges, and fish fauna. Presence/absence information was logged for each image.

TowCam Dive #	Canyon Location	Date	Launch Lat N	Launch Lon W	Recovery Lat	Recovery Lon	No. of Images on bottom	No. images with corals	No. images with sponges	% images with corals	% images with sponges	Nominal Depth (m)
HB1204-01	Toms Canyon SE	7/7/2012	38 56.3823	72 25.7944	38 55.5772	72 25.6275	1734	828	2	47.75	0.12	1802
HB1204-02	Toms Canyon Lower West	7/8/2012	38 57.1788	72 27.2815	38 57.5213	72 27.5442	2067	557	121	26.95	5.85	1736 to 1694
HB1204-03	Toms Canyon Canyon Head	7/8/2012	39 06.2975	72 38.0914	39 05.8721	72 38.1695	1226	11	16	0.90	1.31	553 to 861
HB1204-04	Hendrickson Canyon Lower East Scarp	7/9/2012	38 57.6673	72 26.3203	38 57.5940	72 26.5532	1148	291	264	25.35	23.00	175 to 1705
HB1204-05	Middle Toms Canyon Mid	7/10/2012	38 56.9385	72 35.3163	38 56.8551	72 35.0058	1963	1016	522	51.76	26.59	1337 to 1591
HB1204-06	Toms Canyon Mid-East	7/10/2012	39 01.6231	72 33.2098	39 01.7749	72 33.1740	1781	154	83	8.65	4.66	1115 to 1216
HB1302-001	Ryan Canyon	6/10/2013	39 46.4979	71 41.9049	39 46.3115	71 41.9738	649	0	0	0.00	0.00	599
HB1302-002	Ryan Canyon	6/11/2013	39 43.8514	71 42.6188	39 43.9435	71 41.9149	420	2	0	0.48	0.00	771
HB1302-003	Ryan Canyon	6/12/2013	39 43.8357	71 42.1705	39 43.3885	71 41.3225	2262	48	497	2.12	21.97	992
HB1302-004	Ryan Canyon	6/12/2013	39 42.3582	71 38.6827	39 41.5694	71 38.3807	2079	62	496	2.98	23.86	1135
HB1302-005	Ryan Canyon	6/13/2013	39 34.7145	71 33.3316	39 35.317	71 32.6441	1358	584	9	43.00	0.66	1965
HB1302-006	Ryan-McMaster Inter-canyon area	6/13/2013	39 47.5719	71 42.7850	39 47.3285	71 40.5977	2230	1	52	0.04	2.33	498

7.1.3 Northeast Fisheries Observer Program Records

Records of deep-sea coral bycatch in the Northeast Fisheries Observer Program (NEFOP) data were obtained for the years 1994 to 2014. The data contains limited records with limited taxonomic information: there were 65 confirmed coral entries in the database collected from 1994-2014. Most of these records were identified as stony corals, with the remaining records composed primarily of sea pens (Table 26). Historically, observers did not record numbers or density; instead, corals tended to be discarded and the total weight simply estimated. Gear types in these recorded observations included otter trawls, scallop dredges, lobster pots and sink gill nets, at beginning haul depths ranging from 5.5 to 464 meters (3 to 254 fathoms). Estimated or actual weights for the deep-sea coral in a given haul ranged from 0.1 to 100 kg.

Within the Mid-Atlantic Council region, only 11 records of deep sea corals have been reported in the observer data since 1994 (Table 27). Of these, six of were recorded as interactions with gill nets in state waters in the Chesapeake Bay area. Of the remaining 5 records in federal waters, none occur within any of the currently proposed deep sea coral zones (Figure 12).

Table 26: NEFOP records of deep sea interactions in the Northeast region, by coral type and gear type, 1994-2014. NK= not known.

Coral Type and Gear Type	Number of observations	Total weight (kg)
CORAL, SOFT, NK	**2**	**0.7**
TRAWL,OTTER,BOTTOM,FISH	2	0.7
CORAL, STONY, NK	**46**	**562.9**
DREDGE, SCALLOP,SEA	3	10.6
GILL NET, DRIFT-SINK, FISH	1	0.1
GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES	26	315.2
TRAWL,OTTER,BOTTOM,FISH	16	237
SEA PEN, NK	**17**	**7.8**
GILL NET, DRIFT-SINK, FISH	6	1.8
GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES	5	1.7
POT/TRAP, LOBSTER OFFSH NK	2	0.6
TRAWL,OTTER,BOTTOM,FISH	4	3.7
Grand Total	**65**	**571.4**

Table 27: NEFOP records of deep sea corals within the Mid-Atlantic Council Region, 1994-2014. NK= not known.

Coral Records by Gear Type	Number of observations	Total weight (kg)
DREDGE, SCALLOP,SEA	**3**	**10.6**
CORAL, STONY, NK	3	10.6
GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES	**6**	**120**
CORAL, STONY, NK	6	120
TRAWL,OTTER,BOTTOM,FISH	**2**	**100.1**
CORAL, SOFT, NK	1	0.1
CORAL, STONY, NK	1	100
Grand Total	**11**	**230.7**

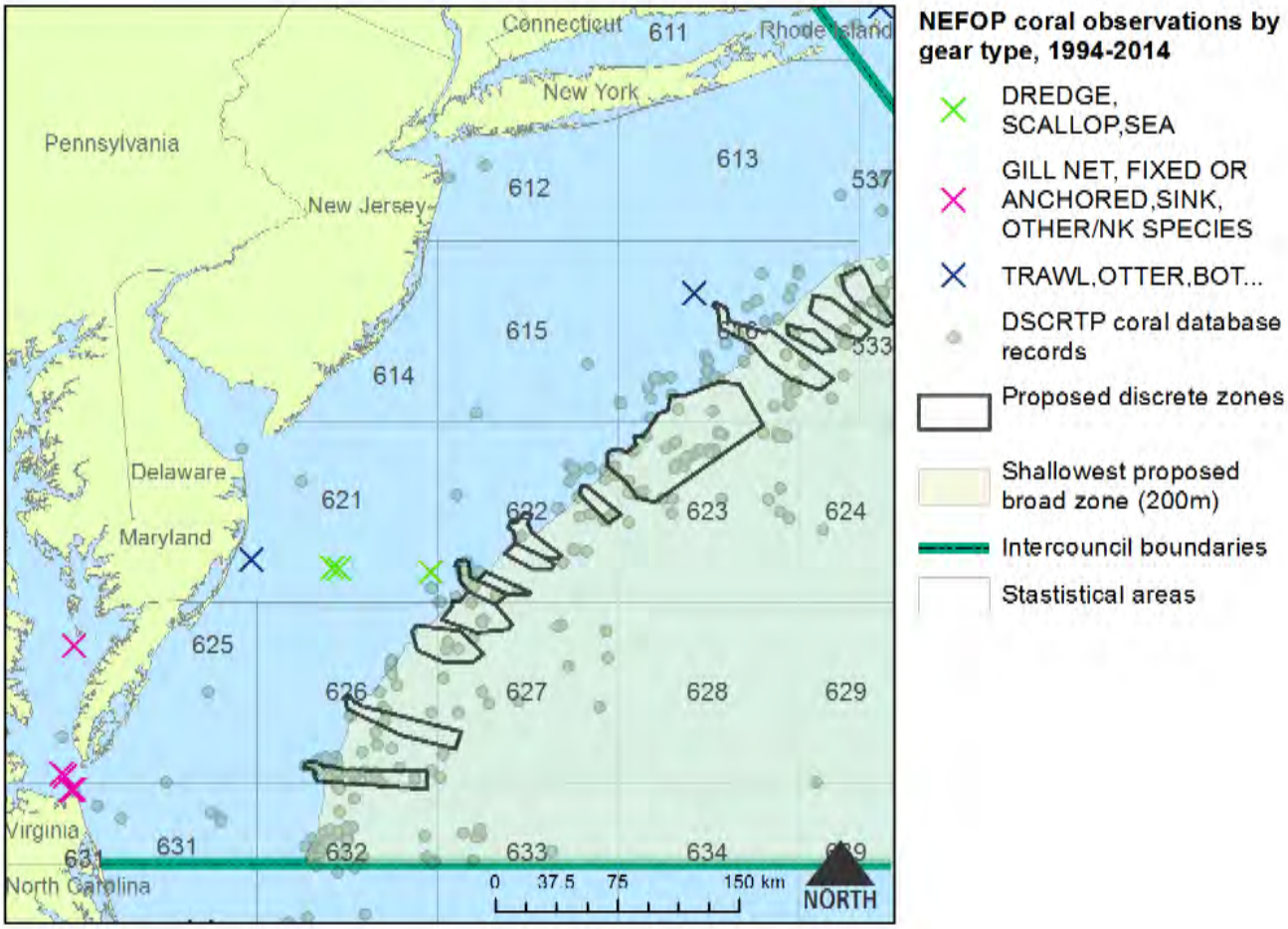


Figure 12: NEFOP records of deep sea corals in the Mid-Atlantic, 1994-2014.

7.1.4 Deep Sea Coral Habitat Suitability Model

A main limitation of point data for deep sea coral observations is that this data is mostly presence-only, and many areas have not been surveyed for the presence of deep sea corals. Surveying deep offshore habitats using Remotely Operated Vehicles (ROVs) or towed cameras is expensive and often logistically difficult. However, existing coral observation data, together with associated environmental data, are useful for developing models that can predict deep sea coral habitat based on known coral locations. The following summarizes the results of a habitat suitability model for deep sea corals in the Northeast region, developed in partnership between NOAA's National Centers for Coastal Ocean Science (NCCOS) and NOAA Northeast Fisheries Science Center (NEFSC).[20] This predictive habitat model was developed by relating two types of data: 1) known deep sea coral presence locations from the Deep Sea Coral Research & Technology Program database, and 2) environmental and geological predictor variables. A variety of environmental variables were incorporated, including slope, depth, depth change, rugosity, salinity, oxygen, substrate, temperature, turbidity, and others.

In the Northeast Region, several different taxonomic groups of deep sea corals were modeled. Some of these model outputs are better predictors of coral presence than others, due to different sample sizes of coral records of each type in the DSCRTP database. The model output for Gorgonian and Alcyonacean corals is expected to be the model with the best predictive ability for structure-forming deep sea corals, as it is based on a sizeable number of data points from known structure-forming species. Therefore, the model outputs for Gorgonian and Alcyonacean corals were used to evaluate the habitat suitability of each proposed discrete zone (Table 28, Figures 13-24). Model outputs are displayed in the figures below, and reflect the predicted likelihood of deep sea coral habitat for a given area. In these maps, the values for predicted likelihood of coral habitat suitability are displayed by the following likelihood categories: very low, low, medium, high, and very high.

In July 2012, the NOAA ship Bigelow visited three "hotspots" predicted by the model, and surveyed the sites using WHOI's TowCam. Data collected during this cruise was used to refine model predictions. The model was qualitatively validated: all camera tow sites that were observed to be hotspots of coral abundance and diversity were also predicted hotspots of habitat suitability based on the regional model. The model was further validated during the August 2014 towed camera surveys previously described. Each attempt has indicated that this habitat suitability model performs well in predicting areas of likely deep sea coral habitat, as well as predicting areas where corals are unlikely to be found.

It should be noted that the exact location of deep coral hotspots on the seafloor often depends on fine-scale seabed features (e.g., ridges or ledges of exposed hard substrate) that are smoothed over in this regional-scale model. The current resolution of the model is grid cells of approximately 370 m^2 (although there are plans to improve the model by increasing resolution to 25 m^2 within the next several years, as well as incorporate more recent coral observations). These maps should be viewed as representing only the general locations of predicted suitable coral habitat (within approximately 350-750 meters, or approximately two model grid cells). This is the primary reason why proposed discrete zone boundaries were buffered by 0.4

[20] Kinlan BP, Poti M, Drohan A, Packer DB, Nizinski M, Dorfman D, Caldow C. 2013. Digital data: Predictive models of deep-sea coral habitat suitability in the U.S. Northeast Atlantic and Mid-Atlantic regions. Downloadable digital data package. Department of Commerce (DOC), National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), National Centers for Coastal Ocean Science (NCCOS), Center for Coastal Monitoring and Assessment (CCMA), Biogeography Branch. Released August 2013. Available at: <http://coastalscience.noaa.gov/projects/detail?key=35>. Funding for this research was provided by the National Marine Fisheries Service - Northeast Fisheries Science Center, the NOAA Deep Sea Coral Research and Technology Program, and the National Ocean Service - National Centers for Coastal Ocean Science.

nautical miles (approximately 741 meters). Also, model predictions are of coral presence, and high likelihood of presence will not necessarily correlate with high abundance.

Table 28: Percent of each proposed discrete zone area within each predicted habitat suitability likelihood class (very low, low, medium, high, and very high), and total discrete zone area.

	Percent of canyon area within each likelihood class of predicted habitat suitability for Alcyonacean and Gorgonian Corals					
Canyon or Complex	**Very Low**	**Low**	**Medium**	**High**	**Very High**	**Total canyon Area (km^2)**
Block Canyon	9%	22%	61%	6%	2%	231.6
Ryan-McMaster Canyons	17%	19%	49%	11%	4%	390.3
Emery-Uchupi Canyons	18%	27%	42%	10%	2%	369.2
Jones-Babylon Canyons	12%	19%	46%	17%	5%	166.1
Hudson Canyon	12%	15%	30%	12%	30%	770.8
Mey-Lindenkohl Slope	18%	27%	41%	9%	6%	2818.2
Mey-Lindenkohl Slope *(Advisor proposed under Alt. 3B-1; Straight line)*	20%	28%	39%	8%	5%	2445.3
Mey-Lindenkohl Slope *(Advisor proposed under Alt. 3B-1; Depth-based)*	20%	27%	38%	9%	7%	2458.8
Spencer Canyon	18%	16%	49%	7%	10%	163.3
Wilmington Canyon	5%	7%	23%	15%	50%	268.1
North Heyes-South Wilmington Canyons	2%	10%	47%	27%	14%	183.4
South Vries Canyon	8%	11%	39%	30%	12%	142.6
Baltimore Canyon	8%	6%	31%	13%	42%	231.0
Baltimore Canyon *(Advisor proposed under Alt. 3B-1)*	13%	7%	23%	16%	41%	220.7
Warr-Phoenix Canyon Complex	5%	10%	51%	24%	10%	511.6
Accomac-Leonard Canyons	22%	20%	44%	12%	2%	538.2
Washington Canyon	45%	19%	22%	5%	10%	554.1
Norfolk Canyon	51%	8%	20%	8%	14%	543.7
Norfolk Canyon *(Advisor proposed under Alt. 3B-1)*	55%	8%	17%	7%	12%	598.4

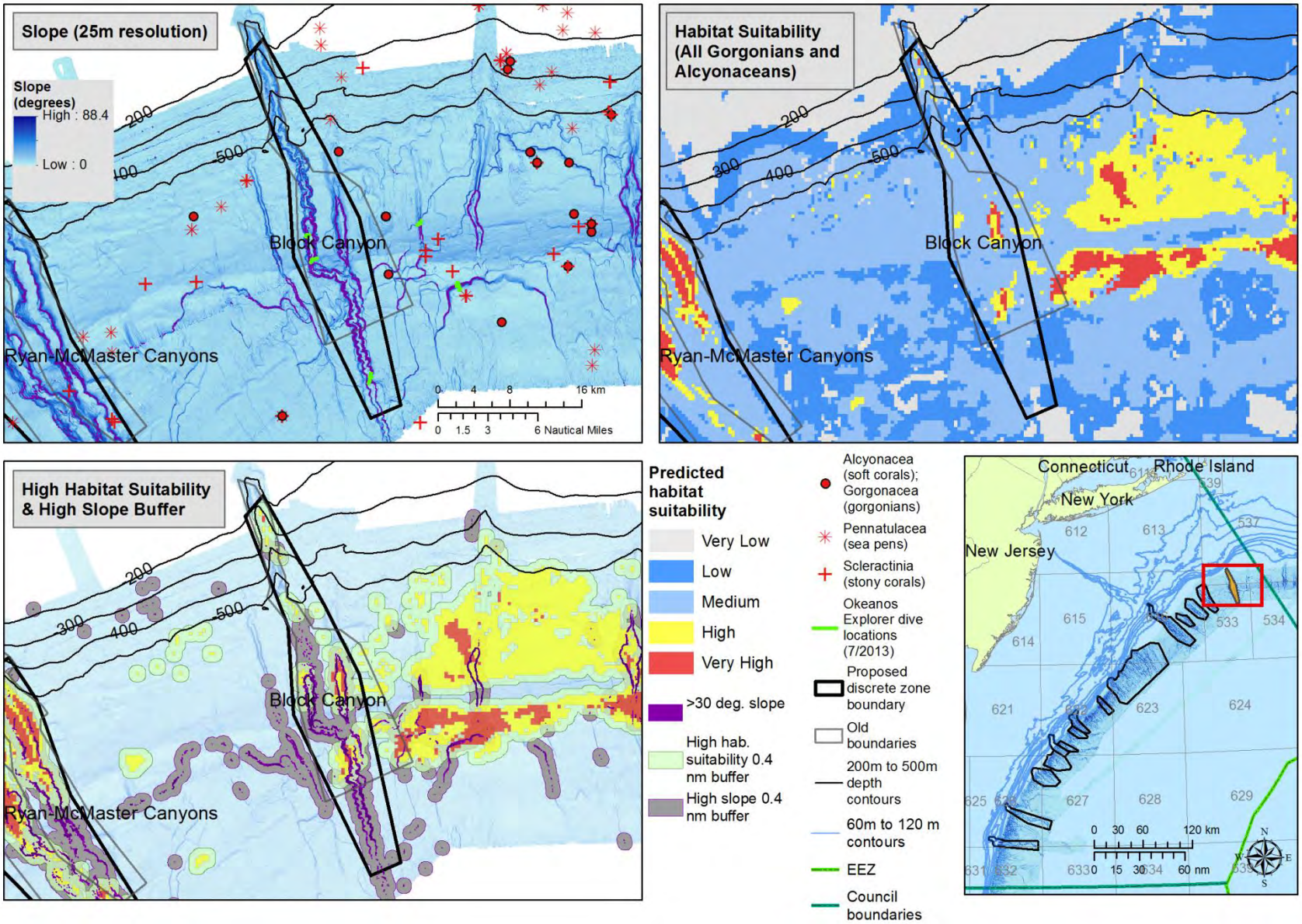


Figure 13: Block Canyon areas of high slope, deep sea coral habitat suitability, and discrete zone boundaries.

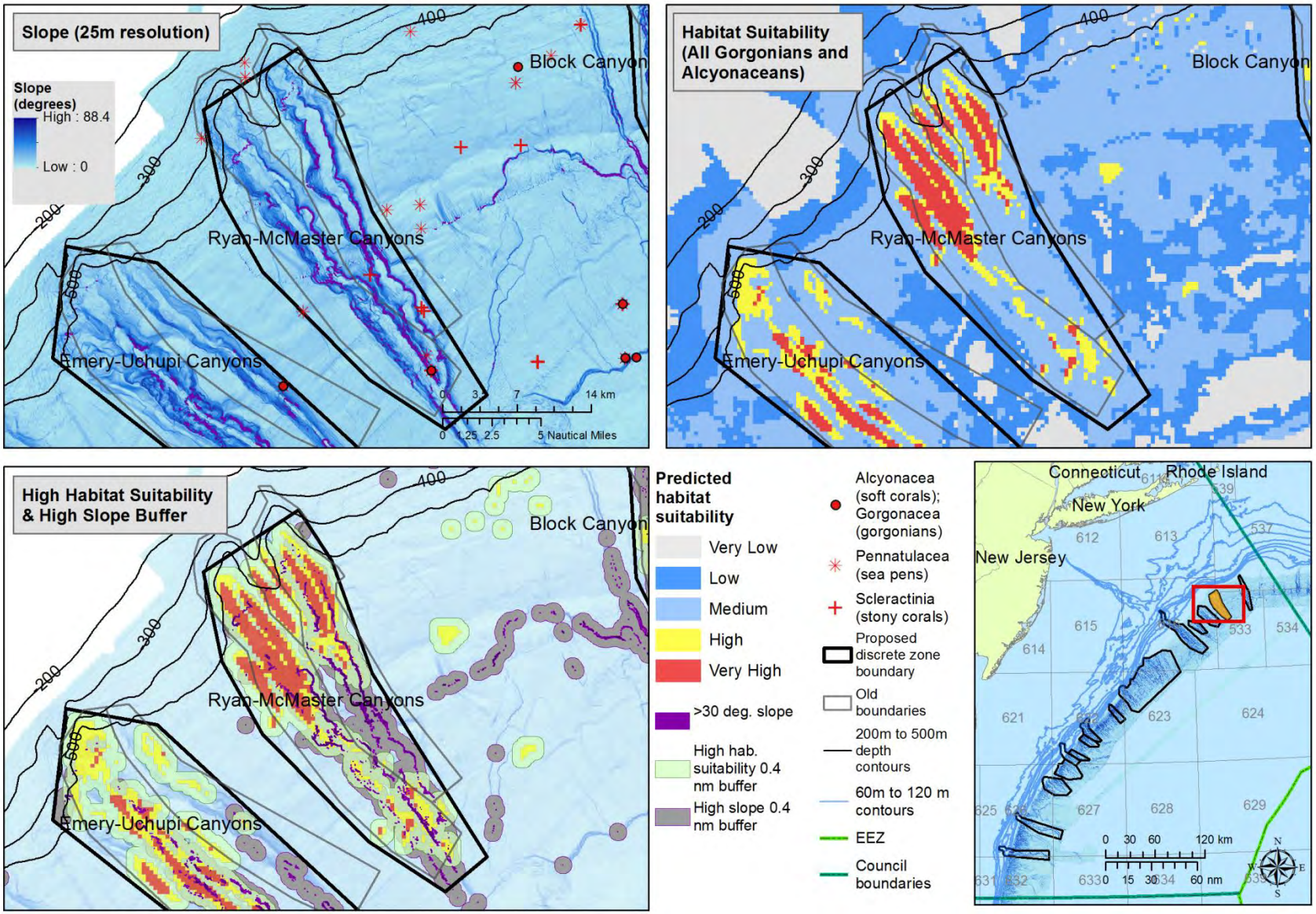


Figure 14: Ryan and McMaster Canyons areas of high slope, deep sea coral habitat suitability, and discrete zone boundaries.

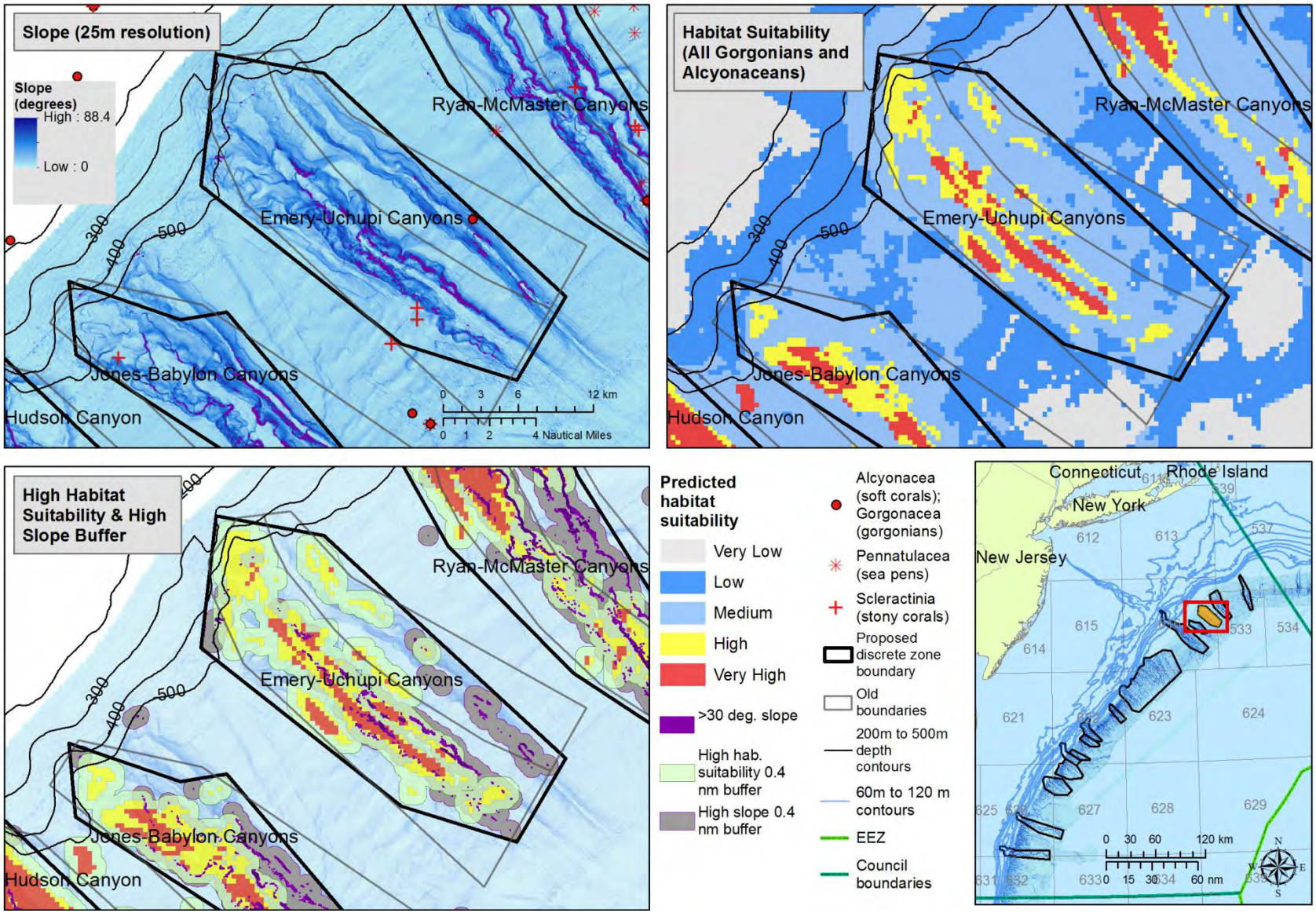


Figure 15: Emery and Uchupi Canyons areas of high slope, deep sea coral habitat suitability, and discrete zone boundaries.

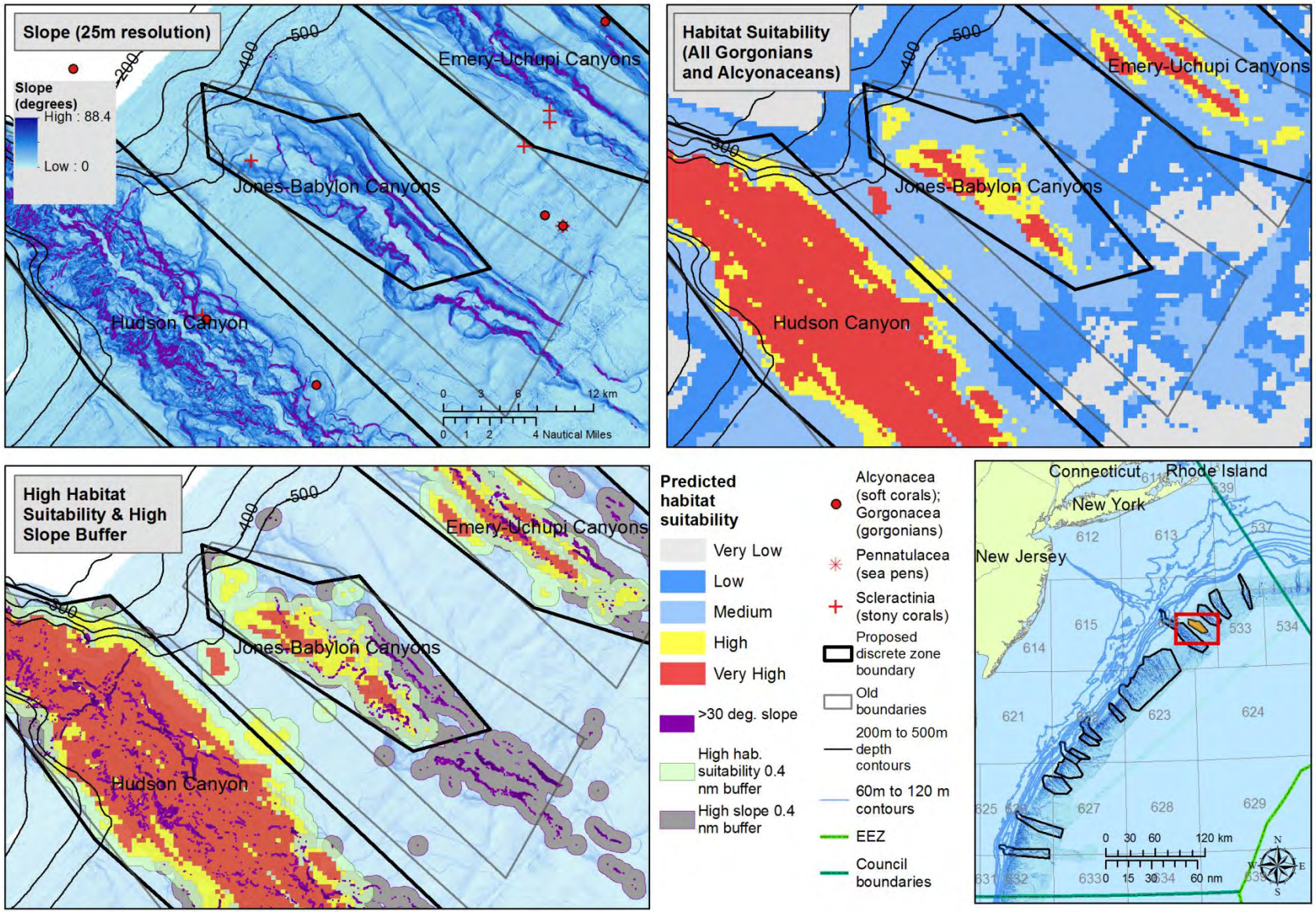


Figure 16: Jones and Babylon Canyons areas of high slope, deep sea coral habitat suitability, and discrete zone boundaries.

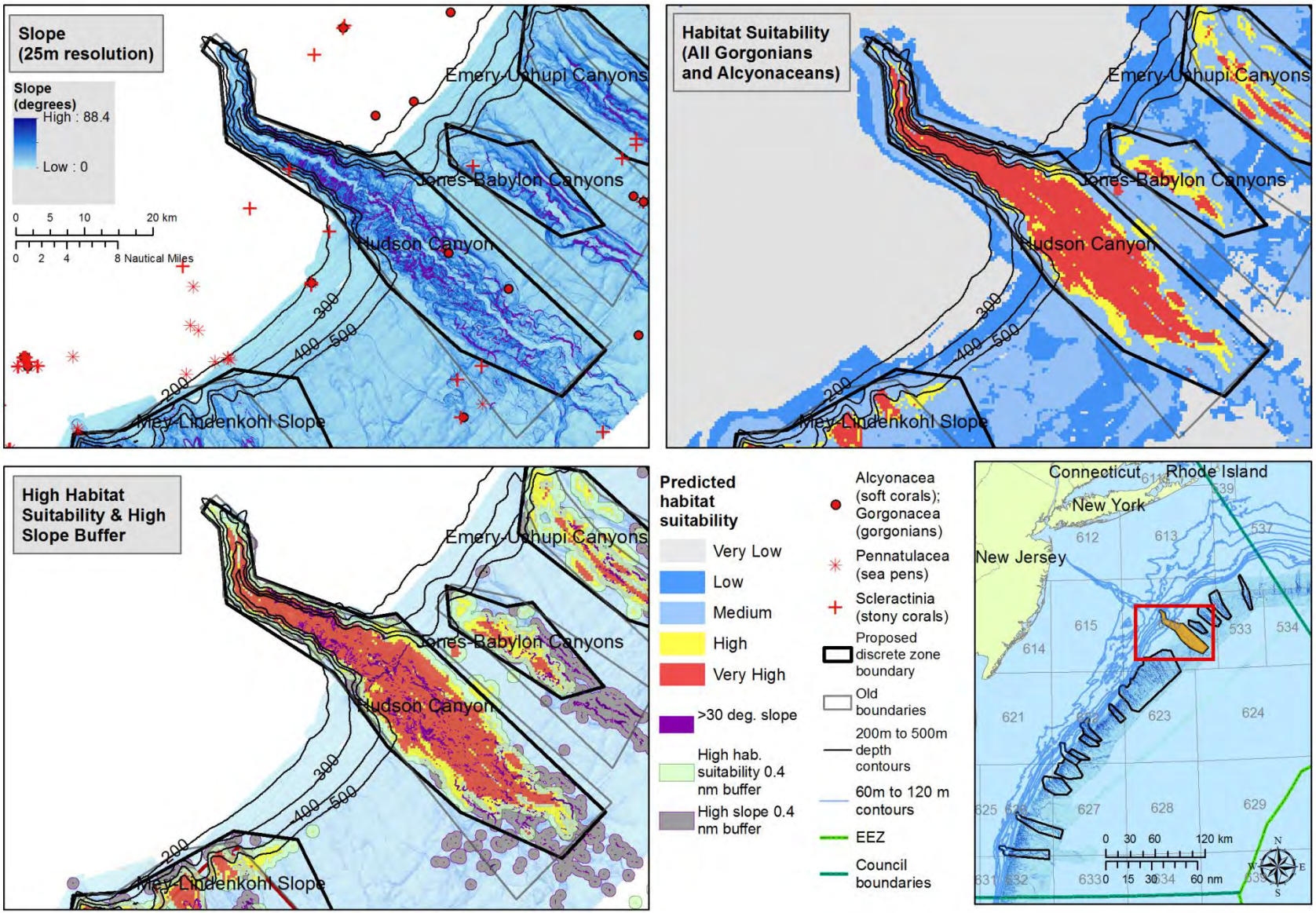


Figure 17: Hudson Canyon areas of high slope, deep sea coral habitat suitability, and discrete zone boundaries.

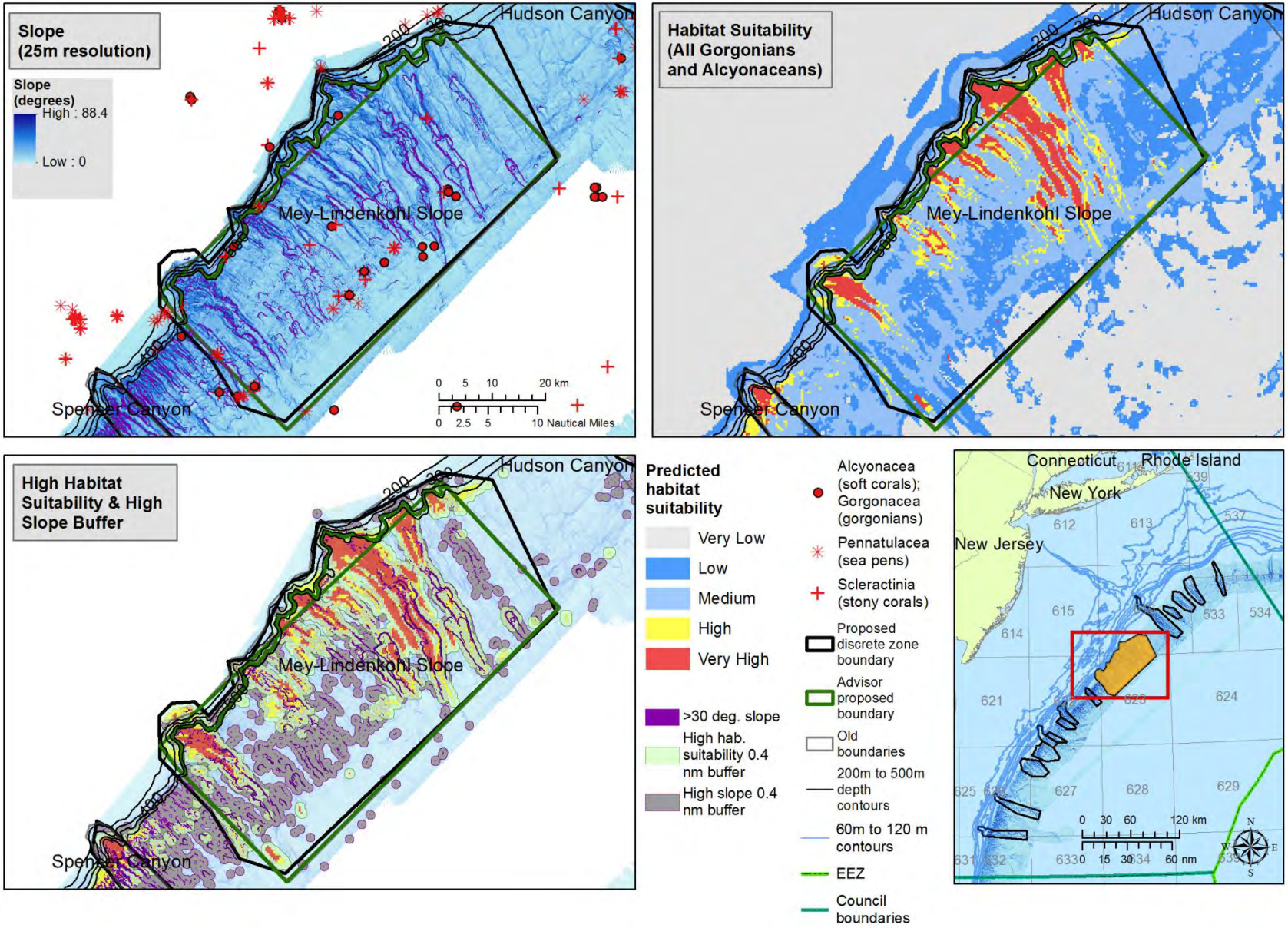


Figure 18: Mey-Lindenkohl Slope areas of high slope, deep sea coral habitat suitability, and discrete zone boundaries.

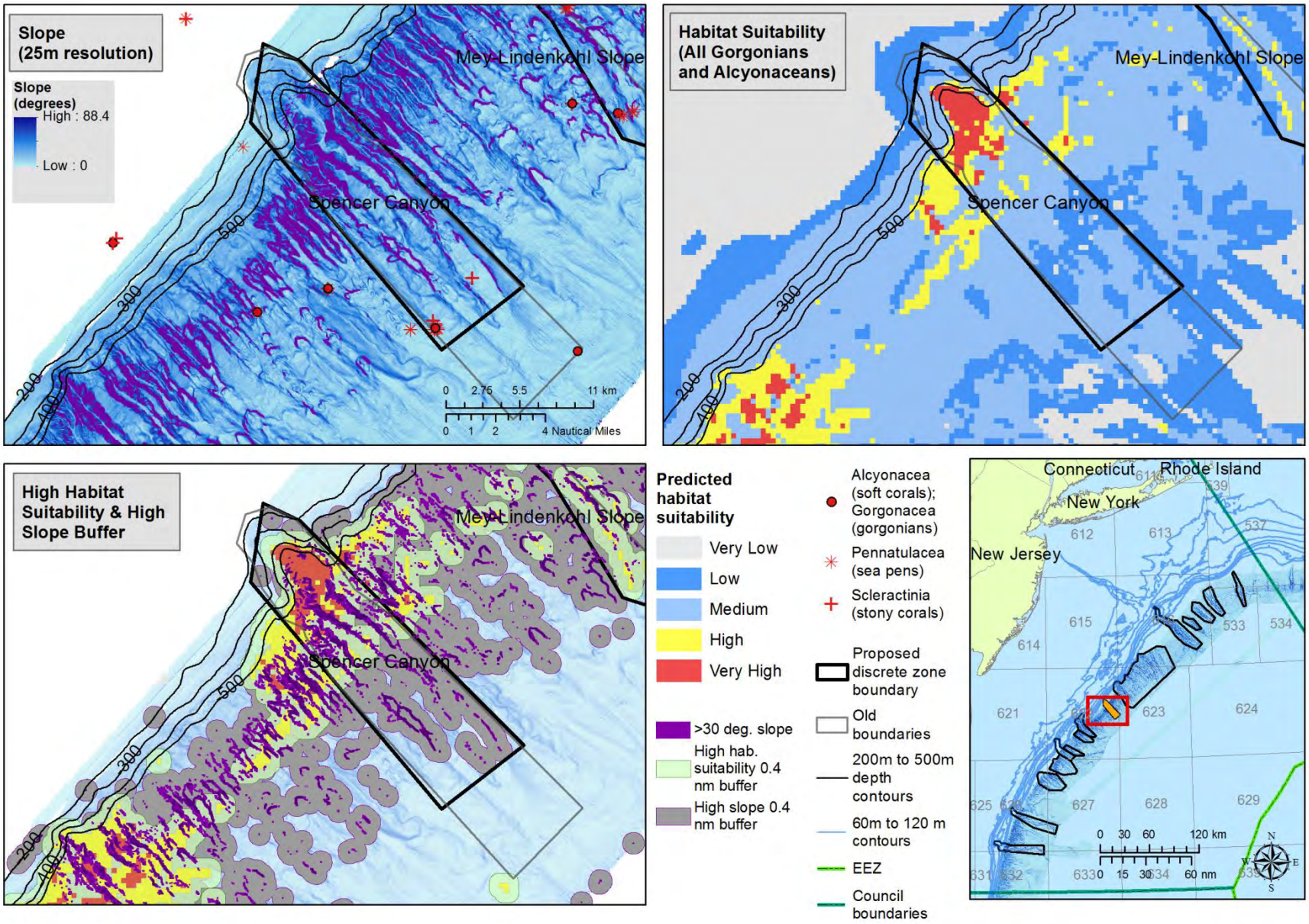


Figure 19: Spencer Canyon areas of high slope, deep sea coral habitat suitability, and discrete zone boundaries.

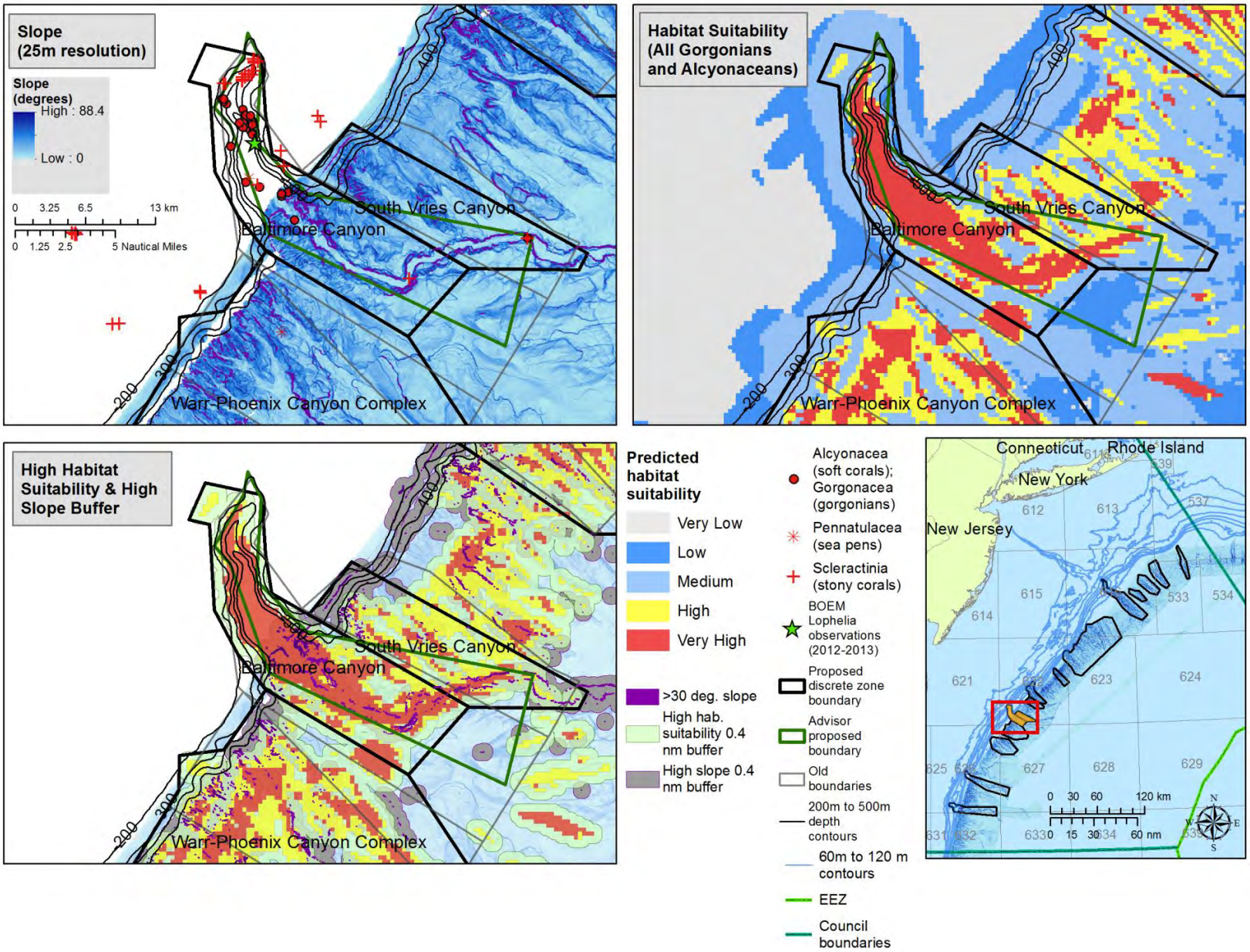


Figure 20: Baltimore Canyon and South Vries Canyons (two separate proposed areas) areas of high slope, deep sea coral habitat suitability, and discrete zone boundaries.

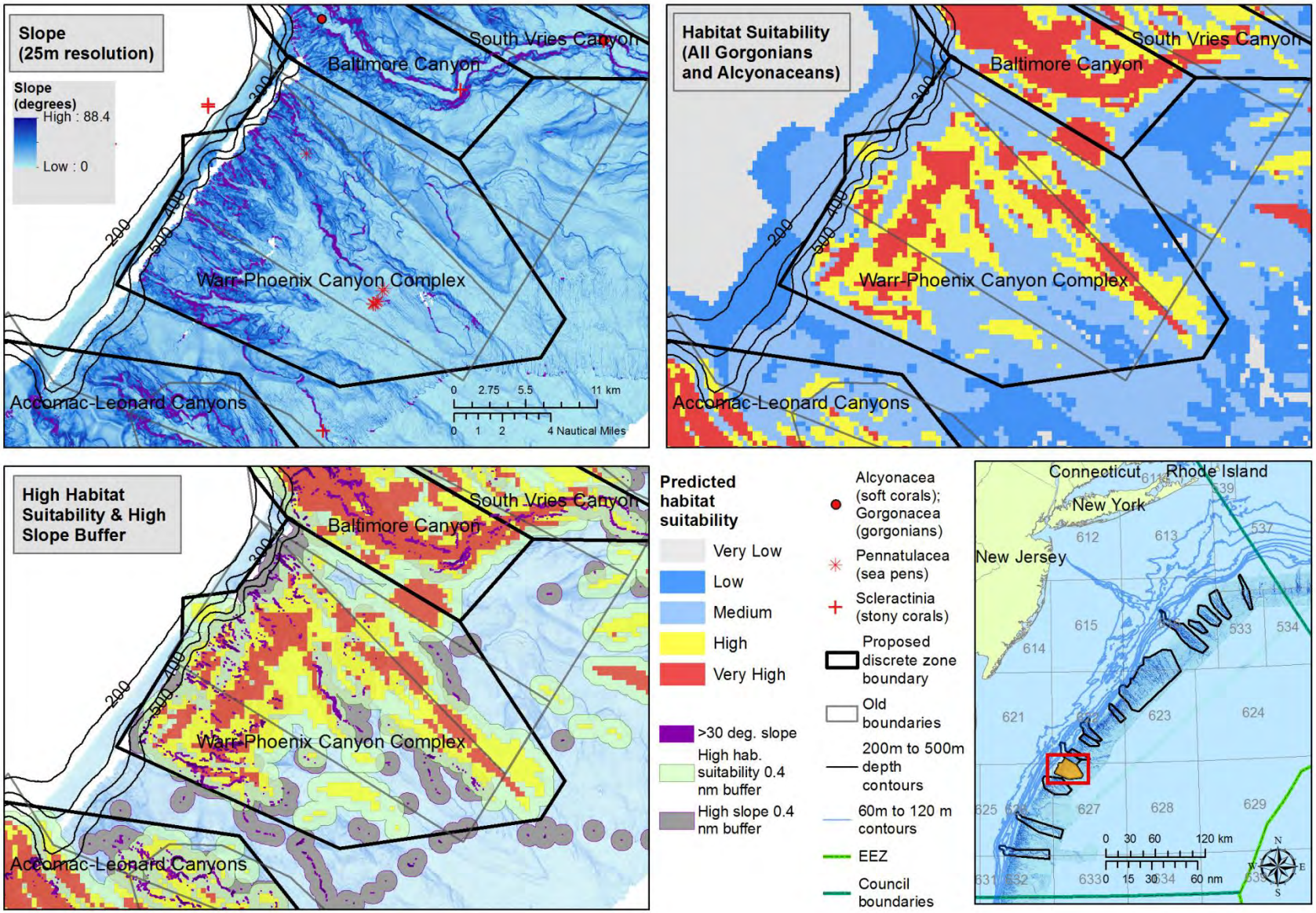


Figure 21: Warr-Phoenix Canyon Complex areas of high slope, deep sea coral habitat suitability, and discrete zone boundaries.

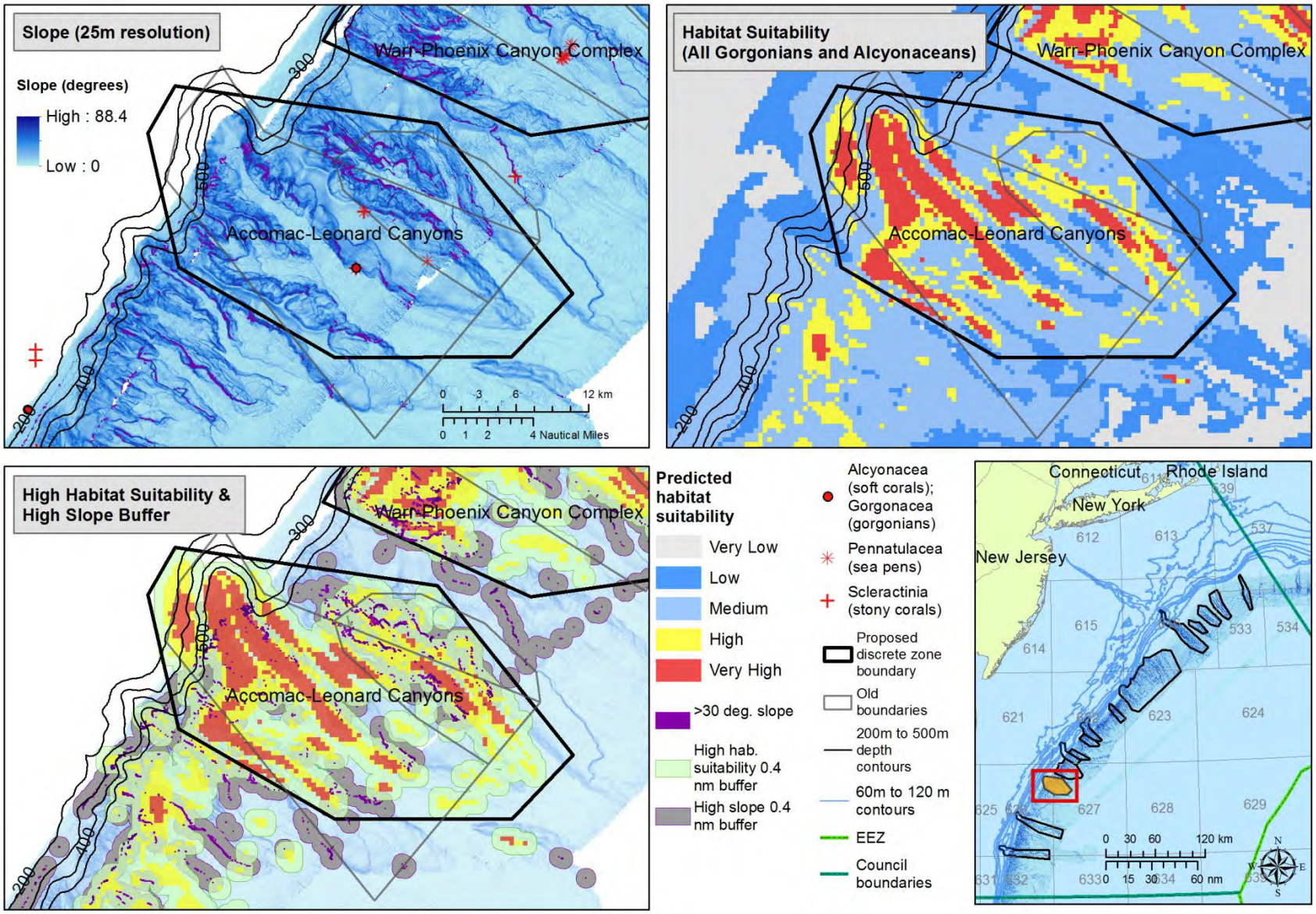


Figure 22: Accomac and Leonard Canyons areas of high slope, deep sea coral habitat suitability, and discrete zone boundaries.

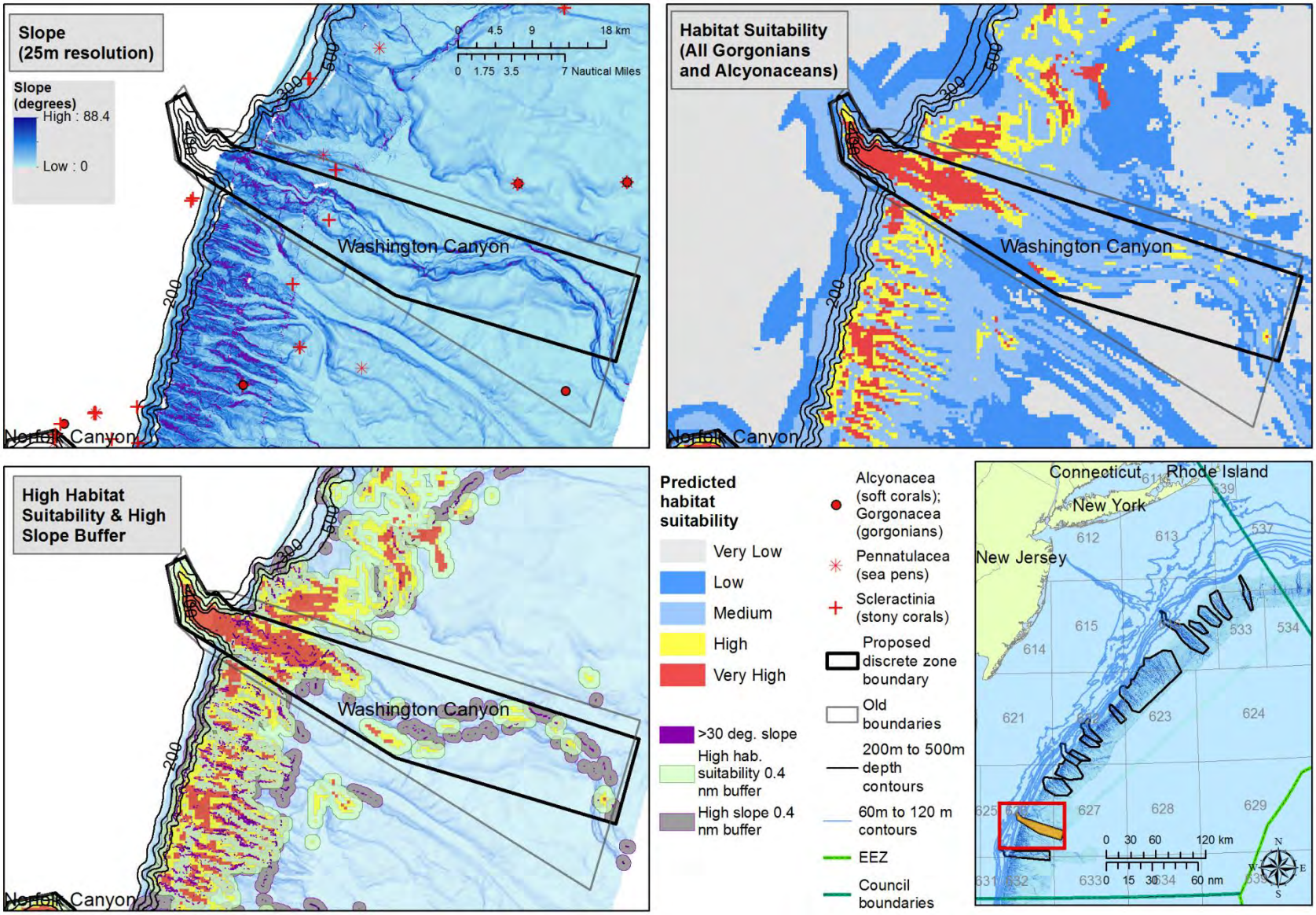


Figure 23: Washington Canyon areas of high slope, deep sea coral habitat suitability, and discrete zone boundaries.

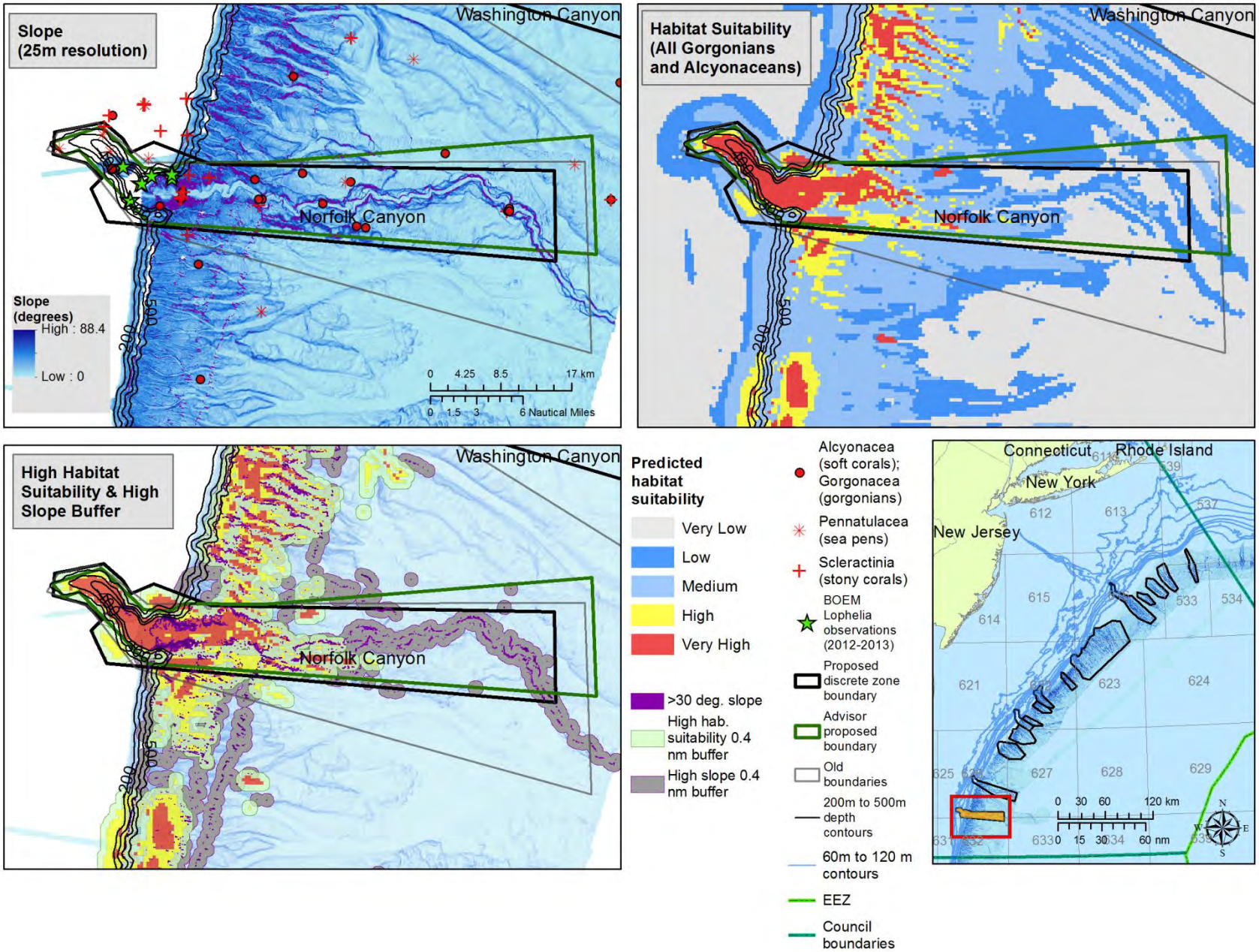


Figure 24: Norfolk Canyon areas of high slope, deep sea coral habitat suitability, and discrete zone boundaries.

7.2 Impacts to Deep Sea Corals

In general terms, deep sea corals are expected to benefit from any alternative that reduces the likelihood of damage by commercial fishing gear. However, many corals growing on steep slopes are likely to have a degree of natural protection from some commercial fishing gear, as very steep slopes cannot be trawled. Areas of higher three-dimensional complexity tend to be avoided by fishermen for fear of damage and loss of their gear. In other areas, fishing may be occurring in or near areas of deep sea coral habitats. Thus, the exact nature of potential impacts to corals are difficult to define, but it should be noted that many of the proposed measures are precautionary in nature and are designed to protect corals from future expansion of fishing effort. Given its small overall scope and the small physical footprint of gear contact with the seafloor, it is believed that the red crab fishery may currently have a small impact on corals. As such, an exemption from the broad zones is being considered for the red crab fishery.

Under the status-quo, one would expect some ongoing negative impacts to deep water corals and any potential expansion of effort into new deep water areas would be unconstrained and could increase impacts. Evidence of gear impacts to deep water corals in the Mid-Atlantic is sparse and generally limited to occasional observations of fishing gear during remote vehicle coral surveys and coral observations in the limited NEFOP data described above. However, trawling's detrimental impact on deep water corals is well documented.[21]

As shown above, for areas where the presence of deep sea corals is likely but not proven, the presence of modeled deep sea coral habitat provides the best measure for inferring deep sea coral occurrence. Deep sea research dives have, however, validated that coral is likely to be found in areas predicted to have suitable habitat by the model. Therefore, for any of the coral zones defined in the alternatives, the total area of likely deep sea coral habitat serves as a measure of the importance of the zone for deep sea corals. The impacts of the alternatives can be assessed as the protection afforded to corals by eliminating or reducing access to those areas by vessels using bottom tending fishing gear.

In Tables 29 and 30 on the next page, the canyon areas are arranged in descending order in terms of total area of modeled high/very high suitable habitat (the left side of the "Habitat Suitability" columns). This area is simply the total area of the potential discrete zone multiplied by the percent of the area that has high or very high suitability (from the suitability model described above) for deep water corals. For example, the Mey-Lindenkohl Slope area is 2818.2 km^2, and 14.7% of that area is predicted to have high/very high habitat suitability for corals, so its total area with modeled high/very high deep water coral suitability is 414.1 km^2 (2818*.147 = 414).

While slope is a variable included in the habitat suitability model, areas of high slope (>30 degrees) are also believed to be an important indicator of coral habitat, so the amount of high slope areas in the potential coral zones is also provided in the table below. These follow the same initial trend as modeled habitat suitability, with the Mey-Lindenkohl Slope and Hudson Canyon areas having the greatest areas of high slope, but also identify some canyons as potentially having more or less coral than suggested by the suitability model. For example, based on high slope areas, the Norfolk and Spencer Canyon areas may have relatively more coral habitat than suggested by the suitability model.

As discussed in the economic impacts section, if some canyon areas are closed, it would be expected that effort would shift near/around canyons that remain open to some degree. This reduces both the positive biological and negative fishery socio-economic impacts of canyon closures.

[21]For example, see references in Hourigan 2014, p. 128 in Interrelationships Between Corals and Fisheries, Ed. Stephen Bortone.

As can be seen in the maps above for the canyons, the 500 m broad zone would cover most of the high/very high suitability areas. The exceptions are the heads of longer canyons that incise the shelf/slope break (e.g. Hudson, Baltimore, Washington, and Norfolk), where high/very high suitability areas extend into the shallower heads of the canyons (400m/300m). Based on the outputs of the habitat suitability model in the Mid-Atlantic Region, the 200m broad zone would protect nearly 100% of areas predicted as having a high or very high likelihood of coral habitat suitability, the 300m broad zone would protect 99% of high/very high likelihood areas, the 400m broad zone would protect 97% of high/very high likelihood areas, and the 500m broad zone would protect 93% of high/very high likelihood areas.

THIS SPACE INTENTIONALLY LEFT BLANK

Table 29: Summary of analysis across proposed discrete zones under alternative 3B for coral observations, habitat suitability, and areas of high slope. Note: recent fieldwork observations are not included in the DSCRTP historical database.

		Coral Observations		Habitat Suitability		Slope	
Canyon or Complex	Total area (km^2)	Historical Coral Records (all)	Recent fieldwork with coral observations?	Total Area of High/Very High Habitat Suitability	Percent High/Very High Habitat Suitability	Total area of slope >30 degrees (km^2)	Percent area of slope >30 degrees
Mey-Lindenkohl Slope	2818.2	74	✓	414.1	14.7%	178.9	6.3%
Hudson Canyon	770.8	5		329.0	42.7%	82.7	10.7%
Warr-Phoenix Canyon Complex	511.6	14	✓	174.1	34.0%	19.5	3.8%
Wilmington Canyon	268.1	2	✓	172.8	64.5%	24.1	9.0%
Baltimore Canyon	231	54	✓	126.8	54.9%	19.5	8.5%
Norfolk Canyon	543.7	37	✓	118.4	21.8%	45.1	8.3%
Washington Canyon	554.1	1	✓	81.6	14.7%	12.0	2.2%
North Heyes-South Wilmington Canyons	183.4	0		74.0	40.3%	12.0	6.6%
Accomac-Leonard Canyons	538.2	6	✓	70.6	13.1%	19.5	3.6%
South Vries Canyon	142.6	2		59.9	42.0%	13.5	9.5%
Ryan-McMaster Canyons	390.3	16	✓	59.3	15.2%	15.0	3.9%
Emery-Uchupi Canyons	369.2	6		44.1	11.9%	12.0	3.3%
Jones-Babylon Canyons	166.1	1		37.4	22.5%	9.0	5.4%
Spencer Canyon	163.3	12	✓	28.0	17.1%	22.6	13.8%
Block Canyon	231.6	0	✓	17.7	7.6%	16.5	7.1%

Table 30: Summary of analysis across advisor-proposed discrete zones under sub-alternative 3B-1 for coral observations, habitat suitability, and areas of high slope. Note: recent fieldwork observations are not included in the DSCRTP historical database.

		Coral Observations		Habitat Suitability		Slope	
Canyon or Complex	Total area (km^2)	Historical Coral Records (all)	Recent fieldwork with coral observations?	Total Area of High/Very High Habitat Suitability	Percent High/Very High Habitat Suitability	Total area of slope >30 degrees (km^2)	Percent area of slope >30 degrees
Mey-Lindenkohl Slope Dep	2458	62	✓	383.4	15.6%	175.3	7.1%
Mey-Lindenkohl Slope Strai	2445	65	✓	317.8	13.0%	172.4	7.1%
Baltimore Canyon	220	50	✓	125.2	56.9%	13.2	6.0%
Norfolk Canyon	598	37	✓	118.4	19.8%	42.9	7.2%

7.3 FISHERY EFFORT AND ECONOMIC IMPACTS

Impacts to fishing effort and thus also economic impacts were analyzed by mapping and quantifying recent fishing effort relative to all proposed coral zones (broad and discrete). Several data sources are available to analyze past effort. None of the sources are complete, and their strengths and weaknesses are discussed below.

7.3.1 VTR Revenue Mapping Model

Economic impacts of proposed coral zones were analyzed using a Vessel Trip Report (VTR)-based revenue mapping model produced by the Northeast Fisheries Science Center. A Technical Memo outlining the methodology behind this model is forthcoming from the NEFSC, and an overview is provided here.

Federally permitted vessels are required to submit a VTR for each trip, the requirements of which include indicating a general fishing location as a set of geographic coordinates. These self-reported coordinates do not precisely indicate the location of fishing effort, given that only one point is provided regardless of trip length or distance covered during the trip. In the absence of spatially explicit fishery effort data for many fisheries, this model allows for more robust analysis using VTR data by taking into account some of the uncertainties around each reported point. Using observer data, for which precise locations are available, the model was developed to derive probability distributions for actual fishing locations, around a provided VTR point. Other variables likely to impact the precision of a given VTR point, such as trip length, vessel size, and fishery, were also incorporated into the model. This model allows for generation of maps that predict the spatial footprint of fishing. Price information from dealer reports was used to transform VTR catches into revenues. Trip information was used to incorporate information about revenue generated from each trip, resulting in a model that can produce maps of revenue generated for a given set of specified parameters such as gear type, species, or port of landing. The revenue-mapping model covers the years 2007-2012, and can be used to identify areas important to specific fishing communities, species, gears, and seasons to establish a baseline of commercial fishing effort.

For this analysis, first, gear and species combinations likely to be impacted by the proposed measures were identified. VTR-point data were used to identify the primary gear-species combinations that occur within proposed broad and discrete zones. The primary gear types reported within the proposed coral zones (broad and discrete combined) include bottom otter trawls, sea scallop dredges, crab pots and traps, lobster pots, and bottom longlines. The primary species caught include longfin squid, *Illex* squid, sea scallops, deepsea red crab, American lobster, summer flounder, silver hake (whiting), golden tilefish, Jonah crab, scup, and black sea bass.

Of these gear-species combinations, American lobster and Jonah crab were not included in further analysis due to the nature of the regulatory authority under which the alternatives in this document are proposed. Management measures applied under the discretionary provisions of the MSA to designate deep sea coral zones would be applicable to Federally-managed fisheries only, meaning they would not impact lobster pots, since lobster is managed solely by the Atlantic States Marine Fisheries Commission (i.e., not jointly managed with NMFS or the Councils). Jonah crabs are caught as bycatch within the lobster pot fishery, and generally retained for sale.

Thus the primary gear-species combinations identified for further analysis in the revenue-mapping model included:

1. Bottom otter trawl – Squid (*Illex* and longfin)
2. Bottom otter trawl – Hake

3. Bottom otter trawl – Summer flounder, scup, and black sea bass (BOT – FLUKE)
4. Pots/Traps – Red crab
5. Bottom longline – Golden tilefish
6. Dredge – Sea scallops

The data in Tables 31 and 32 are also illustrated in revenue intensity maps shown in Figures 25-30 and both are a direct product of the VTR model. The data reveal spatial concentrations of effort that provide additional context for the estimates in the tables. When interpreting the maps, the appropriate interpretation is that most revenues would be contained by the areas of intense color, but it would not be correct to interpret the model as saying high effort definitely occurred in all areas of intense color.

This model does have important caveats. The probability distributions generated from each reported VTR point create a likelihood of actual fishing locations in all directions from a given point, and do not take into account any specific directionality that may be associated with specific fishing methods or specific locations. For example, the model does not take into account fishing behavior along depth contours or other specific habitat features. The model-estimated distribution of fishing effort would tend to be expanded beyond the shelf break or into the middle of canyons to deeper areas that are not actually fished. As such, the model likely overstates effort and revenue dependence in those deeper areas, suggesting that the values (i.e. contributions to overall revenue) in Tables 31 and 32 are overestimates. The model should still illustrate the approximate relative value among potential closure areas and facilitate approximate relative comparisons.

THIS SPACE INTENTIONALLY LEFT BLANK

Table 31: VTR model-estimated revenue (USD) by proposed discrete zone, shown as a percentage of coastwide revenues for each species-gear combination, 2007-2012, Maine through North Carolina. BOT = bottom otter trawl; BLL = bottom longline; DRG = dredge.

DISCRETE ZONE	AREA (km^2)	BOT-SQUID	DRG-SCALL	BOT-FLUKE	POT-RCRAB	LL-TILE	BOT-HAKE	Total	Mobile gears only (trawl/ dredge)
Mey-Lindenkohl Slope	2,818	2.14%	0.19%	1.17%	3.47%	1.65%	0.32%	0.42%	0.39%
Hudson Canyon	770	1.27%	0.04%	0.56%	1.13%	3.50%	1.20%	0.22%	0.18%
Wilmington Canyon	268	1.64%	0.08%	0.17%	0.77%	0.13%	0.02%	0.21%	0.20%
Baltimore Canyon	231	0.73%	0.05%	0.16%	0.80%	0.02%	0.01%	0.11%	0.11%
Warr & Phoenix Canyon Complex	512	0.62%	0.05%	0.10%	0.98%	0.03%	0.01%	0.10%	0.09%
Accomac & Leonard Canyons	539	0.33%	0.05%	0.10%	0.87%	0.02%	0.01%	0.08%	0.07%
North Heyes & South Wilmington Canyon	183	0.53%	0.03%	0.06%	0.42%	0.02%	0.01%	0.07%	0.07%
Washington Canyon	554	0.22%	0.05%	0.10%	0.64%	0.00%	0.00%	0.07%	0.06%
Spencer Canyon	163	0.46%	0.02%	0.09%	0.24%	0.01%	0.00%	0.06%	0.06%
South Vries Canyon	143	0.36%	0.02%	0.04%	0.28%	0.01%	0.00%	0.05%	0.05%
Norfolk Canyon*	544	0.34%	0.01%	0.03%	0.88%	0.01%	0.00%	0.04%	0.04%
Ryan & McMaster Canyons	390	0.13%	0.00%	0.18%	0.30%	0.22%	0.34%	0.03%	0.03%
Emery & Uchupi Canyons	369	0.12%	0.00%	0.14%	0.33%	0.32%	0.23%	0.03%	0.02%
Jones & Babylon Canyons	166	0.08%	0.01%	0.06%	0.17%	0.44%	0.12%	0.02%	0.02%
Block Canyon	231	0.06%	0.00%	0.10%	0.13%	0.14%	0.22%	0.02%	0.01%
All Discrete Zones	**7,881**	9.00%	0.60%	3.06%	11.43%	6.51%	2.48%	1.50%	1.40%
Coastwide		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

*Norfolk Canyon revenue estimates for trawl and dredge fisheries were adjusted to exclude the Norfolk Canyon Tilefish GRA, which is closed to mobile bottom-tending gear.

Table 32: VTR model-estimated cumulative revenue (USD) by proposed broad zone, shown as a percentage of coastwide revenues for each species-gear combination, 2007-2012, Maine through North Carolina. BOT = bottom otter trawl; BLL = bottom longline; DRG = dredge. Note that percentages are not additive given the significant overlap in area across all broad zones.

BROAD ZONE	APPROX. AREA (km^2)	BOT-SQUID	DRG-SCALL	BOT-FLUKE	POT-RCRAB	LL-TILE	BOT-HAKE	Total	Mobile gears only (trawl/ dredge)
200 Broad Zone	101,372	24.56%	1.25%	7.44%	42.15%	16.83%	7.80%	3.80%	3.47%
300 Broad Zone	100,165	22.13%	1.12%	6.35%	40.31%	12.31%	6.10%	3.37%	3.09%
400 Broad Zone	99,218	20.29%	1.03%	5.62%	38.63%	10.07%	4.84%	3.07%	2.81%
500 Broad Zone	98,444	19.06%	0.97%	5.14%	37.29%	8.83%	4.07%	2.86%	2.62%

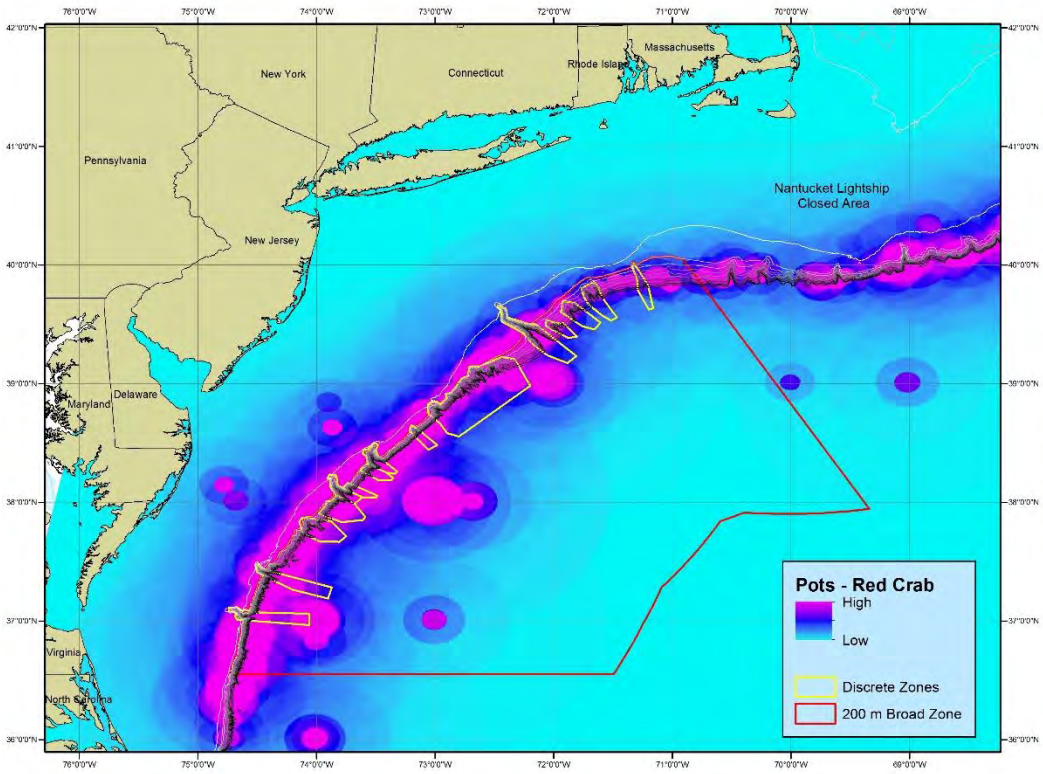


Figure 25: Areas of high cumulative estimated revenue (USD) for red crab caught using pots, 2007-2012, Maine through Virginia.

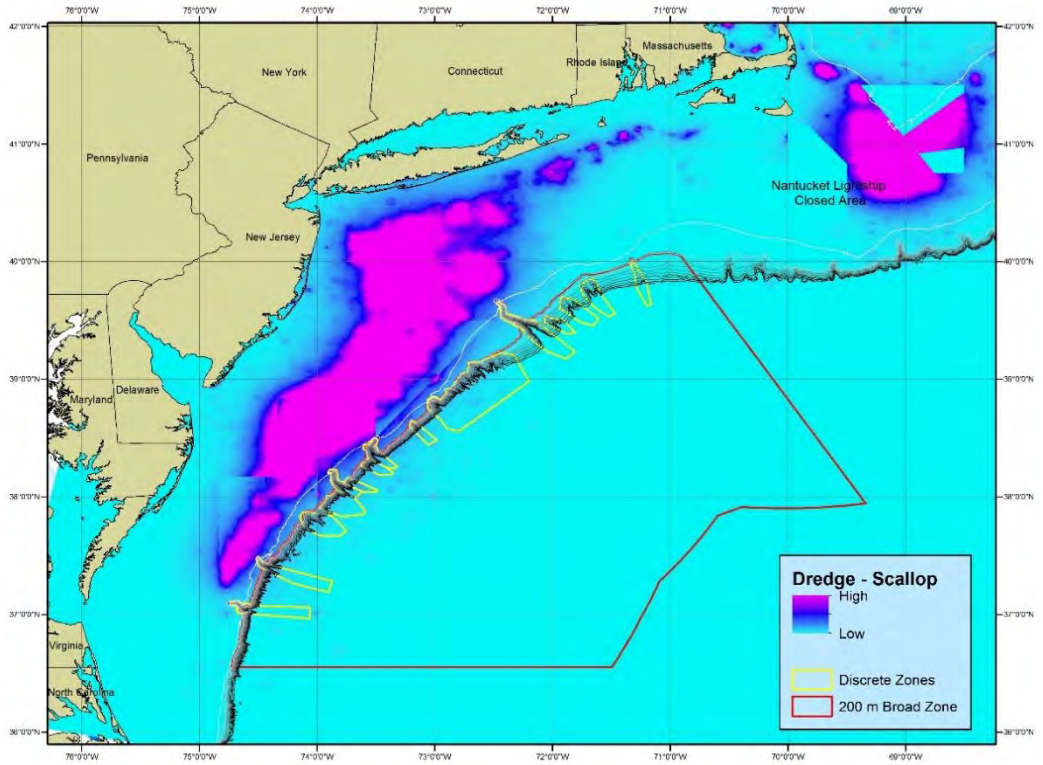


Figure 26: Areas of high cumulative estimated revenue (USD) for scallops caught using dredge gear, 2007-2012, Maine through Virginia.

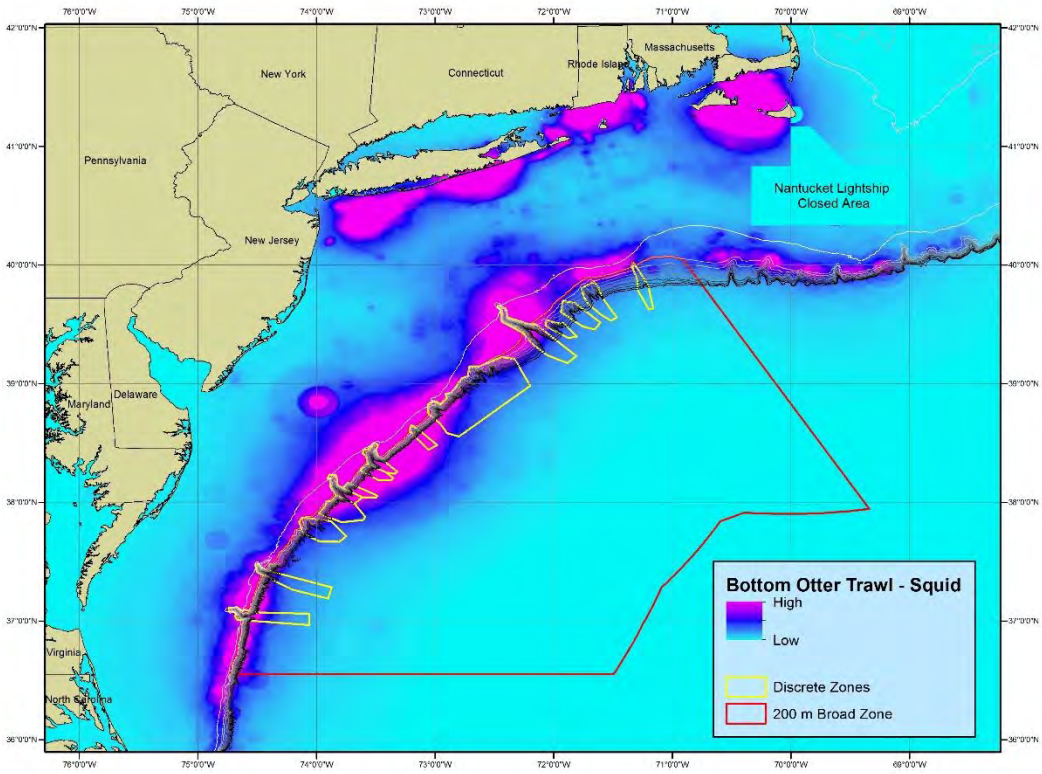


Figure 27: Areas of high cumulative estimated revenue (USD) for *Illex* and longfin squid caught using bottom otter trawls, 2007-2012, Maine through Virginia.

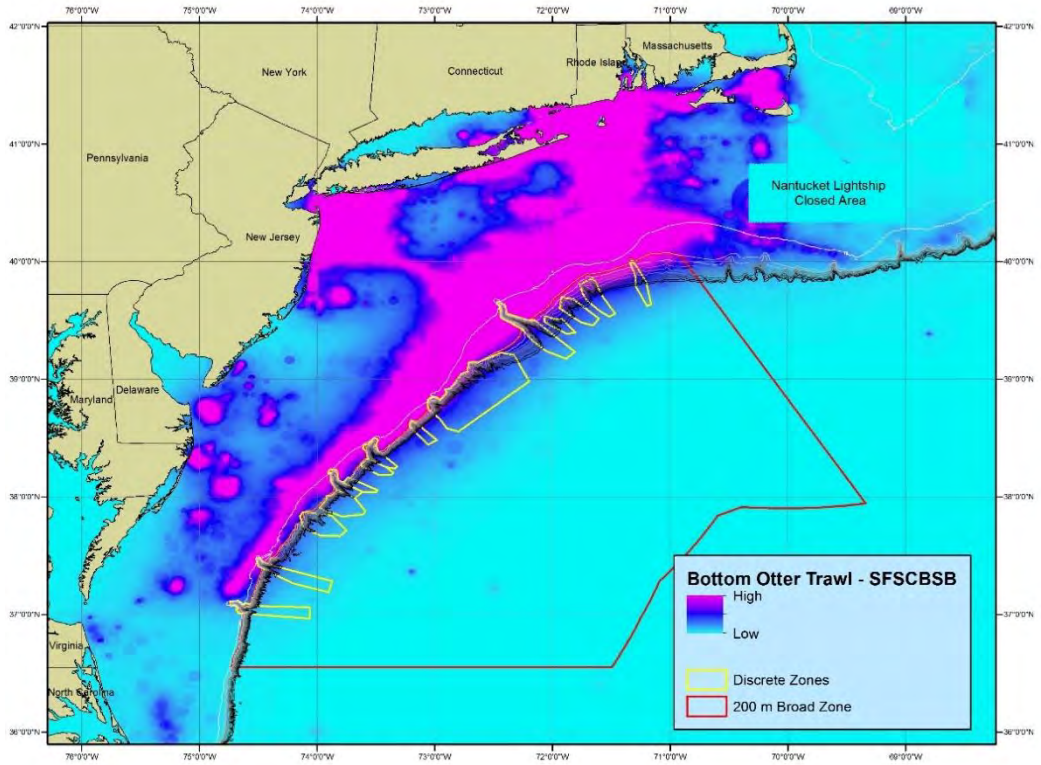


Figure 28: Areas of high cumulative estimated revenue (USD) for summer flounder, scup, and black sea bass caught using bottom otter trawl gear, 2007-2012, Maine through Virginia.

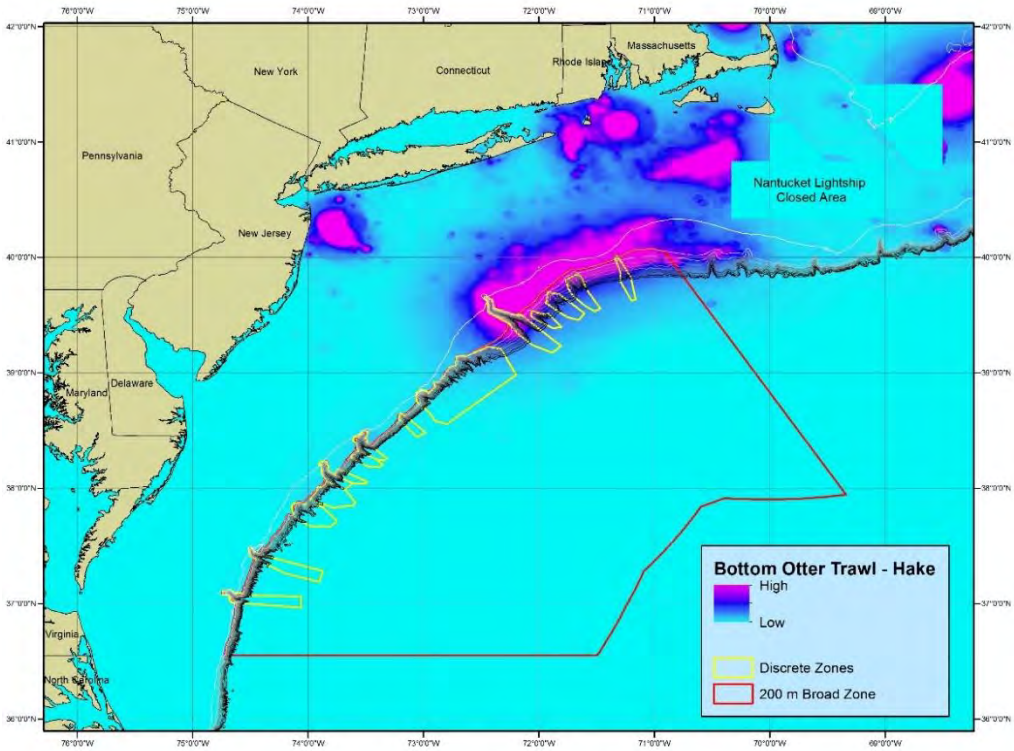


Figure 29: Areas of high cumulative estimated revenue (USD) for silver hake (whiting) caught using bottom otter trawl gear, 2007-2012, Maine through Virginia.

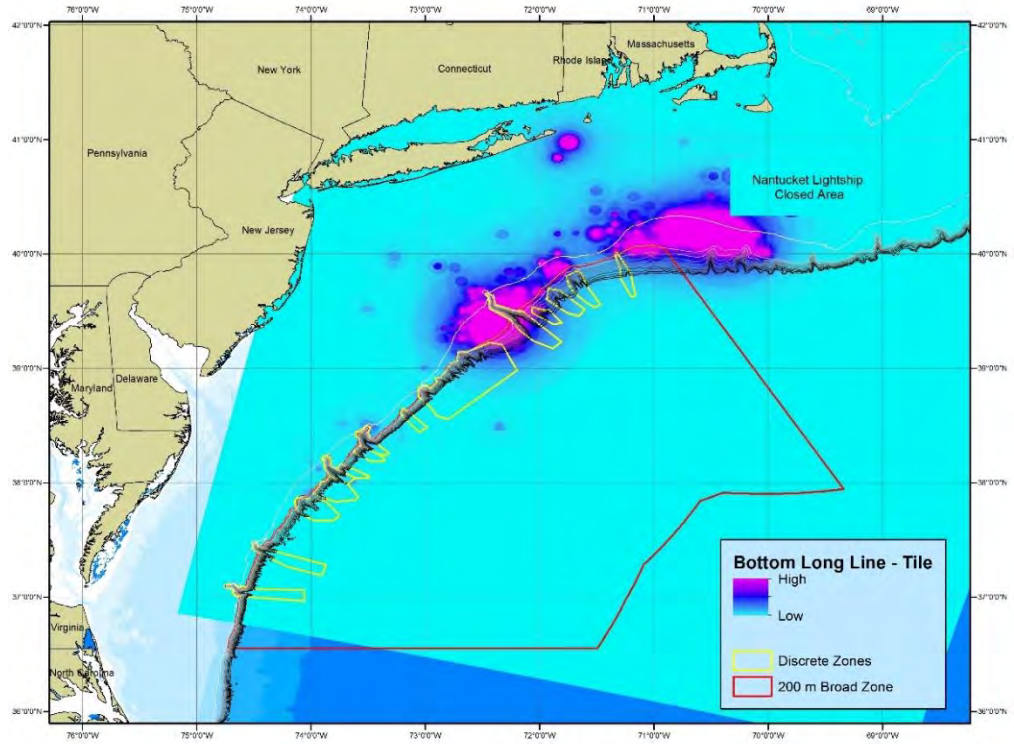


Figure 30: Areas of high cumulative estimated revenue (USD) for golden tilefish caught using bottom longline gear, 2007-2012, Maine through Virginia.

Because of the limitations of the VTR revenue-mapping model, raw VTR catch data and observer data were also analyzed to provide additional information on how fishing activity might be impacted by the proposed coral zones. For both of these additional investigations, a broader range of years was also used, 2000-2013.

7.3.2 VTR Point Data

An analysis of VTR point data, based on reported locations, was conducted to support for the model results. However, additional years were considered (2000-2013), and only catch data were used (i.e., they were not transformed into revenues as was done for the model). Additionally, the summer flounder/scup/black sea bass group was broken up into a summer flounder/black sea bass group and scup alone due to the lower value of scup. Unlike the above model, this analysis focused on the reported point location alone rather than spreading the effort around the point based on other information.

The initial dataset was all Northeast VTR reports for the gears described in the table below. Not all VTR reports include location information that can be mapped, so records lacking this information were removed. As discussed above, the VTR location information is approximate for a trip overall, but likely gives an approximate indication of whether areas are important for fishing, especially when considered over a range of years. The following table reports the percentage of catches that did have location information that could be mapped.

Table 33. Percent of VTR catch data with associated location information, 2000-2013.

Fishery	Percent of Catch Mappable
1. Bottom otter trawl – Squid (*Illex* and longfin)	94%
2. Bottom otter trawl – Hake	93%
3a. Bottom otter trawl – Summer flounder and black sea bass	93%
3b. Bottom otter trawl – Scup	95%
4. Pots/Traps – Red crab	87%
5. Bottom longline – Golden tilefish	92%
6. Dredge – Sea scallops	95%

Catches were analyzed with ArcGIS to determine the amounts of catch (totaled over all years) that are associated with the various areas being considered in this amendment. The table below describes the results. The percentages in the table are only of the total available to be mapped. So for example, from the 94% of all VTR squid catches (pounds) that could be mapped, 1.3% of those trips reported locations on their VTRs deeper than 500m (i.e. in the 500m broad zone), and those 1.3% of trips accounted for 15% of reported VTR catches. Since each trip only is associated with one general latitude/longitude point, these values are not necessarily the catches that actually occurred in the area, but should indicate relative importance of the various areas if the VTR locations are generally reported near where fishing actually occurred.

Table 34. Fishing activity in potential coral zones based on Vessel Trip Report (VTR) point data, 2000-2013.

Area	1. Bottom otter trawl – Squid (*Illex* and longfin)		2. Bottom otter trawl – Hake		3a. Bottom otter trawl – Summer flounder and black sea bass		3b. Bottom otter trawl – Scup		4. Pots/Traps – Red crab		5. Bottom longline – Golden tilefish		6. Dredge – Sea scallops	
*The catch percents assume that all of the catch from a given trip occurred in the area encompassed by the reported VTR location	% of Trips in Area	% of Catch from Area*	% of Trips in Area	% of Catch from Area*	% of Trips in Area	% of Catch from Area*	% of Trips in Area	% of Catch from Area*	% of Trips in Area	% of Catch from Area*	% of Trips in Area	% of Catch from Area*	% of Trips in Area	% of Catch from Area*
All Areas Not Under Consideration	93.4%	44.5%	93.7%	88.1%	97.7%	93.8%	98.3%	92.7%	36.9%	21.9%	75.8%	78.1%	99.3%	99.0%
500m broad zone	1.3%	15.0%	0.6%	0.7%	0.5%	1.7%	0.3%	1.3%	29.8%	42.6%	2.8%	2.5%	0.3%	0.6%
400m broad zone (includes deeper zones)	1.7%	19.9%	1.1%	1.8%	0.6%	2.0%	0.4%	1.7%	31.3%	43.7%	3.1%	2.8%	0.4%	0.6%
300m broad zone (includes deeper zones)	3.0%	30.5%	2.6%	5.6%	1.0%	2.8%	0.6%	2.3%	33.2%	44.7%	9.3%	8.6%	0.4%	0.7%
200m broad zone (includes deeper zones)	4.7%	40.7%	4.6%	9.5%	1.6%	3.8%	1.0%	3.7%	35.2%	44.9%	16.5%	15.2%	0.4%	0.7%
Baltimore Canyon (Industry)	0.0%	0.5%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	1.9%	1.7%	0.1%	0.0%	0.0%	0.0%
Mey-Lindenkohl Slope-Depth (Industry)	0.1%	0.6%	0.1%	0.1%	0.1%	0.3%	0.1%	0.5%	3.6%	5.5%	0.4%	0.2%	0.0%	0.1%
Mey-Lindenkohl Slope-Straight (Industry)	0.2%	1.2%	0.1%	0.1%	0.1%	0.4%	0.1%	0.7%	3.0%	4.6%	0.4%	0.2%	0.0%	0.1%
Norfolk Canyon (Industry)	0.1%	1.2%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	1.5%	0.5%	0.1%	0.0%	0.0%	0.0%
Accomac & Leonard Canyons	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	1.3%	0.0%	0.0%	0.0%	0.0%
Baltimore Canyon	0.1%	1.0%	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%	2.1%	1.7%	0.0%	0.0%	0.0%	0.0%
Block Canyon	0.1%	0.1%	0.1%	0.4%	0.0%	0.0%	0.0%	0.0%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%
Emery & Uchupi Canyons	0.0%	0.0%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.6%	0.7%	0.0%	0.0%	0.0%	0.0%
Hudson Canyon	0.7%	1.1%	1.0%	1.3%	0.2%	0.2%	0.2%	1.0%	2.0%	3.2%	5.3%	5.1%	0.0%	0.0%
Jones & Babylon Canyons	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	1.4%	0.4%	0.5%	0.0%	0.0%
Mey-Lindenkohl Slope	0.3%	2.2%	0.2%	0.2%	0.1%	0.5%	0.2%	1.2%	3.6%	5.5%	0.6%	0.4%	0.0%	0.1%
Norfolk Canyon	0.1%	1.5%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	1.6%	0.7%	0.1%	0.0%	0.0%	0.0%
North Heyes & South Wilmington Canyon	0.0%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	0.7%	0.0%	0.0%	0.0%	0.0%
Ryan & McMaster Canyons	0.0%	0.1%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.5%	0.7%	0.0%	0.0%	0.0%	0.0%
South Vries Canyon	0.1%	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Spencer Canyon	0.0%	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.4%	0.0%	0.0%	0.0%	0.0%
Warr & Phoenix Canyon Complex	0.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.3%	1.7%	0.0%	0.0%	0.0%	0.0%
Washington Canyon	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	2.5%	0.9%	0.3%	0.2%	0.0%	0.0%
Wilmington Canyon	0.1%	1.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	1.0%	1.6%	0.0%	0.0%	0.0%	0.0%

7.3.3 Northeast Fisheries Observer Program Data (NEFOP)

Observer data from NEFOP were obtained for bottom trawl, bottom longline, and sink/anchored gillnet gear types for years 2000 through 2013 for the Mid-Atlantic region. Records with incomplete geographic coordinates were removed. Observed hauls were analyzed relative to proposed broad zones. While coverage of trips is much lower with the observer data compared to the Vessel Trip Report (VTR) data, the observer data generally provides very precise location data for each tow/set. Observer coverage also varies by fishery and by year, however, aggregating the data over many years likely reveals relative patterns in fishing effort. Accordingly, NEFOP data was used to consider effort across the potential coral zones.

Observed Bottom Trawl Effort

Within the Mid-Atlantic management region, there were 25,073 total observed hauls (on 3,967 trips) using bottom trawl gear within this time period (Table 35; Figure 31). Tables 36-39 show the number of bottom trawl hauls intersecting each of the proposed broad coral zones, with associated number of trips and the average depth taken at the start of each haul. Depth information is meant to provide an approximation of the depth at which these fisheries are prosecuted, but may not provide a complete picture (especially for longer hauls), given that it is based on haul start location.

Hauls were analyzed by selecting those intersecting each broad zone, and many records are duplicated across Tables 36-39 if they intersect more than one broad zone alternative. In the vicinity of the proposed coral zones, bottom trawl effort is concentrated along the continental shelf and shelf break, and at the heads of canyons (Figure 31). For observed bottom trawl hauls over this time period, 14% intersect the 200 meter broad zone, 6% intersect the 300 meter broad zone, 3% intersect the 400 meter broad zone, and 1% intersect the 500 m broad zone. Tables are also provided that describe how many hauls intersect the discrete zones, and Figure 31 overlays the haul track data on a map with the proposed coral zones.

Table 35: All NEFOP observed bottom trawl hauls and trips, by gear type, within the Mid-Atlantic Council region from 2000-2013.

Gear Type	Number of trips	Number of hauls	Average Haul Start Depth
TRAWL,OTTER,BOTTOM,FISH	3,959	24,985	86 m (47 ftm)
TRAWL,OTTER,BOTTOM,SCALLOP	2	20	51 m (28 ftm)
TRAWL,OTTER,BOTTOM,SHRIMP	6	68	340 m (186 ftm)
Total	**3,967**	**25,073**	**Average: 87 m (48 ftm)**

Table 36: NEFOP observed bottom trawl hauls, trips, and average haul start depth, by gear type and target species, intersecting the 200 meter broad zone alternative, 2000-2013. Records removed for species observed on less than 5 hauls.

200 meter broad zone			
Gear Type; Target Species	**Number of trips**	**Number of hauls**	**Average Haul Start Depth**
TRAWL,OTTER,BOTTOM,FISH	**637**	**3,414**	**199 m (109 ftm)**
SQUID, ATL LONG-FIN	--	1,257	163 m (89 ftm)
SQUID, SHORT-FIN	--	1,248	199 m (109 ftm)
MONKFISH (GOOSEFISH)	--	449	267 m (146 ftm)
HAKE, SILVER (WHITING)	--	245	279 m (152 ftm)
FLOUNDER, SUMMER (FLUKE)	--	67	109 m (60 ftm)
WHITING, BLACK (HAKE, OFFSHORE)	--	46	362 m (198 ftm)
SCUP	--	32	133 m (73 ftm)
SQUID, NK	--	23	152 m (83 ftm)
SEA BASS, BLACK	--	20	100 m (55 ftm)
GROUNDFISH, NK	--	18	262 m (143 ftm)
TRAWL,OTTER,BOTTOM,SHRIMP	**6**	**67**	**343 m (188 ftm)**
SHRIMP, ROYAL RED	--	31	344 m (188 ftm)
HAKE, SILVER (WHITING)	--	15	338 m (185 ftm)
SHRIMP, PANDALID (NORTHERN)	--	9	353 m (193 ftm)
WHITING, BLACK (HAKE, OFFSHORE)	--	9	350 m (191 ftm)
Grand Total	**643**	**3,481**	**Average: 202 m (110 ftm)**

Table 37: NEFOP observed bottom trawl hauls, trips, and average haul start depth, by gear type and target species, intersecting the 300 meter broad zone alternative, 2000-2013. Records removed for species observed on less than 5 hauls.

300 meter broad zone			
Gear Type; Target Species	**Number of trips**	**Number of hauls**	**Average Haul Start Depth**
TRAWL,OTTER,BOTTOM,FISH	**432**	**1,486**	**217 m (119 ftm)**
SQUID, SHORT-FIN	--	640	207 m (113 ftm)
SQUID, ATL LONG-FIN	--	441	162 m (88 ftm)
MONKFISH (GOOSEFISH)	--	172	323 m (176 ftm)
HAKE, SILVER (WHITING)	--	121	323 m (177 ftm)
WHITING, BLACK (HAKE, OFFSHORE)	--	42	371 m (203 ftm)
FLOUNDER, SUMMER (FLUKE)	--	31	101 m (55 ftm)
SEA BASS, BLACK	--	13	91 m (50 ftm)
SCUP	--	11	126 m (69 ftm)
GROUNDFISH, NK	--	7	289 m (158 ftm)
SQUID, NK	--	5	147 m (81 ftm)
TRAWL,OTTER,BOTTOM,SHRIMP	**6**	**67**	**343 m (188 ftm)**
SHRIMP, ROYAL RED	--	31	344 m (188 ftm)
HAKE, SILVER (WHITING)	--	15	338 m (185 ftm)
SHRIMP, PANDALID (NORTHERN)	--	9	353 m (193 ftm)
WHITING, BLACK (HAKE, OFFSHORE)	--	9	350 m (191 ftm)
Grand Total	**438**	**1,553**	**Average: 222 m (122 ftm)**

Table 38: NEFOP observed bottom trawl hauls, trips, and average haul start depth, by gear type and target species, intersecting the 400 meter broad zone alternative, 2000-2013. Records removed for species observed on less than 5 hauls.

400 meter broad zone			
Gear Type; Target Species	**Number of trips**	**Number of hauls**	**Average Haul Start Depth**
TRAWL,OTTER,BOTTOM,FISH	**272**	**627**	**221 m (121 ftm)**
SQUID, SHORT-FIN	--	291	208 m (113 ftm)
SQUID, ATL LONG-FIN	--	166	158 m (86 ftm)
HAKE, SILVER (WHITING)	--	63	348 m (190 ftm)
MONKFISH (GOOSEFISH)	--	56	378 m (207 ftm)
FLOUNDER, SUMMER (FLUKE)	--	19	91 m (50 ftm)
WHITING, BLACK (HAKE, OFFSHORE)	--	14	395 m (216 ftm)
SEA BASS, BLACK	--	10	86 m (47 ftm)
SCUP	--	7	126 m (69 ftm)
TRAWL,OTTER,BOTTOM,SHRIMP	**5**	**13**	**357 m (195 ftm)**
SHRIMP, ROYAL RED	--	5	345 m (189 ftm)
Grand Total	**277**	**640**	**Average: 225 m (123 ftm)**

Table 39: NEFOP observed bottom trawl hauls, trips, and average haul start depth, by gear type and target species, intersecting the 500 meter broad zone alternative, 2000-2013.

500 meter broad zone			
Gear Type; Target Species	**Number of trips**	**Number of hauls**	**Average Haul Start Depth**
TRAWL,OTTER,BOTTOM,FISH	**170**	**299**	**192 m (105 ftm)**
FLOUNDER, SUMMER (FLUKE)	--	13	81 m (44 ftm)
HAKE, SILVER (WHITING)	--	12	341 m (186 ftm)
MONKFISH (GOOSEFISH)	--	9	338 m (185 ftm)
SCUP	--	6	123 m (67 ftm)
SEA BASS, BLACK	--	10	86 m (47 ftm)
SQUID, ATL LONG-FIN	--	95	157 m (86 ftm)
SQUID, NK	--	1	106 m (58 ftm)
SQUID, SHORT-FIN	--	153	212 m (116 ftm)
TRAWL,OTTER,BOTTOM,SHRIMP	**1**	**1**	**349 m (191 ftm)**
SHRIMP, ROYAL RED	--	1	349 m (191 ftm)
Grand Total	**171**	**300**	**Average: 192 m (105 ftm)**

Table 40: NEFOP observed bottom trawl hauls, trips, and average haul start depth, by target species, intersecting the discrete zones under alternative 3B.

Bottom Otter Trawl				
Canyon or Complex TARGET SPECIES	**Trips**	**Hauls**	**Avg. Haul Start Depth**	
			meters	**fathoms**
Block Canyon	**26**	**51**	**329.7**	**180.3**
GROUNDFISH, NK	--	3	249.9	136.7
HAKE, SILVER (WHITING)	--	14	360.9	197.4
MONKFISH (GOOSEFISH)	--	33	327.5	179.1
SQUID, ATL LONG-FIN	--	1	206.7	113.0
Ryan-McMaster Canyons	**8**	**13**	**261.9**	**143.2**
HAKE, SILVER (WHITING)	--	4	334.7	183.0
MONKFISH (GOOSEFISH)	--	5	303.6	166.0
SQUID, ATL LONG-FIN	--	4	137.2	75.0
Emery-Uchupi Canyons	**6**	**12**	**365.2**	**199.7**
HAKE, SILVER (WHITING)	--	7	368.1	201.3
MONKFISH (GOOSEFISH)	--	2	299.9	164.0
WHITING, BLACK (HAKE, OFFSHORE)	--	3	401.7	219.7
Jones-Babylon Canyons	**4**	**6**	**390.8**	**213.7**
HAKE, SILVER (WHITING)	--	4	388.6	212.5
WHITING, BLACK (HAKE, OFFSHORE)	--	2	395.0	216.0
Hudson Canyon	**197**	**488**	**154.1**	**84.3**
DORY, BUCKLER (JOHN)	--	1	135.3	74.0
FLOUNDER, SUMMER (FLUKE)	--	15	119.4	65.3
HAKE, RED (LING)	--	1	40.2	22.0
HAKE, SILVER (WHITING)	--	41	214.0	117.0
MONKFISH (GOOSEFISH)	--	2	138.1	75.5
SCUP	--	21	127.8	69.9
SEA BASS, BLACK	--	3	134.1	73.3
SHRIMP, ROYAL RED	--	12	356.3	194.8
SQUID, ATL LONG-FIN	--	373	137.0	74.9
SQUID, NK	--	2	139.9	76.5
SQUID, SHORT-FIN	--	5	186.2	101.8
WHITING, BLACK (HAKE, OFFSHORE)	--	12	376.0	205.6
Mey-Lindenkohl Slope	**172**	**571**	**153.2**	**83.8**
FLOUNDER, SUMMER (FLUKE)	--	66	109.8	60.0
HAKE, SILVER (WHITING)	--	14	246.2	134.6
SCUP	--	13	113.8	62.2
SEA BASS, BLACK	--	14	105.9	57.9
SHRIMP, ROYAL RED	--	1	365.8	200.0
SQUID, ATL LONG-FIN	--	349	141.7	77.5
SQUID, NK	--	8	151.1	82.6
SQUID, SHORT-FIN	--	104	212.7	116.3
WHITING, BLACK (HAKE, OFFSHORE)	--	2	343.8	188.0

Table 40, continued:

Spencer Canyon	**91**	**248**	**169.9**	**92.9**
FLOUNDER, SUMMER (FLUKE)	--	1	118.9	65.0
SCUP	--	4	134.9	73.8
SQUID, ATL LONG-FIN	--	119	156.8	85.7
SQUID, NK	--	6	133.8	73.2
SQUID, SHORT-FIN	--	118	186.5	102.0
Wilmington Canyon	**112**	**215**	**156.8**	**85.8**
FLOUNDER, SUMMER (FLUKE)	--	15	86.6	47.3
MACKEREL, ATLANTIC	--	1	76.8	42.0
SCUP	--	4	107.9	59.0
SEA BASS, BLACK	--	5	99.1	54.2
SQUID, ATL LONG-FIN	--	108	154.3	84.4
SQUID, NK	--	1	168.2	92.0
SQUID, SHORT-FIN	--	81	180.1	98.5
North Heyes-South Wilmington Canyons	**33**	**49**	**183.2**	**100.2**
SQUID, ATL LONG-FIN	--	15	173.6	94.9
SQUID, SHORT-FIN	--	34	187.4	102.5
South Vries Canyon	**58**	**121**	**183.4**	**100.3**
SQUID, ATL LONG-FIN	--	41	169.4	92.6
SQUID, SHORT-FIN	--	80	190.5	104.2
Baltimore Canyon	**117**	**267**	**150.3**	**82.2**
FLOUNDER, SUMMER (FLUKE)	--	80	81.3	44.5
SEA BASS, BLACK	--	13	89.0	48.7
SQUID, ATL LONG-FIN	--	89	152.6	83.4
SQUID, SHORT-FIN	--	85	222.4	121.6
Warr-Phoenix Canyon Complex	**30**	**72**	**185.8**	**101.6**
SQUID, ATL LONG-FIN	--	43	176.2	96.3
SQUID, SHORT-FIN	--	29	200.1	109.4
Accomac-Leonard Canyons	**37**	**87**	**168.6**	**92.2**
FLOUNDER, SUMMER (FLUKE)	--	5	66.2	36.2
SQUID, ATL LONG-FIN	--	40	161.7	88.4
SQUID, SHORT-FIN	--	42	187.4	102.5
Washington Canyon	**47**	**93**	**150.3**	**82.2**
FLOUNDER, SUMMER (FLUKE)	--	19	93.1	50.9
SCUP	--	1	107.9	59.0
SEA BASS, BLACK	--	11	104.9	57.4
SQUID, ATL LONG-FIN	--	27	143.5	78.5
SQUID, SHORT-FIN	--	35	202.1	110.5
Norfolk Canyon	**50**	**178**	**193.1**	**105.6**
CROAKER, ATLANTIC	--	1	20.1	11.0
FLOUNDER, SUMMER (FLUKE)	--	2	77.7	42.5
SQUID, ATL LONG-FIN	--	49	174.7	95.5
SQUID, SHORT-FIN	--	126	203.5	111.3

Table 41: NEFOP observed bottom trawl hauls, trips, and average haul start depth, by target species, intersecting the advisor-proposed discrete zones under sub-alternative 3B-1.

Bottom Otter Trawl				
Canyon or Complex	**Trips**	**Hauls**	**Avg. Haul Start Depth**	
			meters	**Fathoms**
Baltimore Canyon	**34**	**45**	**192**	**105**
FLOUNDER, SUMMER (FLUKE)	--	8	77	42
SEA BASS, BLACK	--	1	106	58
SQUID, ATL LONG-FIN	--	12	153	83
SQUID, SHORT-FIN	--	24	254	139
Mey-Lindenkohl Slope (Depth-based)*	**24**	**30**	**182**	**99**
FLOUNDER, SUMMER (FLUKE)	--	2	131	72
HAKE, SILVER (WHITING)	--	2	221	121
SCUP	--	1	57	31
SQUID, ATL LONG-FIN	--	16	135	74
SQUID, SHORT-FIN	--	9	281	154
Mey-Lindenkohl Slope Straight*	**69**	**151**	**179**	**98**
FLOUNDER, SUMMER (FLUKE)	--	8	125	69
HAKE, SILVER (WHITING)	--	1	132	72
SCUP	--	4	113	62
SEA BASS, BLACK	--	1	90	49
SQUID, ATL LONG-FIN	--	83	156	85
SQUID, SHORT-FIN	--	54	229	125
Norfolk Canyon	**36**	**86**	**209**	**114**
CROAKER, ATLANTIC	--	1	20	11
FLOUNDER, SUMMER (FLUKE)	--	2	59	32
SQUID, ATL LONG-FIN	--	20	186	102
SQUID, SHORT-FIN	--	63	224	122

*Differences in hauls and trips in the depth-based vs. straight line option for advisor-proposed boundaries of Mey-Lindenkohl are largely due to a very small area in the western corner of the proposed area, where the straight-line boundary extends slightly into an area where the depth-based boundary does not.

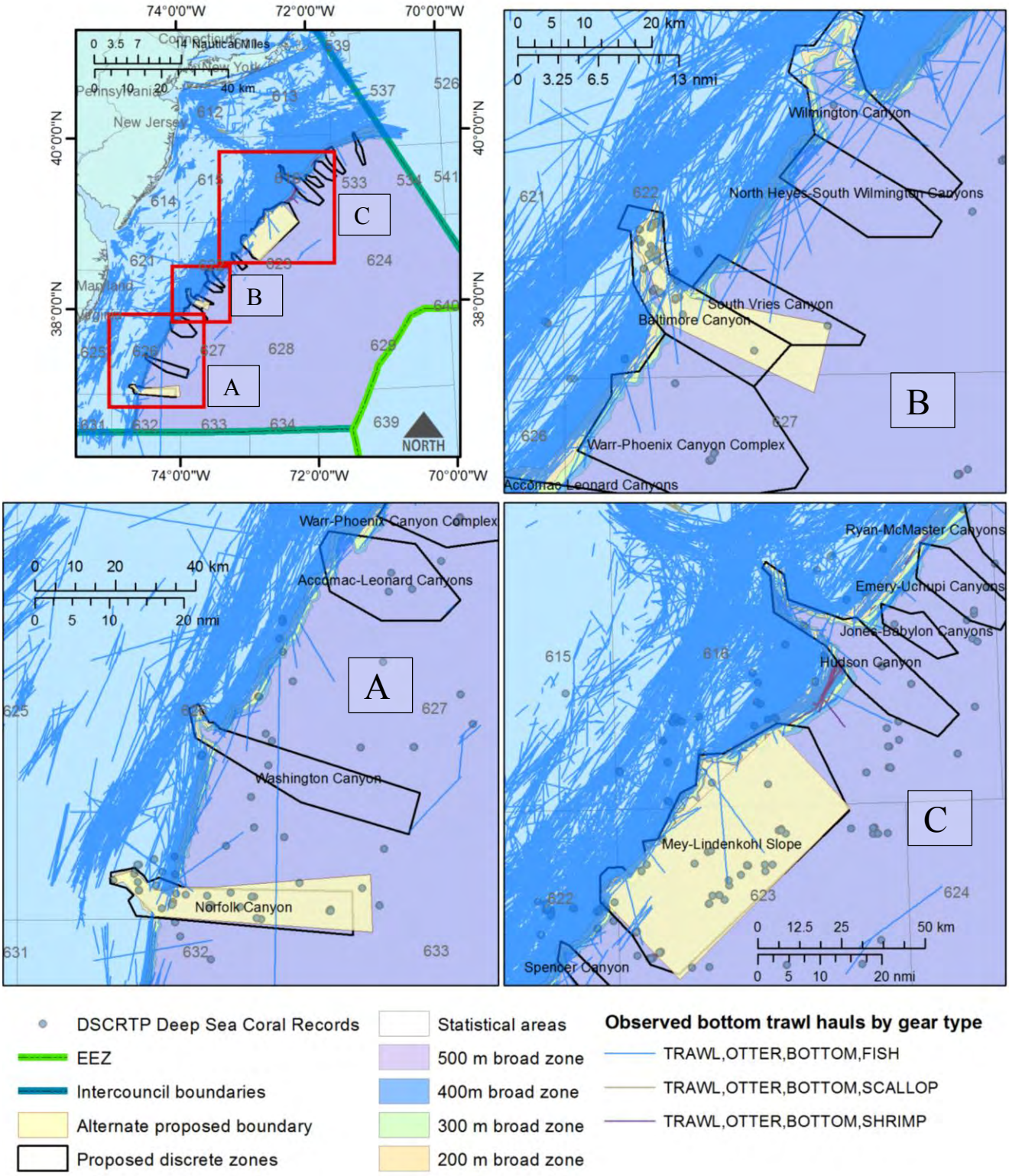


Figure 31: NEFOP observed bottom trawl hauls in the Mid-Atlantic region by gear type, 2000-2013.

Observed Gillnet Effort

Observer data indicate that in the Northeast Region from 2000-2013, there were 63,494 observed hauls (on 14,160 trips) using gillnet gear. Geographic coordinates for gillnet set location were present for only about 33% of the records in the database; therefore, haul coordinates were analyzed. Records with incomplete geographic location for haul were removed (6% of hauls; 4% of trips).

Within the Mid-Atlantic region, there were 13,928 observed hauls using gillnet gear, on 3,432 trips (Table 42a). Of these observed hauls, only six intersected any of the proposed coral zones (a small fraction of one percent). All six of these were hauls targeting monkfish using sink gillnets in 2004. These hauls occurred on two trips northeast of Block Canyon along the 300 meter depth contour (Figure 32). No observed gillnet hauls during this time period intersected any of the proposed discrete zones.

The vast majority of observed gillnet effort since 2000 has occurred in waters much shallower than the depths of any of the proposed coral zones in the Mid-Atlantic (Table 42). Only about 0.6% of observed gillnet trips and 0.5% of observed gillnet hauls occurred deeper than 75 fathoms (137 meters) in the Mid-Atlantic region, according to haul depth information recorded in the observer data.

Table 42: NEFOP Observer records of gillnet gear a) in the MAFMC region and b) intersecting proposed coral zones, 2000-2013.

a) Within MAFMC Region

Gear Type	Trips	Hauls	Average Haul Start Depth
GILL NET, ANCHORED-FLOATING, FISH	32	135	10 m (5 ftm)
GILL NET, DRIFT-FLOATING, FISH	197	621	20 m (11 ftm)
GILL NET, DRIFT-SINK, FISH	496	2,045	8 m (15 ftm)
GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES	2,707	11,127	12 m (22 ftm)
Total	**3,432**	**13,928**	**11 m (21 ftm)**

b) Within proposed coral zones

Gear Type	Trips	Hauls	Average Haul Start Depth
GILL NET, FIXED OR ANCHORED,SINK, OTHER/NK SPECIES	2	6	282 m (154 ftm)
Total	**2**	**6**	**282 m (154 ftm)**

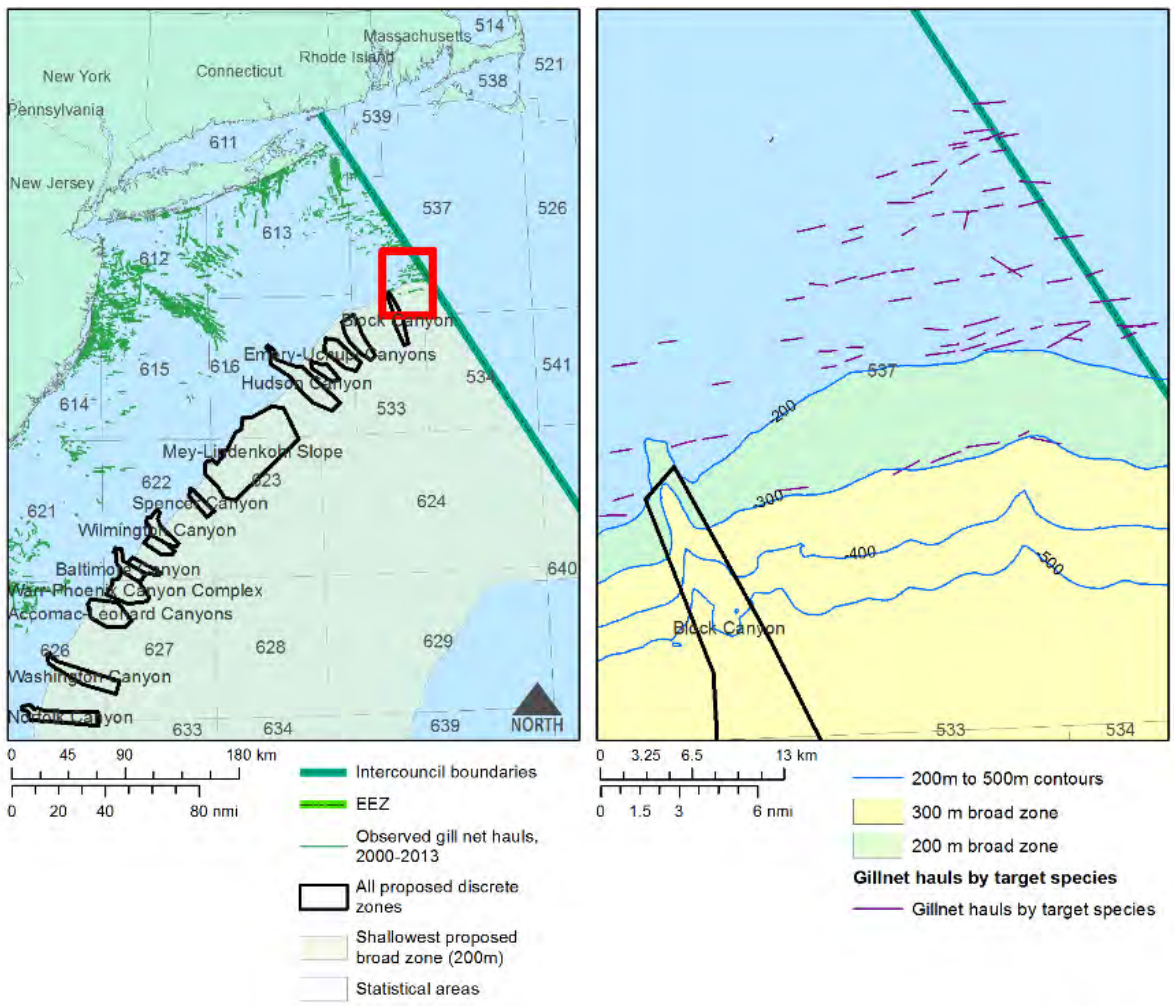


Figure 32: NEFOP observer hauls for gillnet gear in the Mid-Atlantic, 2000-2013, and area of intersection with proposed MAFMC broad coral zones.

Observed Bottom Longline Effort

For years 2000-2013, a total of 885 trips and 4,791 hauls using bottom longline gear were recorded for the Northeast Region in the NEFOP database. The majority of these records occurred within the management region of the NEFMC, and primarily targeted Atlantic cod, haddock, and other groundfish. Records with missing or incomplete geographic coordinates were unable to be plotted and were removed (about 1% of trips; 8% of hauls).

Within the MAFMC region, a total of 130 hauls using bottom longline gear were recorded in the observer data for 2000-2013. All of these records indicated tilefish as the target species, and occurred in northern areas of the MAFMC management region between 2004 and 2008 (Table 43; Figure 33).

In total, the proposed coral zones are intersected by most of these observed longline trips occurring within the MAFMC region (92%), and only about half of the hauls (53%). At the 300 meter broad zone, the number of observed trips within proposed zones drops to 4. Only one trip extends into the 400 meter and 500 meter broad zones (Figure 33). This would suggest that longline effort in these areas tends to be concentrated around the 200 meter depth contour or shallower at the heads of the canyon.

Table 43: NEFOP Observer data records of hauls using bottom longline gear from 2000-2013 a) in the MAFMC region, and b) within proposed broad coral zones.

a) Within MAFMC Region

Gear Type, Target Species	Trips	Hauls	Average Haul Start Depth
LONGLINE, BOTTOM			
TILEFISH, GOLDEN	10	98	180 m (99 ftm)
TILEFISH, NOT KNOWN	3	32	166 m (91 ftm)
Grand Total	**13**	**130**	**177 m (97 ftm)**

b) Within proposed broad coral zones

Broad Zone, Target Species	Trips	Hauls	Average Haul Start Depth
200 Meter Broad Zone	**12**	**69**	**203 m (111 ftm)**
TILEFISH, GOLDEN		54	205 m (112 ftm)
TILEFISH, NOT KNOWN		15	195 m (106 ftm)
300 Meter Broad Zone		**5**	**229 m (125 ftm)**
TILEFISH, GOLDEN		4	193 m (106 ftm)
TILEFISH, NOT KNOWN		1	375 m (205 ftm)
400 Meter Broad Zone		**2**	**144 m (79 ftm)**
TILEFISH, GOLDEN		2	144 m (79 ftm)
500 Meter Broad Zone		**1**	**146 m (80 ftm)**
TILEFISH, GOLDEN		1	146 m (80 ftm)

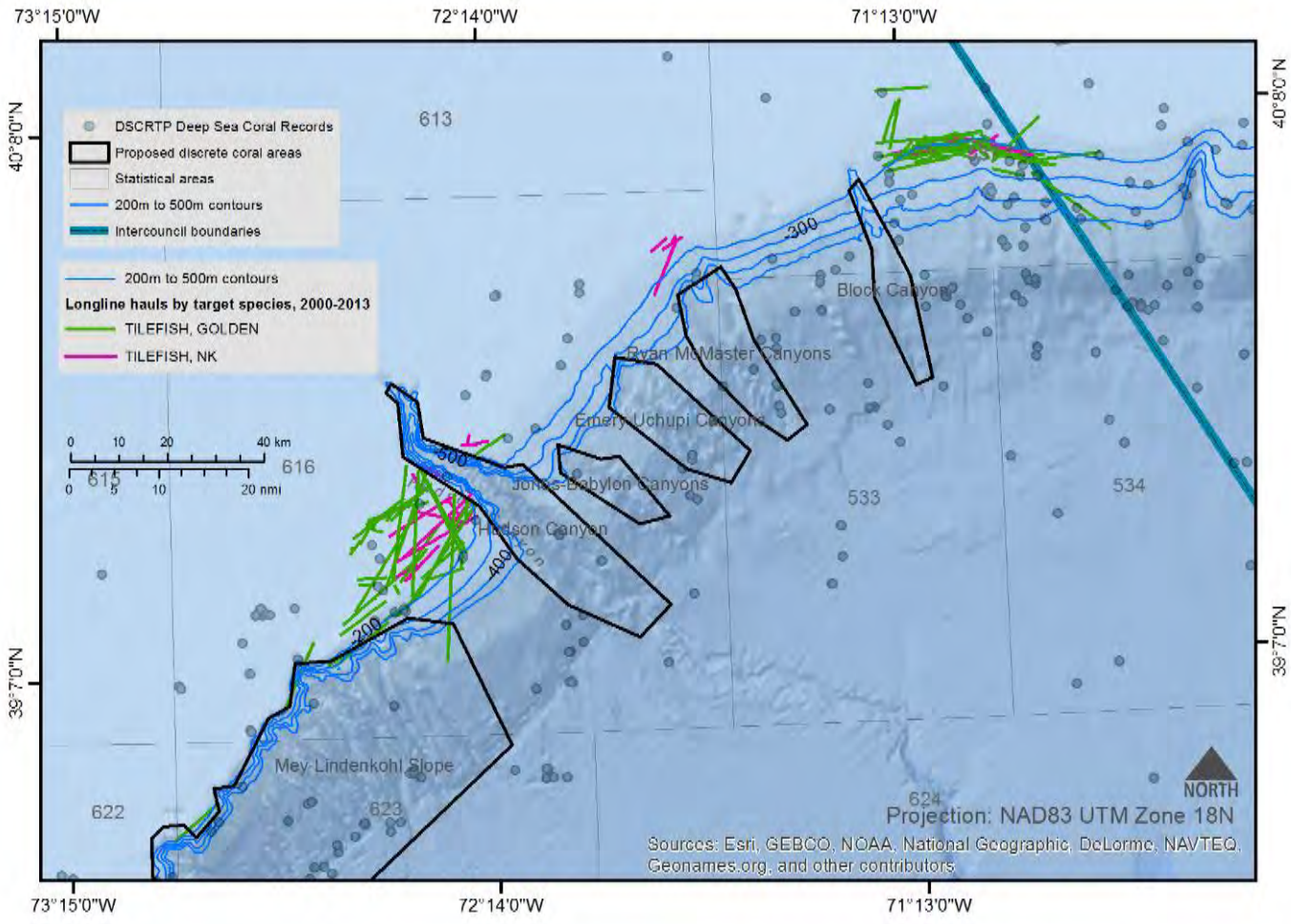


Figure 33: Observed bottom longline hauls in the MAFMC region, 2000-2013.

7.3.4 Summary of Economic Impacts

In general terms, fisheries that operate in offshore areas are expected to be negatively affected by any alternative that reduces access to those fishing areas. Of the fisheries that operate in the area, the squid and red crab fisheries are most likely to be affected. The potential for revenue losses at gross fleet-wide levels should be proportionate to the relative reduction in areas that can be fished, though the exact losses would depend on which areas are closed and how vessels respond to area closures, given that participants would be expected to relocate harvest effort into areas that remain open to some degree. Net losses are then dependent on the degree of reduced efficiencies, i.e., if lower catches are made in the remaining areas and/or if it costs more to fish in those areas. Many of the fisheries operate in specific environments and locations, such as in specific areas near/around canyons that are known for being highly productive. Thus, alternative locations may be limited depending on the measures selected by the Council. However, in general, effort would be expected to shift near/around other areas/canyons not impacted by the proposed measures. This effect would reduce both the negative socio-economic impacts to commercial fishermen and the protections to corals from closing particular areas.

Alternatively, socio-economic effects may be increased because of how fishermen deploy and fish their nets to account for bottom contours, current, wind, and area restrictions, which may prevent them from fishing a greater area than is mapped. For example, if they cannot have gear in the water (but not in contact with the bottom) while their vessel is above a canyon during net deployment and/or retrieval, they may not be able to fish the non-restricted shelf areas immediately adjacent to the closed areas. They also report that these areas are sometimes the most productive areas. While it is not possible to quantify the exact impacts relative to this fishing behavior, it would suggest that fishery impacts may be greater than is otherwise apparent because the effective closed area would be bigger than the mapped closed area.

7.4 SYNTHESIS OF CORAL AND ECONOMIC IMPACTS

The information provided in the above sections reflects the best scientific information on the distribution of deep sea coral and coral habitat. For the discrete zones, the measure of coral presence in individual canyon areas is quantitatively expressed as the area of high/very high coral habitat suitability within each canyon. This allows for a ranking of the canyons relative to their potential value if closed. The broad zones include portions of all of the discrete zones/canyons - their protective value and economic impacts diminish as the defining depth contours increase in depth.

The relative values of the discrete zones provided in Tables 29 (total coral habitat area) and 31 and 32 (ex-vessel revenue) are illustrated in Figure 34. Note that when the canyons are ranked by descending coral habitat area, the decline in percent revenue corresponds fairly well. Exceptions include Spencer Canyon, which is important economically, for its size, but comprises the second lowest coral habitat position, and Norfolk Canyon which has a high coral habitat rank, but a low economic value, largely due to the fact that a Tilefish GRA currently closes part of Norfolk Canyon to mobile bottom-tending gear, which was accounted for in revenue estimates.

This figure can be used to rank individual discrete zones - areas that result in higher coral protection relative to fishery revenues potentially have a higher rank given that more coral would be protected while impacting relatively less fishery revenue. However, results should be interpreted with caution, as there are uncertainties associated with both the habitat model and the revenue mapping model. In addition, effort redistribution by commercial fishermen as a reaction to any closed area may partially reduce the expected impacts.

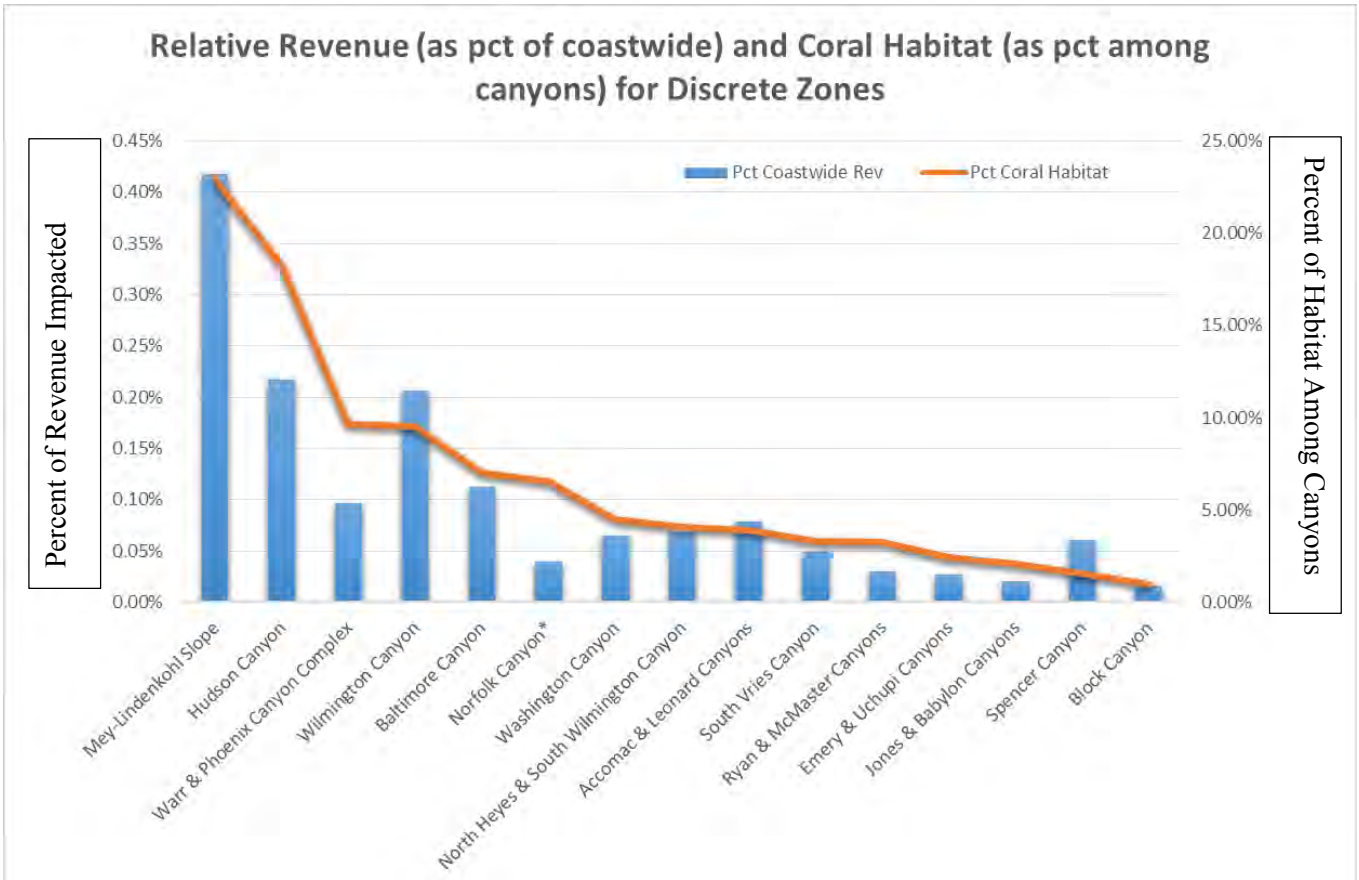


Figure 34: Ranked discrete zones as percentage of coastwide revenue (all gears, species) and coral habitat. *Note: Norfolk Canyon revenue estimates for trawl and dredge fisheries were adjusted to exclude the Norfolk Canyon Tilefish GRA, which is closed to mobile bottom-tending gear.

APPENDIX A: Criteria for proposed discrete coral zone boundaries

The Council's Deep Sea Corals FMAT met in April 2014 to discuss revisions to the original discrete zone boundaries based on new scientific information. Original boundaries were developed by the NEFMC Habitat Plan Development Team (PDT) during development of the NEFMC's Omnibus Habitat Amendment 2 (prior to splitting deep sea coral alternatives into a separate omnibus amendment).

The FMAT reviewed the boundaries relative to new information available from a deep sea coral habitat suitability model, new high resolution bathymetry data, and recent observations of corals from research surveys. The following criteria were developed by the FMAT and used to guide the re-drawing of boundaries:

1. Identify the major geomorphological features of each canyon or slope area (major axes; overall shape) within the current range of alternatives, based on examination of high resolution slope, bathymetry and other data describing canyon features and morphology.
2. Encompass areas of high and very high habitat suitability[1] from the deep sea coral habitat suitability model outputs for Alcyonacean corals (gorgonian and non-gorgonian combined), within the geographic range of each proposed canyon or slope area. Note: the Alcyonacean model output is expected to be the best predictor of habitat suitability for structure-forming corals.
3. For each proposed canyon or slope area, encompass areas of slope greater than 30 degrees, with emphasis on areas of slope greater than 36 degrees[2], within approximately 0.4 nautical miles (2 habitat suitability model grid cells) of high or very high suitable habitat. Note: during 2012-2013 TowCam and Okeanos Explorer cruises, areas of slope >=36 degrees contained exposed hard bottom almost 100% of the time, and areas of slope >=30 degrees often contained hardbottom habitat.
4. Draw boundaries to approximate a buffer of 0.4 nautical miles (2 model grid cells) from target areas of high slope and areas of high habitat suitability (as described in steps 2 and 3 above).
5. Incorporate available data for coral observations from 2012-2013 fieldwork in Baltimore Canyon, Norfolk Canyon, Toms Canyon complex, Block Canyon, and Ryan Canyon. Ensure that boundaries encompass areas where corals were observed within the proposed canyons, if location data is available. Note: These observations have not yet been incorporated into the habitat suitability model or the DSCRTP coral database.
6. Identify additional areas of conservation interest based on database (historical) records of deep sea corals, with an emphasis on records of Alcyonaceans (soft corals and gorgonians) and Scleractinians (stony corals), particularly larger and/or structure-forming (including colonial) coral types.
7. For adjacent canyons or slope areas with identified conservation areas of interest, identify whether such adjacent areas should be collapsed into a single area. Eliminate overlap between proposed discrete zone boundaries. Simplify boundary lines where possible.
8. Identify whether these coral data-based boundaries conflict with any of the industry-proposed boundaries, and where there are major discrepancies, consider sub-options.

[1] "High" and "very high" likelihood classes for habitat suitability were taken directly from thresholded versions of the model output provided by NOAA/NCCOS model developers.
[2] Slope data derived from ACUMEN 25m resolution multibeam data.

APPENDIX B: Coordinates for discrete zone alternatives

Table B1: Geographic coordinates of discrete zone options under Alternative 3B (decimal degrees).

Name	Point	Latitude	Longitude
Block Canyon	1	39.78774	-71.2897
	2	39.87666	-71.2918
	3	39.98863	-71.3417
	4	40.00886	-71.3171
	5	39.89611	-71.2436
	6	39.82509	-71.2019
	7	39.6349	-71.1584
	8	39.62337	-71.1979
	9	39.78774	-71.2897
Ryan & McMaster Canyons	1	39.85643	-71.657
	2	39.81256	-71.6229
	3	39.71607	-71.5835
	4	39.55715	-71.4652
	5	39.52924	-71.5128
	6	39.57439	-71.5947
	7	39.66868	-71.706
	8	39.73072	-71.7474
	9	39.80707	-71.764
	10	39.85643	-71.657
Emery & Uchupi Canyons	1	39.6018	-71.9388
	2	39.69588	-71.9203
	3	39.67931	-71.8211
	4	39.51302	-71.604
	5	39.4543	-71.6522
	6	39.48318	-71.7578
	7	39.6018	-71.9388
Jones & Babylon Canyons	1	39.48357	-72.06
	2	39.53643	-72.0641
	3	39.50618	-71.962
	4	39.51045	-71.9188
	5	39.39676	-71.8026
	6	39.38328	-71.8747
	7	39.48357	-72.06
Hudson Canyon	1	39.32704	-72.1715
	2	39.42664	-72.2581
	3	39.52176	-72.4375
	4	39.62123	-72.4461
	5	39.64233	-72.474
	6	39.65916	-72.4604
	7	39.62348	-72.3987
	8	39.55616	-72.3871
	9	39.49726	-72.1959
	10	39.50198	-72.1511
	11	39.23224	-71.8073
	12	39.1731	-71.8829
	13	39.23788	-72.0515
	14	39.32704	-72.1715

Table B1 (continued):

Mey-Lindenkohl Slope	1	39.22271	-72.4366
	2	39.20866	-72.3282
	3	38.98085	-72.1964
	4	38.55349	-72.7979
	5	38.58046	-72.8952
	6	38.66082	-72.9539
	7	38.75238	-73.0619
	8	38.82365	-73.0615
	9	38.84491	-73.0325
	10	38.84654	-72.9841
	11	38.82296	-72.9545
	12	38.87079	-72.8996
	13	38.91425	-72.9109
	14	38.91835	-72.8611
	15	39.04203	-72.7772
	16	39.06321	-72.724
	17	39.14312	-72.7101
	18	39.14626	-72.6236
	19	39.22271	-72.4366
Spencer Canyon	1	38.63672	-73.1702
	2	38.48241	-72.9827
	3	38.4408	-73.054
	4	38.59631	-73.2134
	5	38.64906	-73.2014
	6	38.63672	-73.1702
Wilmington Canyon	1	38.32567	-73.5678
	2	38.3879	-73.5794
	3	38.40976	-73.6104
	4	38.44497	-73.5978
	5	38.44538	-73.5659
	6	38.49917	-73.5139
	7	38.48334	-73.4793
	8	38.43814	-73.5
	9	38.38391	-73.4782
	10	38.25638	-73.3171
	11	38.23769	-73.3382
	12	38.24964	-73.4122
	13	38.32567	-73.5678
North Heyes & South Wilmington Canyon	1	38.32564	-73.5679
	2	38.24969	-73.4121
	3	38.20536	-73.3536
	4	38.1844	-73.3701
	5	38.18542	-73.4787
	6	38.26847	-73.6292
	7	38.32564	-73.5679
South Vries Canyon	1	38.1218	-73.7805
	2	38.16504	-73.7347
	3	38.05362	-73.4869
	4	38.03972	-73.4963
	5	38.04236	-73.6122
	6	38.1218	-73.7805

Table B1 (continued):

Baltimore Canyon	1	38.12645	-73.8805
	2	38.19796	-73.8846
	3	38.20234	-73.9062
	4	38.23295	-73.8885
	5	38.22208	-73.8292
	6	38.17262	-73.8259
	7	38.13976	-73.8195
	8	38.04245	-73.6128
	9	37.98644	-73.6778
	10	38.05924	-73.8274
	11	38.08937	-73.8566
	12	38.12645	-73.8805
Warr & Phoenix Canyon Complex	1	37.98642	-73.6779
	2	37.87505	-73.588
	3	37.84869	-73.6098
	4	37.83062	-73.7852
	5	37.90283	-73.9788
	6	37.97586	-73.9204
	7	38.00492	-73.9194
	8	38.00937	-73.8726
	9	38.05919	-73.8271
	10	37.98642	-73.6779
Accomac & Leonard Canyons	1	37.83528	-74.1436
	2	37.87024	-74.1179
	3	37.83992	-73.8725
	4	37.71273	-73.7477
	5	37.666	-73.8055
	6	37.66739	-73.9709
	7	37.73559	-74.116
	8	37.83528	-74.1436
Washington Canyon	1	37.48498	-74.4904
	2	37.44389	-74.4604
	3	37.44267	-74.444
	4	37.4282	-74.4272
	5	37.28014	-73.8687
	6	37.18749	-73.9017
	7	37.26229	-74.2035
	8	37.40942	-74.4992
	9	37.47416	-74.5159
	10	37.48498	-74.4904
Norfolk Canyon	1	37.10603	-74.7374
	2	37.1165	-74.6713
	3	37.0984	-74.645
	4	37.08395	-74.6341
	5	37.09448	-74.6034
	6	37.07048	-74.5257
	7	37.06082	-74.0613
	8	36.96249	-74.0606
	9	37.00855	-74.6676
	10	37.04396	-74.6883
	11	37.05542	-74.6742
	12	37.07256	-74.6953
	13	37.08211	-74.7396
	14	37.10603	-74.7374

Table B2: Geographic coordinates of advisor-proposed discrete zone options under alternative 3B-1 (decimal degrees) for Norfolk Canyon, Mey-Lindenkohl Slope (straight line), and Baltimore Canyon. Note: Mey-Lindenkohl depth-based option not shown due to depth-contour based boundaries.

Discrete Zone	Point	Latitude	Longitude
Norfolk Canyon	1	37.0668	-74.6169
	2	37.06449	-74.5835
	3	37.07265	-74.5624
	4	37.07191	-74.452
	5	37.09775	-74.0097
	6	36.96916	-74.0059
	7	37.00795	-74.6123
	8	37.04666	-74.6578
	9	37.08634	-74.7046
	10	37.0807	-74.7249
	11	37.09514	-74.7412
	12	37.11139	-74.6742
	13	37.0668	-74.6169
Mey-Lindenkohl Slope (Straight line)	1	38.774168	-73.0613
	2	39.209146	-72.4398
	3	38.989577	-72.1927
	4	38.538973	-72.7948
	5	38.74111	-73.032
	6	38.774168	-73.0613
Baltimore Canyon	1	38.15049	-73.836
	2	38.10714	-73.7835
	3	38.06859	-73.5448
	4	37.97704	-73.5757
	5	38.07334	-73.8233
	6	38.16501	-73.8633
	7	38.18001	-73.88
	8	38.22256	-73.8483
	9	38.24167	-73.8433
	10	38.21923	-73.8295
	11	38.15049	-73.836