



New England Fishery Management Council

50 WATER STREET | NEWBURYPORT, MASSACHUSETTS 01950 | PHONE 978 465 0492 | FAX 978 465 3116
Frank Blount, *Chairman* | Paul J. Howard, *Executive Director*

Habitat Area of Particular Concern Candidate Proposal Submission
Form

Name of Proposer: Christopher J. Zeman

Affiliation: Oceana

Telephone
201-263-9756

FAX
201-263-9758

Email:
czeman@oceana.org

Title of HAPC Proposal: Deep-sea coral habitat HAPC

Signature of Primary Proposer or Representative:

Date: March 25, 2005

Abstract / Brief Statement of Proposal:

Oceana proposes the designation as HAPC of nine deep-sea canyons known to contain deep-sea cold-water corals and other long-lived soft corals, sea fans and sponges: Lydonia, Oceanographer, Baltimore, Toms, Carteret, Hendrickson, Alvin, Norfolk, and Heezen. In addition, Oceana proposes that an area along the United States-Canadian border containing deep-sea corals be designated as HAPC. Scientists have reported the existence of deep-sea corals in all these canyons in a series of scientific reports related to an extensive federally-funded assessment of the New England and Mid-Atlantic continental slope in the late 1970s and 1980s. The proposal also recommends management measures that are consistent with prior approaches used in New England, the South Atlantic, and the North Pacific to protect deep-sea corals and other long-lived sensitive habitats.

Objectives of Proposal

The HAPC is proposed to give priority protection to those areas of deep-sea cold-water corals and other biogenic structure-forming species (e.g., sponges) that are abundant within these deep-sea canyons. Deep-sea cold water corals and sponges are extremely sensitive to disturbance by bottom-tending mobile gear and require extremely long periods of time to recover from such damage. While no fishery for benthic or demersal species is currently actively operating in the ten deep-sea canyons proposed for HAPC designation, with the exception of the Monkfish Fishery, actions after any such fishery

commences may be too late to conserve these important coral habitats. This proposal is an opportunity to conserve sensitive coral communities with little to no economic impact to the fishing industry or other economic activities.

Justification for Council Action:

A. Legal Authority

In New England, there has been confusion over the authority of the council to protect these sensitive areas as HAPCs. The Council and the agency have the authority to protect deep-sea canyons as HAPC because they are already EFH for numerous species. Moreover, the Council and the agency have the authority to designate deep-sea canyon areas as EFH and protect them as HAPC in the development of this Omnibus Amendment.

Deep-sea canyons are EFH for numerous species in the fishery management units (“FMUs”) under NEFMC jurisdiction. The species and life stages whose EFH could potentially benefit from HAPC protection in the canyons rely on habitat that has the following characteristics: (1) vulnerable to bottom trawls (2) deeper than 200 meters (3) includes rocky substrate (gravel, rocks, pebbles, etc.). Affected species and life stages are listed below.

Species and life stages with EFH more than minimally vulnerable to otter trawl gear (42): American plaice (Juvenile (J), Adult (A)), Atlantic cod (J, A), Atlantic halibut (J, A), haddock (J, A), pollock (A), ocean pout (E, J, A), red hake (J, A), redfish (J, A), white hake (J), silver hake (J), winter flounder (A), witch flounder (J, A), yellowtail flounder (J, A), black sea bass (J, A), scup (J), tilefish (J, A), barndoor skate (J, A), clearnose skate (J, A), little skate (J, A), rosette skate (J, A), smooth skate (J, A), thorny skate (J, A), and winter skate (J, A).

Species and life stages with EFH more than minimally vulnerable to otter trawl gear and designated in waters deeper than 200 meters (22):

Atlantic halibut (A), Pollock (A), Redfish (J, A), Silver hake (J), Witch flounder (J, A), Tilefish (J, A), Barndoor skate (J, A), Clearnose skate (J, A), Rosette skate (J, A), Smooth skate (J, A), Thorny skate (J, A), Winter skate (J, A), and White hake (J).

The Council also has the authority to protect these deep-sea canyons as HAPC because they are part of the Northeast Multispecies (“Groundfish”) FMU (Fishery Management Unit). Section 2.4.5 of the 1998 Omnibus Habitat Amendment provides that:

The management unit for the Northeast Multispecies FMP is the multispecies (finfish) fishery that occurs from eastern Maine through southern New England, encompassing all commercial and recreational harvesting sectors in New England and all fish species that factor into a fishery within a trip, from trip to trip and from season to season, except those species that

are subject to other fishery management plans under the Magnuson-Stevens Fishery Conservation and Management Act.

By specifying that the FMU includes “*all fish species that factor into a fishery . . .*” the definition sweeps in all fish species that groundfish vessels might catch. Because the groundfish fishery may expand out to deep-sea canyons in the future, groundfish vessels might catch deep-sea corals and other members of the deep-sea canyon community. Therefore, these species are part of the FMU.

Since canyon species are part of the FMU, the agency has the authority to identify EFH for them. 50 C.F.R. § 600.805(b)(1). Oceana proposes that as part of the second Omnibus Habitat Amendment, the Council identify EFH for deep-sea corals and associated species in the deep-sea canyon proposal areas, and then protect this EFH as HAPC.

Furthermore, because the scope of the current Omnibus Amendment extends to all habitat-related facets of FMPs under the Council’s jurisdiction, it is within the scope of the amendment to adjust FMUs, as necessary, to include deep-sea canyons. The broad definitions of *fish*, *fishery*, and *fishing* set forth in the Magnuson-Stevens Act, 16 U.S.C. §§ 1802(12)-(13), (15), as well as the broad definition of FMU set forth in the agency’s regulations, 50 C.F.R. § 600.10, grant the Council ample authority to include in the FMU any species that may be encountered by vessels fishing under the jurisdiction of one of its FMPs, designate EFH for that species, and create a HAPC.

B. Does the proposed HAPC address the four considerations set out in the final EFH regulations:

1. Ecological importance: does the habitat perform an important ecological function?

Yes. Canyons serve as natural fishing refuges, nursery areas, and home to rich biological communities associated with corals and sponges.

Ecological function #1:

Canyons historically served as natural refuges beyond the reach of fishing gear

Submarine canyons in other regions have been identified as potential natural refuges where long-lived species associated with rocky outcrops maintain remnant populations (Yoklavich et al. 2000).

Ecological function #2:

Canyons serve as nursery areas for a wide range of species

Canyons are also thought to serve as nursery areas for a number of species (Hecker 2001; Cooper et al. 1987). Hecker et al. (1983) found many faunal groups in canyons, particularly on hard substrates, that do not occur in other slope environments. The increased environmental heterogeneity of canyons may explain these differences in fauna

that respond to variable substrates and enriched nutrients (Levin and Gooday 2003, Hecker and Blechschmidt 1979).

Ecological function #3:

Canyons support rich biological communities associated with corals and sponges

Canyons may develop lush coral-associated communities compared to adjacent slope environments. Deep water corals and sponges provide high quality habitat that supports diverse communities of fish and other sea life. The vertical structure of these corals provides complex habitat with space for associated animals. Marine epifauna such as corals play an important role in shaping benthic communities through the habitat they provide (Bradshaw et al. 2003).

Corals, like most benthic species, are not individually identified in the EFH descriptions for any managed species in the Northeast region. However, benthic communities that include coral are found within the proposed closed areas and some corals may provide relief and shelter for managed species in the same way as other benthic epifauna. Benthic communities that include coral are known to be particularly vulnerable to damage from bottom-tending mobile fishing gear.

According to the NOAA Fisheries scientists, deep-sea corals serve many important purposes, including:

- Habitat for unique and diverse fish and invertebrate communities;
- Indicators of climatic trends. Deep-sea coral skeletons have been radiocarbon-dated to more than 40,000 years old (NOAA Fisheries)
- Potential sources of novel compounds for pharmaceutical and technological applications

See NOAA Fisheries' Deep-sea Coral Briefing Document [Attachment II]

In Canadian waters, abundant corals are better documented and appear to overlap with important fishing areas for redfish and Atlantic halibut (*pers. comm.* Dr. Don Gordon, DFO). Research such as that by Mortenson suggests that coral habitats have higher abundances of flatfish prey species, including shrimp and other crustaceans.

The canyon coral gardens described below support a rich diversity of species in a relatively small area that is worthy of special protection. Living seafloor with corals and sponges provides nurseries, feeding grounds, shelter from currents and predators, and spawning areas for many species of marine life.

In Mid-Atlantic mud slope habitats, sea pens act to increase the structural complexity of these otherwise flat habitats, and provide shelter to white hake and other finfish and crustaceans (Auster and Watling, unpublished).

For the same reason that they provide complex habitat, deepwater corals, sea pens, and other epifauna can be destroyed by bottom-tending fishing gear - because they stand erect

above the seafloor. Many deep-sea ecosystems are only rarely affected by natural large-scale physical disturbances (Levin et al. 2001). Consequently, they can be extremely vulnerable to anthropogenic disturbance. Some canyons are subject to powerful turbidity currents that affect the kinds of animals that live there, but these currents also serve an important role in connecting shallow and deepwater ecosystems (Curdia et al. 2004, Stocks and Boehlert 2003).

2. Sensitivity: Are deep-sea coral habitats sensitive to human induced environmental degradation

Yes. Deep-sea coral habitats epitomize the type of habitat that is most sensitive to disturbance and takes the longest to recover, if recovery is even possible. Deep-water corals are the oldest and slowest growing types of epifauna. A colony of *Primnoa resedaeformis* was aged to 112 years in the Gulf of Alaska (Andrews et al. 2002). Larger colonies formed from multiple settlement events may be 500 years old or more (Risk et al, 2000).

Fishing has had significant impacts on deepwater coral populations worldwide. Between 30%-50% of *Lophelia* reefs off Norway have been impacted or destroyed by trawling (Fossa et al. 2002). More than 90% of *Oculina* habitat in a reserve off the east coast of Florida has been reduced to unconsolidated rubble (Koenig et al. in review). Observations of the impacts of a single trawl tow through *Primnoa* habitat in the Gulf of Alaska, where 1000 kg of coral were landed, showed seven years later that 7 of 31 colonies remaining in the trawl path were missing 80-99% of their branches and boulders with corals attached were tipped and dragged (Krieger 2001).

Corals are clearly sensitive to fishing gear impacts and recovery rates are expected to be extremely slow based on our limited knowledge of recruitment, growth rates, and age structure.

For *Primnoa resedaeformis*, a common outer shelf-upper slope species, Risk et al. (2002) estimates linear growth rates at the distal tips of the colonies at 1.5-2.5 mm yr⁻¹ based on comparisons of live specimens with growth rates through the base of a sub-fossil specimen collected from the Northeast Channel at 450 m. Growth rates of this same species in the Gulf of Alaska are reported as 1.60-2.32 cm yr⁻¹, although these samples were collected at less than 200 m depth (Andrews et al. 2002). Age estimates for only a few specimens suggest this species lives for hundreds of years. The colony collected from the Northeast Channel (Risk et al. 2002) has an estimated age of >300 years, which is in accordance with age estimates of the same species collected in Alaska (>100 years; Andrews et al. 2002).

Desmophyllum cristagalli, a deepwater scleractinian (stony coral), grows at 0.5-1.0 mm yr⁻¹ and lives >200 years, with this growth rate verified by a specimen collected from an aircraft sunk in Baltimore Canyon in 1944 (Lazier et al. 1999, Risk et al. 2002). A 1.5 m high colony of the deepwater scleractinian coral *Lophelia pertusa* may be up to 366 years

of age (Breeze et al. 1997). Deep-water reefs of *Oculina varicosa* form pinnacles and ridges 3-35 m in height off the east coast of Florida and have an average growth rate of 16.1 mm yr⁻¹ (Reed 2002). Based simply on age and growth information, recovery of impacted colonies and thickets may take hundreds of years.

Although sea pens, a soft-coral Alcyonarian, are not as long-lived as coral, but can be decades old (Auster and Watling, unpublished). A pennatulid (sea pen) from the Bering Sea (248 m depth), although from a genus different from the common species in the northwest Atlantic region (*Halipteris willemoesi* in the Bering Sea versus *Pennatula aculeata*), has an estimated age for large specimens of 44.3 yrs (Auster and Watling, unpublished).

Data on recruitment patterns is even more limited. A single series of observations in the Gulf of Alaska suggest that recruitment of *Primnoa* sp. is patchy and aperiodic (Krieger 2001). No recruitment of new colonies was observed in an area where *Primnoa* was removed by trawling after seven years. However, six new colonies were observed at a second site one year after trawling. Four of these colonies were attached to the bases of colonies removed by trawling. Recruits of *Primnoa* were also observed on two 7 cm diameter cables (>15 colonies each). Scientists' limited observations of corals in the Gulf of Maine and in submarine canyons have not revealed any recent (or abundant) new recruits of coral taxa (Watling, Auster, and France, unpublished observations cited in Watling and Auster 2005).

3. Exposure: whether, and to what extent, development activities are, or will be stressing the habitat

At present, these areas proposed for HAPC designation are likely experiencing little disturbance from fishing activity, due to their depth and steep terrain. However, trawl fishing activity, specifically for monkfish, has expanded in recent years into continental slope areas in search of large monkfish.

Bottom trawling alters the physical structure of the seafloor, reduces habitat complexity, and changes the composition of benthic communities. Bottom trawling removes epifauna, thereby reducing habitat complexity and species diversity of the benthic community (Collie et al. 2000, Kaiser et al. 2000). From 1990 to 2002, U.S. federal fishery observers reported over 1,500 metric tons of coral and sponge bycatch from the Aleutian Islands, of which approximately 90% was caused by bottom trawling (NMFS 2002). Gravel pavement substrate disturbed by bottom trawling on Georges Bank in the Northeast Atlantic, for example, had significantly less emergent epifauna, shrimp, polychaetes, brittlestars, and small fish than undisturbed sites (Collie et al., 2000). Scavenging organisms tended to dominate communities in areas of high dredging disturbance while long-lived organisms and fragile taxa disappeared (Collie et al. 1997).

Bottom trawling can also decrease benthic productivity. Trawled areas of the North Sea, off the coast of Ireland, were significantly less productive when compared to untrawled areas of similar habitat type (Jennings et al. 2001). Areas disturbed by mobile fishing

gear on Georges Bank had lower levels of benthic production (both biomass and energy) when compared to undisturbed areas (Hermsen et al. 2003).

Research conducted in Alaska confirms research in other regions indicating that bottom trawling gear damages sensitive benthos. When bottom trawling occurs in coral habitat, up to 30% of coral colonies can be removed (Krieger, 1999). During a submersible study in the Gulf of Alaska, it was reported that 50% of the coral had been removed or broken by a single pass of a research bottom trawl (Krieger, 2002). The corals at the site had not recovered seven years later (Krieger, 2002). In Seguam Pass in the Aleutian Islands, gorgonian corals, which 20 years ago were a major component of the bycatch of the Atka mackerel fishery, steadily declined thereafter (NMFS 2001). This observation suggests that after years of bottom fishing, there were significantly fewer of these habitat-forming species left to catch. Video observation of some areas in Seguam Pass show completely destroyed coral habitats with only fragments of coral skeletons and rubble on the bottom (Zenger, 1999).

4. Rarity: Are these communities a rare habitat type?

As discussed earlier, canyons support unusual assemblages of deep-sea species that are not found in other slope areas. Protection of the proposed submarine canyons within the Council's management area is needed to maintain these rare combinations of species.

In the Mid-Atlantic, deep-sea corals are distributed in a narrow band in offshore waters along the Outer Continental Shelf, Slope, and part of the Continental Rise. Overall densities, as reported by (Wigley and Thoroux 1981) were very low. Deep-sea coral habitats are extremely rare and are not found in most areas on the continental shelf. Coral bycatch has not been consistently identified or enumerated during the groundfish survey of the Northeast Fisheries Science Center so this data set is limited in any assessment of status. No systematic assessment of the distribution and population dynamics of coral taxa is available for this region. However, the rarity of encounters with deepwater corals by scientists over 20 years of submersible dives across complex habitats on the shelf and upper slope of the northeast U.S. suggests that the distribution of these species has significantly contracted since the time of the surveys conducted by Wigley, Theroux and others. (Auster and Watling 2005).

While sea pens are more common than hard-corals in slope areas, they are not common in shelf areas that comprise most of the Mid-Atlantic (B.Hecker, *pers.comm.*)

Coordinates of Candidate HAPC (Please provide in latitude and longitude to the scale of degree/minutes/seconds or decimal degrees):

Coordinates for each of the canyons were designed to encompass mapped deep-sea corals within the canyons, as well as other long-lived emergent epifauna (i.e. sponges, sea pens). In the case where mapped corals occurred within the boundaries proposed, but not adopted, under Monkfish Amendment 2 in Alternative 5C, the HAPC proposal uses those boundaries. If mapped deep-sea corals occur outside those boundaries, then the HAPC

proposal expands the boundaries to encompass known areas of deep-sea corals. The Supporting Data section includes maps, text descriptions and dive summaries that support the proposed boundaries for each HAPC. The petitioner is willing to consider modifying the proposed areas, if necessary, for example, in order to improve enforceability. The proposed boundaries for the proposed HAPCs are as follows (see Appendix I for a map of the location of each of the canyons):

Norfolk Canyon - The proposed boundary for this HAPC is as follows: northwest corner at 37.07° N, 74.34° W; southwest corner at 36.58° N, 74.34° W; northeast corner at 37.07° N, 74.06° W; southeast corner at 36.58° N, 74.06° W. This area incorporates known deep sea corals as identified during four Alvin dives in Norfolk Canyon. These dives were summarized and corals were mapped as part of a 1979 report by Dr. Barbara Hecker and Dr. Blechschmidt. See Supporting Data for full cite to this report.

Baltimore Canyon - The proposed boundary for this HAPC is as follows: northwest corner at 38.15° N, 73.55° W; southwest corner at 37.50° N, 73.55° W; northeast corner at 38.00° N, 73.40° W; southeast corner at 37.50° N, 73.40° W.

Hendrickson Canyon (Slope II) - The proposed boundary for this HAPC is as follows: northwest corner at 39.10° N, 72.40° W; southwest corner at 38.50° N, 72.30° W; northeast corner at 39.15° N, 72.25° W; southeast corner at 38.55° N, 72.20° W.

Toms and Carteret Canyons (Slope I) - See proposed map in Supporting Data for specific coordinates.

Alvin Canyon - - The proposed boundary for this HAPC is as follows: northwest corner at 40.00° N, 70.45° W; southwest corner at 39.40° N, 70.45° W; northeast corner at 40.00° N, 70.25° W; southeast corner at 39.40° N, 70.25° W.

Lydonia Canyon – The proposed boundary for this HAPC is as follows: northwest corner at 40.27° N, 67.40° W; southwest corner at 40.16° N, 67.42° W; northeast corner at 40.27° N, 67.38° W; southeast corner at 40.16° N, 67.34° W.

Oceanographer Canyon - The proposed boundary for this HAPC is as follows: northwest corner at 40.24° N, 68.09° W; southwest corner at 40.10° N, 68.12° W; northeast corner at 40.24° N, 68.08° W; southeast corner at 40.10° N, 67.59° W.

Heezen Canyon - The proposed boundary for this HAPC is as follows: northwest corner at 41.05° N, 66.25° W; southwest corner at 41.00° N, 66.25° W; northeast corner at 41.05° N, 66.19° W; southeast corner at 41.00° N, 66.19° W.

US-Canadian Boundary - The proposed boundary for this HAPC is as follows: northwest corner at 41.60° N, 66.30° W; southwest corner at 40.55° N, 66.30° W; northeast corner at 41.60° N, 66.10° W; southeast corner at 37.49° N, 66.10° W.

Supportive Data and Other Information:

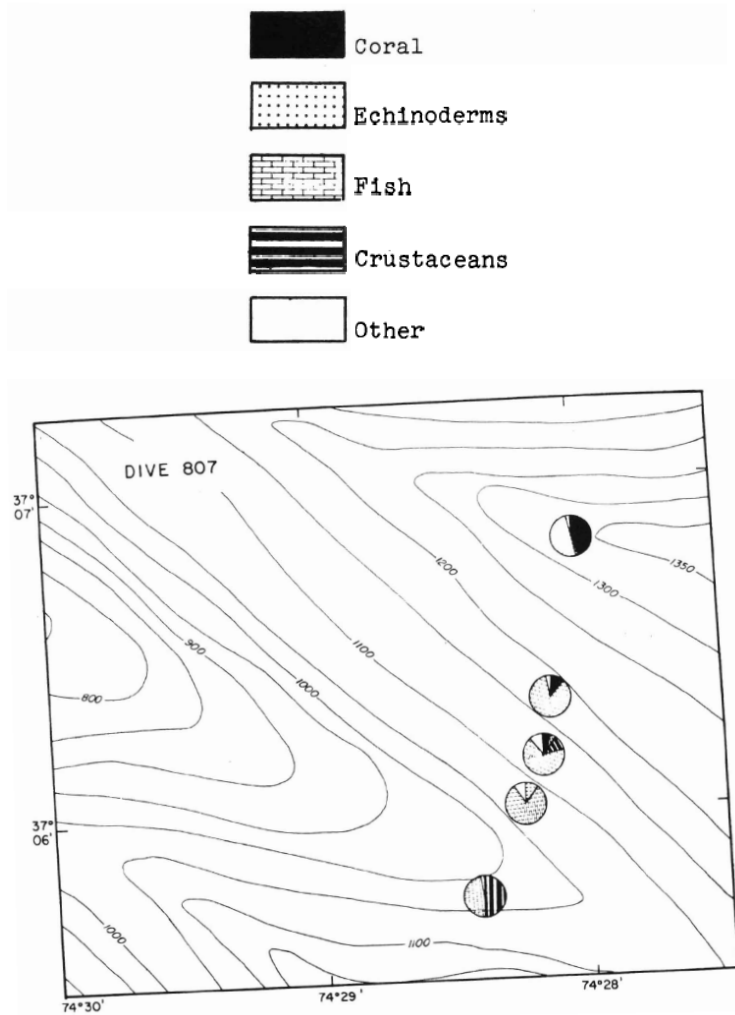
This section provides the supporting data, dive summaries, and coral maps used to support the proposed HAPC areas. Relevant data is reproduced from the original reports and included for each proposed canyon HAPC.

Norfolk Canyon

Deep-sea coral species, including *D. cristigalli* and *Acanthogorgia armata*, were identified during Alvin dives in Norfolk Canyon. The figures and maps below provide locations for these dives, as well as taxonomic classification of the various corals found in Norfolk Canyon.

Figure C-3.

Map showing the relative percentages of major faunal groups on the continental slope north of Norfolk Canyon for 50 meter depth intervals.



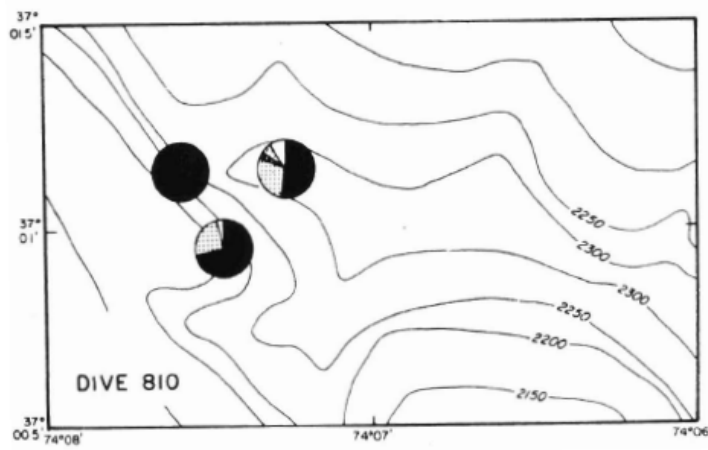
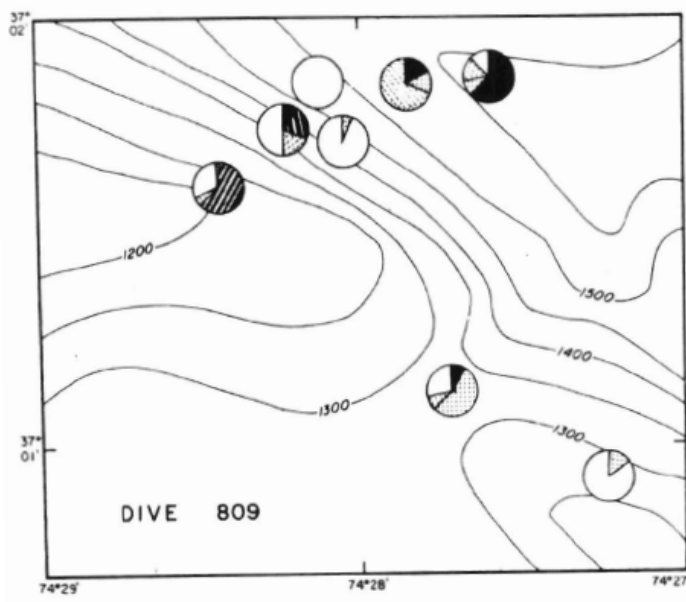
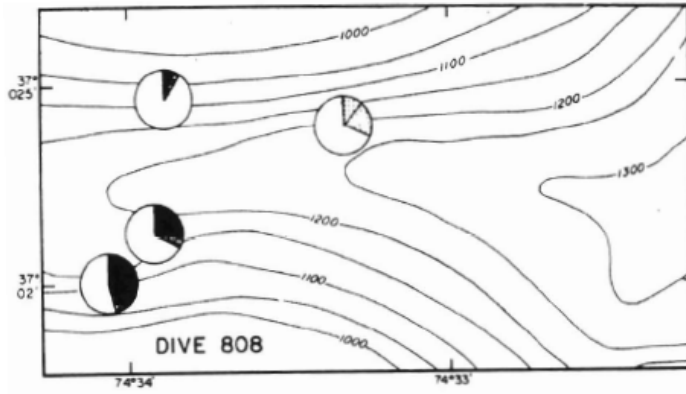
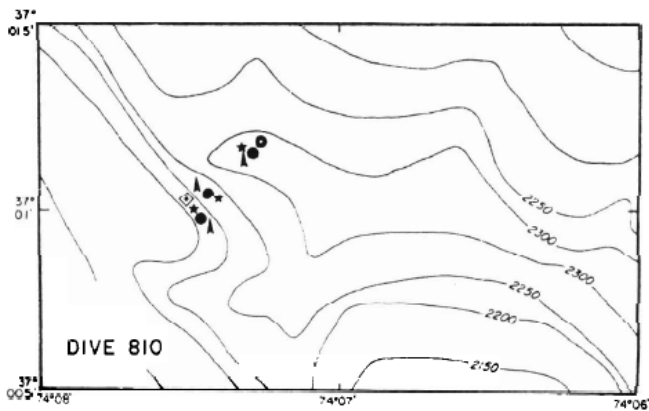
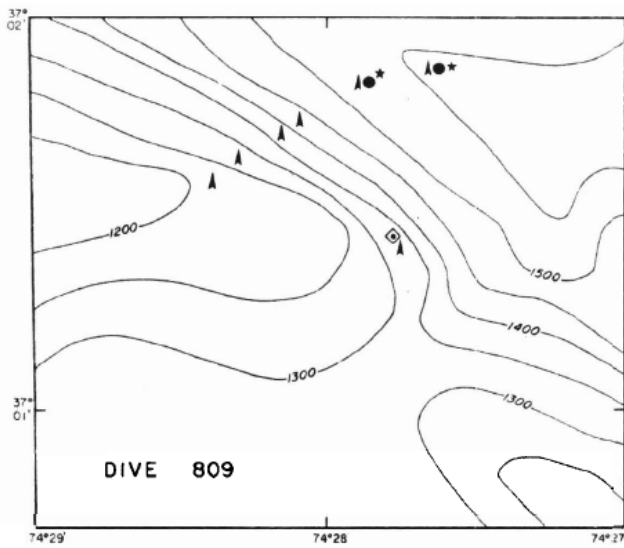
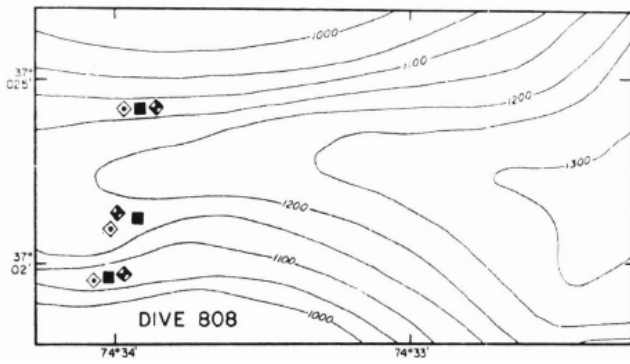


Figure E-4.

Location of coral species in Norfolk Canyon seen
in ALVIN dives 808, 809 and 810.

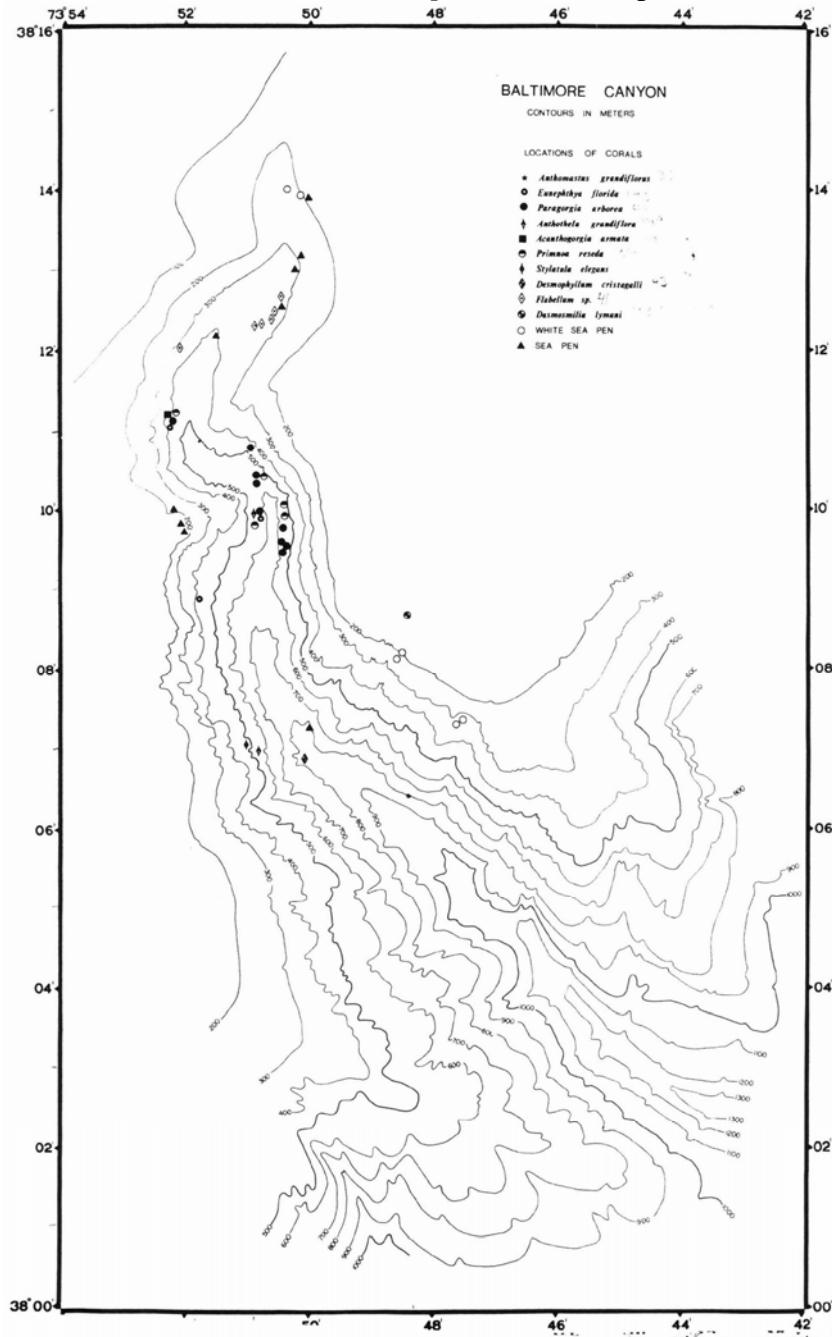
- *Pennatula* sp. - Sea pen
- ⊛ *Eunephthya fruticosa*
- ★ *Anthomastus grandiflorus*
Acanthogorgia armata
- ▲ Sea pen
Desmophyllum cristagalli
- ◊ *Flabellum* sp.



Hecker, B. and Blechschmidt, G. Final Historical Coral Report for the Canyon Assessment Study in the Mid- and North Atlantic Areas of the U.S. Outer Continental Shelf, Appendix A - Epifauna of the Northeastern U.S. Continental Margin., July 14, 1979, at A71 - A74, A95 - A96.

Baltimore Canyon

Nearly 300 areas and 135 species were analyzed to discern megafaunal assemblage patterns in Baltimore Canyon. Deep sea corals identified in surveys and dive summaries include the scleractinium, *Dasmosmia lymani*, gorgonian corals, *Paragorgia arborea* and *Primnoa reseda*, *Anthothela grandiflora*, and the solitary hard coral *Flabellum alabastrum*. Other forms of biological structure-forming organisms include sea pens *Stylata elegans*, species of sponges including *Bumunida picta*, and exceptionally dense stands of the anemone *Halcurias pilatus*. See map below.



This map of known coral locations in Baltimore Canyon is reproduced from Hecker, B., Blechschmidt, G., and Gibson, P. Epifaunal Zonation and Community Structure in Three Mid- and North Atlantic Canyons, Final Report for the Canyon Assessment Study in the Mid- and North Atlantic Areas of the U.S. Outer Continental Shelf. Lamont-Doherty Geological Observatory, Published January 11, 1980, Prepared for U.S. Dept. of the Interior, Bureau of Land Management, Contract #BLM AA551-CT8-49.

In addition, dive summaries of Alvin and Johnson Sea Link dives for the study cited below also note dense colonies of deep-sea corals *Primnoa reseda*, *Paragorgia arborea* and *Anthothela grandiflora* at depths starting at 390 meters and below 441 meters. Below 1000 meters, the dives observed the occurrence of *D. cristagalli*, and the cup coral *Flabellum alabastrum*. From 1790 to 1940 meters, the dives observed the coral *Acanella arbuscula* and *Anthomastus agassizii*.

Dive summaries are summarized from Final Report, Canyon and Slope Processes Study, Volume III, Biological Processes. Prepared for US Dept. of Interior, Minerals Management Service, Washington DC, Contract #14-12-0001-29178, Sept 1983, Prepared by Lamont-Doherty Geological Observatory of Columbia University, Palisades, New York, Appendix B – Dive Summaries, at 121-124.

Tom's and Cateret Canyons (Slope I)

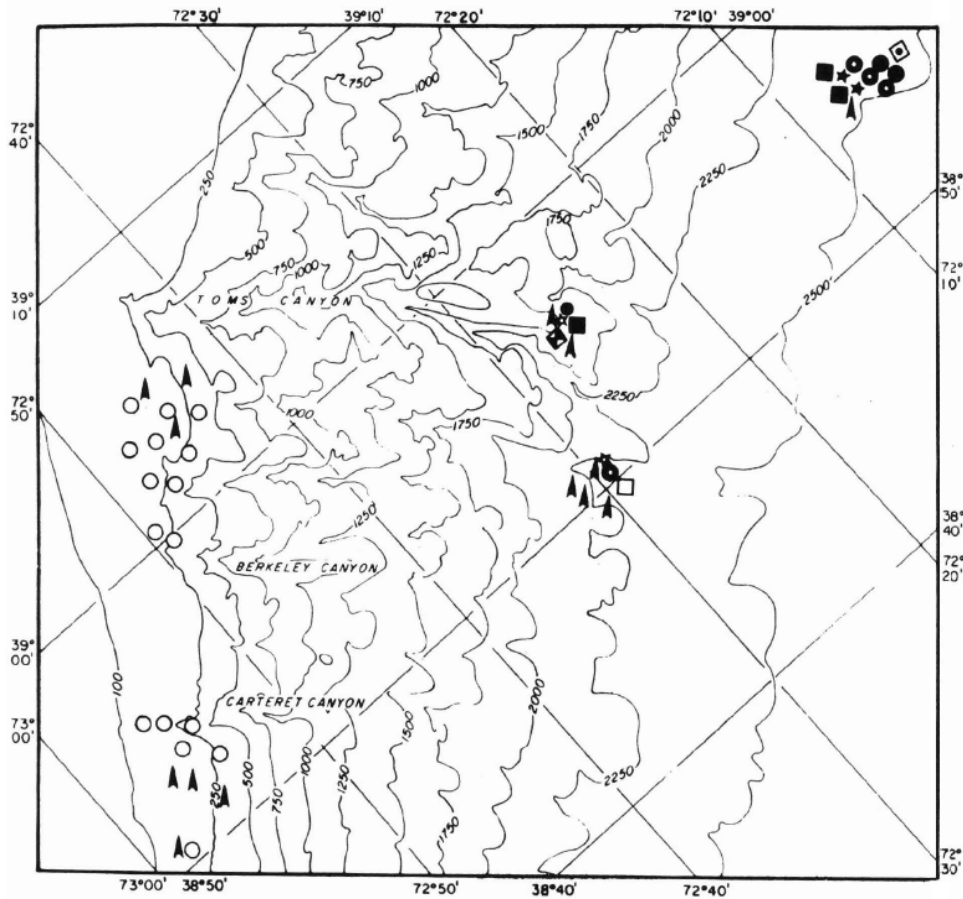
Dive summaries of Alvin dives in this area report the existence of deep-sea corals *D. cristagalli* and *Anthomastus agassizii* occurring between 1400 and 1425 meters. Between 1500 and 1900 meters, *D. cristagalli* and a soft coral *Acanella arbuscula* are common. Between 1900 and 2100 meters, dense populations of *D. cristagalli* occur with occasional colonies of the coral *Anthomastus agassizii*, *Chrysogorgia agassizii*, and *Anthomastus agassizii*.

Dive summaries are summarized from Final Report, Canyon and Slope Processes Study, Volume III, Biological Processes. Prepared for US Dept. of Interior, Minerals Management Service, Washington DC, Contract #14-12-0001-29178, Sept 1983, Prepared by Lamont-Doherty Geological Observatory of Columbia University, Palisades, New York. Appendix B – Dive Summaries, at 124-125.

Figure E-5.

Location of coral species in Carteret and Toms Canyons, and at DWD #106.

- *Pennatula* sp. sea pen
- ⊙ *Eunephthya fruticosa*
- ☆ *Anthomastus agassizii*
- ★ *Anthomastus grandiflorus*
- *Paramuricea borealis*
- ~~White sea pen~~ *Siphonalia elegans*
- ▲ Sea pen
- ▲ *Acanthogorgia armata*
- ▲ *Desmophyllum cristagalli*
- ◊ *Flabellum* sp.



The above map provides locations of deep-sea corals and taxonomic breakdown. The map is reproduced from the following report: Hecker, B. and Blechschmidt, G. Final Historical Coral Report for the Canyon Assessment Study in the Mid- and North Atlantic

Hendrickson Canyon (Slope II)

Five camera-sled transects, and four submersible transects were analyzed from Hendrickson Canyon (Slope II area). Areas between 1350 and 1430 meters consist of 3 cliff areas, which are vertical exposures of Eocene chalk. Observations recorded the existence of the horn coral, *Desmophyllum cristigalli*, and the soft coral, *Anthomastus agassizii*. Fissures and indentations at the base of these cliffs were inhabited by dense populations of hard corals (*D. cristigalli* and *Solenosmilia variabilis*). See map below (Cluster Group 3c – white areas on map surrounded by Cluster Group 3a (dotted)).

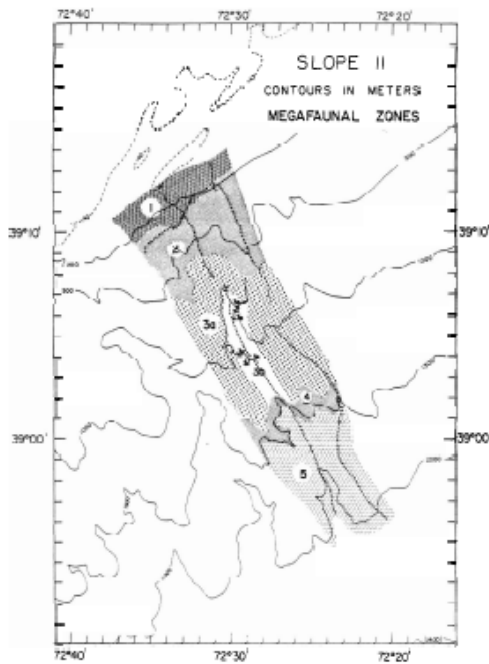


FIG. 41. Megafaunal zones in Slope II defined by cluster analysis.

Hendrickson Canyon
off New Jersey

Text descriptions and maps of corals in Hendrickson Canyon are reproduced from Final Report, Canyon and Slope Processes Study, Volume III, Biological Processes. Prepared for US Dept. of Interior, Minerals Management Service, Washington DC, Contract #14-12-0001-29178, Sept 1983, Prepared by Lamont-Doherty Geological Observatory of Columbia University, Palisades, New York. Pgs. 79-81.

Dive summaries of Alvin and Johnson Sea Link dives for the study cited below also note the existence of *D. cristigalli* between the depths of 930 and 1450 meters. From 1350 to

1450 meters, *D. cristagalli*, the colonial scleractinium *Solenosmilia variabilis*, *Paramuricea grandis*, and *Anthomastus agassizii*. Between the depths of 1735 and 2080 meters, dive summaries recorded the presence of *Acanella arbuscula*, *Chrysogorgia agassizii*, *Paramuricea grandis*, as well as *D. cristagalli*.

Dive summaries are summarized from Final Report, Canyon and Slope Processes Study, Volume III, Biological Processes. Prepared for US Dept. of Interior, Minerals Management Service, Washington DC, Contract #14-12-0001-29178, Sept 1983, Prepared by Lamont-Doherty Geological Observatory of Columbia University, Palisades, New York, Appendix B – Dive Summaries, at 125-127.

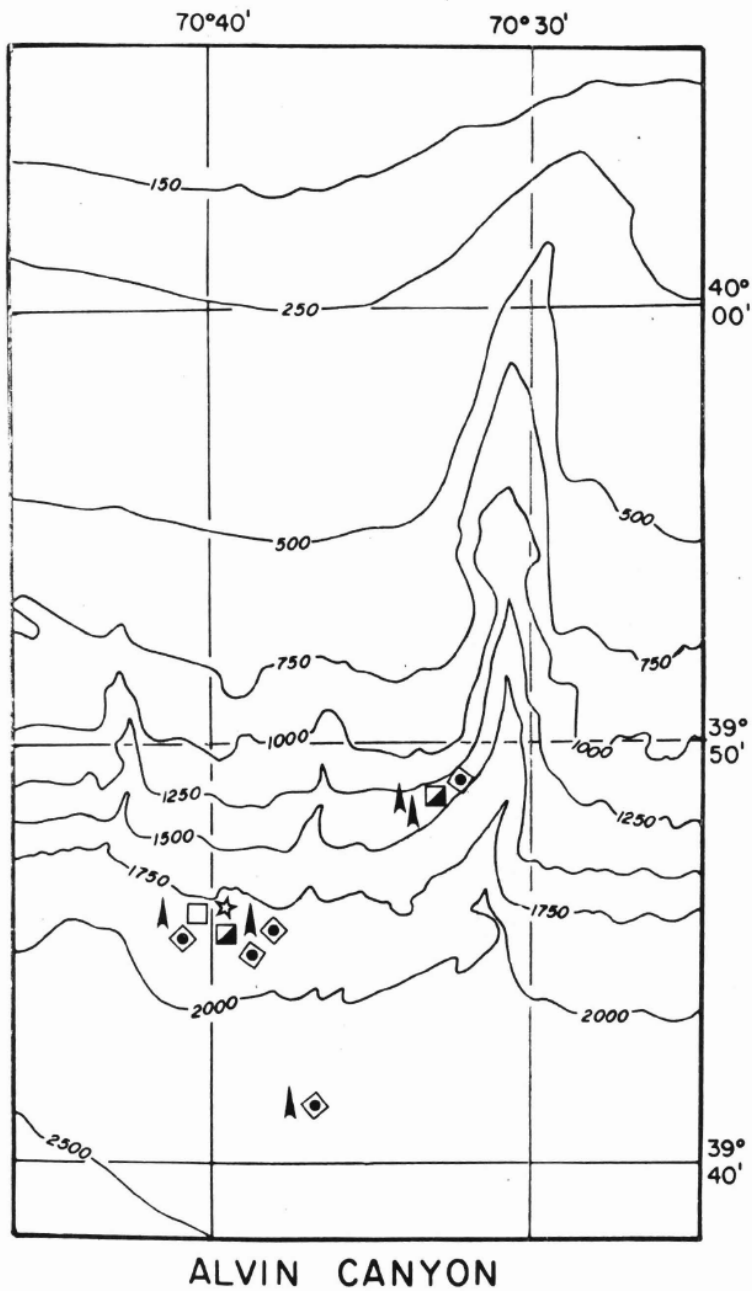
Alvin Canyon

Two areas were identified to contain *A. agassizii*, *Paramuricea borealis*, *Acanella arbuscula*, as well as long-lived species of sea pens.

Figure E-6.

Location of coral species on the continental slope near Alvin Canyon.

- ☆ *Anthomastus agassizii*
- *Paramuricea borealis*
- *Acanella arbuscula*
- ◇ *Flabellum* sp.
- Sea pen



The map of coral locations is from Hecker, B. and Blechschmidt, G. Final Historical Coral Report for the Canyon Assessment Study in the Mid- and North Atlantic Areas of the U.S. Outer Continental Shelf, Appendix A - Epifauna of the Northeastern U.S. Continental Margin, July 14, 1979. Pgs. A99-A100.

Lydonia and Oceanographer Canyon

These canyons are proposed for HAPC designation based on the known abundances of very high densities of deep-sea corals. This was the basis for the Council to close these areas to monkfish trawling and gillnets in Monkfish Amendment 2. However, these areas were not designated HAPC, nor were prohibitions put in place for other fisheries that may expand into these areas. For these reasons, both canyons are included in this proposal. The petitioner has coral maps of these two canyons as well as dive summaries that provide extensive discussion of the corals in these two canyons. These materials can be obtained upon request.

Heezen Canyon

Dive summaries from three Alvin dives into Heezen Canyon identified significant amounts of deep-sea coral species, including *A. agassizii*, *P. borealis*, *A. arbuscula*, *D. cristagalli*, and *E. florida*.

Figure C-6.

Map showing the relative percentages of major faunal groups in Heezen Canyon for 50 meter depth intervals (ALVIN dives 780, 782 and 783).

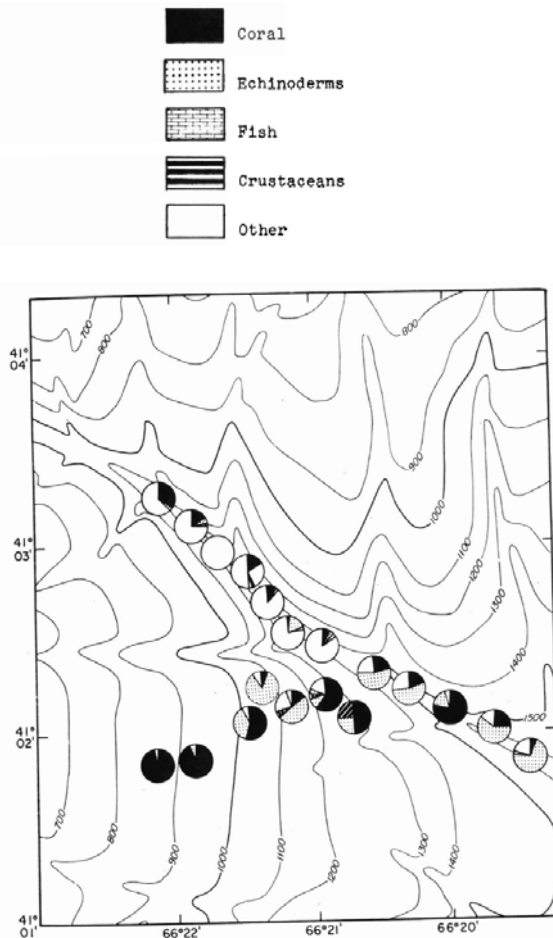
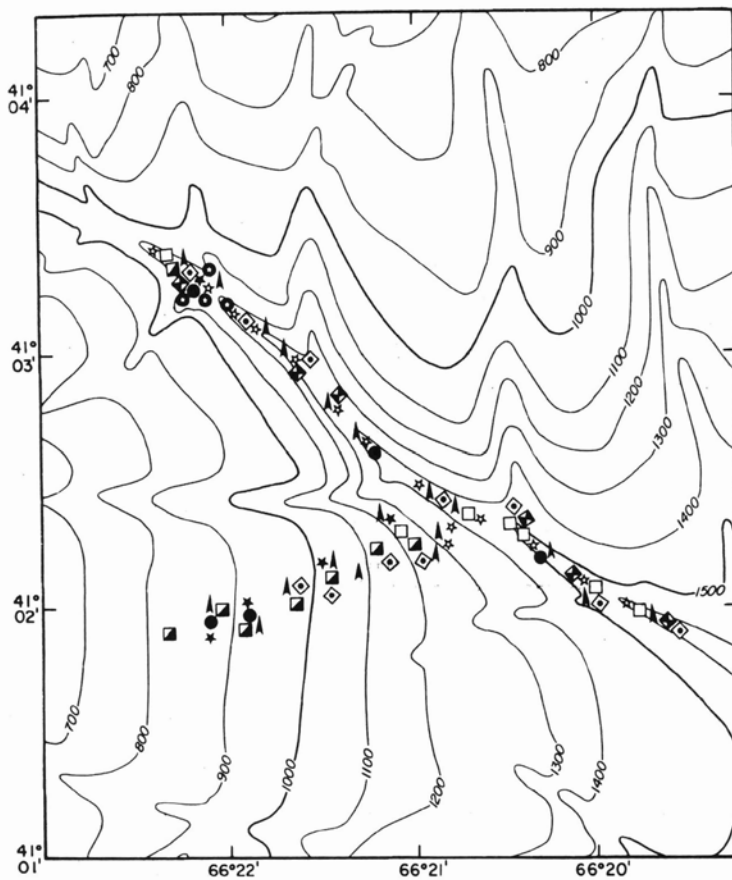


Figure E-8.

Location of coral species in Heezen Canyon seen
in ALVIN dives 780, 782 and 783.

- *Pennatula* sp. - Sea pen
- ☆ *Anthomastus agassizii*
- ★ *Anthomastus grandiflorus*
- *Paramuricea borealis*
- ▣ *Acanella arbuscula*
- ◈ *Desmophyllum cristagalli*
- ◊ *Flabellum* sp.
- ▲ Sea pen
- ⊙ *Eunephtya florida*



All maps of corals in Heezen Canyon are from Hecker, B. and Blechschmidt, G. Final Historical Coral Report for the Canyon Assessment Study in the Mid- and North Atlantic Areas of the U.S. Outer Continental Shelf, Appendix A - Epifauna of the Northeastern U.S. Continental Margin., July 14, 1979. Pgs. A77-A78, A103 - A104.

reflected in the relatively low faunal similarities. All of the areas within cluster 3 were inhabited by the deep-sea eel Synaphobranchus spp. The first group within this cluster (group 3a) was composed of areas surveyed during the May 1985 tow; these areas were inhabited by relatively high concentrations of Amphilimna sp. In addition to Synaphobranchus spp., the two areas in group 3c were also inhabited by moderate densities of a stalked crinoid. The other two groups of areas within cluster 3 (groups 3b and 3d) were inhabited only by sparse populations of several taxa. The main portion of the middle slope is represented by the areas in cluster 4. These areas were inhabited by relatively dense populations of the soft coral Acanella arbuscula. Additionally, the areas in group 4b also supported moderate to high densities of another soft coral, Eunephthya florida, and a stalked crinoid, and low densities of the brittle star Ophiomusium lymani.

The areas in cluster 5 had mean depths between 1057 and 1243 m, and were from the November 1984 and May 1985 tows. Numerous boulders and cobbles in these areas supported very high densities of E. florida, and moderate densities of another soft coral, Anthomastus agassizii. In addition, the areas in cluster 5 were also inhabited by moderate densities of two soft-substrate taxa, stalked crinoids and O. lymani. Two areas between clusters 5 and 6 (group t) were from the November 1984 and May 1986 tows. Both of these areas were characterized by high densities of the sea pen Distichoptilum gracile and low densities of O. lymani. The last cluster (6) consisted of areas located on the lower slope, with mean depths ranging from 1323 to 2391 m. This cluster further subdivided into three groups of areas with high levels of faunal similarity. The shallowest of these groups (6b) consisted of areas that were inhabited by dense populations of O. lymani, and sparse populations of D. gracile and cerianthid anemones. Slightly deeper, the areas in group 6a supported moderate densities of the same three species. The deepest areas surveyed were in group 6c. These deep areas supported very dense populations of O. lymani and cerianthid anemones and sparse populations of D. gracile.

Maps and excerpts are taken from the following report: Maciolek, N., Grassle, J.F., Hecker, B., Brown, B., Blake, J.A., Boehm, P.D., Petrecca, R., Duffy, S., Baptiste, E., and Ruff, R.E. Study of Biological Processes on the U.S. North Atlantic Slope and Rise. Final Report Prepared for the U.S. Dept. of the Interior, Mineral Management Service. OCS Study, Mineral Management Service 87-0051, Contract # 14-12-0001-30064. December 15, 1987. Pg. 191-193.

Proposed management measures and their specific objectives, if appropriate:

These HAPC areas contain long-lived deep-sea corals that are known to be extremely sensitive to disturbance by bottom-tending mobile fishing gears. For this reason, all mobile gear that intentionally or inadvertently tends bottom should be prohibited in these HAPCs.

Discretionary Topics

Foreseeable Impacts of Proposal

New England deep-sea canyons should be closed to all types of bottom-tending mobile gear. This prohibition would have little or no immediate economic impact, as there is little or no bottom trawling occurring in the HAPC area now, but would protect essential fish habitat and fragile deep-sea corals against the threat of future fishery expansion.

Alternatives

A. Using Discretionary Authority to Protect Deep-Sea Corals

The Council can protect deep-sea corals as habitat under the Magnuson-Stevens Act even without considering canyon species as part of the FMUs regulated by the NEFMC. This alternative for canyon protection would be similar to the action taken by the Council in Monkfish Amendment 2 to protect Lydonia and Oceanographer canyons. Under 50 C.F.R. § 600.805(b)(1) – “An FMP may describe, identify and protect the habitat of species not in an FMU; however, such habitat may not be considered EFH for the purposes of section 303(a)(7) and 305(b) of the Magnuson-Stevens Act.”

NMFS, in its Response to Comments on the EFH regulations, sided in support of this authority;

Comment C: One commenter said that NMFS should delete from Sec. 600.805(b) the language saying that a Council may describe, identify, and protect the habitat of species not in a fishery management unit, but such habitat may not be considered EFH. The commenter said that under the Magnuson-Stevens Act, Councils may only develop FMPs for identified species and may not describe, identify, or protect the habitat of other species. The commenter also said that Councils have no authority under the Magnuson-Stevens Act to protect the habitat of any fish.

Response C: The preamble to the interim final rule at 62 FR 66534 notes that the Magnuson-Stevens Act does not preclude Councils from identifying habitat (other than EFH) of a fishery resource under its authority even if the species is not managed under an FMP. Council actions to protect the habitats of managed or non-managed species is limited to protecting habitats from fishing activities.

Comment C (67 FR 2348 (2002)).

The NEFMC also has broad discretion to implement area-based gear restrictions in deep-sea coral areas to minimize the bycatch of deep-sea corals to the extent practicable. 16 U.S.C. 1851(a)(9) and 1853(a)(11). According to the Magnuson-Stevens Act, deep-sea corals are included in its definition of “fish.” 16 U.S.C. §1802(12). Therefore, deep-sea corals are species within the definition of “bycatch” under the Act and the NEFMC and NMFS have authority to regulate fishing in order to reduce bycatch of deep-sea corals.

The Fisheries Service has interpreted existing statutory authority to support the New England Council’s broad statutory authority to reduce bycatch of deep-sea corals, as well as other non-commercially managed species. As seen in the Fisheries Service’s

Response to Comments on the National Standard One Guidelines, bycatch includes marine species with no commercial value:

Comment 4. One commenter observed that national standard 9 applies not only to commercially valuable species, but also to all finfish, shellfish, and invertebrate species with no commercial value.

Response. NMFS agrees. The definition of “fish” in the Magnuson-Stevens Act includes finfish, shellfish, and invertebrate species, and all other forms of marine animal and plant life except marine mammals and birds; by extension, bycatch applies to these forms of marine life.

See. 63 Fed. Reg. 24224 (1998) (National Standard One Guidelines).

Habitat may be protected for precautionary reasons. As the recent Monkfish Amendment 2 final rule stated:

“...due to the potential expansion of the offshore monkfish fishery resulting from the implementation of the Offshore Fishery Program in the SFMA ... canyon closure areas are considered to be a necessary precautionary measure to limit the potential interaction between monkfish trawl and gillnet gear and the 18 species of coral known to inhabit these two canyons.”

70 Fed. Reg. 21932 (April 28, 2005) (response to comment 3)

Because of the potential for bottom trawling to expand into deeper waters, the canyons are at risk and the closures should be viewed as a precautionary measure to limit the interaction between bottom tending mobile gear and deep-sea corals.

Independent of any other authority, the Council has broad discretion to regulate fishing and close areas to fishing, as long as this action is consistent with National Standards and other applicable law. Under section 303(b) of the Magnuson-Stevens Act - “Discretionary Provisions” - NMFS and the New England Council may “designate zones where, and periods when, fishing shall be limited, or shall not be permitted, or shall be permitted only by specified types of fishing vessels or with specified types and quantities of fishing gear.” 16 U.S.C. §1853(b)(2). Therefore, the New England Council can create, and regulate certain fishing activities, in deep-sea coral protection areas such as the canyons.

B. A Comprehensive Proposal to Protect Important Habitat Areas from the Adverse Impacts Caused by Bottom Trawling and Scallop Dredging for New England and the Mid-Atlantic Regions

It is important to recognize that these areas likely do not include all deep-sea coral areas, as mapping has been extremely limited in continental slope areas and the numerous deep-sea canyons. Therefore, areas with only one dive or few survey areas should not be interpreted to only contain limited amounts of deep-sea corals in only those specified

areas. Instead, the data provides new evidence of the existence of deep-sea corals in these canyons, and it is likely that nearby areas of similar depth and seafloor conditions (hard-bottom areas containing cobbles and boulders) also include similar coral habitats.

In this vein, the petitioner recommends that the New England Council consider the approach taken by the North Pacific Regional Fishery Management Council (NPFMC) to protect unfished deep-sea coral and sponge habitats in February 2005. The NPFMC unanimously approved habitat protections for the entire Aleutian Islands area of the North Pacific. The approach used by the NPFMC is a paradigm shift in fisheries management for US waters that protects large areas of habitat from the adverse effects of bottom trawling, while at the same time maintaining healthy fisheries and access to important fishing grounds. The NPFMC, using science and an open public process, identified important fishing grounds and sensitive habitat areas, and used this information to designate areas open to continued bottom trawling, designate coral and sponge conservation areas closed permanently to bottom trawling, and closed to bottom trawling all other areas that have not been trawled in the past seven years. This new management approach can be used by both the NEFMC and the MAFMC to protect a wide range of important habitats while maintaining vibrant sustainable fisheries.

Oceana Proposal for New England and the Mid-Atlantic:

Immediately close to bottom tending mobile gears all areas that have not been trawled or dredged in the past seven years. All known areas of cold water coral and sponge, sensitive juvenile cod habitat, and other areas of high ecological value, should be permanently closed to bottom-tending mobile gear. These known sensitive habitat areas should be designated as “habitat conservation areas”, HAPC’s, or some other designation that makes clear that these special areas are permanently protected.

Immediately designate the area that will be left open to the use of mobile bottom tending gear as the “open trawl area”. The remaining area that is neither “open trawl area” or “habitat conservation zone” can only be designated as one of those two categories after there has been a thorough scientific assessment of the area and a determination has been made of expected impacts to the habitat from bottom trawling and dredging. This entire management approach will be monitored by the use of VMS.

Another critical component is to establish a rigorous scientific mapping and habitat assessment program to increase our knowledge of the unfished area and monitor the bycatch of cold water corals in the “open trawl area.” If significant bycatch of corals is evident, an immediate habitat assessment of that area must be completed and its designation changed to “habitat conservation area” if warranted.

Mapping:

Data on both habitat and fishing effort, from all sources, will be entered into a Geographic Information System (GIS) database, which is then used to make specific and

detailed maps of the precise locations of sensitive habitat and the areas swept by bottom trawls over the past seven years. This will result in an accurate map of the “open bottom trawl zone.”

Non-mobile and mid-water gears will not be affected by this proposal and will be allowed continued use pursuant to current regulations.

The Oceana Approach provides responsible stewardship of public resources by protecting essential habitat while maintaining vibrant sustainable fisheries.

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Appendix I
Map of Deep-Sea Canyons in New England and the Mid-Atlantic (Reproduced from NEFMC, Amendment 13, II-1125) (2003)

