MYSTIC AQUARIUM

Anderson Cabot Center for Ocean Life at the New England Aquarium

7 July 2017

The Honorable Ryan Zinke
Secretary of the Interior
1849 C Street, N.W.
Washington, DC 20240

The Honorable Wilbur L. Ross Jr.
Secretary of Commerce
1401 Constitution Avenue N.W.
Washington, DC 20230

Dear Secretary Zinke and Secretary Ross:

Thank you for the opportunity to provide comments for your review of Marine National Monuments pursuant to Executive Orders 13792 and 13795. Here we offer information focused on the designation of the Northeast Canyons and Seamounts Marine National Monument (NECSMNM) under the Antiquities Act of 1906.

Prior to designation we conducted an analysis of the best available physiographic and ecological data for the canyons and seamounts area to aid in the designation process (Kraus et al. 2016; Figure 1 and supplementary material attachment). Our results identified many sensitive and vulnerable attributes associated with the area that would benefit from permanent protection. Indeed, the monument area exhibits extremely high habitat diversity (Figure 1A), includes hot spots with high species richness and abundance (benthic invertebrates, fish, and marine mammals; Figure 1B), areas of high deep-sea coral occurrence (Figure 1D), as well as unusual and rare species (e.g., xenophyophores and cold seep fauna) that are not subsets of diversity hot spot areas (Kraus et al. 2016). The Monument area likely serves as a source habitat for spillover into surrounding areas (Auster and Shackell 2000, Sackett et al. 2017) of eggs-larvae, juveniles, and adults of a variety of economically valuable fish species (e.g., deep sea redfish, tilefish, red crab). It also includes many species with very slow growth, long population recovery times, and extremely low ecological resilience (e.g., recovery from damage could be thousands of years in the case of some deep-sea coral communities, if recovery after disturbance occurs at all). Permanent protection as a Marine National Monument maximizes the potential for conserving these important ecological features and functions. Further, this site serves as a critical reference area for understanding the effects of direct human disturbance and regional climate change effects across the wider continental margin and deep-sea region off the northeastern United States.

The Antiquities Act requires that monuments not exceed "… the smallest area compatible with the proper care and management of the objects to be protected", and that designation protects "objects of … scientific interest". The Proclamation states that the monument includes the waters and submerged lands in and around the deep-sea canyons Oceanographer, Lydonia, and Gilbert, and the seamounts Bear, Physalia, Retriever, and Mytilus. Further, it stipulates explicitly that the objects to be protected "… are the canyons and seamounts themselves, and the natural resources and ecosystems in and around them."

Below we address these requirements, as well as the effects of the designation on the use and enjoyment of waters beyond monument boundaries.

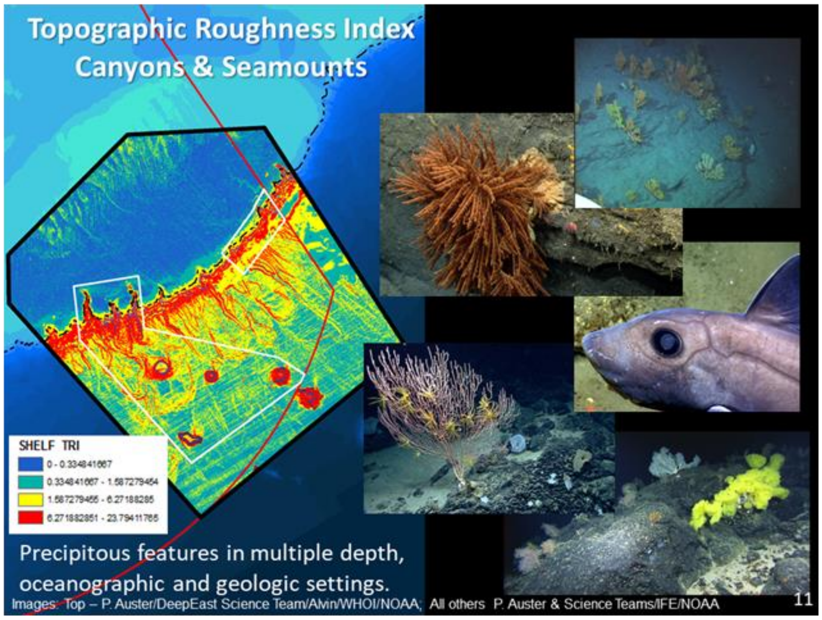
Objects of Scientific Interest

The seamounts and canyons, due to their remarkable size and physical complexity, influence large and small scale oceanographic conditions. The submarine topography (steep slopes, deep canyons, and undersea mountains) influence oceanographic processes (variable flow regimes, upwellings, stratification, and mixing: Shank, 2010) that make the biological characteristics and species within the monument so diverse, abundant, and unique to the region. Indeed, the seamounts influence Gulf Stream flows and deeper Atlantic western boundary currents (e.g., Ezer 1994), producing complex flow environments around seamounts at the seafloor, along the continental margin, and throughout the overlying water column (Auer 1987, Waring et al. 2001, White et al. 2007), upon which the structure of these deep-ocean ecosystems are dependent (Griffin 1999, Waring et al. 2001).

Marine species are differentially distributed across depths and substrates, similar to the various plant and animal zones observed when climbing tall mountains on land. Because the monument encompasses an extraordinary diversity of topography, depths, and substrates, it protects multiple communities of organisms and their component species in a very small area (Figure 1C). In fact, for the bottom dwelling animals alone, four major community types have been identified along the continental slope and rise (Hecker et al 1980, Hecker 1990a) and at least four others down the slopes of the seamounts grading into the abyss (Cho 2008). Further, the canyons and the seamounts sections of the Monument harbor significantly different marine communities, even when taking depth variation into account (Kilgour et al. 2016). The small spatial-scale variability of substrate types and topographies contributes greatly to these overall patterns of diversity (Ryan et al. 1978, Valentine 1987, Auster et al. 2005). Thus, within a relatively small area, the combined canyon and seamount units in the Monument capture a wide diversity of community types. This combination of many unique marine ecosystem elements, as well as the abundance and diversity of animal life at the seafloor, in the water

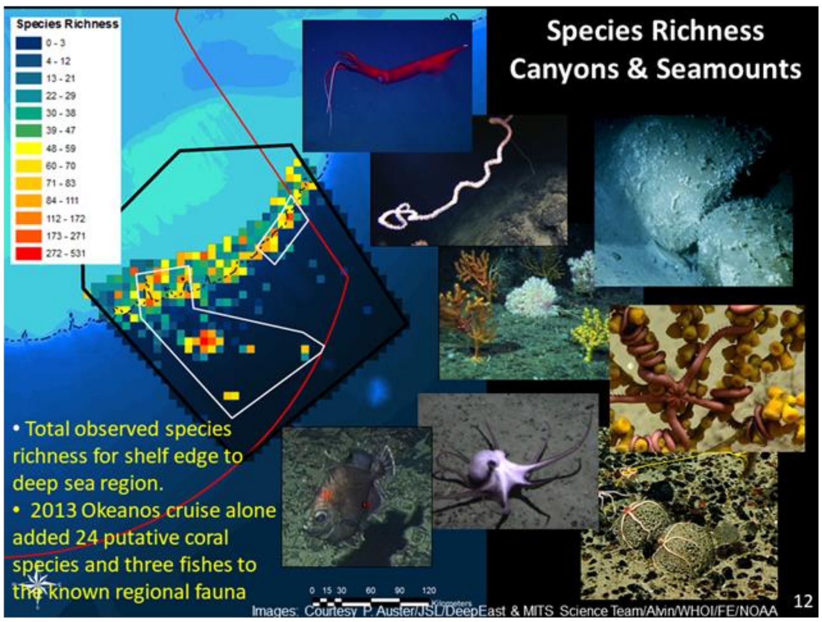
Figure 1 (Following pages). Attributes of the monument region (slides are from Kraus et al. 2016 with original proposed boundary configuration). (A) Topographic roughness index based on bathymetry shows the variability in medium-scale habitat complexity with warmer colors (reds) indicating steepest terrain. (B) Species richness of seafloor fauna (invertebrates and demersal fishes) aggregated from multiple types of sampling programs. Note hotspots occur in canyons and on seamounts. (C) Distribution of major community types. (D) Grid cells with documented presence of deep sea corals. (E) Marine mammal distribution showing species richness and total number of individuals for all marine mammals in a heat map. (F) Hot spot statistical analysis of species richness and numbers of marine mammals, with hot spots based on significantly higher values than surrounding areas. Note hot spots over canyon heads. Low values over seamounts is due in part to low survey effort.

A



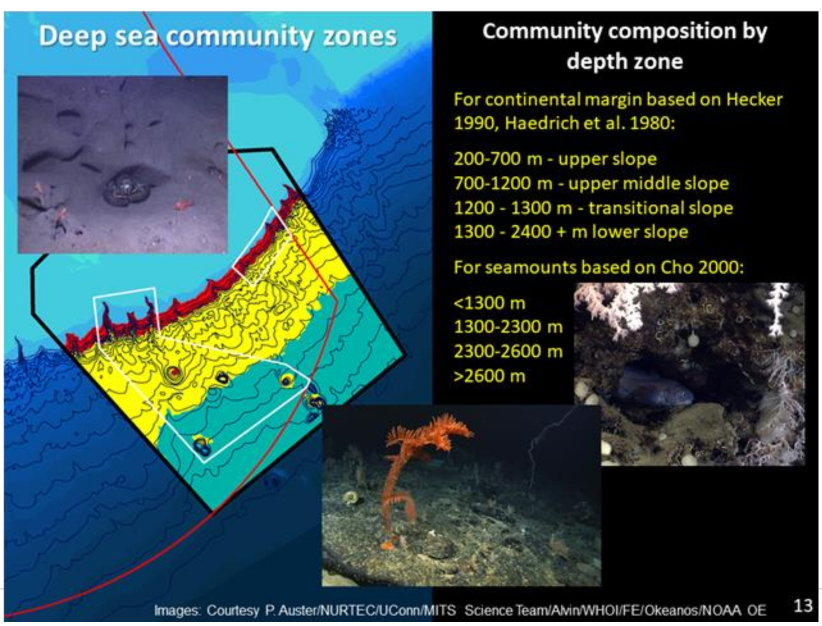
Topographic Roughness Index
Canyons & Seamounts
SHELF TRI
0 - 0.334841667
0.334841667 - 1.587279454
1.587279455 - 6.27188285
6.271882851 - 23.79411765
Precipitous features in multiple depth, oceanographic and geologic settings.
Images: Top – P. Auster/DeepEast Science Team/Alvin/WHOI/NOAA; All others P. Auster & Science Teams/IFE/NOAA
11

B



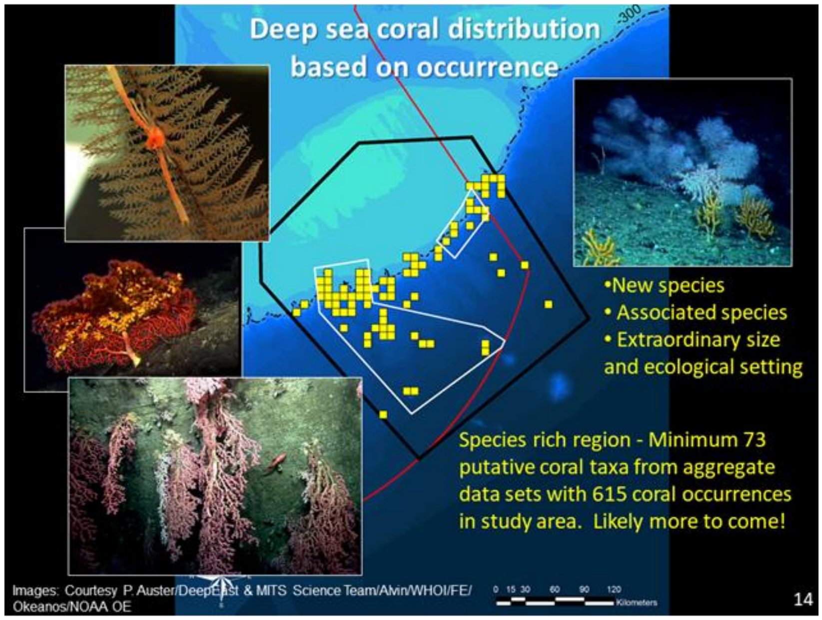
Species Richness
0 - 3
4 - 12
13 - 21
22 - 29
30 - 38
39 - 47
48 - 59
60 - 70
71 - 83
84 - 111
112 - 172
173 - 271
272 - 531
Species Richness
Canyons & Seamounts
• Total observed species richness for shelf edge to deep sea region.
• 2013 Okeanos cruise alone added 24 putative coral species and three fishes to the known regional fauna
0 15 30 60 90 120
Kilometers
Images: Courtesy P. Auster/JSL/DeepEast & MITS Science Team/Alvin/WHOI/FE/NOAA
12

C

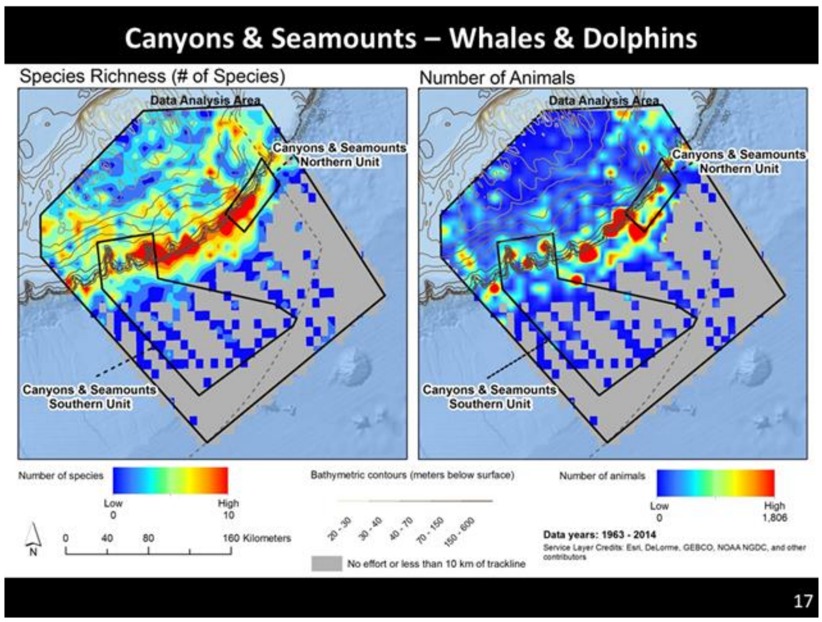


Deep sea community zones
Community composition by depth zone
For continental margin based on Hecker 1990, Haedrich et al. 1980:
200-700 m - upper slope
700-1200 m - upper middle slope
1200 - 1300 m - transitional slope
1300 - 2400 + m lower slope
For seamounts based on Cho 2000:
<1300 m
1300-2300 m
2300-2600 m
>2600 m
Images: Courtesy P. Auster/NURTEC/UConn/MITS Science Team/Alvin/WHOI/FE/Okeanos/NOAA OE
13

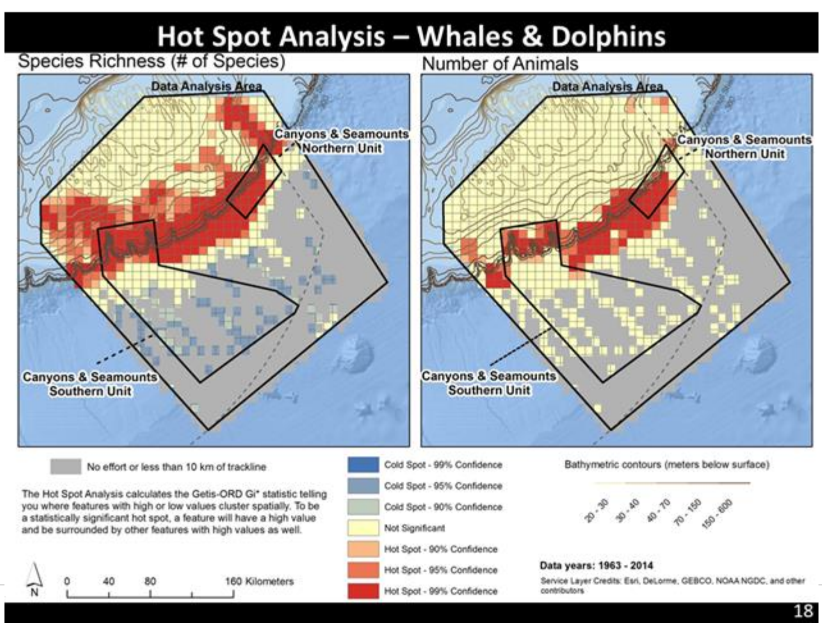
D


Deep sea coral distribution
based on occurrence
•New species
• Associated species
• Extraordinary size
and ecological setting
Species rich region - Minimum 73
putative coral taxa from aggregate
data sets with 615 coral occurrences
in study area. Likely more to come!
Images: Courtesy P. Auster/DeepEast & MITS Science Team/Alvin/WHOI/FE/
Okeanos/NOAA OE
0 15 30 60 90 120
Kilometers
14

E


Canyons & Seamounts – Whales & Dolphins
Species Richness (# of Species)
Number of Animals
Data Analysis Area
Canyons & Seamounts
Northern Unit
Canyons & Seamounts
Southern Unit
Number of species
Low
0
High
10
Bathymetric contours (meters below surface)
20 - 30
30 - 40
40 - 70
70 - 150
150 - 600
Number of animals
Low
0
High
1,806
0 40 80 160 Kilometers
No effort or less than 10 km of trackline
Data years: 1963 - 2014
Service Layer Credits: Esri, DeLorme, GEBCO, NOAA NGDC, and other contributors
17

F


Hot Spot Analysis – Whales & Dolphins
Species Richness (# of Species)
Number of Animals
Data Analysis Area
Canyons & Seamounts
Northern Unit
Canyons & Seamounts
Southern Unit
No effort or less than 10 km of trackline
The Hot Spot Analysis calculates the Getis-ORD Gi* statistic telling you where features with high or low values cluster spatially. To be a statistically significant hot spot, a feature will have a high value and be surrounded by other features with high values as well.
Cold Spot - 99% Confidence
Cold Spot - 95% Confidence
Cold Spot - 90% Confidence
Not Significant
Hot Spot - 90% Confidence
Hot Spot - 95% Confidence
Hot Spot - 99% Confidence
Bathymetric contours (meters below surface)
20 - 30
30 - 40
40 - 70
70 - 150
150 - 600
Data years: 1963 - 2014
Service Layer Credits: Esri, DeLorme, GEBCO, NOAA NGDC, and other contributors
0 40 80 160 Kilometers
18

column, and at the surface, all meet the definition of "objects of scientific interest", as we will address below.

As a result of the complex interactions between topography and oceanography, the canyons and seamounts within the Monument are biodiversity hotspots (Kelly et al. 2010, Kilgour et al. 2016) and protect outstanding examples of our natural heritage that are scientific objects of national significance. Hotspots have been identified for benthic diversity (including deep sea corals, sponges, deep sea fish, and cold-seep chemosynthetic species; Kraus et al. 2016, Figure 1B). Many species function as ecosystem engineers within canyon and seamount communities (e.g., American lobster and tilefish burrow into canyon walls and produce small-scale habitat complexity that enhances local diversity, deep-sea corals support species-specific commensals and enhance local diversity; Cooper et al. 1987a, Watling et al. 2011). Further, the analysis of surface and mid-water animals includes hot-spots of whales, dolphins, seabirds, sea turtles and pelagic fishes (tunas, billfish, sharks) that are unique to the continental shelf edge in the monument area (CeTAP 1982, Hain et al. 1985, Kenney and Winn 1986, Kenney and Winn 1987, Palka 2012, Kraus et al. 2016; Figure 1F).

The outer shelf around the canyon heads is a vital initial link to the ecological processes that occur within canyons and contributes to the patterns of diversity and productivity. For example, dense near-bottom swarms of krill have been observed during daytime in canyon heads at 300-400m that rise in the water column towards the surface at night (Greene et al 1988). These dense swarms exceeded 1000 animals per cubic meter in a layer up to 50 m above the seafloor and occur due to a combination of "topographic blockage" at the shallowest heads of the canyons and surrounding deep shelf (ca. 200 m) during downward migration at dawn and funneling produced by the canyon head morphology (Greene et al. 1988, Hobson et al. 1989). Such swarms can function as trophic subsidies to a wide diversity of large zooplanktivores, because krill are energy rich, large in size, and at high densities are easy to prey on. Dense aggregations of fish and squid that feed on krill and small fishes have been observed in these areas, which explains the high density and diversity of marine mammals in canyon environments (Moors-Murphy 2014).

The marine mammal occurrence in the monument area is remarkably high in both abundance and diversity (CeTAP 1982, Payne and Heinemann 1993, Palka 2012, Kraus et al. 2016; Figure 1E) hosting at least 10 dolphin species, 7 large whale species, and 6 medium whale species. In this latter group, the monument is home to the champion divers on the plant, the beaked whales (Waring et al. 2001). At least three species of beaked whales reside in the monument region, all capable of diving to nearly 1900 m based on tagging studies elsewhere, and staying submerged for over an hour. Evidence of beaked whale predation, based on characteristic gouge marks in the seafloor from whale beaks manipulating prey, was found in Gilbert and Lydonia Canyons with a maximum depth of 2745 m, nearly 900 m deeper than any beaked whale previously recorded (Auster and Watling 2010), While there is undoubtedly migration along the shelf edge by marine mammals, whenever systematic surveys have been done in the Monument, abundance has been high (CeTAP 1982, Palka 2012). A report posted on 12 August 2016 from an Atlantic Marine Assessment Program for Protected Species (AMAPPS) cruise aboard the NOAA Ship Henry Bigelow states "… the scientific party encountered the most animals ever in a single day" in Oceanographer and Lydonia canyons. Sightings included sperm whales in deep waters near Oceanographer Canyon and in the canyon head region between Oceanographer and Lydonia Canyons (100-200 m) "2500 common dolphins, 120 fin whales, 50 humpback whales, 60 Risso's dolphins, 70 pilot whales, 80 bottlenose dolphins, 100 striped dolphins, with a few beaked whales and ocean sunfish when the ship was in the deeper waters" (NEFSC 2016).

The shoalest areas in the Monument (the western upper canyon regions and the epi-pelagic zones over the seamounts) are critical to protecting the ecosystem linkages that both transport nutrients to the surface through predator-prey interactions, and organic carbon to deep sea ecosystems (corals and benthic communities) through plankton and fecal detritus, downwelling materials, down-slope currents, and animal migration and mortality (e.g., Youngbluth et al 1989, Hecker 1990b, van Oevelen 2009, Soetaert et al. 2016). These processes influencing carbon flux and sequestration in the ocean are enhanced in canyon and seamount landscapes, by linking shallow seafloor and pelagic areas to the deep sea. Carbon sequestration through this oceanographic "pump" is of global importance, and the implications for the monument are that the extraordinary diversity of species, including corals at depth, produce an ecological benefit at the local-scale in these undisturbed communities.

Mid-water (mesopelagic) fish are the most abundant group of vertebrate animals on our planet (Irigoien et al. 2014) and also play a significant role in the transport of carbon from surface waters into the deep sea (Davison et al. 2013, St. John et al. 2016). These highly abundant animals undertake large daily vertical migrations through the water column where gut carbonates, released through digestion as particulates at the surface, interact with dissolved CO2 that subsequently rapidly sinks into the deep ocean. Protected areas like the monument contribute to the health of such fish populations and enhance resilience to the stresses from acidification and temperature due to climate change. Roberts et al. (2017) hypothesize that "mesopelagic fish may drive an upward alkalinity pump that is currently acting to counter surface ocean acidification." Currently there is increased interest in exploiting deep sea mesopelagic fish species, and the Monument will provide significant ecological and biogeochemical benefits not generally considered when setting reference targets for sustainable fishing.

At the upper trophic levels, the high density and diversity of shelf-edge marine mammals that feed on deep sea squid and fish, transfer deep-sea productivity to the surface through defecation, and ultimately back to the seafloor through fecal-detritus as well as via the deposition of dead animals (Roman and McCarthy 2010, Schmitz et al 2014). Because the Monument is an area of consistently high numbers of marine mammals (NEFSC 2016, Kraus et al. 2016), this nutrient cycling may be critical for local ecosystem functioning (Roman et al. 2014, Doughty et al. 2016), directly supporting the productivity essential to associated fisheries species in the surrounding regions (Lavery et al. 2014). Further, the oceanographic and biological characteristics of the Monument create essential feeding and navigation waystations for marine mammals, seabirds, sea turtles, tunas, sharks, and swordfish (Holland and Grubbs 2007, Kaschner 2007, Litvinov 2007, Santos et al. 2007, Thompson 2007).

Past studies and current interest demonstrate that the monument has value for future scientific inquiry. It is a unique site with minimal historic and contemporary impacts, it is the only Atlantic Marine Monument, and it encompasses the only complete section of "shelf edge to deep sea" marine habitats that have such protections in perpetuity off the continental United States. This fully protected area will serve an important role to understanding the effects of climate change (e.g., Roberts et al. 2017), by providing a control reference region in contrast to areas subject to commercial scale fisheries and other human activities. Predicted benefits include the conservation of genetic diversity, the enhanced resilience of fish, mammal and invertebrate populations impacted by fishing and acidification, the protection of apex predators, the enhancement of commercially valuable fisheries through spillover (to recolonize habitats and communities affected by fisheries), and the sequestration of carbon (based on conservation of processes that transfer carbon to the deep ocean and elimination of human-caused disturbances to the seafloor). The Monument will play a critical role and focus research in an area that ultimately will be without direct human impacts, a problem associated with studies in other coral rich deep-sea areas (NEFMC 2017). Since the waters of New England and the Canadian Maritimes are warming faster than any other region of the Atlantic Ocean (Mills et al., 2013), and interests in mining methane hydrates and manganese crusts on seamounts is emerging (ISA 2008, Hand 2014, WOR 2014), it will be increasingly important to have this relatively pristine system to serve as a laboratory to assess the impacts of climate change alone and in synergy with other direct human activities at similar sites that lack protection.

The Canyons and Seamounts Monument includes species and habitat types not found in any other Sanctuary, National Park or monument. Based upon recent research conducted within the monument region, it also has an extraordinarily high potential for new scientific discoveries. These will include new species, genetic variability and hidden genetic structure within species, and range extensions of species known from elsewhere. Such discoveries, which will greatly increase our understanding of our marine natural heritage within the monument and in other deep sea waters of the U.S. (e.g., Mills 2003, Moore et al. 2003, Cairns 2006, France 2007, Packer et al. 2007, Thoma et al. 2009, Cho and Shank 2010, Quatrini et al. 2015, Coykendall et al. 2016), have positive implications for medical, aquaculture, and marine technology industries. Finally, the monument includes exemplars of multiple Atlantic marine ecological communities, some of which are known to be unique (e.g., coral-sponge, cold seep, xenophyophore communities) but are only poorly studied (see NOAA 2013, Skarke et al. 2014, Quatrini et al. 2015).

Research in this region historically has involved many investigators and institutions from across the country and the world, focused on a diversity of ecological processes and taxonomic groups, ranging in size from marine microbes to the great whales. The potential for ongoing research and monitoring partnerships and collaborations is high, and such activities - particularly research that requires a commitment to time series data sets - was given a renewed focus and momentum by designation of the Monument. For example, time series studies of canyon head communities by Cooper et al. (1987b) in the early 1980s resulted in a five-year data set from submersible-based photo transects that can serve as a baseline to measure change over a 30 year time frame to the present. A proposal for a cruise to revisit these stations is in the planning stages. This effort will then serve as a reference over time to assess the status and dynamics of these communities within the Monument. Other single and periodic transects conducted by DSV Alvin and the ROV Deep Discoverer in the canyons and seamounts of the Monument also serve as a foundation for time series studies. For example, Kilgour et al (2016) demonstrated that deep communities (below fishing depths) in Oceanographer Canyon were remarkably stable using image transects from 1978, 1980, 2001, 2005 and 2013 within the same region of the Canyon. These long-term studies are critical to understanding the nature and trends in ocean change, with deep implications for the health of commercial fisheries in the Atlantic.

Studies to date relating to the marine monument area have been using internationally-known collections as reference materials and as depositories for new biological specimens. Primary institutions include Smithsonian Institution, Yale Peabody Museum, and Harvard Museum of Comparative Zoology. These institutions have been collecting specimens from Ocean Exploration and Census of Marine Life trawl-dredge and submersible expeditions since 2001, and have active curators and associated scientists with scholarly interests in this region.

Monument boundary considerations

The scientific case that the existing boundaries for the NECSMNM encompass the smallest area for proper care and management of the objects of scientific interest is strong. Indeed, the patterns and processes described above, that produce and influence the natural resources and ecosystems within the monument, indicate that the size, landward boundaries, and inclusion of the pelagic elements of the ecosystem are all important and wholly appropriate.

Exploiting fish populations in ever deeper waters has been an enduring global pattern over time (Morato et al. 2005, Watson et al. 2015) and in part mediated by factors such as fuel costs, available biomass, value of landed catch and subsidies provided by governments and private enterprises (Norse et al. 2012). While the direct effects of disturbance by fishing are well known in terms of type and direction of impacts (Auster and Langton 1999, Koslow et al. 2016), our understanding of how such effects cascade through communities and ecosystems is only currently emerging. Bailey et al. (2009) demonstrated that the effects of exploitation of deep sea fish populations extends beyond the depth of directed fishing, as species with populations only partially within the depths of those fisheries responded and declined despite occurring in a depth refugia. This pattern included species targeted by fisheries as well as populations of by-catch species. Other impacts from fishing are long lasting, on the scale of decades to millennia for the longest-lived habitat-forming species such as corals, with low overall ecological resilience (Koslow et al. 2001, Clark and Koslow 2007, Waller et al. 2007). Based on the life histories of many deep-sea fish species and empirical observations of exploited populations, most taxa are easily overexploited, have very low ecological resilience, and could rapidly reach threatened or endangered status (Devine et al. 2006, Baker et al. 2009). In the current case, the monument as bounded protects a slice of the continental margin and seamounts region from such vertically cascading impacts and serves as a hedge against unintended impacts from fishing activities along the remainder of the continental margin.

The fishing industry has voiced concerns about losses of seafloor fisheries prosecuted at and in the heads of the submarine canyons and with pelagic fisheries in surface waters throughout. If the monument boundaries are moved deeper, away from canyon heads as well as to deeper depths in the pelagic zone, the effects of fishing on target and by-catch species will cascade through deeper portions of the monument. This response is due to impacts at the level of populations that extend beyond fishing depths (see previous paragraph), as well as through shifts in species interactions and ecosystem processes (e.g. shifts in predator-prey interactions, and shifts in rates of carbon transport from surface and mid-water regions to the deep sea). The removal of such areas would eliminate the principal way that the general public would experience the monument. That is, the ability to visit the monument to observe marine mammals and seabirds in high density and high diversity patches in the absence of commercial activities would be eliminated. Recreational fisherman would also suffer the same degradation of experience. Indeed, the same important policy goal was applied in Glacier Bay National Park when commercial fishing activities were phased out to maximize the wilderness experience of visitors (Sloan 2002, Sen 2010).

The boundaries of the Monument encompass the only entanglement-free and bycatch-free zone off the east coast of the US. All bottom contact gear threatens long-lived species such as deep-sea corals and other fragile structure-forming species. Fixed gear (traps, gillnets, and both bottom and pelagic longline gear) with buoy and submerged lines (and associated traps, mesh or hooks) are all identified as significant mortality risk to all marine mammals (Lewison et al. 2014) sea turtles (Finkbeiner et al. 2011) and seabirds (Winter et al. 2011). Mobile gear including deep and mid-water trawls are known to catch and kill numerous species of dolphins (Rossman 2010) Baited hooks also directly capture non-target species, including pilot whales and beaked whales, sea turtles, seabirds, and sharks (Northridge 1996, Moore et al. 2009). Both short- and long-finned pilot whales are a primary component of marine mammal bycatch in the pelagic longline fishery in the monument region (Garrison and Stokes 2014). The Western North Atlantic stock of long-finned pilot whales has a potential biological removal of only 35 individuals and therefore is extremely vulnerable to even low levels of mortality (Garrison and Stokes 2014). Incidental catch also threatens leatherback and loggerhead sea turtle populations in the Monument, both of which are ESA listed species, and have been observed in large numbers among the canyons in the Monument (Northeast Ocean Data Working Group. Data Explorer. http://www.northeastoceandata.org/data-explorer/). The exclusion of commercial scale fishing in the monument therefore contributes to minimizing exposure of these vulnerable species to fishing gear in an area where intense feeding and species interactions are occurring.

The current boundaries also define an area that is protected from any activities from future mining of oil, gas, methane hydrates and manganese crusts, resources under scrutiny for exploitation along the entire east coast and on the high seas when the economics of markets indicate such activities are economically viable (WOR 2014, Snow 2017). The impacts from such activities will be extreme and the monument represents a reference site to compare with impacted areas.

While the Executive Order seeks comments to address: “the effects of a designation on the use and enjoyment of non-Federal lands within or beyond monument boundaries,” in this case the issue is use and enjoyment of Federal waters within or beyond monument boundaries, all of which are in the public commons. The boundaries delineated in the proclamation of the monument appear to have considered the effects of designation on stakeholder communities, given the reduced size of the area compared to an original proposal advanced by a coalition of public aquaria and environmental organizations and the actual proposal submitted by the CT Congressional delegation to the President (Figure 2).

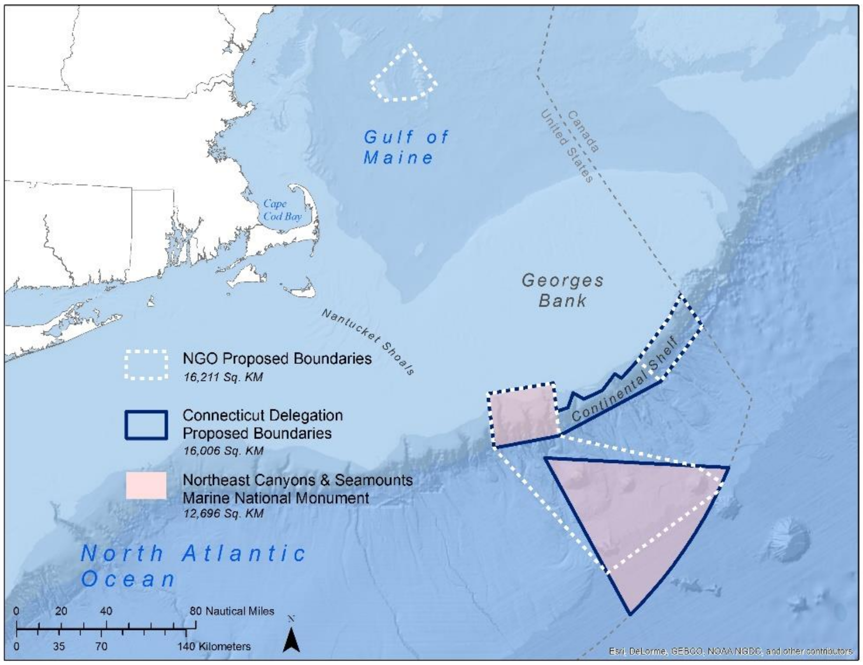


Figure 2. Changes in boundaries through final proclamation of the Marine National Monument. Areas delineated above include the initial boundaries proposed by a coalition of public aquaria and environmental groups (white dotted line), the request directly to President Obama by the Connecticut Congressional delegation (dark blue line), and the final area designated by President Obama under the authority of the Antiquities Act (shaded in pink). The area in the final designation was significantly reduced in size from original requests as a response to fishing industry concerns and those of other stakeholders.

Conclusion

In conclusion, the canyons, seamounts and the natural resources and ecosystems within and surrounding them are objects of scientific interest that are best conserved using the existing boundaries of the Northeast Canyons and Seamounts Marine National Monument and by eliminating all commercial extractive activities as described in the Proclamation. These boundaries capture the local scale processes that sustain the natural resources and ecosystems within and yield the patterns of biological diversity we observe. The monument encompasses the widest range of overlapping and interacting species, communities, and habitats within the smallest footprint, with many of these features of the ecosystem vulnerable and sensitive to human disturbance. Protecting this wild ocean setting, in perpetuity, not only provides an area to study undisturbed oceanic wildlife, but is a gift to the American public as a place to marvel at an incredible and unique element of our natural marine heritage.

We greatly appreciate the opportunity to provide these comments for your review and consideration. Please contact either of us if you have additional questions.

Sincerely,

Peter J. Auster, PhD
Senior Research Scientist
Mystic Aquarium, a Division of Sea Research Foundation
Mystic, CT 06355
and
Emeritus Research Professor of Marine Sciences, University of Connecticut

Scott D. Kraus, PhD.
Vice President, Senior Science Advisor
Cabot Anderson Center for Ocean Life, New England Aquarium
Boston, MA 02110

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