June 7, 2025

Re: SAFMC Proposal to allow access by shrimp trawlers with portions of the northern Oculina Coral Habitat Area of Particular Concern (OHAPC)

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Comment 1: Shrimp Fishery Access Area (SFAA)
I am a retired senior research scientist and Research Professor Emeritus at Harbor Branch Oceanographic Institution, Florida Atlantic University, who has studied the deep-water Oculina coral reefs off Florida since their discovery in the 1970s. My research and that of many other scientists have provided data on the associated grouper/snapper fish and invertebrate communities associated with Oculina ecosystem showing the importance of protecting this truly unique ecosystem. This is probably the most published deep-water, mesophotic ecosystem in the country and likely the world (Attachment 1).

For 10 years (2010- 2021) I was a Co-Principal Investigator along with Stacey Harter and Andy David (NOAA Fisheries, Panama City Lab) on surveys for NOAA Fisheries and the SAFMC documenting the shelf-edge MPAs with ROV and multibeam sonar from south Florida to North Carolina, including the Oculina coral reefs and OHAPC. In fact, it was on our surveys in 2011 when we documented that the Oculina habitat extended north of Cape Canaveral and nearly up to St. Augustine. Our extensive surveys also show that the Oculina banks do not occur north of there, nor are they known to occur anywhere else on earth. These are truly a treasure, that should be protected for perpetuity. I presented these data from these NOAA cruises to the SAFMC; and together with members of the Council, Shrimp Advisory Panel, and Coral Advisory Panel present, the Council drew the new boundaries for the north extension that would protect all the coral habitat and ecosystem. In 2015 the SAFMC council passed the amendment to include the northern Oculina HAPC. We don't need more studies. We need the SAFMC to keep the protections in place that helps sustain the health and conservation of this unique ecosystem.

The region to the north of Cape Canaveral in the northern OHAPC is a continuation of the reef track that is apparent in NOAA regional bathymetric charts (Cape Canaveral 85, Titusville 84, New Smyrna 83, and Daytona 82). These regional contour charts were made by NOAA in 1983 at a scale of 1:100,000. They were obtained by the PI from NOAA (Scanned NOS Bathymetric Maps, Vol. 2, U.S. East and Gulf Coast) and were imported into ArcGIS 9.3 as georeferenced TIFF images. Reed and Farrington 2011 show that these NOAA regional charts are quite accurate in depicting high-relief features and when compared to newer multibeam maps (see Fig. 1 a,b). The multibeam clearly verifies high-relief features of the bathy charts although the individual mounds are not exact.

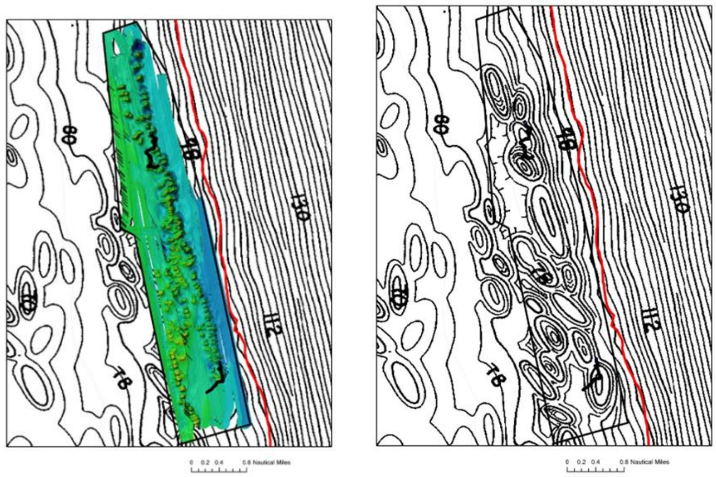
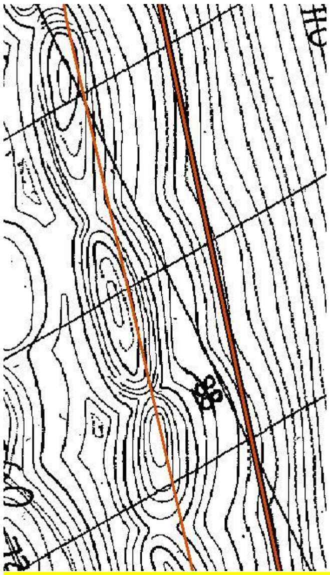


Figure 1 A (left). 2011 NOAA Ship Pisces multibeam sonar off Daytona area with overlay of two ROV dive tracks (Dives 11-156A, 11-156 B). B (right). NOAA regional bathymetric contour chart of same site; black polygon is area of the multibeam in Figure 1 A. Red line= 100 m contour line and OHAPC eastern boundary (NOAA- CRM_10m_nad83). The multibeam map shows over 100 individual, high-relief mounds (base depth from 80-90+ m; peaks 60-70 m). Two ROV dives (thick black lines) verified that these are Oculina coral mounds (from Reed and Farrington, 2011, “A Proposal for Extension of the Boundaries of the Oculina Coral Habitat Area of Particular Concern (OHAPC)”, submitted to South Atlantic Fishery Management Council, 21 pp.)

- The proposed revised Amendment 10 would allow bottom trawling within the OHAPC, leaving little buffer between the trawl nets and the high relief coral mounds. NOAA Regional Bathymetric charts clearly show the proposed area abuts and even extends on top of high relief habitat, i.e., coral ecosystem habitat (see Fig. 2). Figure 2 shows background bathymetric contour lines which are very accurate for predicting high relief habitat (i.e., coral ecosystem habitat). Also keep in mind that the multibeam map under parts of the SFAA are only 5 m resolution. Also the recent multibeam mapping in 2025 is 2 m resolution so even a 1 m coral colony (over 100 years old) would not even show up.

- The current eastern border of the OHAPC of Amendment 8 was purposely drawn along the 100 m contour line and varies from a minimum of 500 m to about 1000 m away from the high relief bathymetry. This is a quite reasonable buffer. Per the Coast Guard, straight borders, and wide buffer zones allows easier enforcement to keep potential poachers and errant trawls far from the reef habitat.



- Figure 2. Proposed Shrimp Fishery Access Area (red polygon) in the northern Oculina HAPC with background of available bathymetric contour lines showing high relief topography and coral ecosystem habitat directly within the western boundary of the proposed SFAA of Amendment 10. Thick red line: current OHAPC eastern border. Thin red line: boundary of proposed Amendment 10 SFAA. The SAFMC ignored these facts when drawing up the proposed SFAA boundary of Amendment 10.

- SAFMC Coral Advisory Panel members supported establishing a substantial buffer of possibly 1,000 m from the known habitat as an approach that would address and account for uncertainty as directed by the Magnuson-Stevens Fishery Conservation and Management Act (Amendment 10 NMFS- SAFMC EA Report Aug 2021.pdf; 5.1.2 Coral AP Comments and Recommendations, pg. 59). The AP indicated the present boundary provided a buffer and approved a motion supporting the no action alternative (i.e., MOTION 11: Consider Option 1 status quo. Do not develop an action to address the issue).

- There is uncertainty about the location of the shrimp trawl rig on the bottom. National Marine Fisheries Service data indicate that the ratio of scope to depth for shrimp trawlers is, typically somewhere between 3 to 4.3 ratio in these depths and these kinds of currents. So, taking a conservative estimate means that the horizontal distance between the boat and the rig can be anywhere from about 230 m to 510 m (Amendment 10 NMFS- SAFMC EA Report Aug 2021.pdf; 5.1.2 Coral AP Comments and Recommendations, pg. 59).

- It is well known that the fishers (shrimp trawls) fish right on the border line of the HAPC. We have seen this numerous times while on NOAA vessels while working in the OHAPC. That means the fishers will track their vessels right along the new border and the nets will extend some unknow distance into the OHAPC, beyond their allowable fishing zone and into the no fishing zone.

- Currently there are no shrimp fishery access areas within the OHAPC, and now is not the time to reverse course, nor to redraw the boundaries of the OHAPC. The deep-water Oculina coral reefs are a unique coral reef ecosystem like no other on earth. These are truly a treasure, that should be protected for perpetuity. Destructive fishing gear, specifically bottom trawls, should have no right to be used within the OHAPC. They have been banned for 38 years, there is no good data to suggest it is OK to allow it now.

References:
Koenig, C.C., A.N. Shepard, J.K. Reed, F.C. Coleman, S.D. Brooke, J. Brusher, and K.M. Scanlon. 2005. Habitat and fish populations in the deep-sea Oculina coral Ecosystem of the western Atlantic. American Fisheries Society Symposium 41: 795-805.

Reed and Farrington, 2011. A Proposal for Extension of the Boundaries of the Oculina Coral Habitat Area of Particular Concern (OHAPC), submitted to South Atlantic Fishery Management Council, 21 pp.

Reed, J. K., C. C. Koenig, and A. N. Shepard, 2007. Impacts of bottom trawling on a deep-water Oculina coral ecosystem off Florida. Bulletin of Marine Science 81: 481–496.

Comment 2: Impacts of Shrimp Trawling on Oculina Reefs
For 10 years (2010- 2021) I also have been a Co-Principal Investigator along with NOAA Fisheries scientists on surveys documenting the shelf-edge MPAs with ROV and multibeam sonar from south Florida to North Carolina, including the Oculina coral reefs and OHAPC. In fact, it was on our surveys in 2011 when we documented that the Oculina habitat extended north of Cape Canaveral and nearly up to St. Augustine.

- During ROV dives conducted with NOAA Fisheries at the sites in the northern OHAPC (Reed and Farrington, 2011), the dominant fish observed included scamp (common), gag grouper, snowy grouper, red porgy (common), amberjack (abundant), black seabass (abundant), tilefish, red hogfish, tattler, cubbyu, blue angelfish, bank butterfly, morays, roughtongue bass, bigeye, scorpionfish, batfish, wrasses. Dominant invertebrates include Oculina varicosa coral (10-40 cm colonies), gorgonian corals, black coral (abundant), sponges, starfish, sea urchins, and mollusks. Unfortunately, the mounds appear to have been impacted by years of bottom shrimp trawling as documented within the Oculina HAPC (Reed et al. 2007, Koenig et al. 2005). Since the reefs' discovery in 1970s, snapper and grouper populations have fallen drastically, and large swaths of the reef have been reduced to rubble (Koenig et al. 2005). Continued trawling near the reefs prevents any possibility of recovery and regrowth of new recruits of coral and impact the fish populations.

- The trawlers have presented these items to the SAFMC in support of their position to have access to the OHAPC for bottom trawling:
  "Dragging takes place east of and parallel to the pinnacles, so sediment should drop back down onto the bottom and not cause any detriment to habitat" (Amendment 10 NMFS- SAFMC EA Report Aug 2021.pdf).
  We contend that this clause is fallacious. See comments below.

- Although rock shrimp occurrence in the proposed SFAA is variable, and fishing is expected to occur in areas impacted from previous trawling, any recovery of ecosystem services that has occurred since the last trawling event would be lost. (Amendment 10 NMFS- SAFMC EA Report Aug 2021.pdf; 5.1.2 Coral AP Comments and Recommendations, pg. 51)

- Indirect effects (Amendment 10 NMFS- SAFMC EA Report Aug 2021.pdf; 5.1.2 Coral AP Comments and Recommendations, pg. 53): Indirect effects to coral could result through influx of suspended benthic sediments created while trawling the bottom. Although surface currents are usually strong and northerly from the Gulf Stream, the bottom currents have strong E-W, north and south components. Bottom currents occur up to 75 cm sec^{-1} (Reed and Hoskin, 1987). During a deployment of a bottom current meter at the Oculina reefs for 289 days, bottom currents had 3 main paths of flow: East-west (tidal), North and South. Average near bottom current speed was 8.6 cm sec^{-1} but equaled or exceeded 15 cm sec^{-1} 11- 17% of the time.

- Studies on larval transport of Oculina larvae indicate that the cross-shelf mechanism of transport is more robust from deep to shallow due to upwelling events, that bring the water across the shelf (Brooke 2002; Brooke and Young 2003, Brooke and Young 2005). These events would also bring any sediment ladened water across the reefs. Reed (1981) showed that these upwelling events occur at the shelf edge Oculina reefs throughout the year.

- The sediments on shelf-edge Oculina reefs are relatively fine and have a higher composition of muds (14.4% mud) compared to sediments in shallow coral reef counterparts (Hoskin et al.1987).
  In addition, areas east of the high relief Oculina mounds have a higher (29%) average percentage of muds (Hoskin et al. 1987). Fine sediments tend to have greater negative effects on
  corals than coarse sediments. Depending on direction and magnitude of water currents in the affected area, shrimp trawls could create sediment plumes during fishing operations and the plumes could be transported to coral habitats. Miller et al. (2016) found suspended particles can travel and impact coral over 700 m from active dredging operations, which was also the farthest they looked. The spatial extent of impacts from dredging can be variable, and in a severe case, water quality impacts have been detected up to 20 km away. Based on hydrodynamic drag, if you had the prominent direction of the current exactly parallel to the high relief feature, the reef feature causes drag which is going to create eddies that would spin off on the left or western side. If a sediment plume was created, that would cause entrainment of particles up onto the reef even if you were dragging off in the soft bottom east of the reef.

- Sedimentation is known to stress corals which do not need another stress factor. Increased sedimentation can cause smothering and burial of coral polyps, shading, tissue necrosis, and reduces recruitment, survival, and settlement of coral larvae (Erftemeijer et al. 2012). Sedimentation can affect coral physiology and reproductive health (Dr. Joshua Voss, FAU, pers. comm.). Sedimentation could affect the planula larvae of coral which are released into the water column where they live for weeks or more before they settle (Brooke 2002). Sediment plumes from trawling along the edge of the reef will impact the remaining corals nearby and prevent baby coral recruits from settling. Coral recruits are particularly susceptible (Fourney and Figueiredo 2017).

- Sediment plumes can also create enabling conditions for coral diseases to thrive. For example, researchers in the Great Barrier Reef found a significant, positive relationship between overall coral disease prevalence and the length of time that a reef was exposed to sediment plumes (Pollock et al. 2014).

- The shrimpers want to trawl near the high relief banks, as these areas are covered with coral rubble and mud, which extend out on the flat areas adjacent to the banks. Rock shrimp preferred habitat is rubble and mud. If the shrimp simply preferred mud, there would be no reason to fish within the OHAPC eastern boundary. There are miles of mud to the east of the boundary, but no coral or coral debris. Trawling the mud east of the current OHAPC boundary should cause no harm to the OHAPC ecosystem and coral.

References:

Brooke, S. 2002. Reproductive ecology of a deep-water scleractinian coral, Oculina varicosa from the southeast Florida shelf. Ph.D Dissertation University of Southampton, School of Ocean and Earth Science, pp. 160.

Brooke, S. and C. Young 2003. Reprduction ecology of deep-water scleractinian coral, Oculina varicosa, from the southeast Florida shelf. Continental Shelf Research 23: 847- 858.

Brooke, S. and C. Young 2005. Embyogenesis and larval biology of the ahermatypic scleractinian Oculina varicosa. Marine Biology 146: 665- 675.

Erftemeijer, P. L. A., R. Bernhard, B. W. Hoeksema, and P. A. Todd. 2012. Environmental impacts of dredging and other sediment disturbances on corals: a review. Marine Pollution Bulletin. 64 (9): 1737-1765.

Fourney, F. and J. Figueiredo. Additive negative effects of anthropogenic sedimentation and warming on the survival of coral recruits. Scientific reports. 2017 Sep 28;7(1):1-8.

Hoskin C. M., J. K. Reed, and D. H. Mook. 1987. Sediments from a living shelf-edge coral reef and adjacent area off central eastern Florida. Symposium on South Florida Geology Miami Geological Society, Memoir 3. 17pp.

Koenig, C.C., A.N. Shepard, J.K. Reed, F.C. Coleman, S.D. Brooke, J. Brusher, and K.M. Scanlon. 2005. Habitat and fish populations in the deep-sea Oculina coral Ecosystem of the western Atlantic. American Fisheries Society Symposium 41: 795-805.

Miller, M. W., J. Karazsia, C. E. Groves, S. Griffin, T. Moore, P. Wilber, and K. Gregg. 2016. Detecting sedimentation impacts to coral reefs resulting from dredging the Port of Miami, Florida USA. PeerJ 4:e2711, https://doi.org/10.7717/peerj.2711.

Pollock, F. J., J. B. Lamb, S. N. Field, S. F. Heron, B. Schaffelke, G. Shedrawi, and B. L Willis. 2014. Sediment and Turbidity Associated with Offshore Dredging Increase Coral Disease Prevalence on Nearby Reefs. PLoS One 9(7), e102498. [Correction issued 1 November 2016: https://doi.org/10.1371/journal.pone.0165541].

Reed, J.K. 1981. In situ growth rates of the scleractinian coral Oculina varicosa occurring with zooxanthellae on 6-m reefs and without on 80-m banks. Pp. 201-206, In: Proceedings Fourth International Coral Reef Symposium, Vol. 2, May 1981, Manila, Philippines.

Reed and Farrington, 2011. A Proposal for Extension of the Boundaries of the Oculina Coral Habitat Area of Particular Concern (OHAPC), submitted to South Atlantic Fishery Management Council, 21 pp.

Reed, J.K. and C.M. Hoskin. 1987. Biological and geological processes at the shelf edge investigated with submersibles. Pp. 191-199, In: Scientific applications of current diving technology on the U.S. Continental Shelf, NOAA Symposium Series for Undersea Research, Vol. 2.
Reed, J. K., C. C. Koenig, and A. N. Shepard, 2007. Impacts of bottom trawling on a deep-water Oculina coral ecosystem off Florida. Bulletin of Marine Science 81: 481–496.

Comment 3: Models of Distribution of Oculina Coral

Re: Report- "Deep-sea coral and sponge observations in Oculina Bank Habitat Area of Particular Concern – northeastern boundary area", Report provided by the NOAA Deep Sea Coral Research & Technology Program for the NOAA Fisheries Southeast Regional Office and South Atlantic Fishery Management Council

- The model predicting habitat suitability for Oculina coral (Fig. 4 of the report) is based in part on these data records in the NOAA Deep Sea Coral Portal. This model clearly shows suitable coral habitat well east of the current HAPC boundary which should preclude any decision to allow shrimp trawling access within the current HAPC boundaries. If anything, the current eastern HAPC boundary should be moved eastward. In addition, since the densest coral observations at the northern end of the OHAPC appear to be east of the predicted suitable sites, the eastern boundary of the model suitability should be moved eastward. So if anything, the boundaries should be expanded, not reduced.

- There are several data sets which do not appear in the NOAA Coral Data Portal. I participated in all the NOAA Fisheries surveys made in this region since their discovery in 2011. The data in the portal are only from the corals that I documented by CPCe Point Count and submitted to NOAA. This takes 50 points from each photograph used in the benthic ROV surveys, and identifies each dot. It is a rough estimate of percent coral cover.

- However, deep-water coral reefs such as Lophelia coral and Oculina coral reefs have relatively lower density of macrobiota than typical shallow water reefs. For these reasons, typical point count analysis is not the only statistic to use on deep-water reefs. In addition to the point count, for each of our annual ROV surveys, I used the ROV video to document the coral and sponge communities (Fig. 1, Table 1). This is much more accurate as each coral observed is included. In addition to the standing live corals, I documented the number of standing dead corals. Standing Oculina coral colonies, whether living or dead, provide important habitat for the Oculina coral community, which consists of hundreds of species of invertebrates and juvenile fish which live among the coral branches (Fig. 1). These data are not included in the NOAA Coral Portal, so critical information is missing in this report.

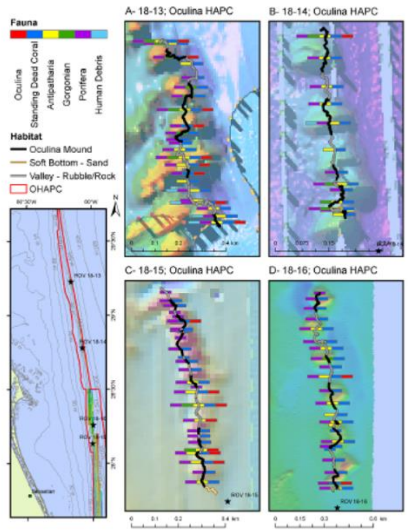


Figure 9. Presence of corals (Scleractinia, gorgonian octocorals, Antipatharia), sponges, and fishing gear based on video analysis of ROV video in 5-minute increments on *Oculina* HAPC reef sites during the NOAA Ship *Pisces* cruise 18-02, May 12-24, 2018.

Figure 1. Harter, Stacey, John Reed, Stephanie Farrington, and Andy David. 2019. South Atlantic MPAs and Oculina HAPC: Characterization of Benthic Habitat and Biota. NOAA Ship Pisces Cruise 19-02. NOAA CIOERT Cruise Report, 388 pp. Harbor Branch Oceanographic Technical Report Number 193. http://www.cioert.org/wp-content/uploads/2020/01/2019-Harter-South-Atlantic-MPAs-and-Oculina-HAPC-Characterization-Cruise-19-02.pdf.

Table 1 (from. Harter, Stacey, John Reed, Stephanie Farrington, and Andy David. 2019).

Table 9. Counts of major benthic macrobiota and fishing gear from video analysis of ROV dive 19-32 on *Oculina* HAPC reef site during the NOAA Ship *Pisces* cruise 19-02, June 7-20, 2019.

Phylum/Group/scientific name	No.
Porifera	**206**
Demospongiae	**206**
Chondrilla sp.	92
Demospongiae	113
Poecilosclerida	1
Cnidaria	**283**
Alcyonacea - Alcyoniina	**10**
Nidalia occidentalis	10
Alcyonacea - gorgonian	**16**
Anthozoa - Non Coral	**90**
Cerianthidae	85
Corallimorpharia	5
Antipatharia	**91**
Antipathes atlantica	4
Stichopathes luetkeni	81
Tanacetipathes tanacetum	6
Coral- Scleractinia	**52**
Cladocora sp.	11
Oculina varicosa	41
Hydrozoa	**24**
Chordata	**3**
Ascidiacea	3
Arthropoda	**7**
Decapoda	7
Echinodermata	**192**
Asteroidea	6
Echinoidea	186
Human debris	**1**
Human debris- fish line/gear	1
Habitat	**56**
dead standing Oculina (habitat)	56
Grand Total	**748**