September 5, 2024

Re: SAFMC Proposed Amendment 10 for the Oculina Coral Habitat Area of Particular Concern (OHAPC)

John Reed
Research Professor emeritus (retired)
Florida Atlantic University- Harbor Branch Oceanographic Institution
Johnkreed48@gmail.com

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.

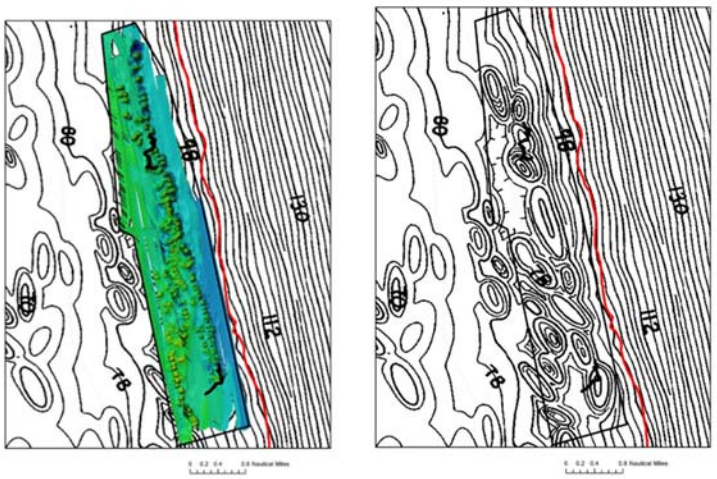
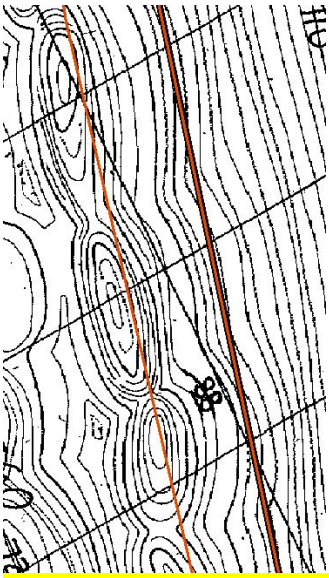


Figure 1 A (left). 2011 NOAA Ship Pisces multibeam sonar off Daytona area with overlay of two ROV dive tracks (Dives 11-156A, 11-156 B). B (right). NOAA regional bathymetric contour chart of same site; black polygon is area of the multibeam in Figure 1 A. Red line= 100 m contour line and OHAPC eastern 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.)

- 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; Reed letter to Janet Coit, NOAA Fisheries, April 7, 2022). 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 which will not even show corals of 10 ft diameter.

- 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).

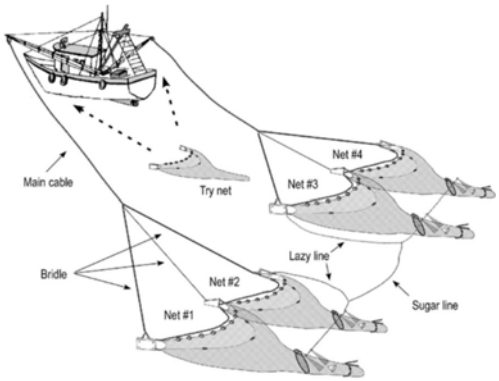


Fig 3. Typical gear configuration for U.S. southeastern shrimp vessels equipped with four nets. (Source: Scott-Denton et al. 2012; Amendment 10 NMFS- SAFMC EA Report Aug 2021.pdf; 5.1.2 Coral AP Comments and Recommendations, pg. 52).

- 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 (Fig. 3).

- Typically, fishers rely on standard chart packs for their navigation. The NOAA multibeam charts and NOAA regional bathymetric charts shown above are not available for their navigation. In other words, they are trawling blind as to what is on the bottom.

- 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

- This detailed report is based on the following:
  “Coral and sponge data included in this report reflect observations recorded to-date in the NOAA Deep Sea Coral Research & Technology Program’s Deep-Sea Coral Data Portal. Areas with no information are not necessarily devoid of these organisms, as the majority of the deep sea is yet to be explored.”

This statement above is crucial: “areas with no information are not necessarily devoid of organisms.”

- 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.

- I question how these alternative eastern borders for the SFAA of the OHAPC were drawn. What data set was used for the shrimp trawling access area? Were the NOAA Regional Bathymetric charts or more recent multibeam maps used? Were NOAA Fisheries data used? Or is it based on where the shrimp trawlers had trawled previously or want to trawl. As I have said in previous letters and publications, the OHAPC contains various habitats, high relief mounds, low relief mounds and ledges, flat rock pavement, flat mud and rubble. All of these make up the Oculina ecosystem and should remain protected.

- 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.

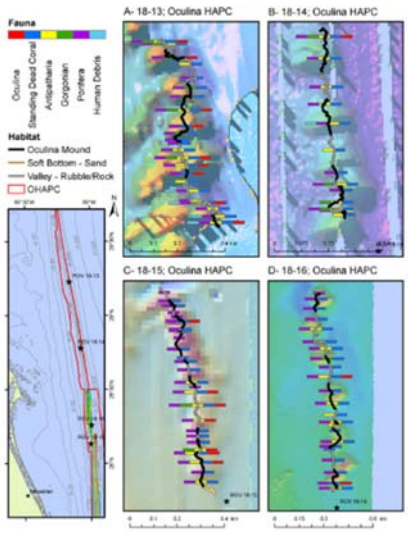


Figure 9. Presence of corals (Scleractinia, gorgonian octocorals, Antipatharia), sponges, and fishing gear based on video analysis of ROV video in 5-minute increments on *Oculina* HAPC reef sites during the NOAA Ship *Pisces* cruise 18-02, May 12-24, 2018.

Figure 4. 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**

Comment 4: Trawling- Historical Impacts to Deep-water Oculina Reefs

- The trawlers have presented these items to the SAFMC in support of their position to have access to the OHAPC for bottom trawling (Amendment 10 NMFS- SAFMC EA Report Aug 2021.pdf; 5.1.2 Coral AP Comments and Recommendations):
  "Fishermen indicate they 1) often drag very close to obstructions; 2) know how to keep equipment safe and not damage bottom habitat; and 3) want to fish in areas where there is no coral."

Response: It appears this is not factual based on historical records showing trawling impacts within the OHAPC outlined below.

- Typically, fishers rely on standard chart packs for their navigation. The NOAA multibeam charts and NOAA regional bathymetric charts are not available for their navigation. In other words, they are trawling blind as to what is on the bottom.

- The OHAPC ecosystem consists of various habitat, not just the high relief mounds. The ecosystem consists of high relief coral rubble mounds, individual live coral colonies, standing dead coral, rock pavement, sand, mud, rubble. At night when the trawlers often fish, some species move off the reefs onto the flats. The simple idea that the fishers should only avoid the high relief bottom shown on Multibeam maps is a fallacy. All the habitat within HAPCs and MPAs needs protected.
- 1984- The Oculina HAPC was designated by NOAA specifically to protect the habitat from bottom trawling, long lines, and traps.

- Longlines, fishing lines, trawl nets, and trawl damage were found in the coral habitat in the late 1970s when the first sub surveys were made.

- One trawler stated that they pulled up a 70-pound piece of white branching coral (Oculina) off Daytona (joint meeting of GOM and South Atlantic Fishery Management Councils, Jacksonville, Florida, 1981).

- Roger Pugliese (SAFMC) can verify how 'goat trails' were made by trawlers dragging doors and chain (without) nets to open up habitat (i.e, knock the coral down into rubble) for trawling. This was verified by the trawlers in the first meetings of the original 1984 HAPC discussions. One of the trawlers (who is on the deep shrimp AP), actually told how her family started rock shrimp trawling around 1970 and how they made these goat trails through the coral habitat (Oculina Workshop in Canaveral; pers. comm., A. Shepard, G Gilmore).

- During NOAA funded ROV surveys (2001-2003), observations indicated that poachers (illegal bottom trawlers) continued to trawl illegally within the Oculina HAPC, and illegal bottom fishing continued within the OECA (A. Shepard, NOAA NURC). This included visual sightings of trawlers during the surveys; evidence of recent fishing lines and bottom longlines wrapped around coral colonies and remnants of bottom trawl nets; damaged artificial reef modules; and apparent trawl tracks in the coral rubble.

- Reef modules (reef balls, and pavers with live coral attached) had been damaged or destroyed after 2000 since their placement on coral rubble habitat within the HAPC. It was clear that something had been dragged over them (pers. comm., Sandra Brooke, Chris Koenig).

- Coast Guard (at Coral and Shrimp AP meeting, Oct 2012)- Stated that 20 cases of illegal trawlers were inside OHAPC.

- Coast Guard (Oct 2012)- Stated that prior to the VMS (2003) there were 'all kinds of entries' by trawlers into the OHAPC.

- One of these illegal shrimp trawlers were caught off Fort Pierce by the Coast Guard who impounded the shrimp trawl boat; their plotting gear proved they were trawling inside of the OECA and over coral habitat. A colony of Oculina varicosa coral was found hidden in the stacks of the ship which John Reed identified for the Coast Guard. The haul of the boat was filled with bags of shrimp but also included hard-bottom species such as fish and lobster.

- Historical photographic transects, taken in the 1970s with the *Johnson-Sea-Link* submersibles, provide crucial evidence of the status and health of the reefs prior to heavy fishing and trawling activities. Over 50,000, 35-mm photographs were taken during manned submersible transects in the late 1970s. Portions of these transects were over reefs and were compared to manned submersible video transects of the same areas completed 25 yrs later in 2001. Quantitative analyses of photographic images by point count data reveal drastic loss of live coral cover between 1975 and 2001, and up to 100% loss on some of the reefs (Reed, Koenig, and Shepard. 2007. "Impacts of Bottom Trawling on a Deep-Water Oculina Coral Ecosystem off Florida").

- Since 2000, when the boundaries of the OHAPC were expanded from Sebastian northward to Cape Canaveral, shrimp bottom trawlers have been caught poaching within the boundaries of the original OHAPC (OECA) and in the vicinity of Chapman's Reef and Jeff's Reef, the only remaining live, high-relief coral reefs. Recent dives completed with ROVs within the OHAPC have documented coral reefs wrapped with fishing lines, piles of bottom longlines, discarded trawl nets, and anchor lines (Reed et al., 2005). Bottom trawling within the Oculina ecosystem has been primarily for rock shrimp and brown shrimp.

- Trawling continues to be the primary threat to the ecosystem as evident from recent photographs of trawl nets found on the bottom, destroyed reefball modules, the documented destruction of the Cape Canaveral Oculina bioherm, and evidence of trawl scars in the rubble (Reed et al., 2005). We contend that the original boundaries of the northern OHAPC remain intact to give these threatened reefs the greatest chance for survival.

- Impact in the southeastern U.S. on the Oculina reefs has been documented by:

  Reed, J.K., A. Shepard, C. Koenig, K. Scanlon, and G. Gilmore. 2005. Mapping, habitat characterization, and fish surveys of the deep-water Oculina coral reef Marine Protected Area: a review of historical and current research. Pp. 443-465, In (A. Freiwald, J. Roberts, Ed.), Cold-water Corals and Ecosystems, Proceedings of Second International Symposium on Deep Sea Corals, Sept. 9-12, 2003, Erlanger, Germany, Springer-Verlag, Berlin Heidelberg.

  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, 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.

- Worldwide, bottom trawling has severely impacted deep-sea coral reef habitat and continues to be a major concern and threat (Rogers, 1999; Butler and Gass, 2001; Morgan et al., 2003; Barnes and Thomas, 2005; Mortensen et al., 2005).

- Bottom trawling causes severe mechanical damage as evident on deep-water Lophelia coral reefs in the northeast Atlantic (Rogers, 1999; Fosså et al., 2002), hard bottom habitats off the southeastern United States (Van Dolah et al., 1987), and deep-water seamounts off New Zealand and Tasmania (Jones, 1992; Koslow et al., 2001).

- A single pass of a bottom trawl removed 1000 kg of Primnoa coral off Alaska and resulted in the detachment of 27% of the corals (Krieger, 2001).

- ROV surveys of extensive deep-water Lophelia coral reefs off Norway found that 30%–50% of the reefs were damaged from bottom gear; at some sites almost all corals were crushed or dead (Fosså et al., 2002).

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Comment 5: Biodiversity and Fish Populations of the Oculina Ecosystem

- The OHAPC ecosystem consists of various habitats, not just the high relief mounds. The ecosystem consists of high relief coral rubble mounds, individual live coral colonies, standing dead coral, rock pavement, rock/sand knolls, ledges, sand, mud, rubble. At night when the trawlers often fish, some fish species move off the reefs onto the flats. The simple idea that the fishers should only avoid the high relief bottom shown on multibeam maps is a fallacy. All the habitat within the OHAPC must remain protected.

- These are the only deep-water Oculina coral reefs in existence around the world. Over many thousands of years this coral has grown at the shelf edge off eastern Florida, in the Gulf Stream. This slow growing coral (~1/2"/ yr) is an oasis of diversity. Oculina coral larvae settle and grow on coral rubble or rock. Most of the young coral recruits that I have seen on the OHAPC in the past 10 years (during ROV surveys with NOAA Fisheries) have been growing on coral rubble habitat. These young corals are mostly less than 12" diameter. A single coral colony of 12" diameter can host up to 2,000 animals. The coral habitat supports over 230 species of mollusks, 50 species of decapod crustaceans, and hundreds of species of echinoderms, polychaete worms and other benthic species; these are the food chain for the fish populations (Reed et al. 1983, Reed and Mikkelsen 1987, Reed 2002, Reed et al. 2005).

- The Oculina ecosystem is important habitat for at least 70 species of fish. Some of these species are interconnected with the Indian River Lagoon. Gag and scamp grouper live in the IRL grassbeds and mangroves as juveniles, then as they mature at 15-20 years they move to the offshore banks to spawn. The deep-water Oculina reefs form breeding grounds for commercially important populations of gag (Mycteroperca microlepis) and scamp (M. phenax) grouper; nursery grounds for juvenile snowy grouper (Epinephelus niveatus); and feeding grounds for these and other fish including black sea bass (Centropristes striata), red grouper (E. morio), speckled hind (E. drummondhayi), warsaw grouper (E. nigritus), goliath grouper (E. itajara), almaco jack (Seriola rivoliana), greater amberjack (S. dumerili), red porgy (Pagrus pagrus), red snapper (Lutjanus campechanus), gray snapper (L. griseus), little tunny (Euthynnus alletteratus), giant ocean sunfish (Mola mola), Atlantic manta ray (Manta birostris), tiger shark (Galeocerdo cuvieri), and scalloped hammerhead shark (Sphyrna lewini) (G. Gilmore, pers. comm.; Reed & Gilmore, 1981; Koenig et al., 2005; Reed et al., 2005).

- These shelf-edge mound structures form part of the migration pathway for king mackerel (Scomberomorus cavalla), Spanish mackerel (S. maculatus), and wahoo (Acanthocymbium solandri). The spiny tail stingray Dasyatis centroura use the deep-water Oculina reefs region for courtship and mating (Reed & Gilmore, 1981), and large populations of the commercially important squid Illex oxygonius have been observed spawning on the banks (Reed & Gilmore, 1981). Also, recently a tagged Great White shark (Breton) was pinged within the OHAPC.

- Dense schools of thousands of small antheids Hemanthias vivanus often cover the healthy coral, darting into the recesses of the branches for protection and for feeding on the invertebrates living within. These in turn help support the large populations of larger fish (Reed & Hoskin, 1987; George et al., 1987).

- In 2005, remotely operated vehicle (ROV) transects on Oculina reefs observed black sea bass (Centropristis striata), which had not been seen on the reefs since the 1980s when they were abundant. In the 1980s, observed individuals were large and mature, but those observed in 2005
  were small juveniles, suggesting that the species was possibly in initial stages of recovery in this location. Juvenile speckled hinds were also observed on the reefs for the first time since the 1980s. These findings support the HAPC's effectiveness to restore reef fish and their habitat (Harter et al. 2009).

- Dominant federally managed fish observed during the ROV video transects within the Northern OHAPC in the region near the proposed SFAA (2017 NOAA ship *Pisces* cruise; PIs- Stacey Harter, Andy David [NOAA Fisheries], John Reed [HBOI/FAU]) included scamp (common), gag, snowy grouper, red porgy (common), amberjack (abundant), and black sea bass (abundant). Dominant invertebrates included Oculina varicosa coral (10-40 cm colonies), gorgonian corals, black coral (abundant), sponges, starfish, sea urchins, and mollusks. The mounds appeared to have been impacted by years of bottom shrimp trawling as documented within the OHAPC. Rock shrimp also utilize Oculina coral habitat areas (SAFMC 1996). This habitat was confirmed by research trawls which captured large amounts of rock shrimp in and around the OHAPC prior to its designation (Cobb et al. 1973).

- In recent studies, we see red snapper and grouper in the low relief and flat areas of these reefs (Harter et al. 2016- 2019). We know that many species move off the high relief reefs to forage and feed. Trawling nearby could easily by-catch these species. Again- these fish species in this region are just rebuilding now. The deep-water snapper-grouper complex of species are long lived, slow to mature, and can be quickly be impacted that can take decades to recover.

- Data from observer coverage in the rock shrimp fishery from 2011-2016 shows 37% of catch consisting of finfish and 17% consisting of other invertebrates. A total of 32 species were identified on observed rock shrimp trips (Scott-Denton et al. 2020).

- Grouper like to migrate off the coral banks at night to nearby areas to forage on benthic fishes and crustaceans, which is exactly where and when the shrimp trawlers will be active. The trawlers catch dozens and dozens of juvenile fish as bycatch on each tow and throw them overboard dying and your fishermen will never see them in the water as prized catch (pers. comm., Grant Gilmore: "I personally documented the rock shrimp trawl fish by-catch by participating in collecting and preserving the fish caught in shrimp trawls during a multi-annual Florida Department of Natural Resources [now the Florida Fish and Wildlife Conservation Commission] study off Cape Canaveral conducted by Dr. Stewart Kennedy, 1973-1974. The trawl by-catch was substantial. Fishery impacts were primarily on seabass (Centropristis spp.), grunts, flatfishes, cuskeels and batfishes)."

- Economic importance of saltwater recreational fishing and fishermen in Florida:

According to a report from the Florida Fish and Wildlife Conservation Commission, saltwater recreational fishing and fishermen have a large impact on the state's economy (Source: American Sportfishing Association and Southwick Associates, based on USFWS 2011 survey data updated to 2020 using FWC-OLP's license trend data plus inflation data). In total, saltwater fishing generates:

- 1.5 million saltwater recreational licenses sold in fiscal year 2019/20202.
- 4 million recreational resident and nonresident who had an active license in fiscal year 2019/2020
- Saltwater recreational fishing generated: $9.2 billion*
- Supports: 88,501 jobs* (saltwater only)

(*Source: American Sportfishing Association and Southwick Associates, based on USFWS 2011 survey data updated to 2020 using FWC-OLP's license trend data plus inflation data)

- Today, the Oculina reef ecosystem is the site of spawning for three fish: gag, snowy grouper, and red porgy that are all overfished and valued by recreational fishermen. The reef is also important habitat for adults and juveniles who find protection and abundant prey in and among the corals.

- Many of these species, specifically red porgy, snowy grouper, and gag are listed as overfished or experiencing overfishing by NOAA Fisheries in the last Status of Stocks report; and other populations have declined substantially off Florida in the last few decades due to habitat destruction. If Amendment 10 goes through, these problems will only get worse. OUR FISH NEED MORE HABITAT, NOT LESS (pers. comm., Grant Gilmore).

- The few rock shrimpers who are behind Amendment 10 are not concerned with grouper - snapper- porgy fisheries, whether commercial or recreational fisheries. In the past 3 years, the annual landings for the rock shrimp fishery on the east coast of Florida have averaged $759,000 per year with a median of $455,000. It's a tiny fishery compared to the value your recreational members create.

- If the rock trawlers have been trawling this SFAA zone in the eastern boundary of the OHAPC, as they say they have, they would have decimated any coral babies (recruits). The coral cannot recover if trawling within the OHAPC continues. Without the coral, the fish cannot recover. We currently see regrowth of the Oculina coral in the Northern OHAPC (Harter et al., 2018 a,b; 2019). Now is not the time to open up an already protected area to trawling.

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Comment 6: Marine Protected Areas; Oculina Habitat Area of Particular Concern

- Deep-water Oculina coral reefs are a unique coral reef ecosystem like no other on earth. The discovery of these reefs led to the formation of the Oculina Habitat Area of Particular Concern (OHAPC) in 1984 by the South Atlantic Fishery Management Council (SAFMC). The OHAPC was the first deep-water coral marine protected area in the world to protect a deep-water coral reef and prohibited bottom trawls, longlines, dredges, and anchors. The OHAPC was first established primarily to prevent the rock shrimp trawl fishery from damaging the coral habitat and to protect the associated grouper/snapper spawning aggregations. Unfortunately, the northern two thirds of the reef system remained open to these gear until 2000 and 2015 when the OHAPC boundaries were expanded to cover all the known Oculina ecosystem, and poaching has been an ongoing and unregulated problem.

- According to the Proposed Amendment 10 (NOAA-NMFS-2021-0126, Coral_Amendment10_Nov21_508; Summary):
  "If approved by the Secretary of Commerce (Secretary), Amendment 10 to the Coral FMP (Coral Amendment 10) would establish a shrimp fishery access area (SFAA) along the eastern boundary of the northern extension of the Oculina Bank Habitat Area of Particular Concern (OHAPC), where trawling for rock shrimp is currently prohibited. Coral Amendment 10 would increase access to historic rock shrimp fishing grounds while maintaining protection of the Oculina deep-water coral ecosystems, provide increased socioeconomic benefits to fishers, and increase the likelihood of achieving optimum yield (OY) in the rock shrimp portion of the South Atlantic shrimp fishery."

  Response:
  1) The entire OHAPC is the rock shrimp historic fishing grounds. Lost trawl nets on the reefs and within the OHAPC and reports by the Coast Guard attest to that [Coast Guard (at Coral and Shrimp AP meeting, Oct 2012)- Stated that 20 cases of illegal trawlers inside OHAPC; Coast Guard (Oct 2012)- Stated that prior to the VMS (2003) there were 'all kinds of entries' by trawlers into the OHAPC].
  2) Since 2000, when the boundaries of the OHAPC were expanded from Sebastian northward to Cape Canaveral, shrimp bottom trawlers have been caught poaching within the boundaries of the original OHAPC (OECA) and in the vicinity of Chapman's Reef and Jeff's Reef, the only remaining live, high-relief coral reefs. Recent dives completed with ROVs within the OHAPC have documented coral reefs wrapped with fishing lines, piles of bottom longlines, discarded trawl nets, and anchor lines (Reed et al., 2005).
  3) Yes, opening up a closed marine protected area will <u>increase</u> the likelihood of catching shrimp; but will also <u>decrease</u> the likelihood of coral recruitment, decrease the recovery of the coral habitat, and subsequently decrease the recovery of fin fish populations.

- According to the Proposed Amendment 10 (NOAA-NMFS-2021-0126, Coral_Amendment10_Nov21_508; pg. 4):

"Information on the concentrated shrimp fishing effort in the area and its economic value to the rock shrimp portion of the shrimp fishery was discussed by the Council very late in the development of Coral Amendment 8. During these discussions, rock shrimp fishermen requested
adjustment of the OHAPC boundary and provided coordinates that comprised the important fishing grounds in that area."

Response:

1) As stated above, the economic effect was discussed by the Council while developing Amendment 8. Members of the Shrimp Advisory Panel and the Coral Advisory Panel were present when the Council Senior Scientist (R Pugliese) drew the boundaries for the Northern OHAPC which included a buffer to keep the trawls away from the reefs, and was approved by the SAFMC in 2015.

- According to the Proposed Amendment 10 (NOAA-NMFS-2021-0126, Coral_Amendment10_Nov21_508; pg. 4):
"The Council also developed Coral Amendment 10 in response to the Presidential Executive Order on Seafood Competitiveness and Economic Growth (E.O. 13921) (85 FR 28471; May 7, 2020). Coral Amendment 10 would address the recommendation to reduce burdens on domestic fishing and to increase production within sustainable fisheries contained in E.O. 13921. This would be accomplished by re-opening a closed area to commercial fishermen who have lost access to areas that have been traditionally fished."

  Response:

  1) This EO is in direct opposition to Biden's 30x30 Initiative. The purpose of the OHAPC is to protect the Oculina coral habitat which in turn will allow the 'traditional' hook and line fin fisheries to recover. Opening up a marine protected area for small destructive fishery while negatively impacting larger more important fin fisheries makes no sense. The Biden/Harris Administration has directed the executive branch, including NOAA, to work toward conserving at least 30% of U.S. ocean area by the year 2030. Scientists have stressed the importance of achieving this target with strong protections that can help mitigate the impacts of the current biodiversity crisis. We need more meaningful, durable protections like those that exist for the Oculina HAPC, not fewer. In fact, if vital protections here can be stripped away with no basis in science, then it is hard to see how any HAPC designation can be seen as providing the type of long-term protection the Biden/Harris Administration is seeking through its commitment to 30x30 and the America the Beautiful initiative. NOAA's decision on this recommendation from the South Atlantic Fishery Management Council will have rippling consequences for how fishery conservation measures are evaluated and viewed in terms of their contributions to 30X30, the America the Beautiful plan, and the Conservation and Stewardship Atlas.

- If passed this Amendment will allow shrimp trawlers access to bottom trawl within the boundaries of a portion of the OHAPC. It will increase the degradation and proximal destruction of this unique-in-the world coral reef system. Adding in the already existing environmental stressors the coral reefs here (and around the world) and we could see the unintended expansion of degradation and destruction growing within the marine protected area. In a non-linear world of ecosystem function one additional change/ variable can become the straw that breaks the camel's back. The purpose of marine protected areas like the OHAPC are to protect

areas of essential habitat, fish populations and their spawning grounds. That is the whole purpose of establishing marine protected areas. It is not and should not allow special interests devest MPAs of their purpose. If we destroy the habitat, we lose the fish; if we lose the fish, we lose the fisheries.

- The nation's fisheries law, the Magnuson–Stevens Fishery Conservation and Management Act (Magnuson–Stevens Act or MSA), has played a critical role in curbing overfishing and rebuilding dozens of once-depleted fish stocks. The MSA recognizes the importance of protecting marine habitat from the impacts of both fishing gear and nonfishing activity, such as sand mining, dredging, and energy exploration and development. To this end, it requires that councils designate areas within their region as "essential fish habitat" (EFH), i.e., the habitat that is necessary for healthy fish populations (NRDC Report- A Safety Net for Ocean Fisheries: The Case for Stronger Protection of Essential Fish Habitat under the Magnuson-Stevens Act, April 2021, R:21-03-A).

- Dr. Sylvia Earle, a former chief scientist for NOAA , the head of Mission Blue and Explorer-in-Residence for National Geographic, has said of the Oculina Coral Reef issue (Pers. comm.): "The science is clear. The economics are clear. The ethical and moral mandates are clear. What remains of the intact East Florida Oculina reef system and the associated damaged areas, if left alone -- that is, protected from fishing, especially trawling, will yield enduring benefits now and forever. Giving a few shrimpers a green light to trawl these ancient systems into oblivion will destroy what could be an on-going source of life and livelihoods in exchange for a few bucks for a few people and then it will be over."

- Opening a portion of the HAPC to trawling is a bad precedent. What would prevent the trawlers from requesting other portions of the OHAPC or the Deepwater CHAPC protected areas to be opened? Now is the time to protect these reefs, to allow the corals to recover, to allow the spawning aggregations of important grouper and snapper to recover. Now is not the time to diminish an area that is already protected.

- In addition to threatening delicate ecosystems in the Oculina HAPC, the South Atlantic Fishery Management Council's recommendation to open the area, if put into effect, calls into question the efficacy and durability of habitat protections under the MSA. If NOAA-designated HAPCs cannot be relied on to protect the ecologically important and/or vulnerable habitats for which they were created, the designation loses meaning. To be clear, the Council is not recommending the Oculina Bank HAPC designation be removed, nor are they alleging that the conditions that necessitated the HAPC's protection have abated. Instead—against the advice of scientists and their own Coral Advisory Panel—they seek to remove protections to benefit a small number of individuals.

- The purpose of the OHAPC is to protect areas of essential habitat, fish populations and their spawning grounds. It is not and should not allow special interests devest HAPCs of their purpose. Opening these areas to the same fishery that destroyed the coral in the first place completely undermines the purpose of the protected areas. This action represents a giant step backwards in stewardship of our natural resources and sets a dangerous precedent for encroachment into other protected areas.

- I am requesting that NOAA Fisheries deny Amendment 10 to open a SFAA which allows trawling by shrimp fishers within the current boundaries of the OHAPC. I ask you to accept Alternative 1 (No Action) of the proposed Amendment 10: “No person may use a bottom longline, bottom trawl, dredge, pot, or trap in the Oculina Bank Habitat Area of Particular Concern. If aboard a fishing vessel, no person may anchor, use an anchor and chain, or use a grapple and chain.” Currently there are no shrimp fishery access areas within the Oculina Bank Habitat Area of Particular Concern, and now is not the time to reverse course, nor to redraw the boundaries of the protected area.

References:

NOAA National Marine Fisheries Service (NMFS) and the SAFMC have drafted an Environmental Assessment (EA) of potential impacts, cumulative effects, economic impacts, etc. for this proposal [https://safmc.net/download/BB%20Council%20Sept%202021/Habitat%20&%20Ecosystem/HabEco_A1b_Coral_Amendment10_Draft_August%2021%202021.pdf].