December 4, 2023

To: Administrator@safmc.net
Re: SAFMC Meeting, Dec 2023
Habitat and Ecosystem Report
Guidance for Resubmission of Amendment 10
NOAA-NMFS-2021-0126; Coral_Amendment10_Nov21_508
Public Comment – Comment 2

From:
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Comment: Impacts of Shrimp Trawling on Oculina Reefs

I am a retired senior research scientist and Research Professor 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.

For the past 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.

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