



UNITED STATES DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

NATIONAL MARINE FISHERIES SERVICE

Southeast Regional Office

263 13th Avenue South

St. Petersburg, Florida 33701-5505

<http://sero.nmfs.noaa.gov>

September 21, 2015

F/SER47:BH/pw

(Sent via Electronic Mail)

Colonel Jason A. Kirk, Commander  
Jacksonville District Corps of Engineers  
Palm Beach Gardens Regulatory Office  
4400 PGA Boulevard, Suite 500  
Palm Beach Gardens, Florida 33410

Attention: Samantha Rice

Dear Colonel Kirk:

NOAA's National Marine Fisheries Service (NMFS) reviewed public notice SAJ-2014-02065 (SP-SLR) dated August 24, 2015. The St. Lucie County Erosion District proposes to dredge a sediment basin (1,645 feet by 211 feet) with a depth of -42 feet NAVD along the northern side of Fort Pierce Inlet, maintenance dredge the sediment basin every two years, and place sand in accordance with the federal Fort Pierce Shore Protection Project between Florida Department of Environmental Protection (FDEP) monuments R-34 to R-41. The applicant requests a 15-year permit duration. Material from the initial dredging is not beach compatible and would be disposed at the Fort Pierce Ocean Dredged Material Disposal Site (ODMDS). The initial dredging of the sediment basin would impact 9.0 acres of sand/shell bottom and 3.4 acres of hardbottom colonized by sponges, hydroids, octocorals, tunicates, worm rock, and macroalgae. Mitigation for impacts to hardbottom would be provided by constructing a limestone boulder reef west of the sediment basin within Fort Pierce Inlet. The Jacksonville District's initial determination is the proposed project would have substantial adverse impacts to essential fish habitat (EFH) or federally managed fisheries. As the nation's federal trustee for the conservation and management of marine, estuarine, and anadromous fishery resources, the following comments and recommendations are provided pursuant to authorities of the Fish and Wildlife Coordination Act and the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

*Essential Fish Habitat within the Proposed Disposal Area Expansions*

The South Atlantic Fishery Management Council (SAFMC) identifies corals and live/hardbottom habitat as EFH for several species, including adult white grunt (*Haemulon plumieri*); juvenile and adult gray snapper (*Lutjanus griseus*) and lane snapper (*Lutjanus synagris*); and juvenile mutton snapper (*Lutjanus analis*), schoolmaster (*Lutjanus apodus*), and dog snapper (*Lutjanus jocu*). Hardbottoms and sponges are also EFH for coral and spiny lobster (*Panulirus argus*). All demersal fish species under SAFMC management that associate with coral habitats are contained within the fishery management plan for the snapper-groupers complex and include some of the more commercially and recreationally valuable fish of the region. All of these species show an association with coral or hardbottom habitat during their life history. For groupers, the demersal



life history of almost all *Epinephelus* species, several *Mycteroperca* species, and all *Centropristis* species takes place in association with coral habitat. Coral, coral reef, and hardbottom habitats benefit fishery resources by providing food or shelter. These habitats are part of a habitat complex that supports a diverse community of fish and invertebrates.

The SAFMC also identifies corals, coral reef, and hardbottom as a Habitat Area of Particular Concern (HAPC) for species within the snapper/grouper complex. SAFMC designates tidal inlets as a HAPC under the fishery management plans for penaeid shrimp and the snapper/grouper complex. HAPCs are subsets of EFH that are either rare, particularly susceptible to human-induced degradation, especially important ecologically, or located in an environmentally stressed area. In light of their designation as HAPCs and Executive Order 13089, NMFS applies greater scrutiny to projects affecting corals, coral reefs, and hardbottom to ensure practicable measures to avoid and minimize adverse effects to these habitats are fully explored.

The habitat in this area also includes marine sandy bottom designated EFH for cobia (*Rachycentron canadum*), black seabass (*Centropristis striata*), king mackerel (*Scomberomorus cavalla*), Spanish mackerel (*S. maculatus*), spiny lobster, and pink shrimp (*Farfantepenaeus duorarum*). Tidal, sandy bottom habitats directly benefit fishery resources by providing foraging habitat. The SAFMC provides detailed information on federally managed fisheries and their EFH in amendments to fishery management plans and in *Fishery Ecosystem Plan of the South Atlantic Region* (available on-line at [www.safmc.net](http://www.safmc.net)).

#### *Impacts to Essential Fish Habitat*

Sediment Basin Dredge: The initial sediment basin dredging would impact 9.0 acres of sand/shell bottom and 3.4 acres of live/hardbottom colonized by sponges, hydroids, octocorals, tunicates, worm rock, and macroalgae. The 3.4-acre hardbottom complex is further broken down by cover as follows:

- 0.1 acre of 0% to 20% hardbottom cover
- 0.4 acre of 20% to 50% hardbottom cover
- 0.1 acre of 50% to 80% hardbottom cover
- 2.8 acres of 80% to 100% hardbottom cover

Pipeline and Vessel Corridors: It is not clear if transport of the dredged material to the beach and the Fort Pierce ODMDS by pipeline or dredge (including any supporting vessels), respectively, would impact coral, coral reef, or hardbottom habitat. The NMFS requests the Jacksonville District and applicant describe habitat in and near the transit corridors and how the pipeline, dredge, and support vessels would be monitored and managed to ensure no damage to coral or hardbottom communities results from towlines, equipment, or pipeline leakage.

Beach and/or dune fill: The public notice does not identify the federal permit authorizing placement of fill between FDEP monuments R-34 to R-41. The NMFS closed EFH consultation for District permit SAJ-1993-00026 (IP-EGR) authorizing sand placement between FDEP monuments R-34+200 to R-35.5 on April 1, 2011. The NMFS cannot find consultation records for the remainder of the project.

### *Mitigation and Monitoring*

Mitigation for unavoidable impacts to hardbottom would be provided by constructing a limestone boulder reef west of the settlement basin within Fort Pierce Inlet. District staff have explained the 12-Point Mitigation Plan provided is not accurate in respects to acreage and other mitigation components. The public notice identifies 3.4 acres of impact to hardbottom; however, the mitigation plan only describes 0.23 acre. Information clarifying mitigation acreage will be needed. The artificial reef would be constructed in similar depths to those of the proposed impacts. The NMFS has reviewed the Uniform Mitigation Assessment Methodology (UMAM) scores provided for both the impact and mitigation site. The NMFS agrees with the scores provided for the impact site; however, additional information regarding the mitigation site location, materials, and drawings are needed. The public notice states that octocorals are present within the impact area. These corals should be relocated in accordance with the enclosed Florida Fish and Wildlife Conservation Commission's (FWC), *Coral and Octocoral Mitigation Relocation Recommendations* and *Coral and Octocoral Visual Health Assessment Protocols for Relocation Activities*. Worm reef will be impacted by the settlement basin. This important habitat should be relocated to the mitigation site if possible. This could be accomplished with the use of float bags if boulders are unattached and of appropriate size.

### **EFH Conservation Recommendations**

Section 305(b)(4)(A) of the Magnuson-Stevens Act requires NMFS to provide EFH Conservation Recommendations for any federal action or permit which may result in adverse impacts to EFH. Therefore, NMFS recommends the following to ensure the conservation of EFH and associated fishery resources:

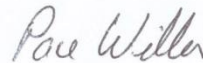
1. The permit require use of the FWC coral health relocation protocols (enclosed) to determine if individual octocoral colonies are candidates for relocation.
2. The performance standard for coral relocation should be 85 percent survival with positive tissue growth and secure substrate attachment two years after relocation. The number of corals monitored should be no less than 25 percent of the relocated corals and include at least ten colonies of each species. If less than ten colonies of a species are relocated, all of the corals of that species should be monitored.
3. The permit require mitigation for impacts to coral and hardbottom habitat, including coral that do not survive relocation. The mitigation should be in-kind and the amount based on a functional assessment. The NMFS requests an opportunity to review a draft of the hardbottom and coral mitigation plan.
4. The permit require movement of the transport barges be limited to corridors lacking hardbottom and coral habitat and the securing of all tow lines to avoid any contact with hardbottom or coral habitats.
5. The permit require identification of transit and pipeline corridors that avoid impacts to hardbottom habitat and require contractors to monitor the pipeline daily for leakage.

Section 305(b)(4)(B) of the Magnuson-Stevens Act and its implementing regulation at 50 CFR Section 600.920(k) require the Jacksonville District to provide a written response to this letter within 30 days of its receipt. If it is not possible to provide a substantive response within 30 days, in accordance with the "findings" with the Jacksonville District, an interim response should be provided to the NMFS. A detailed response then must be provided prior to final approval of the action. The Jacksonville District's detailed response must include a description of measures

proposed by the District agency to avoid, mitigate, or offset the adverse impacts of the activity. If the Jacksonville District's response is inconsistent with our EFH conservation recommendations, the District must provide a substantive discussion justifying the reasons for not following the recommendation.

Thank you for the opportunity to provide comments. Please direct related correspondence to the attention of Mr. Brandon Howard at our West Palm Beach office, 400 North Congress Avenue, Suite 110, West Palm Beach, Florida, 33401. He may be reached by telephone at (561) 249-1652, or by e-mail at Brandon.Howard@noaa.gov.

Sincerely,



/ for

Virginia M. Fay  
Assistant Regional Administrator  
Habitat Conservation Division

Enc.: 1. *FWC Coral and Octocoral Mitigation Relocation Recommendations and Coral*  
2. *FWC Coral and Octocoral Visual Health Assessment Protocols for Relocation Activities*

cc: COE, Samantha.L.Rice@usace.army.mil  
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**Florida Fish and Wildlife Conservation Commission (FWC)  
Coral and Octocoral Mitigation Relocation Recommendations**

**FWC Authorization Required**

A Stock Collection and Release, Special Activity License (SAL) is required for all marine species relocation activities statewide. Information on the SAL Program and applications are available here:

<http://myfwc.com/license/saltwater/special-activities/>

**Definitions**

For purposes of these Recommendations:

- 1) “Coral” is any species of the Order *Scleractinia*, Order *Antipitharia* and Genus *Millepora*.
- 2) An “octocoral” is any species of the Subclass *Octocorallia*.
- 3) “Relocation” includes all activities (e.g., transplantation, outplanting) that move coral fragments or colonies from one place to another, including (but not limited to) into and out of cache locations, or in-water or land-based nurseries.

**Coral and Octocoral Removal and Relocation**

Removal and relocation of corals and octocorals to suitable sites at current or historical, regionally appropriate densities for purposes of project impact minimization should occur on all coastal projects where complete avoidance is not possible. The FWC recommends removal and relocation of coral and octocoral species, but these activities should be considered as minimization of project impacts and not as compensatory mitigation. This minimization effort can be accommodated in both Florida Uniform Mitigation Assessment Method (UMAM) and Habitat Equivalency Analysis (HEA) mitigation assessment methodologies, and would result in lower amounts of compensatory mitigation required for the project relative to the amount of mitigation that would be required if coral removal and relocation was not performed.

Coral and octocoral removal and relocation activities should not occur during times of severe stress (e.g., disease outbreak, coral bleaching, cold stress), or from locations impacted by significant stress events (e.g., during dredging activities or storm water run-off events), unless there are extreme circumstances that warrant an exception. FWC will consider exceptions to this recommendation on a case by case basis when project impacts are imminent and cumulatively harmful, and when benefits outweigh potential risks.

***Coral Removal and Relocation Activities***

The FWC recommends removal and relocation of all state listed, ESA listed and ESA proposed species of corals regardless of colony size, unless a colony displays signs of disease pursuant to the attached “FWC Coral and Octocoral Visual Health Assessment Protocols.” The current species that are state listed or ESA listed/proposed are as follows:

- *Acropora cervicornis* (ESA and state listed as Threatened)
- *Acropora palmata* (ESA and state listed as Threatened)
- *Dendrogyra cylindrus* (ESA and state listed as Threatened)
- *Orbicella annularis* (ESA listed as Threatened, state listing pending)
- *Orbicella faveolata* (ESA listed as Threatened, state listing pending)
- *Orbicella franksi* (ESA listed as Threatened, state listing pending)
- *Mycetophyllia ferox* (ESA listed as Threatened, state listing pending)

## **Florida Fish and Wildlife Conservation Commission (FWC) Coral and Octocoral Mitigation Relocation Recommendations**

The FWC also recommends removal and relocation of all adult corals (defined as colonies 5 cm in diameter or greater and  $\geq 2$  cm in height), unless a colony displays signs of disease pursuant to the attached “FWC Coral and Octocoral Visual Health Assessment Protocols.” If corals fragment upon removal, fragments 5 cm in diameter or greater and  $\geq 2$  cm in height should be relocated near each other, as fragments of the same genet are known to readily and successfully fuse (Raymundo and Maypa 2004). Although coral colonies less than 5 cm have been observed to be reproductive (Soong 1993), the FWC recognizes that colonies greater than 5 cm are generally considered to be adults (Bak and Engel 1979, Miller et al. 2000), based on average growth rates (Vaughn 1915) and estimated age of sexual maturity (Connell 1973).

Corals 5 cm in diameter or greater can be successfully relocated. Brownlee (2010) successfully transplanted small corals (*Siderastrea siderea*, *Dichocoenia stokesii*, and *Porites porites*) with greater than 80 percent survivorship after 13 months. Monty et al. (2006) successfully transplanted 250 corals (14 species) ranging from 5 to 40 cm in diameter with a high rate of survivorship. These corals were monitored for 13 months. Eight species had 100 percent survivorship, including 78 *Siderastrea siderea*. Thornton et al. (2000) transplanted 271 corals from an outfall pipe in Broward County to an articulated concrete mat. *Siderastrea siderea* comprised 90 percent of the corals <1 to 100 square centimeters in size. After 27 months, 266 of the corals had survived (87 percent), as compared to 83 percent survival for corals on the nearby natural substrate. In addition, Stephens (2007) salvaged multiple species of corals from a coastal construction impact site in Broward County; survival of the species ranged between 92 and 100% during monitoring periods varying between 18 and 24 months.

The FWC has further prioritized coral species for removal and relocation (in addition to species identified above) in the event that all corals 5 cm in diameter or greater will not be removed and relocated. These coral species have been prioritized and binned based on a high conservation value (i.e., rare, slow-growing, low genetic diversity, slow to recover, sensitive to stress, poor-recruiter, high post-settlement mortality), and the list is as follows:

### **HIGH PRIORITY SPECIES**

- Order *Antipatharia*
- *Agaricia fragilis*
- *Agaricia lamarcki*
- *Colpophyllia natans*
- *Dichocoenia stokesii*
- *Diploria labyrinthiformis*
- *Favia fragum*
- *Isophyllia* spp.
- *Leptoseris cucullata*
- *Madracis* spp.
- *Manicina aereolata*
- *Meandrina meandrites*
- *Montastraea cavernosa*
- *Mussa angulosa*
- *Mycetophyllia* spp.
- *Oculina diffusa*
- *Oculina robusta*
- *Solenastrea hyades*

**Florida Fish and Wildlife Conservation Commission (FWC)  
Coral and Octocoral Mitigation Relocation Recommendations**

**MEDIUM PRIORITY SPECIES**

- *Eusmilia fastigiata*
- *Porites divaricata*, *P. furcata*, *P. porites*
- *Pseudodiploria* spp.
- *Sidereastrea siderea* ≥10 cm
- *Solenastrea bournoni*
- *Stephanocoenia intersepta* ≥10 cm
- *Undaria* spp

**LOW PRIORITY**

A lower amount of effort should be attributed to removing and relocating the following species, and compensatory mitigation should be designed to offset the loss of any corals not relocated. Alternatively, if the impact area is dominated by these species, effort would be justified to remove and relocate the following species:

- *Porites astreoides*
- *Siderastrea radians*
- *Siderastrea siderea* <10 cm
- *Stephanocoenia intersepta* <10 cm
- *Cladocora arbuscula*
- *Phyllangia* spp.
- *Scolymia* spp.

FWC supports efforts to relocate corals that are less than 5 cm, however we are aware that this may increase project cost due to additional survey design measures to accurately identify coral recruits. For corals that will not be relocated (of any size), FWC recommends coordination with permitted/approved coral nursery/research facilities within the region to determine if they have interest and financial resources to remove corals or accept donated corals.

***Octocoral Removal and Relocation Activities***

The FWC recommends removal and relocation of all *Gorgonia* species and other octocoral species 10 cm in height or greater, based on the prioritized list below. Similar to corals, these octocoral species are also prioritized based on a high conservation value (i.e., state prohibited species, conservation need, local abundance/density, growth rates, relocation success, and ability to recover naturally). In general, more robust rod species are slow growing and have low recruitment, but transplant well and seem to recover quickly from being transplanted (e.g., growing a new holdfast over attachment material) (Brinkhuis 2009). Plumes are low on the list because they recruit very quickly after a disturbance and have high growth rates so their potential for natural recovery is greater. Additionally, more delicate plume species have less tissue (e.g., thinner tissue = less potential/resources for healing after clipping) and are inferior transplantation candidates. However, plumes can be transplanted successfully (Brinkhuis 2009). The prioritized list is as follows:

- *Antillogorgia* (formerly *Pseudopterogorgia*)
- *Eunicea*
- *Gorgonia* (state prohibited species)
- *Leptogorgia*
- *Muricea*
- *Muriceopsis*
- *Plexaura*
- *Plexaurella*
- *Pseudoplexaura*
- *Pterogorgia*

**Florida Fish and Wildlife Conservation Commission (FWC)  
Coral and Octocoral Mitigation Relocation Recommendations**

In addition to the species previously listed, the following are priority genera if deeper relocation sites are targeted (60' +):

- *Diodogorgia*
- *Ellisella*
- *Iciligorgia*
- *Swiftia*
- *Telesto*

***Coral and Octocoral Caching***

If corals and octocorals will be cached after removal and prior to reattachment at the relocation site, the FWC recommends the following cache criteria be adhered to:

- 1) The cache site for corals and octocorals must be located in a stable area (e.g., low energy, low sedimentation, minimal temperature flux, minimal freshwater input), and err conservatively on the side of being slightly farther from expected project-associated direct and indirect impact areas.
- 2) Cached coral colonies must be maintained in an area where sediment does not collect, be affixed to an elevated structure, or placed in a suspended container in a manner wherein colonies are above the sea floor and do not touch each other. If cached corals are to remain in cache for longer than two weeks, colonies must be cemented or epoxied to an elevated structure or to the sea floor.
- 3) Cached octocorals should be attached with zip ties by their holdfast or base to an elevated array or line system previously installed on the sea floor. Orientation is less important, but colonies must not touch each other.

***Relocation Site Selection***

The FWC recommends that the selection of an appropriate relocation site(s) for both corals and octocorals meet the following general criteria:

- 1) Relocation site must be suitable reef habitat, be within the known range of the species or genera, and have historic presence of the species to be relocated (in recent decades).
- 2) Optimally, the relocation site should be located in similar water depths and have similar physical conditions (e.g., light availability, water quality, water circulation) to those at the removal site.
- 3) Optimally, the relocation site should have similar substrate orientation to removal site, e.g., if corals or octocorals are being removed from a vertical or sloped elevated surface, then the relocation site should have similar vertical or sloped areas for relocation.
- 4) For relocation as an avoidance or minimization measure, the relocation site must be as close in proximity to the area requiring mitigation actions as possible to preserve the functional ecosystem value of the surrounding areas provided by the resources to be relocated, but err conservatively on the side of being slightly farther from expected project-associated direct and indirect impact areas.
- 5) Relocation site must be a healthy environment for the given region.
- 6) Relocation site must not contain large amounts of loose rubble and should not be a high energy environment (Edwards and Clark 1998).
- 7) Relocation site must not be located within a direct or indirect impact area for any permitted, authorized or reasonably foreseeable marine coastal construction activity (e.g., dredging, beach nourishment, pipeline or communication cable installations), or within exclusion or buffer areas (e.g., military, aquaculture).
- 8) Relocation site must have adequate and appropriate space to allow for: 1) colony growth, tissue re-colonization and plating based on colony size, species growth rates, and maximum size capacity; and 2) attachment density commensurate with regionally appropriate densities.



**Florida Fish and Wildlife Conservation Commission (FWC)  
Coral and Octocoral Mitigation Relocation Recommendations**

**Health Assessment**

To minimize the risk that diseases are not being spread from the removal area to a cache or relocation site, the FWC recommends a visual health assessment of each coral or octocoral colony slated for caching or direct relocation be conducted immediately prior to removal pursuant to the “FWC Coral and Octocoral Visual Health Assessment Protocols” (attached). Corals and octocorals exhibiting visual signs of disease should not be removed and cached or relocated.

Cached corals and octocorals should again be visually assessed for health pursuant to the “FWC Coral and Octocoral Visual Health Assessment Protocols” immediately prior to removal from cache and reattachment at the relocation site. Any cached colonies displaying signs of disease should either be: 1) removed and disposed of and not be reattached or, 2) donated for ex-situ research.

**Removal, Relocation and Reattachment Methodologies**

The FWC is available to provide technical expertise to assist with the development of appropriate methodologies for the removal, relocation and reattachment of corals and octocorals for mitigation relocation purposes. The FWC would appreciate the ability to provide additional comments on relocation methodologies and relocation methodology revisions if such information becomes available in the future.

NOAA Florida Keys National Marine Sanctuary and NOAA National Marine Fisheries Service are also available to provide technical expertise on coral removal, relocation and reattachment based on lessons learned on the Florida Reef Tract.

**Mitigation Plans**

The FWC is available to provide technical expertise to assist with the development of appropriate mitigation plans to offset project impacts. The FWC would appreciate the ability to provide additional comments on mitigation plans and mitigation plan revisions if such information becomes available in the future.

**Monitoring Plans**

The FWC recommends that relocated corals and octocorals are monitored for attachment success and survival at one week (may be conducted at any time during the first week), one month, three months, six months, one year and two years post-relocation.

The FWC is available to provide technical expertise to assist with the development of monitoring plans to help gauge mitigation success and identify project impacts. The FWC would appreciate the ability to provide additional comments on monitoring plans and monitoring plan revisions if such information becomes available in the future.

**Florida Fish and Wildlife Conservation Commission (FWC)  
Coral and Octocoral Mitigation Relocation Recommendations**

**Literature Cited**

Bak R, Engel M (1979) Distribution, abundance and survival of juvenile hermatypic corals (Scleractinia) and the importance of life history strategies in the parent coral community. *Marine Biology* 54: 341-352.

Brinkhuis VIP (2009) Assessment of gorgonian transplantation techniques offshore Southeast Florida. M.S. Thesis. Nova Southeastern University Oceanographic Center. pp. 96.

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Miller M, Weil E, and A Szmant (2000) Coral recruitment and juvenile mortality as structuring factors for reef benthic communities in Biscayne National Park, USA. *Coral Reefs* 19: 115-123.

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Raymundo, LJ and Maypa, AP. 2004. Getting bigger faster: Mediation of size-specific mortality via fusion in juvenile coral transplants. *Ecological Applications*. 14(1): 281-295.

Soong K. 1993. Colony size as a species character in massive reef corals. *Coral Reefs*. 12(2): 77-83.

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Vaughn T (1915) The geological significance of the growth-rate of the Floridian and Bahaman shoal-water corals. *Journal of Washington Academy of Sciences* 5: 591-600.

**Florida Fish and Wildlife Conservation Commission (FWC)**  
**Coral and Octocoral Visual Health Assessment Protocols for Relocation Activities**

**CORALS**

***Definitions***

For purposes of these Protocols:

- 1) “Coral” is any species of the Order *Scleractinia*, Order *Antipitharia* and Genus *Millepora*.
- 2) “Branching coral” is coral that has numerous branches, and usually secondary branches.
- 3) “Mounding/boulder/foliose coral” is coral that is ball or boulder shaped, or boasts a whorl-like pattern resembling lettuce.
- 4) “Bleaching” for purposes of coral relocation is defined as 100% of coral tissue is discolored due to the loss or reduction in number of endosymbiotic algae (zooxanthellae). During bleaching, tissue is present but is pale to white in color.
- 5) “Partial bleaching” is where only a portion of the coral has lost its zooxanthellae, and the remaining areas of tissue appear normal in color.
- 6) “Old mortality” is the non-living portion of exposed coral skeleton which has been overgrown by algae and other biofouling organisms and where the corallite structure has eroded over time and is no longer identifiable. \*Not to be confused with “recent mortality.”
- 7) “Recent mortality” is the non-living portion of recently exposed coral skeleton (i.e., skeleton is white and corallite structures are intact and identifiable), including the development of fine “fuzz” or turf algae on exposed skeleton (i.e., skeleton is yellowish in appearance and corallite structure may be slightly eroded but still identifiable), indicating that the mortality occurred within a couple of weeks prior to observation. \*Not to be confused with “old mortality.”
- 8) “Relocation” includes all activities (e.g., transplantation, outplanting) that move coral fragments or colonies from one place to another, including (but not limited to) into and out of cache locations, in-water or land-based nurseries.

***Coral Visual Health Assessment***

Each coral fragment or colony selected for relocation must be visually assessed pursuant to these Protocols to ensure that they appear to be in good health and are free from suspected disease. The visual health assessment must be conducted immediately prior to removal from the original collection location for purposes of direct relocation, or immediately prior to removal from the original collection location for purposes of caching, and if cached, again immediately prior to removal from cache and reattachment at the relocation site. **Field personnel conducting coral visual health assessments should be proficient with species identification, and trained in coral disease, predation identification and survey techniques to assure accuracy of the assessment.** Each fragment or colony must meet the following criteria prior to relocation:

- 1) Branching coral fragments or colonies must have at least 5 cm (approx. 2”) of linear growth or 5 cm (approx. 2”) in diameter. **Exception** – Pursuant to the Relocation Recommendations, all state-listed, ESA-listed and ESA-proposed coral species should be relocated regardless of size.
- 2) Mounding, boulder or foliose coral fragments or colonies must have at least 2 cm (approx. 1”) of linear growth or height. **Exception** – Pursuant to the Relocation Recommendations, all state-listed, ESA-listed and ESA-proposed coral species should be relocated regardless of size.
- 3) Show no visible signs of disease or injury, based on the presence of:
  - a. Bleaching or partial bleaching. **Exceptions** - Partial bleaching is acceptable for relocation of specific coral species for which it is recognized as a part of these coral species’ normal, healthy state. These coral species are as follows: *Agaricia fragilis*, *Helioseris cucullata*, *Orbicella franksi*, *Siderastrea radians*, and *Undaria humilis*. Partial bleaching <2 cm on healthy, growing branch tips is also considered acceptable and normal for branching coral species including *Acropora cervicornis*, *Acropora palmata*, *Acropora prolifera*, *Oculina diffusa*, *Millepora alcicornis* and *Millepora complanata*.
  - b. Recent mortality. **Exception** - Old mortality is acceptable for corals that are to be relocated.

**Florida Fish and Wildlife Conservation Commission (FWC)**  
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- c. Active disease (e.g., white/black/yellow/red band diseases, white pox or plague diseases, white *Beggiotoa* mats, dark (purple) spot/blotch diseases, growth anomalies).
  - d. Suspect disease indicators (e.g., bands, spots, microbial mats, cyanobacteria colonization).
  - e. Stress indicators (e.g., tissue sloughing, swelling, or thinning; excessive sedimentation; excessive mucous production; or abrasions (mechanical impacts)). **Exception** – As identified in the Mitigation Relocation Recommendations, there may be extreme circumstances in which the FWC will consider an exception to this criterion, but exceptions must be made in advance of any relocation activities and approved by the FWC.
  - f. Invasive, encrusting and/or overgrowing tunicates, sponges, *Erythropodium caribaeorum*, or other organisms that cannot be removed (e.g., peeled off) prior to relocation. **Exception** - Corals infected with boring sponges of the genus *Cliona* are acceptable for relocation.
- 4) Corals that are experiencing active predation (e.g., presence in feeding position along tissue loss margin of *Coralliophila abbreviata* and/or *Hermodice carunculata*), may be relocated once all predators are removed.

## **OCTOCORALS**

### ***Definitions***

For purposes of these Protocols:

- 1) An “octocoral” is any species of the subclass *Octocorallia*.
- 2) A “rod” is characterized as having thick branches, and usually secondary branches with thick tissues.
- 3) A “seafan” is characteristically fan shaped with interconnected net-like branching with thin tissues.
- 4) A “plume” is characterized as having thin pinnate (feather-like) branches and branchlets with thin tissues.
- 5) A “holdfast” is the base of an octocoral that attaches the colony to the substrate.
- 6) The “axis” of an octocoral is the central supporting skeletal structure made out of proteinaceous gorgonin that is dark brown to black in color.
- 7) “Bleaching” for the purposes of octocoral relocation is defined as 100% of octocoral tissue is discolored due to the loss or reduction in number of endosymbiotic algae (zooxanthellae). During bleaching, tissue is present but is pale to white in color.
- 8) “Partial bleaching” is where only a portion of the octocoral tissue has lost its zooxanthellae, and the remaining areas of tissue appear normal in color. \*Note that octocorals rarely bleach and generally tend to exhibit partial bleaching at their branch tips closest to the water’s surface.
- 9) “Recent mortality” is the non-living portion of recently exposed octocoral axis skeleton (i.e., axis is dark brown to black), including the development of fine “fuzz” or turf algae on exposed axis, indicating that the mortality occurred within a few days prior to observation. \*\*“Old mortality” is not determinable in octocorals.
- 10) “Relocation” includes all activities (e.g., transplantation, outplanting) that move octocoral colonies from one place to another, including (but not limited to) into and out of cache locations, in-water or land-based nurseries.

### ***Octocoral Visual Health Assessment***

Each octocoral colony selected for relocation must be visually assessed pursuant to these Protocols to ensure that they appear to be in good health and are free from suspected disease. The visual health assessment must be conducted immediately prior to removal from the original collection location for purposes of direct relocation, or immediately prior to removal from the original collection location for purposes of caching, and if cached, again immediately prior to removal from cache and reattachment at the relocation site. **Field personnel conducting octocoral visual health assessments should be proficient with species identification, and trained in octocoral disease, predation identification and survey techniques to assure accuracy of the assessment.** Each colony must meet the following criteria prior to relocation:

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- 1) Rod, plume and seafan colonies must have at least 10 cm (approx. 5”) of linear growth (height).
- 2) Show no visible signs of disease or injury based on the presence of:
  - a. Bleaching or partial bleaching.
  - b. Recent mortality greater than 5% of tissue loss exposing axis.
  - c. Active disease (e.g., purple spot, aspergillois, red band disease, black wasting disease, and growth anomalies (severely altered morphology of tissues and skeleton)).
  - d. Suspect disease indicators (e.g., bands, spots or rings (identified by severe dark purpling (25% or greater) or blackening of tissues); microbial mats; cyanobacteria colonization).
  - e. Stress indicators (e.g., tissue sloughing or swelling; excessive sedimentation; excessive mucous production). **Exception** – As identified in the Mitigation Relocation Recommendations, there may be extreme circumstances in which the FWC will consider an exception to this criterion, but exceptions must be made in advance of any relocation activities and approved by the FWC.
- 3) Octocorals that are experiencing active predation (e.g., presence of predators, including *Cyphoma gibbosum* and/or *Hermodice carunculata*, in feeding position along tissue loss margin), may be relocated once all predators are removed. **Exception** – Colonies of *Gorgonia ventalina* with active predation of the nudibranch *Tritonia hamnerorum*, cannot be relocated.