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November 3, 2009

Mr. Rob Weber, Coastal Coordinator
Public Works Department
Town of Palm Beach
951 Old Okeechobee Road
West Palm Beach, FL 33401

Re: Staghorn coral (*Acropora cervicornis*) Critical Habitat Evaluation and Recommendation,
Town of Palm Beach, Florida

Dear Mr. Weber:

By letter dated October 29, 2009, Coastal Eco-Group (CEG) provided the results of the staghorn coral (*Acropora cervicornis*) mapping and assessment activities conducted offshore of the Town of Palm Beach, FL, on October 14 and 15, 2009. This letter report is a follow-up report to evaluate the critical habitat features of *Acropora* spp. within the study area and to provide recommendations for the designation of critical habitat within waters adjacent to the Town of Palm Beach based on the results of this survey and review of historic and current distribution data and published literature.

Critical Habitat Designation in the Florida Area

Critical habitat for threatened elkhorn (*Acropora palmata*) and staghorn (*Acropora cervicornis*) corals was designated on November 26, 2008 and became effective on December 26, 2008 (50 CFR Parts 223 and 226, Federal Register Vol. 73, pp. 72210-72240). The proposed critical habitat rule stated that the critical habitat boundaries for the Florida area would extend from the MHW line to a water depth of 30 meters at the north boundary of Palm Beach County (Federal Register, Vol. 73, February 6, 2008, pp. 6895-6919). In the final critical habitat rule, the northern boundary of the Florida area was designated at Boynton Inlet, Palm Beach County, 26° 32' 42.5"N. The final rule explains that this boundary was designated because the NMFS "*had no knowledge of either species of Acropora historically or presently occurring north of this boundary.*" The final rule designated the shoreward boundary of the Florida area at the 6-ft (1.8 m) contour from the north boundary at Boynton Inlet south to Government Cut, where it moves inshore to MLW, and the seaward boundary at a depth of 98 ft (30 m).

On January 6, 2009, the NMFS received a petition from Palm Beach County Reef Rescue (PBCRR) to revise the Florida critical habitat area for elkhorn and staghorn corals. The petition seeks to extend the northern boundary of designated critical habitat in the Florida area to the Lake Worth Inlet, approximately 15.5 miles (24.9 km) north of the current boundary at Boynton Inlet. The petition provided information on the location of several *A. cervicornis* colonies

identified by PBCRR on Bath and Tennis Reef on December 20, 2008. On July 27, 2009, the NMFS announced a 90-day finding that the petition presents substantial scientific information and that the requested revision to designated critical habitat for *Acropora* spp. might be warranted. The NMFS will issue a finding as to how it intends to proceed with the requested revision by January 6, 2010 (Federal Register, Vol. 74, July 27, 2009. Pp. 36995-36996).

Definition of Critical Habitat in the Final Rule

Section 3 of the Endangered Species Act (ESA) defines critical habitat as: (1) specific areas within the geographical area occupied by the species at the time of listing, that contain the physical or biological features essential to the species' conservation, and which may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by the species if the agency determines that the area itself is essential for conservation. Within these areas, the feature, or primary constituent element (PCE), essential to the conservation of *Acropora* spp. is natural consolidated hard substrate or dead coral skeleton that is free from fleshy and turf macroalgae and sediment cover to maximize the potential for successful recruitment and population growth. The final rule acknowledges that natural areas of loose sediment, fleshy macroalgal-covered hardbottom, or seagrasses do not provide the PCE essential to the conservation of threatened corals.

Although the final critical habitat rule acknowledges that the PCE is unevenly dispersed throughout the Florida area, larger numbers of smaller, discrete specific areas which contained the PCE were not identified due to uncertainties in the age and resolution of the GIS, remote sensing and benthic habitat data that were used to identify and map the areas which contained the PCE. The NMFS concluded that based upon the best available information, although the PCE is unevenly dispersed throughout the ranges of the species, all identified areas in the final rule contained the essential feature. The NMFS stated that they had excluded a large portion of the originally proposed Florida area from the final designation based on new information that the area did not contain the essential feature, and concluded that they had removed gaps in the distribution of the PCE and limited the final designation more precisely to areas that contain the essential feature.

Southeast Florida Reef Tract

The geomorphology of the southeast Florida reef tract has been recently described (Banks et al., 2007; Finkl and Andrews, 2008) and detailed benthic habitat maps following mapping criteria similar to the NOAA biogeographic Caribbean criteria have been produced for Broward, Miami-Dade, and Palm Beach counties as part of the Southeast Florida Coral Reef Initiative by the Florida Fish and Wildlife Research Institute (FWRI) and National Coral Reef Institute (NCRI) (Walker et al., 2008; FWRI/NCRI, 2007).

The southeast Florida reef tract consists of relict (i.e. no active accretion) Holocene reefs and lithified sand ridges suggested to have formed during backstepping of the reefs in response to a rise in sea level (Banks et al., 2007). Three linear reef complexes have been described: an inner, middle, and outer reef tract (Banks et al., 2007, Walker et al. 2008). The outer reef tract is a linear structure which is fairly continuous from Miami-Dade to Palm Beach County, breaking into patch reefs and terminating at the Bahamas Fracture Zone offshore of FDEP monument R-

95 within the Town of Palm Beach at N26° 43' (Banks et al., 2007; Finkl and Andrews, 2008). The inner reef terminates north of Hillsboro Inlet in Broward County, and the middle reef breaks up into patch reefs which terminate north of Boca Inlet. A series of shallow nearshore and intertidal ridges consisting of Anastasia Formation exists inshore of the reef complex throughout Palm Beach County.

The Florida Fish and Wildlife Research Institute (FWRI), assisted by Nova Southeastern University, mapped the coral reefs and other hardbottom habitats offshore of Palm Beach County in 2007. The mapped area extends from the 6 m to the 35 m contour and covers approximately 110 km². The final benthic habitat map revealed a well-developed linear reef complex, which is a continuation of the outer reef of Broward County. The middle reef of Broward County was observed in the southern part of Palm Beach County as a linear reef feature (FWRI/NCRI, 2007).

Similar to Broward County, the outer reef in Palm Beach County was separated into the following categories by geomorphology: deep colonized pavement (drowned back reef), linear reef outer (drowned reef crest), and spur & groove (drowned). These different categories were delineated based on the assumption that differences in topographic complexity result in different habitats/communities (FWRI/NCRI, 2007). The drowned spur and groove system is only present on the forereef of the outer linear reef and consists of alternating sand and coral formations which are oriented perpendicular to the shore or bank/shelf escarpment. The coral formations (spurs) typically have a high vertical relief compared to pavement with sand channels; the spurs are generally 1 to 5 meters from one another and separated by sandy or bare hardbottom floor (grooves) (FWRI/NCRI, 2007).

A major difference between Palm Beach and Broward County was the inclusion of a new category in Palm Beach County, the deep ridge complex. The deep ridge complex is an expansive area of many ridges in the northern half of the county that extends from depths of about 20 to 35 m. The south end of the deep ridge complex is located just south of N26° 43'. According to FWRI/NCRI, most of this habitat consists of low-cover, deep communities dominated by small gorgonians, sponges, and macroalgae, with denser areas occurring near areas of higher relief (FWRI/NCRI, 2007).

A second major difference between Palm Beach and Broward County was the very low occurrence of nearshore shallow-water reef habitats (i.e. shallow ridge, shallow colonized pavement and inner reef) in Palm Beach County (~1 km²) in comparison to Broward County (~33 km²) (FWRI/NCRI, 2007). In Broward County, the benthic communities on this habitat contain some of the highest stony coral cover of all habitat types (Ferro et al., 2005). The shallow colonized pavement category is limited in to the extreme nearshore in Palm Beach County. This category includes flat, low-relief hardbottom and rubble with variable sand cover, which shifts according to wave-generated currents in response to weather. Portions of the shallow colonized pavement are likely always covered by shifting sand, and the density of benthic organisms is highly variable and likely linked to temporal changes. Benthic cover on the shallow ridge is similar to the shallow colonized pavement, however, the ridges are geomorphologically distinct, and presumably consist of early Holocene beachrock ridges with possibly some *Acropora* framestones (not verified) (FWRI/NCRI, 2007).

Summary of historic reports of *Acropora* spp. within Palm Beach County

Acropora spp. was prevalent on Palm Beach County reefs in the early to middle Holocene (~10,000-6,000 years ago), demonstrated by a 10-m thick fossilized record of *Acropora*-dominated reef (Lighty et al., 1978). Oceanic conditions and warmer sea temperatures during the middle Holocene favored growth and accumulation of *Acropora* spp. along the shelf margin of the Florida reef tract, and the mid-Holocene was the last time that Palm Beach County reefs were dominated by *Acropora* spp. After the mid-Holocene time, the ranges of *Acropora* spp. contracted south to the northern Florida Keys due to climatic cooling and a rise in sea level. There is no known record of *Acropora* spp. north of the geomorphologic boundary, the Bahamas Fracture Zone, offshore of FDEP monument R-95 in the Town of Palm Beach (N26° 43') (Banks et al., 2007; Finkl and Andrews, 2008).

Goldberg (1973) reported isolated colonies of *A. cervicornis* in deep water (16 to 30 m) as far north as Palm Beach, FL. This study was conducted prior to the white band outbreak which devastated *Acropora* spp. populations in the 1980s.

The recent appearance of *Acropora* spp. north of the previously known range has been suggested to be linked to the decadal-scale increase in annual sea-surface temperature. With the prediction of continued global warming, the northern limit of this expansion will be determined by a combination of temperature and other physical habitat parameters. Precht and Aronson (2004) suggest that the continued northward expansion of *Acropora*-dominated reefs is a strong possibility with the potential to replicate the geographic distribution of reefs in the mid-Holocene.

Summary of current reports of *Acropora* spp. offshore of the Town of Palm Beach

In late September 2009, PBCRR reported an expansion in the number of staghorn coral colonies at the Bath and Tennis Reef location from approximately 12 colonies in December 2008 to nearly 80 colonies in September 2009. PBCRR reports suggested that the area occupied by staghorn coral colonies is approximately 2,400 sq. ft (223 sq. m). CEG marine scientists characterized and mapped the reef area discovered by PBCRR on October 14 and 15, 2009. The *A. cervicornis* study site is located approximately 5,609 ft (1,710 m) from the shoreline, offshore of FDEP Range Monument R-105, in a water depth of approximately 57 ft (17 m) within the spur and groove habitat on the east side of the outer linear reef. The total reef area mapped by CEG covers 2,353 ft² (219 m²).

The majority of the *A. cervicornis* colonies within the mapped survey area were contained within the 70 m² sample area. Overall stony coral density of colonies ≥ 5 cm (including all *A. cervicornis* colonies, attached and fragments) was 2.24 ± 0.31 colonies/m². When *A. cervicornis* colonies are excluded, stony coral density was 1.51 ± 0.15 colonies/m². In comparison to thickets in Broward County, where *A. cervicornis* accounted for 87-97% of all stony corals (Vargas-Ángel et al., 2003), *A. cervicornis* accounted for 32% of all stony corals within the 70 m² sample area. Mean *A. cervicornis* colony density and mean density of unattached fragments were 0.43 ± 0.11 colonies/m² and 0.30 ± 0.15 fragments/m². Mean stony coral cover was 4% within the sample area, and percent cover of *A. cervicornis* was 2%.

Stony coral diversity (11 species) within the small sample area is high for Palm Beach County, suggesting that the spur and groove habitat along the forereef of the outer reef tract in Palm Beach County supports a relatively diverse benthic community. CEG marine scientists also observed discrete locations of very high coral cover (in excess of 90%) along the spur and groove formations to the south of the main *A. cervicornis* site. At the southernmost point of the diver-verified swim transect along the east edge of the outer reef (see Figure 2 of *Acropora* survey results letter report dated 10/29/09), a large field of high-density cover of the stony coral, *Madracis mirabilis*, was observed. This large coral field transitioned into extensive areas of high-density octocoral cover to the north along the diver-verified transects. Scattered *M. mirabilis* colonies were observed along the entire length of the eastern diver-verified swim transect, and areas of dense *M. mirabilis* rubble were observed to the north of the main *A. cervicornis* site, indicating that other areas of high coral cover may have previously existed.

No *A. cervicornis* recruits were observed within the main study site, and there was very little *Acropora* rubble within the area (<0.5%), indicating that the *A. cervicornis* colonies have recently established at this location. The absence of *A. cervicornis* recruits/juveniles suggests that sexual reproduction is not successfully occurring at this site. It is likely that the initial colony/colonies established via sexual reproduction (annual broadcast spawning of gametes) to establish a core population, followed by asexual reproduction (new colonies forming from fragmentation and reattachment to the substrate), which has likely been the main reproductive method responsible for the increase in the number of colonies during the past few years. The dominant mode of reproduction for *A. cervicornis* is asexual fragmentation, and the coral exhibits the fastest growth of all western Atlantic corals with branches increasing in length by 10 to 20 cm/yr.

Although cover by fleshy macroalgae and sediment is generally low on the reef in this area, thereby providing the PCE essential for the species, the limited amount of open space due to the high octocoral cover (47%) may reduce the potential for continued expansion of *A. cervicornis* within the immediate area of the main site.

Possible white band disease or other disease was identified in 3 of the 51 colonies, 2 of which were the largest colonies within the sample area. The greatest source of region-wide mortality for staghorn coral has been disease outbreaks, mainly of white band disease (NOAA, 2009). Because reproductive effort in the area is mainly driven by asexual reproduction, the incidence of disease is of concern due to the likelihood for low genetic diversity in the population.

In addition to the main *A. cervicornis* site, CEG divers discovered a single attached *A. cervicornis* colony and unattached fragment approximately 1,097 ft (333 m) from the main *A. cervicornis* site in a water depth of 52 ft (16 m). Given the considerable distance from the main site, it is possible that this colony established as a sexual recruit. The presence of this colony within similar habitat to the main site suggests that the spur and groove habitat on the forereef of the outer linear reef tract contains substrate of suitable quality to support recruitment and growth of *A. cervicornis*. Similar to the main site, the high cover of octocorals in the area may reduce the potential for expansion through fragmentation.

An additional sighting of *A. cervicornis* offshore of the Town of Palm Beach has been reported near DEP monitoring site PB2, one of the Southeast Florida Coral Reef Evaluation and Monitoring Project (SECREMP) monitoring stations located to the south of the main *A. cervicornis* site on Bath and Tennis Reef. The small colony was observed during one annual monitoring event in 2005 or 2006 and was located just outside of the established site. Visual appearance suggested that the colony was a fragment (D. Gilliam, personal communication).

Evaluation of Critical Habitat Features of Coral Reef/Hardbottom Habitats offshore of the Town of Palm Beach

Acropora cervicornis occurs in back reef and fore reef environments from 0 to 98 ft (0 to 30 m). The upper limit is defined by wave climate, and the lower limit is controlled by sedimentation and light availability. Reef zones at depths of 16 to 82 ft (5 to 25 m) in the Florida Keys and Caribbean were formerly dominated by extensive monospecific stands of *A. cervicornis* until the disease outbreaks of the mid-1980s.

The final critical rule acknowledges that *A. cervicornis* commonly grows in more protected deeper water ranging from 5 to 20 m, yet defines the critical habitat boundaries as the 1.8 m depth contour for Palm Beach County. As discussed above, the physical relief, sediment dynamics and increased wave climate of most nearshore hardbottom located shallower than 6 m in Palm Beach County (shallow colonized pavement and shallow ridge habitats) do not provide suitable substrate for *A. cervicornis*.

The outer reef crests at 16 m below sea level, and the middle reef crests at 15 m below sea level, with water depths extending to 40 m and 20 m, respectively (Banks et al., 2007; Goldberg, 1973). The outer reef is relict *Acropora palmata* framework (Macintyre and Milliman 1970; Lighty 1977; Lighty et al. 1978). Inner or middle reef tracts are not found throughout most of Palm Beach County (Banks et al., 2007). In contrast to Palm Beach County, the topography of the inner reef in Broward County is typically more pronounced than the outer and middle reefs with vertical dropoffs along the edges of the patch reefs (Banks et al., 2007). This habitat provides ideal conditions for the development of thickets of *A. cervicornis* on the inner reef tract offshore of central Broward County.

The middle and inner reefs may have disappeared from the northern terminus in Palm Beach County due to burial by increased sediment supply and originally lower antecedent relief in comparison to Broward County. The area offshore of West Palm Beach is subjected to a large volume of littoral sediment transported from the north (Banks et al., 2007). The USACE (1996) estimated that 98,000 m³ of sediment annually reaches Lake Worth Inlet in Palm Beach County, while only 4,590 m³/year reaches Government Cut just north of Biscayne Bay in Miami-Dade County.

Acropora spp. need hard consolidated substrate for larval settlement and their larvae prefer to settle on upper exposed surfaces (Szmant and Miller, 2005). The dominant functional groups on nearshore hardbottom (< 6 m in depth) in Palm Beach County are macroalgae/turf algae and substrate with variable sand cover which shifts according to wave climate. Portions of the shallow colonized pavement in Palm Beach County are likely always covered by shifting sand,

and the density of benthic organisms is highly variable and likely linked to temporal changes (FWRI/NCRI, 2007). Stony corals are a minor component of the nearshore hardbottom community and are generally represented by small individuals of *Siderastrea* sp, *Solenastrea bournoni*, *Phyllangia americana*, and *Oculina* spp.

The nearshore hardbottom habitat within the Town of Palm Beach (less than 6 m in depth) does not provide the PCE of substrate of suitability quality and availability, *free from fleshy macroalgae cover and sediment cover*, to support successful larval settlement, recruitment, and reattachment of asexual fragments. Formal surveys of nearshore hardbottom conducted in association with monitoring programs for beach nourishment projects have not reported a single occurrence of *A. cervicornis* on nearshore hardbottom in the Town of Palm Beach during the past seven years of annual monitoring (CPE, 2005; Spadoni et al., 2006; Baron et al., 2007; CPE, 2007; Prekel et al. 2007; Delaney et al., 2008; Prekel et al. 2008).

Critical Habitat Recommendation for the Town of Palm Beach

Based upon review of the historical data and recent documentation of *A. cervicornis* on the spur and groove habitat along the forereef of the outer linear reef tract offshore of Town of Palm Beach with persistence of *A. cervicornis* colonies for at least 2 to 3 years and expansion through fragmentation, Coastal Eco-Group recommends designation of the offshore reef tract in water depths between 14 m and 30 m north of Boynton Inlet as critical habitat for *Acropora* spp. The outer linear reef tract in Palm Beach County contains the physical and biological features essential to conservation of the species as defined in the NMFS critical habitat rule.

The existing petition seeks to extend the northern boundary of designated critical habitat in the Florida area to the Lake Worth Inlet and includes the existing boundaries from the 1.8 m contour to the 30 m contour. By letter dated February 23, 2009, the FDEP also requested that NMFS move the northern critical habitat boundary for *Acropora* in Florida to the Lake Worth Inlet.

The *A. cervicornis* colony to the north of the main study site is currently the northernmost verified location of *A. cervicornis* in Palm Beach County (N26° 41') (see Figure 2 of previous letter reported dated 10/29/09). The north end of known Holocene reef framework in Palm Beach County is located offshore of FDEP monument R-95 at N26° 43' in the Town of Palm Beach (Banks et al., 2007). There is no known record of *Acropora* spp. north of this geomorphologic boundary. Therefore, the north end of the known Holocene framework appears to be the most appropriate location for the northern boundary of critical habitat in Palm Beach County at this point in time.

The Palm Beach County benthic habitat maps prepared by FWRI/NCRI indicate that outer reef tract and associated habitats terminate near this location, transitioning to a deep ridge complex to the north. According to FWRI/NCRI, most of the deep ridge habitat consists of low-cover, deep communities dominated by small gorgonians, sponges, and macroalgae, with denser areas occurring near areas of higher relief (FWRI/NCRI, 2007). Further investigation of the high-relief areas of the deep ridge complex is needed to determine if these hardbottom areas support *A. cervicornis*. Until these investigations are completed, it may be premature to designate the deep ridge areas north of (N26° 41') as critical habitat. However, the Town may wish to consider

the proposed location of Lake Worth Inlet as the northern boundary of critical habitat in Palm Beach County as suggested by the FDEP and PBCRR.

The existing petition suggests revision of the inshore boundary to the currently designated 1.8 m depth contour. Because the PCE of suitable substrate free from fleshy and turf macroalgae and sediment cover does not exist on nearshore hardbottom habitat in water depths less than 6 m offshore of the Town of Palm Beach, Coastal Eco-Group marine scientists do not recommend inclusion of this hardbottom habitat in the revised critical habitat designation. The final critical rule acknowledges that *A. cervicornis* commonly grows in more protected deeper water ranging from 5 to 20 m.

There is no evidence to suggest the presence of *A. cervicornis* in water depths of less than 15 m north of Boynton Inlet in Palm Beach County. The middle and inner reef tracts do not exist in central and northern Palm Beach County. The patch reefs in Palm Beach County are typically low-relief and do not provide the physical relief features and PCE of suitable substrate for *Acropora* spp. which support large thickets of *A. cervicornis* in Broward County. Based on the recent Palm Beach County benthic habitat maps, the results of our investigations, and review of the published and grey literature, Coastal Eco-Group proposes the inshore boundary for critical habitat north of Boynton Inlet in Palm Beach County at the 14-m depth contour. An alternative boundary at the 6-m depth contour may be considered, however, designation of critical habitat at the 6-m contour does not appear warranted based upon the lack of the suitable substrate for *Acropora* spp. between the 6-m and 14-m depth contour.

Although the final critical habitat rule acknowledges that the PCE for *Acropora* spp. is unevenly dispersed throughout the Florida area, the NMFS stated that larger numbers of smaller, discrete specific areas which contained the PCE were not identified in the final rule due to uncertainties in the age and resolution of the GIS, remote sensing and benthic habitat data. The recent Palm Beach County benthic habitat GIS maps provide habitat information to support the designation of the boundary at the 14-m depth contour within the area north of Boynton Inlet in Palm Beach County (FWRI/NCRI, 2007). This boundary would more precisely limit the final designation to areas that specifically contain the essential feature.

Impacts from Proposed Revision to Critical Habitat Designation

Section 7(a)(2) of the ESA requires each Federal agency to consult with NMFS and/or USFWS to insure that any action they authorize, fund or carry out will not likely jeopardize the continued existence of listed species or destroy or adversely modify the designated critical habitat of listed species. Federal agencies are required to enter into consultation whenever a proposed action “may affect” listed species or designated critical habitat. If a proposed Federal action is likely to destroy or adversely modify critical habitat, NMFS may recommend that the agency or the project permittee or grantee implement a reasonable and prudent alternative (RPA) to the proposed action that would avoid destruction or adverse modification of critical habitat (NOAA, 2008).

Based upon the location of the documented *A. cervicornis* colonies on the spur and groove habitats on the east side of the outer reef, potential secondary impacts to *A. cervicornis* and recommended designated critical habitat would be limited to short-term turbidity and sedimentation impacts during dredging of offshore borrow sites in association with beach nourishment projects. However, given the preferred location of the species in the forereef spur and groove habitat, these areas would be protected by a buffer distance in excess of the typical distance required by the regulatory agencies (400 to 600 ft, 123 to 183 m). *A. cervicornis* and *A. palmata* are listed species under the ESA, and as such, the Interim Acropora Survey Protocol would be implemented to determine the presence of these species within the Project Action Area, regardless of the designation of critical habitat within the Town of Palm Beach. Therefore, additional survey costs would not be anticipated with the designation of critical habitat on the outer reef tract offshore of the Town of Palm Beach.

Given the observed stony coral species richness at the location, and areas of extremely high density of other stony coral species (e.g. large field of very dense *Madracis mirabilis*), reef community and sedimentation surveys and turbidity monitoring would be required during any offshore dredging project, and appropriate buffer distances would be implemented to prevent secondary impacts to these very valuable coral reef communities. These protective measures would afford additional protection for any designated critical habitat for *Acropora* spp on the outer reef tract in the Town of Palm Beach.

Conclusions

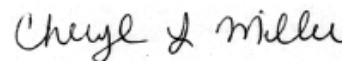
- The offshore reef tract in water depths between 14 m and 30 m north of Boynton Inlet should be designated as critical habitat for *Acropora* spp. The outer linear reef tract in Palm Beach County contains the physical and biological features essential to conservation of the species as defined in the NMFS critical habitat rule.
- The north end of known Holocene framework at N26° 43' (Banks et al. 2007) appears to be the most appropriate location for the northern boundary of critical habitat in Palm Beach County at this point in time. There is no known record of *Acropora* spp. north of this geomorphologic boundary. The *A. cervicornis* colony to the north of the main study site is currently the northernmost verified location of *A. cervicornis* in Palm Beach County (N26° 41' 04.8").
- There is no evidence to suggest the presence of *A. cervicornis* in water depths of less than 15 m north of Boynton Inlet in Palm Beach County. The essential feature (PCE) of *suitable substrate free from fleshy and turf macroalgae and sediment cover* does not exist on nearshore hardbottom habitat in water depths less than 6 m offshore of the Town of Palm Beach.
- *A. cervicornis* and *A. palmata* are listed species under the ESA, and as such, the Interim Acropora Survey Protocol would be implemented to determine the presence of these species within the project area vicinity, regardless of the designation of critical habitat within the Town of Palm Beach. Therefore, additional survey costs would not be

anticipated with the designation of critical habitat on the outer reef tract offshore of the Town of Palm Beach.

- Given the observed stony coral species richness at the main *A. cervicornis* location, and areas of very high density of other stony coral species, reef community monitoring, sedimentation surveys and turbidity monitoring would be required prior to, during, and following any offshore dredging projects conducted within 1,000 ft. of these reef communities. These surveys would be required regardless of the recommended designation of critical habitat for *Acropora* spp. on the outer reef tract in Palm Beach County.
- Potential secondary impacts to recommended designated critical habitat would be limited to short-term turbidity and sedimentation impacts during dredging of offshore borrow sites in association with beach nourishment projects. Given the preferred location of the species in the forereef spur and groove habitat, these areas would be protected by a buffer distance in excess of the typical distance required by the regulatory agencies (400 to 600 ft, 123 to 183 m). The potential for a proposed beach nourishment project to result in an adverse modification to the recommended critical habitat for *Acropora* spp. on the outer reef tract in water depths between 14 m and 30 m is very low.
- Designation of critical habitat for *Acropora* spp. should not significantly affect the length of time required for ESA Section 7 consultation in conjunction with beach nourishment projects. Formal Section 7 consultation is required when a Federal nexus (i.e. permit, funding or authorization) may affect listed species or destroy or adversely modify designated critical habitat (50 CFR 402.14). Section 7 consultation is already required for the listed species present within the Town of Palm Beach (e.g. *Acropora* spp., sea turtles, smalltooth sawfish, Florida manatee, and whales). The evaluation of project-related effects to critical habitat for *Acropora* spp. would be included in the Biological Assessment for a proposed project, and the National Marine Fisheries Service (or U.S. Fish and Wildlife Service) is required to conclude consultation within 135 days of initiating the process with the federal action agency.

If you have any questions regarding our observations or the recommendations presented in this report, please contact me.

Sincerely,



Cheryl L. Miller
President, Principal Scientist

References

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