Abstract

Port Everglades Inlet Sand Bypass Project
Mitigation for Impacts to Rubble-Dominated Hardbottom Communities

Cheryl L. Miller, President, Coastal Eco-Group, Inc.[1], Christopher G. Creed, P.E., Senior Coastal Engineer, Olsen Associates, Inc., and Stephen H. Higgins, Beach Erosion Administrator, Broward County Natural Resources Planning and Management Division

The proposed paper will present the details of an innovative alternative approach to mitigating project-related impacts associated with the planned Port Everglades Sand Bypass project in southern Broward County, Florida. The approach was developed to offset expected project-related impacts to nearshore hardbottom communities by targeting the loss and habitat value of key functional groups within the nearshore landscape. This resulted in an ecologically valuable and highly cost-effective mitigation plan compared to mitigation measures based solely upon the creation of artificial structure as replacement habitat. The standard NEPA process of avoidance, minimization and mitigation was used to formulate the proposed sand bypass project and mitigation plan.

The proposed sand bypass plan for Port Everglades Inlet will include the creation of a 7.1-acre sand trap on the north side of the Port Everglades Entrance channel, rehabilitation of the north jetty, and removal of a portion of a rubble spoil shoal north of the inlet (see Figures 1 and 2). Sand bypassing at Port Everglades Inlet is expected to be net beneficial to the overall nearshore environment by reducing the potential need for offshore sand sources, providing a highly beach compatible sediment source to the beach south of the Inlet at John U. Lloyd Beach State Park, and removing unstable rubble substrate from the nearshore environment. Implementation of the project will directly impact 16.4 acres of nearshore hardbottom habitat, which is mostly unconsolidated rock rubble, and associated communities.

Resource *avoidance and impact minimization* efforts included the reduction of the project footprint using the results of a highly detailed benthic habitat map for the project area (see Figure 1**,** NSUOC, 2008a). Additional *minimization* efforts will include the construction of a rubble barrier structure to stabilize unconsolidated rubble areas that will remain following project completion. Minimization will also include the relocation of stony coral greater than 10 cm and octocorals greater than 15 cm from the project's direct impact area. These corals will be moved to an area of the Broward County Shore Protection Project – Segment III mitigation reef offshore of northern Hollywood.

The proposed *mitigation* approach includes three principal elements: 1) the replacement of approximately 16.4 acres of unconsolidated rubble with about 6.63 acres of stable pavement/hardbottom through removal of approximately 125,000 cy of rock rubble from the rubble spoil shoal (see *light blue area* in Figure 2, NSUOC, 2008b), (2) the physical expansion of the existing Broward County coral nursery at a remote offshore site in Broward County with the deployment of 1.0 acre of limestone boulders, and (3) the harvest and reattachment of 3,000 "corals of opportunity" onto the new nursery structure.

The re-exposed pavement/hardbottom will be in an area where a section of the "first reef" was buried in 1962 by dredge disposal of rock rubble during the Port Everglades channel expansion project. The re-exposure of the stable hardbottom structure will increase habitat stability, benthic community diversity, overall community survivorship and reproductive potential in the project area. The 1.0 acre of limestone boulders is required to expand the existing Broward County coral nursery structure that is currently filled to capacity with reattached corals. This will allow continuation of a historically successful program. The "corals of opportunity" to be placed in the nursery will be stony corals that have been detached from Broward County reefs through natural processes or unknown injury events. Reattachment of "corals of opportunity" will increase survivorship as well as reproductive potential. This will also create conditions for coral recruitment and increase habitat complexity at the nursery site, providing shelter for fish and motile invertebrates.

The FDEP UMAM analysis for this project has shown that the project related impacts can successfully be mitigated with this innovative and cost-effective mitigation approach.

[1] Corresponding Author: Coastal Eco-Group Inc., 808 E. Las Olas Blvd., Suite 101, Ft. Lauderdale, FL 33301, (954) 591-1219, cmiller@coastaleco-group.com

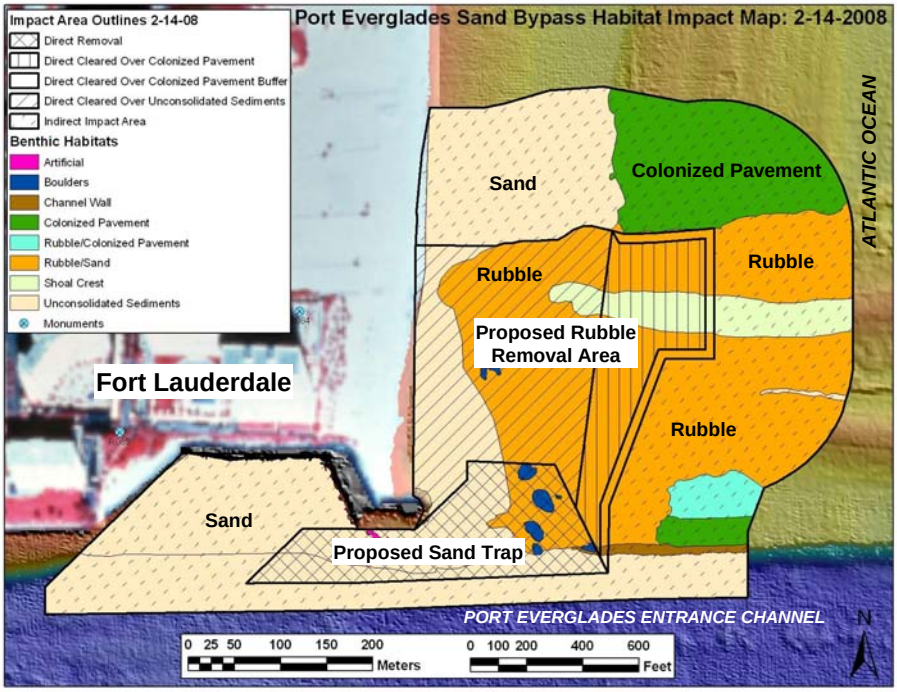

Figure 1: Detailed habitat map for proposed Port Everglades Sand Bypass Project (NSUOC, 2008a).

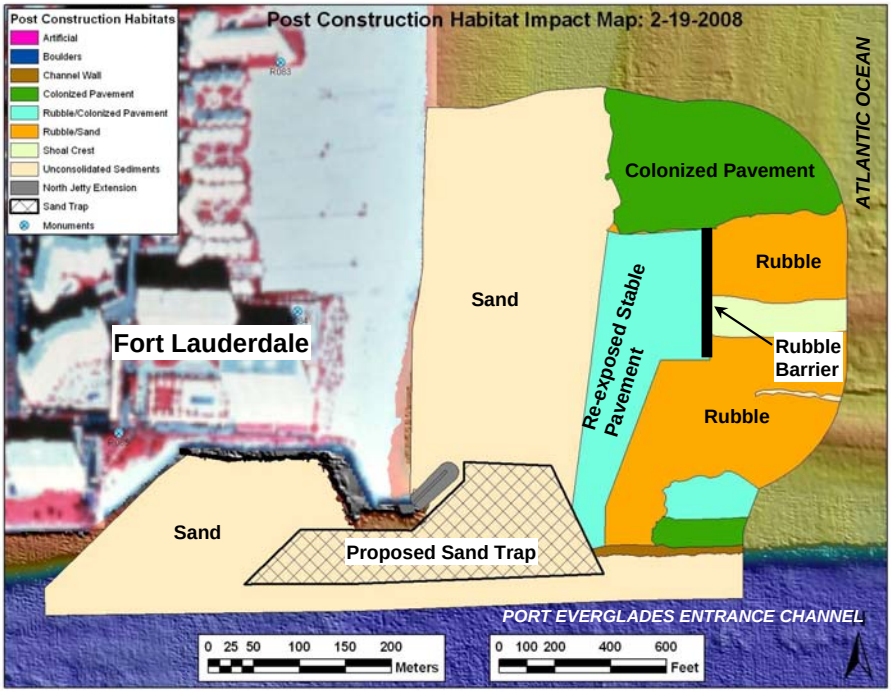

Figure 2: Map of proposed post-construction benthic habitats following partial removal of the rubble shoal (NSUOC, 2008b).

References:

NSUOC. 2008a. "Broward County Port Everglades Sand Bypass Project: Benthic Habitat Mapping and Assessment," report prepared for Olsen Associates, Inc., Nova Southeastern University Oceanographic Center, Dania Beach, FL.

NSUOC. 2008b. "Broward County Port Everglades Proposed Sand Bypass Project: Benthic Resource Impact Summary," report prepared for Olsen Associates, Inc., Nova Southeastern University Oceanographic Center, Dania Beach, FL.