

Hillsboro Inlet Artificial Reef, Florida



marine environmental

Coastal Systems designed and processed environmental regulatory permits for the artificial reef mitigation that was required as part of the inlet improvements constructed by the Hillsboro Inlet Improvement and Maintenance District (District). The inlet improvements were constructed in 2002, and 1.6-acres of mitigation were required to offset permitted impacts to nearshore hardbottom as part of the inlet deepening and navigation channel improvement project.

Coastal Systems performed extensive field investigations that included 1) hydrographic surveying to evaluate bathymetry; 2) subbottom profiling to evaluate the depth of sand; 3) jet probes to confirm subbottom profiling results; 4) magnetometer surveys as part of the marine archeological investigation and subsurface utilities investigation, and 5) detailed nearshore hardbottom mapping. The resulting mapping was utilized to optimize the location and engineering design of the 1.6-acre artificial reef. The reef was designed with the placement of 4' - 5' limestone boulders that would provide the required depth clearance over the reef as well as protective buffers from adjacent hardbottom communities. Stability calculations were also completed to ensure the reef stability for the design coastal storm events. In addition, the reef was designed to provide minimal settlement of limestone boulders in the sand layers. The resulting artificial reef mitigation design was processed through the U.S. Army Corps of Engineers, Florida Department of Environmental Protection (DEP), and the Broward County Environmental Protection and Growth Management Department. Coastal Systems prepared and processed the DEP cost-sharing reimbursement for the artificial reef as part of the inlet improvements project, resulting in approximately \$530K in funding cost-shared with the District.

Coastal Systems prepared construction plans and specifications and conducted a public bidding process on behalf of the District. A qualified marine contractor was selected, and construction of the reef was completed between August, 2008 and April, 2009. Approximately 8,500 tons of limestone boulders (approximately 2,125 boulders) were precisely placed by the contractor within the established construction corridor and artificial reef limits in the nearshore area. Coastal Systems provided construction administration services throughout the project that included as-built hydrographic surveys and underwater inspections during construction by engineer-divers.

Annual marine biological monitoring is being performed by Coastal Systems, and the Year 2 (2010) monitoring results indicated larger macroalgae and sponge communities and the first signs of stony coral growth. These trends are expected to continue and will be documented following the third and final monitoring event in the fourth year post construction. In addition to the benthic communities exhibited on the artificial reef, the difference in the number of species and quantity of fish between the artificial reef and control areas was substantial. More species and a greater abundance of fish within the artificial reef area were observed as compared to the adjacent hardbottom control area. The vertical relief of the artificial reef provided for many crevices and overhangs where fish could take refuge.



Client: Hillsboro Inlet District

Location: Broward County, Florida

Date of Completion: 2009

Construction Cost: \$1,200,000



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