

# Munyon Island Docking Facility, Florida

waterfront & marinas



Coastal Systems International, Inc. (Coastal Systems) designed the docking facility for the John D. MacArthur Beach State Park on Munyon Island in Palm Beach County. A preliminary design report was prepared for Palm Beach County based on hydrographic and marine resource surveys conducted by Coastal Systems. Three alternative designs were prepared to optimize dock layouts and wave attenuation structures and construction cost estimates prepared in an engineering report.

Coastal Systems was then retained by the Florida Department of Environmental Protection (DEP) Parks to complete the final engineering design and prepare construction documents for the selected option. The final design consisted of a pile-crib breakwater for wave attenuation under the access dock that connects to the shore on the west side of the island with a 20-slip floating dock facility. The pile crib breakwater extends approximately 130 feet from shore under the dock and serves three purposes: 1) approach pier for public access to the floating docks, 2) wave attenuation for wind-generated waves and boat wakes, and 3) habitat for marine resources. A statistical analysis was conducted to provide wave characteristics (height, period) for the design of breakwater with respect to the selected 25-year coastal storm return period.

Wave forces were calculated for the structural design of the piles, caps, and slabs that support the pier structure. Wave transmission studies were conducted to specify characteristics and geometry of the rock to be placed in the crib for optimum wave attenuation. Details for structural precast piles, caps, and slabs were developed due to the remote island construction. Fiberglass grating was specified to span concrete slabs along the pile-crib structure to provide a composite design, to relieve uplift pressures from storm wave action and to provide light penetration for seagrass. The design provides ADA accessibility slips, as well as a slip for maintenance vehicles.

Coastal Systems performed pre/post construction surveys of the adjacent seagrass beds, and is performing the seagrass monitoring over the five-year period. Coastal Systems worked with the DEP to modify the seagrass monitoring conditions to reduce monitoring cost over the five-year monitoring period.



Floating Dock Slips



Docking Facility

**Client:** Florida Department of Environmental Protection

**Location:** Palm Beach County, Florida

**Date of Completion:** 2011

**Construction Cost:** \$1,500,000

