

# Coral Reef Restoration, Looe Key Florida Keys National Marine Sanctuary, FL

Working under contract with the National Oceanic and Atmospheric Administration (NOAA) for the marine contractor Team Land Development, Inc., Ben C. Gerwick, Inc. participated in an unique reef replication project in the Florida Keys National Marine Sanctuary – one of the most beautiful diving site in the world.

In 1994, the ship R/V Columbus Iselin ran aground in three to four meters of water at the Looe Key. The total damage area measured over 1000 square meters. Approximately 75 percent of the coral colonies and 90 percent of the total coral cover at the grounding site were destroyed. Due to high wave energy conditions at the site, secondary damage from loose rubble increased the size of the blowholes by more than 100 percent within five years since the ship grounded.

The NOAA's design calls for restoration of the damage site to a physical state approximating the pre-grounding condition. The restoration entails placement of two layers of boulders into the damaged reef holes and placement of

fiberglass bars. Then, underwater concrete is poured into the interstitial space between boulders and around up to the crest of the adjacent undamaged reef. The concrete must stabilize and tie together the boulders and the surrounding reefs. The restoration is designed to withstand a once in fifty year storm.

Due to the sensitive environmental conditions at the site, the underwater concrete placed must be flowable, but yet without causing turbidity and pollution in water. Gerwick developed a special underwater concrete mixture that is sufficiently workable and cohesive for placement at the environmentally sensitive sites. Gerwick also helped the contractor to establish a reliable and effective placement procedure that ensures the in-situ concrete quality and the environmental protection requirements. In July-August, 1999, Gerwick engineers provided on-site engineering support at the project site, including field demonstration tests, supervision of concrete production and placement.



Placement of boulders from barge.



Underwater placement of boulders into reef.



Florida Keys National Marine Sanctuary.

#### Services Performed:

- Diving Activities
- Tremie Concrete
- Construction Supervision

Year of Completion: 2000

Construction Cost: \$17M

Client: National Oceanographic and Atmospheric Administration