NEW METHODS FOR USING ARTIFICIAL REEFS FOR HABITAT PROTECTION, MITIGATION AND RESTORATION

Lee E. Harris, Division of Marine and Environmental Systems, Florida Institute of Technology, 150 West University Boulevard, Melbourne, Florida 32901 USA (tel 407/6 74-7273, E-mail Lharris@fit.edu

Artificial reefs traditionally are used for environmental enhancement and mitigation for damages to natural reef areas. This paper presents newer methods for using artificial reefs for habitat protection, mitigation and restoration. These methods include the use of artificial reefs for protection of existing natural reefs, environmental and eco-tourism enhancement, mitigation for damaged reefs, and shoreline stabilization. Examples of these methods, their unique design aspects and their performance are presented, so that they may be used to benefit other areas of the world.

To protect existing natural reefs, artificial reef units can be used to increase the reef areas, thereby decreasing the stresses on the natural reefs. Use of the artificial reefs can be encouraged for fishing, diving, snorkeling, and other activities, or as mitigation for damaged reef areas, so that the reef areas can recover. Artificial reefs also can be used as obstructions for ships and nets to prevent shipping or fishing in protected areas, or as underwater trail markers to safely guide snorkelers and divers around shallow natural reefs, while also providing information and education on the reefs and their inhabitants. These artificial reefs enhance the underwater environment for both the natural species and eco-tourism.

Just as natural reefs can provide calm areas in their lee that are protected from wave attack and beach erosion, artificial reefs can be used for shoreline stabilization. This requires the reef structure to serve as a submerged breakwater, with the crest of the reef in close proximity to the water surface. This subjects the reef to much greater wave forces and other important design considerations. The performance of these artificial reefs designed for wave attenuation and shoreline stabilization are presented, using several examples from the United States and the Caribbean. The designs and performance of these artificial reef/submerged breakwaters are evaluated in terms of the wave attenuation and shoreline stabilization provided, special design considerations for safety and withstanding severe conditions such as hurricane events, and the environmental enhancement provided by these structures.