



The Performance of Reefs Constructed from Military Armored Vehicles

Project 05-48

Background:

For many years, obsolete military materials have been used for building constructed reefs to enhance recreational fishing and diving opportunities. These materials have included ships, aircraft, and other obsolete items and construction debris. Beginning in 1994, the REEF-EX project sponsored by the Defense Logistics Agency provided obsolete military armored vehicles (MAVs) for use by state and county agencies in constructing fishing reefs. Since then, over 1600 armored vehicles were placed at over 60 sites off the coasts of 11 states along the Atlantic and Gulf of Mexico coasts in water depths ranging from 8 to 42 meters. However, only limited data on their performance as reefs was available to help assess the merits of the program.

Objective:

The overall objective of this series of projects was to assess the performance these constructed reefs, capture lessons learned to improve future construction, and assess the potential for future applications. Evaluating performance included examining the ecological functions provided by the reef habitat, gauging end-user satisfaction with these reefs, assessing where and how such reef materials should be placed, and estimating how long they will function.

Summary of Approach:

The approach used to evaluate the reefs involved direct observations, surveys of end-users (fishers and divers), and interviews with state and county reef program managers. Initial studies focused on assessing MAV reef habitat value for target species, siting flexibility, durability, and the potential for collateral adverse impacts. Based on initial observations, a second phase effort assessed the potential benefits of enhancing the profile of these reefs to improve the abundance and diversity of midwater fish. The third phase concentrated on assessing the fish forage based provided by the reefs. This effort examined the community developing on the reef substrate and compared this with the stomach contents of reef fish species to describe trophic linkages

Benefit:

This project clearly demonstrated the fish habitat enhancement benefits associated with MAV reefs. The reefs created stable and durable reef habitat, enhanced the abundance and diversity of fish and invertebrates, provided forage to support target fish species, and had no observable adverse environmental impacts.

Study results indicated that fish abundance and diversity on MAV reefs were generally equal to or greater than that on other local constructed reefs and comparable to many designed and prefabricated reef modules. Encrusting or fouling community percent cover and diversity was greater on MAV reefs than on collocated hard bottom or many other typical lower profile reefs. Armored vehicles are especially suited for a wide range of shallow to mid-depth sites typically used for reef construction along the Atlantic and Gulf coasts. As a result of their density, structural integrity, form and profile, MAVs were especially suited for shallow or high-energy sites inappropriate for many other types of materials.

Accomplishments:

The primary 'lesson learned' about the performance of MAV reefs was that deployment method and location had a greater impact on performance than the vehicles inherent properties on their success as reefs. "Best practices" for enhancing their reef performance included: 1) improve inter-unit spacing and reef configuration, 2) ensure upright orientation on the bottom, and 3) accurately record and report the location of each vehicle. More recent placements have incorporated these recommendations. An additional "lesson learned" was that poor site selection resulted in subsidence and premature loss of habitat. In this case, best practices included better pre-placement surveys to screen and select appropriate sites.

Work to date has clearly demonstrated the performance of the MAV reefs, captured lessons learned, made recommendations for improving future use of obsolete military materials, and suggested the potential for future use of constructed reefs for mitigation, restoration, and conservation applications. The use of such constructed reefs in conjunction with marine protected areas or restricted zones may provide new opportunities for developing sustainable fisheries.

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