

<b>Concrete Railroad Tie Stack Reef</b>	<b>Sirotkin Artificial Reef Site</b>	<b>Deployed March-June, 2003</b>
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**Project Dates:** March 13, May 9, June 23, and August 1, 2003

**Subject:** First year deployment monitoring report for Railroad Tie Stack Reef

**Location:** Approximately 7 miles offshore St. Lucie Inlet - Martin County, Florida

**GPS coordinates:** N27° 12.201' / W80° 02.310' These coordinates are at the summit of the reefsite

**Crewmembers:** Lee Harris, Kerry Dillon, Jack Glanville, Marc Damon & Coraggio Maglio.

The following is a field report to document the conditions on the recently completed (June 2003) Railroad Tie Stack Reef in the Sirotkin reefsite offshore Martin County, Florida. The report addresses three types of data collected: Fish species identification, benthic species identification, and reef component stability.

**HISTORY OF THE STACK RAILROAD TIE REEF:**

This is the first artificial reefsite to be built in Martin County from donated concrete railroad ties. As part of a grant from the Florida Fish & Wildlife Commission (FFWC) and with additional funding from Martin County, the Railroad Tie Stack Reef was constructed in March, May and June 2003. This reef was built utilizing discarded concrete railroad ties donated by the Florida East Coast Railroad Company. Approximately 1500 tons of concrete railroad ties were placed in three deployments from an anchored barge in 93 feet. of ocean water. Materials were deployed by McCulley Marine Services, Inc. of Ft. Pierce, Florida with assistance from the dive crew of the *Irish Rover* dive vessel out of Stuart, Florida. The dates of the deployments were March 13, May 9, & June 23, 2003.

Each deployment was accomplished by anchoring the barge and utilizing buoys set by divers to give the tug/barge crew exact surface reference points to assure proper deployments. Several times during the deployments because of wind and current shifts the barge would have to be repositioned to fine-tune the deployments so that each drop would land on top of the previous deployed pile of railroad ties. Martin County is now the home to the deepest concrete railroad tie artificial reef in the state of Florida. The crest of the railroad tie reef extends 24 ft. off the bottom in a stacked pile.

**REEF COMPONENTS STABILITY:**

Underwater surveys were performed before the initial deployment and after each of the three deployments. During the post-deployment inspection dives, some of the ties placed that day were unstable and could be moved by hand. However, subsequent dives found that the components of the reef settled into a stable position.

The reef structure is quite complex with thousands of interspatial voids in which marine life can hide from predators. Even on bright sunny days with good visibility many dark recesses were observed which required use of a light just to peer into the areas. Accurate depth readings on top of the summit will be monitored to evaluate any overall settling.

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**Technical Specifications:**

Max. depth at bottom = 93 ft.; Average depth along sloped sides of pile = 78 ft.

Min. depth at top center of summit = 69 ft.

Size of structure = 120 ft. long by 50 ft. wide by 24 ft. high

**FISH SPECIES & ABUNDANCE FINDINGS:**

Fish identification and abundance were determined utilizing the guidelines setup by The Reef Environmental Education Foundation, known as *REEF*. The roving diver method was used for a set time period of 30 minutes. The divers would roam around the reef structure and identify species and abundance and record data on underwater slates. Data would be double-checked once topside using field texts with color photographs and then transferred to the *REEF* data sheets to be added to their worldwide database. Underwater video and digital still photodocumentation was also utilized to accurately document fish species and abundance. Below are the results of those findings:

<b><u>Marine species identified</u></b>	<b><u>Quantity observed</u></b>	<b><u>Juvenile or Adult</u></b>
Gag Grouper	2	A
Tomtate	100's	A
Spotfin butterfly fish	1	A
High-hat	1	J
Gray Triggerfish	5	A
Red Snapper	2	J
Sheepshead Porgy	10's	A
Vermillion Snapper	100's	J & A
Greater Amberjack	10's	A
Banded Sandfish	3	A
Reef Butterflyfish	3	J
Beaugregory	1	J

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**BENTHIC SPECIES IDENTIFICATION:**

The roving diver method also was used for benthic species identification. The divers would roam around the reef structure and identify benthic species and record data on underwater slates. Data was double-checked once topside using field texts with color photographs. Underwater video and digital still photodocumentation was also utilized to accurately document benthic species and distribution.

One interesting observation noted and photographed was what appears to be many egg masses attached directly to the concrete surfaces of several concrete railroad ties. Other benthic findings are below.

**Marine benthic species identified:**

Barnacles (1000's with approximately 20% coverage on each tie)

Brown algae slime - on every tie, with ones closest to the bottom displaying most prolific coverage

Leafy green algae – In patches attached to the concrete surfaces

Sea Urchins – white & pink varieties

5 legged starfish

Arrowcrab – 1 juvenile

The benthic growth rate on the concrete surfaces at this site has been quite rapid. The Tetrahedron Stack and Patch artificial reefs to the north in the same depth of water had a much slower benthic growth rate on the concrete surfaces. The concrete railroad ties utilized for this project were old weathered discarded material assumed to be approximately 15 years old or more.

**CONCLUSIONS:**

The overall size, density, complexity, and profile above the bottom of this site is providing an excellent artificial reef habitat to enhance the offshore marine environment and benefit marine resource users.