

5.7 CONCRETE RAILROAD TIE STACK ARTIFICIAL REEF

- Location: Sirotkin Reef
- Materials: Concrete railroad ties
- Maximum Depth: 94 feet
- Reef High Point: 73 feet
- Year Created: 2003
- Monitoring Date: 7/24/2011
- Total Cost: \$62,000 (FWC 84% & Martin County 16%)

5.7.1 History of the Concrete Railroad Tie Stack Artificial Reef

As part of a \$62,000 grant from the FWC and with additional funding from Martin County, the Railroad Tie Stack Reef was constructed between March and June, 2003 utilizing discarded concrete railroad ties donated by the Florida East Coast Railroad. This was the first artificial reef site built in Martin County using concrete railroad ties. Each railroad tie is approximately 11' x 14" x 10" and weighs about 650 pounds. A total of approximately 1500 tons of concrete railroad ties were placed forming a single pile from three separate deployments. During deployment, the railroad ties that comprise this reef were pushed off the anchored barge and settled to the seafloor in a random, interlocking fashion. The substantial mass of the concrete railroad ties and numerous contact points within the stack has resulted in a stable reef pile. The two hurricanes that struck Martin County in September 2004 and another in October 2005 seemed to have little effect on this reef. Figure 18 shows the location of the Concrete Railroad Tie Stack artificial reefs as well as the Tetrahedron reefs.

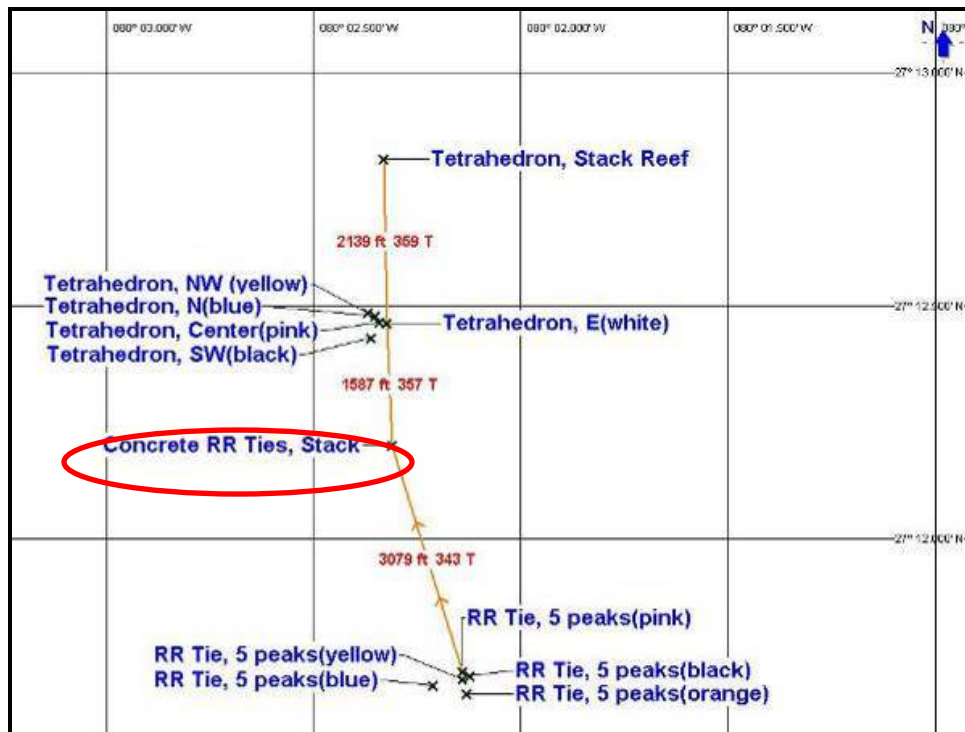


Figure 18. Chart view showing the Concrete Railroad Tie Stack reef location.

5.7.2 Structural Summary

Overall it appears the reef has changed very little since the last monitoring in 2009. The structure is a mound of concrete railroad ties with a complex arrangement of surfaces and voids. The depth to the highest part of the pile was measured at 73 ft in 2011, one foot deeper than in 2009 which could be due to the shifting of material over time. In comparison to previous dives on this reef it appeared that the slope of the mound had decreased slightly, although this could not be confirmed. The photographs in Figure 19 show the general condition of the Concrete Railroad Tie Stack Reef and some of the species observed during the monitoring dive including a school of tomtates and a lionfish.



Figure 19. Concrete Railroad Tie Stack Reef 2011 photographs.

5.7.3 Biological Survey Results

In contrast to the diversity of fish observed on the deeper reefs monitored for this report this shallow artificial reef displayed 24 fish species. Four important sport fish species in the Grouper/Snapper Complex were identified including the black sea bass, greater amberjack, vermilion snapper, and yellowtail snapper. Other notable fish species observed were 1000's of baitfish (round scad) and 100's of pigfish. On a negative note, 9 lionfish were counted swimming inside and on top of the pile of railroad ties. The local population of these exotic invasive species from the Indo-Pacific region seems to be on the increase. Table 20 and Table 21 list the species/taxa, the relative abundance and size class (adult, intermediate, and juvenile) observed during the monitoring dive.

Table 20. Concrete Railroad Tie Stack Artificial Reef Fish Species Census.

Family/ Common Name	Species	2011	
		Abundance	Size
Ostraciidae			
Scrawled cowfish	<i>Acanthostracion quadricornis</i>	S	A
Diodontidae			
Bridled burrfish	<i>Chilomycterus antennatus</i>	F	J & A
Serranidae			
Bank sea bass	<i>Centropristis ocyurus</i>	F	J & A
Belted sandfish	<i>Serranus subligarius</i>	M	J & A
Black sea bass	<i>Centropristis striata</i>	F	J & A
Whitespotted soapfish	<i>Rypticus maculatus</i>	F	J & A
Carangidae			
Greater Amberjack	<i>Seriola dumerili</i>	F	A
Round scad	<i>Decapterus punctatus</i>	A(1000's)	A
Lutjanidae			
Yellowtail snapper	<i>Ocyurus chrysurus</i>	S	A
Vermilion snapper	<i>Rhomboplites aurorubens</i>	F	A
Haemulidae			
Pigfish	<i>Orthopristis chrysoptera</i>	A(100's)	A
Tomtate	<i>Haemulon aurolineatum</i>	A	J & A
Sparidae			
Sheepshead	<i>Archosargus probatocephalus</i>	F	A
Sheepshead porgy	<i>Calamus penna</i>	F	A
Sciaenidae			
Cubbyu	<i>Pareques umbrosus</i>	F	J
Chaetodontidae			
Reef butterflyfish	<i>Chaetodon sedentarius</i>	F	A
Pomacanthidae			
Blue angelfish	<i>Holocanthus bermudensis</i>	S	A
Pomacentridae			
Beaugregory	<i>Stegastes leucostictus</i>	F	A
Yellowtail reeffish	<i>Chromis enchrysurus</i>	F	A
Labridae			
Slippery dick	<i>Halichoeres bivittatus</i>	M	J & A
Spanish hogfish	<i>Bodianus rufus</i>	F	A
Scorpaenidae			
Spotted scorpionfish	<i>Scorpaena plumieri</i>	M	J & A
Red lionfish	<i>Pterois volitans</i>	F(9)	J & A
Ogcocephalidae			
Shortnose batfish	<i>Ogcocephalus nasutus</i>	F(3)	J & A
	Total	24	

Abundance Key: S=single, F=few (2-10), M=many (11-100), A=abundant (>100)

Size Key: A=adult, J=juvenile, A/J=intermediate

Table 21. Concrete Railroad Tie Stack Artificial Reef Benthic Species Census.

	Common Name	Scientific Name
Echinoderms	Rock Boring Urchin	<i>Echinometra lucunter</i>
	3 Rowed Sea Cucumber	<i>Isostichopus badionotus</i>
	Common Arbacia Urchin	<i>Arbacia punctulata</i>
	Sea Star (5 legged)	Unidentified species
	Notched Sand Dollar	<i>Encope aberrans</i>
Cnidarians	Sea Anemones	<i>Aptasia sp.</i>
	Hydroids	Unidentified species
	Colorful Sea Whip	<i>Leptogorgia virgulata</i>
Ascidians	Overgrowing Tunicates	<i>Didemnidae</i>
	White & Black Condominium Tunicates	<i>Eudistoma sp.</i>
	Button Tunicates	<i>Distaplia corolla</i>
Crustaceans	Yellowline Arrow Crab	<i>Stenorhynchus seticornis</i>
	Red Netted Barnacles	<i>Megabalanus sp.</i>
	Rough Box Crab	<i>Calappa gallus</i>
	Caribbean Spiny Lobster	<i>Panulirus argus</i>
	Sessile Barnacles	<i>Thoracia</i>
Mollusca	Rock Snails	<i>Muricidae</i> (Unidentified Species)
	Atlantic Deer Cowrie	<i>Cypraea zebra</i>
Ectoprocta	Encrusting Bryozoans	Unidentified Species
Annelida	Bearded Fireworm	<i>Hermodice carunculata</i>
Porifera	Star Encrusting Sponge	<i>Halisarca sp.</i>