

**Table 17. Aaron Vaughn Memorial Reef Benthic Species Census.**

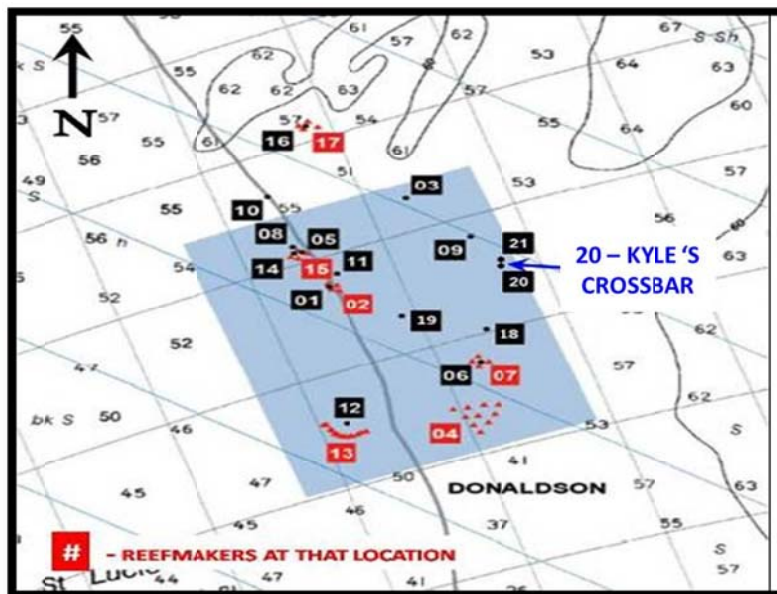
	<b>Common Name</b>	<b>Scientific Name</b>
<b>Cnidarians</b>	Sea Anemones	<i>Aptasia sp.</i>
	Hydroids	<i>Unidentified Species</i>
<b>Crustaceans</b>	Caribbean Spiny Lobster	<i>Panulirus argus</i>
<b>Mollusca</b>	Rock snails	<i>Muricidae (Unidentified species)</i>
	Warty Seacat	<i>Dolabrifera dolabrifera</i>
<b>Porifera</b>	Encrusting Sponge	<i>Halisarca sp.</i>
<b>Polychaeta</b>	N/A	<i>Spirorbidae</i>

## 5.4 KYLE’S CROSSBAR REEF

- Location: Donaldson Reef
- Materials: Large pieces of concrete, predominantly 30” square concrete piling cut offs, various lengths, from the Veterans Memorial Bridge
- Maximum Depth: 63 feet
- Minimum Depth: 62 feet
- Reef High Point: 41 feet
- Year Created: July 2012
- 2012 Monitoring Date: 09/09/2012
- 2013 Monitoring Date: 09/04/2013
- Total Cost: \$40,430 for both reefs(67% FWC grant 11176 & 33% Martin County)

### 5.4.1 History of the Kyle’s Crossbar Reef

In July 2012, this artificial reef was deployed in the Donaldson Reef Site. The reef was created using large pieces of concrete, roughly 3 ft to 20ft long. The reef site received two barge loads of 277 chunks of concrete that varied in length from 3 ft to 20 ft and weighed approximately 904 tons. Figure 17 shows a chart with the location of the Kyle’s Crossbar Reef.



**Figure 17. Chart of the Donaldson Reef area showing the Kyle’s Crossbar Reef location.**

### 5.4.2 Structural Summary

The Kyle’s Crossbar reef site has a seafloor footprint of 56 ft (north/south) by 60 ft (east/west), almost a perfect circle. The entire reef was built from the same type of concrete components (piling cut-offs), so visually it appears as a very symmetrical, cone shaped reef with a profile height of 14 ft. The varying lengths of the piling cut-offs and concrete have yielded many overhangs, tunnels, and voids that formed during deployment which makes for an endless pattern of hiding places for fish and benthic creatures to inhabit. Given the configuration, it is anticipated that these heavy and dense components should remain during storm events and winter swells. Refer to Table 18 for depth measurements taken at the perimeter of the reef.

**Table 18. Summary of Kyle’s Crossbar Reef Depth Measurements.**

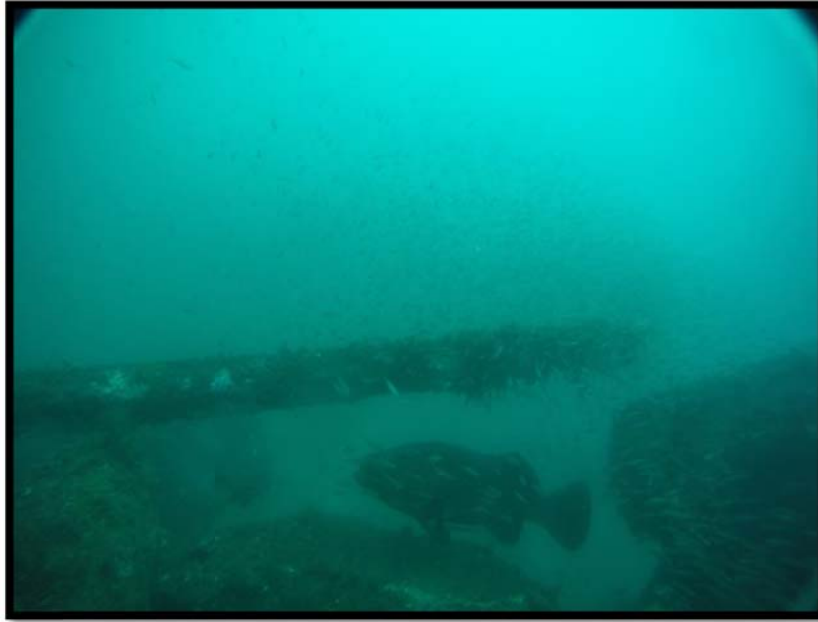
<b>Direction</b>	<b>Distance from reef high point to the perimeter (ft)</b>	<b>Perimeter Depth (ft)</b>	<b>Depth at 25 ft from perimeter (ft)</b>
North	88	63	63
East	73	62	61
South	23	63	63
West	47	63	62

Note – the Reef top depth was recorded to be 41ft.

According to County records, the original maximum deployment depth for the Kyle’s Crossbar site was recorded at 58ft, with a minimum reef crest of 37ft, approximately a 20 ft clearance height (according to the MPR). In comparing our 2013 structural data with past monitoring efforts (by others) and the County’s records, the site has experienced some scouring, as well as a change in the crest height, which could infer some scouring and/or settlement. Tide could be a minor factor for this discrepancy; however, it is likely that some settlement and/or scouring has occurred. Regardless, the site appeared stable; no loose or isolated pieces were encountered or observed.

### 5.4.3 Biological Survey Results

Thirty seven (37) fish species were identified and photographed, just fourteen months post-deployment. Most notable sport/food fish species included greater amberjack, gray, yellowtail, and lane snappers, goliath grouper, and two individuals of juvenile snowy grouper (rare at this shallow depth). Also notable were three species of baitfish, thousands of silversides, and hundreds of round scad and blue runners in schools swimming rapidly all around and above the reef. A large (10”) red lionfish was also observed hiding in the dark recesses of the overhanging concrete piling cut-off sections. The photographs show the general condition of Kyle’s Crossbar Reef and some of the species observed during the survey.



**Figure 18. Kyle's Crossbar Reef, Goliath Grouper, 2013.**



**Figure 19. Kyle Crossbar Reef, Tomtates and Porkfish, 2013.**

The most notable attached benthic organisms consisted of algae and small barnacles that seemed to cover nearly all exposed surfaces, which is positive. Table 19 lists the fish species census, including the relative abundance, and size class (adult, intermediate, and juvenile), while Table 20 lists the benthic species observed during the monitoring dive.

**Table 19. Kyle’s Crossbar Reef Fish Species Census.**

Family/Common Name	Species	2013	
		Abundance	Size
<b>Centropomidae</b>			
Snook	<i>Centropomus undecimalis</i>	M	A
<b>Serranidae</b>			
Belted sandfish	<i>Serranus subligarius</i>	M	A
Black seabass	<i>Centropristis striata</i>	A	A
Goliath grouper	<i>Epinephelus itajara</i>	F	A
<b>Apogonidae</b>			
Twospot cardinalfish	<i>Apogon pseudomaculatus</i>	F	A
<b>Echeneididae</b>			
Sharksucker	<i>Echeneis naucrates</i>	F	A
<b>Carangidae</b>			
Almaco jack	<i>Seriola rivoliana</i>	F	A
Amberjack	<i>Seriola dumerili</i>	F	A
Bar jack	<i>Caranx ruber</i>	F	A
Blue runner	<i>Caranx chrysos</i>	F	A
Round scad	<i>Decapterus punctatus</i>	A	A
<b>Lutjanidae</b>			
Gray snapper	<i>Lutjanus griseus</i>	M	A
Lane snapper	<i>Lutjanus synagris</i>	F	A
<b>Haemulidae</b>			
Black margate	<i>Anisotremus surinamensis</i>	M	A
Pigfish	<i>Orthopristis chrysoptera</i>	M	A
Porkfish	<i>Anisotremus virginicus</i>	A	A
Tomtate	<i>Haemulon aurolineatum</i>	A	A
<b>Sparidae</b>			
Sheepshead	<i>Archosargus probatocephalus</i>	A	A
Sheepshead porgy	<i>Calamus penna</i>	F	A
<b>Sciaenidae</b>			
Cubby	<i>Equetus umbrosus</i>	A	A
<b>Mullidae</b>			
Spotted goatfish	<i>Pseudupeneus maculatus</i>	F	A
<b>Ephippidae</b>			
Spadefish	<i>Chaetodipterus faber</i>	F	A
<b>Chaetodontidae</b>			
Banded butterflyfish	<i>Chaetodon striatus</i>	F	A
<b>Pomacanthidae</b>			
Blue angelfish	<i>Holocanthus bermudensis</i>	F	A
<b>Pomacentridae</b>			

Family/Common Name	Species	2013	
		Abundance	Size
Beaugregory	<i>Stegastes leucostictus</i>	M	A
Yellowtail reeffish	<i>Chromis enchrysurus</i>	M	A
<b>Labridae</b>			
Slippery dick	<i>Halichoeres bivittatus</i>	A	A
Spanish hogfish	<i>Bodianus rufus</i>	F	A
<b>Clinidae</b>			
Hairy blenny	<i>Labrisomus nuchipinnus</i>	M	A
<b>Tetraodontidae</b>			
Bandtail puffer	<i>Sphoeroides spengleri</i>	F	A
Sharpnose puffer	<i>Canthigaster rostrata</i>	F	A
<b>TOTAL</b>		<b>31</b>	

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 20. Kyle’s Crossbar Reef Benthic Species Census**

	Common Name	Scientific Name
<b>Cnidarians</b>	Sea Anemones	<i>Aptasia sp.</i>
<b>Crustaceans</b>	Caribbean Spiny Lobster	<i>Panulirus argus</i>
<b>Mollusca</b>	Rock snails	<i>Muricidae (Unidentified species)</i>
	Octopus - Caribbean Reef	<i>Octopus briareus</i>
<b>Porifera</b>	Encrusting Sponge	<i>Halisarca sp.</i>
<b>Polychaeta</b>	N/A	<i>Spirorbidae</i>

## 5.5 FIVE PEAKS PATCH – BLUE SITE

- Location: Sirotkin Reef
- Materials: Concrete Railroad Ties
- Maximum Depth: 98 feet
- Blue Reef High Point: 92 feet
- Year Created: 2004
- 2009 Monitoring Date: 10/2/2009
- 2013 Monitoring Date: 09/05/2013
- Total Cost: \$10,500 (75% FWC grant (03048) & 25% Martin County)

### 5.5.1 History of the Five Peaks Patch - Blue

As part of a FWC construction grant and with additional funding from Martin County, this 5-unit, color coded patch reef is comprised of donated concrete railroad ties (from the Florida East Coast Railroad Company), and was constructed in late June 2004. Each of the five sites or “peaks” (Pink, Black, Black, Orange and Yellow) are composed of roughly +300 tons of railroad ties (11ft X 14ft X 10”), 924 ties, with each tie weighting approximately 600 to 700 pounds. Distances vary between the peaks, but average 120 feet on center between clusters. Colored nylon tie wraps were added to the top of each pile to help identify each site, and aid in future monitoring efforts. Refer to Figure 20 for all five-peak locations. The “Blue” site was selected for 2013 monitoring.