

Family/ Common Name	Species	2009		2008		2007	
		Abundance	Size	Abundance	Size	Abundance	Size
<b>Sphyraenidae</b>							
Great barracuda	<i>Sphyraena barracuda</i>	F	A				
Guaguanche	<i>Sphyraena guachancho</i>	A	J			M	A
<b>Acanthuridae</b>							
Doctorfish	<i>Acanthurus chirurgus</i>	F	A				
<b>Tetraodontidae</b>							
Bandtail puffer	<i>Sphoeroides spengleri</i>	F	A	M	A		
<b>Diodontidae</b>							
Porcupine fish	<i>Diodon hystrix</i>	F	A				
	<b>Total</b>	<b>46</b>		<b>28</b>		<b>16</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 5. Clifton Perry Memorial Reef fish census.**

### 3.2 Texas Reefmaker Units

- Location: Donaldson Reef
- Materials: Reef modules (steel and concrete)
- Maximum Depth: 54 feet
- Reef High Point: 40 feet
- Year Created: 2005
- Monitoring Date: 6/19/2008

#### 3.2.1 History of the Texas Reefmaker Units

In 2005 Martin County received a grant from FFWCC to enhance existing artificial reef sites by deploying sixty Reefmaker “Florida Special” units adjacent to existing reef materials in the Donaldson and Sirotkin reef sites. These modules are large three-sided pyramids fabricated using concrete and steel (Figure 10). Fifteen Reefmaker artificial reef modules were deployed within the Donaldson Reef Site along the southern face of the Texas Reef on May 20, 2005. The location of the Texas Reef Reefmaker units is shown in Figure 9.

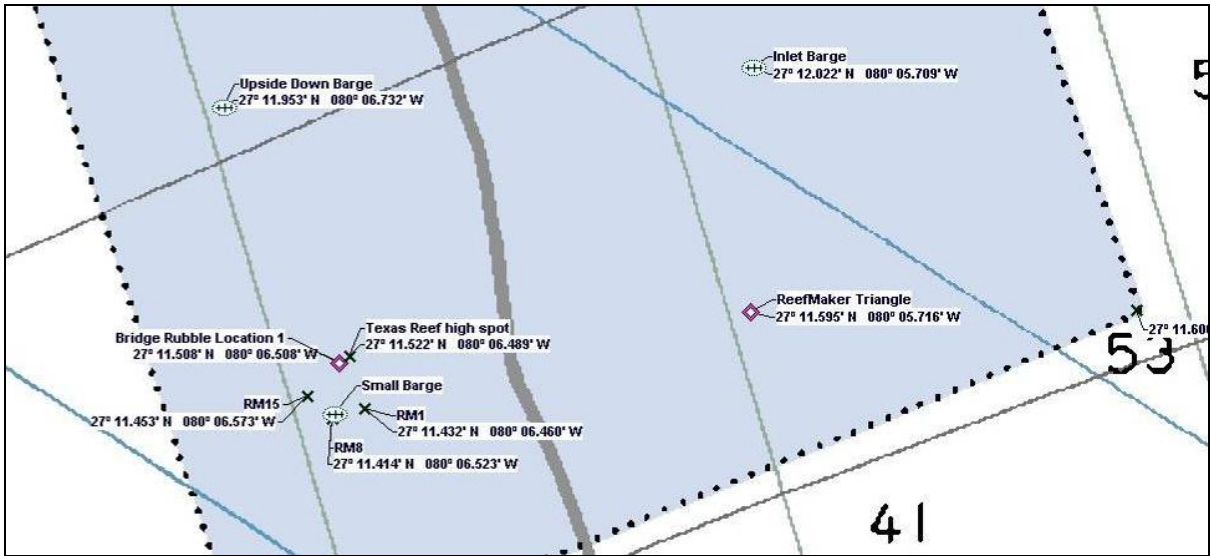


Figure 9. Chart view of Donaldson Reef area with Texas Reef location.

### 3.2.2 Structural Summary

Figure 9 shows the layout of the Reefmaker Units as deployed along the southern face of the Texas Reef. A single unit was deployed south of the Texas Reef, and the remaining units in a chevron pattern, with seven units placed on the eastern side heading to the NE at 50-ft. intervals, and seven units heading to the NW on the western side.

Underwater measurements between the units were performed, with the results shown in Table 6. Figure 11 shows representative photographs of the Reefmaker units at the Texas Reef. All of the Reefmaker units are intact and standing upright. Some settlement of the concrete bases into the bottom was observed and varied from minimal to almost complete burial of the concrete feet or footer beam.



**Figure 10. Reefmaker “Florida Special” artificial reef modules.**

Unit Number	GPS Latitude	GPS Longitude	Depth at Top (feet)	Bottom Depth (feet)	Condition	Distance to Next Unit (feet)
1	27 11.432 N	80 6.460 W	46	55	Intact	42
2	27 11.428 N	80 6.471 W	46	55	Intact	70
3	27 11.421 N	80 6.481 W	46	55	Intact	31
4	27 11.415 N	80 6.496 W	46	55	Intact	70
5	27 11.416 N	80 6.501 W	46	55	Intact	38
6	27 11.413 N	80 6.508 W	46	56	Intact	50
7	27 11.415 N	80 6.518 W	47	55	Intact	25
8	27 11.414 N	80 6.523 W	47	56	Intact	40
9	27 11.417 N	80 6.530 W	47	56	Intact	73
10	27 11.422 N	80 6.538 W	45	53	Intact	16
11	27 11.423 N	80 6.544 W	46	53	Intact	95
12	27 11.434 N	80 6.549 W	43	50	Intact	47
13	27 11.437 N	80 6.554 W	43	51	Intact	77
14	28 11.454 N	81 6.564 W	42	50	Intact	39
15	27 11.453 N	80 6.573 W	40	49	Intact	na

**Table 6. Texas Reef Reefmaker module locations and depths.**



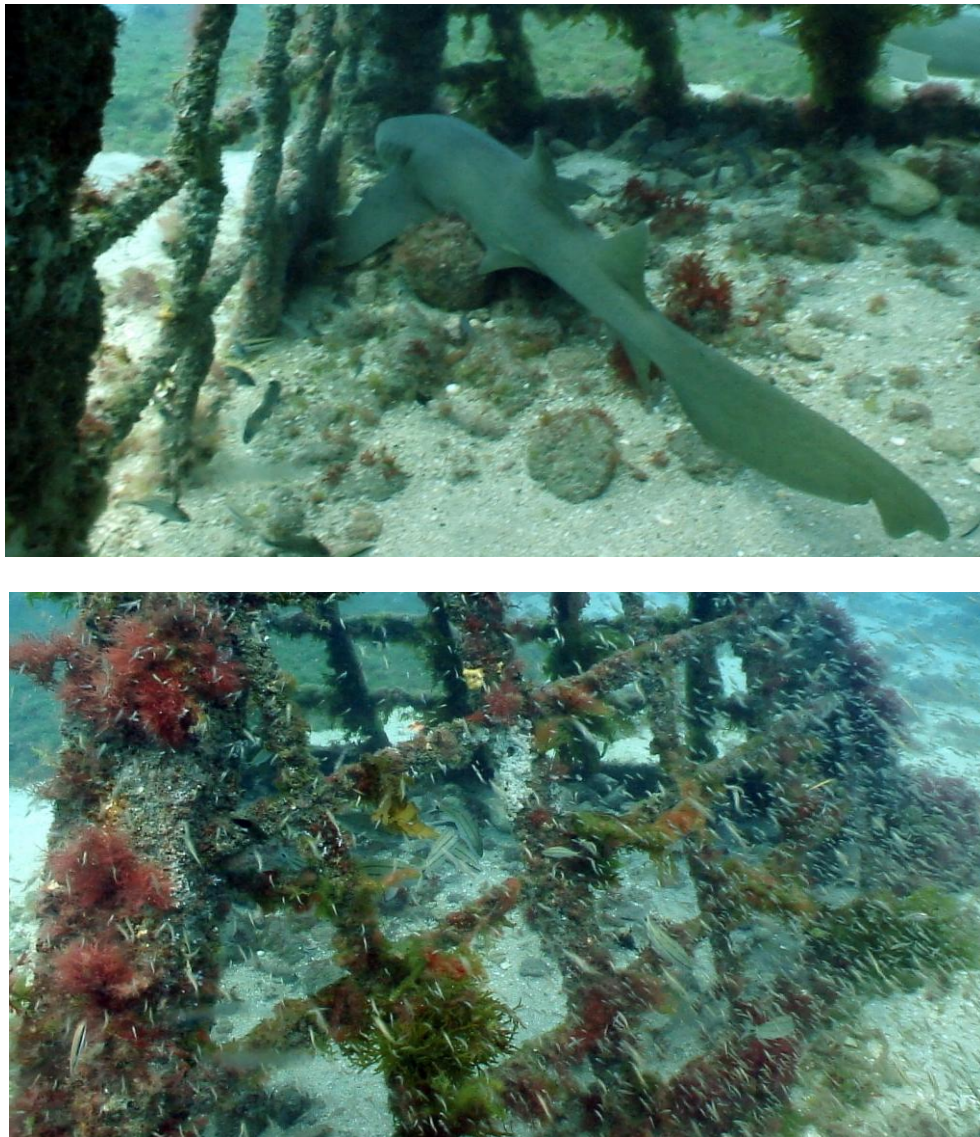


Figure 11. Texas Reefmaker module photographs, 2008.

### 3.2.3 Biological Survey Results

Roving diver survey results show an increasing trend in both fish species diversity and total biomass on the Texas Reefmaker Reef since its deployment in 2005. Seabasses and snappers are the most diverse families but the abundant grunts and jacks appeared to compose the greatest biomass of fishes. Large and small fishes alike were observed inside the reef modules, such as tomtates, seabasses, nurse sharks and goliath grouper. The reef modules supported red, brown and green algae and numerous sessile invertebrates on both the concrete and steel surfaces of the modules. Table 7 lists the species/taxa observed, their relative abundance and size class (adult or juvenile) if applicable for the past three years.

Family/ Common Name	Species	2008		2007		2006	
		Abundance	Size	Abundance	Size	Abundance	Size
<b>Elasmobranchs</b>							
Nurse shark	<i>Ginglymostoma cirratum</i>	S	A				
Spotted eagle ray	<i>Aetobatus narinari</i>	S	A				

Family/ Common Name	Species	2008		2007		2006	
		Abundance	Size	Abundance	Size	Abundance	Size
<b>Centropomidae</b>							
Common snook	<i>Centropomus undecimalis</i>	F	A				
<b>Serranidae</b>							
Belted sandfish	<i>Serranus subligarius</i>	M	A	M	A		
Black seabass	<i>Centropristis striata</i>	M	A,J	F	A,J	F	
Goliath grouper	<i>Epinephelus itajara</i>	F - 2	A	S	J		
Scamp	<i>Mycteroperca phenax</i>	S	A				
<b>Apogonidae</b>							
Twospot cardinalfish	<i>Apogon pseudomaculatus</i>	F	A				
<b>Carangidae</b>							
Amberjack	<i>Seriola dumerili</i>	M	A,J	M	A,J		
Blue runner	<i>Caranx chrysos</i>			F	J		
Round scad	<i>Decapterus punctatus</i>			A	A		
<b>Lutjanidae</b>							
Gray snapper	<i>Lutjanus griseus</i>	F	A				
Lane snapper	<i>Lutjanus synagris</i>	F	A,J	M	A		
Mutton snapper	<i>Lutjanus analis</i>	S	A				
<b>Haemulidae</b>							
Black margate	<i>Anisotremus surinamensis</i>			F	A		
Porkfish	<i>Anisotremus virginicus</i>	M	A,J	M	A,J	F	
Tomtate	<i>Haemulon aurolineatum</i>	A	A	A	A,J	F	
<b>Sparidae</b>							
Sheepshead	<i>Archosargus probatocephalus</i>	M	A	F	A	F	
Sheepshead porgy	<i>Calamus penna</i>	F	A	M	A		
<b>Sciaenidae</b>							
Cubbyu	<i>Equetus umbrosus</i>	F	A,J	M	A	F	
<b>Ephippidae</b>							
Atlantic spadefish	<i>Chaetodipterus faber</i>	F	A	M	A	A	
<b>Chaetodontidae</b>							
Reef butterflyfish	<i>Chaetodon sedentarius</i>	F	A	F	A		
<b>Pomacentridae</b>							
Beaugregory	<i>Pomacentrus leucostictus</i>	F	A,J	F	J		
<b>Labridae</b>							
Slippery dick	<i>Halichoeres bivittatus</i>			F	A		
Spanish hogfish	<i>Bodianus rufus</i>	F	A				
<b>Sphyraenidae</b>							
Great barracuda	<i>Sphyraena barracuda</i>	F	A				
<b>Clinidae</b>							
Hairy blenny	<i>Labrisomus nuchipinnus</i>			F	A		
<b>Acanthuridae</b>							
Doctorfish	<i>Acanthurus chirurgus</i>	F	A				
<b>Balistidae</b>							
Gray triggerfish	<i>Balistes capriscus</i>	F	A				
<b>Tetraodontidae</b>							
Bandtail puffer	<i>Sphoeroides spengleri</i>	F	A,J				
	<b>Total</b>	<b>25</b>		<b>18</b>		<b>6</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 7. Texas Reefmaker Artificial Reef fish census.**