

5.8 THE TEXAS REEF

- Location: Donaldson Reef
- Materials: Limestone rubble, steel, and concrete from bridge demolition
- Maximum Depth: 38 feet sloping down to 52 feet
- Reef High Point: 26 feet
- Year Created: 2002
- Monitoring Date: 8/23/2011
- Total Cost: This was no cost to the County

5.8.1 History of the Texas Reef

This artificial reef was constructed in 2002 using rock excavated from the St. Lucie Inlet during an Army Corps of Engineers project to increase the capacity of Inlet's impoundment basin. The approximately 300,000 cyds of rock that created this reef was excavated by Great Lakes Dock and Dredge using the dredge, Texas. The site is at the southwest corner of the Donaldson Reef Site within the Three Nautical Mile State Waters Boundary (3-nm State Line), in a water depth of approximately 17 m (55 ft).

Additional materials placed in May 2005 at the Texas Reef Site included 15 "Florida Special" Reefmaker artificial reef units and bridge rubble including structural concrete, steel spans and associated mechanisms from the original Jensen Beach Causeway drawbridge. "Florida Special" units were arranged around the southern boundary of Texas Reef; additional "Florida Special" Units were placed within the Donaldson Reef Site seaward of the State Line.

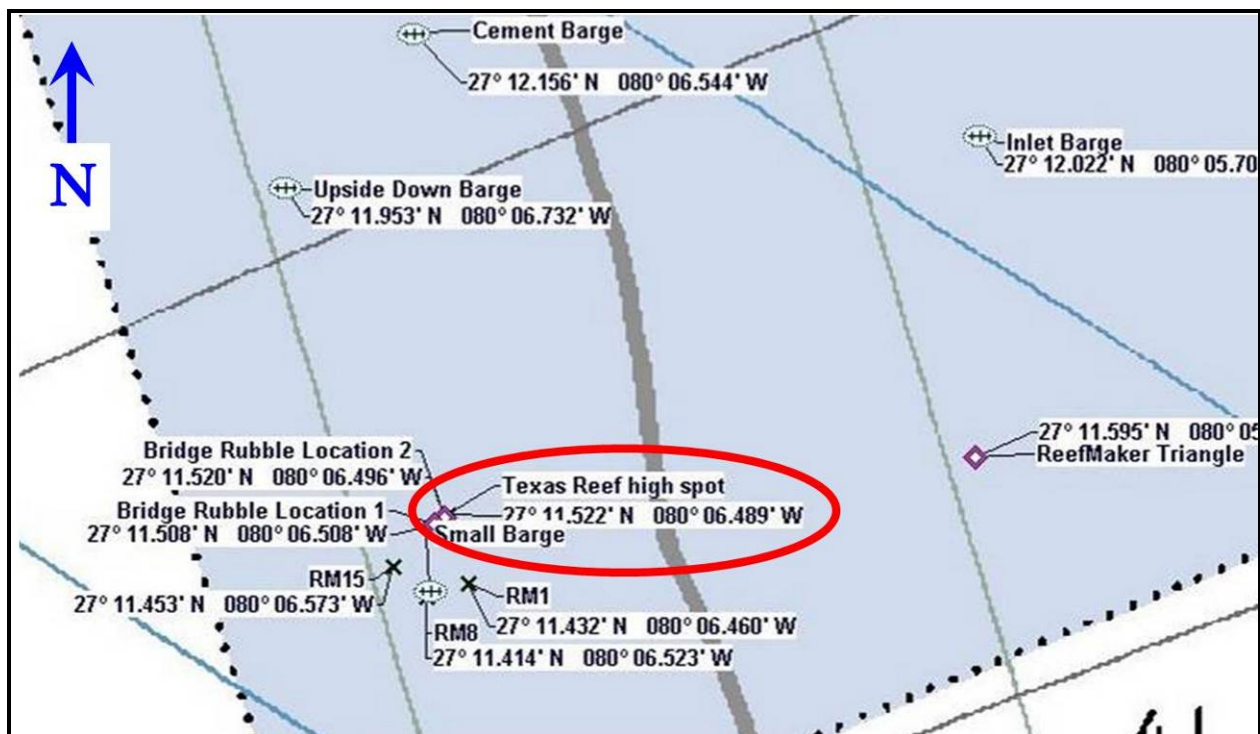


Figure 20. Chart view of the Donaldson Reef site showing the Texas Reef location.

5.8.2 Structural Summary

The limestone portion of the reef measures approx. 1000 ft long from south to north and 300 ft wide from east to west. Continental Shelf & Associates, Inc. (CSA) spent 6 years completing detailed monitoring of this site and did a comprehensive study of the biology of the site for Martin County from the years 2003 – 2009; CSA's reports can be found on both their website and Martin County's website for reference. Maxwell Marine Consulting Engineers was contracted to monitor the newest section of the site in 2011 which is comprised of steel and concrete materials.

The steel and concrete portion of the Texas Reef sits just east of the uppermost summit of the Texas Reef where the reef starts to slope downward. So far all components appear to be holding up well with the exception of anticipated corrosion of the steel components. Because of the shallow characteristic of this site, much seasonal shifting of sediments occurs resulting in some changes in appearance over time. Although this is a dynamic site it appears to be doing very well as an artificial reef as the biological section below describes. The photographs in Figure 21 show the general condition of this section of the Texas Reef and some of the species observed during the monitoring dive.



Figure 21. Texas Reef 2011 photographs.

Identification of species in the photographs shown above in clockwise order from the upper-left photograph are (1) spotted moray eel, (2) bar jacks, (3) loggerhead turtle, and (4) spadefish.

5.8.3 Biological Survey Results

At 38 species, this reef has come close to equaling the current Martin County record of 40 species on a single artificial reef. At a depth of 38 ft this site is an amazing display of fish and benthic species. The most notable sport fish species identified were: common snook, gray snapper, and greater amberjack. The federally protected species seen were goliath grouper. Other notable species include 1000's of baitfish with schools so thick they would temporarily block out the sunlight, spotted and purple mouth moray eels at every crevice, a nurse shark, and unfortunately at least 10 invasive lionfish. This site is a constant flurry of activity of marine life hiding, fleeing, chasing, and eating. This is a five star artificial reef. Table 22 and Table 23 list the species/taxa, the relative abundance and size class (adult, intermediate, and juvenile) observed during the monitoring dive.

Table 22. Texas Reef Artificial Reef Fish Species Census.

Family/Common Name	Species	2011	
		Abundance	Size
Acanthuridae			
Doctorfish	<i>Acanthurus chirurgus</i>	M	A
Ocean Surgeonfish	<i>Acanthurus bahianus</i>	F	A
Apogonidae			
Twospot cardinalfish	<i>Apogon pseudomaculatus</i>	M	A
Atherinidae			
Silversides	<i>Atherinidae</i>	A	A(1,000's)
Carangidae			
Greater amberjack	<i>Seriola dumerili</i>	M	A
Round scad	<i>Decapterus punctatus</i>	A	A(1000's)
Blue runner	<i>Caranx crysos</i>	A	A
Bar jack	<i>Carangoides ruber</i>	A	A
Centropomidae			
Common snook	<i>Centropomus undecimalis</i>	M	A
Chaetodontidae			
Reef butterflyfish	<i>Chaetodon sedentarius</i>	F	A
Cheloniidae			
Loggerhead sea turtle	<i>Caretta caretta</i>	S	J
Ephippidae			
Atlantic spadefish	<i>Chaetodipterus faber</i>	A	A
Ginglymostomatidae			
Nurse shark	<i>Ginglymostoma cirratum</i>	S	A
Gobiidae			
Neon goby	<i>Gobiosoma oceanops</i>	F	A
Haemulidae			
Tomtate	<i>Haemulon aurolineatum</i>	A	J & A
Black margate	<i>Anisotremus surinamensis</i>	F	A
Porkfish	<i>Anisotremus virginicus</i>	M	J & A
Labridae			
Bluehead wrasse	<i>Thalassoma bifasciatum</i>	F	A
Spanish hogfish	<i>Bodianus rufus</i>	F	A

Family/Common Name	Species	2011	
		Abundance	Size
Clown wrasse	<i>Halichoeres maculipinna</i>	F	J
Labrisomidae			
Hairy blenny	<i>Labrisomus nuchipinnis</i>	A	A
Lutjanidae			
Gray snapper	<i>Lutjanus griseus</i>	M	J & A
Muraenidae			
Spotted moray eel	<i>Gymnothorax moringa</i>	M	A
Purplemouth moray eel	<i>Gymnothorax vicinus</i>	M	A
Opistognathidae			
Yellowheaded jawfish	<i>Opistognathus gilbert</i>	F	A
Pomacanthidae			
Queen angelfish	<i>Holacanthus ciliaris</i>	F	A
French angelfish	<i>Pomacanthus paru</i>	F	A
Pomacentridae			
Yellowtail reeffish	<i>Chromis enchrysurus</i>	F	A
Beaugregory	<i>Pomacentrus leucostictus</i>	F	J & A
Sergeant Major	<i>Abudefduf saxatilis</i>	M	A
Sciaenidae			
Cubbyu	<i>Equetus umbrosus</i>	A	A
High hat	<i>Equetus acuminatus</i>	M	J & A
Scorpaenidae			
Red Lionfish	<i>Pterois volitans</i>	F	A
Serranidae			
Goliath grouper	<i>Epinephelus itajara</i>	S	A
Whitespotted soapfish	<i>Rypticus maculatus</i>	F	A
Sparidae			
Pigfish	<i>Orthopristis chrysoptera</i>	M	A
Sphyraenidae			
Great baracuda	<i>Sphyraena barracuda</i>	F	A
Tetraodontidae			
Sharpnose puffer	<i>Canthigaster rostrata</i>	F	J & A
	Total	38	

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 23. Texas Reef Artificial Reef Benthic Species Census.

	Common Name	Scientific Name
Echinoderms	Rock Boring Urchin	<i>Echinometra lucunter</i>
	Common Arbacia Urchin	<i>Arbacia punctulata</i>
	Sea Star	Unidentified species
Cnidarians	Tube Dwelling Anemones	<i>Ceriantharia</i>

	Common Name	Scientific Name
	Hydroids – several species	<i>Thecatae</i>
Ascidians	Overgrowing Tunicates	<i>Didemnidae</i>
	Giant Tunicates	<i>Polycarpa spongiabilis</i>
	Button Tunicates	<i>Distaplia corolla</i>
	Other Unidentified Tunicates	<i>Ascidacea</i>
Crustaceans	Giant Hermit Crab	<i>Petrochirus Diogenes</i>
	Caribbean Spiny Lobster	<i>Panulirus argus</i>
Mollusca	Atlantic Triton’s Trumpet	<i>Charonia zariiegata</i>
	Atlantic Deer Cowrie	<i>Cypraea zebra</i>
	Octopus - Caribbean Reef	<i>Octopus briareus</i>
Ectoprocta	Encrusting Bryozoans	Unidentified Species
Anthozoa	Gorgonians – several species	<i>Holaxonia</i>
Porifera	Star Encrusting Sponge	<i>Halisarca sp.</i>
	White Lumpy Encrusting Sponge	<i>Ptilocaulis sp</i>
	Unidentified Sponge species	<i>Demospongiae</i>