

3.3 PCL Shallow Reef

- Location: Donaldson Reef
- Materials: Concrete, steel
- Maximum Depth: 62 feet
- Reef High Point: 43 feet
- Year Created: 2006
- Monitoring Date: 6/25/2008, 9/28/2009

3.3.1 History of the PCL Shallow Reef

In the winter of 2006, five barge loads of concrete and steel materials totaling approximately 2,800 tons were deployed in 60 feet of water within the Donaldson reef site. These materials came from the decommissioned Ernest Lyons draw bridge that spanned the Indian River Lagoon between Sewalls Point and Hutchinson Island. The new reef was named for the construction company that built the new bridge, demolished the old bridge and built the new reef, covering all costs for the new reef construction.

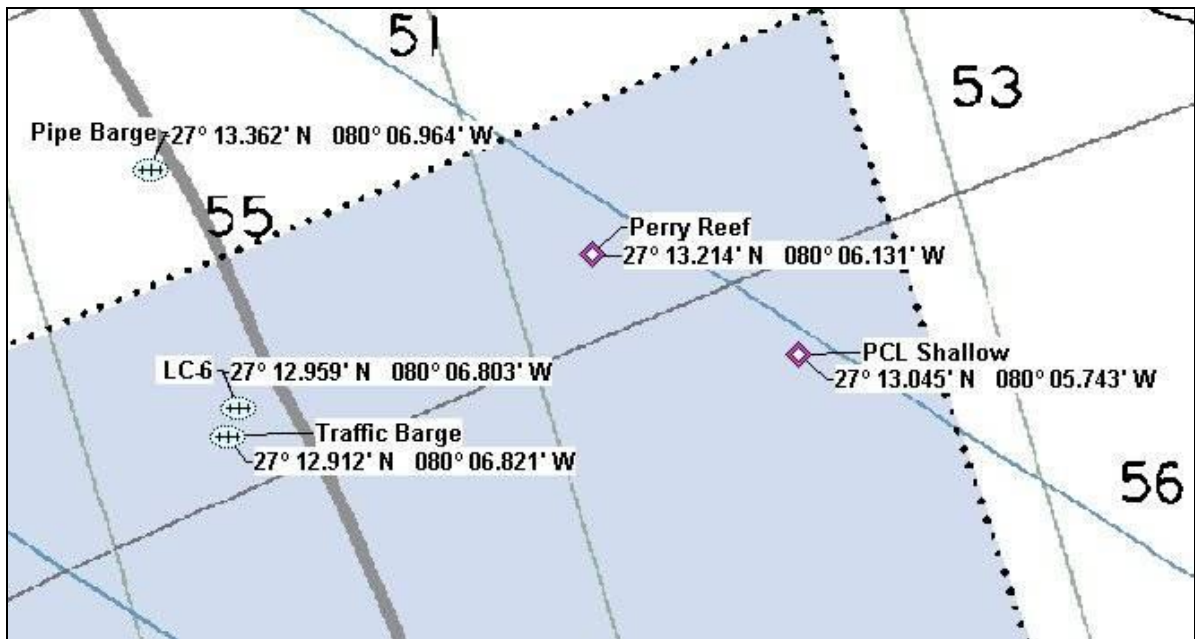


Figure 12. Chart view of Donaldson Reef area with PCL Shallow Reef location.

3.3.2 Structural Summary

The footprint of this reef is roughly ovoid with a north-to-south axis measuring 240 feet by 200 feet, occupying just over one acre of seafloor. Immediately after construction, the maximum profile above the seafloor was 19 feet with an average of about 14 feet. Minor settling has occurred since, but the maximum profile is still 18 feet above the seafloor and still averages 14 feet in most areas. A diverse array of materials in varying sizes and shapes has created a very complex reef structure, including crevices, overhangs, large caverns, scour holes and flat

expanses of reef. Many of the individual reef components are interlocked with one another and help to enhance reef stability. Figure 12 shows a chart with the location of the PCL Shallow reef in the northeastern area of the Donaldson Reef Site.



Figure 13. PCL Shallow Artificial Reef photographs from 2008 and 2009.

3.3.3 Biological Survey Results

Fish surveys indicate an increasing trend in species diversity since 2007, the first annual monitoring period. Jacks, grunts and seabasses represented the most numerous species over the last two years. Vast schools of round scad and Atlantic bumper were observed around and above the reef crest, while numerous snappers, groupers and porgies were observed using the reef structure and cavities for hiding and foraging. Invertebrate biomass on the artificial reef also appeared to have increased steadily since deployment. Some of the most common taxa included sea urchins, barnacles, tunicates, hydroids, sea anemones, tube worms, encrusting sponges and sea cucumbers. Numerous crabs and gastropods were also observed. Table 8 presents the fish species observed during 2007, 2008 and 2009.

Family/ Common Name	Species	2009		2008		2007	
		Abundance	Size	Abundance	Size	Abundance	Size
Elasmobranchs							
Southern stingray	<i>Dasyatis americana</i>	S	A	S	A	F	
Ogcocephalidae							
Shortnose batfish	<i>Ogcocephalus nasutus</i>	S	A				
Centropomidae							
Common snook	<i>Centropomus undecimalis</i>	M	A	M	A	M	
Serranidae							
Bank seabass	<i>Centropristis ocyurus</i>						
Belted sandfish	<i>Serranus subligarius</i>	M	A,J	M	A	F	
Black seabass	<i>Centropristis striata</i>	M	A	M	A	F	
Gag grouper	<i>Mycteroperca microlepis</i>					S	
Goliath grouper	<i>Epinephelus itajara</i>	M	A,J	M	A	F	
Scamp	<i>Mycteroperca phenax</i>	M	A,J			F	
Grammistidae							
Whitespotted soapfish	<i>Rypticus maculatus</i>	M	A	F	A	S	
Apogonidae							
Flamefish	<i>Apogon maculatus</i>	F	A				
Twospot cardinalfish	<i>Apogon pseudomaculatus</i>			F	A		
Rachycentridae							
Cobia	<i>Rachycentron canadum</i>	S	A				
Carangidae							
Almaco jack	<i>Seriola rivoliana</i>	F	A/J				
Amberjack	<i>Seriola dumerili</i>			M	A	F	
Atlantic bumper	<i>Chloroscombus chrysurus</i>	A	A				
Bar jack	<i>Caranx ruber</i>	S	J				
Blue runner	<i>Caranx chrysos</i>	M	A	M	A	M	
Rainbow runner	<i>Elegatis bipinnulata</i>	F	A				
Round scad	<i>Decapterus punctatus</i>	A	A,J	A	A	A	
Yellow jack	<i>Caranx bartholomaei</i>	S	J				
Lutjanidae							
Gray snapper	<i>Lutjanus griseus</i>	M	A	M	A	M	
Lane snapper	<i>Lutjanus synagris</i>	M	A	M	A,J	M	
Yellowtail snapper	<i>Ocyurus chrysurus</i>	F	A			F	
Haemulidae							
Black margate	<i>Anisotremus surinamensis</i>	F	A	M	A	F	
Pigfish	<i>Orthopristis chrysoptera</i>	F	A	A	A		
Porkfish	<i>Anisotremus virginicus</i>	F	A	A	A,J	M	
Tomtate	<i>Haemulon aurolineatum</i>	A	A,J	A	A,J	A	
White grunt	<i>Haemulon plumieri</i>	F	A				
Sparidae							
Pinfish	<i>Lagodon rhomboides</i>	F	A				
Sheepshead	<i>Archosargus probatocephalus</i>	M	A	M	A	F	
Sheepshead porgy	<i>Calamus penna</i>	M	A	F	A	F	
Sciaenidae							
Cubbyu	<i>Equetus umbrosus</i>	A	A,J	F	A,J	M	
Ephippidae							
Atlantic spadefish	<i>Chaetodipterus faber</i>	F	A	M	A		
Chaetodontidae							
Reef butterflyfish	<i>Chaetodon sedentarius</i>	F	A	F	A	F	
Spotfin butterflyfish	<i>Chaetodon ocellatus</i>	F	A				
Pomacanthidae							
Blue angelfish	<i>Holocanthus bermudensis</i>	S	A	F	A		
French angelfish	<i>Pomacanthus paru</i>	S	A	S	A		

Family/ Common Name	Species	2009		2008		2007	
		Abundance	Size	Abundance	Size	Abundance	Size
Gray angelfish	<i>Pomacanthus arcuatus</i>			S	A		
Pomacentridae							
Beaugregory	<i>Pomacentrus leucostictus</i>	M	A,J	F	A,J	F	
Bicolor damselfish	<i>Pomacentrus partitus</i>					F	
Sergeant major	<i>Abudefduf saxatilis</i>			F	A	F	
Yellowtail reeffish	<i>Chromis enchrysurus</i>	M	A,J	M	J		
Labridae							
Painted wrasse	<i>Halichoeres caudalis</i>	S	A				
Slippery dick	<i>Halichoeres bivittatus</i>	M	A,J	A	A,J	M	
Spanish hogfish	<i>Bodianus rufus</i>	F	A	S	A	F	
Sphyraenidae							
Great barracuda	<i>Sphyraena barracuda</i>	S	A				
Guaguanche	<i>Sphyraena guachancho</i>	M	J				
Clinidae							
Hairy blenny	<i>Labrisomus nuchipinnus</i>	F	A	M	A	F	
Acanthuridae							
Blue tang	<i>Acanthurus coeruleus</i>					S	
Doctorfish	<i>Acanthurus chirurgus</i>	F	A	F	A	F	
Scorpaenidae							
Spotted scorpionfish	<i>Scorpaena plumeiri</i>	F	A				
Balistidae							
Gray triggerfish	<i>Balistes caprisus</i>					F	
Tetraodontidae							
Bandtail puffer	<i>Sphoeroides spengleri</i>	F	A	M	A,J	F	
Sharpnose puffer	<i>Canthigaster rostrata</i>	F	A	F	A		
Diodontidae							
Porcupine fish	<i>Diodon hystrix</i>	S	A				
	Total	47		35		31	

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 8. PCL Shallow Artificial Reef fish census.

3.4 PCL Deep Reef

- Location: Sirotkin Reef
- Materials: Concrete, steel
- Maximum Depth: 120 feet
- Reef High Point: 104 feet
- Year Created: 2006
- Monitoring Date: 12/20/2008, 10/2/2009
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3.4.1 History of the PCL Deep Artificial Reef

In October 2006, seven barge loads of concrete and steel materials totaling approximately 3,900 tons were deployed in 120 feet of water within the Sirotkin reef site. These materials came from the decommissioned Ernest Lyons draw bridge that spanned the Indian River Lagoon between Sewalls Point and Hutchinson Island and included some of the largest concrete and steel structural members removed from the old bridge. The new reef was named for the construction