

5.6 FRANCES LANGFORD MEMORIAL REEF

- Location: Sirotkin Reef
- Materials: Concrete & Steel
- Maximum Depth: 156 feet
- Minimum Depth: 154 feet
- Reef High Point: 131 feet
- Year Created: 2005
- 2009 Monitoring Date: 10/10/2009
- 2013 Monitoring Date: 08/28/2013
- Total Cost: \$6,832 (FDOT and Martin County)

5.6.1 History of the Frances Langford Memorial Reef

The Frank Langford drawbridge spanned the Indian River Lagoon at Jensen Beach before it was dismantled, and the materials secured for deployment as an artificial reef. According to County records, in the winter of 2005, eight (8) barge loads of concrete and steel drawbridge materials (ranging from 350 to 600 tons each according to the MPR's) were deployed to create the Frances Langford Memorial Reef in approximately 150 feet of water within the Sirotkin Reef site.

5.6.2 Structural Summary

This artificial reef is comprised of approximately 4,000 tons of large concrete and steel bridge components. The footprint is long and irregular, scattered over a north to south axis and varies considerably in both width and maximum relief along its length. Many components of the old bridge are still visible, including the bridge tender's house, concrete support columns and sections of steel roadway grating. Some of these larger components rise 20 feet above the seafloor. The reef components are stable, despite random and haphazard stacking that occurred during deployment. Reef settling is likely a "minor" factor at this point.

The maximum-recorded depth at this artificial reef site is now 156 feet, with a reef top depth of 131ft. In comparing our 2013 structural data with past monitoring efforts (by others), the site has experienced some minor scouring. Tide could be a minor factor for this discrepancy; however, it is likely that scouring has occurred. Regardless, the site appeared stable; no loose or isolated pieces were encountered or observed. Figure 23 shows a chart with the location of the Frances Langford Memorial Reef, while the recorded depth profiles are shown in Table 23.

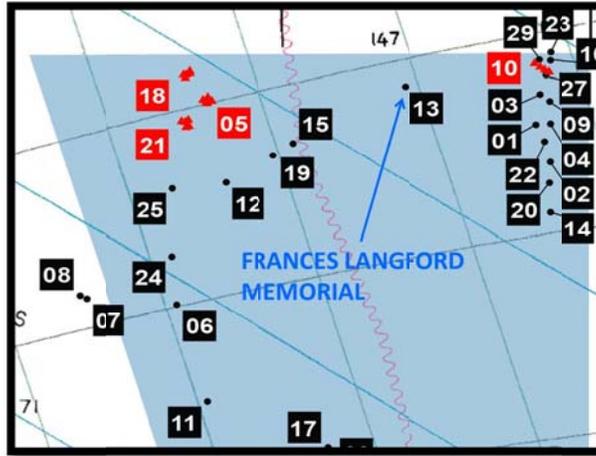


Figure 23. Chart of Frances Langford Memorial Reef, Sirotkin Site

Table 23. Summary of Frances Langford Depth Measurements.

Direction	2013 Depth (ft)
North	154
East	156
South	155
West	156
Reef top Depth: 131ft	

5.6.3 Biological Survey Results

Since 2007, fish surveys have yielded a more or less stable, consistent trend in species diversity. Seabass, jacks, and yellowtails are the best represented families with six and five species respectively during this survey. Typical to previous monitoring efforts, vast schools of round scad were observed around and above the reef crest, while some formed tight schools around individual goliath grouper, possibly protecting them from the faster predatory jacks and other large fishes. Most other fish species were more closely associated with the reef structure, seeking shelter within cavities when approached by the divers. Numerous small colonies of *Oculina* coral were also observed growing on the reef surface. Refer to Figure 24 and Figure 25 for site photos of the in-water dive of the reef site. Table 23 presents the fish species observed during 2013.



Figure 24. Frances Langford Reef, 2013.



Figure 25. Frances Langford Reef, 2013, recorded depth of -152ft.

Table 24. Observed Fish Species, Frances Langford, 2013

Family/Common Name	Species	2013	
		Abundance	Size
Serranidae			
Bank seabass	<i>Centropristis ocyurus</i>	M	A,J
Belted sandfish	<i>Serranus subligarius</i>	M	A
Black seabass	<i>Centropristis striata</i>	A	A,J
Goliath grouper	<i>Epinephelus itajara</i>	F	A
Grammistidae			
Whitespotted soapfish	<i>Rypticus maculatus</i>	F	A
Carangidae			
Almaco jack	<i>Seriola rivoliana</i>	F	A
Amberjack	<i>Seriola dumerili</i>	F	A
Blue runner	<i>Caranx chrysos</i>	A	A
Round scad	<i>Decapterus punctatus</i>	A	A
Lutjanidae			
Gray snapper	<i>Lutjanus griseus</i>	F	A
Lane snapper	<i>Lutjanus synagris</i>	F	A
Haemulidae			
Tomtate	<i>Haemulon aurolineatum</i>	A	A,J
Sparidae			
Sheepshead porgy	<i>Calamus penna</i>	F	A
Sciaenidae			
Cubbyu	<i>Equetus umbrosus</i>	F	A
Pomacentridae			
Yellowtail reeffish	<i>Chromis enchrysurus</i>	M	A,J
Total		15	

Abundance Key: S=single, F=few (2-10), M=many (11-100), A=abundant (>100)
 Size Key: A=adult, J=juvenile, A/J=intermediate

5.7 KD SELECT REEF

- Location: Sirotkin Reef
- Materials: Concrete, Steel
- Maximum Depth: 130 feet
- Minimum Depth: 129 feet
- Reef High Point: 117 feet
- Year Created: 2007
- 2009 Monitoring Date: 10/10/2009
- 2013 Monitoring Date: 10/09/2013
- Total Cost: \$23,221.25 (64.5% FWC grant 06112 & 35.5% Martin County)

5.7.1 History of the KD Select Reef

According to County records, this artificial reef was deployed in approximately 124 feet of water in July 2007 along the southern boundary of the Sirotkin Artificial Reef area, with a recorded reef top depth of 113ft. The reef was created using approximately 537 tons of waste concrete recovered from the Martin County landfill and stockpiled until enough material was available to create several artificial reefs at once. Refer to Figure 26 for the Chart Location.

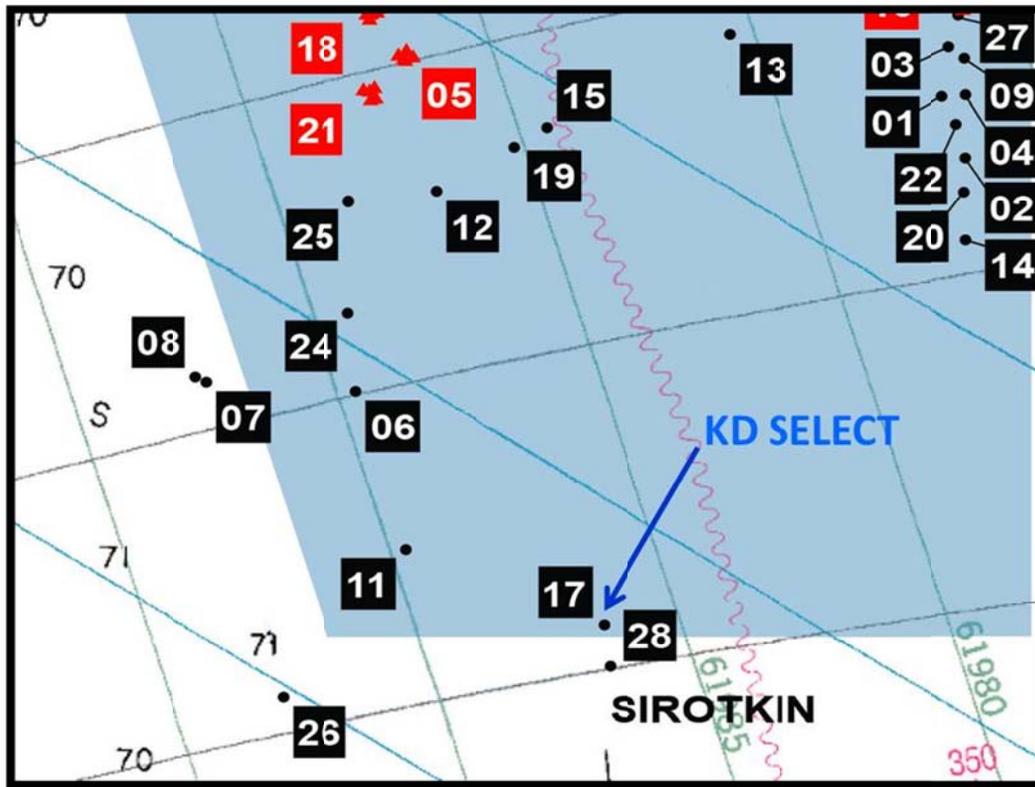


Figure 26. Chart of the Sirotkin Reef site showing the KD Select Reef location.

5.7.2 Structural Summary

The maximum-recorded depth at this artificial reef site is now 130 feet, with a reef top depth of 117ft. In comparing our 2013 structural data with past monitoring efforts (by others), the site appears to have experienced structural changes. Tide could be a minor factor for this discrepancy; however, it is likely that scouring, settlement, and/or shifting (of the crest) has occurred. Regardless, the site appeared stable; no loose or isolated pieces were encountered or observed.

The footprint is basically round and occupies about 0.3 acres of seafloor. The deployment barge was securely moored at two points when the reef materials were dropped and the large concrete components settled in a single pile, although a few pieces settled to the bottom a short distance from the reef pile. Several large culvert sections provide cavernous recesses that are used extensively by large and small fish alike. The seafloor at this site is comprised of a shell/coarse sand mixture and so far appears to be adequate in providing a consolidated base for the heavy concrete and steel pieces, since evidence of scouring is not and has not been significant since monitoring of this site commenced. Refer to Table 25 for the depth measurements.

Table 25. Summary of KD Select Depth Measurements, 2013

Direction	Perimeter Depth (ft)
North	129
East	130
South	130
West	130
Reef top Depth: 117	



Figure 27. KD Select Reef, 2013.

5.7.3 Biological Survey Results

Fish surveys indicate a decrease in species diversity since 2009. Seabasses represented the most numerous species in 2013, although grunts, wrasses and snappers were also common. Typical of the other reef sites, vast schools of adult and juvenile round scad were observed around and above the reef crest. A single nurse shark was documented. Invertebrate biomass on the artificial reef also appeared to have slightly increased since deployment. Most common species included sea urchins, hydroids, tube worms, barnacles, encrusting sponges and sea cucumbers. Fire worms, sea anemones and various crabs were also observed. Table 26 presents the fish species observed during 2013.

Table 26. Summary of Fish Census, KD Select Reef 2013

Family/Common Name	Species	2013	
		Abundance	Size
Elasmobranchs			
Nurse shark	<i>Ginglymostoma cirratum</i>	S	A
Serranidae			
Bank seabass	<i>Centropristis ocyurus</i>	M	A,J
Belted sandfish	<i>Serranus subligarius</i>	M	A
Black seabass	<i>Centropristis striata</i>	A	A,J
Goliath grouper	<i>Epinephelus itajara</i>	F	A
Sand perch	<i>Diplectrum formosum</i>	M	A,J
Grammistidae			
Whitespotted soapfish	<i>Rypticus maculatus</i>	F	A
Carangidae			
Blue runner	<i>Caranx chrysos</i>	A	A
Round scad	<i>Decapterus punctatus</i>	A	A
Lutjanidae			
Gray snapper	<i>Lutjanus griseus</i>	F	A
Lane snapper	<i>Lutjanus synagris</i>	M	A,J
Red snapper	<i>Lutjanus campechanus</i>	F	A,J
Yellowtail snapper	<i>Ocyurus chrysurus</i>	F	A,J
Haemulidae			
Tomtate	<i>Haemulon aurolineatum</i>	A	A,J
Sparidae			
Sheepshead porgy	<i>Calamus penna</i>	M	A
Sciaenidae			
Cubbyu	<i>Equetus umbrosus</i>	F	A
Pomacentridae			
Yellowtail reeffish	<i>Chromis enchrysurus</i>	M	A,J
Labridae			
Pearly razorfish	<i>Xyrichtys novacula</i>	F	A
Total		18	

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

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