

Flower Garden Banks National Marine Sanctuary
2009 Coral Spawning Cruise
August 11–14, 2009

Overview: FGBNMS Research Team conducted a cruise to observe the predicted annual coral spawning event at the FGBNMS. The team was joined by NOS Ocean Media Center videographers, and University of Texas and Texas A&M-Galveston researchers, who were also on board to study aspects of the coral spawn. Specifically, the researchers are studying the uptake of zooxanthellae by larval corals and also plankton variation comparisons between spawning and non-spawning periods. Spawning was moderate, but occurred somewhat as predicted. A second spawn was predicted to occur in September *. The remains of a recruitment rack that was part of a permitted experiment, but destroyed by hurricanes, was consolidated for future recovery.

Image credit – all images: G.P. Schmahl/FGBNMS

Research Team:

John Brooks (NOS Ocean Media Center)
Sarah Davies (University of Texas - researcher)
Ryan Eckert (FGBNMS – Research Intern – deck/dive support)
John Embesi (FGBNMS – Research Specialist - dive support)
Tracy Hamburger (FGBNMS – Operations Officer – dive support)
Emma Hickerson (FGBNMS – Research Coordinator – PI, dive support)
Paul Hillman (NOS Ocean Media Center)
Courtney Horne (TAMU-Galveston – researcher)
Eli Meyer (University of Texas – researcher)
Marissa Nuttall (FGBNMS – Research Assistant – dive support)
G.P. Schmahl (FGBNMS – Sanctuary Superintendent – dive support)

Crew:

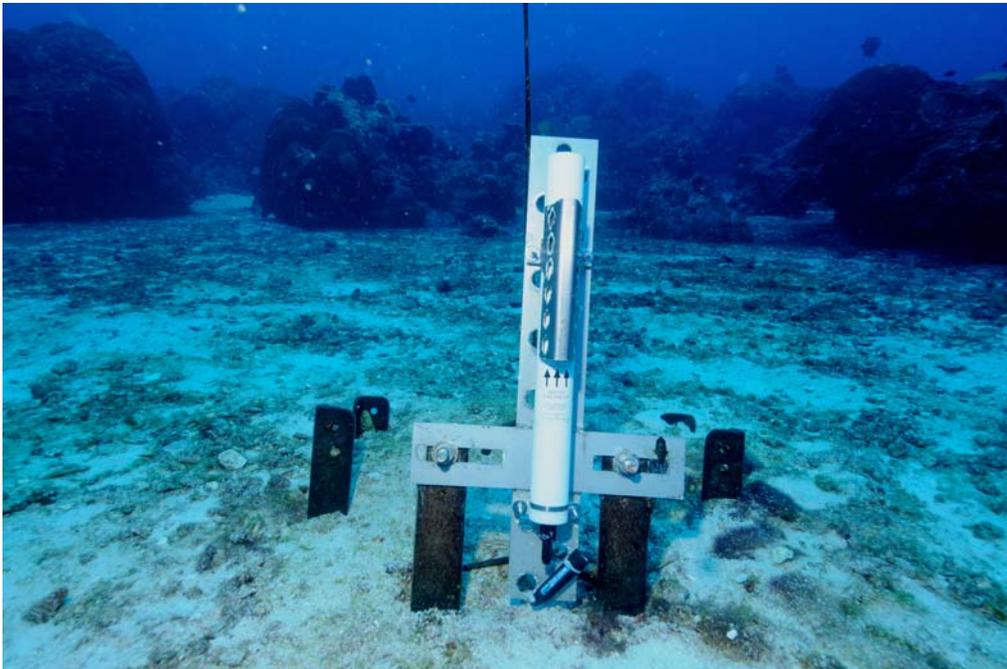
Capt. Chuck Curry – Captain
Ward “Rocky” Watson – Mate
Jack Gray - deckhand

The R/V MANTA was loaded and left the dock on Pelican Island in Galveston at around midnight on August 10, 2009. We arrived at around 6:30am at East Flower Garden Bank, buoy #5, on August 11th.

The first morning dives were spent retrieving, downloading, and redeploying the Seabird instrument and acoustic receiver – the Seabird collects temperature and salinity measurements, and the acoustic receiver tracks animals tagged with acoustic receivers.



John Brooks and Paul Hillman film John Embesi and Emma Hickerson as they swim the Seabird water quality instrument back to the instrument rack at East Flower Garden Bank.



Seabird water quality instrument mounted on rack in sand at East Flower Garden Bank. This instrument measures temperature and salinity. The instrument rack has been partially buried by sand shifting as a result of Hurricanes Rita (2005) and Ike (2009).



Marissa Nuttall makes some notes on her wrist-mounted slate after deploying the acoustic receiver onto the receiver mooring at East Flower Garden Bank.

Mantas were the main attraction for the morning, and remained so for the duration of the dives at the East Bank – at least six individuals were documented over the course of the week. Two of them were re-sightings, but four of them were new animals for our catalog.

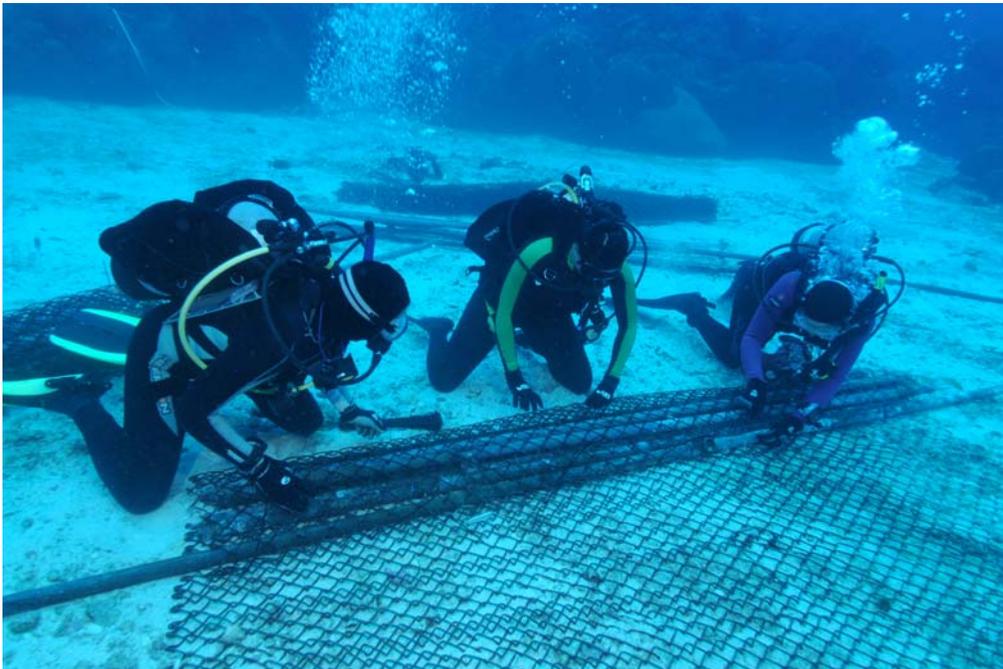


Two of the manta rays sighted at East Flower Garden Bank.



Two additional mantas sighted at East Flower Garden Bank

We also worked with Sarah to roll up what is left of her recruitment rack – in preparation for a future removal. Sarah had put out the rack to look at coral recruitment, but unfortunately nature had other plans for the sand patch – the 2008 hurricane season did some major rearranging! There was no current, visibility was great – about 100’, and temperature was 84F.



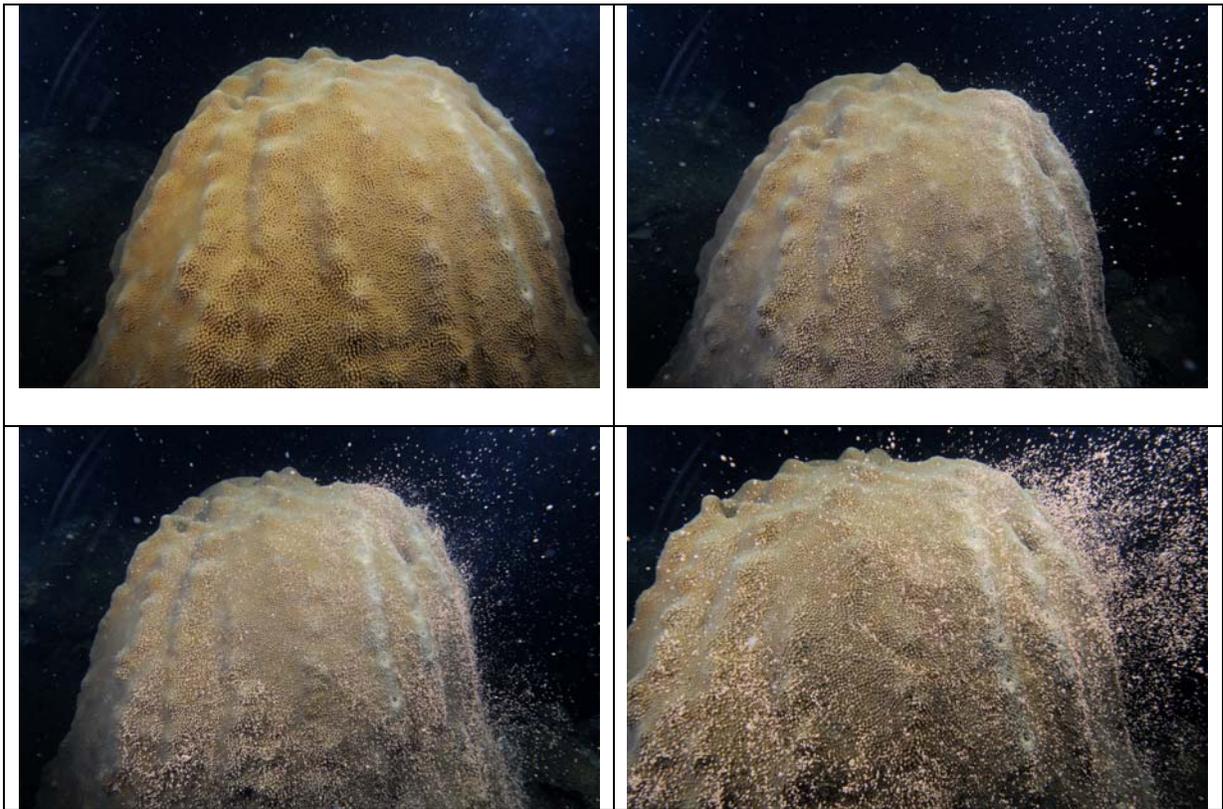
L-R Marissa Nuttall, Sarah Davies, and Emma Hickerson roll metal pipes up in chain link fence to bundle for future recovery.

This year’s coral spawning prediction was a little difficult due to the fact that the full moon was August 6th 055GMT, which, local time, was August 5th at 7:55pm CDT. This is relatively close to midnight, so, the question was, whether to count the 5th as the first night after the full moon, or to count the 6th as the first night. For planning purposes, we went for the earlier of the two, but turns out, the corals went off based on August 6th being counted as the first night after the full moon. If that’s not confusing enough, the full moon fell quite early in the month, so we thought there would be a good chance that

the corals would spawn again in September – we gave it a 50/50 chance.* We make this prediction generally because of the peaking out of the water temperature in the late summer. The corals at the FGB's spawn 7–10 days after the August full moon, and sometimes, 7-10 days after the September full moon. Sometimes there might be two full moons in August (blue moon), which means we will probably get two spawning events that year.

In general, the spawning event in August was decent – not as prolific as we've seen in the past, but well worth the trip out. The M/V FLING was offshore with a boatload of recreational divers and reported their observations to us. We had quite a few of their divers come over for a tour of the R/V MANTA. The corals spawned at the predicted times and on the right days, however, we didn't see other spawning species that we typically expect, i.e. brittle stars (*Ophioderma squamisissimum* and *O. rubicundum*) and Christmas tree worms (*Spirobranchus giganteus*), although the Fling reported the Christmas tree worms going off on the night before we arrived. We didn't see the mass sponge spawning of the barrel sponges (*Xestospongia muta*) either.

What we did see spawn, included the star corals: *Montastraea cavernosa*, *M. franksi*, *M. faveolata*, *Stephanocoenia intersepta*, and the brain coral, *Diploria strigosa*.



Sequence of Montastraea faveolata spawning

We headed over to the West Flower Garden Bank to maintain the Seabird water quality instrument and the acoustic receiver over there. The instrument rack is quite buried and we'll have to get out there and dig it out before too long.



John Embesi and Emma Hickerson digging out the Seabird instrument at West Flower Garden Bank for recovery.

Unfortunately it seems that the one and only WFGB staghorn coral (*Acropora palmata*) is succumbing to a disease. *Add image.* Interestingly, on this bank, we had a thermocline at about 65ft – 84F above, 80F below. We were concerned at the lack of fish on the first couple of dives. While Marissa and Emma were redeploying the Seabird instrument, and very curious black grouper came and sat at the tip of Emma's fins to watch our progress. He stayed there long enough for Emma to turn around and get face to face. After attaching the instrument, Emma and Marissa swam the sand flat to make some observations. There were at least 5 large queen conch (*Strombus gigas*) in the flat, and a 7ft male nurse shark was relaxing on top of on the large *Siderastrea* colonies on the north side of the flat. The *Xestospongia* sponges that were infected with disease last summer, appear to be recovering.



Black grouper making friends with Emma.

After conducting our work at the West Bank, we returned to the East Bank to continue our spawning observations and research.

The following is the official report submitted to NOAA's Coral Listserve:

August 11, 2009

2125-2140 *Montastraea cavernosa* male, 2 colonies
2125-2140 *M. cavernosa* female, 1 colony
2150-2155 *M. cavernosa* 2 colonies, female colony 1
2205 *M. franksi*, 1 colony

August 12, 2009

2133-2218 *M. franksi*, 34 colonies
2149 *Diploria strigosa*, 1 colony

August 13, 2009

2110-2135 *M. cavernosa* male, 8 colonies
+2125-2210+ *M. franksi*, 59 colonies
+2125-2205 *D. strigosa*, 31 colonies
2250 *D. strigosa*, 1 colony
2240 *Stephanocoenia intersepta* male, 1 colony
2245-2330+ *M. faveolata*, 20 colonies

Other spawning observations

August 10, 2009

2125-2140 Christmas tree worms (*Spirobranchus giganteus*)

August 11, 2009
Approx. 0930 Barrel sponge (*Xestospongia muta*)
2125-2140 Christmas tree worms, 3 male individuals

Observations submitted by FGBNMS Coral Spawning Research Team:
Emma Hickerson
G.P. Schmahl
John Embesi
Marissa Nuttall
Sarah Davies
Eli Meyer
Neal Baltz

On August 14th we spent our time at Stetson Bank- retrieving, downloading, and redeploying the Seabird water quality instrument and acoustic receiver. G.P and Emma came across two very large, newly molted spiny lobster casings, several sharks, and two flying gurnards – that was the first record of these guys in the Sanctuary!

*The FGBNMS Research Team was unable to go back out during the September spawning prediction dates, however, the M/V FLING made it out with a group of recreational divers, and report that the spawn did indeed occur, in similar quantities as the August spawn.

2010 coral spawning predictions for the FGBNMS:

Next year the August full moon falls on August 24th at 1705 GMT, which is 12:05 CDT locally, so I'm going to count that as the first day after the full moon. This means that the prediction for the spawn is August 30th (7 days after the full moon) to September 2 (10 days after the full moon).

Below is a copy of a table we use to help us – this has been compiled over several years of coral spawning observations at the Flower Garden Banks NMS.

There is no guarantee that our predictions will be right. The only thing I know for sure is that Nature is driving this bus (or submarine) – we are just along for the ride.

SPECIES	6TH NAFM	7TH NAFM	8TH NAFM	9TH NAFM	10TH NAFM
<i>Montastraea cavernosa</i> female	1950-2115	2059-2138	2040-2200	2104-2230	
<i>Montastraea cavernosa</i> male	2100>	1830-2127	<2030-2145	2140-2200	
<i>Montastraea franksi</i>	2145-2210	2100-2245	2030-2245	2100-2250	
<i>Diploria strigosa</i>		2100-2215	1935-2230	1920-2230>	
<i>Stephanocoenia interseptam</i> male		2250	2208-2300	2200-2240	2215-2245
<i>Stephanocoenia interseptam</i> female		2200-2220	2218-2300	2200-2300	2215-2245
<i>Montastraea faveolata</i>		2221-2320	2113-2330	2300-5660	
<i>Colpophyllia natans</i>				2020-2132	2030-2110
<i>Montastraea annularis</i>		2223-2256	2246		2230
<i>Xestospongia muta</i> female	0850-0950	0840 f		0830-0950	
<i>Xestospongia muta</i> male	0915 m	0815-0820	0840 m	0830-0900	
encrusting sponges				0915 smokers	
<i>Ophioderma rubicundum</i> male			2030-2150	x	
<i>Ophioderma rubicundum</i> female			2030-2150	2100-2220	
<i>Ophioderma squamosissimum</i> female		x	2045	2030-2130	
<i>Ophioderma squamosissimum</i> male			2045	2030-2130	
***weight of color reflects # of years spawning has been seen as well as amount of spawning					



Table 1. Colors convey least (0) to most (6) confidence in prediction that spawning will occur in these blocks of time. This has been determined from a combination of levels of spawning and the number of times the observations have been made, from 2000 to 2006, which includes nine separate spawning events.