Flower Garden Banks National Marine Sanctuary

Research Summary

2007

Prepared by
Emma L. Hickerson
January 2008

A. OVERVIEW

The purpose of this document is to report the activities of the Flower Garden Banks Research Team during 2007. The team included Emma L. Hickerson (Research Coordinator) and Doug Weaver (GIS specialist).

B. SUMMARY

The FGBNMS research team was involved in 10 research cruises in 2007 field season, at a value of approximately $169,350 for the shiptime, $77,050 of which came directly out of FGBNMS FY07 budget. In addition, Dr. Bob Ballard brought the NR1 nuclear submarine and ARGUS towsled to the Sanctuary in March for the Secrets of the Gulf expedition (at a value of approximately $1M), and then returned in October with the JASON Project. The FGBNMS benefited from 5 days of Nancy Foster shiptime, 3 of which were operational days. The Sanctuary responded to a ciguatera poisoning event, which led to the EPA releasing an advisory to seafood processors targeting fish caught in and around the FGBNMS. A pool of 60 sanctuary personnel, scientists, and volunteer divers conducted approximately 971 SCUBA dives during the 2007 field season. Activities included biological surveys and collection, equipment maintenance, and image collection. Eleven sanctuary permits were processed, and an additional 12 were ongoing.

C. CRUISES ($ amt. represents approximate shiptime value)

Winter Research Cruise
March 6-9, 2007 ($15,400)

The annual Flower Garden Banks NMS winter research cruise was conducted the week of March 4th. The cruise also supported the NR-1 Expedition that was underway in the vicinity of the FGBNMS.

Dr. Andy Bruckner, NOAA Fisheries Office of Protected Resources, conducted disease and parrotfish predation surveys. Dr. Bob Jonas, Geoff Cook, and Staci Lewis, of George Mason University, also conducted coral disease surveys. A plague-like disease was documented for the third consecutive winter period, although the outbreak does not appear to be as widespread as the winter 2006 event. We hope to continue monitoring the outbreak as water temperature increases over the coming months. It does appear that there are small losses of coral tissue as a result of the last two seasonal events, which is a major cause of concern if the events continue to occur on an annual basis.

Dr. Craig Burnside of Bainbridge College conducted queen conch surveys. Over a dozen previously tagged conch were found, and Dr. Burnside tagged an additional dozen animals. One snail was originally tagged in October 2005. Dr. Mary Wicksten, Texas A&M University, continues to survey the invertebrate populations, and cleaning station behavior.

Dr. Rachel Graham of Wildlife Conservation Society, is conducting a manta ray acoustic tagging study. Last year six animals were tagged with acoustic pingers. Acoustic receivers are deployed on the East and West Flower Garden Banks, as well as Stetson Bank. Dr. Graham downloaded all three receivers. For the first time, she has documented use of all three banks within the Sanctuary by one animal. An animal that was tagged at Stetson Bank traveled over 40 miles to the East Flower Garden Bank, and then back another 12 miles to West Flower Garden Bank. Another animal tagged at East Bank traveled across to West Bank, and then back to East Bank. A third animal showed up at both the East and West Banks. This is the first definitive connectivity of the three Sanctuary resources by large pelagic animals. The FGBNMS is also working with Dr. Graham to catalog the local population of manta rays, using photographs and video collected throughout the years at the Sanctuary. This information will be made available to the public via the internet, as well as to divers visiting the Sanctuary.

Three participants from the FGBNMS Long Term Monitoring Contracting Team, PBS&J, successfully changed out the YSI water quality instruments on all three banks. Highlights from the divers included sighting of a 10-12' tiger shark, and multiple smaller tiger sharks, scalloped hammerhead sharks, manta rays, schooling mobula and spotted eagle rays, loggerhead sea turtles, huge schools of Spanish and king mackerel, dusky sharks, and the Sanctuary's second ever, photodocumention of a Nassau grouper!

Research Coordinator, Emma Hickerson, and Dr. Graham, spent a day on board the SSV Carolyn Chouest to participate in satellite broadcasts, and assist in the collection of data during the ARGUS towsled dives.

Secrets of the Gulf – NR1/ARGUS
March 2-10, 2007 ($1M – all encompassing value)

A ground-breaking expedition called "Secrets of the Gulf", and featuring more than a dozen partners, wrapped up on March 10, 2007 with the return of the *SSV Carolyn Chouest* and the U.S. Navy's nuclear powered research submarine NR-1 to Galveston. The expedition built upon previous work coordinated by the sanctuary and included several different, yet complementary, missions. Sanctuary researchers explored the deeper water low-relief ridges and scarps that connect the various banks along the continental shelf in the northwestern Gulf of Mexico, including two of the three banks that comprise the Flower Garden Banks National Marine Sanctuary. The mission documented plants and animals that utilize these 'hidden highways' between the banks to determine how the sanctuary may be affected by events that occur outside its boundaries. University of Rhode Island researchers, led by Dr. Robert Ballard, explored the same areas for evidence of ancient shorelines and the people who may have lived there. "Immersion Presents", a private organization, aired 5 broadcasts of the mission each day into classrooms and informal settings such as Boys and Girls Clubs and public aquaria. Meanwhile, in the shallower coral reef portion of the sanctuary, researchers aboard the charter vessel *M/V Spree* investigated connections on the coral reef cap, including manta ray movements, conch populations, and parrot fish predation of corals.

NW GOM Post-Hurricane Cruise I
April 29 – May 2, 2007 ($11,550)

A post-hurricane cruise was conducted at several banks in the Northwestern Gulf of Mexico by the Flower Garden Banks NMS, Minerals Management Service, and contractors, PBS&J and Geo-Marine, Inc., to determine whether hurricane impacts occurred during the passage of Hurricane Rita in 2005. SCUBA surveys were conducted on Sonnier, Geyer, and Bright Banks. Impacts were most severe at Sonnier Bank, although the development of a visual timeline will be necessary to attribute impacts to hurricanes or anchoring and fishing activities over time. Surveys will be conducted at deeper depths, and additional locations by remotely operated vehicle (ROV) later in the month. Biological sightings of note included scalloped hammerhead sharks, sandbar sharks, Caribbean reef sharks, nurse sharks, a loggerhead sea turtle, and a school of over 100 Mobulid rays. Orange cup coral (*Tubastrea coccinea*), an invasive species, was documented at both Sonnier and Geyer Banks.

Post-Hurricane Cruise II
May 20 – 23, 2007 ($11,550)

G.P. Schmahl participated in the second phase of a research project May 20-23 to investigate the status of reefs and banks impacted by hurricanes Katrina and Rita in 2005.

The initial cruise was conducted April 29-May 2. This research project was funded primarily by the Mineral Management Service (MMS) with contract ship time furnished by the Flower Garden Banks NMS. The environmental consulting firm PBS&J was contracted by MMS to conduct the study, which visited several topographic features east of the Flower Garden Banks NMS (including Sonnier, Geyer and McGrail Banks). This portion of the project utilized an ROV to collect benthic transect data in deeper waters to assess impacts and recovery of hurricane damage. The ROV, a "Seabotix LBV300" was purchased for the project by MMS, and may be available for future use by the sanctuary. No major signs of hurricane impacts were observed at Geyer or McGrail Banks, but significant physical injury was documented at Sonnier Bank. While it is probable that much of this injury was caused by the hurricanes, there is some evidence of other potential impacts, such as anchor damage. All of the subject banks have been suggested by the public as potential expansion areas for the FGBNMS in the ongoing management plan review.

FGBNMS Long Term Monitoring Cruise
June 11-15, 2007 ($19,250)

The annual Flower Garden Banks National Marine Sanctuary (FGBNMS) Long Term Monitoring cruise was successfully conducted last week. The monitoring project is co-funded by the FGBNMS and Minerals Management Service and represents annual data collection since 1988. Contractors, PBS&J and Geo-Marine, Inc., conducted the data collection at the study sites on the reef caps of the East and West Flower Garden Banks. Conditions were excellent, with calm seas, light or no current, and high visibility encountered all week. Aside from the monitoring data collection, highlights included manta ray, mobula, spotted eagle ray, and tiger shark sightings, and the documentation of mass sponge spawning by two sponge species: *Agelas clathrodes*, and *Xestospongia muta*. This was the first documentation of *Agelas* spawning at the FGBNMS.

Stetson Bank Long Term Monitoring Cruise
July 23-25, 2007 ($11,550)

The annual Stetson Bank Long Term Monitoring data collection cruise was conducted last week. This is the seventeenth Stetson Bank LTM cruise. Seventeen Sanctuary staff and volunteers located and photographed 45 repetitive photostations. Several video surveys were also conducted. Other observations included a school of approximately 30 silky sharks, and a very curious 8' sandbar shark, a loggerhead sea turtle and even a sea horse! In addition to the monitoring tasks, lobster, spiny sea urchin, conch and other invertebrate surveys were conducted, and a photography team was on hand to record events. Several observations of new sanctuary species records were made, including mustache jawfish, a sea anemone (*Calliactis tricolor*) attached to a decorator crab, and a flower coral, *Scolymia* sp. A rare sighting, a checkered blenny was also photographed. Volunteers included divers from Texas Parks and Wildlife, Texas A&M - Galveston, Texas A&M - College Station, Azure Photography, and Moody Gardens.

Summer Research Cruise
August 4-8, 2007 ($19,250)

Investigations included: lobster sampling for genetics (Florida Fish and Wildlife), coral sampling for coral stress response (TAMU-CC), coral sampling for coral reproduction studies (University of Calgary), coral spawning observations (FGBNMS and University of Calgary), acoustic tracking of manta rays (FGBNMS and Wildlife Conservation Society), parrotfish predation surveys (NOAA Fisheries), fish surveys (REEF), 360 degree photo imagery of the West FGB sand flat (TAMU-CC), photo-documentation (Azure Photography). The lobsters sampled were impressive sizes, with a maximum carapace size of 180mm. The animals were sampled at depth. A small amount of coral spawning was witnessed, as predicted. We expect the "big" spawning event to occur 7-10 days after the full moon in September. This prediction was based on the moon phases, and sea temperatures during the wintertime. Downloading of the acoustic receivers revealed exciting movements by the tagged manta rays. A second manta ray was documented moving from the East Flower Garden Bank, to the West FGB twelve miles away, and back to the EFGB. A manta tagged at Stetson Bank moved over 40 miles to the EFGB, then over to the WFGB, then all the way back to Stetson Bank over an 11 month period. It is unknown where else the animals have been spending their time, however, funding is being sought to expand the network of acoustic receivers. REEF conducted 100 surveys during the course of the cruise. A fresh water event resulting from riverine influences that are picked up by eddies in the loop current has been reported, and measured, at the East Flower Garden Bank. This has been persistent for at least the past three weeks, based on observations at the site. Water at the surface was measured last week at 31.7ppt, compared to about 35ppt normal salinity.

Coral Spawning Cruise
September 3-7, 2007 ($19,250)

The Flower Garden Banks National Marine Sanctuary conducted its annual Coral Spawning research cruise September 3-7, 2007. In addition to observing the annual mass coral spawning in an effort to better understand species spawning times and proliferation, research coordinator Emma Hickerson coordinated several other research efforts as well. Peter Vize, Dan Hilton and Sarah Davies from the University of Calgary continued work on coral reproduction studies at East Flower Garden Bank including how coral settlement is affected by the presence or absence of herbivores and trying to determine what chemical triggers instigate coral spawning. They were assisted by Chris Jarabek and Mike Nickell. Martha Robbart and Jeremy Marshal from PBS&J rephotographed several monitoring stations at West Flower Garden Bank as part of their long-term monitoring contract for the sanctuary. Misha Matz and John Williams from the University of Texas spent time examining corals and other sanctuary invertebrates for fluorescence as part of a study to determine why coral reefs are colorful and how this is accomplished. Craig Burnside from Bainbridge College continued to survey all three banks for queen conch and tagged 34 animals as part of his study on the population ecology of these invertebrates within the sanctuary. Rod and Jacqui Stanley spent time photographing and videotaping the marine life of the sanctuary. Education specialist

Kelly Drinnen assisted with the conch surveys and prepared an online cruise report for the sanctuary web site.

Nancy Foster Cruise
September 8-13, 2007 ($50,000)

The FGBNMS Research Team joined the NCCOS Biogeography Team on board the NOAA Ship Nancy Foster to conduct year two data collection for a joint habitat characterization project. The research cruise, which was scheduled for September 8th - 15th, 2007, was cut short due to the formation of TD/TS/Hurricane Humberto, which formed in the NW Gulf of Mexico, and moved onto land about 30 miles east of Galveston. During the three days of operation, ten divers conducted benthic and fish surveys at 32 locations around the coral cap of the East Flower Garden Bank. In addition to the SCUBA ops, high-resolution multibeam bathymetry was collected in previously unmapped areas northwest of the Sanctuary boundaries. In total, 94 square kilometers of bathymetry were collected at depths ranging from 48 meters to 108 meters (i.e., 158 feet to 354 feet). To map this area, the NOAA ship Nancy Foster traveled 462 kilometers. Several prominent ridges and depressions were discovered approximately 18 kilometers northwest of the West Flower Garden Bank Sanctuary boundary. These features may prove to be important habitat for fish and other marine organisms. Daily logs and background essays were uploaded to http://sanctuaries.noaa.gov/missions/2007nancy_foster/welcome.html.

Jason Project
October 12-14, 2007 ($11,550)

Dr. Robert Ballard and a team of student and teacher argonauts visited the sanctuary Oct 12-14, 2007 to learn about coral reefs and sanctuary research efforts. While in the sanctuary they visited the oil production platform High Island A389A, spoke with the CEO and COO of the company operating the platform, and used an ROV to see the artificial reef environment beneath the platform. The Argonauts also snorkeled at East and West Flower Garden Banks, conducted fish counts and used the ROV to get a closer look at the main reef habitat. G.P. Schmahl and Kelly Drinnen accompanied the group on their trip to the sanctuary to provide more in depth information about the sanctuary.

D. CANCELLED AND/OR POSTPONED CRUISES:

March 5, 2007 Winter Research Cruise shortened by one day due to weather

April 30, May 3-5 NWGOM Post-Hurricane Cruise shortened by 5 days due to weather

June 18-21 Stetson Bank LTM – postponed due to weather

September 13-15 Nancy Foster Cruise shortened due to Hurricane Humberto – ops stopped on the 12th.

E. CONFERENCES, MEETINGS, PRESENTATIONS, TRAINING, ETC.

1. January 20, 2007. Ocean Discovery Day, Galveston, TX. Included Research Presentation. Hickerson
2. February 5-7. 2007. Towed Underwater Vehicle Workshop, Monterey Bay, CA. Weaver.
3. February 26-27, 2007. Invasive Species Workshop, Corpus Christi, TX. Hickerson.
4. May 18, 2007. Patton Elementary School 5th Graders, Austin, TX. FGBNMS Presentation. Hickerson
5. May 18, 2007. Laurel Mountain Elementary School Ecology Club. FGBNMS Presentation. Austin, TX.
6. May 21, 2007. Austin City Council, Alternatives to plastic bags meeting. Hickerson.
7. June 2 – 15, 2007. Remote Sensing, GIS Applications Course. Ithaca, NY. Weaver.
8. July 18, 2007. FGBNMS Fishing Impacts Workshop. Galveston, TX.
9. July 19, 2007. Boundary Expansion Workshop. Galveston, TX.
10. July 16, 2007. Environmental Defense. Austin, TX
11. October 1, 2007. Presentation to USCG. Galveston, TX.
12. November 9, 2007. Laurel Mountain Elementary School Ecology Club. FGBNMS presentation. Austin, TX.

F. PUBLICATIONS:

DeBose, J.L. and G.A. Nevitt. 2007. Investigating the association between pelagic fish and dimethylsulfoniopropionate in a natural coral reef system. Marine and Freshwater Research, 200, 58, 720-724.
http://www.publish.csiro.au/nid/126/paper/MF06195.htm.

Gentry, D.K., Sosdian, S., Grossman, E.L., Rosenthal, Y., Hicks, D.W., Lear, C., 2007. Seasonal isotope and trace-metal profiles of serially-sampled Conus gastropods: Proxies for paleoenvironmental change. Palaios (accepted pending revision).

Precht WF, Aronson RB, Deslarzes KJP, Robbart ML, Murdoch TJT, Gelber A, Evans D, Gearheart B, Zimmer B (in press) Long-term monitoring at the East and West Flower Garden Banks, 2004-2005; Final Report. U.S. Dept. of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, New Orleans, Louisiana. OCS Study MMS ???

Weaver, D.C. and L.A. Rocha. 2007. A New Species of *Halichoeres* (Teleostei: Labridae) from the Western Gulf of Mexico. Copeia, 2007, (4), pp. 298-807.

Weaver, D.C., E.L. Hickerson, and G.P. Schmahl. 2006. Deep reef fish surveys by submersibles on Alderdice, McGrail, and Sonnier Banks in the Northwestern Gulf of Mexico. In Emerging Technologies for reef fisheries research and management, J.C. Taylor (ed.), p. 69-87. NOAA Professional Paper NMFS 5. The full volume is available online at: http://spo.nmfs.noaa.gov/pp5.pdf

Other products:

- **Coral Reefs of the U.S.**
- **Status of the Coral Reef Ecosystems of the US and Pacific Freely Associated States: 2008**
- **Flower Garden Banks NMS Conditions Report**

G. NEW SANCTUARY BIOLOGICAL RECORDS

Crinoids:
Comactinia meriodionalis
Davidaster discoideus
Cyphoma mcgintyi

Fish:
Mustache jawfish *Opistognathus longhurus*

Anemone:
Hermit crab anemone *Calliactis tricolor*

H. OTHER SCIENCE PRODUCTS

- Updated version of the Habitat Characterization Map
- 2006 Research Report
- Poster Series – Biology of the Deepwater Habitats of the Northwestern Gulf of Mexico. 1. Invertebrates 2. Antipatharians 3. Octocorals 4. Fishes 5. Sponges

I. ADDITIONAL SCIENCE ACTIVITIES:

Sanctuary responds to the ciguatera poisoning event

In a report dated September 22, 2006, Dr. Tracy Villareal (University of Texas Marine Science Institute - UTMSI) reported the presence of the toxic dinoflagellate *Gambierdiscus toxicus* in algae sampled from the Flower Garden Banks National Marine Sanctuary (FGBNMS) under permit FGBNMS-2006-010. This is the first record of the species at the FGBNMS. It was stated at that time, it was unknown whether ciguatoxins were entering the food web of the Sanctuary.

In April, 2007, the Galveston Daily News reported that a couple from Galveston, TX had suffered from ciguatera poisoning after consuming a grouper that had been caught at the Flower Garden Banks NMS. The grouper was later identified as a gag. Bob Dickey (Food and Drug Administration - FDA) confirmed that the fish tested positive for ciguatoxin after analysis.

In response to this event, the FGBNMS collaborated with Villareal, Dickey, and Quay Dortch (National Centers for Coastal Ocean Science – NCCOS), to obtain and analyze fish samples. Patricia Hay (NCCOS) facilitated the collaboration between FGBNMS and NCCOS. A vessel was provided by the recreational fishing member of the FGBNMS Sanctuary Advisory Committee, John Stout, and funding was provided by the FGBNMS and ONMS for the cruise response. On June 5, 2007, a total of 31 fish were collected and provided to FDA and NCCOS for analysis. In addition to the analysis for ciguatoxin levels, the fish were aged by Dr. Linda Lombardi-Carlson (NMFS/SEFSC, Panama City), and mercury levels were analyzed by Dr. David Evans (NCCOS).

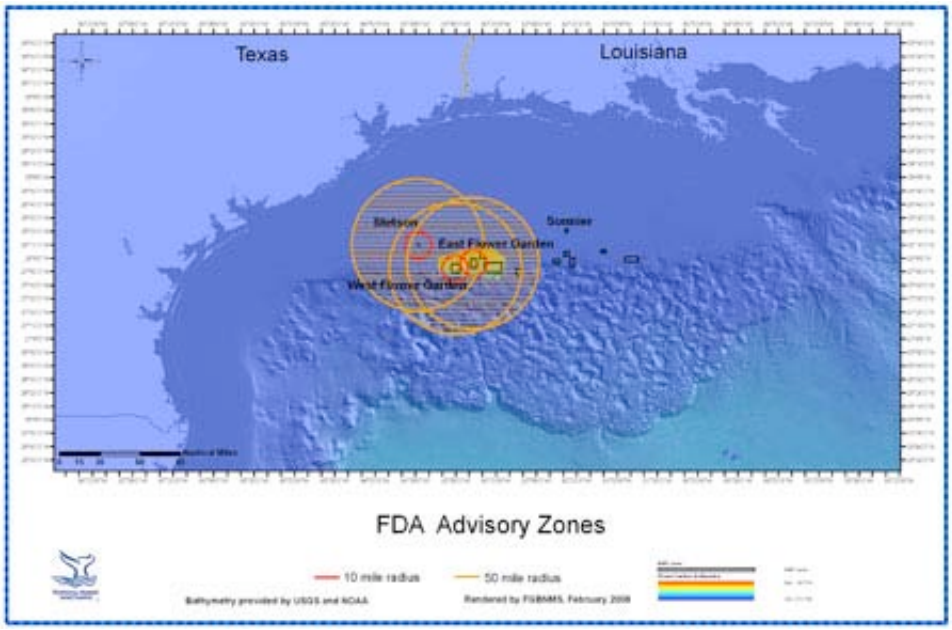
Based on FDA results, 4 out of the 31 fish tested positive for elevated levels of ciguatoxin – marbled grouper (*Dermatolepis inermis*) , scamp grouper (*Mycteroperca phenax*), barracuda (*Sphyraena barracuda*), and sand tilefish (*Malacanthus plumieri*). This was supported by NCCOS analysis.

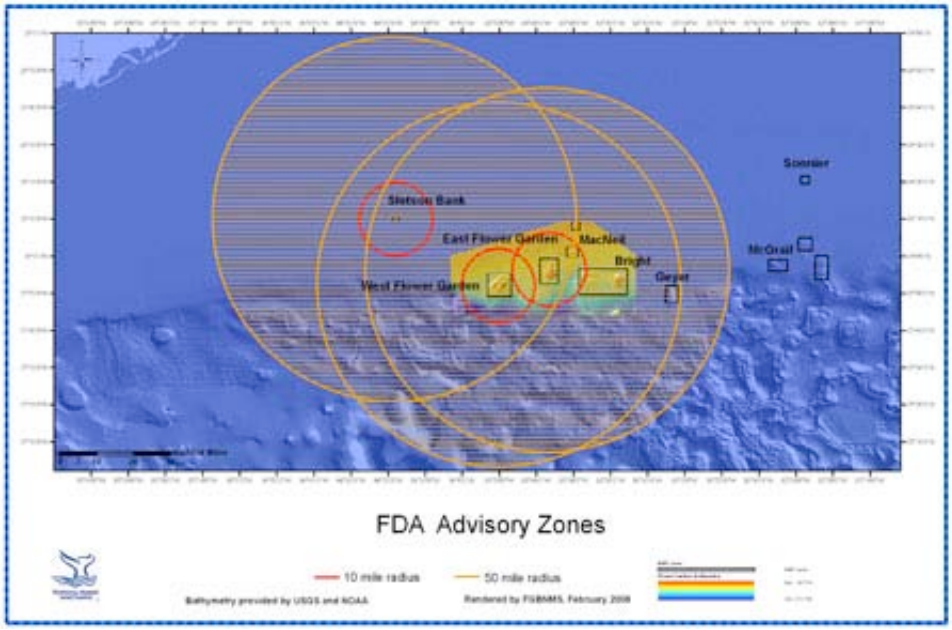
Based on NCCOS analysis, 24 out of 31 of the fish tested for mercury were at levels above Environmental Protection Agency (EPA) cause for concern.

Since the initial Galveston case of ciguatera poisoning, an additional 55 cases of ciguatera poisoning cases have been reported through the media and internal agency reports.

On February 5th, 2008, the FDA issued an advisory targeting seafood processors purchasing grouper, amberjack, and related predatory reef species captured in the northern Gulf of Mexico, in response to the FDA's concern with a number of recent outbreaks of ciguatera fish poisoning (CFP) that have been traced to fish from the vicinity of the Flower Garden Banks NMS. The FDA considers CFP a reasonably likely hazard for hogfish, grouper, and snapper species of concern captured within 10 miles of the FGBNMS, and amberjack, barracuda and other pelagic species of concern captured within 50 miles of the sanctuary. FDA recommends that primary processors avoid

purchasing the listed species from the area detailed. Maps showing the impact of this advisory are shown below. To download the full advisory, visit www.regulations.gov, and search for FDA-2008-D-0079-0002.





The FGBNMS has issued a request for samples from fishers targeting winter populations of grouper and wahoo at the FGBNMS, and will collaborate with NCCOS, UTMSI, FDA and NMFS/SEFSC for analysis. The level and longevity of this investigation will depend on availability of funds, however, the FGBNMS is committed to providing vessel time and resources to obtain samples on at least a quarterly basis, for the long term monitoring needs to address this issue.

Poster Series Developed to Support Secrets of the Gulf Expedition
The Flower Garden Banks National Marine Sanctuary research team is pleased to announce the development of a poster series depicting the conspicuous biota of the deepwater habitats of the Northwestern Gulf of Mexico, from depths between 50m to 150m. The series includes separate posters for antipatharians, octocorals, sponges, fishes, and algae/invertebrates. Many of the images of antipatharians, octocorals, and sponges are images of specimens sampled. The majority of the images were obtained using a remotely operated vehicle over the course of five years. During this time, over 180 ROV surveys were conducted for a total dive time of over 218 hours, close to 8500 high resolution digital still images were obtained, and nearly 250 directed samples were collected.

Sanctuary Assists with Species Status Information
The Flower Garden Banks National Marine Sanctuary (FGBNMS) provided input to the IUCN (World Conservation Union) for the assessment of the status of the marbled grouper (*Dermotolepis inermis*). The IUCN Red List Categories and Criteria is a system for classifying species at high risk of global extinction. Based on the information provided by the FGBNMS, the marbled grouper was upgraded from LC (Least Concern) to NT (Near Threatened). This brings the species closer to qualifying for or is likely to qualify for a threatened category in the near future. Descriptions of the categories and criteria can be found at http://www.iucnredlist.org/info/categories_criteria2001#categories. The marbled grouper is considered fairly rare, but practically no research has been conducted specifically on the species to feed into the assessment process. The northwestern Gulf of Mexico appears to be a hotspot for the species, and the FGBNMS will work with researchers to target the species for future research. The FGBNMS mined data for the assessment process from NOAA Fisheries, both in Pascagoula, MS, and Beaufort, NC, as well as from internal resources.

Sponges Shipped to Smithsonian for Analysis
Research Coordinator Emma Hickerson and G.P. Schmahl are collaborating with Dr. Klaus Ruetzler, of the Smithsonian Institution's Museum of Natural History, in the identification of a collection of sponges from the Flower Garden Banks and vicinity. Over 75 sponge specimens, collected by ROV in depths between 50-100 meters, have been catalogued, packaged and shipped to the Smithsonian for analysis.

Sanctuary Plans Saturation Diving Mission
The Flower Garden Banks National Marine Sanctuary (FGBNMS), National Marine Sanctuary Program headquarters, NOAA Diving, NOAA's Office of Ocean Exploration, U.S. Navy Deep Submergence Unit, and the Harte Research Institute for Gulf of Mexico Studies will hold a conference call to discuss planning and logistics for an upcoming saturation diving mission to the FGBNMS. A 30 day mission is tentatively planned to take place in summer, 2009. The mission would be broken up into several week-long projects. The FGBNMS Research Team is developing a science plan to drive the saturation diving mission.

Sanctuary Distributing Reusable Shopping Bags
The FGBNMS and the NMSF initiated a reusable shopping bag program. 2500 reusable shopping bags were printed, and have been distributed to the NMSP, and Flower Garden Banks NMS SAC, constituents, and supporters. On average, every household brings home 15 plastic shopping bags each week. As a program, through the integration of these reusable shopping bags into the everyday lives of the NMS personnel, we can make a difference by reducing the consumption of plastic bags by 234,000 bags a year. By distributing the 2500 bags, we hope to reach 625 households, equating to a reduction of 487,500 plastic bags a year! This initiative is funded through monies donated to the FGBNMS by film makers Howard and Michele Hall, for consultation during the IMAX 3D film development, DeepSEA3D. Bags have also been distributed to the entire Galveston NOAA facility, and were donated for distribution for the Galveston Beach Cleanup event, DEMA, and to over 100 HIHWNMS SPLASH volunteers. They will also be distributed at the upcoming 2008 Galveston NOAA Oceans Discovery Day event.

Additional activities:

- Submitted shiptime requests and needs
- Submitted monthly shiptime reports to NMAO.
- Provided support and supervision for development of Stetson Bank Long Term Monitoring Database (Emily Platzer)
- Participated in NOAA/NAVY/NMSP Saturation Diving collaboration planning calls
- Organized response to ciguatera poisoning event. Worked with researchers to conduct additional analysis.
- Ancient Acropora Reef research
- Regional GIS support

J. RESEARCH AND SCIENCE PARTNERSHIPS

- Azure Photographic Services
- Bainbridge College
- Dauphin Island Sea Laboratory (DISL)
- Florida International University
- GeoMarine, Inc.
- George Mason University
- Harte Research Institute for Gulf of Mexico Studies
- Minerals Management Service (MMS)
- Mote Marine Laboratory
- National Aquarium
- NCCOS – Biogeography
- NOAA Fisheries
- North Carolina Coastal Ocean Service (NCCOS)
- PBS&J
- Reef Environmental Education Foundation (REEF)
- Smithsonian Institute
- Texas A&M University (TAMU)
- Texas A&M University – Galveston (TAMUG)

- Texas A&M University - Corpus Christi (TAMU-CC)
- Texas Parks and Wildlife (TPWD)
- University of Calgary
- University of Rhode Island
- University of Texas
- Wildlife Conservation Society (WCS)

K. SCIENTIFIC INTERPRETATION/OUTREACH ACTIVITIES

1. Maintenance of digital slide catalog/library
2. Maintenance of video library (annotations)
3. Development of PowerPoint presentations for various events
4. Contributed to Sanctuary Web discussions.
5. Coordinated diving operations on Agency/Industry Cruise.
6. Web-based research reports
7. Immersion Presents support – Bob Ballard/NR1 Expedition
8. Ocean Discovery Day – preparation and participation
9. Implementation of Reusable Bag Program
10. Contributions for Ocean's Atlas

L. MANAGEMENT ACTIVITIES

- Writing of permits for science activities
- Responded to oil and gas industry spill drills in Manager's absence.
- Attended Sanctuary Advisory Committee meetings.
- Led Boundary Expansion Working Group activities, including meetings, and workshop, and product development
- Coordinated with USCG for regional presentations.
- Research Specialist job search
- Acting Timekeeper duties

M. TECHNOLOGY

1. Maintenance and development of media equipment.
2. Research for underwater technologies to further Sanctuary's capabilities.