



Flower Garden Banks National Marine Sanctuary

Research Summary

2008



Prepared by
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A. OVERVIEW

The purpose of this document is to report the activities of the Flower Garden Banks (FGBNMS) Research Team during 2008. The team included Emma L. Hickerson (Research Coordinator), Jennifer DeBose (Research Specialist), and Marissa Nuttall (Research Assistant).

B. SUMMARY

The FGBNMS research team was involved in 8 research cruises in the 2008 field season, at a value of approximately \$93,500 for the shiptime, \$49,000 of which came directly out of the FGBNMS FY08 budget. Unfortunately 8 days of Nancy Foster shiptime was lost due to generator failure. A pool of 32 sanctuary personnel, scientists, and volunteer divers conducted approximately 340 SCUBA dives during the 2008 field season. Activities included biological surveys and collection, equipment maintenance, u-bolt installation, and image collection. Ten sanctuary permits were processed, and an additional 13 were ongoing.

C. CRUISES (\$ amount represents approximate shiptime value)

WATER QUALITY INSTRUMENT DEPLOYMENT

M/V SPREE (\$10,000)

February 2-3, 2008

The Flower Garden Banks NMS supported a cruise to change out the YSI water quality instruments and install new Seabird temperature/salinity instruments. Sanctuary staff worked with the long term monitoring contractor, PBS&J, to accomplish the tasks. Staff noted the presence of a plague-like coral disease that was affecting multiple colonies, and multiple species. This is the fourth year that this unusual winter-time disease event has been documented at the FGBNMS. A 6' goliath grouper was encountered on the reef cap – a rare sighting. Spinner sharks were jumping at Stetson Bank. Water temperature was approximately 68F at all three banks.

TABS BUOY RESPONSE CRUISE

R/V BROOKS MCCALL (\$15,000)

February 9-10, 2008

On Friday, February 15th, 2008, Flower Garden Banks NMS staff responded to a call reporting that the TABS Buoy V, had broken loose from its mooring, and had become entangled in the coral cap at the East Flower Garden Bank (EFGB). FGBNMS worked with Texas A&M University/GERG to obtain secure a response vessel, the Brookes McCall, and FGBNMS provided NOAA working divers to conduct in water operations. The chain and cable attached to the buoy were entangled in the reef at over 100 ft of water. The FGBNMS team (G.P. Schmahl, Jennifer DeBose, and Tracy Hamburger) unshackled the buoy from the chain at depth, and laid the chain on the substrate for future recovery. The buoy was recovered by the vessel before returning to shore ahead of heavy seas.

R/V MANTA SHAKEDOWN CRUISE

March 19-20, 2008 (\$2,500)

Elliott Bay, Seattle, WA

The new Flower Garden Banks NMS research catamaran, the R/V MANTA, was accepted by the program on Thursday, March 13th, 2008, from the builders, All American Marine, Inc., in Bellingham, WA. The vessel was brought down to Seattle for sea trial operations during the week of March 17th, 2008. Sanctuary Program Director Dan Basta and FGBNMS Superintendent G.P. Schmahl conducted inaugural water entries donning drysuits and snorkels off the R/V MANTA at the pier at Sand Point - Dan, of course, being the first off! The FGBNMS collaborated with Mike Overfield (ONMS - RUST Program), Mitchell Tartt (ONMS - HQ), Bob Pavia (ONMS - Seattle), and Dana Wilkes (ONMS - Small Boat Program) to conduct sidescan and remotely operated vehicle (ROV) surveys of two RUST target sites in the vicinity of Elliott Bay, Seattle. The primary objective of the mission was to test the capabilities of the R/V MANTA, and run the vessel systems. The RUST (Resource and UnderSea Threats) targets, Four Mile Rock Barges, and the AJ Fuller - a schooner that had been converted to a gravel barge, were both successfully mapped and video image collected. Technicians from Teledyne Benthos (Darren Moss), and Seafloor Systems (John and Tim Tamplin)

loaned the mission their expertise and equipment to run the survey operations. The Assistant Archaeologist for the State of Washington, Scott Williams, was on hand to observe the operations, along with Olympic Coast NMS representatives, Bob Steelquist and George Galasso, and Seattle Aquarium representatives. Other participants included Ruth Yender from NOS/ORR and Mark Miller from the NOAA Small Boat Program. The R/V MANTA was also on site during the ONMS Small Boat Summit in Seattle in April. The vessel then returned to All American Marine, Inc., for final adjustments, before heading to Nanaimo, BC, Canada, in preparation for loading on a Dockwise transport ship for delivery to Fort Lauderdale, FL.

SPRING RESEARCH CRUISE

M/V FLING (\$13,500)

April 28-30, 2008

The Flower Garden Banks Spring Research cruise was shortened due to inclement weather. Dives were conducted at all three banks, East and West Flower Garden Bank, and Stetson Bank. Participants from Texas A&M University (College Station, Galveston, and Corpus Christi) and University of Calgary joined the FGBNMS research team. Coral recruitment tiles were photographed, maintenance was performed on the recruitment rack, sponge and coral samples were collected for bleaching studies, and general reef observations were made. Water temperature ranged from 69F (Stetson) to 73F (FGB's). In general, visibility was low - around 30ft at Stetson Bank and 50ft at the FGB's. Seas were 2-4ft on the first day of the cruise, and deteriorated to 5-7ft on the second day, prompting an early departure.

STETSON BANK LONG TERM MONITORING

M/V FLING (\$13,500)

June 16-18, 2008

The 18th Stetson Long Term Monitoring expedition took place June 15-18, 2008. Sanctuary staff and volunteer divers from the Texas A&M Galveston (TAMUG) Scientific Diving program located and photographed 44 repetitive photo stations, in 2 1/2 days at Stetson. This year photographs were taken using a digital system, rather than the former Nikonos film set up, for the first time. In addition, expedition participants conducted lobster and urchin counts, witnessed fire worm spawning and observed aggregating sharks. Southern stingrays were also noted in abundance

Research assistant Marissa Nuttall recently completed analysis of 15 years of Stetson Bank Monitoring photos.

ICRS FIELD TRIP

M/V FLING (\$13,500)

July 2-4, 2008

The FGBNMS supplemented the International Coral Reef Symposium (ICRS) Field Trip to ensure participants had the opportunity to visit. The Flower Garden Banks was one of multiple sites that hosted field trips for ICRS participants. The weather gods smiled upon us, and our trip was deemed hugely successful. We were thrilled to be able to share the beauty of the Flower Garden Banks NMS with national and international coral reef

scientists. The trip was led by Sanctuary Superintendent,, G.P. Schmahl, and Research Coordinator, Emma Hickerson. Field Trip participants were:

ICRS Scholars:

- Karen Neely
- Jen Dupont, USF
- Sarah Davies, University of Calgary

ICRS participants:

- Karla Hubbard, Oberlin College
- Dennis Hubbard, Oberlin College
- David Burdick, Guam Coastal Management Program
- Laurence McCook, Great Barrier Reef Marine Park Authority
- Brian Von Herzen, Climate Foundation

FGBNMS researchers:

- Dan Castellanos, Wildlife Conservation Society – manta ray and whale shark acoustic tagging, change out acoustic receivers
- Deana Erdner, University of Texas – collection of algae for ciguatoxin analysis
- Jeremy Marshall (PBS&J) – change-out of water quality instrumentation
- Amy Borgen (PBS&J) – change out of water quality instrumentation
- Marissa Nuttall (FGBNMS) - manta ray and whale shark acoustic tagging, change out acoustic receivers

MOORING DRILLING CRUISE

M/V SPREE (\$15,000)

July 28-30, 2008

An important part of managing and protecting the reefs of the Flower Garden Banks National Marine Sanctuary is maintaining the moorings that allow boats to tie up and access the sanctuary. The FGBNMS is a no anchor zone, as designated through sanctuary regulations, as well as through the International Maritime Organization.

The National Marine Sanctuary Foundation funded this effort, using funds received from Rowan Companies, Inc., as part of a settlement agreement that included monies designated to restore, protect, preserve, and improve the natural resources of the FGBNMS.

Captains Frank and Melanie Wasson, owners and operators of the M/V SPREE were contracted by the FGBNMS to conduct a cruise to drill new u-bolt locations for mooring buoys at Stetson Bank, and East and West Flower Garden Banks. Several u-bolts were in disrepair or broken, and needed replacement.

In general, sea conditions were reasonable, temperatures were about 84F, and there was relatively little current. Visibility was good at all locations. A whale shark (about 20' in length) cruised by the boat at Stetson Bank on July 28, but was only seen from the deck...unfortunately the divers doing their safety stop were looking the wrong direction!

A loggerhead sea turtle was observed taking a breather on the surface, also at Stetson. Several small dusky sharks were also noted by divers. Two manta rays visited G.P. Schmahl and Tracy Hamburger on their reconnaissance dive at the East Flower Garden Bank. Emma Hickerson photo- and video-documented the activities.

Paired u-bolt holes approximately 6 feet in length were drilled into the claystone at Stetson Bank #2, and about 3 feet into dead coral heads at WFGB#5, WFGB#3, and EFGB#2. Sites were selected by sanctuary staff.

A hydraulic drilling rig owned by FGBNMS was used to conduct the work. The hydraulic pump sat on the stern deck during operations with hydraulic hoses running forward to the bow, and over the side. Divers were deployed off the bow, carrying the drill and bits to the target location. Teams were deployed in 20-minute shifts during the drilling. A specially fabricated drill bit with large teeth for Stetson Bank due to the nature of the claystone.

A diamond tipped drill bit was used for the drilling at the East and West Flower Garden Banks. The drill bits are about 4 inches in diameter. After the paired holes were drilled, cement was premixed and loaded up into long PVC tubes, which were carried down by divers. The tubes were uncapped, and cement was poured into the holes around the u-bolt, which had been placed into the drilled holes.

**INAUGURAL CRUISE, CORAL SPAWNING
R/V MANTA (\$12,000)
August 21-24, 2008**

Corals spawn spectacularly at the Flower Garden Banks

Based on predictions made by the FGBNMS, French film company, Galatee Films launched a very expensive operation to film the coral spawn at the Flower Garden Banks. Water temperatures were about 2C less than last year, so we were holding our breath to see what happened! The corals spawned spectacularly at the Flower Garden Banks eight nights after the August full moon (August 23rd) at around 8:45 p.m., as predicted. FGBNMS Divers G.P. Schmahl, Jennifer DeBose, Tracy Hamburger, Marissa Nuttall, and Emma Hickerson documented the event with stills and video. A TAMU-Galveston researcher, Courtney Horne, took water samples to look at phytoplankton in relation to the coral spawning event.

Ups and Downs of inaugural R/V MANTA cruise to the FGBNMS

This was the R/V MANTA's first cruise to the FGBNMS. The ride out was a little rough due to the 4-5' swells set very close together, but we made the trip in a record time of 5 hours, traveling at a speed of 20kts. Typical transits to the site on board the charter vessels are 8 hours. We were very pleased with the overall set up of the boat, both inside, and on the deck. The vessel sat well on station on the moorings. We had several visitors from other charter vessels while we were out. We ran the 12 miles from the EFGB to the WFGB in less than 1/2 an hour - both in the R/V MANTA, and the 15' Rigid Hull Inflatable Boat (RHIB), which also did the transit to get some run time on the engine.

SCUBA activities were made very easy with all of the forethought that had gone into the design of the back deck, entries and exits were safe and comfortable, and the Nitrox system worked well. The moon pool was used extensively for water quality measurements and water sampling.

Unfortunately we experienced a major failure of one of the CAT engines on the way back to Galveston. We returned to Galveston on one engine, which took about 9 hours from FGBNMS. The engine was replaced in October 2008.

FY09

POST HURRICANE IKE QUICK-LOOK

M/V EAGLE RAY (\$3,500)

October 10, 2008

A quick-look cruise was conducted by FGBNMS staff and volunteers to determine the impacts of Hurricane Ike at East and West Flower Garden Banks. Emma Hickerson was joined by Marissa Nuttall (FGBNMS Research Assistant and TAMUG AAUS diver) and Eric McHugh (TAMUG AAUS diver). Significant impacts were photographed and videotaped, including sponge injuries, collapse of the *Madracis* fields on East Flower Garden Bank, and extraction and movement of up to 4m coral colonies. No coral bleaching was encountered. Buoys and instrumentation were in place, but water quality instruments were in need of recovery and re-placement.

FLOWER GARDEN BANKS LONG TERM MONITORING

M/V SPREE (\$20,000)

November 3-5, 2008

G.P. Schmahl and Emma Hickerson participated in the Long Term Monitoring Cruise to the Flower Garden Banks NMS. Long term photographic data was collected by contractors, PBS&J, at the coral caps of East and West Flower Garden Banks, and the Seabird water quality instruments were downloaded and redeployed at all three banks, including Stetson Bank. Sea conditions were highly variable, with visibility ranging from 35ft to 150ft at EFGB, around 30ft at WFGB, and around 20ft at Stetson Bank. Water temperature ranged from 74F - 77F. Seas were calm for the first two days of the cruise, deteriorating to 4-7' seas for the last two days. This was the first visit to Stetson Bank since the passage of Hurricane Ike. Significant impacts were observed and photographed.

POST HURRICANE IKE II

M/V MANTA (\$5,000)

November 20, 2008

A second cruise was conducted to continue the assessment of impacts due to Hurricane Ike at the FGBNMS. Steve Gittings, Emma Hickerson, Jenn DeBose, Tracy Hamburger, and Marissa Nuttall joined the crew of the R/V MANTA and made a comfortable 5-hour run out on the afternoon of November 19th. Dives were conducted on November 20th at East and West Flower Garden Bank. Visibility was around 60', and water temperature was 75F. Seas were flat, and no current was encountered. Transects documenting damage were conducted from buoys at both banks. A survey was conducted on the north

side of WFGB to determine the condition of the *Madracis* fields – the fields appear to be intact, with very little damage sustained, unlike the flattened fields at EFGB. The newly installed u-bolt at EFGB#2 is now unfortunately on the bottom side of a very large upturned coral colony. Other sightings of note were a loggerhead sea turtle on the surface at WFGB, and a spotted eagle ray at EFGB. A rotary camera was retrieved for TAMU-CC researchers, Ian MacDonald and Doug Weaver, from EFGB.

D. CANCELLED AND/OR POSTPONED CRUISES:

Winter Research Cruise – March 4-6, 2008. Postponed due to weather.

Winter Research Cruise – March 25-27, 2008. Cancelled due to weather.

Spring Research Cruise – April 28-30, 2008. Shortened by 3 days due to inclement weather.

FGBNMS Long Term Monitoring Cruise – June 9-13, 2008. Postponed due to weather.

Geyer Bank Marbled Grouper Cruise – August 28-September 2, 2008. Cancelled due to engine failure on R/V MANTA.

Nancy Foster Cruise – August 25-September 2, 2008. Cancelled due to generator repairs, then Hurricane Gustav.

FGBNMS Long-Term Monitoring – September 8-12, 2008. Postponed due to Hurricane Ike.

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

1. January 25, 2008. Gulf of Mexico Initiative. Reefs and Banks of the Northwestern Gulf of Mexico. Sarasota, FL. Hickerson and Schmahl.
2. February 29, 2008. FGBNMS overview and management review process. Texas A&M University – Corpus Christi. Hickerson
3. April 1-3, 2008. Marine Debris Forum, Washington, DC. DeBose.
4. April 15-17, 2008. Small Boat Summit. Seattle, WA. Hickerson and Hamburger.
5. April 23-24, 2008. Research Closure Workshop. Galveston, TX. DeBose, Schmahl, Hickerson.
6. May 28, 2008. First Aid/CPR/O2/AED Training. Galveston, TX. Hickerson, Schmahl, Kiene.
7. July 7-11, 2008. International Coral Reef Symposium. Fort Lauderdale, FL. Schmahl, Hickerson, DeBose, Kiene.

G.P. Schmahl, Emma Hickerson and Jennifer DeBose attended the 11th International Coral Reef Symposium (ICRS) in Ft. Lauderdale, where they presented two posters:

Species catalogs for deepwater coral communities of the northwestern Gulf of Mexico (Hickerson and Schmahl) and *Change and resilience at Stetson Bank, a high latitude coral community in the Gulf of Mexico* (Schmahl, DeBose, Nutall and Hickerson); and two presentations: *Holocene reef development at the Flower Garden Banks: recent surprises* (Precht, Deslarzes, Hickerson, Schmahl, Sinclair and Aronson) and *A new role for dimethylsulfoniopropionate (DMSP) as a foraging cue for coral reef fishes* (DeBose, Lema, Nevitt). Several posters/presentations also presented data collected at the Flower Garden Banks: *Post-Hurricane Rita assessment of four sensitive banks in the vicinity of the Flower Garden Banks, Gulf of Mexico* (Deis, Zimmer and Duncan), *Herbivore effects on coral and algal population dynamics* (Davies and Vize), and *Light sensing and the coordination of coral broadcast spawning behavior* (Hilton and Vize). Over 2500 coral reef scientists and managers attended the 5-day symposium. Sanctuary staff were able to make important contacts, provide information about the health of the Flower Garden Banks, and update their scientific knowledge base for the continuing research and monitoring efforts at the Flower Garden Banks NMS.

8. July 12-14, 2008. Mesophotic Coral Ecosystems Workshop, Jupiter, FL. Schmahl.

G.P. Schmahl participated in the "Mesophotic Coral Ecosystems" workshop, following the ICRS. Mesophotic coral ecosystems are those coral communities that occur in the "twilight zone" of the reef, between 30 and 150 meters in depth. The workshop was organized by the NOAA office of Sponsored Coastal and Ocean Research, with the purpose of developing a research plan for these under-studied areas. G.P. served as co-chair of the Management team for this meeting.

FY09

9. December 1-5, 2008. International Deep Sea Coral Symposium, Wellington, New Zealand. Hickerson

F. ABSTRACTS AND PUBLICATIONS:

Davies, S. and P. Vize. Herbivore effects on coral and algal population dynamics. Abstracts 11th Int'l Coral Reef Symposium, Ft. Lauderdale, FL.

DeBose, J.L., G.P. Schmahl, M.F. Nuttall and E. Hickerson, in press. Coral Bleaching Mortality and Resilience at Stetson Bank, a High Latitude Coral Community in the Gulf of Mexico. Proceedings of the 11th International Coral Reef Symposium. Florida, July 7-11, 2008.

Etnoyer, P. and E. Hickerson. Deep-water Alyconacea of Flower Garden Banks, Northwestern Gulf of Mexico. Abstract. International Deepsea Coral Symposium, Wellington, New Zealand.

- Foley, Kim A. et al. 2007. First Confirmed Record of Nassau Grouper *Epinephelus striatus* (Pisces: Serranidae) in the Flower Garden Banks National Marine Sanctuary. *Gulf of Mexico Science*, 2007 (32), pp. 162-165.
- Hickerson E.L. and G.P. Schmahl 2008. Gulf of Mexico Initiative, Northwestern Gulf of Mexico. In, Ritchie, K.B. and Brian D. Keller, eds. 2008. A Scientific Forum on the Gulf of Mexico: The Islands in the Stream Concept. Marine Sanctuaries Conservation Series NMSP-08-04. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Sanctuary Program, Silver Spring, MD. 105 pp.
- Hickerson, E.L., G.P. Schmahl, M. Robbart, W.F. Precht, and C. Caldwell, 2008. State of Coral Reef Ecosystems of the Flower Garden Banks, Stetson Bank, and Other Banks in the Northwestern Gulf of Mexico. In. The State of Coral Reef Ecosystems of the United States and Pacific Freely Associated States: 2008. In, Waddell, J.E. and A.M. Clarke (eds.), 2008. NOAA Technical Memorandum NOS NCCOS 73. NOAA/NCCOS Center for Coastal Monitoring and Assessment's Biogeography Team. Silver Spring, Maryland. 569 pp.
- Hickerson, E.L. and G.P. Schmahl. Species catalogs for deepwater coral communities of the northwestern Gulf of Mexico. Abstracts 11th Int'l Coral Reef Symposium Ft. Lauderdale, FL.
- Office of the National Marine Sanctuaries. 2008. Flower Garden Banks National Marine Sanctuary Condition Report 2008. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries, Silver Spring, MD. 29 pp.
- Parsons-Hubbard, Karla M. et al. 2008. The taphonomic signature of a brine seep and the potential for Burgess Shale style preservation. *Journal of Shellfish Research*, Vol. 27, No. 1, 227-239, 2008
- Precht, W.F., R.B. Aronson, K.J.P. Deslarzes, L.S. Kaufman, M.L. Robbart, El. Hickerson, G.P. Schmahl and J. Sinclair. Long-Term Reef Monitoring at the Flower Garden Banks: Status, Stasis and Change. In, Ritchie, K.B. and Brian D. Keller, eds. 2008. A Scientific Forum on the Gulf of Mexico: The Islands in the Stream Concept. Marine Sanctuaries Conservation Series NMSP-08-04. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Sanctuary Program, Silver Spring, MD. 105 pp.
- Precht, W.F., Deslarzes, K.J.P., Hickerson, E. Schmahl, G.P., Sinclair, J. and Aronson, R.B. Holocene reef development at the Flower Garden Banks: recent surprises. Abstracts 11th Int'l Coral Reef Symposium Ft. Lauderdale, FL, p.5

Robbart, M.L., R.B. Aronson, L. Duncan, and B. Zimmer. In press. Post-hurricane assessment of sensitive habitats of the Flower Garden Banks Vicinity. U.S. Department of the Interior, Minerals Management Service, Gulf of Mexico OCS Region, New Orleans, Louisiana. OCS Study MMS.

Robbart, M., Aronson, R., Precht, W. and Deslarzes, K. Impact of Hurricane Rita on four shallow banks in the northern Gulf of Mexico. Abstracts 11th Int'l Coral Reef Symposium Ft. Lauderdale, FL. p.417

Schmahl, G.P., E.L. Hickerson and W.F. Precht, 2008. Biology and Ecology of Coral Reefs and Coral Communities in the Flower Garden Banks Region, Northwestern Gulf of Mexico. In, B.M. Riegl and R.E. Dodge, *Coral Reefs of the USA*, Springer Science, 2008.

Slowey, N.C., T. Holcombe, M.P. Betts, and W.R. Bryant. Habitat Islands along the Shelf Edge of the Northwestern Gulf of Mexico. In, Ritchie, K.B. and Brian D. Keller, eds. 2008. A Scientific Forum on the Gulf of Mexico: The Islands in the Stream Concept. Marine Sanctuaries Conservation Series NMSP-08-04. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Sanctuary Program, Silver Spring, MD. 105 pp.

G. NEW SANCTUARY BIOLOGICAL RECORDS

Rock shrimp – *Sicyonia* sp. – Frank and Joyce Burek

Greater soapfish – *Rypticus saponaceus* – Stetson Bank – Marissa Nuttall

H. OTHER SCIENCE PRODUCTS

- 2007 Research Report
- Manta Ray Identification poster and catalog
- R/V MANTA poster
- 2007 Research Activities Poster

I. ADDITIONAL SCIENCE ACTIVITIES:

- Submitted shiptime requests and needs
- Submitted monthly charter reports to NMAO.
- Provided support and supervision for development of Stetson Bank Long-Term Monitoring Database (Marissa Nuttall)
- Ancient Acropora Reef research
- Regional GIS support

J. RESEARCH AND SCIENCE PARTNERSHIPS

- Azure Photographic Services
- Bainbridge College
- FDA

- GeoMarine, Inc.
- George Mason University
- Harte Research Institute for Gulf of Mexico Studies
- Minerals Management Service (MMS)
- NCCOS – Biogeography
- NOAA Fisheries
- 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 Texas
- University of Texas at Arlington
- 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. Sanctuary Web discussion and contributions
5. Web-based research reports
6. Ocean Discovery Day preparation and participation
7. Implementation of Reusable Bag Program
8. Purchase of camera equipment for education team

L. MANAGEMENT ACTIVITIES

- Review and writing of permits for science activities
- Responded to oil and gas industry spill drills in Manager's absence
- Attended Sanctuary Advisory Committee meetings
- Acting Timekeeper duties