



GRAY'S REEF NATIONAL MARINE SANCTUARY - 2006

AN INTRODUCTION.

Gray's Reef National Marine Sanctuary, designated in January 1981, is one of the largest near-shore live-bottom reefs in the southeastern United States. The year 2006 marked our 25th anniversary as a sanctuary.

Gray's Reef completed the first revision of its management plan undertaken since its designation. The Final Management Plan/Final Environmental Impact Statement was released to the public as the focus of the quarterly Sanctuary Advisory Council meeting in July 2006. The plan updates sanctuary research, monitoring, enforcement, exploration, administration and education programs and includes regulatory changes that are intended to enhance conservation with compatible public and private uses.

The year continued with a groundbreaking characterization of sanctuary bottom features linking the benthic and fish communities to the habitat type in a more precise way. The ongoing invertebrate assessment in the sanctuary revealed a possible new species of sponge—the fourth possible new species found at Gray's Reef in three years.

Finally, 25 years of sanctuary science, education and conservation was celebrated at a 25th anniversary gala hosted by the National Marine Sanctuary Foundation held at the Georgia Aquarium in Atlanta. Top accomplishments from a quarter century of ocean stewardship were reviewed as citizens from around Georgia gathered to commemorate the sanctuary's service to the American people.

Gray's Reef is just one of 14 sites that make up the National Marine sanctuary system. Gray's Reef is part of the sanctuary system's Southeast/Gulf of Mexico/Caribbean region, which also includes the Florida Keys and Flower Garden Banks. The Department of Commerce's National Oceanic and Atmospheric Administration (NOAA) manages the National Marine Sanctuary system, which was created by the National Marine Sanctuaries Act in 1972.

Gray's Reef is the only natural area protected off the Georgia coast and the only federally protected ocean bottom habitat in the South Atlantic Bight. The 17 square nautical miles (about 11,000 acres) of Gray's Reef is just

a tiny part of the vast Atlantic Ocean, yet its value as a natural marine habitat is recognized both nationally and internationally.

Within the sanctuary there are rocky ledges and flat and rippled sand plains. The most recent characterization of Gray's Reef divided the ledges into three types by height and depth of undercut and divided the sand plains into two types. Gray's Reef isn't a coral reef like those found in the tropics, built

by living hard corals, but is instead made up of scattered rock outcroppings, standing above the shifting sands of the nearly flat continental shelf. Gray's Reef does, however, support soft, non-reef building corals and sponges.



The rocky ledges can be as tall as eight feet but lie under 60 to 70 feet of water. The rocky ledges are complex—they have many nooks, crannies and bumps for invertebrates (animals without spines) to latch on to and for fish to hide in. These animals form a dense carpet of living creatures that, in places, completely hides the rock. They give the habitat of Gray's Reef its common name—a live-bottom. The small cryptic fishes as well as worms, shrimp, and other invertebrates provide a food source for the larger pelagic fishes that move through the sanctuary.

Recent bottom surveys revealed that there is far less of the important rock ledge habitat than originally thought. It



TO AN AMERICAN UNDERWATER TREASURE



was once thought that the rocky live-bottom covered about 25 percent of the sanctuary. Now we know that the ledge habitat is scattered over only about one percent of the sanctuary.

That revelation directly impacts the management of the sanctuary. Both the mandates of the National Marine Sanctuary system and the Gray's Reef designation document call for the protection of this unique and fragile habitat and its living resources. Since there is less of this habitat than originally thought, issues like anchor damage and marine debris become more critical and are addressed in the Final Management Plan.

Gray's Reef is one of the most popular recreational fishing and sport diving destinations along the Georgia coast. Sport fishing occurs year-round but at different levels of intensity. Fishing for pelagic (open water) species such as king mackerel is one of the most popular activities. Regional sport fishing tournaments sponsored by private fishing clubs take place in the spring and summer; Gray's Reef is a popular destination for participants. In order to better protect the natural resources an allowable fishing

gear regulation was established with the Final Management Plan. Fishing is allowed only by rod and reel, handline and spearfishing gear without powerheads.

For divers, access to the reef itself requires experience in open-ocean diving; currents can be strong and visibility varies greatly. For those who do not dive, Gray's Reef engages the public through extensive land-based education and outreach programs. The sanctuary is used as a living classroom for educators and numerous education programs are based on the resources of the sanctuary. For scientists, the sanctuary is a living laboratory for a variety of marine research and monitoring projects.

Constituent interests—users, scientist, educator and other partners—guide management of the sanctuary through the Gray's Reef Sanctuary Advisory Council. Advisory council members serve as liaisons to the community with regards to sanctuary issues and represent community interests, concerns and management needs of the sanctuary.



GRAY'S REEF - EDUCATION

Teacher and student education is one way of meeting the program's mandate to "enhance public awareness, understanding and appreciation of the marine environment." To that end, dozens of teachers from across the country are brought together each summer to use the sanctuary as a living classroom. Students, too, are given special programs that help bring the sanctuary and environs alive for them.

Twelve high school students and their teachers from three Atlanta area high schools learned about a watershed that connects Atlanta to the ocean and to Gray's Reef. The students were from schools that typically do not receive such opportunities. They experienced all aspects of the watershed by monitoring the water quality, trawling a net in the estuary, and sifting the sand for sea and beach creatures. The students explored Gray's Reef through a series of lectures in the sanctuary offices and visits to two local aquariums to see fish, turtles, and invertebrates that typically inhabit Gray's Reef. The effort was part of the Saltwater University's 2nd annual conference and sponsored by business owners in the saltwater aquarium trade and aquariums including the Georgia Aquarium.

Gray's Reef Education Intern & Student Ocean Council

Each year one student from the marine science department of Savannah State University (SSU) is chosen to coordinate and manage the Gray's Reef Student Ocean Council (SOC) program under the guidance of the Gray's Reef Education Coordinator. Savannah State is the sanctuary's partner institution of high learning for under-represented and under-served populations.



The education intern receives invaluable training in arranging programs and field trips, managing the high school students who participate in the SOC, preparing and teaching some of the programs and interacting with professionals involved in ocean science. To date, five education interns have participated in the program. One has gone on to become a NOAA National Marine Fisheries employee after earning a Masters of Science degree with a NOAA Nancy Foster Scholarship at Clemson University. Another was employed as a marine educator at Jekyll Island 4-H Center in coastal Georgia. Two others are enrolled as undergraduates at SSU. Over a dozen high

school students from area public, private, and home schools participated in SOC ocean sciences programs and field trips this past year.

ROV Workshops and Competition

Two ROV workshops brought students and teachers a better understanding of how scientists explore our marine environment through technology. In Savannah, 27 students in eight teams built their own Remotely Operated Vehicles (ROVs) over two sessions and launched them in a local pool. All eight teams were successful in completing the grade requirement of maneuvering their machines through various underwater exercises. The students gained an appreciation for ocean science technology through this very interactive hands-on workshop. Media coverage of the event increased the public's awareness of technology used in ocean science research and exploration.

In Atlanta, Gray's Reef and Georgia Aquarium staff led 20 teachers through a workshop that taught them how to build a ROV. The teachers took their new skills and put them to work in the classroom to provide students with a hands-on science lesson. As a result of both ROV programs, the first annual Southeastern Regional ROV Competition was held in Savannah with one team of students moving on to the national competition.

Rivers to Reefs Educator's Workshops Follow the Watershed

Rivers to Reefs Educator's Workshops follow the Altamaha River watershed from its headwaters in Atlanta through Georgia's piedmont and coastal plains to the coast and finally offshore to Gray's Reef. Participating educators conduct water quality monitoring as they explore the watershed. The goal is to make the connection that what is done onshore impacts the marine environment through the watershed. The final stop is in the sanctuary where the participants operate a Remotely Operated Vehicle (ROV) and learn how science is conducted in the marine environment. Thirty-two participants were selected for the 2006 workshops.

Education Materials

Gray's Reef publishes a wide variety of educational materials including posters, workbooks, videos and DVDs, and teaching guides. All materials are free and available to educators and the public upon request. In 2006, the sanctuary distributed approximately 300 education posters, 300 sets of right whale education materials, 650 sets of Rivers to Reef curriculum materials and other materials. Approximately 320 educators and students were reached by direct contact and through education conferences.



GRAY'S REEF - HOMEPORT

The location of Gray's Reef's administrative offices on the Skidaway Institute of Oceanography campus links the sanctuary with other academic institutions of the University System of Georgia such as Georgia Southern University, Georgia Tech and the University of Georgia, as well as two units of the UGA Marine Extension Service, all of which have facilities and programs on campus. The Georgia Aquarium, a Gray's Reef exhibit and program partner, too, has a presence on the campus.

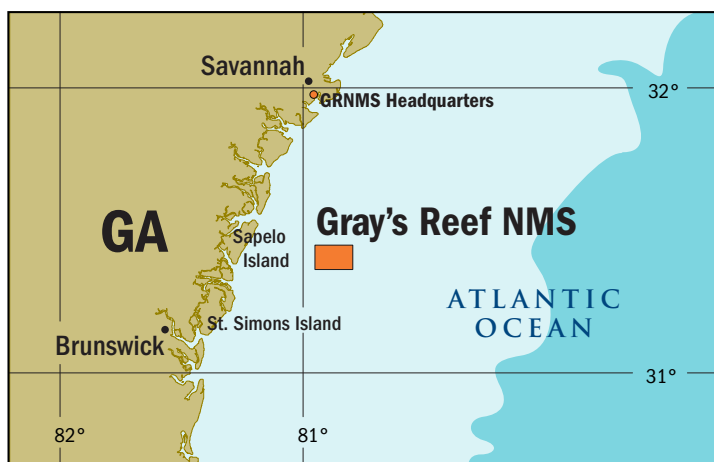
Gray's Reef National Marine Sanctuary is 17 miles east of Sapelo Island in an area on the continental shelf where temperate and tropical waters mingle west of the Gulf Stream. The 17 square nautical miles of Gray's Reef is just a tiny part of the vast Atlantic Ocean, yet it is linked to a much bigger region. In 2006, the National Marine Sanctuary Program moved to a regional organization like much of the rest of federal government. Gray's Reef became part of the Southeast/Gulf of Mexico/ Caribbean Region, which also includes the Florida Keys and the Flower Garden Banks National Marine Sanctuaries.

Vessels

In 2006, Gray's Reef operated the 33-foot R/V Sam Gray and a 41-foot renovated Coast Guard patrol vessel, the R/V Joe Ferguson. Both boats were used for research, dive operations and day operations in Gray's Reef and in support of a variety of activities for our partners. The sanctuary logged a total of 55 days or 475 boat hours at sea.

Staff

Gray's Reef staff includes Leah Cooling, Education Program Student Analyst; Capt. Scott Fowler, Boat Operations Coordinator, LT Keith Golden, Operations Coordinator; Gail Krueger, Communications and Outreach Coordinator; Greg McFall, Research Coordinator and Sanctuary Co-Manager; Debbie Meeks, Administrative Coordinator; Courtney Reynolds, Education Intern; Cathy Sakas, Education Coordinator and Sanctuary Co-Manager; Becky Shortland, Stewardship Coordinator; and Jim Sullivan, Regional Projects Coordinator. During the summer months, when field research is at its most intense, Gray's Reef adds between one and three temporary interns to its staff.





Enhancing public awareness, understanding and appreciation of the marine environment is a mission of both NOAA National Marine Sanctuary Program and Gray's Reef. The outreach program brings the sanctuary and the marine environment to the public in non-programmatic learning environments such as festivals, exhibits and events. Part of this work is to reach people who may not have an established interest in the marine environments; to engage them in thought-provoking ways and to encourage them to learn more and take action. Gray's Reef also strives to keep the public abreast of its activities through local, regional and national media outreach.



GRAY'S REEF - OUTREACH

Citizens from around Georgia commemorated 25 years of science, education and conservation at Gray's Reef in September when the National Marine Sanctuary Foundation hosted a 25th anniversary recognition event at the Georgia Aquarium in Atlanta where Gray's Reef has exhibits. The aquarium, which received more than 3 million visitors in 2006. The aquarium is key to helping Gray's Reef promote ocean literacy in the region through exhibits and programming. As part of its anniversary celebrations, Gray's Reef forged a partnership with students and teachers at Thunderbolt Elementary Marine Science Academy near Savannah to enrich marine science education for Thunderbolt's 650 children and the larger community.

Clean the Reef, Clean the Beach

Sanctuary staff, volunteers from Savannah's Clean Coast group, and volunteers from area scuba clubs sponsored three clean ups in June to remove trash and debris from local beaches and the sanctuary in honor of World Oceans Day.

The diving volunteers received special training on how to remove trash from the reef without damaging the soft corals and other invertebrates living there. The beach-based volunteers received information about Gray's Reef and the impact that debris has on the marine environment. The most common types of trash found within the sanctuary are fishing line, fishing gear, and beverage cans. The most common beach trash picked up on the beach during the clean up was plastic items of various kinds and beverage cans. It is hoped that the information on debris collected by the divers can feed into a long-term study of how marine debris impacts sanctuary waters and reef habitats.

Ocean Film Festival

More than 1,800 people learned about the ocean by attending the Gray's Reef Ocean Film Festival in September. More than 50 ocean films were shown during five days at three different venues. The festival brought together Gray's Reef, Sapelo Island National Estuarine Research Reserve, and other partners to raise the level of ocean literacy in the community through films.



Exhibits and Events

The Gray's Reef exhibit program allows the sanctuary to reach millions of people across the region—far more than could be reached in a traditional visitor's center. Exhibit partners include the Georgia Aquarium, South Carolina Aquarium, Fernbank Museum of Natural History, Georgia Southern University, Tybee Island Marine Science Center, Sapelo Island Visitor Center, and the University of Georgia Marine Education Center and Aquarium.

In 2006, Gray's Reef held several joint events with the Sapelo Island National Estuarine Research Reserve in honor of important anniversaries for each—30 years for Sapelo as a reserve and 25 years for Gray's Reef as a sanctuary. Programs included a lecture on coastal history and a mini film festival in Brunswick, Ga. Gray's Reef also partnered with the Coastal Heritage Society to put on a special program about maritime heritage.

Some 500 artists competed for the Gray's Reef Fantastic Fishes Award and the Gray's Reef Sea Creatures Award at the 2006 Savannah College of Art and Design's Sidewalk Arts Festival and Sand Arts Festival. The art festivals drew thousands to view the artwork and provided a way to get people—some of whom may not spend much time thinking about the ocean—to think about the marine environment as a source of inspiration.

Gray's Reef also participated in several ocean-themed events with our various partners including CoastFest with the Coastal Resources Division of the Georgia Department of Natural Resources, Marine Science Day with the Skidaway Institute of Oceanography, and Earth Day with the City of Savannah among others.

The Media, Publication and Speakers

Media coverage of Gray's Reef has a multiplier effect, enabling Gray's Reef to reach many more people than staff could on a one on one basis. In 2006, area, regional, and national reports about whales, rays, scientific research, and sanctuary events were among the stories that included Gray's Reef. Staff is frequently interviewed on radio, television and the local press about marine issues.

Each month Gray's Reef produces a radio commercial for broadcast on the Adventure Radio Group—a group of seven AM and FM stations with a reach of more the 300,000 households. In addition, Gray's Reef sponsors a National Public Radio program called "Our Ocean World" broadcast in the Georgia coastal region by Peachstate Public Radio station WSVH.

Three issues of the *Shades of Gray* newsletter published in 2006 reached about 3,500 people highlighting the research, education and outreach of the sanctuary. In addition, posters and brochures on various topics were distributed.

Gray's Reef staff and volunteers frequently talk to civic, non-governmental, business, sport fishing and other organizations in addition to our frequent talks to educators. In 2006, those general population talks plus outreach at events and festivals reached about 10,000 people.



GRAY'S REEF - PARTNERSHIPS & COMMUNITY

Effective marine conservation bridges all boundaries and borders. Our partnership with constituents—users, researchers, educators and other federal and state management agencies—is a critical element of site management. Partners include NOAA Fisheries, United States Coast Guard, Georgia Department of Natural Resources, South Atlantic Fishery Management Council, South Carolina Department of Natural Resources and the Skidaway Institute of Oceanography among many others. Gray's Reef relies on collaboration with sanctuary partners to maximize the use of funds and avoid duplication of efforts.

The Sanctuary Advisory Council

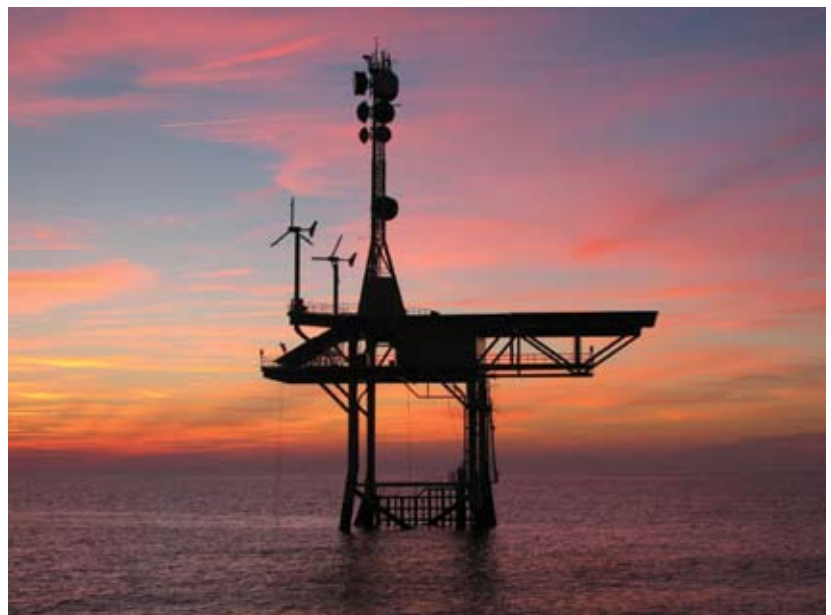
Gray's Reef has a Sanctuary Advisory Council, which, through its members, serves as a liaison to the community with regard to sanctuary issues and represents community interests, concerns, and management needs of the sanctuary. Council members represent education, living and non-living resources, research, recreational fishing and diving, commercial/charter fishing, governmental, research and non-governmental partners among others. Advisory council meetings are open to the public and are held quarterly at various locations up and down the coast.

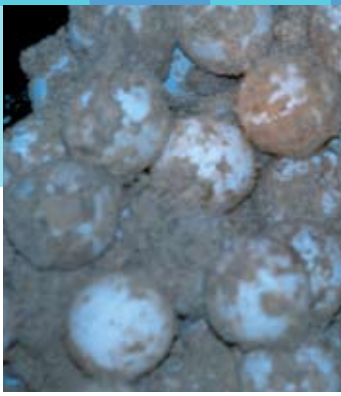
In April, the council broke ground by holding a joint meeting with the Sapelo Island National Estuarine Research Reserve Advisory Committee. The meeting also included leadership from the sanctuary program's Southeast/Gulf of Mexico/Caribbean Region.

The council established an education and outreach working group to support and enhance those programs. The council also established a research advisory panel to support development of the Gray's Reef condition report and other research programs.

Ocean Observing Partnerships

Gray's Reef is an active participant in the Southeast Atlantic Coastal Ocean Observing System (SEACOOS), the Integrated Ocean Observing Systems (IOOS), the Global Ocean Observation System (GOOS), the South Atlantic Bight Synoptic Offshore Observational Network (SABSOON), the Southeast Coastal Ocean Observation Regional Association (SECOORA) and the sanctuary wide monitoring system. Together these monitoring systems are giving the nation better comprehensive near real-time information on ocean and coastal conditions for a broad range of users. The system is improving weather forecasting, detecting and forecasting ocean component of climate variability and facilitating safe and efficient marine operations.





GRAY'S REEF - RESOURCES PROTECTION

Each sanctuary's primary goal is protection of its marine resources whether natural biological communities or relicts of maritime heritage. Sanctuaries are mandated to maintain natural biological communities, to protect, and where appropriate, restore and enhance natural habitats, populations, and ecological processes. A principal role for Gray's Reef is to identify and address current and emerging marine resource issues relative to the sanctuary region, while considering uses that are compatible with resource protection.

Complete details about the new regulations can be found on the Gray's Reef website at www.graysreef.noaa.gov

The Gray's Reef Final Management Plan/Final Environmental Impact Statement was released to the public in July. The plan updates sanctuary research, monitoring, enforcement, exploration, administration, and education and outreach programs. It includes regulatory changes that are intended to enhance conservation with compatible public and private uses. The accompanying final rule was published in the Federal Register in October 2006; the regulations went into effect in February 2007.

Law Enforcement Expands

Enforcement of sanctuary and other applicable regulations, such as those protecting fish stocks and marine mammals in Gray's Reef has been supported by the U.S. Coast Guard and enhanced through a Joint Enforcement Agreement (JEA) between NOAA's Office for Law Enforcement (OLE) and the Georgia Department of Natural Resources. Officers from the Georgia Wildlife Resources Division and the Coast Guard regularly patrol Gray's Reef and advise management through the Sanctuary Advisory Council.

Protecting North Atlantic Right Whales

These highly endangered whales are seen in and around Gray's Reef in the winter months. The sanctuary is part of the Southeastern US Implementation Team for the Recovery of North Atlantic Right Whales. The team is creating tools such as press kits and a video documentary to reach target audiences with right whale information. By informing the public through a documentary and through media, researchers, educators and outreach staff hope to reduce and ultimately eliminate ship strikes and entanglements, which are, respectively, the first and second leading causes of mortality for these mighty whales.





GRAY'S REEF - SCIENCE

Each marine sanctuary is mandated to support, promote, and coordinate scientific research on and monitoring of the resources of these marine environments. Research at Gray's Reef is ongoing with scientists in various fields using the sanctuary as a staging area for study related to marine species, marine chemistry and water quality, marine biogeography, and other topics.

A two-week cruise during May and June on the NOAA Ship Nancy Foster, a 187-foot research vessel, provided the basis for much of the science done in the sanctuary in 2006. NOAA and Skidaway Institute of Oceanography scientists collected seismic sub-bottom data on the thickness and distribution of sand on the sea floor of Gray's Reef. The sub-bottom profiling was also used to examine relict paleo-channels present in the sanctuary. This data will enable the sanctuary to track the deposition and redistribution of sand; properly place seepage meters to conduct groundwater chemistry analysis, and will provide a baseline for future studies.

Georgia Southern University scientists continued study on the recruitment, colonization, chemical ecology, and ecological succession of the sanctuary's invertebrate community, particularly the sponges and corals. Sampling in and around Gray's Reef was conducted to support invertebrate identification in the region and the creation of an invertebrate field guide for Gray's Reef. Scientists from the South Carolina Department of Natural Resources' Southeastern Regional Taxonomic Center (SERTC) produced a new poster, "Echinoderms of the Coastal Carolinas, Georgia and Northern Florida," based on specimens collected in the area.



As with all studies conducted in Gray's Reef, the data gathered from these and other expeditions enable us to better understand the relationships between natural and human-influenced changes in the ecosystem. Knowledge gained from these and other investigations will further enable us to make informed decisions regarding the continue protection and wise use of the resources that belong to all of us.

Possible New Sponge Species

Georgia Southern University scientists cataloging sponges in the South Atlantic Bight found 52 species of sponges from seven habitats in the sanctuary, two of which are thought to be undescribed species. Two years ago, the same team found three tunicates in the sanctuary thought to be undescribed species.



Within the sanctuary there are tropical species living at the northern most edge of their range and temperate sponges living at the southern most edge of their range, indicating that Gray's Reef is a crossroad of the Atlantic.

New Analysis for Resource Management

An ongoing bio-geographic study is giving Gray's Reef a spatially explicit characterization of bottom habitat that links fish and invertebrate communities to ledge and sand types. Development of the habitat map has also led to key information management of issues that affect sanctuary resources such as the accumulation of marine debris and activities such as recreational fishing, spearfishing, and diving.



Water Quality Testing

The water at Gray's Reef is relatively pristine, mostly free from the impacts of shore-sourced pollution and bacteria. That is according to the early results of a water quality monitoring project started in 2005. Every four to six weeks, water samples are taken for analysis from multiple depths at the NOAA weather buoy in

the sanctuary. Scientists are looking at a number of parameters including the dissolved oxygen, bacteria, and fecal coliform; microbial is also being collected for future study.

Research Area Working Group

Scientists from the National Center for Coastal Ocean Sciences' (NCCOS) Biogeography Team have developed an analysis tool to assist Gray's Reef management in the placement of boundaries for a potential research area within Gray's Reef. Based on development of a habitat map of Gray's Reef and using stakeholder-guided information, a Geographic Information System (GIS) based tool was developed that maximizes resource protection while attempting to minimize displacement of recreational anglers.

In 2006, NOAA Gray's Reef accepted the Sanctuary Advisory Council's recommendation to formally consider the concept of a research area in the sanctuary. A public scoping process on the concept will begin in 2007.