GRAY'S REEF NATIONAL MARINE SANCTUARY
SANCTUARY PROGRAM REPORT

Reporting Period: May 2014 - August 2014

Sanctuary Advisory Council

Officers

Rick DeVictor, Chair, NOAA Fisheries Service Southeast Regional Office Representative

Michael Denmark, Vice-Chair, Sport Fishing Representative

Dr. Anna George, Secretary, Conservation Representative

Other Non-government Members

Dr. Peter Auster, Living Resources Research Representative

Dr. Scott Noakes, Non-living Resources Research Representative

Capt. Warren Hupman, Charter/Commercial Fishing Representative

Mary Conley, Conservation Representative

Randy Rudd
Sport Diving Representative

Emily Kroutil
K-12 Education Representative

Dr. Timothy Goodale, University Education Representative

William O. Cliett
Citizen-at-large Representative

Christine Laporte
Citizen-at-large Representative

Government Members

Patrick Geer, Georgia Department of Natural Resources, Coastal Resources Division Representative

Suzanne VanParreren, Sapelo Island NERR Representative - non-voting

LT Mike Mastrianni, U.S. Coast Guard Representative – non-voting

Capt. Doug Lewis, Georgia Department of Natural Resources, Law Enforcement Division Representative – non-voting

Al Samuels, NOAA Office of Law Enforcement Representative – non-voting

Dr. Charles Hopkinson, NOAA Sea Grant Representative – non-voting

Jene Nissen, U.S. Navy Representative – non-voting

Hot Off the Press

It has been a busy summer field season for Gray's Reef National Marine Sanctuary!

We are grateful for the good weather days, fully operational vessels, and dedicated partners, staff, and volunteers that have made it possible to accomplish valuable research in the Sanctuary throughout this summer.

GRNMS Research Area Monitoring

Annual monitoring is conducted in Gray's Reef National Marine Sanctuary and this summer has been a productive one for monitoring within and outside the Research Area.

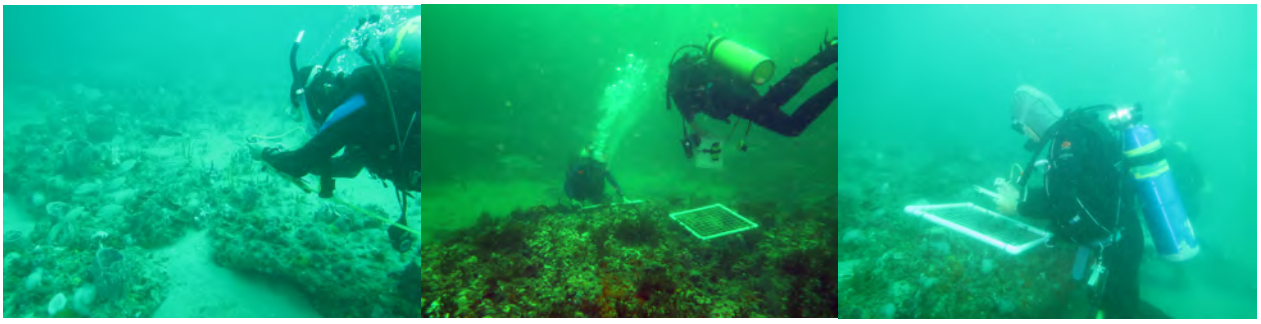
In partnership with scientists from the University of Connecticut (UConn), Sea Research Foundation (SRF), Georgia Southern University (GSU), Valdosta State University (VSU) and the National Marine Fisheries Service (NMFS) Beaufort Laboratory, and assisted by Team Ocean volunteer divers, surveys were conducted throughout the month of June.
While poor visibility and weather conditions at sea limited the days suitable for dive operations, the UConn team completed three days of surveys in Gray's Reef and two days of surveys at Anchor Ledge. The goal of these teams was to observe and record predation and behavioral interactions among piscivores, or fish-eating fishes, within visible range of the observers. They also tested a towable underwater camera system for recording the same types of interactions among halo predators, or piscovores just outside visible range during surveys .

Teams from GSU, VSU, and NMFS enjoyed favorable conditions, and were able to conduct fish, invertebrate, and habitat surveys for nine days. The fish and habitat survey teams visited 64 sites while the invertebrate team visited 36 sites and completed 492 quadrats.

Of the many fishes and invertebrates observed during these dive surverys, some notable ones included a manta ray with a wingspan of 18 feet, a sand tiger shark, and high densities of sea nettle jellies.

In comparison to dive surveys conducted during the same season last summer, fewer numbers of lionfish have been spotted this field season. So few, actually, that only 2 very small lionfish were sighted during the June 2014 operations and no lionfish were sighted in July.

Few sea turtles were observed during the June dives; a surprise considering divers spent over 150 hours underwater in the Sanctuary.

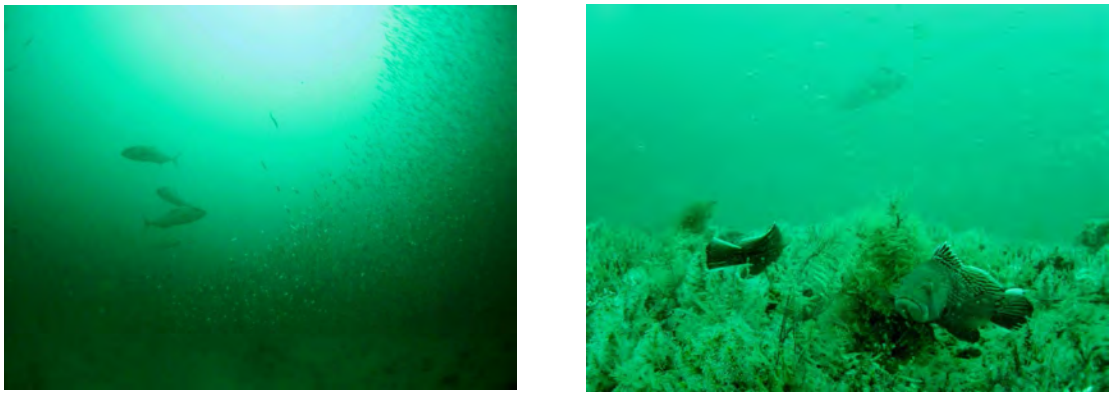


(Far left) Research divers lay out a transect along a section of Gray's Reef before beginning a survey. (Photo: Sarah Fangman); (Center) Quadrats, or four-sided sampling grids, are placed onto sections of the reef for conducting surveys. (Photo: Tim Henkel); (Far right) Data, such as density and composition of invertebrate species, are collected from within the quadrats. (Photo: Tim Henkel)

Peter Auster and the UConn/SRF team study behavioral interactions of piscivores

The 2014 survey of behavioral interaction webs amongst piscivores inside and outside of the research area was hampered, as in 2013, by high seas from a storm event and subsequent poor visibility. Despite these conditions, two teams, composed of two divers each, collected data at nine stations. Additional surveys were conducted at a long term reference site outside the sanctuary. Noteworthy is that other than black sea bass, the low numbers of piscivores that interacted in group predation events both inside and outside the closed area in 2013 persisted during the 2014 surveys. Combining survey data for both 2013 and 2014 (due to low sample sizes each year), and using data from 2009-2011 as a baseline for pre-closure conditions, we find reduced diversity (species richness per predation event) in groups of piscivores during the current period, both inside and outside the closed area. Of interest is that group predation and links between species at the reference site appeared to be within the range of values observed from 2009 onward. Multiple hypotheses emerge from this initial analysis so it is useful not to read too much into this single preliminary result.

During the current year we also tested a new approach for assessing halo predators around reefs. Here the halo zone around reefs is defined as the area beyond the visual limit of direct observation by divers during surveys but harboring piscivores (i.e., halo predators) whose ambit may be linked to the local reef or reefs. Direct observations by divers are limited to the range of visibility and are spatially constrained due to limits in bottom time. In the past we classified some piscovores as transients to reefs due to the limited occurrence of some species in our data. We tested use of a towed underwater video camera (TrollPro with a GoPro camera) mounted within a spreader and artificial baits and towed the mounted camera over our study reefs to assess the occurrence of greater abundances or different species than found during surveys. The video revealed that some species did occur in the halo zone and were not observed during surveys, but the reverse was also true in that some species normally classified as transient were observed by divers but did not occur in the video. These results suggest that both diver and towed video surveys are necessary to obtain a more complete picture of the piscivore guild and the role these animals play in shaping the behavior web of piscivores and prey at these sub-tropical reefs.



(Right - left) Divers record observations of interactions among piscovores throughout the water column and along the reef. (Photos: Peter Auster)

(Right - left) Team Ocean diver Randy Rudd and Captain Todd Recicar demostrate the style and function of a TrollPro towable camera mounted to a baited fishing gear. (Photos: Peter Auster)

Clark Marino collecting samples from sponges in GRNMS. (Photo: Sarah Fangman)

Gray's Reef supported numerous graduate students in their studies this summer

Clark Marino, a University of North Carolina, Wilmington student, is studying changes in the microscopic organisms that live in a symbiotic relationship with the sponge *Ircinia campana*, commonly known as the Stinky Vase Sponge. Earlier in the summer he had collected samples in the Florida Keys, and has previously collected samples from offshore Wilmington, NC. His collections along the coasts of Florida, Georgia, and North Carolina allow him to study changes along a latitudinal gradient on the southeastern coast of the U.S.

In support of our Research Area monitoring, Dr. Lauren Stefaniak, Postdoctoral Associate at Georgia Southern University, collected samples of ascidians, also called sea squirts, at four sites within the sanctuary (two inside and two outside the research only zone) and at one site along J-Y reef. In addition to morphological identification of sea squirts, these samples will be used to develop a DNA barcode database for Gray's Reef ascidians and provide a basis for designing future experiments.

Graduate student Alicia Reigel is investigating an invasive species of marine barnacle, *Megabalanus coccopoma*. This barnacle is normally found in tropical waters, but it has been found on artificial structures in the southeastern waters, including our Gray's Reef buoy, since 2006. Alicia's thesis work focuses on completing a population assessment at 9 sites along the southeastern coastline, including 5 onshore sites, the Gray's Reef buoy, and 3 offshore navy towers. Her research assesses the density, average size, and temperature and salinity tolerances of this barnacle species. Additionally, she is completing a population genetic assessment in an attempt to determine if the populations found offshore are providing larvae to repopulate the coastline sites each summer. The information that will gained through Alicia's work is vital to controlling and/or eradicating this invasive species here in the southeast as there is currently very little known about this species of barnacle, even within its native range.

In June, the Gray's Reef operations team assisted Alicia in collecting approximately 30 barnacles from each of the 4 offshore sites. A team of 4 divers is required to complete the collection by hand and to capture photographs of the quadrats, or collection areas, that will later be used to assess density.

Since beginning this work, at several of the offshore sites a new species of *Megabalanus* was discovered that was not previously known to exist in Georgia. This is the first documentation of a second invasive barnacle in the Georgia area. Using genetics and a physical analysis, Alicia's research team aims to determine which species of *Megabalanus* this may be.

Ocean Sampling Day

(Left) Water samples were collected at Gray's Reef from the *RV Sam Gray* as part of a global Ocean Sampling Day. (Right) Water samples were filtered and preserved following a global standard protocol for a single-day snapshot of microbial populations around the world. (Photos: Sarah Fangman)

Gray's Reef joined scientists from Skidaway Institute of Oceanography (SkIO) to conduct water sampling as part of Ocean Sampling Day – a global, single-day snapshot of microbial populations around the globe. On Saturday, June 21st, the *R/V Sam Gray* traveled out to the Sanctuary with GRNMS and SkIO scientists to collect water samples. Scientists from around the world – from Antarctica to the Arctic and from New Zealand to Iceland – also collected and processed water samples using the same protocols. This was the first such effort, and may provide information on the diversity of microbes, their functions, and their potential economic benefits. Microbes, such as viruses, bacteria, algae, fungi, and microzooplankton, account for the majority of biomass and genetic diversity of life on earth.

For additional information on Ocean Sampling Day visit: http://www.microb3.eu/osd

Outreach and Education

Georgia teachers gained knowledge of scientific concepts through first-hand experiences through the 2014 Rivers to Reefs Educators Workshop

Gray's Reef partnered with University of Georgia, Georgia Aquarium, and Gordon State College in leading the annual Rivers to Reefs Educators Workshop. In this 6-day workshop, 16 educators are led on a journey from Rivers to Reefs where they learn a wealth of information and gain a first-hand perspective on our watersheds, the input and flow of nutrients and pollutants throughout our river systems to offshore ocean habitats, and an up-close look at the many communities of people, animals and plants that inhabit or rely on our freshwater and marine resources. Scientific investigations included water quality monitoring and environmental observations.


(Left) Participating educators visted High Falls near metro Atlanta as part of the 2014 Rivers to Reefs Educators Workshop. (Photo: Kim Morris-Zarneke) (Right) Divided into sampling teams, teachers learned to collect samples at sea, such as this sediment grab sample onboard the *RV Savannah.* (Photo: Amy Rath)

Gray's Reef Southeast Regional MATE ROV Competition champions competed in the 2014 International MATE ROV Competition at Thunder Bay National Marine Sanctuary

In June, 2014, sixty teams representing K12 education institutions and universities from 18 states and 13 countries participated in the MATE International ROV (remotely operated vehicle) Competition in Alpena, Michigan. This year's focus was the shipwrecks, science, and conservation in Thunder Bay National Marine Sanctuary (TBNMS). Students were tasked with exploring and documenting an unknown shipwreck, collecting scientific samples, taking inventory of invasive species, and conserving the shipwreck site. The MATE competition challenged students to think like entrepreneurs and helped them develop the teamwork, creative thinking, and problem solving skills that make them competitive in today's global workplace.

The Southeast Regional MATE Competition, hosted by Gray's Reef National Marine Sanctuary in Savannah, Georgia, took place in March and was won by a team from Carrollton High School in Carrollton, Georgia. The team traveled to Alpena, Michigan as the Ranger class winner for the Southeast, placing 15th overall at the International event while taking home the Ranger class award for Best Poster Display with an Engineering MVP award to team member Brendan Whitaker. Students from Jesuit High School of Carmichael, California took the overall first place in Explorer (advanced) class and a team from Clarenville High School of Clarenville, Newfoundland and Labrador, Canada won overall first place in the Ranger (intermediate) class of the competition.

Hosting the 2014 MATE International ROV Competition provided Thunder Bay National Marine Sanctuary an opportunity to connect with an international audience. The theme of this year's competition raised awareness of Thunder Bay, Great Lakes shipwrecks, and the sanctuary system as a whole. This event also encouraged new relationships with industry professionals and educational institutions in the field of marine technology. The competition also brought nearly 1,000 people to the town of Alpena, Michigan and bolstered the local economy. Gray's Reef hopes to bring the MATE International Competition to Savannah in 2016.

Team Innovocean from Carrollton High School at the 2014 MATE International ROV Competition in Alpena, MI. Photo: Jody Patterson

Gray's Reef intern is awarded travel to present research at professional conference

We are proud to share the achievements of 2014 intern Darius Sanford, who joined Gray's Reef for a short 6 weeks to conduct a policy analysis of our proposed rule to allow weighted marker buoys in Gray's Reef National Marine Sanctuary. Darius worked under the mentorship of Communications and Outreach Coordinator Amy Rath and with guidance from Resource and Protection Coordinator Becky Shortland. The objective of his analysis was to interpret and assess the legal language of the revised policy, explore the proposed exemption and alternative options for the regulation, and to provide suggestions for regulations. With an interest in environmental law and a clear understanding of his own project, Darius gave an outstanding presentation to a panel of his peers, program mentors, and presentation judges. Selected among his cohort for Best Presentation, he was awarded fully funded travel to a professional conference of our choosing.

Amy Rath congratulates intern Darius Sanford who was awarded Best Presentation among his REU internship cohort. (Photo: Amy Rath)

This internship experience was supported by the National Science Foundation's Bridge to Research Experience for Undergraduates (REU) Program and led by Savannah State University's Marine Sciences Program.

Resource Protection

Revised management plan allowing weighted marker buoys promotes safe diving practices in Gray's Reef National Marine Sanctuary

NOAA's Gray's Reef National Marine Sanctuary published a final rule and environmental assessment today which now permits the use of weighted marker buoys in the sanctuary, an important safety measure for recreational diving and an enhancement for recreational fishing.

While sanctuary regulations prohibit the placement of any material on the seafloor, which previously included weights to mark locations during recreational diving or fishing, the exemption now allows for weighted marker buoys:

- Weighing up to 10 pounds
- Maximum of 1\4 inch buoy line
- Continuously tended by divers and fishers
- Cannot be attached to a vessel
- Cannot be capable of holding a boat at anchor
- Must be removed within 12 hours

Weighted marker buoys are intended to increase diver safety and to help recreational anglers mark and relocate a fishing spot as their boat drifts.

Gray's Reef vessel operators use an 8 pound mushroom anchor attached to a line and buoy float to mark the location of divers underwater. (Photo: Todd Recicar, Amy Rath)

Gray's Reef Staff:

Sarah Fangman, Superintendent; Acting Science Coordinator; Acting Deputy Superintendent
912 598 2416 Sarah.Fangman@noaa.gov

LTJG Jared Halonen, Vessel Operations Officer
912 598 2432 Jared.Halonen@noaa.gov

Debbie Meeks, Financial & IT Coordinator / Webmaster
912 598 2434 Debra.Meeks@noaa.gov

Jody Patterson, Administrative Assistant
912 598 2431 Jody.Patterson@noaa.gov

Amy Rath, Communications and Outreach Coordinator
912 598 2397 Amy.Rath@noaa.gov

Todd Recicar, Marine Operations Coordinator
912 598 2383 Todd.Recicar@noaa.gov

Becky Shortland, Resource Protection Coordinator
912 598 2381 Becky.Shortland@noaa.gov

Southeast, Gulf of Mexico, Caribbean Region Staff:

George Sedberry, Science Coordinator
912 598 2439 George.Sedberry@noaa.gov

The Office National Marine Sanctuaries

The Gray's Reef National Marine Sanctuary is one of 14 marine protected areas in the National Marine Sanctuary System. The Office of National Marine Sanctuaries (ONMS) was established under the National Marine Sanctuaries Act of 1972 which authorizes the Secretary of Commerce to designate as national marine sanctuaries areas of the marine environment or Great Lakes with special national significance due to their conservation, recreational, ecological, historical, scientific, cultural, archeological, educational, or aesthetic qualities. Visit the ONMS web site at: http://www.sanctuaries.nos.noaa.gov/

Learn More about Your Sanctuary

To learn more about the sanctuary please visit our web site at: http://graysreef.noaa.gov/.

To learn more about the Sanctuary Advisory Council please visit: http://graysreef.noaa.gov/management/sac/welcome.html

Visit Your Sanctuary!

For information on visiting Gray's Reef National Marine Sanctuary please see: http://graysreef.noaa.gov/visit/welcome.html

This page has information about visitor centers, sanctuary regulations, and recreation in the sanctuary, and about the sanctuary's unique resources and how you can help protect them.