

# Sounding Line

News of the Florida Keys National Marine Sanctuary

Summer 2005

## First-ever *Safe Sanctuaries* Drill Takes Place in Florida Keys

David Hall and Cheva Heck, NOAA

The Florida Keys National Marine Sanctuary was chosen as the test site for NOAA's first-ever *Safe Sanctuaries* drill in April 2005, an exercise that simulated a ship grounding and oil spill in the vicinity of Key Largo.

The drill, a collaborative effort between the National Oceanic and Atmospheric Administration (NOAA), the U.S. Coast Guard and the Florida Department of Environmental Protection, was designed to improve the agencies' ability to protect the environment and the public in the event of an incident.

NOAA's first *Safe Sanctuaries* drill involved the hypothetical grounding of the *M/V Portsmouth Trader*, an 800-foot cargo vessel carrying 1.2 million gallons of fuel, at Elbow Reef off Key Largo. In the scenario, the grounding injured coral reef habitat and submerged historical artifacts, and an oil spill threatened other resources. The drill involved field operations in the Key Largo area. A series of buoys represented the grounded vessel. The Monroe County Emergency Operations Center in Marathon served as the exercise command post.

"The *Safe Sanctuaries* drill provided a real-world test of NOAA's ability to work with the U.S. Coast Guard and other partners to protect natural and cultural resources in the case of a major grounding or hazardous material spill," said Timothy

R.E. Keeney, deputy assistant secretary of commerce for oceans and atmosphere. "The size and scope of today's emergency response exercise demonstrates our commitment to protecting the health and safety of the citizens, environment and economy of the Keys, and provides us with insights that will be useful in hazardous material spill response."

To simulate an oil spill, NOAA released hundreds of orange and yellow drift cards designed to float on the water surface, responding to wind and current. The public was asked to watch for cards that may wash up on shore. Each card contains written reporting instructions, in English and Spanish. By tracking the cards' movement, NOAA will learn more about where hazardous materials might travel in the event of a spill. The small wooden cards are nontoxic and will decompose within a few months if not collected.

During the exercise, NOAA also deployed an incident meteorologist to monitor weather conditions; activated NOAA All Hazards Radio (formerly NOAA weather radio), simulated a boating accident in which an EPIRB (emergency position indicating radio beacon) was deployed, conducted helicopter surveys of the simulated spill, deployed a real-time observation buoy at Elbow Reef, conducted rapid surveys of the seafloor, and assessed injury to natural resources resulting from the incident.



During the *Safe Sanctuaries* drill, sanctuary staff combed the shoreline in search of drift cards near the site of a secondary simulated oil spill. Back Row (from left to right): Russell Reardon, Harold Hudson; Front Row (from left to right) Laurie MacLaughlin, Amy Massey. (Photo: Jeff Anderson)

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Sanctuary**

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Dear Readers,

In the fall of 1989, three ships ran aground on coral reefs in the Florida Keys, from Key Largo to the Dry Tortugas. These three groundings occurred at the close of one of the most environmentally stressful decades ever recorded for coral reefs. Coral bleaching and diseases, which were leading to the decline in the health of coral reefs, especially in the Caribbean, were introducing previously unknown levels of stress to coral reefs and their associated inhabitants.

Coincidentally, the 1989 ship groundings took place following the grounding of the Exxon *Valdez* in Alaska. The *Valdez* catastrophe resulted in one of the largest oil spills to occur in U.S. waters and also resulted in this nation's largest ever response to an oil spill. It became clear that the natural resources of the U.S. were extremely vulnerable to major impacts resulting from the acts of humans.

These assaults on the marine environment prompted Congress to designate the Florida Keys National Marine Sanctuary, which at the time was the largest of the national marine sanctuaries, the first-ever designated by an Act of Congress, and the first to totally surround a community. However, one of the most important actions Congress took in the Act was to establish an internationally designated *Area to be Avoided* (ATBA) for ships greater than 50 meters (164') in length, and prohibit them from transiting specific areas of the sanctuary. Prior to this designation, there were major ship groundings nearly every year. Since the designation of the sanctuary in November of 1990, there have only been two major ship groundings. For the past 15 years, ships navigating through the Florida Straits, off the Florida Keys, travel further off the reef tract. Our sanctuary Fish and Wildlife Conservation Officers take any violations of the ATBA very seriously, and this has contributed to the compliance on the part of the shipping industry.

Even with the success of the ATBA designation, we can't be overly cautious or overly prepared for a catastrophic event or accident on our coral reefs, or in any one of our national marine sanctuaries. For that reason, NOAA and its partners conducted *Safe Sanctuaries*, a training and planning exercise designed to test NOAA's capability to respond to a ship grounding and an oil spill, as well as a threat of hazardous materials release. An article in this edition of *Sounding Line* gives a detailed account of the *Safe Sanctuaries* drill, but here I wanted to recognize the tremendous leadership and capability of the U.S. Coast Guard, State of Florida, Monroe County and our other federal partners in being prepared for a response to a catastrophe such as a major ship grounding on our coral reefs.

The U.S. Coast Guard has the lead in the unified response to major ship groundings, and the various agencies such as NOAA and the State have trustee responsibilities and different roles in the response. By conducting a drill such as *Safe Sanctuaries*, all of the responding parties have a chance to work with one another and learn what is important to each other. This will lead to greater and more effective coordination in the case of another incident.

I want to close by thanking the U.S. Coast Guard, State of Florida, Monroe County and our other federal partners for participating in the drill and providing the level of resources and commitment that made the drill a huge success. I also want to thank all other national marine sanctuaries and NOAA staff that provided technical and personnel support to make the drill successful. As a result, I feel we are all more qualified and prepared to respond to a major disaster along our coast.

Sincerely,

Billy D. Causey



### Subscribe to *Sanctuary Watch* Newsletter



*Sanctuary Watch* is the newsletter of the National Marine Sanctuary Program. To sign up to receive *Sanctuary Watch*, available in electronic or hard copy, please visit: [http://sanctuaries.noaa.gov/news/sanctuarywatch/sw\\_emailer.html](http://sanctuaries.noaa.gov/news/sanctuarywatch/sw_emailer.html)

### Volunteers Splice Buoy Lines



The Marathon Sailing Club held a splicing party to prepare new lines for the mooring buoys that have been installed throughout the sanctuary to protect corals from anchor damage. The sanctuary buoy team maintains the sanctuary's over 450 mooring buoys. The club's contribution of 50 new buoy lines is very much appreciated. (Photo: John Nazzaro)



### Mote Marine Lab Anniversary 1955-2005

The Florida Keys National Marine Sanctuary wishes to congratulate Mote Marine Laboratory on its 50th anniversary.

Mote Marine Laboratory was founded in 1955 as a non-profit organization dedicated to "advancing the science of the sea." Today, Mote scientists study the behavior, physiology, and habitats of sharks, sea turtles, coral reefs, manatees, red tides and other marine organisms.

The Mote Aquarium, located at Mote's main facility on City Island in Sarasota, Florida, serves as an educational resource for the public. Mote's education department also offers an array of programs geared for students of all ages.

### NOAA Environmental Hero 2005



During the *Safe Sanctuary* drill, Capt. Scott Fowler, Sanctuary Advisory Council alternate for Diving (Upper Keys), was named NOAA Environmental Hero for 2005 by Tim Keeney, deputy assistant secretary of commerce for oceans and atmosphere. Capt. Fowler has shown immense dedication in supporting the efforts of the Florida Keys National Marine Sanctuary to protect the coral reef ecosystem by working to raise public awareness, advising sanctuary managers, helping to design outreach programs and participating in ecosystem monitoring projects. (Photo: Angela Calos)





## Marine Events Reporting System Collects Observations of Events at Sea

Nancy Diersing, FKNMS Education Specialist

You can be the eyes and ears of the scientists studying the marine life of the Florida Keys National Marine Sanctuary.

MEERA, the Marine Ecosystem Event Response and Assessment program, seeks information about unusual events affecting marine life in waters of the Florida Keys. If you see a fish kill or an event that adversely affects marine life, you are encouraged to complete an observer report form online to create a record of the observation.

“Mote scientists use the observer reports to determine if there might be a large scale event occurring and if a response team is needed to assess the situation. Ecosystem managers and scientists use the reports to help determine whether the events are natural or linked to human activities,” commented MEERA Project Coordinator Cory Walter, Mote’s Tropical Research Laboratory, Summerland Key.

This past winter, observers reported several events to MEERA. Evan Haskell of Sunset Watercraft in Key West described the rescue of a large manta ray that was caught up on a shoal, unable to get to deeper water on its own. The Sunset Watercraft crew was concerned about the ray, so they sent one of their small boats to rescue the struggling animal and carry it out to deeper water, where “she took off like a bullet,” according to owner/operator Carlo Gigli.



The crew from Sunset Watercraft of Key West rescued a stranded manta ray aboard one of their small boats and released it in deeper waters. The manta was doused in seawater frequently during the short trip to deeper water. (Photo: Sunset Watercraft)

In December, a micro-algal bloom known as red tide was reported off Cape Sable at the southern tip of the Florida peninsula. This bloom was associated with discolored water and numerous fish kills. After examining the water samples collected by Captain Gary Nichols of Conch Key and Captain Bruce Irwin of Marathon, Mote scientists determined that the concentration of the bloom organism, *Karenia brevis*, was high enough to cause human respiratory irritation and probably fish kills. During the winter, the bloom moved slowly southward on the gulf side of the Keys, eventually dissipating in the vicinity of Key West.



A macro-algal bloom on the seafloor was reported this past spring in several locations. Samples of the algae are now being genetically identified to help determine the origin of the bloom. (Photo: Ken Nedimyer)

In late spring, Marine Life Collector Skip Wohlers reported a benthic algae bloom in Hawks Channel. This bloom is characterized by an overgrowth of algae growing attached to the bottom. A similar bloom was also reported in the vicinity of Pickles and Conch reefs by Sanctuary Advisory Council Vice-Chair Ken Nedimyer. Scientists are in the process of genetically identifying the algae to help determine the origin of the bloom.

Since the program began in 1997, five years of data have been collected and over 1,000 reports have been logged. MEERA was the brainchild of Mote’s Tropical Research Laboratory’s first director Dr. Erich Mueller and former Sanctuary Science Coordinator Ben Haskell.

For more information on MEERA, visit the website: <http://isurus.mote.org/Keys/research/MEERA.phtml> or contact the Program Coordinator, Cory Walter, Mote Marine Laboratory Tropical Research Laboratory at: [cwalter@mote.org](mailto:cwalter@mote.org) or (305) 745-2729 x 301.

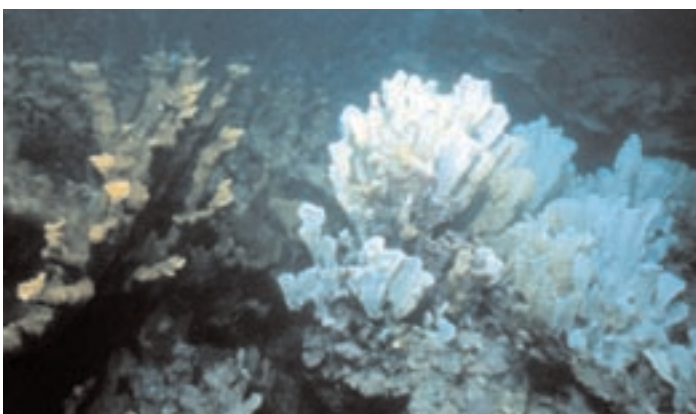


## BleachWatch Program Launched

This summer Mote Marine Laboratory's Tropical Research Laboratory and the Florida Keys National Marine Sanctuary have launched a new event response program. *BleachWatch*, modeled after a similar program at Australia's Great Barrier Reef Marine Park, allows divers to submit reports describing where bleaching is observed in corals. Bleaching occurs when corals expel the symbiotic algae (called zooxanthellae) living within their polyp tissues. Bleaching is usually a stress response to one or more factors such as extremes in sea surface temperatures, salinity, pollution, sedimentation, low oxygen, disease, and predation. The coral colony does not always die after bleaching, but it can become more susceptible to disease and other stressors.

Divers can participate in *BleachWatch* at two different levels. Divers who make occasional trips to the reef or who visit a variety of reefs can participate in *BleachWatch Community*. After returning from a dive, observers simply complete an online form describing the location of the bleaching event. *BleachWatch Professional* requires that the observer complete a short training session. This level is designed for the diver who frequently visits the same reef. Regular monitoring of reefs will help scientists evaluate the susceptibility of these sites to bleaching. The reports made by both community and professional *BleachWatch* observers are relatively short and can be completed online.

For more information on *BleachWatch*, visit the website: <http://isurus.mote.org/Keys/research/bleaching/bleachwatch.phtml> or contact the Program Coordinator, Cory Walter, Mote Marine Laboratory Tropical Research Laboratory at: [cwalter@mote.org](mailto:cwalter@mote.org) or (305) 745-2729 x 301.



The elkhorn coral colony (above left) does not show signs of bleaching, but the blade fire coral, *Millepora complanata*, (above right) has expelled its zooxanthellae in the process of bleaching, thus exposing its white calcium carbonate skeleton.

## Elkhorn May be Listed as Threatened

NOAA's National Marine Fisheries Service (NMFS) is seeking public comment on a proposed rule to list elkhorn and staghorn coral as threatened under the Endangered Species Act (ESA). The comment period began May 9, 2005, with the publication of the proposed rule in the Federal Register. Comments must be received by August 8, 2005.

If listed as threatened, the prohibited acts of the ESA will not automatically apply, as they would if the species were listed as endangered. Therefore, NMFS will consider developing a separate proposed rule, 4(d) rule, detailing proposed prohibitions and protective measures for the conservation of these two species. This separate rule could be implemented if the proposed rule to list these species as threatened is finalized. If NMFS develops the 4(d) rule, there will be separate public meetings to solicit public comment on the proposed prohibitions and protective measures.

To view the proposed rule, visit the Southeast Region's Protected Resources website: <http://sero.nmfs.noaa.gov/pr/protres.htm>. Additional background information on elkhorn and staghorn coral and on NMFS' review of their status is available on the same website and on the sanctuary's website: <http://floridakeys.noaa.gov>.

Comments must be identified by the proposed rule Docket Number 050304058-5113-02 or Regulatory Information Number (RIN) 0648-XB29.

You may submit comments by any of the following methods:

\*E-mail: [Acropora.Info@noaa.gov](mailto:Acropora.Info@noaa.gov). Include Docket Number or RIN in the subject line of the message.

\*Mail: Assistant Regional Administrator, Protected Resources Division, NMFS, Southeast Regional Office, Protected Resources Division, 263 13th Ave. South, St. Petersburg, FL 33701.

\*Facsimile (fax) to: (727) 824-5309.

\*Federal eRulemaking Portal: [www.regulations.gov](http://www.regulations.gov). Follow the instructions for submitting comments.

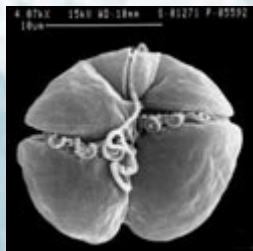
For meeting times and locations or more information, contact Jennifer Moore at: [jennifer.moore@noaa.gov](mailto:jennifer.moore@noaa.gov) or (727) 824-5312.





## Scientists Discover Red Tide Toxin Caused Deaths in Dolphins and Manatees

Scott Willis, FWC Fish and Wildlife Research Institute



During a red tide bloom, millions of *Karenia brevis* organisms, shown magnified in the photograph, may be found in a single liter of seawater. (Photo: FWC)

New research findings have revealed that the toxins produced during Florida red tides do pose a threat to marine mammals, even after the blooms have disappeared. As reported in the June 9 issue of *Nature*, scientists from the Florida Fish and Wildlife Conservation Commission's Fish and Wildlife Research Institute (FWC/FWRI) and the University of North Carolina Wilmington Center for Marine Science (UNCW/CMS), together with collaborators from Mote Marine Laboratory, Harbor Branch Oceanographic Institution and the National Oceanographic and Atmospheric Administration (NOAA), have discovered how red tide toxin accumulation and transfer in the food web, a series of interconnected food chains, resulted in mass fatalities of endangered manatees in 2002 and bottlenose dolphins in 2004.

In Florida, red tides cause massive fish kills and contaminate shellfish, making them unsafe for human consumption. They can cause respiratory problems in humans. Brevetoxins, the dangerous neurotoxins produced during Florida red tides (blooms of the toxic microalga *Karenia brevis*) also have been implicated in numerous mass marine mammal deaths in Florida. However, the mechanisms of intoxication leading to their deaths have remained uncertain.

"We knew that brevetoxins were involved in manatee mortalities, but we did not understand how these herbivorous mammals could be exposed to lethal amounts of toxins after the red tide had dissipated," said Leanne Flewelling of FWRI's Harmful Algal Blooms group and principal author of the publication. The authors reveal that brevetoxins can accumulate in high concentration on seagrass, the principal food source for manatees, and can remain there after the bloom is gone. This can be especially dangerous when the red tides form in early spring and the migrating manatees move to coastal waters, eating seagrass that has been exposed to the red tide toxins.

The involvement of brevetoxins in dolphin mortalities has been much debated, primarily because toxins were not always found in dead animals and because the source of the poisoning was not understood. "Because red tides typically result in massive fish kills, people believed that brevetoxins could not accumulate to concentrations dangerous for marine mammals that feed on whole live fish prey," said Jerome Naar, research assistant professor at UNCW/CMS and corresponding author in the publication.

Research Scientists Leanne Flewelling (FWC/FWRI), Jan Landsberg (FWC/FWRI), Karen Steidinger (FWC/FWRI), and Daniel Baden (UNCW/CMS) are co-authors in the *Nature* article with Naar. Funding for their studies on the potential for fish to accumulate brevetoxins by food-web transfer was provided by the Centers for Disease Control and Prevention, the Florida Department of Health and FWC.

The scientists reported that planktivorous (plankton-eating) fish can, in fact, feed on the red tide cells, but brevetoxin seems to be fatal to them only if the toxin passes through their gills. When there is only a low level of toxin dissolved in the seawater, these fish can become contaminated, particularly in the internal organs, and can cause fatalities in other species, such as dolphin or seabirds which rely on whole fish as a food source.

The 2004 spring mortality of 107 dolphins in the Florida Panhandle was the first evidence that brevetoxin-contaminated fish are a threat to dolphins. "Discovering exactly the same toxin composition in the dolphin stomachs as in the planktivorous fish gave us quite a good indication of what was responsible," Naar said. "The finding that red tide is this toxic to manatees and dolphins highlights the need for more research on the health effects of red tide toxin exposure in human populations," said David Schwartz, M.D., director of the National Institute of Environmental Health Sciences.

Despite documented annual red tides in the Gulf of Mexico since the late 1800s, there are no reports of human poisonings from fish consumption in red-tide impacted areas. The investigation of the dolphin mortality led by NOAA included multiple scientists from state and federal agencies, as well as other non-profit organizations and universities. Additional funding support for the study was obtained from the Center for Sponsored Coastal Ocean Research Harmful Algal Bloom Event Response Fund, the National Institute of Environmental Health Sciences, NOAA's Monitoring and Event Response for Harmful Algal Blooms program, and the NOAA Marine Biotoxins Program.

For more information, contact Scott Willis, FWRI at: (727) 896-8696 or [Scott\\_Willis@fwc.state.fl](mailto:Scott_Willis@fwc.state.fl).



## Drift Cards Released in Safe Sanctuaries Drill

(continued from p. 1)

“Early planning and participation in emergency response drills allows all partners to be prepared for emergency situations,” said Florida Department of Environmental Protection Secretary Colleen M. Castille. “Protecting the unique and environmentally sensitive Florida Keys and ensuring the safety of area citizens is vital during emergency response situations.”

“By establishing a variety of protective measures such as specific areas to be avoided and the Racon radar beacons that line the reef tract, we have reduced the occurrence of large ship groundings in the Florida Keys,” said Billy Causey, Florida Keys National Marine Sanctuary superintendent. “The *Safe Sanctuaries* drill provided a valuable opportunity to test our ability to work with our partners to prevent further damage to the environment in the event of a major grounding and fuel spill.”

Information on where drift cards released during the drill have been found is available at: [http://response.restoration.noaa.gov/drifter\\_fl/keylargo.html](http://response.restoration.noaa.gov/drifter_fl/keylargo.html)



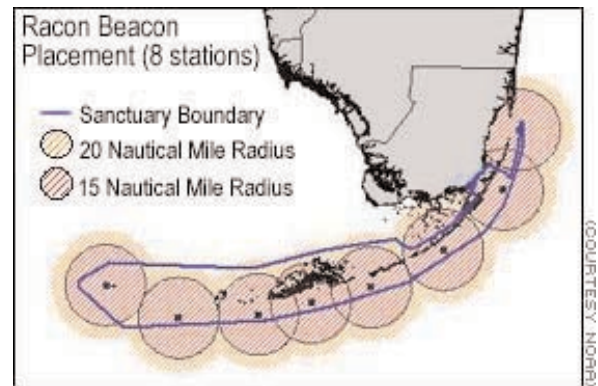
As of May 9, 2005, over 100 yellow drift cards and 52 orange cards had been found in the Key Largo area (shown above). The yellow cards were released on April 19, 2005, to represent the initial oil release at the Elbow Reef, off Key Largo. The orange cards were released a day later to simulate a secondary oil release in the *Safe Sanctuaries* drill.

## Protecting Corals, Saving Ships Project Gains Momentum with Council Input

The goal of NOAA’s *Protecting Corals, Saving Ships* is to compile and encode data that can be integrated into navigational systems used by large ships operating in the vicinity of the Florida Keys National Marine Sanctuary. Once completed, navigational software designed for large ships will contain information about sanctuary regulations and the locations of coral reefs and will function to warn mariners in advance, helping them to avoid damaging natural habitat and entering the *Area To Be Avoided*, off-limits to ships greater than 50 meters in length. This information supplements what is currently already shown on NOAA-produced electronic charts. Further, the same information will also be available to recreational users, depending on the sophistication of the navigational system aboard their craft.

A working group established by the Florida Keys National Marine Sanctuary Advisory Council has met two times with project developers to identify the regulatory zones and place them in a hierarchical structure and to discuss the level of detail that will be needed to explain the rules and regulations properly.

*Protecting Corals, Saving Ships* is funded by the Coral Reef Conservation Program, NOAA. Actual data collection and encoding will begin in the near future. For more information, contact Project Manager Erich Frey at: [Erich.Frey@noaa.gov](mailto:Erich.Frey@noaa.gov) or (301) 713-2780 x144 or Upper Region Manager LCDR Stephen Beckwith at: (305) 852-7717 x35.



As a measure to prevent large ship groundings, 8 racon transponder beacons were placed throughout the Florida Keys National Marine Sanctuary in 1999. *Protecting Corals, Saving Ships* will also serve to inform mariners of large ships about the location and nature of the sanctuary’s coral reefs and other sensitive habitats.





## Community Connection Students Explore Sanctuary in Small Boats

For the past 10 spring seasons, small groups of eighth grade students from Key Largo School’s *Community Connection Program* have taken boat trips with sanctuary educators to learn about the Florida Keys National Marine Sanctuary.

“On the boat, students have fun while they become familiar with sanctuary rules and regulations, boating etiquette, and some of the habitats in our local marine environment,” commented Sanctuary Educator Rewa Maldonado.

“Usually, we visit a Sanctuary Preservation Area (SPA), where students are taught about SPAs and introduced to the concept of marine zoning. They also learn how to properly moor the boat to a mooring buoy,” she added.

Key Largo School’s *Community Connection* students also visit local businesses and state parks as part of the program.



Before leaving the dock for their *Community Connection* boat trip, Education Specialist Rewa Maldonado (far right) points out the locations they will visit and discusses navigating in Keys waters. (Photo: Nancy Diersing)

The Florida Keys National Marine Sanctuary thanks everyone who contributed their articles, photographs, and editing expertise to *Sounding Line* newsletter. *Sounding Line* is produced by the Florida Keys National Marine Sanctuary. For more information or to be placed on the mailing list, email the editor at [Nancy.Diersing@noaa.gov](mailto:Nancy.Diersing@noaa.gov).



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