

Sounding Line

News of the Florida Keys National Marine Sanctuary

Spring 2001

International Protection for Keys Waters

Cheva Heck, FKNMS Public Affairs Officer

The United States Government, in a proposal developed by the National Oceanic and Atmospheric Administration (NOAA), is seeking international approval for a measure that would help protect the coral reefs, seagrass meadows and mangrove forests of the Florida Keys from threats posed by international shipping activity.

The proposal asks the International Maritime Organization (IMO), the international body responsible for international shipping issues, to designate the marine area around the Florida Keys as a "Particularly Sensitive Sea Area" (PSSA). The coral reef ecosystem of the Keys would be the third area in the world selected for this designation, joining Australia's Great Barrier Reef and Sabana-Camaguey Archipelago in Cuba. The PSSA would stretch from Biscayne National Park to the Tortugas.

The waters around the Florida Keys and the Tortugas are one of the most heavily trafficked shipping areas in the world. An estimated forty percent of the world's commerce passes within a day and a half sailing time of Key West. Ships can cause damage to the coral reef ecosystem through anchoring, groundings, collisions, and accidental and operational discharges of harmful substances.



PSSA status will help educate the international shipping community about the importance of coral reefs.

"Designating the waters around the Florida Keys as a Particularly Sensitive Sea Area will bring international recognition of the ecological significance of our region," said Sanctuary Superintendent Billy Causey. "PSSA status will help educate the international shipping community about the sensitivity of coral reef resources to international shipping activities and increase compliance with domestic measures already in place to protect the area."

The Sanctuary Advisory Council (SAC) unanimously endorsed the proposal at its December 2000 meeting. "If any area deserves designation as a Particularly Sensitive Sea Area, it's the Florida Keys. The Sanctuary Advisory Council supports the proposal as a way to provide additional protection for our priceless coral reef ecosystem," said SAC vice chair Debra Harrison, Florida Keys Director for the World Wildlife Fund.

As part of the proposal, the United States will be seeking two additional measures to protect this area from damage by international shipping. First, the United States will request IMO recognition of three no-anchoring areas: a complete prohibition for all ships in the two sections of the proposed Tortugas Ecological Reserve, and a prohibition on anchoring by vessels 50 meters or greater in length on the remainder of Tortugas Bank.

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Message from the Superintendent



Dear Readers,

March 2001 has been proclaimed Seagrass Awareness Month by Governor Jeb Bush. The members of the Seagrass Outreach Partnership should be congratulated for their hard work and efforts to raise everyone's awareness about the importance of seagrass around the State of Florida. Perhaps you are asking yourself, "Why all the fuss, isn't the greatest threat to our Keys' resources from declining water quality?" Well ...in the next few paragraphs I would like to explain.

Marine life is pretty resilient if three conditions are met. Marine plants and animals must have good water quality, healthy and intact habitat, and good management to survive. This is not only true for our recreationally and commercially important species of fish, lobster, shrimp, and crabs that live in Keys waters, but all of our marine critters. I often use the analogy of a three-legged stool. Everything is in balance as long as the stool has all three legs, but cut one of the legs off and the stool will topple. The same is true for our marine environment; if water quality continues to decline or marine habitats, such as seagrass, are destroyed, all the good management in the world won't help the resources bounce back to life.

Decline in water quality in the Florida Keys is not a topic of debate. Most who have lived here for more than two decades have witnessed firsthand deteriorating water quality. When my wife, Laura, and I moved full time to Big Pine Key in 1974, our canal water was crystal clear on most days and underwater visibility on the reef was seldom less than 100 feet. Today, debates continue over the specific causes of water quality decline and the technological solutions that we should implement as resources are lost.

Physical destruction of the marine habitats of the Keys poses an equal threat to the continued health and vitality of our marine resources. For example, in 2000, we had 612 reported boat groundings on coral reefs, seagrass beds, and hardbottom areas. After reading the articles in this edition of Sounding Line, you will get a feeling for just some of the management actions we are taking in the Sanctuary to address habitat destruction in the Florida Keys. However, pressures on our marine resources will continue to rise as boating activities climb in the Keys.

That's why we need your help! Educating boaters to pay attention to water depth and color, use current charts, and navigate with caution is critical for protecting our marine resources. Remember, "Brown, Brown,.... Run aground!" and remind your friends and visitors who are boating to navigate carefully. Spreading the word of Seagrass Awareness Month and reminding even "old salts" that more people are now sharing our waterways is the best way to preserve the special marine communities of the Florida Keys.

Florida Keys National Marine Sanctuary

Billy D. Causey
Superintendent

Anna Marie Hartman
State Co-trustee

Sanctuary Advisory Council

George R. Neugent, **Chair**
Local Elected Official

Fran Decker, **Vice Chair**
Citizen at Large-Middle Keys

Wayne Blevins
Tourism-Upper Keys

John D. Brownlee
Charter Fishing/Sport Fishing

Virginia Cronk
Education/Outreach

Thomas N. Davidson
Recreational Fisher

Joe DiNovo
Conservation and Environment

Todd Firm
Diving-Upper Keys

Richard Grathwohl
Charter Fishing-Flats Guide

Debra Harrison
Conservation and Environment

David Hawtof
Citizen at Large-Lower Keys

Tony Iarocci
Commercial Fishing-Shell/Scale

Warren Johnson
Boating Industry

Don Kincaid
Diving-Lower Keys

Karen Lee
Citizen at Large-Upper Keys

R. Duncan Mathewson III
Submerged Cultural Resources

Ken Nedimyer
Commercial Fishing-
Marine/Tropical

Anita Schwessinger
Tourism-Lower Keys

Deborah A. Shaw
Research and Monitoring



International Protection



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NOAA designated Tortugas Bank as a no-anchor zone for ships 50 meters and greater in length in 1997 to halt destruction of the region's lush coral reefs by anchors as large as fifteen feet weighing several tons. While incidents have declined since the regulation took effect, NOAA has documented several violations of the no-anchoring area.

Although the no-anchoring zone appears on NOAA nautical charts and extensive efforts were made to educate the international shipping community about the regulation, many foreign-flagged vessels carry non-NOAA charts that do not show this zone. Since all international nautical charts must show IMO-adopted no-anchoring areas, this should increase compliance with anchoring restrictions in the Tortugas region.

The second measure is an amendment of one of the existing Areas To Be Avoided (ATBA). The proposal identifies the four Areas to be Avoided (ATBA) in the Sanctuary as a strategy for protecting the proposed PSSA. The legislation that created the Sanctuary also established these buffer areas that keep ships greater than 50 meters in length away from the reef tract.

The proposed amendment to the northernmost ATBA is in an area called the Elbow. Mariners have raised concerns that the oceanographic conditions in this area as well the configuration of the ATBA result in a potential convergence of northeasterly-bound and southwesterly-bound traffic. Although the amendment would not bring ship traffic any closer to the reef than the other areas of the ATBA, it would allow ships to increase the distance between these two opposing traffic patterns, thus increasing maritime safety in the area. By reducing the potential for collisions, the amendment would also reduce the threat to the coral reef from spills of oil, fuel and other contaminants.

NOAA expects the IMO to initially consider the proposal in April 2001. If approved, the committees could designate the area "in principle," while forwarding the no-anchoring area and ATBA amendment proposals to the appropriate Sub-committee and Committee for their consideration. The process will hopefully culminate in final PSSA designation in 2002.



John Hunt, Research Administrator for the FWC (far left), and Billy Causey, FKNMS Superintendent (far right), recognized The Nature Conservancy Five-Year Volunteers at the annual TNC volunteer luncheon held on March 10. The TNC Volunteers of the Year for each program were also honored at the event.



Seagrass is Alive!

Seagrass Awareness Month Celebrated in Florida

Cheva Heck, FKNMS Public Affairs Officer

An initiative that started in the Florida Keys spread statewide this year as Governor Jeb Bush proclaimed March 2001 Seagrass Awareness Month, in recognition of the importance of seagrass habitat to Florida's environment and economy.

The proclamation fulfills a request from the Seagrass Outreach Partnership, a Florida Keys-based coalition that includes local, state and federal agencies, conservation organizations and commercial and recreational fishing groups.

In the proclamation, Governor Bush notes that Florida's seagrass habitat supported a commercial fish and shellfish catch worth an estimated \$112 million in 1999. "Protecting seagrass habitat makes good sense for Florida, not just environmentally, but economically," said Governor Bush. "Our 2.5 million acres of seagrass help to support a healthy manatee population and produce the fresh seafood, clear waters and world-class diving and snorkeling that draw visitors to our state from around the world."

Locally, Monroe County has declared its third annual Seagrass Awareness Month. "Like many, I used to take seagrass for granted, but I've come to realize that seagrass habitat is the rudimentary building block for the marine life that supports our tourism and commercial fishing-based economy," said Monroe County Mayor George Neugent. "During Seagrass Awareness Month, I encourage residents and visitors to learn more about the environmental and economic importance of seagrass and how they can help protect it."

Seagrass is a flowering plant that lives underwater. It occurs in coastal areas throughout Florida. Because it needs sunlight to survive, seagrass is found in

relatively clear, shallow water. Seagrass beds serve as nurseries for juvenile fish, lobster, crabs and shrimp that later move offshore. They provide homes for threatened and endangered species such as the queen conch and the Bahama star. Larger animals, such as manatees, turtles, sharks and rays, forage in the seagrass, feeding on the plants themselves or on the smaller creatures that live there. Many birds, such as

herons, roseate spoonbills and osprey, feed in the grass flats. Seagrass also helps to maintain water quality, serving as a filter and anchoring sediments.

Declining water quality and chronic damage by boaters pose major threats to seagrass beds in the Florida Keys. In Monroe County, scars from boat propellers have damaged 30,000 acres of seagrass, according to a 1995 report by the Florida Marine Research Institute. These scars may take years to heal, and some may never

heal. Learning to identify

shallow water, using charts and other navigational aids are several ways boaters can avoid damaging seagrass.

"While boating-related damage is not the only threat to Florida's seagrass habitat, it's a problem that we can easily prevent by spreading the word about how to boat responsibly," said Mary Tagliareni, education coordinator for the Florida Keys National Marine Sanctuary and Seagrass Outreach Partnership chair.

In advance of Seagrass Awareness Month, the Seagrass Outreach partnership distributed more than one hundred CDs to a variety of groups around the state to jump-start local seagrass awareness campaigns. Among the contents are sample fact sheets, radio public service announcements, press releases, seagrass photos and word puzzles for children.



Over 200 young people made "Seagrass Critter Buttons" at the Kids Carnival on West Summerland Key on March 10. This was the first year that the Seagrass Outreach Partnership set up an educational booth at this annual event, which is sponsored by the Big Pine and Lower Keys Rotary Club.





Damage Assessment Team Surveys Groundings



A detailed protocol is followed by the Florida Keys National Marine Sanctuary Damage Assessment Team when assessing coral or seagrass communities. An initial inspection of the grounding site is the first step in documenting vessel damage (above left). Detailed site mapping and measurement of injuries such as prop scars and blowholes follows the site inspection. A Trimble Differential Global Positioning System Receiver unit (survey quality GPS) is used to map, record location, and document the dimensions of the injury site (above right).



To aid in measurements and detailed site mapping, a flyover may be conducted to obtain aerial photographs of the site (above left). In order to produce a detailed site map, site attributes and map data are transferred to the Geographical Information System (GIS). Statistical analysis and modeling based on monitoring of other grounding sites is used to predict recovery rates and determine the monetary compensation that will be required of the responsible party. Restoration techniques may be applied to speed the growth of new seagrass. One promising technique involves placing a series of small "bird stakes" along the length of the prop scar or throughout the blowhole (above right). These stakes are attractive landing posts for cormorants, gulls, and other birds whose waste products stimulate the growth of shoal grass, *Halodule wrightii*. Recolonization by this pioneering seagrass species stabilizes the loose sediments often exposed after dredging, thereby preventing further erosion of the grassbed by currents.



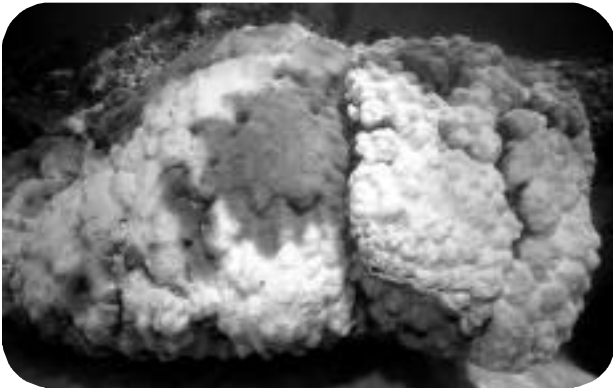
The Link between Coral Bleaching and Global Warming

Billy Causey, FKNMSSuperintendent and Joanne Delaney, FKNMS Research Interpreter

One might think that global warming would benefit the living coral reefs of the world. After all, corals thrive in subtropical climates with warm, clear water. But too much heat is not necessarily a good thing, as has been evidenced over the past several decades in the Florida Keys.

The tiny, individual polyps that comprise a coral colony require specific environmental conditions to live and grow, including clear, nutrient-poor water, sunlight, and moderate water temperatures. Increases in sea temperatures, if they are high enough, prolonged, or occur in concert with other stresses, can cause coral animals to expel the symbiotic algae living within their tissue, exposing the limestone coral skeleton. This phenomenon, known as "bleaching", leaves corals more susceptible to other stresses and may eventually cause death.

In the past twenty years, coral bleaching in the Florida Keys and elsewhere around the world has increased. Two events first signaled problems in the Florida Keys. Those were a large die-off of barrel sponges on the outer reefs off Big Pine Key in 1978 and a Keys-wide die-off of reef fish along the outer reefs in 1980. Massive coral bleaching was first recorded in the Florida Keys in 1983 along the outer reef tract of the lower Keys. This



Bleaching in boulder star coral, *Montastrea annularis*, Key Largo in 1987.

event was preceded by periods of low wind and high air temperature, which likely contributed to localized increased sea temperature. Coral bleaching was next observed in July 1987, again following doldrum-like weather conditions. During this incidence, the outer reefs throughout the Florida Keys were afflicted, and secondary impacts such as coral diseases were observed. This was also the first time coral bleaching was reported on a global scale. In July 1990, bleaching exploded Keys-wide. Inshore reefs bleached for the first time on record, and coral mortality reached nearly 65% in some areas. Bleaching expansion and intensification in the Florida Keys continued with another massive episode in 1997 that affected inshore and offshore reefs. Lingering high water temperatures and a particularly strong El Niño event caused yet another bleaching event in 1998, before the reefs could adequately recover from the previous year's stress. Similar

observations of bleaching have been made regionally and internationally since 1987, and it is widely recognized that 1997 and 1998 were the worst coral bleaching years on record causing significant loss of corals worldwide.

The pattern of geographical expansion and increased duration of coral bleaching presents compelling evidence that our coral reefs are responding to global climate change. In fact, coral bleaching episodes worldwide have coincided with the ten warmest years on record, which have occurred since 1983. Additionally, meteorological data indicate that our planet is experiencing the fastest global warming rate in 10,000 years and over the last century, average temperatures have increased by nearly 1°F. Temperatures are predicted to rise during the 21st century as atmospheric carbon dioxide emissions increase.

These alarming trends necessitate action if coral bleaching is to be curtailed. Globally, strict air pollution standards must be adopted, carbon dioxide emissions reduced, and renewable energy technologies employed. At the regional scale, elected officials and policymakers should work to conserve and protect watersheds, reduce emissions, and decrease energy use. Local communities that are culturally and economically supported by coral reefs, such as the Florida Keys, can focus efforts on improving water quality, eliminating physical impacts to corals, employing sustainable fishing practices, reducing pollution, and saving energy. Solutions exist and must be aggressively pursued and applied at many scales to slow warming trends. The Florida Keys National Marine Sanctuary is committed to doing its part to protect coral reefs locally while addressing regional issues and engaging leaders globally on climate change.





NOAA Trains Working Divers in the Keys

Cheva Heck, FKNMS Public Affairs Officer

This winter, eighteen National Oceanic and Atmospheric Administration (NOAA) employees attended an intensive training course designed to prepare them to perform scientific and technical tasks underwater.

The NOAA working diver class is designed to take non-divers and give them the skills necessary to complete scientific and work diving tasks. NOAA operates the largest federal civilian diving program, and the history of NOAA diving dates back to 1971, one year after the agency was established. Thirty years later, more than 300 NOAA divers average more than 10,000 dives per year, with a safety record of 99.97%.



A diver practices underwater work techniques in the Florida Keys Community College lagoon.

NOAA divers deploy and retrieve scientific instruments such as tidal gauges, document the behavior of marine animals, perform ship repair and maintenance, assess the impact of humans on the environment, and locate and chart submerged objects. Here in the Keys, NOAA divers install mooring buoys, assess and restore reefs damaged by vessel groundings, and track marine life populations.

The NOAA Dive Center trains new divers three times per year. The Florida Keys Community College hosts the Keys training. More than half the students in this year's class are in the NOAA Corps, NOAA's uniformed service. Several work for the National Marine Fisheries Service and four are part of the National Marine Sanctuary System.

Referred to by graduates as "dive boot camp," working diver training involves extensive classroom and in-water instruction, beginning with snorkeling techniques in the pool and progressing to basic SCUBA skills. Once these are mastered, students gain experience working

underwater. Practice tasks include object search and recovery, surveying underwater obstructions and using a sonar locator.

Trainees also learn to use specialized equipment such as AGA full-face masks and drysuits. Here in the Keys, Sanctuary divers use AGA masks to narrate underwater tours in real-time on the Internet. NOAA Corps personnel need them to perform ship maintenance tasks in polluted harbors, to avoid inhaling contaminated water. NOAA divers also use them for added warmth in cold water dives in such frigid locations as the Bering Sea.

For the students in the class who will routinely dive in cold waters, drysuits will be a way of life. Drysuit training includes practice in controlling buoyancy by adding and venting air from the suits and practice recovering from emergencies unique to drysuits, such as leg-blow-up, a rapid feet-first ascent that can occur when divers work in an inverted position and air shifts to the drysuit legs.

A different kind of dive rounds out the training - a dry dive to one hundred and thirty feet in the college's hyperbaric chamber, which allows students to safely experience the narcotic effects of nitrogen that occur on deep dives. Training in rescue techniques prepares NOAA divers, who often work far from shore, to respond to emergencies.

New working divers leave with a solid foundation in the basics of diving and hands-on experience with equipment and tasks that will help them to fulfill NOAA's mission: "to describe and predict changes in the Earth's environment and conserve and wisely manage the nation's coastal and marine resources."



Divers wearing drysuits and AGA masks perform a giant stride entry.

Employee of the Year

Reef Restoration Pioneer Receives Recognition

NOAA's National Ocean Service has recognized Florida Keys National Marine Sanctuary "Reef Doctor" Harold Hudson as its Employee of the Year for 2000. Hudson has been a pioneer in the field of assessing and restoring damaged coral reef and seagrass habitat. Since joining the National Marine Sanctuary System in 1989, Hudson has overseen numerous coral reef restoration projects. One of these was in August 1999, when Hudson directed a major reef restoration project at the site of the Columbus Iselin grounding, at Looe Key, one of the most heavily visited reefs in the Sanctuary.



Sanctuary Assessment and Restoration Biologist Harold Hudson and Resource Specialist Lauri MacLaughlin reattach a fragment of live coral at the R/V Columbus Iselin grounding site.

Hudson has shared this expertise by training colleagues in Florida, Puerto Rico and the Middle East and assisting American Samoa with a restoration project in Pago Pago Harbor and the State of Florida with a project in John Pennekamp Coral Reef State Park.

Hudson's other accomplishments include the co-development of the concept for mooring buoys that protect coral reefs from anchor damage, the invention of a method for removing black band disease from coral using vacuum aspiration, and the establishment and maintenance an array of water temperature sensors to track conditions and trends in the Florida Keys.

In nominating Hudson, his colleagues observed that, "his tireless efforts in the 11 years he has worked for the Florida Keys National Marine Sanctuary have contributed to NOAA recouping millions of dollars for damage to Sanctuary resources and resulted in the restoration of hundreds of acres of coral reef habitat."



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