

Sounding Line

News of the Florida Keys National Marine Sanctuary

January/February 2000

Sustainable Seas Expedition Arrives in the Florida Keys

Sanctuary Staff, edited from the NMS SSE website

The five-year Sustainable Seas Expeditions project was launched in the Florida Keys National Marine Sanctuary this past August, and involved scientists, technicians, teachers and students in the exciting realm of submersible technology and ocean exploration.

The Sustainable Seas Expeditions project, which uses new technologies to pioneer deep sea exploration, is funded with a grant of \$5 million from the Richard & Rhoda Goldman Fund, a philanthropic and environmental foundation based in San Francisco, and \$775,000 from the National Geographic Society's Exploration Council.

The project is led by marine biologist and National Geographic Explorer-in-Residence Sylvia Earle and former National Marine Sanctuary program director Francesca Cava. "In order to protect the oceans, we first need to understand and appreciate them," said Richard N. Goldman, president of the Richard & Rhoda Goldman Fund.

"Policies governing deep-water resources are based largely on samples retrieved by dragging nets and lowering instruments into the depths without actually seeing anything," said Earle. "It's as if aliens tried to understand the nature of San Francisco or New York by blindly pulling a trawl through the streets from a craft somewhere in the sky."

The Sustainable Seas Expeditions project will create baseline data for monitoring of the sanctuaries, comparing relatively pristine coasts with those that have been heavily used, and educating the public about the diversity of marine life and the importance of protecting it.

"Sustainable Seas Expeditions has the potential to produce stunning scientific discoveries and extraordinary educational experiences for millions of people," said John Fahey, president of the National Geographic Society. "The data we gather will provide stronger foundations for marine research and for

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From the Superintendent



Dear Readers:

The fall and winter always reminds me of football season and the level of teamwork it takes for a team to make it all the way to the Superbowl. An individual or even groups of individuals can not achieve such feats alone. I would like to use this space to acknowledge the hard work and dedication of the men and women who make up the Sanctuary Team for the Florida Keys National Marine Sanctuary. It has been an extraordinarily busy year for the Sanctuary with many new projects and all of our on-going management programs, but these tasks have been met with enthusiasm and dedication by the Sanctuary Team and our partners.

This edition of Sounding Line contains reports on several of our exciting projects that were completed during the Summer. The Sanctuary Team and many of our partners have really been busy kicking off the Shipwreck Trail, completing the first phase of the coral reef restoration project at Looe Key Reef, participating in the exciting Sustainable Seas Expedition, working on the proposed Tortugas Ecological Reserve, and marking the boundaries of our Wildlife Management Areas. These are just some of the projects that have kept us busy in the Sanctuary over the past several months, and that doesn't include all the mooring buoy work, Coral Reef Classroom, Team OCEAN projects, and many more of our regular management programs.

As I look back on the past few months and reflect on all of the incredible work completed by the dedicated Sanctuary Team, I can't help but be proud of the professional level of the work performed and the dedication and commitment each and every one of them has put into their work. Please join me in saying "JOB WELL DONE" to one of the most dedicated teams of people in State or Federal employment. Frequently, I receive compliments on the work the Sanctuary Team performs, and I have to say it is all because of their love and commitment to protecting the resources of the Sanctuary that they go beyond the call of duty on a regular basis.

Please join me in saying thank you to the most dedicated people I have ever had the opportunity or privilege to know!

Sincerely,

A handwritten signature in black ink, appearing to read "B. Causey", with a long, sweeping horizontal stroke extending to the right.

Billy D. Causey

ps. Don't forget to check out another of the great products of the past few months our new and improved Sanctuary Webpage: <http://www.fknms.nos.noaa.gov/>



Sustainable Seas Expedition

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more sound marine conservation policies. Through new knowledge, we have the opportunity to create a 'sea-change' in how Americans perceive--and care about-- their coastal areas and ocean resources."

The first week of the Florida Keys mission took the researchers, sub-pilots and support crew to the Dry Tortugas, 80 miles west of Key West, on board the NOAA Ship Ferrel. Site characterization, biological inventories, and geological studies were conducted in this remote and largely unexplored area, and the effects of waters from the Gulf of Mexico on the deep reef tract west of the Tortugas were also examined.

During the second half of the mission, the NOAA Ship Ferrel worked its way from Key West along the

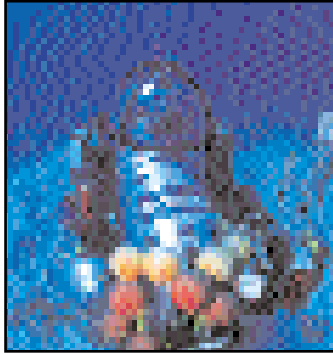


Photo by: Stephen Frink

upper Keys towards Key Largo. Habitat characterization, fish counts, studies of artificial reefs, and coral and sponge health surveys were performed. Mission logs, photographs, and research summaries of this year's Florida Keys expedition are archived on the Sustainable Seas Expeditions website at: <http://sustainableseas.noaa.gov>.

The first year of the Sustainable Seas Expedition project gave all those involved a glimpse of the diverse and fascinating underwater habitats of the Florida Keys National Marine Sanctuary. Stay tuned for updates on how this exciting project will be used in future years to better understand our ocean environment.

SSE Research Projects for 1999 in the Florida Keys National Marine Sanctuary

Lieutenant Commander Dave Savage, NOAA Corps

Three of the scientific projects for the first leg of the Sustainable Seas Expeditions (SSE) in August focused on the Sanctuary's proposed Ecological Reserve located west of the Dry Tortugas. Dr. Sylvia Earle, the Explorer-in-Residence for National Geographic, was the first submersible pilot to take the plunge into this beautiful and mysterious realm. Dr. Earle's dives focused on exploring and ground-truthing the most interesting features of the intermediate and deep reef environment.

Dr. Pamela Hallock-Muller of the University of South Florida was the Principal Investigator for the second major scientific project in the Tortugas region. Her project focused on the biological and geological characterization of the Tortugas Bank and adjacent areas. Walt Jaap of the Florida Marine Research Institute in St. Petersburg was the submersible pilot for Dr. Hallock-Muller's project.

The third major scientific project in the Tortugas was lead by Dr. Erich Mueller of Mote Marine Laboratory in Summerland Key, Florida. Dr. Mueller acted as both Principal Investigator and submersible pilot for his project, which investigated the influence of Gulf of Mexico water on the deep reef tract to the west of the Tortugas. Recent drifter studies show

that water can travel from the Gulf of Mexico and off of the southwest Florida coast to the reefs of the Florida Keys and the Tortugas. Nutrient-rich waters produced during flood episodes in these areas may periodically threaten the coral reefs of the Florida Keys National Marine Sanctuary by promoting algal overgrowth and thereby reducing sunlight reaching the coral.

The second leg of the SSE focused on the Florida Keys National Marine Sanctuary from Key West up the reef tract to Key Largo. There were five primary projects for this portion of the SSE mission. Mary Tagliareni, Education Coordinator for the Florida Keys National Marine Sanctuary, piloted the submersible through two dives at the Conch Reef Sanctuary Preservation Area and the Eastern Sambo Research Only Area.

Laddie Akins, Director of the Reef Environmental Education Foundation (R.E.E.F.), piloted the submersible to survey fish populations in the deep reef environment in both the Upper Keys near the Carysfort Sanctuary Preservation Area and in the Tortugas at Sherwood Forest. The R.E.E.F. roving-diver fish count technique has provided the National Marine Sanctuary Program with invaluable fish pop-

see **Research**, pg 4



DeepWorker Submersible Technology

DeepWorker is a one-person submersible used by Sustainable Seas Expeditions' pilots to explore the underwater world to a depth of 2000 feet. The pilot acts as researcher, navigator, and camera operator. Despite this, driving the submersible is as intuitive for most as driving our personal car.

Construction

The design of DeepWorker is simple, and consists of a small compartment built for a seated human with outstretched legs, perched atop the battery pods that power for the submersible's thrusters and electrical systems and the ballast tanks allow the pilot to adjust buoyancy and trim. Affixed to the exterior of the sub are thrusters, cameras, and data collection instruments. Behind the pilot's compartment are oxygen tanks and air systems. A half-sphere glass dome gives the pilot a fantastic 250° to 270° field of vision.

Operation

An onboard computer controls many of DeepWorker's main functions. The pilot uses a touch screen for tasks such as powering up the sub, controlling lights, and monitoring the depth of a dive.

DeepWorker is steered by foot pedals. Pilots quickly find their intuition taking over, allowing them to direct the sub with little thought. For example, pressing with the toe of the right foot makes the sub go forward, and pressing with that heel powers the sub backward. The left foot controls up and down movement, and turning with either foot steers Deep-

Worker left or right.

The thruster systems of DeepWorker make the compact submersible extremely maneuverable. Two main thrusters control forward and back movement. The addition of two angled thrusters, one on each side, gives DeepWorker the capability of moving up and down and from side to side. The thruster system allows the submersible to travel at a speed of three to four knots in any direction.

The Advantages of DeepWorker

The construction of DeepWorker gives it many advantages over its predecessors. Submersibles in the past have been heavy and large, requiring transport by large ships. DeepWorker is transportable by trailer over land and can be launched by much smaller ships.

Another advantage of DeepWorker is that it is a directly-operated vehicle, requiring no tether to the surface. A tether supplies the necessary power supply to run the submersible, but it also puts drag on the vehicle as it moves through the water, decreasing its maneuverability. In contrast, DeepWorker is a completely self-contained, lightweight submersible that can carry an explorer to significant depths at a fraction of the cost, and with far less logistical jockeying, than is traditionally required.

Vehicle Specifications

Length: 8.25 ft.(2.4 m)
Beam: 5.3 ft.(1.6 m)
Height: 5.75 ft.(1.35 m)
Weight in air: 1.3 tons (1181.8 kg)
Payload: 250 lb.(114 kg)
Life Support: 106 person hours
Speed: 3 - 4 knots max

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ulation data throughout the country.

Dr. John Ogden of the Florida Institute of Oceanography was the Principal Investigator and submersible pilot for a project which documented sponge health in the deep reef environment. Dr. Ogden's dives took place on Conch Wall and the Western Sambo Ecological Reserve.

Dr. Phil Dustan of the University of Charleston was the Principle Investigator and submersible pilot for a project which documented deep reef health near the Carysfort Sanctuary Preservation Area. Dr. Dustan has been monitoring corals for many years in the shallow reef environment near Carysfort reef under the US EPA coral monitoring program.

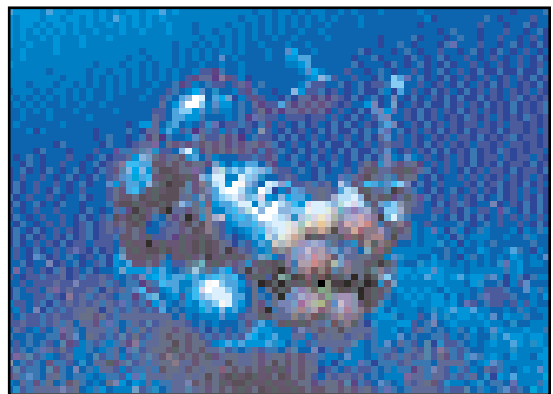


Photo by: Stephen Frink

SSE Education

The 1999 Sustainable Seas Expeditions (SSE) in the Florida Keys opened the door for new and innovative education and outreach opportunities that reached a diverse population in the Keys and beyond. We are looking forward to the Florida Keys Expedition next summer to continue and expand on some of the projects that were developed in this inaugural year.

Open house

The chance to view the Deep-Worker submersibles drew nearly seven hundred visitors to an SSE open house in Key West on Sunday, August 22. For the occasion, the NOAA Ship Ferrel, support ship for this mission, docked at Mallory Square, home of Key West's famed sunset celebration.

Children and adults alike jumped at the chance to play make believe – posing for pictures in one of the DeepWorkers on board. Dr. Sylvia Earle, SSE project director, Mary Tagliareni of the FKNMS, Mote Marine Lab's Dr. Erich Mueller, and Reef Environmental Education Foundation's Laddie Akins answered questions and shared their experiences piloting the sub.

For the smaller set, a children's activity station offered a chance to draw the view from inside the sub using crayons, colored pencils and dolphin, starfish and sand-dollar stamps. A choice of coloring books made learning about the ocean easy and fun.

Internet Events

During the Keys' mission technology played a large role in educating the nation about the Sustainable Seas Expeditions. Two internet events, a live web chat and a live video broadcast, were sponsored by the Oceanographic Program in the Earth Sciences (OPES) of the National Aeronautics and Space Administration (NASA). They were organized, hosted and managed as a partnership between NASA's Quest Project and NOAA's National Marine Sanctuaries Program.

On August 20 in the Tortugas aboard the NOAA Research Vessel Dante Fascell, Mary Tagliareni hosted an all-star cast of experts for the live video

broadcast including Dr. Sylvia Earle, Explorer-in-Residence at the National Geographic Society and Chief Scientist for SSE, Billy Causey, FKNMS Superintendent, and Walt Jaap from the Florida Marine



Sanctuary Staff, edited from the NMS SSE website Research Institute. The experts discussed the importance of marine reserves and the impact that the Tortugas 2000 effort has on the preservation of coral reefs in the Keys and around the world. An underwater tour guided by Bill Goodwin, FKNMS Resource Manager, and videographed by Kip Evans, SSE photographer, guided viewers through some amazing underwater sites, while on-board experts answered questions from the internet and

provided interpretation of the dive.

The web chat on September 2 proved to be a highly informative hour of on-line activity. Each of our experts shared a great deal about their experiences in the Florida Keys and other areas where they have conducted research. Walt Jaap shared his extensive knowledge of the history of coral in the Florida Keys. Dr. Erich Mueller also shared his expertise in response to a question regarding coral diseases in the Keys. Ben Haskell, FKNMS Science Coordinator, gave an overview on the impact of no-take areas. Bill Goodwin encouraged chatters to pursue their interest in the oceans and to get involved in the sanctuaries as much as they can.

Web Site

Since April, when the Sustainable Seas Expeditions project began in California, each day of the mission has brought over 400 visits to the SSE web site. On the site, browsers can learn more about each Sanctuary through their photo gallery, daily mission logs, essays, maps, archived live events, and more. Visitors can also learn about SSE research and researchers, education and outreach efforts, and technology.

Mini Student Summit

Seven students from two Florida Keys high schools participated in a Mini-Student Summit on August 22. After a brief introductory session, the group toured the NOAA Ship Ferrel and the Deep-



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Worker submersible. Then each student had the opportunity to climb into the sub to get a feel for what it's like to be a DeepWorker pilot.

Dr. Earle spoke to the students about her concerns for the future of our ocean planet and her hopes for the wisdom of upcoming generations.

Student/Teacher At Sea Experience

Two teachers and six students from Key West and Coral Shores high schools had the opportunity to observe the expedition aboard the NOAA Ship Ferrel on August 24 and August 27. After being shuttled to the ship, the students spent their visit watching firsthand how technology is enhancing research and education in the Sanctuary.

Student Summit

The first annual Florida Keys SSE Student Summit was held on Monday, October 4. Students from Coral Shores High School, Key West High School, Florida Keys home school students, Dr. Phillips High School in Orlando, and Collier County schools participated in the Student Summit. The Summit provided an opportunity for students to put their classroom lessons to the test as they used background knowledge, reasoning ability, and verbal skills in a spirited discussion about the state of ocean science and the fate of their local environment.

The morning session included guest speakers Francesca Cava, SSE Project Manager; Dave Savage, FKNMS SSE mission coordinator; and Coral Shores high school students. A panel of SSE DeepWorker pilots, biologists, and other experts engaged the students in a question and answer session about the SSE project, the Florida Keys ecosystem, and the National Marine Sanctuaries. The afternoon included a student discussion and debate about student-written "Hot Topics" related to the marine environment, and a brainstorming session on ideas for future Sustainable Seas Expeditions.

Shipwreck Trail Opens

Karen Bareford



This past July, the Sanctuary introduced the Shipwreck Trail in the Florida Keys. Through the Shipwreck Trail, the Florida Keys National Marine Sanctuary is seeking to make our rich maritime heritage more visible and to encourage an appreciation and understanding of these irreplaceable remnants of the past.

For each of the nine Shipwreck Trail sites there is an underwater site guide available. The guides provide the shipwreck and mooring buoy positions, history, a site map, and identify marine life you can expect to see.

The Shipwreck Trail brochure provides an overview of the Keys rich maritime history, a map identifying the general location of each of the vessels, a brief overview of each of the sites, and tips on how divers can help preserve them. The brochure and site guides are available throughout the Keys at Sanctuary offices, chambers of commerce, and most dive shops.

Sites on the Shipwreck Trail:

- ✓ City of Washington
- ✓ Benwood
- ✓ Duane
- ✓ San Pedro
- ✓ Eagle
- ✓ Thunderbolt
- ✓ Adelaide Baker
- ✓ North America
- ✓ Amesbury

T-2000

Sanctuary staff are in the process of writing the Draft Supplemental Environmental Impact Statement for the proposed Tortugas Ecological Reserve. The document should be available for public comment in March. The FKNMS is pursuing a collaborative interagency approach to protecting the unique resources of the Tortugas involving the National Park Service, the State of Florida, the National Marine Fisheries Service, and the Gulf of Mexico Fishery Management Council. The next public meetings on Tortugas 2000 will be held in the spring in order to receive public comment on the draft plan. For further information, please contact Ben Haskell at (305) 743-2437 x25 or ben.haskell@noaa.gov.



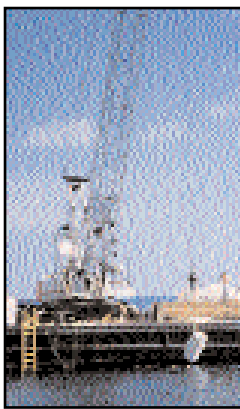
Around the Sanctuary

Columbus Iselin

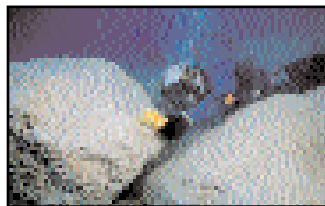
During July and August 1999, the restoration of one of America's most significant coastal barrier coral reefs took place within the boundaries of the Florida Keys National Marine Sanctuary. The project joined NOAA staff and contractors in the difficult job of physical reconstruction of four coral reef spurs damaged in the grounding of the Research Vessel Columbus Iselin at Looe Key.

For more information, visit the Columbus Iselin Coral Reef Restoration Project on-line at <http://www.sanctuaries.nos.noaa.gov/special/columbus/columbus.html>

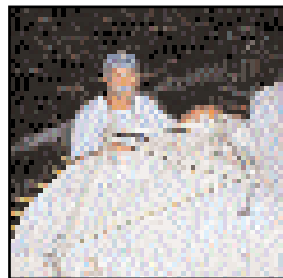
Photos by Harold Hudson, FKNMS Restoration Biologist and
Craig Krumpel, Coastal Planning and Engineering



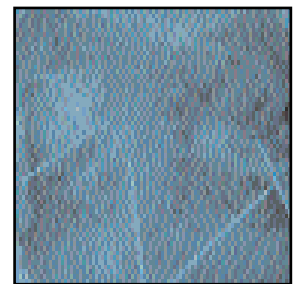
Crane lowers five ton quarried limestone bolder into grounding excavation from deck of barge.



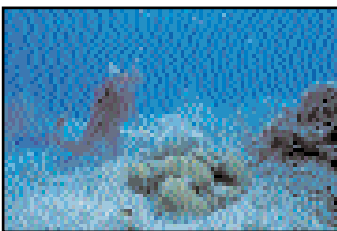
Using surface-supplied air, commercial diver scrubs biofouling from boulders to enhance adhesion of pumped concrete.



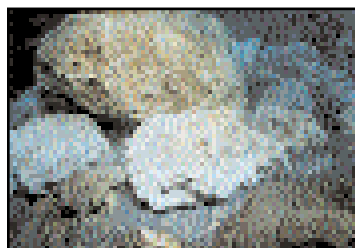
Special fiberglass reinforcing rod and stainless steel anchor rods anchored in bottom side of bolder provide additional linkage between concrete and bolder.



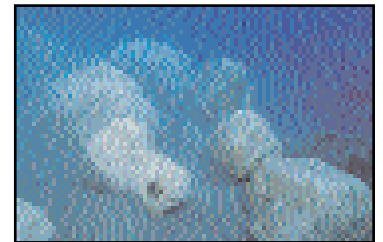
To provide tensile strength between boulders and concrete, a lattice-work of fiberglass reinforcing rods crisscross spaces between boulders.



A special non-separating underwater tremie concrete is then pumped into filled excavations.



Concrete surface completed repairs ornamented with various sized limestone rocks and small boulders to mimic natural reef outcroppings. This additional "roughness" will also provide critical habitat for coral recruits and other reef biota.



Final "icing on the cake" is transplanting of adult coral colonies. Here a large multi-lobed starlet coral has been embedded in the newly restored reef framework.

Sanctuary Friends of the Florida Keys

Alan Cradick, Chair

I have some exciting news. The Florida Keys National Marine Sanctuary has a Friends organization. Our mission statement is: "Sanctuary Friends of the Florida Keys is dedicated to raising awareness and building support for the Florida Keys National Marine Sanctuary. Sanctuary Friends seeks to protect the endangered marine ecosystems of the Florida Keys and North America's largest coral reef for current and future generations."

Sanctuary Friends is established in the state of Florida as a not-for-profit corporation and has been issued a Federal Employer Identification Number by the IRS. We are pursuing 501(c)(3) status from IRS and Charitable Organization status from the state of Florida.

We have opened a bank account and a post office box. Sanctuary Friends has a domain on the world wide web. We hope to launch our web page in the next few months.

Donations so far received include: two computers and a printer, 3000 copies of letter-head, web site design, post office box fees and web domain registration.

If you are interested in joining Sanctuary Friends, please send a self-addressed, stamped envelope to Sanctuary Friends, Post Office Box 504301, Marathon, FL 33050.

**Sanctuary
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Florida Keys National Marine Sanctuary
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