

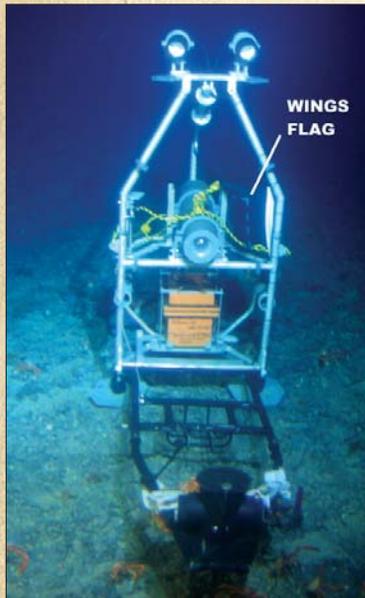
FLORIDA & CALIFORNIA EXPEDITIONS

Deep-Sea Exploration with New “Eyes and Ears”

Dr. Edie Widder and her graduate student, Erika Raymond, carried Wings WorldQuest Flag #8 deep into the ocean to study how brightly lit and noisy Remote Operated Vehicles (ROVs) and submersibles influence what deep-sea explorers see.

Edie developed the Eye-in-the-Sea camera to answer the question: “How many creatures are we not seeing because they flee when they hear or see us coming?” Deep-sea explorers have traditionally collected marine organisms by dragging nets behind ships. The truism among oceanographers, however, is that “nets only capture the slow, the stupid, and the greedy.”

With the advent of submersibles and ROVs, new wonders were revealed, especially fragile jellyfish, which are destroyed by nets. Submersibles and ROVs, however, use noisy thrusters for propulsion and bright spotlights to probe the darkness. One can assume that any creature with sight, hearing, and sense would try to evade such behemoths. By contrast, Edie’s Eye-in-the-Sea sits quietly on the bottom, recording life in the depths with red light that is invisible to most marine life.



caption text

OPENING A WINDOW INTO THE DEEP SEA

To tempt marine life into the camera’s field of view, Edie uses traditional bait, as well as an unusual lure – an electronic jellyfish that mimics a brilliant bioluminescent display believed to attract predators. The first time Edie deployed this lure, during a 2004 Gulf of Mexico expedition, she recorded a video of a large squid, over six feet in length, so new to science that it cannot be placed in any known scientific family. Astonishingly, this squid appeared only 86 seconds after the lure was turned on for the first time.

Although the squid recording was proof of the effectiveness of the Eye-in-the-Sea, further evidence was required. As part of Erika’s research, a hydrophone was added – converting the Eye-in-the-Sea into an Eye-and-Ear-in-the-Sea – in order to learn about how marine life responds to the sounds made by submersibles and ROVs.

THE DEEP FLAG AND A SUBMERSIBLE DIVE IN FLORIDA

In June, Wings WorldQuest Flag #8 traveled to a depth of 940 feet, attached to Edie’s Eye-in-the-Sea, where it remained on top of the Miami Terrace, 15 miles off the coast of Fort Lauderdale, Florida, to record the activity of deep-sea life for 48 hours. During this dive, Erika rode in the *Johnson-Sea-Link* submersible, which was initially transported to the site by the Harbor Branch Oceanographic Institution’s R/V *Seward Johnson*. Not long after the Eye-in-the-Sea camera was deployed from the submersible, a 12-foot-long six-gill shark arrived to investigate the bait, nearly pushing the deep-sea camera on its side.

Some 15 miles off the coast of southern Florida, the Miami Terrace rises like a backbone from the sea floor. This unique undersea habitat is rich with deep-sea coral thickets and a myriad of specialized creatures. Because the dive occurred in the evening, many basket stars were fanned out along the coral, extending their long tentacles into the food-rich current. Groups of fish dodged the submersible. Some species darted back to the safety of the coral, while others were attracted to the bright lights and the hum of the thrusters.

“In order to be good stewards of the ocean, we need to know how many animals there are, how they are distributed, and how they behave”

– Dr. Edie Widder

WHO
Dr. Edie Widder

WHAT
Exploring ocean depths with new technological “eyes and ears”

WHERE
940 feet deep on the Miami Terrace off Florida and 2,896 feet deep in the Monterey Canyon off California

WHY
To record how the lights and noise of exploration vehicles impact marine life

photo caption



Read about Edie's work on the Web:

www.oceanrecon.org/research.html

THE DEEPEST FLAG AND ROV DIVES IN CALIFORNIA

In September, Wings WorldQuest Flag #8 plunged to a depth of 2,896 feet in the Monterey Canyon, where it remained attached to the Eye-in-the-Sea for 48 hours. A series of tests were run with the ROV *Ventana* – transported by the Monterey Bay Aquarium Research Institute's vessel, the R/V *Pt. Lobos* – to record how much noise it produced at different distances from the hydrophone and when it activates different thrusters.



photo caption

The next day, a similar series of tests were run with the ROV *Tiburón*. In the interim, the camera was programmed to record the behavior of fish and other aquatic animals when viewed alternately under far-red light or white light.

EXPEDITION TEAM

Principal Investigator:
Dr. Edie Widder, Ocean Research & Conservation Association

Graduate Student:
Erika Raymond, Ocean Research & Conservation Association and Johns Hopkins University

Engineer:
Lee Frey, Harbor Branch Oceanographic Institution

Ship Support:
Captain and crew, R/V *Pt. Lobos*
ROV pilots, *Ventana*

Captain and crew, R/V *Seward Johnson*
Submersible pilots and crew,
Johnson-Sea-Link

EXPEDITION RESULTS

The team was elated about the hydrophone results from the submersible and the ROV dives. Recordings demonstrated that the ROV *Ventana's* hydraulic pump created a piercing noise in the audible range that greatly reduced the amount of marine life seen around the camera. The ROV *Tiburón* and the submersible, however, which are primarily operated without the use of hydraulics, were quieter and less disturbing to the oceanic fauna.

The 48-hour deployment in Florida revealed a strong day/night cycle in many of the species present. Wreckfish, a species whose numbers have dramatically declined over the past decade, appeared to be thriving in this region, and many new observations were made about their undisturbed behavior.

ABOUT DR. EDIE WIDDER

Dr. Edie Widder is president and senior scientist of the Ocean Research & Conservation Association in Fort Pierce, Florida. She also is an adjunct research professor in the Earth and Planetary Sciences Department of Johns Hopkins University; a Distinguished Scientist Adjunct at the Monterey Bay Aquarium Research Institute; and an adjunct professor of biological science at Florida Institute of Technology, at Florida Atlantic University, and at Bigelow Laboratory for Ocean Sciences. She is a world authority on marine bioluminescence, and as an ocean explorer, she has participated in over 60 research expeditions. In 38 of these expeditions, she was the chief scientist. She is also a certified deep-submersible pilot. Her research in bioluminescence has been featured in numerous nature programs that have aired on the BBC, PBS, Discovery Channel, and National Geographic. Edie was the recipient of the 2006 Wings WorldQuest *Women of Discovery Sea Award*.

EXPEDITION SPONSORS

National Science Foundation
Monterey Bay Aquarium Research Institute
Harbor Branch Oceanographic Institution



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