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Anne Smrcina/NOAA

Above the wreck of the passenger vessel *Portland* aboard the R/V *Connecticut*, Stellwagen Bank National Marine Sanctuary manager Craig MacDonald says a few words of remembrance for the 192 passengers and crew lost in the *Portland* sinking, as three student aquanauts—(left to right) Alex Kolbovski, Lynn Worobey and Amberlie Silva—prepare to throw flowers into the sea.

Real-Time Weather Data Will Enhance Homeland Security

—By Curtis Carey and
Barbara McGehan

Following the Sept. 11 terrorist attack on the World Trade Center, the National Weather Service hastily deployed mobile meteorological stations near the World Trade Center to track and forecast the acrid air from the smoldering remains.

The more precise weather observations and forecasts from these multiple mobile weather stations allowed rescuers to fine tune their emergency responses, helping protect the lives of rescue workers.

A new partnership the Weather Service recently signed with AWS Convergence Technologies will now allow weather data collected by a network of 6,000 real-time weather stations maintained by the company to be immediately available to government agencies in real time if another attack occurs.

The weather stations are located primarily at schools around the country, which use the stations as part of their classroom science curriculum. In the Washington, D.C., area, for example, over 400 schools are part of the AWS weather network.

Because the school weather stations are particularly dense in major metropolitan areas, the network is particularly well suited to augment the Weather Service's
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"Discovering" the Sunken Ship *Portland*

—By Ivar G. Babb

The year 2002 may be remembered as the year of submerged cultural resources for NOAA.

Significant discoveries and advances were made through the efforts of several NOAA programs during the last few months, including most recently the validation of the location of the sunken passenger ship *Portland* in NOAA's Stellwagen Bank National Marine Sanctuary off New England.

Portland sank during a storm Nov. 27, 1898, on a run from Boston to Portland, Maine, with the loss of all 192 passengers and crew.

Two private citizen explorers, John Fish and Arnie Carr, had previously conducted a side scan sonar and camera survey of the *Portland* site. Although they believed the wreck to be *Portland*, they were unable to definitively identify it.

The ultimate confirmation of the wreck's identity took place this past summer during a two-day cruise conducted by the NOAA-cooperative National Undersea Research Center for the North Atlantic and Great Lakes at the University of Connecticut.

Every year teachers and students
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Ens. Bryan Wagonseller/NOAA

NOAA ship *Delaware II* master Jack McAdam (left) and executive officer Lt. Cdr. Richard Wingrove display a certificate bearing a drawing of the new species of snailfish, *Pseudnos delawarei*, named after the ship.

New Fish Species Is Named After NOAA's Delaware II

—By Jeanne Kouhestani

What started out as a routine cruise resulted in an honor rarely bestowed on a research vessel—having a newly discovered species of fish named after the ship that netted it.

David Stein, an ichthyologist with NOAA's Office of Oceanic and Atmospheric Research and one of the world's leading experts on snailfish, or liparids, named a new species of snail fish after the NOAA ship *Delaware II*.

Stein and Russian researcher Natalia Chernova published the first description of the new species, *Pseudnos delawarei*, in the professional journal *Copeia* in August.

The one-and-one-half-inch fish was collected by Harvard University scientist Karsten Hartel during a NOAA Fisheries cruise aboard

Delaware II off Cape Cod in November 2000, then placed in Harvard's Museum of Comparative Biology, where Chernova found it.

Jack McAdam, master of *Delaware II*, said he was caught by surprise when he recently got the word from Charles Byrne at NOAA's Northeast Fisheries Science Center in Woods Hole, Mass., that the fish had been named after the ship.

"It was news to me that they decided to name the fish after the ship. It was quite an honor. To me this is a big deal," McAdam said.

Byrne's message to the captain and crew of *Delaware II* stated in part, "It is my distinct honor and pleasure to be the person to inform you that the *Delaware II* has received an honor afforded only to those who have made significant contributions in the pursuit of science. In recognition of the contributions that the *Delaware II* and her officers and crew have made to further our understanding of marine ecosystems off our coast, continued on page 6

Weather Data

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ability to provide emergency response weather data.

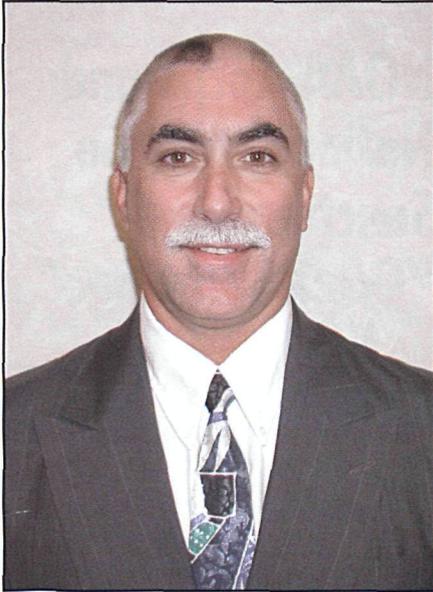
The Weather Service has long played a key role in helping federal and local officials respond to major disasters that are not caused by adverse weather conditions. Weather Service forecast offices already provide weather forecasts for civil emergency responses and broadcast the emergency messages over NOAA Weather Radio. Forecast offices have set up pre-arranged agreements to facilitate and speed the process, since minutes and seconds make a difference.

Responding to major disasters, either from terrorism or accidents, local emergency-response officials like firefighters, police and other emergency crews have precious few minutes to make life-saving decisions.

"Faster access to more real-time surface-level weather data is critical in helping crisis response agencies, the military and emergency managers make critical decisions," Weather Service director Jack Kelly said. "In the case of the Twin Towers, AWS has more than 40 weather stations near ground zero in Manhattan, the closest of which is just a half mile from the site," he said.

According to Kelly, access to the AWS weather stations during the World Trade Center recovery effort would have allowed the government to respond even more quickly.

If another homeland security incident does occur, the Weather Service will receive real-time data from the stations located near the event to help first responders and other emergency officials. In the case of a chemical spill or attack, the first responders have to decide continued on page 7



Richard H. Spadoni/CP&E, Inc.

Craig Kruempel.

Craig Kruempel Is the Team Member of the Month

—By Dane Konop

Just before midnight on Aug. 10, 1994, the 154-foot research vessel *Columbus-Iselin* operated by the University of Miami went aground on the coral reef of Looe Key, part of NOAA's Florida Keys National Marine Sanctuary. The ship remained aground on the reef for nearly two days. Before salvagers could remove it, the mortar and pestle action of the ship's steel hull wore away 345 square meters of living star coral, brain coral, sea fans and other soft coral and 338 square meters of the underlying reef framework.

According to Harold Hudson, widely known as NOAA's coral reef doctor, all that remained of that portion of the reef was coral rubble.

In 1998, Hurricane Georges struck the area, doubling the damage to the reef. A bus-sized portion of the reef left precariously hanging over the edge of the damaged reef simply disappeared during the storm.

Today, following extensive repairs of the reef base completed in 1999, the impact of the grounding is barely discernable, thanks in large part to a restoration team led by Craig Kruempel, the October Team Member of the Month.

Kruempel, director of environmental studies for Coastal Planning and Engineering, Inc., of Boca Raton, Fla., worked with Hudson and other sanctuary employees in the summer of 1999 to replace the damaged section of reef base with nearly 200 cubic meters of concrete embedded with rocks, locally quarried limestone boulders and fragments of coral recovered after the grounding.

"The overall effect is a rocky, elevated outcrop," Hudson said. "On that outcrop we have transplanted ten specimens of hard and soft coral," he said.

Although it will be centuries before the slowly growing reef recovers, Mother Nature also lent a hand. Algae and other bio-fouling organisms have blended in the repair with the surrounding reef, according to Hudson. "Numerous fish have also re-occupied the site, feeding on the algal accumulations on the rock," he said.

"Craig was in charge of drawing up the plans, blueprints and all the specifications for the materials, the concrete, just about anything you can imagine that would have to do with putting together a plan of this scale," Hudson said.

Hudson and Kruempel were well matched for the job.

"Harold is amazing. I want to be like him when I grow up," Kruempel joked. "He has got so much knowledge in his head—the practical application of what will work on a site, his knowledge of the reef, coral morphology and the biology of the animals there."

Kruempel and Hudson also collaborated on the restoration of *continued on page 8*



Jennifer Ise/NOAA

Erica Seiden.

Erica Seiden Is the October Employee of the Month

—By Theresa Eisenman

When the going gets tough, the National Ocean Service calls on Erica Seiden.

Her colleagues say they turn to her when they need help because she is reliable, gets the job done and is simply a pleasure to work with. These are just a few of the reasons why Seiden has been named Employee of the Month for October.

Seiden is a program specialist for the National Estuarine Research Reserve System, a network of protected areas established for long-term research, water quality monitoring, education and stewardship.

The reserve system is a partnership between NOAA and the coastal states.

Seiden is the NOAA liaison for reserves located in the southeast and in Alaska. She plays an important role in ensuring states are awarded NOAA funding, leads sites *continued on page 8*

Focus On...



Amy Massey/Fla. DEP

Lt. Cdr. David Score takes the helm of the Florida Keys National Marine Sanctuary's research vessel *Odyssey*.



Felipe Arzayus/NOAA

Lt. Peter Fischel prepares to board a U.S. Coast Guard helicopter to survey Gray's Reef National Marine Sanctuary.

NOAA Corps and National Marine Sanctuaries: A "Great Marriage"

—By David Hall

This fall, NOAA's Channel Islands National Marine Sanctuary will have a new manager when Lt. Cdr. Matt Pickett, a NOAA Corps officer, passes the torch to Christopher Mobley.

Mobley, a former officer, will be the sanctuary's first civilian sanctuary manager, a job that historically has been held by NOAA Corps officers.

Pickett, meanwhile, will be the last NOAA Corps officer to hold the sanctuary manager title, as the requirement for officers to rotate assignments every two or three years does not allow the continuity preferred for the top position.

But Pickett will not be the last NOAA Corps officer to serve within the National Marine Sanctuary Program, and do so with distinction. The long-standing relationship between the NOAA Corps and the sanctuary program endures—to everyone's benefit.

"The imprint of the NOAA Corps on the sanctuary program has been, and remains, significant," said National Marine Sanctuary Program director Daniel J. Basta, citing the many services that the NOAA Corps has provided for more than two decades. Basta also credits NOAA Corp officers with filling a critical need from the program's inception, when funding for civilian sanctuary personnel was unavailable.

Currently, NOAA Corps officers serve as executive officers and
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Rebecca Young/NOAA

Lt. Cdr. Matt Pickett performs pre-flight checks on NOAA-64, a Lake Renegade Seawolf seaplane used by the Channel Islands National Marine Sanctuary to monitor sanctuary activities and resources.



Lt. (j.g.) Jeremy Weirich/NOAA

Lt. Jon Swallow and Lt. (j.g.) Holly DeHart navigate the NOAA ship Whiting while mapping Gray's Reef National Marine Sanctuary as civilian Vicky Carpenter looks on.

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assistant managers at three sanctuaries: Channel Islands, Florida Keys and Gray's Reef. Many more serve on NOAA vessels and aircraft, supporting sanctuary work with critical research on everything from habitat characterizations to marine mammal surveys.

"One of the reasons NOAA Corps officers have provided effective leadership in the sanctuary program is the same reason Pickett must move on to a new position," said Rear Adm. Evelyn Fields, director of the NOAA Corps and Office of Marine and Aviation Operations, which operates and manages the NOAA fleet.

"Officers rotate billets every several years, giving them a broad spectrum of operational experience aboard our ships or aircraft, as well as experience within NOAA's shore-based programs. This broad diversity of experience enables them to 'cross-fertilize' and enrich each new assignment, and is of great benefit to all NOAA pro-

grams," she said.

Florida Keys National Marine Sanctuary superintendent Billy Causey is a big fan of the uniformed service. "I have worked with NOAA Corps officers since 1984," Causey said. "They have been a tremendous asset to the sanctuary program over the years."

The National Marine Sanctuary Program would like to see an increase in the role of NOAA Corps officers in the program. To that end, the sanctuary program has proposed the creation of a sanctuaries-oriented career track for NOAA Corps officers.

The reason is simple. NOAA Corps officers not only have a skill base that is extraordinarily difficult to find, they also have a profound commitment to public service.

Eventually, the program hopes to have a NOAA Corps officer at every site in some capacity.

"Working with the sanctuaries allows one to work across a broad canvass and to effect change," Basta said. "Everything a NOAA

Corps officer is trained to do—from ship handling to conducting research—can be done in a sanctuary. It's a wonderful training ground at many levels."

Lt. Cdr. David Score, a NOAA Corps officer who serves as upper region manager for the Florida Keys sanctuary, agrees.

"Sanctuaries benefit by getting personnel with broad operational and management skills," Score said. "The NOAA Corps benefits by giving officers a wide range of duties, responsibilities and exposure to various state, federal and academic organizations as well as stakeholder groups."

Pickett, who is moving to Silver Spring, Md., to head up a NOAA Corps remote sensing flight division, would like to see NOAA Corps officers remain involved in sanctuary work.

"Much of what NOAA does coalesces in the sanctuary program," Pickett said. "Sanctuaries and the NOAA Corps are a great marriage." ☺

Portland

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from the northeast are selected for the center's student aquanaut program, of which the Stellwagen Bank marine sanctuary is a primary sponsor.

The student aquanauts spend two weeks preparing for, conducting and reporting the results of a real-world research project using the advanced underwater technologies available at the UCONN center.

For the Portland mission the UCONN undersea research center provided the *R/V Connecticut*, a remotely operated vehicle, side-scan sonar and technicians.

Student activities planned for the *Portland* cruise included logging the location of the vessel during side-scan sonar surveys and the ship's initial fathometer passes over the suspected wreck sites, logging archaeological observations with NOAA marine archaeologist Bruce Terrell, and logging biological observations with me, the mission's biologist.

All aboard the *R/V Connecticut* on those last few days in July were abuzz with excitement and anticipation as we set out from Gloucester, Mass., on a beautiful New England morning.

The first planned activity of the day was to have the ship pass over the wreck site coordinates that were provided by the Stellwagen Bank sanctuary. One of the students, Amberlie Silva, and I were on the bridge to log this initial survey with the ship's captain, Turner Cabaniss.

As the ship passed *Portland's* suspected location, we carefully watched the ship's fathometer as it dramatically changed depth by over 40 feet. "There is something big down there," Turner said, as Amberlie scrambled to record the exact latitude and longitude.

In the first act of the drama, the ROV descended to the sea floor using its sector scanning sonar to pinpoint the range and bearing to the large wreck.

On the surface, archaeologists and other sanctuary personnel crowded into the control van with computer screens for the integrated navigation system and sonar, plus video screens for the two video cameras mounted on the ROV.

Another television monitor in the ship's galley wired to the ROV output was being carefully watched by sanctuary educational personnel, aquanaut program teachers and the ship's crew.

Approaching the wreck, we encountered a few pieces of debris that provided clues that we were getting close. Many of the pieces were covered with brightly colored sea stars or were habitat for redfish. Then suddenly the video screens filled with a solid vertical wall—the side of the wreck!

As ROV pilot Craig Bussel began to slowly maneuver the vehicle up the outwardly curving wall, the screen was filled with the bright oranges, pinks and whites of anemones festooning the wreck. Then all screens went black. The ROV had lost power and had to be recovered by hand as everyone's minds and mouths raced with questions, guesses, suppositions and hypotheses as to what was wrong with the vehicle.

Was this a fatal breakdown? What had we just seen?

The ROV's support crew quickly began to trouble shoot the problem, while the side scan sonar crew spun up to conduct a survey of another significant wreck site that lay only kilometers from the *Portland* site.

Act two of the drama ensued in the afternoon as the ROV was quickly repaired.

Again the ROV descended from the dynamically positioned ship,

Pseudonotus delawarei

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the new species has been named *Pseudonotus delawarei* after the *Delaware II*."

Stein said *Pseudonotus delawarei* and related species of snailfish, which are widespread in marine waters around the world but not in very large numbers, feed on copepods and other minute organisms in the light-deprived mid-ocean depths.

This particular organism qualifies as a new species because it has a combination of characteristics unlike others in this genus, including the number of vertebrae, the angle of the mouth, its gill rakes and the color of its skin.

McAdam hopes to commemorate the honor by printing T-shirts with a picture of his new favorite fish.

And a slogan? "Maybe something like, 'The *Delaware II*—kicking butt and MAKING names,'" he said. ☺

this time from a slightly different location over the wreck. A long, cylindrical object appeared in the distance as the ROV headed toward the wreck. As the ROV ran along its length, all wondered what this pipe was that lay solitary on the sea floor with its base tortuously bent over 90 degrees.

The ROV then encountered the large hull of the wreck and began a detailed survey that produced numerous clues that this was, indeed, the sunken *Portland*.

As the *R/V Connecticut* headed for port at the end of the day, many reviewed the tapes for additional features that could confirm the vessel's identity.

Suddenly a loud cheer emanated from the map-strewn wet lab of the ship.

"Kathryn found it," shouted sanctuary manager Craig
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Weather Data

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quickly which municipalities to evacuate and the order in which to do so, the best approach routes for police and firefighters and the type of equipment to dispatch to a disaster site.

Real-time weather information such as surface temperatures and wind speed and direction can help shape all of these key decisions. When local officials know more about the movement of hazards in the air, such as smoke or dangerous chemicals, they can make more informed decisions that can save lives.

AWS Technologies is now sending data from the schools to NOAA's Forecast Systems Laboratory in Boulder, Colo., where scientists verify and check the data before they are sent to forecast offices, NOAA's Storm Prediction Center in Norman, Okla., and NOAA's National Centers for Environmental Prediction.

Every 15 minutes, laboratory scientists gather temperature, precipitation, wind speed and direction, barometric pressure and relative humidity and verify whether the data look good or not.

Patricia Miller, mathematician and chief of the laboratory's Scientific Applications Branch, said, "[We] look at temperature as a function of time. We do temperature consistency checks. For example, if the temperature from a particular station falls from 90 degrees to 0 degrees in 15 minutes, we know the data is bad, and we make sure we catch it."

The laboratory was one of the few groups able to handle these large data sets because of its previous experience in working with many state and local government agencies, public utility companies, research organizations and private companies that have installed

meteorological observing systems.

In addition to providing information to the Weather Service, the Forecast Systems Laboratory will make the statistics and quality control information available to AWS Technologies as well.

Recognizing his company could help in the event of another attack, especially an attack with an airborne hazardous substance, AWS chief executive officer Robert Marshall offered the Weather Service access to the company's data.

"The unique value and quality of highly localized, up-to-the-second weather information provided by the AWS weather net are critical for homeland security and emergency response applications," he said.

According to Marshall, the partnership also gives the schools something to be proud of and an important role in helping support homeland security.

John Leck, a science teacher at Kingsview Middle School in Germantown, Md., said his students are excited about their AWS Weathernet station being used in the partnership.

"They are going to get the chance to see how scientists and meteorologists work directly with the real data and they are going to get a chance to do it themselves," Leck said.

In July, President George W. Bush said, "In the war on terror, the American people are showing tremendous strength and great resolve. Our unity is a great weapon in this fight."

Kelly said the new partnership with AWS Convergence Technologies embodies the kind of involvement President Bush called for from all Americans

"This agreement is a great example of the public-private partnerships so vital to our mission. We are working together to save lives," Kelly said. ☺

Portland

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MacDonald, referring to one of the aquanaut program teachers, Kathryn Zubrowski, who matched the pipe found on the sea floor with a steam escape pipe shown in a painting of *Portland*.

The final act of the drama played out the following afternoon. The ROV descended on its third dive as the vessel was positioned over the stern of the wreck. The dive began without incident, but blood pressures began to rise in direct relation to the number of lost gill nets the ROV encountered as it worked along the stern of the *Portland* wreck.

The wreck's rudder was clearly documented. But when the ROV tried to proceed forward, it reared up like a lassoed horse or a dog on a leash, indicating that its tether was caught. Numerous attempts to pilot out of the snag proved fruitless.

Fortunately, the *R/V Connecticut* remained rock-solidly positioned over the wreck. Had it not been for this capability in the face of a freshening breeze, the ROV probably would have been lost. In the end, finesse gave way to force and the ROV was retrieved by the ship's winch, along with 100 pounds of lost net and settled fauna. All breathed sighs of relief.

The epilogue of the drama played out on the deck of *Connecticut* above the *Portland* wreck as the assembled researchers, students and crew paused for a few words of remembrance and a moment of silence for those lost on that fateful day of Nov. 26, 1898.

Student aquanauts then cast three bunches of brightly colored flowers upon the waters, which slowly drifted away from the ship, as MacDonald said solemnly, "May this forever be a sanctuary for their souls." ☺

Seiden

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through the management plan, environmental impact statement and evaluation processes, and provides overall guidance to reserve management.

Seiden also coordinates the reserve system's graduate research fellowship. This program provides master's and doctoral candidates with an opportunity to conduct their research in a national estuarine research reserve.

Established in 1997, the fellowship has made tremendous strides since Seiden began managing it three years ago. The program has become more competitive and the scope of the research has expanded. Over the last year, Seiden has fostered increased interaction among the students and provided more professional development opportunities for them.

"Erica cares deeply about the students enrolled in the graduate research fellowship and is constantly looking to improve the program in creative ways," said Laurie McGilvray, chief of the Estuarine Reserves Division of the National Ocean Service. "She is highly organized and effective in accomplishing it," she said.

"Seiden has had to deal with many challenging issues in her role as a site liaison and coordinator of our fellowship program," McGilvray said. "She works through these challenges with the utmost professionalism, gaining the trust and respect of our state partners, staff scientists and graduate research fellows."

Prior to joining the National Estuarine Research Reserve System four years ago, Seiden worked for NOAA's Office of Sustainable Development.

Her B.S. and M.S. degrees are in marine biology from the University of West Florida and the University

of North Carolina, respectively.

Seiden resides in Washington, D.C., with her husband Steven. She volunteers at a local animal shelter and as a coach for a community basketball league called the Capitol Hill Kids. ☺

Kruempel

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Molasses Reef, also in the Florida Keys marine sanctuary, which was damaged in August 1984 during the grounding of the freighter *M/V Wellwood*. The ship was hugging the reef to save fuel by avoiding the Gulf Stream when a navigational error led them onto the reef.

The massive, 400-foot ship remained aground for 12 days before being pulled off the reef by salvors.

"Unfortunately, the salvors did almost as much injury to the reef as the ship itself," Hudson said. "It was eventually lightered and removed. That was 1,282 square meters of reef just essentially destroyed, an area about three times the size of the injury at Looe Key," he said. The area looked like a "rubble road bed," Hudson said.

Hurricane Georges also hit Molasses Reef, gouging out 14 huge potholes in the already damaged reef bed.

It took nearly 15 years to collect the fines used to restore the reef. Restoration work began this past Memorial Day weekend and was completed July 17.

"The damage was spread out over a larger area than Looe Key," Kruempel said. "But from a structural restoration standpoint, the quantities of concrete and boulders that were needed were significantly less," he said, because the reef was protected by deeper water than at Looe Key.

Approximately 100 cubic yards of concrete were used at Molasses Reef.

In both projects, the restoration team worked from a 150-foot barge moored above the reef, with a concrete-mixing dump truck welded to the barge alongside a 100-ton crane to handle the boulders.

A special mix of concrete used in offshore marine construction was pumped into the site through a six-inch plastic hose operated by hard-hat divers.

At Molasses Reef, the team placed "reef replacement modules" in the damaged portion of reef bed and anchored them in the artificial reef bed with concrete. These reef replacement modules, which are a mix of concrete, limestone rocks and coral rubble containing nooks, crannies and other cavities, were fabricated ashore and designed by Hudson to resemble natural reef outcrops.

"Incorporation of Harold's reef modules into the *Wellwood* grounding site was amazing," Kruempel said. The fish assemblage immediately after the site was restored was just amazing," he said.

Kruempel was surprised to be singled out for the work, calling it a team effort.

"It's nice to be recognized," he said, "but even better to be recognized for a job you enjoyed working on." ☺

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