

In depth reefsearch

Team works to answer questions about continental shelf

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ABOARD THE R/V SEWARD JOHNSON | The small, four-man submersible surfaced just off the bow of the 204-foot-long research vessel Seward Johnson, signaling the end of another exploration to the sea bottom.

As the 1,200-ton boat maneuvered closer to the Johnson-Sea-Link sub, a crewman swam over and attached a towline to the mini sub as a light swell washed over its bubble-nose.

Once within range, an A-frame crane on the ship's stern hauled the 23-foot-long sub aboard, and another small section of North Carolina's deep reef habitat became a little better understood.

Long known to commercial fishermen as prime fishing grounds, researchers are only just beginning to explore the habitat and ecological role of the deep reef areas that pepper the continental shelf between North Carolina and Florida.

Andrew Shepard, associate director of the National Underwater Research Center at the University of North Carolina at Wilmington, said the areas are ecologically rich because of the combination of the rocky outcroppings and warm water of the Gulf Stream. "You put those two things together and you've got a hot spot," he said.

But scientists know precious little about the maritime resource beyond what commercial



STAFF PHOTOS | KEN BLEVINS

The Johnson-Sea-Link sub prepares to be raised out of the ocean and brought aboard the research vessel 'Seward Johnson.' The sub is owned and operated by the Harbor Branch Oceanographic Institution.



Jonathan Hartsell empties a net as the crew of the research vessel 'Seward Johnson' prepares to look for more specimens.

fishermen catch.

"That's a function of this being a difficult habitat to work in," said Steve Ross, research coordinator with the N.C. Coastal Reserve Program, as other researchers went through a bucket of samples recently brought onboard. "Science doesn't get a chance to work out here very often."

With tools ranging from nets to mini subs, researchers hope data gleaned from a 10-day mission to the area, funded by the National Oceanic and Atmospheric Administration, helps them fill in some of those blanks.

The investigation is part of a three-legged mission NOAA is sponsoring to look at deep reef

habitats of the Southeast.

Areas the North Carolina research team investigated included the Steeples, a region of high relief outcroppings 60 miles southeast of Wrightsville Beach, and the Lophelia Banks, where forests of coral litter the deep-water habitat.

One of the primary goals is to find out the role the habitats play in species distribution and spawning practices. Populations of economically valuable reef fish, such as grouper and snapper, have been declining for several decades in the Southern Atlantic region, with overfishing believed to be a primary culprit. One possible solution is the establishment of marine protection areas – fishing no-go zones – to allow hard-pressed species to recover.

"The concept is good, but there's a big flaw in the process," said Dr. Ross, the principal investigator on the mission. "The problem is no one knows what they're setting aside."

So to find out about the deepwater habitats along the continental shelf, researchers have come armed with a slew of research devices.

Surface and trawl nets allow scientists to gather samples from surface, mid and deepwater areas. Instruments also allow researchers to track conditions at the different water levels, such as temperature, current and salinity. But the most high-tech exploratory gadget onboard is the submersible, a two-chambered vehicle that is capable of diving to depths of up to 3,000 feet.

Research tools include exterior still and video cameras.

"The great thing is we can now show everyone else what we've seen," Dr. Ross said, remembering previous missions when the sub didn't have video capability.

The sub also is equipped with a robotic arm for grabbing samples and a suction tube for gathering specimens, which are first killed before being vacuumed up and deposited in a rotating wheel of 12 buckets. But the sub does have its disadvantages.

It operates on battery power so it can't stay down for extended periods of time, meaning trips usually last less than four hours. The submersible also isn't fast, with a maximum speed of 1 knot, making it susceptible to strong currents. Still, Dr. Ross said, it's the best way out there to study specific habitats.

"There's no way you can get this data from the deep sea with any other system," he said as he removed a rocky, coral-covered formation from the sub's collection basket.

Although glad to be out there, several researchers said they were disappointed that rough weather associated with a northeaster and Tropical Storm Cristobol forced several sub dives to be canceled and the ship to relocate to safer waters. The loss of two trawl nets didn't help the research push either.

But citing his experience from his first research trip out here, Dr. Ross said he expects the samples, specimens and data collected during the mission to keep him and his staff busy for a long time. However, he said there was still much to learn about these unique habitats that hug the continental shelf.

"We know so little it's scary," he said, noting that previous missions to the continental shelf habitats resulted in the discovery of four species of fish not previously recorded in the continental United States.



Steve Ross, research coordinator for the N.C. Coastal Reserve Program, talks about the Johnson-Sea-Link sub's video system, used to record the ocean floor.



The research vessel 'Seward Johnson' waits for the Johnson-Sea-Link sub to return to the surface.