There are plenty of fish in the sea.

At least for now.

After six years of scouring the world's oceans, from sun-dappled surfaces to their darkest depths, a global group of marine scientists has made some record-breaking revelations.

Released near the midpoint of the first-ever census of the seas, some of the wonders observed include a Manhattan-size school of herring off the New Jersey coast, the hottest hydrothermal vent ever found, a mighty microbe detectable by the naked eye and mysterious 4-pound Madagascar lobsters.

Using ships, advanced sonar, miniature robotic subs and new genetic techniques, 19 teams of researchers representing the international Census of Marine Life are amassing systematic records of the diversity, distribution and abundance of marine life, a feat they hope to have completed by 2010. The preliminary findings were released yesterday.

"Each census expedition reveals new marvels of the ocean," said J. Frederick Grassle of Rutgers University, who is heading the effort's scientific steering committee. "And with the return of each vessel, it is increasingly clear that many more discoveries await marine explorers for years to come."

Beyond appeasing scientific curiosity, the census is designed to aid governments in figuring out what's really happening to fish populations, which many environmentalists and scientists believe are in rapid decline.

"Overfishing is often caused by fishermen who think there are more fish in an area than there really are," said Grassle, a renowned oceanographer who heads the Institute for Marine and Coastal Sciences in New Brunswick. "We can't get a handle on what we've lost until we have a realistic baseline."

The data-gathering mission, he said, is expected to become the main source of information on marine life in the ocean for scientists worldwide. The database for the mission, the Ocean Biographic System, or OBIS, (http://www.iobis.org/) is centered at Rutgers University.

Drawing upon 10.3 million records in 153 individual databases, OBIS allows professionals and the merely curious to find out how many members of any one of 75,000 marine species live where.

According to the census, 8 million fish, most of them herring, swarm in one extended school along the continental shelf near New Jersey. It qualifies as the most "new abundance" discovered, according to Nicholas Makris, a mechanical engineering professor at the Massachusetts Institute of Technology.

Using a ship-based system that focused sound in a new way, Makris and other scientists were able to scan ocean areas 10,000 times larger than previously possible.

"We're able to see for the first time what a large group of fish looks like," said Makris, who compared the dramatic improvement to the difference between seeing everything on a television screen and seeing only one pixel.

One of the obstacles to accurate fish counts is the darkness in the ocean.

"You don't know what's going on," he said.

The new system uses low-frequency sonar, bouncing sound waves off objects that travel greater distances than standard sonar. This effectively "illuminates" vast areas of the ocean, about a million times larger than what could previously be studied. The images are updated every minute, offering a chance to monitor continuously the shoals as they change in size and shape over time.
Makris found fish often congregate in an hourglass pattern, with a thin "bridge" connecting the two ends. Looking in the equatorial Atlantic, researchers found shrimp and other life forms thriving on the edge of fluids billowing from the Earth's core at an unprecedented marine recording of 765 degrees Fahrenheit -- hot enough to melt lead.

The hydrothermal vent, a sulfur-spewing chimney on the sea floor nearly two miles beneath the surface, was surrounded by near-freezing water. Researchers hope to learn from this discovery how creatures near the hydrothermal vent withstand such temperature variations.

Census scientists exploring the Nazare underwater canyon off the coast of Portugal found a macro microbe between two and three miles down. The fragile new species of protozoan is enclosed within a plate-like shell, nearly a half-inch in diameter. It is made of grainy minerals.

Of the many species discovered by census scientists, a 4-pound rock lobster found off the coast of Madagascar may be the largest. Named Palinurus barbarae, its main body is nearly two feet long, and the creature mysteriously has gone undetected -- until now.

Scientists also found the diversity of marine microbes was far greater than had been expected raising fundamental new questions about life and evolution in the oceans.

Researchers from the Marine Biological Laboratory in Wood's Hole discovered the diversity of the tiny organisms could be as much as 100 times greater than expected. In addition, the vast majority are previously unknown.

"Just as scientists have discovered through ever more powerful telescopes that stars number in the billions, we are learning through DNA technologies that the number of marine organisms invisible to the eye exceeds all expectations," said lead scientist Mitchell Sogin.

The idea for the census grew out of a 1995 report by the National Academy of Sciences decrying a lack of knowledge about life in the oceans. Grassle of Rutgers took it upon himself to obtain funding from organizations such as the Sloan Foundation, a private philanthropy, and convinced his colleagues far and wide to get involved.

"Unless people have an appreciation of what the ocean is and what lives there, we will have a very difficult time managing the ocean. Right now, the problem is that what lives there is 'out of sight out of mind,'" Grassle said. "The fact is, we can't understand the planet without understanding the life in the oceans."

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