



Left to right: A bacterium that is key to artificial life, Borneo's Planted Forests, dark-matter sensors, a feather starfish, strata showing the ages of life.

THE **6** MOST IMPORTANT EXPERIMENTS IN THE WORLD

► **Making a Brain**

A computer model will mimic the human brain, neuron by neuron.

► **Dating the Earth**

A systematic new method will synchronize how scientists date ancient life.

► **Saving**

Ecosystems A bold plan for preserving ecosystems is giving both private industry and indigenous people a fair share.

► **Trapping Dark**

Matter An advanced XENON detector will hunt for traces of the universe's most elusive matter.

► **Surveying**

the Sea A census is polling all the life in the world's oceans.

► **Creating Life**

A way to manipulate genomes is showing how to build life from the ground up.

The scale and scope of the Census of Marine Life go beyond any previous biological survey, but 7 years into the 10-year initiative, Grassle reports that work is progressing on schedule. About 5,300 previously unknown organisms have already been identified, and every new sighting is logged into the census's

Found by the Census of Marine Life: The amphipod *Eusirus holmii*, a small shrimplike crustacean.



THE CENSUS OF MARINE LIFE

What lives in the ocean? In 2000, this deceptively simple question spawned a \$650 million study to catalog all sea life: plants, animals, bacteria, and fungi. "We simply had no concept of the diversity of life in the ocean," says Rutgers University biologist Fred Grassle, who chairs the Census of Marine Life's scientific steering committee. "Whether it was coral reefs, the deep seafloor, or even what lives in people's backyards along the shore—so little was known." By helping researchers identify threatened species and habitats, the census will allow better protection of the ocean's resources. Newly discovered creatures could also provide a gold mine of natural chemical compounds useful as pharmaceuticals or for industrial applications.

It takes time to cover something as large as the world's oceans, so the 2,000-plus census takers from more than 80 countries have broken up their assignment into 17 more manageable subgroups—like coral reefs, continental shelves, and mid-ocean ridges—that should provide a good overview of what's out there. Teams of marine scientists are towing nets to scoop up plankton, tagging large predators to track their migrations, sequencing the DNA in seawater to hunt for microbes, and trawling the seafloor for bottom dwellers.

freely accessible Ocean Biogeographic Information System (www.iobis.org), which boasts more than 13 million observations of 80,000 species. Scientists have been bowled over by the diversity that has turned up in unexpected places, from crustaceans and worms on the deep seafloor to carnivorous sponges in the Antarctic Ocean.

The long-term challenge, says marine ecologist Paul Snelgrove of Memorial University of Newfoundland, will be to continue investigating the ecological significance of the newfound organisms after the primary census is completed in 2010. "The first 10 years have been very much focused on discovery," he says. "The next step is to ask, what do these species do and how important are they to the way the earth works?"

Jennifer Barone