What Lies Beneath

Interview with Jesse Ausubel, Census of Marine Life

by Amy Entwistle

Vampyroteuthis, or vampire squid, is a cephalopod that lives in the oxygen minimum zone of Monterey Bay, California, at depths of 600-900 meters.

How did you come up with the idea for the Census of Marine Life?
In 1996, Professor Fred Gloeckner of Rutgers University approached me with a report, published in 1995 by the National Research Council, called Understanding Biodiversity. Fred served on the committee of authors, and said to me, "This was a good report, but none of the recommendations are being implemented. There's so much to discover and the oceans are changing very fast." Fred said that something big needed to be done. I said, "Big means global. You can't just look at the North Atlantic or the Caribbean. You should do a worldwide census." I had experience organizing cooperative international scientific programs, so over the course of the next hour and a half we came up with the idea of the worldwide Census of Marine Life.

What were some of the first findings of the Census?
Deep in the North Atlantic, in the world's longest mountain range, is a sort of canyon called the Charlie Gibbs Fracture Zone, through which a lot of water passes. It had never really been explored. Using Mir submarines—the Russian submarines that found the Titanic—a Russian-American expedition explored the zone and discovered a tremendous amount of plant and animal life: amphipods, copepods, decapods, zooplankton, and many kinds of squid. That was in the summer of 2003.

What's been the biggest surprise for you so far?
A huge surprise for me was the importance of very small life in the oceans, of single-cell organisms such as bacteria and archaea. Very small life makes up about 90 percent of all the biomass in the oceans. And we found enormous variety within that. There might be 38,000 different kinds of bacteria in a liter of sea water.
The other big surprise is the astonishing cosmopolitan behavior of the large animals that connect the oceans. Bluefin tuna swim back and forth between Sicily and Cuba and between Los Angeles and Yokohama. White sharks swim back and forth between Australia and South Africa. Some turtles circumnavigate the entire Pacific. A turtle might set off from a beach in Central America, go down to South America, swim across the South Pacific over to Australia, up to the Philippines, up to Japan, and then swing all the way back around to California and down to Central America again.

Can the Census tell us anything about global warming and its effects on the oceans?
Part of the reason for the Census is that we believe that global changes are taking place. There are changes in noise in the ocean, in acidity, probably in currents and temperature. We wanted to create a baseline so that in 2015 or 2050, we could make comparisons. But even within
Aside from providing a baseline, what are some of the ways in which the findings will be used? One of our goals was to create a complete world marine biodiversity database. The Census has already prepared maps of hotspots of biodiversity in the world’s oceans, and these have been shared with the UN’s international Convention on Biological Diversity. Recently, in Nagoya, Japan, the Convention sought to identify what they called “ecologically and biologically significant areas,” or EBSAs. One hundred ninety countries came to an agreement that they’d like to increase the area of protected ocean from about one percent today to 10 percent by 2020. Ten percent may not sound like much, but a tenfold increase in the amount of area protected from overfishing or habitat destruction would be a tremendous step forward. The Charlie Gibbs Fracture zone is now protected. Areas of the Antarctic that are especially rich in marine life are tentatively designated for protection as well.

The Census found that some of the same areas that provide great biodiversity are also vast resources of natural gas and petroleum. Do you think it’s possible to balance our need for energy with the need to sustain biodiversity? I think that we have to. Around the continents are shallow shelves that go to 200 meters, or about 600 feet deep. Then you have continental margins, or continental slopes, that go down to the vast abyssal plains, which average 10,000 to 12,000 feet. These sloping areas with the gradients—think of them as hillsides—have unexpectedly high levels of biodiversity. They also have enormous amounts of natural gas, and to a lesser extent, petroleum. Oil companies have been drilling and extracting oil and gas on the shelves for decades. In the last 10 to 15 years they’ve started drilling deeper, 1,000 meters, 2,000 meters. The Brazilian national oil company Petrobras has made huge discoveries of gas and oil along the continental margins south of Rio de Janeiro. It’s enormously valuable, and once people find it, it rarely stays in the ground. So we have to figure out how to extract the oil and gas with minimum damage. People may love the oceans, but they love their mobility, too.

The Census refers to one of the impediments to studying marine life as “blinders we put on ourselves by choosing not to learn or spend.” Do you think that the public can be persuaded to support exploration of marine life? The public engagement with the Census has been wonderful, beyond our wildest expectations. We’re delighted that the yeti crab and others of our animals are now replicated as stuffed animals, and are featured on skateboarders. There has been a big increase in public interest in the varieties of marine life and the threats to marine life during the last decade.

A hundred years ago, Teddy Roosevelt established a system of protected lands—our national park system. It was not until 1975 that the first bit of ocean was protected in the U.S., and it’s only recently that we’ve started to seriously consider the idea that we really need parks in the ocean. In 2006, a very large park was created around the northwest Hawaiian Islands. On the basis of the Census findings, there are many more areas that we think are more valuable to people if they’re left alone than if they’re exploited. We hope that the blunders are coming off. It’s partly because of technology that we’re able to get people’s park was created around the northwest Hawaiian Islands. On the basis of the Census findings, there are many more areas that we think are more valuable to people if they’re left alone than if they’re exploited. We hope that the blunders are coming off. It’s partly because of technology that we’re able to get people’s