Jellyfish Rising? Maybe Not.

Delicate but armed, mindless yet unstoppable, jellyfish sometimes appear abruptly near coasts in staggering numbers that cause problems and generate headlines: Jellyfish fill fishing nets in Japan, sinking a boat. Jellyfish clog water intakes at nuclear plant. Gelatinous animals decimate fish stocks. Dangerous jellyfish inhabit areas where they haven't been seen before. Is this a glimpse of the future ocean?

Scientists and others have speculated that the frequency of such blooms is rising, possibly related to warming oceans, nutrient pollution, or overfishing. In November 2010, 17 specialists on gelatinous animals convened to explore whether blooms are actually increasing—or whether increased observing efforts, public attention, and global media help create the perception of a jellyfish upsurge. The group included Larry Madin, a biologist and director of research at Woods Hole Oceanographic Institution, and former WHOI/MIT Joint Program student Kelly Sutherland.

The scientists examined documented jellyfish aggregations—from fossils and ancient historical records through modern scientific and news articles. Reporting in the February 2012 issue of *BioScience*, the group concluded that there is not enough evidence to support the view that jellyfish blooms are on the rise.

"Despite a popular idea that jellyfish are taking over the oceans, this study shows that bloom populations have occurred throughout history," Madin said, "and we don't have enough data now to conclude we are seeing a new global phenomenon. Population fluctuations will continue—sometimes traceable to human impacts such as overfishing and sometimes with consequences for human activities."

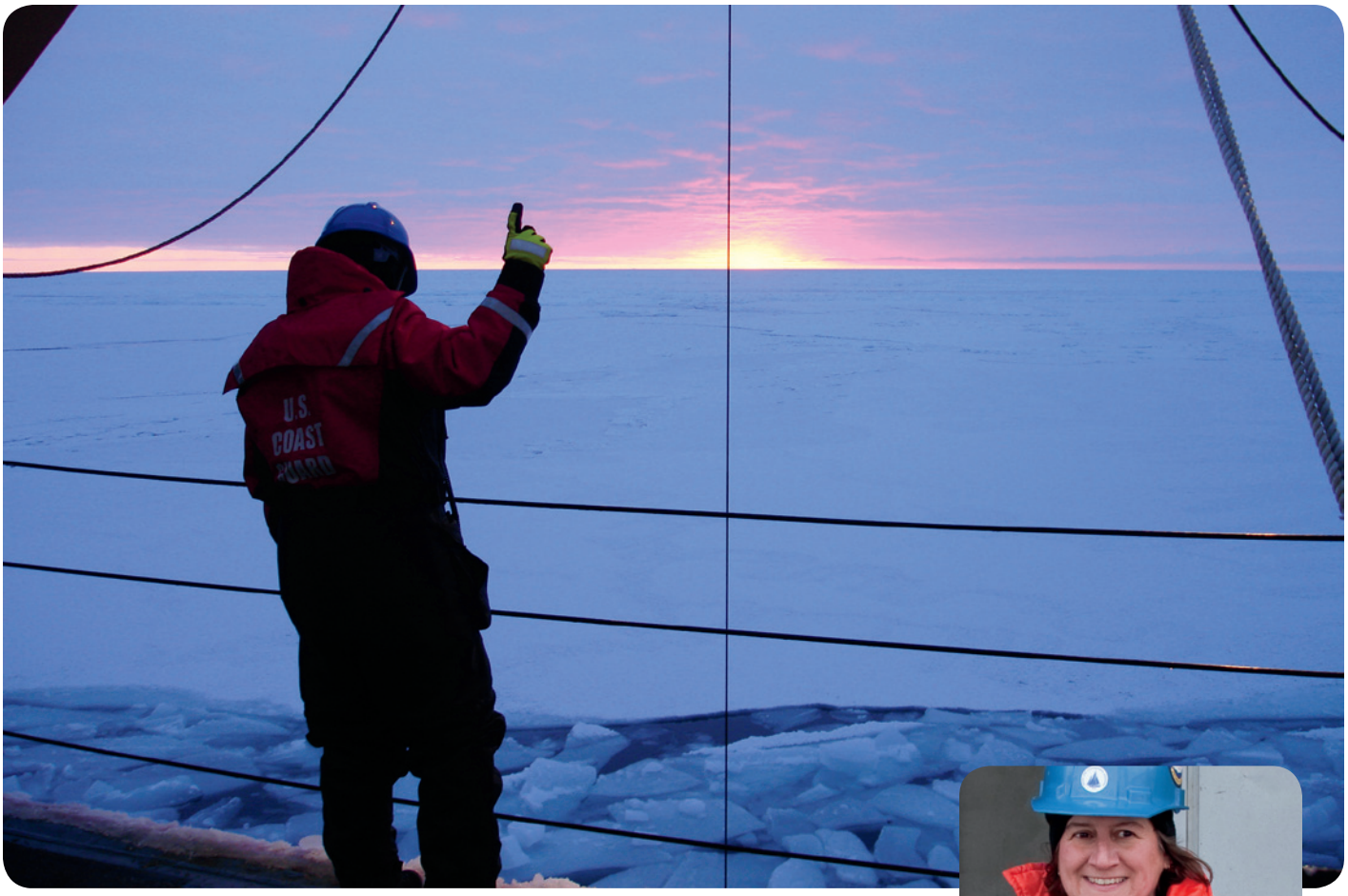
The group has established a global database for past, current, and future reports of gelatinous zooplankton, to provide an organized way to track and compare jellyfish occurrences.

—Kate Madin

This study was funded by the National Science Foundation, the University of California at Santa Barbara, and the state of California.

Larry Madin, WHOI

High Noon in Arctic Winter



Carin Ashjian, WHOI

Chris Linder

Dawn duty? Collecting a final sample before dinnertime? No, this is what the middle of the day looked like for scientists and crew who voyaged to the Chukchi Sea this past winter.

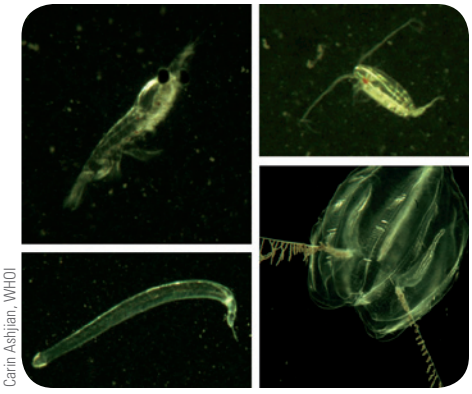
Carin Ashjian (right), a biologist at Woods Hole Oceanographic Institution, led the first research cruise ever conducted in the ice-covered Chukchi Sea during winter, when the sun appears for only a few hours a day and never rises higher than a few degrees above the horizon. Wind chills reached as low as -40°F.

Researchers from WHOI and the Universities of Alaska and Rhode Island spent 43 days on the U.S. Coast Guard icebreaker *Healy* in the Bering and Chukchi Seas in the late fall of 2011 as ice and darkness closed in. They investigated ocean conditions and marine life (below) at the base of the food chain. Their findings were surprising: Far from shutting down for the season, "the biological community was still very active," Ashjian said.

—Kate Madin

Cruise blog:
arctic-winter-cruise.blogspot.com

Audio slideshow:
whoi.edu/oceanus/ashjian



Carin Ashjian, WHOI

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Can Whales Get the Bends?

Scuba divers can get decompression sickness, or the bends, a painful and potentially fatal condition, from ascending too quickly from a deep dive. That causes dissolved gas to come out of solution and form bubbles in the body. But can whales and dolphins, for whom deep diving is a way of life, ever get the bends?

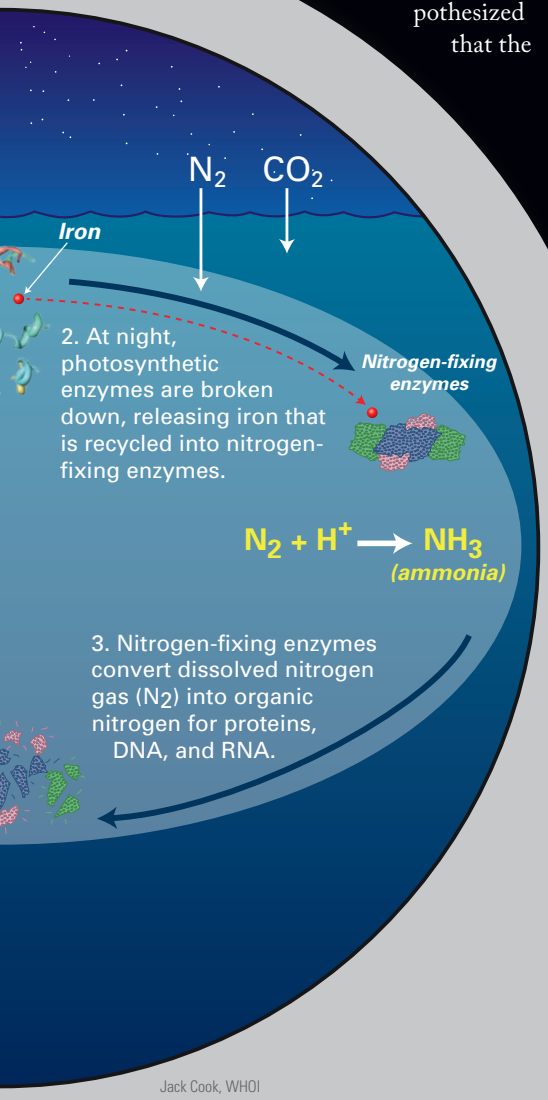
To learn how marine mammals manage gas under pressure in the depths, biologist Michael Moore and colleagues at Woods Hole Oceanographic Institution examined animals that had stranded ashore and reported evidence of bubbles in seemingly healthy live animals.

The finding, published November 2011 in *Proceedings of The Royal Society B*, informs previous research in which they found lesions in a rib of a dead sperm whale that had washed ashore on Nantucket (right). They hypothesized that the lesions were caused by tiny bubbles circulating in the whale's body that had obstructed blood flow and led to bone damage.

Tom Kleindinst, WHOI

"Until recently the dogma was that marine mammals have anatomical, physiological, and behavioral adaptations to make the bends not a problem," said Moore, who is director of the Marine Mammal Center at WHOI. "There is no evidence that marine mammals get the bends routinely, but the most recent studies suggest that they are actively *avoiding* decompression, rather than simply not having issues with it."

In other words, unusual circumstances, such as exposure to sonar, might cause animals to alter their usual diving behavior in ways that result in their getting the bends. But, as yet, there is no proof.



Jack Cook, WHOI

"*Crocosphaera* have a bit of a Dr. Jekyll and Mr. Hyde lifestyle," said Mak Saito, a WHOI biogeochemist and lead author of the *PNAS* paper. Scientists previously knew cyanobacteria had this unusual dual-metabolic capacity, but they did not know how they could accomplish it with meager iron supplies.

The scientists called the strategy "hot bunking," referring to the practice of ships sailing with fewer bunks than sailors on board. The bunks are kept continuously in use, as sailors finishing night shifts hop into bunks newly emptied by sailors arising for day shifts.

Crocosphaera expend energy to destroy and rebuild the two sets of enzymes each day, but it's worth it to maximize the use of scarce iron. The scientists estimated that by using the hot-bunking strategy, the organisms can survive with about 40 percent less iron than they would otherwise need. That allows *Crocosphaera* to thrive and produce life-sustaining organic nitrogen in iron-poor waters that would otherwise be far less productive.

—Lonny Lippsett

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