

## 2008 Annual Report: Ocean Life Institute

Life in the ocean is threatened on many fronts, from global warming to pollution to over-fishing. Basic research sponsored by the Ocean Life Institute (OLI) during the past year has addressed several key issues related to ocean health and biodiversity. This research included studies of how ocean physics and chemistry affect ocean life, and was supported through OLI fellowships, postdoctoral and graduate student awards, and research grants.

New research grants funded by OLI during 2008 covered a variety of topics. The research involved studies of reef fish genetics and connectivity, chemical communication among bacteria, how marine animals respond genetically to environmental stress, and toxic algae that cause diuretic shellfish poisoning.

The Tropical Research Initiative within OLI supported five new grants, including hormone transfer between corals, geological analysis of ancient ocean circulation patterns, physics of equatorial waves, bacterial cycling of nutrients in the Pacific, and the importance of nitrogen-fixing bacteria (bacteria that can take nitrogen from the air and incorporate it into organic compounds) in tropical estuaries.

OLI supports several studies at the Liquid Jungle Laboratory, Panama. We are developing a new initiative on the oceanography of coral reefs that will tie together several WHOI projects around the globe. We also are pursuing a new study off Taiwan, to examine the impact of climate, ocean currents, and plankton on coral reef ecosystems and fisheries.

This year OLI continued to promote research in the area of ecosystem-based management and worked to develop a new modeling-observing system in support of fisheries along the northeast US coast. A new multi-institutional proposal was submitted to NOAA (the National Oceanographic and Atmospheric Administration) with WHOI as the lead, to establish the framework for such a system. The OLI also supported the use of a state-of-the-art computer model of ocean physics and biology to aid in the design of an ocean observing system in the Gulf of Maine-Georges Bank region.

Highlights of 2008 include the research projects of two OLI Fellows, a grantee, and a student. Fellow Marco Coolen from the Marine Chemistry and Geochemistry Department has developed new tools for analyzing DNA of ancient plankton communities, archived in layers of marine sediments, providing a glimpse into the past that was never before possible. Fellow Mac Saito (also MC&G) is studying the proteins produced by microbes and their importance in ocean ecology and global nutrient cycling.

With an OLI grant, Gareth Lawson, in the Biology Department, is using new acoustic methods – sending sound into the water, then analyzing sound reflected back from objects – to study krill populations in the Gulf of Maine. Finally, MIT-WHOI Joint Program student Carter Esch (also Biology) is studying the distribution patterns of whales' prey organisms in the Arctic Ocean.

I would like to express my deepest appreciation for all who have supported the OLI.

–[Cabell Davis](#), *Institute Director*

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Mail: Woods Hole Oceanographic Institution, 266 Woods Hole Road, Woods Hole, MA 02543, USA.

E-Contact: [info@whoi.edu](mailto:info@whoi.edu); press relations: [media@whoi.edu](mailto:media@whoi.edu), tel. (508) 457-2000

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With funding from the OLI, WHOI researchers Gareth Lawson, Andone Levery and Peter Wiebe are analyzing data collected from a suite of advanced sensing technologies, to understand krill distribution in the deep basins of the Gulf of Maine. In the Gulf of Maine, there is evidence, based on limited observations that krill can be locally abundant and important members of the food web. (Photo by Øystein Paulsen)

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