USGS
science for a changing world

News Release

August 20, 2008	Thierry Work	808-792-9520	twork@usgs.gov
	Gail Moede Rogall	608-270-2438	gmrogall@usgs.gov

Shipwrecks on Coral Reefs Harbor Unwanted Species

Shipwrecks on coral reefs may increase invasion of unwanted species, according to a recent U.S. Geological Survey study. These unwanted species can completely overtake the reef and eliminate all the native coral, dramatically decreasing the diversity of marine organisms on the reef. This study documents for the first time that a rapid change in the dominant biota on a coral reef is unambiguously associated with man-made structures.

The findings of the study, published in the open-access journal PLoS One (Public Library of Science), suggest that removal of these structures sooner rather than later is key to keeping reefs healthy. The study can be accessed at http://www.plosone.org/home.action.

In many areas of the world, coral reef health is declining, but identifying the exact cause of the problem is difficult. Overgrowth of coral reefs by other species, such as algae, are usually attributed to environmental degradation, but bleaching, disease, damage by typhoons, overfishing, coastal development, pollution, and tourism can cause problems as well.

The study was conducted at Palmyra Atoll National Wildlife Refuge in the central Pacific, a relatively remote, comparatively pristine area where little human activity has occurred since WWII. In 1991, a 100-foot vessel shipwrecked on the atoll. Scientists first surveyed the area in 2004 and found a species called *Rhodactis howesii* —an organism related to sea anemones and corals—in low abundance around the wreck. In subsequent years, however, populations of this organism increased exponentially. Scientists documented extremely high densities of *R. howesii* that progressively decreased with distance from the ship, whereas *R. howesii* were rare to absent in other parts of the atoll. They also confirmed high densities of *R. howesii* around several buoys.

Whether this phenomenon occurs on other coral atolls is unknown; however, in the case of Palmyra, the *R. howesii* infestation is beginning to reach catastrophic proportions, according to Dr. Thierry Work, the lead author of the study and a scientist at the USGS National Wildlife Health Center, Honolulu Field Station. Within a few years, *R. howesii* spread to where it now occupies nearly 1 square mile.

“Why this phenomenon is occurring remains a mystery,” said Work. One possibility, he said, is that iron leaching from the ship and mooring buoy chains, accompanied with other environmental factors particular to Palmyra atoll, are somehow promoting the growth of *Rhodactis*.

"Given the ability of *Rhodactis* sp. to rapidly reproduce and completely smother reefs, managers are now facing the possibility that even with removal of the ship, sheer reproductive capacity of *R. howesii* may continue to fuel its spread along the western reef shelf of Palmyra," Work said.

Understanding what constitutes a healthy underwater ecosystem, as well as what does not, is crucial to preventing further losses in species and habitat. This research illustrates a little-known problem that, unlike global warming and pollution, could be prevented by removing man-made debris such as shipwrecks from coral reefs before organisms like *Rhodactis howesii* can overtake healthy coral reefs.

USGS provides science for a changing world. For more information, visit www.usgs.gov.

Subscribe to USGS News Releases via our electronic mailing list or RSS feed.

**** www.usgs.gov ****

Links and contacts within this release are valid at the time of publication.