

Guam's Coral Reefs: How Are They Doing?

A brief guide to reefs around the island

The health of Guam's reefs varies, with some reefs showing signs of severe degradation and others supporting relatively healthy reef communities. While it is difficult to compare the reefs of today to reefs of the past, scientific data presented in the 2008 Status of the Coral Reef Ecosystems of Guam Report (available at <http://www.bsp.guam.gov>) suggest that the overall health of Guam's reefs has declined significantly in recent decades, and that this decline is expected to continue into the future unless major action is taken locally and globally.

Sedimentation caused by illegal wildfires, improper development, and other sources of upland erosion; stormwater runoff and associated pollutants (fertilizers, oil, etc.) caused by improper coastal development and poor stormwater management infrastructure; and the overharvesting of reef fish continue to pose the most serious threats to the health of Guam's reefs. Crown of thorns seastar outbreaks, coral bleaching and coral diseases have also emerged as more serious threats since the last report in 2005.

The scarcity of reef fish, especially larger individuals, despite the persistence of some relatively healthy and diverse coral communities, continues to be a serious issue. Of particular concern is the use of harmful, non-traditional fishing methods, such as the use of scuba and lights while spearfishing and the use of monofilament gillnets. Both of these methods have been banned in many other jurisdictions because of their devastating effects on local reef fisheries.

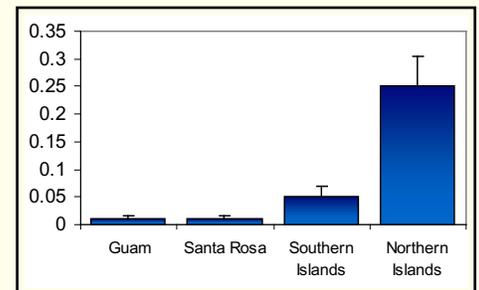


Coral bleaching, seen in this photo taken at Ypao Beach in August 2007, can be caused by a small increase in the ocean's temperature. Incidences of severe coral bleaching, which can kill vast amounts of coral, are expected to increase as a result of global climate change. Photo: D. Burdick.

Some much needed good news is that the number of fish in Guam's marine preserves has increased significantly only 3 years after enforcement began in 2001. In fact, the amount of fish in the Piti Bomb Holes and Achang Reef Flat preserves increased by more than 100%.

Preliminary evidence suggests that the increasingly abundant large fish in the preserves produce large numbers of eggs that drift with currents to nearby reefs, while others swim into adjacent non-protected areas, where they can be caught by fishermen.

Poor water quality, the lack of large algae-eating fish, and few young corals may severely decrease the ability of Guam's reefs to recover from future disturbances, such as major storms, crown of thorns sea star outbreaks, and coral bleaching events.



The amount of large fish (<19 inches) measured during towed diver surveys conducted by NOAA in 2005. The amount observed in the southern CNMI was 5x more than on Guam and Santa Rosa Bank, while it was 25x higher in the far northern islands.

Northern Reefs



The northern reefs are generally considered to be in better condition than reefs in the south, and although they may be exposed to elevated nutrient levels through groundwater discharge, northern reefs are not affected by the intense levels of sedimentation experienced by many southern reefs. In general, the highest coral cover and diversity on Guam is found in an area beginning roughly at Falcona Beach on the northwest coast, continuing clockwise around the northern coast, and extending down to Pagat Point on the eastern side of the island. The abundance of medium-to-large fish is slightly higher on northern reefs compared to reefs in other parts of the island, but are still quite low compared to other islands in the Marianas. Crown of thorns sea star outbreaks may have significantly altered the coral communities in the northwestern part of the island in the last few years, however, including at least some of the reef extending north from Falcona Beach to Ritidian Point.



Left: A diverse, healthy coral community near Tarague Beach, along the northern coast (Aug. '08). Right: The forereef slope near Urunao Pt., in northwestern Guam, with evidence of extensive, and fairly recent (<5 yrs), predation by crown of thorns sea stars (May '08). Photos: D. Burdick.

East-central and Southeastern Reefs



The health of reefs along the central and southern portions of the east coast is highly variable; some reefs adjacent to large river mouths have been degraded by sedimentation, while other reefs appear relatively healthy. Some of the reefs reported as relatively healthy in 2005, such as the forereef slope off the Achang Reef Flat Marine Preserve and the east side of Cocos Lagoon, have since experienced crown of thorns seastar outbreaks. Other areas previously known to have relatively high coral cover and diversity, such as the northern part of Pago Bay and at sites south of Agfayan Bay and Talofofu Bay, have also been heavily impacted by crown of thorns predation.



Left: A degraded reef community in Ajayan Bay, in southeastern Guam. Several of the coral colonies in this photo appear to have died relatively recently, perhaps by crown of thorn sea star predation, but the sediment-crusted substrate also suggests stress as a result of poor water quality. Right: A colorful, thriving coral community in the shallow, clear waters near Ipan Beach Park. Photos: D. Burdick.



Luxuriant, although not particularly diverse, coral growth at Gabgab Beach, in Apra Harbor. Photo: D. Burdick.



Apra Harbor Reefs

Although Apra Harbor is home to the busiest port in Micronesia, a large U.S. Navy base, and numerous recreational facilities, it contains both patch and fringing reefs with some of the highest coral percent cover (>80%) on the island. While some harbor reefs appear to be doing relatively well, the impacts of the increased turbidity, pollution, overharvesting, and invasive species associated with the area's use as a port and naval base have not been fully assessed. Several acres of reef were removed from the entrance of the Inner Harbor by the Navy in 2006 and 2007 and additional areas, including a large area near Polaris Point, are expected to be lost or degraded due to other planned construction and dredging activities in the harbor.



A highly degraded reef community near Apaca Pt., Agat. Little living coral remains in this area, and a thick algal mat laden with sediment covers much of the reef. Photo: D. Burdick.

Southwestern Reefs



Most of the fringing reefs and patch reefs along the southwestern shore remain in poor to fair condition, depending on their proximity to river mouths and the impact of crown of thorns sea stars. Data from NOAA surveys conducted in 2005 suggest that these reefs had the lowest average coral cover on the island. A 10 km stretch of reef in this area was reportedly heavily impacted by sedimentation from a poorly planned coastal road project in the early 1990s. The reefs in this area continue to experience high levels of sedimentation from erosion caused by wildland arson, off road vehicle use and other upland activities.



Spectacular coral growth on the forereef slope in Agana Bay, near Adelup Point. Despite the large amount of coral, few medium to large fish are observed. Photo: D. Burdick.



West-central Reefs

Several large bays, including Piti, Asan, Agana, and Tumon, are located along the central western coastline. Both Piti and Tumon Bays host a wide diversity of habitats and possess areas with vibrant reef communities, but there are also large expanses of severely degraded reef in these bays. Chronic crown of thorns seastar outbreaks and poor water quality appear to be the main impacts to these reef communities. Asan Bay is heavily impacted by fishing, with fish stocks decreasing in this area since monitoring began in 2001. The reef communities in Asan Bay are also heavily impacted by sediment- and nutrient-laden river discharges and stormwater runoff. The health of coral communities in West and East Agana Bays varies; coral cover is relatively high, especially along the shallow reef front and forereef slope, but fish abundance is low.