



Marine Benthic Communities, 2016 Coral Reef Monitoring Summary

Importance: A Critical Resource for Fisheries, Tourism and Marine Biodiversity

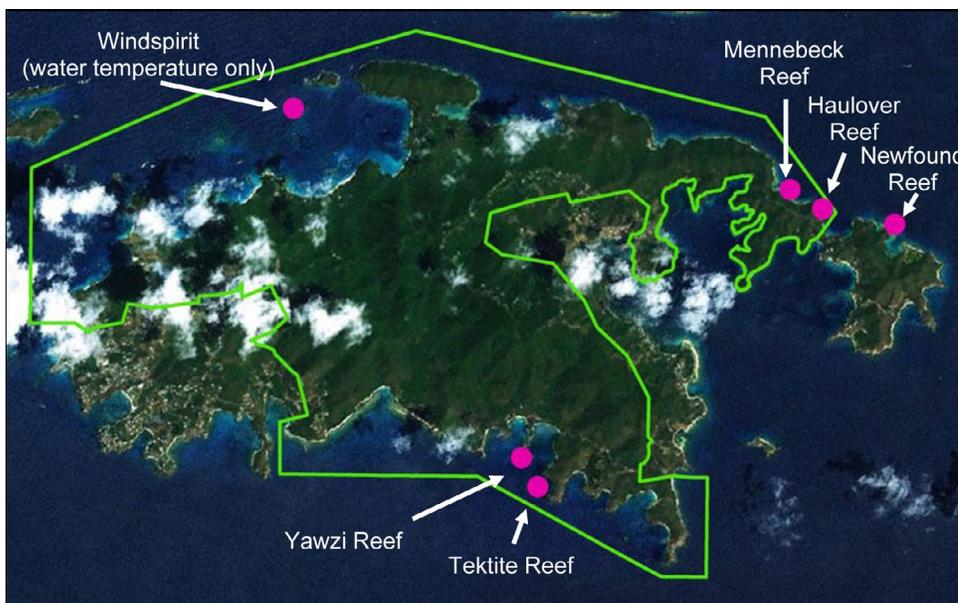
Coral reef communities within Virgin Islands National Park (VIIS) consist of stony corals, octocorals, sponges, algae, and gorgonians (e.g., sea fans). Reefs support incredible marine biodiversity including a multitude of fish species, as well as lobsters, sea turtles, and other creatures. Reefs play a vital role for humans by supporting fisheries, fishery nursery areas, tourism, sand creation for beaches, pharmaceutical bio-prospecting, and shoreline protection. Monitoring coral reefs was identified as a national priority in President Clinton's Executive Order 13089, establishing the Coral Reef Initiative. These coral reefs are negatively affected by events such as extreme water temperatures that cause "bleaching," vessel scarring, and major storms, as well as long-term stressors such as coral disease, overfishing, damaging fishing methods, sediment runoff, nutrient enrichment, contaminants, ocean acidification, and abrasion of the reef by debris or careless snorkelers and divers.



Tektite Reef in Virgin Islands National Park.

Long-term Monitoring: Five Coral Monitoring Sites

The South Florida/Caribbean Network (SFCN) annually monitors five intensive coral reef sites: Newfound Reef (est. 1999); Yawzi Reef (est. 1999); Mennebeck Reef (est. 2000); Haulover Reef (est. 2003); and Tektite Reef (est. 2005). Sites were selected through management recommendation, high initial reef coral cover, comparability with historic work, and levels of stressors in differing watersheds. Each site consists of 20 permanent, randomly selected 10 meters (32.8 feet [ft]) transects (index sites), which are monitored using underwater video. Percent cover of living coral by species, macroalgae, turf algae, crustose coralline algae, octocorals, and sponges are calculated. Data on coral disease, bleaching, water temperature, and long-spined sea urchins are also collected.



The five reefs monitored by SFCN are:

Yawzi Reef (7,125 square meters, or 1.8 acres), Newfound Reef (13,768 square meters or 3.4 acres), Mennebeck Reef (12,495 square meters or 3.1 acres), Haulover Reef (13,568 square meters or 3.4 acres), and Tektite Reef (18,711 square meters or 4.6 acres).

All are forereef features between 2–20 meters (6.5–65.6 feet [ft]) deep. The most common stony coral present is star coral (*Orbicella* spp.) although Yawzi Reef also has appreciable mustard hill coral (*Porites astreoides*), finger coral (*Porites porites*), and massive starlet coral (*Siderastrea siderea*). Water temperature is also monitored at a sixth site called Windspirit.

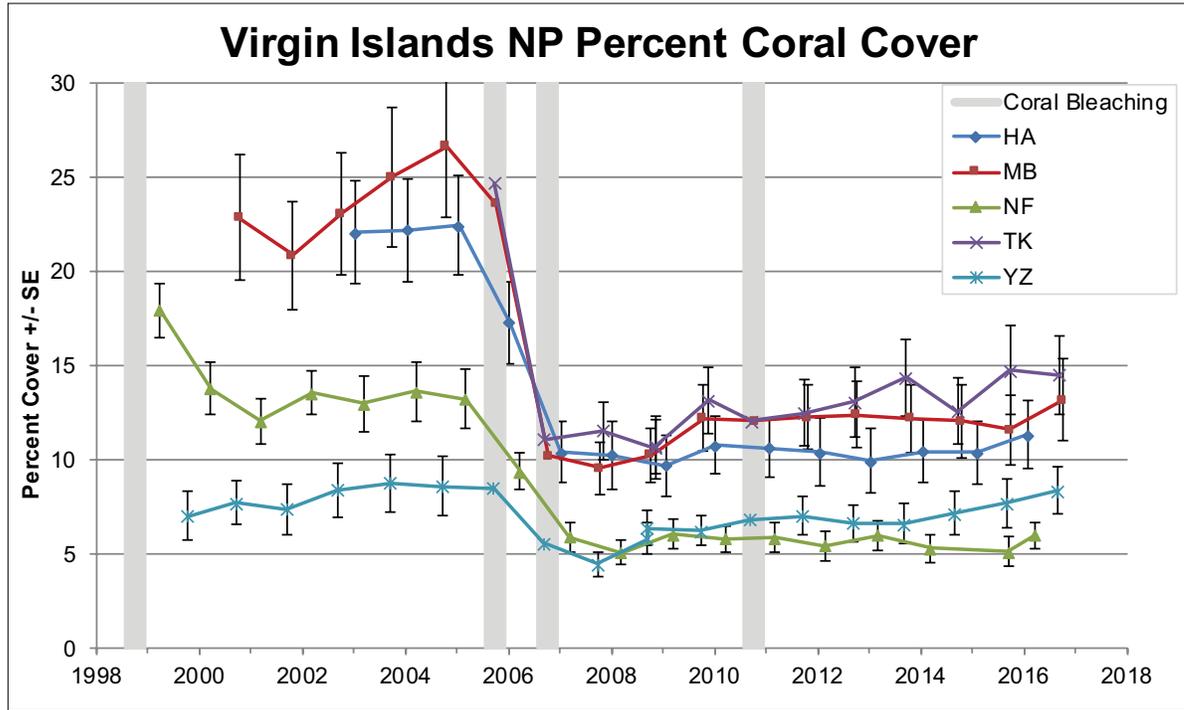


South Florida/Caribbean Network
18001 Old Cutler Rd. Suite 419
Palmetto Bay, FL 33157

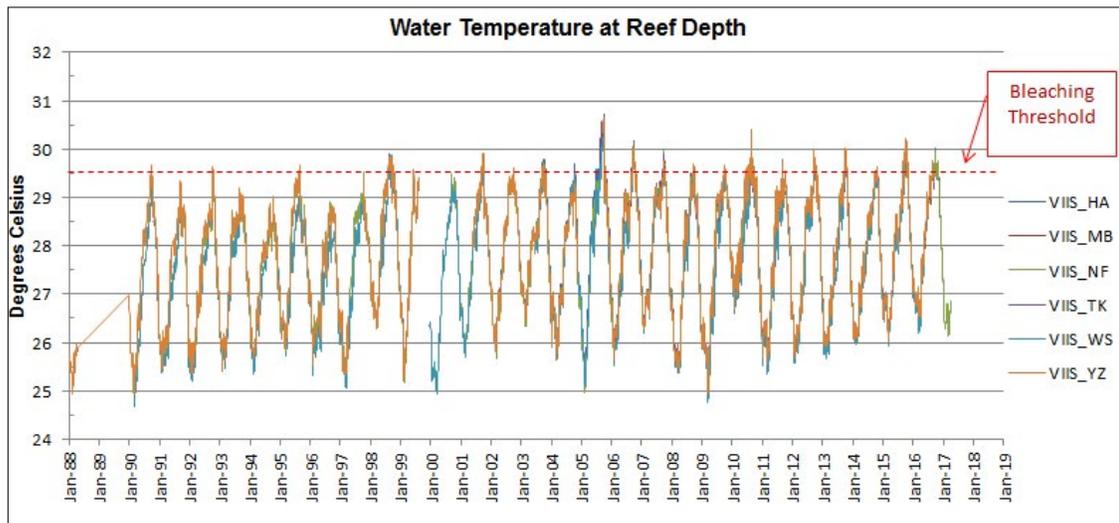
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Status and Trends: Small Upward Trend in Stony Corals Post 2005–2006 Bleaching and Mortality Event

In 2005–2006, soaring water temperatures were associated with a coral bleaching/disease outbreak followed by catastrophic stony coral mortality. Since 2007, a small but statistically significant increase in stony coral cover has occurred at Mennebeck, Tektite, and Yawzi sites. While coral bleaching occurred in 2010, temperatures peaked below 2005 levels and widespread coral disease outbreaks did not occur. Sites in Virgin Islands National Park have between 12–18 years of data.



Trends in live stony coral cover at index sites throughout VIIS. Grey bars indicate coral bleaching/disease event of 2005 that continued into 2006 and the coral bleaching event in 2010. Coral bleaching occurs when coral under stress lose their symbiotic algae and look white or “bleached.”



VIIS water temperature (°C) from six sites at reef depth using underwater data loggers. Monitoring at Yawzi (YZ) and Windspirit (WS) were initiated in 1990, Newfound (NF) in 1991, Haulover (HA) in 1998, and Mennebeck (MB) and Tektite (TK) in 2005. The bleaching stress threshold of 29.5°C for the Virgin Islands parks is shown. Note: The Windspirit site does not have concurrent coral monitoring.



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