



Marine Benthic Communities: Coral Reef Monitoring in Dry Tortugas National Park

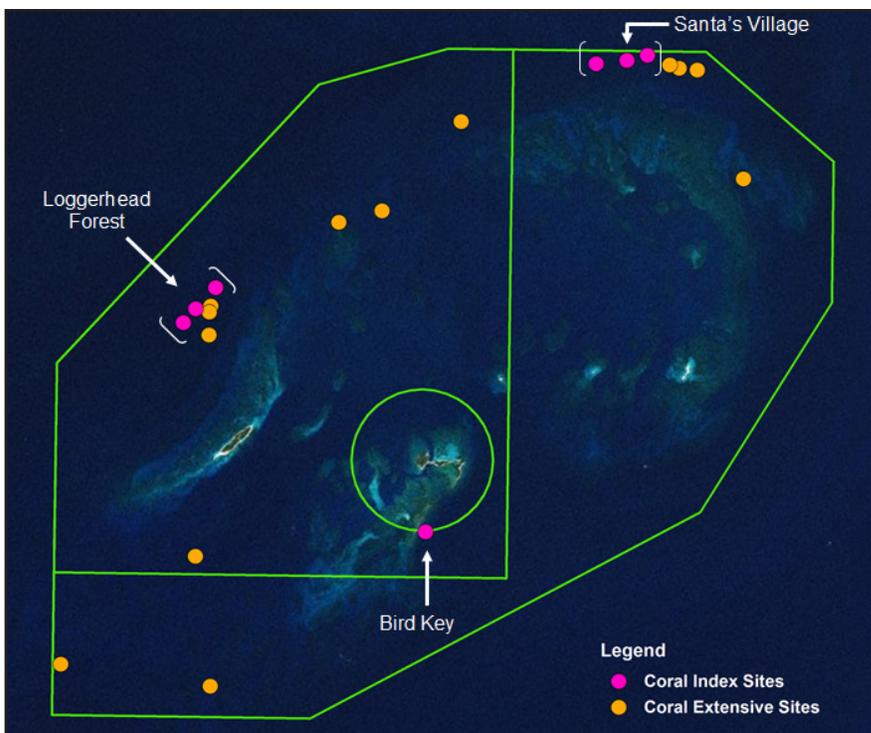
2012

Importance: *A critical resource for fisheries, tourism and marine biodiversity*

Coral reef communities within Dry Tortugas National Park, at the western end of the Florida Keys, consist of stony corals, octocorals (e.g., sea fans), sponges, and algae. Reefs support incredible marine biodiversity including a multitude of fish species, as well as lobsters, sea turtles, and other creatures. Reefs in Dry Tortugas play a vital role for humans by supporting fisheries, fishery nursery areas, tourism, pharmaceutical bio-prospecting, and protection of the islands and Fort Jefferson to name a few. 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 impacted 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, over-fishing, damaging fishing methods, abrasion of the reef by debris or careless snorkelers and divers, ocean acidification, nutrient enrichment, and contaminants.



Bird Key Reef in Dry Tortugas National Park.



Three long term index sites are monitored by SFCN: Bird Key (19,352 m²), Loggerhead Forest (596,637 m²), and Santa's Village (371,763 m²). In addition, 13 4-transect extensive sites have been monitored inside and outside the RNA since 2008.

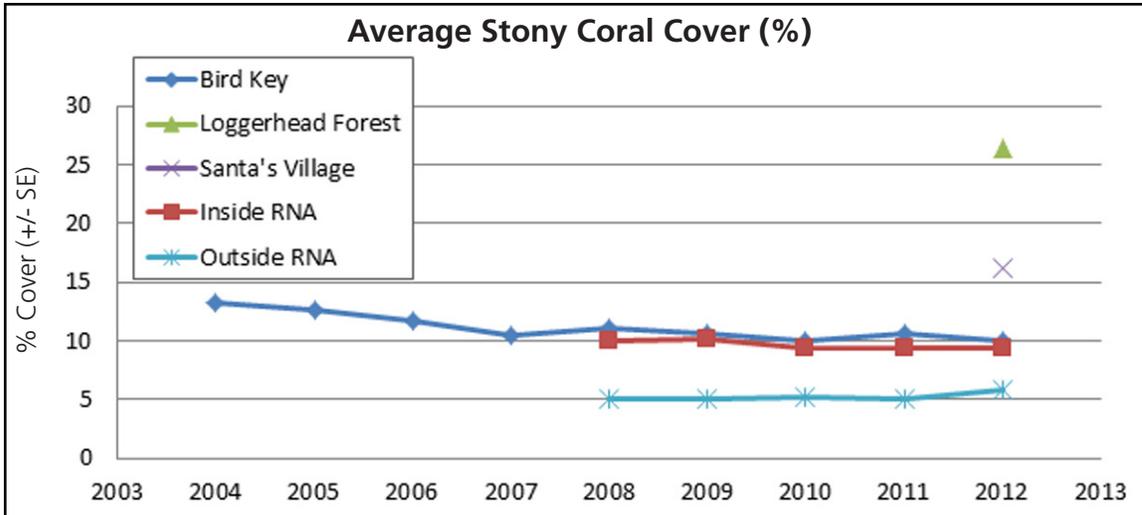
Long-term Monitoring: *Bird Key Reef, Loggerhead Forest, Santa's Village and additional sites inside and outside the Research Natural Area (RNA)*

The South Florida/Caribbean Network (SFCN) began coral reef monitoring at Bird Key Reef in 2004 in Dry Tortugas National Park (DRTO). Bird Key Reef was selected due to management interest and to compare with historical work and consists of 20 permanent, randomly-selected 10m transects which are monitored using underwater video. An additional 134-transect extensive sites were randomly selected in 2008 to compare trends inside and outside the newly established no-take Research Natural Area (RNA). In 2012, Loggerhead Forest Reef and Santa's Village Reef were selected for additional focused monitoring due to their unusually high coral cover and diversity. Loggerhead Forest reef had 3 additional sites added to the 2 previously installed 4-transect sites and Santa's Village reef had 3 sites added. 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.

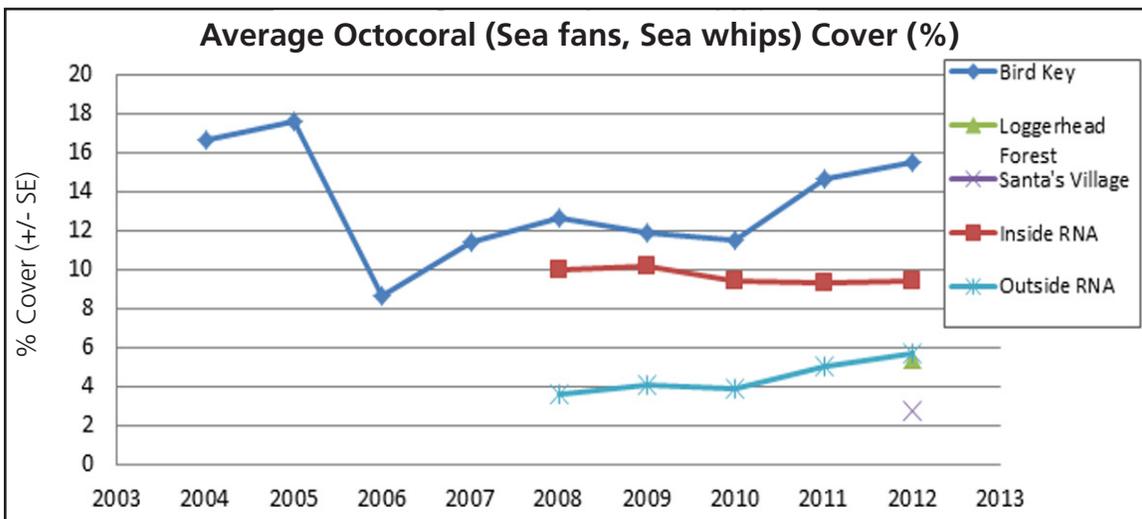


Status and Trends: Declines in stony coral and octocoral at Bird Key

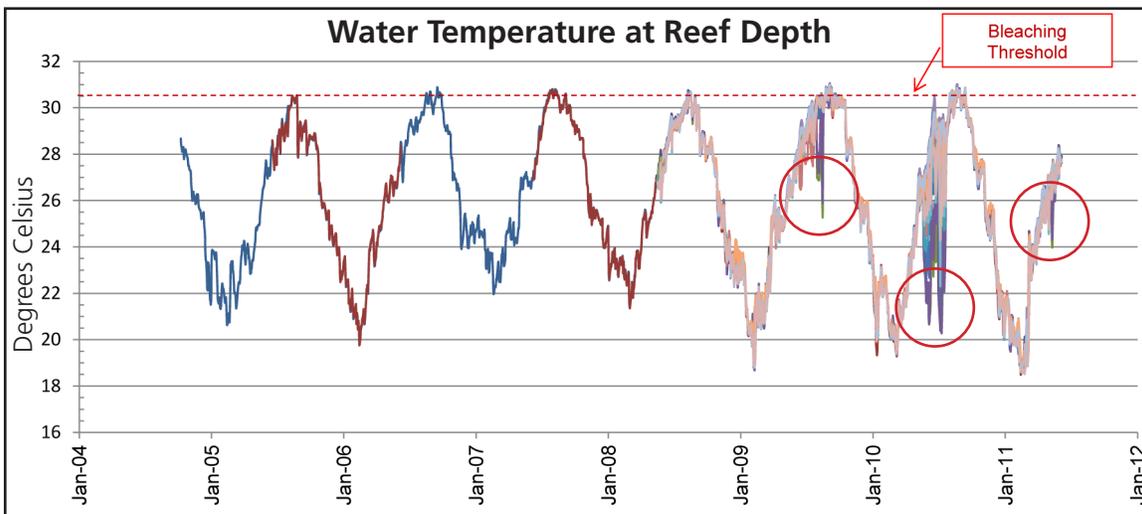
Monitoring through 2012 shows a significant negative trend in stony coral cover at Bird Key. No trends are significant at the extensive sites. The octocorals have only partially recovered from a significant decrease that occurred in 2006. SFCN suspects that the fragile octocorals were damaged during the 4 hurricanes that passed over the park in late 2005. Water temperature data shows similar patterns throughout the park except in May-June when cold water events appear to affect western and north-western sites more than the rest of the park.



Trends in live stony coral cover at all survey sites in DRTO including extensive sites and Bird Key Reef. Only Bird Key, the longest monitored site, has a statistically significant negative trend at this time.



Trends in octocoral cover (sea fans, sea whips, etc.). Octocorals at Bird Key have only partially recovered from a significant decrease recorded in 2006. SFCN suspects that the fragile octocorals were damaged during the 4 hurricanes that passed over the park in late 2005.



DRTO water temperature summary graph. Graph shows water temperature data from the 20 sites in DRTO since 2008. The bleaching stress threshold of 30.5 °C is shown. The three red circles indicate cold-water events, occurring in late spring through early summer.

