



## Marine Benthic Communities: Coral Reef Monitoring in Buck Island Reef National Monument

2012

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

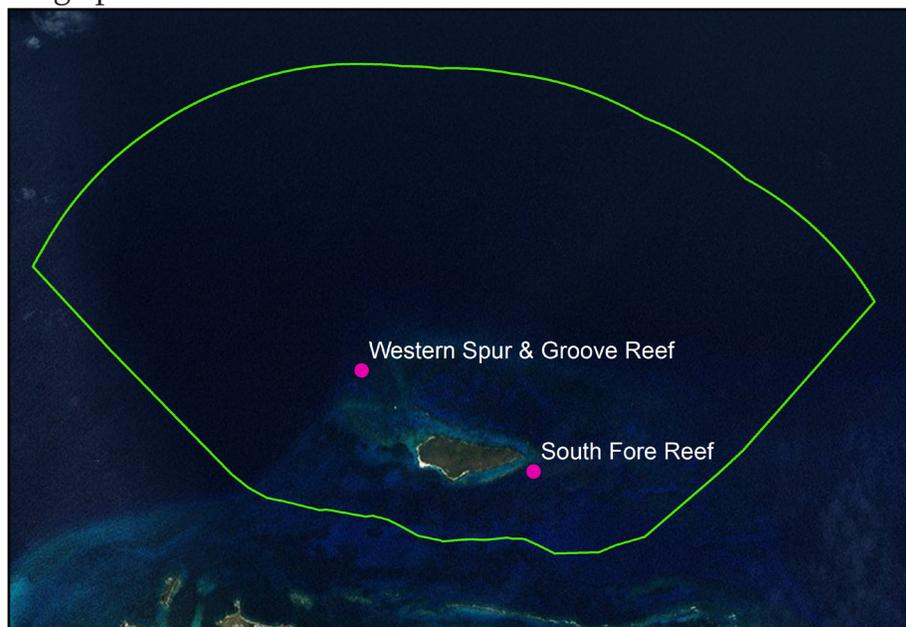
Coral reef communities within Buck Island Reef National Monument (BUIS) consist of stony corals, octocorals, sponges, algae, and gorgonians (e.g., sea fans). Reefs support incredible marine biodiversity including a multitude of fish species, as well as lobsters, sea turtles, and other creatures. Reefs play a vital role for humans by supporting fisheries, fishery nursery areas, tourism, sand creation for beaches, pharmaceutical bio-prospecting, and shoreline protection 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, nutrient enrichment, contaminants, ocean acidification, and abrasion of reef by debris or careless snorkelers and divers.



South Fore Reef in Buck Island Reef National Monument.

### Long-term Monitoring: Two sites monitored annually since 2000 and 2002

The South Florida/Caribbean Network (SFCN) has annually monitored two intensive coral reef sites at Buck Island Reef National Monument: South Fore Reef since 2002 and Western Spur & Groove Reef since 2000. Sites were selected based on depth, size of the reef area, composition, complexity of the reef structures, and through management recommendations. Each site consists of 20 permanent, randomly-selected 10m transects, 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.



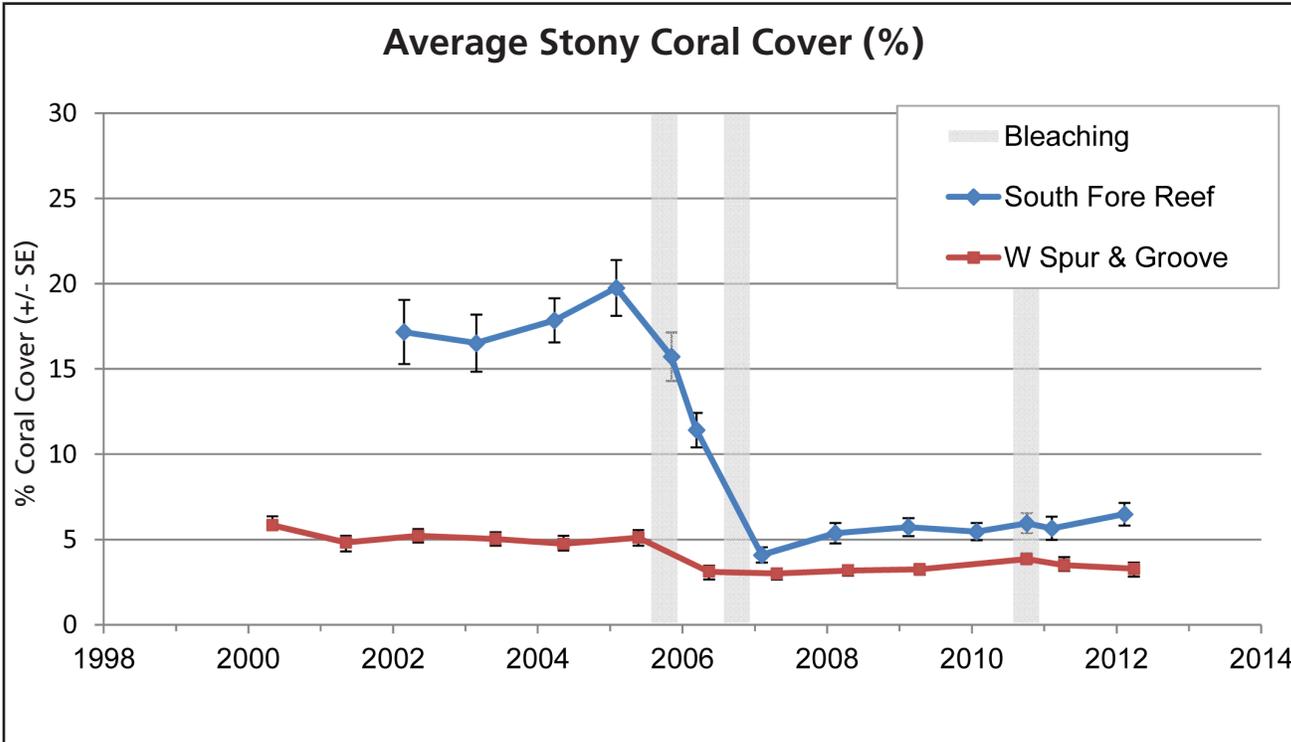
South Fore Reef encompasses over 40,000 m<sup>2</sup> of the forereef that typifies the south side of Buck Island and is a highly complex, high coral cover reef, dominated by Boulder Star Coral (*Montastraea annularis complex*). Depths range from 11-14m.

Western Spur and Groove Reef is a 26,365 m<sup>2</sup> reef area, typical of the park's northwest waters. The "spurs" are low relief features with shallow sand channels between. Depths range from 9-13 m. The area is subjected to large sea swells from the north, especially during winter "cold" fronts that approach the area. Coral cover is relatively low, and made up of low "mounded" type corals (e.g., Brain and Great Star Corals) which survive well in the high surge environment.

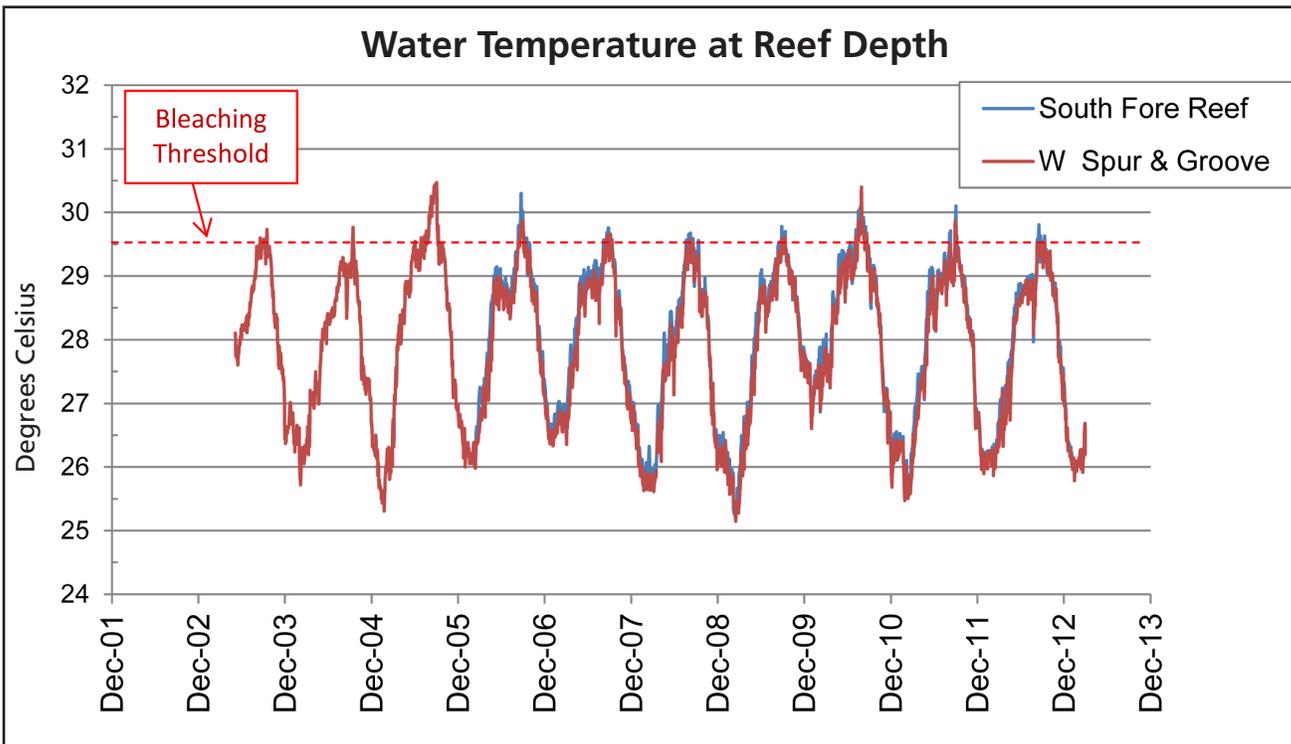


## Status and Trends: *Slight upward trend since catastrophic coral mortality of 2005-2006*

In 2005-2006, soaring water temperatures were associated with a coral bleaching/disease outbreak followed by catastrophic stony coral mortality, which the reefs have not fully recovered from. Stony coral cover in 2012 was 6.5% at South Fore Reef and 3.3% at Western Spur & Groove, which are relative decreases of 67% and 35% from pre-event levels. Since 2007 there has been a small but statistically significant increase in stony coral cover at South Fore Reef. While coral bleaching occurred in 2010, temperatures peaked below 2005 levels and duration of high temperatures did not last as long and widespread coral disease outbreaks did not occur.



Trends in live stony coral cover at Western Spur and Groove Reef and South Fore Reef. Grey bars indicate the coral bleaching/disease event of 2005 that continued into 2006 and the coral bleaching event in 2010.



BUIS water temperature summary graph showing data from the two coral monitoring sites since 2002. The bleaching stress threshold of 29.5°C is shown. Warm water temperatures in 2005, 2006, and 2010 were associated with coral bleaching.

