



Marine Benthic Communities: Coral Reef Monitoring in Salt River Bay National Historical Park and Ecological Preserve, St. Croix, U. S. Virgin Islands

2021

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

Coral reef communities within Salt River Bay National Historical Park and Ecological Preserve (NHP&EP) consist of stony corals, octocorals, sponges, algae, and gorgonians (e.g., sea fans). Reef support incredible marine biodiversity and provide habitat for a multitude of fish species, lobsters, sea turtles, and other creatures. Coral reefs also play a vital economic role by supporting fisheries, tourism, sand creation for beaches, source for pharmaceuticals, 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. Coral reefs are negatively impacted by events such as extreme water temperatures that cause "bleaching," vessel grounding and anchoring, major storms, coral disease, damaging fishing practices, sediment runoff, nutrient enrichment, contaminants, ocean acidification, and abrasion of the reef by debris or careless snorkelers and divers.



Above: Aerial image of monitoring sites in Salt River Bay NHP&EP.

Long-term Monitoring: *Site monitored annually since 2012*

The South Florida/Caribbean Network (SFCN) has annually monitored this site since in April 2012. The site is 26,437 square meters (284,566 square feet) and consists of 20 randomly placed permanent transects, located within three sections: Canyon West Wall, Canyon East Wall, and Northwest Spur and Groove. These areas were constrained to less than or equal to 33 meters (108.3 feet) depth and were chosen because of relatively high coral cover, reef complexity, and historical significance. The 10-meter (32.8-foot) transects are monitored annually using underwater video. Percent cover of living coral by species, macroalgae, turf and coralline algae, octocorals, and sponges are calculated. Data on coral disease, bleaching, water temperature, and long-spined sea urchins are also collected.



Above: Large plate corals (*Agaricia* and *Undaria* spp.) are found in Salt River Canyon.

Status and Trends: *Stable coral cover since monitoring began.*

While coral cover remained relatively constant despite the passing of two category 5 hurricanes (Irma and Maria) in September 2017, live stony coral cover decreased in 2021, primarily due to the dramatic increase in the coral disease (Figures 1–3). Coral disease lesions (numbers and size of lesions) remained at low background levels until 2021, when dramatic increases occurred in all disease metrics (Figures 1–3). Stony Coral Tissue Loss Disease (SCTLD) is an extremely virulent and lethal coral disease affecting most all the major reef building corals, including several species listed as "threatened" on the US Endangered Species Act. The canyon in Salt River contains some of the largest plate corals (*Agaricia* and *Undaria* spp.) found in any SFCN monitoring sites. At this time, plating corals seem to have a low vulnerability to SCTLD and their cover remained consistent during this monitoring period.

Reef depth water temperatures exceeded the theoretical bleaching threshold (29.5°C) during six of the past eight summers (2013–2020). The "cold water wake" left behind by Hurricanes Irma and Maria in 2017 can be observed in this data revealing the importance of these events in keeping water temperatures below coral bleaching stress levels (Figure 4). Data collection occurs in April 2021 and does not include the temperature recorded during the warmest time of 2021 (August through October; Figure 5).



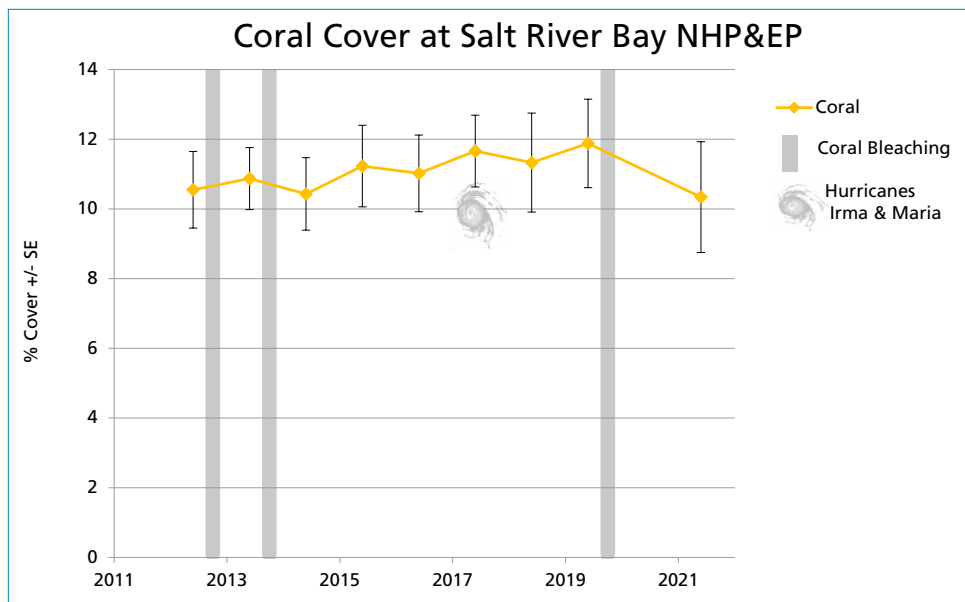


Figure 1. Average live percent stony coral cover ($\pm$ SE) Salt River Bay National Historical Park and Ecological Preserve.

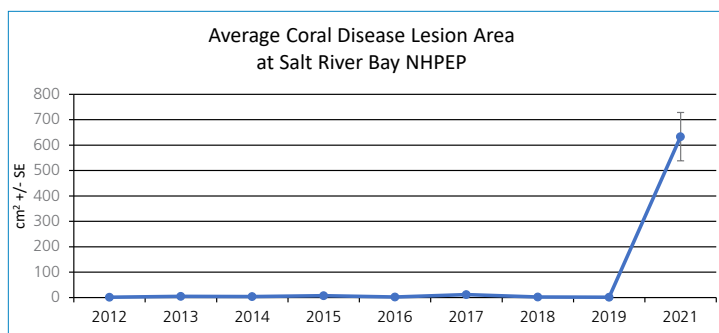


Figure 2. The average area recently killed by coral disease ($\pm$ SE). It significantly increased in 2021.

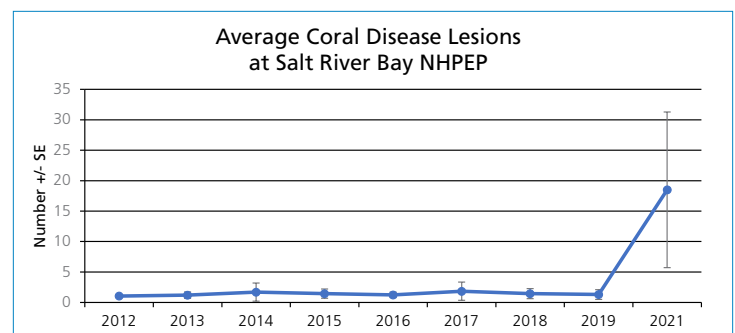


Figure 3. The average number of coral disease lesions recently killed by coral disease ($\pm$ SE). It significantly increased in 2021.

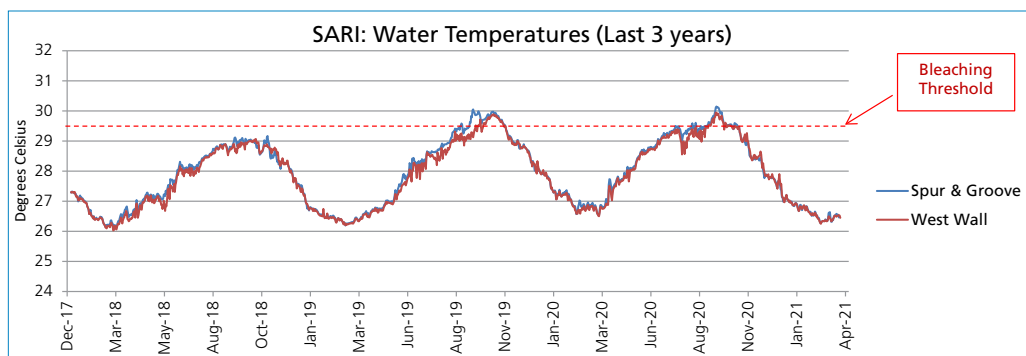


Figure 4. Salt River Bay National Historic Park and Ecological Preserve water temperature summary graph showing data from the two coral monitoring sites since 2018. A bleaching stress threshold of 29.5°C (85.1°F) is shown. Note data shown do not include 2021 season of thermal maximum (August–October).

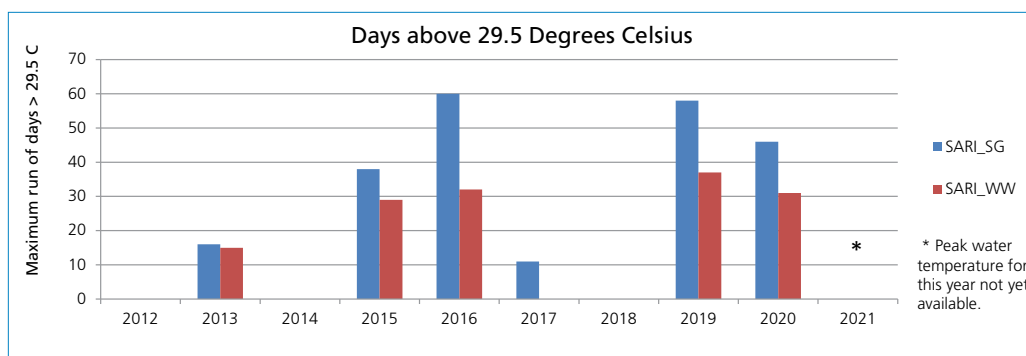


Figure 5. Salt River Bay National Historic Park and Ecological Preserve water temperature summary graph showing data from the two coral monitoring sites since 2018. Days above that threshold are quantified. Note data shown do not include 2021 season of thermal maximum (August–October).

