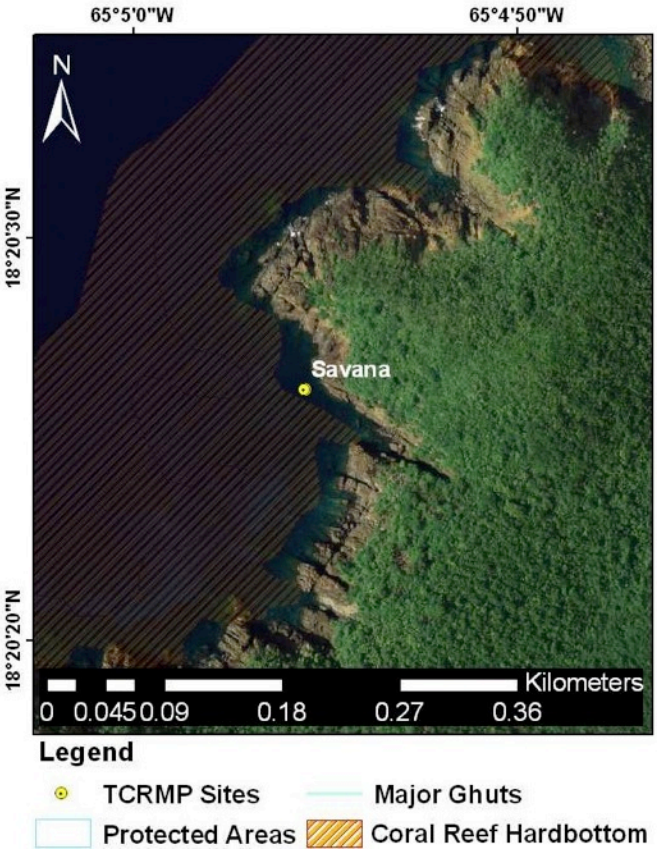
## SAVANA ISLAND

**Description**. The Savana Island site is a midshelf fringing reef facing the Atlantic Ocean to the northwest in depths of 5 – 17 m. The reef is a well-developed coral community atop bedrock, with some insipient carbonate accumulation. Savana has been monitored since 2003, with permanent benthic transects installed in 2007.




**Outstanding Feature**. Savana harbors behemoth colonies of boulder star coral (*Orbicella faveolata*) and a diverse and abundant fish community.

**Threats**. Savana is threatened the invasive algae *Ramicrusta* sp. (identification provisional) and by warming ocean temperatures, as *O. faveolata* can be susceptible to bleaching, disease, and partial mortality. The area is also open to fishing and the occasional accumulation of debris can be seen.

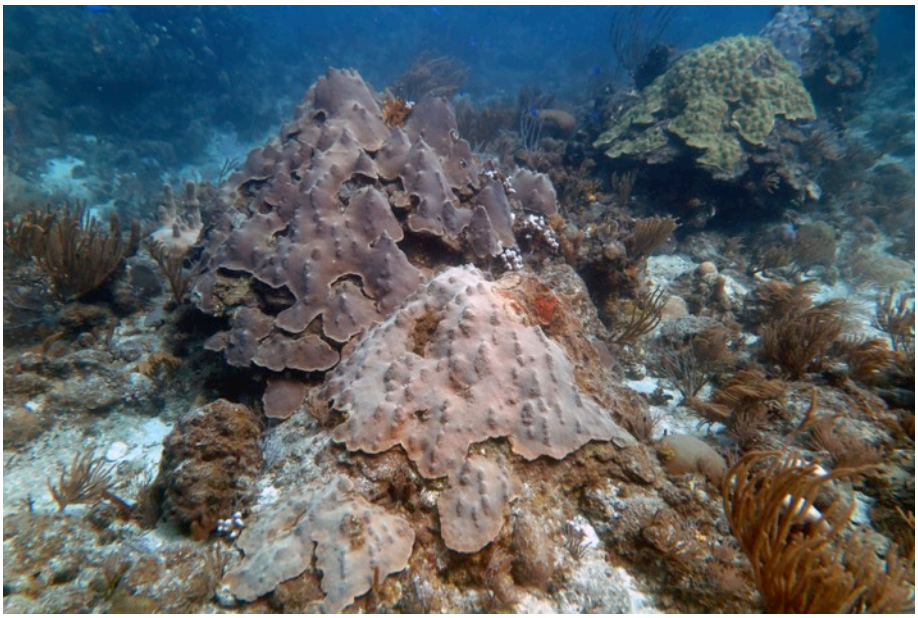


Figure 176. Savana. (top) Location. (right) A representative photo of the reef showing large colonies of *Orbicella faveolata* (Nov. 17, 2015).

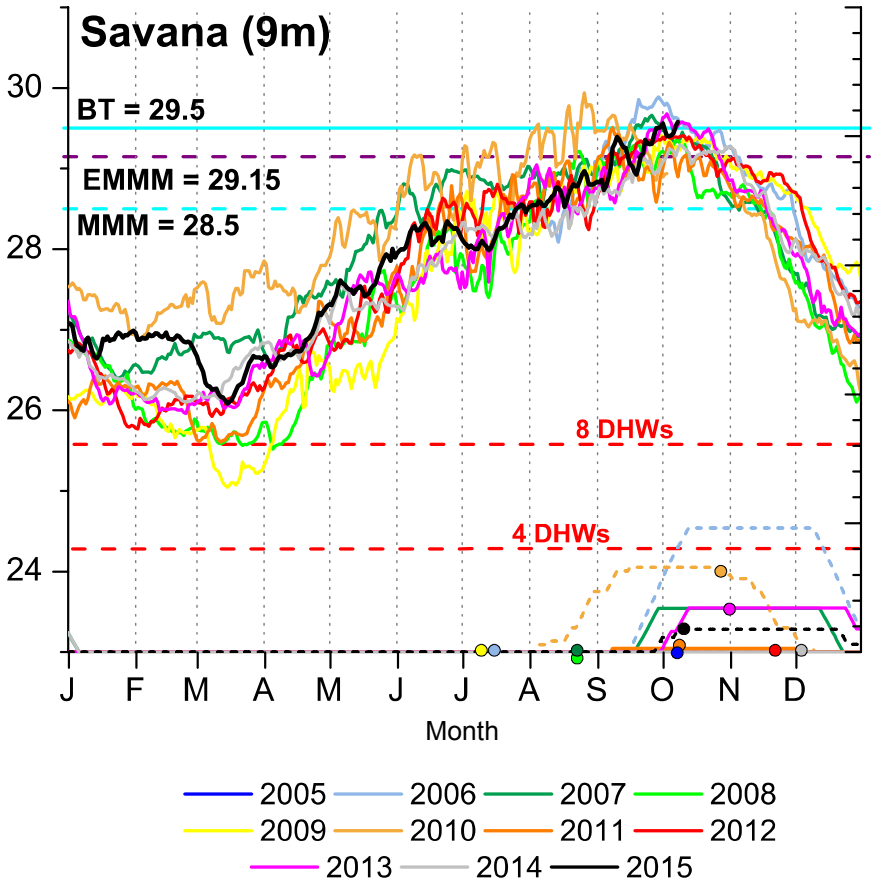



Figure 177. Savana benthic temperature record (10 m depth).

### Physical Characteristics.

**Current**. Currents have not been measured directly at Savana. Strong unidirectional currents can influence the surface near the site. Wave-driven oscillatory currents are common and occasionally strong.

**Temperature**. Savana has temperatures cooler than other shallow sites, likely due to the proximity of the open Atlantic Ocean.

**Benthic Community**. Boulder star corals, predominately large (>2m wide) colonies of *Orbicella faveolata*, dominate the coral community at the Savana monitoring site. The site lost 45.2% of its coral cover in the 2005 bleaching event. Coral cover has continued to decline, rather than recover, and this is related to a striking increase in the red encrusting algae *Ramicrusta* sp. to over 60% cover (this is responsible for the spike in "macroalgae" in benthic cover after 2005). This algae overtops coral edges leading a slow, creeping mortality. Gorgonians and sponges are also prominent components of the sessile epibenthic animal community.

**Coral Health**. The coral community at Savana was highly affected in the 2005 bleaching event, with 80% of corals affected on almost 90% of the colony surface. Bleaching was also very prominent in 2006, but at a lower extent. Bleaching was moderate during the 2010 bleaching event, with over 50% of colonies bleached at a low extent. Coral diseases can reach high prevalence and are diversely represented. Particularly noticeable is the dramatic outbreak of white disease in 2006. Dark spots disease has also affected a high proportion of corals from 2008 onwards. Old partial mortality increased markedly after the 2005 coral bleaching event and has declined only slightly. Recent partial mortality after the 2005 coral bleaching event was unprecedented for any site.

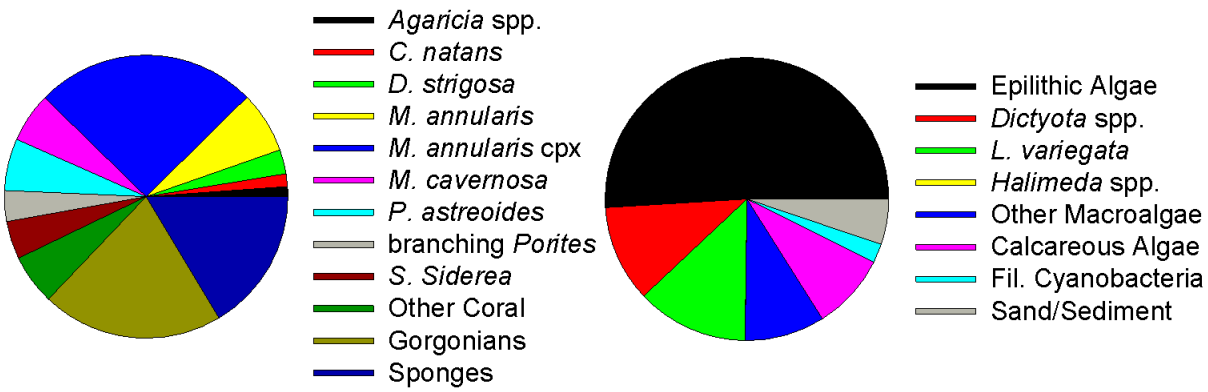



Figure 178. Savana Island. (left) Relative composition of the sessile epibenthic animal community. (right) Relative composition of the algal community and unconsolidated sediment.

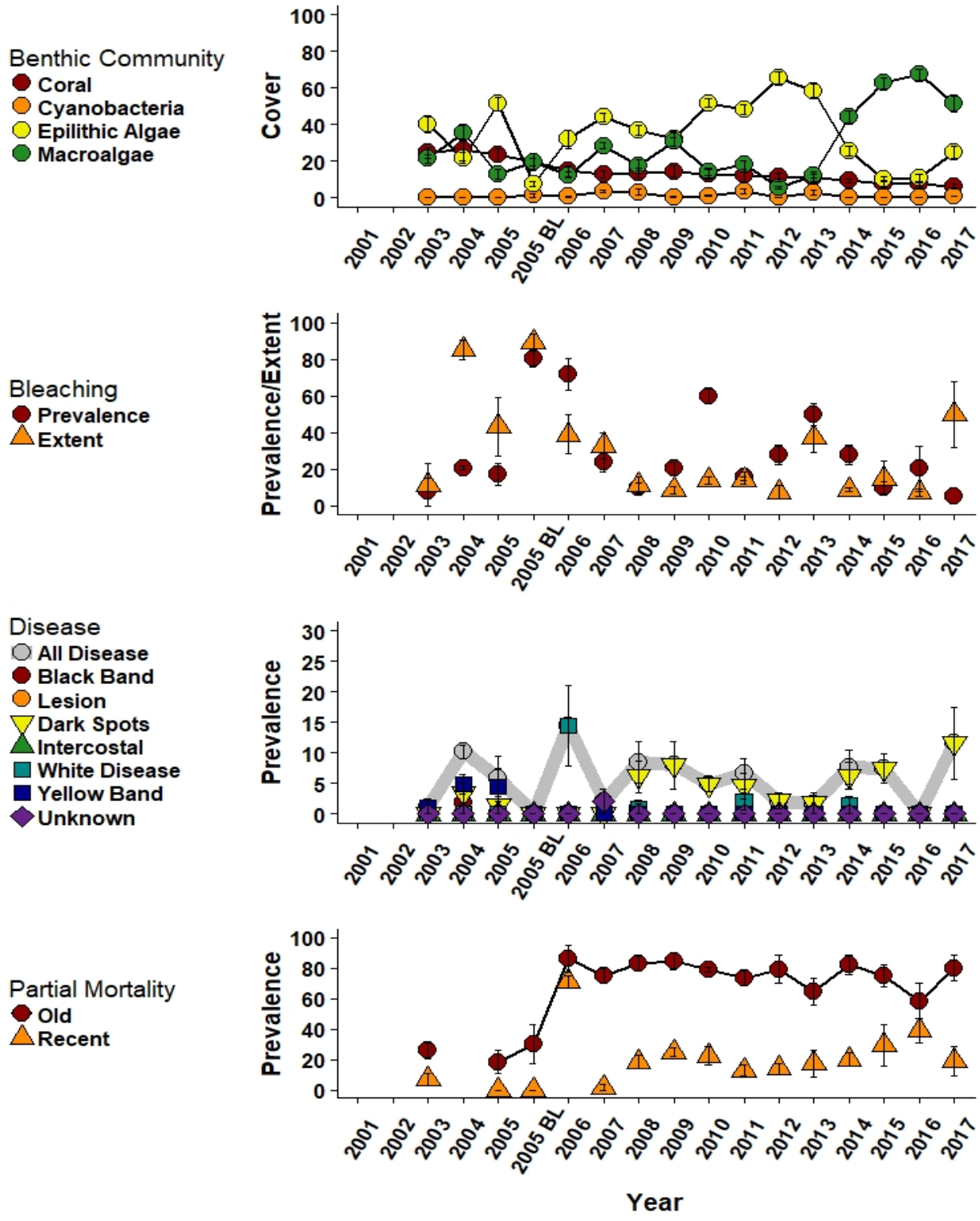



Figure 179. Savana Island benthic cover and coral health through time (mean ± SE).

**Fish Community**. The Savana Island fish community is fairly small in biomass, but is quite diverse, and highlights the variety of benthic resources available to fishes in the area. The site is dominated by herbivores, but it also supports a diverse invertivore community. Planktivores in the quiet protected bay are limited to the smaller pomacentrids and wrasses. However, these fish groups are all quite prolific. The most numerous piscivore observed in the first three years of fish monitoring has been the schoolmaster snapper. One small yellowmouth grouper (11-20 cm) was observed on a belt transect in 2012, the first seen on a site in shallow water located near land. The area is highly fished with fish traps. No large commercially important fish have been seen in the bay.

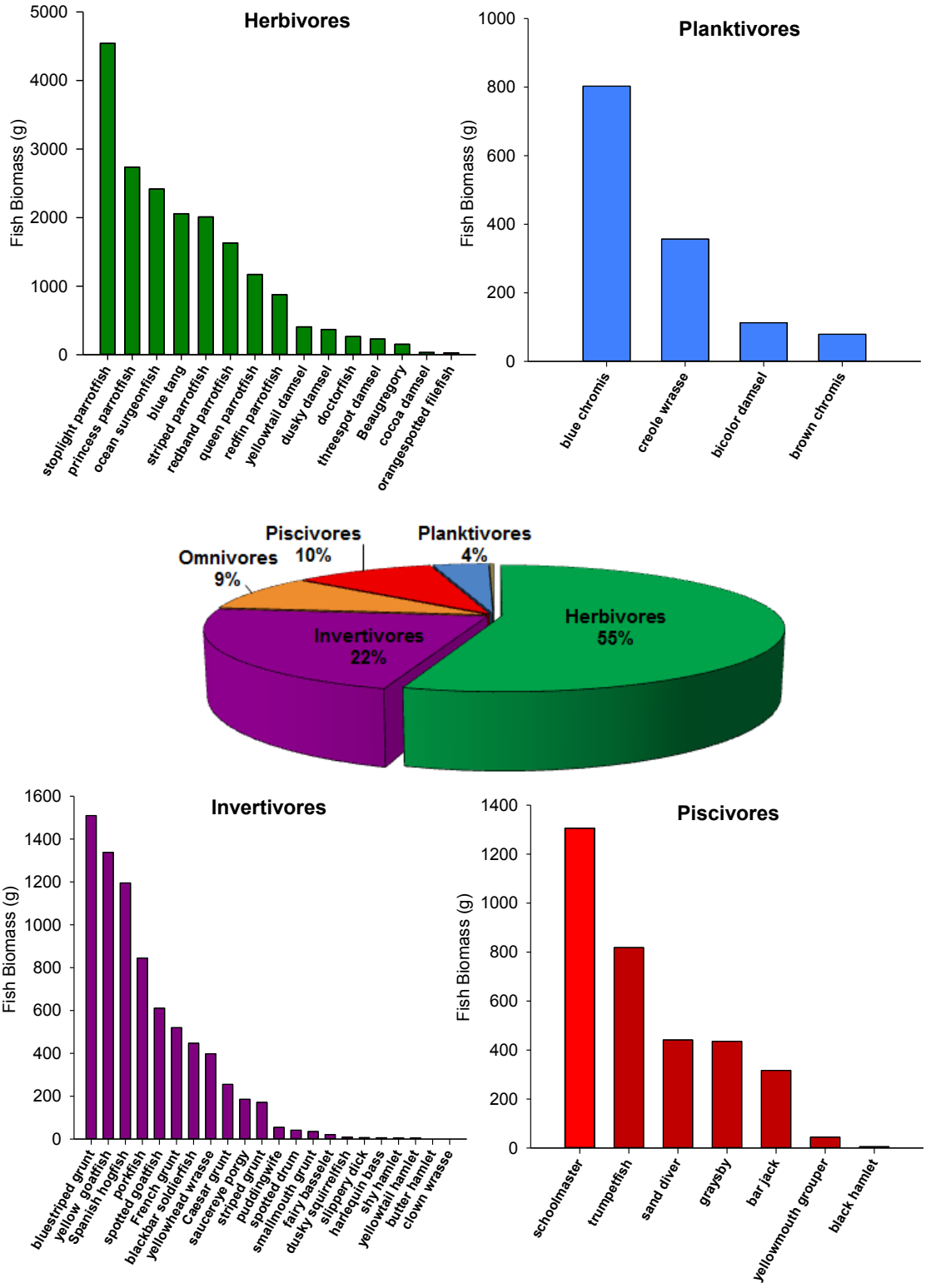
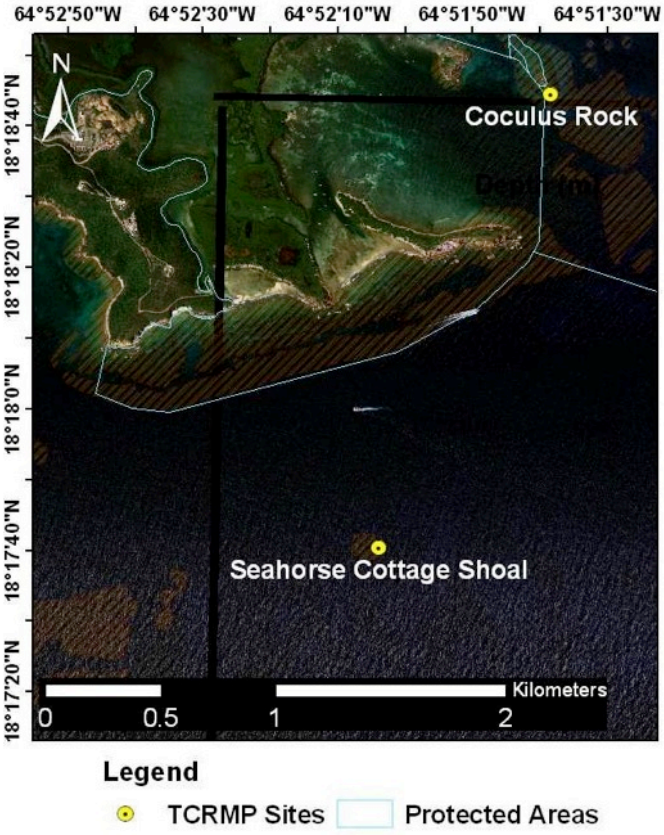



Figure 180. The Savana Island fish community by absolute and relative biomass.

## SEAHORSE COTTAGE SHOAL

**Description**. The Seahorse Cottage Shoal site is a large patch reef surrounded by sand and rhodolith in depths of 17 – 23m. The isolated reef is flat topped and dominated by *Orbicella* spp.. Seahorse has been monitored since 2003, with permanent benthic transects installed in 2007. A ciguatera study with monthly sampling has been ongoing since 2009.




**Outstanding Feature**. Seahorse supports a diverse and abundant coral and fish community adjacent to the St. Thomas East End Reserves.

**Threats**. Seahorse is buffered from land-based sources of pollution. The site is a targeted site in the St. Thomas trap fishery and trap strings have been observed over and adjacent to the site.

Figure 181. Seahorse Cottage Shoal. (top) Location. (right) A representative photo of the reef.

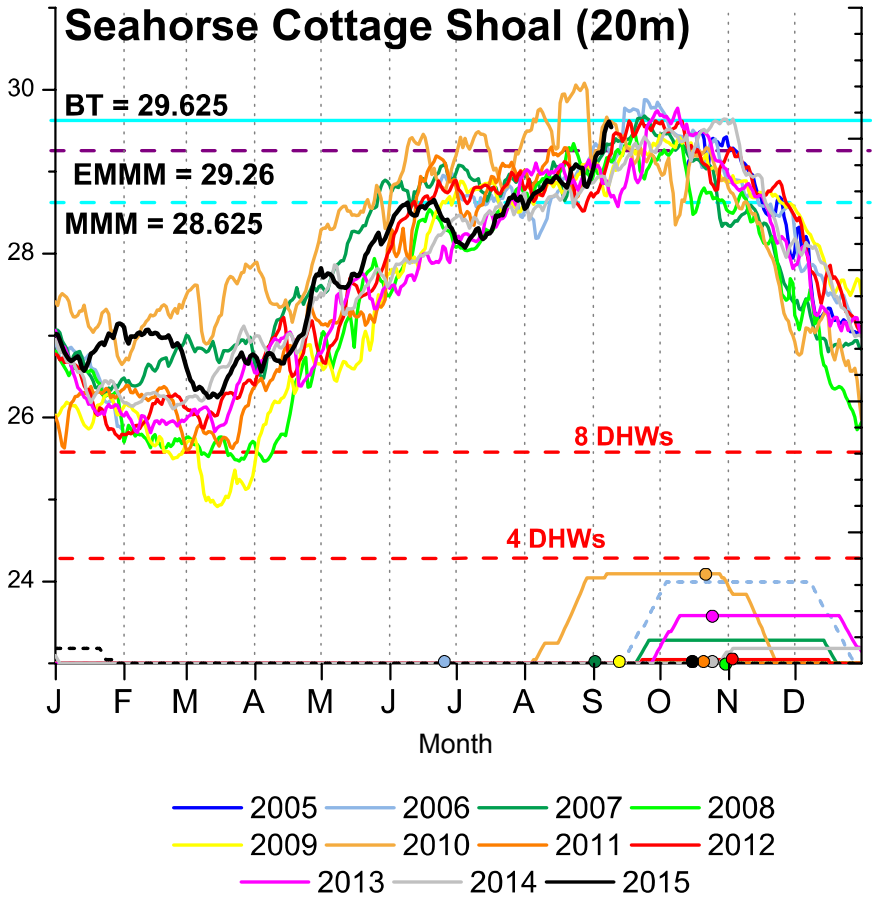



Figure 182. Seahorse benthic temperature record (21 m depth).

## Physical Characteristics.

**Current**. Currents have not been directly measured at Seahorse Cottage Shoal. Unidirectional benthic currents tend to be slow and wave-driven oscillatory currents only occur during heavy storm activity.

**Temperature**. Benthic temperatures are moderate to high during warming events.

**Benthic Community**. The coral community of the Seahorse site is dominated by the boulder star coral (*Orbicella* spp.), but hosts a high diversity of other coral species. The site lost 46.6% of its cover in the 2005 bleaching event and had only regained 4.7% of this loss by 2011. Gorgonians and sponges are also common components of the sessile epibenthic animal community. The algal community is co-dominated by epilithic algae and the macroalgae *Lobophora variegata* and *Dictyota* spp..

**Coral Health**. The coral community bleached severely in the 2005 bleaching event with nearly 100% of corals bleaching over about 100% of their surface. Bleaching prevalence after 2005 was slow to decline due to delayed recovery in large *Orbicella* spp. colonies. The site also had a high prevalence of bleaching in the 2010 event, but at a low extent on colonies. Bleaching was also moderately prevalent in 2011. Coral diseases are common and diverse at Seahorse. White disease was also prevalent in 2004, which is rare for a site at this depth. Dark spots disease is also ubiquitous. Old partial mortality increased to a very high prevalence after the 2005 bleaching event, but had declined by 2011.

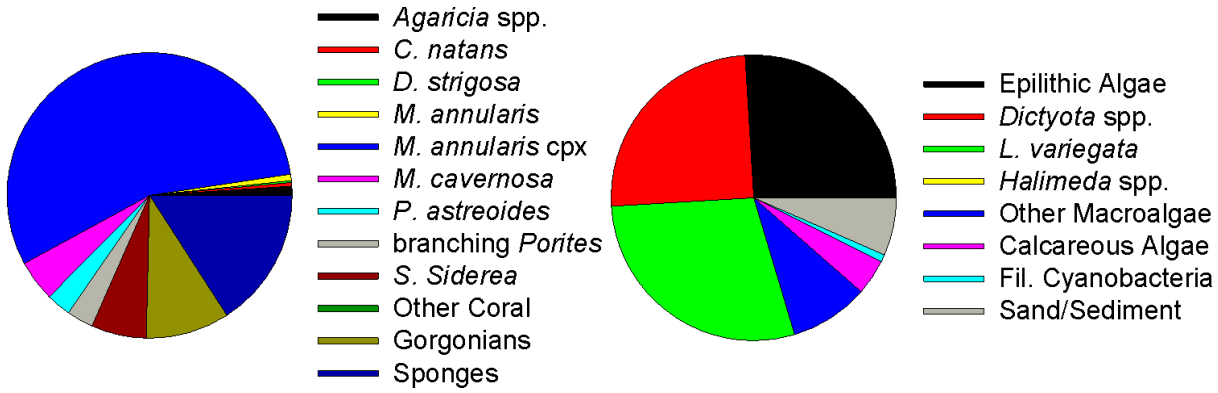



Figure 183. Seahorse Cottage Shoal. (left) Relative composition of the sessile epibenthic animal community. (right) Relative composition of the algal community and unconsolidated sediment.

# SEAHORSE COTTAGE SHOAL

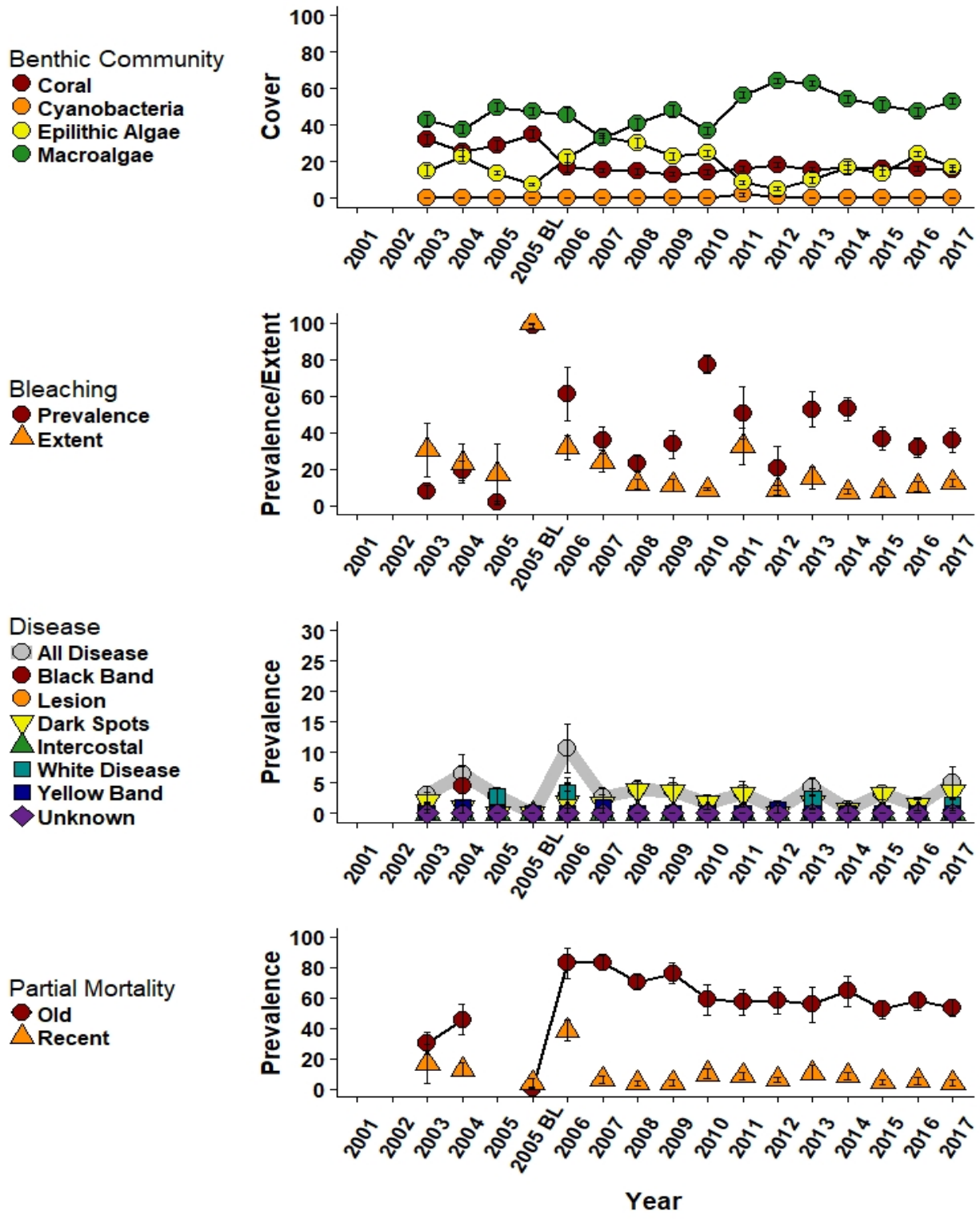



Figure 184. Seahorse Cottage Shoal benthic cover and coral health through time (mean ± SE).

**Fish Community**. Seahorse Cottage Shoal supports a large variety of reef fish and hosts aggregations of gray snapper and lane snapper during the summer months. The trophic guilds on the offshore reef are split relatively evenly between herbivores, invertivores, and piscivores. This reflects the heterogeneity of reef substrate and the availability of unconsolidated sand and rhodolith habitat surrounding the reef. Mutton snapper and queen triggerfish are relatively common. Adult stoplight and redband parrotfish dominate herbivores, although most of the larger parrotfish species do occur, including both adult and juvenile phase. Glasseye snapper and graysby dominate the piscivores trophic guild. Large groupers have never been seen on the reef. Seahorse Cottage Shoal is well known to fishermen and fairly heavily fished. Traps on the reef are common during surveys. However, schoolmaster, lane, gray, and mahogany snapper are all common. This may reflect the proximity to nursery habitats in the St. Thomas East End Reserves and the mangrove habitats therein.

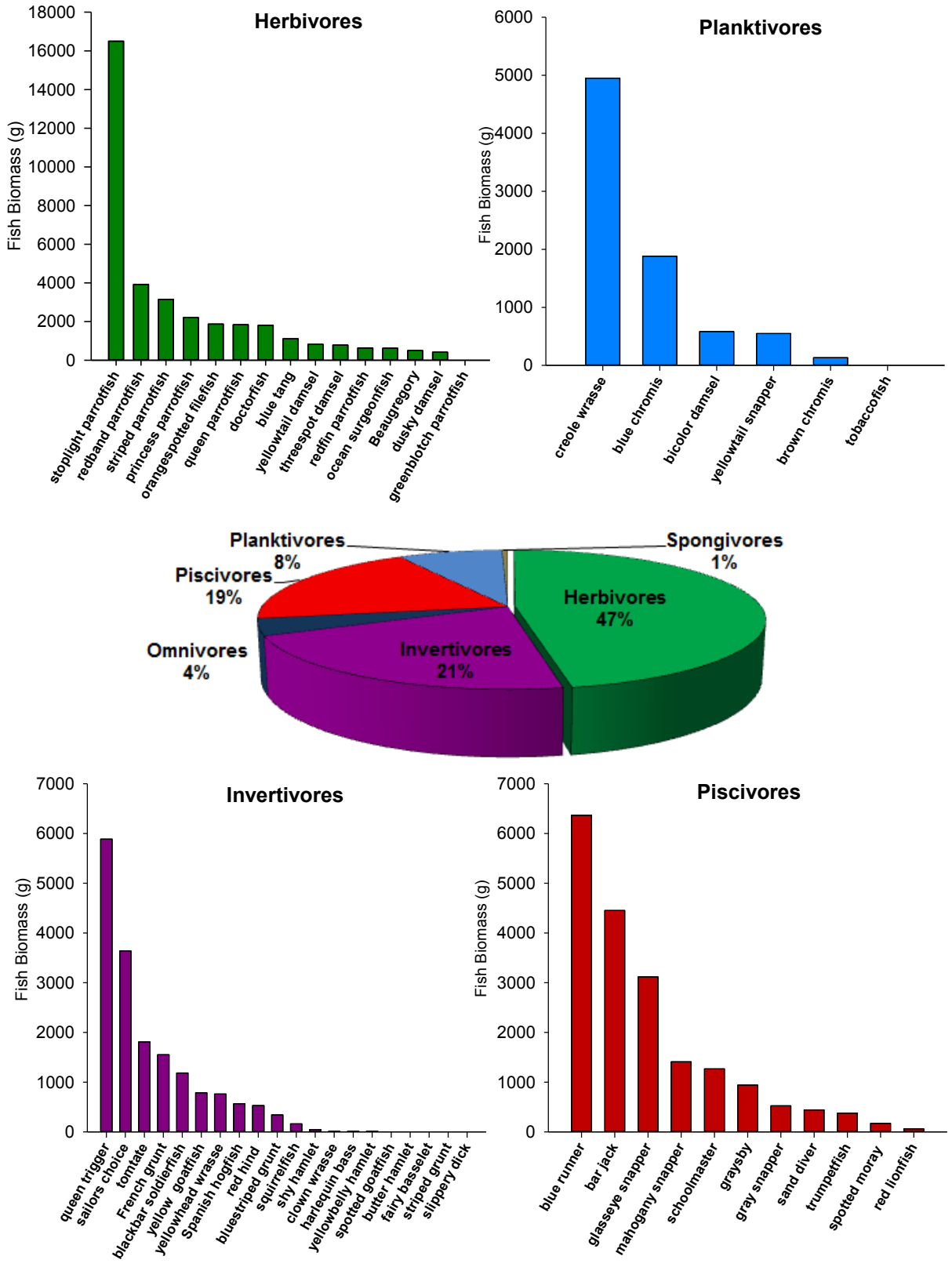
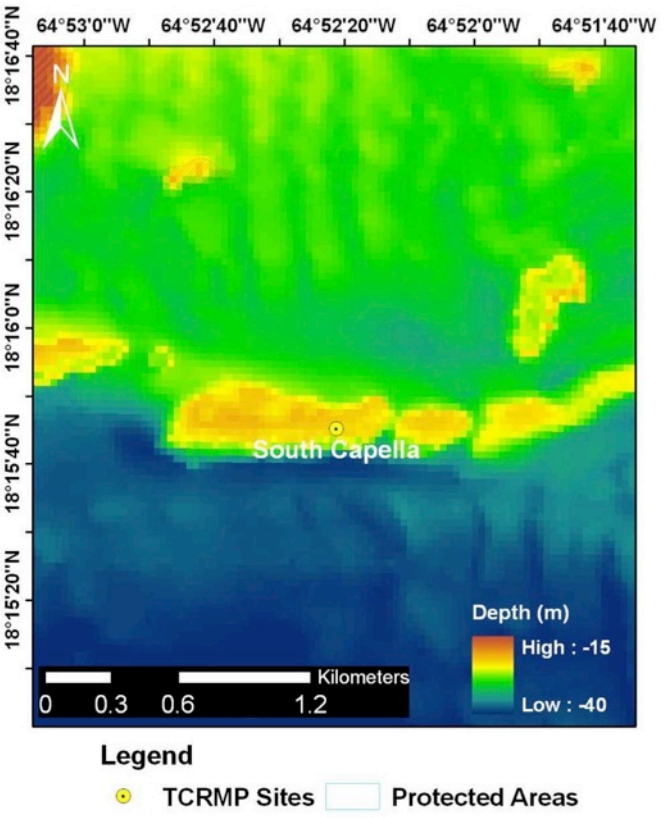



Figure 185. The Seahorse Cottage Shoal fish community by absolute and relative biomass.

## SOUTH CAPELLA

**Description**. The South Capella site is located on a rise of the St. Thomas-St. John midshelf reef complex in depths of 16 - 25 m. The reef is made of rolling ridges of coral and pavement interspersed with sand grooves. South Capella has been monitored since 2003, with permanent benthic transects installed in 2007.

**Outstanding Feature**. The South Capella site is part of an outstanding shallow water midshelf reef system that is essential fish habitat.




**Threats**. The St. Thomas trap fishery heavily targets South Capella. Active and derelict trap strings crisscross the site and a derelict trap appeared in permanent transect 1 in 2008 and has been degrading there since. The trap was still fully intact as of 2016 but not actively trapping. The reef was also highly affected by the 2005 coral bleaching event, suggesting a susceptibility to rising sea surface temperatures.

Figure 186. South Capella. (top) Location. (right) The reef with a derelict Antillean fish trap in Transect #1.

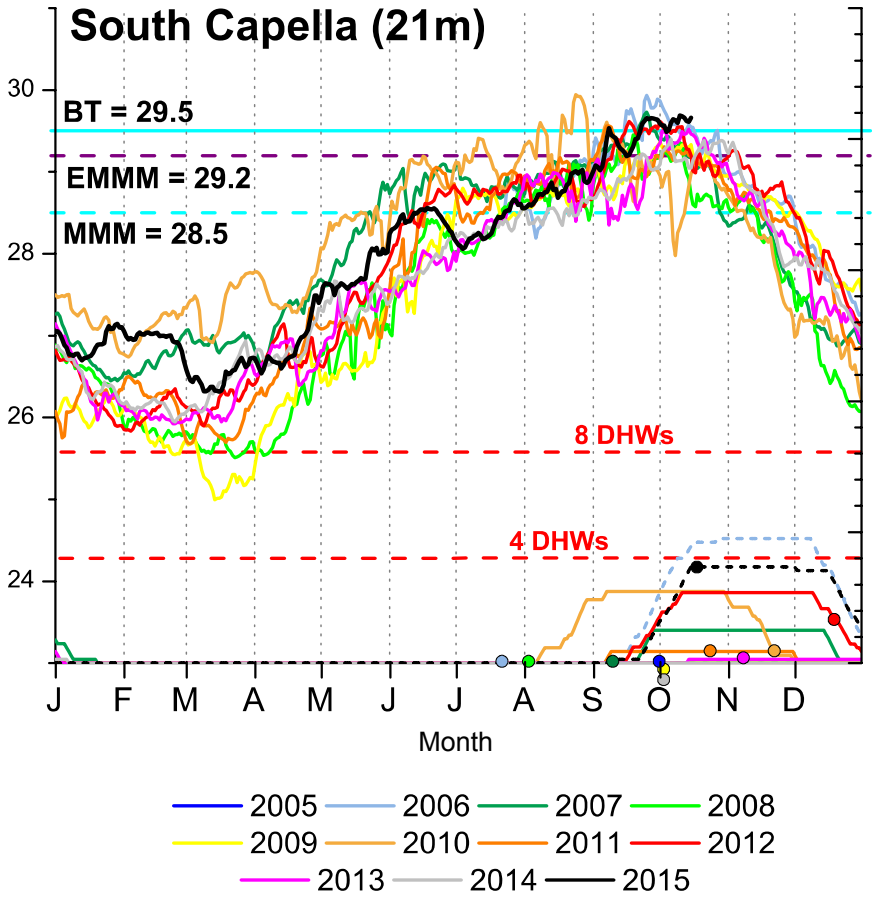



Figure 187. South Capella benthic temperature record (24 m depth).

## Physical Characteristics.

**Current**. Currents were directly measured at South Capella and this data will be included in a future report. Wave-driven oscillatory currents have not been experienced but are likely during swells and storms. Unidirectional benthic currents are usually weak, but strong currents can develop from the surface to midwater.

**Temperature**. South Capella has relatively cool benthic temperatures for a shallow site during warm years, which may be a reflection of its moderately deep depth and proximity to deep water to the south.

**Benthic Community**. Boulder star corals (*Orbicella* spp.) dominate the coral community at South Capella. These corals were very heavily affected by mortality due to the 2005 coral bleaching event. The site lost 56.4% of its cover and had not regained any cover by 2011 (-3.7% recovery). Gorgonians and sponges are also common components of the sessile epibenthic animal community. The macroalga *Lobophora variegata* dominates the algal community, with epilithic algae and *Dictyota* spp. comprising the second largest shares. There was also a high abundance of crustose coralline algae and filamentous cyanobacteria.

**Coral Health**. Corals were moderately-heavily affected by the 2005 bleaching event, with a prevalence of 80%, but an extent on colonies of only about 50%. Bleaching prevalence also increased during the 2010 bleaching event, but at a low extent. Bleaching is moderately prevalent at this site even in years without notable thermal stress. Coral diseases are common and diverse at South Capella. White disease was prevalent after the 2005 bleaching event in 2006, and then again in 2009 and 2011. Black band disease was found in 2002, which is unusual for a site at these depths. Dark spots disease was also typically present in most years. Old partial mortality increased after the 2005 bleaching event and has declined to 2011. Recent partial mortality was prevalent in most years of monitoring, particularly in 2006. In years not following thermal stress the highest identifiable source of recent partial mortality was biting from territorial damselfish (*Stegastes* spp.).

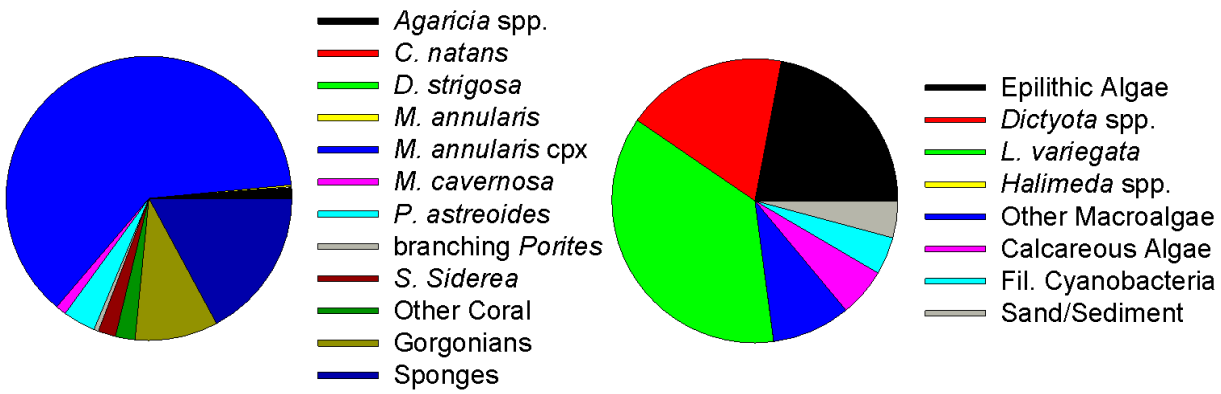



Figure 188. South Capella. (left) Relative composition of the sessile epibenthic animal community. (right) Relative composition of the algal community and unconsolidated sediment.

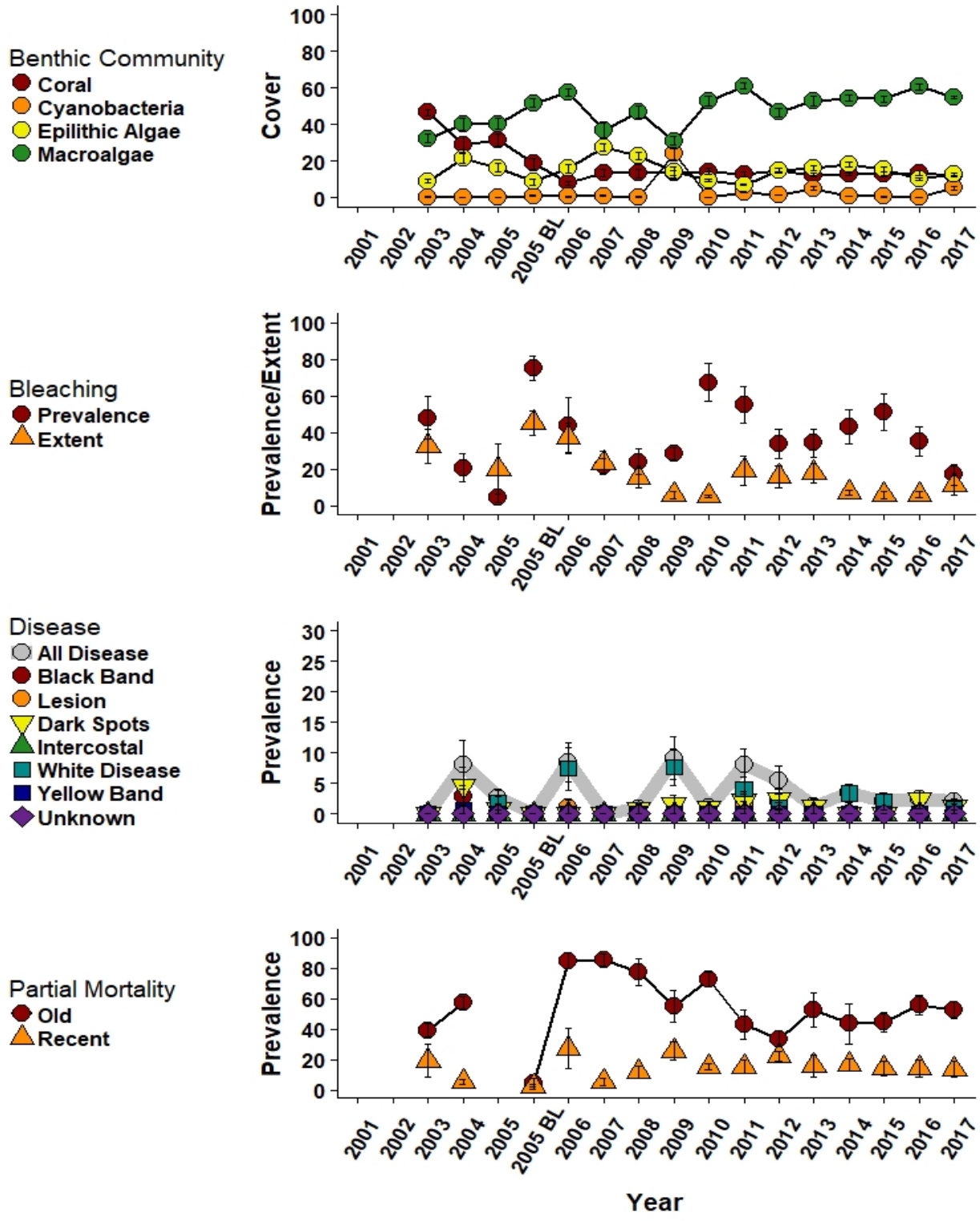



Figure 189. South Capella benthic cover and coral health through time (mean ± SE).

**Fish Community**. South Capella is characterized by a fairly diverse fish community that is fairly well split between trophic levels. In 2011, a large school of schoolmaster snapper skewed this balance toward piscivores; however, this was probably a spawning event, and not typical of the daily fish community. The reef is spur and groove with complex reef edges and sand channels that support a large number of invertivores and variety of omnivores. Planktivores include yellowtail snapper and black durgeon. Benthic herbivores are dominated in biomass by large stoplight parrotfish. The South Capella reef is highly fished and traps are commonly seen during our survey events. The rich, complex reef is noticeably bare of large snappers and groupers. The serranid group is represented only by the graysby and small hamlets, with an occasional red hind observed. Lionfish are more common on this site than other offshore sites.

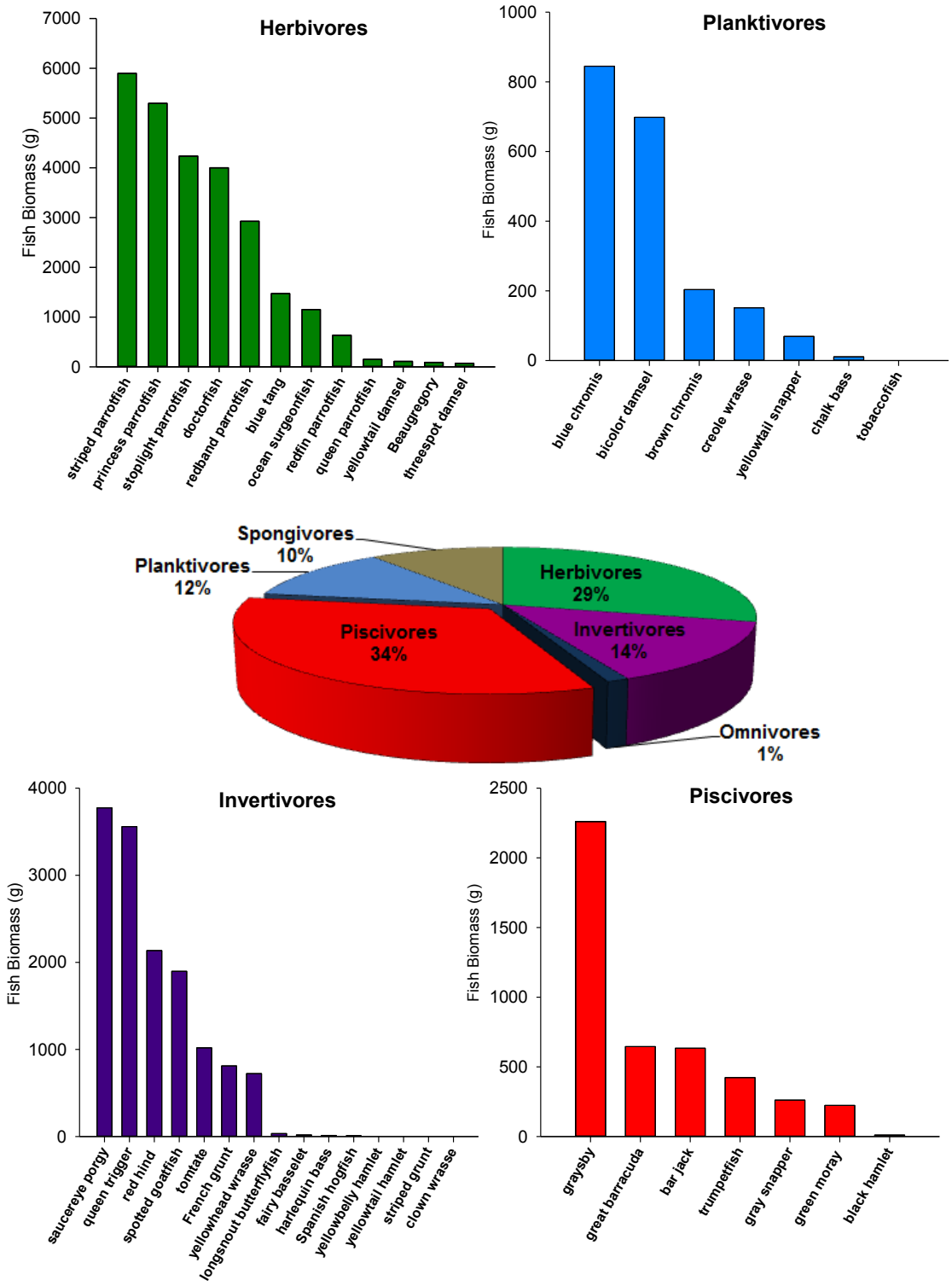
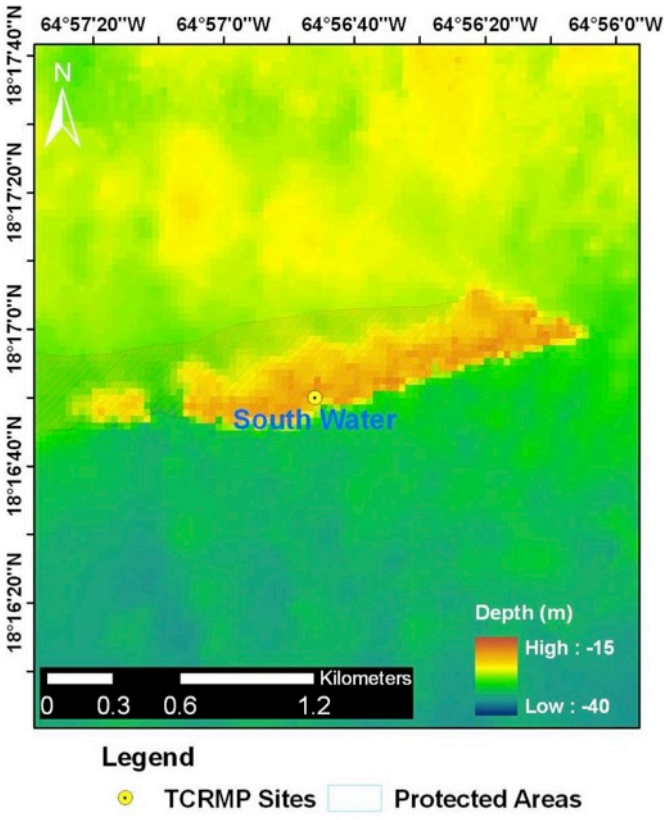



Figure 190. The South Capella fish community by absolute and relative biomass.

## SOUTH WATER

**Description**. South Water is a hardbottom coral community along the sharp break of a midshelf reef complex in depths of 17 – 28 m. The reef has a sharp break in slope leading to a steep escarpment that terminates in a sand/sediment plain at the reef base. South Water has been monitored since 2005, with permanent benthic transects installed in 2007.

**Outstanding Feature**. South Water is a commercially important fishing ground for reef fishes and spiny lobster.




**Threats**. South Water is primarily threatened by fishing and strings of fish and lobster traps are common over the site.

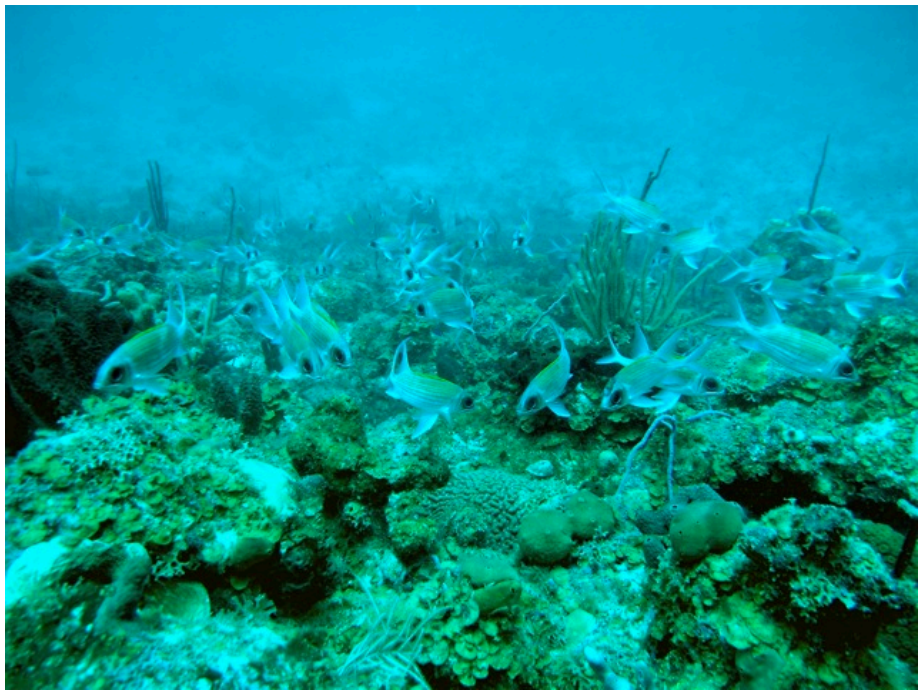


Figure 191.South Water. (top) Location. (right) A representative photo of the reef.

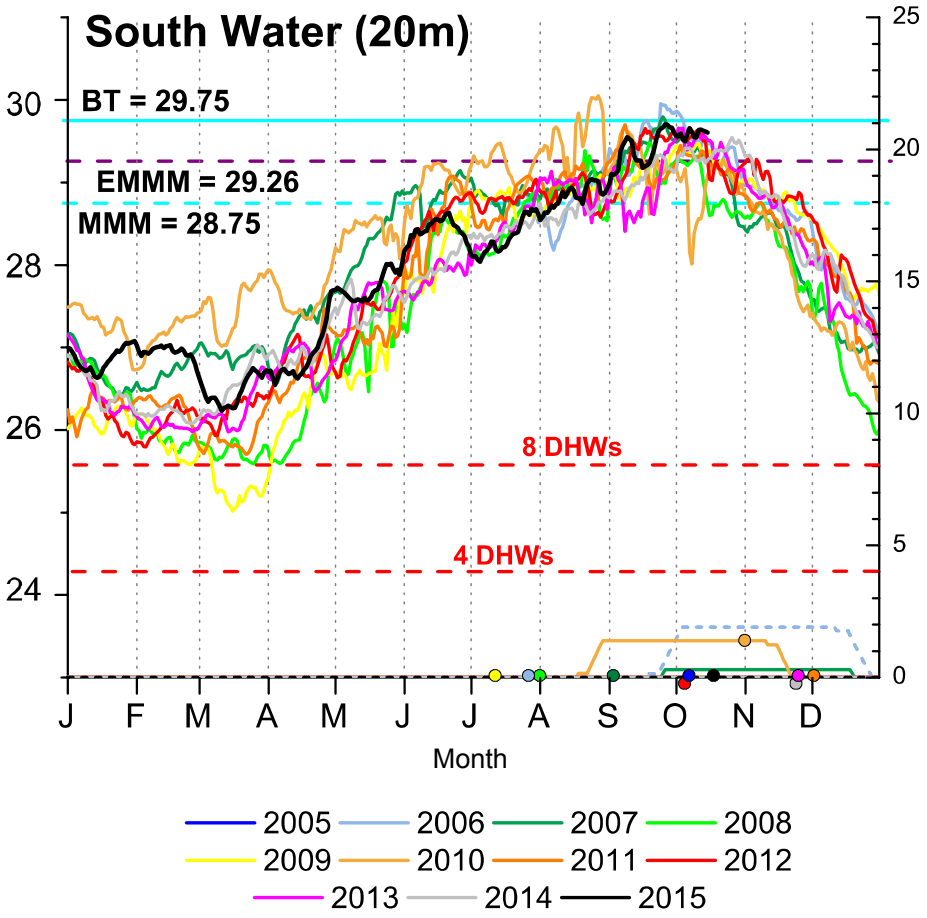



Figure 192. South Water benthic temperature record (24 m depth)

Physical Characteristics.

**Current**. Current measurements have not been taken at the South Water site. Unidirectional benthic currents can be moderate on the hardbottom reef top and strong from the surface to midwater. Wave-driven oscillatory currents are likely to be felt on the reef top during swells and storms.

**Temperature**. South Water has relatively moderate temperatures compared with other shallow water sites during warm years. This may be due to the deeper depths of the site and the proximity of deep water.

**Benthic Community**. The sparse coral community at South Water is very diverse. Coral cover increased by 21.3% over the 2005 bleaching event and had increased by 42.6% between 2005 and 2011. However, permanent transects were not installed until 2007 and the low coral cover means that small variations in detection of corals can lead to large apparent year-to-year differences in cover. Sponges and gorgonians dominate the sessile epibenthic animal community. The algal community is nearly equally divided between *Lobophora variegata*, *Dictyota* spp., and epilithic algae. Crustose coralline algae and filamentous cyanobacteria are also very common.

**Coral Health**. Corals were severely affected by the 2005 coral bleaching event, with over 80% of corals bleaching over nearly the entire coral surface. Corals were moderately affected in the 2010 bleaching event, with just less than 50% of corals bleaching at a low extent. Bleaching tends to be moderately prevalent even in non-thermal stress years. Coral diseases are not common, although there is a trend of increasing dark spots disease. Old partial mortality increased in prevalence after the 2005 bleaching event, but at a lower prevalence than most other sites. Recent partial mortality is rare.

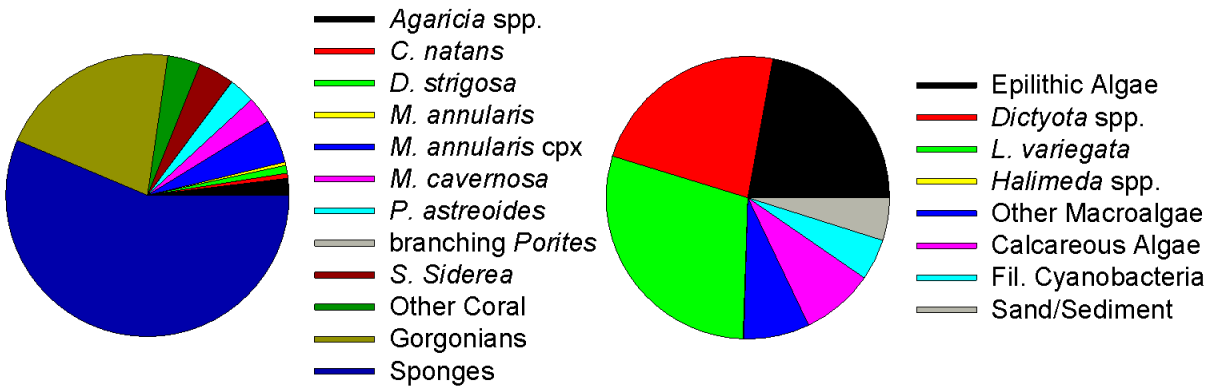



Figure 193. South Water. (left) Relative composition of the sessile epibenthic animal community. (right) Relative composition of the algal community and unconsolidated sediment.

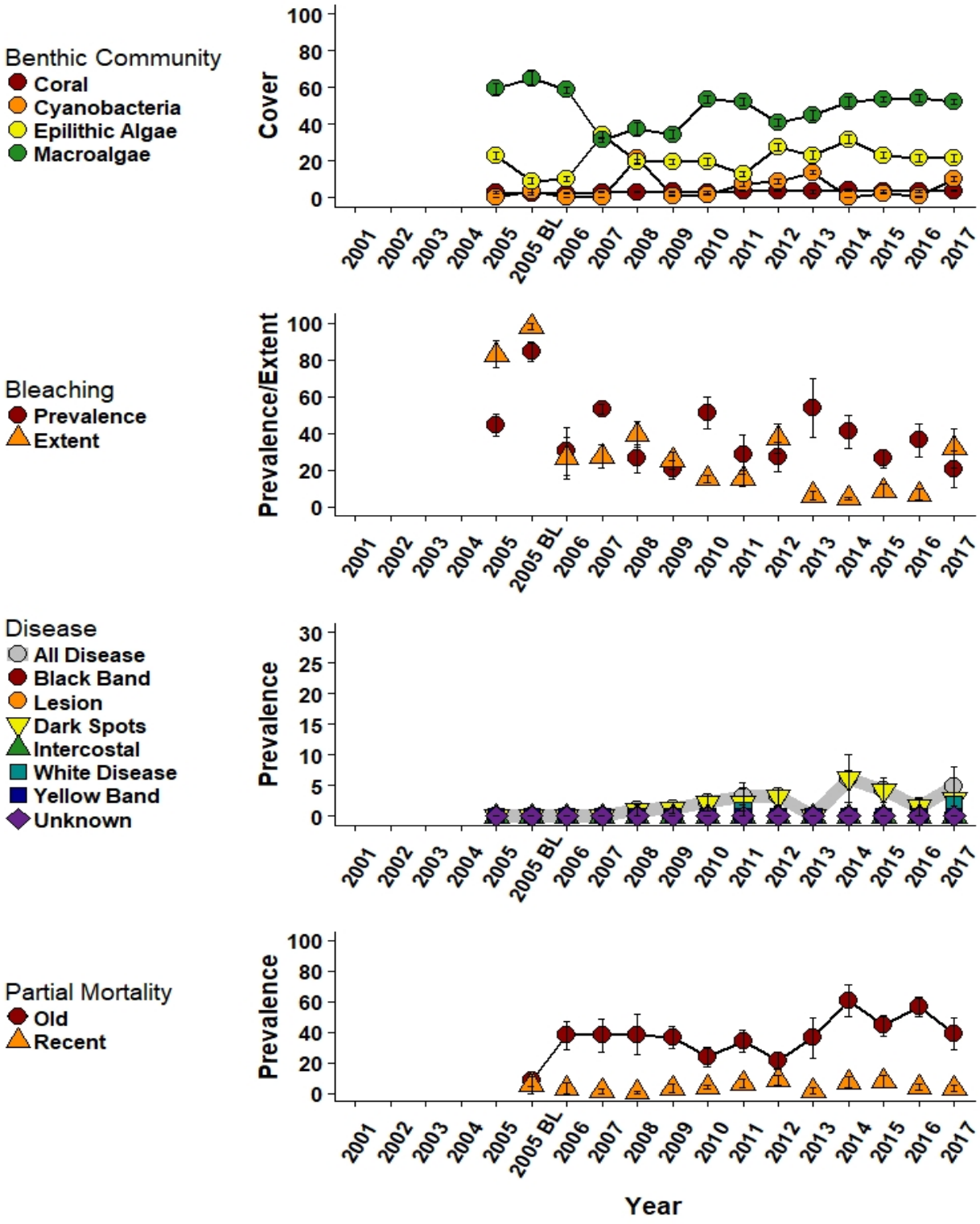



Figure 194. South Water benthic cover and coral health through time (mean ± SE).

**Fish Community.** South Water Island is a low lying reef with hard bottom that supports primarily invertivores. Fish biomass is lower on this site than other offshore St. Thomas sites. Queen trigger and red hind dominate invertivore biomass. Mutton snapper are occasional. Stoplight and princess parrotfish dominate herbivores, and many juvenile and sub-adults of these species occur on the site. Piscivores make up only 5% of the biomass on the South Water Island site; the guild is primarily composed of the graysby. South Water Island is highly fished and traps are commonly seen during our survey events. Lobsters are common on this low-lying reef, hiding in the hard bottom ledges that extend across the site. Except for mutton snapper, the reef is bare of large snappers and groupers.

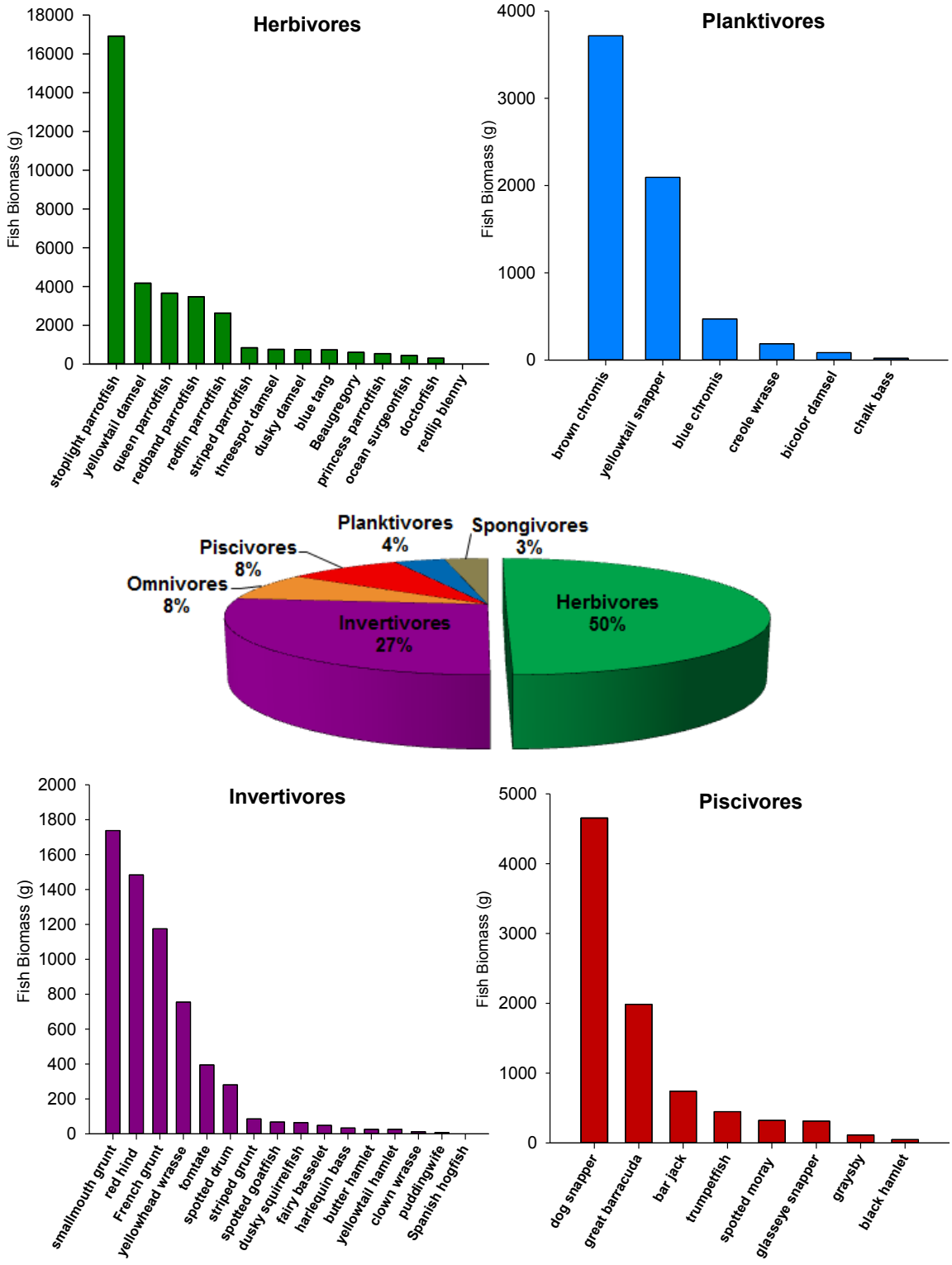



Figure 195. The South Water fish community by absolute and relative biomass.

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