

FLAT CAY

FLAT CAY

Description. This monitoring site wraps around the northwest corner depths of Flat Cay in depths of 10 – 17 m. Flat Cay has been monitored since 2003, with permanent benthic transects installed in 2007. A ciguatera fish poisoning study with monthly sampling has been ongoing since 2009.

Outstanding Feature. Flat Cay supports a lush coral community, including dense populations of the endangered elkhorn and staghorn corals (*Acropora* spp.) outside the TCRMP monitoring site. The site is a popular tourist dive site and is an important site for research by local and international investigators.

Threats. Flat Cay is down current of industrial port activities and a major sewage outfall. Mollusks, including the commercially important queen conch (*Strombus gigas*) show sterility (imposex) as a likely result of exposure to hormone mimics released from boat hulls coated with marine antifouling paint containing Tributyltin (Strand et al. 2009). The area experiences heavy fishing and damage from anchoring within the reef.

Figure 145. Flat Cay. (top) Location. (right) A representative photo of the reef.



SITE SUMMARIES

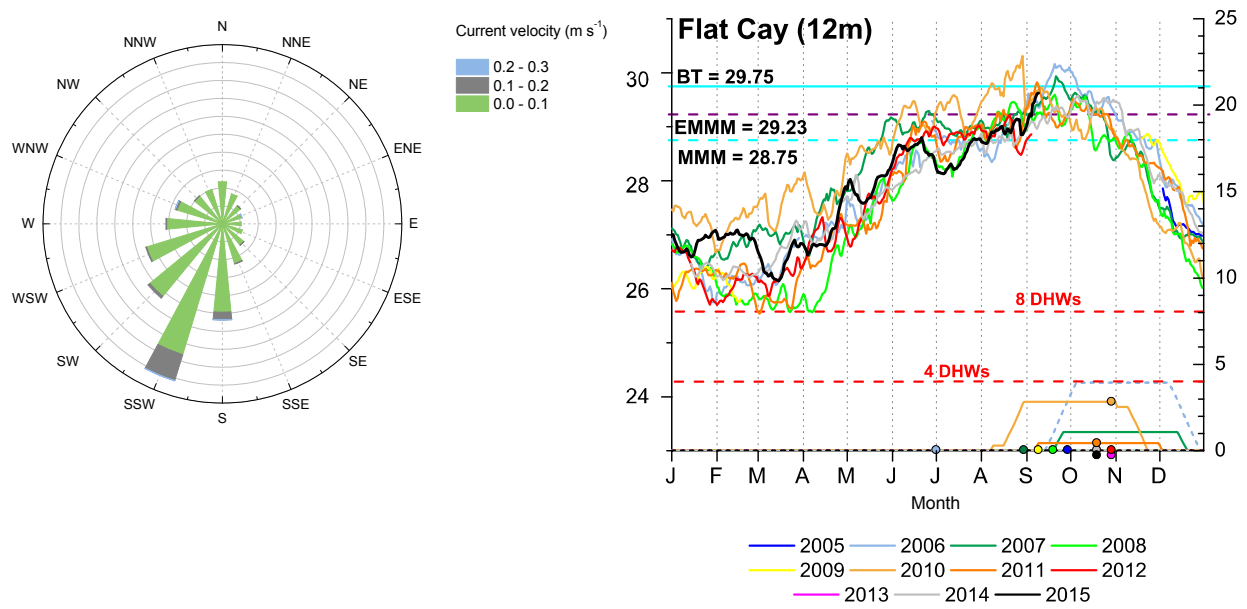


Figure 146. Flat Cay benthic current speed (left) and temperature record (right) (14 m depth).

Physical Characteristics.

Current. The benthic current at the Flat Cay site is weak and dominated by a south-southwesterly flow. This may be an effect of the wrapping of the generally westward and occasionally strong surface current. Currents were measured with an Aandaraa 2-D current meter measuring 1m above the seafloor.

Temperature. Flat Cay experiences moderate warming for a shallow water site and rapid cooling with the passage of tropical storms.

Benthic Community. Flat Cay supports a diverse coral community with dominance of boulder star corals (*Orbicella* spp.). The sessile epibenthic animal community also shows a high abundance of sponges. The site lost a moderate 21.9% of cover in the 2005 bleaching event and had regained 159.3% of this cover by 2011. A caveat is that transects were not made permanent until 2007. Epilithic algae and the macroalga *Dictyota* spp., with lesser amounts of *Lobophora variegata*, dominate the algal community. Sand in pockets between coral also makes up a fair amount of the non-living substrate.

Coral Health. Corals were severely affected during the 2005 coral bleaching event, with over 90% of corals bleached at 100% extent of the colony surface. Bleaching was also moderately prevalent in the 2010 bleaching event, but at low extent. Coral diseases, particularly dark spots disease can be very prevalent at Flat Cay. There was an unusual outbreak of black band disease in 2004. This disease is rare at the depths of Flat Cay. White disease was somewhat prevalent after the 2005 bleaching. Old partial mortality increased rapidly after the 2005 bleaching event and has not decreased in the intervening years. Recent mortality can be moderate and is due to a variety of causes.

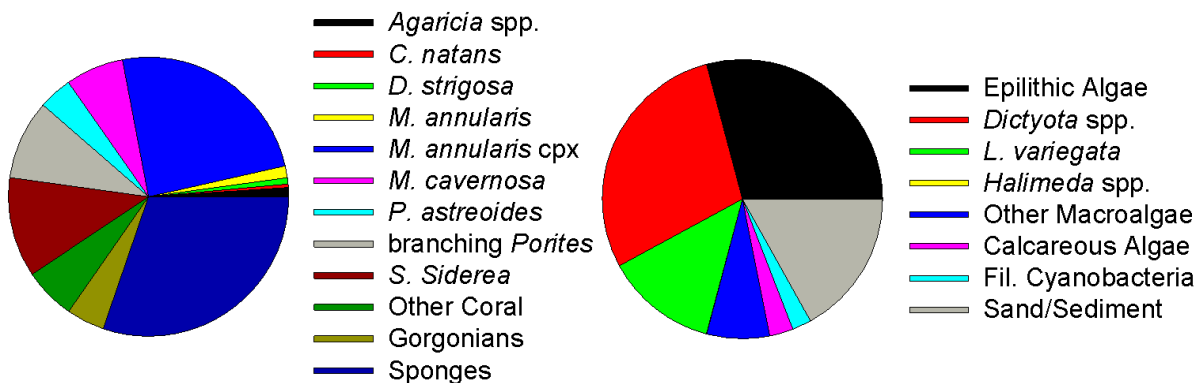


Figure 147. Flat Cay (left) Relative composition of the sessile epibenthic animal community. (right) Relative composition of the algal community and unconsolidated sediment.

SITE SUMMARIES

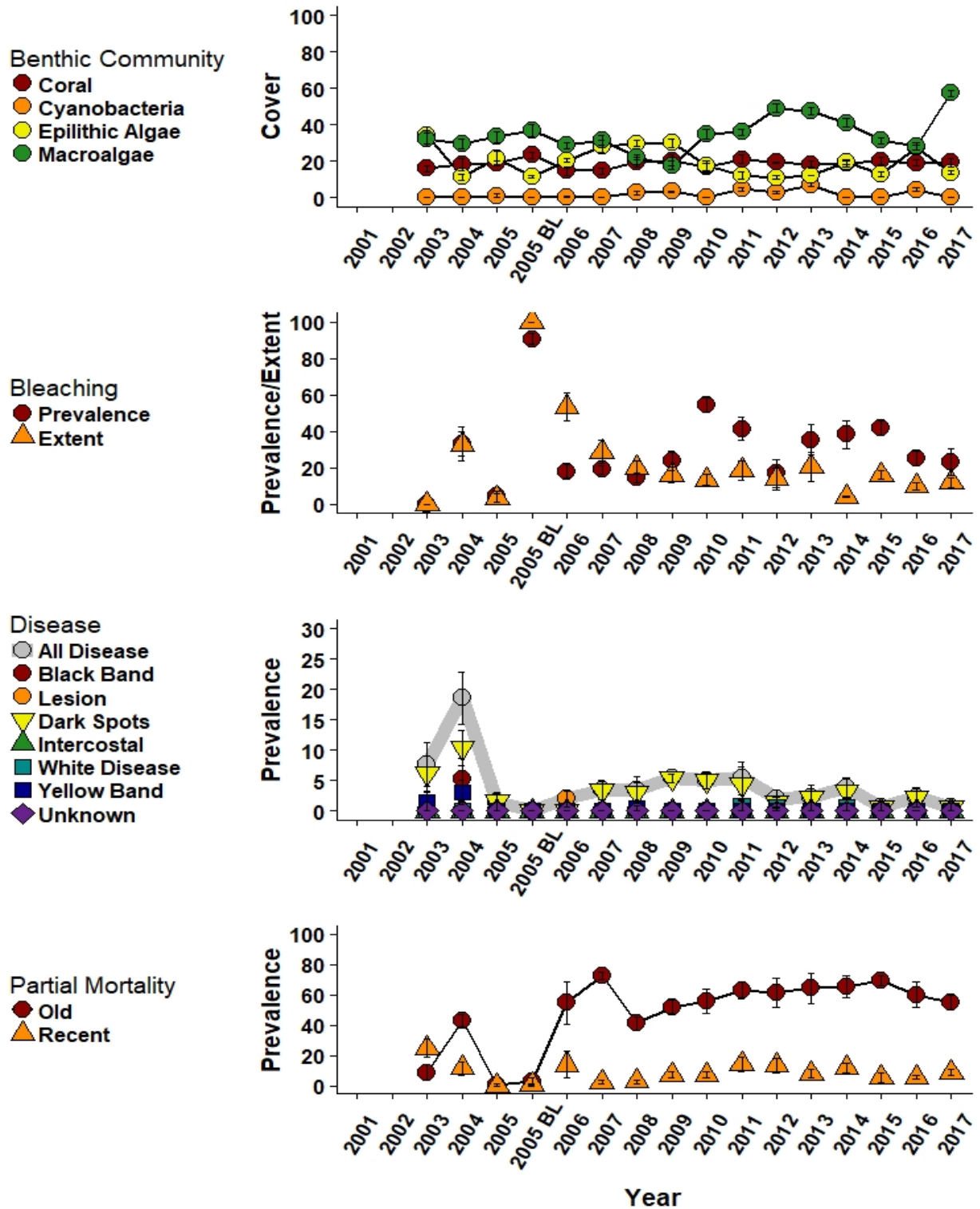


Figure 148. Flat Cay benthic cover and coral health through time (mean $\pm$ SE).

FLAT CAY

Fish Community. Flat Cay is characterized by a large diversity of fish evenly distributed across trophic guilds. There is a higher biomass of invertivores than other groups due to the regular occurrence of large schools of creole wrasse. Herbivores are dominated by redband and striped parrotfish; however, there is a diversity of parrotfish species. Juvenile parrotfish are most prevalent. Carangids frequent the reef and dominate the piscivore trophic group. Very occasional large groupers (Nassau, yellowfin, black) have been observed on Flat Cay over the past eight years. The occurrence of black grouper is notable, since this species is absent throughout the majority of monitoring sites. Generally, the serranids are highly dominated by the coney. The Flat Cay reef is highly used as a recreational dive site and spearfishing occurs regularly. Where the reef meets the sand offshore, large schools of grunts, gray snapper, squirrelfish, and goatfish occur. Small reef sharks are seen out over the sand regularly.

SITE SUMMARIES

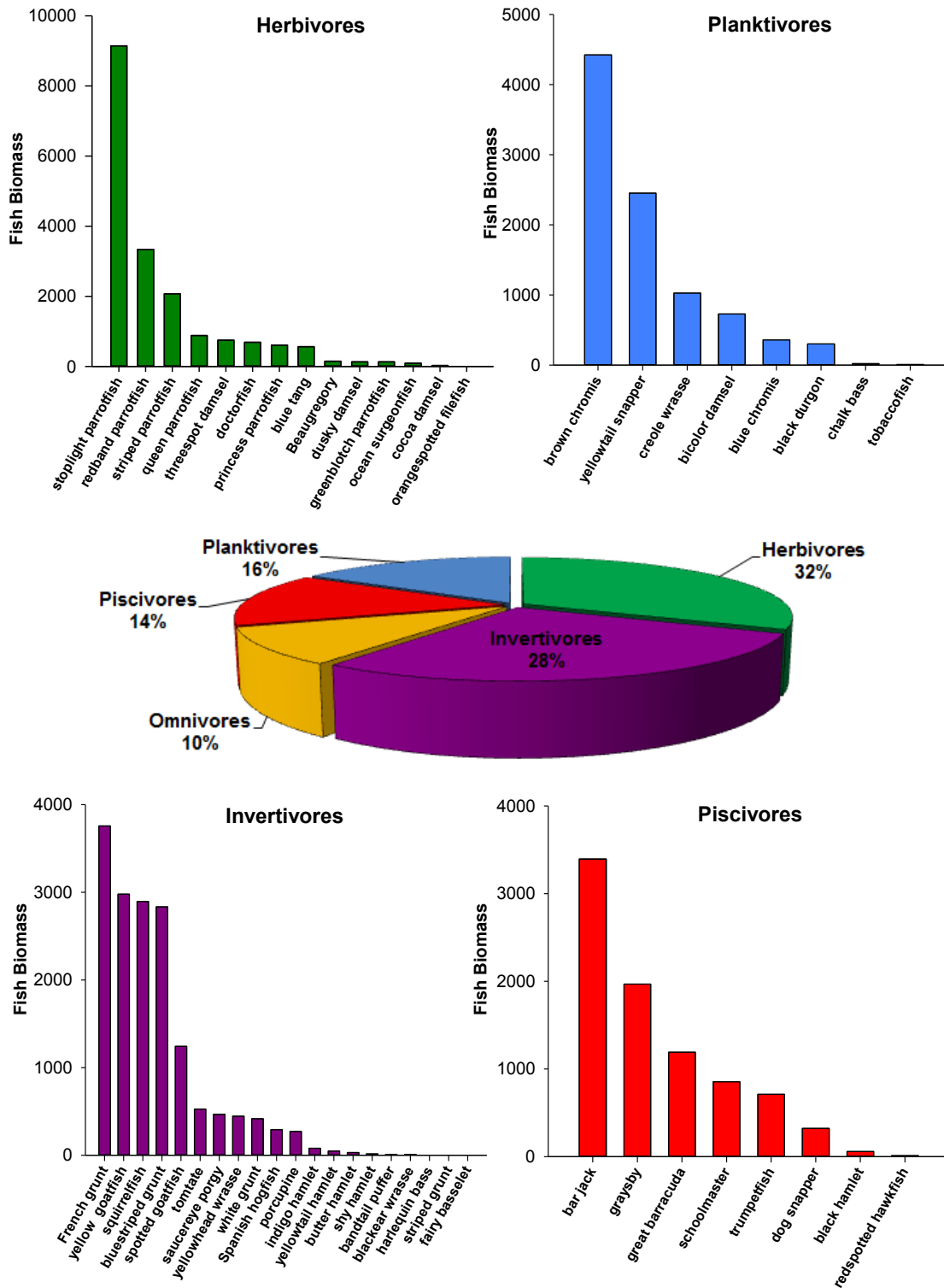


Figure 149. The Flat Cay fish community by absolute and relative biomass.

GINSBURGS FRINGE

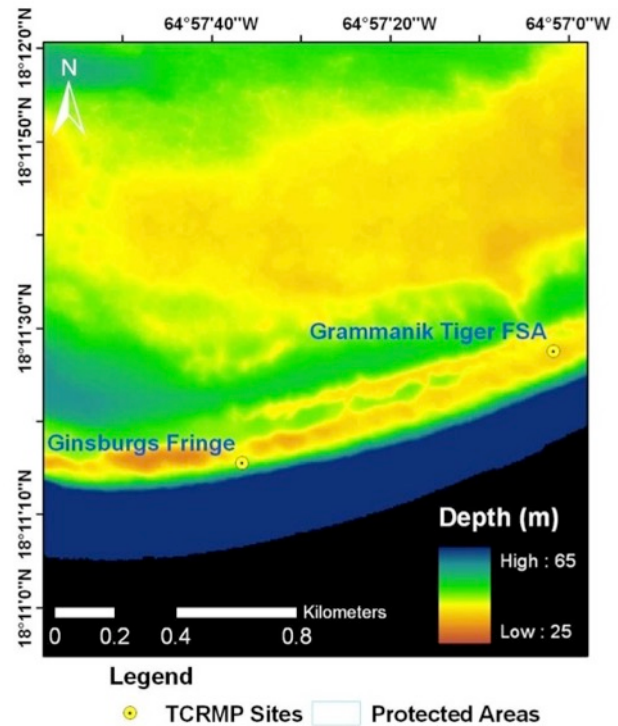
GINSBURGS FRINGE

Description. Ginsburgs Fringe is a lower mesophotic lettuce coral (*Agaricia undata*) reef at depths of 60-75 m (established in 2011). The reef is on a steep escarpment dropping into the abyssal Virgin Islands trough.

Outstanding Feature. Ginsburgs Fringe had the highest 2011 coral cover among all TCRMP monitoring sites (44%), with living colonies of lettuce corals over 6m (20') wide. This site is the epicenter of a multispecies fish spawning aggregation, including the threatened Nassau grouper (*Epinephelus striatus*). The site name honors the father of comparative sedimentology and mesophotic coral studies, Dr. Robert N. Ginsburg.

Threats. Although little is known about conditions in deep mesophotic lettuce coral reefs, Lettuce corals at these depths are potato chip thin at edges and fragile. Reef claw-type anchors appear to be responsible for a 50% drop in coral cover in the last few years. The site is being heavily invaded by red lionfish (*Pterois volitans*).

Figure 150. Ginsburgs Fringe. (top) Location. (right) A representative photo of the reef showing whorled lettuce coral colonies up to 7m in width and research diver filming permanent transect in background (Nov. 13, 2015).



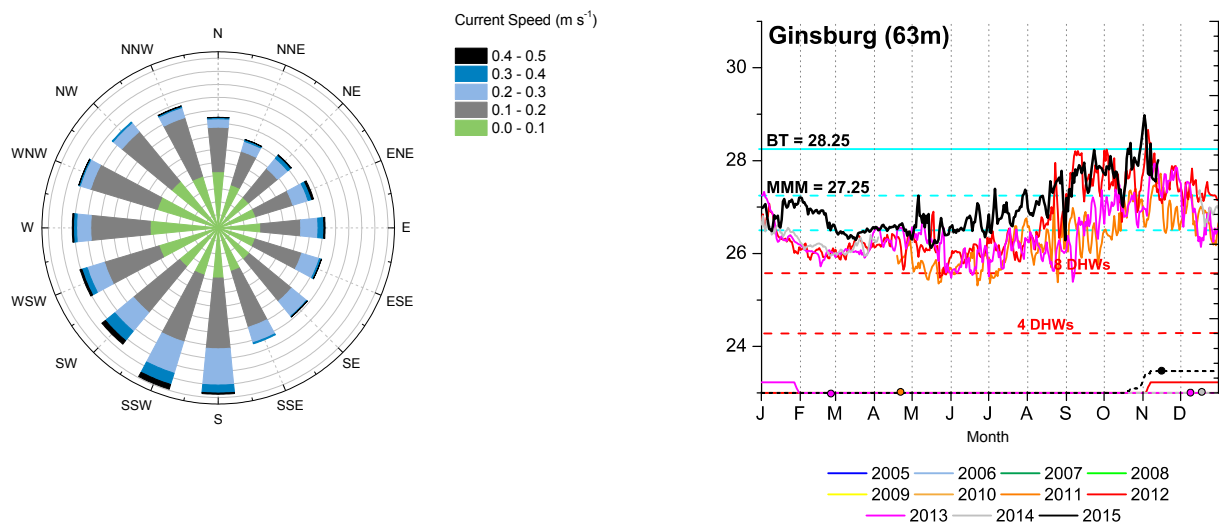


Figure 151. Ginsburgs Fringe current speed (50 m depth) and benthic temperature (63 m depth). BT = bleaching threshold ; DHW = degree heating weeks .

Physical Characteristics.

Current. Currents have been measured above the site in 50 m depth. There is a strong offshelf-downwelling (southward) that occurs just above the site, potentially carrying larvae and heterotrophic food supplies to the site.

Temperature. Temperatures are much cooler at Ginsburgs Fringe than any other TCRMP site, but still quite suitable for healthy Caribbean stony corals. The cooler temperatures lead to a lower bleaching threshold temperature.

GINSBURGS FRINGE

Benthic Community. The coral community at Ginsburgs Fringe is almost exclusively lettuce corals of the genus *Agaricia*. Among the agariciid genus, the rank abundance of species is *A. undata* (30.8% absolute cover), *A. grahamae* (8.2%), and *A. lamarcki* (2.3%), with no colonies of *A. agaricites* and *A. fragilis* occurring in transects. These species identifications are tentative as voucher specimens have not been collected. Although not well represented in cover, individual colonies of *Montastraea cavernosa* and *Siderastrea siderea* also occur at the site. The algal community is dominated by the macroalga *Lobophora variegata*, which is surprising for these depths, and epilithic algae. Crustose coralline algae are also in high abundance, as well as a variety of unidentified algal species.

Coral Health. Coral health is not directly monitored at Ginsburgs Fringe due to the depth and difficulties assessing colonies greater than 3m width. However, some observations have been made. Anchor damage from reef claw type anchors appears to be causing recent extreme losses of coral cover by breakage and dispersal of the reef framework (*a 49% decrease between 2011 and 2016*). What appears to be warm season bleaching has been observed. Colonies have a fair degree of partial mortality and recent mortality is very common. In some cases it appears that shaded colony portions die back due to lack of light. The corallivorous snail, *Coralliophila abbreviata*, has been observed feeding on lettuce corals.

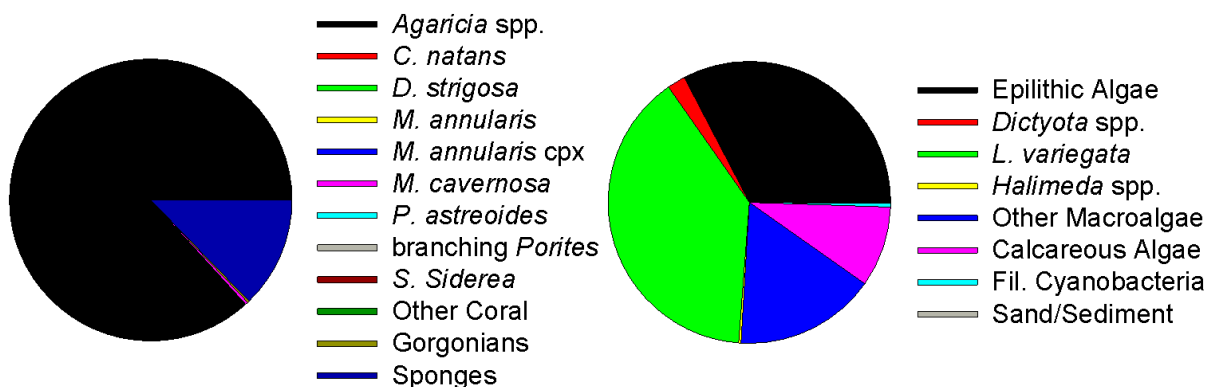


Figure 152. Ginsburgs Fringe. (left) Relative composition of the sessile epibenthic animal community. (right) Relative composition of the algal community and unconsolidated sediment.

SITE SUMMARIES

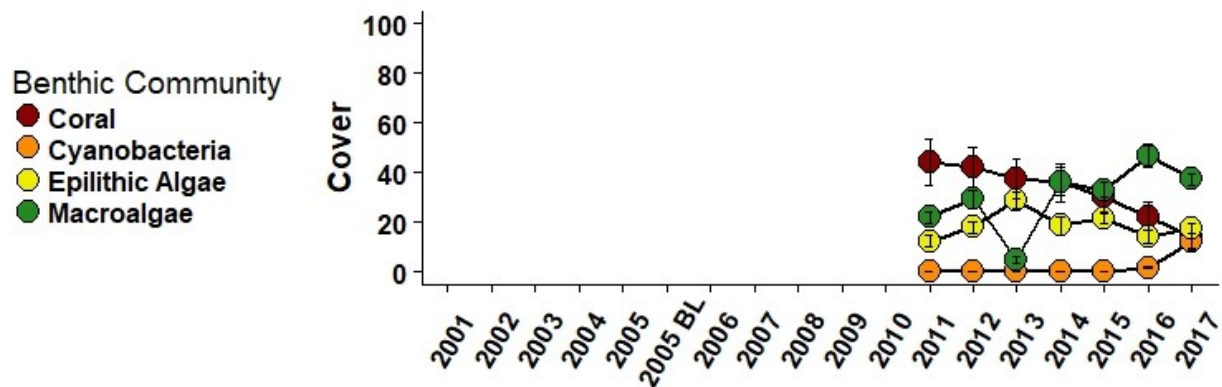


Figure 153. Ginsburgs Fringe benthic cover through time (mean $\pm$ SE).

GINSBURGS FRINGE

Fish Community. Both abundance and biomass of fish are low on this lower mesophotic lettuce coral reef. Deep-water fishes, such as blackfin snapper, small cherubfish, and sunshinefish, are commonly found on Ginsburgs Fringe, but are rare in upper mesophotic and shallow sites. However, despite its depth there is still some overlap with shallow and upper mesophotic coral reef fish communities. Herbivores are in notably low abundance. Piscivores make up the bulk in biomass of fishes encountered, include dog snapper and blackfin snapper. Lionfish are also very abundant and make up much of the biomass within the piscivore group. During the grouper spawning aggregation period in the winter and spring months, large groups of Nassau and yellowfin grouper have been observed spawning over the reef at depths between 46-65 m. Historically, black grouper were caught off this reef in the spawning season, but they have not been observed spawning here in the last 10 years (Edmond Bryan, commercial fishermen).

SITE SUMMARIES

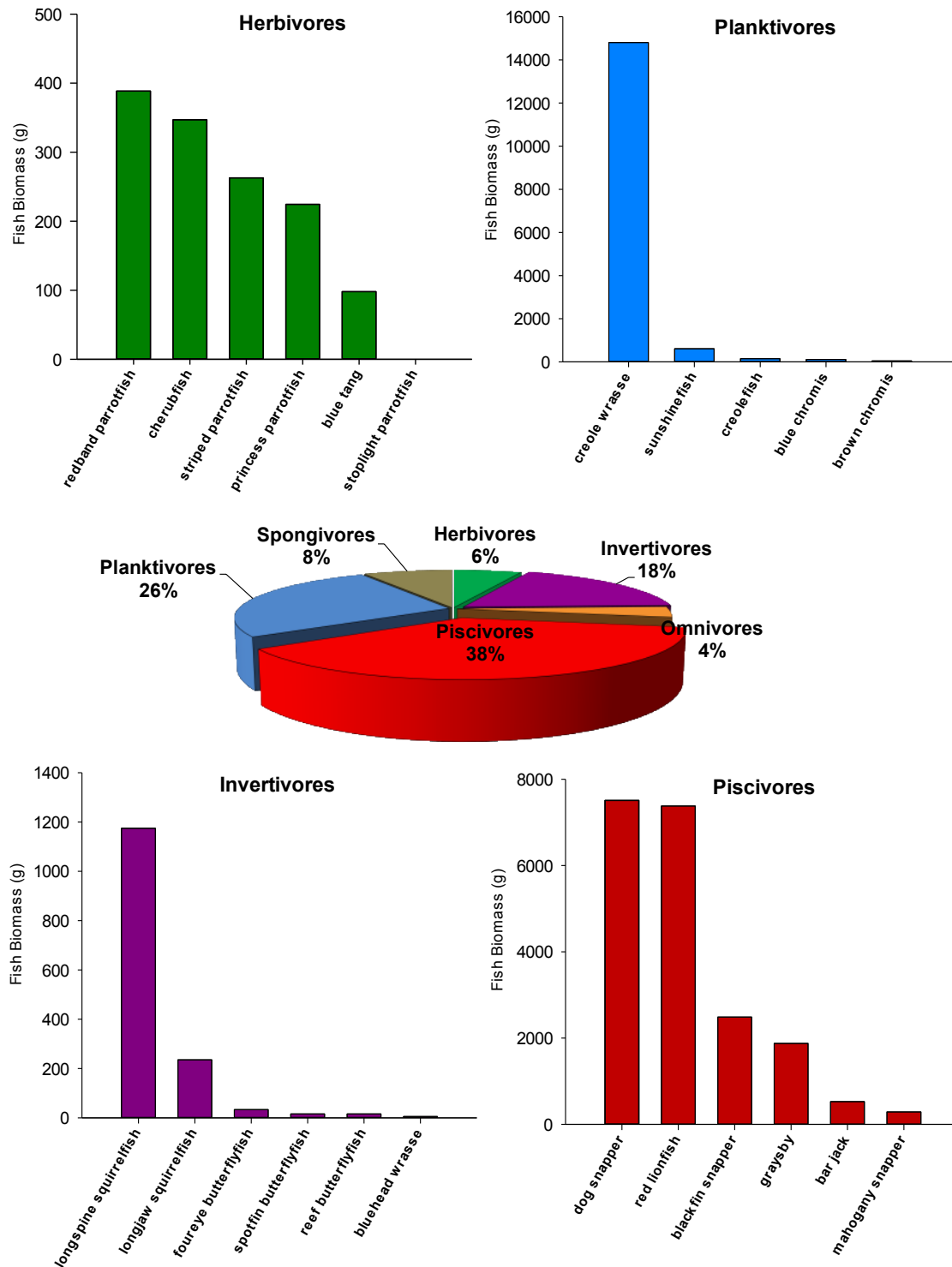


Figure 154. The Ginsburgs Fringe fish community by absolute and relative biomass.

GRAMMANIK TIGER

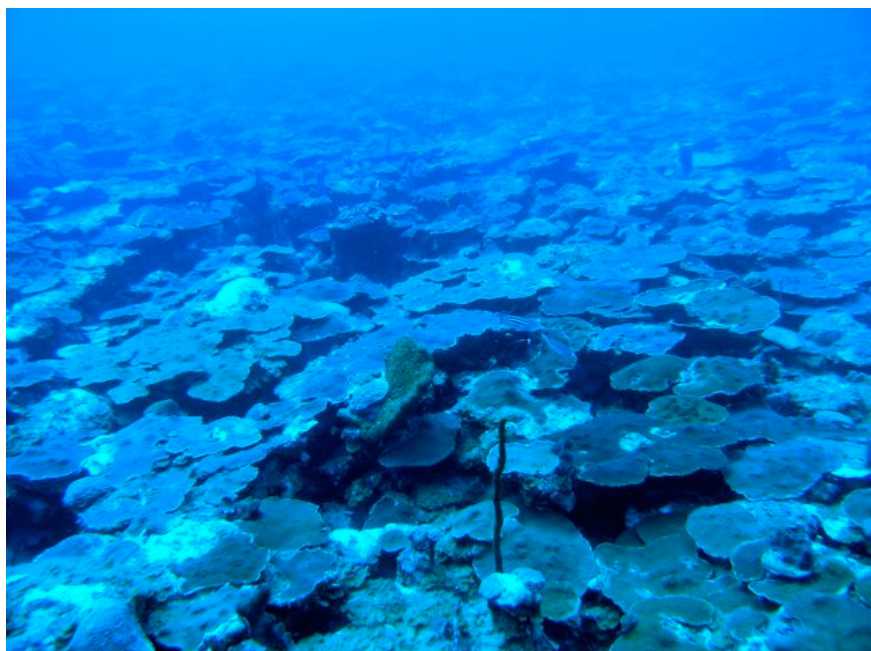
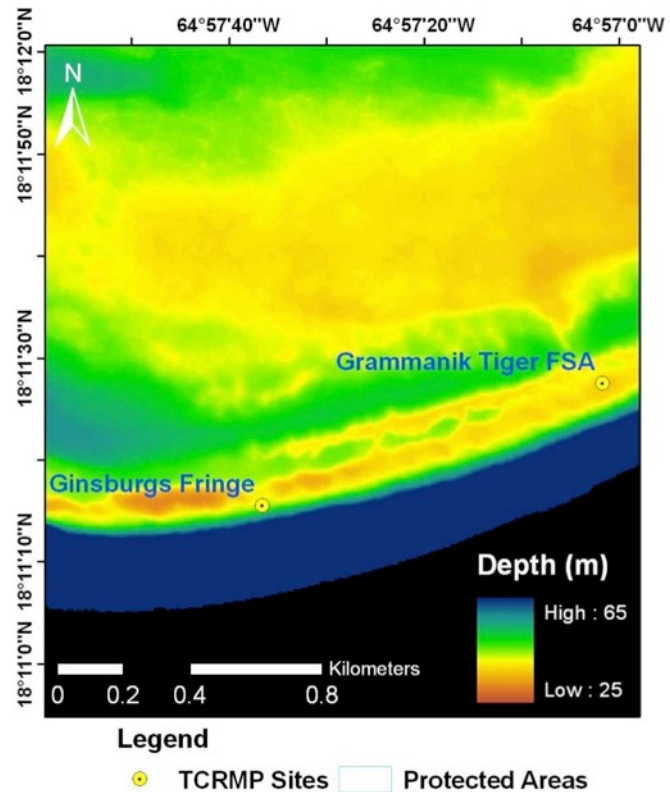
GRAMMANIK TIGER

Description. The Grammanik Tiger monitoring site is a primary bank mesophotic reef in depths of 37 – 41m. Star corals (*Orbicella* spp.) dominate the reef structure. Grammanik Tiger has been monitored since 2003, with permanent transects installed in 2007.

Outstanding Feature. The Grammanik Tiger monitoring site supports a dense coral community that is a staging area for annual multi-species fish spawning events, including the threatened Nassau grouper (*Epinephelus striatus*).

Threats. Although the Grammanik Tiger site and surrounding dense reefs are somewhat buffered from high thermal stress, but they are susceptible to chronic coral white diseases. Periodic disease outbreaks follow coral bleaching events. The Indo-Pacific lionfish (*Pterois volitans*) has formed dense populations within the study area and may be affecting native fish populations.

Figure 155. Grammanik Tiger (top) Location. (right) A representative photo of the reef.



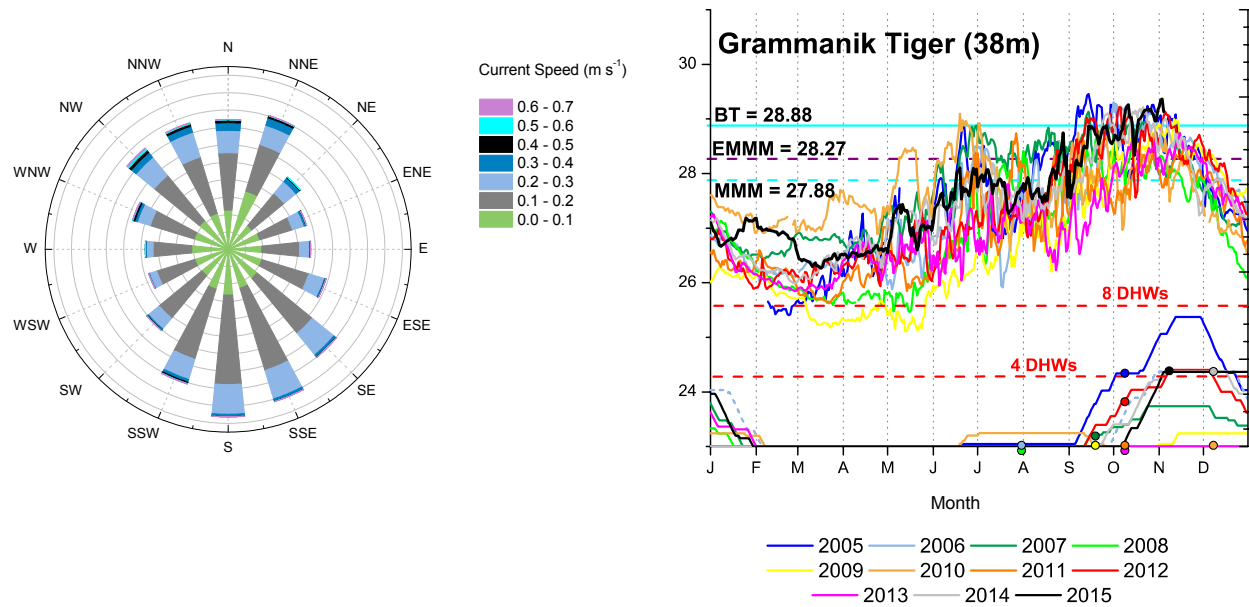


Figure 156. Grammanik Tiger benthic currents speed and temperature record (38 m depth).

Physical Characteristics.

Current. Unidirectional benthic currents at the Grammanik Tiger site are generally north-south, with the strongest current from the north-northeast to the northwest. Currents are typically weak to moderate, but occasionally reach strengths greater than 30 cm s^{-1} . Current speeds are based on near-continuous ADCP deployments from February 2005 to April 2009, with measurements at 30 or 60 minute intervals. Oscillatory currents are nil at this depth, with the possible exception of long period swells generated by tropical storms, although this has not been measured.

Temperature. Benthic temperatures at Grammanik Tiger are ameliorated by the passage of tidally driven internal tides in the warm season (May-November). Inter-annual variability creates temperatures that can be up to 2°C different for the same Julian Day. The Grammanik Tiger site is a prime example of how cooler temperatures at depth decrease the coral bleaching threshold by acclimation and lead to potential bleaching even in moderate temperatures relative to shallow reefs (Smith et al. 2016a).

GRAMMANIK TIGER

Benthic Community. Boulder star corals (*Orbicella* spp.) dominate the coral community of the Grammanik Tiger site; however, there is representation by a high number of other species that are also present in shallow water reefs. Grammanik Tiger lost only 5.4% of its coral cover in the 2005 bleaching event, but had not regained any cover (-129.6%) by 2011. A caveat is that transects were not made permanent until 2007. Other prominent members of the sessile epibenthic animal community are sponges. The macroalga *Lobophora variegata* and epilithic algae dominate the algal community. There are also a relatively high proportion of crustose coralline algae and various other macroalgae species.

Coral Health. Corals at Grammanik Tiger were very affected by bleaching in 2005, but were underestimated in surveys conducted when thermal stress was only about half (4 degree heating weeks) what it eventually reached. The 2010 bleaching event was sampled at the peak (4 degree heating week) but was not detectable above background bleaching levels. High prevalence of bleaching in normal years is due largely to granular bleaching of *Orbicella* spp., where pigmented spots are surrounded by bleached areas. Coral diseases are very prevalent with high representation of white disease. Yellow band disease was reported at high prevalence in the first years of monitoring. Old partial mortality was low, but increased rapidly after the 2005 coral bleaching event. Recent partial mortality is very high and is caused by disease lesions, predations, and fish bites.

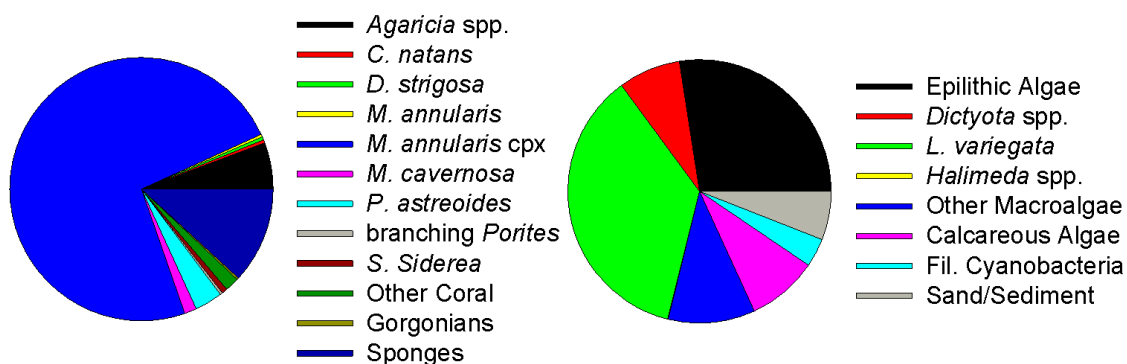


Figure 157. Grammanik Tiger FSA. (left) Relative composition of the sessile epibenthic animal community. (right) Relative composition of the algal community and unconsolidated sediment.

SITE SUMMARIES

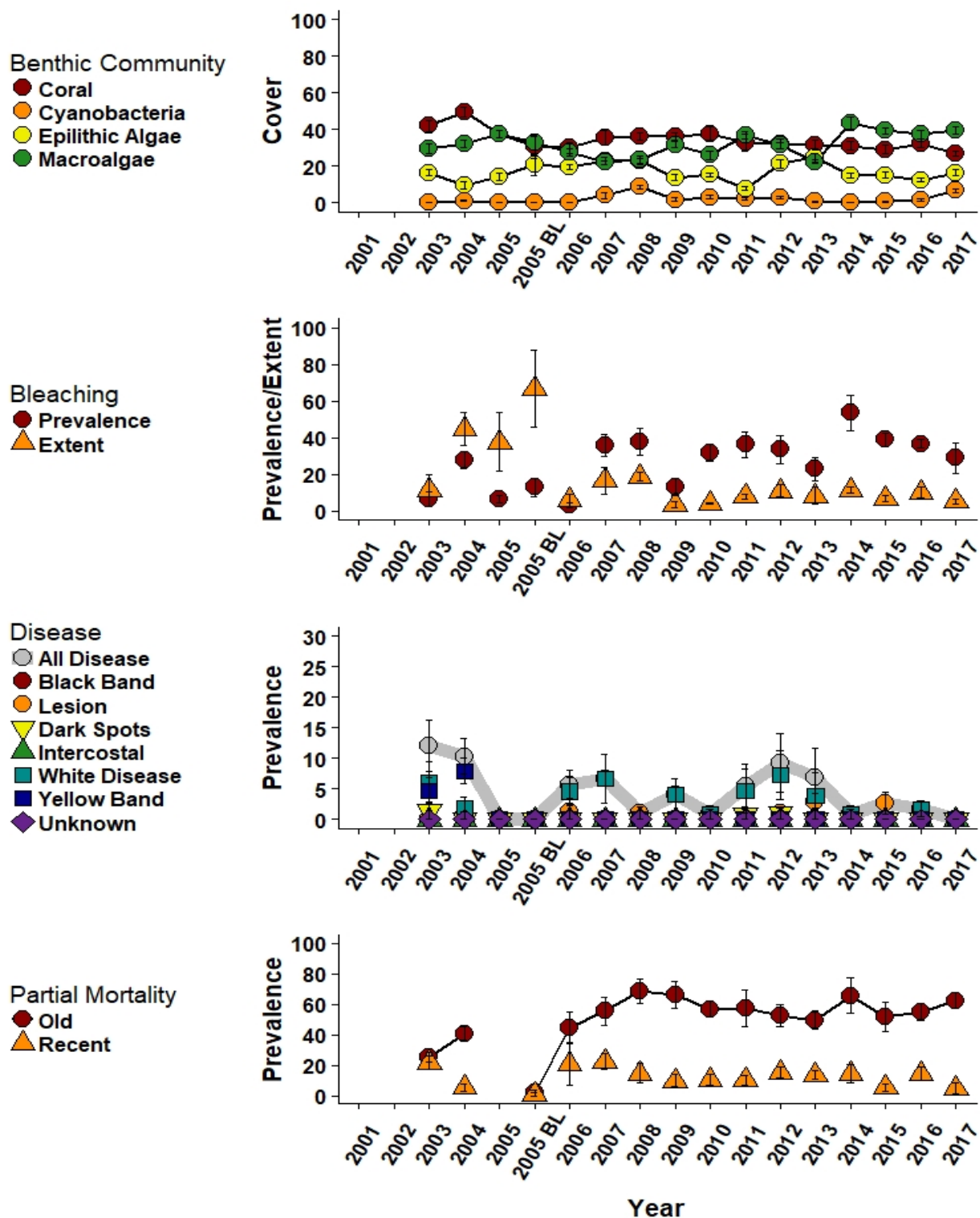


Figure 158. Grammanik Tiger benthic cover and coral health through time (mean $\pm$ SE).

GRAMMANIK TIGER

Fish Community. The Grammanik Tiger site supports less herbivores and a greater number of piscivores than the more shallow sites in the TCRMP. It is within the staging area and near the spawning site of an aggregation of several species of grouper and snapper. Given the range of spawning species encountered, surveys often coincide with the occurrence of aggregations, particularly in those species with protracted spawning seasons (e.g., cubera and schoolmaster snapper). This drives up the relative piscivore biomass; however, on the Grammanik Bank there also commonly occur members of the pelagic jack family (Carangidae) as well as occasional other large non-spawning grouper and snapper that are rarely or never found on other near and offshore reefs. Nassau, yellowfin, yellowmouth, and tiger grouper are present during non-spawning periods. This reef is protected from traps year round, and from all fishing gear from February through April. Creole wrasse highly dominate the invertivores and adult stoplight parrotfish dominate the herbivores. Juvenile parrotfish and doctorfish are relatively uncommon on this and all mesophotic sites. Yellowhead and bluehead wrasse are also notably much less common on the Grammanik Bank than other sites. In recent years the invasive Indo-Pacific lionfish (*Pterois volitans*) has become very common, with tens of individual commonly observed on any given dive. This is bothersome because, although fishing pressure is low, potential lionfish predators are in relatively high abundance but do not appear to be controlling the lionfish abundance. As well as large groupers and snappers, lemon and bull sharks are seen frequently on the Grammanik Bank reef.

SITE SUMMARIES

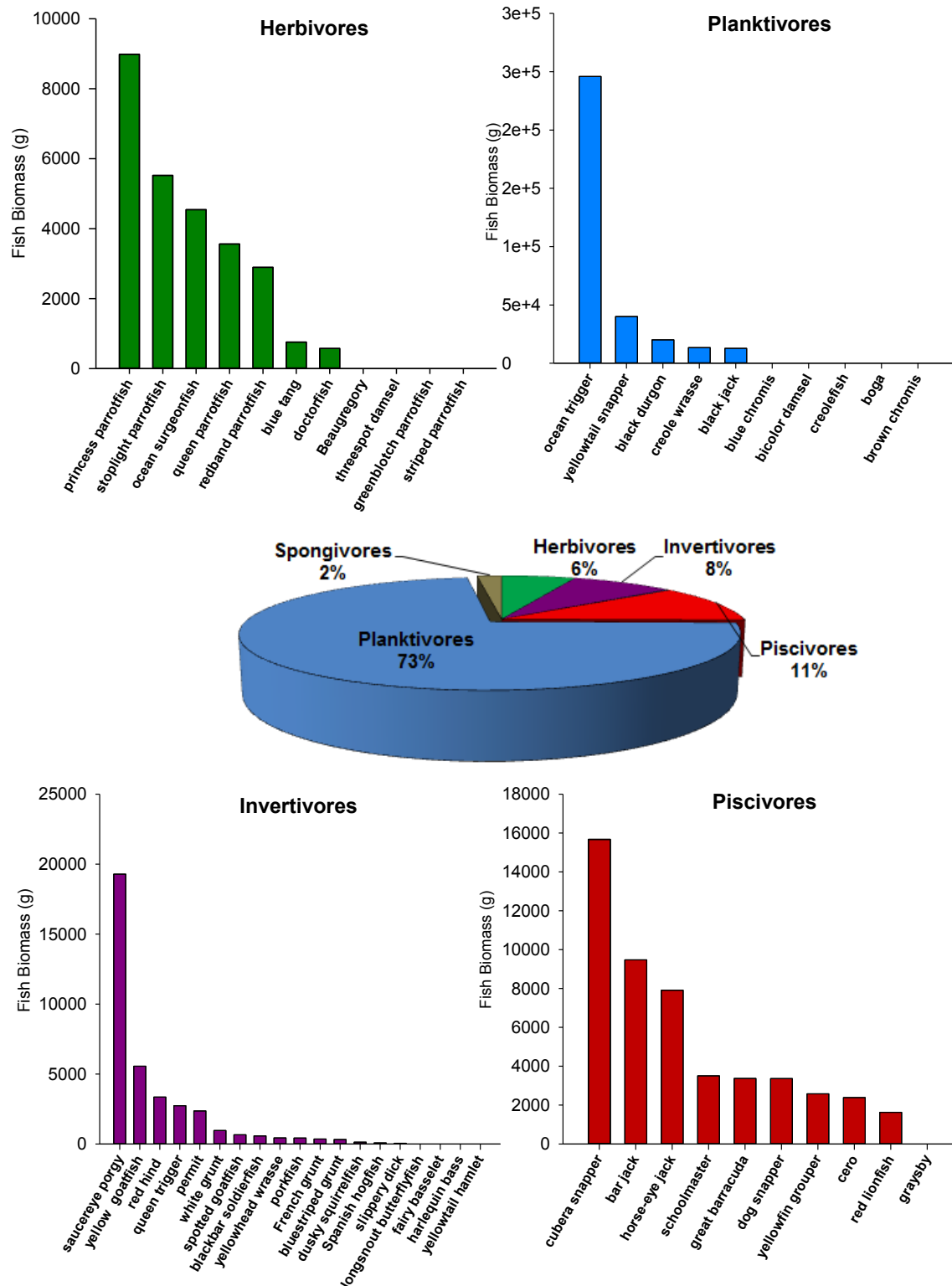


Figure 159. The Grammanik Tiger fish community by absolute and relative biomass.

HIND BANK

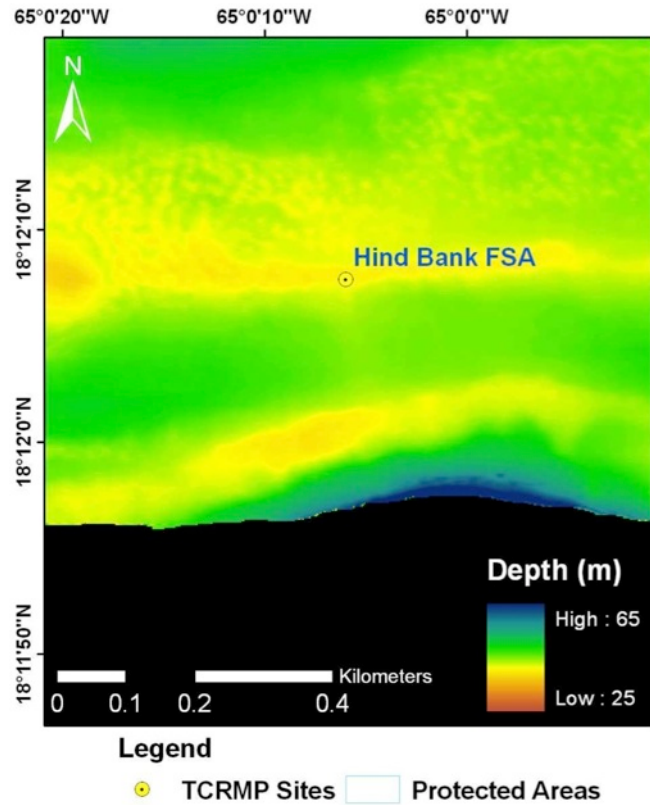
HIND BANK

Description. The Hind Bank is a mesophotic tertiary bank in depths of 38 – 42 m. The reef is part of a patchy complex of star coral (*Orbicella* spp.) dominated reefs that stretch across the eastern Red Hind Marine Conservation District. The Hind Bank has been monitored since 2003, with permanent benthic transects installed in 2007.

Outstanding Feature. The Hind Bank is within a no-take marine reserve and fish populations are recovering and robust. The Hind Bank monitoring site hosts a multispecies spawning aggregation, including a recovering population of the commercially important red hind grouper (*Epinephelus guttatus*).

Threats. The Hind Bank and surrounding dense reefs are somewhat buffered from high thermal stress, but they are susceptible to chronic coral white diseases. Periodic disease outbreaks follow high thermal stress. The Indo-Pacific lionfish (*Pterois volitans*) has formed dense populations within the study area and may be affecting native fish populations.

Figure 160. Hind Bank (top) Location. (right) A representative photo of the reef.



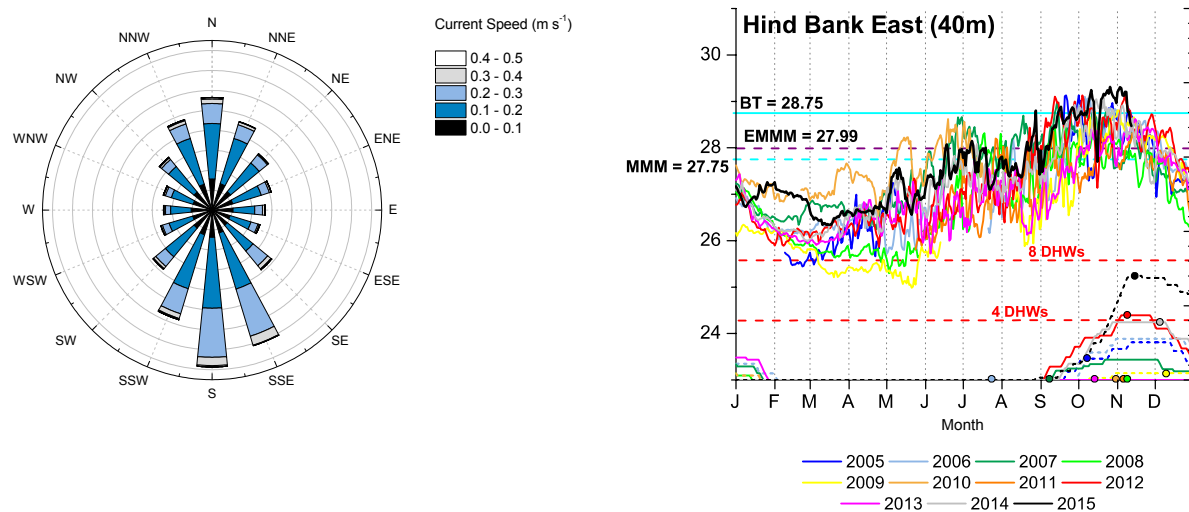


Figure 161. (top) Hind Bank benthic current speed (40m depth). (bottom) Benthic temperature record at 40 m depth.

Physical Characteristics.

Current. Hind Bank has moderately strong unidirectional near-benthic currents that are dominated by a north to south components. Currents can be moderate to strong ($>20\text{cm s}^{-1}$). Current speeds are based on near-continuous ADCP deployments from February 2005 to May 2012, with measurements at 30 or 60 min. intervals. Oscillatory currents are not known from the Hind Bank.

Temperature. Temperatures show much evidence of internal tides in the warm season and are notable cooler than shallow water sites in the upper mixed layer and nearshore embayments.

HIND BANK

Benthic Community. The Hind Bank site is dominated by boulder star corals (*Orbicella* spp.), but also has a high abundance of lettuce corals (*Agaricia* spp.). The Hind Bank site lost 21.8% of its coral cover in the 2005 bleaching event, but had regained 71.4% of this cover by 2011. The algal community is co-dominated by epilithic algae and the macroalga *Lobophora variegata*. There is also high representation of crustose coralline algae and other unidentified macroalgal species.

Coral Health. Bleaching during the 2005 event was underestimated because sampling occurred before the peak in heat stress. The prevalence of bleaching was higher during the 2010 coral bleaching event. In later years, the high prevalence of moderate prevalence, low colony extent bleaching was often associated with granular bleaching. This bleaching pattern shows pigmented spots surrounded by bleached tissue. Coral diseases are common at the Hind Bank and may be increasing. White disease was the dominant disease, and 2011 showed a peak of disease signs. In 2009 there was a high prevalence of intercostal mortality syndrome, which is only known from mesophotic coral reefs (Smith et al. 2010b). Old partial mortality increased after the 2005 bleaching event and the high prevalence was not reduced until 2011. Recent partial mortality prevalence is often high and reflects the impacts of disease and predation.

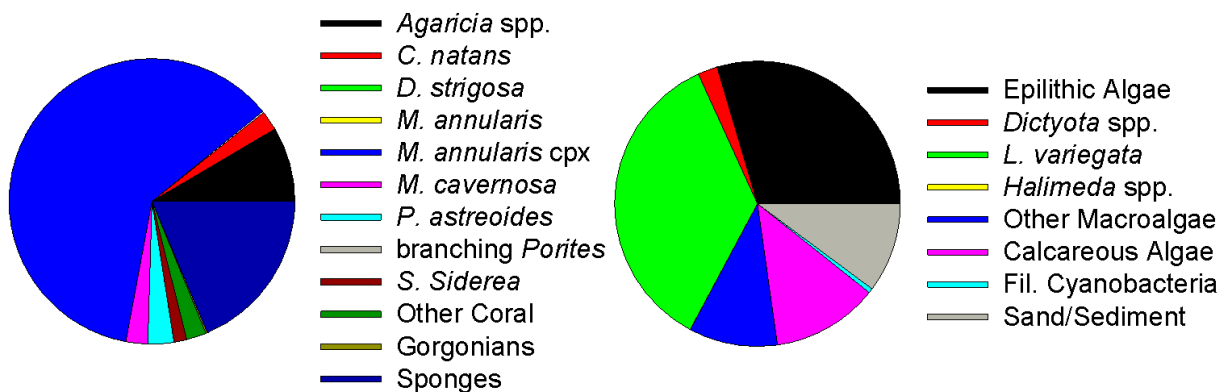


Figure 162. Hind Bank. (left) Relative composition of the sessile epibenthic animal community. (right) Relative composition of the algal community and unconsolidated sediment.

SITE SUMMARIES

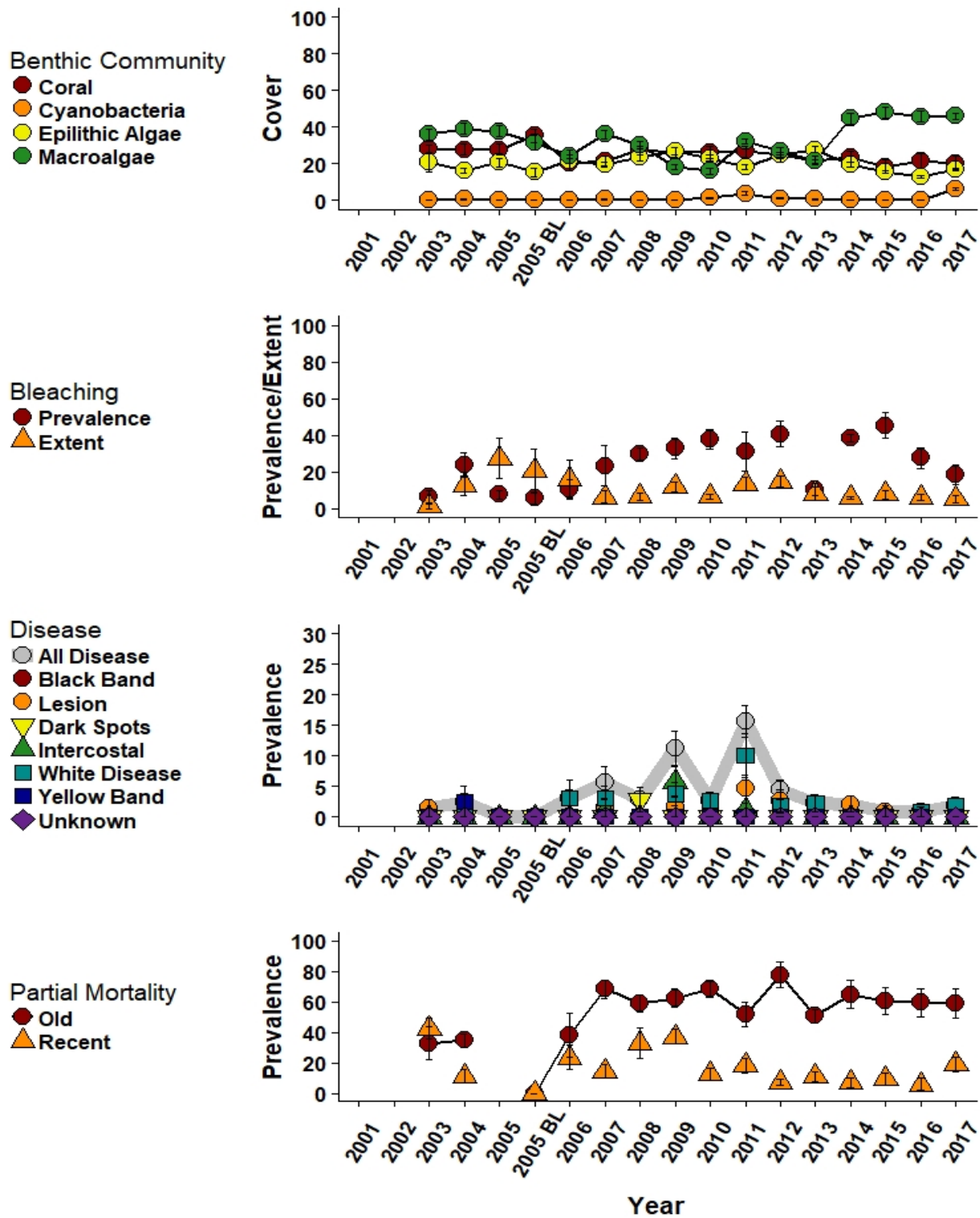


Figure 163. Hind Bank benthic cover and coral health through time (mean $\pm$ SE).

HIND BANK

Fish Community. Like the Grammanik Bank, the Hind Bank is characterized by a high number of piscivorous fish. The site is within the Marine Conservation District (MCD) and is protected year round from all fishing, except surface trolling. It is the spawning site for several species including red hind, mutton snapper, tiger grouper, and schoolmaster snapper. Surveys often coincide with the occurrence of schoolmaster snapper, which has a protracted spawning season. This drives up the relative piscivore biomass; however, there are also commonly members of the pelagic jack family (Carangidae), large barracuda, and resident groupers. Benthic invertivores are dominated by goatfish as the likely result of the proximity of sand areas along the reef. Creole wrasse are not nearly as dominant on the Hind Bank as on other mesophotic sites. Herbivores, as on other mesophotic sites, are less common than on nearshore sites. This group is dominated by adult or semi-adult princess parrotfish and juvenile parrotfish are uncommon. Yellowhead wrasse are fairly common on the Hind Bank, however bluehead wrasse are not. Mesophotic species such as the fairy basslet, sunshinefish, and longsnout butterflyfish are also common.

SITE SUMMARIES

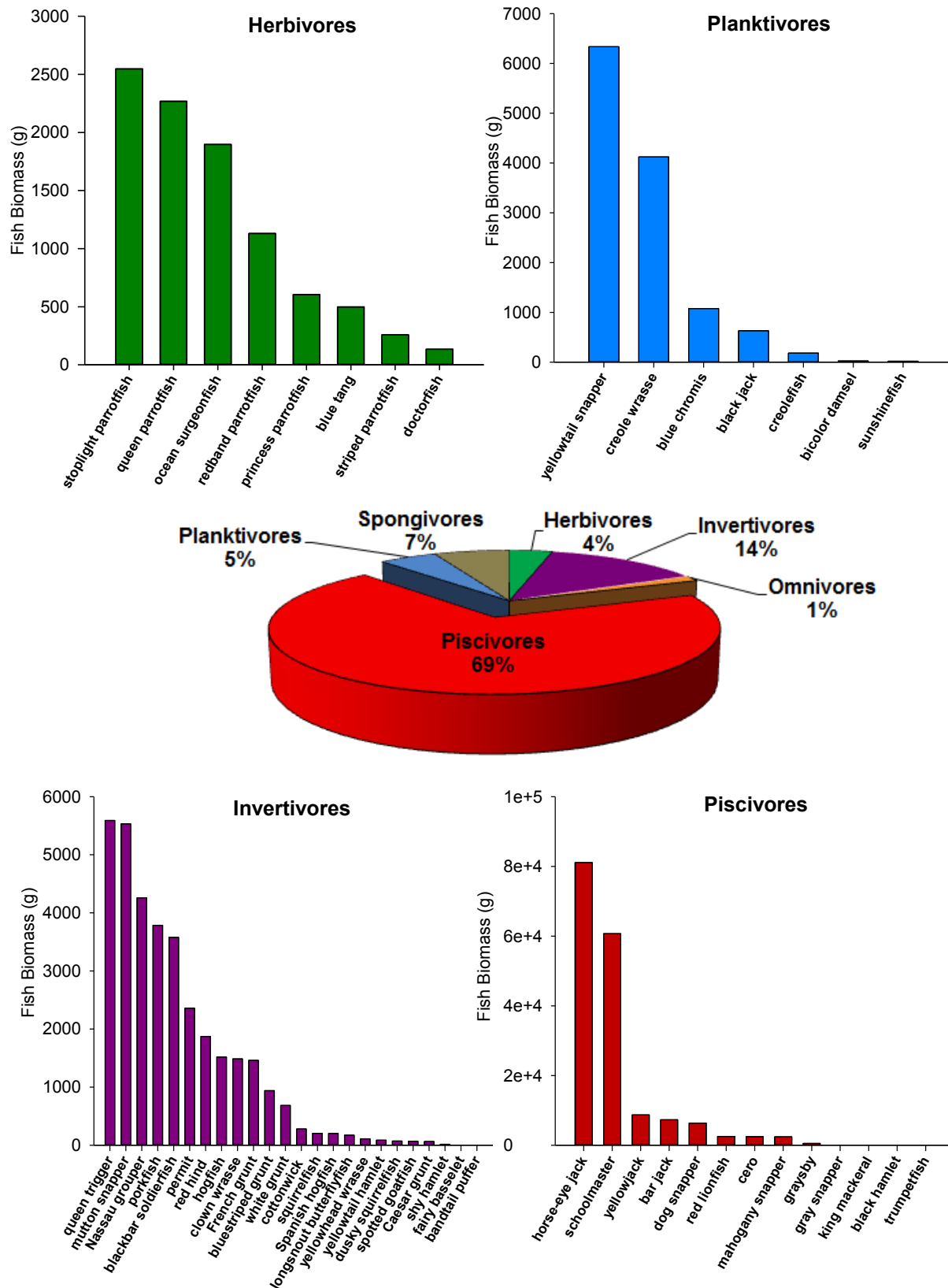


Figure 164. The Hind Bank East fish community by absolute and relative biomass.

LITTLE SAINT JAMES

LITTLE SAINT JAMES

Description. The Little St. James site is a midshelf hardbottom reef in depths of 16-22 m. The site is a patch reef surrounded by sand/rhodolith plain. Little St. James has been monitored since 2005, with permanent benthic transects installed in 2007.

Outstanding Feature. The Little St. James site is just outside the St. Thomas East End Reserve and supports occasional high densities of snappers, grunts, and queen trigger.

Threats. Commercial fisherman target the Little St. James site and active and derelict fish traps are in high abundance. The site is down-current of development on Little St. James Island and is potentially threatened by land-based source of pollution.

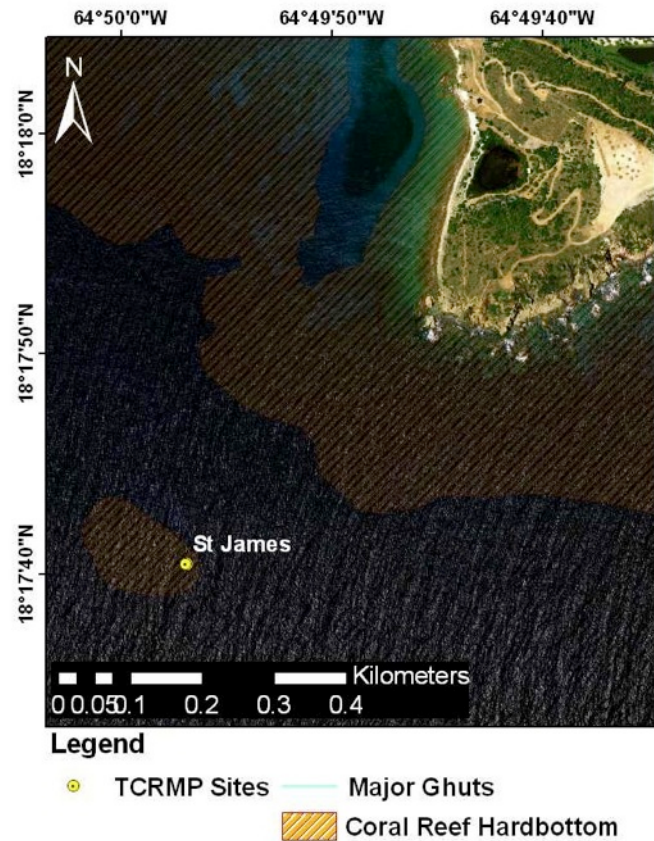


Figure 165. Little St. James. (top) Location. (right) A representative photo of the reef with derelict fish trap



SITE SUMMARIES

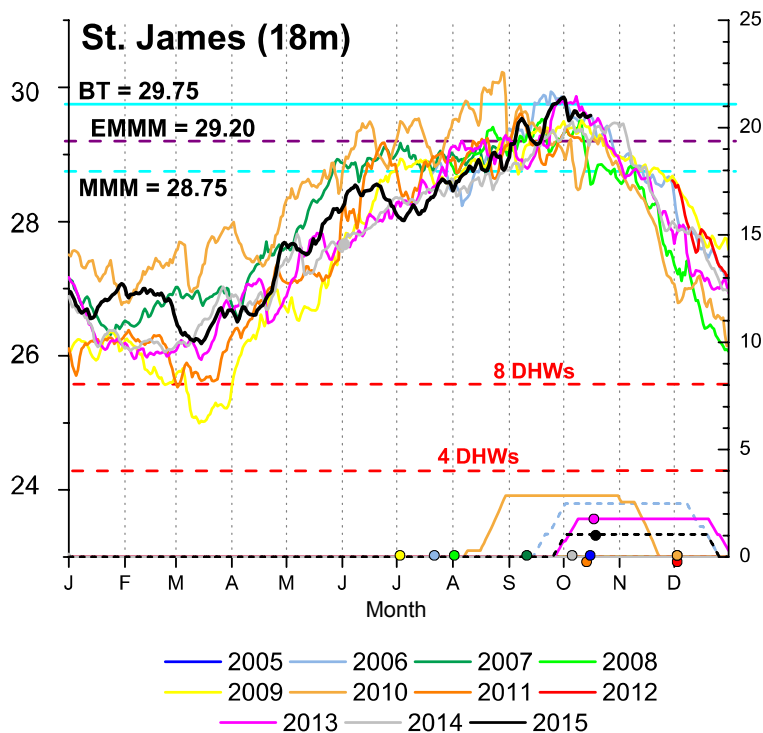


Figure 166. Little St. James benthic temperature record (19 m depth).

Physical Characteristics.

Current. Currents have not been directly measured at St. James. Unidirectional benthic currents have only been weak during monitoring. Strong wave-driven oscillatory currents may take place, as evidenced by the high proportion of gorgonians and *Sargassum* spp. at the site.

Temperature. Benthic temperatures at St. James can be high during warm years, such as 2010.

Benthic Community. The sparse coral community of the Little St. James site is diverse.

There is a high proportion of rare species, such as *Eusmilia fastigiatum*, *Madracis* spp., and *Mycetophyllia* spp.. The site lost 16.5% of coral cover in the 2005 bleaching event but had apparently regained 376.2% of this loss by 2011. This large increase above bleaching losses may be explained by the fact that transects were not made permanent until 2007 and were then sited in areas with the densest coral. The sessile epibenthic community overall is largely composed of sponges and gorgonians. The algal community is dominated by the macroalgae *Dictyota* spp. and the *Sargassum* spp.. *Lobophora variegata* and epilithic algae are also in high proportional abundance.

Coral Health. The coral community at Little St. James was highly affected by the 2005 coral bleaching event, with all corals assessed completely bleached. Half the corals were affected by low extent bleaching in 2010. Low-level bleaching is a common feature of the site. Diseases are less common, with the exception of a white disease outbreak that preceded the coral bleaching event in June 2005. Dark spots disease can also be common. Old partial mortality increased rapidly after the 2005 bleaching event. Recent partial mortality is not very prominent.

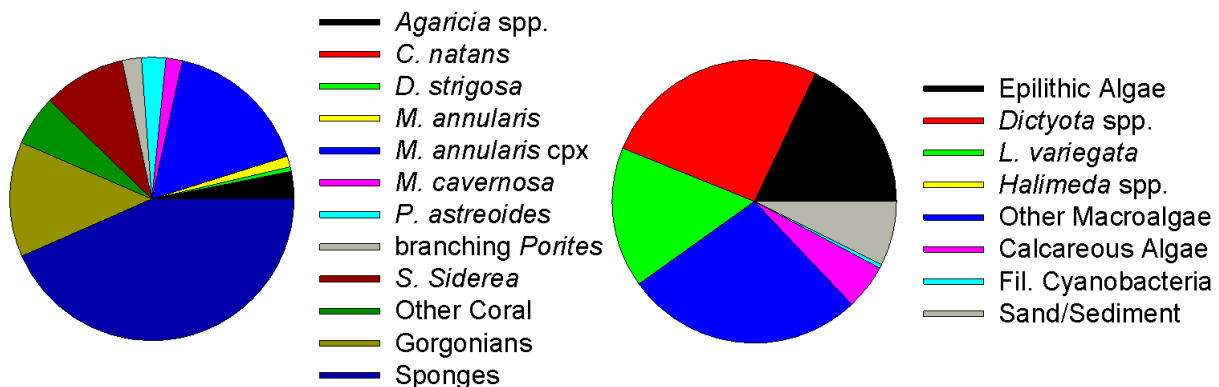


Figure 167. Little St. James. (left) Relative composition of the sessile epibenthic animal community. (right) Relative composition of the algal community and unconsolidated sediment.

SITE SUMMARIES

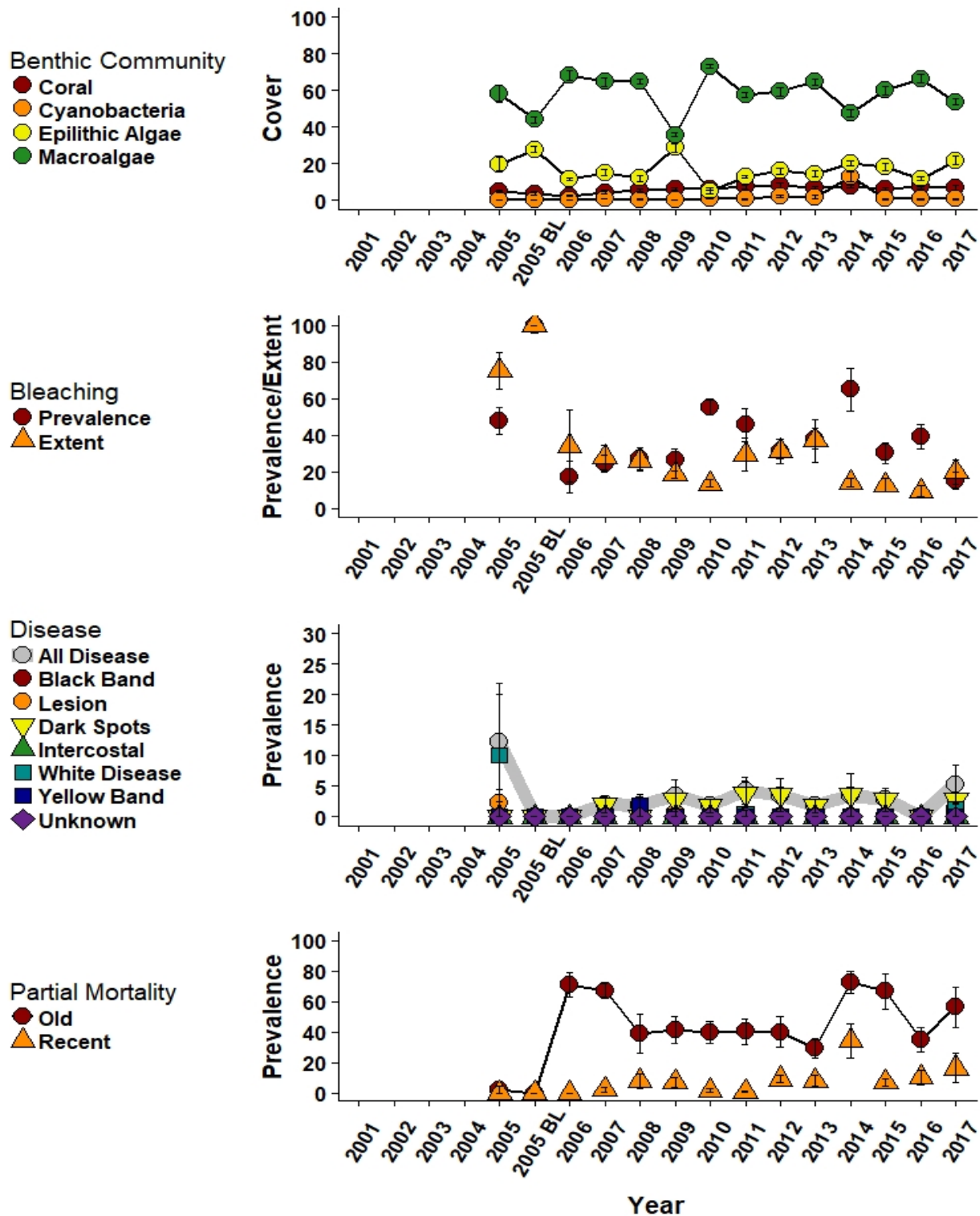


Figure 168. Little St. James benthic cover and coral health through time (mean $\pm$ SE).

LITTLE SAINT JAMES

Fish Community. The fish community of Little St. James differs slightly from those of the more developed reef habitats, representing both reef and hard bottom fish community. Queen triggerfish and mutton snapper are far more common on Little St. James than on other TCRMP sites. Red hind are also very common. These three benthic invertivores are indicative of sand mixed with hard bottom sites. The Little St. James reef is outside of the boundaries of the St. Thomas East End Reserves, and fish traps are observed regularly on the site. During parts of the year, grunts (French and white) have been observed in huge numbers, and may use the site for spawning. Bar and yellow jacks are very common swimming in the water column above the Little St. James site, and the schoolmaster, gray, and mahogany snapper are all prolific. All of these species are considered ciguatoxic in this area and so are not targeted by hook and line, trap, or spear fishermen. Notably the queen triggerfish is observed in large numbers and sizes at Little St. James. Lobster are generally found during monitoring events on transects or roving dives.

SITE SUMMARIES

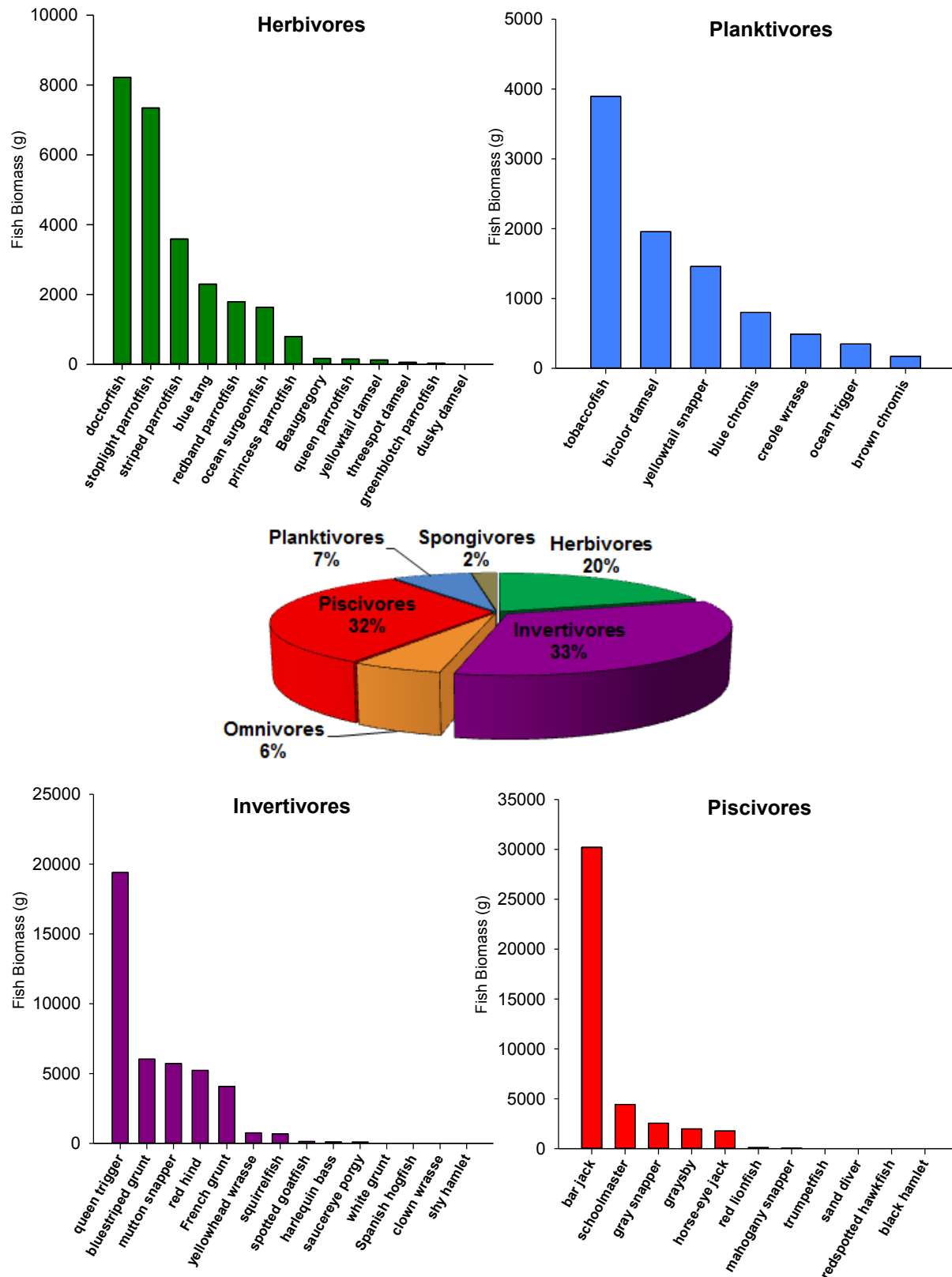


Figure 169. The Little St. James fish community by absolute and relative biomass.

MAGENS BAY

MAGENS BAY

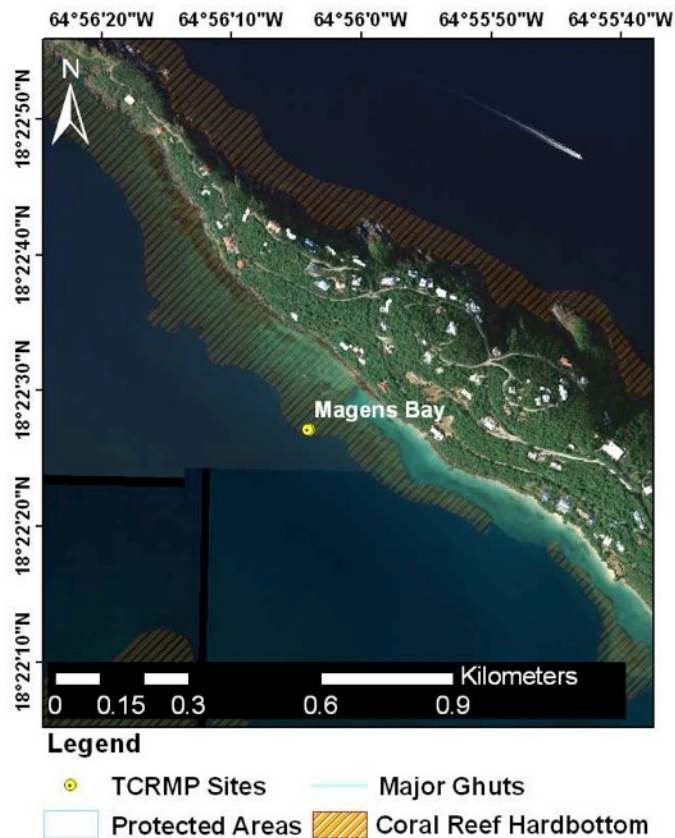
Description. The Magens Bay site is a nearshore fringing reef located along Peterborg Point in depths of 4 – 14 m. The reef has a sharp break in slope leading to a steep escarpment that terminates in a sand/sediment plain at the reef base. Magens Bay has been monitored since 2001.

Outstanding Feature. The Magens Bay site is a well-protected northside St. Thomas reef near one of the most popular tourist beaches in the Caribbean.

Threats. Magens Bay is in a highly enclosed embayment receiving a very large and developed watershed. Sediment run-off is high and deposition on reefs is favored by slow current speeds. The turbidity after rain and swell events can be extreme in the bay and water visibility is often less and 3m. In addition, leaky septic systems may impair bay waters.

Recreational/artisanal fishers frequently fish this site with hand line and spear.

Figure 170. Magens Bay. (top) Location. (right) A representative photo of the reef.



SITE SUMMARIES

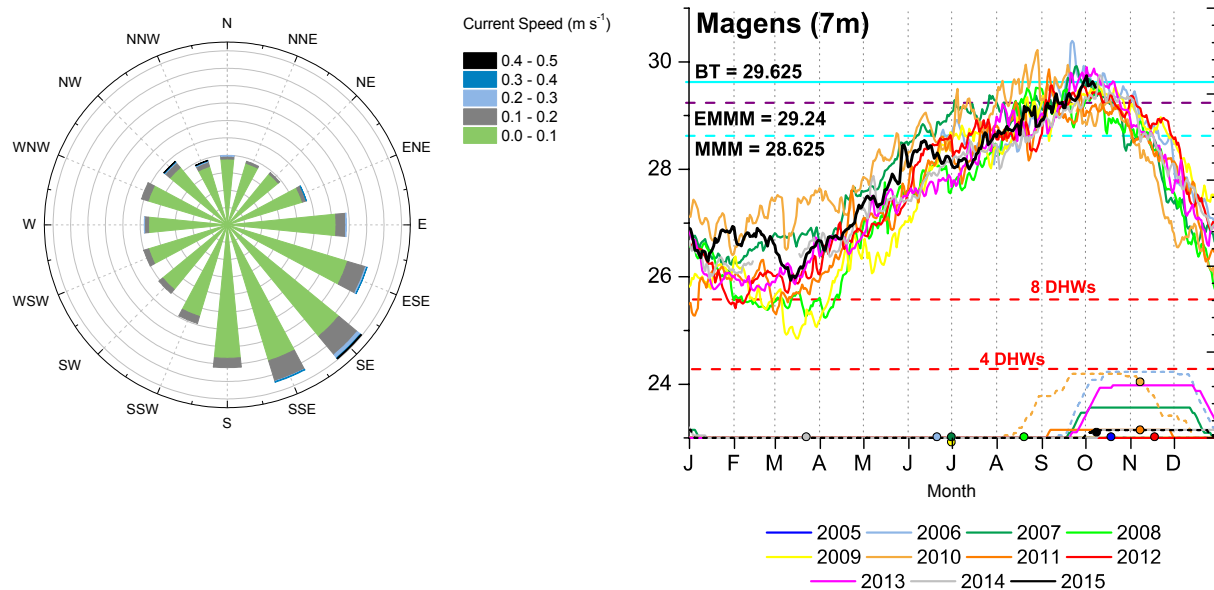


Figure 171. Magens Bay current speed and benthic temperature record (9 m depth).

Physical Characteristics. Current. Magens Bay has restricted water flow dominated by weak currents running counter or orthogonally to the left of the dominant wind direction. This may indicate that there is a counter flowing eddy. Current data are based on average data from Dec. 2006-Oct. 2007 7.5 m above the sensor head. **Temperature.** Magens Bay has low circulation, but temperatures are kept cooler by exposure to the Atlantic. **Chlorophyll & Turbidity.** Magens Bay is susceptible to very high chlorophyll and turbidity values indicating very high productivity that is likely fueled by terrestrial run-off. Turbidity reduces light penetration and reduces the depth limits for coral growth and water column productivity favors heterotrophic organisms, such as sponges and gorgonians.

MAGENS BAY

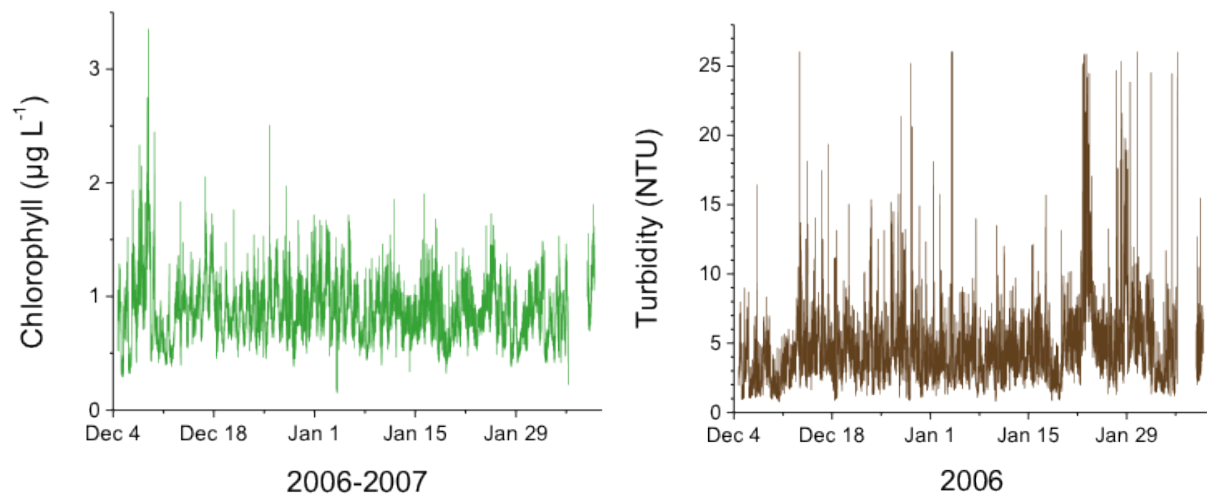


Figure 172. Magens Bay chlorophyll (left) and turbidity (right) record (16 m depth).

SITE SUMMARIES

Benthic Community. The sparse coral community at Magens Bay is very diverse, with no real dominance by any one species. The site lost 12.4% of its coral cover in the 2005 bleaching and has continued to lose coral, with a cover loss of 33.1% from 2005 pre-bleaching to 2011. Gorgonians and then sponges dominate the sessile epibenthic community. Epilithic algae and the macroalga *Dictyota* spp. dominate the algal community. Filamentous cyanobacteria are also common. There is a high proportion of sand/sediment around corals at the Magens Bay site.

Coral Health. Corals were highly affected by the 2005 bleaching event, with about 80% of all corals about 80% affected across the colony surface. This site also showed a strong response to the 2010 bleaching event with about 60% of corals bleached at a low extent. Diseases can be high and are dominated by dark spots disease. Old partial mortality increased after the 2005 bleaching event and then declined, with a slight increase from 2009 to 2011. Recent partial mortality is common at the Magens Bay site, largely as the result of biting by territorial damselfish (*Stegastes* spp.; data not shown).

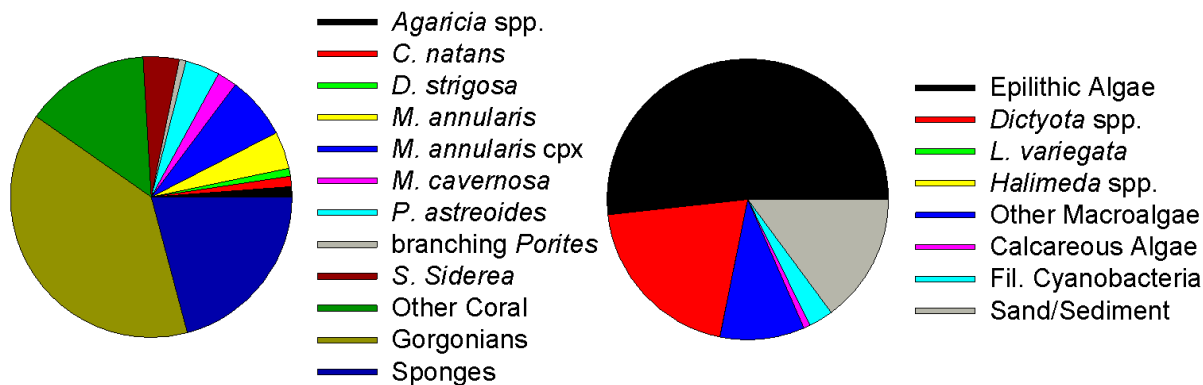


Figure 173. Magens Bay. (left) Relative composition of the sessile epibenthic animal community. (right) Relative composition of the algal community and unconsolidated sediment.

MAGENS BAY

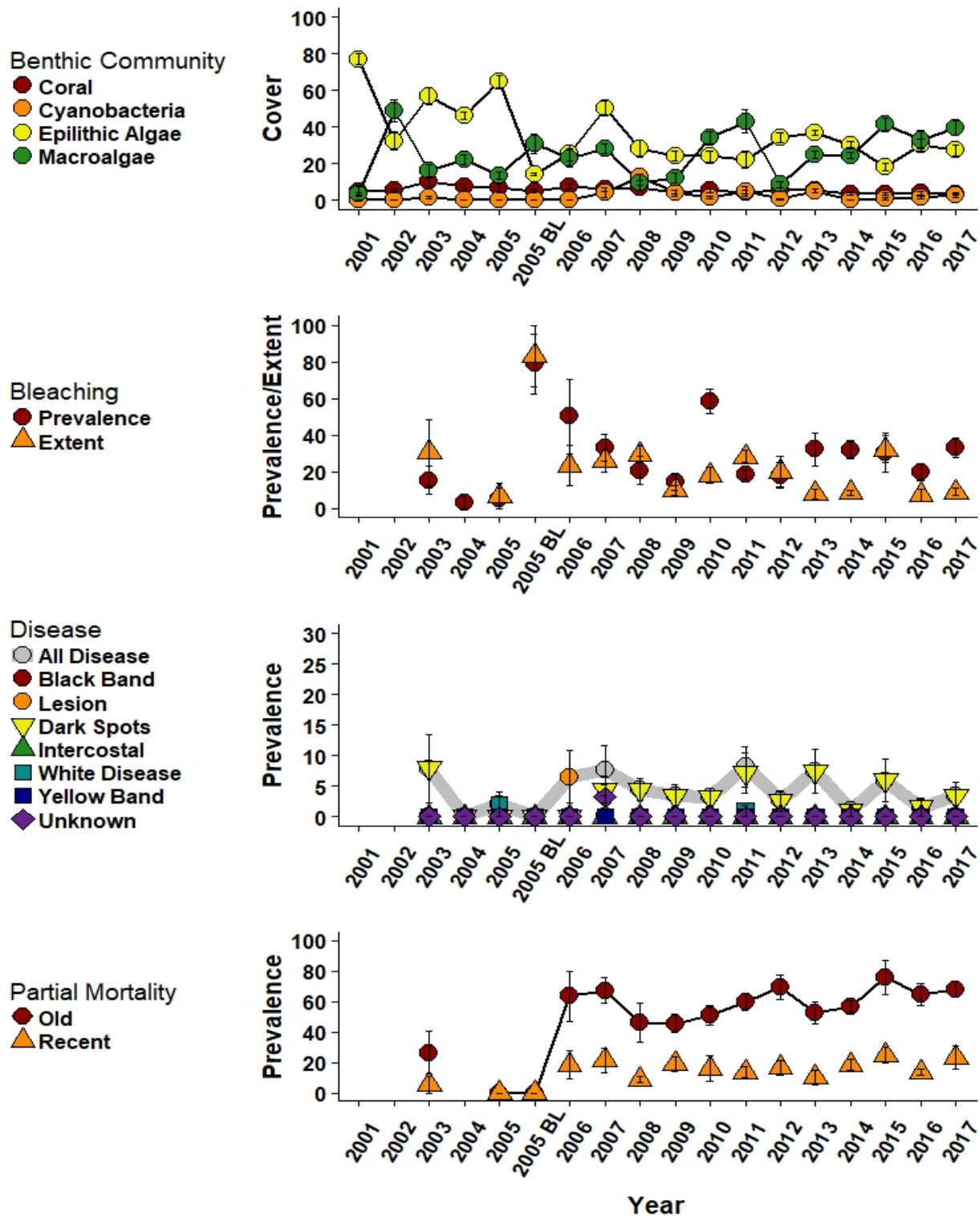


Figure 174. Magens Bay benthic cover and coral health through time (mean $\pm$ SE).

SITE SUMMARIES

Fish Community. Magens Bay once supported its own rich fishery and was the notorious site of the only fatality by shark attack recorded in St. Thomas (Randall 1963a). The days of large, commercially important fish in Magens Bay have been gone since the 1970's; however, the bay is connected to the deeper Puerto Rican shelf to the north and large sharks are known to frequent the bay. Tiger sharks are still caught commonly off either point defining the bay to the east or west. Anecdotally, hammerheads mate in the middle of Magens Bay during one moon phase of the year, and along the mile long sandy beach it is not uncommon to see young of the year sharks swimming in the clear water, suggesting that the deep protected bay is the pupping ground for at least one species of shark. Along the reef that is the TCRMP monitoring site, large fish are rare, and herbivores make up the bulk of the fish biomass. The largest fish swim along the reef edge, where occasional mahogany and lane snapper reside, along with grunts, goatfish, and larger parrotfishes. Schools of wrasse, mixed with juvenile parrotfish, and damselfishes occupy the top of the reef. The threespot damselfish is extremely prolific. No large groupers or snappers were observed in Magens Bay from 2012 to 2014, the first three years of fish monitoring.

MAGENS BAY

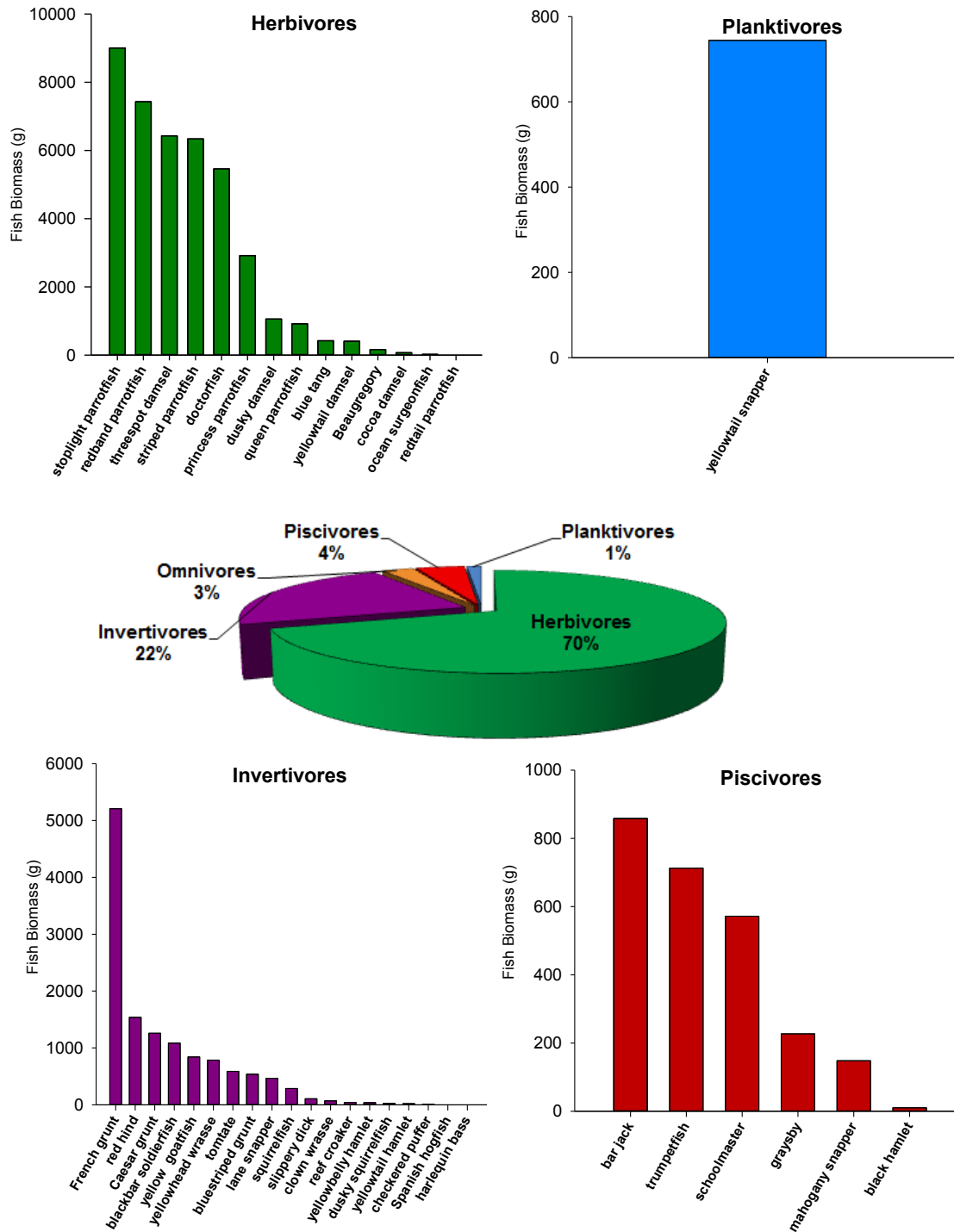


Figure 175. The Magens Bay fish community by absolute and relative biomass.