

St. John

SITE SUMMARIES

CORAL BAY

Description. The Coral Bay site is atop a patch reef complex at the southeast mouth of Coral Harbor. The reef is a low carbonate build up with high coral diversity. Coral Bay appears to be a true reef with a well-developed carbonate framework over bedrock. Coral Bay monitoring was initiated in 2011.

Outstanding Feature. Coral Bay supports a high diversity of coral and an apparent high rate of coral recruitment.

Threats. Coral Bay is subject to land-based sources of pollution, primarily as sediment influx from the large and steep Coral Bay watershed. Recent restoration activities in the watershed are expected to decrease the sediment influx. Coral Bay may also be threatened by maritime activities within Coral Harbor. Proximity to land makes this site in territorial waters potentially vulnerable to fishing.

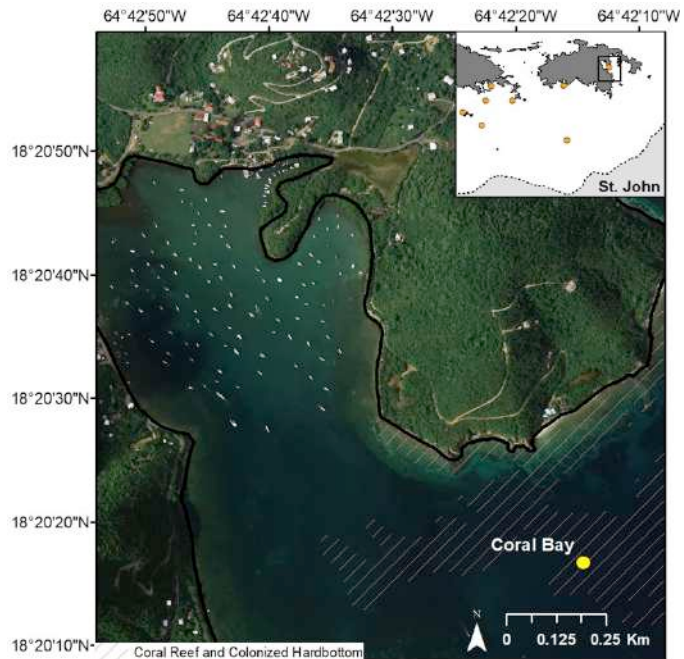


Figure 89. Coral Bay.
(top) Location. (right) A
representative photo of
the reef.



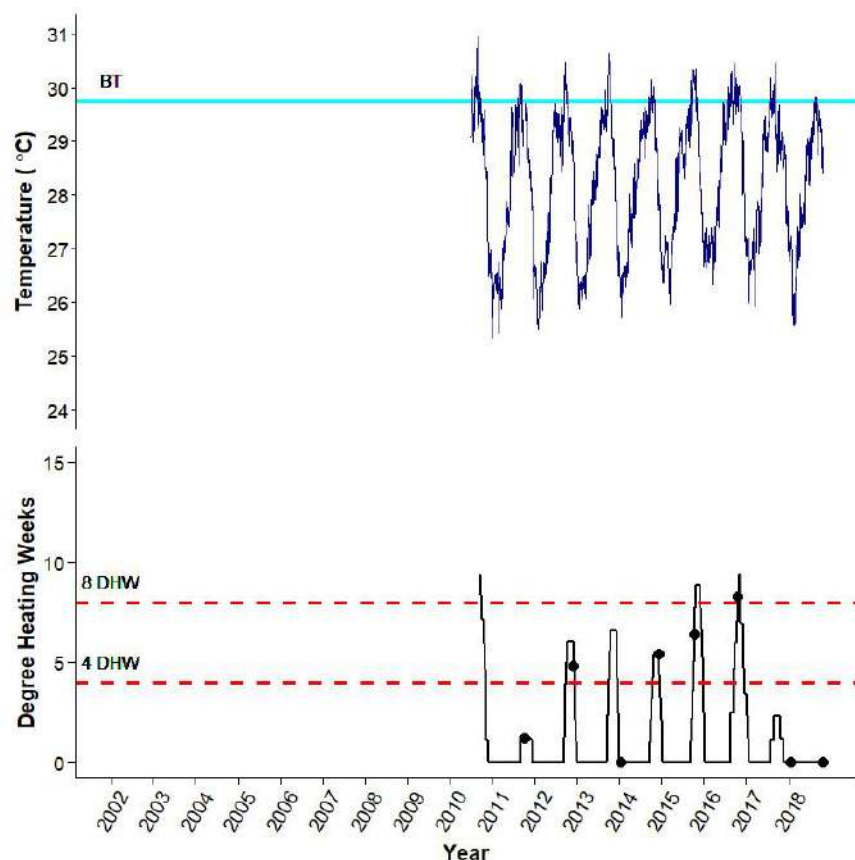


Figure 90. Coral Bay benthic temperature (9 m depth)

Physical Characteristics.

Current. Currents have not been measured by the TCRMP, however, Dr. Sarah Gray (University of San Diego) has measured 2-D near bottom measurements for some years between 2009-2011. Oscillatory currents are expected to be light and only weak unidirectional currents have been experienced.

Temperature. Coral Bay may have restricted water circulation and had very high temperatures during the 2010 bleaching event. There is no empirically established bleaching threshold and the modeled bleaching threshold (Smith et al. 2016a) is likely too low, given high DHW values with limited observed bleaching.

Other. This site and the wider Coral Bay area have been under investigation for land-based sources of pollution impacts since 2009 (Smith et al. 2013a).

SITE SUMMARIES

Benthic Community. Coral Bay has a very diverse coral community, with no clear dominance of cover. In contrast to most sites, the mustard hill coral *Porites astreoides* has the greatest cover among coral species. Coral cover has been declining since 2015, with a precipitous decline in the year 2018. Increasing impacts of land-based sources of pollution may be contributing to the degradation. Sponges and gorgonians are also very common at this site. In particular, Gorgonians have been increasing in cover at this site, following a possible island-wide trend for St. John (Tsounis and Edmunds 2017). Epilithic algae and a high abundance of crustose coralline algae dominate the algal community, with very low abundance of macroalgae. This is surprising at this turbid reef site that likely receives high inputs of particulate and dissolved nutrient sources, and indicates that grazing is quite high. There is not a high abundance of herbivorous fish and only the occasional occurrence of *Diadema antillarum*. However, there is a great abundance of the rock boring urchin *Echinometra* spp. that appears to be the dominant grazer. This genus is not monitored in TCRMP protocols, but perhaps should be included in future years.

Coral Health. It is not known how corals were affected by bleaching in 2005. There was a low prevalence of low extent bleaching in 2011. Diseases were not recorded in 2011. Old partial mortality prevalence was low in 2011, but this may partly be explained by the high abundance of small coral colonies that are less prone old partial mortality. Recent mortality had low prevalence in 2011.

SITE SUMMARIES

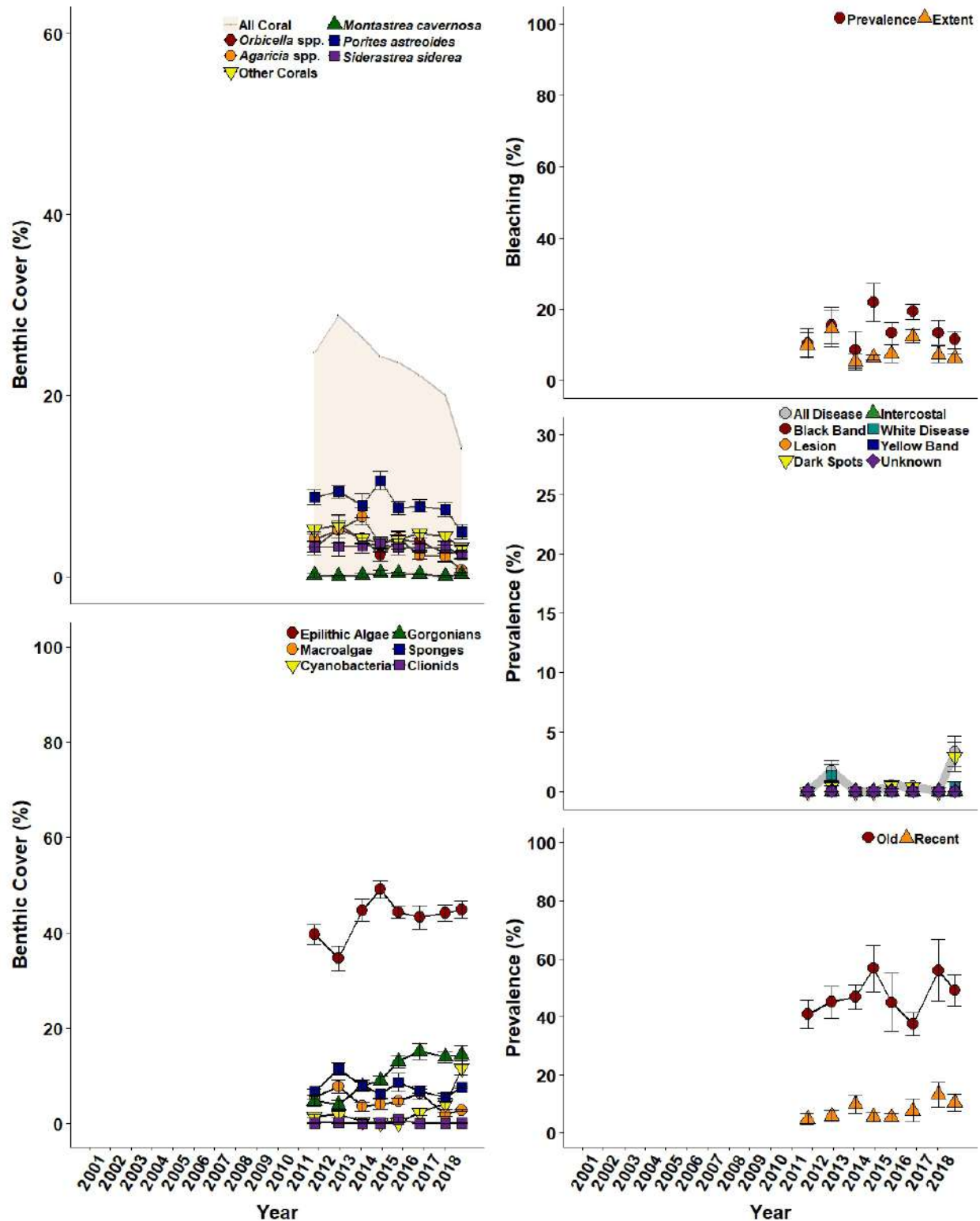


Figure 91. Coral Bay benthic cover and coral health through time (mean $\pm$ SE).

SITE SUMMARIES

Fish Community. The Coral Bay site is low in fish diversity, biomass and abundance.

Although epilithic algae are prolific, large grazers are nearly absent. Three spot damselfish dominate the group in abundance and juvenile striped and redbad parrotfish in biomass. Acanthurids are present but only in the juvenile phase. Planktivores in the high turbidity habitat are limited to a few juvenile yellowtail snapper and bicolor damselfish. Although benthic invertivores are more prolific and diverse, only a few individuals comprise each species group and most fish are juveniles. Likewise, piscivores have a very low biomass and are limited to a very few individuals that appear to be moving across the reef rather than residing there.

SITE SUMMARIES

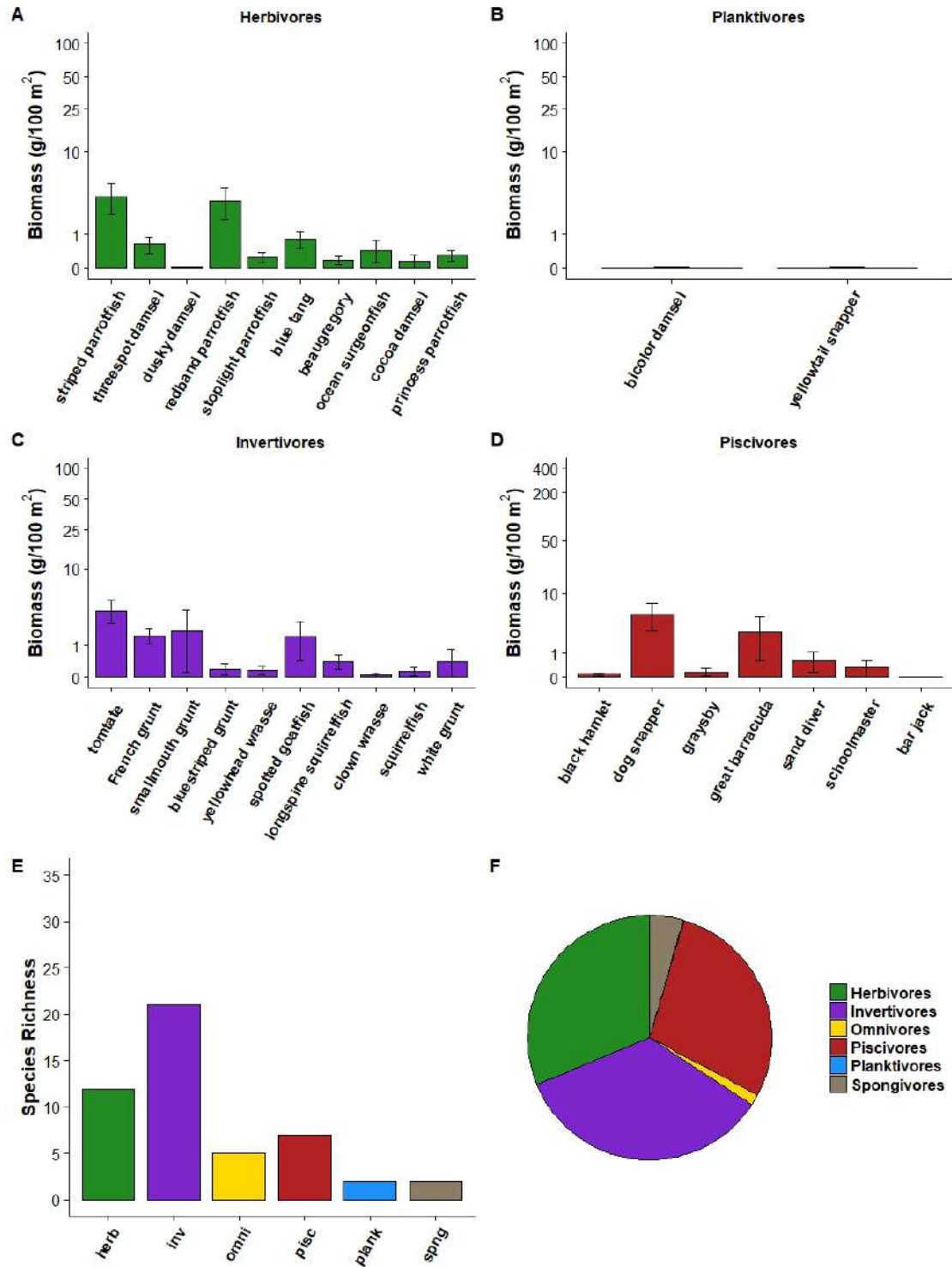


Figure 92. The Coral Bay fish community as (A-D) average biomass per trophic group with the most common species shown in order on the x-axis, (E) species richness, and (F) relative community composition by total biomass. Note that biomass is a log scale.

SITE SUMMARIES

FISH BAY

Description. Fish Bay is a nearshore Fringing Reef in territorial waters. The monitoring site is a sharp edge of a shallow water coral community dropping to sand at 7 m depth. The site has been monitored since 2001.

Outstanding Feature. Fish Bay inner transects (1 – 3) are heavily sediment impacted, while outer transects (4-6) support large boulder star corals (*Orbicella faveolata*). The site lies just outside the southwestern boundary of the Virgin Islands National Park.

Threats. Fish Bay is subjected to land-based sources of pollution.

Inner bay transects tend to have turbid water and overgrowth by macroalgae. This site may also be vulnerable to fishing impacts.

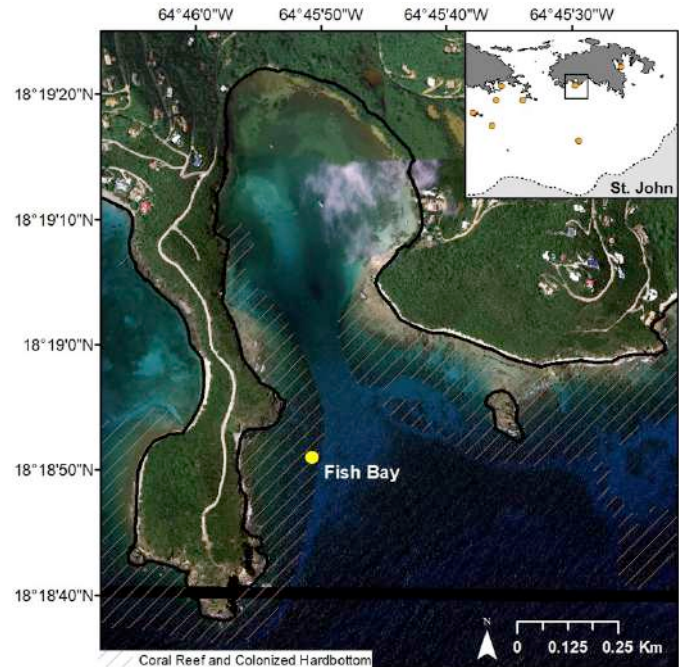


Figure 93. Fish Bay. (top) Location. (right) A representative photo of the reef.



SITE SUMMARIES

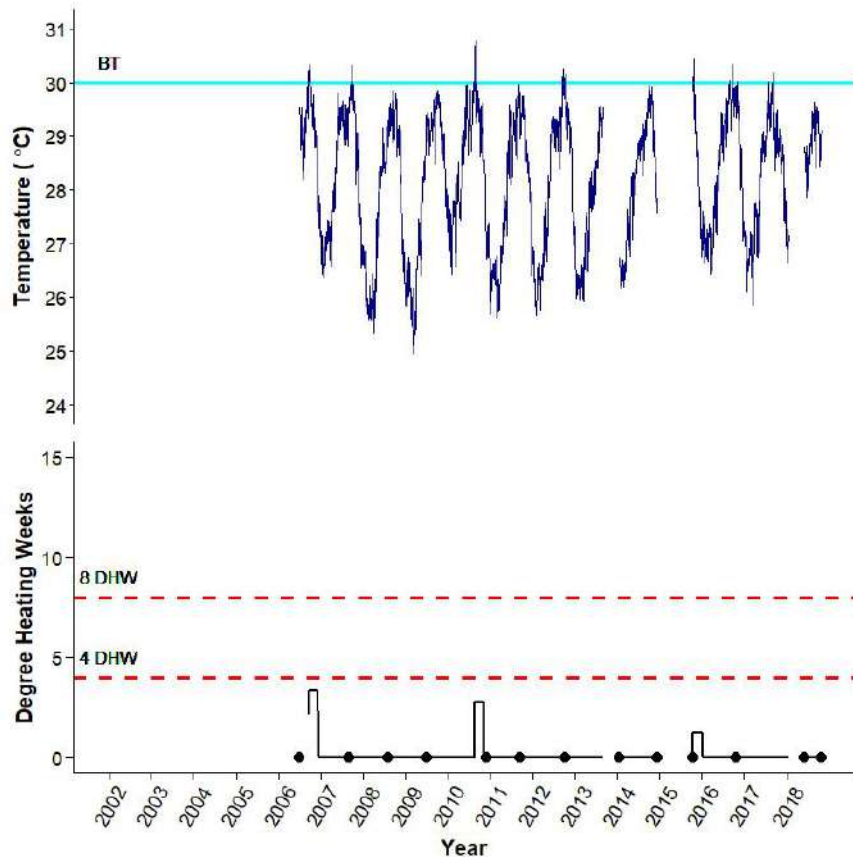


Figure 94. Fish Bay benthic temperature record (6 m depth).

Physical Characteristics.

Current. Fish Bay currents have not been measured directly by the TCRMP. Unidirectional currents are mild to slack. Because of the southeast exposure, wave driven oscillatory currents can be quite intense, particularly on the outer transects.

Temperature. Fish Bay has relatively high mean temperatures and a high bleaching threshold.

SITE SUMMARIES

Benthic Community. The coral community of Fish Bay is dominated by the boulder star coral *Orbicella* spp.. In particular, large (>2m wide) colonies of *O. faveolata* are common on the seaward transects (4-6). The inner transects (1-3) are mostly depauperate of coral (< 4% cover as of 2011). The site lost 37.1% of its cover due to the 2005 coral bleaching event, but had regained 136.1% of cover by 2011. Gorgonians are also very common on the wave-washed outer transects. Gorgonians have been increasing in cover at this site, following a possible island-wide trend for St. John (Tsounis and Edmunds 2017). Equal parts epilithic algae and the macroalgae *Dictyota* spp. dominate the algal community. The site also has a high abundance of *Halimeda opuntia*, which can smother coral on inner bay transects closest to land-based sources of pollution.

Coral Health. Fish Bay corals were very severely affected in the 2005 with 100% of corals showing almost 100% bleaching. Bleaching is also normally high at this site even in years without thermal stress, a likely consequence of sediment and macroalgal interactions. Diseases, particularly dark spots disease and white disease, can have very high prevalence at Fish Bay. Old partial mortality did increase after the 2005 coral bleaching event, with a decline in 2010 and resurgence in 2011. Recent partial mortality can also be relatively high compared with other sites, largely as the results of bites from site-attached damselfish (*Stegastes* spp.).

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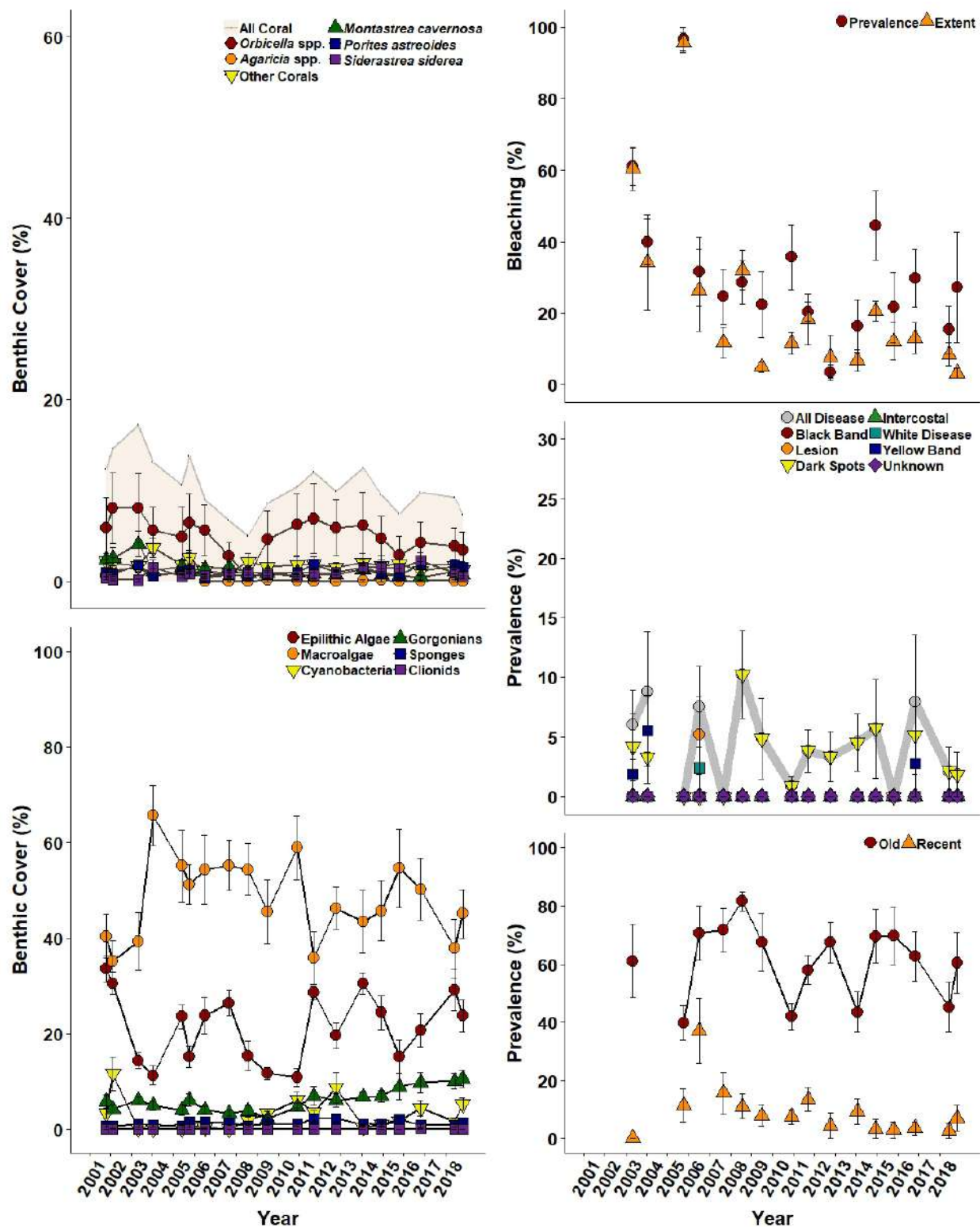


Figure 95. Fish Bay benthic cover and coral health through time (mean $\pm$ SE).

SITE SUMMARIES

Fish Community. The Fish Bay fish community is typical of a nearshore reef habitat that receives moderate to heavy sedimentation. The site is dominated by herbivores that include all of the common Caribbean parrotfishes, large schools of mixed acanthurids, and herbivorous pomacentrids. The common planktivores in the turbid water are limited to juvenile yellowtail snapper and a few small pomacentrids. Benthic invertivores and piscivores are more diverse and have a higher biomass, but generally fish are juveniles or subadults; large fish are rare in the bay. Invertivores are comprised primarily of grunts, goatfish and wrasses, and piscivore biomass is dominated annually by jacks. Large serranids and lutjanids are generally absent from Fish Bay although in 2018 a dog snapper was recorded. Both Caribbean reef sharks and lemon sharks are known to pup in Fish Bay, and juvenile lemon sharks are sometimes seen in the murky water.

SITE SUMMARIES

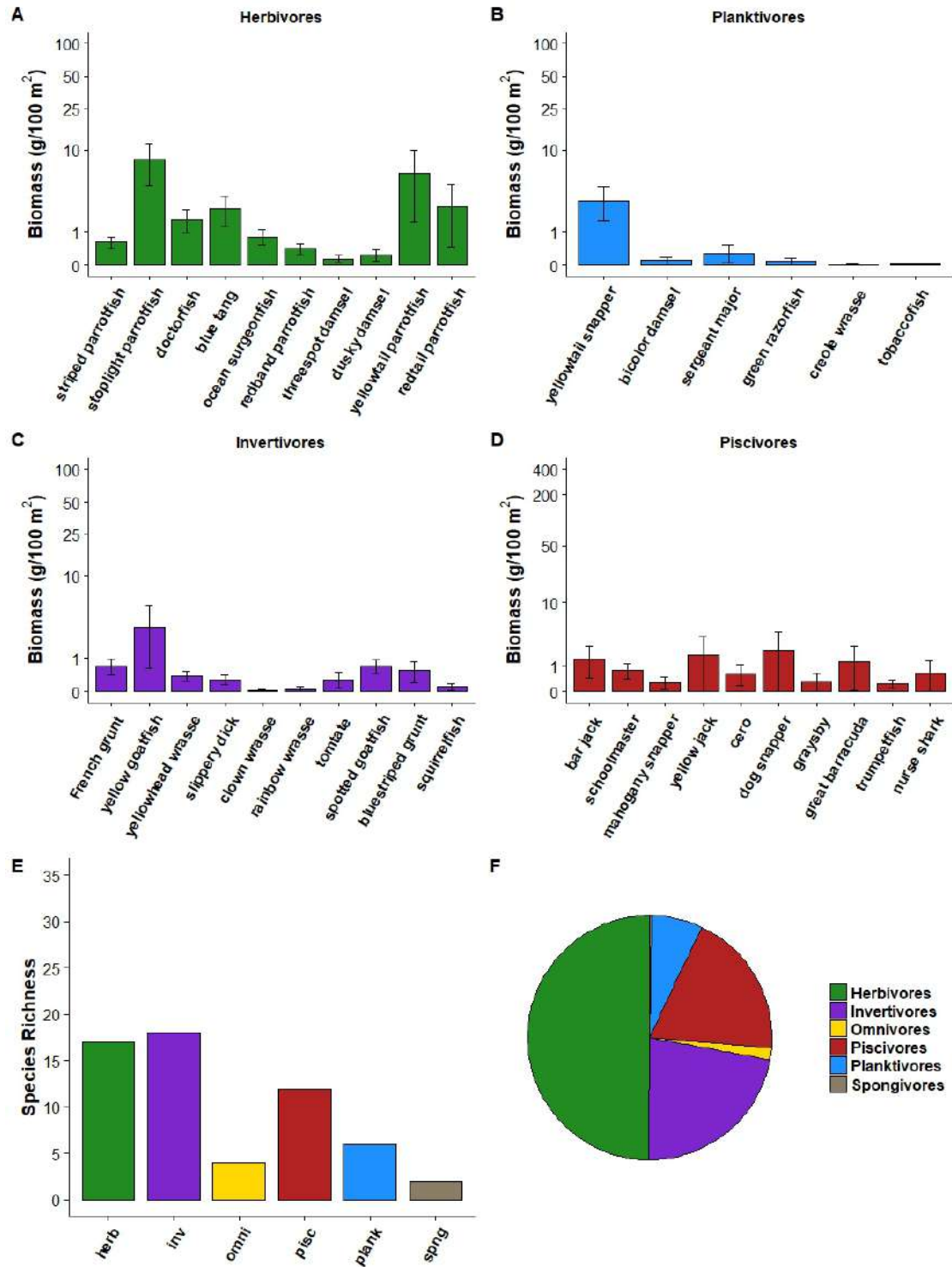
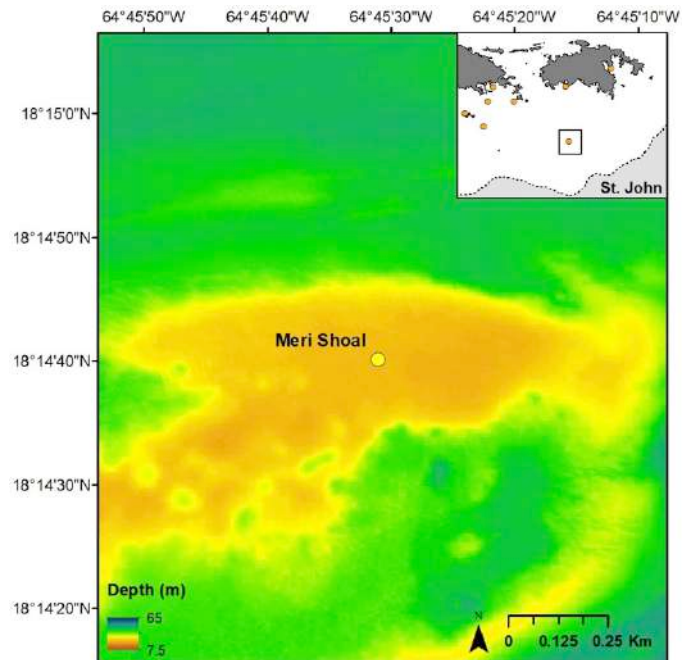


Figure 96. The Fish Bay fish community as (A-D) average biomass per trophic group with the most common species shown in order on the x-axis, (E) species richness, and (F) relative community composition by total biomass. Note that biomass is a log scale.

SITE SUMMARIES

MERI SHOAL

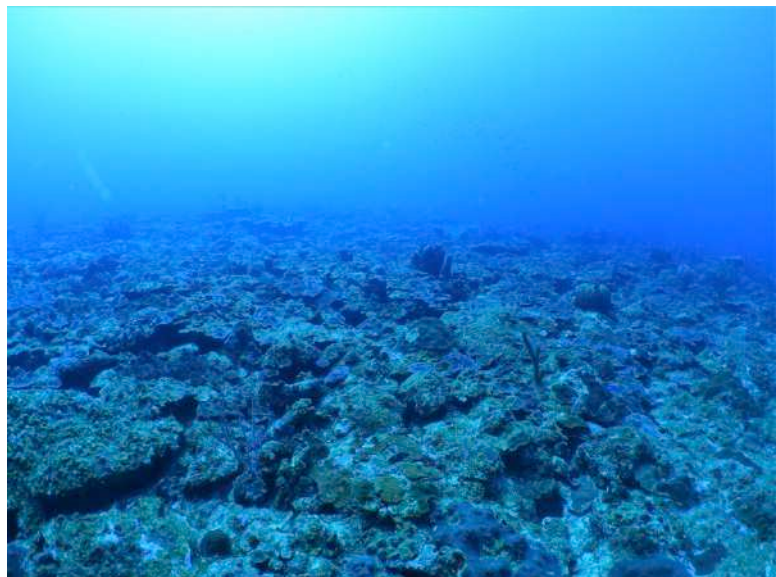
Description. Meri Shoal is an offshore mesophotic coral bank 30 m depth. The reef is located four miles south of St. John and is on the southernmost of two impressive midshelf coral banks. The reef is dominated by interlocking colonies of boulder star corals (*Orbicella* spp.). The reef top is very flat coral plain. The site is named for Dr. Meri Whitaker, former director of the VI EPSCoR Program who passed away in 2009. Meri Shoal has been monitored since 2005.



Outstanding Feature. Meri Shoal has the highest star coral abundance of any site in the TCRMP and is bathed in clear, clean water.

Threats. Meri Shoal is vulnerable to fishing impacts, as it is outside any marine protected area. The high density of corals may also make this site vulnerable to disease impacts.

Figure 97. Meri Shoal. (top) Location. (right) A representative photo of the reef.



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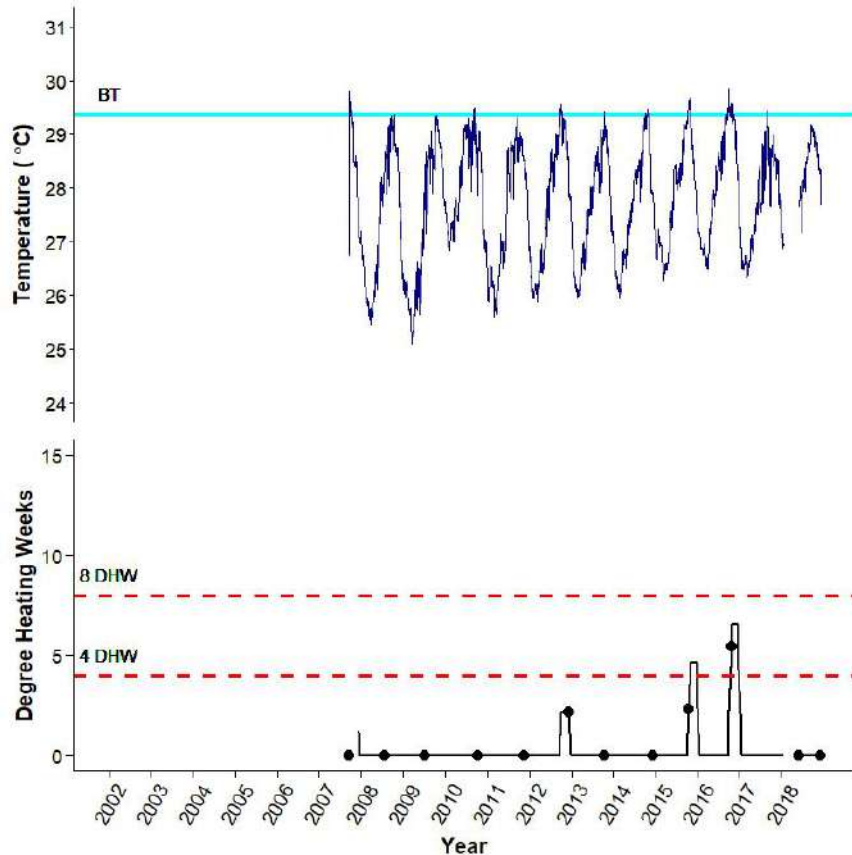


Figure 98. Meri Shoal benthic temperature record (30 m depth).

Physical Characteristics.

Current. Currents have not been measured directly at the Meri Shoal site, although the Caribbean Regional Association buoy VI 1 is located within 700 m and its downward focused ADCP has been recording data since April 2011.

Temperature. Meri Shoal has relatively low temperatures that are more similar to other mesophotic sites.

SITE SUMMARIES

Benthic Community. The Meri Shoal site is exceptional for its dominance by boulder star corals (*Orbicella* spp.). Cover of this and other coral species was exceptionally high when the site was first monitored during the 2005 coral bleaching event, but declined by 36.0% after bleaching and had not recovered any cover as of 2011 (-9.6%). Surprisingly, given the high coral cover, *Lobophora variegata*, and not epilithic algae, dominate the algal community and there has been a trend of increasing macroalgal cover since 2008.

Coral Health. Coral bleaching was relatively high for a mesophotic site during the coral bleaching event in 2005. Bleaching was again at high prevalence, but low extent in the thermal stress of 2010. However, low-extent bleaching at moderate prevalence is a persistent feature of Meri Shoal. Disease, particularly white disease and lesions that are likely the remnants of white disease, are highly prevalent, particularly in years following high thermal anomalies, such as 2006 and 2011. Old partial mortality climbed steeply from the 2005 coral bleaching event onwards and reached very high levels by 2006. Recent partial mortality has also been consistently high as the result of white disease and disease lesions.

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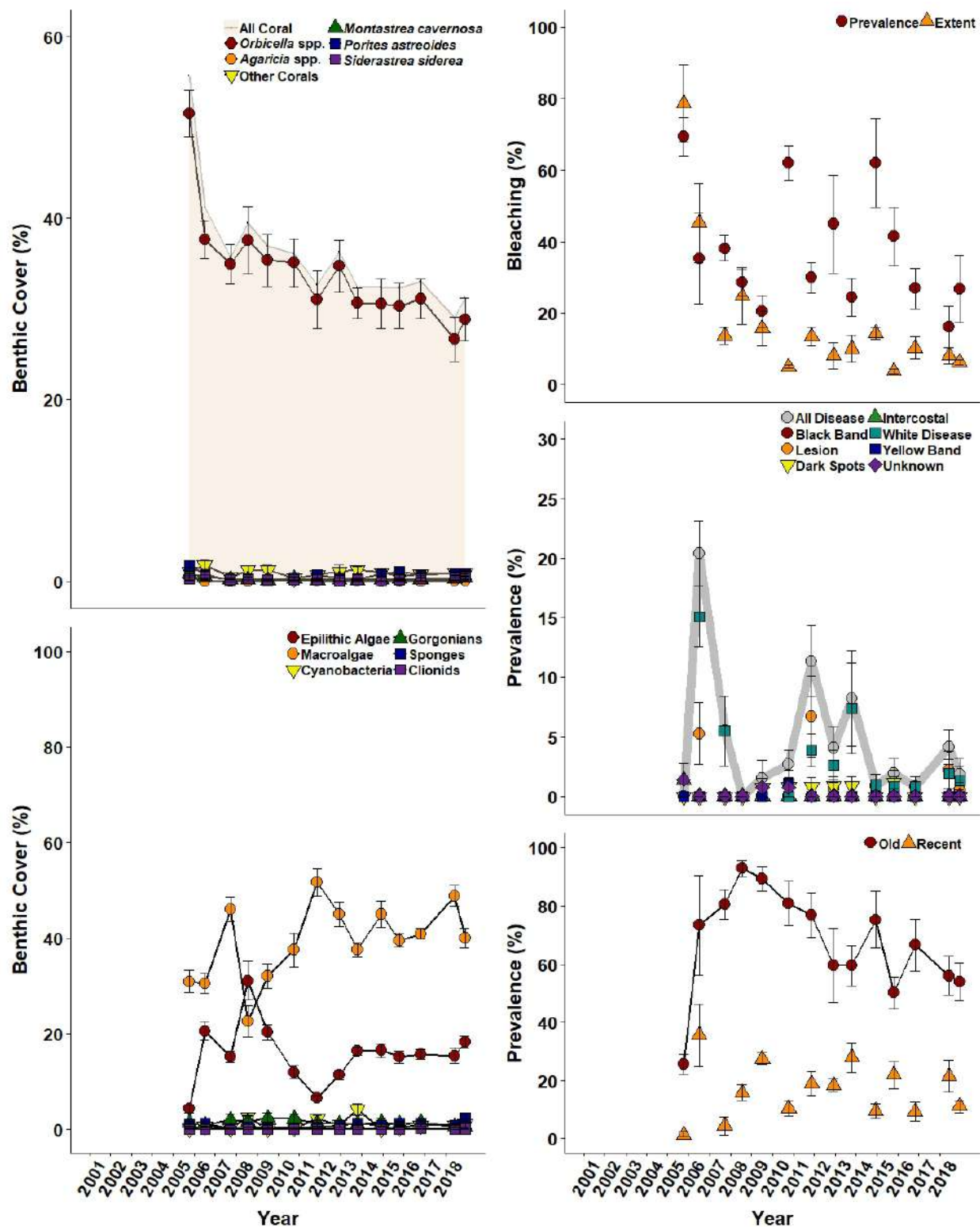


Figure 99. Meri Shoal benthic cover and coral health through time (mean $\pm$ SE).

SITE SUMMARIES

Fish Community. Meri Shoal is a beautiful site in relatively deep water and holds a dynamic fish community of high biomass. Important planktivores include the very prolific creole wrasse, feeding on tiny jellyfish, invertivore larvae and phytoplankton, and the black surgeon, primarily a zooplankton feeder. Herbivores observed on the site include large stoplight parrotfish, as well as the three common smaller Caribbean parrotfish (redband, striped and princess), and all three acanthurids. Ocean surgeonfish are especially in high abundance. Queen triggerfish and red hind are both common at Meri Shoal. In 2012 a tiger grouper was observed on a belt transect and another on a roving dive. A Nassau grouper was also observed on a roving dive in 2013. These are rare but exciting encounters as the site is not protected from traps or any bottom fishing. Large jacks, mackerels, and barracuda are also regularly observed in the water column at Meri Shoal.

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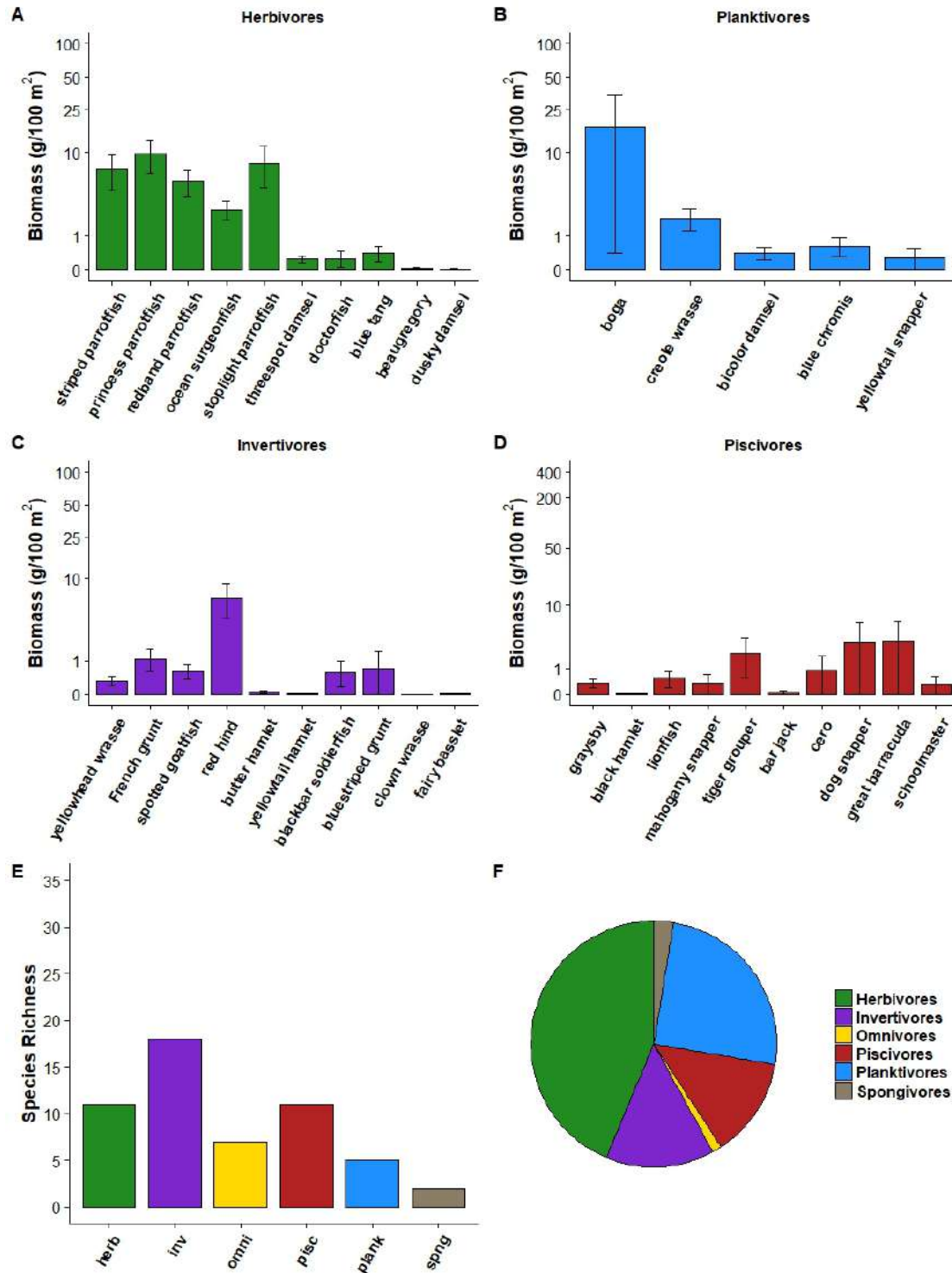


Figure 100. The Meri Shoal fish community as (A-D) average biomass per trophic group with the most common species shown in order on the x-axis, (E) species richness, and (F) relative community composition by total biomass. Note that biomass is a log scale.