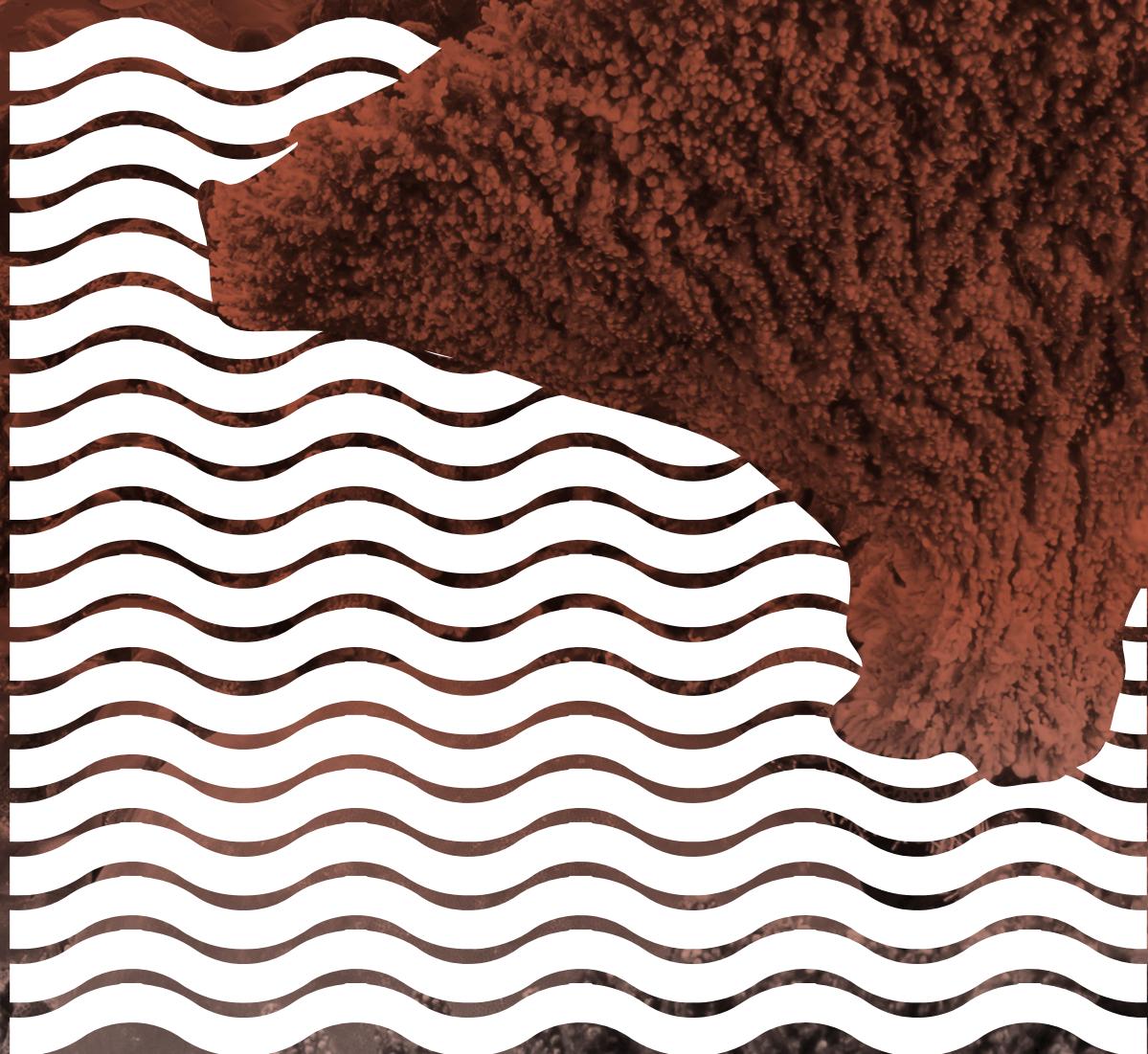


BIODIVERSITY ANNUAL REPORT

ABU DHABI 2017

CORAL MONITORING AND ASSESSMENT





EXECUTIVE SUMMARY

This report gives a status overview on coral monitoring and assessment in Abu Dhabi Emirate in 2017. Abu Dhabi has approximately 350 km² of coral reef associated habitat. The Environment Agency – Abu Dhabi (EAD), in collaboration with the New York University – Abu Dhabi Institute (NYUAD) conducts an annual monitoring and assessment programme to understand the health status of coral communities in Abu Dhabi's coastal waters. The year 2017 witnessed the most severe bleaching event, with an overall loss of approximately 73% of coral cover across all sites in Abu Dhabi waters. The results presented in this report highlights three key representative areas out of the nine monitored sites, these are; Ras Ghanadah, Bu Tinah, and Delma.

INTRODUCTION

Coral reefs are one of the most diverse marine ecosystems, valued for their many goods and services, they also play an important role in providing habitats for commercially important species of fish, such as the farsh (painted sweetlips), hamour (orange-spotted grouper) and shaari (spangled emperor), as well as critically endangered marine wildlife such as the hawksbill turtle.

Coral reefs face threats from global climate change. During 1997 and 1998, coral communities died across large regions of the world due to increased sea surface temperatures. Up to 98% of Abu Dhabi's corals have died in the past following prolonged positive seawater temperature anomalies. The health of coral reefs has also deteriorated due to anthropogenic activities such as dredging, land reclamation, wastewater discharge, pollution, anchor damage and discarded or lost fishing gear.





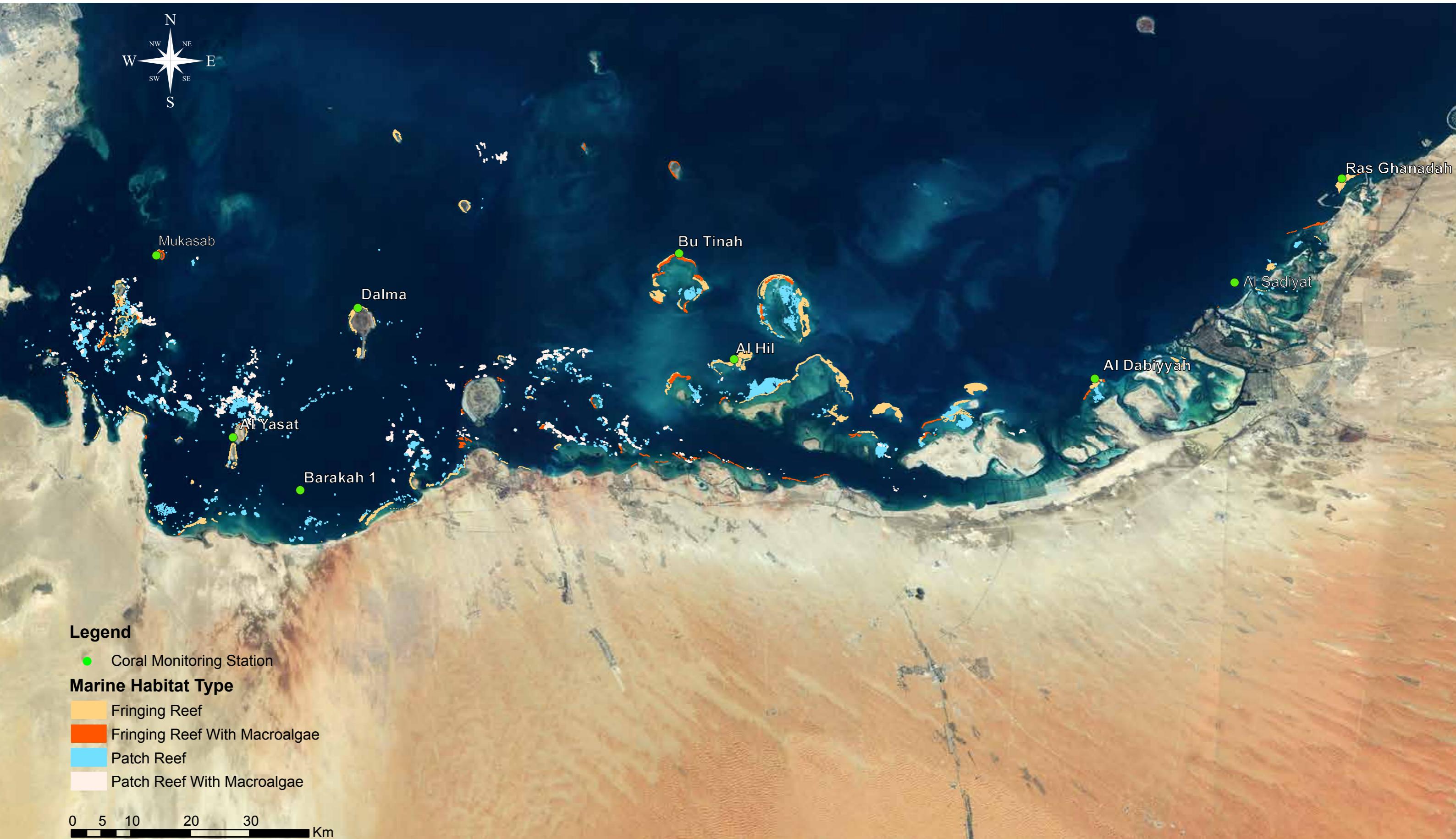
METHOD

The coral reef assessment and monitoring survey is conducted annually at representative sites ranging from Mukasab in the west to Ras Ghanada in the east, seasonal surveys were conducted during April and October. At each site, six 30 metre line transects are laid parallel to each other with a five metre spacing between them. A high-resolution digital camera, mounted on a custom-built frame, is used to photograph a 0.25 m^2 quadrat area at an interval of three metres along each transect line. A total of 11 images are taken for each transect and 66 images per site for each survey. An automated temperature logger is installed at each monitoring station to record seawater temperature at hourly intervals.

The CoralNet web-based software used for image analysis employs 50 randomly distributed points on each quadrat image and provides the percentage cover of major benthic categories in each quadrat. The major benthic categories included; turf, fleshy and crustose coralline algae, urchins, bivalves and other invertebrates, rock, rubble, sand and dead coral, as well as the total amount of live coral.

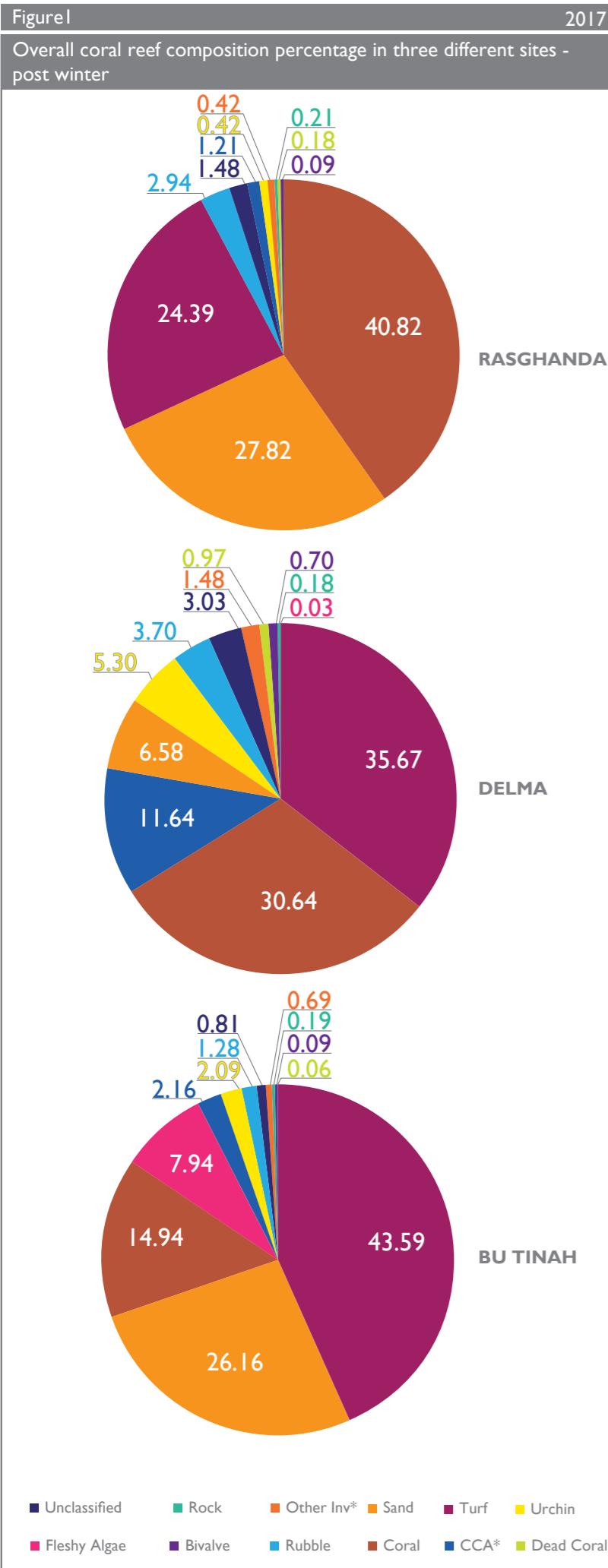
MAP I

Location of Abu Dhabi's coral monitoring stations.





RESULTS

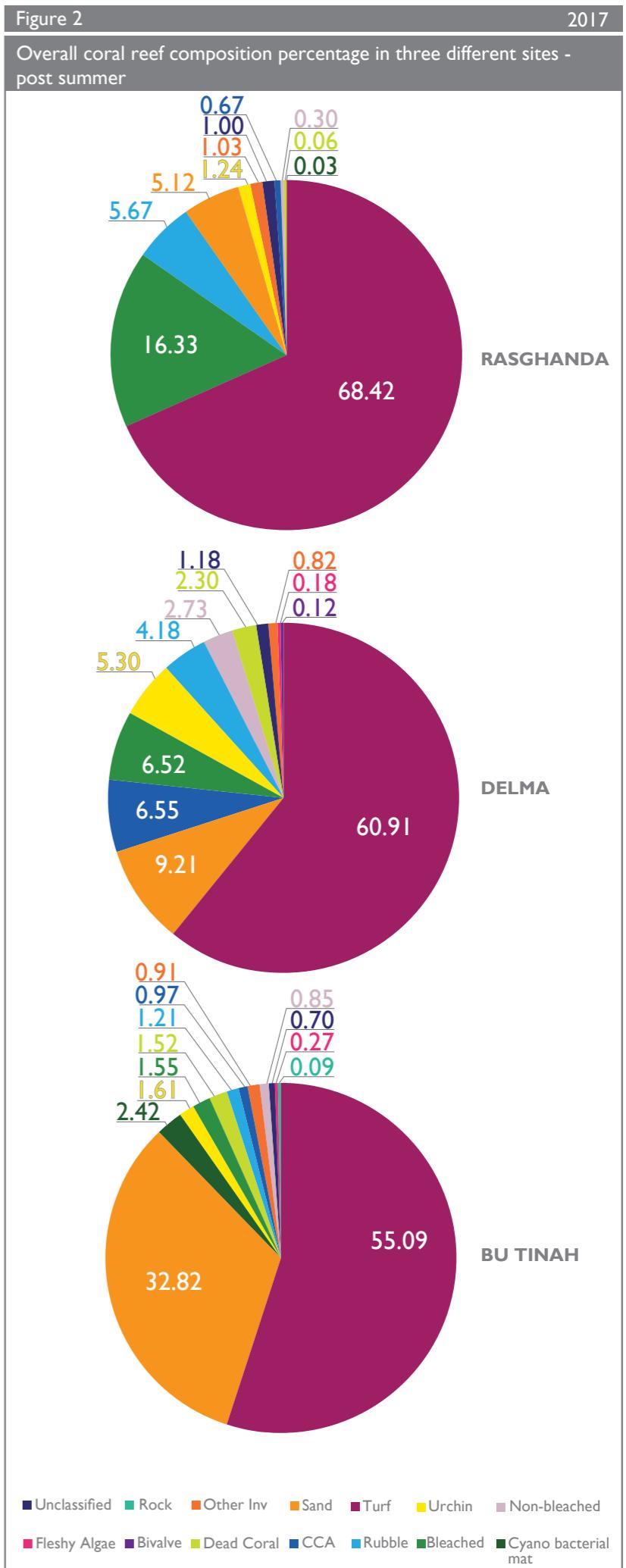


OVERALL CORAL REEF COMPOSITION 2017 POST WINTER

There was an 8.1% decrease in the amount of live coral cover in Abu Dhabi from 2016 to 2017 (post winter), an important observation of $29.7 \pm 5.6\%$ in 2016 down to $27.5 \pm 2.3\%$ in 2017. Ras Ghanada had the highest live coral cover (40.82%) (Figure 1, RASGHANDA), followed by Delma (30.64 %) (Figure 1, DELMA), and Bu Tinah (14.94%) (Figure 1, BU TINAH). Bu Tinah was dominated by turf and fleshy algae, while Delma had more crustose coralline algae and rubble compared to the other two sites.

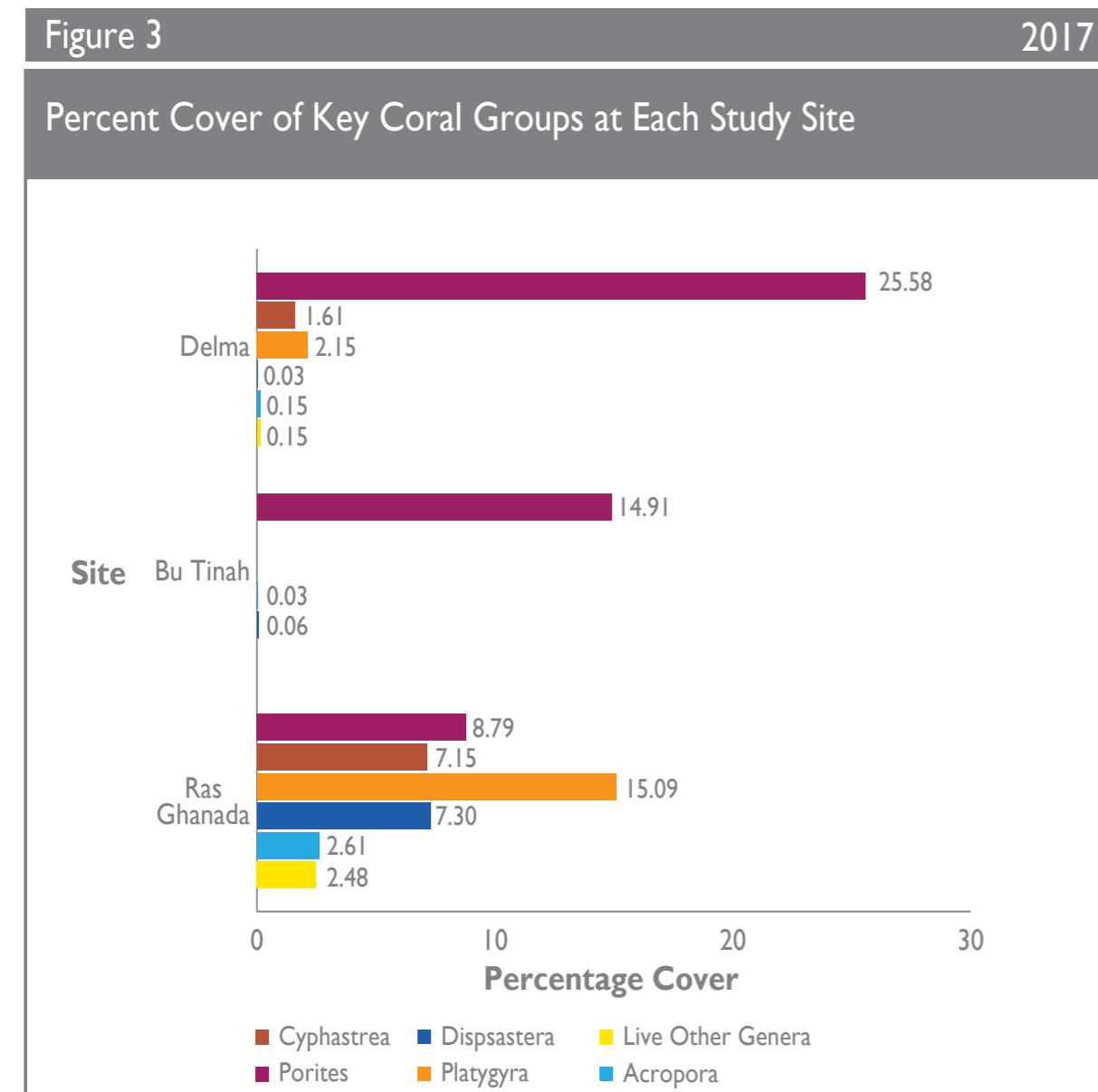
OVERALL CORAL REEF COMPOSITION 2017 POST SUMMER

Surveys during the summer shows there was a bleaching event (Sept/Oct 2017). This indicates a dramatic change across all three sites in benthic community coverage with a live coral coverage of about 9.5%, of which 8.2% (86% of live coral) is bleached. Ras Ghanada had the highest percentage of bleached coral (16.33%) (Figure 2, RASGHANDA), followed by Delma (6.52%) (Figure 2, DELMA), and Bu Tinah (1.55%) (Figure 2, BU TINAH).



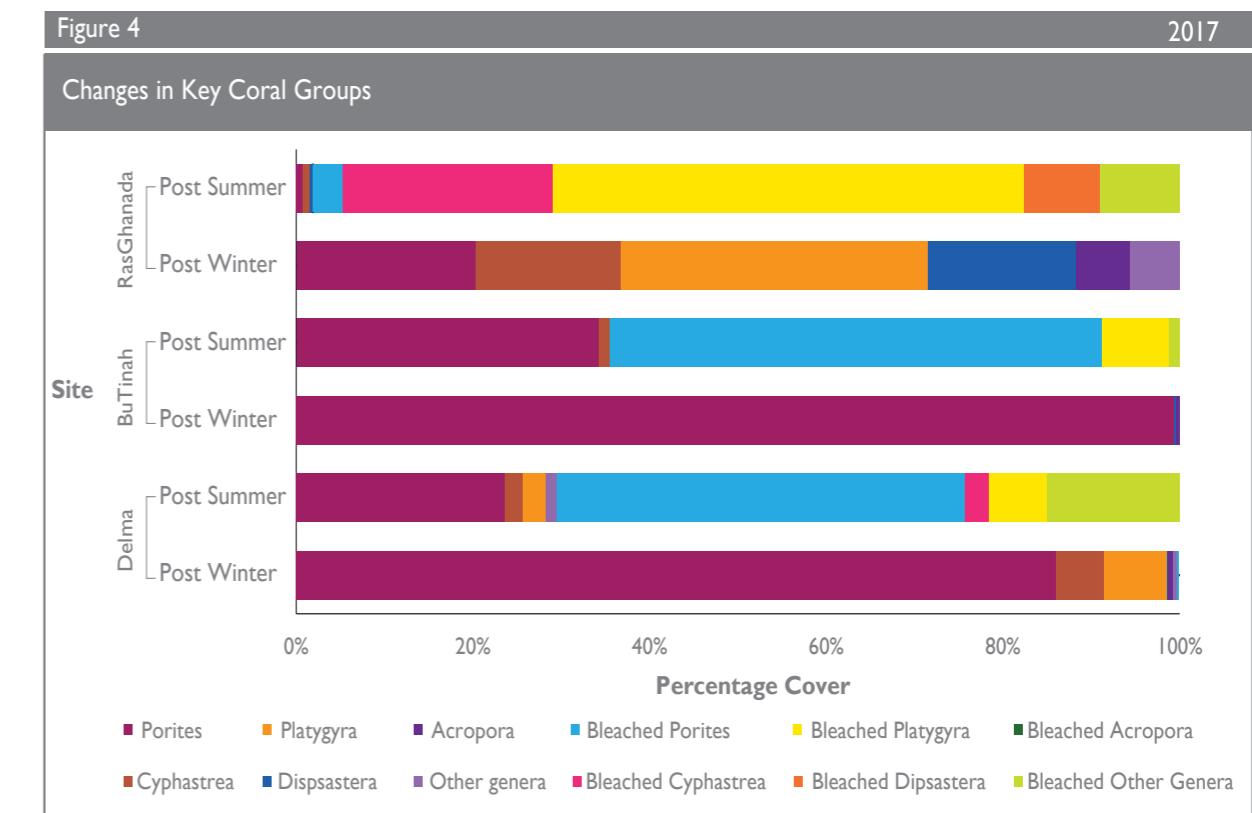
KEY CORAL GROUPS 2017

Five key coral genera observed across all sites; *Porites*, *Cyphastrea*, *Platygyra*, *Dipsastrea*, *Acropora*. The most abundant coral genus across all sites was *Porites*. The main coral species recorded in Ras Ghanada in 2017 included representatives of; *Porites* (8.79%), *Cyphastrea* (7.15%), *Platygyra* (15.09%) and *Dipsastrea* (*Favia*) (7.30%), while also having the highest diversity of other live genera (2.48%) (Figure 3). Bu Tinah has shown the least coral genera diversity with no representation from major groups such as *Cyphastrea* and *Platygyra*. Coral benthos in Delma indicates towards a *Porites* dominate reef with 25.58% (Figure 3) coverage attributed to this site .



CHANGES IN KEY CORAL GROUPS 2017

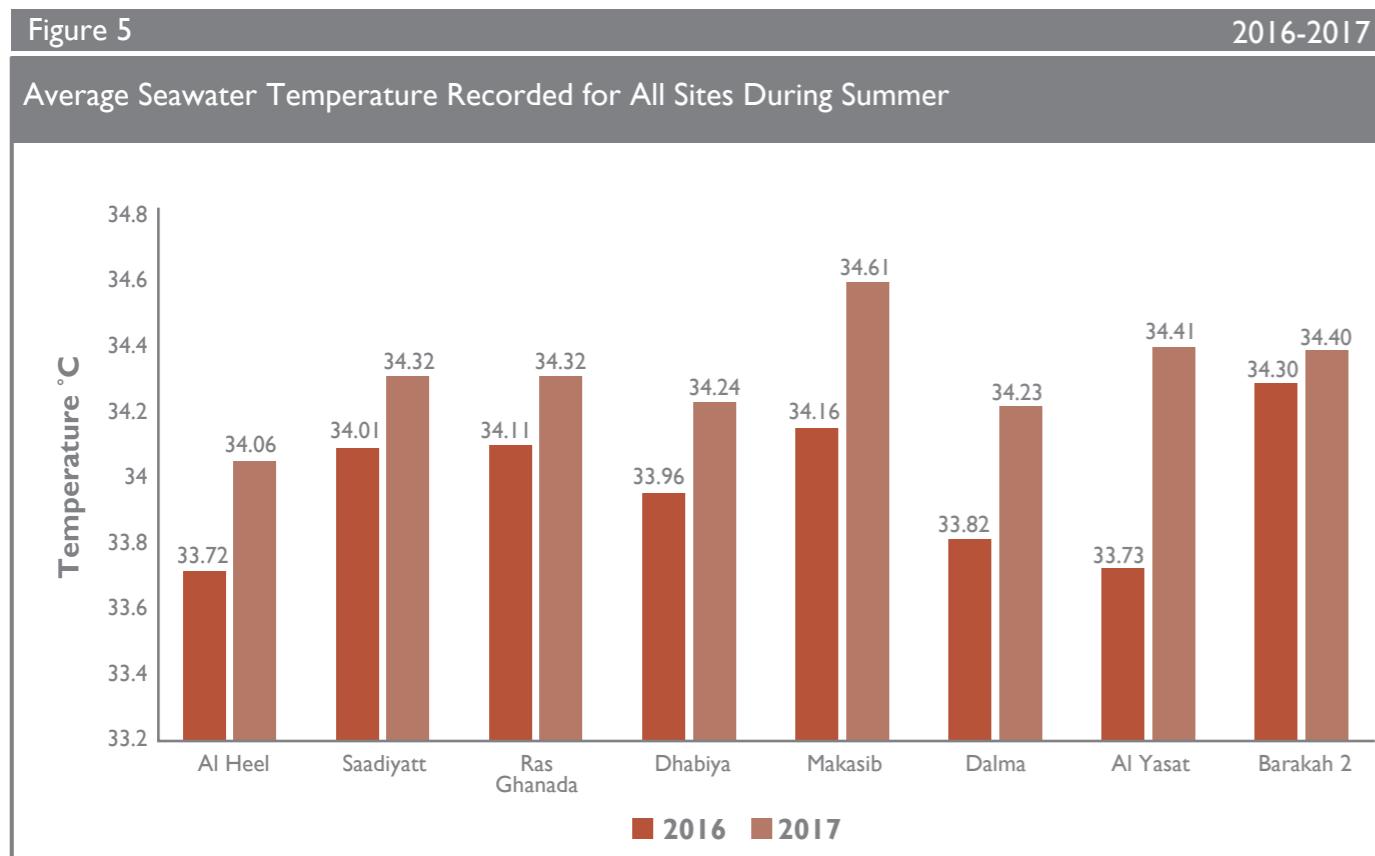
Summer of 2017 indicate a massive bleaching event, around two thirds of all live coral was reduced (down to 9.5%). Prior to the bleaching event 49% of all live coral abundance was *Porites*, followed by *Cyphastrea* and *Platygyra* (12.4% and 16.2%, respectively) across the three sites. A shift in community composition is evident as *Porites* abundance has decreased by 39.7% during the bleaching event, being slightly less than *Platygyra* (9.9%) coverage at 9.3%. Sites such as Delma and Bu Tinah, where *Porites* is most dominate; there is extensive bleaching of this genus at 66.4%. *Acropora* was not represented during the bleaching event. Across the three sites an estimate of 86% of all live coral were bleached during the event.



AVERAGE SEAWATER TEMPERATURE

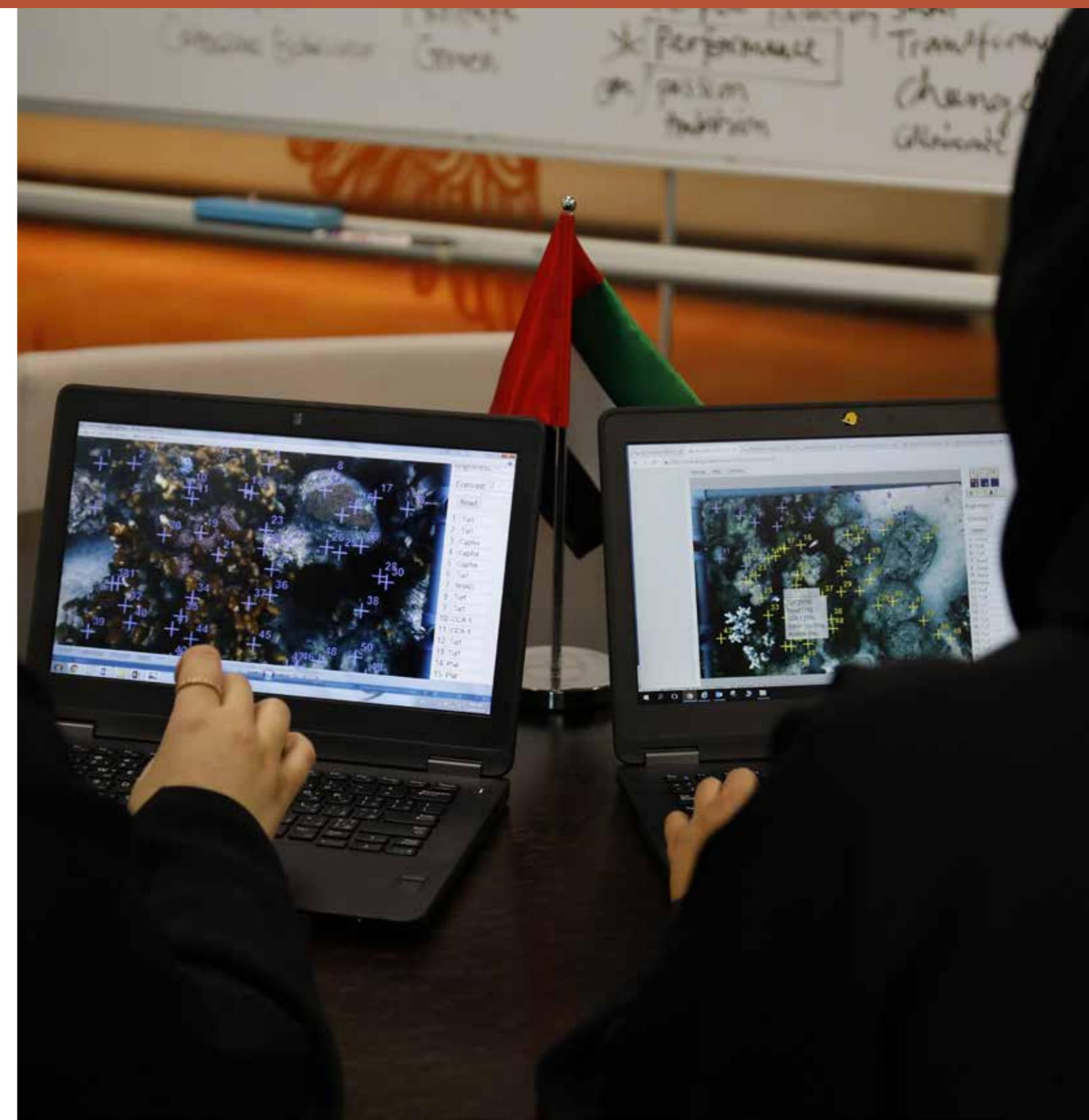
The average seawater temperatures during the months of June to September was 34.43°C , which indicates a slight increase in average seawater temperature of 0.34°C compared to the previous year (Figure 5). Due to this increase, corals spent nearly 2 months above bleaching temperatures.

Figure 5



CAPACITY BUILDING

Staff from the Marine Assessment & Conservation Section in EAD's Terrestrial & Marine Biodiversity Sector attended training sessions at the New York University – Abu Dhabi Institute. The capacity building initiatives were focused on using the web based software CoralNet to process images collected through the photo-quadrat surveys and analyse the data generated.





SUMMARY

The coral reef monitoring survey provides important information on the health of coral reef communities in Abu Dhabi, such knowledge is essential to understanding the condition of these reefs and trends over time. The collaborative project between EAD and NYUAD has evolved rapidly since 2013, with each party supporting each other in various components of the collaboration, by both parties performing the field surveys and conducting analyses of imagery and data in conjunction.

This report summarizes data samplings from 2017, this annual survey was conducted as a part of this collaboration, and provides an assessment of the structure of coral reef communities at the representative sites throughout Abu Dhabi's coastal waters. The data demonstrates that there has been a sharp decline in live coral across Abu Dhabi during the summer of 2017 due to a severe bleaching event. These results show that climate change and elevated seawater temperatures could severely impede conservation measures and threaten coral reefs. EAD will closely monitor the recovery trend coral reefs in Abu Dhabi.



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