

Temperature Data Loggers

In a collaborative project with the Seychelles Islands Foundation, Optic StowAway temperature data loggers were deployed on the outer reef and in the lagoon for the first long-term collection of sea water temperature data at Aldabra. They were programmed to record temperatures at 30 minute intervals. The loggers were placed in circular cages of 1.5 cm mesh Vexar plastic, to avoid damage from fish grazing encrustations. These cages were then attached to transect stakes with cable ties.

Temperature data loggers were placed at 6, 10, and 20 m depths on the outer reef at Sites 6, and at Site 3 at 5 m depth in the East Channel at the eastern end of the lagoon. These loggers will be retrieved, downloaded, and redeployed on future surveys. A further 3 temperature loggers were placed at Site 1 (10 m depth), in Passe Dubois (3 m) and north of Ile Esprit (3 m). These will be retrieved, downloaded, and redeployed at regular intervals by Aldabra Station staff.





Stingrays (Dasyatidae)

Results

Relocation of the 1999 AMP Expedition Transects

All 14 transects at the 7 permanent survey sites established by AMP in November 1999 were found with relative ease, although steps were taken to further improve the location process (see above). All 28 transect stakes were found in good condition. There was little growth on the stakes with the exception of one that was completely covered with *Xenia* spp.

New Survey Sites Established in 2001

In February 2001 four additional permanent survey sites were established one on the outer reef (Site 8), and three in the lagoon (Figure 6). The new site in the western lagoon near Grande Passe, has one transect at 2 - 3.5 m depth (Site 9), located away from the main channel on the reef flat about 1.5 km north of Ile Esprit. The lagoon sites at the East Channel/Passe Houareau have two permanent transect lines, one along the eastern side of the channel at 5 m depth (Site 10), and another at 1 m depth (Site 11) at the point where the channel levels off into the lagoon.

Descriptions of Permanent AMP Survey Sites

The details of the locations, habitats, and depth profiles for the permanent survey sites at Aldabra Atoll established by AMP during 1999 and 2001 are given below (see Figures 7 to 15).

Site 1

This site was initially based on compass bearings given by Drew (1977) (20-30° to expedition hut, 91-99° to point at research station). The location of this site (Site 1) in front of the research station raised doubts about its suitability as a permanent monitoring site due to the high risk of anchor damage and evidence that it was once used to dispose of rubbish. A second more suitable site was therefore established north along the coastline (Site 6).

At Site 1 the shallow reef area extends several hundred metres towards the shoreline. Below 10 m there is a steady drop to 23 m, then a steep drop-off to a sandy plateau at 40 m (Figure 7). On the slope there are numerous gorgonians and colonies of large black coral bushes. The dominant coral genus at depth appears to be *Pachyseris*. This is replaced by *Physogyra* at shallower depths up the reef slope.

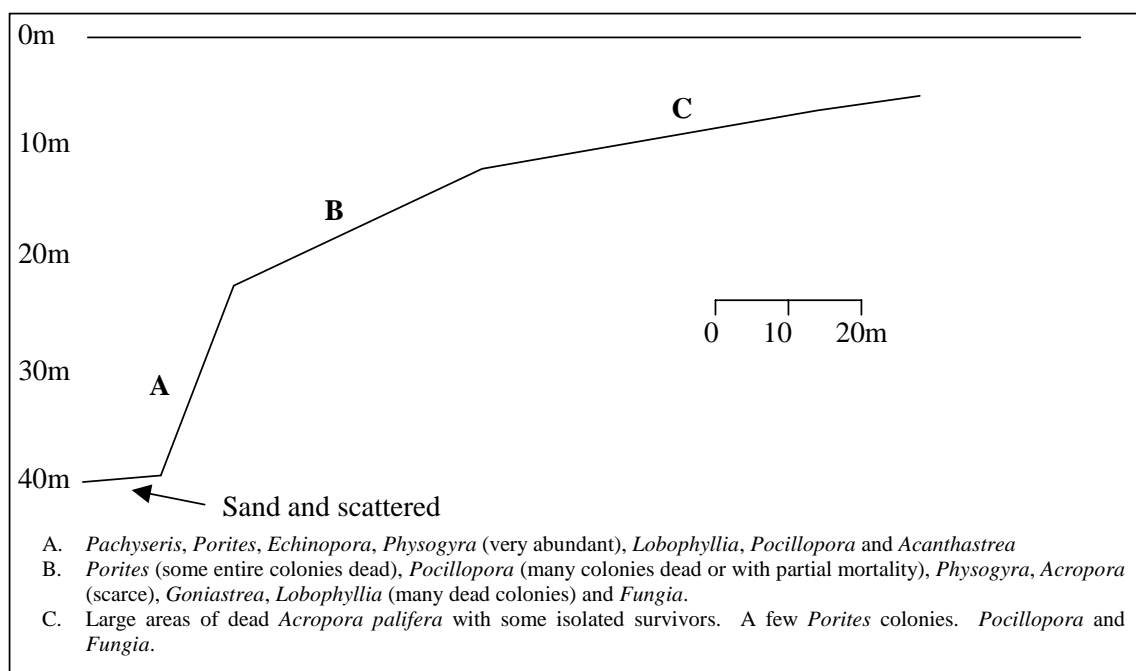


Figure 7. Site 1 reef profile with corresponding coral species composition.

Site 2 (Anse Cèdres Polymnie)

The reef at this site, and along the entire north coast, differed from western reefs. The substrate was less consolidated with many areas of coral rubble and patches of sand. This became more obvious moving east towards Site 5, where there was very little consolidated reef. Soft corals and *Halimeda* also appear to increase in abundance moving east. Below 10 m the reef seems to be in very good health with relatively little mortality. From 20 m down there is a plateau with large patches of coral and gorgonians (Figure 8). From 10 m and up there is substantial dead *Acropora* and massive colonies. The most abundant species in the shallows is *A. palifera*. Many colonies are dead with some isolated colonies having survived. In the shallower water there are also many *Porites* colonies, a good number of which are also alive.

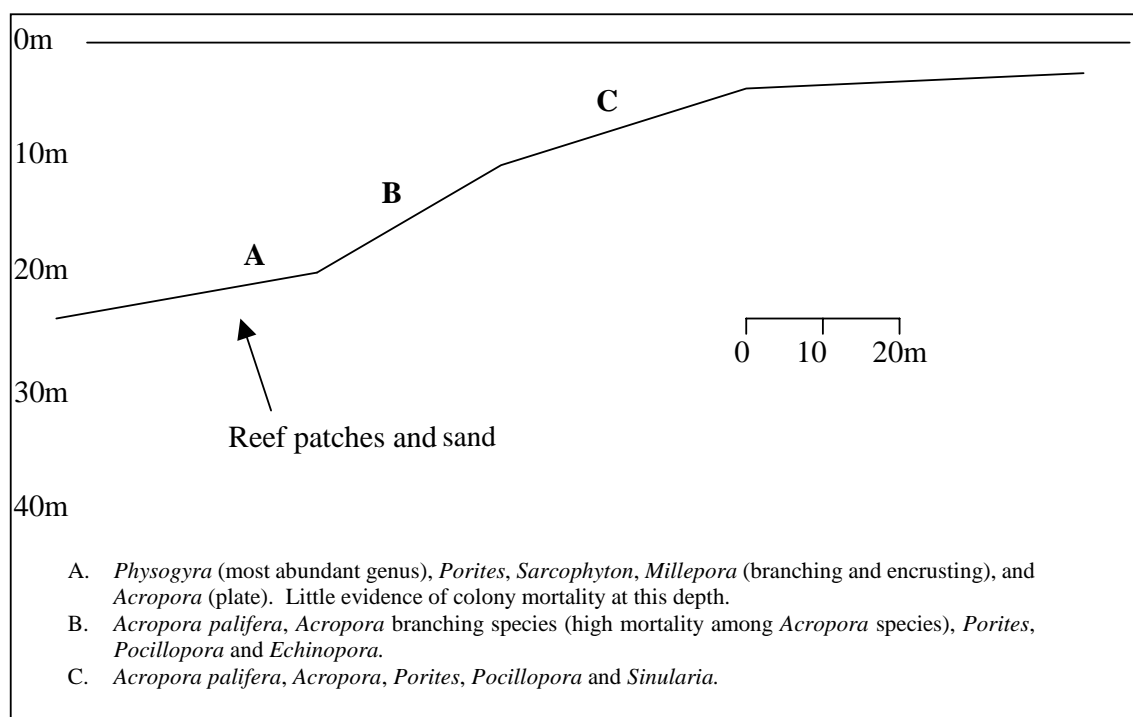


Figure 8. Site 2 reef profile with corresponding coral species composition.

Site 3 (Anse Badamier)

The increase in abundance of *Halimeda* and soft corals (*Sarcophyton* and *Sinularia*) was very evident at this site. Again coral mortality was most evident above 10 m where there were dead colonies of *Acropora palifera*, *Porites* and *Heliopora*. *Porites* is the most abundant genus on the slope and shallows. Throughout this site there are large patches of coral rubble that are poorly consolidated.

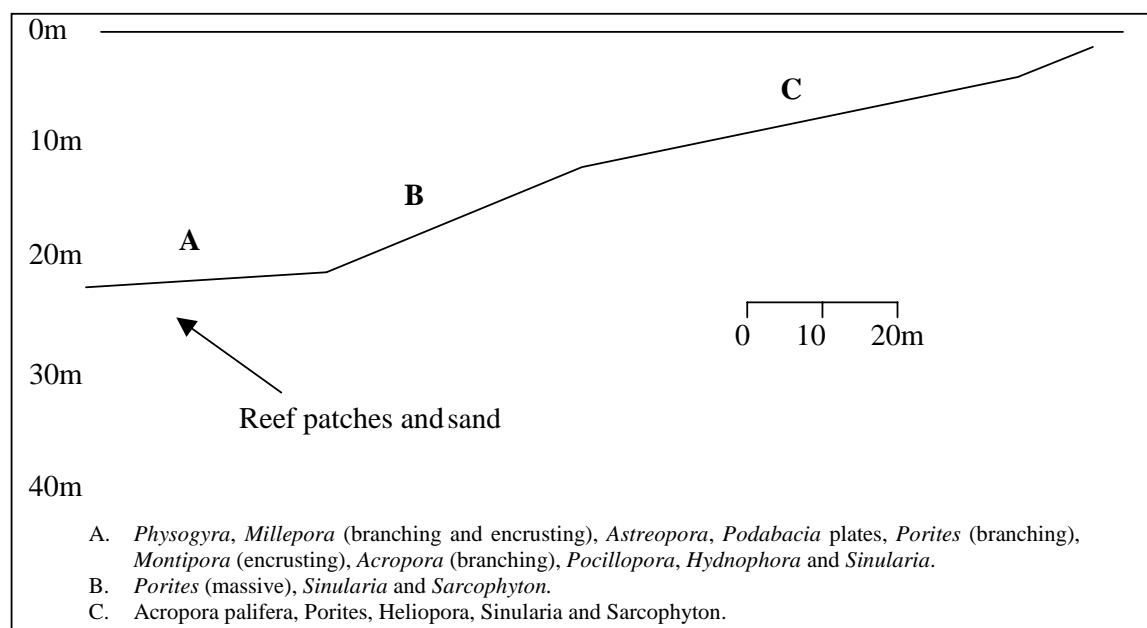


Figure 9. Site 3 reef profile with corresponding coral species composition.

Site 4 (*Passe Hourareau*)

As with other sites most mortality had occurred in shallower water, but there were some large dead branching *Millepora* colonies as deep as 23m. This site was similar to Site 3 but with more rubble and increasing *Halimeda* coverage.

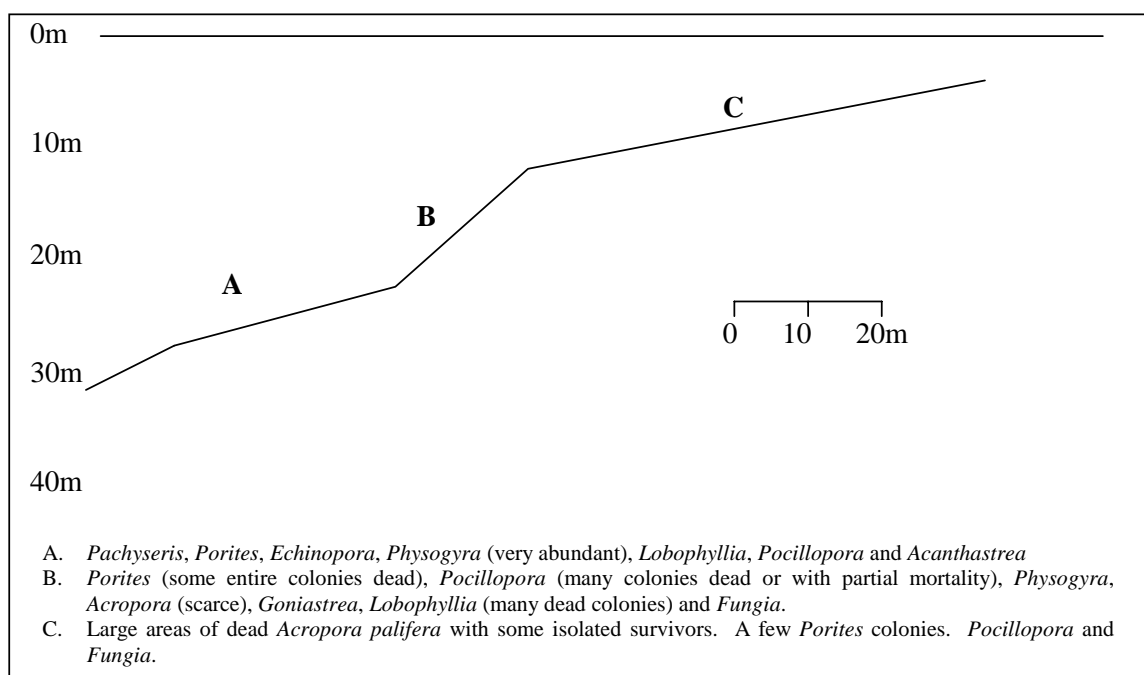


Figure 10. Site 4 reef profile with corresponding coral species composition.

Site 5 (*Anse Cèdres, eastern site*)

This site is in a high-energy environment with a substrate consisting almost entirely of coral rubble, and the occasional bommie. Coral diversity on the bommies was very high. Elsewhere the environment was dominated by *Halimeda*. The sand at the base of the reef slope was clearly *Halimeda* generated. Few corals were established on the rubble slope. From 10 m upwards the reef was consolidated, and there were also patches of seagrass. There was evidence of dead *Porites*, *Heliopora*, *Pocillopora*, *Lobophyllia* and *Acropora palifera* in the shallow reef area.

Due to the unique diversity of the bommies, in an area otherwise devoid of large colonies, a video inventory of coral species was taken at a bommie in shallow water and one in deeper water. The two bommies are located at 17.6 - 19.6 m depth and 8.5 - 11 m depth. The primary video crossed the deeper of the two bommies.

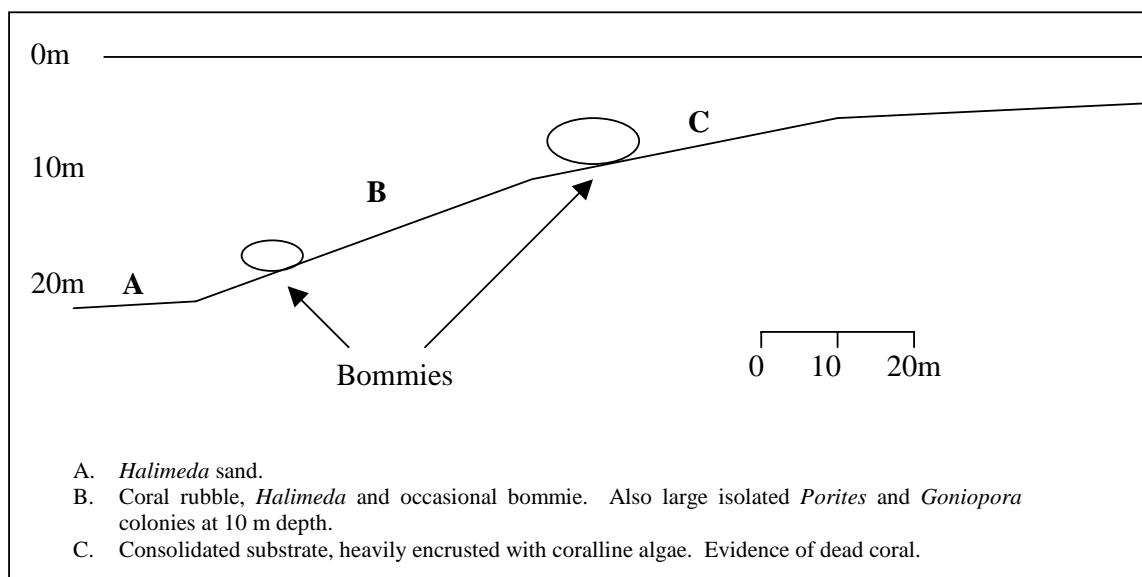


Figure 11. Site 5 reef profile with corresponding coral species composition.

Site 6 (Anse Var)

There was evidence of dead *Acropora palifera*, *Pocillopora* and *Porites* in shallow water, but there were also live *Favia*, *Lobophyllia* and other massive colonies. This was not the case at other sites. This was the only location where strong currents (2 - 3 knots) were observed. Below 20 m there were many *Tubastrea micrantha* colonies. There also appeared to be more *Montipora* and *Acropora* colonies at depth and a decrease in the number of *Physogyra* colonies.

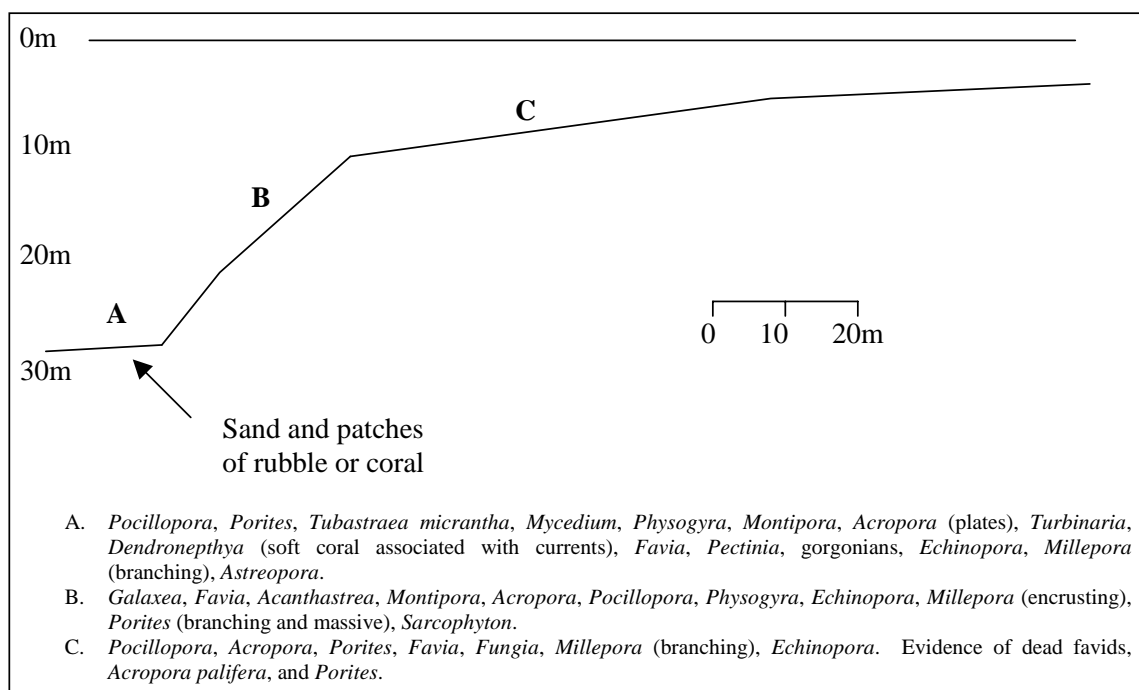


Figure 12. Site 6 reef profile with corresponding coral species composition.

Site 7 (*Anse Badamier IV*)

This site is shallower than the others. There is a long, shallow reef flat followed by a steep drop from 5 to 19 m, and then a sandy shelf (Figure 13). There was evidence of extensive coral mortality at all depths. Due to the nature of the site the secondary transects were laid at 5 and 15 m.

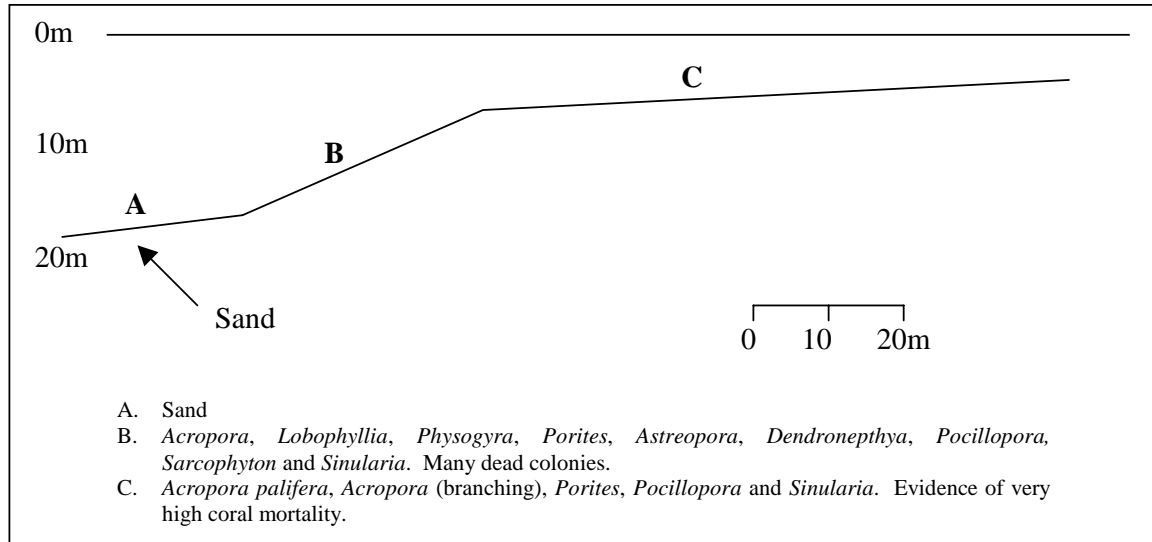


Figure 13. Site 7 reef profile with corresponding coral species composition.

Site 8 (*southern shoreline*)

Site 8 is located on the exposed southern shoreline of Aldabra and the reef here lacks a pronounced reef crest. The substrate slopes gently from the shoreline to 10 m depth and then drops at a steeper angle to a second shelf at 30 m (Figure 14). Above 10 m the reef is dominated by coralline algae, with occasional coral colonies that appear squat and robust. There is very little loose coral rubble as seen on the northern coast and the substrate is scoured into channels that run perpendicular to the shoreline. In the deeper water scleractinian coral cover is greater and soft corals are very abundant. This site is dominated by a very large 4 - 5 m tall bommie at 20 m where large numbers of fish aggregate.

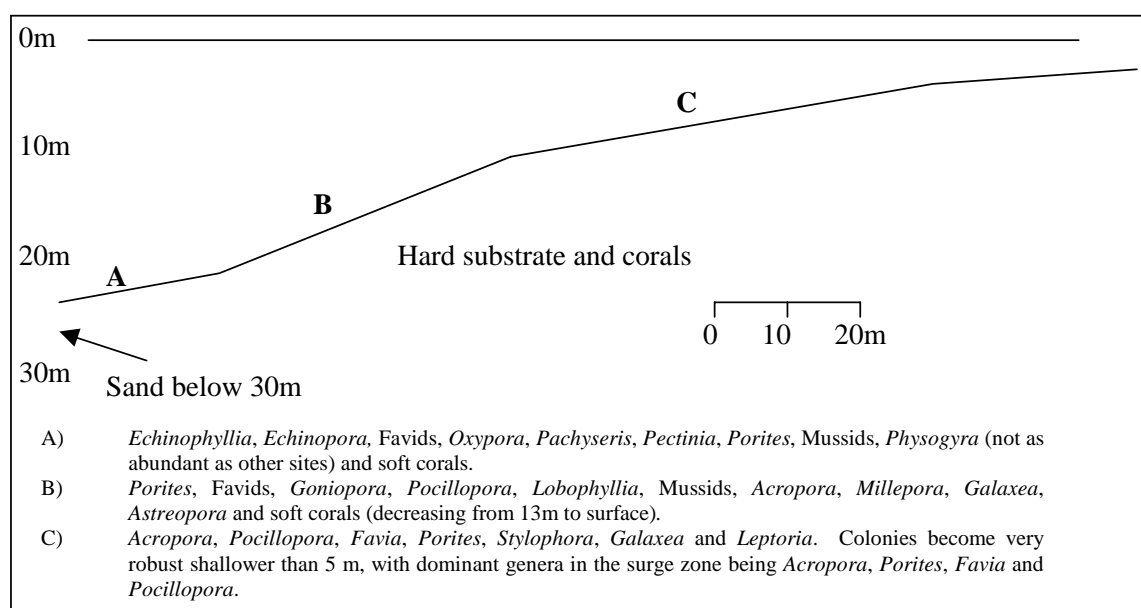
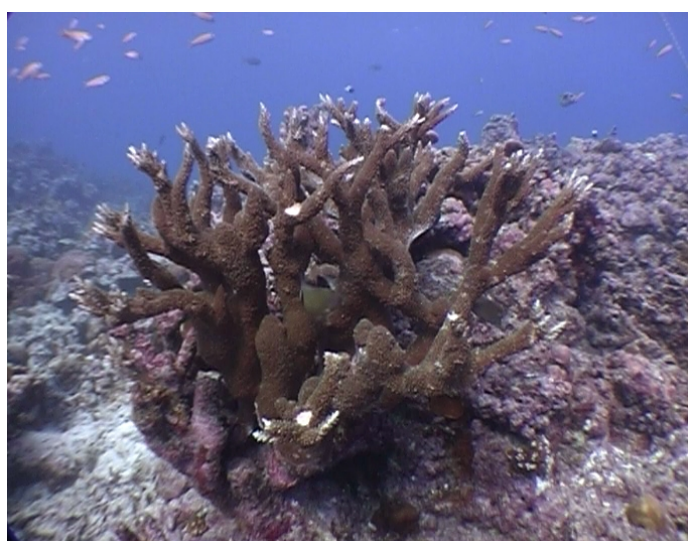


Figure 14. Site 8 reef profile with corresponding coral species composition.



Robust *Acropora* sp. colony in shallow water (6 m) at site 8

Site 9 (Grande Passe)

Site 9 is located north of Ile Sylvestre near the Grande Passe main channel. The site is in an area of abundant coral growth at 1 – 2 m depth, with surrounding sandy bottom channels reaching 5 m depth. The prominent corals at Grande Passe were: *Acropora*, *Pocillopora*, *Seriatopora*, *Stylophora*, *Favia*, *Porites* (mainly branching and some massive), *Fungids* and *Heliopora*.

Site 10 (Passe Houareau)

Site 10 is located along the eastern side of the Passe Houareau channel. The 50 m transect runs at the 2 - 3.5 m depth contour at low water. The maximum depth of the channel at this site is 14 m (Figure 15). There is abundant coral growth, all of which is subjected to considerable current during the tidal exchanges.

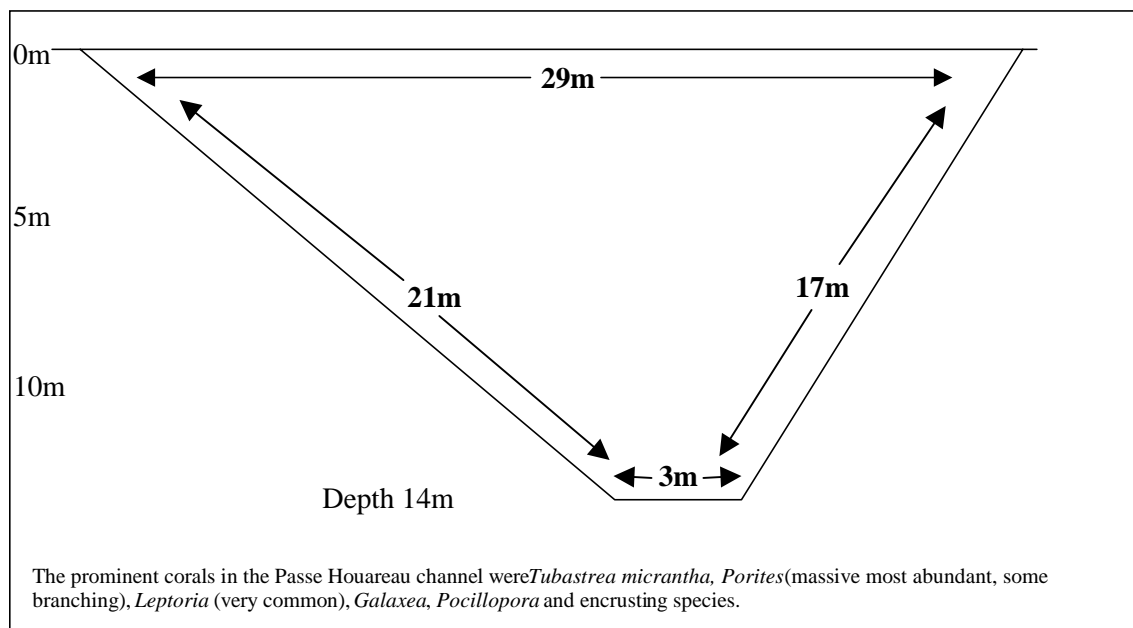


Figure 15. Site 10 channel profile with corresponding coral species composition.

Site 11 (Passe Houareau)

This is a reef flat site in about 1 m depth at low water located near the end of the Passe Houareau channel. The most prominent corals at Site 11 were: *Leptoria*, *Porites* (massive and branching), *Millepora*, *Goniastrea*, *Pavona*, *Tubastrea micrantha* and *Tubastrea* spp.

Coral Transects and Benthic Habitats

The video transect analysis for Sites 1 - 7 shows that the percentage of live coral cover around Aldabra has changed little between November 1999 and February 2001 (Figures 15 and 16). There is a small increase (maximum 6%) in percent live coral cover except at Site 1 (10 m depth) and Site 4 (20 m) where cover decreased by 4% and 2%, respectively. Live coral cover ranged from 3 - 28% in shallow water (10 m) and 0.2 - 36% in deep water (20 m). Algal cover also remained generally unchanged, though there was also a tendency for small rises in percent cover. Sites 6 and 7 showed considerable increases in algal growth over the 15 month period (12 and 28%, respectively), possibly due to the large amount of dead coral substrate available for colonisation at these sites in 1999. Most algal cover at Site 7 is coralline algae, which are quick to cover dead coral colonies.

The percent of dead coral cover decreased considerably at all sites between November 1999 and February 2001. There was a corresponding rise in the amount of sand, rock and rubble due to the break-down of the dead coral, with the exception of Site 6 where the amount of sand, rock and rubble decreased by 2% in both shallow and deep water. Coral and algal growth over the 15 month period was greatest at Site 6, which accounts for the decrease in dead coral not leading to an increase in sand, rock and rubble.

A detailed description of the reefs at Sites 1 - 11 has already been given. The new Site 8 showed a unique benthic composition compared to the other sites. At 10 m there was no loose coral rubble, but a predominance of coralline algae. Live coral cover was low. Other sites around Aldabra have an abundance of loose rubble in both shallow and deep water, Site

5 being completely dominated by rubble. Site 8 is highly exposed and therefore rubble would soon be washed into deeper water or along the coast. It is the high exposure of this location that made it impossible to set up a permanent survey site here in 1999, and the potential for adverse sea conditions may make re-surveying Site 8 difficult in the future. At 20 m depth the benthic habitat composition at Site 8 resembled other sites around the atoll.

The amount live coral cover in shallow water (5 - 10 m) around Aldabra in both 1999 and 2001 closely follows the pattern of exposure. Live coral is most abundant at Site 6 which is on the sheltered northwest coast, and progressively decreases moving around the atoll in both directions (Figures 16 and 17). Algal cover tends to increase in more exposed areas. This trend is particularly evident from the February 2001 data, and accounts for the increase in coralline algae that favour the more exposed sites. There is also an increase in *Halimeda* spp. cover moving east along the north coast. However, *Halimeda* spp. was not common at Sites 7 and 8.

Of the three new sites established in the lagoon two had a very high percentage of live coral (Figure 18), Site 9 at Grand Passe (45%) and 10 at Passe Houareau (40%). These sites have strong currents, are rarely exposed at low tide, and are well flushed with water giving rise to good conditions for coral growth. Site 11 at Passe Houareau had poor coral live coral cover (10%), but this site is at the end of the channel and the corals are probably often exposed at low tide, experience temperature extremes and are regularly inundated by lagoonal sediment. Algal cover at these lagoon sites was similar to outer reef sites, with a predominance of coralline algae at Sites 10 and 11, and turf algae at Site 9. Levels of sand, rubble and rocks were low at Site 10 due to currents and the steep walls of the channel (Figure 18).

During Phases I and II, 41 scleractinian coral genera and 57 species were recorded (Table 1). A further 10 non-scleractinian genera were noted, and the true figure is expected to be considerably higher.

Table 1. List of coral genera and species recorded at Aldabra during the November 1999 and February 2001 AMP surveys.

Coral Genera		
<i>Acanthastrea</i>	<i>Goniopora</i>	<i>Platygyra</i>
<i>Acropora</i>	<i>Hydnophora</i>	<i>Plerogyra</i>
<i>Astreopora</i>	<i>Leptoseris</i>	<i>Pocillopora</i>
<i>Blastomussa</i>	<i>Leptastrea</i>	<i>Podabacia</i>
<i>Coscinaraea</i>	<i>Leptoria</i>	<i>Porites</i>
<i>Cyphastrea</i>	<i>Lobophyllia</i>	<i>Psammocora</i>
<i>Diploastrea</i>	<i>Merulina</i>	<i>Seriatopora</i>
<i>Echinophyllia</i>	<i>Montastrea</i>	<i>Stylophora</i>
<i>Echinopora</i>	<i>Montipora</i>	<i>Symphyllia</i>
<i>Favia</i>	<i>Mycedium</i>	<i>Tubastrea</i>
<i>Favites</i>	<i>Oxypora</i>	<i>Turbinaria</i>
<i>Fungia</i>	<i>Pachyseris</i>	
<i>Galaxea</i>	<i>Pavona</i>	<i>Heliopora</i>
<i>Gardineroseris</i>	<i>Pectinia</i>	<i>Millepora</i>
<i>Goniastrea</i>	<i>Physogyra</i>	
Other benthic sessile genera		
<i>Dendronephthya</i>	<i>Sarcophyton</i>	
<i>Discosoma</i>	<i>Sinularia</i>	
<i>Palythoa</i>	<i>Tubipora</i>	
<i>Protopalythoa</i>	<i>Xenia</i>	
Coral species		
<i>Acanthastrea echinata</i>	<i>Leptoseris mycetoseroides</i>	<i>Podabacia crustacea</i>
<i>Acropora palifera</i>	<i>Leptastrea inaequalis</i>	<i>Porites cylindrica</i>
<i>Acropora robusta</i>	<i>Leptastrea purpurea</i>	<i>Porites lutea</i>
<i>Astreopora myriophthalma</i>	<i>Leptoria phrygia</i>	<i>Porites nigrescens</i>
<i>Blastomussa merleti</i>	<i>Lobophyllia hemprichii</i>	<i>Porites rus</i>
<i>Coscinaraea columna</i>	<i>Montastrea annuligera</i>	<i>Psammocora profundacella</i>
<i>Cyphastrea microphthalma</i>	<i>Montastrea curta</i>	<i>Stylophora pistillata</i>
<i>Diploastrea heliopora</i>	<i>Montipora undata</i>	<i>Seriatopora hystrix</i>
<i>Echinophyllia aspera</i>	<i>Montipora monasteriata</i>	<i>Symphyllia radians</i>
<i>Echinopora gemmacea</i>	<i>Montipora tuberculosa</i>	<i>Symphyllia recta</i>
<i>Favia laxa</i>	<i>Mycedium elephantotus</i>	<i>Tubastrea micrantha</i>
<i>Favia stelligera</i>	<i>Pachyseris speciosa</i>	<i>Turbinaria reniformis</i>
<i>Favia pallida</i>	<i>Pavona varians</i>	<i>Turbinaria stellulata</i>
<i>Favites abdita</i>	<i>Pavona venosa</i>	
<i>Galaxea astreata</i>	<i>Pavona maldivensis</i>	<i>Heliopora coerulea</i>
<i>Galaxea fascicularis</i>	<i>Pavona explanulata</i>	<i>Millepora exaesa</i>
<i>Gardineroseris planulata</i>	<i>Physogyra lichtensteini</i>	<i>Millepora platyphylla</i>
<i>Goniastrea retiformis</i>	<i>Platygyra daedalea</i>	<i>Millepora tenella</i>
<i>Goniastrea edwardsi</i>	<i>Plerogyra sinuosa</i>	<i>Tubipora musica</i>
<i>Hydnophora exesa</i>	<i>Pocillopora damicornis</i>	
<i>Hydnophora microconus</i>	<i>Pocillopora eydouxi</i>	
<i>Leptoseris hawaiiensis</i>	<i>Pocillopora verrucosa</i>	



Corals of Aldabra – *Astreopora* (top). *Fungia* sp. (middle). *Lobophyllia*

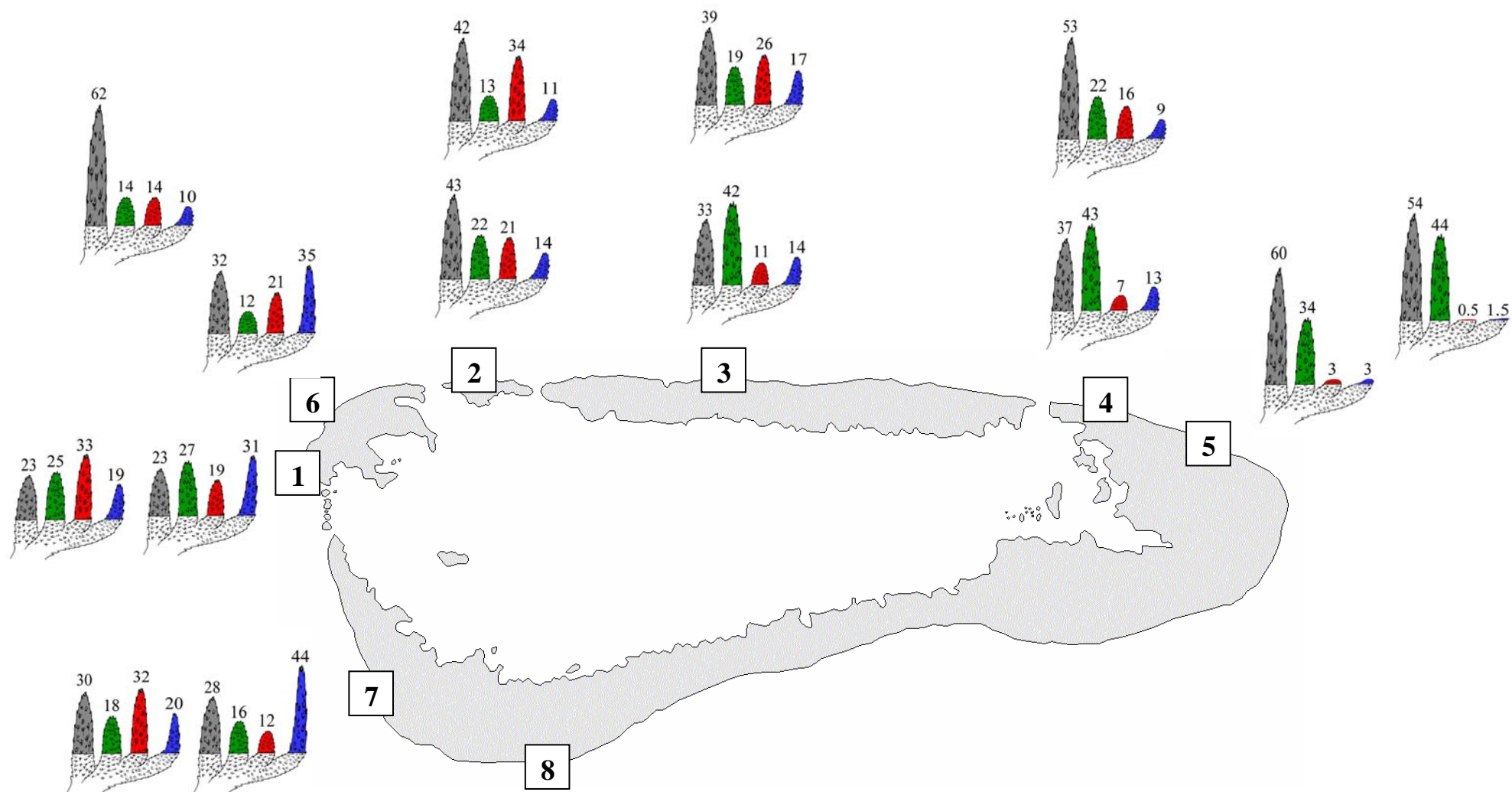


Figure 16. General substrate cover for outer reef shallow and deep transect sites (numbers in boxes) around Aldabra in November 1999. Shoreward coral graph = 10m depth, offshore = 20m. Coral branch length and numbers indicate percent cover of category. Colours represent: ♦ Sand, rock, rubble; ♦ Algae; ♦ Live coral; ♦ Dead coral.

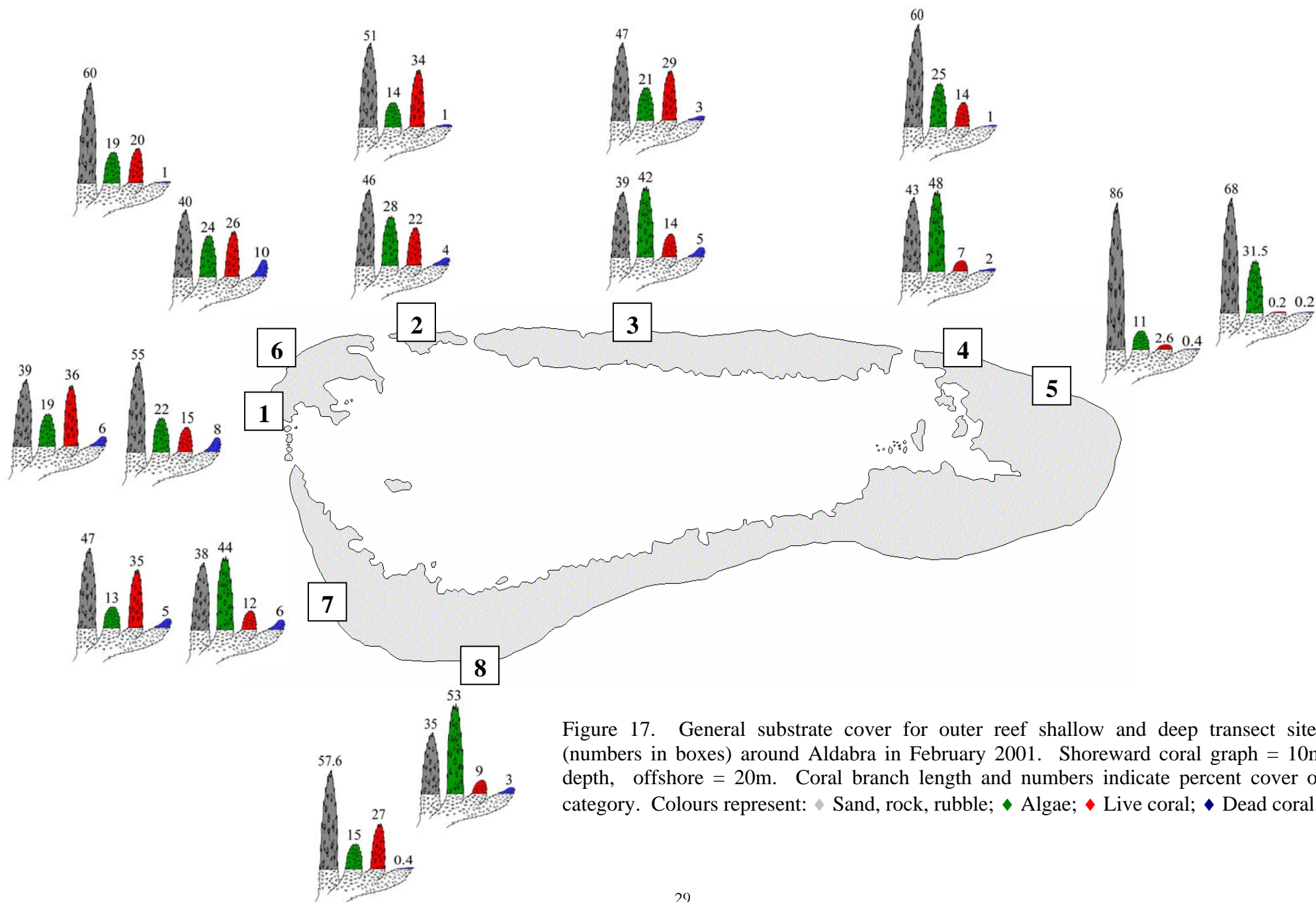


Figure 17. General substrate cover for outer reef shallow and deep transect sites (numbers in boxes) around Aldabra in February 2001. Shoreward coral graph = 10m depth, offshore = 20m. Coral branch length and numbers indicate percent cover of category. Colours represent: ♦ Sand, rock, rubble; ♦ Algae; ♦ Live coral; ♦ Dead coral.