LIVING CORAL REEF RESOURCES OF SARAWAK, WITH SPECIAL REFERENCE KUCHING AREA

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ABSTRACT

Abstract. Belt transects surveys conducted on the reefs of Pulau Talang Talang Kecil and Talang Talang Besar. The Line Intercept Transect Method was used to assess the distribution of coral reefs. This was a first survey within this area. Study was carried out from April to September 2002. Around 18 benthic were identified during the survey. Objective of this study is to identify the distribution of coral reef composition as a first database in Sarawak with special reference Kuching area. Statistical Analysis, One-factor ANOVAs showed that no significant difference in percentage of benthic between Pulau Talang Talang Kecil and Besar ($P>0.05$), which the P-value was 0.59.

Keyword: coral reef, Sarawak, resources

INTRODUCTION

Coral reef ecosystem consists of an assemblage of a variety of flora and fauna in tropical waters where corals from the dominant components. Minute marine animals called coral polyps that secrete a calcium carbonate exoskeleton around them construct hard corals, which form the most visible part of the coral reef. They do this by precipitating calcium ions from the seawater. The polyps fused together by their skeletons. In addition to corals, coralline algae also produce limestone skeletons and help build and consolidate coral reefs (Harmelin and Stoddart, 1985)

Wells and Prince, 1992 reported coral reef flourish in the warm waters of tropical sea that optimally have temperatures between 26°C and 27°C. The shallow waters allow sufficient light penetration for the zooxanthellae and other primary producers to photosynthesize. They need constant high salinity and pollution free water thrives. There is an estimated 6000,00 km of coral reefs worldwide, 25 to 30 percent of which are located in South East Asia. Malaysia has coral reefs on both the East and West coasts of the Peninsula, as well as off Sabah and Sarawak.

Coral reefs act as a natural protection between the open seas and coastlines by acting as wave breaks, thus effectively preventing coastal erosion. They also perform a vital role in protecting coastal areas from the consequences of predicted sea level rise such as storm flooding (Markham et al, 1993). Furthermore, there is increasing evidence of the potential of reefs to act as bio-indicators for climate change, as they are sensitive to sea level rise and sea temperature. In addition, reefs are good indicators of coastal pollution, as they are sensitive to changes in their ambient environment.

This project was implementing under development project of Department of Fisheries. The main objective of this study is to obtained the first data of coral reefs in Kuching water. These included assessing coral cover and composition.

METHODOLOGY

Description of the survey area

The Pulau Talang Talang (1°53'N; 109°46'E) is situated off the Sematan area. Pulau Talang Talang is consisting of Talang Talang Kecil and Talang Talang Besar. This island is located 6 nautical miles from the north of Sematan (Figure 1). This island was declared as a turtle Sanctuary by state government of Sarawak. Water depth over corals ranges from 1 to about 8 m (Pilcher, N and Cabanban, A, 2000).

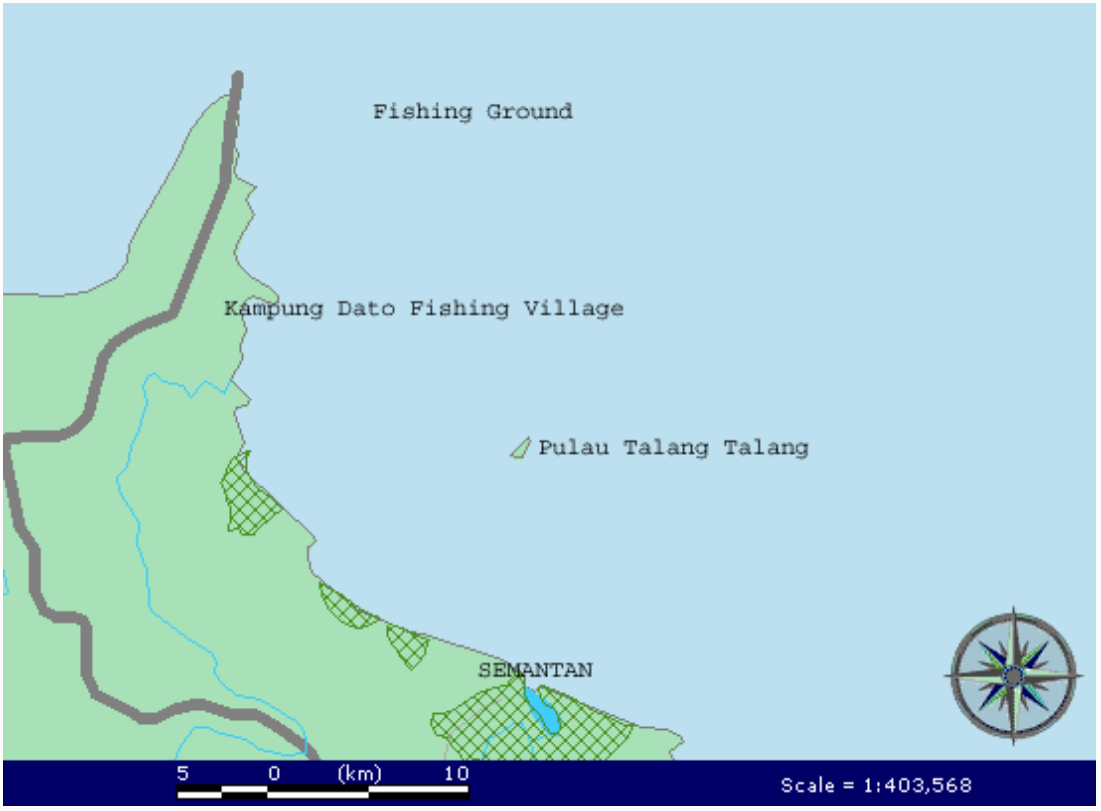


Figure 1. Map showing the location of Pulau Talang Talang.

Survey of coral reef

The Line Intercept Transect (LIT) method (English et al, 1994) was used to assess the sessile benthic community of the reefs. The community is characterized using life form categories, which provide a morphological description of the reef community. The

LIT is used to estimate the cover of a life form or group of life forms within a specified area. Gates, 1979 reported by calculating the fraction of the length of the line that is intercepted by that life form. Two general assumptions are made; the size of the life form is small relative to the length of the line; and the length of the line is small relative to the reef of interest (English et al, 1994). The measure of cover, expressed as a percentage, is then considered to be an unbiased estimate of the proportion of the total area covered by that life form.

At each site surveyed, 50 meter transect line were laid at a depth of 10 m using measuring tape. Where there was little or no coral at 10m transect were then laid at 6-8 meters depth, and these differences noted. Transects were repeated for all the reefs at least twice. Once the transect laid, the observer moved slowly along the transect, recording on data sheets the life forms encountered under the tape. At each point where the benthic life form changed, the transition point in centimeters and the code of the life form was recorded. The intercept of each life form encountered under the transect is the difference between the transitions points recorded for each life form. To ensure standardization of the data, the same observer recorded data for each individual transect, at all sites and during repeat surveys.

Other site variables were also noted, such as the depth range, visibility, currents, the general reef profile, attractions for divers and the extent of damage of the particular reef surveyed. The position of each reef surveyed was taken using as GPS (Global Positioning System).

Data Analysis

In this study, one-way ANOVA was used to compare total length in meter of benthic from 2 islands, Pulau Talang Talang Kecil and Besar. The purposed of this investigation is to see either there was a difference of benthic percentage among the island (Pulau Talang Talang Kecil and Besar). Statistical analyses were carried out using SYSTAT statistical software (Wilkinson et al. 1992).

RESULT.

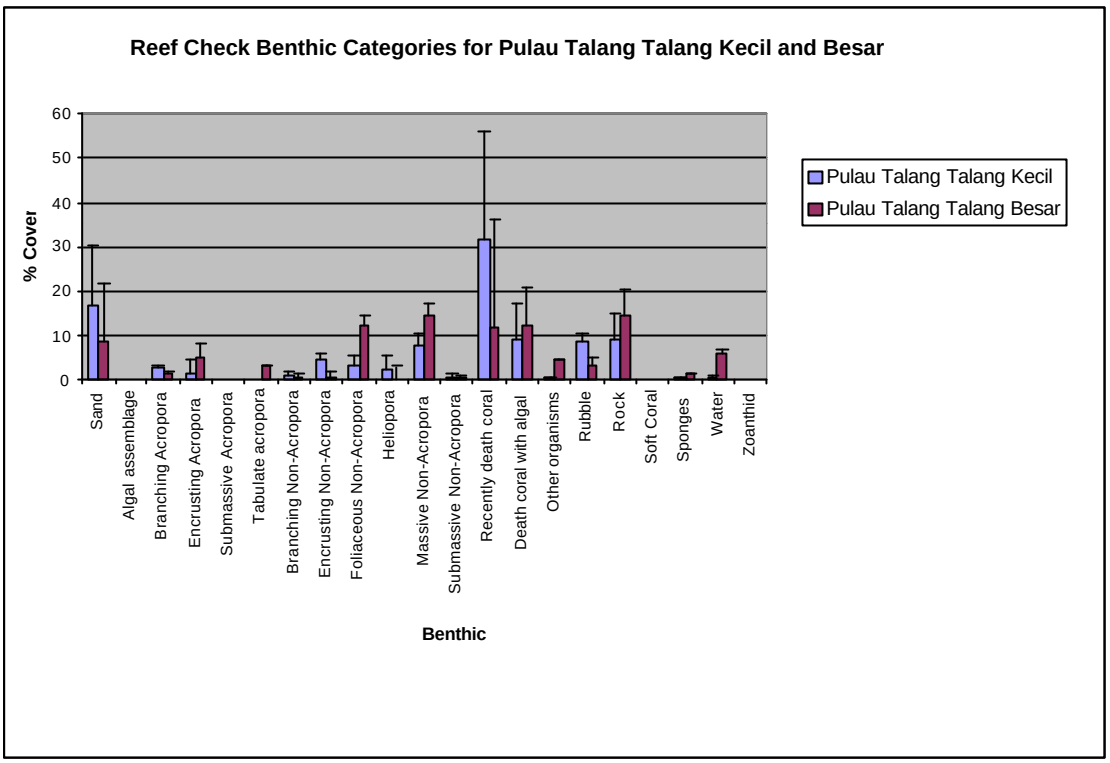
A total of 18 benthic categories were found from Pulau Talang Talang Kecil and Talang Talang Besar. During the study (table 1), 'Death Coral' appeared to be the most dominant of benthic organism (67%) at transect D (Talang Talang Kecil), followed by 'Rock' (53%) in transect A at Talang Talang Besar, 'Sand' (36%) in transect B at Talang Talang Kecil and 'Death Coral with algal' in transect D at Talang Talang Besar (33%). Data presented in this report can be obtained from the Fisheries Research Institute Sarawak Branch base upon request (friswak@po.jaring.my).

Table 1. Percentage of benthic organisms in Pulau Talang Talang Kecil and Besar.

	Pulau Talang Talang Kecil				Pulau Talang Talang Besar				
Transect	A	B	C	D	A	B	C	D	E
(length in meter)	50	100	100	100	59	100	100	100	100
Benthic Category									
S	10.52	36.03	15.87	4.82	9.24	0	0	1.45	31.12
AA	0	0.10	0	0	0	0	0	0	0
ACB	3.81	2.70	2.82	2.1	2.37	0.4	2.80	0	1.04
ACE	5.91	0	0	0	25.51	0	0	0.60	0
ACS	0	0	0.05	0.085	0	0	0	0.3	0
ACT	0	0	0	0	0	1.8	0	8.72	4.55
CB	2.42	0.18	1.06	0	1.88	0	0	0	0
CE	5.82	3.18	3.83	5.91	0	1.76	0	0	2.19
CF	5.96	4.13	1.29	1.835	0.31	19.97	10.30	24.96	6.01
CHL	6.52	0	3.07	0.49	0	0	0	0	0
CM	6.59	6.37	11.77	6.93	0	21.92	23.86	22.62	4.8
CS	1.71	0.36	0.30	0.15	0	0.2	0	1.1	0.65
DC	25.91	19.10	13.96	67.3	0.78	29.42	25.90	0	2.51
DCA	5.51	5.72	21.40	2.42	0	18.98	0	32.93	9.22
OT	0.76	0.33	0.23	0.2	0.14	0	0	3.92	18.12
R	6.81	8.68	11.50	7.76	0	0	14.20	1.9	0
RCK	9.55	12.93	12.71	0	52.58	0	0	0	19.79
SC	0	0	0	0	0	0	0	0	0
SP	0.65	0.2	0.14	0	0	2.9	1.74	1.5	0
WA	1.54	0	0	0	6.51	2.65	21.20	0	0
ZO	0	0	0	0	0.69	0	0	0	0

Where: S= Sand, AA = Algal assemblage, ACB= Branching Acropora, ACE= Encrusting Acropora, ACS= Submassive Acropora, ACT= Tabulate acropora, CB= Branching Non-Acropora, CE=Encrusting Non-Acropora, CF= Foliaceous Non-Acropora, CHL= Heliopora, CM= Massive Non-Acropora, CS= Submassive Non-Acropora, DC= Recently death coral, DCA= Death coral with algal, OT= Other organisms, R= Rubble, RCK= Rock, SC= Soft Coral, SP= Sponges, WA= Water, ZO=Zoanthid

Figure 2. Percentage of benthic for Pulau Talang Talang Kecil and Besar.



Comparison of benthic cover between Pulau Talang Talang Besar and Kecil, DC showed a highest percentage 46% at Talang Talang Kecil. Hard Coral gives a highest percentage, 33% at Pulau Talang Talang Besar.

Figure 2. Percentage cover of benthics at Pulau Talang Talang Kecil

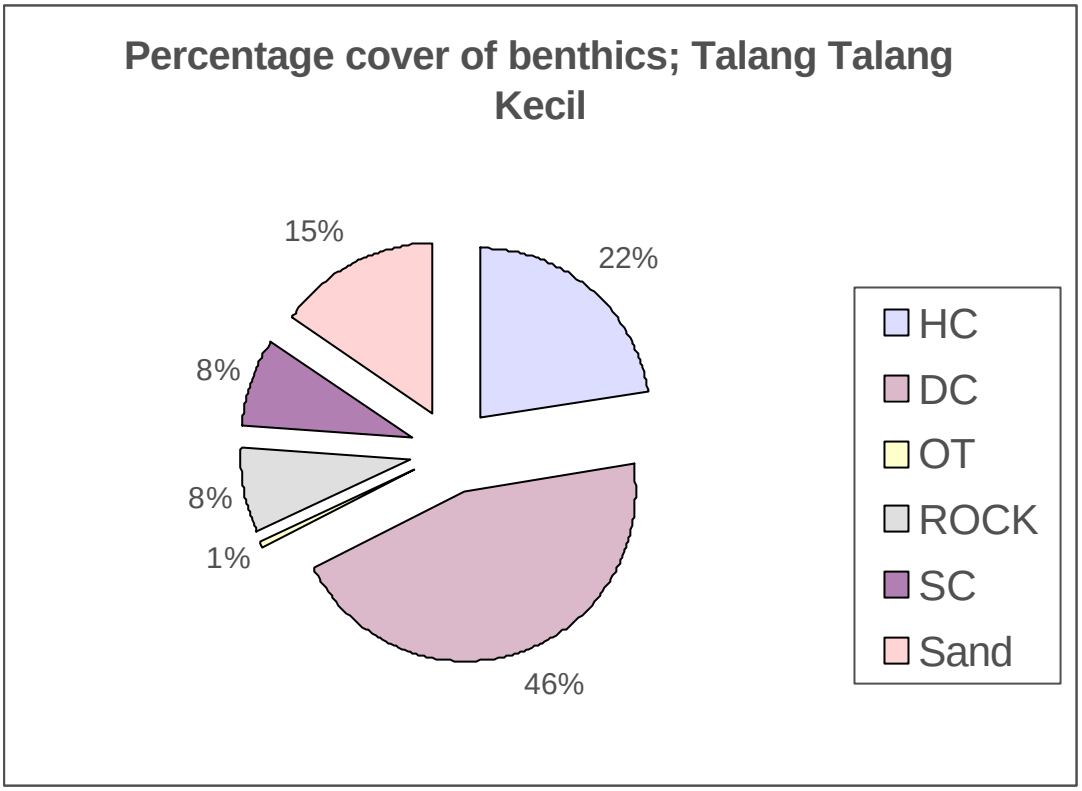
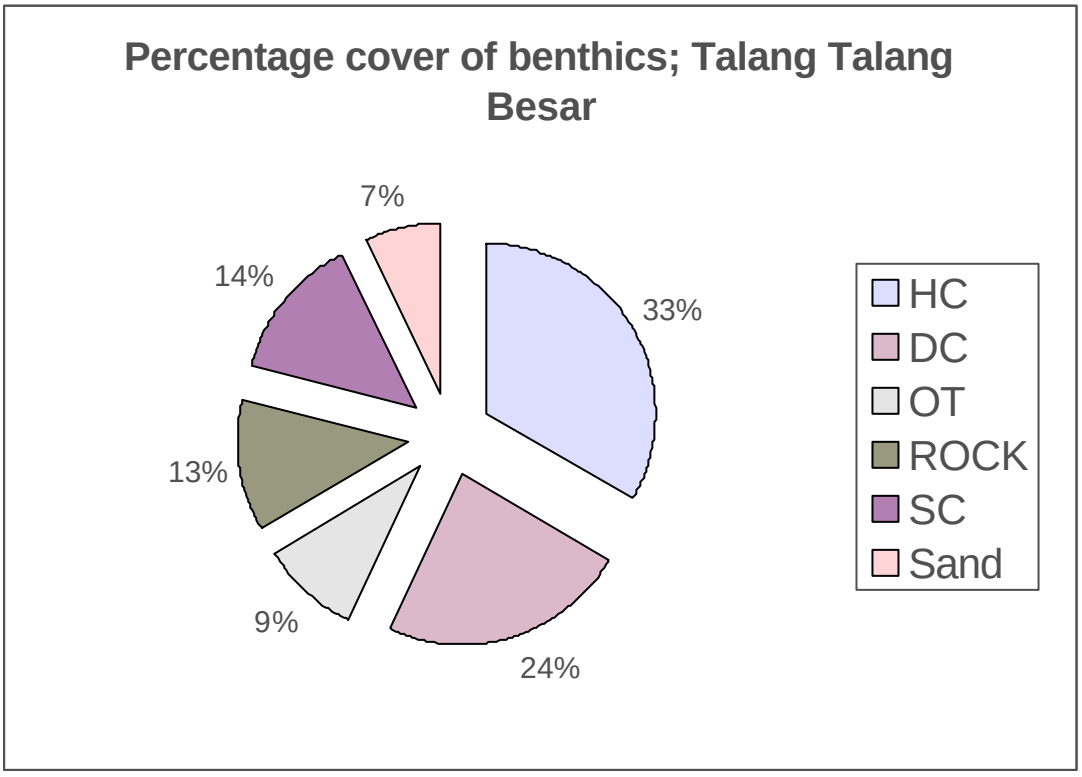


Figure3. Percentage cover of benthics at Pulau Talang Talang Besar



Statistical Analysis, One-factor ANOVAs showed that no significant difference in percentage of benthic between Pulau Talang Talang Kecil and Besar (P>0.05), which the P-value was 0.59.

Table 2. Statistical analysis using One Way ANOVA.

Anova: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Pulau Talang Talang Kecil	21	400	19.04762	917.0214
Pulau Talang Talang Besar	21	500	23.80952	704.214

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	238.0952	1	238.0952	0.293721	0.590853	4.08474
Within Groups	32424.71	40	810.6177			
Total	32662.8	41				

DISCUSSION AND CONCLUSION

Much of the seabed is made up of dead coral and dead coral rubble, with small colonies of hard coral (CM) and a lot of soft corals among the rubble. Most rocks are extensively covered with sediment. Pilcher, N and Cabanban, A (2000) reported no quantitative data is available on coral cover, but hard corals comprised mostly *Porites* (CM and CD), *Echinopora* (CF and CE), *Diploastrea* (CM) and *Montastrea* (CM and CE).

The information collected indicates that the coral reefs in the Pulau Talang Talang of Sarawak can be classified as fringing reef. According to Walshe and Catsburg (1979), Pulau Talang Talang completely fringed by reefs except for beach areas. Pulau Talang Talang Besar showed more benthics form compared to Pulau Talang Talang Kecil (refer to figure 2.) For both island, the visibility was poor (considering the high tide effect), which ranges from 3 to 5m. The coral reefs of Pulau Talang Talang did not show any sign of stress except some fishing practices. Department of Fisheries Sarawak should provide a buoy to fishermen. Therefore they can tied their boat. This is the way to avoid them from using anchor within this island.

A furthers study should be conducted especially fish composition and fauna inventory within this island. With this information, a good conclusion can be made. Long-term and short-term monitoring should be conducted to see the impact and growth of coral reefs in Talang Talang Island.

REFERENCES

Harding, S., Lowery, C., Wesson, H, Colmer, M. and Daw, T. 2001. The Pulau Banggi Project for Coral Reef Biodiversity. 1st Annual Report (July 1999 – September 2000). GREENFORCE. London. 98pp.

Harmelin-Vivien and M, Stoddart DR. 1985. Hurricane effect on coral reefs. Proc. Of the fifth Internat. Oral Reef Congress, Tahiti, 3: 315.

Pilcher, N and Cabanban, A. 2000. The Status Of Coral Reefs In Sabah, Labuan And Sarawak, East Malaysia. GCRMN. Australian Institute of Marine Science. 57pp.

Walshe, T. and Catsburg, I. 1979. A survey to identify the major species of Coral and their distribution from Tanjong Serabang to Pulau Badar. Volume XXVII No. 48. The Sarawak Museum Journal.

Wilkinson, L. 1992. SYSTAT for Windows: Statistics, Version 5. SYSTAT, Inc., Evansto. 750pp.

English, S., C. Wilkinson & V. Baker. 1994. Survey manual for tropical marine resources. ASEAN-Australia Marine Science Project. Australian Institute of Marine Science, Townsville.

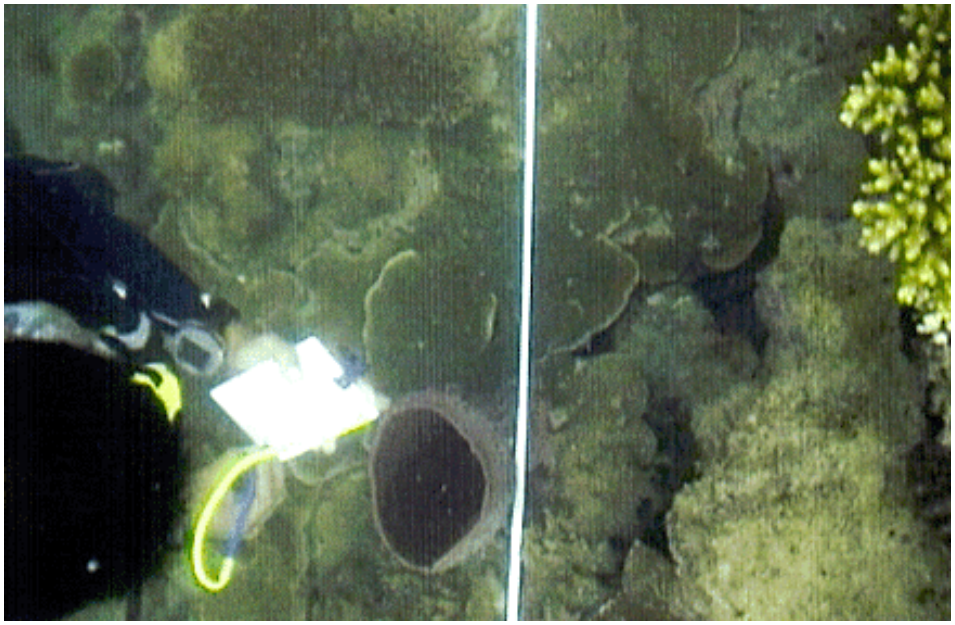
Markham, A., N. Dudley and S. Stolton. 1993. Some Like It Hot: Climate Change, Biodiversity and the Survival of Species, WWF International, IUCN, Gland, Switzerland.

Wells, S.M. and A.R.G., Price. 1992. Coral reefs - Valuable but vulnerable. WWF International Discussion paper.

APPENDIX

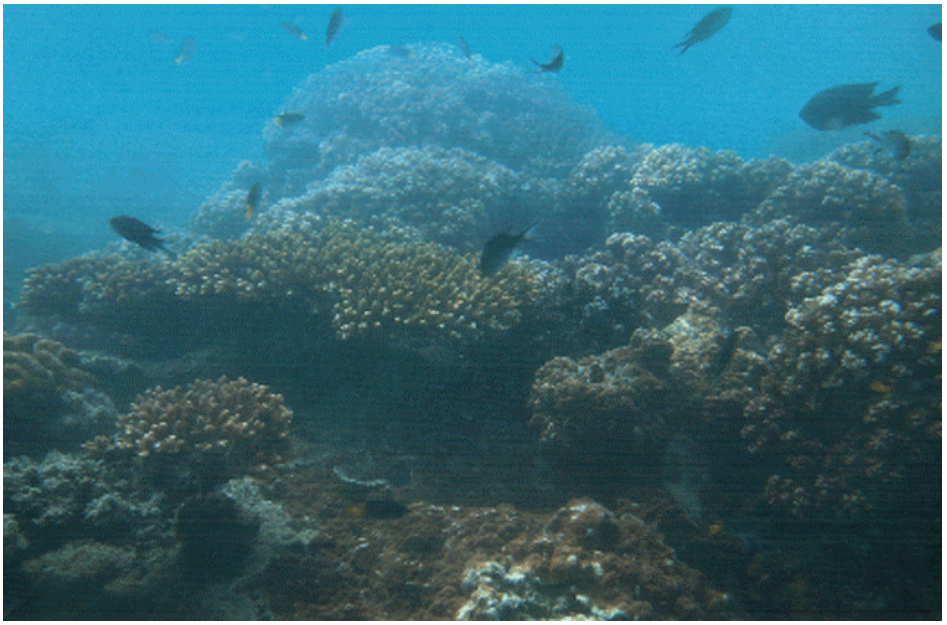
Pulau Talang Talang Besar

Pulau Talang Talang Kecil



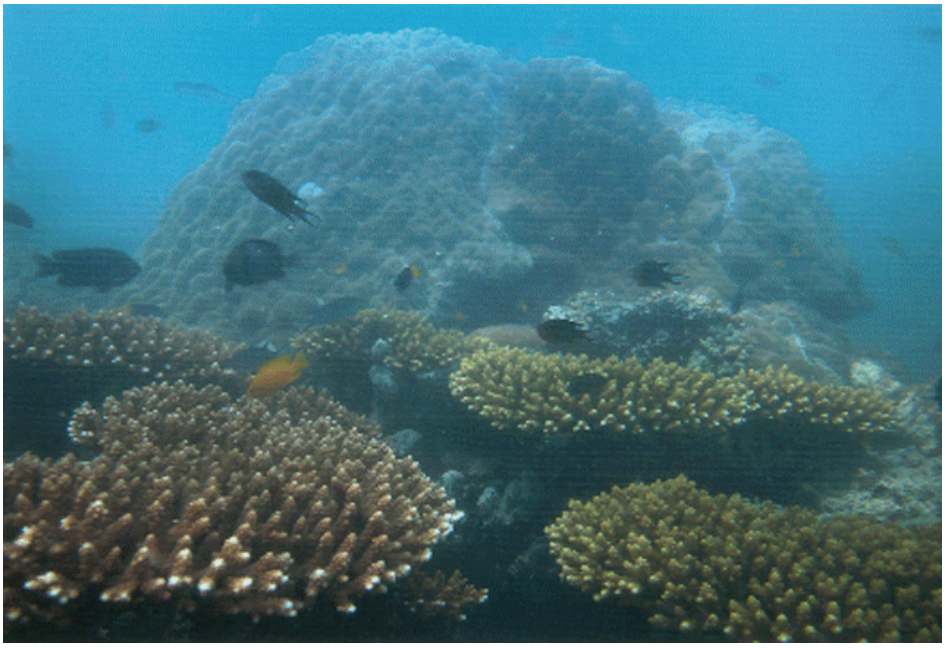
Counts of benthic organisms from Line Intercept Transect surveys

Line Intercept Transect was used to examine the reef in detail



Pulau Talang Talang Besar; depth of 6 meter, afternoon

Coral Foliose (CF) at the depth of 6 meter at Pulau Talang Talang Besar



Coral reef; Acropora types, 6m depth, afternoon