

APPENDIX 1. ANALYSIS OF VARIANCE TABLES

A. Permanent Transects for Each Annual Survey.

Source of Variation	df	MS	F	p	MS	F	p
				Total Coral Cover 85	Total Coral Cover 86		
Location	2	1.950	0.861	~0.4	0.151	0.071	~0.9
Site (L)	9	2.266	4.472	<0.001	2.127	3.786	<0.001
Residual	48	0.507			0.562		
				Total Coral Cover 87	Total Coral Cover 88		
Location	2	0.552	0.338	~0.1	0.069	0.026	~0.9
Site (L)	9	1.633	2.125	0.045	2.648	5.162	<0.001
Residual	48	0.768			0.513		
				Pocilloporids 85	Pocilloporids 86		
Location	2	1.627	2.926	~0.1	1.140	1.572	~0.25
Site (L)	9	0.556	1.088	0.389	0.725	1.960	0.065
Residual	48	0.511			0.370		
				Pocilloporids 87	Pocilloporids 88		
Location	2	6.726	29.371	<0.001	4.793	21.786	<0.001
Site (L)	9	0.229	0.878	0.552	0.222	0.587	0.801
Residual	48	0.260			0.378		
				Acropora 85	Acropora 86		
Location	2	3.094	0.479	~0.65	2.228	0.321	~0.7
Site (L)	9	6.456	7.927	<0.001	6.937	7.780	<0.001
Residual	48	0.815			0.892		
				Acropora 87	Acropora 88		
Location	2	2.176	0.352	~0.7	3.059	0.342	~0.7
Site (L)	9	6.179	9.073	<0.001	8.938	12.705	<0.001
Residual	48	0.681			0.703		
				Montipora 85	Montipora 86		
Location	2	10.450	1.070	~0.3	3.637	0.498	~0.6
Site (L)	9	9.766	15.391	<0.001	7.297	9.893	<0.001
Residual	48	0.635			0.738		
				Montipora 87	Montipora 88		
Location	2	8.480	1.375	~0.3	4.658	0.474	~0.6
Site (L)	9	6.166	8.491	<0.001	9.837	14.358	<0.001
Residual	48	0.726			0.685		
				Porites 85	Porites 86		
Location	2	0.079	0.058	~0.9	2.099	1.662	~0.25
Site (L)	9	1.352	5.573	<0.001	1.263	4.047	<0.001
Residual	48	0.243			0.312		
				Porites 87	Porites 88		
Location	2	1.492	1.624	~0.25	0.233	0.333	~0.7
Site (L)	9	0.919	3.962	<0.001	0.699	1.893	0.076
Residual	48	0.232			0.369		
				Turbinaria 85	Turbinaria 86		
Location	2	6.963	1.965	~0.2	4.906	1.822	~0.2
Site (L)	9	3.543	7.452	<0.001	2.693	7.538	<0.001
Residual	48	0.475			0.357		
				Turbinaria 87	Turbinaria 88		
Location	2	6.228	2.741	~0.15	6.662	2.487	~0.15
Site (L)	9	2.272	4.717	<0.001	2.679	6.409	<0.001
Residual	48	0.482			0.418		

Source of Variation	df	MS	F	p	MS	F	p
				Faviids 85			
Location	2	0.365	0.172	~0.9	0.173	0.086	~0.9
Site (L)	9	2.122	6.340	<0.001	2.016	5.862	<0.001
Residual	48	0.335			0.344		
				Faviids 87			
Location	2	0.191	0.081	~0.9	0.375	0.155	~0.9
Site (L)	9	2.348	7.615	<0.001	2.415	5.799	<0.001
Residual	48	0.308			0.417		
				Deep Water Corals 85			
Location	2	5.047	1.008	~0.4	6.053	1.242	~0.3
Site (L)	9	5.005	6.503	<0.001	4.874	5.027	<0.001
Residual	48	0.770			0.970		
				Deep Water Corals 87			
Location	2	6.572	1.338	~0.3	7.972	1.714	~0.25
Site (L)	9	4.912	5.202	<0.001	4.650	4.610	<0.001
Residual	48	0.944			1.009		
				Soft Corals 85			
Location	2	3.096	0.279	~0.75	1.267	0.146	~0.9
Site (L)	9	11.090	8.531	<0.001	8.687	5.056	<0.001
Residual	48	1.300			1.718		
				Soft Corals 87			
Location	2	1.077	0.124	~0.9	1.386	0.213	~0.9
Site (L)	9	8.708	5.544	<0.001	6.503	5.673	<0.001
Residual	48	1.571			1.146		
				Sponges 85			
Location	2	4.242	4.032	~0.06	0.434	0.775	~0.5
Site (L)	9	1.052	5.141	<0.001	0.560	2.660	0.014
Residual	48	0.205			0.210		
				Sponges 87			
Location	2	2.992	3.916	~0.07	2.904	1.421	~0.3
Site (L)	9	0.764	2.320	0.029	2.044	6.472	<0.001
Residual	48	0.329			0.316		

B. Proportional Change in Abundance Between Successive Surveys of Permanent Transects.

Source of Variation	df	MS	F	p	MS	F	p
Total Coral Cover				Pocilloporids			
Time	2	3491541	80.452	<0.001	9084.04	7.871	<0.001
Location	2	34493.5	0.795	~0.45	546.04	0.850	~0.4
Site (L)	9	42058.8	0.969	~0.5	406.31	0.633	~0.75
Time x Location	4	58240.8	1.342	~0.25	697.87	1.087	~0.5
Time x Site (L)	18	43399.3	1.038	0.422	642.11	0.556	0.925
Residual	144	41815.9			1145.1		
Acropora				Montipora			
Time	2	234049	16.202	<0.001	1095335	27.170	<0.001
Location	2	4971.5	0.344	~0.7	14171.6	0.352	~0.7
Site (L)	9	9114.4	0.631	~0.7	15557.2	0.386	~0.9
Time x Location	4	11023.8	0.763	~0.5	83897.3	2.081	~0.15
Time x Site (L)	18	14446.0	1.096	0.362	40314.2	1.538	0.085
Residual	144	13175.9			26207.1		
Porites				Turbinaria			
Time	2	1057.9	2.336	~0.1	2374.5	2.234	~0.1
Location	2	154.87	0.342	~0.7	282.95	0.266	~0.75
Site (L)	9	204.89	0.452	~0.8	259.30	0.244	~0.75
Time x Location	4	965.22	2.132	~0.12	1895.2	1.783	~0.2
Time x Site (L)	18	452.83	0.852	0.637	1063.0	0.342	0.994
Residual	144	531.76			3080.0		
Faviids				Deep Water Corals			
Time	2	1189.7	1.821	~0.2	34503.9	15.990	<0.001
Location	2	456.72	0.700	~0.5	1886.5	0.874	~0.5
Site (L)	9	312.90	0.480	~0.9	581.64	0.270	~0.9
Time x Location	4	322.96	0.495	~0.75	3314.0	1.536	~0.25
Time x Site (L)	18	652.34	0.643	0.860	2157.8	0.149	1.00
Residual	144	1013.9			14508.4		
Soft Corals				Sponges			
Time	2	42972.1	3.038	~0.07	2939.3	3.071	~0.07
Location	2	6731.5	0.476	~0.6	26.406	0.028	~0.9
Site (L)	9	7311.1	0.517	~0.8	582.18	0.608	~0.75
Time x Location	4	16270.8	1.150	~0.3	3911.0	4.087	~0.04
Time x Site (L)	18	14146.5	0.622	0.878	956.99	1.788	0.032
Residual	144	22755.2			535.27		

C. Haphazard Transects at Major Study Sites.

Source of Variation	df	MS	F	p	MS	F	p
				Total Coral Cover	Pocilloporids		
Time	2	3.557	7.94	~0.004	6.530	10.398	<0.001
Location	2	1.311	1.57	~0.25	4.695	15.048	<0.001
Site (L)	9	1.915	4.275	~0.004	0.932	1.484	~0.25
Time x Location	4	2.006	4.48	~0.01	1.361	2.167	~0.1
Time x Site (L)	18	0.448	0.537	0.936	0.628	2.014	0.012
Residual	144	0.833			0.312		
				Acropora	Montipora		
Time	2	3.367	1.969	~0.2	8.385	8.196	~0.003
Location	2	2.233	1.306	~0.25	8.786	7.653	<0.001
Site (L)	9	8.995	5.260	~0.002	12.504	12.222	<0.001
Time x Location	4	2.984	1.745	~0.2	1.322	1.292	~0.3
Time x Site (L)	18	1.710	2.166	0.006	1.023	0.891	0.590
Residual	144	0.789			1.148		
				Porites	Turbinaria		
Time	2	1.898	7.622	~0.005	31.285	1.697	~0.2
Location	2	3.430	4.942	~0.02	40.643	5.740	~0.015
Site (L)	9	1.783	7.161	<0.001	90.970	4.935	~0.003
Time x Location	4	0.346	1.390	~0.25	67.893	3.68	~0.025
Time x Site (L)	18	0.249	0.359	0.993	18.432	2.603	<0.001
Residual	144	0.694			7.081		
				Faviids	Deep Water Corals		
Time	2	1.048	2.460	~0.1	5.840	4.771	~0.025
Location	2	0.346	0.812	~0.4	6.38	8.728	<0.001
Site (L)	9	2.557	6.002	<0.001	10.222	8.351	<0.001
Time x Location	4	0.831	1.951	~0.15	7.891	6.447	~0.003
Time x Site (L)	18	0.426	1.081	0.377	1.224	1.676	0.050
Residual	144	0.394			0.731		
				Soft Corals	Sponges		
Time	2	3.394	1.895	~0.15	3.569	3.520	~0.05
Location	2	8.570	4.785	<0.001	16.931	16.697	<0.001
Site (L)	9	13.610	7.599	<0.001	3.468	3.420	~0.015
Time x Location	4	1.815	1.013	~0.3	4.509	4.447	~0.015
Time x Site (L)	18	1.791	1.674	0.050	1.014	0.760	0.744
Residual	144	1.069			1.335		

D. Haphazard Transects at Run-Off Sites.

Source of Variation	df	MS	F	p	MS	F	p
Total Coral Cover					<i>Acropora</i>		
Time	3	1.525	1.592	0.198	1.257	1.742	0.165
Site	4	71.912	68.28	<0.001	7.272	24.904	<0.001
Time x Site	12	1.054	1.101	0.3711	0.292	0.405	0.958
Residual	80	0.957			0.722		
<i>Montipora</i>					<i>Porites</i>		
Time	3	2.182	2.450	0.070	0.351	0.569	0.637
Site	4	28.607	29.46	<0.001	9.549	19.65	<0.001
Time x Site	12	0.971	1.090	0.380	0.486	0.786	0.663
Residual	80	0.890			0.618		
<i>Turbinaria</i>					Faviids		
Time	3	0.513	0.661	0.578	0.635	1.089	0.359
Site	4	17.273	48.66	<0.001	10.073	13.31	<0.001
Time x Site	12	0.355	0.458	0.933	0.757	1.298	0.236
Residual	80	0.776			0.583		
Deep Water Corals					Sponges		
Time	3	0.426	0.830	0.481	2.560	4.310	0.007
Site	4	10.462	44.52	<0.001	15.434	22.34	<0.001
Time x Site	12	0.235	0.457	0.934	0.691	1.164	0.323
Residual	80	0.514			0.594		

APPENDIX 2. LIST OF FISHES OBSERVED ON THE FRINGING REEFS OF THE CAPE TRIBULATION REGION

Abundance scale codes: A = abundant (commonly seen on all dives); C = common (seen on most dives); O = occasional (10-20 seen in 3 years) R = rare (only 1-2 seen in 3 years).

Hemiscyllidae - long-tailed carpet sharks	
<i>Hemiscyllium ocellatum</i>	R
Dasyatidae - stingrays	
<i>Himantura granulatam</i>	O
Muraenidae - moray eels	
<i>Gymnothorax</i> sp.	R
Chanidae - milkfishes	
<i>Chanos chanos</i>	O
Latidae - barramundis	
<i>Lates calcarifer</i>	R
Holocentridae - squirrelfishes	
<i>Myripristis</i> sp.	R
Centropomidae - sand basses	
<i>Psammoperca waigiensis</i>	O
Platycephalidae - flatheads	
<i>Platycephalus arenarius</i>	R
Serranidae - groupers	
<i>Plectropomus maculatus</i>	O
<i>P. leopardus</i>	O
<i>Cephalopholis boenak</i>	C
<i>C. cyanostigma</i>	R
<i>C. microprion</i>	R
<i>Epinephalus malabaricus</i>	R
<i>E. quoyanus</i>	R
Carangidae - jacks and trevallies	
<i>Cananx</i> sp.	O
<i>C. melampygus</i>	O
Lutjanidae - snappers	
<i>Lutjanus fulvus</i>	R
<i>L. fulviflamma</i>	O
<i>L. russelli</i>	O
<i>L. carponotatus</i>	C
<i>L. argentimaculatus</i>	O
<i>L. rivulatus</i>	O
<i>L. vitta</i>	O
<i>L. lemniscatus</i>	F
Haemulidae - sweetlips	
<i>Plectorhynchus gibbosus</i>	O
<i>P. flavomaculatus</i>	R
<i>Diagramma pictum</i>	O

Nemipteridae - threadfin breams	
<i>Pentapodus paradiseus</i> ?	R
<i>Scolopsis lineatus</i>	
Lethrinidae - emperor fishes	
<i>Lethrinus laticaudis</i>	O
<i>L. atkinsoni</i>	R
<i>L. obsoletus</i>	R
<i>L. harak</i>	O
<i>L. miniatus</i>	R
Mullidae - goatfishes	
<i>Parupeneus indicus</i>	O
<i>P. multifasciatus</i>	O
<i>P. ciliatus</i>	R
<i>P. barberinus</i>	R
<i>Upeneus tragula</i>	R
<i>Mulloidides flavolineatus</i>	R
Kyphosidae - rudderfishes	
<i>Kyphosus</i> sp.	O
Ephippidae - batfishes	
<i>Platax pinnatus</i>	R
<i>P. batavianus</i>	R
<i>P. teira</i>	R
Chaetodontidae - butterflyfishes	
<i>Chelmon rostratus</i>	O
<i>Chaetodon aureofasciatus</i>	C
<i>C. auriga</i>	O
<i>C. rainfordi</i>	C
<i>C. trifascialis</i>	O
<i>C. vagabundus</i>	C
<i>C. plebeius</i>	R
<i>C. melannotus</i>	R
<i>C. lineolatus</i>	R
Pomacanthidae - angelfishes	
<i>Pomacanthus sexstriatus</i>	C
<i>P. semicirculatus</i>	R
Pomacentridae - damselfishes	
<i>Abudefduf bengalensis</i>	A
<i>A. sexfasciatus</i>	O
<i>A. vaigiensis</i>	R
<i>A. whitleyi</i>	R
<i>Pomacentrus wardi</i>	A
<i>P. nagasakiensis</i>	R
<i>P. chrysurus</i>	R
<i>P. moluccensis</i>	R
<i>P. tripunctatus</i>	C
<i>P. coelestis</i>	R
<i>P. sp.</i>	C
<i>Stegastes apicalis</i>	A
<i>Parma oligolepis</i>	R

<i>Neopomacentrus bankieri</i> .	A
<i>N. azysron</i>	C
<i>Neoglyphidodon nigroris</i>	O
<i>N. melas</i>	O
Labridae - wrasses	
<i>Anampses geographicus</i>	O
<i>Choerodon fasciatus</i>	R
<i>C. graphicus</i>	O
<i>C. schoenleinii</i>	R
<i>C. anchorago</i>	R
<i>C. cyanodus</i>	R
<i>C. vitta</i>	R
<i>Cheilinus chlorurus</i>	O
<i>Epibulus insidiator</i>	R
<i>Gomphosus varius</i>	O
<i>Halichoeres marginatus</i>	R
<i>H. miniatus</i>	A
<i>H. dussumieri</i>	A
<i>H. melanurus</i>	O
<i>Hemigymnus melapturus</i>	C
<i>H. fasciatus</i>	O
<i>Cheilio inermis</i>	O
<i>Labrichthys unilineatus</i>	O
<i>Labroides dimidiatus</i>	C
<i>L. bicolor</i>	R
<i>Pseudolabrus guentheri</i>	O
<i>Pterogogus amboinensis</i> .	O
<i>Stethojulis strigiventer</i>	O
<i>S. interrupta</i>	R
<i>Thalassoma lunare</i>	C
<i>T. hardwicke</i>	R
<i>T. janseni</i>	R
Scaridae - parrotfishes	
<i>Scarus altipinnis</i>	R
<i>S. ghobban</i>	C
<i>S. microrhinos</i>	R
<i>S. rivulatus</i>	C
<i>S. sordidus</i>	R
<i>Leptoscarus vaigiensis</i>	R
Acanthuridae - surgeonfishes	
<i>Ctenochaetus striatus</i>	R
<i>Acanthurus grammoptilus</i>	O
<i>A. dussumieri</i>	R
<i>A. triostegus</i> (juvenile)	R
<i>Naso annulatus</i> (juvenile)	R
<i>Naso unicornis</i>	C
Siganidae - rabbitfishes	
<i>Siganus lineatus</i>	O
<i>S. fuscescens</i>	R

<i>S. doliatus</i>	R
Scombridae - mackerels and tunas	
<i>Scomberomorus queenslandicus</i>	R
Balistidae - triggerfishes	
<i>Balistoides viridescens</i>	R
Monacanthidae - leatherjackets	
<i>Aleuterus scriptus</i>	R
<i>Pervagor</i> sp.	R
Ostraciidae - boxfishes	
<i>Ostracion meleagris?</i>	O
Tetradontidae - pufferfishes	
<i>Arothron stellatus</i>	O
<i>A. meleagris</i>	R