

APPENDIX 2

RAW DATA FROM THE SURVEYS OF SELECTED FISHES MADE IN THREE OF THE MONITORING SITES ON NORMAN REEF

Raw data from the 5 replicate transects is shown along with the mean and standard deviation for each group of transects (bold type). See figures 4-6 for the areas within which the transects were haphazardly surveyed.

SUMMARY:

Transect #	1	2	3	4	5	mean	std.dev.
Serranidae	2	1	4	0	0	1.4	1.7
Carangidae	0	0	1	0	4	1.0	1.7
Lutjanidae	11	6	10	0	0	5.4	5.3
Caesionidae	16	8	35	12	7	15.6	11.4
Haemulidae	2	5	2	0	0	1.8	2.0
Lethrinidae	26	11	11	9	6	12.6	7.8
Ephippidae	2	0	0	1	7	2.0	2.9
Chaetodontidae	16	32	17	17	9	18.2	8.4
Labridae	2	0	0	0	0	0.4	0.9
Scaridae	16	36	76	83	56	53.4	27.8
Acanthuridae	2	3	0	0	0	1.0	1.4
Siganidae	0	0	0	0	0	0.0	0.0

Transect #	1	2	3	4	5	mean	std.dev.
SERRANIDAE - Groupers and Coral Trout							
<i>Plectropomus laevis</i>	0	1	1	0	0	0.4	0.5
<i>Plectropomus leopardus</i>	1	0	0	0	0	0.2	0.4
<i>Epinephelus fuscoguttatus</i>	0	0	0	0	0	0.0	0.0
<i>Epinephelus microdon</i>	0	0	0	0	0	0.0	0.0
<i>Epinephelus suillus</i>	0	0	1	0	0	0.2	0.4
<i>Cromileptes altivelis</i>	1	0	1	0	0	0.4	0.5
<i>Cephalopholis argus</i>	0	0	1	0	0	0.2	0.4
CARANGIDAE - Jacks and Trevallies							
<i>Carangoides plagiotaenia</i>	0	0	1	0	0	0.2	0.4
<i>Caranx speciosus</i>	0	0	0	0	4	0.8	1.8
LUTJANIDAE - Snappers							
<i>Lutjanus bohar</i>	0	4	1	0	0	1.0	1.7
<i>Lutjanus carponotatus</i>	0	0	0	0	0	0.0	0.0
<i>Lutjanus fulvus</i>	2	0	4	0	0	1.2	1.8
<i>Lutjanus gibbus</i>	0	0	3	0	0	0.6	1.3
<i>Lutjanus quinquilineatus</i>	0	0	0	0	0	0.0	0.0
<i>Lutjanus russelli</i>	9	1	2	0	0	2.4	3.8
<i>Macolor spp.</i>	0	1	0	0	0	0.2	0.4
CAESIONIDAE - Fusiliers							
<i>Caesio cuning</i>	16	8	35	12	7	15.6	11.4
<i>Caesio caeruleaurea</i>	0	0	0	0	0	0.0	0.0
<i>Pterocaesio chrysozona</i>	0	0	0	0	0	0.0	0.0
HAEMULIDAE - Sweetlips							
<i>Plectorhynchus chaetodontoides</i>	0	1	2	0	0	0.6	0.9
<i>Plectorhynchus goldmanni</i>	2	4	0	0	0	1.2	1.8
LETHRINIDAE - Emperors							
<i>Gymnocranius spp.</i>	0	0	0	0	1	0.2	0.4
<i>Lethrinus elongatus</i>	0	3	0	0	1	0.8	1.3
<i>Lethrinus kallopterus</i>	0	0	0	0	0	0.0	0.0
<i>Lethrinus mahsena</i>	5	1	1	2	0	1.8	1.9
<i>Lethrinus nebulosus</i>	13	2	7	2	1	5.0	5.0
<i>Lethrinus ramak</i>	1	0	1	1	2	1.0	0.7
<i>Lethrinus xanthochilus</i>	0	0	0	0	0	0.0	0.0
<i>Monotaxis grandoculis</i>	7	5	2	4	1	3.8	2.4
EPHIPPIDAE - Batfishes							
<i>Platax spp.</i>	2	0	0	1	7	2.0	2.9

FISH COUNTS; NORMAN REEF; pontoon site; 1st April 1987

Transect #	1	2	3	4	5	mean	std.dev.
CHAETODONTIDAE - Butterflyfishes							
<i>Chaetodon auriga</i>	0	1	0	3	0	0.8	1.3
<i>Chaetodon aureofasciatus</i>	0	0	0	0	0	0.0	0.0
<i>Chaetodon baronessa</i>	0	5	0	4	2	2.2	2.3
<i>Chaetodon citrinellus</i>	3	8	4	4	2	4.2	2.3
<i>Chaetodon ephippium</i>	0	2	0	0	0	0.4	0.9
<i>Chaetodon lineolatus</i>	0	0	0	0	0	0.0	0.0
<i>Chaetodon melanotus</i>	0	0	0	0	0	0.0	0.0
<i>Chaetodon plebeius</i>	4	2	0	2	2	2.0	1.4
<i>Chaetodon pelewensis</i>	2	2	2	0	0	1.2	1.1
<i>Chaetodon rainfordi</i>	0	0	0	0	0	0.0	0.0
<i>Chaetodon trifascialis</i>	0	2	1	0	1	0.8	0.8
<i>Chaetodon trifasciatus</i>	6	6	8	4	2	5.2	2.3
<i>Chaetodon ulietensis</i>	0	0	0	0	0	0.0	0.0
<i>Chaetodon unimaculatus</i>	0	2	0	0	0	0.4	0.9
<i>Chaetodon vagabundus</i>	0	0	0	0	0	0.0	0.0
<i>Forcipiger flavissimus</i>	1	2	2	0	0	1.0	1.0
LABRIDAE - Wrasses							
<i>Cheilinus undulatus</i>	2	0	0	0	0	0.4	0.9
<i>Choerodon anchorago</i>	0	0	0	0	0	0.0	0.0
<i>Hemigymnus melapturus</i>	0	0	0	0	0	0.0	0.0
SCARIDAE - Parrotfishes							
<i>Bulbometopon muricatum</i>	0	0	0	0	0	0.0	0.0
<i>Cetoscarus bicolor</i>	2	1	3	1	0	1.4	1.1
<i>Hipposcarus longiceps</i>	2	1	8	4	4	3.8	2.7
<i>Scarus altipinnis</i>	0	5	2	6	0	2.6	2.8
<i>Scarus bleekeri</i>	0	0	0	0	0	0.0	0.0
<i>Scarus chameleon</i>	0	0	0	0	0	0.0	0.0
<i>Scarus dimidiatus</i>	0	2	1	0	0	0.6	0.9
<i>Scarus flavipectoralis</i>	0	0	0	0	0	0.0	0.0
<i>Scarus frenatus</i>	0	0	0	3	0	0.6	1.3
<i>Scarus ghobban</i>	0	2	0	1	0	0.6	0.9
<i>Scarus gibbus</i>	0	1	1	2	2	1.2	0.8
<i>Scarus globiceps</i>	0	0	7	6	10	4.6	4.4
<i>Scarus niger</i>	5	9	5	6	4	5.8	1.9
<i>Scarus oviceps</i>	0	0	0	0	0	0.0	0.0
<i>Scarus psittacus</i>	2	4	12	9	9	7.2	4.1
<i>Scarus rivulatus</i>	0	0	12	18	4	6.8	7.9
<i>Scarus schlegeli</i>	3	1	12	5	5	5.2	4.1
<i>Scarus sordidus</i>	2	10	13	22	18	13.0	7.7
ACANTHURIDAE - Surgeonfishes							
<i>Acanthurus mata</i>	0	0	0	0	0	0.0	0.0
<i>Acanthurus xanthopterus</i>	0	2	0	0	0	0.4	0.9
<i>Naso brevirostris</i>	2	1	0	0	0	0.6	0.9
SIGANIDAE - Rabbitfishes							
<i>Siganus doliatus</i>	0	0	0	0	0	0.0	0.0
<i>Siganus punctatus</i>	0	0	0	0	0	0.0	0.0
<i>Siganus virgatus</i>	0	0	0	0	0	0.0	0.0
<i>Siganus vulpinus</i>	0	0	0	0	0	0.0	0.0

Data from five 50 x 20m visual transect counts

SUMMARY:

Transect #	1	2	3	4	5	mean	std.dev.
Serranidae	1	2	0	0	1	0.8	0.8
Carangidae	2	1	0	0	0	0.6	0.9
Lutjanidae	48	169	27	3	11	51.6	67.8
Caesionidae	222	111	18	89	44	96.8	79.0
Haemulidae	0	3	0	0	0	0.6	1.3
Lethrinidae	10	16	5	55	30	23.2	20.1
Ephippidae	3	1	0	0	0	0.8	1.3
Chaetodontidae	3	10	21	23	18	15.0	8.3
Labridae	0	2	1	0	1	0.8	0.8
Scaridae	65	72	67	30	49	56.6	17.2
Acanthuridae	42	6	0	6	0	10.8	17.7
Siganidae	2	2	2	0	2	1.6	0.9

Transect #	1	2	3	4	5	mean	std.dev.
SERRANIDAE - Groupers and Coral Trout							
<i>Plectropomus laevis</i>	0	0	0	0	0	0.0	0.0
<i>Plectropomus leopardus</i>	1	0	0	0	0	0.2	0.4
<i>Epinephelus fuscoguttatus</i>	0	0	0	0	1	0.2	0.4
<i>Epinephelus microdon</i>	0	1	0	0	0	0.2	0.4
<i>Epinephelus suillus</i>	0	0	0	0	0	0.0	0.0
<i>Cromileptes altivelis</i>	0	0	0	0	0	0.0	0.0
<i>Cephalopholis argus</i>	0	1	0	0	0	0.2	0.4
CARANGIDAE - Jacks and Trevallies							
<i>Carangoides plagiotaenia</i>	2	1	0	0	0	0.6	0.9
<i>Caranx speciosus</i>	0	0	0	0	0	0.0	0.0
LUTJANIDAE - Snappers							
<i>Lutjanus bohar</i>	43	65	13	2	8	26.2	26.8
<i>Lutjanus carponotatus</i>	0	0	0	0	0	0.0	0.0
<i>Lutjanus fulvus</i>	0	6	1	0	0	1.4	2.6
<i>Lutjanus gibbus</i>	5	96	12	0	1	22.8	41.2
<i>Lutjanus quinquilineatus</i>	0	0	0	0	0	0.0	0.0
<i>Lutjanus russelli</i>	0	2	1	0	0	0.6	0.9
<i>Macolor spp.</i>	0	0	0	1	2	0.6	0.9
CAESIONIDAE - Fusiliers							
<i>Caesio cuning</i>	141	47	12	64	0	52.8	55.7
<i>Caesio caerulaurea</i>	44	18	6	25	44	27.4	16.6
<i>Pterocaesio chrysozona</i>	37	46	0	0	0	16.6	23.0
HAEMULIDAE - Sweetlips							
<i>Plectorhynchus chaetodontoides</i>	0	3	0	0	0	0.6	1.3
<i>Plectorhynchus goldmanni</i>	0	0	0	0	0	0.0	0.0
LETHRINIDAE - Emperors							
<i>Gymnocranius spp.</i>	0	0	0	0	0	0.0	0.0
<i>Lethrinus elongatus</i>	0	0	0	0	0	0.0	0.0
<i>Lethrinus kallopterus</i>	0	0	0	0	0	0.0	0.0
<i>Lethrinus mahsena</i>	0	1	0	5	4	2.0	2.3
<i>Lethrinus nebulosus</i>	1	5	0	6	3	3.0	2.5
<i>Lethrinus ramak</i>	2	4	1	5	2	2.8	1.6
<i>Lethrinus xanthochilus</i>	0	0	0	0	2	0.4	0.9
<i>Monotaxis grandoculis</i>	7	6	4	39	19	15.0	14.6
EPHIPPIDAE - Batfishes							
<i>Platax spp.</i>	3	1	0	0	0	0.8	1.3

FISH COUNTS; NORMAN REEF; pontoon site; 17th June 1988

Transect #	1	2	3	4	5	mean	std.dev.
CHAETODONTIDAE - Butterflyfishes							
<i>Chaetodon auriga</i>	0	0	0	0	0	0.0	0.0
<i>Chaetodon aureofasciatus</i>	0	0	0	0	0	0.0	0.0
<i>Chaetodon baronessa</i>	1	1	5	4	5	3.2	2.0
<i>Chaetodon citrinellus</i>	0	3	4	4	6	3.4	2.2
<i>Chaetodon ephippium</i>	0	0	0	0	0	0.0	0.0
<i>Chaetodon lineolatus</i>	0	0	0	0	0	0.0	0.0
<i>Chaetodon melannotus</i>	0	0	0	0	0	0.0	0.0
<i>Chaetodon plebeius</i>	2	0	4	2	3	2.2	1.5
<i>Chaetodon pelewensis</i>	0	0	0	2	0	0.4	0.9
<i>Chaetodon rainfordi</i>	0	0	0	0	0	0.0	0.0
<i>Chaetodon trifascialis</i>	0	0	2	1	2	1.0	1.0
<i>Chaetodon trifasciatus</i>	0	4	6	4	2	3.2	2.3
<i>Chaetodon ulietensis</i>	0	0	0	0	0	0.0	0.0
<i>Chaetodon unimaculatus</i>	0	2	0	0	0	0.4	0.9
<i>Chaetodon vagabundus</i>	0	0	0	4	0	0.8	1.8
<i>Forcipiger flavissimus</i>	0	0	0	2	0	0.4	0.9
LABRIDAE - Wrasses							
<i>Cheilinus undulatus</i>	0	0	0	0	0	0.0	0.0
<i>Choerodon anchorago</i>	0	0	0	0	0	0.0	0.0
<i>Hemigymnus melapturus</i>	0	2	1	0	1	0.8	0.8
SCARIDAE - Parrotfishes							
<i>Bulbometopon muricatum</i>	0	6	0	0	0	1.2	2.7
<i>Cetoscarus bicolor</i>	0	0	5	0	2	1.4	2.2
<i>Hipposcarus longiceps</i>	3	1	4	1	3	2.4	1.3
<i>Scarus altipinnis</i>	0	0	3	0	2	1.0	1.4
<i>Scarus bleekeri</i>	0	0	0	0	0	0.0	0.0
<i>Scarus chameleon</i>	0	0	0	0	2	0.4	0.9
<i>Scarus dimidiatus</i>	0	1	1	0	0	0.4	0.5
<i>Scarus flavipectoralis</i>	1	0	0	0	0	0.2	0.4
<i>Scarus frenatus</i>	0	0	4	0	3	1.4	1.9
<i>Scarus ghobban</i>	0	3	0	0	1	0.8	1.3
<i>Scarus gibbus</i>	0	3	4	0	1	1.6	1.8
<i>Scarus globiceps</i>	4	1	0	0	1	1.2	1.6
<i>Scarus niger</i>	5	16	13	9	6	9.8	4.7
<i>Scarus oviceps</i>	0	1	2	0	0	0.6	0.9
<i>Scarus psittacus</i>	28	19	17	6	12	16.4	8.2
<i>Scarus rivulatus</i>	3	1	2	3	0	1.8	1.3
<i>Scarus schlegeli</i>	10	6	3	3	4	5.2	2.9
<i>Scarus sordidus</i>	11	14	9	8	12	10.8	2.4
ACANTHURIDAE - Surgeonfishes							
<i>Acanthurus mata</i>	3	1	0	0	0	0.8	1.3
<i>Acanthurus xanthopterus</i>	23	3	0	1	0	5.4	9.9
<i>Naso brevirostris</i>	16	2	0	5	0	4.6	6.7
SIGANIDAE - Rabbitfishes							
<i>Siganus doliatus</i>	2	2	0	0	2	1.2	1.1
<i>Siganus punctatus</i>	0	0	2	0	0	0.4	0.9
<i>Siganus virgatus</i>	0	0	0	0	0	0.0	0.0
<i>Siganus vulpinus</i>	0	0	0	0	0	0.0	0.0

Data from five 50 x 20m visual transect counts

SUMMARY:

Transect #	1	2	3	4	5	mean	std.dev.
Serranidae	0	0	0	1	1	0.4	0.5
Carangidae	0	2	0	0	1	0.6	0.9
Lutjanidae	3	0	2	2	0	1.4	1.3
Caesionidae	44	0	3	3	0	10.0	19.1
Haemulidae	0	0	0	0	0	0.0	0.0
Lethrinidae	8	2	6	12	7	7.0	3.6
Ephippidae	3	0	0	0	0	0.6	1.3
Chaetodontidae	18	25	38	25	19	25.0	8.0
Labridae	1	1	0	0	0	0.4	0.5
Scaridae	14	11	13	14	17	13.8	2.2
Acanthuridae	0	0	0	0	0	0.0	0.0
Siganidae	0	0	0	0	0	0.0	0.0

Transect #	1	2	3	4	5	mean	std.dev.
SERRANIDAE - Groupers and Coral Trout							
<i>Plectropomus laevis</i>	0	0	0	1	0	0.2	0.4
<i>Plectropomus leopardus</i>	0	0	0	0	1	0.2	0.4
<i>Epinephelus fuscoguttatus</i>	0	0	0	0	0	0.0	0.0
<i>Epinephelus microdon</i>	0	0	0	0	0	0.0	0.0
<i>Epinephelus suillus</i>	0	0	0	0	0	0.0	0.0
<i>Cromileptes altivelis</i>	0	0	0	0	0	0.0	0.0
<i>Cephalopholis argus</i>	0	0	0	0	0	0.0	0.0
CARANGIDAE - Jacks and Trevallies							
<i>Carangoides plagiotaenia</i>	0	2	0	0	1	0.6	0.9
<i>Caranx speciosus</i>	0	0	0	0	0	0.0	0.0
LUTJANIDAE - Snappers							
<i>Lutjanus bohar</i>	0	0	0	0	0	0.0	0.0
<i>Lutjanus carponotatus</i>	0	0	0	0	0	0.0	0.0
<i>Lutjanus fulvus</i>	0	0	0	0	0	0.0	0.0
<i>Lutjanus gibbus</i>	0	0	0	0	0	0.0	0.0
<i>Lutjanus quinquilineatus</i>	1	0	1	0	0	0.4	0.5
<i>Lutjanus russelli</i>	2	0	0	0	0	0.4	0.9
<i>Macolor spp.</i>	0	0	1	2	0	0.6	0.9
CAESIONIDAE - Fusiliers							
<i>Caesio cuning</i>	32	0	3	3	0	7.6	13.7
<i>Caesio caerulea</i>	12	0	0	0	0	2.4	5.4
<i>Pterocaesio chrysozona</i>	0	0	0	0	0	0.0	0.0
HAEMULIDAE - Sweetlips							
<i>Plectorhynchus chaetodontoides</i>	0	0	0	0	0	0.0	0.0
<i>Plectorhynchus goldmanni</i>	0	0	0	0	0	0.0	0.0
LETHRINIDAE - Emperors							
<i>Gymnocranius spp.</i>	0	0	0	0	0	0.0	0.0
<i>Lethrinus elongatus</i>	0	0	0	0	0	0.0	0.0
<i>Lethrinus kallopterus</i>	0	0	0	0	0	0.0	0.0
<i>Lethrinus mahsena</i>	0	0	1	2	0	0.6	0.9
<i>Lethrinus nebulosus</i>	4	1	0	0	1	1.2	1.6
<i>Lethrinus ramak</i>	2	0	1	2	2	1.4	0.9
<i>Lethrinus xanithochilus</i>	0	0	0	0	0	0.0	0.0
<i>Monotaxis grandoculis</i>	2	1	4	8	4	3.8	2.7
EPHIPPIDAE - Batfishes							
<i>Platax spp.</i>	3	0	0	0	0	0.6	1.3

FISH COUNTS; NORMAN REEF; DSDD site; 22nd June 1987

Transect #	1	2	3	4	5	mean	std.dev.
CHAETODONTIDAE - Butterflyfishes							
<i>Chaetodon auriga</i>	1	0	0	0	1	0.4	0.5
<i>Chaetodon aureofasciatus</i>	0	0	1	0	0	0.2	0.4
<i>Chaetodon baronessa</i>	3	2	7	6	2	4.0	2.3
<i>Chaetodon citrinellus</i>	0	1	6	3	3	2.6	2.3
<i>Chaetodon ephippium</i>	0	0	0	0	0	0.0	0.0
<i>Chaetodon lineolatus</i>	0	0	0	0	0	0.0	0.0
<i>Chaetodon melannotus</i>	0	1	4	0	0	1.0	1.7
<i>Chaetodon plebeius</i>	1	2	2	6	2	2.6	1.9
<i>Chaetodon pelewensis</i>	4	10	4	2	2	4.4	3.3
<i>Chaetodon rainfordi</i>	0	0	1	0	0	0.2	0.4
<i>Chaetodon trifascialis</i>	1	0	3	2	0	1.2	1.3
<i>Chaetodon trifasciatus</i>	7	6	7	4	5	5.8	1.3
<i>Chaetodon ulietensis</i>	0	0	0	2	0	0.4	0.9
<i>Chaetodon unimaculatus</i>	0	2	0	0	0	0.4	0.9
<i>Chaetodon vagabundus</i>	0	1	3	0	4	1.6	1.8
<i>Forcipiger flavissimus</i>	1	0	0	0	0	0.2	0.4
LABRIDAE - Wrasses							
<i>Cheilinus undulatus</i>	1	1	0	0	0	0.4	0.5
<i>Choerodon anchorago</i>	0	0	0	0	0	0.0	0.0
<i>Hemigymnus melapturus</i>	0	0	0	0	0	0.0	0.0
SCARIDAE - Parrotfishes							
<i>Bulbometopon muricatum</i>	0	0	0	0	0	0.0	0.0
<i>Cetoscarus bicolor</i>	0	1	0	1	0	0.4	0.5
<i>Hipposcarus longiceps</i>	3	0	0	0	0	0.6	1.3
<i>Scarus altipinnis</i>	0	1	0	1	3	1.0	1.2
<i>Scarus bleekeri</i>	0	1	1	1	0	0.6	0.5
<i>Scarus chameleon</i>	0	0	0	0	0	0.0	0.0
<i>Scarus dimidiatus</i>	0	0	0	0	0	0.0	0.0
<i>Scarus flavipectoralis</i>	0	0	0	0	0	0.0	0.0
<i>Scarus frenatus</i>	0	0	1	0	0	0.2	0.4
<i>Scarus ghobban</i>	2	1	0	0	0	0.6	0.9
<i>Scarus gibbus</i>	2	1	2	3	1	1.8	0.8
<i>Scarus globiceps</i>	0	0	0	0	0	0.0	0.0
<i>Scarus niger</i>	4	2	4	4	2	3.2	1.1
<i>Scarus oviceps</i>	0	0	0	0	0	0.0	0.0
<i>Scarus psittacus</i>	0	0	0	0	0	0.0	0.0
<i>Scarus rivulatus</i>	0	1	2	0	9	2.4	3.8
<i>Scarus schlegeli</i>	0	0	0	1	1	0.4	0.5
<i>Scarus sordidus</i>	3	3	3	3	1	2.6	0.9
ACANTHURIDAE - Surgeonfishes							
<i>Acanthurus mata</i>	0	0	0	0	0	0.0	0.0
<i>Acanthurus xanthopterus</i>	0	0	0	0	0	0.0	0.0
<i>Naso brevirostris</i>	0	0	0	0	0	0.0	0.0
SIGANIDAE - Rabbitfishes							
<i>Siganus doliatus</i>	0	0	0	0	0	0.0	0.0
<i>Siganus punctatus</i>	0	0	0	0	0	0.0	0.0
<i>Siganus virgatus</i>	0	0	0	0	0	0.0	0.0
<i>Siganus vulpinus</i>	0	0	0	0	0	0.0	0.0

SUMMARY:

Transect #	1	2	3	4	5	mean	std.dev.
Serranidae	0	0	0	2	1	0.6	0.9
Carangidae	0	0	0	2	0	0.4	0.9
Lutjanidae	3	5	3	0	0	2.2	2.2
Caesionidae	117	0	200	18	0	67.0	88.8
Haemulidae	0	0	0	0	0	0.0	0.0
Lethrinidae	7	11	10	8	4	8.0	2.7
Ephippidae	0	1	4	3	1	1.8	1.6
Chaetodontidae	26	25	17	15	23	21.2	4.9
Labridae	1	4	2	0	1	1.6	1.5
Scaridae	42	25	30	9	13	23.8	13.3
Acanthuridae	0	1	2	1	0	0.8	0.8
Siganidae	2	4	1	2	4	2.6	1.3

Transect #	1	2	3	4	5	mean	std.dev.
SERRANIDAE - Groupers and Coral Trout							
<i>Plectropomus laevis</i>	0	0	0	1	0	0.2	0.4
<i>Plectropomus leopardus</i>	0	0	0	1	0	0.2	0.4
<i>Epinephelus fuscoguttatus</i>	0	0	0	0	1	0.2	0.4
<i>Epinephelus microdon</i>	0	0	0	0	0	0.0	0.0
<i>Epinephelus suillus</i>	0	0	0	0	0	0.0	0.0
<i>Cromileptes altivelis</i>	0	0	0	0	0	0.0	0.0
<i>Cephalopholis argus</i>	0	0	0	0	0	0.0	0.0
CARANGIDAE - Jacks and Trevallies							
<i>Carangoides plagiotaenia</i>	0	0	0	2	0	0.4	0.9
<i>Caranx speciosus</i>	0	0	0	0	0	0.0	0.0
LUTJANIDAE - Snappers							
<i>Lutjanus bohar</i>	0	2	0	0	0	0.4	0.9
<i>Lutjanus carponotatus</i>	0	0	0	0	0	0.0	0.0
<i>Lutjanus fulvus</i>	0	0	0	0	0	0.0	0.0
<i>Lutjanus gibbus</i>	0	0	0	0	0	0.0	0.0
<i>Lutjanus quinquilineatus</i>	2	0	3	0	0	1.0	1.4
<i>Lutjanus russelli</i>	1	0	0	0	0	0.2	0.4
<i>Macolor spp.</i>	0	3	0	0	0	0.6	1.3
CAESIONIDAE - Fusiliers							
<i>Caesio cuning</i>	78	0	89	0	0	33.4	45.9
<i>Caesio caerulaurea</i>	39	0	111	18	0	33.6	46.2
<i>Pterocaesio chrysozona</i>	0	0	0	0	0	0.0	0.0
HAEMULIDAE - Sweetlips							
<i>Plectorhynchus chaetodontoides</i>	0	0	0	0	0	0.0	0.0
<i>Plectorhynchus goldmanni</i>	0	0	0	0	0	0.0	0.0
LETHRINIDAE - Emperors							
<i>Gymnocranius spp.</i>	0	0	0	0	0	0.0	0.0
<i>Lethrinus elongatus</i>	0	0	0	0	0	0.0	0.0
<i>Lethrinus kallopterus</i>	0	0	1	0	0	0.2	0.4
<i>Lethrinus mahsena</i>	1	2	0	1	0	0.8	0.8
<i>Lethrinus nebulosus</i>	0	1	6	1	0	1.6	2.5
<i>Lethrinus ramak</i>	1	2	0	2	0	1.0	1.0
<i>Lethrinus xanthochilus</i>	0	0	0	0	0	0.0	0.0
<i>Monotaxis grandoculis</i>	5	6	3	4	4	4.4	1.1
EPHIPPIDAE - Batfishes							
<i>Platax spp.</i>	0	1	4	3	1	1.8	1.6

FISH COUNTS; NORMAN REEF; DSDD site; 16th June 1988

Transect #	1	2	3	4	5	mean	std.dev.
CHAETODONTIDAE - Butterflyfishes							
<i>Chaetodon auriga</i>	1	0	0	2	0	0.6	0.9
<i>Chaetodon aureofasciatus</i>	0	0	0	0	0	0.0	0.0
<i>Chaetodon baronessa</i>	2	8	0	5	1	3.2	3.3
<i>Chaetodon citrinellus</i>	2	4	8	2	4	4.0	2.4
<i>Chaetodon ephippium</i>	0	0	0	0	0	0.0	0.0
<i>Chaetodon lineolatus</i>	0	0	2	0	0	0.4	0.9
<i>Chaetodon melannotus</i>	0	0	0	0	0	0.0	0.0
<i>Chaetodon plebeius</i>	3	7	1	0	2	2.6	2.7
<i>Chaetodon pelewensis</i>	5	2	2	0	6	3.0	2.4
<i>Chaetodon rainfordi</i>	0	0	0	0	0	0.0	0.0
<i>Chaetodon trifascialis</i>	0	1	0	0	0	0.2	0.4
<i>Chaetodon trifasciatus</i>	5	2	2	6	6	4.2	2.0
<i>Chaetodon ulietensis</i>	0	0	0	0	0	0.0	0.0
<i>Chaetodon unimaculatus</i>	2	1	0	0	0	0.6	0.9
<i>Chaetodon vagabundus</i>	4	0	2	0	4	2.0	2.0
<i>Forcipiger flavissimus</i>	2	0	0	0	0	0.4	0.9
LABRIDAE - Wrasses							
<i>Cheilinus undulatus</i>	0	1	1	0	0	0.4	0.5
<i>Choerodon anchorago</i>	0	0	0	0	0	0.0	0.0
<i>Hemigymnus melapturus</i>	1	3	1	0	1	1.2	1.1
SCARIDAE - Parrotfishes							
<i>Bulbometopon muricatum</i>	0	0	0	0	0	0.0	0.0
<i>Cetoscarus bicolor</i>	2	2	2	0	0	1.2	1.1
<i>Hipposcarus longiceps</i>	8	0	10	0	0	3.6	5.0
<i>Scarus altipinnis</i>	2	0	2	0	0	0.8	1.1
<i>Scarus bleekeri</i>	1	0	1	0	0	0.4	0.5
<i>Scarus chameleon</i>	0	2	1	0	0	0.6	0.9
<i>Scarus dimidiatus</i>	0	0	0	0	0	0.0	0.0
<i>Scarus flavipectoralis</i>	2	2	0	1	0	1.0	1.0
<i>Scarus frenatus</i>	0	0	0	0	0	0.0	0.0
<i>Scarus ghobban</i>	2	0	0	0	0	0.4	0.9
<i>Scarus gibbus</i>	1	0	0	2	0	0.6	0.9
<i>Scarus globiceps</i>	0	0	0	0	0	0.0	0.0
<i>Scarus niger</i>	12	8	6	4	7	7.4	3.0
<i>Scarus oviceps</i>	0	0	0	0	0	0.0	0.0
<i>Scarus psittacus</i>	0	0	0	1	1	0.4	0.5
<i>Scarus rivulatus</i>	0	0	0	0	0	0.0	0.0
<i>Scarus schlegeli</i>	4	1	0	0	1	1.2	1.6
<i>Scarus sordidus</i>	8	10	8	1	4	6.2	3.6
ACANTHURIDAE - Surgeonfishes							
<i>Acanthurus mata</i>	0	0	0	0	0	0.0	0.0
<i>Acanthurus xanthopterus</i>	0	0	2	1	0	0.6	0.9
<i>Naso brevirostris</i>	0	1	0	0	0	0.2	0.4
SIGANIDAE - Rabbitfishes							
<i>Siganus doliatus</i>	2	2	0	2	2	1.6	0.9
<i>Siganus punctatus</i>	0	0	0	0	0	0.0	0.0
<i>Siganus virgatus</i>	0	2	0	0	2	0.8	1.1
<i>Siganus vulpinus</i>	0	0	1	0	0	0.2	0.4

SUMMARY:

Transect #	1	2	3	4	5	mean	std.dev.
Serranidae	0	0	0	0	0	0.0	0.0
Carangidae	1	1	0	2	0	0.8	0.8
Lutjanidae	0	0	1	1	1	0.6	0.5
Caesionidae	0	58	4	3	0	13.0	25.2
Haemulidae	0	1	0	0	0	0.2	0.4
Lethrinidae	6	15	3	4	5	6.6	4.8
Ephippidae	0	1	0	0	0	0.2	0.4
Chaetodontidae	11	22	29	23	25	22.0	6.7
Labridae	0	0	0	0	2	0.4	0.9
Scaridae	21	18	30	25	30	24.8	5.4
Acanthuridae	0	0	0	0	0	0.0	0.0
Siganidae	0	0	0	0	0	0.0	0.0

Transect #	1	2	3	4	5	mean	std.dev.
SERRANIDAE - Groupers and Coral Trout							
<i>Plectropomus laevis</i>	0	0	0	0	0	0.0	0.0
<i>Plectropomus leopardus</i>	0	0	0	0	0	0.0	0.0
<i>Epinephelus fuscoguttatus</i>	0	0	0	0	0	0.0	0.0
<i>Epinephelus microdon</i>	0	0	0	0	0	0.0	0.0
<i>Epinephelus suillus</i>	0	0	0	0	0	0.0	0.0
<i>Cromileptes altivelis</i>	0	0	0	0	0	0.0	0.0
<i>Cephalopholis argus</i>	0	0	0	0	0	0.0	0.0
CARANGIDAE - Jacks and Trevallies							
<i>Carangoides plagiotaenia</i>	1	1	0	2	0	0.8	0.8
<i>Caranx speciosus</i>	0	0	0	0	0	0.0	0.0
LUTJANIDAE - Snappers							
<i>Lutjanus bohar</i>	0	0	0	0	1	0.2	0.4
<i>Lutjanus carponotatus</i>	0	0	0	0	0	0.0	0.0
<i>Lutjanus fulvus</i>	0	0	0	0	0	0.0	0.0
<i>Lutjanus gibbus</i>	0	0	0	0	0	0.0	0.0
<i>Lutjanus quinquilineatus</i>	0	0	1	0	0	0.2	0.4
<i>Lutjanus russelli</i>	0	0	0	0	0	0.0	0.0
<i>Macolor spp.</i>	0	0	0	1	0	0.2	0.4
CAESIONIDAE - Fusiliers							
<i>Caesio cuning</i>	0	0	4	3	0	1.4	1.9
<i>Caesio caerulaurea</i>	0	32	0	0	0	6.4	14.3
<i>Pterocaesio chrysozona</i>	0	26	0	0	0	5.2	11.6
HAEMULIDAE - Sweetlips							
<i>Plectorhynchus chaetodontoides</i>	0	1	0	0	0	0.2	0.4
<i>Plectorhynchus goldmanni</i>	0	0	0	0	0	0.0	0.0
LETHRINIDAE - Emperors							
<i>Gymnocranius spp.</i>	0	0	0	0	1	0.2	0.4
<i>Lethrinus elongatus</i>	0	0	0	0	1	0.2	0.4
<i>Lethrinus kallopterus</i>	0	0	0	0	0	0.0	0.0
<i>Lethrinus mahsena</i>	0	1	0	1	1	0.6	0.5
<i>Lethrinus nebulosus</i>	2	1	0	0	0	0.6	0.9
<i>Lethrinus ramak</i>	1	2	0	0	0	0.6	0.9
<i>Lethrinus xanthochilus</i>	0	0	0	0	0	0.0	0.0
<i>Monotaxis grandoculis</i>	3	11	3	3	2	4.4	3.7
EPHIPPIDAE - Batfishes							
<i>Platax spp.</i>	0	1	0	0	0	0.2	0.4

FISH COUNTS; NORMAN REEF; control site; 22nd June 1987

Transect #	1	2	3	4	5	mean	std.dev.
CHAETODONTIDAE - Butterflyfishes							
<i>Chaetodon auriga</i>	1	2	1	0	0	0.8	0.8
<i>Chaetodon aureofasciatus</i>	0	0	0	0	0	0.0	0.0
<i>Chaetodon baronessa</i>	0	3	5	1	3	2.4	1.9
<i>Chaetodon citrinellus</i>	2	0	3	4	4	2.6	1.7
<i>Chaetodon ephippium</i>	0	0	0	2	0	0.4	0.9
<i>Chaetodon lineolatus</i>	0	0	0	0	0	0.0	0.0
<i>Chaetodon melannotus</i>	0	0	0	0	0	0.0	0.0
<i>Chaetodon plebeius</i>	2	1	2	2	6	2.6	1.9
<i>Chaetodon pelewensis</i>	2	7	4	0	2	3.0	2.6
<i>Chaetodon rainfordi</i>	0	0	0	0	0	0.0	0.0
<i>Chaetodon trifascialis</i>	0	1	0	4	3	1.6	1.8
<i>Chaetodon trifasciatus</i>	4	4	10	6	4	5.6	2.6
<i>Chaetodon ulietensis</i>	0	2	0	0	0	0.4	0.9
<i>Chaetodon unimaculatus</i>	0	0	2	0	0	0.4	0.9
<i>Chaetodon vagabundus</i>	0	2	2	4	3	2.2	1.5
<i>Forcipiger flavissimus</i>	0	0	0	0	0	0.0	0.0
LABRIDAE - Wrasses							
<i>Cheilinus undulatus</i>	0	0	0	0	1	0.2	0.4
<i>Choerodon anchorago</i>	0	0	0	0	1	0.2	0.4
<i>Hemigymnus melapturus</i>	0	0	0	0	0	0.0	0.0
SCARIDAE - Parrotfishes							
<i>Bulbometopon muricatum</i>	0	0	0	0	0	0.0	0.0
<i>Cetoscarus bicolor</i>	0	0	0	2	1	0.6	0.9
<i>Hipposcarus longiceps</i>	1	0	0	2	0	0.6	0.9
<i>Scarus altipinnis</i>	0	0	0	1	2	0.6	0.9
<i>Scarus bleekeri</i>	2	1	0	0	0	0.6	0.9
<i>Scarus chameleon</i>	0	0	0	0	0	0.0	0.0
<i>Scarus dimidiatus</i>	0	0	0	0	0	0.0	0.0
<i>Scarus flavipectoralis</i>	1	0	0	0	0	0.2	0.4
<i>Scarus frenatus</i>	1	0	0	3	0	0.8	1.3
<i>Scarus ghobban</i>	0	0	1	1	0	0.4	0.5
<i>Scarus gibbus</i>	0	0	1	1	4	1.2	1.6
<i>Scarus globiceps</i>	0	0	0	0	0	0.0	0.0
<i>Scarus niger</i>	7	5	8	7	11	7.6	2.2
<i>Scarus oviceps</i>	0	0	0	0	0	0.0	0.0
<i>Scarus psittacus</i>	0	1	1	0	2	0.8	0.8
<i>Scarus rivulatus</i>	0	0	0	2	0	0.4	0.9
<i>Scarus schlegeli</i>	1	1	3	2	1	1.6	0.9
<i>Scarus sordidus</i>	8	10	16	4	9	9.4	4.3
ACANTHURIDAE - Surgeonfishes							
<i>Acanthurus mata</i>	0	0	0	0	0	0.0	0.0
<i>Acanthurus xanthopterus</i>	0	0	0	0	0	0.0	0.0
<i>Naso brevirostris</i>	0	0	0	0	0	0.0	0.0
SIGANIDAE - Rabbitfishes							
<i>Siganus doliatus</i>	0	0	0	0	0	0.0	0.0
<i>Siganus punctatus</i>	0	0	0	0	0	0.0	0.0
<i>Siganus virgatus</i>	0	0	0	0	0	0.0	0.0
<i>Siganus vulpinus</i>	0	0	0	0	0	0.0	0.0

SUMMARY:

Transect #	1	2	3	4	5	mean	std.dev.
Serranidae	0	0	3	0	1	0.8	1.3
Carangidae	0	1	0	0	0	0.2	0.4
Lutjanidae	1	6	0	3	0	2.0	2.5
Caesionidae	0	0	12	0	42	10.8	18.2
Haemulidae	1	0	11	0	0	2.4	4.8
Lethrinidae	2	39	21	7	17	17.2	14.4
Ephippidae	0	0	0	0	0	0.0	0.0
Chaetodontidae	16	21	19	20	28	20.8	4.4
Labridae	1	0	3	1	0	1.0	1.2
Scaridae	18	19	26	38	17	23.6	8.8
Acanthuridae	2	0	0	0	0	0.4	0.9
Siganidae	4	4	4	0	2	2.8	1.8

Transect #	1	2	3	4	5	mean	std.dev.
SERRANIDAE - Groupers and Coral Trout							
<i>Plectropomus laevis</i>	0	0	1	0	0	0.2	0.4
<i>Plectropomus leopardus</i>	0	0	1	0	0	0.2	0.4
<i>Epinephelus fuscoguttatus</i>	0	0	1	0	1	0.4	0.5
<i>Epinephelus microdon</i>	0	0	0	0	0	0.0	0.0
<i>Epinephelus suillus</i>	0	0	0	0	0	0.0	0.0
<i>Cromileptes altivelis</i>	0	0	0	0	0	0.0	0.0
<i>Cephalopholis argus</i>	0	0	0	0	0	0.0	0.0
CARANGIDAE - Jacks and Trevallys							
<i>Carangoides plagiotaenia</i>	0	1	0	0	0	0.2	0.4
<i>Caranx speciosus</i>	0	0	0	0	0	0.0	0.0
LUTJANIDAE - Snappers							
<i>Lutjanus bohar</i>	1	0	0	0	0	0.2	0.4
<i>Lutjanus carponotatus</i>	0	1	0	0	0	0.2	0.4
<i>Lutjanus fulvus</i>	0	3	0	0	0	0.6	1.3
<i>Lutjanus gibbus</i>	0	0	0	0	0	0.0	0.0
<i>Lutjanus quinquilineatus</i>	0	0	0	0	0	0.0	0.0
<i>Lutjanus russelli</i>	0	0	0	0	0	0.0	0.0
<i>Macolor spp.</i>	0	2	0	3	0	1.0	1.4
CAESIONIDAE - Fusiliers							
<i>Caesio cuning</i>	0	0	12	0	0	2.4	5.4
<i>Caesio caerulea</i>	0	0	0	0	6	1.2	2.7
<i>Pterocaesio chrysozona</i>	0	0	0	0	36	7.2	16.1
HAEMULIDAE - Sweetlips							
<i>Plectorhynchus chaetodontoides</i>	0	0	0	0	0	0.0	0.0
<i>Plectorhynchus goldmanni</i>	1	0	11	0	0	2.4	4.8
LETHRINIDAE - Emperors							
<i>Gymnocranius spp.</i>	0	0	0	0	0	0.0	0.0
<i>Lethrinus elongatus</i>	0	0	0	0	0	0.0	0.0
<i>Lethrinus kallopterus</i>	0	0	0	0	0	0.0	0.0
<i>Lethrinus mahsena</i>	1	6	4	1	7	3.8	2.8
<i>Lethrinus nebulosus</i>	0	0	1	1	1	0.6	0.5
<i>Lethrinus ramak</i>	0	2	1	0	0	0.6	0.9
<i>Lethrinus xanthochilus</i>	0	0	0	0	0	0.0	0.0
<i>Monotaxis grandoculis</i>	1	31	15	5	9	12.2	11.7
EPHIPPIDAE - Batfishes							
<i>Platax spp.</i>	0	0	0	0	0	0.0	0.0

FISH COUNTS; NORMAN REEF; control site; 17th June 1988

Transect #	1	2	3	4	5	mean	std.dev.
CHAETODONTIDAE - Butterflyfishes							
<i>Chaetodon auriga</i>	0	2	0	0	0	0.4	0.9
<i>Chaetodon aureofasciatus</i>	0	0	0	0	0	0.0	0.0
<i>Chaetodon baronessa</i>	2	5	3	4	6	4.0	1.6
<i>Chaetodon citrinellus</i>	2	4	2	4	6	3.6	1.7
<i>Chaetodon ephippium</i>	0	0	0	2	2	0.8	1.1
<i>Chaetodon lineolatus</i>	0	0	2	0	2	0.8	1.1
<i>Chaetodon melannotus</i>	0	0	0	0	0	0.0	0.0
<i>Chaetodon plebeius</i>	3	3	4	2	2	2.8	0.8
<i>Chaetodon pelewensis</i>	0	0	0	4	0	0.8	1.8
<i>Chaetodon rainfordi</i>	0	0	0	0	0	0.0	0.0
<i>Chaetodon trifascialis</i>	3	1	1	0	4	1.8	1.6
<i>Chaetodon trifasciatus</i>	2	4	3	2	4	3.0	1.0
<i>Chaetodon ulietensis</i>	2	0	0	0	2	0.8	1.1
<i>Chaetodon unimaculatus</i>	0	0	2	0	0	0.4	0.9
<i>Chaetodon vagabundus</i>	2	2	2	0	0	1.2	1.1
<i>Forcipiger flavissimus</i>	0	0	0	2	0	0.4	0.9
LABRIDAE - Wrasses							
<i>Cheilinus undulatus</i>	0	0	1	0	0	0.2	0.4
<i>Choerodon anchorago</i>	0	0	1	0	0	0.2	0.4
<i>Hemigymnus melapturus</i>	1	0	1	1	0	0.6	0.5
SCARIDAE - Parrotfishes							
<i>Bulbometopon muricatum</i>	0	0	0	0	0	0.0	0.0
<i>Cetoscarus bicolor</i>	0	0	1	2	0	0.6	0.9
<i>Hipposcarus longiceps</i>	1	1	0	8	2	2.4	3.2
<i>Scarus altipinnis</i>	0	0	0	0	0	0.0	0.0
<i>Scarus bleekeri</i>	1	0	0	0	0	0.2	0.4
<i>Scarus chameleon</i>	0	0	1	1	0	0.4	0.5
<i>Scarus dimidiatus</i>	0	0	0	0	0	0.0	0.0
<i>Scarus flavipectoralis</i>	1	0	0	0	0	0.2	0.4
<i>Scarus frenatus</i>	0	0	2	0	0	0.4	0.9
<i>Scarus ghobban</i>	0	0	0	0	0	0.0	0.0
<i>Scarus gibbus</i>	0	0	0	1	1	0.4	0.5
<i>Scarus globiceps</i>	0	0	0	0	0	0.0	0.0
<i>Scarus niger</i>	7	7	2	8	5	5.8	2.4
<i>Scarus oviceps</i>	0	0	0	0	0	0.0	0.0
<i>Scarus psittacus</i>	0	1	4	3	0	1.6	1.8
<i>Scarus rivulatus</i>	0	0	0	0	0	0.0	0.0
<i>Scarus schlegeli</i>	2	1	2	2	0	1.4	0.9
<i>Scarus sordidus</i>	6	9	14	13	9	10.2	3.3
ACANTHURIDAE - Surgeonfishes							
<i>Acanthurus mata</i>	0	0	0	0	0	0.0	0.0
<i>Acanthurus xanthopterus</i>	2	0	0	0	0	0.4	0.9
<i>Naso brevirostris</i>	0	0	0	0	0	0.0	0.0
SIGANIDAE - Rabbitfishes							
<i>Siganus doliatus</i>	2	2	4	0	2	2.0	1.4
<i>Siganus punctatus</i>	2	0	0	0	0	0.4	0.9
<i>Siganus virgatus</i>	0	2	0	0	0	0.4	0.9
<i>Siganus vulpinus</i>	0	0	0	0	0	0.0	0.0

Data from five 50 x 20m visual transect counts

