

**Long term monitoring of Fagatele Bay National Marine
Sanctuary and Tutuila Island (American Samoa) 1985 to 2001:
summary of surveys conducted in 1998 and 2001.**

Charles Birkeland
Alison Green
Craig Mundy
Karen Miller

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EXECUTIVE SUMMARY

- Long-term monitoring of the coral and fish communities in Fagatele Bay National Marine Sanctuary and at other sites around Tutuila Island has been under way since 1982.
- Permanent transects in Fagatele Bay were re-surveyed in 1998 and 2001 to assess changes in coral and fish communities through time.
- Coral communities in Fagatele Bay generally show improved condition both in the 1998 and 2001 surveys. The coral communities on the reef slope have increased in the number of colonies, in colony size and in coral cover, although communities are still dominated largely by fast growing, opportunistic species.
- The results indicate that the coral communities in Fagatele Bay are well on the way to recovery from the major disturbances of the last few decades, and are in the best condition that they have been in since the Crown-of-Thorns outbreak in the late 1970s.
- In contrast to the coral communities, the fish communities appear to be taking longer to fully recover from the habitat destruction caused by the major disturbances of the last few decades in Fagatele Bay. As with the coral communities, we have seen a gradual increase through time both in fish abundance and species richness, although communities are still below levels recorded in 1985.
- Shallow water communities on the reef flat in Fagatele Bay appear to have suffered from the effects of a severe low tide event that lead to a mass die-off of reef flat corals around the island in 1998. We have recorded a decline in the number and size of coral colonies as well as a decline in fish abundance and species richness on the reef flat.
- Reef communities at key locations around Tutuila Island also appear to be gradually recovering from the effects of Crown-of-Thorns and hurricanes Val and Ofu. Notably however, coral communities at Cape Larson (severely affected by COTs) and Pago pago Harbour (severely affected by pollution) are still in poor condition, but seem to be showing signs of recovery.

TABLE OF CONTENTS

EXECUTIVE SUMMARY.....	2
INTRODUCTION	4
METHODS	4
Survey techniques	4
<i>Corals</i>	4
<i>Fishes</i>	4
Survey locations	5
<i>Surveys inside Fagatele Bay</i>	5
<i>Surveys around Tutuila Island</i>	6
Data analysis	7
RESULTS	7
Corals	7
<i>Fagatele Bay – 1998</i>	7
<i>Fagatele Bay – 2001</i>	8
<i>Sites around Tutuila Island – 1998</i>	8
<i>Sites around Tutuila Island – 2001</i>	9
<i>Trends in coral populations 1995-2001 – Fagatele Bay</i>	9
<i>Trends in coral populations 1995-2001 – Tutuila Island</i>	9
Fish	30
<i>Fagatele Bay - 1998</i>	30
<i>Fagatele Bay - 2001</i>	33
<i>Sites around Tutuila Island – 1998 & 2001</i>	33
<i>Trends in fish populations 1995-2001 – Fagatele Bay</i>	34
<i>Trends in fish populations 1995-2001 – Sites around Tutuila</i>	34
DISCUSSION	64
<i>Coral and Fish communities in Fagatele Bay</i>	64
<i>Coral and Fish Communities around Tutuila Island</i>	67
Conclusions and Recommendations	68
REFERENCES	70
LIST OF FIGURES	71
LIST OF TABLES.....	72
APPENDIX 1	73
APPENDIX 2.....	92
APPENDIX 3.....	117
APPENDIX 4.....	129
APPENDIX 5.....	146
APPENDIX 6.....	151

INTRODUCTION

The coral reefs of American Samoa have suffered many destructive impacts in the last few decades, including a major outbreak of the corallivorous starfish *Acanthaster planci*, several devastating hurricanes, a period of high water temperature, and exposure during unusually low tides (Birkeland et al. 1996, 2003, Green 1996, 1997, Green et al. 1997). The reefs in some locations, such as Pago Pago Harbour, have also been subjected to human impacts including sedimentation, eutrophication, pollution and overfishing (Birkeland et al. 1996, 2003, Green 1996, 1997, Green et al. 1997). As a direct result of these disturbances, the reefs of Fagatele Bay National Marine Sanctuary (FBNMS) and other locations around Tutuila Island have undergone some major changes in the last 25 years (Birkeland et al. 1996, 2003, Green et al. 1997). Of particular concern have been the physical and biological changes to the coral communities in some locations.

Coral communities provide important habitat for reef fishes and changes in their condition may have important consequences for the associated fish fauna. The purpose of the ongoing monitoring of reef communities is to determine if the coral and fish communities in Fagatele Bay, and elsewhere around Tutuila, have changed substantially over the last few decades. The coral reef communities of Fagatele Bay and other sites around Tutuila have been the subjects of a long term monitoring program since the late 1970s, supported by the Fagatele Bay National Marine Sanctuary Program. The results of this program have been used to describe the changes in the coral and fish communities of American Samoa during the 20 years from 1978-1995 (Birkeland et al. 1987, 1994, 1996, 2003; Green et al. 1999). This document reports the results from the two most recent surveys in this program (1998 and 2001), and specifically summarises the changes that have occurred since the surveys were last conducted in 1995.

METHODS

Survey techniques

Corals

Coral communities were surveyed using the point-quarter method as described in Birkeland et al. 1987. In brief, survey points were selected randomly at each site/depth (see below) based on a blind throw of a hammer. At each point, the cross of the hammer was used to designate four quarters. Within each quarter, the coral closest to the centre point of the hammer was chosen and the species, maximum and minimum diameters (length and width), and distance from the hammer were recorded. In this way, a minimum of 32 corals were surveyed at each site/depth. In 1998, the coral surveys were conducted by Charles Birkeland and Dick Randall. In 2001, surveys were done by Charles Birkeland and Craig Mundy. Surveys were conducted in April 1998 and February 2001.

Fishes

Fishes were surveyed using the same underwater visual census techniques that were used in previous surveys (ie. fixed length transects), and are described in detail in Birkeland et al.

(1987, 1994). Surveys were conducted in April 1998 and February 2001. In both years a single observer, Alison Green, conducted the fish counts. This was the same observer who conducted the fish surveys in 1995 (see Birkeland et al. 2003). Prior to that, two different observers conducted the surveys: Richard Wass in 1985 and Steve Amesbury in 1988.

Survey locations

Surveys inside Fagatele Bay

Coral and fish surveys in Fagatele Bay were conducted across a variety of depths at each of six permanent sites located inside Fagatele Bay (Figure 1; see also Birkeland et al. 1987, 1994 and 2003). GPS readings were taken of the sites for the first time in 1995, and were used to relocate the sites subsequently.

At each site and depth, corals were surveyed at eight randomly chosen points using the point-quarter method described above. Fishes were counted along a standard 30 x 2m transect. At Sites 1 and 6, counts were done at two depths (9 and 12m), with the exception that Site 1 was not surveyed in 1998, as it was not accessible due to rough weather conditions. At Sites 2, 3, 4 and 5, coral surveys were done at four depths (3, 6, 9 and 12m) and fish transects were run at 5 depths (3, 6, 9, 12 and 18m). In previous surveys, fish transects at Sites 2-5 had only been done to a depth of 12m. In 1998 and 2001 we surveyed additional transects at 18m depth in order to obtain a more comprehensive description of the reef fish assemblages in the FBNMS. As in previous years, fish were also counted at two reef flat sites within Fagatele Bay in 1998 and 2001 (B & C; Figure 1), and corals were counted on the reef flat on Transects 2, 3 and 4 in 1998. In 2001, corals were surveyed on the reef flat in an area between transects 3 and 4.

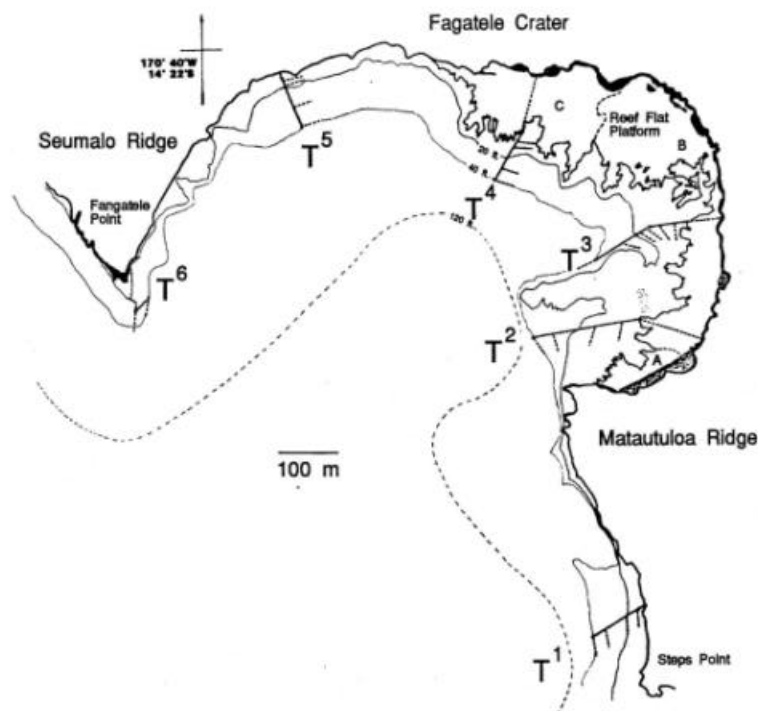


Figure 1. Map of Fagatele Bay showing six permanent transects (T¹ – T⁶) and the approximate locations of the coral and fish surveys at each depth along each transect. The location of three reef flat sites (A-C) is also indicated.

Surveys around Tutuila Island

To provide comparisons between the coral reef communities in Fagatele Bay and elsewhere around Tutuila, corals and fish have been surveyed in up to 13 other sites around the island (Figure 2). In 1998, corals were surveyed at seven of these sites - inside Masefau Bay (3m), at Aua (1m and 3m), Fagasa Bay (3, 6 and 9m), Cape Larsen (3 and 6m), Fagafue Bay (2m), Massacre Bay (2m) and Rainmaker Hotel (6m). In 2001 corals were surveyed at 3 and six metre depths at eight sites - inside Masefau Bay, at Aua, Aunu'u Island, Fagasa Bay, Cape Larsen, Rainmaker Hotel, Fatumafuti and Auasi. At each site and depth, the point quarter method was used to survey coral communities. In addition, at each of these sites, and in each year, one 30x2m transect was used to survey fish at each depth.

Fish were also surveyed in a single 100 x 2 m transect on the reef slope at each of three sites (Fagatele Bay (12m), Sita Bay (5-6m) and Cape Larsen (8-9m), see Figure 2). These are the same three sites that have been surveyed regularly since 1977 and were initially surveyed as part of an assessment of the impacts of the crown-of-thorns starfish, *Acanthaster planci* (see Birkeland et al. 1987, 2003). We have continued to survey them in each year to follow long term trends in fish communities at each of the sites, and because they form the oldest continuous survey data from American Samoa. Larger transects (100 x 2 m) are used in this part of the study, because they were originally designed as part of a different project (see Wass 1982), but due to the different depths and locations of sampling at each site, the data is not directly comparable among the three sites. The exact location of each transect is described in Birkeland et al. (1987).

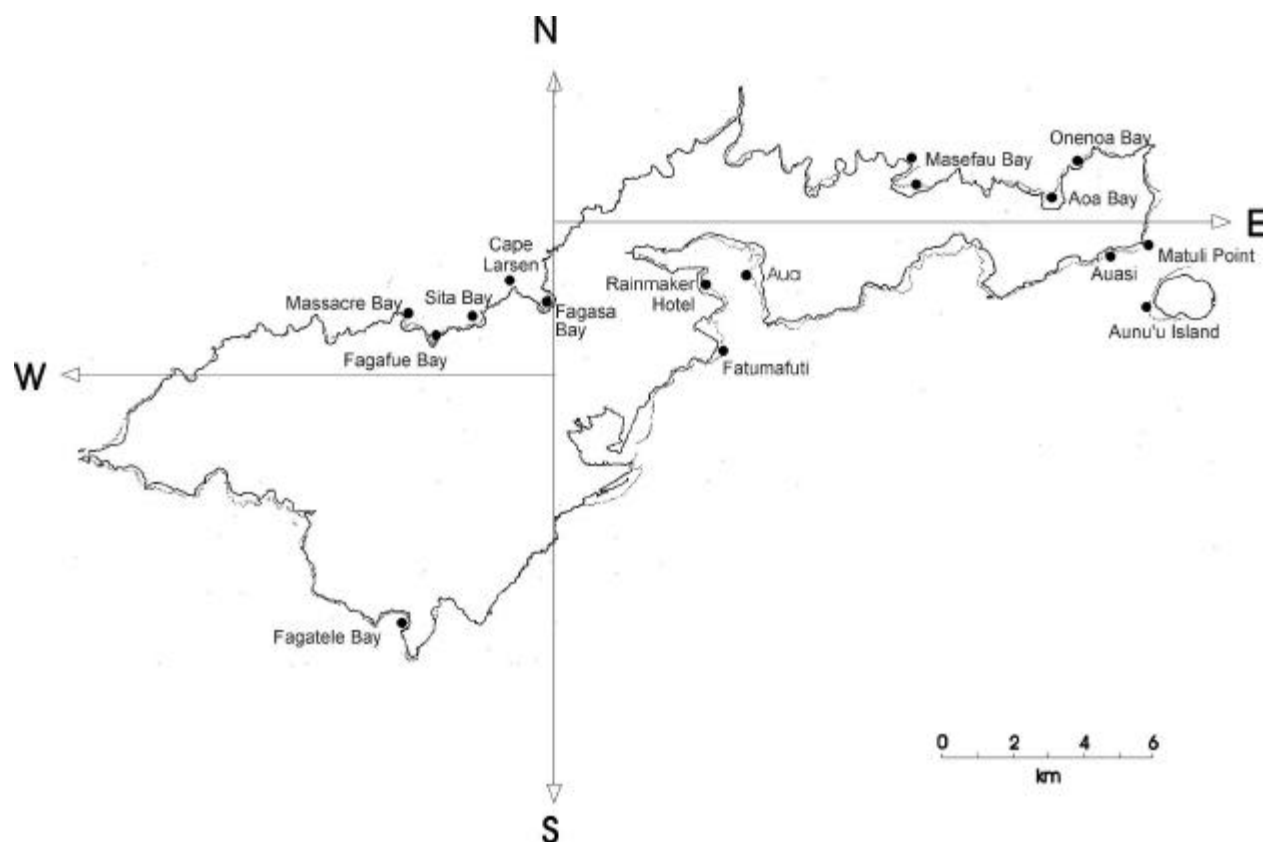


Figure 2. Location of coral and fish survey sites around Tutuila Island, American Samoa.

Data analysis

For each year (1998 and 2001), coral data were summarised to determine the average size of each colony (area calculated as area of a circle i.e. $\pi \cdot (\frac{1}{2}(\text{length} + \text{width}))^2$), the size-range of colonies of each species at each site, the density and cover of each coral species per square metre at each site, as well as the overall density and cover of corals at each site. Data were analysed using the point-centered quarter method as outlined by Mitchell (2001). In brief, density and cover for each species were calculated as

$$\text{density of corals per hectare} = n/Q \cdot [10000 / (Sd/Q)^2]$$

$$\text{relative density of corals} = (n/Q) \cdot 100$$

$$\text{coral cover (m}^2\text{/ha)} = \text{mean colony area} \cdot \text{density} / 10000$$

$$\text{relative coral cover} = \text{coral cover} / \text{total coral cover} \cdot 100$$

where n is the number of corals, Q is the total number of quarters surveyed at each site/depth, and d is the distance between the sample point and the centre of each coral.

Fish data were summarised to determine the relative abundance and species richness at each site in each year. Changes in coral and fish communities in Fagatele Bay were described by comparing trends between 1998 and 2001. In addition, changes in coral and fish communities over the last 25 years were examined by comparing the 1998 and 2001 data with results from surveys prior to 1998, as described in Birkeland et al. (2003).

RESULTS

Corals

Fagatele Bay – 1998

A total of 1384 coral colonies belonging to 83 species were recorded in the point-quarter surveys in Fagatele Bay in 1998. The most common coral species in the bay (312 colonies) was *Porites* sp. 2. Four other species were common and represented by >80 colonies including *Galaxea fascicularis* (103 colonies), *Porites rus* (100 colonies), *Montipora grisea* (93 colonies) and *Pavona divaricata* (88 colonies). Most species (59 of the 83) were numerically rare, and were represented by <10 colonies (Table 1).

At the family level, coral communities in Fagatele Bay were numerically dominated by Poritids (34% of corals) and Acroporiids (27.4% of corals). Agariciids, Oculinids, Faviids and Pocilloporiids represented 10.4%, 7.4%, 6.3% and 6.3% of corals overall (Table 2).

In general coral density, cover and diameter was highest at 9 and 12m depths, and lowest on the reef flat across all Transects. Overall density of corals in the Fagatele Bay sites ranged from 0.5 colonies/m² on the reef flat at Transect 2, to 20.6 colonies/m² at 12m depth on Transect 6 (Table 3). Coral cover in Fagatele Bay ranged from 0.9% on the reef flat at Transect 2 to 145.3% at 12m on Transect 4 (note that due to the nature of the calculation of cover from the point-quarter method i.e. as estimated horizontal area per square metre, cover can be >100% in a complex 3D reef structure)(Table 4). The average diameter of coral colonies at each sampling location ranged from 6.0cm on the reef flat at Transect 4 to 21.3cm

at 12m depth on Transect 4 (Table 5). A full summary of data summaries from the 1998 surveys including species size, density and cover across all transects and depths is provided in Appendix 1.

Fagatele Bay – 2001

A total of 1391 coral colonies belonging to 89 species were recorded in the point-quarter surveys in Fagatele Bay in 2001. The most common coral species in the bay (198 colonies) was *Montipora foveolata*. Four other species were common and represented by =80 colonies including *Montipora grisea* (125 colonies), *Galaxea fascicularis* (98 colonies), *Porites lichen* (82 colonies), and *Pocillopora eydouxi* (80 colonies). Most species (65 of the 89) were numerically rare, and were represented by =10 colonies (see Table 1).

At the family level, coral communities in Fagatele Bay were numerically dominated by Acroporiids (50% of corals). Poritiids, Pocilloporiids, Oculinids, Agariciids and Faviids represented 14.2%, 11.4%, 7%, 6% and 4.5% of corals overall (Table 2).

Patterns of coral community structure were similar in 2001 as in 1998 with the highest abundance, cover and size colonies generally occurring at depths below 9metres. Overall density of corals in the Fagatele Bay sites ranged from 5.0 colonies/m² at 3m depth on Transect 4, to 37.4 colonies/m² at 12m depth on Transect 2 (Table 3). Coral cover in Fagatele Bay ranged from 12.2% on the reef flat to 189.9% at 12m on Transect 3 (Table 4). The average diameter of coral colonies at each sampling location ranged from 7.0cm on the reef flat to 26.6cm at 12m depth on Transect 4 (Table 5). A full summary of data summaries from the 2001 surveys including species size, density and cover across all transects and depths is provided in Appendix 2.

Sites around Tutuila Island – 1998

A total of 609 corals from 76 species were sampled across the seven different areas surveyed around Tutuila Island in 1998. *Montipora grisea* (81 colonies) and *Montipora verrilli* (59 colonies) were the two most abundant species recorded outside of Fagatele Bay. *Pocillopora verrucosa* (44 colonies), *Pocillopora eydouxi* (37 colonies) *Acropora hyacinthus* (36 colonies) and *Montipora ehrenberghii* (32 colonies) were moderately abundant. 59 of the 76 species were rare (=10 colonies; see Table 1)

At the family level, coral communities around Tutuila were numerically dominated by Acroporiids (51.6% of corals). Pocilloporids were also common (19.4% of corals). Faviids rmade up 7.7% of corals, Agariciids 6.7% and Poritiids 6.1% (Table 2).

Overall density of corals in the sites around Tutuila in 1998 ranged from 2.3 colonies/m² at Masefau Bay (2-3m) and Rainmaker Hotel (6m) to 20.3 colonies/m² on the outer reef at Aua (Table 6). Coral cover at the sites around Tutuila ranged from 3% at Rainmaker Hotel (6m depth) to 39.9% at Fagasa Bay (3m depth) (Table 7). The average diameter of coral colonies at each sampling location ranged from 11cm at Rainmaker Hotel (6m) to 17cm at Fagafue Bay (2-3m) (Table 8). A full summary of data summaries from the 1998 surveys at sites around Tutuila including species size, density and cover across all transects and depths is provided in Appendix 3.

Sites around Tutuila Island – 2001

A total of 937 corals from 84 species were sampled across the seven different areas surveyed around Tutuila Island in 2001. *Montipora grisea* (160 colonies) was by far the most common coral species outside Fagatele Bay. *Porites lichen* (82 colonies), *Pocillopora meandrina* (60 colonies), *Montipora foveolata* (59 colonies) and *Montipora informis* (54 colonies) were all moderately abundant around Tutuila. 61 of the 84 species were rare (=10 colonies; Table 1)

At the family level, coral communities around Tutuila in 2001 were numerically dominated by Acroporiids (52.1% of corals). Pocilloporids were also common (19.3% of corals) and Poritiids represented 13.8% of corals. The remaining seven families constituted less than 5% of all corals (Table 2).

Overall density of corals in the sites around Tutuila in 2001 ranged from 1.15 colonies/m² at Rainmaker Hotel (6m) 45.8 colonies/m² at Fatumafuti (6m) (Table 6). Coral cover at the sites around Tutuila ranged from 5.3% at Rainmaker Hotel (2-3m depth) to 189.15% at Masefau Bay (6m) (Table 7). The average diameter of coral colonies at each sampling location ranged from 6.2cm at Fatumafuti (2-3m depth) to 29.1cm at Rainmaker Hotel (6m) (Table 8). A full summary of data from the 1998 surveys at sites around Tutuila including species size, density and cover across all transects and depths is provided in Appendix 4.

Trends in coral populations 1995-2001 – Fagatele Bay

The reef flat communities in Fagatele Bay showed an overall decline in abundance and cover of corals from 1995 to 2001, despite an increase in the mean size of colonies surveyed (Tables 3, 4 and 5). Coral communities at 3 and 6 metres throughout the bay showed an increase in colony abundance, cover and mostly size (although size of colonies at 3m was largely stable through time). At 9m colony size increased from 1995 to 2001, and there were substantial increases in colony cover over the same period (Tables 4 & 5). Similarly, colony abundance increased from 1995 to 1998 at 9m, although there was a slight decline overall in colony abundance in 2001 (Table 3). Coral communities at 12m depth were much more variable through time, with some sites showing an increase in coral abundance, cover and size, but others showing decreases (Tables 3-5).

Trends in coral populations 1995-2001 – Tutuila Island

Generalities about the changes in coral communities at sites around Tutuila Island are difficult due to the sporadic sampling at different sites in different years. Nonetheless, for those sites which were sampled consistently from 1995 to 2001, increases in coral abundance, cover and colony size were apparent only at Cape Larsen and inside Masefau Bay (Tables 6, 7 and 8). At Fagasa Bay, coral cover and size increased from 1995 to 2001 (Table 7 & 8), although abundance showed a steady decline in shallow water but was relatively stable in deeper water (Table 6). The reefs at Rainmaker Hotel have depauperate coral communities, and showed a continued decline both in abundance and cover in these surveys (Tables 6 & 7), with the exception of a dramatic increase in cover in deeper water in 2001, probably influenced by the presence of a large (>2.5m) *Diploastrea heliopora* colony that was surveyed in that year (see Appendix 4). Aua was only introduced to the survey in 1998 (as an additional Pago Pago Harbour site). In the subsequent survey at Aua in 2001 we did record an increase in coral cover both in deep and shallow water (Table 7), despite a drop in abundance at 6m (Table 6) and a drop in average colony size at 3m (Table 8).

Table 1. Total number of colonies of all coral species recorded in point-quarter surveys of Fagatele Bay and Tutuila Island in 1998 and 2001.

	Fagatele Bay		Sites around Tutuila	
	1998	2001	1998	2001
<i>Acropora aculeus</i>	3	12		
<i>Acropora akajimensis</i>		7		
<i>Acropora abrotanoides</i>				1
<i>Acropora azurea</i>	4			
<i>Acropora clathrata</i>				3
<i>Acropora crateriformis</i>	68	31	10	7
<i>Acropora cytharea</i>		1		7
<i>Acropora dichotoma</i>				1
<i>Acropora digitifera</i>	6		3	
<i>Acropora divaricata</i>		4		2
<i>Acropora gemmifera</i>	19	10	5	3
<i>Acropora humilis</i>			1	1
<i>Acropora hyacinthus</i>	29	53	36	20
<i>Acropora insignis</i>		3		2
<i>Acropora irregularis</i>			3	
<i>Acropora juvenile</i>		3		
<i>Acropora latistella</i>		5		
<i>Acropora meandrina</i>				1
<i>Acropora monticulosa</i>		4	3	1
<i>Acropora myriophthalma</i>			2	
<i>Acropora nana</i>			19	7
<i>Acropora nasuta</i>	2	2	2	2
<i>Acropora nobilis</i>	2			
<i>Acropora ocellata</i>	6			
<i>Acropora pagoensis</i>	5	2	1	
<i>Acropora palifera</i>	9	8		
<i>Acropora paniculata</i>		1		1
<i>Acropora polystoma</i>	3		2	
<i>Acropora robusta</i>	2	1		1
<i>Acropora samoensis</i>		1		
<i>Acropora secale</i>	6		2	
<i>Acropora sp.</i>				1
<i>Acropora sp. 2</i>	1		4	
<i>Acropora subulata</i>				6
<i>Acropora yongei</i>	2		1	
<i>Alveopora sp.</i>	4		2	
<i>Alveopora sp. 1</i>	2			
<i>Astreopora listeri</i>		5		2
<i>Astreopora myriophthalma</i>		7		
<i>Astreopora randalli</i>			1	
<i>Coscinaraea columnna</i>	1	1		3
<i>Cyphastrea chalcidicum</i>		1		
<i>Cyphastrea seralia</i>	2			
<i>Cyphastrea sp.</i>	5			1
<i>Diploastrea heliopora</i>			1	4
<i>Echinopora hirsutissima</i>	9	1	1	
<i>Echinopora lamellosa</i>	1	5	1	2

	Fagatele Bay		Sites around Tutuila	
	1998	2001	1998	2001
<i>Favia matthaii</i>	1		2	
<i>Favia stelligera</i>	1	4		2
<i>Favites abdita</i>	4	4		
<i>Favites complanata</i>	1		8	
<i>Favites halicora</i>	4			
<i>Favites russelli</i>			1	
<i>Favites sp.</i>	2		1	
<i>Fungia fungites</i>		2		
<i>Fungia juvenile</i>		1		
<i>Fungia scutaria</i>	8		3	
<i>Fungia sp</i>		2		1
<i>Galaxea fascicularis</i>	103	98	17	15
<i>Gardineroseris planulata</i>	3	3		
<i>Goniastrea edwardsi</i>	1	1		
<i>Goniastrea favulus</i>	1			
<i>Goniastrea retiformis</i>	20	9	11	1
<i>Goniopora somaliensis</i>		1		
<i>Goniopora sp.</i>				3
<i>Herpolitha limax</i>		1		
<i>Hydnophora exesa</i>		3		1
<i>Hydnophora microconos</i>	2	8		1
<i>Hydnophora rigida</i>	4	3		
<i>Leptastrea purpurea</i>	13	15	6	17
<i>Leptastrea transversa</i>	1	5	1	1
<i>Leptoria phrygia</i>	11	4	3	2
<i>Leptoseris explanata</i>			1	
<i>Lobophyllia corymbosa</i>	1			
<i>Merulina ampliata</i>		11		
<i>Merulina vaughani</i>	1			
<i>Millepora exaesa</i>		6		11
<i>Millepora dichotoma</i>			6	
<i>Millepora platyphylla</i>	33		11	1
<i>Millepora tuberosa</i>	11	2	1	
<i>Millepora sp</i>				14
<i>Montastrea annuligera</i>		3		2
<i>Montastrea curta</i>	10	11	11	4
<i>Montipora aequituberculata</i>				1
<i>Montipora berryi</i>			2	
<i>Montipora calcarea</i>				2
<i>Montipora caliculata</i>	11	1	4	
<i>Montipora corbettensis</i>		25		13
<i>Montipora danae</i>	1	1		
<i>Montipora divaricata</i>				1
<i>Montipora efflorescens</i>		58		26
<i>Montipora ehrenbergii</i>	4		32	
<i>Montipora elschneri</i>	27		16	
<i>Montipora floweri</i>		1		
<i>Montipora foveolata</i>		198	1	59
<i>Montipora granulosa</i>		2	3	1

	Fagatele Bay		Sites around Tutuila	
	1998	2001	1998	2001
<i>Montipora grisea</i>	93	125	81	160
<i>Montipora hispida</i>			1	3
<i>Montipora hoffmeisteri</i>	5	7	3	1
<i>Montipora informis</i>	3	23		54
<i>Montipora lobulata</i>			1	
<i>Montipora millepora</i>		3	2	4
<i>Montipora monasteriata</i>		16	10	11
<i>Montipora nodosa</i>		6		26
<i>Montipora sp</i>		3		6
<i>Montipora sp. 2</i>			4	
<i>Montipora tuberculosa</i>		58		42
<i>Montipora turgescens</i>	1			1
<i>Montipora venosa</i>	1	2		6
<i>Montipora verrilli</i>	67	5	59	
<i>Montipora verrucosa</i>		3		1
<i>Pavona clavus</i>	1			
<i>Pavona collines</i>		21		11
<i>Pavona decussata</i>			1	1
<i>Pavona divaricata</i>	88	39		
<i>Pavona explanulata</i>			4	2
<i>Pavona frondifera</i>				1
<i>Pavona minuta</i>			1	
<i>Pavona profundacella</i>	1			
<i>Pavona varians</i>	11	20	4	17
<i>Pavona venosa</i>	12	1	11	8
<i>Pavona verrucosa</i>				2
<i>Pavona sp. 2</i>	6		11	
<i>Pavona sp. 3</i>	22		6	
<i>Pavona sp. 4</i>			2	
<i>Pavona sp. 5</i>			1	
<i>Pavona sp. 6</i>			1	
<i>Platygyra daedalea</i>	1			
<i>Platygyra pini</i>				1
<i>Pocillopora damicornis</i>	1	5	9	41
<i>Pocillopora danae</i>	2		13	30
<i>Pocillopora elegans</i>			9	
<i>Pocillopora eydouxi</i>	30	80	37	18
<i>Pocillopora juvenile</i>		6		10
<i>Pocillopora ligulata</i>	1		2	
<i>Pocillopora meandrina</i>	7	46	1	60
<i>Pocillopora setchelli</i>			1	
<i>Pocillopora sp.</i>	1			
<i>Pocillopora verrucosa</i>	45	19	44	22
<i>Pocillopora woodjonesi</i>		1		
<i>Porites "mound"</i>		17		4
<i>Porites "yellow encrusting"</i>		1		3
<i>Porites annae</i>	7	10	1	9
<i>Porites cylindrica</i>	15	16	2	2
<i>Porites horizontalata</i>				1

	Fagatele Bay		Sites around Tutuila	
	1998	2001	1998	2001
<i>Porites lichen</i>	6	82		82
<i>Porites lutea</i>	23		3	
<i>Porites massive</i>		3		
<i>Porites rus</i>	100	58	15	17
<i>Porites sp. 2</i>	316	9	14	8
<i>Porites spp</i>		1		
<i>Porites vaughani</i>	2			
<i>Psammocora contigua</i>	9	5	8	3
<i>Psammocora haimeana</i>	5	7		11
<i>Psammocora nierstraszi</i>	4			
<i>Psammocora obtusangula</i>		5		
<i>Psammocora profundacella</i>		1		
<i>Psammocora samoensis</i>			3	
<i>Stylocoeniella armata</i>	25	35	1	
<i>Stylophora mordax</i>		1		
<i>Symphylia radians</i>	2		2	
<i>Turbinaria reniformis</i>	1			
Total no of colonies	1384	1391	609	937
Total no. of species	83	89	76	81

Table 2. Total number of colonies of each coral family recorded in point-quarter surveys of Fagatele Bay and Tutuila Island in 1998 and 2001.

Family	Fagatele Bay		Sites around Tutuila	
	1998	2001	1998	2001
Acroporiidae	380	697	314	488
Agariciidae	144	84	41	42
Astrocoeniidae	25	35	1	
Dendrophylliidae	1			
Faviidae	88	63	47	36
Fungiidae	8	6	3	1
Merulinidae	7	25		2
Milleporidae	44	8	18	26
Mussidae	3		2	
Oculinidae	103	98	17	15
Pectiniidae				
Pocilloporiidae	87	158	118	181
Poritiidae	475	198	37	129
Siderastreidae	19	19	11	17
Total no. of families	13	12	11	10
Total no. of colonies	1384	1391	609	937

Table 3. Abundance of hermatypic corals (number of colonies per m²) in Fagatele Bay National Marine Sanctuary from surveys conducted in 1985-2001. Data from 1985, 1988 and 1995 are from Birkeland et al 2003.

Depth	<u>Permanent Transect Number</u>					
	1	2	3	4	5	6
Reef flat						
1985		7.2	9.1	8.8		
1988		3.6	25.4			
1995		7.2	11.2	10.8		
1998		0.6	2.2	2.6		
2001			19.6*			
3m						
1985		2.0	23.3	3.2	15.4	
1988		8.0	33.4	6.2	10.3	
1995		13.6	12.6	3.4	4.6	
1998		7.7	11.0	11.0	4.1	
2001		24.6	14.2	29.9	5.0	
6m						
1985	6.8	2.5	34.5	1.4	3.7	20.4
1988		3.4	25.2	2.6	5.2	8.3
1995	8.8	6.0	14.3	6.2	5	6.6
1998		7.1	10.7	12.2	4.7	
2001		15.2	22.2	37.3	7.9	
9m						
1985	10.0	3.3	9.3	3.2	6.7	5.7
1988	11.9	5.5	15.3	3.4	9.6	
1995	9.1	11.0	8.6	1.0	7.0	5.8
1998		15.1		19.6	14.4	10.9
2001	16.9	20.3	14.9	15.1	13.7	9.3
12m						
1985	10.4	2.6	2.3	2.3	3.2	7.1
1988	7.1	17.1	14.8	14.7	5.8	8.1
1995	7.8	14.7	14.5	7.1	5.6	7.1
1998		10.9	16.7	7.3		20.6
2001	9.6	37.4	9.7	24.4	18.1	15.7

(*Survey actually conducted on reef flat platform between Transect 3 and Transect 4)

Table 4. Percent cover of substrata by hermatypic corals in Fagatele Bay National Marine Sanctuary from surveys conducted in 1985-2001. Data from 1985, 1988 and 1995 are from Birkeland et al 2003.

Depth	<u>Permanent Transect Number</u>					
	1	2	3	4	5	6
Reef flat						
1985		4.0	45.2	6.6		
1988		3.5	43.4			
1995		5.0	37.6	11.4		
1998		0.9	2.2	1.3		
2001			12.2*			
3m						
1985		1.1	25.6	2.2	46.2	
1988		7.3	31.8	6.1	15.8	
1995		16.9	37.0	5.6	7.3	
1998		19.4	18.3	20.1	18.6	
2001		69.9	17.0	54.5	37.1	
6m						
1985	17.1	1.2	11.8	0.9	12.9	20.2
1988		2.3	32.4	4.0	17.9	37.6
1995	26.5	13.8	21.0	7.4	8.0	5.8
1998		14.6	9.5	33.1	17.2	
2001		60.9	90.7	82.6	27.1	
9m						
1985	10.5	64.4	2.3	2.4	11.7	4.5
1988	31.6	3.9	6.9	2.8	7.6	
1995	12.7	10.9	3.5	1.9	0.7	2.4
1998		40.2		59.5	43.3	19.7
2001	53.4	131.1	87.5	95.0	90.0	35.0
12m						
1985	10.7	0.9	0.8	1.0	1.3	8.4
1988	10.9	7.2	5.2	6.5	5.6	10.9
1995	14.3	8.2	2.5	9.3	0.4	0.7
1998		47.3	82.3	145.3		34.9
2001	33.8	88.9	189.9	63.7	99.4	100.6

(*Survey actually conducted on reef flat platform between Transect 3 and Transect 4)

Table 5. Mean coral colony diameter (cm) in Fagatele Bay National Marine Sanctuary from surveys conducted in 1985-2001. Data from 1985, 1988 and 1995 are from Birkeland et al 2003.

Depth	<u>Permanent Transect Number</u>					
	1	2	3	4	5	6
Reef flat						
1985		6.4	14.4	8.6		
1988		9.1	10.9			
1995		7.1	14.1	7.8		
1998		11.3	8.4	6.1		
2001			7.0*			
3m						
1985		7.0	8.2	8.4	14.4	
1988		9.5	8.8	9.5	11.8	
1995		10.6	12.0	9.5	11.6	
1998		13.8	11.8	11.2	19.7	
2001		13.4	10.0	10.7	23.1	
6m						
1985	11.9	6.3	5.2	7.7	15.7	9.1
1988		7.6	9.3	10.8	14.8	16.2
1995	13.8	13.9	9.7	9.7	10.8	8.4
1998		13.7	8.6	14.9	17.3	
2001		15.5	15.2	10.8	16.4	
9m						
1985	8.3	18.9	5.1	7.1	10.8	8.7
1988	16.2	8.0	10.0	8.0	7.7	
1995	11.3	13.3	8.9	11.4	9.1	12.7
1998		12.0		12.5	15.6	11.8
2001	15.6	19.9	19.7	16.8	21.5	16.9
12m						
1985	10.3	5.4	5.3	6.0	6.5	11.0
1988	11.2	6.4	6.3	5.4	8.3	9.7
1995	35.9	10.5	5.3	10.4	9.6	8.9
1998		17.5	14.0		17.8	12.4
2001	15.6	13.8	26.6	11.9	18.9	21.9

(*Survey actually conducted on reef flat platform between Transect 3 and Transect 4)

Table 6. Abundance of hermatypic corals (number of colonies per m²) at sites around Tutuila Island from surveys conducted in 1982-2001. Data from 1982, 1985, 1988 and 1995 are from Birkeland et al 2003.

Location	Depth	Year	Number of coral colonies per m2
Anuu'u Island	2-3m	1982	
		1985	
		1988	
		1995	
		1998	
		2001	14.40
	6m	1982	
		1985	
		1988	
		1995	
		1998	
		2001	21.82
Aua	2-3m	1982	
		1985	
		1988	
		1995	
		1998	8.87
		2001	20.04
	6m	1982	
		1985	
		1988	
		1995	
		1998	20.26
		2001	10.96
Auasi	2-3m	1982	
		1985	
		1988	
		1995	
		1998	
		2001	26.01
	6m	1982	
		1985	
		1988	
		1995	
		1998	
		2001	16.24

Location	Depth	Year	Number of coral colonies per m2
Cape Larsen	2-3m	1982	7.88
		1985	7.81
		1988	14.13
		1995	11.22
		1998	6.8
		2001	23.8
	6m	1982	7.57
		1985	12.17
		1988	12
		1995	5.77
		1998	15.55
		2001	21.57
		Fagafue Bay	2-3m
1985	12.4		
1988	10.17		
1995	7.79		
1998	7.4		
2001			
6m	1982		5.41
	1985		13.88
	1988		12.2
	1995		9.2
	1998		
	2001		
	Fagasa Bay		2-3m
1985		4.29	
1988		16.61	
1995		15.07	
1998		11.69	
2001		8.75	
6m		1982	3.13
		1985	5.6
		1988	7.76
		1995	10.1
		1998	
		2001	9.63

Location	Depth	Year	Number of coral colonies per m2
Fatumafuti	2-3m	1982	22.19
		1985	18.79
		1988	21
		1995	24.43
		1998	
		2001	20.46
	6m	1982	19.66
		1985	17.41
		1988	18.7
		1995	
		1998	
		2001	45.83
Masefau Bay (inside)	2-3m	1982	2.89
		1985	3.51
		1988	4.2
		1995	7.38
		1998	2.3
		2001	11.12
	6m	1982	5.93
		1985	8.14
		1988	12.41
		1995	5.3
		1998	
		2001	16.82
Massacre Bay	2-3m	1982	11.92
		1985	28.83
		1988	14.8
		1995	20.01
		1998	12.89
		2001	
	6m	1982	5.9
		1985	18.23
		1988	15.57
		1995	19.26
		1998	
		2001	

Location	Depth	Year	Number of coral colonies per m2
Rainmaker Hotel	2-3m	1982	4.69
		1985	8.25
		1988	7.54
		1995	9.23
		1998	
		2001	8.02
	6m	1982	11.58
		1985	0.84
		1988	0.25
		1995	2.95
		1998	2.28
		2001	1.15

Table 7. Percent cover of substrata by hermatypic corals at sites around Tutuila Island from surveys conducted in 1982-2001. Data from 1982, 1985, 1988 and 1995 are from Birkeland et al 2003.

Location	Depth	Year	Percent cover by coral colonies
Anuu'u Island	2-3m	1982	
		1985	
		1988	
		1995	
		1998	
		2001	47.56
	6m	1982	
		1985	
		1988	
		1995	
		1998	
		2001	112.05
Aua	2-3m	1982	
		1985	
		1988	
		1995	
		1998	31.81
		2001	37.67
	6m	1982	
		1985	
		1988	
		1995	
		1998	26.7
		2001	60.31
Auasi	2-3m	1982	
		1985	
		1988	
		1995	
		1998	
		2001	35.58
	6m	1982	
		1985	
		1988	
		1995	
		1998	
		2001	72.06

Location	Depth	Year	Percent cover by coral colonies
Cape Larsen	2-3m	1982	10.65
		1985	14.25
		1988	34.8
		1995	19.51
		1998	20.41
		2001	110.6
	6m	1982	7.35
		1985	22.34
		1988	29.7
		1995	1.79
		1998	38.96
		2001	68.42
Fagafue Bay	2-3m	1982	80.1
		1985	85.5
		1988	32.9
		1995	14.64
		1998	24.19
		2001	
	6m	1982	115.44
		1985	98.43
		1988	93.5
		1995	2.4
		1998	
		2001	
Fagasa Bay	2-3m	1982	16.77
		1985	1.93
		1988	61.3
		1995	24.74
		1998	39.9
		2001	65.82
	6m	1982	2.48
		1985	21.33
		1988	51.3
		1995	2.72
		1998	
		2001	92.32

Location	Depth	Year	Percent cover by coral colonies		
Fatunafuti	2-3m	1982	17.34		
		1985	61.49		
		1988	30.3		
		1995	13.45		
		1998			
		2001	9.62		
	6m	1982			
		1985			
		1988	23.2		
		1995	5.5		
		1998			
		2001	38.72		
		Masefau Bay (inside)	2-3m	1982	12.31
				1985	3.69
1988	8.7				
1995	8.18				
1998	6.54				
2001	96.07				
6m	1982		32.85		
	1985		66.08		
	1988		2.8		
	1995		1.69		
	1998				
	2001		189.15		
	Massacre Bay		2-3m	1982	59.99
				1985	88.69
1988		45.4			
1995		13.17			
1998		30.46			
2001					
6m		1982	60.6		
		1985	91.68		
		1988	127.1		
		1995	15.55		
		1998			
		2001			

Location	Depth	Year	Percent cover by coral colonies
Rainmaker Hotel	2-3m	1982	6.65
		1985	11.38
		1988	3.2
		1995	12.04
		1998	
		2001	5.33
	6m	1982	27.72
		1985	19.19
		1988	18.7
		1995	3.06
		1998	2.99
		2001	47.28

Table 8. Mean diameter (cm) of hermatypic corals at sites around Tutuila Island from surveys conducted in 1982-2001. Data from 1992, 1985, 1988 and 1995 are from Birkeland et al 2003.

Location	Depth	Year	Mean colony diameter (cm)		
Anuu'u Island	2-3m	1982			
		1985			
		1988			
		1995			
		1998			
		2001	14.06		
	6m	1982			
		1985			
		1988			
		1995			
		1998			
		2001	18.95		
		Aua	2-3m	1982	
				1985	
1988					
1995					
1998	16.18				
2001	10.23				
6m	1982				
	1985				
	1988				
	1995				
	1998		11.93		
	2001		15.09		
Auasi	2-3m	1982			
		1985			
		1988			
		1995			
		1998			
		2001	10.16		
	6m	1982			
		1985			
		1988			
		1995			
		1998			
		2001	15.56		

Location	Depth	Year	Mean colony diameter (cm)
Cape Larsen	2-3m	1982	8.9
		1985	12.3
		1988	14.7
		1995	13
		1998	16.89
		2001	17.99
	6m	1982	7.7
		1985	11.9
		1988	14.4
		1995	14.6
		1998	13.3
		2001	16.98
Fagafue Bay	2-3m	1982	28.0
		1985	22.1
		1988	17.2
		1995	13.9
		1998	17.01
		2001	
	6m	1982	32.4
		1985	20.1
		1988	20.6
		1995	12.0
		1998	
		2001	
Fagasa Bay	2-3m	1982	10.9
		1985	6.3
		1988	16.4
		1995	12.1
		1998	16.32
		2001	23.08
	6m	1982	6.6
		1985	15.2
		1988	20.3
		1995	11.2
		1998	
		2001	25.5

Location	Depth	Year	Mean colony diameter (cm)
Fatumafuti	2-3m	1982	9.8
		1985	11.4
		1988	10.6
		1995	7.4
		1998	
		2001	6.23
	6m	1982	8.3
		1985	19.2
		1988	8.8
		1995	7.0
		1998	
		2001	7.43
		Masefau Bay (inside)	2-3m
1985	8.9		
1988	9.1		
1995	9.9		
1998	15.21		
2001	23.64		
6m	1982		14.9
	1985		30.6
	1988		4.2
	1995		10.3
	1998		
	2001		25.39
	Massacre Bay		2-3m
1985		14.7	
1988		16.5	
1995		8.1	
1998		14.75	
2001			
6m		1982	26.0
		1985	21.8
		1988	22.4
		1995	15.8
		1998	
		2001	

Location	Depth	Year	Mean colony diameter (cm)
Rainmaker Hotel	2-3m	1982	8.8
		1985	9.3
		1988	6.6
		1995	8.4
		1998	
		2001	7.37
	6m	1982	11.9
		1985	22.4
		1988	40.6
		1995	29.5
		1998	11.01
		2001	29.06

Fish

Fagatele Bay - 1998

A total of 2939 fish belonging to 112 species were recorded in the transect surveys in Fagatele Bay in 1998 (Tables 9 & 10). Of these, 13 were new species records for the transect surveys, although six of these (*) had been sighted in the vicinity of the transects during previous surveys:

*Acanthurus albipectoralis** (F. Acanthuridae);
Pseudobalistes flavimarginatus (F. Balistidae);
*Caesio cuning** (F. Caesionidae);
*Caranx melampygus** (Family Carangidae);
*Heniochrus varius** (F. Chaetodontidae);
Spratelloides delicatulus (F. Clupeidae);
Chelinus chlorourus (F. Labridae);
Aluterus scriptus and *Oxymonocanthus longirostris* (F. Monacanthidae)
Chromis weberi and *Dascyllus reticulatus** (F. Pomacentridae);
Hipposcarus longiceps and *Scarus ghobban** (F. Scaridae).

An additional 46 species were observed in the vicinity of the transects. New species sighted in the bay, but not recorded on transects included:

Tylosurus crocodilus (F. Belonidae);
Chaetodon speculum (F. Chaetodontidae);
Crenimugil crenilabrus (F. Mugilidae);
Cheilinus fasciatus and *Labropsis australis* (F. Labridae);
Centropyge bicolor (F. Pomacanthidae);
Chromis alpha (F. Pomacentridae);
Arothron meleagris (F. Tetraodontidae); and
Terapon jarbua (F. Terapontidae).

Four of these new species also represented new family and generic records for Fagatele Bay (Families Belonidae, Clupeidae, Mugilidae, and Terapontidae). This brings the total number of species recorded in the bay to 271 (118 genera and 44 families: see Appendix 6).

A total of 2619 individual fish from 106 species was recorded on the reef slope in 1998 (3m-18m). The dominant fishes on the reef slope were similar to those recorded in previous surveys (see Birkeland et al. 1987, 2003). They include four acanthurids (*Ctenochaetus striatus*, *Ctenochaetus strigosus*, *Acanthurus nigrofuscus* and *Acanthurus nigricans*), one labrid (*Thalassoma quinquevittatum*), six pomacentrids (*Chromis acares*, *C. iomelas*, *C. xanthura*, *Pomacentrus vaiuli*, *P. brachialis* and *Plectroglyphidodon lacrymatus*), and one scarid (*Clororus sordidus*: Table 9).

Fishes were surveyed on the deep reef slope for the first time in 1998. The fish assemblages present at 18m were most similar to those recorded on the reef slope at 12m (Table 9), although species richness and abundance were generally lower at 18m than at 12m (Figures 3 and 4, Table 9). Notably, there was an apparent switch in the abundance of two closely related species in shallow and deep water. *Ctenochaetus striatus*, one of the dominant fish species in shallow water (depth = 3m-12m), was less abundant in deeper water at 18m. However, *Ctenochaetus strigosus*, was more abundant at 18m than it was in shallower water (3-12m; Table 9).

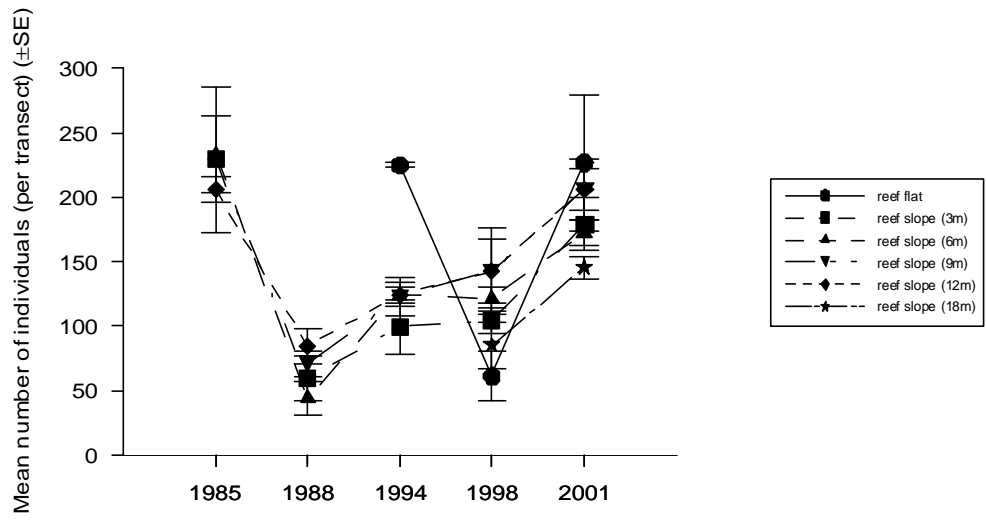


Figure 3. Mean (and SE) of species richness of fishes on the reef slope in Fagatele Bay during surveys conducted from 1985-2001.

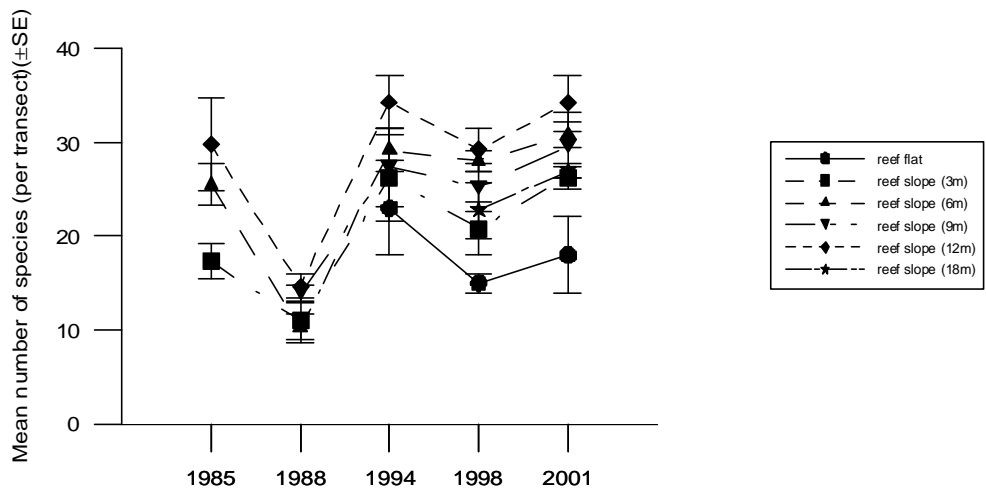


Figure 4. Mean (and SE) of abundance of fishes on the reef slope in Fagatele Bay during surveys conducted from 1985-2001.

Additional qualitative observations were made in deeper water on the reef slope (20-50m). In summary we noted that:

- Fish species richness and abundance tended to decrease with increasing depth. In particular, there was a noticeable decline below the thermocline, which occurred at a depth of 25m.
- Fish assemblages above the thermocline (20-25m) were similar to those described at 18 m (see above).
- Common species on the deep reef slope below the thermocline (25m) included acanthurids (*Ctenochaetus strigosus*) and pomacentrids (*Chromis alpha*, *Chromis iomelas* and *Chrysiptera cyanea*). Less common species observed on the deep reef slope and adjacent sand flat (35-50m) included:

acanthurids	<i>Zebrasoma scopas</i> ;
caesionids	<i>Caesio caerulea</i> * and <i>C. cuning</i> ;
chaetodontids	<i>Chaetodon reticulatus</i> , <i>Forcipiger flavissimus</i> , and <i>Hemitaurichthys polylepis</i> *;
gobiids	<i>Valenciennea strigata</i> *
labrids	<i>Bodianus loxozonus</i> *, <i>Cheilinus fasciatus</i> *, <i>Halichoeres biocellatus</i> , <i>Macropharyngodon meleagris</i> *, <i>Labropsis australis</i> *, <i>Pseudocheilinus evanidus</i> *, and <i>Pseudodax mollucanus</i> ;
malacanthids	<i>Malacanthus latovittatus</i> *;
mullids	<i>Parupeneus multifasciatus</i> and <i>P. pleurostigma</i> *;
pomacanthids	<i>Apolemichthys trimaculatus</i> *, <i>Centropyge bicolor</i> * and <i>C. bispinosus</i> ;
serranids	<i>Epinephelus hexagonatus</i> * and <i>Variola louti</i> *.

- Of the species observed below the thermocline, 14 were not recorded in shallower water in this survey (those marked with an asterisk above). In addition, two species (*Labropsis australis* and *Centropyge bicolor*) have only been recorded below the thermocline.
- One species, *Chromis alpha*, was particularly abundant below the thermocline, but was uncommon in shallower water (Table 1). This species is also a new record for the bay (see above).

Only a small proportion of the fishes recorded in the quantitative survey was observed on the reef flat (Table 10). A total of 320 individuals and 21 species were recorded on the reef flat transects, while another three species were observed in the vicinity of the transects. This was probably due to lower species richness on the reef flat than the reef slope (Figure 4), as well as the much smaller area surveyed on the reef flat (area = 120m² vs. 1320m²). Even though species richness is lower on the reef flat, fish abundance is usually high due to the high abundance of a few species eg schooling fishes such as *Spratelloides delicatulus* and common species such as the acanthurid *Ctenochaetus striatus*, and the damselfish *Stegastes albifasciatus*.

The dominant fishes on the reef flat were similar to those recorded for that habitat type in the last survey (Birkeland et al 2003). They included: three pomacentrids (*Stegastes albifasciatus*, *Chrysiptera cyanea* and *C. leucopoma*), three acanthurids (*Ctenochaetus striatus*, *Acanthurus nigrofuscus* and *Acanthurus triostegus*), one labrid (*Thalassoma hardwicke*) and unidentified juvenile scarids (*Scarus* spp.: Table 10). Two of these species were not abundant on the adjacent reef slope (*S. albifasciatus*, and *A. triostegus*; Table 9).

Fagatele Bay - 2001

A total of 4908 fish belonging to 135 species were recorded during transect surveys in Fagatele Bay in 2001 (Tables 11 & 12). Of these, 14 were new species records for the transect surveys, although seven of these (*) had been sighted in the vicinity of the transects during previous surveys:

Acanthurus nigroris, *Naso unicornis** and *Naso sp.* (Family Acanthuridae);
*Chaetodon melannotus**, *Heniochus chrysostomus** and *H. monoceros* (F. Chaetodontidae);
Plectorhinchus orientalis (F. Haemulidae);
*Lutjanus bohar** (F. Lutjanidae);
Parupeneus sp. (F. Mullidae);
*Ostracion meleagris** (F. Ostraciidae);
Apolemichthys trimaculatus and *Pomacentrus imperator* (F. Pomacanthidae);
*Scarus schlegeli** (F. Scariidae) and
*Arothron meleagris** (F. Tetraodontidae).

One of these species also represented a new family and genus record for Fagatele Bay (Genus *Plectorhinchus*, Family Haemulidae). This brings the total number of species recorded in Fagatele Bay to 215 (119 genera and 45 families).

A total of 4456 individual fish from 130 species was recorded on the reef slope in 2001 (3m-18m). The dominant fishes on the reef slope were similar to those recorded in previous years and include four acanthurids (*Ctenochaetus striatus*, *Acanthurus nigrofuscus* and *Acanthurus nigricans*, *Zebrasoma scopas*), one labrid (*Thalassoma quinquevittatum*) six pomacentrids (*Chromis acares*, *C. iomelas*, *Pomacentrus vaiuli*, *P. brachialis* and *Plectroglyphidodon lacrymatus* and *Plectroglyphidodon dickii*) (Table 11).

A total of 453 individuals and 27 species were recorded on the reef flat transects in 2001. The dominant fishes on the reef flat were again very similar to previous surveys and included four pomacentrids (*Stegastes albifasciatus*, *Stegastes nigricans*, *Chrysiptera cyanea* and *C. leucopoma*), three acanthurids (*Ctenochaetus striatus*, *Acanthurus lineatus* and *Acanthurus triostegus*), and one labrid (*Thalassoma hardwicke*) (Table 12). Four of these species were not abundant on the adjacent reef slope (*S. albifasciatus*, *S. nigricans*, *C. leucopoma* and *A. triostegus* Table 11).

Sites around Tutuila Island – 1998 & 2001

At each of the sites where corals were surveyed around Tutuila Island, we used one 30 x 2m transect to survey fish at depths of 3m and 6m. However, the fish data have not been analysed for this report due to a decision to discontinue this aspect of the survey. We believe the method used for these fish surveys is inappropriate to properly monitor trends in fish communities around the island, and due to the lack of replication, generally produce poor results.

The three additional sites where fish were surveyed in 100m transects at Fagatele Bay, Sita Bay and Cape Larsen are not directly comparable with each other in the context that each transect is run at a different depth or exposure (see methods). Surveys are done at these sites

only to monitor long-term changes in fish communities at each site. The number and species of fish recorded at these three sites in 1998 and 2001 are presented in Tables 13 & 14.

Trends in fish populations 1995-2001 – Fagatele Bay

The abundance of fish in Fagatele Bay has shown a gradual increase over the last six years. With the exception of the reef flat areas, all sites showed a slight increase in abundance from 1995 to 1998, with a more dramatic increase between 1998 and 2001. However, the overall abundance of fish in Fagatele Bay in the 2001 surveys is still lower than levels recorded in the first survey in 1985 (Figure 3).

The same general trends in species richness are apparent across all depths on the reef slope (3-18m) from 1995 to 2001. Specifically, there was a slight drop in species richness between 1994 and 1998, although by 2001 species richness had returned to 1995 levels (Figure 4). On the reef flat, species richness also dropped in 1998, although despite a subsequent increase in the number of species, 2001 levels remained below those recorded in 1995. There has been an overall increase in species richness on the reef slope in Fagatele Bay from 1985 to 2001 (Figure 4), although the notable drop in species richness in 1988 may well be due to variation among observers (all surveys since 1994 have been done by Alison Green).

Trends in fish populations 1995-2001 – Sites around Tutuila

Species richness and fish abundance at sites outside Fagatele Bay were similar to the patterns observed within Fagatele Bay. Changes in fish abundance outside Fagatele Bay mirrored changes inside the bay. Fish abundance gradually increased from 1995 to 2001, and were approaching peak levels recorded in 1985 (despite a slight drop in fish abundance in Sita Bay from 1995 to 1998) (Figure 5). Overall there was little difference in species richness between the 1995 and 2001 surveys, and species richness was similar to, but slightly higher than, that recorded in 1977 and 1985, and higher than in 1988 (Figure 6).

Abundance of fish at the three sites around Tutuila varied considerably at the family level. Acanthurids, Chaetodontids, Pomacentrids and Scarids have all increased in abundance at all three sites between 1995 and 2001 (with the exception of Scarids at Fagatele Bay which were unusually common in 1995; Figure 7). Fish from three of the families (Acanthuridae, Chaetodontidae and Scaridae) were more common in 2001 than in 1978, but Pomacentrid abundance was considerably lower in 2001 than in 1977 (Figure 7).

Labrid abundance varied in a similar way among all three sites, although there was a slight drop in labrid abundance both at Cape Larsen and Fagatele Bay between 1995 and 2001. Labrids were less abundant in 2001 than in 1977. The abundance of Caesionids, Cirrhitids and Serranids has varied unpredictably among surveys, although the abundance both of Serranids and Cirrhitids were similar in the 1977 and 2001 surveys (Figure 7).

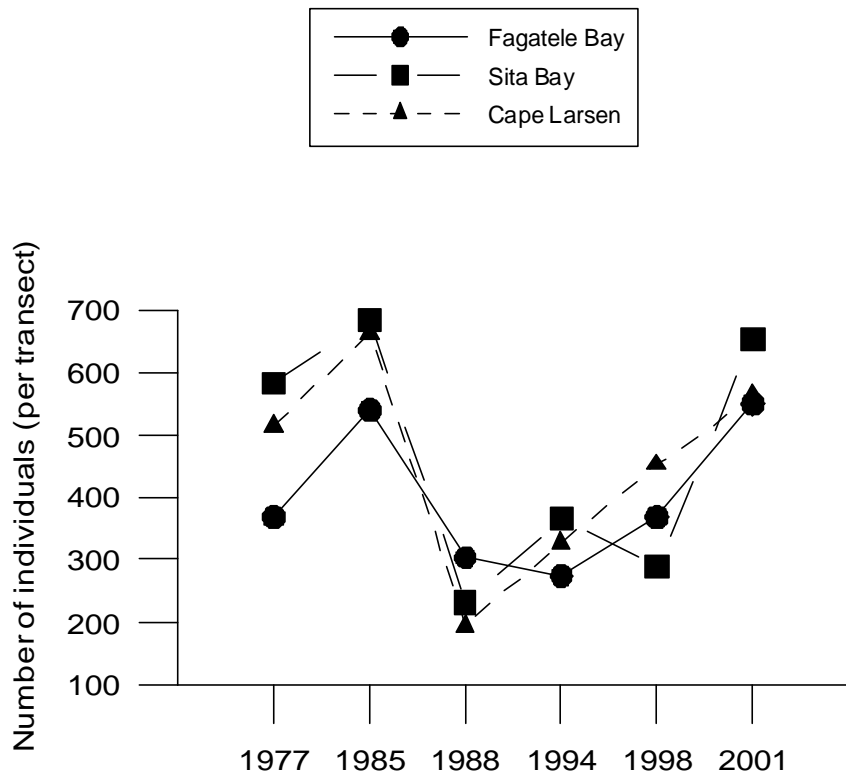


Figure 5. Abundance of fishes on the reef slope at three sites around Tutuila Island during surveys conducted from 1977-2001.

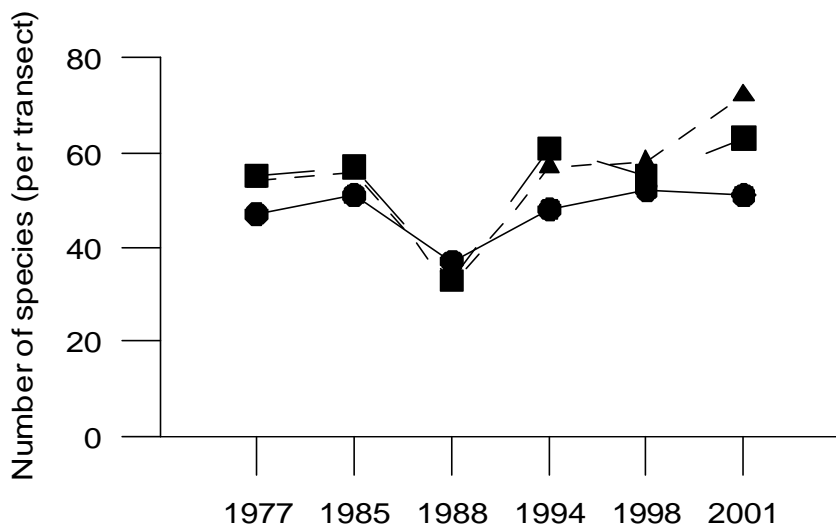


Figure 6. Species richness of fishes on the reef slope at three sites around Tutuila Island during surveys conducted from 1977-2001.

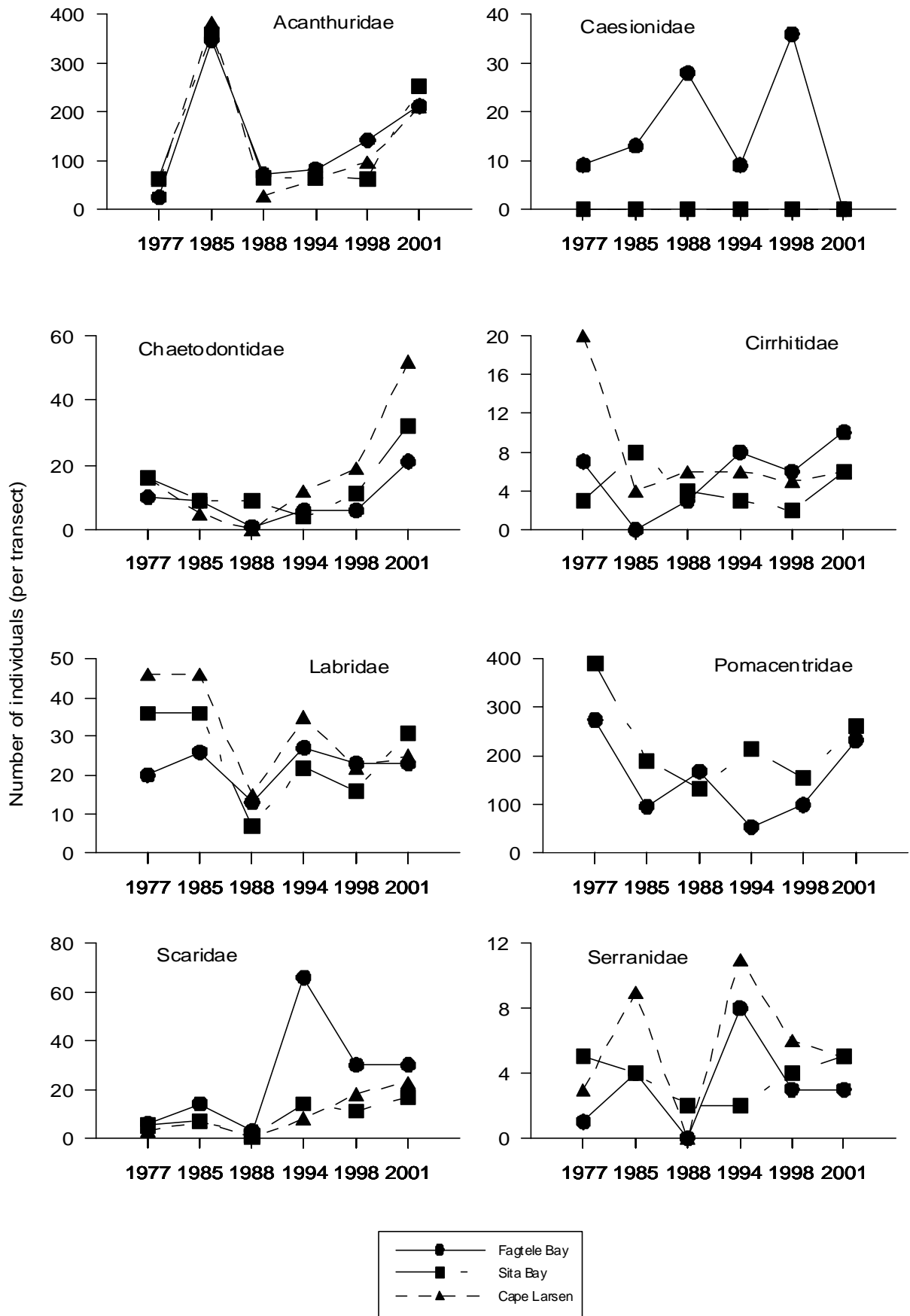


Figure 7. Abundance of fishes from each of eight Families on the reef slope at three sites around Tutuila Island during surveys conducted from 1977-2001

Table 9. Fishes recorded on the reef slope at different depths at each of five sites in Fagatele Bay National Marine Sanctuary in April 1998. Note Site 1 was not surveyed in 1998. Numbers represent fish counted on transects. P = fish present in the vicinity of the transect.

	Site 2					Site 3					Site 4					Site 5					Site 6		
	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	9m	12m	
CLASS OSTEICHTHYES																							
FAMILY ACANTHURIDAE																							
<i>Acanthurus achilles</i>						P										1						7	3
<i>A. albipectoralis</i>																						10	1
<i>A. blochii</i>				P													P						1
<i>A. guttatus</i>	13															4							
<i>A. lineatus</i>	2	4	1	2		1									4	4	1				2	1	
<i>A. nigricans</i>	3	3	2	1		1	9	2	1	1	2	1		7	1	7	5	15	5	1	3	13	
<i>A. nigricauda</i>									P														
<i>A. nigrofuscus</i>	3	1	1		3	21	5	1	1	3	7	1	2	1	1			2	1	1	4		
<i>A. pyroferus</i>					P																		
<i>A. triostegus</i>						4					P	P											
<i>Ctenochaetus striatus</i>	31	27	40	41	15	28	48	23	30	2	14	31	37	26	19	31	35	30	12	19	100	58	
<i>C. strigosus</i>		1	1	2	4		P		3	12		P	4	7	12		P	1	1	7	5	1	
<i>Naso lituratus</i>	P	P		1	P	P		P	1	P		3	P	P	1	4		1	3	1		2	
<i>Zebrasoma scopas</i>	4	2	P	2	2	1	2	4	2	1	5	7	4	3	5					6		P	
<i>Z. veliferum</i>		1																					
FAMILY AULOSTOMIDAE																							
<i>Aulostomus chinensis</i>		1	P				P																
FAMILY BALISTIDAE																							
<i>Balistapus undulatus</i>		1	P			1	2		2	1		P		P	1		P		2	1	2	2	
<i>Melichthys niger</i>																	P	P	P		P		
<i>M. vidua</i>	P	1		P		P	1		1	P		1	P	4	1			1	2	P	P		
<i>Pseudobalistes flavimarginatus</i>				1	P				P								P						
<i>Rhinecanthus rectangulus</i>																P	P						
<i>Sufflamen bursa</i>					P											P						1	

	Site 2					Site 3					Site 4					Site 5					Site 6	
	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	9m	12m
FAMILY BELONIDAE																						
<i>Tylosurus crocodilus</i>	P					P																
FAMILY BLENNIDAE																						
<i>Meiacanthus atrodorsalis</i>					2					3												
unidentified blenniids				1		P		P	2			2	3				1	7	2			1
FAMILY CAESIONIDAE																						
<i>Caesio cuning</i>														P							6	P
<i>Pterocaesio tile</i>			P					16						1								
P. spp.														P								
FAMILY CARANGIDAE																						
<i>Caranx melampygus</i>			P			P											P					
<i>Scomberoides lysan</i>																		P				
FAMILY CHAETODONTIDAE																						
<i>Chaetodon auriga</i>											P											
<i>C. bennetti</i>									P					P								
<i>C. citrinellus</i>						1																P
<i>C. ephippium</i>		P				1						P		P		1	P		P		2	P
<i>C. lunula</i>		1	P				P															
<i>C. melannotus</i>								P														
<i>C. ornatissimus</i>						P									2						2	2
<i>C. pelewensis</i>														P							P	
<i>C. quadrimaculatus</i>																	P	1				
<i>C. rafflesi</i>		P					P					P										
<i>C. reticulatus</i>		2	2	P	1	4	2	3	P		2	2	P				2	P			P	2
<i>C. semeion</i>		1	P						P			P	P	1	P		P	P				P
<i>C. speculum</i>	P													P								
<i>C. trifascialis</i>	P				P		P															

	Site 2					Site 3					Site 4					Site 5					Site 6	
	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	9m	12m
<i>C. trifasciatus</i>	1	P				1					P	P										4
<i>C. ulietensis</i>	2						P	P				P								P		
<i>C. unimaculatus</i>																		P				
<i>C. vagabundus</i>						P	P		P			2	P	P			P				P	
<i>Forcipiger flavissimus</i>			P	P	P		3							1	1						P	
<i>Heniochus chrysostomus</i>								P			P									P		
<i>H. varius</i>			P	P			P		3													
<i>Zebrasoma veliferum</i>																						P
FAMILY CIRRHITIDAE																						
<i>Paracirrhites arcatus</i>	P		2		4	P	1					1								2	2	
<i>P. forsteri</i>									2													
<i>P. hemistictus</i>		1		1	1	P	P		P			1		1								1
FAMILY FISTULARIIDAE																						
<i>Fistularia commersonii</i>																	P					
FAMILY HOLOCENTRIDAE																						
<i>Myripristis berndti</i>																						1
<i>Neoniphon sammara</i>																			P			
FAMILY KYPHOSIDAE																						
<i>Kkyphosus vaigiensis</i>	P	P	P			P	2					4										
FAMILY LABRIDAE																						
<i>Anampses twistii</i>	P						1	2					P		1							
<i>Bodianus axillaris</i>										2	P											
<i>Cheilinus chlorourus</i>			1																			
<i>C. digrammus</i>		1			P				P			P			1		1			P		
<i>C. fasciatus</i>				P																		
<i>C. oxycephalus</i>						P			P													

	Site 2					Site 3					Site 4					Site 5					Site 6	
	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	9m	12m
<i>C. unifasciatus</i>						P	1									P	1					P
<i>Coris aygula</i>						P			P													
<i>C. gaimard</i>																	P		P	1		
<i>Epibulus insidiator</i>	1						1	P	1			1		P	P		1					P
<i>Gomphosus varius</i>	1	1	P	1			2	3	P		1	1	P				2	3	3			3
<i>Halichoeres biocellatus</i>					1										3				1	2		
<i>H. hortulanus</i>					P			1	P	1				P								4
<i>H. marginatus</i>						3	3										1					3
<i>Hemigymnus fasciatus</i>	1	1	P	1			P	1	1			P		P			2	P	P	1	4	1
<i>H. melapterus</i>												P					P					P
<i>Labrichthys unilineatus</i>								3	1													
<i>Labroides bicolor</i>	1				P	1					1			1					P			1
<i>L. dimidiatus</i>					P	P	1	1	P			1	2		1	1	1		P	P		
<i>L. rubrolabiatus</i>		1		1				1	3								P	P			1	3
<i>Labropsis xanthonota</i>				1				P	P					P	2		P					P
<i>Novaculichthys taeniourus</i>					P																	
<i>Pseudocheilinus hexataenia</i>						P						1						1				P
<i>P. octotaenia</i>																			1			
<i>Pseudodax moluccanus</i>	P	P																				
<i>Stethojulis bandanensis</i>					P																	
<i>Thalassoma hardwicke</i>	2	2	P	P		6	2	1	P		6	3		1		P						
<i>T. lutescens</i>		1		1				2	2					P					1		P	P
<i>T. quinquevittatum</i>	8	1	1			1	3	1	P		10	7	2	1		20	21	3			3	
FAMILY LETHRINIDAE																						
<i>Monotaxis grandoculis</i>					1		P				P			P			1		P	P		P
FAMILY LUTJANIDAE																						
<i>Aphareus furca</i>	1		3	4	1	P	1		1		P		1	P					P		1	4
<i>Aprion virescens</i>																			P			
<i>Lutjanus bohar</i>		P																				

	Site 2					Site 3					Site 4					Site 5					Site 6		
	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	9m	12m	
<i>L. fulvus</i>						P	P																
<i>Macolor macularis</i>														P									
<i>M. niger</i>					1					P											P		
FAMILY MICRODESMIDAE																							
<i>Nemateleotris magnifica</i>										P													
<i>Ptereleotris evides</i>					P								P		P								
FAMILY MONACANTHIDAE																							
<i>Aluterus scriptus</i>						1	P					P											
<i>Amanses scopas</i>	P	P	P				P	1						2						P		1	
<i>Cantherhines dumerilii</i>																		P	P	2			1
<i>Oxymonacanthus longirostris</i>							P				2												
FAMILY MUGILIDAE																							
<i>Crenimugil crenilabrus</i>	P																						
FAMILY MULLIDAE																							
<i>Mulloides flavolineatus</i>											P												
<i>M. vanicolensis</i>								1															
<i>Parupeneus bifasciatus</i>						1																4	1
<i>P. cyclostomus</i>	P	P		1		P					2				P	1				P			
<i>P. multifasciatus</i>					1	P		1											2				
FAMILY OSTRACIIDAE																							
<i>Ostracion meleagris</i>		P	P															P					
FAMILY PINGUIPEDIDAE																							
<i>Parapercis clathrata</i>					2													1		1	P		
FAMILY POMACANTHIDAE																							

	Site 2					Site 3					Site 4					Site 5					Site 6	
	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	9m	12m
<i>Centropyge bispinosus</i>				1	1				P	1					2					2		
<i>C. flavissimus</i>	P		1			2	P	P					P					1			3	1
<i>Pygoplites diacanthus</i>			P	P				1	1						1				1	1	1	2
FAMILY POMACENTRIDAE																						
<i>Abudefduf septemfasciatus</i>																P						
<i>A. sexfasciatus</i>				P												P						
<i>Amphiprion chrysopterus</i>		P										1		2	4							
<i>A. melanopus</i>						P									6							
<i>Chromis acares</i>		20	40	45				29	57				28	13				P			5	56
<i>C. agilis</i>				1				P						P								
<i>C. alpha</i>					P										P							
<i>C. iomelas</i>			P	1	9		3		7	1	1		6	14	5				11	6		
<i>C. margaritifer</i>							2		1									3			6	10
<i>C. weberi</i>															11							
<i>C. xanthurus</i>		P		P		1						P	P	1	23		P	18	P	P	35	20
<i>Chrysiptera cyanea</i>	6					14					11					4	1					
<i>C. leucopoma</i>						P										11	1					
<i>Dascyllus reticulatus</i>		3		4			2		P													
<i>D. trimaculatus</i>													3	1	6					P		
<i>Plectroglyphidodon dickii</i>	1	13	1					3	1		3	9									12	2
<i>P. johnstonianus</i>		1		1			P	1	1				2	2							4	1
<i>P. lacrymatus</i>		2	3	1	3	8	20	10	3		5	10	2	2				3	2	5		3
<i>Pomacentrus brachialis</i>	2	12	9	7	4		19	9	19	12		3		1				7			1	28
<i>P. vaiuli</i>	4	P	P		6			P	1	8	3	4	7	7	11				6	15	2	2
<i>Stegastes fasciolatus</i>	1						2					2				4	24	2				
FAMILY SCARIDAE																						
<i>Calatomus carolinus</i>				1				P		P			P	P								
<i>Cetoscarus bicolor</i>																	3					
<i>Hipposcarus longiceps</i>																	1					

	Site 2					Site 3					Site 4					Site 5					Site 6	
	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	9m	12m
<i>Scarus forsteni</i>					P		P					3	P	4			P	1		1	3	
<i>S. frenatus</i>						2		P	2		1		1	1		1	1		P	P	P	
<i>S. frontalis</i>			P										1									
<i>S. ghobban</i>	P	P	1																			
<i>S. globiceps</i>			P	P						P	P	4										
<i>S. microrhinos</i>					P	P		P	P		3							P	1	P		
<i>S. niger</i>									1			1										
<i>S. oviceps</i>	5	P	1	1	3	4	1	P	2			P	3	P	2			2	P	1	P	1
<i>S. psittacus</i>	6	6		2	1	12	P	2			1	3	P				1					6
<i>S. pyrrhurus</i>				2		3	1					P					2	1	1		1	5
<i>S. rubroviolaceus</i>				P			P					1				P	1					2
<i>S. schlegeli</i>					P															P		
<i>S. sordidus</i>	5	2	1	5	7	11	9	6	1	1	1		4	2	7			3		1	3	3
<i>S. spinus</i>		1			1			P				P	2		1				2			1
FAMILY SERRANIDAE																						
<i>Cephalopholis argus</i>		P			P				1	1		P		P	1	2						2
<i>C. urodeta</i>					P		1	P				1	1	1			1	P			1	P
<i>Epinephelus merra</i>						P																
<i>Pseudanthias pascalus</i>																			P			P
FAMILY SPHYRAENIDAE																						
<i>Sphyraena barracuda</i>																						P
FAMILY TETRAODONTIDAE																						
<i>Arothron nigropunctatus</i>											P											
<i>A. meleagris</i>																						P
FAMILY TERAPONTIDAE																						
<i>Terapon jarbua</i>	P																					

	Site 2					Site 3					Site 4					Site 5					Site 6		
	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	9m	12m	
FAMILY ZANCLIDAE																							
<i>Zanclus cornutus</i>			1											P	1		P		P	2	2	5	
TOTALS:																							
# individuals on transect	104	115	112	134	74	134	150	129	155	50	85	105	121	104	135	94	115	109	59	80	242	260	
# species on transect	23	30	19	29	23	26	29	27	31	15	21	28	23	24	30	13	25	23	20	22	34	41	
# species on transect & vicinity	38	46	39	41	42	50	49	44	49	21	34	43	40	42	35	21	43	36	36	35	47	55	

Table 10. Fishes recorded on the reef flat at each of two sites in Fagatele Bay National Marine Sanctuary in April 1998. Numbers represent fish counted on transects. P = fish present in the vicinity of the transect.

	Site B	Site C
CLASS OSTEICHTHYES		
FAMILY ACANTHURIDAE		
<i>Acanthurus lineatus</i>	1	
<i>A. nigrofuscus</i>		8
<i>A. triostegus</i>	6	4
<i>Ctenochaetus striatus</i>	18	22
<i>Zebrasoma scopas</i>	1	2
FAMILY CARANGIDAE		
<i>Caranx melampygus</i>	1	
FAMILY CHAETODONTIDAE		
<i>Chaetodon citrinellus</i>		2
<i>C. trifasciatus</i>		2
FAMILY CLUPEIDAE		
<i>Spratelloides delicatulus</i>	110	
FAMILY LABRIDAE		
<i>Gomphosus varius</i>		1
<i>Halichoeres hortulanus</i>	P	2
<i>H. marginatus</i>	1	2
<i>Thalassoma hardwicke</i>	5	3
FAMILY LETHRINIDAE		
<i>Lethrinus harak</i>		1
FAMILY POMACENTRIDAE		
<i>Abudefduf septemfasciatus</i>	4	1
<i>Chrysiptera cyanea</i>	4	4
<i>C. leucopoma</i>	12	15
<i>Plectroglyphidodon leucozonus</i>	P	
<i>Stegastes albifasciatus</i>	39	23
FAMILY SCARIDAE		
<i>Scarus globiceps</i>		p
<i>S. spinus</i>	2	
unidentified juveniles	23	
FAMILY TETRAODONTIDAE		
<i>Canthigaster solandri</i>	P	
FAMILY ZANCLIDAE		
<i>Zanclus cornutus</i>		1
Total # Individuals on transect	227	93
Total # species on transect	14	16
Total # species on transect & vicinity	17	17

Table 11. Fishes recorded on the reef slope at different depths at each of six sites in Fagatele Bay National Marine Sanctuary in February 2001. Numbers represent fish counted on transects. P = fish present in the vicinity of the transect.

	Site 1		Site 2			Site 3			Site 4			Site 5			Site 6										
	9m	12m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	9m	12m						
CLASS OSTEICHTHYES																									
FAMILY ACANTHURIDAE																									
<i>Acanthurus achilles</i>													1					P	1						2
<i>Acanthurus guttatus</i>													P						P						
<i>Acanthurus lineatus</i>	P	23	1						P									2							
<i>Acanthurus nigricans</i>	22	10	3	11	1		1	4	5		1	P	7	5	5	4		6	7	5	4	1		20	
<i>Acanthurus nigrofuscus</i>	8		34	3	4	4	9	4	2	7	7	5	4	3	2	6	5	1	3	7	9	14	22	4	
<i>Acanthurus nigroris</i>																								3	
<i>Acanthurus olivaceus</i>																								P	
<i>Acanthurus thompsoni</i>		1																							
<i>Acanthurus triostegus</i>																									
<i>Ctenochaetus striatus</i>	39	33	97	68	61	77	28	72	67	62	76	71	88	68	76	73	47	45	85	73	64	51	23	48	
<i>Ctenochaetus strigosus</i>							1		4	11	8	2			6	5	3		7	6	39	6			
<i>Naso hexacanthus</i>																								P	
<i>Naso literatus</i>		P	1				1			1				2				1		1			7	P	
<i>Naso unicornis</i>																									
<i>Naso sp.</i>		7				2				1								1							
<i>Zebrasoma scopas</i>			7	1	12	10	5	4	1	14	12	7	3	6	11	11	14	1	1	10	9	6			
FAMILY AULOSTOMIDAE																									
<i>Aulostomus chinensis</i>					P	P						P		P	3				P						
FAMILY BALISTIDAE																									
<i>Balistapus undulatus</i>	P								1					1	1	2	1						1	1	
<i>Balistoides conspicillum</i>																								P	
<i>Melichthys niger</i>																			P						
<i>Melichthys vidua</i>	1	2		1	1					1	1	P			1						2	2		1	

	Site 1		Site 2					Site 3					Site 4					Site 5					Site 6	
	9m	12m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	9m	12m
<i>Pseudobalsites flavimarginatus</i>																P								
<i>Sufflamen bursa</i>	1	1					1								P							P		P
FAMILY BLENNIIDAE																								
<i>Meiacanthus atrodorsalis</i>											1													
<i>Plagiotremus tapeinosoma</i>																						P		
unid brown blenny				1	1				1	1		1		2	1				2	1	1		3	1
unid pink blenny																							1	
FAMILY CAESIONIDAE																								
<i>Caesio cuning</i>		P																						31
<i>Pterocaesio spp.</i>				P		P									P		P							
FAMILY CARANGIDAE																								
<i>Caranx melampygus</i>	P	1																						
<i>Scomberoides lysan</i>								P											P					
FAMILY CHAETODONTIDAE																								
<i>Chaetodon auriga</i>																			P					
<i>Chaetodon bennetti</i>									P				P											
<i>Chaetodon citrinellus</i>																								P
<i>Chaetodon ephippium</i>	P	2				P		1	P							1	1					1	1	P
<i>Chaetodon lunula</i>	1			1										P	P									
<i>Chaetodon melannotus</i>				2	P				1	1														
<i>Chaetodon ornatissimus</i>	P	1			1			2	2							1		P				3		P
<i>Chaetodon pelewensis</i>						1	4				7	4			P	2	3		5	7	4	2		
<i>Chaetodon quadrimaculatus</i>	P																							2
<i>Chaetodon rafflesii</i>								P		P			P						P		P			
<i>Chaetodon reticulatus</i>	P	1		2	7	13	2	1	4	1	1	5	4	1	8	2	4	2	8	13	9	2		P
<i>Chaetodon semeion</i>	P												P											

	Site 1		Site 2			Site 3			Site 4			Site 5			Site 6											
	9m	12m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	9m	12m		
<i>Chaetodon speculum</i>																				P						
<i>Chaetodon trifascialis</i>			1					1			P					1										
<i>Chaetodon trifasciatus</i>		P	2					P	2	P	P	P			P		3	4							P	
<i>Chaetodon ulietensis</i>				2		2				3	4	2		2	P	1		2								
<i>Chaetodon unimaculatus</i>						1	P			P		1			1	1	P	4	2	5	6	3			P	
<i>Chaetodon vagabundus</i>	P		2	1						P		P				2			P							
<i>Forcipiger flavissimus</i>	3	2				1	P					2					1				1	2			P	
<i>Hemitaurichthys polylepis</i>	P	21				P										P			P						P	
<i>Hemitaurichthys thompsoni</i>		P																								
<i>Heniochus chrysostomus</i>																1	1		P			1				
<i>Heniochus monoceros</i>																	1									
<i>Heniochus varius</i>		2																		P			1			
FAMILY CIRRHITIDAE																										
<i>Cirrhichthys pinnulatus</i>																										P
<i>Paracirrhites arcatus</i>	4	1	1	1	3	3				3	2			1	1	1				1	1	2	1	3	5	
<i>Paracirrhites forsteri</i>	1	1				2	1		1	1	1	2		1	2					1		2		P	P	
<i>Paracirrhites hemisticus</i>		P	1															P						1		
FAMILY HAEMULIDAE																										
<i>Plectorhinchus orientalis</i>	1							P					P	P												
FAMILY HOLOCENTRIDAE																										
<i>Myripristis berndti</i>														P						1						
<i>Myripristis sp.</i>																						P				
<i>Neoniphon opercularis</i>																			P							
<i>Neoniphon sammara</i>		3												P												
<i>Sargocentron caudimaculatum</i>		1																								
<i>Sargocentron diadema</i>			1																							
<i>Sargocentron microstoma</i>		1						P																		

	Site 1		Site 2			Site 3			Site 4			Site 5			Site 6										
	9m	12m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	9m	12m	
FAMILY KYPHOSIDAE																									
<i>Kyphosus vaigiensis</i>												P						2	1						
FAMILY LABRIDAE																									
<i>Anampses meleagrides</i>												P													
<i>Anampses twistii</i>				P								P			2										
<i>Bodianus axillaris</i>	P	2							1			P			P				1						P
<i>Bodianus loxozonus</i>																									P
<i>Cheilinus diagrammus</i>				P			1					P			P		1		P						
<i>Cheilinus oxycephalus</i>				P										1	P					1					
<i>Cheilinus trilobatus</i>														1											
<i>Cheilinus unifaciatus</i>								1									P		P	P	1				P
<i>Coris aygula</i>																			P						P
<i>Coris gaimard</i>																									P
<i>Epibulus insidiator</i>					P			1	P			P	1			P			P	1	1				
<i>Gomphosus varius</i>	1	1			2	1		P	1	2		1		2	3	1		2	5	2	2				P
<i>Halichoeres biocellatus</i>							2				1	3				1	2					1			
<i>Halichoeres hortulanus</i>		P		P			1		P			1			P			P					P	1	
<i>Halichoeres ornatissimus</i>		1																							
<i>Halichoeres marginatus</i>																		P							
<i>Hemigymnus fasciatus</i>	P		P		1			1							1				P		P				P
<i>Hemigymnus melapterus</i>																									P
<i>Hologymnosus annulatus</i>																P									
<i>Labrichthyes unilineatus</i>						P		3					4		P				P		1				
<i>Labroides bicolor</i>								1	P			P		1											
<i>Labroides dimidiatus</i>	2	1		5				P	2		1	1	4	1	3	4		2	1	3	2		1	1	
<i>Labroides rubrolabiatus</i>						P		1	3			P	1	1	6	P			P	3				P	
<i>Labropsis xanthonota</i>						P						P		P	2						1				P

	Site 1		Site 2			Site 3			Site 4			Site 5			Site 6										
	9m	12m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	9m	12m	
<i>Macropharyngodon meleagris</i>							1																		
<i>Pseudocheilinus hexataenia</i>	2				2	1	1		1	4	1	1		4	3	3			5	1	1				
<i>Pseudocheilinus octotaenia</i>							1									1				1					
<i>Pseudocheilinus tetrataenia</i>										P															
<i>Pseudodax moluccanus</i>	P		2																						
<i>Thalassoma amblycephalum</i>																									1
<i>Thalassoma hardwicke</i>			1	1	1	1		1					4	4		1		1							
<i>Thalassoma lutescens</i>	1	1				1						P			2	1							3		P
<i>Thalassoma quinquevittatum</i>	9	1	6	3				9	5	3	1		11		P			10	1	2				53	10
<i>Thalassoma trilobatum</i>			3																						
FAMILY LETHRINIDAE																									
<i>Gnathodentax aurolineatus</i>					P				3						P			1	1	P	1				
<i>Lethrinus harak</i>																									
<i>Monotaxis grandoculis</i>	P						1							P		1	P			P		1		P	
FAMILY LUTJANIDAE																									
<i>Aphareus furca</i>		1				2		1	1	2				P	1		1				2				P
<i>Aprion virescens</i>																									P
<i>Lutjanus bohar</i>																	4								
<i>Lutjanus fulvus</i>													2												
<i>Lutjanus monostigma</i>										1				P								P			
<i>Macolor macularis</i>	P																				P				P
<i>Macolor niger</i>										P		1		P				P	P						
FAMILY MICRODESMIDAE																									
<i>Nemateleotris magnifica</i>												1													
FAMILY MONACANTHIDAE																									

	Site 1		Site 2			Site 3			Site 4			Site 5			Site 6										
	9m	12m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	9m	12m	
<i>Aluterus monoceros</i>																			P						
<i>Amanses scopas</i>				2					P						1				2						
<i>Cantherhinus dumerilii</i>	3	1		P		1			P	2					1				1		P				
<i>Oxymonacanthus longirostris</i>				1		2					1		1	2	P	2									
FAMILY MULLIDAE																									
<i>Mulloides vanicolensis</i>													11												
<i>Parupeneus bifasciatus</i>					1										P										
<i>Parupeneus cyclostomus</i>		1						2			1						2		P	1					
<i>Parupeneus multifasciatus</i>	3					1				2		2			1					1	1	2	P	P	
<i>Parupeneus sp.</i>												1													
FAMILY OSTRACIDAE																									
<i>Ostracion meleagris</i>									1			P	P	1						P					
FAMILY PEMPHERIDAE																									
<i>Pempheris oualensis</i>	P	4		3					1					1		P		P	1						
FAMILY PINGUIPEDIDAE																									
<i>Parapercis hexophtalma</i>																									P
FAMILY POMACANTHIDAE																									
<i>Apolemichthys trimaculatus</i>	1																							P	
<i>Centropyge bispinosus</i>		1					2				2	2			1		2			2	P	3		P	
<i>Centropyge flavissimus</i>	4	4			P							P			2					2				2	
<i>Pomacanthus imperator</i>		3																							
<i>Pygoplites diacanthus</i>	P	1			P	1			1							P					P				P
FAMILY POMACENTRIDAE																									

	Site 1		Site 2			Site 3			Site 4			Site 5			Site 6										
	9m	12m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	9m	12m	
<i>Abudefduf sexfasciatus</i>																			P						
<i>Amphiprion chrysopterus</i>		P				P																			
<i>Amphiprion melanopus</i>														P	P										
<i>Amphiprion perideraion</i>												P													
<i>Chromis acares</i>	1	13			30	6	5		1	1	8			1	45	1			1			74			
<i>Chromis agilis</i>		2														P		1		4					
<i>Chromis amboinensis</i>												P				2	9								
<i>Chromis iomelas</i>						2	9			5	19	6			16	14	15			41	42	10			
<i>Chromis margaritifer</i>	8	31			1	6												8		2				17	
<i>Chromis vanderbiliti</i>	P								1										P						
<i>Chromis xanthura</i>																	P								
<i>Chrysiptera cyanea</i>								5					20					6							
<i>Chrysiptera leucopoma</i>																		P						12	
<i>Dascyllus reticulatus</i>	38	1	P				6					P		P	P							4	20	P	
<i>Dascyllus trimaculatus</i>															6					1					
<i>Neopomacentrus metallicus</i>								10																	
<i>Plectroglyphidodon dickii</i>	54	5	34	23	17	5		19	13	11	1		3	14	4	1		7	1	1			4	P	
<i>Plectroglyphidodon johnstonianus</i>	4			2	8	6	5		1	6	3	P			4	4			1	3	4		5	P	
<i>Plectroglyphidodon lacrymatus</i>				11	2	14	5	2		8		1	7	22	3	5		3	9	11	9			10	
<i>Pomacentrus brachialis</i>		2	4	16	13	4	6		10	3		P	P	4	14	9		2	16	19	1				
<i>Pomacentrus vaiuli</i>	3	1		2	3	4	22		1	3	2	28		3	2	1	9		7	8	11	34		2	
<i>Stegastes albifasciatus</i>																									
<i>Stegastes fasciolatus</i>	P							3					1					6					2	13	
<i>Stegastes nigricans</i>													8												
FAMILY SCARIDAE																									
<i>Calotomus carolinus</i>												1													
<i>Chlorurus frontalis</i>	P																					1			
<i>Chlorurus microrhinos</i>		P										P													
<i>Chlorurus pyrrhus</i>	P																	3							

	Site 1		Site 2			Site 3			Site 4			Site 5			Site 6										
	9m	12m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	9m	12m	
<i>Chlorurus sordidus</i>			5	2		4		9	8	5	3	1	3	8	2	2		5	17	1	4	4		1	
<i>Scarus forsteni</i>	P	P							1						1					1	P	1		1	
<i>Scarus frenatus</i>	P								P				2			P		P					1		1
<i>Scarus niger</i>											1				1										
<i>Scarus oviceps</i>	2	1	5	1	11	1	2	2		2	1	P	1	2		1	1	3	1	1	1	1	5		1
<i>Scarus psittacus</i>			9	7	1			2	2				1		P	P							1		P
<i>Scarus rubroviolaceus</i>	P	P											1						P						2
<i>Scarus schlegelii</i>															1	1									
<i>Scarus spinus</i>		P			1								1			P				1	1	2			
FAMILY SERRANIDAE																									
Subfamily Anthinae																									
<i>Pseudanthias pascalus</i>						P						P													
Subfamily Ephinephelinae																									
<i>Cephalopholis argus</i>		2		1						P		P			1	3	1			1					
<i>Cephalopholis urodeta</i>	3	1	1						1			P			1				P	1	1	1	1	1	1
<i>Epinephalus merra</i>													1	P											
<i>Epinephalus polyphekadion</i>																	P								
<i>Gracilia albomarginata</i>												P													
<i>Plectropomus sp.</i>		P																							
<i>Variola louti</i>												P					P								
FAMILY TETRAODONTIDAE																									
<i>Arothron meleagris</i>													1												
<i>Arothron nigropunctatus</i>										P															
<i>Arothron sp.</i>																		P							
<i>Canthigaster solandri</i>					1								3								1				
FAMILY ZANCLIDAE																									

	Site 1		Site 2			Site 3			Site 4			Site 5			Site 6									
	9m	12m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	3m	6m	9m	12m	18m	9m	12m
<i>Zanclus cornutus</i>	4	7	2	1		1	2	1	1		3	4		1	2		4			1	5	1		4
TOTALS:																								
# individuals on transect	224	203	223	175	186	180	125	162	151	163	174	158	199	166	246	176	136	131	198	250	322	163	165	180
# species on transect	28	44	23	28	25	31	27	26	34	27	30	28	29	30	39	39	25	27	32	41	37	28	19	24
# species on transect & vicinity	52	56	25	34	30	41	29	33	41	37	32	57	36	43	57	49	33	40	56	47	46	28	27	57

Table 12. Fishes recorded on the reef flat at each of two sites in Fagatele Bay National Marine Sanctuary in February 2001. Numbers represent fish counted on transects.

	Site B	Site C
CLASS OSTEICHTHYES		
FAMILY ACANTHURIDAE		
<i>Acanthurus achilles</i>		2
<i>Acanthurus lineatus</i>	5	8
<i>Acanthurus nigrofuscus</i>		2
<i>Acanthurus triostegus</i>	1	10
<i>Ctenochaetus striatus</i>	78	132
<i>Naso literatus</i>	3	
<i>Naso unicornis</i>		1
<i>Zebrasoma scopas</i>	2	
FAMILY CHAETODONTIDAE		
<i>Chaetodon ephippium</i>		2
<i>Chaetodon reticulatus</i>	1	
<i>Chaetodon vagabundus</i>		1
FAMILY LABRIDAE		
<i>Gomphosus varius</i>	1	2
<i>Halichoers marginatus</i>		1
<i>Labroides dimidiatus</i>		1
<i>Thalassoma hardwicke</i>	2	5
FAMILY LETHRINIDAE		
<i>Lethrinus harak</i>		1
FAMILY MONACANTHIDAE		
<i>Cantherhinus dumerilii</i>		1
FAMILY OSTRACIDAE		
<i>Ostracion meleagris</i>	2	
FAMILY POMACENTRIDAE		
<i>Chrysiptera cyanea</i>	18	11
<i>Chrysiptera leucopoma</i>	41	53
<i>Pomacentrus vaiuli</i>		1
<i>Stegastes albifasciatus</i>	11	40
<i>Stegastes nigricans</i>	8	
FAMILY SCARIDAE		
<i>Chlorurus sordidus</i>		2
<i>Scarus psittacus</i>		1
FAMILY SERRANIDAE		
<i>Epinephalus merra</i>		1
FAMILY ZANCLIDAE		
<i>Zanclus cornutus</i>	1	1
Total # individuals on transect	174	279
Total # species on transect	14	22
Total # species on transect & vicinity	14	22

Table 13. Fishes recorded along 100-m transects on the reef slopes at three locations around Tutuila Island in April 1998. Numbers represent fish counted on transects. P = fish present in the vicinity of the transect.

	Fagatele Bay	Sita Bay	Cape Larsen
CLASS OSTEICHTHYES			
FAMILY ACANTHURIDAE			
<i>Acanthurus guttatus</i>		3	
<i>A. lineatus</i>		P	
<i>A. nigricans</i>	9	4	4
<i>A. nigrofuscus</i>	3	15	11
<i>Ctenochaetus striatus</i>	107	20	64
<i>C. strigosus</i>	5	8	1
<i>Naso lituratus</i>	4	5	15
<i>N. unicornis</i>			2
<i>Zebrasoma scopas</i>	14	1	
<i>Z. veliferum</i>		6	P
FAMILY AULOSTOMIDAE			
<i>Aulostomus chinensis</i>	P		
FAMILY BALISTIDAE			
<i>Balistapus undulatus</i>	3	1	2
<i>Melichthys vidua</i>	4	2	5
<i>Sufflamen bursa</i>			2
FAMILY BLENNIDAE			
<i>Plagiotremus tapeinosoma</i>		1	
unidentified blenniids	1	2	
FAMILY CAESIONIDAE			
<i>Pterocaesio marri</i>	1		
<i>P. tile</i>	35		
FAMILY CARANGIDAE			
<i>Caranx melampygus</i>			P
FAMILY CHAETODONTIDAE			
<i>Chaetodon ephippium</i>	1		
<i>C. lunula</i>			2
<i>C. melannotus</i>	1		
<i>C. ornatissimus</i>	P		2
<i>C. pelewensis</i>		5	1
<i>C. reticulatus</i>	2	4	6
<i>C. semeion</i>	1		
<i>C. trifascialis</i>	P		
<i>C. trifasciatus</i>			1
<i>C. ulietensis</i>	P		2
<i>C. vagabundus</i>		2	2
Chaetodontidae cont.			
<i>Forcipiger flavissimus</i>	1		2
<i>F. longirostris</i>			1

	Fagatele Bay	Sita Bay	Cape Larsen
FAMILY CIRRHITIDAE			
<i>Paracirrhites arcatus</i>	3	1	4
<i>P. hemistictus</i>	3	1	1
FAMILY DIODONTIDAE			
<i>Diodon hystrix</i>			1
FAMILY HAEMULIDAE			
<i>Plectorhinchus orientalis</i>		3	1
FAMILY HOLOCENTRIDAE			
<i>Myripristis berndti</i>			P
<i>Neoniphon sammara</i>		2	
FAMILY KYPHOSIDAE			
<i>Kyphosus vaigiensis</i>	1		
FAMILY LABRIDAE			
<i>Anampses twistii</i>		2	
<i>Bodianus axillaris</i>	1		P
<i>Cheilinus digrammus</i>	1		P
<i>C. oxycephalus</i>	P		
<i>C. trilobatus</i>	1		
<i>C. undulatus</i>			P
<i>C. unifasciatus</i>			1
<i>Epibulus insidiator</i>			P
<i>Gomphosus varius</i>	4	4	4
<i>Halichoeres biocellatus</i>	1		
<i>H. hortulanus</i>	P	1	2
<i>H. margaritaceus/miniatus</i>			1
<i>H. marginatus</i>		1	1
<i>H. ornatissimus</i>	2		1
<i>Hemigymnus fasciatus</i>	1		
<i>Labroides bicolor</i>	1	2	4
<i>L. dimidiatus</i>	2		2
<i>L. rubrolabiatus</i>	1	1	1
<i>Labropsis xanthonota</i>	3		1
<i>Pseudocheilinus hexataenia</i>		1	2
<i>Stethojulis bandanensis</i>	2		
<i>Thalassoma hardwicke</i>		3	
<i>T. lutescens</i>	1		
<i>T. quinquevittatum</i>	2	1	2
FAMILY LETHRINIDAE			
<i>Gnathodentex aurolineatus</i>		1	
<i>Monotaxis grandoculis</i>		6	p
FAMILY LUTJANIDAE			
<i>Aphareus furca</i>	7	1	p
<i>Lutjanus bohar</i>	P	1	P

	Fagatele Bay	Sita Bay	Cape Larsen
<i>L. fulvus</i>		1	
<i>L. monostigma</i>		1	
<i>Macolor niger</i>	P		
FAMILY MICRODESMIDAE			
<i>Nemateleotris magnifica</i>			1
<i>Ptereleotris evides</i>	P		1
FAMILY MONACANTHIDAE			
<i>Amanses scopas</i>	p		
<i>Cantherhines dumerilii</i>		1	P
FAMILY MULLIDAE			
<i>Parupeneus bifasciatus</i>		1	2
<i>P. cyclostomus</i>	P		1
<i>P. multifasciatus</i>	3		1
FAMILY OSTRACIIDAE			
<i>Ostracion meleagris</i>	1		
FAMILY PINGUIPEDIDAE			
<i>Synodus variegatus</i>	P		
FAMILY POMACANTHIDAE			
<i>Centropyge bispinosus</i>	P		
<i>C. flavissimus</i>	1	2	5
<i>Pomacanthus imperator</i>			1
<i>Pygoplites diacanthus</i>	2	P	3
FAMILY POMACENTRIDAE			
<i>Chromis acares</i>	27	1	21
<i>C. iomelas</i>	27		9
<i>C. margaritifer</i>		22	67
<i>C. xanthura</i>		10	29
<i>Chrysiptera cyanea</i>		47	50
<i>Neopomacentrus metallicus</i>			13
<i>Plectroglyphidodon dickii</i>	3	2	3
<i>P. johnstonianus</i>	8	8	1
<i>P. lacrymatus</i>	11	23	
<i>Pomacentrus brachialis</i>	12	35	47
<i>P. vaiuli</i>	11	7	16
FAMILY SCARIDAE			
<i>Calatomus carolinus</i>	P		P
<i>Cetoscarus bicolor</i>	P		
<i>Scarus forsteni</i>			3
<i>S. frenatus</i>			P
<i>S. frontalis</i>			P
<i>S. ghobban</i>	1		
<i>S. globiceps</i>	1		P
<i>S. microrhinos</i>		1	P

	Fagatele Bay	Sita Bay	Cape Larsen
<i>S. niger</i>	1	2	3
<i>S. oviceps</i>	5		
<i>S. psittacus</i>	12	4	
<i>S. pyrrhurus</i>		2	9
<i>S. rubroviolaceus</i>	P	1	P
<i>S. sordidus</i>	10	1	3
FAMILY SERRANIDAE			
<i>Cephalopholis argus</i>	3	1	
<i>C. urodeta</i>		3	6
<i>Pseudanthias pascalus</i>	P		
<i>Variola louti</i>			P
FAMILY ZANCLIDAE			
<i>Zanclus cornutus</i>			3
CLASS CHONDRICHTHYES			
FAMILY HEMIGALEIDAE			
<i>Triaenodon obesus</i>		1	
Total # individuals on transect	368	288	452
Total # species on transect	52	55	58
Total # species on transect & vicinity	69	57	76

Table 14. Fishes recorded along 100-m transects on the reef slopes at three locations around Tutuila Island in February 2001. Numbers represent fish counted on transects. P = fish present in the vicinity of the transect.

	Fagatele Bay	Sita Bay	Cape Larsen
CLASS OSTEICHTHYES			
FAMILY ACANTHURIDAE			
<i>Acanthurus lineatus</i>		1	
<i>A. nigricans</i>	9	7	14
<i>A. nigricauda</i>		2	
<i>A. nigrofuscus</i>	11	8	12
<i>Ctenochaetus striatus</i>	159	212	173
<i>C. strigosus</i>	4		
<i>Naso lituratus</i>		21	11
<i>N. unicornis</i>		P	P
<i>N. sp</i>	4		
<i>Zebrasoma scopas</i>	25		1
<i>Z. veliferum</i>		2	1
FAMILY AULOSTOMIDAE			
<i>Aulostomus chinensis</i>	1		
FAMILY BALISTIDAE			
<i>Balistapus undulatus</i>		1	
<i>Melichthys vidua</i>	4	5	5
<i>Sufflamen bursa</i>			6
FAMILY BLENNIDAE			
unidentified blenniids			2
FAMILY CARANGIDAE			
<i>Caranx melampygus</i>			2
FAMILY CHAETODONTIDAE			
<i>Chaetodon citrinellus</i>		3	3
<i>C. ephippium</i>	P		
<i>C. lunula</i>		1	
<i>C. melannotus</i>	P		
<i>C. ornatissimus</i>	1	3	P
<i>C. pelewensis</i>	3	1	4
<i>C. rafflesi</i>	P		
<i>C. reticulatus</i>	14	6	10
<i>C. trifascialis</i>	1		8
<i>C. trifasciatus</i>	P	1	1
<i>C. ulietensis</i>	P	2	
<i>C. unimaculatus</i>		12	6
<i>C. vagabundus</i>			2
<i>Forcipiger flavissimus</i>	2		P
<i>Hemitaurichthys polylepis</i>	P	3	17
<i>Heniochus varius</i>			1
FAMILY CIRRHITIDAE			
<i>Paracirrhites arcatus</i>	8	3	4

	Fagatele Bay	Sita Bay	Cape Larsen
<i>P. forsteri</i>	2	3	2
FAMILY FISTULARIIDAE			
<i>Fistularia commersonii</i>			1
FAMILY HAEMULIDAE			
<i>Plectorhinchus vittatus</i>		1	4
FAMILY HOLOCENTRIDAE			
<i>Myripristis berndti</i>			1
<i>M. kuntee</i>		2	
<i>Neoniphon sammara</i>		8	1
<i>Sargocentron spiniferum</i>			1
FAMILY LABRIDAE			
<i>Bodianus axillaris</i>		1	1
<i>Cheilinus digrammus</i>	1		
<i>C. unifasciatus</i>		2	4
<i>Coris aygula</i>			2
<i>Epibulus insidiator</i>	1		1
<i>Gomphosus varius</i>	5	3	
<i>Halichoeres hortulanus</i>	2	1	1
<i>H. marginatus</i>		1	
<i>H. ornatissimus</i>			2
<i>Hemigymnus fasciatus</i>	P		1
<i>Labrichthys unilineatus</i>	4		
<i>Labroides bicolor</i>		1	1
<i>L. dimidiatus</i>	2	3	2
<i>L. rubrolabiatus</i>	1	3	2
<i>Labropsis xanthonota</i>			1
<i>Pseudochelinus hexataenia</i>	2	2	3
<i>Pseudodax moluccanus</i>	1		
<i>Stethojulis trilineata</i>		1	
<i>Thalassoma hardwicke</i>		P	
<i>T. lutescens</i>	3		
<i>T. quinquevittatum</i>	1	11	4
<i>T. trilobatum</i>		2	
FAMILY LETHRINIDAE			
<i>Gnathodentex aurolineatus</i>		P	
<i>Monotaxis grandoculis</i>		3	1
FAMILY LUTJANIDAE			
<i>Aphareus furca</i>		1	1
<i>Lutjanus fulvus</i>		1	1
<i>Macolor macularis</i>		1	4
FAMILY MONACANTHIDAE			
<i>Amanses scopas</i>	3		
<i>Cantherhines dumerilii</i>	1	3	
<i>Oxymonacanthus longirostris</i>	1	1	

	Fagatele Bay	Sita Bay	Cape Larsen
FAMILY MULLIDAE			
<i>Mulloides vanicolensis</i>		6	
<i>Parupeneus bifasciatus</i>			P
<i>P. cyclostomus</i>		2	1
<i>P. multifasciatus</i>		1	1
FAMILY MURAENIDAE			
<i>Gymnothorax flavimarginatus</i>			1
FAMILY PEMIPHERIDAE			
<i>Pempheris oualensis</i>		2	1
FAMILY POMACANTHIDAE			
<i>Centropyge bispinosus</i>	4		
<i>C. flavissimus</i>	3	1	5
<i>Pygoplites diacanthus</i>	1	3	3
FAMILY POMACENTRIDAE			
<i>Chromis acares</i>	73		1
<i>C. iomelas</i>	55		16
<i>C. margaritifer</i>	4	21	23
<i>C. xanthura</i>			5
<i>Chrysiptera taupau</i>		79	22
<i>Dascyllus reticulatus</i>	2	1	3
<i>Neopomacentrus metallicus</i>		30	
<i>Plectroglyphidodon dickii</i>	22	21	14
<i>P. johnstonianus</i>	2	2	7
<i>P. lacrymatus</i>	45	25	1
<i>Pomacentrus brachialis</i>	19	64	61
<i>P. vaiuli</i>	10	18	36
FAMILY SCARIDAE			
<i>Chlorurus frontalis</i>		1	1
<i>C. microrhinos</i>			1
<i>C. pyrrhurus</i>	8	14	11
<i>C. sordidus</i>	5	1	2
<i>Scarus forsteni</i>	3		
<i>S. frenatus</i>	2		
<i>S. globiceps</i>			1
<i>S. niger</i>	2	1	5
<i>S. oviceps</i>	6		
<i>S. psittacus</i>	3		2
<i>S. spinus</i>	1		
FAMILY SERRANIDAE			
<i>Cephalopholis argus</i>	1		2
<i>C. urodeta</i>	2	5	2
<i>Variola louti</i>			1
FAMILY SPHYRAENIDAE			

	Fagatele Bay	Sita Bay	Cape Larsen
<i>Sphyraena barracuda</i>			P
FAMILY TETRAODONTIDAE			
<i>Canthigaster solandri</i>		3	1
Total # individuals on transect	549	650	555
Total # species on transect	51	62	71
Total # species on transect & vicinity	58	65	76

DISCUSSION

Coral and Fish communities in Fagatele Bay

The surveys of coral and fish communities in Fagatele Bay National Marine Sanctuary in 1998 and 2001 indicate an overall improvement in the condition of the reefs. With the exception of reef flat communities, coral abundance, cover and size has largely increased at all sites and depths in the bay from 1995 to 2001, although coral communities still tend to be dominated by faster-growing, opportunistic species including Acroporiids (especially *Montipora* spp.), *Porites* sp. 2 and *Porites rus*. At 17 of the 22 sites surveyed in Fagatele Bay coral cover in 2001 has exceeded levels recorded in 1985, and at 15 of these coral density is also higher than in 1985 (which was the highest ever recorded). At 20 of the 22 sites the mean colony diameter has also increased between 1985 and 2001. These results indicate that the coral communities in Fagatele Bay are well on the way to recovery from the major disturbances of the last few decades, and are in the best condition that they have been in since the Crown-of-Thorns outbreak in the late 1970s.

The situation is different on the reef flat, where we witnessed a drop in coral cover and abundance in 1998, and community characteristics were still much lower in 2001 than was first observed in 1985. Since the traditional reef flat sites at Transects 2, 3 and 4 were not surveyed in 2001, it is impossible to determine if this is a continuing trend, or due to a localised event. Certainly the survey of the reef flat area between Transects 3 and 4 that was done in 2001 suggests coral abundance and cover may have increased from 1998 to 2001. However it will be important for the reef flat sites at Transects 2, 3 and 4 to be surveyed for corals in future years to properly follow trends in these communities.

Importantly we have also seen a decline in fish abundance and species richness on the reef flat in Fagatele Bay from 1995 to 1998, and fish communities on the reef flat were still relatively low in 2001. Declines in both the fish and corals may be linked to the extremely low tides that occurred just prior to the 1998 survey which resulted in a mass die-off of corals on the reef flat.

In contrast to the coral communities, the fish communities appear to be taking longer to fully recover from the habitat destruction caused by the major disturbances of the last few decades in Fagatele Bay. As with the coral communities, we have seen a gradual increase through time both in fish abundance and species richness, although communities are still below levels recorded in 1985. For example in 1998, some small, site-attached species closely associated with the coral communities (e.g. the damselfish *Plectroglyphidodon dickii*) were still much less abundant than they were in the late 1970s, although by 2001 *P. dickii* was once again one of the more common fish species recorded in the surveys. This is a good indication that the fish communities in the bay are recovering. Several factors may be responsible for the slower recovery of fish communities relative to coral communities. Some reef fishes may take longer to recover from disturbance because their recruitment may be sporadic and unpredictable. Furthermore, many reef fishes have specific microhabitat requirements, and their recovery may be contingent upon the prior recovery of the benthic coral reef communities (Green 2002). While this may be true, it is likely that another factor, fishing, may also be affecting the recovery of the fish populations in Fagatele Bay.

Several large species of reef fish that are characteristic of unfished reefs in the Indo-Pacific region, are conspicuous by their absence or small size in Fagatele Bay. These include species such as maori wrasse (*Cheilinus undulatus*), sharks, and large species of serranids and scarids, all of which are known to be particularly vulnerable to fishing (Green 2002). Given that many of these species are more abundant elsewhere in Samoa (Green 1996, 2002), these results are indicative of fishing pressure on the reefs in Fagatele Bay.

Fagatele Bay is a National Marine Sanctuary, and although fishing is prohibited, several lines of evidence indicate that the Sanctuary is being fished. For example, groups of people have been observed in the bay on several occasions over the last few years, both on shore and in fishing boats (*alias*). While these people were not fishing at the time, it is likely that they had been fishing or that this was their intent, since most of the groups left when representatives of the local government arrived. The case for asserting that the Sanctuary is being fished is also supported by the presence of physical damage to the reef. For example, large pieces of coral rubble have been overturned on the reef flat, indicating that gleaners have been active in the area. There is also evidence that dynamite fishing is occurring in the bay. During this survey, a large coral bommie (*Porites lutea*) was observed that had been severely damaged. There was a large crack in the colony, and one side had been blown away and reduced to rubble (Figure 8). It appears that this damage was caused by explosives, because approximately 10m of detonation cord was found adjacent to the bommie (Figure 9). This colony was exceptionally large (see Figure 10), and given the slow growth rate of this species, was estimated to be approximately 800 years of age.



Figure 8. Photograph of a *Porites* bommie in Fagatele Bay showing a large crack, most likely from dynamite damage.



Figure 9. Dynamite detonation cord found adjacent to the damaged *Porites* bommie (Fig 8) in Fagatele Bay.

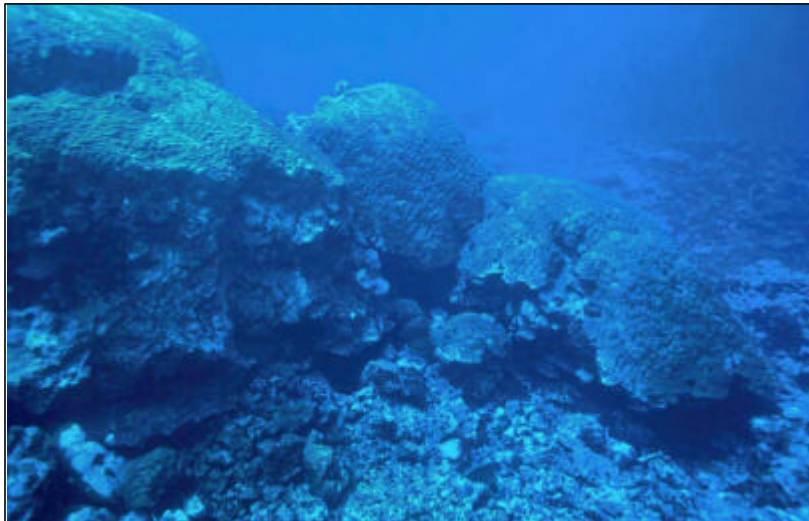


Figure 10. Photograph showing the extent of damage and large size of the dynamite damaged *Porites* bommie in Fagatele Bay.

Anecdotal reports from the local community also suggest that teams of commercial fishermen were systematically harvesting the reefs around the island of Tutuila for several years in the late 1990s (Green 2002). Since Fagatele Bay is not protected by the presence of a village, it is likely that the Sanctuary was being fished when weather conditions permitted. These fishermen have the potential to diminish the population of commercial reef fish species in a small area such as Fagatele Bay very quickly, since they are spearfishing using SCUBA equipment at night. Fortunately, this fishery was banned by the Government of American Samoa in 2001 (see Green 2002). The results of this ongoing monitoring program, and the advice of the monitoring team, played an important role in banning this destructive fishery

Despite evidence of fishing within Fagatele Bay, we have seen an overall improvement in the fish and coral populations, although fisheries species have continued to decline. In the absence of other major perturbations, and importantly in the absence of increased illegal fishing, we believe that the coral reef communities in Fagatele Bay should continue to recover.

Coral and Fish Communities around Tutuila Island

The dynamics of the coral communities vary among sites around Tutuila, although generally the results from the surveys concur with the data collected in Fagatele Bay in that the reefs are recovering. Recovery is more evident in the coral than in the fish communities, most likely for the same reasons as described above for Fagatele Bay. One exception is Cape Larsen, which was severely impacted by the Crown-of-Thorns starfish outbreak in late 1978, and the hurricanes in the early 1990s. Our results from 1998 and 2001 surveys indicate continued recovery both of the coral and fish populations, although coral species richness is still relatively low in comparison to other sites around Tutuila, and the community is dominated by early colonising, fast growing species.

The coral communities on reefs adjacent to Rainmaker Hotel show continued decline, which may be associated with water quality issues within Pago Pago Harbour. Although there has been considerable efforts over the last 12 years both to minimise pollution in Pago Pago Harbour and to remediate the effects of human-induced disturbances (see Green et al 2002), there is clearly a lag in coral recovery in these areas. We did record an increase in coral cover at Aua between 1998 and 2001, which suggests recovery will happen in time. Furthermore, we have recently seen evidence of coral recruits in Pago Pago Harbour sites (C. Birkeland, unpubl. data) which is the first evidence of recruitment into the harbour in years. Importantly recruits included species of *Acropora*, including *Acropora hyacinthus*, which are usually highly sensitive to sedimentation. We believe this provides evidence that recovery of these reefs is underway, but that changes will occur slowly. Obviously continued surveys of reef sites in Pago Pago harbour will be important for monitoring the recovery process.

While there appears to be a general improvement in coral communities at most sites, unfortunately the lack of coherence both in sampling sites around Tutuila across years and between the fish and coral surveys of the Tutuila sites makes it difficult to draw conclusions about the status of the reef communities around Tutuila generally. Furthermore, as fishes are only surveyed along a single transect (and at different depths at each site), and the number of corals surveyed is also low, the usefulness of the data collected outside Fagatele Bay is limited. Therefore, we recommend that these surveys be discontinued in future, especially since archipelago-wide surveys, which commenced in the mid 1990s (Green 1996, Mundy 1996, Fisk & Birkeland 2002, Green et al 2002), provide much more comprehensive data. Exceptions should include the sites in Pago Pago Harbour (Rainmaker and Aua), which should continue to be monitored because of their value for long term monitoring and management of the harbour. The long term monitoring of fishes at three sites around the island (Fagatele Bay, Sita Bay, Cape Larsen) should also continue, because it is the oldest quantitative fish data for the island, and the only data set that predates the Crown-of-Thorns starfish outbreak in the late 1970s.

Conclusions and Recommendations:

- Surveys of corals and fish in the Fagatele Bay National Marine Sanctuary conducted in 1998 and 2001 show an overall continued recovery of reef communities. Coral communities have largely exceeded levels recorded since the surveys began in 1985 whereas fish populations are lagging behind the recorded 1985 levels (although they continue to improve).
- Reef flat communities in the Fagatele Bay National Marine Sanctuary have declined since 1995, probably due to the severe low tide event that led to a mass die-off of reef flat corals around the island in 1998. Continued monitoring of the long-term reef flat sites associated with Transects 2, 3 and 4 that have been established in Fagatele Bay (but which unfortunately were not surveyed in 2001) is imperative in order to document future changes in these communities.
- There is evidence that illegal fishing is occurring within Fagatele Bay, which may be impacting the fish communities and impeding the recovery of the fish communities from the habitat destruction of the last few decades. We recommend that enforcement be increased to stop illegal fishing in the Sanctuary for three reasons:
 1. It is illegal and incompatible with the philosophy of the Sanctuary;
 2. Both the fish communities and their habitat have been affected by the use of destructive fishing techniques; and
 3. Visitor perception of the Sanctuary may be suffering as a result of these activities. In the last few years, many visitors to Fagatele Bay have reported that they were disappointed with the reefs in the Sanctuary, which they described as “nothing special” or worse. This is quite clearly untrue, because the reefs in the Sanctuary are in good condition once again and are among the most beautiful in Samoa (Green 1996, Green et al. 2002). This misconception may be the result of two factors. First, the coral communities have been severely impacted by several disturbances in the last two decades (see *Introduction*), and they have only recently recovered sufficiently to regain their former beauty. Second, the absence of large reef fishes which are usually characteristic of a Sanctuary are absent, probably due to the effects of fishing.
- If fishing were to be effectively controlled by improved enforcement in the Sanctuary, it is likely that the fish communities would recover from the effects of fishing and visitor perception of the area would improve. This is possible given that previous studies have shown that even quite small sanctuaries, such as Fagatele Bay, can support a higher biomass of reef fishes (especially large target species) than adjacent fished areas (Roberts and Hawkins 1997).
- Reef communities at locations around Tutuila Island appear to be gradually recovering from the effects of Crown-of-Thorns and hurricanes Val and Ofu with the exception of coral communities adjacent to Rainmaker Hotel, which are still in poor condition but seem to be showing the first signs of recovery in decades. However the nature of data collections at these sites limits our interpretation of community change.
- Recommendations for future surveys:
 1. The surveys in Fagatele Bay should continue unchanged, with the exception that point-quarter survey techniques should be replaced with the belt-transect method that has been adopted for the archipelago-wide surveys (see Mundy 1996). This approach would involve approximately the same amount of effort, but would sample considerably more corals at each site and hence provide a much more rigorous data set. Results would also be directly comparable with the archipelago-wide surveys.
 2. The coral and fish surveys from around the island should be discontinued as they have been superseded by the archipelago-wide surveys.

3. The two sites in Pago Pago Harbour (Rainmaker Hotel and Aua), which provide useful information for management, should continue in conjunction with the Fagatele Bay surveys. The long-term monitoring of the Aua transect should continue to be surveyed at the same time as the Fagatele Bay survey (for logistic reasons), and the results should be included in future Fagatele Bay reports.
4. The long-term fish surveys at three sites around the island (Fagatele Bay, Sita Bay and Cape Larsen) should be continued as they represent the oldest quantitative fish data for the island.

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LIST OF FIGURES

Figure		Page No.
Figure 1	Map of Fagatele Bay showing six permanent transects (T ¹ – T ⁶) and the approximate locations of the coral and fish surveys at each depth along each transect.	5
Figure 2	Location of coral and fish survey sites around Tutuila Island, American Samoa.	6
Figure 3	Mean (and SE) of species richness of fishes on the reef slope in Fagatele Bay during surveys conducted from 1985-2001.	31
Figure 4	Mean (and SE) of abundance of fishes on the reef slope in Fagatele Bay during surveys conducted from 1985-2001.	31
Figure 5	Abundance of fishes on the reef slope at three sites around Tutuila Island during surveys conducted from 1977-2001.	35
Figure 6	Species richness of fishes on the reef slope at three sites around Tutuila Island during surveys conducted from 1977-2001.	35
Figure 7	Abundance of fishes from each of eight Families on the reef slope at three sites around Tutuila Island during surveys conducted from 1977-2001	36
Figure 8	Photograph of a <i>Porites</i> bommie in Fagatele Bay showing a large crack, most likely from dynamite damage	65
Figure 9	Dynamite detonation cord found adjacent to the damaged <i>Porites</i> bommie (Fig 8) in Fagatele Bay.	66
Figure 10	Photograph showing the extent of damage and large size of the dynamite damaged <i>Porites</i> bommie in Fagatele Bay.	66

LIST OF TABLES

Table		Page No.
Table 1	Total number of colonies of all coral species recorded in point-quarter surveys of Fagatele Bay and Tutuila Island in 1998 and 2001	10
Table 2	Total number of colonies of each coral family recorded in point-quarter surveys of Fagatele Bay and Tutuila Island in 1998 and 2001	14
Table 3	Abundance of hermatypic corals (number of colonies per m ²) in Fagatele Bay National Marine Sanctuary from surveys conducted in 1985-2001.	15
Table 4	Percent cover of substrata by hermatypic corals in Fagatele Bay National Marine Sanctuary from surveys conducted in 1985-2001	16
Table 5	Mean coral colony diameter (cm) in Fagatele Bay National Marine Sanctuary from surveys conducted in 1985-2001.	17
Table 6	Abundance of hermatypic corals (number of colonies per m ²) at sites around Tutuila Island from surveys conducted in 1982-2001.	18
Table 7	Percent cover of substrata by hermatypic corals at sites around Tutuila Island from surveys conducted in 1982-2001.	22
Table 8	Mean diameter (cm) of hermatypic corals at sites around Tutuila Island from surveys conducted in 1982-2001.	26
Table 9	Fishes recorded on the reef slope at different depths at each of five sites in Fagatele Bay National Marine Sanctuary in April 1998	37
Table 10	Fishes recorded on the reef flat at each of two sites in Fagatele Bay National Marine Sanctuary in April 1998.	45
Table 11	Fishes recorded on the reef slope at different depths at each of six sites in Fagatele Bay National Marine Sanctuary in February 2001.	46
Table 12	Fishes recorded on the reef flat at each of two sites in Fagatele Bay National Marine Sanctuary in February 2001.	55
Table 13	Fishes recorded along 100-m transects on the reef slopes at three locations around Tutuila Island in April 1998.	56
Table 14	Fishes recorded along 100-m transects on the reef slopes at three locations around Tutuila Island in February 2001.	60

APPENDIX 1

Summary of results from point-quarter surveys at Fagatele Bay from the 1998 surveys.

Fagatele Bay Transect 2		Size distribution of colonies							
1m depth – April 1998		(diameter in cm)							
Coral species	n	mean	stdev	range	frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
<i>Acropora crateriformis</i>	2	16.39	9.32	9.8-23	0.03	0.02	2.94	3.96	4.39
<i>Cyphastrea seralia</i>	1	13.49			0.01	0.01	1.47	1.15	1.28
<i>Echinopora lamellosa</i>	1	9.90			0.01	0.01	1.47	0.62	0.69
<i>Favites abdita</i>	1	31.43			0.01	0.01	1.47	6.27	6.96
<i>Galaxea fascicularis</i>	17	7.49	2.50	4.2-13.5	0.25	0.14	25.00	6.68	7.41
<i>Gardineroseris planulata</i>	3	21.08	8.09	16.1-30.4	0.04	0.02	4.41	9.29	10.31
<i>Goniastrea retiformis</i>	2	20.65	14.23	10.6-30.7	0.03	0.02	2.94	6.69	7.43
<i>Leptastrea purpurea</i>	1	3.46			0.01	0.01	1.47	0.08	0.08
<i>Millepora platyphylla</i>	2	32.65	15.31	21.8-43.5	0.03	0.02	2.94	15.01	16.66
<i>Millepora tuberosa</i>	2	23.38	10.09	16.2-30.5	0.03	0.02	2.94	7.58	8.41
<i>Montipora verrilli</i>	2	13.02	5.46	9.2-16.9	0.03	0.02	2.94	2.34	2.60
<i>Pocillopora verrucosa</i>	1	7.48			0.01	0.01	1.47	0.36	0.39
<i>Porites lutea</i>	14	11.23	10.16	4.2-41.5	0.21	0.11	20.59	19.70	21.87
<i>Porites rus</i>	10	8.90	6.92	3-24.7	0.15	0.08	14.71	7.75	8.60
<i>Porites sp. 2</i>	8	5.26	2.32	2.8-10.5	0.12	0.06	11.76	1.64	1.82
<i>Psammocora contigua</i>	1	12.49		12.5-12.5	0.01	0.01	1.47	0.99	1.10
COMMUNITY	68	11.31	9.06	2.8-43.5		0.55		90.10	

Fagatele Bay Transect 2 3m depth – April 1998		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora azurea</i>	1	14.00			0.02	0.13	1.67	19.80	1.02
<i>Acropora crateriformis</i>	1	9.95			0.02	0.13	1.67	10.00	0.51
<i>Acropora gemmifera</i>	3	22.63	12.05	9-31.9	0.05	0.39	5.00	184.53	9.49
<i>Acropora hyacinthus</i>	1	15.10			0.02	0.13	1.67	23.03	1.18
<i>Acropora robusta</i>	1	33.47			0.02	0.13	1.67	113.12	5.82
<i>Favites abdita</i>	2	12.37	5.09	8.8-16	0.03	0.26	3.33	33.53	1.73
<i>Galaxea fascicularis</i>	33	8.35	2.99	4-15.1	0.55	4.24	55.00	261.40	13.45
<i>Goniastrea retiformis</i>	3	17.93	16.23	8.1-36.7	0.05	0.39	5.00	150.60	7.75
<i>Leptoria phrygia</i>	5	28.64	13.56	9.9-43.2	0.08	0.64	8.33	488.55	25.14
<i>Millepora tuberosa</i>	1	11.22			0.02	0.13	1.67	12.73	0.65
<i>Montipora caliculata</i>	1	18.89			0.02	0.13	1.67	36.06	1.86
<i>Montipora ehrenbergii</i>	1	17.49			0.02	0.13	1.67	30.91	1.59
<i>Montipora verrilli</i>	1	12.96			0.02	0.13	1.67	16.97	0.87
<i>Pocillopora eydouxi</i>	2	51.85	5.24	48.1-55.6	0.03	0.26	3.33	545.92	28.09
<i>Pocillopora verrucosa</i>	1	8.77		8.8-8.8	0.02	0.13	1.67	7.78	0.40
<i>Porites sp. 2</i>	3	4.96	2.48	2.4-7.4	0.05	0.39	5.00	8.69	0.45
COMMUNITY	60	13.76	11.56	4-55.6		7.72		1943.60	

Fagatele Bay Transect 2 6m depth – April 1998		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora azurea</i>	2	15.12	13.02	5.9-24.3	0.03	0.24	3.33	57.95	3.97
<i>Acropora crateriformis</i>	3	15.80	2.01	14-18	0.05	0.35	5.00	69.97	4.79
<i>Acropora gemmifera</i>	2	23.73	2.44	22-25.5	0.03	0.24	3.33	104.63	7.17
<i>Acropora hyacinthus</i>	1	11.00			0.02	0.12	1.67	11.18	0.77
<i>Acropora sp. 2</i>	1	13.96			0.02	0.12	1.67	18.02	1.23
<i>Echinopora hirsutissima</i>	1	36.41			0.02	0.12	1.67	122.56	8.40
<i>Favia matthaii</i>	1	29.29			0.02	0.12	1.67	79.30	5.43
<i>Galaxea fascicularis</i>	28	9.84	3.70	3-17	0.47	3.30	46.67	284.76	19.51
<i>Goniastrea retiformis</i>	4	18.73	12.91	5.9-33.9	0.07	0.47	6.67	175.89	12.05
<i>Leptoria phrygia</i>	2	12.54	10.80	4.9-20.2	0.03	0.24	3.33	39.84	2.73
<i>Millepora tuberosa</i>	4	26.22	11.26	15.4-41.7	0.07	0.47	6.67	289.39	19.82
<i>Montipora calculata</i>	1	33.47			0.02	0.12	1.67	103.52	7.09
<i>Montipora ehrenbergii</i>	1	17.75			0.02	0.12	1.67	29.11	1.99
<i>Montipora verrilli</i>	1	6.48			0.02	0.12	1.67	3.88	0.27
<i>Pavona sp. 3</i>	1	6.00			0.02	0.12	1.67	3.33	0.23
<i>Pavona varians</i>	2	10.58	7.62	5.2-16	0.03	0.24	3.33	26.06	1.79
<i>Pocillopora verrucosa</i>	1	4.90			0.02	0.12	1.67	2.22	0.15
<i>Porites rus</i>	1	15.49			0.02	0.12	1.67	22.18	1.52
<i>Porites sp. 2</i>	3	7.08	3.36	5-11	0.05	0.35	5.00	15.99	1.10
COMMUNITY	60	13.71	8.75	3-41.7		7.06		1459.77	

Fagatele Bay Transect 2 9m depth – April 1998		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Cyphastrea sp.</i>	1	27.20			0.02	0.27	1.79	157.18	3.91
<i>Echinopora hirsutissima</i>	5	39.06	28.76	4-77.1	0.09	1.35	8.93	2322.60	57.80
<i>Montipora caliculata</i>	2	16.09	2.55	14.3-17.9	0.04	0.54	3.57	111.30	2.77
<i>Montipora elschneri</i>	1	14.42			0.02	0.27	1.79	44.18	1.10
<i>Montipora grisea</i>	8	18.72	8.43	8.5-29.8	0.14	2.16	14.29	701.35	17.45
<i>Pavona sp. 2</i>	1	23.92			0.02	0.27	1.79	121.49	3.02
<i>Pavona venosa</i>	1	5.92			0.02	0.27	1.79	7.43	0.18
<i>Pocillopora meandrina</i>	1	12.65			0.02	0.27	1.79	33.98	0.85
<i>Pocillopora verrucosa</i>	1	36.41			0.02	0.27	1.79	281.64	7.01
<i>Porites rus</i>	1	3.00			0.02	0.27	1.79	1.91	0.05
<i>Porites sp. 2</i>	32	5.24	2.63	1-11.3	0.57	8.65	57.14	232.58	5.79
<i>Stylocoeniella armata</i>	2	2.50	0.71	2-3	0.04	0.54	3.57	2.76	0.07
COMMUNITY	56	12.03	14.02	1-36.4		15.14		4018.41	

Fagatele Bay Transect 2 12m depth – April 1998		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora hyacinthus</i>	2	5.51	1.16	4.7-6.3	0.03	0.32	2.99	7.89	0.17
<i>Acropora secale</i>	1	2.45			0.01	0.16	1.49	0.76	0.02
<i>Galaxea fascicularis</i>	1	12.00			0.01	0.16	1.49	18.32	0.39
<i>Hydnophora rigida</i>	1	27.13			0.01	0.16	1.49	93.61	1.98
<i>Leptastrea purpurea</i>	1	18.97			0.01	0.16	1.49	45.79	0.97
<i>Montipora caliculata</i>	2	29.80	14.64	19.4-40.1	0.03	0.32	2.99	253.11	5.35
<i>Montipora elschneri</i>	3	22.73	6.20	15.7-27.5	0.04	0.49	4.48	206.88	4.37
<i>Montipora grisea</i>	12	29.06	19.52	5.2-59.7	0.18	1.94	17.91	1821.66	38.50
<i>Montipora verrilli</i>	8	35.72	13.14	14.1-59.5	0.12	1.30	11.94	1452.16	30.69
<i>Pavona clavus</i>	1	16.43			0.01	0.16	1.49	34.34	0.73
<i>Pavona sp. 2</i>	1	14.83			0.01	0.16	1.49	27.98	0.59
<i>Pavona sp. 3</i>	1	11.96			0.01	0.16	1.49	18.19	0.38
<i>Pavona varians</i>	1	32.31			0.01	0.16	1.49	132.79	2.81
<i>Pavona venosa</i>	3	4.70	3.45	1.7-8.5	0.04	0.49	4.48	11.45	0.24
<i>Pocillopora verrucosa</i>	1	46.96			0.01	0.16	1.49	280.46	5.93
<i>Porites lutea</i>	2	3.52	1.23	2.6-4.4	0.03	0.32	2.99	3.34	0.07
<i>Porites rus</i>	5	12.13	12.54	4.2-34.1	0.07	0.81	7.46	173.49	3.67
<i>Porites sp. 2</i>	18	7.00	3.99	1-17.4	0.27	2.92	26.87	146.49	3.10
<i>Stylocoeniella armata</i>	3	2.37	0.83	1.5-3.2	0.04	0.49	4.48	2.32	0.05
COMMUNITY	67	17.48	15.92	1-59.5		10.85		4731.03	

Fagatele Bay Transect 3 1m depth – April 1998		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m ²	relative % density	cover cm ² /m ²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora crateriformis</i>	9	16.63	4.71	11-26.5	0.07	0.16	7.26	37.32	16.78
<i>Acropora digitifera</i>	2	15.98	2.85	14-18	0.02	0.04	1.61	7.26	3.27
<i>Alveopora sp. 1</i>	1	4.90			0.01	0.02	0.81	0.34	0.15
<i>Fungia scutaria</i>	4	2.62	0.74	2-3.5	0.03	0.07	3.23	0.41	0.18
<i>Leptastrea purpurea</i>	7	4.50	1.69	1.4-6	0.06	0.12	5.65	2.23	1.00
<i>Millepora tuberosa</i>	1	21.17			0.01	0.02	0.81	6.27	2.82
<i>Pavona divaricata</i>	33	5.74	8.23	1-38.5	0.27	0.59	26.61	45.53	20.47
<i>Pocillopora danae</i>	1	12.00			0.01	0.02	0.81	2.02	0.91
<i>Pocillopora verrucosa</i>	5	10.30	3.38	5.7-13.9	0.04	0.09	4.03	8.06	3.62
<i>Porites annae</i>	2	4.47	2.85	2.4-6.5	0.02	0.04	1.61	0.67	0.30
<i>Porites cylindrica</i>	8	14.25	11.14	4-34.8	0.06	0.14	6.45	34.89	15.69
<i>Porites lutea</i>	2	3.67	1.73	2.4-4.9	0.02	0.04	1.61	0.42	0.19
<i>Porites rus</i>	15	14.40	8.74	2-34	0.12	0.27	12.10	58.51	26.31
<i>Porites sp. 2</i>	27	6.08	2.60	2-12	0.22	0.48	21.77	16.44	7.39
<i>Porites vaughani</i>	1	4.90			0.01	0.02	0.81	0.34	0.15
<i>Psammocora contigua</i>	3	4.22	3.71	1.7-8.5	0.02	0.05	2.42	1.13	0.51
<i>Stylocoeniella armata</i>	3	3.65	0.75	3-4.5	0.02	0.05	2.42	0.57	0.26
COMMUNITY	124	8.40	7.62	1-26.5		2.21		222.41	

Fagatele Bay Transect 3 3m depth – April 1998		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora crateriformis</i>	21	16.16	7.65	4.6-36.4	0.35	3.84	35.00	955.63	52.35
<i>Acropora gemmifera</i>	3	17.53	13.89	4.9-32.4	0.05	0.55	5.00	187.94	10.30
<i>Acropora palifera</i>	2	12.46	0.71	12-13	0.03	0.37	3.33	44.69	2.45
<i>Alveopora sp. 1</i>	1	4.47			0.02	0.18	1.67	2.87	0.16
<i>Fungia scutaria</i>	1	3.46			0.02	0.18	1.67	1.72	0.09
<i>Hydnophora rigida</i>	2	16.97	3.50	14.5-19.4	0.03	0.37	3.33	84.49	4.63
<i>Montipora caliculata</i>	1	18.49			0.02	0.18	1.67	49.14	2.69
<i>Pavona venosa</i>	1	13.27			0.02	0.18	1.67	25.29	1.39
<i>Pocillopora verrucosa</i>	2	7.50	3.54	5-10	0.03	0.37	3.33	17.96	0.98
<i>Porites cylindrica</i>	1	27.84			0.02	0.18	1.67	111.35	6.10
<i>Porites lutea</i>	1	23.07			0.02	0.18	1.67	76.44	4.19
<i>Porites rus</i>	2	17.73	15.17	7-28.5	0.03	0.37	3.33	123.42	6.76
<i>Porites sp. 2</i>	19	5.68	4.53	2-20.9	0.32	3.48	31.67	141.24	7.74
<i>Stylocoeniella armata</i>	3	2.58	1.23	1.4-3.9	0.05	0.55	5.00	3.30	0.18
COMMUNITY	60	11.79	8.60	1.4-36.4		10.98		1825.49	

Fagatele Bay Transect 3 6m depth – April 1998		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m ²	relative % density	cover cm ² /m ²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora azurea</i>	1	24.68			0.02	0.18	1.67	85.41	9.00
<i>Acropora crateriformis</i>	11	11.83	5.02	3-17.5	0.18	1.96	18.33	251.06	26.45
<i>Acropora digitifera</i>	1	20.90			0.02	0.18	1.67	61.29	6.46
<i>Acropora gemmifera</i>	2	17.49	6.08	13.2-21.8	0.03	0.36	3.33	91.03	9.59
<i>Echinopora hirsutissima</i>	1	11.00			0.02	0.18	1.67	16.97	1.79
<i>Galaxea fascicularis</i>	9	7.85	3.39	3-13	0.15	1.61	15.00	90.60	9.54
<i>Leptoria phrygia</i>	1	23.81			0.02	0.18	1.67	79.52	8.38
<i>Millepora tuberosa</i>	2	13.39	10.56	5.9-20.9	0.03	0.36	3.33	65.92	6.94
<i>Montipora ehrenbergii</i>	1	5.48			0.02	0.18	1.67	4.21	0.44
<i>Montipora venosa</i>	1	22.05			0.02	0.18	1.67	68.16	7.18
<i>Pocillopora verrucosa</i>	2	10.68	3.87	7.9-13.4	0.03	0.36	3.33	34.08	3.59
<i>Porites sp. 2</i>	26	4.21	2.48	1.4-11.5	0.43	4.64	43.33	86.40	9.10
<i>Psammocora contigua</i>	1	7.42			0.02	0.18	1.67	7.71	0.81
<i>Psammocora nierstraszi</i>	1	7.00			0.02	0.18	1.67	6.87	0.72
COMMUNITY	60	8.60	6.29	1.4-24.7		10.71		949.24	

Fagatele Bay Transect 3 12m depth – April 1998		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m ²	relative % density	cover cm ² /m ²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora nobilis</i>	1	100.63			0.02	0.36	2.22	2858.12	34.73
<i>Acropora pagoensis</i>	3	55.40	39.93	23.5-100.2	0.07	1.08	6.67	3498.55	42.51
<i>Cyphastrea sp.</i>	2	8.22	2.24	6.6-9.8	0.04	0.72	4.44	39.52	0.48
<i>Goniastrea favulus</i>	1	11.83			0.02	0.36	2.22	39.52	0.48
<i>Leptastrea purpurea</i>	2	13.71	2.42	12-15.4	0.04	0.72	4.44	107.82	1.31
<i>Montastrea curta</i>	1	7.94			0.02	0.36	2.22	17.78	0.22
<i>Montipora elschneri</i>	3	18.98	12.75	4.5-28.4	0.07	1.08	6.67	396.85	4.82
<i>Montipora grisea</i>	3	12.39	4.93	6.7-15.5	0.07	1.08	6.67	143.67	1.75
<i>Montipora verrilli</i>	2	29.49	27.85	9.8-49.2	0.04	0.72	4.44	709.87	8.63
<i>Pavona sp. 2</i>	1	5.66			0.02	0.36	2.22	9.03	0.11
<i>Pavona venosa</i>	1	8.12			0.02	0.36	2.22	18.63	0.23
<i>Pocillopora verrucosa</i>	2	21.66	5.89	17.5-25.8	0.04	0.72	4.44	274.63	3.34
<i>Porites lichen</i>	2	1.50	0.12	1.4-1.6	0.04	0.72	4.44	1.27	0.02
<i>Porites rus</i>	5	3.40	0.88	2.6-4.5	0.11	1.80	11.11	17.22	0.21
<i>Porites sp. 2</i>	14	4.64	1.65	2.4-7.7	0.31	5.03	31.11	95.19	1.16
<i>Stylocoeniella armata</i>	2	1.67	0.63	1.2-2.1	0.04	0.72	4.44	1.69	0.02
COMMUNITY	45	13.98	21.51	1.2-100.6		16.17		8229.37	

Fagatele Bay Transect 4 1m depth – April 1998		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora crateriformis</i>	1	7.35			0.01	0.03	1.19	1.33	1.04
<i>Galaxea fascicularis</i>	2	7.50	0.71	7-8	0.02	0.06	2.38	2.78	2.17
<i>Goniastrea retiformis</i>	1	2.45			0.01	0.03	1.19	0.15	0.12
<i>Leptastrea purpurea</i>	1	4.00			0.01	0.03	1.19	0.39	0.31
<i>Lobophyllia corymbosa</i>	1	8.00			0.01	0.03	1.19	1.57	1.23
<i>Millepora platyphylla</i>	1	16.91			0.01	0.03	1.19	7.03	5.49
<i>Millepora tuberosa</i>	1	10.25			0.01	0.03	1.19	2.58	2.02
<i>Pavona divaricata</i>	55	5.26	5.11	1-23	0.65	1.72	65.48	72.02	56.23
<i>Pavona varians</i>	1	5.48			0.01	0.03	1.19	0.74	0.58
<i>Pocillopora verrucosa</i>	2	7.90	2.69	6-9.8	0.02	0.06	2.38	3.25	2.53
<i>Porites annae</i>	3	5.00	1.00	4-6	0.04	0.09	3.57	1.89	1.48
<i>Porites cylindrica</i>	4	12.38	8.21	4.6-19.7	0.05	0.13	4.76	20.04	15.65
<i>Porites lutea</i>	1	12.25			0.01	0.03	1.19	3.69	2.88
<i>Porites rus</i>	1	5.29			0.01	0.03	1.19	0.69	0.54
<i>Porites sp. 2</i>	5	5.62	3.04	2-10.4	0.06	0.16	5.95	4.79	3.74
<i>Psammocora contigua</i>	2	9.46	3.59	6.9-12	0.02	0.06	2.38	4.72	3.69
<i>Stylocoeniella armata</i>	2	2.50	2.12	1-4	0.02	0.06	2.38	0.42	0.33
COMMUNITY	84	6.05	5.07	1-19.7		2.63		128.07	

Fagatele Bay Transect 4 3m depth – April 1998		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora crateriformis</i>	6	16.34	2.80	12.8-20	0.10	1.11	10.00	237.62	11.84
<i>Acropora gemmifera</i>	2	31.67	22.97	15.4-47.9	0.03	0.37	3.33	366.78	18.27
<i>Acropora nasuta</i>	2	21.07	15.10	10.4-31.7	0.03	0.37	3.33	161.60	8.05
<i>Acropora palifera</i>	2	16.27	5.13	12.6-19.9	0.03	0.37	3.33	80.51	4.01
<i>Fungia scutaria</i>	2	3.67	0.29	3.5-3.9	0.03	0.37	3.33	3.91	0.19
<i>Goniastrea retiformis</i>	1	53.10			0.02	0.18	1.67	408.34	20.34
<i>Montipora grisea</i>	1	29.70			0.02	0.18	1.67	127.71	6.36
<i>Pavona venosa</i>	3	18.50	20.54	5-42.1	0.05	0.55	5.00	270.92	13.50
<i>Porites sp. 2</i>	38	7.30	2.95	3-14.5	0.63	7.01	63.33	339.41	16.91
<i>Psammocora contigua</i>	1	7.75			0.02	0.18	1.67	8.69	0.43
<i>Stylocoeniella armata</i>	2	2.45	0.00	2.4-2.4	0.03	0.37	3.33	1.74	0.09
COMMUNITY	60	11.19	10.37	2.4-53.1		11.06		2007.21	

Fagatele Bay Transect 4 6m depth – April 1998		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora crateriformis</i>	7	17.37	8.01	5-28.1	0.12	1.43	11.67	400.23	12.09
<i>Acropora palifera</i>	4	15.27	5.90	11-24	0.07	0.82	6.67	166.15	5.02
<i>Fungia scutaria</i>	1	2.45			0.02	0.20	1.67	0.96	0.03
<i>Goniastrea retiformis</i>	1	28.25			0.02	0.20	1.67	127.85	3.86
<i>Merulina vaughani</i>	1	14.97			0.02	0.20	1.67	35.89	1.08
<i>Montipora caliculata</i>	2	13.42	0.00	13.4-13.4	0.03	0.41	3.33	57.68	1.74
<i>Platygyra daedalea</i>	1	27.50			0.02	0.20	1.67	121.13	3.66
<i>Pocillopora verrucosa</i>	2	5.65	0.50	5.3-6	0.03	0.41	3.33	10.25	0.31
<i>Porites cylindrica</i>	2	14.00	1.41	13-15	0.03	0.41	3.33	63.13	1.91
<i>Porites lutea</i>	1	31.98			0.02	0.20	1.67	163.90	4.95
<i>Porites rus</i>	5	39.79	15.34	19-59.3	0.08	1.02	8.33	1419.22	42.86
<i>Porites sp. 2</i>	23	9.48	4.38	3.5-23.5	0.38	4.69	38.33	399.26	12.06
<i>Porites vaughani</i>	1	3.87			0.02	0.20	1.67	2.40	0.07
<i>Psammocora haimeana</i>	5	16.97	8.52	6-23.7	0.08	1.02	8.33	277.34	8.37
<i>Stylocoeniella armata</i>	3	4.94	1.37	3.9-6.5	0.05	0.61	5.00	12.34	0.37
<i>Turbinaria reniformis</i>	1	18.33		18.3-18.3	0.02	0.20	1.67	53.83	1.63
COMMUNITY	60	14.88	11.18	2.4-59.3		12.24		3311.56	

Fagatele Bay Transect 4 9m depth – April 1998		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora nobilis</i>	1	72.28			0.01	0.25	1.27	1021.48	17.18
<i>Acropora palifera</i>	1	27.39			0.01	0.25	1.27	146.62	2.47
<i>Favites abdita</i>	1	38.42			0.01	0.25	1.27	288.56	4.85
<i>Galaxea fascicularis</i>	2	11.02	1.73	9.8-12.2	0.03	0.50	2.53	48.09	0.81
<i>Hydnophora rigida</i>	1	6.93			0.01	0.25	1.27	9.38	0.16
<i>Millepora platyphylla</i>	1	4.00			0.01	0.25	1.27	3.13	0.05
<i>Montipora elschneri</i>	1	41.23			0.01	0.25	1.27	332.35	5.59
<i>Montipora grisea</i>	4	11.33	8.40	3.2-23	0.05	1.00	5.06	141.74	2.38
<i>Montipora hoffmeisteri</i>	1	74.19			0.01	0.25	1.27	1076.03	18.09
<i>Montipora verrilli</i>	4	18.70	19.56	1.5-41.6	0.05	1.00	5.06	498.03	8.37
<i>Pavona sp. 2</i>	1	14.07			0.01	0.25	1.27	38.71	0.65
<i>Pavona sp. 3</i>	6	12.35	5.45	3.9-18.4	0.08	1.49	7.59	208.11	3.50
<i>Pavona varians</i>	2	19.39	22.22	3.7-35.1	0.03	0.50	2.53	243.49	4.09
<i>Pavona venosa</i>	1	2.45			0.01	0.25	1.27	1.17	0.02
<i>Pocillopora eydouxi</i>	1	45.96			0.01	0.25	1.27	412.89	6.94
<i>Porites lutea</i>	1	1.50			0.01	0.25	1.27	0.44	0.01
<i>Porites rus</i>	23	12.94	12.09	1.7-42.5	0.29	5.73	29.11	1381.50	23.23
<i>Porites sp. 2</i>	25	4.06	1.68	1.2-7.7	0.32	6.22	31.65	93.60	1.57
<i>Stylocoeniella armata</i>	2	2.06	0.09	2-2.1	0.03	0.50	2.53	1.66	0.03
COMMUNITY	79	12.49	15.23	1.2-74.2		19.66		5946.99	

Fagatele Bay Transect 5 3m depth – April 1998		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m ²	relative % density	cover cm ² /m ²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora crateriformis</i>	3	15.49	7.36	11-24	0.05	0.20	5.00	44.17	2.38
<i>Acropora gemmifera</i>	3	26.91	6.59	19.9-33	0.05	0.20	5.00	120.52	6.48
<i>Acropora hyacinthus</i>	2	17.16	12.26	8.5-25.8	0.03	0.14	3.33	39.43	2.12
<i>Acropora ocellata</i>	3	10.80	8.39	5.9-20.5	0.05	0.20	5.00	26.20	1.41
<i>Cyphastrea seralia</i>	1	4.24			0.02	0.07	1.67	0.96	0.05
<i>Favites complanata</i>	1	22.36			0.02	0.07	1.67	26.68	1.43
<i>Favites halicora</i>	1	18.33			0.02	0.07	1.67	17.93	0.96
<i>Galaxea fascicularis</i>	3	9.61	4.98	4.5-14.4	0.05	0.20	5.00	17.45	0.94
<i>Goniastrea retiformis</i>	6	22.65	16.66	7.5-51.3	0.10	0.41	10.00	238.32	12.82
<i>Hydnophora microconos</i>	1	8.77			0.02	0.07	1.67	4.11	0.22
<i>Leptastrea transversa</i>	1	15.49			0.02	0.07	1.67	12.80	0.69
<i>Leptoria phrygia</i>	1	22.91			0.02	0.07	1.67	28.01	1.51
<i>Millepora platyphylla</i>	13	29.83	21.20	4-65.5	0.22	0.88	21.67	904.67	48.65
<i>Montipora ehrenbergii</i>	1	21.17			0.02	0.07	1.67	23.90	1.29
<i>Montipora elschneri</i>	1	32.31			0.02	0.07	1.67	55.70	3.00
<i>Montipora verrilli</i>	7	21.48	9.49	8.1-34.5	0.12	0.48	11.67	201.19	10.82
<i>Pavona sp. 3</i>	1	9.95			0.02	0.07	1.67	5.28	0.28
<i>Pocillopora danae</i>	1	7.35			0.02	0.07	1.67	2.88	0.15
<i>Pocillopora eydouxi</i>	1	6.93			0.02	0.07	1.67	2.56	0.14
<i>Pocillopora verrucosa</i>	7	11.70	4.19	6.9-17.5	0.12	0.48	11.67	56.71	3.05
<i>Porites rus</i>	1	12.49			0.02	0.07	1.67	8.32	0.45
<i>Psammocora nierstraszi</i>	1	20.20			0.02	0.07	1.67	21.77	1.17
COMMUNITY	60	19.69	14.02	4-51.9		4.08		1859.55	

Fagatele Bay Transect 5 6m depth – April 1998		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora crateriformis</i>	1	8.77			0.02	0.08	1.67	4.78	0.28
<i>Acropora gemmifera</i>	2	20.95	0.71	20.4-21.4	0.03	0.16	3.33	54.47	3.17
<i>Acropora ocellata</i>	3	9.83	0.25	9.5-10	0.05	0.24	5.00	17.99	1.05
<i>Acropora robusta</i>	1	13.42			0.02	0.08	1.67	11.17	0.65
<i>Echinopora hirsutissima</i>	2	25.98	5.66	22-30	0.03	0.16	3.33	85.74	5.00
<i>Favia stelligera</i>	1	11.31			0.02	0.08	1.67	7.94	0.46
<i>Favites halicora</i>	3	12.77	7.33	6.9-21	0.05	0.24	5.00	37.04	2.16
<i>Galaxea fascicularis</i>	8	11.11	3.10	3.9-14.3	0.13	0.63	13.33	65.45	3.81
<i>Goniastrea retiformis</i>	2	12.43	2.62	10.6-14.3	0.03	0.16	3.33	19.61	1.14
<i>Hydnophora microconos</i>	1	11.96			0.02	0.08	1.67	8.87	0.52
<i>Millepora platyphylla</i>	16	27.50	19.60	10-79.2	0.27	1.26	26.67	1108.50	64.61
<i>Montipora verrilli</i>	4	24.53	3.33	19.6-26.7	0.07	0.32	6.67	151.44	8.83
<i>Pavona sp. 3</i>	1	17.49			0.02	0.08	1.67	18.98	1.11
<i>Pocillopora eydouxi</i>	2	12.93	2.73	11-14.9	0.03	0.16	3.33	21.22	1.24
<i>Pocillopora ligulata</i>	1	17.75			0.02	0.08	1.67	19.54	1.14
<i>Pocillopora meandrina</i>	2	14.79	1.32	13.9-15.7	0.03	0.16	3.33	27.24	1.59
<i>Pocillopora verrucosa</i>	4	8.77	3.75	4-12.8	0.07	0.32	6.67	21.71	1.27
<i>Porites sp. 2</i>	1	6.32			0.02	0.08	1.67	2.48	0.14
<i>Psammocora contigua</i>	1	4.90			0.02	0.08	1.67	1.49	0.09
<i>Psammocora nierstraszi</i>	2	12.91	4.19	9.9-15.9	0.03	0.16	3.33	21.78	1.27
<i>Symphyllia radians</i>	2	7.93	2.85	5.9-9.9	0.03	0.16	3.33	8.31	0.48
COMMUNITY	60	17.30	12.83	3.9-79.2		4.74		1715.76	

Fagatele Bay Transect 5 9m depth – April 1998		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora aculeus</i>	1	12.37			0.01	0.18	1.27	21.84	0.50
<i>Acropora crateriformis</i>	1	18.97			0.01	0.18	1.27	51.38	1.19
<i>Acropora digitifera</i>	3	13.16	3.95	8.8-16.4	0.04	0.55	3.80	78.64	1.82
<i>Acropora hyacinthus</i>	13	8.71	6.23	2.4-27.1	0.16	2.36	16.46	207.38	4.79
<i>Montastrea curta</i>	1	3.00			0.01	0.18	1.27	1.28	0.03
<i>Montipora calculata</i>	1	21.35			0.01	0.18	1.27	65.08	1.50
<i>Montipora elschneri</i>	3	18.61	12.24	5.7-30	0.04	0.55	3.80	191.11	4.41
<i>Montipora grisea</i>	18	22.91	13.59	1-48.5	0.23	3.27	22.78	1796.78	41.49
<i>Montipora hoffmeisteri</i>	1	16.88			0.01	0.18	1.27	40.68	0.94
<i>Montipora informis</i>	1	22.23			0.01	0.18	1.27	70.51	1.63
<i>Montipora verrilli</i>	10	31.23	8.01	20.1-44.3	0.13	1.82	12.66	1474.65	34.05
<i>Pavona sp. 3</i>	2	12.21	2.42	10.5-13.9	0.03	0.36	2.53	43.39	1.00
<i>Pavona varians</i>	2	13.42	12.65	4.5-22.4	0.03	0.36	2.53	74.22	1.71
<i>Pocillopora eydouxi</i>	7	7.29	6.16	1.2-17.5	0.09	1.27	8.86	85.60	1.98
<i>Pocillopora meandrina</i>	2	10.68	3.87	7.9-13.4	0.03	0.36	2.53	34.68	0.80
<i>Pocillopora verrucosa</i>	1	10.49			0.01	0.18	1.27	15.70	0.36
<i>Porites sp. 2</i>	12	5.99	3.25	2-11	0.15	2.18	15.19	78.11	1.80
COMMUNITY	79	15.62	11.91	1-48.5		14.36		4331.04	

Fagatele Bay Transect 5 12m depth – April 1998		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m ²	relative % density	cover cm ² /m ²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora aculeus</i>	2	17.07	17.66	4.6-29.6	0.03	0.46	2.74	162.32	0.08
<i>Acropora hyacinthus</i>	6	8.50	2.18	5.5-11.3	0.08	1.39	8.22	82.88	0.04
<i>Acropora polystoma</i>	1	12.49			0.01	0.23	1.37	28.29	0.01
<i>Acropora secale</i>	3	11.58	1.19	10.5-12.8	0.04	0.69	4.11	73.45	0.03
<i>Cyphastrea sp.</i>	1	20.98			0.01	0.23	1.37	79.80	0.04
<i>Leptastrea purpurea</i>	1	2.83			0.01	0.23	1.37	1.45	0.00
<i>Montastrea curta</i>	2	11.45	4.97	7.9-15	0.03	0.46	2.74	52.05	0.02
<i>Montipora calculata</i>	1	4.90			0.01	0.23	1.37	4.35	0.00
<i>Montipora elschneri</i>	6	23.15	20.22	3.2-59.7	0.08	1.39	8.22	953.61	0.45
<i>Montipora grisea</i>	9	17.59	9.69	2.4-31.5	0.12	2.08	12.33	641.30	0.30
<i>Montipora hoffmeisteri</i>	1	15.68			0.01	0.23	1.37	44.62	0.02
<i>Montipora informis</i>	2	32.61	1.63	31.5-33.8	0.03	0.46	2.74	386.30	0.18
<i>Montipora verrilli</i>	24	26.19	17.39	1.2-66.8	0.33	5.54	32.88	4247.25	1.99
<i>Pavona sp. 3</i>	3	10.87	3.56	8.5-15	0.04	0.69	4.11	68.92	0.03
<i>Pocillopora eydouxi</i>	1	11.49			0.01	0.23	1.37	23.94	0.01
<i>Pocillopora meandrina</i>	1	9.38			0.01	0.23	1.37	15.96	0.01
<i>Pocillopora sp.</i>	1	4.00			0.01	0.23	1.37	2.90	0.00
<i>Porites lichen</i>	1	15.87			0.01	0.23	1.37	45.70	0.02
<i>Porites sp. 2</i>	7	4.62	2.81	1.5-7.9	0.10	1.62	9.59	35.77	0.02
COMMUNITY	73	17.76	14.58	1.2-66.8		16.86		6950.88	

Fagatele Bay Transect 6 9m depth – April 1998		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora hyacinthus</i>	1	4.90			0.03	0.29	2.70	5.55	0.28
<i>Acropora yongei</i>	1	7.35			0.03	0.29	2.70	12.49	0.63
<i>Coscinaraea columna</i>	1	10.49			0.03	0.29	2.70	25.44	1.29
<i>Cyphastrea sp.</i>	1	4.24			0.03	0.29	2.70	4.16	0.21
<i>Favites sp.</i>	1	1.41			0.03	0.29	2.70	0.46	0.02
<i>Goniastrea edwardsi</i>	1	11.96			0.03	0.29	2.70	33.07	1.67
<i>Leptoria phrygia</i>	1	3.46			0.03	0.29	2.70	2.77	0.14
<i>Montastrea curta</i>	4	5.97	2.76	2.5-8.4	0.11	1.18	10.81	38.21	1.94
<i>Montipora elschneri</i>	1	3.46			0.03	0.29	2.70	2.77	0.14
<i>Montipora grisea</i>	6	19.32	11.95	6.2-33.9	0.16	1.77	16.22	682.99	34.59
<i>Pavona venosa</i>	1	4.90			0.03	0.29	2.70	5.55	0.28
<i>Pocillopora damicornis</i>	1	1.94			0.03	0.29	2.70	0.87	0.04
<i>Pocillopora eydouxi</i>	5	20.17	9.52	7.5-30	0.14	1.47	13.51	554.30	28.07
<i>Pocillopora verrucosa</i>	6	19.38	6.55	8-24.7	0.16	1.77	16.22	570.72	28.90
<i>Porites annae</i>	1	4.47			0.03	0.29	2.70	4.62	0.23
<i>Porites sp. 2</i>	4	4.72	3.74	1.7-10.2	0.11	1.18	10.81	30.35	1.54
<i>Stylocoeniella armata</i>	1	1.22			0.03	0.29	2.70	0.35	0.02
COMMUNITY	37	11.77	9.73	1.2-33.9		10.89		1974.70	

Fagatele Bay Transect 6 12m depth – April 1998		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora hyacinthus</i>	1	5.10			0.03	0.56	2.70	11.36	0.33
<i>Montastrea curta</i>	2	8.28	1.71	7.1-9.5	0.05	1.11	5.41	61.17	1.75
<i>Montipora elschneri</i>	2	16.67	6.43	12.1-21.2	0.05	1.11	5.41	260.87	7.47
<i>Montipora grisea</i>	15	12.87	9.82	2.4-37	0.41	8.35	40.54	1674.88	47.98
<i>Montipora hoffmeisteri</i>	2	20.97	8.50	15-27	0.05	1.11	5.41	415.99	11.92
<i>Montipora turgescens</i>	1	14.99			0.03	0.56	2.70	98.21	2.81
<i>Montipora verrilli</i>	1	25.46			0.03	0.56	2.70	283.15	8.11
<i>Pavona sp. 3</i>	2	8.12	0.52	7.7-8.5	0.05	1.11	5.41	57.68	1.65
<i>Pocillopora eydouxi</i>	7	11.34	6.20	3.9-20.4	0.19	3.89	18.92	493.99	14.15
<i>Pocillopora verrucosa</i>	3	8.32	4.71	3.2-12.4	0.08	1.67	8.11	110.11	3.15
<i>Porites sp. 2</i>	1	7.35			0.03	0.56	2.70	23.60	0.68
COMMUNITY	37	12.39	8.01	2.4-25.5		20.59		3491.00	

APPENDIX 2

Summary of results from point-quarter surveys at Fagatele Bay from the 2001 surveys.

Fagatele Bay Transect 1 9m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora hyacinthus</i>	3	8.66	7.17	2-16.3	0.07	1.15	6.82	99.00	7.62
<i>Acropora insignis</i>	1	16.91			0.02	0.38	2.27	86.33	6.64
<i>Astreopora listeri</i>	1	33.67			0.02	0.38	2.27	342.29	26.34
<i>Astreopora myriophthalma</i>	1	22.91			0.02	0.38	2.27	158.47	12.19
<i>Galaxea fascicularis</i>	2	9.16	0.31	8.9-9.4	0.05	0.77	4.55	50.71	3.90
<i>Leptastrea purpurea</i>	1	10.25			0.02	0.38	2.27	31.69	2.44
<i>Leptastrea transversa</i>	1	11.22			0.02	0.38	2.27	38.03	2.93
<i>Montastrea curta</i>	1	3.16			0.02	0.38	2.27	3.02	0.23
<i>Montipora corbettensis</i>	1	13.42			0.02	0.38	2.27	54.33	4.18
<i>Montipora efflorescens</i>	2	14.55	3.67	12-17.2	0.05	0.77	4.55	131.90	10.15
<i>Montipora foveolata</i>	2	2.72	0.39	2.5-3	0.05	0.77	4.55	4.53	0.35
<i>Montipora grisea</i>	5	22.60	19.94	6.5-57.3	0.11	1.92	11.36	1250.82	96.26
<i>Montipora tuberculosa</i>	4	21.31	18.27	9.2-48.2	0.09	1.54	9.09	850.58	65.46
<i>Pocillopora damicornis</i>	1	3.00			0.02	0.38	2.27	2.72	0.21
<i>Pocillopora eydouxi</i>	9	18.40	14.38	2.8-47	0.20	3.46	20.45	1418.94	109.20
<i>Pocillopora meandrina</i>	4	19.60	10.18	9.5-31.6	0.09	1.54	9.09	557.50	42.90
<i>Porites rus</i>	3	12.63	12.25	4.5-26.7	0.07	1.15	6.82	235.13	18.10
<i>Psammocora haimeana</i>	2	6.08	4.13	3.2-9	0.05	0.77	4.55	27.47	2.11
COMMUNITY	44	15.58	12.77	2-57.3		16.91		5343.45	

Coral species	Size distribution of colonies (diameter in cm)				frequency /quarter	density per m ²	relative % density	cover cm ² /m ²	relative % cover
	n	mean	stdev	range					
<i>Acropora crateriformis</i>	1	20.35			0.01	0.10	1.09	33.96	3.11
<i>Acropora hyacinthus</i>	2	6.23	2.48	4.5-8	0.02	0.21	2.17	6.87	0.63
<i>Acropora insignis</i>	1	11.96			0.01	0.10	1.09	11.73	1.07
<i>Acropora latistella</i>	2	10.29	7.07	5.3-15.3	0.02	0.21	2.17	21.49	1.97
<i>Acropora samoensis</i>	1	71.83		71.8-71.8	0.01	0.10	1.09	423.17	38.78
<i>Astreopora myriophthalma</i>	2	24.16	5.40	20.4-28	0.02	0.21	2.17	98.18	9.00
<i>Galaxea fascicularis</i>	5	7.35	2.48	5-10.6	0.05	0.52	5.43	24.20	2.22
<i>Gardineroseris planulata</i>	1	17.97			0.01	0.10	1.09	26.49	2.43
<i>Goniastrea edwardsi</i>	1	4.90			0.01	0.10	1.09	1.97	0.18
<i>Leptastrea purpurea</i>	3	8.56	4.54	5-13.7	0.03	0.31	3.26	21.41	1.96
<i>Leptoria phrygia</i>	1	28.28			0.01	0.10	1.09	65.62	6.01
<i>Millepora exaesa</i>	5	8.58	7.20	1.4-20.4	0.05	0.52	5.43	47.25	4.33
<i>Millepora tuberosa</i>	2	19.02	3.92	16.3-21.8	0.02	0.21	2.17	60.62	5.55
<i>Montastrea annuligera</i>	1	7.21			0.01	0.10	1.09	4.27	0.39
<i>Montastrea curta</i>	6	6.48	4.39	1.7-11.5	0.07	0.63	6.52	28.54	2.62
<i>Montipora efflorescens</i>	1	41.81			0.01	0.10	1.09	143.38	13.14
<i>Montipora foveolata</i>	3	4.66	1.38	3.7-6.2	0.03	0.31	3.26	5.66	0.52
<i>Montipora grisea</i>	9	16.77	11.34	4.5-41.4	0.10	0.94	9.78	291.93	26.75
<i>Montipora informis</i>	1	19.00			0.01	0.10	1.09	29.61	2.71
<i>Montipora sp</i>	1	0.50			0.01	0.10	1.09	0.02	0.00
<i>Montipora tuberculosa</i>	4	28.40	28.91	3.9-65.3	0.04	0.42	4.35	470.25	43.09
<i>Pavona collines</i>	4	16.20	9.64	7.7-30	0.04	0.42	4.35	108.97	9.99
<i>Pocillopora eydouxi</i>	15	20.20	17.97	1-52.9	0.16	1.57	16.30	872.96	80.00
<i>Pocillopora juvenile</i>	3	1.65	0.39	1.2-2	0.03	0.31	3.26	0.70	0.06

Fagatele Bay Transect 1 12m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Pocillopora meandrina</i>	4	18.16	5.39	12-25	0.04	0.42	4.35	115.33	10.57
<i>Pocillopora verrucosa</i>	3	21.83	14.35	6.2-34.5	0.03	0.31	3.26	151.01	13.84
<i>Porites</i> "mound"	4	8.53	9.28	1.4-21	0.04	0.42	4.35	45.05	4.13
<i>Porites</i> "yellow encrusting"	1	8.37			0.01	0.10	1.09	5.74	0.53
<i>Porites cylindrica</i>	1	16.52			0.01	0.10	1.09	22.39	2.05
<i>Porites massive</i>	2	36.22	5.31	32.5-40	0.02	0.21	2.17	217.53	19.93
<i>Porites rus</i>	1	8.94			0.01	0.10	1.09	6.56	0.60
<i>Psammocora haimeana</i>	1	15.49			0.01	0.10	1.09	19.69	1.80
COMMUNITY	92	15.57	14.42	0.5-65.3		9.61		3382.56	

Fagatele Bay Transect 2 3m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora aculeus</i>	1	19.34			0.02	0.38	1.56	112.88	8.00
<i>Acropora crateriformis</i>	1	8.77			0.02	0.38	1.56	23.24	1.65
<i>Acropora gemmifera</i>	1	14.42			0.02	0.38	1.56	62.78	4.45
<i>Acropora hyacinthus</i>	1	3.46			0.02	0.38	1.56	3.62	0.26
<i>Galaxea fascicularis</i>	23	10.11	3.70	1.5-17.3	0.36	8.84	35.94	801.27	56.82
<i>Gardineroseris planulata</i>	2	7.34	0.58	6.9-7.8	0.03	0.77	3.13	32.60	2.31
<i>Goniastrea retiformis</i>	3	39.84	21.63	14.9-52.7	0.05	1.15	4.69	1719.79	121.95
<i>Leptastrea transversa</i>	1	40.62			0.02	0.38	1.56	498.01	35.31
<i>Montipora efflorescens</i>	1	46.99			0.02	0.38	1.56	666.43	47.26
<i>Montipora foveolata</i>	8	5.44	2.90	1.6-10	0.13	3.07	12.50	89.11	6.32
<i>Montipora grisea</i>	2	33.25	21.53	18-48.5	0.03	0.77	3.13	807.38	57.25
<i>Montipora hoffmeisteri</i>	2	3.45	2.87	1.4-5.5	0.03	0.77	3.13	9.66	0.68
<i>Pavona collines</i>	1	3.87			0.02	0.38	1.56	4.53	0.32
<i>Pocillopora damicornis</i>	2	1.50	0.71	1-2	0.03	0.77	3.13	1.51	0.11
<i>Pocillopora eydouxi</i>	5	17.67	20.35	2-46.4	0.08	1.92	7.81	970.97	68.85
<i>Pocillopora meandrina</i>	3	15.40	10.76	3-22.2	0.05	1.15	4.69	284.62	20.18
<i>Porites annae</i>	2	5.83	4.79	2.5-9.2	0.03	0.77	3.13	27.47	1.95
<i>Porites rus</i>	3	26.53	19.85	4.7-43.5	0.05	1.15	4.69	875.29	62.07
<i>Porites sp. 2</i>	1	2.24			0.02	0.38	1.56	1.51	0.11
<i>Stylocoeniella armata</i>	1	2.00			0.02	0.38	1.56	1.21	0.09
COMMUNITY	64	13.35	13.67	1-52.7		24.59		6993.87	

Fagatele Bay Transect 2 6m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora aculeus</i>	6	13.26	10.50	2-24.5	0.05	0.71	4.69	149.25	9.54
<i>Acropora akajimensis</i>	2	2.59	0.20	2.5-2.7	0.02	0.24	1.56	1.25	0.08
<i>Acropora crateriformis</i>	5	9.58	3.72	6.5-15.5	0.04	0.59	3.91	47.77	3.05
<i>Acropora divaricata</i>	1	41.23			0.01	0.12	0.78	157.99	10.10
<i>Acropora gemmifera</i>	2	44.55	16.14	33.1-56	0.02	0.24	1.56	393.11	25.13
<i>Acropora hyacinthus</i>	1	5.66			0.01	0.12	0.78	2.97	0.19
<i>Acropora monticulosa</i>	1	51.96			0.01	0.12	0.78	250.92	16.04
<i>Acropora palifera</i>	1	24.25			0.01	0.12	0.78	54.64	3.49
<i>Echinopora lamellosa</i>	2	20.70	7.05	15.7-25.7	0.02	0.24	1.56	84.29	5.39
<i>Favites abdita</i>	1	17.55			0.01	0.12	0.78	28.62	1.83
<i>Galaxea fascicularis</i>	14	11.55	3.82	5-19.8	0.11	1.66	10.94	191.16	12.22
<i>Goniastrea retiformis</i>	2	31.45	17.61	19-43.9	0.02	0.24	1.56	212.63	13.59
<i>Hydophora exesa</i>	1	27.22			0.01	0.12	0.78	68.86	4.40
<i>Leptoria phrygia</i>	1	41.70			0.01	0.12	0.78	161.61	10.33
<i>Merulina ampliata</i>	2	40.98	14.87	30.5-51.5	0.02	0.24	1.56	332.70	21.27
<i>Millepora exaesa</i>	1	18.17			0.01	0.12	0.78	30.67	1.96
<i>Montipora corbettensis</i>	1	2.96			0.01	0.12	0.78	0.81	0.05
<i>Montipora efflorescens</i>	3	34.04	4.81	30.3-39.5	0.02	0.35	2.34	327.31	20.92
<i>Montipora foveolata</i>	13	4.61	1.74	2.5-7.2	0.10	1.54	10.16	29.09	1.86
<i>Montipora grisea</i>	7	35.01	28.92	2.8-88.4	0.05	0.83	5.47	1263.43	80.75
<i>Montipora hoffmeisteri</i>	1	3.00			0.01	0.12	0.78	0.84	0.05
<i>Montipora informis</i>	2	32.60	43.65	1.7-63.5	0.02	0.24	1.56	374.61	23.94
<i>Montipora tuberculosa</i>	2	41.89	39.35	14.1-69.7	0.02	0.24	1.56	470.06	30.04
<i>Montipora verrucosa</i>	1	19.49			0.01	0.12	0.78	35.31	2.26

Fagatele Bay Transect 2 6m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Pavona collines</i>	4	9.11	6.87	1.7-16	0.03	0.47	3.13	44.05	2.82
<i>Pavona divaricata</i>	1	11.83			0.01	0.12	0.78	13.01	0.83
<i>Pavona varians</i>	2	21.15	19.51	7.4-34.9	0.02	0.24	1.56	118.49	7.57
<i>Pocillopora eydouxi</i>	7	23.17	23.18	2.1-53.4	0.05	0.83	5.47	648.91	41.48
<i>Pocillopora meandrina</i>	5	16.66	2.73	13.4-21	0.04	0.59	3.91	131.78	8.42
<i>Pocillopora verrucosa</i>	1	29.29			0.01	0.12	0.78	79.74	5.10
<i>Porites annae</i>	2	2.47	0.04	2.5-2.5	0.02	0.24	1.56	1.14	0.07
<i>Porites lichen</i>	14	5.10	3.04	1-13	0.11	1.66	10.94	44.98	2.87
<i>Porites rus</i>	11	12.97	13.19	3-47.3	0.09	1.30	8.59	333.61	21.32
<i>Porites sp. 2</i>	3	2.00	1.01	1.4-3.2	0.02	0.35	2.34	1.30	0.08
<i>Stylocoeniella armata</i>	5	1.88	0.75	1-2.8	0.04	0.59	3.91	1.86	0.12
COMMUNITY	128	15.46	16.58	1-88.4		15.15		6088.79	

Fagatele Bay Transect 2 9m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora robusta</i>	1	58.40			0.03	0.63	3.13	1700.11	58.46
<i>Echinopora lamellosa</i>	2	43.93	40.63	15.2-72.7	0.06	1.27	6.25	2747.60	94.48
<i>Galaxea fascicularis</i>	1	9.17			0.03	0.63	3.13	41.88	1.44
<i>Montipora corbettensis</i>	1	12.96			0.03	0.63	3.13	83.76	2.88
<i>Montipora efflorescens</i>	1	48.34			0.03	0.63	3.13	1165.15	40.06
<i>Montipora foveolata</i>	10	5.59	1.98	2.7-8.9	0.31	6.35	31.25	173.50	5.97
<i>Montipora grisea</i>	5	23.37	11.99	13.3-43.4	0.16	3.17	15.63	1647.76	56.66
<i>Montipora monasteriata</i>	2	26.64	1.01	25.9-27.4	0.06	1.27	6.25	707.96	24.34
<i>Pavona venosa</i>	1	6.32			0.03	0.63	3.13	19.94	0.69
<i>Pocillopora eydouxi</i>	4	39.56	32.29	7.3-82.4	0.13	2.54	12.50	4681.29	160.97
<i>Porites rus</i>	2	9.87	3.37	7.5-12.3	0.06	1.27	6.25	102.70	3.53
<i>Psammocora haimeana</i>	1	8.37			0.03	0.63	3.13	34.90	1.20
<i>Stylocoeniella armata</i>	1	1.41			0.03	0.63	3.13	1.00	0.03
COMMUNITY	32	19.90	20.96	1.4-82.4		20.31		13107.5	

Fagatele Bay Transect 2 12m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora crateriformis</i>	1	3.87			0.03	1.17	3.13	13.76	0.95
<i>Acropora nasuta</i>	1	38.88			0.03	1.17	3.13	1386.62	95.36
<i>Acropora pagoensis</i>	2	14.52	7.04	9.5-19.5	0.06	2.34	6.25	431.94	29.71
<i>Montipora corbettensis</i>	5	13.32	13.31	5.3-36.5	0.16	5.84	15.63	1463.66	100.66
<i>Montipora efflorescens</i>	1	33.54			0.03	1.17	3.13	1031.71	70.95
<i>Montipora foveolata</i>	7	5.37	1.96	1.7-7.8	0.22	8.17	21.88	206.34	14.19
<i>Montipora grisea</i>	7	15.74	10.50	3-31	0.22	8.17	21.88	2195.94	151.02
<i>Montipora monasteriata</i>	1	21.21			0.03	1.17	3.13	412.69	28.38
<i>Pavona varians</i>	1	19.90			0.03	1.17	3.13	363.16	24.97
<i>Pocillopora eydouxi</i>	1	24.68			0.03	1.17	3.13	558.50	38.41
<i>Porites rus</i>	5	11.38	7.92	2.5-20	0.16	5.84	15.63	824.22	56.68
COMMUNITY	32	13.83	10.74	1.7-38.9		37.37		8888.55	

Fagatele Bay Transect 3 3m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora crateriformis</i>	1	17.32			0.03	0.44	3.13	104.48	23.09
<i>Favites abdita</i>	2	18.73	14.49	8.5-29	0.06	0.89	6.25	317.62	70.18
<i>Galaxea fascicularis</i>	14	9.97	5.46	2.7-21	0.44	6.21	43.75	619.57	136.90
<i>Goniastrea retiformis</i>	1	27.20			0.03	0.44	3.13	257.72	56.95
<i>Montipora grisea</i>	1	19.34			0.03	0.44	3.13	130.25	28.78
<i>Montipora sp</i>	1	1.00			0.03	0.44	3.13	0.35	0.08
<i>Montipora tuberculosa</i>	1	11.40			0.03	0.44	3.13	45.27	10.00
<i>Pocillopora meandrina</i>	2	10.75	9.54	4-17.5	0.06	0.89	6.25	112.14	24.78
<i>Porites lichen</i>	7	6.22	3.21	2.1-10.9	0.22	3.10	21.88	115.97	25.63
<i>Porites spp</i>	1	1.00			0.03	0.44	3.13	0.35	0.08
<i>Stylocoeniella armata</i>	1	1.73			0.03	0.44	3.13	1.04	0.23
COMMUNITY	32	10.03	7.35	1-29		14.19		1704.77	

Fagatele Bay Transect 3 6m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora aculeus</i>	2	8.60	4.75	5.2-12	0.06	1.39	6.25	92.94	4.83
<i>Echinopora hirsutissima</i>	1	51.38			0.03	0.69	3.13	1439.14	74.82
<i>Galaxea fascicularis</i>	3	9.21	1.05	8.2-10.3	0.09	2.08	9.38	139.83	7.27
<i>Goniastrea retiformis</i>	1	62.61			0.03	0.69	3.13	2136.91	111.09
<i>Merulina ampliata</i>	3	31.57	38.18	3.9-75.1	0.09	2.08	9.38	3219.54	167.37
<i>Montipora corbettensis</i>	1	22.91			0.03	0.69	3.13	286.19	14.88
<i>Montipora foveolata</i>	8	5.20	1.23	3.7-7.5	0.25	5.55	25.00	123.47	6.42
<i>Montipora grisea</i>	1	11.83			0.03	0.69	3.13	76.32	3.97
<i>Pocillopora eydouxi</i>	1	23.98			0.03	0.69	3.13	313.45	16.30
<i>Pocillopora meandrina</i>	3	15.97	4.80	10.5-19.4	0.09	2.08	9.38	442.10	22.98
<i>Porites annae</i>	2	4.99	3.52	2.5-7.5	0.06	1.39	6.25	33.93	1.76
<i>Porites lichen</i>	1	21.82			0.03	0.69	3.13	259.48	13.49
<i>Porites rus</i>	2	19.90	7.94	14.3-25.5	0.06	1.39	6.25	466.09	24.23
<i>Psammocora contigua</i>	1	7.48			0.03	0.69	3.13	30.53	1.59
<i>Stylocoeniella armata</i>	2	2.22	0.32	2-2.5	0.06	1.39	6.25	5.45	0.28
COMMUNITY	32	15.16	17.29	2-62.6		22.21		9065.38	

Fagatele Bay Transect 3 9m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora cytharea</i>	1	6.00			0.01	0.17	1.14	4.79	0.21
<i>Acropora gemmifera</i>	2	43.79	15.80	32.6-55	0.02	0.34	2.27	543.60	23.99
<i>Galaxea fascicularis</i>	7	7.53	2.91	4.5-12	0.08	1.19	7.95	59.55	2.63
<i>Montastrea curta</i>	1	46.73			0.01	0.17	1.14	290.63	12.83
<i>Montipora corbettensis</i>	1	55.99			0.01	0.17	1.14	417.18	18.41
<i>Montipora efflorescens</i>	15	22.07	15.83	2.8-63.7	0.17	2.54	17.05	1438.80	63.50
<i>Montipora foveolata</i>	24	5.25	2.58	2.5-12.5	0.27	4.07	27.27	108.45	4.79
<i>Montipora grisea</i>	12	33.06	24.85	2.5-87	0.14	2.03	13.64	2649.45	116.93
<i>Montipora hoffmeisteri</i>	1	6.32			0.01	0.17	1.14	5.32	0.23
<i>Montipora informis</i>	4	33.07	21.56	9.8-60	0.05	0.68	4.55	767.82	33.89
<i>Montipora monasteriata</i>	2	45.94	5.51	42.1-49.8	0.02	0.34	2.27	565.82	24.97
<i>Montipora nodosa</i>	1	44.90			0.01	0.17	1.14	268.27	11.84
<i>Montipora tuberculosa</i>	7	22.76	17.89	2.8-57.5	0.08	1.19	7.95	738.15	32.58
<i>Pavona collines</i>	1	15.30			0.01	0.17	1.14	31.14	1.37
<i>Pocillopora eydouxi</i>	2	43.95	32.15	21.2-66.7	0.02	0.34	2.27	651.52	28.75
<i>Pocillopora meandrina</i>	3	17.77	6.21	12.9-24.7	0.03	0.51	3.41	136.26	6.01
<i>Pocillopora verrucosa</i>	1	8.94			0.01	0.17	1.14	10.65	0.47
<i>Porites rus</i>	3	11.18	6.72	5.3-18.5	0.03	0.51	3.41	61.88	2.73
COMMUNITY	88	19.73	19.02	2.5-87		14.91		8749.26	

Fagatele Bay Transect 3 12m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora akajimensis</i>	3	25.30	7.59	20-34	0.03	0.28	2.88	148.59	2.43
<i>Acropora crateriformis</i>	2	14.67	8.02	9-20.4	0.02	0.19	1.92	36.12	0.59
<i>Acropora divaricata</i>	2	10.97	1.45	10-12	0.02	0.19	1.92	17.73	0.29
<i>Acropora hyacinthus</i>	1	7.00			0.01	0.09	0.96	3.58	0.06
<i>Acropora juvenile</i>	1	2.83			0.01	0.09	0.96	0.58	0.01
<i>Acropora monticulosa</i>	1	23.45			0.01	0.09	0.96	40.14	0.66
<i>Astreopora myriophthalma</i>	1	8.94			0.01	0.09	0.96	5.84	0.10
<i>Coscinarea columna</i>	1	25.83			0.01	0.09	0.96	48.68	0.80
<i>Fungia fungites</i>	1	19.00			0.01	0.09	0.96	26.35	0.43
<i>Galaxea fascicularis</i>	6	6.70	2.64	1.5-8.9	0.06	0.56	5.77	22.20	0.36
<i>Goniopora somaliensis</i>	1	9.49			0.01	0.09	0.96	6.57	0.11
<i>Hydnophora microconos</i>	1	49.18			0.01	0.09	0.96	176.54	2.89
<i>Hydnophora rigida</i>	1	4.90			0.01	0.09	0.96	1.75	0.03
<i>Leptastrea purpurea</i>	2	16.99	4.26	14-20	0.02	0.19	1.92	43.46	0.71
<i>Montastrea annuligera</i>	1	10.39			0.01	0.09	0.96	7.88	0.13
<i>Montipora corbettensis</i>	4	61.52	12.80	48.9-79.4	0.04	0.37	3.85	1140.67	18.67
<i>Montipora danae</i>	1	17.89			0.01	0.09	0.96	23.35	0.38
<i>Montipora efflorescens</i>	10	32.67	20.82	2.5-58.7	0.10	0.93	9.62	1063.53	17.41
<i>Montipora foveolata</i>	16	5.00	3.16	1.2-12.6	0.15	1.49	15.38	40.12	0.66
<i>Montipora grisea</i>	16	29.31	18.60	6.5-68.3	0.15	1.49	15.38	1381.94	22.62
<i>Montipora informis</i>	6	37.96	28.34	5.9-81	0.06	0.56	5.77	923.99	15.12
<i>Montipora millepora</i>	1	6.54			0.01	0.09	0.96	3.12	0.05
<i>Montipora monasteriata</i>	3	20.03	8.63	10.8-27.9	0.03	0.28	2.88	98.74	1.62
<i>Montipora nodosa</i>	1	27.57			0.01	0.09	0.96	55.46	0.91

Fagatele Bay Transect 3 12m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Montipora tuberculosa</i>	6	18.89	21.12	3.9-48.4	0.06	0.56	5.77	318.92	5.22
<i>Pavona varians</i>	3	14.30	7.49	5.7-19.4	0.03	0.28	2.88	52.95	0.87
<i>Pocillopora eydouxi</i>	4	40.64	19.36	14.4-61.2	0.04	0.37	3.85	564.13	9.23
<i>Pocillopora meandrina</i>	1	21.00			0.01	0.09	0.96	32.18	0.53
<i>Pocillopora verrucosa</i>	1	5.92			0.01	0.09	0.96	2.55	0.04
<i>Porites rus</i>	4	145.70	172.30	4.9-359.3	0.04	0.37	3.85	12696.11	207.79
<i>Psammocora haimeana</i>	2	7.99	2.84	6-10	0.02	0.19	1.92	9.91	0.16
COMMUNITY	104	26.62	42.56	1.2-359.3		9.66		18993.6	

Fagatele Bay Transect 4 3m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora crateriformis</i>	7	14.55	10.41	4.7-34.5	0.10	2.91	9.72	695.53	69.79
<i>Acropora gemmifera</i>	2	43.97	11.98	35.5-52.4	0.03	0.83	2.78	1308.35	131.28
<i>Acropora palifera</i>	2	31.59	10.09	24.5-38.7	0.03	0.83	2.78	684.52	68.68
<i>Acropora paniculata</i>	1	24.08			0.01	0.42	1.39	189.24	18.99
<i>Echinopora lamellosa</i>	1	42.58			0.01	0.42	1.39	591.53	59.35
<i>Fungia juvenile</i>	1	1.00			0.01	0.42	1.39	0.33	0.03
<i>Herpolitha limax</i>	1	3.46			0.01	0.42	1.39	3.92	0.39
<i>Montipora foveolata</i>	10	9.05	5.68	3.9-23.5	0.14	4.15	13.89	362.16	36.34
<i>Montipora grisea</i>	1	2.45			0.01	0.42	1.39	1.96	0.20
<i>Pocillopora eydouxi</i>	2	14.72	0.62	14.3-15.2	0.03	0.83	2.78	141.60	14.21
<i>Pocillopora juvenile</i>	1	0.50			0.01	0.42	1.39	0.08	0.01
<i>Pocillopora verrucosa</i>	4	13.92	11.16	3-29.5	0.06	1.66	5.56	374.81	37.61
<i>Porites lichen</i>	21	7.97	7.45	1-30.9	0.29	8.72	29.17	797.66	80.04
<i>Porites rus</i>	3	6.63	2.01	5.3-8.9	0.04	1.25	4.17	45.68	4.58
<i>Porites sp. 2</i>	1	2.24			0.01	0.42	1.39	1.63	0.16
<i>Psammocora contigua</i>	4	12.41	4.09	7.4-16.6	0.06	1.66	5.56	217.30	21.80
<i>Psammocora obtusangula</i>	1	4.90			0.01	0.42	1.39	7.83	0.79
<i>Stylocoeniella armata</i>	9	2.85	1.00	1.4-4.6	0.13	3.74	12.50	26.43	2.65
COMMUNITY	72	10.73	10.89	0.5-52.4		29.91		5450.55	

Fagatele Bay Transect 4 6m depth – Feb 2001	Size distribution of colonies (diameter in cm)				frequency /quarter	density per m ²	relative % density	cover cm ² /m ²	relative % cover
	Coral species	n	mean	stdev					
<i>Acropora crateriformis</i>	4	16.58	8.13	5.5-24	0.05	1.96	5.26	499.85	36.96
<i>Acropora hyacinthus</i>	2	4.45	0.64	4-4.9	0.03	0.98	2.63	15.40	1.14
<i>Acropora monticulosa</i>	1	46.48		46.5-46.5	0.01	0.49	1.32	831.80	61.50
<i>Acropora palifera</i>	4	20.10	10.74	9.5-34.9	0.05	1.96	5.26	755.94	55.89
<i>Hydnophora microconos</i>	2	1.57	0.22	1.4-1.7	0.03	0.98	2.63	1.93	0.14
<i>Merulina ampliata</i>	4	18.10	15.42	4.9-40.4	0.05	1.96	5.26	779.04	57.60
<i>Montipora corbettensis</i>	2	31.22	28.28	11.2-51.2	0.03	0.98	2.63	1059.00	78.29
<i>Montipora efflorescens</i>	1	19.77		19.8-19.8	0.01	0.49	1.32	150.57	11.13
<i>Montipora foveolata</i>	5	4.45	2.73	1.4-8.7	0.07	2.45	6.58	49.68	3.67
<i>Montipora grisea</i>	2	44.32	14.78	33.9-54.8	0.03	0.98	2.63	1596.98	118.07
<i>Montipora hoffmeisteri</i>	1	1.73		1.7-1.7	0.01	0.49	1.32	1.16	0.09
<i>Montipora verrucosa</i>	1	5.29		5.3-5.3	0.01	0.49	1.32	10.78	0.80
<i>Pocillopora damicornis</i>	1	2.00		2-2	0.01	0.49	1.32	1.54	0.11
<i>Pocillopora meandrina</i>	2	14.23	9.54	7.5-21	0.03	0.98	2.63	191.01	14.12
<i>Pocillopora woodjonesi</i>	1	60.33		60.3-60.3	0.01	0.49	1.32	1401.74	103.63
<i>Porites "mound"</i>	1	5.29		5.3-5.3	0.01	0.49	1.32	10.78	0.80
<i>Porites annae</i>	4	3.89	2.09	1.2-6.3	0.05	1.96	5.26	28.30	2.09
<i>Porites lichen</i>	25	6.47	4.32	1-20	0.33	12.26	32.89	575.52	42.55
<i>Porites rus</i>	1	3.00		3-3	0.01	0.49	1.32	3.47	0.26
<i>Porites sp. 2</i>	2	5.74	3.88	3-8.5	0.03	0.98	2.63	31.19	2.31
<i>Psammocora obtusangula</i>	2	11.40	11.23	3.5-19.3	0.03	0.98	2.63	148.65	10.99
<i>Psammocora profundacella</i>	1	15.81		15.8-15.8	0.01	0.49	1.32	96.27	7.12
<i>Stylocoeniella armata</i>	7	2.21	1.13	1.4-4.6	0.09	3.43	9.21	16.17	1.20
COMMUNITY	76	10.79	12.96	1-60.3		37.26		8256.76	

Fagatele Bay Transect 4 9m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora aculeus</i>	1	13.49			0.02	0.24	1.56	33.70	1.38
<i>Acropora crateriformis</i>	2	22.00	2.83	20-24	0.03	0.47	3.13	180.75	7.39
<i>Acropora latistella</i>	1	12.49			0.02	0.24	1.56	28.89	1.18
<i>Acropora palifera</i>	1	25.92			0.02	0.24	1.56	124.45	5.09
<i>Favites abdita</i>	1	49.91			0.02	0.24	1.56	461.31	18.86
<i>Galaxea fascicularis</i>	5	8.59	7.09	2-16.7	0.08	1.18	7.81	105.56	4.32
<i>Hydnophora rigida</i>	2	27.49	18.48	14.4-40.6	0.03	0.47	3.13	343.16	14.03
<i>Merulina ampliata</i>	2	14.13	1.65	13-15.3	0.03	0.47	3.13	74.45	3.04
<i>Montipora efflorescens</i>	2	12.25	5.49	8.4-16.1	0.03	0.47	3.13	61.11	2.50
<i>Montipora foveolata</i>	14	5.41	2.85	2.5-11.8	0.22	3.30	21.88	95.56	3.91
<i>Montipora grisea</i>	5	24.35	11.00	13.9-42.9	0.08	1.18	7.81	638.54	26.11
<i>Montipora nodosa</i>	1	36.47			0.02	0.24	1.56	246.30	10.07
<i>Montipora tuberculosa</i>	1	22.49			0.02	0.24	1.56	93.71	3.83
<i>Montipora verrilli</i>	2	15.81	4.47	12.7-19	0.03	0.47	3.13	96.30	3.94
<i>Pavona collines</i>	1	9.49			0.02	0.24	1.56	16.67	0.68
<i>Pocillopora damicornis</i>	1	2.00			0.02	0.24	1.56	0.74	0.03
<i>Pocillopora eydouxi</i>	6	39.61	21.42	8.5-66	0.09	1.41	9.38	2168.40	88.66
<i>Pocillopora meandrina</i>	2	5.10	0.28	4.9-5.3	0.03	0.47	3.13	9.63	0.39
<i>Pocillopora verrucosa</i>	1	7.35			0.02	0.24	1.56	10.00	0.41
<i>Porites lichen</i>	8	6.00	3.08	2.5-11.5	0.13	1.89	12.50	65.70	2.69
<i>Porites rus</i>	3	57.24	87.29	5.5-158	0.05	0.71	4.69	4642.27	189.81
<i>Stylocoeniella armata</i>	2	3.23	0.33	3-3.5	0.03	0.47	3.13	3.89	0.16
COMMUNITY	64	16.84	22.94	2-158		15.09		9501.07	

Fagatele Bay Transect 4 12m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Galaxea fascicularis</i>	2	10.43	0.25	10.3-10.6	0.03	0.76	3.13	65.14	5.05
<i>Montipora efflorescens</i>	1	5.92			0.02	0.38	1.56	10.48	0.81
<i>Montipora foveolata</i>	29	5.08	2.28	1.7-12	0.45	11.06	45.31	267.38	20.73
<i>Montipora grisea</i>	10	28.59	20.07	7-63.4	0.16	3.81	15.63	3533.19	273.92
<i>Montipora informis</i>	1	27.46			0.02	0.38	1.56	225.82	17.51
<i>Montipora millepora</i>	2	3.80	2.37	2.1-5.5	0.03	0.76	3.13	10.33	0.80
<i>Montipora tuberculosa</i>	1	16.12			0.02	0.38	1.56	77.87	6.04
<i>Pavona collines</i>	1	4.90			0.02	0.38	1.56	7.19	0.56
<i>Pavona varians</i>	8	21.64	17.85	6-49.7	0.13	3.05	12.50	1789.80	138.76
<i>Pocillopora verrucosa</i>	1	24.37			0.02	0.38	1.56	177.90	13.79
<i>Porites lichen</i>	1	11.96			0.02	0.38	1.56	42.83	3.32
<i>Porites rus</i>	4	3.36	0.51	2.7-3.9	0.06	1.53	6.25	13.78	1.07
<i>Stylocoeniella armata</i>	2	2.09	0.51	1.7-2.5	0.03	0.76	3.13	2.70	0.21
<i>Stylophora mordax</i>	1	22.20			0.02	0.38	1.56	147.65	11.45
COMMUNITY	64	11.96	13.87	1.7-27.5		24.41		6372.06	

Fagatele Bay Transect 5 3m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora crateriformis</i>	4	5.08	1.97	3.5-7.5	0.06	0.28	5.56	6.31	0.38
<i>Acropora gemmifera</i>	1	34.87			0.01	0.07	1.39	66.73	4.03
<i>Acropora hyacinthus</i>	25	30.80	20.61	2.7-82	0.35	1.75	34.72	1860.73	112.50
<i>Galaxea fascicularis</i>	6	9.23	6.82	3-18.6	0.08	0.42	8.33	40.80	2.47
<i>Goniastrea retiformis</i>	1	34.06			0.01	0.07	1.39	63.66	3.85
<i>Montipora efflorescens</i>	2	28.48	5.64	24.5-32.5	0.03	0.14	2.78	90.77	5.49
<i>Montipora foveolata</i>	5	4.32	1.13	2.8-5.6	0.07	0.35	6.94	5.41	0.33
<i>Montipora grisea</i>	3	37.24	36.96	15.5-79.9	0.04	0.21	4.17	378.23	22.87
<i>Montipora hoffmeisteri</i>	1	8.00			0.01	0.07	1.39	3.51	0.21
<i>Montipora informis</i>	6	46.53	11.49	31.4-62	0.08	0.42	8.33	749.16	45.30
<i>Montipora monasteriata</i>	1	6.00			0.01	0.07	1.39	1.98	0.12
<i>Montipora sp</i>	1	1.00			0.01	0.07	1.39	0.05	0.00
<i>Montipora tuberculosa</i>	3	41.23	7.76	32.4-47	0.04	0.21	4.17	286.42	17.32
<i>Montipora verrucosa</i>	1	8.49			0.01	0.07	1.39	3.95	0.24
<i>Pavona collines</i>	1	39.91			0.01	0.07	1.39	87.42	5.29
<i>Pocillopora eydouxi</i>	1	23.37			0.01	0.07	1.39	29.96	1.81
<i>Pocillopora juvenile</i>	1	0.50			0.01	0.07	1.39	0.01	0.00
<i>Pocillopora meandrina</i>	1	11.31			0.01	0.07	1.39	7.02	0.42
<i>Pocillopora verrucosa</i>	6	8.02	3.04	4.9-11.8	0.08	0.42	8.33	23.71	1.43
<i>Porites rus</i>	1	6.48			0.01	0.07	1.39	2.30	0.14
<i>Psammocora obtusangula</i>	1	5.29			0.01	0.07	1.39	1.54	0.09
COMMUNITY	72	23.14	20.22	0.5-79.9		5.03		3709.69	

Fagatele Bay Transect 5 6m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora crateriformis</i>	1	4.00			0.02	0.12	1.59	1.57	0.16
<i>Acropora gemmifera</i>	1	20.62			0.02	0.12	1.59	41.65	4.30
<i>Acropora hyacinthus</i>	12	26.85	15.32	5.5-59	0.19	1.50	19.05	1100.93	113.71
<i>Acropora insignis</i>	1	26.00			0.02	0.12	1.59	66.25	6.84
<i>Acropora latistella</i>	2	6.96	0.05	6.9-7	0.03	0.25	3.17	9.51	0.98
<i>Favia stelligera</i>	1	12.65			0.02	0.12	1.59	15.68	1.62
<i>Galaxea fascicularis</i>	6	10.88	1.07	9.5-12.7	0.10	0.75	9.52	70.17	7.25
<i>Leptoria phrygia</i>	1	16.43			0.02	0.12	1.59	26.46	2.73
<i>Montastrea annuligera</i>	1	8.37			0.02	0.12	1.59	6.86	0.71
<i>Montipora efflorescens</i>	2	13.07	5.52	9.2-17	0.03	0.25	3.17	36.46	3.77
<i>Montipora floweri</i>	1	14.42			0.02	0.12	1.59	20.38	2.11
<i>Montipora foveolata</i>	6	6.03	2.31	2.5-8.4	0.10	0.75	9.52	24.01	2.48
<i>Montipora grisea</i>	4	31.08	10.95	17-43.5	0.06	0.50	6.35	413.85	42.75
<i>Montipora monasteriata</i>	3	34.81	24.00	13-60.5	0.05	0.37	4.76	469.22	48.46
<i>Montipora nodosa</i>	1	24.82			0.02	0.12	1.59	60.37	6.24
<i>Pavona collines</i>	1	1.00			0.02	0.12	1.59	0.10	0.01
<i>Pocillopora eydouxi</i>	1	18.49			0.02	0.12	1.59	33.52	3.46
<i>Pocillopora meandrina</i>	4	15.71	7.82	5.9-24.5	0.06	0.50	6.35	114.76	11.85
<i>Porites lichen</i>	2	9.84	0.50	9.5-10.2	0.03	0.25	3.17	19.01	1.96
<i>Porites rus</i>	10	9.32	8.99	2.5-31.4	0.16	1.25	15.87	156.51	16.17
<i>Psammocora obtusangula</i>	1	16.49			0.02	0.12	1.59	26.66	2.75
<i>Stylocoeniella armata</i>	1	2.45			0.02	0.12	1.59	0.59	0.06
COMMUNITY	63	16.41	13.15	1-60.5		7.86		2714.49	

Fagatele Bay Transect 5 9m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora aculeus</i>	1	44.12			0.02	0.21	1.56	326.24	13.39
<i>Acropora hyacinthus</i>	2	8.97	1.46	7.9-10	0.03	0.43	3.13	27.31	1.12
<i>Galaxea fascicularis</i>	1	8.49			0.02	0.21	1.56	12.06	0.50
<i>Leptastrea purpurea</i>	1	11.83			0.02	0.21	1.56	23.46	0.96
<i>Montipora caliculata</i>	1	35.41			0.02	0.21	1.56	210.12	8.63
<i>Montipora corbettensis</i>	2	31.00	39.60	3-59	0.03	0.43	3.13	584.79	24.01
<i>Montipora efflorescens</i>	3	42.29	21.80	23-65.9	0.05	0.64	4.69	1058.15	43.44
<i>Montipora foveolata</i>	20	5.76	2.59	2.5-10.6	0.31	4.27	31.25	132.46	5.44
<i>Montipora grisea</i>	8	44.35	13.15	23.9-64.8	0.13	1.71	12.50	2839.83	116.58
<i>Montipora informis</i>	2	43.39	7.93	37.8-49	0.03	0.43	3.13	641.59	26.34
<i>Montipora nodosa</i>	1	46.83			0.02	0.21	1.56	367.46	15.08
<i>Montipora tuberculosa</i>	9	27.18	12.62	12.5-52	0.14	1.92	14.06	1327.42	54.49
<i>Montipora verrilli</i>	1	77.19			0.02	0.21	1.56	998.50	40.99
<i>Pavona collines</i>	3	15.53	8.35	5.9-20.9	0.05	0.64	4.69	144.61	5.94
<i>Pavona varians</i>	2	21.64	15.31	10.8-32.5	0.03	0.43	3.13	196.21	8.05
<i>Pocillopora meandrina</i>	2	15.33	0.90	14.7-16	0.03	0.43	3.13	78.92	3.24
<i>Porites lichen</i>	1	6.00			0.02	0.21	1.56	6.03	0.25
<i>Porites sp. 2</i>	2	7.74	5.30	4-11.5	0.03	0.43	3.13	24.80	1.02
<i>Stylocoeniella armata</i>	2	1.93	0.73	1.4-2.5	0.03	0.43	3.13	1.34	0.06
COMMUNITY	64	21.53	19.54	1.4-77.2		13.65		9001.32	

Fagatele Bay Transect 5 12m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora akajimensis</i>	1	61.97		62-62	0.01	0.27	1.47	804.12	34.44
<i>Acropora hyacinthus</i>	2	11.83	1.43	10.8-12.9	0.03	0.53	2.94	59.05	2.53
<i>Astreopora listeri</i>	1	23.37		23.4-23.4	0.01	0.27	1.47	114.34	4.90
<i>Fungia fungites</i>	1	11.00		11-11	0.01	0.27	1.47	25.34	1.09
<i>Fungia sp</i>	2	13.50	2.12	12-15	0.03	0.53	2.94	77.27	3.31
<i>Montipora corbettensis</i>	7	37.90	27.26	11.5-89	0.10	1.87	10.29	3039.74	130.18
<i>Montipora efflorescens</i>	2	44.47	18.35	31.5-57.5	0.03	0.53	2.94	898.77	38.49
<i>Montipora foveolata</i>	18	6.17	3.25	1.5-12.3	0.26	4.80	26.47	181.19	7.76
<i>Montipora grisea</i>	7	36.37	19.61	20-75.6	0.10	1.87	10.29	2421.99	103.72
<i>Montipora informis</i>	1	18.00		18-18	0.01	0.27	1.47	67.85	2.91
<i>Montipora monasteriata</i>	2	33.62	12.45	24.8-42.4	0.03	0.53	2.94	505.92	21.67
<i>Montipora tuberculosa</i>	7	9.94	10.78	2-32.5	0.10	1.87	10.29	290.76	12.45
<i>Montipora venosa</i>	2	10.95	3.49	8.5-13.4	0.03	0.53	2.94	52.77	2.26
<i>Montipora verrilli</i>	2	29.62	12.33	20.9-38.3	0.03	0.53	2.94	399.34	17.10
<i>Pavona collines</i>	2	9.88	2.15	8.4-11.4	0.03	0.53	2.94	41.88	1.79
<i>Pavona varians</i>	3	27.26	14.34	14-42.5	0.04	0.80	4.41	553.04	23.68
<i>Pocillopora meandrina</i>	2	30.56	3.42	28.1-33	0.03	0.53	2.94	393.68	16.86
<i>Porites lichen</i>	2	3.74	1.04	3-4.5	0.03	0.53	2.94	6.07	0.26
<i>Porites rus</i>	2	4.17	0.42	3.9-4.5	0.03	0.53	2.94	7.33	0.31
<i>Stylocoeniella armata</i>	2	2.17	0.24	2-2.4	0.03	0.53	2.94	1.99	0.09
COMMUNITY	68	18.91	18.60	1.5-89		18.13		9942.44	

Fagatele Bay Transect 6 9m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora aculeus</i>	1	10.00		10-10	0.02	0.19	2.08	15.24	1.33
<i>Acropora hyacinthus</i>	1	2.74		2.7-2.7	0.02	0.19	2.08	1.14	0.10
<i>Acropora juvenile</i>	1	2.83		2.8-2.8	0.02	0.19	2.08	1.22	0.11
<i>Favia stelligera</i>	3	11.79	8.86	5.9-22	0.06	0.58	6.25	87.46	7.62
<i>Galaxea fascicularis</i>	1	7.00		7-7	0.02	0.19	2.08	7.47	0.65
<i>Hydnophora microconos</i>	1	14.46		14.5-14.5	0.02	0.19	2.08	31.84	2.78
<i>Leptastrea purpurea</i>	1	2.00		2-2	0.02	0.19	2.08	0.61	0.05
<i>Leptastrea transversa</i>	1	34.99		35-35	0.02	0.19	2.08	186.49	16.25
<i>Montastrea curta</i>	1	7.48		7.5-7.5	0.02	0.19	2.08	8.53	0.74
<i>Montipora efflorescens</i>	1	10.49		10.5-10.5	0.02	0.19	2.08	16.76	1.46
<i>Montipora grisea</i>	6	24.84	22.61	5.7-62.8	0.13	1.16	12.50	953.78	83.12
<i>Montipora monasteriata</i>	1	15.72		15.7-15.7	0.02	0.19	2.08	37.63	3.28
<i>Montipora tuberculosa</i>	5	14.34	7.74	5.5-21.8	0.10	0.97	10.42	193.19	16.84
<i>Pavona collines</i>	1	19.90		19.9-19.9	0.02	0.19	2.08	60.33	5.26
<i>Pocillopora eydouxi</i>	12	25.53	14.67	5.5-48.5	0.25	2.33	25.00	1552.86	135.33
<i>Pocillopora juvenile</i>	1	2.50		2.5-2.5	0.02	0.19	2.08	0.95	0.08
<i>Pocillopora meandrina</i>	8	13.81	10.00	3.2-31	0.17	1.55	16.67	339.16	29.56
<i>Pocillopora verrucosa</i>	1	5.00		5-5	0.02	0.19	2.08	3.81	0.33
<i>Psammocora haimeana</i>	1	4.47		4.5-4.5	0.02	0.19	2.08	3.05	0.27
COMMUNITY	48	16.93	14.01			9.31		3501.52	

Fagatele Bay Transect 6 12m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora akajimensis</i>	1	16.12		16.1-16.1	0.01	0.18	1.14	36.45	1.44
<i>Acropora crateriformis</i>	2	20.12	10.12	13-27.3	0.02	0.36	2.27	127.84	5.03
<i>Acropora divaricata</i>	1	6.48		6.5-6.5	0.01	0.18	1.14	5.89	0.23
<i>Acropora gemmifera</i>	1	9.80		9.8-9.8	0.01	0.18	1.14	13.46	0.53
<i>Acropora hyacinthus</i>	1	14.00		14-14	0.01	0.18	1.14	27.47	1.08
<i>Acropora juvenile</i>	1	3.46		3.5-3.5	0.01	0.18	1.14	1.68	0.07
<i>Acropora monticulosa</i>	1	3.87		3.9-3.9	0.01	0.18	1.14	2.10	0.08
<i>Acropora nasuta</i>	1	10.25		10.3-10.3	0.01	0.18	1.14	14.72	0.58
<i>Astreopora listeri</i>	3	23.62	17.51	10-43.4	0.03	0.54	3.41	320.58	12.63
<i>Astreopora myriophthalma</i>	3	36.11	13.45	23.9-50.5	0.03	0.54	3.41	599.11	23.59
<i>Galaxea fascicularis</i>	2	8.71	0.32	8.5-8.9	0.02	0.36	2.27	21.31	0.84
<i>Goniastrea retiformis</i>	1	16.88		16.9-16.9	0.01	0.18	1.14	39.95	1.57
<i>Hydnophora exesa</i>	2	10.45	4.98	6.9-14	0.02	0.36	2.27	34.06	1.34
<i>Hydnophora microconos</i>	4	11.85	7.18	2.5-20	0.05	0.71	4.55	100.40	3.95
<i>Leptastrea purpurea</i>	6	9.67	3.36	6-15	0.07	1.07	6.82	86.63	3.41
<i>Leptastrea transversa</i>	2	20.56	7.26	15.4-25.7	0.02	0.36	2.27	125.88	4.96
<i>Leptoria phrygia</i>	1	29.56		29.6-29.6	0.01	0.18	1.14	122.51	4.82
<i>Montastrea curta</i>	2	4.47	1.42	3.5-5.5	0.02	0.36	2.27	5.89	0.23
<i>Montipora efflorescens</i>	10	27.87	18.28	3.5-63.5	0.11	1.78	11.36	1510.53	59.49
<i>Montipora granulosa</i>	2	7.54	5.77	3.5-11.6	0.02	0.36	2.27	20.61	0.81
<i>Montipora grisea</i>	14	27.90	23.38	4.2-73.5	0.16	2.50	15.91	2523.43	99.38
<i>Montipora hoffmeisteri</i>	1	2.45		2.5-2.5	0.01	0.18	1.14	0.84	0.03
<i>Montipora monasteriata</i>	1	34.94		34.9-34.9	0.01	0.18	1.14	171.15	6.74
<i>Montipora nodosa</i>	1	41.13		41.1-41.1	0.01	0.18	1.14	237.18	9.34

Fagatele Bay Transect 6 12m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Montipora tuberculosa</i>	8	37.07	30.31	11.5-105.5	0.09	1.43	9.09	2442.55	96.19
<i>Pavona collines</i>	1	39.34		39.3-39.3	0.01	0.18	1.14	216.99	8.55
<i>Pavona varians</i>	1	5.66		5.7-5.7	0.01	0.18	1.14	4.49	0.18
<i>Pocillopora eydouxi</i>	10	23.81	14.87	10-51	0.11	1.78	11.36	1073.46	42.28
<i>Porites "mound"</i>	3	11.31	6.80	4.9-18.4	0.03	0.54	3.41	66.72	2.63
<i>Porites massive</i>	1	27.91		27.9-27.9	0.01	0.18	1.14	109.20	4.30
COMMUNITY	88	21.91	18.43	2.5-105.5		15.71		10063.0	

Fagatele Bay Reef Flat 0.5m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Cyphastrea chalcidicum</i>	1	3.00			0.02	0.31	1.56	2.17	0.79
<i>Leptastrea purpurea</i>	1	1.41			0.02	0.31	1.56	0.48	0.17
<i>Pavona divaricata</i>	38	7.69	6.44	1-32.4	0.59	11.65	59.38	910.51	330.89
<i>Porites "mound"</i>	9	6.41	3.84	2.1-15.9	0.14	2.76	14.06	117.36	42.65
<i>Porites cylindrica</i>	15	6.28	3.69	2-13.5	0.23	4.60	23.44	188.25	68.41
COMMUNITY	64	7.01	5.52	1-32.4		19.62		1218.77	

APPENDIX 3

Summary of results from point-quarter surveys at all sites around Tutuila from the 1998 surveys.

Aua 3m depth – April 1998		Size distribution of colonies (diameter in cm)							
Coral species	n	mean	stdev	range	frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
<i>Acropora digitifera</i>	1	20.98			0.02	0.15	1.67	51.07	1.61
<i>Acropora nana</i>	1	23.66			0.02	0.15	1.67	64.99	2.04
<i>Acropora sp. 2</i>	2	25.48	15.58	14.5-36.5	0.03	0.30	3.33	178.85	5.62
<i>Millepora platyphylla</i>	2	79.05	9.64	72.2-85.9	0.03	0.30	3.33	1461.22	45.93
<i>Montipora ehrenbergii</i>	6	15.33	7.22	7.5-27.9	0.10	0.89	10.00	193.94	6.10
<i>Montipora elschneri</i>	2	15.58	9.08	9.2-22	0.03	0.30	3.33	65.92	2.07
<i>Montipora granulosa</i>	1	24.00			0.02	0.15	1.67	66.85	2.10
<i>Montipora grisea</i>	4	11.08	6.93	4.5-18.7	0.07	0.59	6.67	73.70	2.32
<i>Montipora sp. 2</i>	2	22.20	3.25	19.9-24.5	0.03	0.30	3.33	115.60	3.63
<i>Montipora verrilli</i>	10	18.17	6.49	7-26.1	0.17	1.48	16.67	426.99	13.42
<i>Pocillopora damicornis</i>	2	4.88	0.58	4.5-5.3	0.03	0.30	3.33	5.57	0.18
<i>Pocillopora danae</i>	11	6.94	2.94	2-11.2	0.18	1.63	18.33	71.49	2.25
<i>Pocillopora eydouxi</i>	5	19.17	5.29	10.5-23.5	0.08	0.74	8.33	226.32	7.11
<i>Pocillopora verrucosa</i>	7	11.56	5.63	3.5-19.5	0.12	1.03	11.67	130.69	4.11
<i>Porites lutea</i>	1	15.49			0.02	0.15	1.67	27.85	0.88
<i>Porites sp. 2</i>	3	7.11	3.34	4.9-11	0.05	0.44	5.00	20.19	0.63
COMMUNITY	60	16.18	14.08	2-85.9		8.87		3181.27	

Aua – outer reef April 1998		Size distribution of colonies (diameter in cm)							
Coral species	n	mean	stdev	range	frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
<i>Acropora nana</i>	17	10.46	4.35	3.5-16.2	0.61	12.30	60.71	1228.92	46.02
<i>Millepora platyphylla</i>	1	26.38			0.04	0.72	3.57	395.62	14.81
<i>Montipora verrilli</i>	1	16.52			0.04	0.72	3.57	155.18	5.81
<i>Pocillopora danae</i>	2	12.45	6.39	7.9-17	0.07	1.45	7.14	199.51	7.47
<i>Pocillopora verrucosa</i>	7	12.66	3.96	9.2-21	0.25	5.07	25.00	691.20	25.88
COMMUNITY	28	11.93	5.13	3.5-26.4		20.26		2670.42	

Cape Larsen 3m depth – April 1998		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora crateriformis</i>	1	10.49			0.02	0.11	1.64	9.62	0.47
<i>Acropora gemmifera</i>	1	22.96			0.02	0.11	1.64	46.11	2.26
<i>Acropora monticulosa</i>	2	23.06	4.05	20.2-25.9	0.03	0.22	3.28	94.50	4.63
<i>Acropora nasuta</i>	1	11.22			0.02	0.11	1.64	11.02	0.54
<i>Galaxea fascicularis</i>	4	8.18	1.46	6-9	0.07	0.45	6.56	23.97	1.17
<i>Goniastrea retiformis</i>	7	11.00	8.39	5.5-27.5	0.11	0.78	11.48	111.12	5.44
<i>Leptastrea transversa</i>	1	41.81			0.02	0.11	1.64	152.94	7.49
<i>Millepora platyphylla</i>	4	14.04	7.75	6.3-22.6	0.07	0.45	6.56	84.78	4.15
<i>Montastrea curta</i>	2	9.37	2.30	7.7-11	0.03	0.22	3.28	15.84	0.78
<i>Montipora ehrenbergii</i>	5	20.66	21.03	4.9-56.7	0.08	0.56	8.20	341.58	16.74
<i>Montipora monasteriata</i>	3	19.61	9.87	13.4-31	0.05	0.33	4.92	117.94	5.78
<i>Montipora verrilli</i>	4	19.36	10.91	8.5-31.5	0.07	0.45	6.56	162.39	7.96
<i>Pavona sp. 3</i>	1	9.38			0.02	0.11	1.64	7.70	0.38
<i>Pavona sp. 4</i>	1	10.82			0.02	0.11	1.64	10.24	0.50
<i>Pavona varians</i>	1	8.37			0.02	0.11	1.64	6.12	0.30
<i>Pavona venosa</i>	1	27.35			0.02	0.11	1.64	65.45	3.21
<i>Pocillopora damicornis</i>	1	4.00			0.02	0.11	1.64	1.40	0.07
<i>Pocillopora elegans</i>	4	21.37	2.39	18-23.5	0.07	0.45	6.56	161.34	7.90
<i>Pocillopora eydouxi</i>	10	20.61	6.23	9-30	0.16	1.11	16.39	402.31	19.71
<i>Pocillopora ligulata</i>	1	24.25			0.02	0.11	1.64	51.45	2.52
<i>Pocillopora verrucosa</i>	5	18.62	5.28	9.9-23	0.08	0.56	8.20	161.43	7.91
<i>Psammocora samoensis</i>	1	4.47			0.02	0.11	1.64	1.75	0.09
COMMUNITY	61	16.89	9.94	4-56.7		6.80		2041.02	

Cape Larsen 6m depth – April 1998		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m ²	relative % density	cover cm ² /m ²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora digitifera</i>	1	22.65			0.01	0.18	1.15	72.03	1.85
<i>Acropora gemmifera</i>	1	13.42			0.01	0.18	1.15	25.27	0.65
<i>Acropora hyacinthus</i>	8	5.23	3.39	2-12.8	0.09	1.43	9.20	42.05	1.08
<i>Acropora polystoma</i>	1	5.92			0.01	0.18	1.15	4.91	0.13
<i>Alveopora sp. 1</i>	2	4.18	1.44	3.2-5.2	0.02	0.36	2.30	5.20	0.13
<i>Astreopora randalli</i>	1	10.58			0.01	0.18	1.15	15.73	0.40
<i>Favites russelli</i>	1	4.90			0.01	0.18	1.15	3.37	0.09
<i>Leptastrea purpurea</i>	1	9.80			0.01	0.18	1.15	13.48	0.35
<i>Leptoria phrygia</i>	1	6.48			0.01	0.18	1.15	5.90	0.15
<i>Montastrea curta</i>	3	5.61	1.53	4.5-7.3	0.03	0.54	3.45	13.90	0.36
<i>Montipora caliculata</i>	1	7.48			0.01	0.18	1.15	7.86	0.20
<i>Montipora elschneri</i>	4	6.01	7.00	1.9-16.5	0.05	0.72	4.60	40.93	1.05
<i>Montipora grisea</i>	30	20.37	14.97	1-61.8	0.34	5.36	34.48	2660.63	68.28
<i>Montipora monasteriata</i>	3	18.51	15.81	6.5-36.4	0.03	0.54	3.45	214.55	5.51
<i>Pavona explanulata</i>	4	10.93	3.98	6.6-15.6	0.05	0.72	4.60	73.72	1.89
<i>Pavona minuta</i>	1	4.47			0.01	0.18	1.15	2.81	0.07
<i>Pavona sp. 2</i>	3	16.86	10.76	6.7-28.1	0.03	0.54	3.45	152.20	3.91
<i>Pavona sp. 3</i>	1	19.00			0.01	0.18	1.15	50.69	1.30
<i>Pavona varians</i>	1	6.00			0.01	0.18	1.15	5.05	0.13
<i>Pavona venosa</i>	6	7.17	4.41	3-15.4	0.07	1.07	6.90	57.01	1.46
<i>Pocillopora eydouxi</i>	4	21.81	9.21	15.3-35.5	0.05	0.72	4.60	302.86	7.77
<i>Pocillopora verrucosa</i>	3	12.55	11.62	3-25.5	0.03	0.54	3.45	104.32	2.68
<i>Porites lutea</i>	1	3.24			0.01	0.18	1.15	1.47	0.04

Cape Larsen 6m depth – April 1998		Size distribution of colonies (diameter in cm)							
Coral species	n	mean	stdev	range	frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
<i>Porites rus</i>	1	2.45			0.01	0.18	1.15	0.84	0.02
<i>Porites sp. 2</i>	4	5.19	3.26	1.9-8.1	0.05	0.72	4.60	19.62	0.50
COMMUNITY	87	13.30	11.99	1-36.4		15.55		3896.41	

Fagafue Bay 2m depth – April 1998		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora crateriformis</i>	1	6.32			0.02	0.12	1.67	3.87	0.16
<i>Acropora gemmifera</i>	1	21.21			0.02	0.12	1.67	43.58	1.80
<i>Acropora humilis</i>	1	26.50			0.02	0.12	1.67	67.98	2.81
<i>Acropora hyacinthus</i>	7	19.39	14.70	4-43	0.12	0.86	11.67	380.46	15.73
<i>Acropora irregularis</i>	2	33.42	14.95	22.8-44	0.03	0.25	3.33	237.92	9.84
<i>Echinopora hirsutissima</i>	1	17.66			0.02	0.12	1.67	30.21	1.25
<i>Favia matthaii</i>	1	12.85			0.02	0.12	1.67	15.98	0.66
<i>Galaxea fascicularis</i>	5	7.65	1.96	5.3-9.8	0.08	0.62	8.33	29.83	1.23
<i>Goniastrea retiformis</i>	3	29.56	14.91	13.8-43.4	0.05	0.37	5.00	296.89	12.27
<i>Montastrea curta</i>	1	19.42			0.02	0.12	1.67	36.51	1.51
<i>Montipora ehrenberghii</i>	6	15.67	10.27	3-27.5	0.10	0.74	10.00	193.67	8.01
<i>Montipora elschneri</i>	1	9.38			0.02	0.12	1.67	8.52	0.35
<i>Montipora foveolata</i>	1	20.49			0.02	0.12	1.67	40.67	1.68
<i>Montipora grisea</i>	4	11.27	6.86	4-18.2	0.07	0.49	6.67	62.85	2.60
<i>Montipora sp. 2</i>	1	10.49			0.02	0.12	1.67	10.65	0.44
<i>Montipora verrilli</i>	14	16.03	11.79	5-43.6	0.23	1.73	23.33	523.29	21.63
<i>Pavona sp. 3</i>	1	3.46			0.02	0.12	1.67	1.16	0.05
<i>Pocillopora elegans</i>	1	28.00			0.02	0.12	1.67	75.92	3.14
<i>Pocillopora eydouxi</i>	3	22.59	13.91	11.2-38.1	0.05	0.37	5.00	185.73	7.68
<i>Pocillopora verrucosa</i>	3	23.36	5.24	19.9-29.4	0.05	0.37	5.00	163.84	6.77
<i>Symphyllia radians</i>	2	6.98	0.71	6.5-7.5	0.03	0.25	3.33	9.49	0.39
COMMUNITY	60	17.01	11.37	3-43.4		7.40		2419.02	

Fagasa Bay 3m depth – April 1998		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora crateriformis</i>	1	7.94			0.02	0.19	1.67	9.64	0.24
<i>Acropora hyacinthus</i>	10	6.63	2.06	4-10	0.17	1.95	16.67	73.13	1.83
<i>Acropora monticulosa</i>	1	48.74			0.02	0.19	1.67	363.52	9.11
<i>Acropora sp. 2</i>	1	24.68			0.02	0.19	1.67	93.18	2.33
<i>Favia matthaii</i>	1	9.17			0.02	0.19	1.67	12.85	0.32
<i>Favites complanata</i>	2	17.28	8.19	11.5-23.1	0.03	0.39	3.33	101.59	2.55
<i>Galaxea fascicularis</i>	2	9.12	3.10	6.9-11.3	0.03	0.39	3.33	26.93	0.67
<i>Leptoria phrygia</i>	1	15.43			0.02	0.19	1.67	36.41	0.91
<i>Millepora platyphylla</i>	1	20.49			0.02	0.19	1.67	64.26	1.61
<i>Montastrea curta</i>	1	18.97			0.02	0.19	1.67	55.08	1.38
<i>Montipora ehrenberghii</i>	11	17.07	9.85	6.3-42.5	0.18	2.14	18.33	638.92	16.01
<i>Montipora elschneri</i>	2	10.10	0.14	10-10.2	0.03	0.39	3.33	31.21	0.78
<i>Montipora grisea</i>	1	13.49			0.02	0.19	1.67	27.85	0.70
<i>Montipora verrilli</i>	18	21.72	18.19	2-64.2	0.30	3.51	30.00	2159.73	54.12
<i>Pocillopora elegans</i>	2	16.83	1.58	15.7-17.9	0.03	0.39	3.33	87.06	2.18
<i>Pocillopora eydouxi</i>	3	18.24	11.65	5-26.9	0.05	0.58	5.00	194.31	4.87
<i>Pocillopora verrucosa</i>	1	6.71			0.02	0.19	1.67	6.88	0.17
<i>Porites sp. 2</i>	1	7.35			0.02	0.19	1.67	8.26	0.21
COMMUNITY	60	16.32	13.08	2-48.7		11.69		3990.81	

Inside Masefau Bay 3m depth – April 1998		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m ²	relative % density	cover cm ² /m ²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora crateriformis</i>	5	13.67	5.00	8.5-21	0.08	0.19	8.33	31.10	4.75
<i>Acropora digitifera</i>	1	7.94			0.02	0.04	1.67	1.90	0.29
<i>Acropora gemmifera</i>	1	15.30			0.02	0.04	1.67	7.04	1.07
<i>Acropora hyacinthus</i>	1	6.00			0.02	0.04	1.67	1.08	0.17
<i>Acropora myriophthalma</i>	2	27.23	8.82	21-33.5	0.03	0.08	3.33	46.96	7.17
<i>Acropora sp. 2</i>	1	5.66			0.02	0.04	1.67	0.96	0.15
<i>Leptastrea purpurea</i>	1	3.00			0.02	0.04	1.67	0.27	0.04
<i>Millepora dichotoma</i>	2	14.18	2.39	12.5-15.9	0.03	0.08	3.33	12.27	1.87
<i>Millepora tuberosa</i>	1	43.63			0.02	0.04	1.67	57.27	8.75
<i>Montipora berryi</i>	2	39.01	15.97	27.7-50.3	0.03	0.08	3.33	99.21	15.15
<i>Montipora ehrenberghii</i>	2	31.80	24.19	14.7-48.9	0.03	0.08	3.33	78.45	11.98
<i>Montipora granulosa</i>	2	18.42	0.67	17.9-18.9	0.03	0.08	3.33	20.42	3.12
<i>Montipora grisea</i>	3	19.80	11.09	10.4-32	0.05	0.11	5.00	42.77	6.53
<i>Montipora hispida</i>	1	15.72			0.02	0.04	1.67	7.43	1.13
<i>Montipora lobulata</i>	1	3.00			0.02	0.04	1.67	0.27	0.04
<i>Pavona sp. 3</i>	1	4.00			0.02	0.04	1.67	0.48	0.07
<i>Pavona venosa</i>	2	13.17	0.46	12.8-13.5	0.03	0.08	3.33	10.44	1.59
<i>Pocillopora elegans</i>	2	23.44	12.76	14.4-32.5	0.03	0.08	3.33	37.96	5.80
<i>Pocillopora eydouxi</i>	4	23.20	4.87	19-30	0.07	0.15	6.67	66.93	10.22
<i>Pocillopora setchelli</i>	1	5.66			0.02	0.04	1.67	0.96	0.15
<i>Pocillopora verrucosa</i>	15	7.22	3.46	1.4-15	0.25	0.57	25.00	28.55	4.36
<i>Porites cylindrica</i>	2	15.91	10.67	8.4-23.5	0.03	0.08	3.33	18.65	2.85
<i>Porites lutea</i>	1	34.91			0.02	0.04	1.67	36.67	5.60

Inside Masefau Bay 3m depth – April 1998		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Porites rus</i>	2	24.58	13.98	14.7-34.5	0.03	0.08	3.33	42.23	6.45
<i>Porites sp. 2</i>	3	4.79	1.44	3.5-6.3	0.05	0.11	5.00	2.20	0.34
<i>Psammocora samoensis</i>	1	8.94			0.02	0.04	1.67	2.41	0.37
COMMUNITY	60	15.21	11.57	1.4-48.9		2.30		654.89	

Coral species	Size distribution of colonies (diameter in cm)				frequency /quarter	density per m ²	relative % density	cover cm ² /m ²	relative % cover
	n	mean	stdev	range					
<i>Acropora crateriformis</i>	1	14.49			0.02	0.21	1.67	35.44	1.16
<i>Acropora hyacinthus</i>	8	10.82	6.98	4.5-23	0.13	1.72	13.33	215.52	7.07
<i>Acropora irregularis</i>	1	28.98			0.02	0.21	1.67	141.76	4.65
<i>Acropora nana</i>	1	6.00			0.02	0.21	1.67	6.08	0.20
<i>Acropora nasuta</i>	1	19.97			0.02	0.21	1.67	67.34	2.21
<i>Echinopora lamellosa</i>	1	22.76			0.02	0.21	1.67	87.42	2.87
<i>Favites complanata</i>	6	12.06	3.80	7.7-17.3	0.10	1.29	10.00	159.49	5.23
<i>Galaxea fascicularis</i>	6	7.60	0.95	6-8.5	0.10	1.29	10.00	59.24	1.94
<i>Goniastrea retiformis</i>	1	48.74			0.02	0.21	1.67	400.99	13.16
<i>Leptastrea purpurea</i>	1	10.95			0.02	0.21	1.67	20.25	0.66
<i>Millepora platyphylla</i>	1	20.86			0.02	0.21	1.67	73.41	2.41
<i>Montastrea curta</i>	4	10.24	4.43	6.3-16.4	0.07	0.86	6.67	80.67	2.65
<i>Montipora caliculata</i>	3	22.47	12.93	12-36.9	0.05	0.64	5.00	312.05	10.24
<i>Montipora elschneri</i>	1	16.12			0.02	0.21	1.67	43.88	1.44
<i>Montipora grisea</i>	1	13.27			0.02	0.21	1.67	29.70	0.97
<i>Montipora monasteriata</i>	3	26.93	5.87	20.2-31	0.05	0.64	5.00	378.88	12.43
<i>Montipora sp. 2</i>	1	12.96			0.02	0.21	1.67	28.35	0.93
<i>Montipora verrilli</i>	5	17.63	7.72	11.2-30.5	0.08	1.07	8.33	302.60	9.93
<i>Pocillopora eydouxi</i>	4	24.73	7.21	19-35.2	0.07	0.86	6.67	439.30	14.42
<i>Pocillopora ligulata</i>	1	16.25			0.02	0.21	1.67	44.55	1.46
<i>Pocillopora verrucosa</i>	1	17.49			0.02	0.21	1.67	51.64	1.69
<i>Porites sp. 2</i>	3	6.05	0.41	5.7-6.5	0.05	0.64	5.00	18.56	0.61
<i>Psammocora contigua</i>	4	8.34	0.55	7.7-8.8	0.07	0.86	6.67	47.09	1.55

Massacre Bay 2m depth – April 1998		Size distribution of colonies (diameter in cm)							
Coral species	n	mean	stdev	range	frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
<i>Psammocora samoensis</i>	1	4.00			0.02	0.21	1.67	2.70	0.09
COMMUNITY	60	14.75	9.20	4-48.7		12.89		3046.93	

Rainmaker Hotel 6m depth – April 1998		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m ²	relative % density	cover cm ² /m ²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora hyacinthus</i>	1	7.98			0.01	0.03	1.49	1.70	0.57
<i>Acropora secale</i>	1	3.46			0.01	0.03	1.49	0.32	0.11
<i>Diploastrea heliopora</i>	1	33.47			0.01	0.03	1.49	29.94	10.00
<i>Fungia scutaria</i>	3	7.58	0.63	7-8.2	0.04	0.10	4.48	4.62	1.54
<i>Leptastrea purpurea</i>	3	7.67	8.33	1-17	0.04	0.10	4.48	8.42	2.81
<i>Leptoseris explanata</i>	1	10.95			0.01	0.03	1.49	3.21	1.07
<i>Millepora dichotoma</i>	4	9.46	7.15	3.7-19.4	0.06	0.14	5.97	13.66	4.56
<i>Millepora platyphylla</i>	2	13.81	3.97	11-16.6	0.03	0.07	2.99	10.61	3.54
<i>Montipora ehrenbergii</i>	2	4.77	0.74	4.2-5.3	0.03	0.07	2.99	1.23	0.41
<i>Montipora elschneri</i>	4	13.60	3.07	9.2-16	0.06	0.14	5.97	20.53	6.85
<i>Montipora grisea</i>	14	11.09	5.59	2.7-20	0.21	0.48	20.90	56.89	19.00
<i>Montipora hoffmeisteri</i>	3	24.93	3.87	22.5-29.4	0.04	0.10	4.48	50.65	16.91
<i>Montipora millepora</i>	2	3.67	0.29	3.5-3.9	0.03	0.07	2.99	0.72	0.24
<i>Montipora monasteriata</i>	1	6.48			0.01	0.03	1.49	1.12	0.37
<i>Montipora verrilli</i>	6	7.15	4.95	2.5-13	0.09	0.20	8.96	11.47	3.83
<i>Pavona decussata</i>	1	24.00			0.01	0.03	1.49	15.40	5.14
<i>Pavona sp. 3</i>	1	3.87			0.01	0.03	1.49	0.40	0.13
<i>Pavona varians</i>	4	7.82	1.93	6.3-10.5	0.06	0.14	5.97	6.84	2.28
<i>Pavona venosa</i>	2	9.49	2.83	7.5-11.5	0.03	0.07	2.99	5.03	1.68
<i>Pocillopora damicornis</i>	7	13.86	5.76	4.9-21.9	0.10	0.24	10.45	41.27	13.78
<i>Psammocora contigua</i>	4	11.17	5.13	6-17.9	0.06	0.14	5.97	15.45	5.16
COMMUNITY	67	11.01	6.84	1-33.5		2.28		299.49	

APPENDIX 4

Summary of results from point-quarter surveys at sites around Tutuila Island from the 2001 surveys.

Aua 3m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora hyacinthus</i>	1	3.00			0.01	0.25	1.25	1.77	0.21
<i>Leptastrea purpurea</i>	2	1.72	1.02	1-2.4	0.03	0.50	2.50	1.38	0.16
<i>Millepora exaesa</i>	2	7.93	3.21	5.7-10.2	0.03	0.50	2.50	26.76	3.18
<i>Millepora sp</i>	8	6.83	4.73	1.4-14.1	0.10	2.00	10.00	104.28	12.39
<i>Montastrea annuligera</i>	1	10.39			0.01	0.25	1.25	21.25	2.53
<i>Montipora corbettensis</i>	6	9.86	5.94	4.5-19.5	0.08	1.50	7.50	149.34	17.75
<i>Montipora efflorescens</i>	4	13.98	6.30	7.3-22.2	0.05	1.00	5.00	177.28	21.07
<i>Montipora grisea</i>	12	18.43	18.48	3.7-61.42	0.15	3.01	15.00	1541.30	183.15
<i>Montipora informis</i>	5	21.77	22.75	6.3-61.6	0.06	1.25	6.25	873.80	103.83
<i>Montipora monasteriata</i>	2	16.31	17.06	4.2-28.4	0.03	0.50	2.50	161.93	19.24
<i>Montipora nodosa</i>	3	9.02	2.26	7.1-11.5	0.04	0.75	3.75	49.98	5.94
<i>Montipora sp</i>	2	2.64	0.27	2.4-2.8	0.03	0.50	2.50	2.75	0.33
<i>Montipora tuberculosa</i>	1	12.00			0.01	0.25	1.25	28.33	3.37
<i>Pavona decussata</i>	1	3.46			0.01	0.25	1.25	2.36	0.28
<i>Pavona varians</i>	1	11.49			0.01	0.25	1.25	25.97	3.09
<i>Pocillopora damicornis</i>	8	3.44	2.76	1-8	0.10	2.00	10.00	29.07	3.45
<i>Pocillopora danae</i>	15	5.50	5.07	1-17	0.19	3.76	18.75	159.91	19.00
<i>Pocillopora eydouxi</i>	1	39.47			0.01	0.25	1.25	306.55	36.43
<i>Pocillopora meandrina</i>	1	12.49			0.01	0.25	1.25	30.69	3.65
<i>Pocillopora verrucosa</i>	3	10.08	5.48	6-16.3	0.04	0.75	3.75	71.82	8.53
<i>Porites lichen</i>	1	2.12			0.01	0.25	1.25	0.89	0.11
COMMUNITY	80	10.23	11.68	1-61.6		20.04		3767.41	

Aua 6m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora subulata</i>	1	5.00			0.01	0.13	1.16	2.53	0.14
<i>Fungia sp.</i>	1	15.49			0.01	0.13	1.16	24.30	1.34
<i>Leptastrea purpurea</i>	7	3.04	1.99	1-6.5	0.07	0.77	6.98	8.92	0.49
<i>Millepora exaesa</i>	4	66.17	78.92	2.4-179.1	0.05	0.52	4.65	3664.88	202.35
<i>Montipora calcarea</i>	2	16.56	5.04	13-20.1	0.02	0.26	2.33	58.11	3.21
<i>Montipora corbettensis</i>	6	12.84	14.58	2.4-41	0.07	0.77	6.98	207.74	11.47
<i>Montipora efflorescens</i>	1	5.48			0.01	0.13	1.16	3.04	0.17
<i>Montipora grisea</i>	36	16.44	10.50	3-51	0.42	4.64	41.86	1375.51	75.95
<i>Montipora informis</i>	7	11.75	18.06	3.5-52.7	0.08	0.90	8.14	295.81	16.33
<i>Montipora monasteriata</i>	1	11.40			0.01	0.13	1.16	13.16	0.73
<i>Montipora nodosa</i>	2	4.95	1.00	4.2-5.7	0.02	0.26	2.33	5.06	0.28
<i>Pavona varians</i>	2	20.99	16.96	9-33	0.02	0.26	2.33	118.35	6.53
<i>Pocillopora damicornis</i>	8	4.47	4.30	1.5-14.9	0.09	1.03	9.30	29.28	1.62
<i>Pocillopora danae</i>	3	5.33	3.21	3-9	0.03	0.39	3.49	10.73	0.59
<i>Pocillopora meandrina</i>	2	12.98	12.04	4.5-21.5	0.02	0.26	2.33	48.80	2.69
<i>Pocillopora verrucosa</i>	2	13.46	6.38	8.9-18	0.02	0.26	2.33	40.80	2.25
<i>Porites rus</i>	1	34.99			0.01	0.13	1.16	123.91	6.84
COMMUNITY	86	15.09	21.69	1-179.1		10.96		6030.93	

Auasi 3m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora crateriformis</i>	4	12.82	8.25	6-23.3	0.06	1.63	6.25	275.10	39.42
<i>Echinopora lamellosa</i>	2	10.19	9.51	3.5-16.9	0.03	0.81	3.13	95.10	13.63
<i>Galaxea fascicularis</i>	8	8.89	5.99	3.5-22.4	0.13	3.25	12.50	282.12	40.43
<i>Leptoria phrygia</i>	2	12.24	2.48	10.5-14	0.03	0.81	3.13	97.66	14.00
<i>Montastrea curta</i>	1	13.49			0.02	0.41	1.56	58.08	8.32
<i>Montipora foveolata</i>	6	5.15	3.64	2.3-12.2	0.09	2.44	9.38	71.89	10.30
<i>Montipora grisea</i>	6	20.38	17.90	3.2-47.4	0.09	2.44	9.38	1306.88	187.29
<i>Montipora tuberculosa</i>	2	13.35	9.40	6.7-20	0.03	0.81	3.13	142.02	20.35
<i>Pocillopora meandrina</i>	12	11.61	8.62	1.2-28.1	0.19	4.88	18.75	776.95	111.34
<i>Pocillopora verrucosa</i>	6	11.39	3.23	7.7-15	0.09	2.44	9.38	265.21	38.01
<i>Porites annae</i>	4	7.45	3.50	3.5-11.5	0.06	1.63	6.25	82.66	11.85
<i>Porites lichen</i>	9	3.89	2.11	1-6.7	0.14	3.66	14.06	54.73	7.84
<i>Porites rus</i>	2	8.50	3.54	6-11	0.03	0.81	3.13	50.11	7.18
COMMUNITY	64	10.16	8.50	1-47.4		26.01		3558.50	

Auasi 6m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora crateriformis</i>	2	24.49	9.18	18-31	0.03	0.51	3.13	255.94	14.31
<i>Favia stelligera</i>	2	5.60	0.44	5.3-5.9	0.03	0.51	3.13	12.56	0.70
<i>Hydnophora microconos</i>	1	62.00			0.02	0.25	1.56	766.22	42.85
<i>Millepora</i>	1	28.28			0.02	0.25	1.56	159.46	8.92
<i>Millepora exaesa</i>	1	99.35			0.02	0.25	1.56	1967.37	110.03
<i>Montipora foveolata</i>	12	7.01	4.79	2.4-16.9	0.19	3.05	18.75	167.83	9.39
<i>Montipora grisea</i>	4	26.16	9.30	17.7-39.3	0.06	1.02	6.25	597.19	33.40
<i>Montipora monasteriata</i>	1	24.66			0.02	0.25	1.56	121.19	6.78
<i>Montipora sp</i>	2	1.25	0.35	1-1.5	0.03	0.51	3.13	0.65	0.04
<i>Montipora tuberculosa</i>	1	32.00			0.02	0.25	1.56	204.11	11.42
<i>Pavona collines</i>	2	35.78	27.37	16.4-55.1	0.03	0.51	3.13	659.78	36.90
<i>Pocillopora damicornis</i>	1	4.00			0.02	0.25	1.56	3.19	0.18
<i>Pocillopora eydouxi</i>	3	51.45	15.18	34-61.4	0.05	0.76	4.69	1674.96	93.68
<i>Pocillopora meandrina</i>	9	14.42	4.55	8-22.8	0.14	2.28	14.06	406.03	22.71
<i>Porites (encrusting)</i>	1	6.93			0.02	0.25	1.56	9.57	0.54
<i>Porites annae</i>	3	4.55	1.87	3.5-6.7	0.05	0.76	4.69	13.75	0.77
<i>Porites lichen</i>	12	7.28	3.37	1.2-13.5	0.19	3.05	18.75	151.79	8.49
<i>Porites sp. 2</i>	2	3.15	0.45	2.8-3.5	0.03	0.51	3.13	3.99	0.22
<i>Psammocora haimeana</i>	1	5.92			0.02	0.25	1.56	6.98	0.39
Soft coral	3	6.14	1.58	5-7.9	0.05	0.76	4.69	23.52	1.32
COMMUNITY	64	15.56	18.10	1-99.3		16.24		7206.07	

Aunu'u 3m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora abrotanoides</i>	1	38.34			0.02	0.22	1.54	255.74	20.40
<i>Acropora hyacinthus</i>	5	22.49	14.97	10.5-46.2	0.08	1.11	7.69	596.04	47.55
<i>Acropora nasuta</i>	1	15.00			0.02	0.22	1.54	39.14	3.12
<i>Galaxea fascicularis</i>	1	5.29			0.02	0.22	1.54	4.87	0.39
<i>Leptastrea purpurea</i>	2	5.37	5.14	1.7-9	0.03	0.44	3.08	14.61	1.17
<i>Montastrea annuligera</i>	1	8.94			0.02	0.22	1.54	13.92	1.11
<i>Montastrea curta</i>	2	11.39	3.38	9-13.8	0.03	0.44	3.08	47.15	3.76
<i>Montipora corbettensis</i>	1	12.96			0.02	0.22	1.54	29.23	2.33
<i>Montipora foveolata</i>	15	3.35	1.47	1.2-6	0.23	3.32	23.08	34.49	2.75
<i>Montipora grisea</i>	8	15.01	16.13	1.4-42.4	0.12	1.77	12.31	630.44	50.30
<i>Montipora informis</i>	1	32.94			0.02	0.22	1.54	188.76	15.06
<i>Montipora millepora</i>	1	7.75			0.02	0.22	1.54	10.44	0.83
<i>Montipora nodosa</i>	2	30.84	9.79	23.9-37.8	0.03	0.44	3.08	347.60	27.73
<i>Montipora sp</i>	1	0.50			0.02	0.22	1.54	0.04	0.00
<i>Montipora tuberculosa</i>	6	25.03	22.79	5.3-57.8	0.09	1.33	9.23	1106.14	88.24
<i>Pavona collines</i>	1	39.89			0.02	0.22	1.54	276.80	22.08
<i>Pocillopora damicornis</i>	1	2.00			0.02	0.22	1.54	0.70	0.06
<i>Pocillopora eydouxi</i>	4	28.52	21.02	2-53.4	0.06	0.89	6.15	796.46	63.54
<i>Pocillopora juvenile</i>	3	1.44	0.05	1.4-1.5	0.05	0.66	4.62	1.09	0.09
<i>Pocillopora meandrina</i>	4	19.53	9.98	5.9-29.2	0.06	0.89	6.15	317.51	25.33
<i>Porites rus</i>	1	3.87			0.02	0.22	1.54	2.61	0.21
<i>Porites sp. 2</i>	1	2.00			0.02	0.22	1.54	0.70	0.06
<i>Psammocora haimeana</i>	2	9.85	6.86	5-14.7	0.03	0.44	3.08	41.93	3.34
COMMUNITY	65	14.06	15.05	1.2-57.8		14.40		4756.41	

Aunu'u 6m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora clathrata</i>	1	25.69			0.02	0.34	1.56	176.76	7.37
<i>Acropora crateriformis</i>	1	27.50			0.02	0.34	1.56	202.47	8.44
<i>Acropora gemmifera</i>	2	15.08	15.66	4-26.2	0.03	0.68	3.13	187.47	7.82
<i>Acropora hyacinthus</i>	4	14.83	10.93	4.2-30.2	0.06	1.36	6.25	331.55	13.82
<i>Acropora insignis</i>	1	1.73			0.02	0.34	1.56	0.80	0.03
<i>Coscinaraea columna</i>	1	52.44			0.02	0.34	1.56	736.48	30.70
<i>Galaxea fascicularis</i>	3	7.60	2.71	5.3-10.6	0.05	1.02	4.69	50.35	2.10
<i>Hydnophora exesa</i>	1	57.39			0.02	0.34	1.56	882.17	36.78
<i>Leptastrea purpurea</i>	1	8.94			0.02	0.34	1.56	21.42	0.89
<i>Montipora foveolata</i>	12	8.15	11.42	2-44	0.19	4.09	18.75	597.49	24.91
<i>Montipora grisea</i>	7	20.31	17.25	4-52.5	0.11	2.39	10.94	1251.21	52.16
<i>Montipora informis</i>	5	35.48	28.80	3.7-76	0.08	1.70	7.81	2573.67	107.30
<i>Montipora nodosa</i>	2	34.24	11.90	25.8-42.7	0.03	0.68	3.13	666.05	27.77
<i>Montipora tuberculosa</i>	3	38.82	17.23	20.2-54.2	0.05	1.02	4.69	1369.85	57.11
<i>Montipora venosa</i>	1	12.65			0.02	0.34	1.56	42.85	1.79
<i>Pavona collines</i>	4	16.60	6.18	8.9-24.1	0.06	1.36	6.25	325.93	13.59
<i>Pavona varians</i>	6	24.50	15.80	9.2-53.5	0.09	2.05	9.38	1299.15	54.16
<i>Pocillopora eydouxi</i>	1	13.86			0.02	0.34	1.56	51.42	2.14
<i>Pocillopora juvenile</i>	4	2.73	0.51	2-3.2	0.06	1.36	6.25	8.17	0.34
<i>Pocillopora meandrina</i>	3	22.04	6.77	15-28.5	0.05	1.02	4.69	414.84	17.30
<i>Psammocora haimeana</i>	1	7.48			0.02	0.34	1.56	15.00	0.63
COMMUNITY	64	18.95	17.30	1.7-57.4		21.82		11205.0	

Cape Larsen 3m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora clathrata</i>	1	21.45			0.03	0.74	3.13	268.65	11.85
<i>Acropora cytherea</i>	1	7.94			0.03	0.74	3.13	36.79	1.62
<i>Acropora hyacinthus</i>	3	8.46	3.97	4.5-12.4	0.09	2.23	9.38	143.67	6.34
<i>Acropora nasuta</i>	1	14.87			0.03	0.74	3.13	129.07	5.69
<i>Coscinaraea columna</i>	1	17.32			0.03	0.74	3.13	175.21	7.73
<i>Goniopora sp.</i>	2	4.47	0.00	4.5-4.5	0.06	1.49	6.25	23.36	1.03
<i>Montipora foveolata</i>	1	2.00			0.03	0.74	3.13	2.34	0.10
<i>Montipora grisea</i>	7	17.95	16.82	2.4-47.5	0.22	5.21	21.88	2308.07	101.79
<i>Montipora informis</i>	8	20.00	18.10	3-50.8	0.25	5.95	25.00	3208.05	141.48
<i>Montipora nodosa</i>	2	21.98	7.08	17-27	0.06	1.49	6.25	593.37	26.17
<i>Montipora tuberculosa</i>	2	44.11	42.18	14.3-73.9	0.06	1.49	6.25	3312.01	146.07
<i>Pavona varians</i>	1	27.00			0.03	0.74	3.13	425.75	18.78
<i>Pocillopora eydouxi</i>	2	16.49	14.15	6.5-26.5	0.06	1.49	6.25	434.52	19.16
COMMUNITY	32	17.99	16.64	2-73.9		23.80		11060.8	

Cape Larsen 6m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora paniculata</i>	1	43.44			0.03	0.67	3.13	999.02	67.81
<i>Galaxea fascicularis</i>	2	12.54	1.61	11.4-13.7	0.06	1.35	6.25	167.83	11.39
<i>Goniopora sp.</i>	1	15.49			0.03	0.67	3.13	127.06	8.62
<i>Montipora foveolata</i>	1	6.48			0.03	0.67	3.13	22.24	1.51
<i>Montipora grisea</i>	10	12.79	9.23	3.9-30	0.31	6.74	31.25	1271.14	86.28
<i>Montipora informis</i>	3	12.21	6.67	6.6-19.6	0.09	2.02	9.38	283.77	19.26
<i>Montipora nodosa</i>	5	24.39	9.54	9.5-35.3	0.16	3.37	15.63	1767.21	119.96
<i>Montipora tuberculosa</i>	1	37.99			0.03	0.67	3.13	763.95	51.86
<i>Pavona varians</i>	1	18.44			0.03	0.67	3.13	180.00	12.22
<i>Pavona venosa</i>	2	20.43	5.40	16.6-24.2	0.06	1.35	6.25	457.42	31.05
<i>Pocillopora eydouxi</i>	1	29.85			0.03	0.67	3.13	471.71	32.02
<i>Pocillopora verrucosa</i>	1	23.07			0.03	0.67	3.13	281.65	19.12
<i>Porites rus</i>	2	5.74	1.79	4.5-7	0.06	1.35	6.25	36.53	2.48
<i>Psammocora haimeana</i>	1	4.90			0.03	0.67	3.13	12.71	0.86
COMMUNITY	32	16.98	10.92	3.9-43.4		21.57		6842.24	

Fagasa 3m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora cytherea</i>	4	9.52	2.92	5.3-11.8	0.13	1.09	12.50	83.29	3.74
<i>Acropora dichotoma</i>	1	8.37			0.03	0.27	3.13	15.03	0.68
<i>Acropora hyacinthus</i>	2	7.92	0.80	7.3-8.5	0.06	0.55	6.25	27.05	1.22
<i>Acropora monticulosa</i>	1	14.49			0.03	0.27	3.13	45.08	2.03
<i>Acropora nana</i>	1	6.32			0.03	0.27	3.13	8.59	0.39
<i>Cyphastrea sp.</i>	1	17.55			0.03	0.27	3.13	66.12	2.97
<i>Montipora curta</i>	1	13.86			0.03	0.27	3.13	41.22	1.85
<i>Montipora foveolata</i>	1	6.48			0.03	0.27	3.13	9.02	0.41
<i>Montipora grisea</i>	9	15.31	11.28	2.8-35	0.28	2.46	28.13	671.29	30.16
<i>Montipora informis</i>	3	57.12	9.82	46-64.4	0.09	0.82	9.38	2142.48	96.26
<i>Montipora nodosa</i>	1	47.43			0.03	0.27	3.13	483.02	21.70
<i>Montipora tuberculosa</i>	3	56.49	27.98	35.8-88.3	0.09	0.82	9.38	2391.07	107.43
<i>Pavona collines</i>	1	18.33			0.03	0.27	3.13	72.13	3.24
<i>Pavona varians</i>	1	17.89			0.03	0.27	3.13	68.70	3.09
<i>Platygyra pini</i>	1	10.49			0.03	0.27	3.13	23.61	1.06
<i>Pocillopora eydouxi</i>	1	45.00			0.03	0.27	3.13	434.72	19.53
COMMUNITY	32	23.08	20.95	2.8-88.3		8.75		6582.42	

Fagasa 6m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora clathrata</i>	1	4.24			0.03	0.30	3.13	4.26	0.14
<i>Acropora cytherea</i>	2	8.44	2.14	6.9-9.9	0.06	0.60	6.25	34.76	1.17
<i>Acropora sp.</i>	1	4.90			0.03	0.30	3.13	5.67	0.19
<i>Coscinaraea columna</i>	1	59.48			0.03	0.30	3.13	836.53	28.12
<i>Leptastrea purpurea</i>	1	10.82			0.03	0.30	3.13	27.66	0.93
<i>Montipora efflorescens</i>	1	5.29			0.03	0.30	3.13	6.62	0.22
<i>Montipora grisea</i>	10	16.65	13.28	3.5-45.2	0.31	3.01	31.25	1030.65	34.65
<i>Montipora informis</i>	1	59.50			0.03	0.30	3.13	837.00	28.14
<i>Montipora monasteriata</i>	2	74.44	12.20	65.8-83.1	0.06	0.60	6.25	2655.70	89.28
<i>Montipora nodosa</i>	1	22.45			0.03	0.30	3.13	119.17	4.01
<i>Montipora tuberculosa</i>	6	47.66	18.25	25.9-69.7	0.19	1.81	18.75	3616.36	121.58
<i>Pocillopora eydouxi</i>	1	7.94			0.03	0.30	3.13	14.90	0.50
<i>Porites (mound)</i>	2	8.35	4.06	5.5-11.2	0.06	0.60	6.25	36.88	1.24
<i>Porites horizontalata</i>	1	4.90			0.03	0.30	3.13	5.67	0.19
<i>Psammocora haimeana</i>	1	1.41			0.03	0.30	3.13	0.47	0.02
COMMUNITY	32	25.50	24.26	1.4-83.1		9.63		9232.31	

Fatumafuti 3m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora nana</i>	2	10.45	5.62	6.5-14.4	0.03	63.93	3.13	62.76	29.48
<i>Acropora subulata</i>	2	5.91	2.87	3.9-7.9	0.03	63.93	3.13	19.58	9.20
<i>Montipora foveolata</i>	1	5.29			0.02	31.96	1.56	7.03	3.30
<i>Montipora grisea</i>	1	10.00			0.02	31.96	1.56	25.10	11.79
<i>Montipora monasteriata</i>	1	20.49			0.02	31.96	1.56	105.44	49.53
<i>Montipora venosa</i>	2	3.12	1.59	2-4.2	0.03	63.93	3.13	5.52	2.59
<i>Pocillopora danae</i>	2	1.97	0.67	1.5-2.4	0.03	63.93	3.13	2.07	0.97
<i>Pocillopora juvenile</i>	1	2.45			0.02	31.96	1.56	1.51	0.71
<i>Pocillopora meandrina</i>	15	9.10	3.84	2.8-16.1	0.23	479.47	23.44	363.52	170.75
<i>Pocillopora verrucosa</i>	5	12.86	5.47	6.9-21.2	0.08	159.82	7.81	237.74	111.67
<i>Porites lichen</i>	28	3.60	1.74	1.4-8.5	0.44	895.00	43.75	111.53	52.39
<i>Porites rus</i>	1	6.32			0.02	31.96	1.56	10.04	4.72
<i>Psammocora haimeana</i>	3	3.26	2.48	0.5-5.3	0.05	95.89	4.69	11.11	5.22
COMMUNITY	64	6.23	4.63	0.5-20.5		2045.72		962.96	

Fatumafuti 6m depth – Feb 2001		Size distribution of colonies (diameter in cm)				frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range						
<i>Acropora gemmifera</i>	1	6.32			0.01	0.64	1.39	20.00	3.50	
<i>Acropora nana</i>	4	10.71	5.40	4.5-15.6	0.06	2.55	5.56	272.99	47.73	
<i>Acropora subulata</i>	2	7.47	3.50	5-9.9	0.03	1.27	2.78	62.00	10.84	
<i>Montipora foveolata</i>	5	5.49	2.61	1.7-8	0.07	3.18	6.94	89.00	15.56	
<i>Montipora grisea</i>	1	15.10			0.01	0.64	1.39	113.99	19.93	
<i>Montipora informis</i>	2	11.30	6.60	6.6-16	0.03	1.27	2.78	149.49	26.14	
<i>Montipora tuberculosa</i>	1	3.87			0.01	0.64	1.39	7.50	1.31	
<i>Montipora venosa</i>	3	2.31	1.00	1.7-3.5	0.04	1.91	4.17	9.00	1.57	
<i>Palythoa</i>	2	6.68	4.70	3.4-10	0.03	1.27	2.78	55.62	9.73	
<i>Pocillopora danae</i>	2	3.46	0.00	3.5-3.5	0.03	1.27	2.78	12.00	2.10	
<i>Pocillopora eydouxi</i>	1	23.81			0.01	0.64	1.39	283.49	49.57	
<i>Pocillopora juvenile</i>	2	0.50	0.00	0.5-0.5	0.03	1.27	2.78	0.25	0.04	
<i>Pocillopora meandrina</i>	8	13.96	9.37	3-26.8	0.11	5.09	11.11	1086.94	190.05	
<i>Pocillopora verrucosa</i>	3	15.70	12.90	2.5-28.3	0.04	1.91	4.17	536.10	93.73	
<i>Porites (mound)</i>	1	36.22			0.01	0.64	1.39	655.97	114.69	
<i>Porites annae</i>	2	4.73	1.79	3.5-6	0.03	1.27	2.78	24.00	4.20	
<i>Porites lichen</i>	29	4.35	3.27	0.5-13	0.40	18.46	40.28	424.23	74.17	
<i>Porites rus</i>	2	7.45	3.46	5-9.9	0.03	1.27	2.78	61.50	10.75	
Soft coral	1	4.00			0.01	0.64	1.39	8.00	1.40	
COMMUNITY	72	7.43	7.29	0.5-36.2		45.83		3872.05		

Masefau Bay (inside) 3m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora divaricata</i>	1	36.06			0.02	0.19	1.69	192.50	6.68
<i>Acropora hyacinthus</i>	4	31.19	21.80	13.5-62.9	0.07	0.75	6.78	787.32	27.33
<i>Acropora insignis</i>	1	36.08			0.02	0.19	1.69	192.80	6.69
<i>Acropora meandrina</i>	1	46.48			0.02	0.19	1.69	319.85	11.10
<i>Acropora robusta</i>	1	100.60			0.02	0.19	1.69	1498.53	52.02
<i>Leptastrea transversa</i>	1	20.00			0.02	0.19	1.69	59.23	2.06
<i>Montipora divaricata</i>	1	44.79			0.02	0.19	1.69	297.04	10.31
<i>Montipora efflorescens</i>	6	11.74	5.30	4.9-18.3	0.10	1.13	10.17	143.34	4.98
<i>Montipora foveolata</i>	1	2.29			0.02	0.19	1.69	0.78	0.03
<i>Montipora grisea</i>	7	30.33	14.94	9-50.1	0.12	1.32	11.86	1151.59	39.98
<i>Montipora hispida</i>	1	101.86			0.02	0.19	1.69	1536.29	53.33
<i>Montipora informis</i>	6	28.15	24.98	3.2-57.9	0.10	1.13	10.17	1166.10	40.48
<i>Montipora monasteriata</i>	2	10.90	0.45	10.6-11.2	0.03	0.38	3.39	35.24	1.22
<i>Montipora tuberculosa</i>	1	58.34			0.02	0.19	1.69	504.05	17.50
<i>Montipora verrucosa</i>	1	52.44			0.02	0.19	1.69	407.21	14.14
<i>Pavona varians</i>	1	12.41			0.02	0.19	1.69	22.80	0.79
<i>Pavona venosa</i>	1	7.35			0.02	0.19	1.69	8.00	0.28
<i>Pocillopora damicornis</i>	2	1.72	1.02	7.3-7.3	0.03	0.38	3.39	1.04	0.04
<i>Pocillopora eydouxi</i>	3	37.54	19.92	1-2.4	0.05	0.57	5.08	743.64	25.82
<i>Pocillopora meandrina</i>	5	14.58	10.18	23.5-60.3	0.08	0.94	8.47	218.71	7.59
<i>Porites (encrusting)</i>	2	7.59	9.01	7-31	0.03	0.38	3.39	29.10	1.01
<i>Porites (mound)</i>	1	5.29			0.02	0.19	1.69	4.15	0.14
<i>Porites lichen</i>	3	3.71	1.34	5.3-5.3	0.05	0.57	5.08	6.66	0.23
<i>Porites rus</i>	1	42.26			0.02	0.19	1.69	264.46	9.18

Masefau Bay (inside) 3m depth – Feb 2001		Size distribution of colonies (diameter in cm)							
Coral species	n	mean	stdev	range	frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
<i>Porites</i> sp. 2	4	3.95	3.24	42.3-42.3	0.07	0.75	6.78	13.92	0.48
<i>Psammocora haimeana</i>	1	4.24			0.02	0.19	1.69	2.67	0.09
COMMUNITY	59	23.64	23.18	4.2-4.2		11.12		9607.02	

Masefau Bay (inside) 6m depth – Feb 2001		Size distribution of colonies (diameter in cm)				frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range						
<i>Galaxea fascicularis</i>	1	5.48				0.02	0.26	1.56	6.19	0.13
<i>Leptastrea purpurea</i>	1	6.98				0.02	0.26	1.56	10.06	0.22
<i>Montipora aequituberculata</i>	1	24.19				0.02	0.26	1.56	120.75	2.62
<i>Montipora foveolata</i>	3	7.11	3.51	4.1-11		0.05	0.79	4.69	36.43	0.79
<i>Montipora grisea</i>	27	24.41	16.38	3-64		0.42	7.10	42.19	4759.53	103.20
<i>Montipora hispida</i>	2	33.83	16.03	22.5-45.2		0.03	0.53	3.13	525.53	11.39
<i>Montipora informis</i>	2	34.81	25.23	17-52.6		0.03	0.53	3.13	631.63	13.70
<i>Montipora nodosa</i>	4	9.80	9.52	4.2-24		0.06	1.05	6.25	135.41	2.94
<i>Montipora sp.</i>	1	24.08				0.02	0.26	1.56	119.72	2.60
<i>Montipora tuberculosa</i>	4	26.42	15.61	9.5-42.7		0.06	1.05	6.25	727.41	15.77
<i>Pavona varians</i>	1	3.54				0.02	0.26	1.56	2.58	0.06
<i>Pavona venosa</i>	6	5.62	2.80	2.2-9.8		0.09	1.58	9.38	47.27	1.02
<i>Pocillopora meandrina</i>	1	28.72				0.02	0.26	1.56	170.29	3.69
<i>Porites cylindrica</i>	2	140.23	65.05	94.2-186.2		0.03	0.53	3.13	8991.46	194.96
<i>Porites rus</i>	7	36.23	24.34	3.5-70.2		0.11	1.84	10.94	2630.15	57.03
<i>Porites sp. 2</i>	1	1.73				0.02	0.26	1.56	0.62	0.01
COMMUNITY	64	25.39	28.28	1.7-186.2			16.82		18915.0	

Rainmaker 3m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora humilis</i>	1	4.97			0.02	0.13	1.56	2.44	1.29
<i>Acropora hyacinthus</i>	1	8.22			0.02	0.13	1.56	6.65	3.53
<i>Goniastrea retiformis</i>	1	2.24			0.02	0.13	1.56	0.49	0.26
<i>Leptastrea purpurea</i>	2	4.20	2.06	2.7-5.7	0.03	0.25	3.13	3.89	2.06
<i>Montipora efflorescens</i>	9	7.47	6.11	1.7-21.4	0.14	1.13	14.06	78.91	41.87
<i>Montipora granulosa</i>	1	11.96			0.02	0.13	1.56	14.08	7.47
<i>Montipora grisea</i>	6	5.88	1.66	4.2-7.9	0.09	0.75	9.38	21.78	11.56
<i>Montipora informis</i>	6	16.29	6.12	11.8-28.1	0.09	0.75	9.38	175.13	92.91
<i>Montipora millepora</i>	2	6.32	4.47	3.2-9.5	0.03	0.25	3.13	9.85	5.22
<i>Montipora monasteriata</i>	2	3.87	0.18	3.7-4	0.03	0.25	3.13	2.95	1.57
<i>Montipora nodosa</i>	4	9.75	3.30	6.5-14	0.06	0.50	6.25	40.66	21.57
<i>Montipora tuberculosa</i>	6	5.52	4.05	1.4-12.5	0.09	0.75	9.38	26.09	13.84
<i>Montipora turgescens</i>	1	5.92			0.02	0.13	1.56	3.45	1.83
<i>Pavona explanulata</i>	2	6.63	4.48	3.5-9.8	0.03	0.25	3.13	10.63	5.64
<i>Pavona frondifera</i>	1	25.69			0.02	0.13	1.56	64.98	34.48
<i>Pocillopora damicornis</i>	10	3.49	2.14	0.5-7	0.16	1.25	15.63	16.05	8.51
<i>Pocillopora danae</i>	6	6.28	4.22	2.4-13.4	0.09	0.75	9.38	32.10	17.03
<i>Pocillopora verrucosa</i>	2	7.49	2.82	5.5-9.5	0.03	0.25	3.13	11.84	6.28
<i>Psammocora contigua</i>	1	11.00			0.02	0.13	1.56	11.91	6.32
COMMUNITY	64	7.37	5.55	0.5-28.1		8.02		533.88	

Rainmaker 6m depth – Feb 2001		Size distribution of colonies (diameter in cm)			frequency /quarter	density per m²	relative % density	cover cm²/m²	relative % cover
Coral species	n	mean	stdev	range					
<i>Acropora divaricata</i>	1	25.42			0.01	0.02	1.47	8.57	0.19
<i>Acropora subulata</i>	1	9.95			0.01	0.02	1.47	1.31	0.03
<i>Astreopora listeri</i>	2	63.58	64.23	18.2-109	0.03	0.03	2.94	161.94	3.67
<i>Diploastrea heliopora</i>	4	255.29	149.40	75.9-441.5	0.06	0.07	5.88	4345.23	98.46
<i>Leptastrea purpurea</i>	1	0.50			0.01	0.02	1.47	0.00	0.00
<i>Millepora exaesa</i>	4	24.02	3.43	20.9-28.1	0.06	0.07	5.88	31.07	0.70
<i>Millepora platyphylla</i>	1	7.07			0.01	0.02	1.47	0.66	0.02
<i>Millepora sp</i>	5	23.34	17.48	4.9-44.7	0.07	0.08	7.35	52.32	1.19
<i>Montipora efflorescens</i>	5	9.62	7.35	2-18.2	0.07	0.08	7.35	9.00	0.20
<i>Montipora foveolata</i>	1	11.62			0.01	0.02	1.47	1.79	0.04
<i>Montipora grisea</i>	9	12.23	9.49	2.1-32	0.13	0.15	13.24	27.39	0.62
<i>Montipora hoffmeisteri</i>	1	3.00			0.01	0.02	1.47	0.12	0.00
<i>Montipora informis</i>	5	11.46	7.40	4.9-23.7	0.07	0.08	7.35	11.60	0.26
<i>Montipora millepora</i>	1	3.46			0.01	0.02	1.47	0.16	0.00
<i>Montipora tuberculosa</i>	5	16.91	12.85	2.4-35.5	0.07	0.08	7.35	27.72	0.63
<i>Pavona collines</i>	2	14.10	15.04	3.5-24.7	0.03	0.03	2.94	8.28	0.19
<i>Pavona varians</i>	3	6.14	2.53	3.5-8.5	0.04	0.05	4.41	1.67	0.04
<i>Pavona venosa</i>	1	6.00			0.01	0.02	1.47	0.48	0.01
<i>Pocillopora damicornis</i>	11	12.34	5.65	4.5-20.5	0.16	0.19	16.18	26.46	0.60
<i>Pocillopora danae</i>	2	13.90	2.92	11.8-16	0.03	0.03	2.94	5.24	0.12
<i>Psammocora contigua</i>	2	12.19	10.91	4.5-19.9	0.03	0.03	2.94	5.52	0.13
<i>Psammocora haimeana</i>	1	13.42			0.01	0.02	1.47	2.39	0.05
COMMUNITY	68	29.06	66.82	0.5-441.5		1.15		4728.91	

APPENDIX 5

Updated species list of all coral species recorded in Fagatele Bay National Marine Sanctuary, American Samoa up to, and including, 2001.

Class Anthozoa

Order Scleractinia

Suborder Astrocoeniina

Family Acroporidae

- Acropora (Acropora) aculeus* (Dana, 1846)
- Acropora (Acropora) acuminata* (Verrill, 1864)
- Acropora (Acropora) akajimensis* Veron, 1990
- Acropora (Acropora) azurea* Veron and Wallace, 1984
- Acropora (Acropora) cerealis* (Dana, 1846)
- Acropora (Acropora) crateriformis* (Gardiner, 1898)
- Acropora (Acropora) cytherea* (Dana, 1846)
- Acropora (Acropora) digitifera* (Dana, 1846)
- Acropora (Acropora) divaricata* ((Dana, 1846)
- Acropora (Acropora) cf. gemmifera* (Brook, 1892)
- Acropora (Acropora) humilis* (Dana, 1846)
- Acropora (Acropora) hyacinthus* (Dana, 1846)
- Acropora (Acropora) insignis* Menenzo, 1967
- Acropora (Acropora) irregularis* (Brook, 1892)
- Acropora (Acropora) loripes* (Brook, 1892)
- Acropora (Acropora) latistella* (Brook, 1891)
- Acropora (Acropora) millepora* (Ehrenberg, 1834)
- Acropora (Acropora) monticulosa* (Bruggemann, 1879)
- Acropora (Acropora) cf. nana* (Studer, 1878)
- Acropora (Acropora) nasuta* (Dana, 1846)
- Acropora (Acropora) nobilis* (Dana, 1846)
- Acropora (Acropora) ocellata* (Klunzinger, 1879)
- Acropora (Acropora) pagoensis* Hoffmeister, 1925
- Acropora (Acropora) palmerae* Wells, 1954
- Acropora (Acropora) paniculata* Verrill, 1902
- Acropora (Acropora) paxilligera* Dana, 1846
- Acropora (Acropora) polystoma* (Brook, 1891)
- Acropora (Acropora) robusta* (Dana, 1846)
- Acropora (Acropora) samoensis* (Brook, 1891)
- Acropora (Acropora) secale* (Studer, 1878)
- Acropora (Acropora) selago* (Studer, 1878)
- Acropora (Acropora) smithi* (Brook, 1893)
- Acropora (Acropora) tenuis* (Dana, 1846)
- Acropora (Acropora) tutuilensis* Hoffmeister, 1925
- Acropora (Acropora) valida* (Dana, 1846)
- Acropora (Acropora) verweyi* Veron and Wallace, 1984
- Acropora (Acropora) yongei* Veron and Wallace, 1984
- Acropora (Acropora) sp. 1*
- Acropora (Acropora) sp. 2*
- Acropora (Isopora) crateriformis* (Gardiner, 1898)
- Acropora. (Isopora) palifera* (Lamarck, 1816)

Alveopora sp.
Alveopora sp. 1
Astreopora listeri Bernard, 1896
Astreopora myriophthalma (Lamarck, 1816)
Astreopora sp. 1
Montipora berryi Hoffmeister, 1925
Montipora calcarea Bernard, 1897
Montipora caliculata (Dana, 1846)
Montipora corbettensis Veron and Wallace, 1984
Montipora danae (Milne, Edwards and Haime, 1851)
Montipora efflorescens Bernard, 1897
Montipora ehrenbergii Verrill, 1875
Montipora elschneri Vaughan, 1918
Montipora floweri Wells, 1954
Montipora foveolata (Dana, 1846)
Montipora granulosa Bernard, 1897
Montipora grisea Bernard, 1897
Montipora hoffmeisteri Wells, 1954
Montipora informis Bernard, 1897
Montipora lobulata Bernard, 1897
Montipora millepora Crossland, 1952
Montipora monasteriata (Forsk., 1775)
Montipora nodosa (Dana, 1846)
Montipora tuberculosa (Lamarck, 1816)
Montipora turgescens Bernard, 1897
Montipora venosa (Ehrenberg, 1834)
Montipora verrilli Vaughan, 1907
Montipora verrucosa (Lamarck, 1816)
Montipora sp. 1
Montipora sp. 2
Montipora sp. 3

Family Astrocoeniidae

Stylocoeniella armata (Ehrenberg, 1834)

Family Pocilloporidae

Pocillopora ankeli Sheer and Pillai, 1974
Pocillopora damicornis (Linnaeus, 1758)
Pocillopora danae Verrill, 1864
Pocillopora elegans Dana, 1846
Pocillopora eydouxi Milne Edwards and Haime, 1860
Pocillopora ligulata Dana, 1846
Pocillopora meandrina Dana, 1846
Pocillopora setchelli Hoffmeister, 1929
Pocillopora verrucosa (Ellis and Solander, 1786)
Pocillopora woodjonesi Vaughan, 1918
Pocillopora sp. 1 (juvenile)
Stylophora mordax (Dana, 1846)

Family Thamnasteriidae

Psammocora contigua (Esper, 1797)

Psammocora haimeana Milne Edwards and Haime, 1851
Psammocora neistraszi van der Horst, 1921
Psammocora obtusangula (Lamarck, 1816)
Psammocora profundacella Gardiner, 1898
Psammocora samoensis Hoffmeister, 1925
Psammocora superficialis Gardiner, 1898
Psammocora sp. 1

Suborder Caryophylliina

Family Caryophylliidae

Euphyllia glabrescens (Chamisso and Eysenhardt, 1821)

Suborder Dendrophylliina

Family Dendrophylliidae

Turbinaria reniformis Bernard, 1896

Suborder Faviina

Family Faviidae

Caulastrea furcata Dana, 1846
Cyphastrea chalcidicum (Forsk., 1775)
Cyphastrea serailia (Forsk., 1775)
Cyphastrea sp. 1
Echinopora hirsutissima Milne Edwards and Haime, 1849
Echinopora lamellosa (Esper, 1795)
Favia fавus (Forsk., 1775)
Favia matthaii Vaughan, 1918
Favia pallida (Dana, 1846)
Favia rotumana (Gardiner, 1899)
Favia speciosa (Dana, 1846)
Favia stelligera (Dana, 1846)
Favites abdita (Ellis and Solander, 1786)
Favites cf. *complanata* (Ehrenberg, 1834)
Favites flexuosa (Dana, 1846)
Favites cf. *halicora* (Ehrenberg, 1834)
Favites pentagona (Esper, 1794)
Favites russelli (Wells, 1954)
Goniastrea edwardsi Chevalier, 1971
Goniastrea favulus (Dana, 1846)
Goniastrea pectinata (Ehrenberg, 1834)
Goniastrea retiformis (Lamarck, 1816)
Goniastrea sp. 1
Hydnophora exesa (Pallas, 1766)
Hydnophora microconos (Lamarck, 1816)
Hydnophora rigida (Dana, 1846)
Leptastrea purpurea (Dana, 1846)
Leptastrea transversa Klunzinger, 1879
Leptastrea sp. 1
Leptoria phrygia (Ellis and Solander, 1786)
Montastrea annuligera (Milne Edwards and Haime, 1849)
Montastrea curta (Dana, 1846)

Platygyra daedalea (Ellis and Solander, 1786)

Platygyra pini Chevalier, 1975

Family Merulinidae

Merulina ampliata (Ellis and Solander, 1786)

Merulina vaughani Van der Horst, 1921

Family Mussidae

Acanthastrea echinata (Dana, 1846)

Lobophyllia corymbosa (Forskal, 1775)

Lobophyllia costata (Dana, 1846)

Lobophyllia hemprichii (Ehrenberg, 1834)

Symphyllia radians Milne, Edwards and Haime, 1849

Symphyllia recta (Dana, 1846)

Family Oculinidae

Galaxea fascicularis (Linnaeus, 1767)

Family Pectinidae

Echinophyllia aspera (Ellis and Solander, 1786)

Suborder Fungiina

Family Agariciidae

Gardineroseris planulata (Dana, 1846)

Pavona clavus (Dana, 1846)

Pavona collines

Pavona divaricata (Lamarck, 1816)

Pavona duerdeni Vaughan, 1907

Pavona maldivensis (Gardiner, 1905)

Pavona varians Verrill, 1864

Pavona venosa (Ehrenberg, 1834)

Pavona sp. 1

Pavona sp. 2

Pavona sp. 3

Pavona sp. 4

Pavona sp. 5

Pavona sp. 6

Family Fungiidae

Fungia (Fungia) fungites (Linnaeus, 1758)

Fungia (Verrillofungia) repanda Dana, 1846

Fungia (Pleuractis) scutaria Lamarck, 1801

Family Poritidae

Alveopora superficiales Pillai and Scheer, 1976

Alveopora viridis Quoy and Gaimard, 1833

Alveopora sp. 1

Goniopora somaliensis Vaughan, 1907

Goniopora sp. 1

Porites (Naporora) vaughani Crossland, 1952

Porites (Porites) annae Crossland, 1952
Porites (Porites) cylindrica Dana, 1846
Porites (Porites) lichen Dana, 1846
Porites (Porites) lobata Dana, 1846
Porites (Porites) lutea Milne Edwards and Haime, 1860
Porites (Porites) murrayensis Vaughan, 1918
Porites (Porites) superfusa Gardiner, 1898
Porites (Porites) sp. 1
Porites (Porites) sp. 2
Porites (Porites) sp. 3
Porites (Synaraea) convexa Verrill, 1864
Porites (Synaraea) rus (Forskal, 1775).

Family Siderastreidae

Coscinaraea columna (Dana, 1846)
Coscinaraea sp. 1

Class Hydrozoa

Order Milleporina

Family Milleporidae

Millepora dichotoma Forskal, 1775
Millepora exaesa (Forskal, 1775)
Millepora platyphylla Hemprich and Ehrenberg, 1834
Millepora tuberosa Boschma, 1966
Millepora sp. 1

Order Stylasterina

Family Stylasteridae

Stylaster cf. gracilis Milne Edwards and Haime, 1850

APPENDIX 6

Updated list of all fish species recorded in Fagatele Bay National Marine Sanctuary, American Samoa up to, and including, 2001.

Class Chondrichthyes

Order Carcharhiniformes

Family Carcharhinidae

Carcharhinus melanopterus (Quoy & Gaimard, 1824)

Family Hemigaleidae

Triaenodon obesus (Ruppell, 1837)

Order Myliobatiformes

Family Myliobatidae

Aetobatus narinari (Euphrasen, 1790)

Class Osteichthyes

Order Anguilliformes

Family Muraenidae

Gymnothorax javanicus (Bleeker, 1859)

Gymnothorax meleagris (Shaw & Nodder 1795)

Order Aulopiformes

Family Synodontidae

Synodus sp.

Order Beryciformes

Family Holocentridae

Myripristis berndti (Jordan & Evermann, 1903)

Myripristis violacea Bleeker, 1851

Neoniphon opercularis (Valenciennes, 1831)

Neoniphon sammara (Forsskal, 1775)

Sargocentron caudimaculatum (Ruppell, 1838)

Sargocentron diadema (Lacepede, 1801)

Sargocentron microstoma (Gunther, 1859)

Sargocentron spiniferum (Forsskal, 1775)

Sargocentron tiere (Cuvier, 1829)

Order Syngnathiformes

Family Aulostomidae

Aulostomus chinensis (Linnaeus, 1758)

Family Fistulariidae

Fistularia commersonii Ruppell, 1838

Order Perciformes

Family Serranidae

Subfamily Anthiinae

Pseudanthias pascalus (Jordan & Tanaka, 1927)

Subfamily Epinephelinae

- Aethaloperca rogae* (Forsskal, 1775)
- Anyperodon leucogrammicus* (Valenciennes, 1828)
- Cephalopholis argus* (Bloch & Schneider, 1801)
- Cephalopholis leopardus* (Lacepede, 1801)
- Cephalopholis urodeta* Bloch & Schneider, 1801
- Epinephelus hexagonatus* (Bloch & Schneider, 1801)
- Epinephelus howlandi* (Gunther, 1873)
- Epinephelus merra* Bloch, 1793
- Epinephelus tauvina* (Forsskal, 1775)
- Gracila albomarginata* (Fowler & Bean, 1930)
- Plectropomus leopardus* (Lacepede, 1802)
- Variola louti* (Forsskal, 1775)

Subfamily Grammistinae

- Belonoperca chabanaudi* Fowler & Bean, 1930

Family Apogonidae

- Cheilodipterus macrodon* (Lacepede, 1802)

Family Malacanthidae

- Malacanthus latovittatus* (Lacepede, 1801)

Family Carangidae

- Caranx melampygus* Cuvier, 1833
- Scomberoides lysan* (Forsskal, 1775)
- Trachinotis bailloni* (Lacepede, 1801)

Family Coryphaenidae

- Coryphaena hippurus* Linnaeus, 1758

Family Lutjanidae

- Aphareus furca* (Lacepede, 1802)
- Aprion virescens* Valenciennes, 1830
- Lutjanus bohar* (Forsskal, 1775)
- Lutjanus fulvus* (Bloch & Schneider, 1801)
- Lutjanus gibbus* (Forsskal, 1775)
- Lutjanus kasmira* (Forsskal, 1775)
- Lutjanus monostigma* (Cuvier, 1828)
- Macolor macularis* Fowler, 1931
- Macolor niger* (Forsskal, 1775)

Family Caesionidae

- Caesio caerulaurea* Lacepede, 1801
- Caesio cuning* (Bloch, 1791)
- Caesio teres* Seale, 1906
- Pterocaesio marri* Schultz, 1953
- Pterocaesio tile* (Cuvier, 1830)
- Pterocaesio trilineata* Carpenter, 1987

Family Haemulidae

Plectorhinchus orientalis (Bloch, 1793)

Family Lethrinidae

Gnathodentex aurolineatus (Lacepede, 1802)

Lethrinus harak (Forsskal, 1775)

Monotaxis grandoculis (Forsskal, 1775)

Family Mullidae

Mulloides flavolineatus (Lacepede, 1801)

Mulloides vanicolensis (Valenciennes, 1831)

Parupeneus barberinus (Lacepede, 1801)

Parupeneus bifasciatus (Lacepede, 1801)

Parupeneus cyclostomus (Lacepede, 1801)

Parupeneus multifasciatus (Quoy & Gaimard, 1825)

Parupeneus pleurostigma (Bennett, 1830)

Family Pempheridae

Pempheris oualensis Cuvier, 1831

Family Kyphosidae

Kyphosus cinerascens (Forsskal, 1775)

Kyphosus vaigiensis (Quoy & Gaimard, 1825)

Family Chaetodontidae

Chaetodon auriga Forsskal, 1775

Chaetodon bennetti Cuvier, 1831

Chaetodon citrinellus Cuvier, 1831

Chaetodon ephippium Cuvier, 1831

Chaetodon lunula (Lacepede, 1803)

Chaetodon melannotus Bloch & Schneider, 1801

Chaetodon ornatissimus Cuvier, 1831

Chaetodon pelewensis Kner, 1868

Chaetodon quadrimaculatus Gray, 1833

Chaetodon rafflesi Bennett, 1830

Chaetodon reticulatus Cuvier, 1831

Chaetodon semeion Bleeker, 1855

Chaetodon speculum Cuvier, 1831

Chaetodon trifascialis Quoy & Gaimard, 1824

Chaetodon trifasciatus Park, 1797

Chaetodon ulietensis Cuvier, 1831

Chaetodon unimaculatus Bloch, 1787

Chaetodon vagabundus Linnaeus, 1758

Forcipiger flavissimus Jordan & McGregor, 1898

Forcipiger longirostris (Broussonet, 1782)

Hemitaurichthys polylepis (Bleeker, 1857)

Heniochus chrysostomus Cuvier, 1831

Heniochus monoceros Cuvier, 1831

Heniochus varius (Cuvier, 1829)

Family Pomacanthidae

Apolemichthys trimaculatus (Lacepede, 1831)
Centropyge bicolor (Bloch, 1787)
Centropyge bispinosus (Gunther, 1860)
Centropyge flavissimus (Cuvier, 1831)
Centropyge loriculus (Gunther, 1874)
Pomacanthus imperator (Bloch, 1787)
Pygoplites diacanthus (Boddaert, 1772)

Family Pomacentridae

Abudefduf septemfasciatus (Cuvier, 1830)
Abudefduf sexfasciatus (Lacepede, 1802)
Abudefduf vaigiensis (Quoy & Gaimard, 1825)
Amphiprion chrysopterus Cuvier, 1830
Amphiprion melanopus Bleeker, 1852
Chromis acares Randall & Swerdloff, 1973
Chromis agilis Smith, 1960
Chromis alpha Randall, 1988
Chromis amboinensis (Bleeker, 1873)
Chromis atripectoralis Welander & Schultz, 1951
Chromis iomelas Jordan & Seale, 1906
Chromis margaritifer Fowler, 1946
Chromis vanderbilti (Fowler, 1941)
Chromis weberi Fowler & Bean, 1928
Chromis xanthura (Bleeker, 1854)
Chrysiptera cyanea (Quoy & Gaimard, 1824)
Chrysiptera glauca (Cuvier, 1830)
Chrysiptera leucopoma (Lesson, 1830)
Dascyllus reticulatus (Richardson, 1846)
Dascyllus trimaculatus (Ruppell, 1828)
Lepidozygus tapeinosoma (Bleeker, 1856)
Neopomacentrus metallicus (Jordan and Seale, 1906)
Plectroglyphidodon dickii (Lienard, 1839)
Plectroglyphidodon johnstonianus Fowler & Ball, 1924
Plectroglyphidodon lacrymatus (Quoy & Gaimard, 1824) *Plectroglyphidodon*
leucozonus (Bleeker, 1859)
Plectroglyphidodon phoenixensis (Schultz, 1943)
Pomacentrus brachialis (Cuvier, 1830)
Pomacentrus coelestis Jordan & Starks, 1901
Pomacentrus vaiuli Jordan & Seale, 1906
Pomachromis richardsoni (Synder, 1909)
Pristotis jerdoni (Day, 1873)
Stegastes albifasciatus (Schlegel & Muller, 1839-44)
Stegastes fasciolatus (Ogilby, 1889)
Stegastes nigricans (Lacepede, 1802)

Family Cirrhitidae

Cirrhitus pinnulatus (Schneider, 1801)
Paracirrhites arcatus (Cuvier, 1829)
Paracirrhites forsteri (Schneider, 1801)
Paracirrhites hemistictus (Gunther, 1874)

Family Sphyraenidae

Sphyraena barracuda (Walbaum, 1792)

Family Labridae

Anampses caeruleopunctatus Ruppell, 1829

Anampses meleagrides Valenciennes, 1840

Anampses twistii Bleeker, 1856

Bodianus axillaris (Bennett, 1831)

Bodianus loxozonus (Synder, 1908)

Cheilinus chlorourus (Bloch, 1791)

Cheilinus digrammus (Lacepede, 1801)

Chelinus fasciatus (Bloch, 1791)

Cheilinus oxycephalus Bleeker, 1853

Cheilinus trilobatus Lacepede, 1801

Cheilinus undulatus Ruppell, 1835

Cheilinus unifasciatus Streets, 1877

Cirrhilabrus sp.

Coris aygula Lacepede, 1801

Coris gaimard (Quoy & Gaimard, 1824)

Epibulus insidiator (Pallas, 1770)

Gomphosus varius Lacepede, 1801

Halichoeres biocellatus Schultz, 1960

Halichoeres hortulanus (Lacepede, 1801)

Halichoeres margaritaceus (Valenciennes, 1839)

Halichoeres marginatus Ruppell, 1835

Halichoeres melanurus (Bleeker, 1851)

Halichoeres ornatissimus (Garrett, 1863)

Hemigymnus fasciatus (Bloch, 1792)

Hemigymnus melapterus (Bloch, 1791)

Hologymnosus doliatus (Lacepede, 1801)

Labrichthys unilineatus (Guichenot, 1847)

Labroides bicolor Fowler & Bean, 1928

Labroides dimidiatus (Valenciennes, 1839)

Labroides rubrolabiatus Randall, 1955

Labropsis australis Randall, 1981

Labropsis xanthonota Randall, 1981

Macropharyngodon meleagris (Valenciennes, 1839)

Novaculichthys taeniourus (Lacepede, 1801)

Pseudocheilinus evanidus Jordan & Evermann, 1903

Pseudocheilinus hexataenia (Bleeker, 1857)

Pseudocheilinus octotaenia Jenkins, 1900

Pseudodax moluccanus (Valenciennes, 1839)

Stethojulis bandanensis (Bleeker, 1851)

Stethojulis trilineata (Bloch & Schneider, 1801)

Thalassoma amblycephalum (Bleeker, 1856)

Thalassoma hardwicke (Bennett, 1828)

Thalassoma lutescens (Lay & Bennett, 1839)

Thalassoma purpureum (Forsskal, 1775)

Thalassoma quinquevittatum (Lay & Bennett, 1839)

Thalassoma trilobatum (Lacepede, 1801)

Family Scaridae

- Bolbometopon muricatum* (Valenciennes, 1840)
- Calatomus carolinus* (Valenciennes, 1840)
- Cetoscarus bicolor* (Ruppell, 1829)
- Hipposcarus longiceps* (Valenciennes, 1840)
- Scarus altipinnus* (Steindachner, 1879)
- Scarus dimidiatus* Bleeker, 1859
- Scarus forsteni* (Bleeker, 1861)
- Scarus frenatus* Lacepede, 1802
- Scarus frontalis* Valenciennes, 1840
- Scarus ghobban* Forsskal, 1775
- Scarus globiceps* Valenciennes, 1840
- Scarus microrhinos* Bleeker, 1854
- Scarus niger* Forsskal, 1775
- Scarus oviceps* Valenciennes, 1840
- Scarus psittacus* Forsskal, 1775
- Scarus pyrrhurus* (Jordan & Seale, 1906)
- Scarus rubroviolaceus* Bleeker, 1847
- Scarus schlegeli* (Bleeker, 1861)
- Scarus sordidus* Forsskal, 1775
- Scarus spinus* Kner, 1868
- Scarus tricolor* Randall & Choat, 1980

Family Pinguipedidae

- Parapercis clathrata* Ogilby, 1911
- Parapercis millipunctata* (Gunther, 1860)

Family Blennidae

Tribe Nemophini

- Aspidontus taeniatus* Quoy & Gaimard, 1834
- Meiacanthus atrodorsalis* (Gunther, 1877)

Tribe Salarinii

- Cirripectes polyzona* (Bleeker, 1868)
- Cirripectes stigmaticus* Strasburg & Schultz, 1953
- Cirripectes variolosus* (Valenciennes, 1836)
- Ecsenius bicolor* (Day, 1888)

Family Gobiidae

- Valenciennea strigata* (Brousonet, 1782)

Family Microdesmidae

Subfamily Ptereleotrinae

- Nemateleotris magnifica* Fowler, 1928
- Ptereleotris evides* (Jordan & Hubbs, 1925)
- Ptereleotris heteroptera* (Bleeker, 1855)

Family Acanthuridae

Subfamily Acanthurinae

- Acanthurus achilles* Shaw, 1803
- Acanthurus albipectoralis* Allen & Ayling, 1987
- Acanthurus blochii* Valenciennes, 1835

Acanthurus guttatus Forster, 1801
Acanthurus lineatus (Linnaeus, 1758)
Acanthurus maculiceps (Ahl, 1923)
Acanthurus mata Cuvier, 1829
Acanthurus nigricans (Linnaeus, 1758)
Acanthurus nigricauda Duncker & Mohr, 1929
Acanthurus nigrofuscus (Forsskal, 1775)
Acanthurus nigroris Valenciennes, 1835
Acanthurus olivaceus Bloch & Schneider, 1801
Acanthurus pyroferus Kittlitz, 1834
Acanthurus thompsoni (Fowler, 1923)
Acanthurus triostegus (Linnaeus, 1758)
Acanthurus xanthopterus Valenciennes, 1835
Ctenochaetus binotatus Randall, 1955
Ctenochaetus striatus (Quoy & Gaimard, 1825)
Ctenochaetus strigosus (Bennett, 1828)
Zebrasoma scopas (Cuvier, 1829)
Zebrasoma veliferum (Bloch, 1797)

Subfamily Nasinae

Naso annulatus (Quoy & Gaimard, 1825)
Naso brevirostris (Valenciennes, 1835)
Naso lituratus Forster, 1801
Naso tuberosus Lacepede, 1802
Naso unicornis (Forsskal, 1775)

Family Zanclidae

Zanclus cornutus (Linnaeus, 1758)

Family Siganidae

Siganus argenteus (Quoy & Gaimard, 1825)
Siganus punctatus (Forster, 1801)
Siganus spinus (Linnaeus, 1758)

Family Scombridae

Gymnosarda unicolor (Rüppell, 1838)

Order Tetraodontiformes

Family Balistidae

Balistapus undulatus (Park, 1797)
Balistoides conspicillum (Bloch & Schneider, 1801)
Balistoides viridescens (Bloch & Schneider, 1801)
Melichthys niger (Bloch, 1786)
Melichthys vidua (Solander, 1844)
Pseudobalistes flavimarginatus (Rüppell, 1829)
Rhinecanthus rectangulus (Bloch & Schneider, 1801)
Sufflamen bursa (Bloch & Schneider, 1801)

Family Monacanthidae

Aluterus scriptus (Osbeck, 1765)
Amanses scopas Cuvier, 1829
Cantherhines dumerilii (Hollard, 1854)
Cantherhines pardalis (Rüppell, 1837)
Oxymonacanthus longirostris (Bloch & Schneider, 1801)
Pervagor melanocephalus (Bleeker, 1853)

Family Ostraciidae

Ostracion cubicus Linnaeus, 1758

Ostracion meleagris Shaw, 1796

Family Tetraodontidae

Subfamily Tetraodontinae

Arothron meleagris Lacepède, 1802

Arothron nigropunctatus (Bloch & Schneider, 1801)

Subfamily Canthigasterinae

Canthigaster amboinensis (Bleeker, 1865)

Canthigaster solandri (Richardson, 1844)