Survey Report Draft[1]

Ha'apai
Date: 13, 15 and 16 Aug 2002
Participants: Asipeli, Peter, Dee and Seiji
(Ministry of Fisheries @ Ha'apai: Sione Mailau, Taliauli Napa'a)
Prepared by: Seiji Nakaya

1. Objectives

(1) There are no data available on coral reef ecology of the Ha'apai group. We conducted a survey to obtain baseline information on the coral reefs of the Ha'apai area. We visited two of the 3 reefs that were once proposed by Ha'apai Environment Conservation Committee to be MPAs based on suggestions from the Ministry of Fisheries[2],[3].

(2) There are few, if any, people who are capable of conducting scientific survey on coral reefs in Ha'apai. One of the objectives of the survey was to transfer basic skill of coral reef survey and monitoring to the staff of the Ministry of Fisheries as well as to a DoE-affiliated Peace Corps member based in Ha'apai.

(3) Start obtaining information for evaluating the accuracy of the data collected by the spot check method and for standardization of this method.

2. Methods

Spot check method was used to survey Mu'i kuku (August 13), Kito/Kito si'i (August 15) and Lua hoko (August 16). Reef Check method was used at Kito si'i Reef on August 15, where two staff members of the Ministry of Fisheries participated.

For obtaining information for standardizing spot check method, the spot check data were compared with other data set collected by using a different method. That was:

a) A 50m tape measure was laid at the depth contours of 10m and 3m, and
b) a series of underwater digital photographs of the reef surface were taken along

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[1] The trip consisted of underwater surveys, meeting of Ha'apai Conservation Committee, and visits of sites for environmental issues. This report draft covers only underwater surveys.

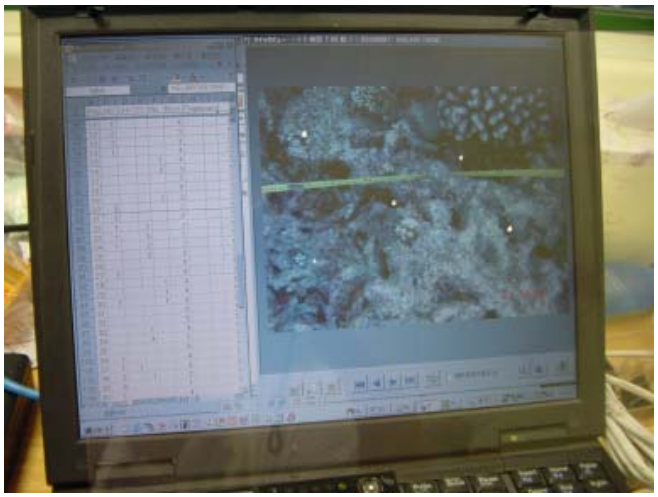
[2] We have yet to obtain documents for this proposal.

[3] This survey was not more than a preliminary reconnaissance survey. We have learned, from our experiences of the management of MPAs established in the Nuku'alofa area in 1979, that establishing new MPAs requires a long process of baseline biological/physical and socio-economic studies and that public participation for decision making for the MPAs is critical to expect the support of users and the community.

entire length of the line (50m).

The coverage of types of substratum such as live hard corals and of soft corals was calculated by the following procedures similar to the video transect method (English 1997):

1) Attach a piece of transparent sheet with randomly placed 5 dots to a PC monitor;
2) Display underwater photos one by one on the monitor;
3) Record the number of dots that are on each category of substratum such as live hard corals, soft corals, rocks, etc. for each photo;
4) A series of photos along the 50m line was divided into 4 parts, for each of which the coverage in per cent was calculated[4];
5) Obtain average and standard error for each data sets (10m and 3m).



3. Results and discussions

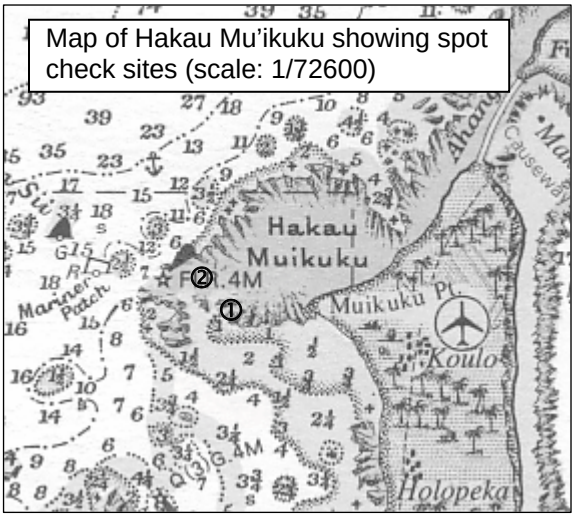
(1) Spot check

Mu'i kuku Reef on the western coast of Lifuka Island near its northern tip showed low coverage of live hard corals (<15%) consisting of high variety of colony types as well as a moderate coverage of soft corals (<10%) (Appendix 1). The low coral coverage was observed with no obvious threats such as sedimentation, recorded outbreaks of Crown-of-thorns starfish or bleaching.

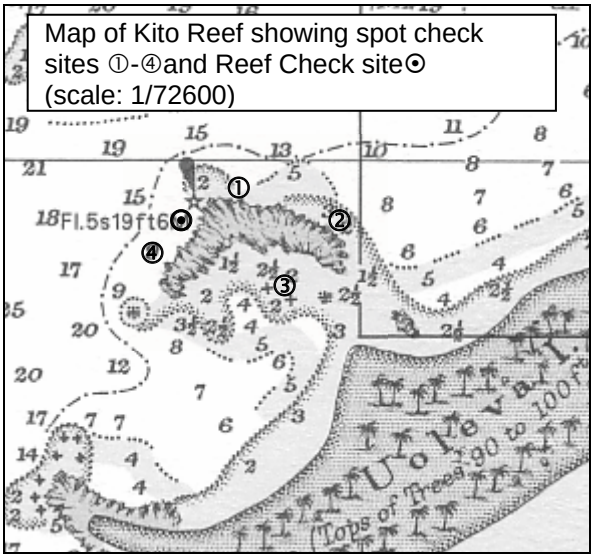
Kito and Kito si'i Reefs also showed low percentage of corals (at most 7.5%) with a variety of coral types. At some sites of Kito some large colonies of massive *Porites* were observed. An isolated island of Lua hoko also showed low coverage of corals (<5%) on

[4] The line was divided into 4 parts to obtain variance for comparison, even though this method is not statistically convincing due to interdependency of data among these parts. Ideally, multiple numbers of shorter tapes should be placed randomly on the reef.

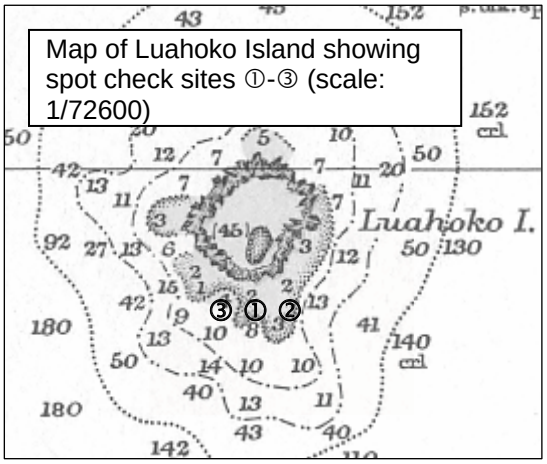
its southern reefs (this was the only part of the reefs surrounding the island that we were able to access due to rough seas).



Map of Hakau Mu'ikuku showing spot check sites (scale: 1/72600)



Map of Kito Reef showing spot check sites ①-④and Reef Check site⊙ (scale: 1/72600)



Map of Luahoko Island showing spot check sites ①-③ (scale: 1/72600)

It was found that the variation among observers within site was large. Therefore, it is necessary to standardize data by using objectively collected data.

(2) Reef Check

For the Reef Check survey, we selected a part of the reef on Kito si'i where hard-bottom slope continues to more than 10m deep. Live hard coral cover was 19% ± 0.7SE and 16% ± 0.3SE, and soft coral 24%±1.2SE and 31% ± 1.0SE, at 10m deep and 3m deep, respectively.

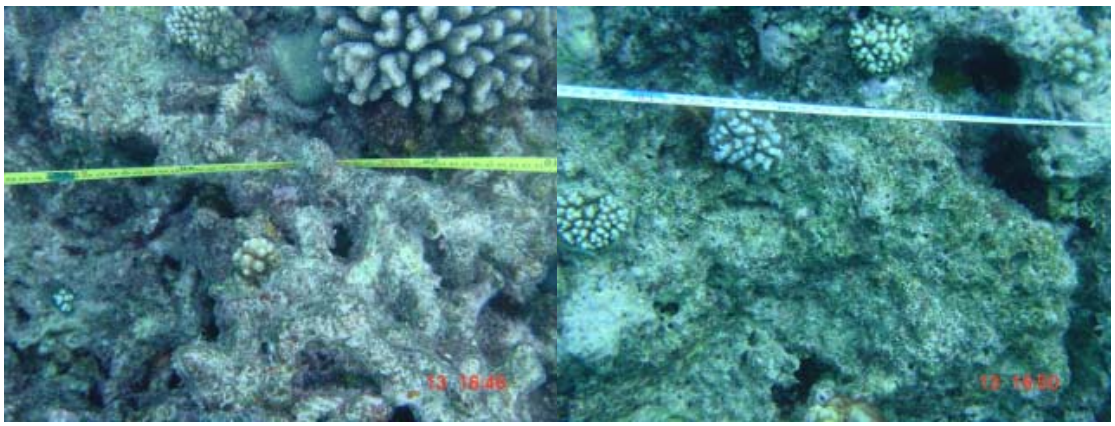
Few fish were recorded during the survey except butterflyfish. The record spreadsheets are attached in Appendix 2.

Understanding situations including that there are not available data on ecology of Ha'apai coral reefs, that there is no staff of DoE in Ha'apai, and that there are few, if any, personnel capable to conduct reef surveys, it is essential for DoE to collaborate with staffs from the Ministry of Fisheries, experts of AusAID who are undertaking a community-based management project in Ha'apai and DoE DoE affiliated US Peace Corps members.

(3) Digital photos

On Mu'i kuku Reef at the depth contours of 3 and 10m, the coverage of live hard corals, dead hard corals, soft corals, rubble, rock, fleshy algae and sand were calculated as below. It is noticed that coral cover at 10m deep contour was comparatively high (28% ±7.1SE).

Sample of underwater photos for calculation of coral coverage



Data obtained by using underwater photos.

Depth		Live hard corals	Dead hard corals	Soft corals	Rubble	Rock	Fleshy algae	sand
10m	Mean%	27.5	0.7	14.6	0.0	56.4	0.0	0.7
	SE	7.1	0.7	2.5	0.0	8.5	0.0	0.7
3m	Mean%	10.0	0.3	4.3	10.3	75.3	0.0	0.0
	SE	3.1	0.3	3.9	2.7	5.1	0.0	0.0

Data obtained by using spot check method.

Diver	Depth m	Live hard corals%	Dead hard corals %	Soft corals%	sand
A	3-3	7.5 (range 5-10)	10	7.5	20
B	2-5	15	10	1(<5)	0

The results of photo analysis were compared with the data from Spot Check at the same site. As the divers conducting spot check use only snorkel, the reef deeper than some 5m may be uncertain, depending on the visibility. Therefore, the data only from 3m contour was compared. The coverage of live hard corals measured by digital photo method and by spot check method were 10%±3.1SE and 7.5 - 15%, respectively.

As noticed during the spot check surveys, the variation within treatment was too high to make a statistically meaningful comparison of data among different sites or different times. It is necessary to reduce variation within the data sets. For this, it may be useful to consider stratification for sampling, reducing the number of parameters to be measured and increase replicates. The variation of data may also affected by skill and experience of surveyors and by reef conditions such as coral cover and topography. Use of underwater video may also be useful to make underwater time short, to reduce effort in the field and therefore to increase the number of replicates.

Appendix 1. Results of Spot Check surveys in Ha'apai between August 13 and 16, 2002.

Site name	No.	Diver	Date	Time	LHC %	DHC %	Soft C%	Dominant coral type	COT No.	Type of substratum with no corals	%	Sediment (0-4)	Largest plate Acropora cm diameter	Depth m	Remarks	South	West
Mu'i kuku	1	Asipeli	02/08/13	1700	7.5	10	7.5	5	0	sand	20	0		3-3		19°46'13.7"	174°21'24.2"
Mu'i kuku	1	Asipeli	02/08/13	1700	13	10	10	5	0		0	0		5-5		19°46'13.7"	174°21'24.2"
Mu'i kuku	1	Peter	02/08/13	1700	15	10	1	5	0		0	0	60	2-5		19°46'13.7"	174°21'24.2"
Mu'i kuku	2	Asipeli	02/08/13	1745	7.5	10	15	5	0		0	0	15	3-5		19°45'58.7"	174°21'07.9"
Mu'i kuku	2	Seiji	02/08/13	1745	5	1	5	5	0		0	0		2-3		19°45'58.7"	174°21'07.9"
Kito	1	Asipeli	02/08/15	945	1	5	5	5	0		0	0		5		19°50'04.4"	174°25'03.6"
Kito	1	Seiji	02/08/15	945	1	1	5	5	0		0	0	20	0.5-4		19°50'04.4"	174°25'03.6"
Kito	1	Dee	02/08/15	945	1	1	1	2	0	sand	10	0		4-6		19°50'04.4"	174°25'03.6"
Kito	2	Asipeli	02/08/15	1015	7.5	1	5	4	0		0	0		5-5	massive Porites	19°50'10.5"	174°24'46.2"
Kito	2	Seiji	02/08/15	1015	5	1	1	5	0	sand	10	0	20	5-6	massive Porites(>5m	19°50'10.5"	174°24'46.2"
Kito	2	Dee	02/08/15	1015	5	1	5	5	0	sand	10	0	15	4- 6		19°50'10.5"	174°24'46.2"
Kito	2	Dee	02/08/15	1015	1	5	1	5	0	sand	50	0	10	1- 3		19°50'10.5"	174°24'46.2"
Kito	3	Asipeli	02/08/15	1050	1	5	1	5	0	sand, rubble	40	0	10	2-2		19°50'23.3"	174°24'43.7"
Kito	3	Seiji	02/08/15	1050	1	1	1	5	0	sand, rubble	30	0	15	1-2		19°50'23.3"	174°24'43.7"
Kito	3	Dee	02/08/15	1050	1	1	1	5	0	rubble	15	0	15	4-6		19°50'23.3"	174°24'43.7"
Kito	4	Seiji	02/08/15	1145	1	1	1	5	0			0	20	5-6		19°50'27.5"	174°25'19.2"
Lua hoko	1	Seiji	02/08/16	1545	1	1	1	5	0	sand	30	0	20	1-3		19°40'26.2	174°23'39.4"
Lua hoko	1	Peter	02/08/16	1545	1	1	1	5	0	sand	30	0	20	1-3		19°40'26.2	174°23'39.4"
Lua hoko	1	Dee	02/08/16	1545	1	1	1	5	0	samd	5	0		1-5		19°40'26.2	174°23'39.4"
Lua hoko	2	Seiji	02/08/16	1605	5	1	1	5	0	sand, rubble	15	0	60	2-5	many Zoanthidae		
Lua hoko	2	Dee	02/08/16	1605	1	5	2	5	0	sand	5	0	20	1-5			
Lua hoko	3	Seiji	02/08/16	1640	1	1	1	5	0	sand	10	0	30	1-3			
Lua hoko	3	Peter	02/08/16	1640	5	1	1	5	0	sand	10	0	20	3-5			
Lua hoko	3	Dee	02/08/16	1640	1	1	1	5	0	sand	10	0	15	1-5			

Photo: 20020813Haapai, 20020815Haapai and 20020816Haapai

Appendix 2.

Spread sheets for the results of Reef Check in Kito si'i Reef on 15 August 2002

Site name	Kito si'i (near Uoleva Island of Ha'apai Group)			
Date	15-Aug-02			
Time of day that work started	1300			
Time of day that work ended	1730			
Longitude of transect start point	19,50'16.2"S			
Latitude of transect start point	174,25'16.9"W			
From chart or by GPS? (If GPS, indicate units)	chart_____	GPS__X WGS84		
Orientation of transect	N-S___	NE-SW X	E-W___	SE-NW___
Distance from shore	1300 m			
Distance from nearest river	180 km (No river exists in this island group; a stream exists on a			
River mouth width	<10m_X	11-50m__	51-100m__	101-500m__
Weather	sunny_X	cloudy__X	raining__X	
Air temperature	23 degrees C			
Water temperature at surface	23_ degrees C			
Water temperature at 3 m	23_ degrees C			
Water temperature at 10 m	? degrees C	not able to measure		
Distance to nearest population centre	7 km			
Approximate population size	3x1000 people			
Horizontal visibility in water	25 m			
Why was this site selected?				
Is this site -	sheltered_X	exposed_____		
Any major coral damaging storms in past years?	yes_____	no_____	unknown_X	
How do you rate this site overall in terms of anthropogenic impact?	none____	low____	moderate_X	heavy____
What types of impacts do you believe occur?	linefishing, spearfishing, shell collection			
Dynamite fishing	none_X	low____	moderate____	heavy____
Poison fishing	none_X	low____	moderate____	heavy____
Aquarium fish collection	none_X	low____	moderate____	heavy____
Harvest of invertebrates for food	none____	low____	moderate_X	heavy____
Harvest of invertebrates for curio sales	none____	low_x	moderate____	heavy____
Tourist diving	none____	low_x	moderate____	heavy____
Sewage pollution	none_X	low____	moderate____	heavy____
Industrial pollution	none_X	low____	moderate____	heavy____
Other forms of fishing? (Specify)	none____	low____	moderate_x	heavy____
Other impacts? (Specify)	none____	low____	moderate____	heavy____
Is there any form of protection (statutory or other) at this site?	yes_____	no_x(once the fishery agency proposed this		
If yes, what type of protection?				
Other comments				
Submitted by (enter TL/TS and your name)	TL: 'Asipeli Palaki; TS: Seiji Nakaya (submitted by S. Nakaya)			

Site name:		Kito si'i													
Depth:		10m				Date:	#####								
Team Leader:		Asipeli Palaki				Data recorded by:				Asipeli Palaki					
Time:		1600													
Substrate Code															
HC hard coral				**SC** soft coral				**RKC** recently killed coral							
FS fleshy seaweed				**SP** sponge				**RC** rock							
RB rubble				**SD** sand				**SI** silt/clay							
OT other															
(For first segment, if start point is 0 m, last point is 19.5 m)															

SEGMENT 1				**SEGMENT 2**				**SEGMENT 3**				**SEGMENT 4**			
0 - 19.5 m				**25 - 44.5 m**				**50 - 69.5 m**				**75 - 94.5 m**			
1	RC	21	sc	41	sc	61	rc	81	rc	101	RC	121	sc	141	rc
2	FS	22	sc	42	rc	62	rc	82	rc	102	RC	122	rc	142	rc
3	SD	23	sc	43	rc	63	rc	83	rc	103	RC	123	fs	143	rc
4	RB	24	rc	44	sd	64	rc	84	rc	104	fs	124	rc	144	rc
5	RB	25	rc	45	sc	65	hc	85	sc	105	fs	125	rc	145	hc
6	SC	26	rc	46	hc	66	hc	86	hc	106	fs	126	hc	146	sc
7	HC	27	hc	47	rc	67	sc	87	hc	107	sc	127	rc	147	rc
8	SC	28	rb	48	sd	68	rc	88	rc	108	RC	128	hc	148	sc
9	HC	29	sc	49	rc	69	rc	89	rc	109	RC	129	hc	149	sc
10	SC	30	sc	50	sc	70	rc	90	rc	110	RC	130	hc	150	hc
11	SC	31	hc	51	sc	71	rc	91	hc	111	RC	131	rc	151	sc
12	RB	32	rc	52	rb	72	hc	92	rc	112	sc	132	rc	152	rc
13	HC	33	hc	53	rc	73	hc	93	rc	113	sc	133	rc	153	rc
14	rb	34	sc	54	rc	74	fs	94	hc	114	sc	134	rc	154	rc
15	hc	35	sc	55	rb	75	fs	95	sc	115	RC	135	hc	155	rc
16	hc	36	rc	56	rc	76	sc	96	sc	116	RC	136	hc	156	sc
17	sc	37	rc	57	hc	77	rc	97	sc	117	RC	137	sc	157	sc
18	rb	38	sd	58	sc	78	rc	98	hc	118	hc	138	sc	158	hc
19	rc	39	fs	59	sc	79	rc	99	rc	119	hc	139	rc	159	rb
20	sc	40	rb	60	rc	80	rc	100	rc	120	RC	140	sd	160	sc

DO NOT TYPE DATA BELOW THIS LINE

Total S1		**Total S2**		**Total S3**		**Total S4**		**Grand total**			**Mean**		**SD**	
HC	8	HC	6	HC	7	HC	9	HC	30		HC	7.5	HC	1.3
SC	13	SC	8	SC	8	SC	10	SC	39		SC	9.8	SC	2.4
RKC	0	RKC	0	RKC	0	RKC	0	RKC	0		RKC	0	RKC	0
FS	2	FS	2	FS	3	FS	1	FS	8		FS	2	FS	0.8
SP	0	SP	0	SP	0	SP	0	SP	0		SP	0	SP	0
RC	8	RC	20	RC	22	RC	18	RC	68		RC	17	RC	6.2
RB	7	RB	2	RB	0	RB	1	RB	10		RB	2.5	RB	3.1
SD	2	SD	2	SD	0	SD	1	SD	5		SD	1.3	SD	1
SI	0	SI	0	SI	0	SI	0	SI	0		SI	0	SI	0
OT	0	OT	0	OT	0	OT	0	OT	0		OT	0	OT	0
#	40	#	40	#	40	#	40					40		

Comments:

Site name:		Kito si'i													
Depth:		3m				Date:	#####								
Team Leader:		Asipeli Palaki				Data recorded by:				Taliauli Napa'a					
Time:		1700													
Substrate Code															
HC hard coral				**SC** soft coral						**RKC** recently killed coral					
FS fleshy seaweed				**SP** sponge						**RC** rock					
RB rubble				**SD** sand						**SI** silt/clay					
OT other															
(For first segment, if start point is 0 m, last point is 19.5 m)															

SEGMENT 1				**SEGMENT 2**				**SEGMENT 3**				**SEGMENT 4**			
0 - 19.5 m				**25 - 44.5 m**				**50 - 69.5 m**				**75 - 94.5 m**			
1	rc	21	sc	41	rc	61	rc	81	hc	101	sc	121	sc	141	sc
2	hc	22	hc	42	rc	62	rc	82	rc	102	sc	122	sc	142	hc
3	rc	23	rc	43	rc	63	rc	83	rc	103	sc	123	rc	143	hc
4	sc	24	sc	44	sc	64	rc	84	rc	104	RC	124	rc	144	hc
5	sc	25	rc	45	sc	65	rc	85	rc	105	hc	125	rc	145	rc
6	sc	26	rc	46	sc	66	hc	86	rc	106	rc	126	hc	146	hc
7	hc	27	rc	47	rc	67	rc	87	rc	107	sc	127	rc	147	sp
8	rc	28	sc	48	hc	68	sp	88	hc	108	sc	128	sc	148	rc
9	sc	29	rc	49	rc	69	sd	89	hc	109	sc	129	sc	149	rc
10	rc	30	sc	50	rc	70	sd	90	hc	110	sc	130	rc	150	hc
11	rc	31	rc	51	rc	71	rc	91	rkc	111	rc	131	sc	151	sp
12	rc	32	sc	52	sc	72	hc	92	sc	112	rc	132	sc	152	rc
13	sc	33	rc	53	rc	73	sc	93	sc	113	rc	133	sc	153	rc
14	hc	34	sc	54	sc	74	sc	94	sc	114	rc	134	sc	154	sp
15	sc	35	rc	55	hc	75	sc	95	rc	115	rc	135	hc	155	sc
16	rc	36	sc	56	hc	76	rc	96	sc	116	sc	136	rc	156	rb
17	sc	37	hc	57	rkc	77	hc	97	sd	117	rc	137	rc	157	rb
18	rc	38	rc	58	sc	78	sc	98	sd	118	rc	138	rc	158	rb
19	sc	39	hc	59	sc	79	rc	99	sd	119	rc	139	rc	159	rb
20	hc	40	rc	60	sc	80	rc	100	rc	120	hc	140	rc	160	rb

DO NOT TYPE DATA BELOW THIS LINE

Total S1		**Total S2**		**Total S3**		**Total S4**		**Grand total**		**Mean**		**SD**	
HC	7	HC	6	HC	6	HC	7	HC	26	HC	6.5	HC	0.6
SC	15	SC	12	SC	12	SC	10	SC	49	SC	12	SC	2.1
RKC	0	RKC	1	RKC	1	RKC	0	RKC	2	RKC	0.5	RKC	0.6
FS	0	FS	0	FS	0	FS	0	FS	0	FS	0	FS	0
SP	0	SP	1	SP	0	SP	3	SP	4	SP	1	SP	1.4
RC	18	RC	18	RC	18	RC	15	RC	69	RC	17	RC	1.5
RB	0	RB	0	RB	0	RB	5	RB	5	RB	1.3	RB	2.5
SD	0	SD	2	SD	3	SD	0	SD	5	SD	1.3	SD	1.5
SI	0	SI	0	SI	0	SI	0	SI	0	SI	0	SI	0
OT	0	OT	0	OT	0	OT	0	OT	0	OT	0	OT	0
#	40	#	40	#	40	#	40						

REEF CHECK 2001- Please fill in all Black outlined boxes							
Site Name:	Kito si'i						
Depth:	10m		Team Leader:		Asipeli Palaki		
Date:	#######		Time:		1400		
Red Sea Belt Transect : Fish							
Data recorded by:	Peter Cloutier						
	0-20m	**25-45m**	**50-70m**	**75-100m**	**Total**	**Mean**	**SD**
Butterfly fish	1	0	2	3	6	1.5	1.29
Sweetlips (Haemulidae)	0	0	0	0	0	0	0
Snapper (Lutjanidae)	0	0	1	1	2	0.5	0.58
Broomtail wrasse (Cheilinus lunulatus)	0	0	0	0	0	0	0
Grouper >30cm (Give sizes in comments)	0	0	0	0	0	0	0
Bumphead parrotfish (Bolbometopon muricatum)	0	0	0	0	0	0	0
Humphead wrasse (Cheilinus undulatus)	0	0	0	0	0	0	0
Any Parrotfish (>20cm)	0	0	2	1	3	0.75	0.96
Moray eel	0	0	0	0	0	0	0
Red Sea Belt Transect : Invertebrates							
Data recorded by:	Seiji Nakaya						
	0-20m	**25-45m**	**50-70m**	**75-100m**	**Total**	**Mean**	**SD**
Banded coral shrimp (Stenopus hispidus)	**0**	**0**	**0**	**0**	0	0	0
Diadema urchins	0	0	0	0	0	0	0
Pencil urchin (Heterocentrotus mammilatus)	0	0	0	0	0	0	0
Sea cucumber (edible only)	0	1	0	0	1	0.25	0.5
Crown-of-thorns star (Acanthaster)	0	0	0	0	0	0	0
Giant clam (Tridacna)	1	0	0	0	1	0.25	0.5
Triton shell (Charonia tritonis)	0	0	0	0	0	0	0
Lobster	0	0	0	0	0	0	0
For each segment, rate the following as: None=0, Low=1, Medium=2, High=3							
Coral damage : Anchor	0	0	0	0	0	0	0
Coral damage:Dynamite	0	0	0	0	0	0	0
Coral damage : Other	0	0	0	0	0	0	0
Trash : Fish nets	0	0	0	0	0	0	0
Trash : Other	0	0	0	0	0	0	0
Comments:							
Grouper sizes (cm):							
Bleaching (% of coral population):	0	0	0	0			
Belaching (% per colony):	0	0	0	0			
Suspected disease (type/%):							
Rare animals sighted (type/#):							
Other:							

REEF CHECK 2001- Please fill in all Black outlined boxes							
Site Name:	Kito si'i						
Depth:	3m		Team Leader:		Asipeli Palaki		
Date:	#######		Time:		1540		
Red Sea Belt Transect : Fish							
Data recorded by:	Seiji Nakaya						
	0-20m	**25-45m**	**50-70m**	**75-100m**	**Total**	**Mean**	**SD**
Butterfly fish	0	1	0	3	4	1	1.41
Sweetlips (Haemulidae)	0	0	0	0	0	0	0
Snapper (Lutjanidae)	0	0	0	0	0	0	0
Broomtail wrasse (Cheilinus lunulatus)	0	0	0	0	0	0	0
Grouper >30cm (Give sizes in comments)	0	0	0	0	0	0	0
Bumphead parrotfish (Bolbometopon muricatum)	0	0	0	0	0	0	0
Humphead wrasse (Cheilinus undulatus)	0	0	0	0	0	0	0
Any Parrotfish (>20cm)	0	1	0	0	1	0.25	0.5
Moray eel	0	0	0	0	0	0	0
Red Sea Belt Transect : Invertebrates							
Data recorded by:	Taliauli Napa'a						
	0-20m	**25-45m**	**50-70m**	**75-100m**	**Total**	**Mean**	**SD**
Banded coral shrimp (Stenopus hispidus)	**0**	**0**	**0**	**0**	0	0	0
Diadema urchins	0	0	0	0	0	0	0
Pencil urchin (Heterocentrotus mammilatus)	0	0	0	0	0	0	0
Sea cucumber (edible only)	0	2	1	1	4	1	0.82
Crown-of-thorns star (Acanthaster)	0	0	1	0	1	0.25	0.5
Giant clam (Tridacna)	1	1	0	1	3	0.75	0.5
Triton shell (Charonia tritonis)	0	0	0	0	0	0	0
Lobster	0	0	0	0	0	0	0
For each segment, rate the following as: None=0, Low=1, Medium=2, High=3							
Coral damage : Anchor	0	0	0	0	0	0	0
Coral damage:Dynamite	0	0	0	0	0	0	0
Coral damage : Other	0	0	0	0	0	0	0
Trash : Fish nets	0	0	0	0	0	0	0
Trash : Other	0	0	0	0	0	0	0
Comments:							
Grouper sizes (cm):							
Bleaching (% of coral population):	0	0	0	0			
Belaching (% per colony):	0	0	0	0			
Suspected disease (type/%):							
Rare animals sighted (type/#):							
Other:							