

Kanahena Bay, Maui

20° 37.049' N 156° 26.241' W

Management Status: Natural Area Reserve

Area Description: Upslope conservation land and agriculture (grazing). Residential development north of bay. Rugged basalt shoreline. Volcanic rock and boulder shallow habitat with patches of encrusting and lobate corals. Deeper reef characterized by aggregated coral heads and sand channels. Relatively low relief. Southern sheltered site. One of the more pristine of the CRAMP sites.



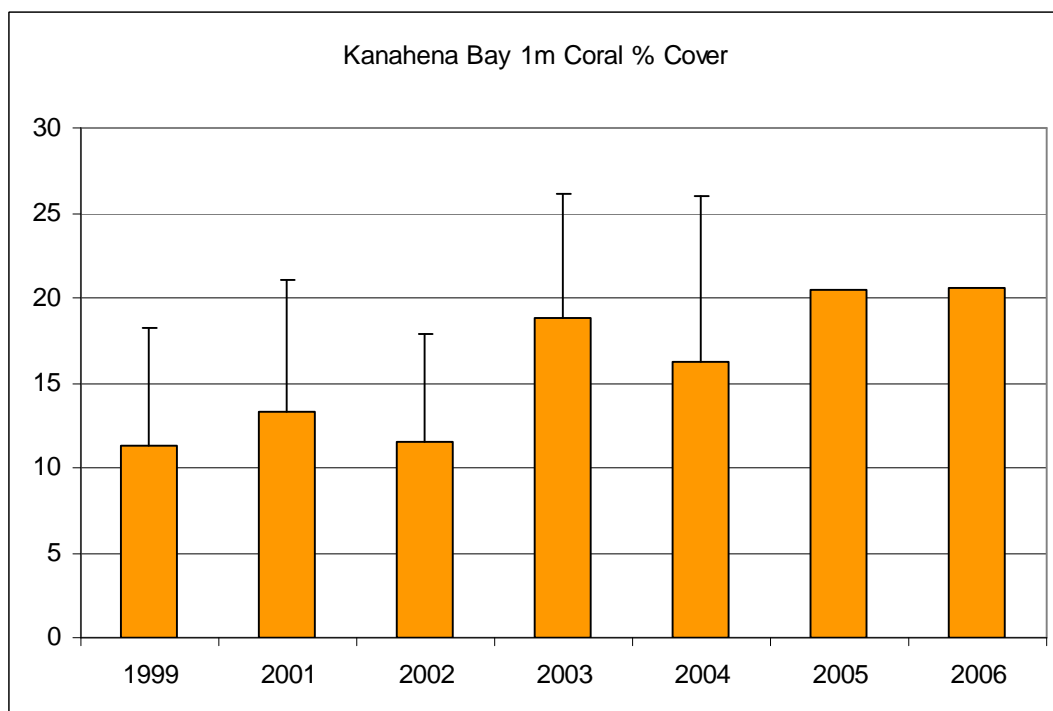
Benthic Habitat Data: 1 m

	Depth (m)	Rugosity	Sediment Composition (% wt.)		Sediment Grain Size (% wt.)			
			LOI	H ₂ CO ₃	Gravel	Coarse	Fine	Silt
Mean	1	1.30	2.77	89.46	14.31	70.81	12.95	1.93
S.D.		05	0.21	0.71	4.48	0.85	5.04	0.28

Video Transect data (1 m):

% Cover: Species	1999		2001		2002		2003		2004	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<i>Cyphastrea ocellina</i>	0	0	0	0	0	0	0	0	0	0
<i>Fungia scutaria</i>	0	0	0	0	0	0	0	0	0	0
<i>Leptastrea purpurea</i>	0	0	0	0	0	0	0	0	0	0
<i>Montipora flabellata</i>	0	0	0	0	0	0	0	0	0	0
<i>Montipora patula</i>	0.4	0.6	0.8	0.9	0.2	0.3	1.3	1.4	0.8	0.8
<i>Montipora studeri</i>	0	0	0	0	0	0	0	0	0	0
<i>Montipora capitata</i>	0.8	0.7	1.4	1.4	1.5	1.1	3.6	2.4	3.7	3.2
<i>Pavona duerdeni</i>	0	0	0	0	0	0	0	0	0	0
<i>Pavona maldivensis</i>	0	0	0	0	0	0	0	0	0	0
<i>Pavona varians</i>	0	0	0	0	0	0	0.0	0.1	0.0	0.1
<i>Pocillopora damicornis</i>	0.0	0.1	0.1	0.3	0.1	0.2	0.1	0.2	0.2	0.2
<i>Pocillopora eydouxi</i>	0	0	0	0	0	0	0	0	0	0
<i>Pocillopora ligulata</i>	0	0	0	0	0	0	0	0	0	0
<i>Pocillopora meandrina</i>	0.3	0.3	0.2	0.4	0.4	0.8	0.2	0.3	0.5	0.6
<i>Porites brighami</i>	0	0	0	0	0	0	0	0	0.0	0.1
<i>Porites compressa</i>	0.4	0.5	0.4	0.6	0.1	0.1	0.0	0.1	0.0	0.1
<i>Porites evermanni</i>	0	0	0	0	0.2	0.4	1.8	2.2	0.9	1.2
<i>Porites lichen</i>	0	0	0	0	0	0	0	0	0	0
<i>Porites lobata</i>	9.2	6.5	10.5	7.3	9.0	6.4	11.8	4.9	10.2	9.1
<i>Porites rus</i>	0	0	0	0	0	0	0	0	0	0
<i>Psammocora nierstraszi</i>	0	0	0	0	0	0	0	0	0	0
Unknown Coral	0.2	0.3	0	0	0	0	0	0	0	0
Total Coral	11.3	6.9	13.3	7.8	11.6	6.3	18.9	7.2	16.2	9.8
Species Richness:	7		6		7		8		9	
Macroalgae	0	0	0	0	0	0	0.0	0.1	0.4	0.5

% Cover: Species	2005		2006	
	Mean	SD	Mean	SD
<i>Cyphastrea ocellina</i>	0	0	0	0
<i>Fungia scutaria</i>	0	0	0	0
<i>Leptastrea purpurea</i>	0	0	0	0
<i>Montipora flabellata</i>	0	0	0	0
<i>Montipora patula</i>	1.8	3.4	1.3	2.3
<i>Montipora studeri</i>	0	0	0	0
<i>Montipora capitata</i>	3.2	1.6	3.7	2.8
<i>Pavona duerdeni</i>	0	0	0	0
<i>Pavona maldivensis</i>	0	0	0	0
<i>Pavona varians</i>	0	0	0	0
<i>Pocillopora damicornis</i>	0	0	0	0
<i>Pocillopora eydouxi</i>	0	0	0	0
<i>Pocillopora ligulata</i>	0	0	0	0
<i>Pocillopora meandrina</i>	0.4	0.7	0.4	0.8
<i>Porites brighami</i>	0.2	0.6	0	0
<i>Porites compressa</i>	0	0	0	0
<i>Porites evermanni</i>	0.3	0.5	0	0
<i>Porites lichen</i>	0	0	0	0
<i>Porites lobata</i>	14.5	9.1	15.2	9.5
<i>Porites rus</i>	0	0	0	0
<i>Psammocora nierstraszi</i>	0	0	0	0
Unknown Coral	0	0	0	0
Total Coral	20.5	10.3	20.6	10.9
Species Richness:	6		4	
Macroalgae	0.0	0.1	0	0





Photoquadrat Data (1 m): Photo analysis pending

Findings: Initial coral cover rank is 42 among 60 reefs. Coral cover stayed roughly the same over the two periods of monitoring despite high human usage at site. No significant macroalgae coverage but low levels of macroinvertebrates (e.g. *Echinometra mathaei*). Low percentage of fines with low terrigenous content. No rare or unusual species observed.

Kanahena Bay, Maui

Benthic Habitat: 3 m

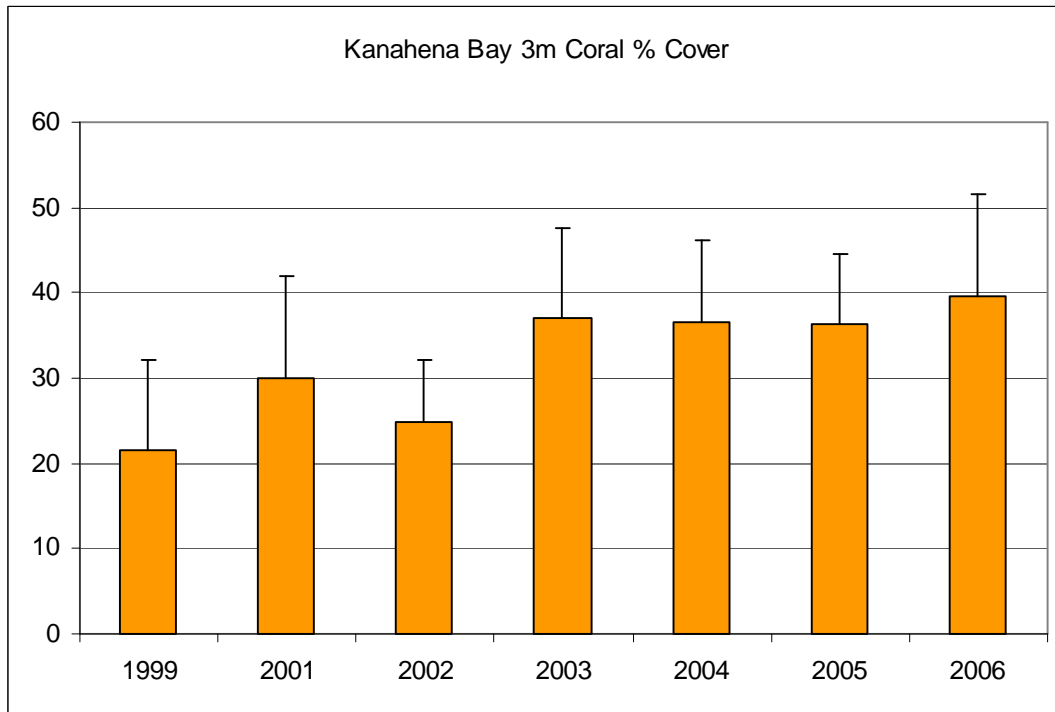
	Depth (m)	Rugosity	Sediment Composition (% wt.)		Sediment Grain Size (% wt.)			
			LOI	H ₂ CO ₃	Gravel	Coarse	Fine	Silt
Mean	3	1.60	2.65	85.06	82.54	14.85	1.65	0.96
S.D.		0.19	0.23	1.13	17.80	18.09	06	0.23

Video Transect data (3 m):

% Cover: Species	1999		2001		2002		2003		2004	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<i>Cyphastrea ocellina</i>	0	0	0	0	0	0	0	0	0.0	0.1
<i>Fungia scutaria</i>	0	0	0	0	0	0	0.0	0.1	0.1	0.3
<i>Leptastrea purpurea</i>	0	0	0	0	0	0	0	0	0	0
<i>Montipora flabellata</i>	0.0	0.1	0	0	0	0	0	0	0	0
<i>Montipora patula</i>	3.3	1.1	4.2	1.7	3.8	1.4	6.5	2.4	5.0	3.0
<i>Montipora studeri</i>	0	0	0	0	0	0	0	0	0	0
<i>Montipora capitata</i>	0	0	0.1	0.1	0.4	0.3	0.8	0.6	0.9	0.9
<i>Pavona duerdeni</i>	0	0	0	0	0	0	0	0	0	0
<i>Pavona maldivensis</i>	0.0	0.1	0	0	0	0	0	0	0	0
<i>Pavona varians</i>	1.8	2.4	3.1	3.2	2.4	2.0	5.1	5.1	3.9	4.2
<i>Pocillopora damicornis</i>	0	0	0	0	0	0	0	0	0	0
<i>Pocillopora eydouxi</i>	0	0	0	0	0	0	0	0	0.1	0.3
<i>Pocillopora ligulata</i>	0	0	0	0	0	0	0	0	0	0
<i>Pocillopora meandrina</i>	0.9	0.8	1.6	1.3	1.4	0.9	1.5	1.5	1.4	1.3
<i>Porites brighami</i>	0	0	0	0	0	0	0	0	0	0
<i>Porites compressa</i>	1.5	1.5	2.8	2.7	1.1	0.7	3.4	2.6	1.2	1.4
<i>Porites evermanni</i>	0	0	0	0	0	0	1.7	2.1	0	0
<i>Porites lichen</i>	0	0	0	0	0	0	0	0	0	0
<i>Porites lobata</i>	14.0	10.2	18.1	11.3	15.8	7.4	18.1	9.7	24.2	12.0
<i>Porites rus</i>	0	0	0	0	0	0	0	0	0.1	0.4
<i>Psammocora nierstraszi</i>	0	0	0	0	0	0	0	0	0	0
Unknown Coral	0.1	0.1	0	0	0	0	0	0	0	0
Total Coral	21.6	10.4	30	11.9	24.9	7.2	37.0	10.6	36.6	9.5
Species Richness:	8		6		6		8		10	
Macroalgae	0.1	0.3	0	0	0	0	0	0	0.2	0.3

% Cover: Species	2005		2006	
	Mean	SD	Mean	SD
<i>Cyphastrea ocellina</i>	0	0	0	0
<i>Fungia scutaria</i>	0.0	0.1	0.1	0.3
<i>Leptastrea purpurea</i>	0	0	0	0
<i>Montipora flabellata</i>	0	0	0	0
<i>Montipora patula</i>	3.4	1.7	5.2	3.0
<i>Montipora studeri</i>	0	0	0	0
<i>Montipora capitata</i>	3.5	2.6	1.0	1.3
<i>Pavona duerdeni</i>	0	0	0	0
<i>Pavona maldivensis</i>	0	0	0	0
<i>Pavona varians</i>	4.0	4.2	2.8	2.1
<i>Pocillopora damicornis</i>	0	0	0	0
<i>Pocillopora eydouxi</i>	0	0	0	0
<i>Pocillopora ligulata</i>	0	0	0.0	0.1
<i>Pocillopora meandrina</i>	1.2	1.3	1.2	1.5
<i>Porites brighami</i>	0	0	0	0

<i>Porites compressa</i>	1.0	1.8	0.1	0.3
<i>Porites evermanni</i>	0	0	0	0
<i>Porites lichen</i>	0	0	0	0
<i>Porites lobata</i>	23.2	7.1	29.0	11.8
<i>Porites rus</i>	0	0	0.1	0.3
<i>Psammocora nierstraszi</i>	0	0	0	0
Unknown Coral	0	0	0	0
Total Coral	36.4	8.1	39.7	11.9
Species Richness:	7		9	
Macroalgae	0.1	0.2	0.1	0.2



Photoquadrat Data (3 m): Photo analysis pending

Findings: Initial coral cover rank is 27 among 60 reefs. Coral cover increased significantly. No significant macroalgae coverage but high cover of crustose coralline algae. There is a relatively high abundance of *Heterocentrotus mammilatus*. Low percentage of fines with low terrigenous content. *Pavona maldivensis* presence is notable as this species is not common to sites surveyed.

Kanahena Bay, Maui

Fish Data: 1 m and 3 m

Species	Density (#/125m ²)				Biomass (g/125m ²)			
	1 m		3 m		1 m		3 m	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<i>Abudefduf abdominalis</i>	0.3	0.5	1.8	2.1	27.2	54.4	166.3	200.4
<i>Abudefduf sordidus</i>	0.8	1.5			90.1	180.2		
<i>Acanthurus achilles</i>			0.3	0.5			8.9	17.7
<i>Acanthurus blochii</i>	1.5	2.4			285.8	439.4		
<i>Acanthurus leucopareius</i>	1.5	1.0			296.5	209.2		
<i>Acanthurus nigrofuscus</i>	8.8	7.6	10.5	6.2	302.1	255.5	223.8	110.6
<i>Acanthurus olivaceus</i>	2.5	1.0	2.3	1.7	909.5	316.3	430.3	319.1
<i>Acanthurus triostegus</i>	29.3	27.6			2480.7	2318.3		
<i>Blenniidae</i>	0.5	1.0			2.3	4.5		
<i>Calotomus carolinus</i>			0.3	0.5			4.0	7.9
<i>Cantherhines dumerilii</i>			0.3	0.5			125.8	251.7
<i>Canthigaster amboinensis</i>	0.8	0.5			19.1	13.2		
<i>Canthigaster jactator</i>	3.3	2.5	3.5	2.9	18.3	14.6	24.1	21.1
<i>Caranx melampygus</i>	0.3	0.5			63.2	126.4		
<i>Centropyge potteri</i>			0.5	1.0			17.6	35.2
<i>Cephalopholis argus</i>	1.5	1.0	3.0	2.6	459.6	699.6	1456.8	2157.3
<i>Chaetodon auriga</i>	1.5	1.0	0.5	1.0	161.4	109.6	61.2	122.5
<i>Chaetodon lineolatus</i>	0.3	0.5			25.6	51.3		
<i>Chaetodon lunula</i>	0.8	1.0			34.3	67.8		
<i>Chaetodon multicinctus</i>			1.0	2.0			29.3	58.6
<i>Chaetodon ornatissimus</i>	2.3	1.3	1.5	0.6	343.1	191.9	167.9	23.7
<i>Chaetodon trifascialis</i>			1.0	2.0			44.3	88.6
<i>Chaetodon unimaculatus</i>	1.0	1.4			47.2	62.2		
<i>Chlorurus perspicillatus</i>			0.3	0.5			612.9	1225.7
<i>Chlorurus sordidus</i>	0.3	0.5	0.5	0.6	77.9	155.8	133.3	154.0
<i>Chromis vanderbilii</i>	5.5	11.0	25.8	29.2	25.5	51.0	63.0	81.9
<i>Cirrihitops fasciatus</i>	0.3	0.5			5.5	11.0		
<i>Cirripectes vanderbilii</i>	0.8	1.0			2.8	4.0		
<i>Coris gaimard</i>			0.3	0.5			49.3	98.6
<i>Ctenochaetus strigosus</i>			7.0	2.9			198.9	163.8
<i>Forcipiger flavissimus</i>	0.5	1.0	0.3	0.5	18.8	37.6	9.4	18.8
<i>Gomphosus varius</i>	0.8	1.0	0.5	0.6	2.5	3.5	8.6	10.4
<i>Gymnothorax meleagris</i>			0.3	0.5			15.9	31.8
<i>Halichoeres ornatissimus</i>			1.3	1.0			11.7	11.7
<i>Kyphosus species</i>	0.8	1.0			148.4	179.2		
<i>Labroides phthirophagus</i>			0.8	1.0			3.0	4.2
<i>Lutjanus fulvus</i>			1.3	1.9			184.0	260.2
<i>Lutjanus kasmira</i>			0.3	0.5			39.6	79.2
<i>Macropharyngodon geoffroyi</i>			0.3	0.5			7.6	15.2
<i>Melichthys niger</i>	7.5	6.8	0.3	0.5	3332.3	2701.2	127.8	255.5

Kanahena Bay, Maui

Fish Data: 1 m and 3 m

Species	Density (#/125m ²)				Biomass (g/125m ²)			
	1 m		3 m		1 m		3 m	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<i>Melichthys vidua</i>	1.0	1.2	0.5	1.0	403.2	466.8	167.7	335.4
<i>Monotaxis grandoculis</i>	0.3	0.5	0.3	0.5	102.7	205.5	79.3	158.7
<i>Mulloidichthys flavolineatus</i>	0.3	0.5	0.5	1.0	48.5	97.0	58.8	117.6
<i>Naso lituratus</i>	2.3	1.7	1.5	1.7	781.5	725.9	172.7	213.8
<i>Ostracion meleagris</i>	1.8	2.2			26.3	39.2		
<i>Paracirrhites arcatus</i>			3.0	2.2			54.7	35.9
<i>Paracirrhites forsteri</i>			0.3	0.5			20.9	41.8
<i>Parupeneus bifasciatus</i>			1.0	0.8			62.0	49.8
<i>Parupeneus cyclostomus</i>	0.5	0.6	0.3	0.5	65.9	79.6	12.8	25.6
<i>Parupeneus multifasciatus</i>	0.3	0.5	1.5	1.3	32.9	65.8	78.9	65.4
<i>Plagiotremus goslinei</i>	0.5	0.6			0.7	0.8		
<i>Plectroglyphidodon imparipennis</i>	4.3	5.3			10	12.1		
<i>Plectroglyphidodon johnstonianus</i>			4.3	1.5			25.3	7.7
<i>Pseudocheilinus octotaenia</i>			0.5	1.0			9.3	18.6
<i>Rhinecanthus rectangulus</i>	1.3	1.0	0.3	0.5	173.3	142.9	33.4	66.7
<i>Scarus psittacus</i>	4.3	2.2	11.8	10.2	822.9	264.2	920.3	935.0
<i>Scarus rubroviolaceus</i>	0.5	0.6	0.8	1.0	2754.8	3707.4	370	655.0
<i>Scomberoides lysan</i>	0.3	0.5			20.5	40.9		
<i>Stegastes fasciolatus</i>	4.8	1.5	4.5	2.5	41.0	49.7	116.9	65.6
<i>Stethojulis balteata</i>	6.8	5.2	1.3	0.5	22.3	13.9	15.8	5.7
<i>Thalassoma ballieui</i>			0.3	0.5			96.6	193.2
<i>Thalassoma duperrey</i>	13.8	4.1	4.8	1.0	216.9	89.6	73.2	43.1
<i>Thalassoma trilobatum</i>	0.3	0.5			17.6	35.1		
<i>Zanclus cornutus</i>			0.3	0.5			37.5	75.1
<i>Zebrasoma flavescens</i>	15.0	10.9	6.0	5.7	1684.6	929.2	318.5	311.6
Total/Depth Avg ± SD:	130.5	2.7	108.3	2.1	16405.5	354.0	6949.7	196.7
Species Richness	43		47					
Species Diversity	2.56		2.64					

Findings: Among 60 reefs, Kanahena Bay 1m ranked 6 in species richness, 45 in density, 25 in biomass, and 4 in diversity. Kanahena Bay 3m ranked 8 in species richness, 52 in density, 43 in biomass, and 1 in diversity. The most abundant species were Convict tangs (*Acanthurus triostegus*) and Blackfin Chromis (*Chromis vanderbilti*) at the 1m and 3m reefs respectively. The species with the highest biomass were the Black Durgon (*Melichthys niger*) and the introduced peacock grouper (*Cephalopholis argus*) at the 1m and 3m reef respectively. *Chaetodon lineolatus* presence is notable as this species is not common to sites surveyed.