

Kanahena Point, Maui

20° 36.089' N 156° 26.214' W

Management Status: Natural Area Reserve

Area Description: Upslope conservation land. Rugged basalt shoreline.. Shallow low rugosity volcanic rock and boulder habitat. Deep reef more structurally complex with aggregated coral heads and sand patches. Deep site partially characterized by two unusual coral species. Southern sheltered site. One of the more pristine of the CRAMP sites.



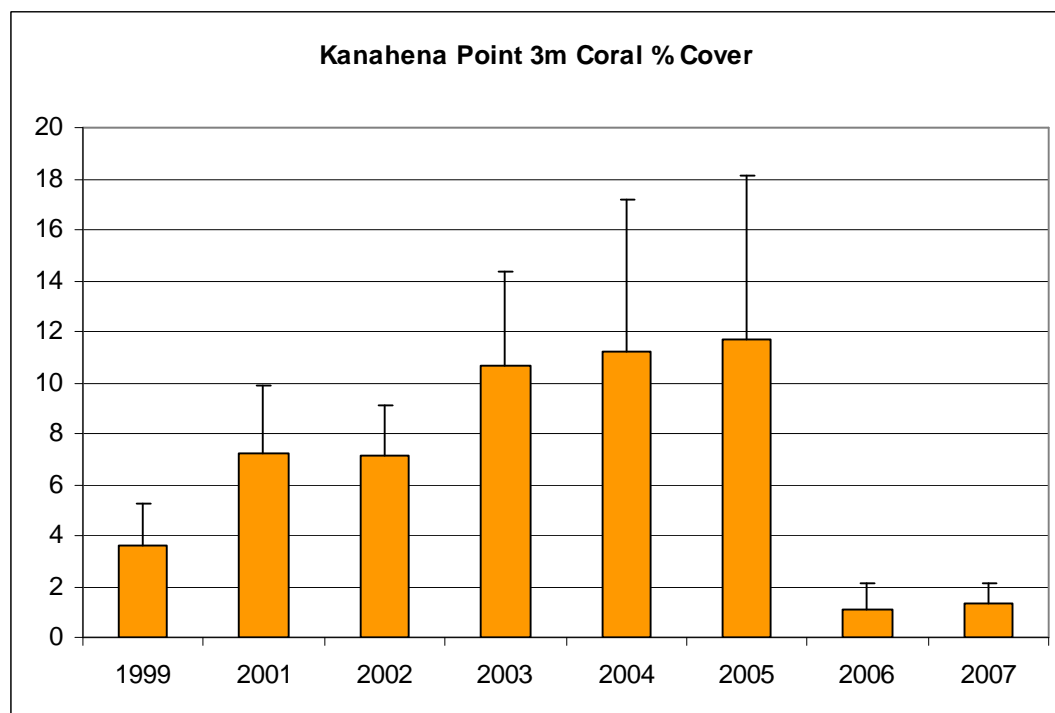
Benthic Habitat Data: 3 m

	Depth (m)	Rugosity	Sediment Composition (% wt.)		Sediment Grain Size (% wt.)			
			LOI	H ₂ CO ₃	Gravel	Coarse	Fine	Silt
Mean	3	1.23	2.09	49.31	82.81	11.91	4.05	1.23
S.D.		05	0.13	0.58	11.34	7.03	3.64	0.67

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
<i>Fungia scutaria</i>	0	0	0	0	0	0	0	0	0	0
<i>Leptastrea purpurea</i>	0	0	0.0	0.1	0	0	0.1	0.2	0	0
<i>Montipora flabellata</i>	0	0	0.1	0.1	0.1	0.1	0.3	0.5	0.2	0.5
<i>Montipora patula</i>	1.2	1.1	2.0	1.5	1.8	1.8	2.4	2.8	3.1	3.7
<i>Montipora studeri</i>	0	0	0	0	0	0	0	0	0	0
<i>Montipora capitata</i>	0	0	0	0	0.2	0.3	0.0	0.1	0.7	1.3
<i>Pavona duerdeni</i>	0.3	0.3	1.3	1.0	0.7	0.5	1.4	1.2	0.5	0.8
<i>Pavona maldivensis</i>	0	0	0	0	0	0	0	0	0	0
<i>Pavona varians</i>	0.3	0.3	0.8	0.6	0.5	0.5	1.6	1.0	0.7	0.7
<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	0
<i>Pocillopora ligulata</i>	0	0	0	0	0	0	0	0	0	0
<i>Pocillopora meandrina</i>	1.3	1.5	1.9	1.3	2.9	2.0	3.3	2.3	4.4	2.5
<i>Porites brighami</i>	0	0	0	0	0	0	0	0	0	0
<i>Porites compressa</i>	0.1	0.1	0.2	0.3	0	0	0.5	1.1	0	0
<i>Porites evermanni</i>	0	0	0	0	0.1	0.3	0.1	0.3	0	0
<i>Porites lichen</i>	0	0	0	0	0	0	0	0	0	0
<i>Porites lobata</i>	0.3	0.4	0.8	0.9	0.8	0.6	1.1	1.2	1.8	1.8
<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	0.1	0.2	0.0	0.1	0	0	0	0	0	0
Total Coral	3.6	1.7	7.2	2.7	7.1	2.0	10.6	3.7	11.2	6.0
Species Richness:	7		9		8		10		7	
Macroalgae	0	0	0	0	0	0	0	0	0.3	0.5

Species	2005		2006		2007	
	Mean	SD	Mean	SD	Mean	SD
<i>Cyphastrea ocellina</i>	0	0	0	0	0	0
<i>Fungia scutaria</i>	0	0	0.1	0.3	0	0
<i>Leptastrea purpurea</i>	0.0	0.1	0	0	0	0
<i>Montipora flabellata</i>	0	0	0	0	0	0
<i>Montipora patula</i>	4.5	5.0	0	0	0.2	0.4
<i>Montipora studeri</i>	0	0	0	0	0	0
<i>Montipora capitata</i>	0.2	0.4	0	0	0	0
<i>Pavona duerdeni</i>	0.2	0.5	0	0	0	0
<i>Pavona maldivensis</i>	0	0	0	0	0	0
<i>Pavona varians</i>	1.2	1.1	0.2	0.8	0.1	0.2
<i>Pocillopora damicornis</i>	0	0	0	0	0	0
<i>Pocillopora eydouxi</i>	0	0	0	0	0	0
<i>Pocillopora ligulata</i>	0	0	0	0	0	0
<i>Pocillopora meandrina</i>	3.5	3.0	0.1	0.3	0.1	0.3
<i>Porites brighami</i>	0	0	0	0	0	0
<i>Porites compressa</i>	0.0	0.1	0	0	0	0
<i>Porites evermanni</i>	0	0	0	0	0	0
<i>Porites lichen</i>	0.0	0.1	0	0	0	0
<i>Porites lobata</i>	2.1	1.1	0.7	0.8	0.7	0.8
<i>Porites rus</i>	0	0	0	0	0.2	0.4
<i>Psammocora nierstraszi</i>	0	0	0	0	0	0
Unknown Coral	0.0	0.1	0	0	0	0
Total Coral	11.7	6.4	1.1	1.0	1.3	0.8
Species Richness:	10		4		5	
Macroalgae	0.0	0.1	0.1	0.2	0	0





Photoquadrat Data (3 m): Photo analysis pending

Findings: Initial coral cover rank is 55 among 60 reefs. No statistically detectable increase in coral cover increased. No significant macroalgae coverage. Moderate levels of macro-invertebrates (e.g. *Echinometra mathaei*). High percentage of crustose coralline algae. Low fines with high terriginous input and/or marine basalt. No rare or unusual species observed.

Kanahena Point, Maui

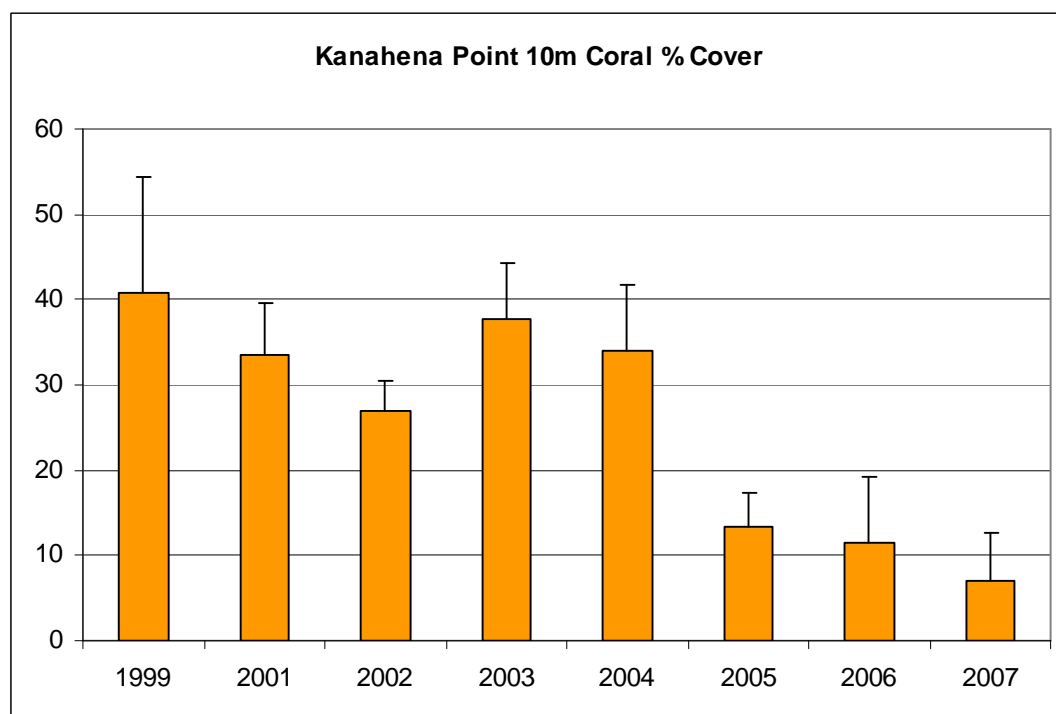
Benthic Habitat: 10 m

	Depth (m)	Rugosity	Sediment Composition (% wt.)		Sediment Grain Size (% wt.)			
			LOI	H ₂ CO ₃	Gravel	Coarse	Fine	Silt
Mean	10	1.56	3.59	92.63	56.04	20.38	20.37	3.21
S.D.		0.15	0.44	0.47	22.16	6.81	13.92	1.42

Video Transect data (10 m):

% Cover:	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	0.3	0.4
<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	0.1	0	0	0	0	0.0	0.1	0.1	0.3
<i>Montipora patula</i>	8.3	4.3	11.0	3.2	11.4	5.5	18.9	7.4	15.4	3.8
<i>Montipora studeri</i>	0	0	0	0	0	0	0	0	0	0
<i>Montipora capitata</i>	0.0	0.1	0.2	0.2	0.4	0.4	0.8	1.0	2.6	3.5
<i>Pavona duerdeni</i>	0.5	0.7	0.6	0.9	0.5	0.8	1.4	2.0	0.3	0.5
<i>Pavona maldivensis</i>	2.9	1.9	4.1	2.0	0.5	0.7	0.3	0.5	0.2	0.5
<i>Pavona varians</i>	2.3	2.6	2.1	2.4	2.6	2.5	2.0	1.9	3.0	1.6
<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	0.4	1.0
<i>Pocillopora ligulata</i>	0	0	0	0	0	0	0	0	0	0
<i>Pocillopora meandrina</i>	0.5	0.5	0.2	0.3	0.6	0.6	1.2	1.6	0.9	1.9
<i>Porites brighami</i>	0	0	0	0	0	0	0	0	0	0
<i>Porites compressa</i>	11.7	9.0	5.3	2.1	4.6	2.3	4.1	2.0	3.0	1.8
<i>Porites evermanni</i>	0	0	0	0	0	0	0	0	0.0	0.1
<i>Porites lichen</i>	0	0	0	0	0	0	0	0	0	0
<i>Porites lobata</i>	0.7	0.7	0.9	1.1	1.2	1.1	2.2	2.0	1.6	1.3
<i>Porites rus</i>	12.3	11.6	9.1	9.0	5.1	5.6	6.8	9.6	6.0	7.3
<i>Psammocora nierstraszi</i>	0	0	0	0	0	0	0	0	0	0
Unknown Coral	1.4	1.0	0.0	0.1	0	0	0	0	0.2	0.3
Total Coral	40.7	13.7	33.5	6.0	26.9	3.6	37.8	6.5	34.0	7.7
Species Richness:	11		10		9		10		14	
Macroalgae	0	0	0	0	0	0	0.0	0.1	0.4	0.5

% Cover: Species	2005		2006		2007	
	Mean	SD	Mean	SD	Mean	SD
<i>Cyphastrea ocellina</i>	0	0	0	0	0	0
<i>Fungia scutaria</i>	0	0	0	0	0	0
<i>Leptastrea purpurea</i>	0.0	0.1	0.2	0.5	0	0
<i>Montipora flabellata</i>	0	0	0	0	0	0
<i>Montipora patula</i>	1.9	1.8	0.8	1.4	0.1	0.2
<i>Montipora studeri</i>	0	0	0	0	0	0
<i>Montipora capitata</i>	1.3	1.4	0.3	0.4	0.1	0.3
<i>Pavona duerdeni</i>	0	0	0	0	0	0
<i>Pavona maldivensis</i>	0.0	0.1	0	0	0	0
<i>Pavona varians</i>	1.9	1.3	0.5	0.7	0.5	0.9
<i>Pocillopora damicornis</i>	0	0	0	0	0	0
<i>Pocillopora eydouxi</i>	0	0	0	0	0	0
<i>Pocillopora ligulata</i>	0	0	0	0	0	0
<i>Pocillopora meandrina</i>	0	0	0	0	0	0
<i>Porites brighami</i>	0	0	0	0	0	0
<i>Porites compressa</i>	3.0	2.6	0.9	1.6	0	0
<i>Porites evermanni</i>	0	0	0	0	0	0
<i>Porites lichen</i>	0	0	0	0	0	0
<i>Porites lobata</i>	2.2	2.2	3.5	2.4	3.6	3.4
<i>Porites rus</i>	3.1	6.1	5.3	8.1	2.8	5.7
<i>Psammocora nierstraszi</i>	0	0	0	0	0	0
Unknown Coral	0	0	0	0	0	0
Total Coral	13.4	4.0	11.4	7.7	7.1	5.6
Species Richness:	8		7		5	
Macroalgae	0.3	0.4	0.2	0.4	0	0





Photoquadrat Data (10 m): Photo analysis pending

Findings: Initial coral cover rank is 11 among 60 reefs. Coral cover decreased slightly but this was not significant ($p=0.29$). This reef has an unusual coral assemblage with a high percentage of uncommon species (e.g. *Pavona maldivensis* and *Porites rus*). No significant macroalgae coverage but high numbers of *Heterocentrotus mammillatus* that appear more numerous than at other reefs (See above photograph). High percentage of crustose coralline algae. Sediment patches consist of very fine carbonates with low terrigenous input.

Kanahena Point, Maui Fish Data: 3 m and 10 m

Species	Density (#/125m ²)				Biomass (g/125m ²)			
	3 m		10 m		3 m		10 m	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<i>Abudefduf abdominalis</i>	0.5	1.0	2.0	2.3	38.4	76.7	160	207.2
<i>Acanthurus achilles</i>	1.5	1.9	2.0	4.0	110.7	177.4	222.4	444.8
<i>Acanthurus blochii</i>	0.5	1.0			60	120		
<i>Acanthurus nigricans</i>	2.5	3.8			158.0	250		
<i>Acanthurus nigrofuscus</i>	33.0	14.7	9.5	1.9	1269.0	653.7	306.5	89.7
<i>Acanthurus olivaceus</i>	1.5	3.0	1.0	2.0	191.2	382.5	79.0	158.1
<i>Aphareus furca</i>	0.5	1.0	2.0	2.8	46.3	92.6	254.2	394.7
<i>Aprion virescens</i>			0.5	1.0			70.4	140.9
<i>Aulostomus chinensis</i>	0.5	1.0			38.7	77.4		
<i>Cantherhines dumerilii</i>			1.0	2.0			284.8	569.6
<i>Canthigaster jactator</i>	5.5	1.0	7.5	5.3	38.6	6.9	30.2	23.1
<i>Centropyge potteri</i>			0.5	1.0			20.1	40.3
<i>Cephalopholis argus</i>	1.5	1.0	0.5	1.0	2099.4	3200	191.1	382.2
<i>Chaetodon multinctus</i>			2.0	1.6			58.6	47.8
<i>Chaetodon ornatissimus</i>	0.5	1.0	6.0	2.3	31.5	63.1	754.2	346.7
<i>Chaetodon quadrimaculatus</i>	1.0	2.0			59.8	119.7		
<i>Chaetodon trifascialis</i>			1.0	2.0			44.3	88.6
<i>Chaetodon unimaculatus</i>			2.5	3.8			80.9	122.5
<i>Chlorurus perspicillatus</i>	0.5	1.0			85.4	170.9		
<i>Chlorurus sordidus</i>	1.0	2.0	2.0	2.8	235.4	470.7	280.7	474.4
<i>Chromis hanui</i>			0.5	1.0			1.7	3.5
<i>Chromis vanderbilti</i>	4.5	9.0			6.2	12.4		
<i>Coris gaimard</i>	0.5	1.0			113.4	226.9		
<i>Ctenochaetus hawaiiensis</i>	5.0	3.5			1309.8	936.9		
<i>Ctenochaetus strigosus</i>	151.0	55.7	43.5	16.4	12676.0	4633.6	2570.3	990.1
<i>Fistularia commersonii</i>	4.5	6.6			669.2	1064.8		

<i>Forcipiger flavissimus</i>	1.0	1.2	1.0	1.2	30.3	37.0	37.6	43.4
<i>Gomphosus varius</i>	4.5	3.0			116.6	44.1		
<i>Gymnothorax flavimarginatus</i>	0.5	1.0			248.6	497.2		
<i>Halichoeres ornatissimus</i>	1.0	2.0			7.8	15.7		
<i>Kyphosus species</i>	2.5	1.9			389.4	365.4		
<i>Lutjanus fulvus</i>			0.5	1.0			72.4	144.8
<i>Melichthys niger</i>	96.0	38.3			46747.0	26206.0		
<i>Melichthys vidua</i>	1.0	1.2	1.0	1.2	259.3	304.8	294.3	339.9
<i>Monotaxis grandoculis</i>			0.5	1.0			587.8	1175.6
<i>Naso hexacanthus</i>			0.5	1.0			66.5	133.0
<i>Naso lituratus</i>	2.0	2.8	2.0	1.6	709.4	915.8	246.2	230.6
<i>Paracirrhites arcatus</i>	0.5	1.0	1.0	2.0	27.4	54.8	27.2	54.4
<i>Parupeneus bifasciatus</i>			0.5	1.0			82.5	165.0
<i>Parupeneus multifasciatus</i>	3.5	3.0	3.0	1.2	286.8	227.7	156.4	62.8

Kanahena Point, Maui Fish Data: 3 m and 10 m

Species	Density (#/125m ²)				Biomass (g/125m ²)			
	3 m		10 m		3 m		10 m	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<i>Plectroglyphidodon imparipennis</i>	0.5	1.0			1.8	3.5		
<i>Plectroglyphidodon johnstonianus</i>			1.0	1.2			8.1	9.8
<i>Pseudocheilinus octotaenia</i>			0.5	1.0			16.5	33.0
<i>Pseudocheilinus tetrataenia</i>			0.5	1.0			1.0	2.1
<i>Scarus psittacus</i>	5.5	7.2	3.0	6.0	277.8	376.3	131.5	263.1
<i>Scarus rubroviolaceus</i>	1.0	1.2			2466.4	2899.2		
<i>Stegastes fasciolatus</i>	1.0	1.2			30.2	34.8		
<i>Stethojulis balteata</i>	1.0	1.2	0.5	1.0	25.8	32.0	9.3	18.6
<i>Sufflamen bursa</i>	0.5	1.0	1.5	1.0	56.1	112.2	168.3	112.2
<i>Thalassoma duperrey</i>	11.5	10.2	12.5	6.6	338.3	382.3	271.6	189.1
<i>Zanclus cornutus</i>	0.5	1.0			63.1	126.2		
<i>Zebrasoma flavescens</i>	41.0	5.8			3145.6	876.0		
<i>Zebrasoma veliferum</i>	1.0	2.0	31.5	22.9	440.2	880.5	2034.3	1544.4
Total/Depth Avg ± SD:	392.0	5.1	145.0	3.1	74906.2	1208.4	9621.0	266.1
Species Richness	39		34					
Species Diversity	1.90		2.23					

Findings: Among 60 reefs, Kanahena Point 3m ranked 29 in species richness, 7 in density, 1 in biomass, and 52 in diversity. Kanahena Point 10m ranked 40 in species richness, 44 in density, 38 in biomass, and 28 in diversity. The most abundant species was the Goldring surgeonfish (*Ctenochaetus strigosus*) at both the 3m and 10m reefs respectively. The species with the highest biomass were the Black Durgon (*Melichthys niger*) and the Goldring surgeonfish (*Ctenochaetus strigosus*) at the 3m and 10m reef respectively. No rare or unusual species observed.