



Rocky Intertidal Community Monitoring at Channel Islands National Park

2003 Annual Report

Natural Resource Technical Report NPS/CHIS/NRTR—2009/263



ON THE COVER

Rocky intertidal zone near Fossil Reef, Santa Rosa Island
Photograph by Dan Richards

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Executive Summary

Channel Islands National Park includes the five northern islands off the coast of southern California and the surrounding waters out one nautical mile. There is approximately 176 miles of coastline around the islands and most of it is rocky. The diversity and undisturbed nature of the tidepools of this rocky coastline was recognized as a special feature of the islands in the enabling legislation. In order to gain information to conserve these communities unimpaired for future generations, the NPS has been monitoring the rocky intertidal at the islands since 1982. This report summarizes the 2003 sampling year efforts (from March 2003 to January 2004) and findings of the Channel Islands National Park (CINP) Rocky Intertidal Monitoring Program.

Thirteen key species or species groups are monitored twice per year at 21 sites on the five park islands (Figure 1) as part of the Rocky Intertidal Monitoring Program. Fixed photoplots were used to monitor the percent cover of thatched and acorn barnacles (*Tetraclita rubescens*, *Balanus glandula*/*Chthamalus* spp.), mussels (*Mytilus californianus*), rockweeds (*Silvetia compressa*, and *Hesperophycus californicus*), turfweed (*Endocladia muricata*), red algal turf (*Pterocladia* spp. and *Gelidium* spp.), goose barnacles (*Pollicipes polymerus*), and tar. Point-intercept transects are used to determine the percent cover of surfgrass (*Phyllospadix* spp.). Information about the size distribution (i.e. “size-frequency” data) is collected for owl limpets (*Lottia gigantea*) in circular plots. Size distribution and relative abundance of black abalone (*Haliotis cracherodii*) and ochre sea stars (*Pisaster ochraceus*) is determined using timed searches. Shorebirds and pinnipeds were counted at each site. Visitor numbers for the Anacapa tidepools were reported by the Concession boats and are presented here.

Sites were established between 1982 and 1994. Site selection considered visitation, accessibility, presence of representative organisms, wildlife disturbance, and safety. The monitoring protocol is detailed in Richards and Davis (1988). Additional protocol for Santa Cruz Island is detailed in Engle *et al.* (1998). Updated protocol summaries can be found in Richards and Lerma (2000), and Richards *et al.* (2009).

Working conditions, in general, were good in 2003 and we were able to sample all the sites, completing all planned sampling. However, we were hampered during a few days by rain or swell and we had to work many tides that were not as low as we would have liked, making it difficult to complete all aspects the sampling protocol within the working window of low water.

In general, the algal and sessile invertebrate condition was good. Nine target taxa were monitored in fixed photoplots from which percent cover of organisms and substrate were determined. No major changes were observed within the photoplots. All target species were generally near the long-term means at most sites. A rock break occurred on the reef at Trailer that affects one of the *Hesperophycus* plots. Motile invertebrate counts were within the range of diversity we expected and there were no surprises.

Haliotis cracherodii were monitored in timed searches as few abalone were found in fixed plots. Overall the black abalone numbers were very low compared to past years but no disease was observed in 2003. No juvenile abalone (under 50 mm) were found. Because of tide and swell conditions, abalone counts were difficult at times, which demonstrates the variability inherent in

sampling black abalone. Most of the *H. cracherodii* found were concentrated at a few sites on San Miguel Island.

Slight increases were seen in smaller size classes of *Lottia gigantea* possibly indicating increased recruitment in recent years. The overall abundance of *L. gigantea* increased slightly at most sites.

High numbers of *Pisaster ochraceus* were found at Willows Anchorage, Landing Cove, Fossil Reef, Middle Anacapa West, Trailer, and Orizaba Cove. In contrast, Harris Point, Cat Rock, South Frenchy's Cove, Sea Lion Rookery, and Northwest Talcott all had very low numbers of all sea stars. *Pisaster ochraceus* were blamed for impacts to mussel beds at Scorpion Rock, Willows Anchorage, Johnson's Lee and Ford Point. *Phyllospadix* spp. was monitored in fixed transects at four sites where it was generally stable but with some variability among replicate transects.

In 2003 we had a total of six sightings of American oystercatchers, *Haematopus palliatus*, from five different sites, more than we have ever had in the past. Black oystercatchers, *H. bachmani*, were again the most ubiquitous shorebird, and were seen at all sites, at least once during sampling in 2003. Large groups of black oystercatchers (up to 24 at Crook Point), were seen at several sites. Only three other shore birds were recorded. Pinnipeds were seen at several sites. *Zalophus californianus* were quite numerous at the two Santa Barbara Island sites and *Phoca vitulina* were common at Otter Harbor.

Island Packers Company ran 34 trips to Frenchy's Cove, Anacapa to visit the tidepools. Total visitation was only 2,018 passengers, well below the 2002 visitation (2,733), and below the long term mean (2538). Over 81% of the visitation occurred January through May.

Acknowledgments

The National Park Service, Channel Islands National Park (CINP) funded this program. California Department of Fish and Game and Channel Islands National Marine Sanctuary (CINMS) provided staff time and general assistance on several events. Boat time (four days in spring and four in fall) was provided by CINMS. Temperature loggers were provided by the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO) Marine Science Institute, University of California, Santa Barbara (UCSB), who maintained the data.

This work was performed in part at the University of California Natural Reserve System, Santa Cruz Island Reserve on property owned and managed by The Nature Conservancy. Thanks to Dr. Lyndal Laughrin and staff at the UC reserve field station for their assistance.

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Introduction

The rocky intertidal zone is a compact and diverse area between marine and terrestrial habitats. Marine organisms living within this zone are highly adapted to physical disturbance and severe temperature fluctuations and are subject to both marine and terrestrial predators. The intense pressure from both physical and biological entities has promoted highly diverse invertebrate and algal assemblages within the rocky intertidal zone. In fact, many organisms are so well adapted to this habitat that they cannot live without the alternating exposure to both the air and sea.

Channel Islands National Park (CINP) and National Marine Sanctuary (CINMS) encompass the four northern Channel Islands and Santa Barbara Island off the coast of Southern California. The park islands and surrounding waters bear the designation of an International Biosphere Reserve and State of California Areas of Special Biological Significance. The State of California maintains jurisdiction over the marine resources and manages them through the California Department of Fish and Game.

The “undisturbed tide pools” are unique features specifically mentioned in the enabling legislation for Channel Islands National Park. The law establishing the park (16-USC-410) also mandated the development of inventories and monitoring of natural resources in the park. Rocky intertidal monitoring began in 1982 with the following goals: 1) to monitor trends in population dynamics of selected indicator organisms, 2) to determine normal limits of variation, 3) to discover abnormal conditions, 4) to provide remedies for management problems, and 5) to measure the success of management actions.

Specific monitoring objectives are: 1) to determine the long-term trends in percent cover of key sessile organisms in the rocky intertidal ecosystem (Table 1), 2) to determine population dynamics of *Haliotis cracherodii*, *Lottia gigantea*, and *Pisaster ochraceus*. Objectives are met by monitoring percent cover of core species in target intertidal zones using photoplots and transects, monitoring species composition and abundance of motile invertebrates using photoplots, measuring size frequency and abundance of black abalone, owl limpets, and seastars using fixed plots or timed searches. Monitoring is done twice each year during spring and fall to monitor the effects of winter storms and summer warm water.

Rocky intertidal monitoring began at Anacapa Island (VTN, Oregon 1984) initially with an emphasis on monitoring trampling effects, based on concerns for visitor impacts (Littler 1978). The program was expanded in 1985 to include the other park islands and to look more broadly at the ecology and possible impacts from other areas. Impacts from harvest, oil spills, and climate change may be of particular interest as future management concerns. Fixed plots are used to minimize natural variance.

Channel Islands National Park Rocky Intertidal Monitoring is part of a government and non-government consortium called the Multi-Agency Rocky Intertidal Network (MARINe) (Dunaway et al. 1998). Within MARINe, we are working to standardize collection of data and make it available to member groups in a centralized database. Within the MARINe network, there are sites from San Diego to central California, including the Channel Islands. By working

with MARINe we will have access to consistent data that can be used for a much broader regional analysis of changes to the intertidal communities.

This report summarizes the 2003 sampling year efforts (from March 2003 to January 2004) and documents activities and observations of the CINP Rocky Intertidal Monitoring Program. Monitoring results were previously reported in Richards 1986, 1988, 1998, Richards and Lerma 2000, 2002 2005a, 2005b, and Richards et al. 2009. Additional black abalone monitoring results have been presented in Haaker et al. 1992, Davis et al. 1992, and Richards and Davis 1993.

Methods

Study Area

The California Channel Islands are comprised of eight islands in the Southern California Bight, five of which are within the Channel Islands National Park. The five park islands have about 323 kilometers (176 miles) of coastline, the majority of which is rocky shore. Rock types vary from hard weathered volcanic basalt or breccias to easily eroded Monterey shale and sandstone. Sites were originally established to include the various exposures and rock types of each of the islands, though broad rocky benches were targeted.

The park islands span the transition zone between cooler waters of the Oregonian biogeographic province and the warmer Californian waters from the south. Mean annual air temperature along the mainland in this area is 15°C. Mean rainfall is about 38 cm per year (Daily et al. 1993). There is a gradient across the island chain with San Miguel Island having the most precipitation, most cloud cover, and most wind. Santa Barbara Island to the southeast is the warmest and driest. The mean monthly sea temperatures range from 13°C in April at San Miguel Island to nearly 20°C at Santa Barbara Island in August and September (Engle and Richards 2001). Swell varies through the year with winter storms bringing high northwest wind and waves during the winter and spring, and distant southern hemisphere storms sending large swells to the south facing shores in summer.

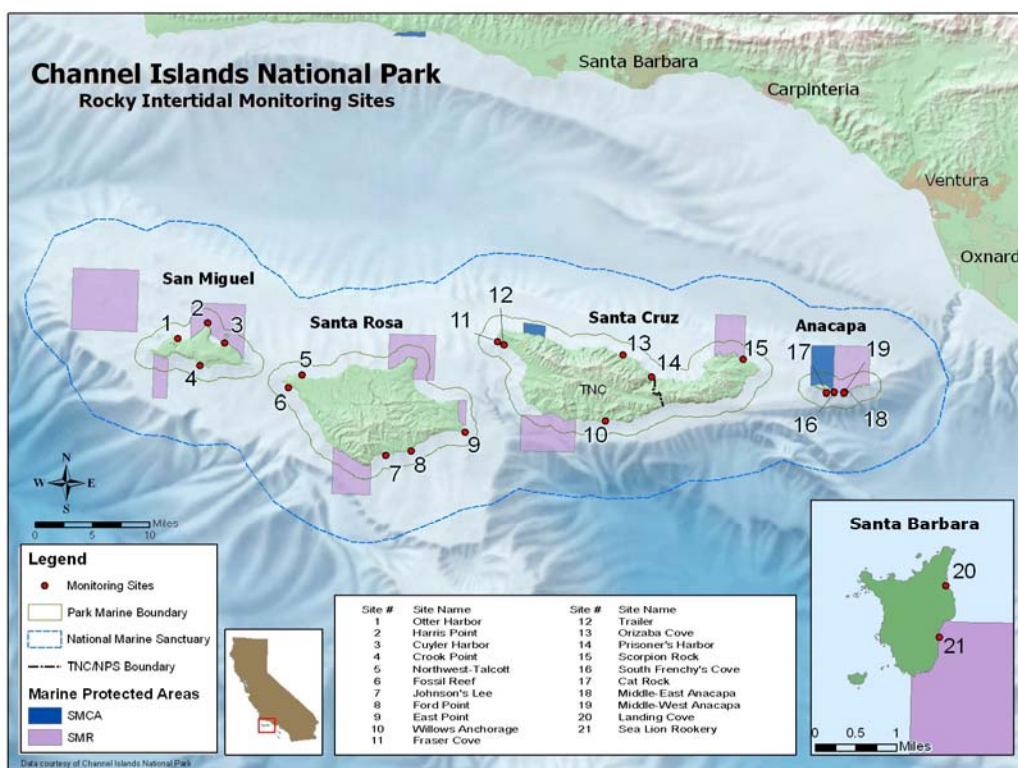


Figure 1. Rocky Intertidal Community Monitoring Site Locations in Channel Islands National Park .

Monitoring

The Channel Islands National Park Rocky Intertidal Monitoring Program has 21 sites on the five park islands (Figure 1). Sites were established between 1982 and 1994. Site selection considered visitation, accessibility, presence of representative organisms, wildlife disturbance, and safety. Sampling is usually conducted twice each year, in spring and fall. In 2003, sites were monitored in spring (March-May) and fall (Oct.-Jan. 2004). The monitoring protocol is detailed in Richards and Davis (1988). Additional protocol for Santa Cruz Island is detailed in Engle *et al.* (1998). Updated protocol summaries can be found in Richards and Lerma (2000), and Richards *et al.* (2007). Also see Engle (2005) for updated MARINE protocols. See Appendix C for notes about personnel and other specifics about the 2003 program.

Data are maintained in Microsoft Access and Excel files at Channel Islands National Park. The data (including trip reports, annual reports, and the database) reside within the CINP network.

Thirteen core species or species groups are targeted for monitoring in fixed photoplots to determine percent cover. These target species are often common and are generally used to define a band or zone within the intertidal zone. Target species include thatched and acorn barnacles (*Tetraclita rubescens*, *Balanus glandula*/*Chthamalus* spp.), mussels (*Mytilus californianus*), rockweeds (*Silvetia compressa*, and *Hesperophycus californicus*), turfweed (*Endocladia muricata*), red algal turf (*Pterocladia* spp. and *Gelidium* spp.), goose barnacles (*Pollicipes polymerus*), and tar which occurs naturally from oil seeps in the channel and can form a thick persistent cover over the substrate. An additional 32 taxa or substrates are also monitored when present (see Table 1 for list of taxa¹). The fixed plots (50 x 75 cm) are photographed on each visit. In most cases, there are five replicate plots in each zone, initially established over high densities of the target species. Not all core species (zones) are represented at each site.

We used a Nikonos V camera with two Ikelite strobes for even illumination and Ektachrome-100 film to photograph each plot in the spring sample. For the fall sampling we photographed plots with a digital Olympus Camedia Z-5050. The shift to digital photography was the only significant change to methodology in 2003. The percent cover of core organisms was determined either in the field by laying a grid over the plot or in the office from the photos. At some sites or at individual plots, field scoring could not be done either because of unfavorable conditions or lack of field time and the plots were then scored in the office by projecting the slide onto a grid of 100 evenly spaced points or overlaying a grid on the digital image on the computer. In both methods, organisms or bare substrate under each point were counted as one percent cover.

Relative abundance and size structure was collected for three species. *Haliotis cracherodii*, black abalone, were counted and measured in fixed irregular plots (5 plots per site) at eleven sites where plots have been established. At each site a search of a defined area of the reef (or 30-minutes) was made to obtain a relative abundance of abalone. *Lottia gigantea*, giant owl limpets, were measured within fixed circular plots of one-meter radius (3 to 5 plots per site). *Pisaster ochraceus*, ochre sea stars, were counted in a general search of the reef (for 30-minutes). When

¹ Taxa are defined as species or groups of similar species that may not be easily separated in the field. Core taxa are those identified by MARINE as species to be searched for and counted by all groups.

possible, 50-100 *P. ochraceus* were measured (radius) for size distribution. At three sites (Johnson's Lee, Fossil Reef, and Landing Cove) where *P. ochraceus* were abundant, fixed transects are done as a rough measure of density within that area.

Motile invertebrates (Table 1) were counted in the photoplots by carefully searching the entire plot. Select species were measured for size frequency distribution. Abundant littorine snails and small limpets were sub-sampled in three small plots (either 20cm x 20cm or 10cm x 10cm, depending on density) within the photoplot area. This sub-sampling is a shift from previous sub-sampling and is now standardized with other MARINE sampling.

Phyllospadix spp., surfgrass, cover was measured on fixed point-intercept transects (10 m long, 100 points) (three transects per site) at four sites (Trailer, Fraser Cove, East Point, Northwest Talcott). Special circumstances and general conditions that may have affected sampling were described on daily logs, and reported in the trip reports. Surfgrass transect scoring methods follow the MARINE protocol, adding *Phyllospadix* spp. understory for surfgrass covered by algae. Point totals for the cover may now be over 100%; however, the understory category can be ignored to compare with past data where only the top layer was scored.

Shorebird and pinniped observations were made on arrival and periodically during the day at each site visit. The numbers reported for each species were the greatest number observed at any one time while working at a site. Visitor numbers were reported by concessioners (Island Packers Company and Truth Aquatics) to the park. No independent counts were made to verify reported figures.

The purpose of this report is to present data collected in 2003. Statistical analysis of the data has not been performed. Any trends presented are simple summary statistics and should be viewed as preliminary.

Field work is conducted during low tides generally below mean low water (minus tides) known as spring tides, as opposed to neap tides. Spring tides occur twice each month but often occur at night. Sampling dates for the spring and fall seasons were chosen for minus tide series occurring during daylight hours. Sampling was conducted by Dan Richards and Paula Rich with assistance from others primarily for data recording and seastar counts.

Taxonomy and nomenclature follow Smith and Carlton (1975), Abbott and Hollenberg (1976), McLean (1978), and Morris et al. (1980), with algal nomenclature updated by Paul Silva and Kathy-Ann Miller (UC Berkeley, unpubl.).

Data Analysis

The purpose of this report is simply to report the data from 2003 so no analysis of trends is presented. Basic trends of percent cover, averaged by zone, were graphed for key species in photoplots (acorn barnacles, thatched barnacles, mussels, rockweeds (*Silvetia* and *Hesperophycus*), goose barnacles, red algal turf, and tar) using stock charts in Microsoft Excel. These charts provide a quick view of the cover by season compared to the overall range and mean of values through time for each taxa at each site. In order to minimize variability, photoplot

target types were not pooled when they were analyzed. For example, the percent cover of mussels in only mussel plots was considered. Descriptive statistics (density, average size, minimum and maximum size), averaged by site, were determined for all circular owl limpet plots and the trend through time was graphed by sampling event. Trends of surfgrass were plotted for temporal reference but no analysis was done.

Photoplots, circular plots, and line transects were all “fixed” or measured in the same location every season. The benefit to this sampling design is that it limits some of the natural variability in the system that can obscure important trends in the data, although the tradeoff is that it is not possible to extrapolate trends in the plots to the whole area without using additional information about the area (Murray *et al.* 2006). Therefore, results from photoplots, transects, and circular plots should be interpreted with care.

Table 1. Core Taxa, Higher Taxa, and Substrates Scored in Photoplots, Point Intercept Transects, Circular Plots, Abalone/Sea stars, and Mobile Invertebrate Counts at all CINP sites in 2003.

(Target species are shown in bold.)	<i>Photoplots</i>	<i>Surfgrass</i>	<i>Circular</i>	<i>Abalone/</i>	<i>Motile</i>
		<i>Transects</i>	<i>Plots</i>	<i>Seastar</i>	<i>Inverts</i>
GREEN ALGAE					
<i>Cladophora columbiana</i>	X				
<i>Ulva/Enteromorpha</i>	X				
Other Green Algae (any greens not listed above)*	X	X			
BROWN ALGAE					
<i>Egregia menziesii</i> (Boa Kelp)	X	X			
<i>Eisenia arborea</i>	X				
<i>Endarachne/Petalonia</i>	X				
<i>Halidrys dioica/Cystoseira</i> spp.		X			
Hesperophycus californicus (= <i>H. harveyanus</i>)	X				
<i>Sargassum muticum</i>	X				
<i>Scytosiphon</i> spp.	X				
Silvetia compressa (= <i>Pelvetia fastigiata</i>)(Rockweed) X					
Other Brown Algae (any browns not listed above)*	X	X			
Ephemeral browns	X				
RED ALGAE					
Endocladia muricata (Turfweed)	X				
<i>Chondracanthus canaliculatus</i> (= <i>Gigartina canaliculata</i>)	X				
<i>Chondracanthus spinosus</i>	X				
<i>Gelidium coulteri/pusillum</i>	X				
<i>Mastocarpus papillatus</i> (blade)	X				
<i>Mazzaella affinis</i> (= <i>Rhodoglossum affine</i>) X					
<i>Mazzaella</i> spp.(= <i>Iridaea</i> spp.)	X				
<i>Porphyra</i> spp.	X				
<i>Prionitis</i> spp.	X				
Articulated Corallines (Erect Corallines)	X	X			
Crustose Corallines (Encrusting Corallines)	X	X			
Other Red Algae (any reds not listed above)*	X	X			
ALGAE/PLANTS					
Phyllospadix scouleri/torreyi (Surfgrass)	X	X			
Non-Coralline Crusts (reds and browns)	X	X			
Other Plant/Algae*		X			
ANEMONES					
<i>Anthopleura elegantissima/sola</i> (Green Anemone)	X	X			
POLYCHAETE WORMS					
<i>Phragmatopoma californica</i>	X	X			

Table 1. Core Taxa, Higher Taxa, and Substrates Scored in Photoplots, Point Intercept Transects, Circular Plots, Abalone/Seastars, and Mobile Invertebrate Counts at all CINP sites in 2003 (continued).

(Target species are shown in bold.)	<i>Photoplots</i>	<i>Surfgrass</i>	<i>Circular</i>	<i>Abalone/</i>	<i>Motile</i>
		<i>Transects</i>	<i>Plots</i>	<i>Seastar</i>	<i>Inverts</i>
MOLLUSKS					
<i>Acanthina</i> spp.					X
Chitons X					X
<i>Fissurella volcano</i>					X
<i>Haliotis cracherodii</i> (Black Abalone)				X	
<i>Lepidochitona hartwegii</i>					X
<i>Littorina</i> spp.					X
<i>Lottia gigantea</i> (Owl Limpet)			X		X
<i>Mopalia</i> spp.					X
<i>Mytilus californianus</i> (California Mussel)	X	X			
<i>Nucella emarginata</i>					X
<i>Nuttalina</i> spp.					X
<i>Ocenebra circumtexta</i>					X
<i>Tegula funebris</i>					X
<i>Tegula gallina</i>					X
<i>Tegula</i> spp.	X				
Limpets	X				
Large Limpets > 15mm (excluding <i>L. gigantea</i>)					X
Medium Limpets 5-15mm					X
Small Limpets < 5mm					X
<i>Littorina</i> spp.	X				X
<i>Septifer/Brachydontes</i> X					
BARNACLES					
<i>Chthamalus dalli/fissus</i> & <i>Balanus glandula</i> (Acorn Barnacle)	X				
<i>Tetraclita rubescens</i> (Thatched Barnacle)	X				
<i>Pollicipes polymerus</i> (Goose Barnacle)	X				
Barnacles*		X			
Other Barnacles (any barnacles not listed above)*	X				
ECHINODERMS					
<i>Pisaster ochraceus</i> (Ochre Star)	X	X		X	X
<i>Pisaster giganteus</i>				X	X
<i>Patiria miniata</i>				X	X
<i>Strongylocentrotus purpuratus</i>					X
CRUSTACEANS					
<i>Pachygrapsus crassipes</i>					X
<i>Pagurus</i> spp.					X
INVERTEBRATES					
Other Invertebrates (Other Animals) (any inverts not listed above)*	X	X			
SUBSTRATES					
Rock (Bare Rock)	X	X			
Sand	X	X			
Tar	X	X			
UNDETERMINED					
Unidentified (cannot tell if plant, invert or substrate)	X	X			
* The specific definitions of these categories are different for photoplots compared to transects.					

Results and Discussion

2003 Sampling Event

We sampled all sites in 2003, visiting each site in both spring and fall except Santa Barbara Island (Table 2). Because of costs and logistic difficulties, and because California brown pelicans now nest on the island every spring, we have abandoned the spring sampling at Santa Barbara Island.

We experienced rain, high wind and swell during part of the Santa Rosa Island sampling in March. We had some high wind and swell at Santa Cruz in March. At San Miguel in April, we had some light rain one day and large swells. High winds and seas delayed part of our spring Anacapa monitoring in April but fortunately we were able to make-up the missed days in May during good conditions. The spring weather was mostly good but the tides were barely long enough to finish a site. In October, we experienced Santa Ana wind at Santa Barbara Island which brought ashes from a mainland fire to the island. High swells were problematic at Santa Barbara Island, but we had the advantage being able to spread the sampling over several days. We had generally good conditions in November and December at Santa Rosa Island and Santa Cruz Island, though at a few sites, large swells made sampling difficult and prevented seastar and abalone searches. Good conditions prevailed throughout the January sample.

Table 2. 2003 Sampling dates for Rocky Intertidal Monitoring sites

<i>Site</i>	<i>Site Codes</i>	<i>Spring</i>	<i>Fall</i>
Cuyler Harbor, SMI	SMCH	4/13/03	1/8/04
Crook Point, SMI	SMCP	4/11/03	1/7/04
Otter Harbor, SMI	SMOH	4/12/03	1/6/04
Harris Point, SMI	SMHP	4/14/03	1/5/04
Fossil Reef, SRI	SRFR	3/13/03	11/23/03
Johnson's Lee, SRI	SRJL	3/17/03	11/24/03
Ford Point, SRI	SRFP	3/18/03	11/25/03
Northwest-Talcott, SRI	SRNWT	3/14/03	11/21/03
East Point, SRI	SREP	3/16/03	11/22/03
Fraser Cove/Forney Cove, SCI	SCFC	3/25/03, 3/26/03	12/8/03
Trailer, SCI	SCTR	3/25/03	12/9/03
Willows Anchorage, SCI	SCWA	3/27/03	12/7/03
Scorpion Rock, SCI	SCSR	5/22/03	12/19/03
Prisoner's Harbor, SCI	SCPH	3/24/03	12/5,6/03
Orizaba Cove, SCI	SCOC	5/19/03	1/22/04
Cat Rock, ANI	ANCR	5/21/03	1/20/04
South Frenchy's Cove, ANI	ANSFC	5/20/03	1/19/04
Middle Anacapa-West	ANMW	4/24/03	1/21/04
Middle Anacapa-East	ANME	4/24/03	1/21/04
Landing Cove, SBI	SBLC	--	10/23-27/03
Sea Lion Rookery, SBI	SBSLR	--	10/25/03

--no spring sample because of nesting pelicans

Photoplots

We began using a digital camera to photograph plots in 2003 and were quite pleased with the results. We shifted over fully to digital in the fall sampling. Partly because of time spent training Paula, and partly because of weather conditions, the majority of plots were scored in the office either from slides or digital images on the computer.

Photoplot data are summarized in figures 2-4 for each target zone and season. Mean percent cover is the pooled value of all replicate plots per zone (usually five) by site and season and is plotted against the range and mean cover across all years. Percent cover values of core taxa by plot are presented in tables in Appendix A. Summary tables (by zone for each site can be found in the trip reports (Appendix B).

Only Trailer, Cuyler Harbor, Crook Point, and Harris Point had *Chthamalus/Balanus* cover greater than the long-term average (figures 2 and 3). Six others were near average, but 10 sites were below the long-term means. High barnacle recruitment was noted at Trailer, Otter Harbor, Harris Point and at Willows Anchorage which does not have barnacle plots. Cover at Otter Harbor fell just below the site mean at least in part because of plot 374 which is entirely dominated by red algae. Barnacles were noted as being abundant at Prisoner's Harbor, but the overall cover was just below the long-term mean. Two of the plots there may get some scouring by cobble stones. Low barnacle cover was noticeable at East Point. Sea Lion Rookery and Landing Cove barnacles may have been partly obscured by the *Ulva* sp. that was dominant in *Chthamalus/Balanus* zone plots. A large decline in the cover of *Chthamalus* sp. at South Frenchy's cove between spring and fall was a result of new growth by *Endocladia muricata* and *Hesperophycus californicus* in those plots.

Dense *Endocladia muricata* was seen at East Point, Harris Point, and Willows Anchorage. At Willows Anchorage, the *E. muricata* was dense and dark in the spring but some bleaching was noted there in the fall. *Ulva* sp. was abundant in the *Endocladia* zone at Sea Lion Rookery. Between spring and fall, *E. muricata* declined severely at Harris Point. Some decline was noted at Crook Point, but mostly in one plot.

Mytilus californianus were noted as having high recruitment at all the Anacapa and Santa Barbara Island sites as well as Willows Anchorage, and Crook Point. Several of the sites had noticeable increases in mussel cover between spring and fall (figures 2 and 3). High cover was also seen at East Point. Seven sites had lower than normal mussel cover. *Pisaster ochraceus* were most likely responsible for the low cover at many of the sites, particularly at Johnson's Lee, Ford Point, Willows Anchorage, and Fossil Reef. Large open patches were noted in the mussel bed at Prisoner's Harbor in the spring sample with only two plots having appreciable cover. *Mytilus* were missing from all plots except for some small recruits in the fall sample. Pigs were suspected of much of the damage after having been observed eating mussels on that reef in 2002. A film of small filamentous red algae (Ceramiales) covered the mussel plots. Small dense patches of small *Mytilus* were present at on the reef at Prisoner's Harbor. *Mytilus californianus* were abundant in some *Silvetia* plots at Crook Point.

Silvetia compressa cover was notably low at Willows Anchorage, Prisoner's Harbor, Crook Point, and South Frenchy's Cove (figures 2 and 3). Cover was low at Fossil Reef, but *Silvetia* was present and the highest cover was in one of the Endocladia zone plots. Young dense plants were noted on some of the higher parts of Fossil Reef. At Prisoner's Harbor with most of the *S. compressa* fronds were cropped short, possibly due to pigs browsing as they had in fall 2002 (Richards *et al.* 2009).

Hesperophycus californica recruitment was noted at Harris Point and East Point where young plants were found. Rock breakage at Trailer sheared off part of plot He-4 (919). We will continue to monitor this plot but suspect that the change in topography will change the suitability of the plot to *H. californica*. *Hesperophycus* continued to be prominent in Chthamalus/Balanus zone plots at Cat Rock.

Tetracilita rubescens cover was slightly above average at Harris Point but below the mean at Scorpion Rock. Tar cover at Fraser Cove was slightly above average. Red algal turf was slightly below the long-term mean at Landing Cove, probably because of increasing surfgrass. *Pollicipes polymerus* cover in that zone was low but essentially unchanged in the Pollicipes zone at Fraser Cove (figure 4).

The red algal turf zone is monitored only at Landing Cove. It was established partly for experimental reasons and partly because that zone is so prominent there. *Chondracanthus canaliculatus*, *Gelidium* spp. and *Pterocladia* sp. are the dominant algae. *Corallina* spp., *Mazzaella affinis*, and other small red algae may be common. *Phyllospadix torreyi* has become dominant in two of the plots and one plot one plot (324) is a mix of algae with *Egregia menziesii* and *Prionitis lanceolata* dominating.

Note: we experienced camera problems at East Point and Johnson's Lee and we do not have a film record for the plots from spring. However, we were experimenting with digital photos and have those in most cases as a backup record. The photo of one of the Endocladia zone plots (885) at Fraser Cove was half exposed because of camera problems. There was a problem with the camera at Harris Point and several frames overlap on the film resulting in a loss of three plots (435, 427, 429) and the abalone plots. Unfortunately we did not shoot digital photos Harris Point and did not score the plots in the field so we have no cover data for those missing plots.

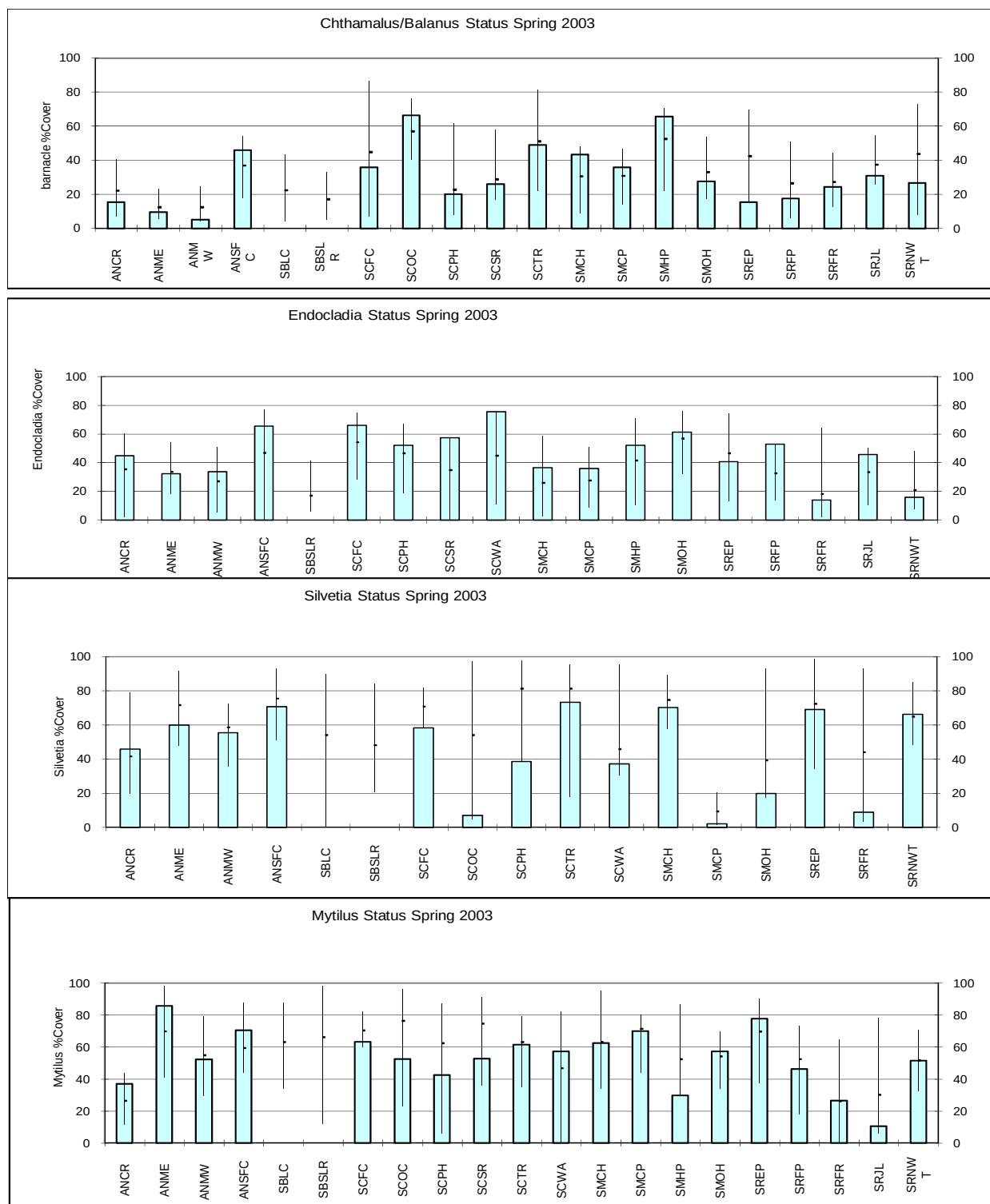


Figure 2. Percent cover of target species in fixed plots by zone in spring 2003. Bars represent the spring 2003 mean percent cover from five plots within that zone. Vertical lines represent the range of means since monitoring began at that site. Horizontal tick marks represent the overall mean for all years at that site. Sites without bars were not sampled in this season. See table 2 for site codes.

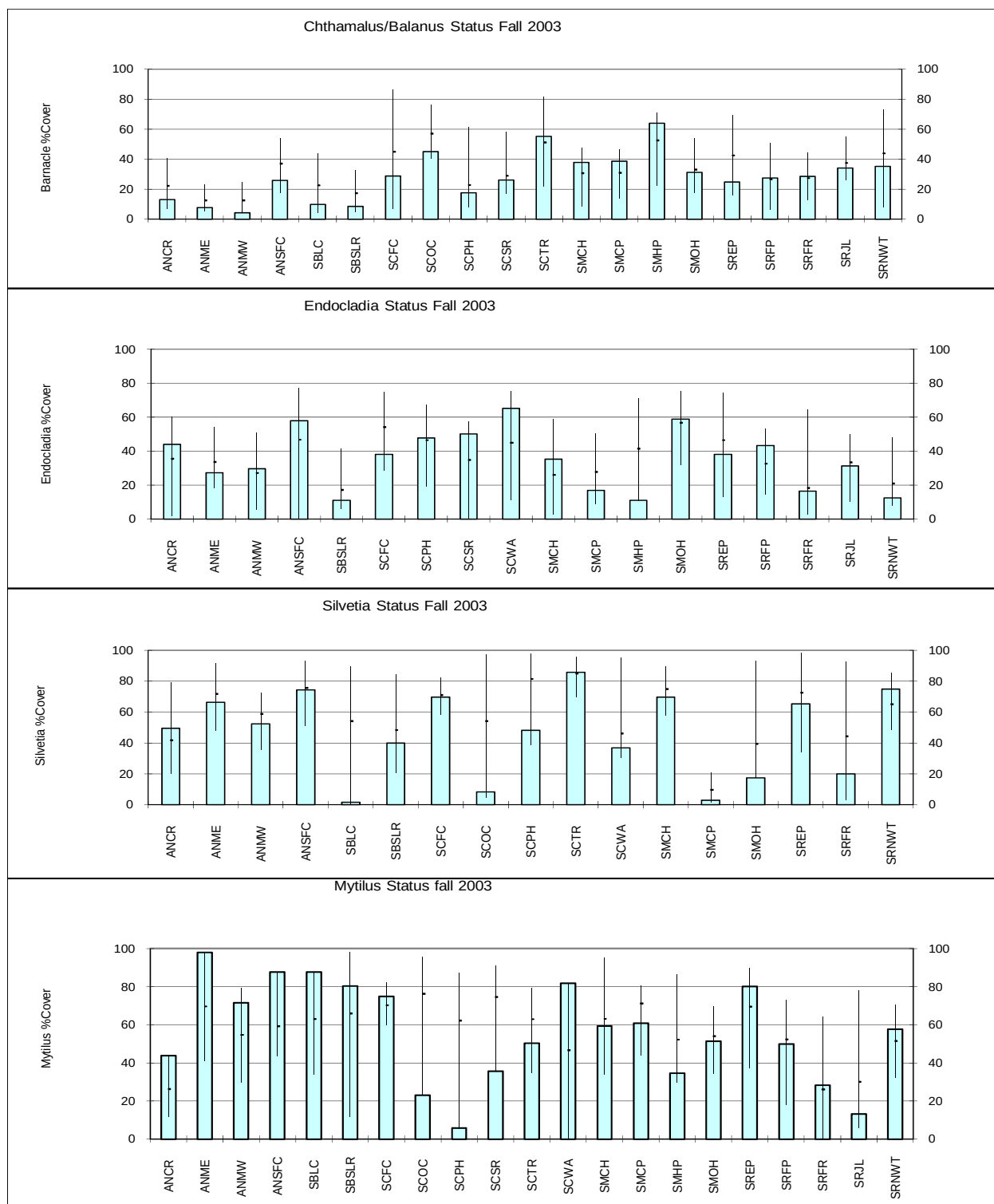


Figure 3. Percent cover of target species in fixed plots by zone in fall 2003.

Bars represent the fall 2003 mean percent cover from five plots within that zone. Vertical lines represent the range of means since monitoring began at that site. Horizontal tick marks represent the overall mean for all years at that site. Sites without bars were not sampled in this season. See table 2 for site codes.

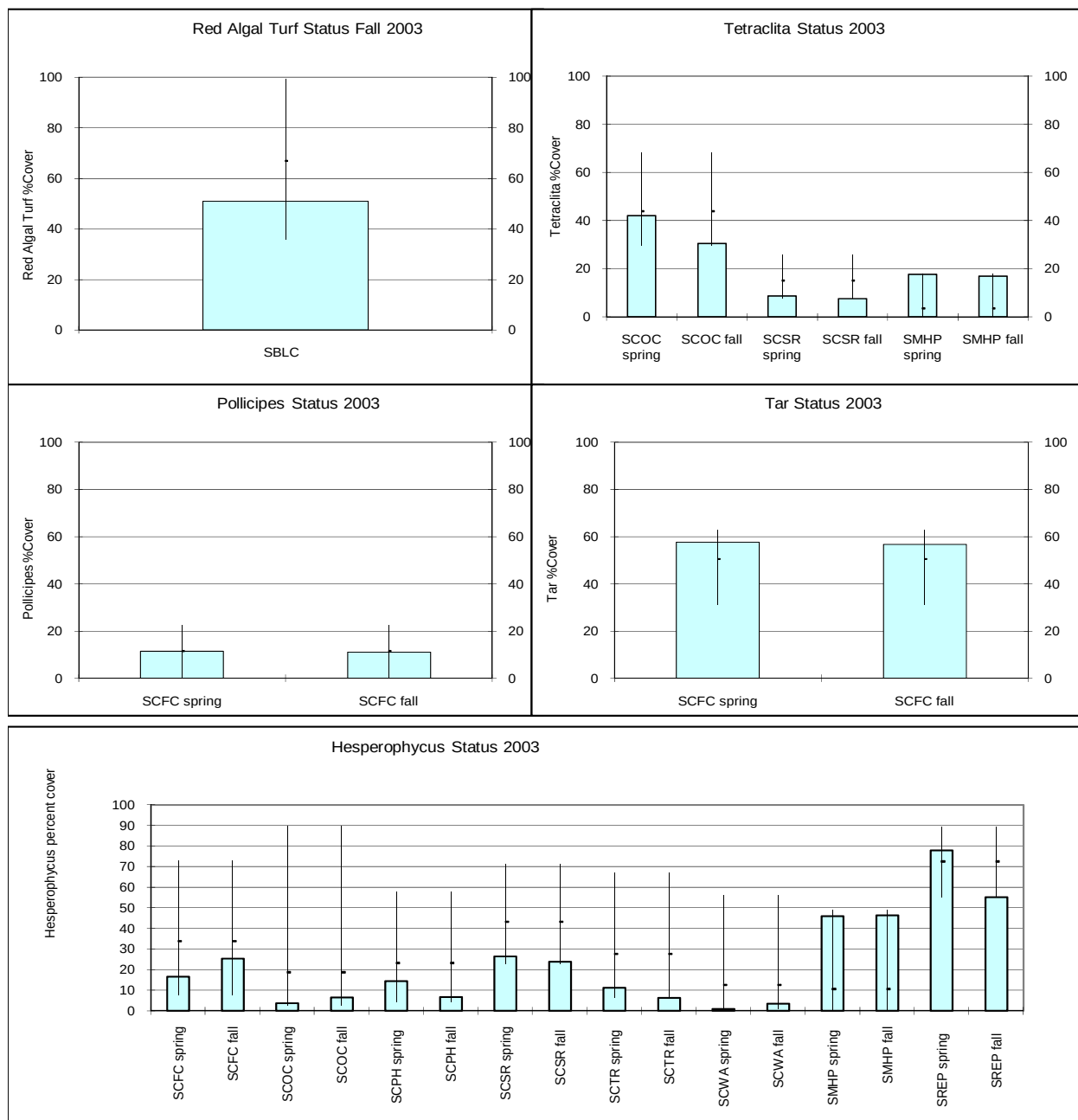


Figure 4. Percent cover of target taxa in fixed plots by zone in 2003. Bars represent the seasonal mean percent cover from five plots within that zone. Vertical lines represent the range of means since monitoring began at that site. Horizontal tick marks represent the overall mean for all years at that site. See table 2 for site codes.

Motile Invertebrates

Motile invertebrates were sampled at all sites in spring except Middle Anacapa East, Scorpion Rock, Landing Cove and Sea Lion Rookery. Not all plots were counted at Prisoner's Harbor and Orizaba Cove because of time constraints. Motile invertebrates at all four Anacapa sites and both Santa Barbara Island sites were counted in the fall. Motile invertebrates were not counted at Scorpion Rock in the 2003 sampling because of lack of time, but had been counted in January 2003 and were reported in the 2002 annual report. Additional details about the counts and data tables can be found in the trip reports in Appendix B.

There was considerable variation between both numbers and diversity of motile invertebrates among the sites. For example there are three main predatory snails common among the sites; however, their distribution can be highly variable. *Acanthina* sp. was present at all Anacapa sites but *Ocenebra circumtexta* was only common at South Frenchy's Cove, while *Nucella emarginata* was common at all Anacapa sites except Cat Rock where it was absent. *Nucella* was absent at both Santa Barbara Island sites, but both *Acanthina* and *Ocenebra* were common. All three of the snails were common at Cuyler Harbor and rare at Otter Harbor. Cuyler had an extraordinary abundance of *N. emarginata*, 10 times the number found at Otter Harbor. *Nucella emarginata* were present in all zones at Cuyler Harbor and were especially abundant in the mussel zone plots with 20-49 snails in each plot. At Santa Rosa Island, *Nucella* and *Acanthina* were common at all sites while *Ocenebra* was uncommon at all sites. *Acanthina* were most abundant at East Point and rare at both Johnson's Lee and Ford Point. At Santa Cruz Island, *Nucella* were fairly common except at Prisoner's Harbor and were most abundant at Orizaba Cove and Fraser Cove. *Acanthina* were present in moderately low numbers at most sites but were absent from Orizaba Cove. *Ocenebra* were present at low densities at all sites, though a fair number were found at Prisoner's Harbor. A subjective comparison of sizes among *Nucella* and *Acanthina* shows very little difference among the islands. *Ocenebra* was the only snail with much variation with Anacapa having the smallest means (7-12 mm) and San Miguel with the largest (15-20 mm). *Nucella* and *Ocenebra* tended to be most common in the Mussel zone while *Acanthina* was more commonly found in the upper zones.

Mean sizes were fairly consistent among the species at sites that had sufficient sample sizes for comparison. Mean sizes for *N. emarginata* were between 14 and 21mm at all sites. The overall range for *N. emarginata* was 6-30mm. *Acanthina* sp. mean sizes were 10-17mm with an overall range of 4-25mm. The mean sizes of *O. circumtexta* were between 7-18mm at all sites with an overall range of 4-22mm.

Two chitons, *Lepidochitona* spp. and *Nuttalina* spp., were abundant at Cat Rock. Fossil Reef had the highest density of *Nuttalina* for all the sites and was anomalous with the other Santa Rosa Island sites. *Lepidochitona* was dense at East Point where there is a broad rockweed zone, which is its preferred habitat.

Littorina keenae and *L. scutulata* were both typically present at all sites and were often abundant in all zones except the mussel zone, though they were most abundant in the Balanus/Chthamalus zone. East Point, Otter Harbor, Harris Point, Crook Point, and Orizaba Cove had the highest densities of *Littorina* spp., all with several hundred snails per plot *averaged* for the whole site.

Tegula funebris, black turban snails, were common at Fraser Cove, Trailer, East Point, Fossil Reef, Northwest Talcott, and Cuyler Harbor. Few black turban snails were found at Santa Barbara or Anacapa. Santa Rosa Island sites had the greatest overall size range with individuals from 3-34mm found. Santa Rosa also had the greatest range of mean sizes of *T. funebris* with 8mm at Johnson's Lee and 21mm at Northwest Talcott. Sizes at San Miguel ranged from 10-19mm and at Santa Cruz from 13-16mm. Juveniles were noted at Johnson's Lee, Ford Point, and Crook Point. *Tegula gallina*, considered a southern species, was found at Northwest-Talcott, Trailer, Fraser Cove, and Cat Rock.

Pachygrapsus crassipes were common at Sea Lion Rookery, Cat Rock, Middle West, South Frenchy's Cove, East Point, Fossil Reef, and Harris Point. The highest abundance was at Cat Rock. There were more crabs found in the spring sample at Cat Rock and South Frenchy's Cove than in fall, but Middle Anacapa showed no seasonal variation. Most of the crabs found in our plots were recently settled juveniles and were most often found in mussel zone plots. Young *Pugetia producta* were present at Northwest-Talcott, though these crabs are not typically monitored in our plots.

Haliotis cracherodii

Haliotis cracherodii count and size information is summarized in Table 3, pooled by island for each season. Additional information about counts at individual sites is presented in Tables 4 and 5. Otter Harbor was once again the site with the greatest number (87) of *H. cracherodii*. We also found 53 abalone at Crook Point. Both numbers were improvements over the last two years but the 24 found at Harris Point was a decrease of nearly 30%. Excellent conditions in the fall allowed us to do complete counts, making up for not being able to make thorough counts in the spring because of rough conditions. A total of 201 black abalone were counted in fall 2003, an improvement over the 162 counted in 2002. Abalone were found within the fixed plots at both Crook Point and Harris Point (tables 4-5). Black abalone numbers in plots were down from the 2002 numbers at Harris Point and Otter Harbor but up at Crook Point.

In 2003, we did not find abalone under 50 mm. With the exception of a few small juveniles found in 2002, the size distribution (figure 5) is the essentially same as in 2002. No evidence of Withering Syndrome was observed in 2003.

Table 3. *Haliotis cracherodii*, black abalone, counts from 2003 sampling. Data from sites are combined by island. CountRandom is the number of abalone from 30-minute search, CountInPlot is the number of abalone found in fixed plots (not all sites were monitored each season, thus area size is different).

Island	Year	Season	CountRandom	CountInPlots	Area (m ²)	Density	CountSized	MeanSize	StDev	MinSize	MaxSize
SB	2003	fall	0	0		.000	0				
AN	2003	spring	5	0		.000	5	96.20	18.89	78	123
AN 2	003	fall	1	0		.000	1	130.00		130	130
SC	2003	spring	0	0		.000	0				
SC	2003	fall	6	0		.000	8	83.38	21.70	60	120
SM 2	003	spring	4	4	34.2	.117	8	98.75	24.09	50	122
SM	2003	fall	161	3	5.9	.508	164	102.37	23.44	50	170
SR	2003	spring	14	0	128.6	.000	14	120.79	19.30	84	159
SR	2003	fall	28	0		.000	28	131.71	20.05	91	168

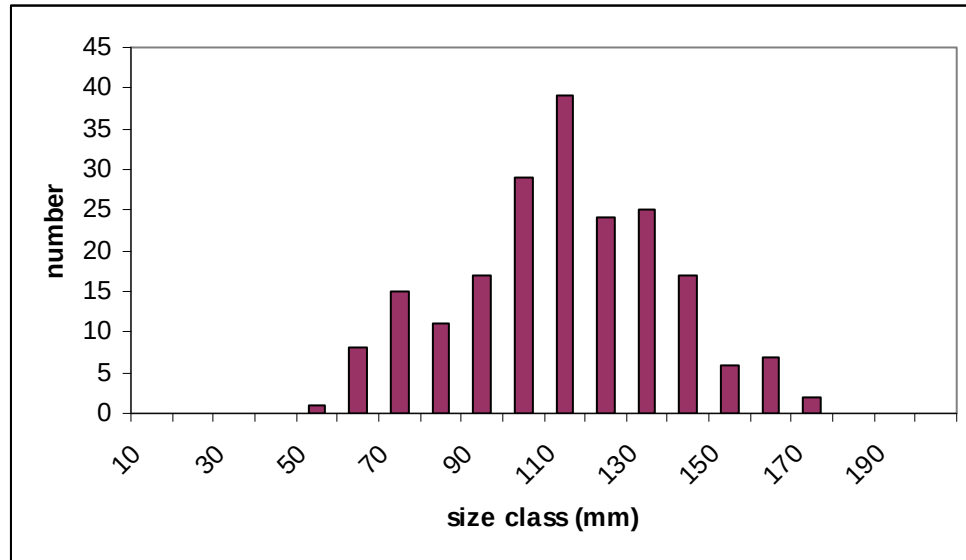


Figure 5. *Haliotis cracherodii* size distribution in fall 2003, all sites combined (n=201).

Table 4. Sea star and black abalone searches in spring 2003. (-- indicates no plot or transect, nc indicate no count performed, P.o.= *Pisaster ochraceus*, P.g.=*P. giganteus*, P.b.= *Pisaster brevispinous*, P.h.=*Pycnopodia helianthoides*, P.m.= *Patiria miniata*).

<i>Site Sampling</i>	<i>Date</i>	<i>Seastars in 30 min</i>	<i>Seastars in transects</i>	<i>Abalone in plots</i>	<i>Abalone search</i>
Cuyler Harbor, SMI	4/13/2003	nc --		-	nc
Crook Point, SMI	4/11/2003	94 P.o.	12 P.o. in ab plots	2 0	
Otter Harbor, SMI	4/12/2003	nc	--	0	nc
Harris Point, SMI	4/14/2003	Nc	(2mx12m)2 P.o.	2	4
Fossil Reef, SRI	3/13/2003	-	(15mx6m x2) 23,32 P.o.	0 13	
Johnson's Lee, SRI	3/17/2003	-	(10mx2m x3) 42, 30,42 P.o.	0 1	
Ford Point, SRI	3/18/2003	Nc, Abundant	--	0	-
Northwest-Talcott, SRI	3/14/2003	1 P.g.	--	0	0
East Point, SRI	3/16/2003	120 P.o.	--	0	0
Fraser Cove, SCI	3/26/2003	75 P.o.	--	--	0
Trailer, SCI	3/25/2003	235 P.o. 4 P.g.	--	-- 0	
Willows Anchorage, SCI	3/27/2003	390 P.o.	--	--	0
Scorpion Rock, SCI	5/22/2003	88 P.o., 2 P.g.	-- --		0
Prisoner's Harbor, SCI	3/24/2003	Nc, Common	--	--	nc
Orizaba Cove, SCI	5/19/2003	131 P.o.	--	--	0
Cat Rock, ANI	5/21/2003	0 --		0	0
South Frenchy's Cove, ANI	5/20/2003	1 P.o.	--	--	0
Middle Anacapa-West	4/24/2003	229 p.o.	--	nc	2

Table 5. Sea star and black abalone searches in fall 2003. (-- indicates no plot or transect, nc indicate no count performed, P.o.= *Pisaster ochraceus*, P.g.=*P. giganteus*, P.b. = *Pisaster brevispinus*, P.h.=*Pycnopodia helianthoides*, P.m.= *Patiria miniata*).

<i>Site Sampling</i>	<i>Date</i>	<i>Seastars in 30 min</i>	<i>Seastars in transects</i>	<i>Abalone in plots</i>	<i>Abalone search</i>
Cuyler Harbor, SMI	1/8/04	111 --		--	0
Crook Point, SMI	1/7/04	122	--	1	53 (1 hr)
Otter Harbor, SMI	1/6/04	37 P.o., 2 P.m., 4 P.g.	--	0	87 (1 hr)
Harris Point, SMI	1/5/04	8 P.o.	(2mx12m) 0	2	24 (1 hr)
Fossil Reef, SRI	11/23/03	266 P.o., 36 P.g., 3 P.h., 3 P. m.	(30x6m) 72 P.o.	0	16
Johnson's Lee, SRI	11/24/03	nc	(10x2m) 45 P.o., 1 P.g.	0 3	
Ford Point, SRI	11/25/03	nc --		0	8
Northwest-Talcott, SRI	11/21/03	3 P.o., 2 P.b.	--	0	1
East Point, SRI	11/22/03	105 P.o.	--	0	0
Fraser Cove/Forney Cove, SCI	12/8/03	nc --		--	nc
Trailer, SCI	12/9/03	141	--	-- 0	
Willows Anchorage, SCI	12/7/03	nc --		--	1
Scorpion Rock, SCI	12/19/03	73 P.o., 3 P.g.	--	--	
Prisoner's Harbor, SCI	12/6/03	67 P.o., 1 P.g.	--	--	0
Orizaba Cove, SCI	1/22/04	186 P.o. 1 P.g., P.m.= present (nc)	-- --		7
Cat Rock, ANI	1/20/04	7 P.o., 1 P.g.	--	0	1
South Frenchy's Cove, ANI	1/19/04	4 P.o.	--	--	0
Middle Anacapa-West	1/21/04	216 --		nc	0
Middle Anacapa-East	1/21/04	nc	--	--	nc
Landing Cove, SBI	10/26/03	309 P.o.	(18x2m) 69 P.o.	-	0
Sea Lion Rookery, SBI	10/25/03	6 P.o.	--	0	0

Lottia gigantea

All *Lottia gigantea* plots were monitored in the fall. Because we had time, plots were also monitored at South Frenchy's Cove and Northwest-Talcott in spring. Summary count and size information are presented in Table 6. Plot data can be found in the trip reports (Appendix B). Distribution among size classes is shown in Table 7. Histograms for each site are shown in trip reports (Appendix B). Overall counts at each of island increased over the 2002 counts. At Northwest-Talcott, the percentage of small owl limpets (<30 mm) was higher in spring as was the total number in plots (125 in spring vs. 104 in fall). A similar pattern was seen at South Frenchy's Cove.

The largest owl limpets were found at Northwest-Talcott (mean=67mm) followed by Fossil Reef (mean=55mm) and Trailer (mean=54mm). The smallest owl limpets were found at Willows Anchorage (mean=31mm), Otter Harbor (mean=31mm), and Cat Rock (mean=32mm). Size and density trends for *L. gigantea* are shown in figures 6-9. Densities increased slightly at several sites in 2003 but show no real change over recent years. Most sites showed a small decline in

mean sizes (coupled with increases in the percentage of smaller size classes compared to 2002) which may indicate some recruitment.

Table 6. *Lottia gigantea* plot count and size information for 2003. All sites pooled by island.

Island	Season	Count	Area (m ²)	Density	MeanSize (mm)	StDev	MinSize (mm)	MaxSize (mm)
Anacapa s	pring	32	9.42	3.396	47.25	8.29	24	65
Anacapa	fall	166	18.85	8.808	34.20	11.15	16	66
Santa Cruz	fall	299	47.12	6.346	41.85	20.69	10	95
San Miguel	fall	487	31.41	15.505	32.15	12.42	14	74
Santa Rosa	spring	125	15.71	7.959	58.34	25.54	15	100
Santa Rosa	fall	590	62.82	9.392	51.86	20.69	11	103

Table 7. Size distribution of *Lottia gigantea* in 2003. All sites pooled by island.

Island	Season	%<20mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	%>=100mm
AN	fall	5.42%	33.73%	29.52%	19.28%	10.24%	1.81%	0.00%	0.00%	0.00%	0.00%
SC	fall	14.72%	19.73%	15.72%	16.05%	11.71%	10.37%	6.02%	4.01%	1.67%	0.00%
SM	fall	13.14%	36.55%	25.67%	12.53%	8.83%	3.08%	0.21%	0.00%	0.00%	0.00%
SR	fall	8.31%	10.00%	10.17%	12.54%	21.19%	19.32%	10.34%	4.24%	3.22%	0.68%

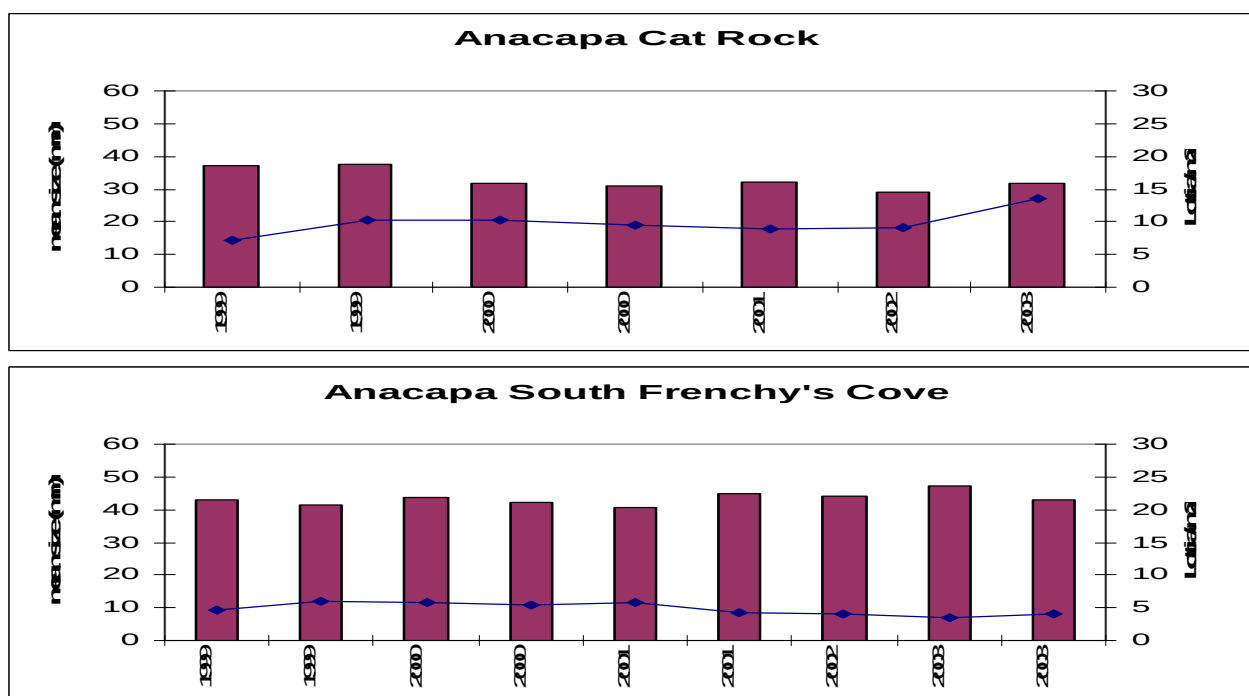


Figure 6. Owl limpets at Anacapa Island 1999-2003. Bars represent mean size (mm) and lines represent mean density from three fixed plots.



Figure 7. Owl limpets at Santa Cruz Island 1998-2003. Bars represent mean size (mm) and lines represent mean density from five fixed plots.

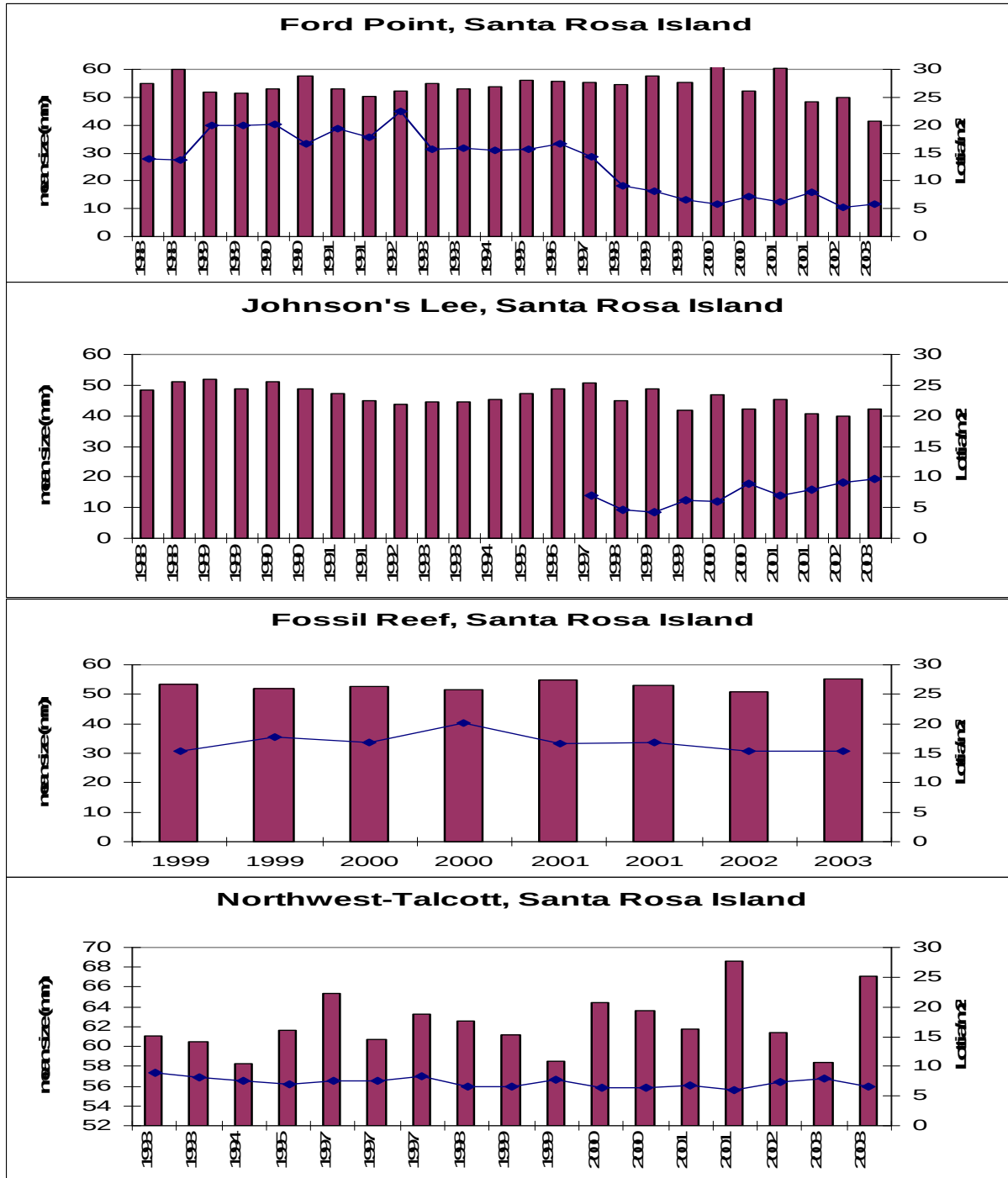


Figure 8. Owl limpets at Santa Rosa Island 1998-2003. Bars represent mean size (mm) and lines represent mean density from five fixed plots.

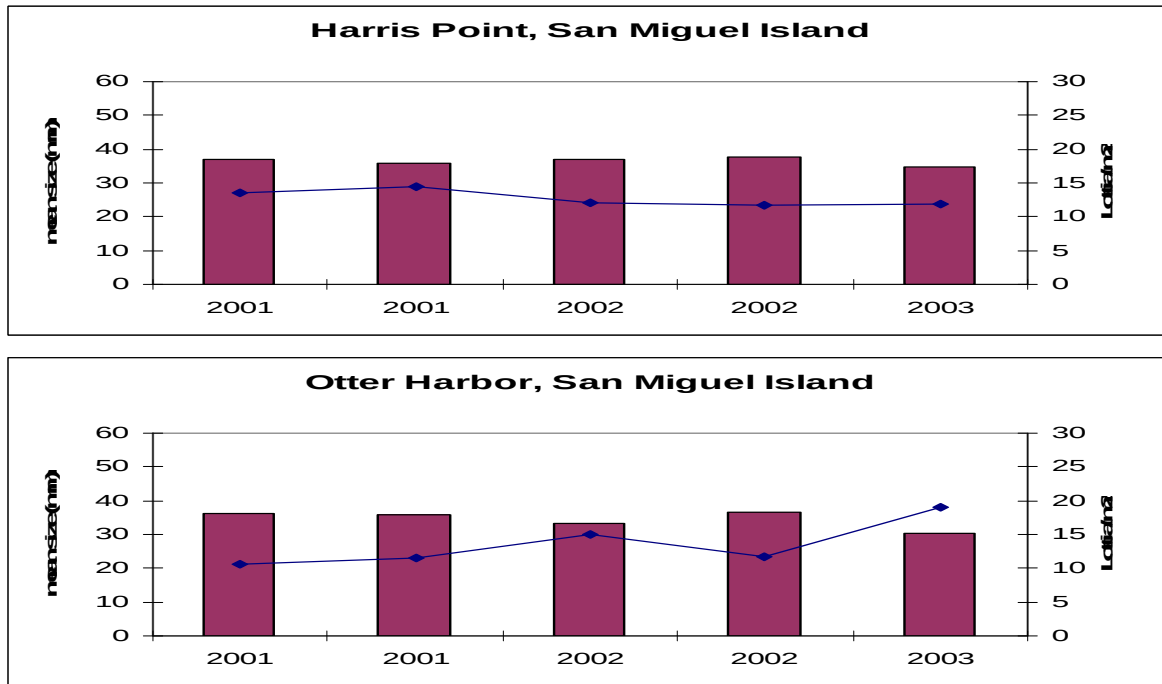


Figure 9. Owl limpets at San Miguel Island 2001-2003. Bars represent mean size (mm) and lines represent mean density from five fixed plots.



Figure 10. Lower reef at Johnson's Lee. Former *Mytilus californianus* bed is dominated by *Phragmatopoma californica* and *Anthopleura sola* following *Pisaster ochraceus* invasion.

Sea stars

Pisaster ochraceus are the most common sea star in the rocky intertidal zone. Because they can be highly mobile, fixed plots are of limited value. Timed counts allow some comparison of effort. There are a few areas where we consistently find aggregations of *P. ochraceus* and transects have been used to follow changes within those areas. Information on timed searches and transects is shown in Tables 4 and 5. Surveys could not be done at all sites in all seasons because of swell or marginal tide levels. Distribution within size categories was collected whenever possible and those data can be found in the trip reports (Appendix B). We began taking size frequency measurement of *P. ochraceus* in the fall and the histograms are shown in the trip reports.

Other species of large sea stars found at the sites in 2003 include *Pisaster giganteus*, *Pisaster brevispinus* (at Northwest-Talcott), *Patiria miniata* (formerly *Asterina miniata*) and *Pycnopodia helianthoides*. Other smaller species such as *Leptasterias hexactis* were found at some sites, but because of their cryptic nature they are not monitored except in the motile invertebrate counts.

Pisaster ochraceus are major predators on *Mytilus californianus* and other mollusks (Ricketts . *Pisaster* are capable of changing the dynamics of the mussel community (Paine 1974) and generally set the lower limit of mussel bed as they have at Johnson's Lee where *Phragmatopoma californica* and *Anthopleura sola* dominate the lower mussel zone plots in their wake (figure 10). Large *P. ochraceus* were heavily impacting the mussels at Scorpion Rock in 2003. Large numbers of juvenile *P. ochraceus* were found at Willows Anchorage where the abundance of sea stars has been increasing in recent years and devouring mussels on the lower shelf. Impacts to the mussels from *P. ochraceus* were also seen at Ford Point.

The greatest numbers of *P. ochraceus* were found at Willows Anchorage, Landing Cove, Fossil Reef, Middle Anacapa West, Trailer, and Orizaba Cove. Ford Point and Johnson's Lee typically have high densities of *P. ochraceus* but we were unable to get counts at either site. Harris Point, Cat rock, South Frenchy's Cove, Sea Lion Rookery, and Northwest Talcott all had very low numbers of all sea stars.

Phyllospadix spp.

Phyllospadix spp., surfgrass, cover was monitored at two sites each on Santa Cruz Island and Santa Rosa Island. *Phyllospadix torreyi* was the dominant species present in most transects but some *P. scouleri* may have been present. Figures 12 and 13 show the trends for each of the three transects at the four sites. Tables with complete results from 2003 are in the trip reports (Appendix B).

Surfgrass overstory cover remained relatively high in all transects. Transect 3 at Northwest Talcott had an overturned boulder in it in spring which caused a slight dip in surfgrass cover but it had recovered by fall. In the spring, we estimated 30% of surfgrass was bleached, usually the result of low daytime tides. At Trailer, *Chondracanthus canaliculatus* was next most abundant category. *Phyllospadix* spp. at Trailer had fairly high bleaching in spring and abundant *Smithora naiadum*, a common epiphyte. Bleached surfgrass was evident in Transects at Fraser Cove (figure 11).



Figure 11. *Phyllospadix* transect 3 at Fraser Cove. Coralline algae is pink and bleached *Phyllospadix* spp. in the lower right is brown

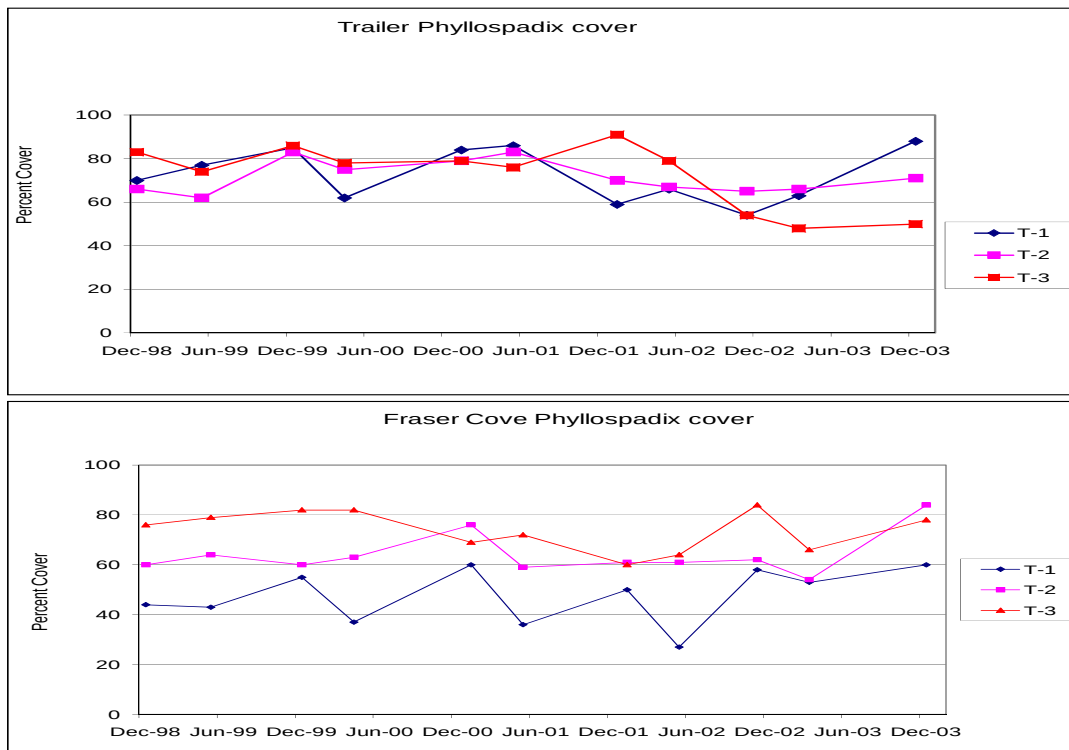


Figure 12. *Phyllospadix* spp. cover trends on 10m point-intercept transects at Trailer and Fraser Cove, Santa Cruz Island.

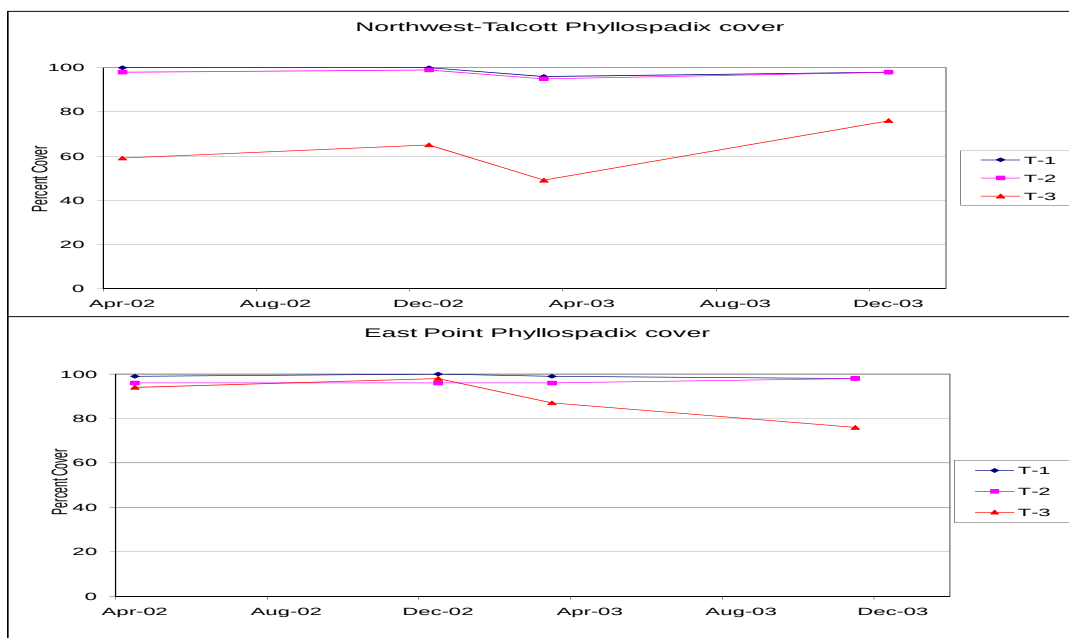


Figure 13. Surfgrass, *Phyllospadix* spp., cover trends on 10m point-intercept transects at Northwest-Talcott and East Point Santa Rosa Island.

Shorebirds and Pinnipeds

Tables 8 and 9 present a summary of the shorebird and pinnipeds observed at the sites in 2003. In 2003 we had a total of six sightings of American Oystercatchers, *Haematopus palliatus*, from five different sites in 2003, more than we have ever had in the past. Black Oystercatchers, *H. bachmani*, were again the most ubiquitous shorebird, seen at all sites at least once during sampling in 2003. Large numbers of black oystercatchers were occasionally seen in an area, including 24 at Crook Point, 13 at Fossil reef and 11 at Fraser Cove (plus one American oystercatcher). Other shorebirds seen were whimbrel, wandering tattler, and willet. Seabirds such as pelicans and cormorants frequently use rocky points and islets as roosting areas. Western gulls, *Larus occidentalis*, are often seen foraging among the mussel beds and adjacent beaches. Terrestrial birds such as song sparrow, *Melospiza meodia*, and black phoebe, *Sayornis nigricans*, often feed in the supra-littoral zone. Common ravens, *Corvus corax*, are always searching for carcasses along the shore but are often seen picking invertebrates from the mussel beds. Occasionally we see belted kingfishers, *Ceryle alcyon*, feeding in tidepools as we did at Scorpion Rock in December 2003.

Harbor seals, *Phoca vitulina*, were observed at or near nine of the sites. They are most numerous at Otter Harbor where they haul out on the protected flat rocky bench to rest at low tide. Northern elephant seals, *Mirounga angustirostris*, usually prefer sandy beaches to rocky shelves to haul out, and were most common at sites adjacent to sandy beaches. They are a common sight at Crook Point and Fossil Reef in the spring when we find weaned pups that haven't gone to sea yet or adults coming ashore to molt. It was unusual to see immature elephant seals at Harris Point. California sea lions, *Zalophus californianus*, are common at both Santa Barbara Island sites where they can be very numerous. Especially at Sea Lion Rookery, they are responsible for trampling the upper reef and contributing much nitrogen to the system, causing the blooms of *Ulva* sp (figure 14).



Figure 14 . Sea Lion Rookery. Endocladia zone plots along reef edge in foreground are green with *Ulva* sp. cover as a result of sea lion trampling.

Table 8. Shorebirds and Pinnipeds at monitoring sites in spring 2003 (maximum number of individuals seen at any one time). (*= nearby but not on monitoring reef)

<i>Site</i>	<i>Blac</i>	<i>k</i>	<i>Black</i>	<i>Other birds</i>	<i>Phoca</i>	<i>Mirounga</i>	<i>Zalophus</i>
			<i>Oystercatcher/</i>	<i>Turnstone</i>	<i>vitulina</i>	<i>Angustirostris</i>	<i>californianus</i>
			<i>(American)</i>				
ANCR 5(1)					2		
ANMW/ANME	4				1		
ANSFC	2			1 Western gull			
SCFC							
(Forneys)							
SCFC (Fraser)	11/(1)						
SCOC 2							1
SCPH 1							
SCSR	2			*California brown pelican			1
SCTR	2		2		*1		
SCWA *4					*1		
SCSR							
SREP	2			15 Brant's cormorant, 30 double-crested cormorant, 10 western gull			
SRFP 1			6				
SRFR	12		1	8 pelagic cormorant, 6 western gull	7	14	
SRJL 2							
SRNWT			*	3 western gull			
SMCH 3			4	1whimbrel			
SMCP	24		5	10 double-crested cormorant, 2 western gull	10		
SMHP 3					2	3	
SMOH	4		10	5 western gull	20	2	

Table 9. Shorebirds and Pinnipeds at monitoring sites in fall 2003 (maximum number of individuals seen at any one time). (*= nearby but not on monitoring reef)

Site	Black <i>Oystercatcher/</i> <i>(American)</i>	Black <i>Turnstone</i>	Other birds	<i>Phoca</i> <i>vitulina</i>	<i>Mirounga</i> <i>Angustirostris</i>	<i>Zalophus</i> <i>californianus</i>
ANCR	2, *5		2 western gull			
ANMW/ANME						
ANSFC *1				*1		
SBLC ¹	2	2	2 wandering tattler			120
SBSLR 3		1				>100
SCFC	5		* Western brown pelican, * western gull			
(Forneys)						
SCFC (Fraser)	10					
SCOC *16						
SCPH ²	3/(1)			3		
SCSR	1/(1)		1 wandering tattler, 1 western gull, *1 belted kingfisher			
SCTR 2						
SCWA	2		1 western gull, 1 black phoebe, 1 common raven			
SREP	1		16 Western brown pelican, 30 double- crested cormorant, 100 western gull			
SRFP 6		7				
SRFR	13/(1)		60 double-crested cormorant, 20 western gull			
SRJL 2						
SRNWT			1 wandering tattler, 2 western gull			
SMCH 9						
SMCP	2(1)	1	17 double-crested cormorant, 3 western gull			
SMHP 4				1		
SMOH 9		2	14 black-bellied plover, 2 whimbrel, 7 willet	26		

¹ SBLC on 10/24/03; ² SCPH on 12/6/03

Visitation

Visitation to Frenchy's Cove on Anacapa Island is reported here since trips there are usually specifically to visit tidepools. Most visitor experiences with the rocky intertidal occur at Frenchy's Cove, though some Santa Rosa Island visitors see East Point tidepools with a park naturalist or on their own. Island Packers Company generally conducts classroom programs, combining oceanography with the tidepool experience for area school groups in the winter and spring months. Surfers were observed coming ashore at Northwest-Talcott but more typically, they stay offshore.

Visitation numbers for Frenchy's Cove are available from monthly reports based on concessionaire reporting from Island Packers Company and Truth Aquatics (Table 10, fig.15). No records are available for the number of private boaters going ashore there. Visitation figures for East Point, Santa Rosa Island are not available.

The total visitation from concession boats in 2003 was only 2018 passengers (Table 10) which was less than the 2733 passengers reported in 2002, but more than the 1850 in 2001. March was

once again the top month for visitation with 646 passengers on 13 trips. Visitation was fairly even over the first five months of the year (figure 15). Over 81 percent of the visitation occurred in the first five months of the year. Visitation by the concession boats was spread throughout the year with no visitation in June, September, or December. The yearly trends for visitation to Frenchy's Cove are shown in figure 16.

Table 10. Visitors to South Frenchy's Cove, Anacapa Island in 2003 (visitation with Island Packers).

YEAR	MONTH	#Passengers	#TRIPS	Pass/trip
2003	January	307	6	51
2003	February	398	8	50
2003	March	223	4	56
2003	April	386	6	64
2003	May	332	5	66
2003	June	0	0	0
2003	July	176	2	88
2003	August	119	1	119
2003	September	0	0	0
2003	October	11	1	11
2003	November	66	1	66
2003	December	0	0	0
2003	total	2018	34	Mean=59

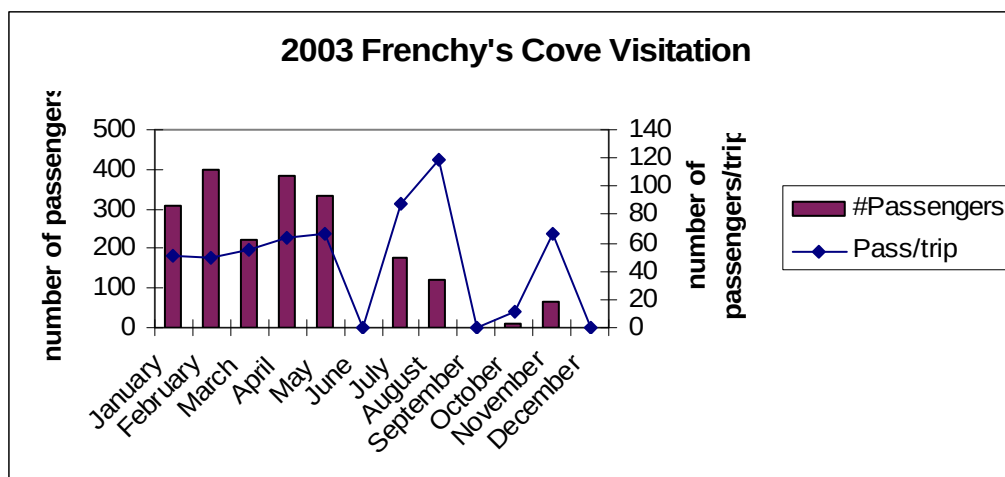


Figure 15. Visitation at Frenchy's Cove, Anacapa (Island Packers visitors).

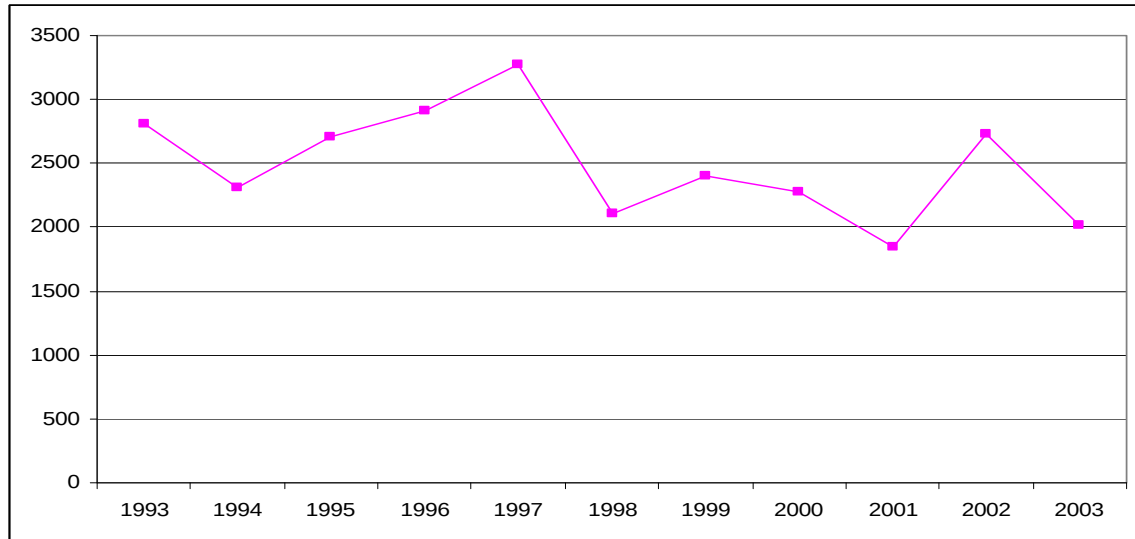


Figure 16. Annual Commercial Visitation at Frenchy's Cove, Anacapa (Island Packers visitors) 1993-2003.

Trip Reports and General Observations

Summaries of work performed, data collected, weather conditions, and natural history observations for each sampling event are presented in the individual trip reports in Appendix B. Explanations for missing or incomplete data are usually found there. Summary tables and figures in the trip reports present additional information on species monitored. For simplicity, photoplot data tables use the combinations of species in lumped categories used in previous reporting (non-core species are combined in Misc. plants or animals). Complete results of seastar, surfgrass and motile invertebrate sampling are presented in the daily trip reports.

Trip reports contain information on beach surveys as well as recommendations for additional monitoring.

2003 was a fairly mild year. Sea surface temperatures in the eastern Pacific were just barely above normal for most of the year (NOAA Climate Prediction Center website). Rainfall was below normal. Summer 2003 started out being foggy but cleared in early-mid June and stayed sunny most of the summer. The ocean, though cold early on, warmed quickly during a prolonged calm spell in July /early-August. While conducting research dives in August, we observed many sea stars with wasting disease, especially along the north side of Santa Cruz Is. Green plankton rich water was appeared to be present for most of the summer.

In April and May 2003 there was another large incidence of Domoic Acid Poisoning from diatom blooms in channel. Many dolphin, sea lions, and pelicans were affected. Domoic acid is a by product of *Pseudo-nitzschia* sp. and the phenomenon was first reported in California in 1991 (Langlois 2005). Similar events occurred in 2002 (Richards et al. 2007).

Some species accounts were noted in the trip reports such as at Crook Point, a small amount of a northern alga species, *Analipus japonica*, was found and *Laminaria setchelli* was common on the edges of the reef while *Plocamium violaceum* was common on top of the reef. *Velella velella* washed ashore at Fraser Cove in spring 2003. High sand levels were noted at Johnson's Lee.

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Appendix A. Photoquadrat Data Tables

Percent cover of selected taxa in fixed 50 x 75 cm photoquadrats based on 100 points per plot. Target taxa are presented in the tables for each site and each sampling (spring and fall). Acorn barnacle taxon includes *Balanus glandula* and *Chthamalus fissus/dalli*. *Pollicipes polymerus* is listed as leaf barnacle. Turf-weed taxon is only used at Landing Cove Santa Barbara Island and includes *Chondracanthus (Gigartina) canaliculatus*, *Gelidium* sp. and *Pterocliadiella capillacea*. The mussel taxon is *Mytilus* spp. with *Mytilus californianus* dominating at all sites. In 2003, horse mussels, *Septifer bifurcates* or *Brachidontes adamsianus* were scored as their own category, but are included in miscellaneous invertebrates in the tables. Misc. Algae and Misc. Animals include a variety of different species. Since 2001 we have identified most species and have added to them to the database; however, because most are rare and for ease of comparison to past data, they are lumped here for convenience. Bare Rock is just that, however we had no way to detect the presence of Cyanobacteria. The *Other* category is a “catch-all” category and in 2003 was used only for *Phyllospadix* spp. at Landing Cove.

**Table A1. Percent Cover of Index Species
Cat Rock, Anacapa Island - Spring 2003 (5/21/03)**

		Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
A-2	Chthamalus/Balanus	31	38	31	0	12	19	0	0	0	0	0	0	0	100
		32	37	10	0	32	21	0	0	0	0	0	0	0	100
		33	46	6	0	12	29	0	0	0	6	1	0	0	100
		35	64	12	0	11	9	0	0	0	4	0	0	0	100
		36	43	5	0	3	39	0	0	0	10	0	0	0	100
		37	9	1	0	0	81	3	0	0	6	0	0	0	100
		38	37	52	0	7	2	0	0	0	2	0	0	0	100
		39	79	16	0	0	3	0	0	0	2	0	0	0	100
		135	56	7	0	3	26	2	0	0	6	0	0	0	100
	Mean	45.44	15.56	.00	8.89	25.44	.56	.00	.00	.00	4.00	.11	.00	.00	100.00
	StDev	19.73	16.19	.00	9.93	24.16	1.13	.00	.00	.00	3.32	.33	.00	.00	.00
	Endocladia	13	12	11	6	66	0	2	0	0	3	0	0	0	100
		14	39	14	8	29	0	3	0	0	7	0	0	0	100
		19	12	0	0	43	23	0	0	0	4	0	0	0	100
		51	15	8	7	15	0	0	24	0	30	1	0	0	100
		52	4	6	0	41	0	3	23	0	22	1	0	0	100
		54	20	9	12	20	0	0	16	0	23	0	0	0	100
		212	4	2	2	89	0	0	0	0	3	0	0	0	100
		467	25	8	6	48	0	3	0	0	10	0	0	0	100
		492	17	13	3	52	1	12	0	0	1	0	0	0	100
	Mean	16.44	7.89	4.89	44.78	2.67	3.33	1.33	7.00	.00	11.44	.22	.00	.00	100.00
	StDev	10.88	4.68	3.98	23.01	7.63	6.78	1.41	10.72	.00	10.71	.44	.00	.00	.00
	Silvetia (Rockweed)	2	24	3	0	25	7	32	0	0	9	0	0	0	100
		3	25	10	0	3	18	18	0	0	26	0	0	0	100
		4	8	5	0	5	3	68	0	0	11	0	0	0	100
		5	29	16	3	32	0	3	5	0	12	0	0	0	100
		6	6	0	0	14	33	44	0	0	3	0	0	0	100
		8	14	2	0	3	6	71	0	0	4	0	0	0	100
		9	3	0	0	2	9	84	0	0	2	0	0	0	100
		10	1	0	0	1	1	94	0	0	3	0	0	0	100
		55	23	25	8	31	0	0	0	0	13	0	0	0	100
	Mean	14.78	6.78	1.22	12.89	8.56	46.00	.56	.00	.00	9.22	.00	.00	.00	100.00
	StDev	10.67	8.70	2.73	13.03	10.78	35.01	1.67	.00	.00	7.61	.00	.00	.00	.00

**Table A1. Percent Cover of Index Species
Cat Rock, Anacapa Island - Spring 2003 (5/21/03) (continued)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Mussels	56	21	17	18	0	0	0	34	0	0	10	0	0	0	100
	164	14	10	13	1	0	0	48	0	0	14	0	0	0	100
	203	23	13	7	0	0	0	46	0	0	10	1	0	0	100
	204	14	4	13	0	0	0	60	0	0	9	0	0	0	100
	468	17	22	13	3	0	0	21	0	0	23	1	0	0	100
	470	33	15	12	5	0	0	24	0	1	8	2	0	0	100
	471	28	15	13	8	0	0	10	0	0	23	3	0	0	100
	472	5	9	6	0	0	0	63	0	2	14	1	0	0	100
	473	36	11	8	0	0	0	28	0	0	17	0	0	0	100
	Mean	21.22	12.89	11.44	1.89	.00	.00	37.11	.00	.33	14.22	.89	.00	.00	100.00
	StDev	9.95	5.18	3.78	2.89	.00	.00	18.20	.00	.71	5.74	1.05	.00	.00	.00

**Table A2. Percent Cover of Index Species
Middle-East, Anacapa Island - Spring 2003 (4/24/03)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	243	52	17	13	2	0	0	5	0	0	9	1	0	1	100
	244	63	9	6	14	0	0	0	0	1	5	2	0	0	100
	245	69	3	7	15	0	0	4	0	1	1	0	0	0	100
	Mean	61.33	9.67	8.67	10.33	.00	.00	3.00	.00	.67	5.00	1.00	.00	.33	100.00
	StDev	8.62	7.02	3.79	7.23	.00	.00	2.65	.00	.58	4.00	1.00	.00	.58	.00
Endocladia	240	11	3	2	51	15	11	0	0	0	7	0	0	0	100
	241	36	10	20	10	0	0	12	0	0	8	1	0	3	100
	242	51	5	1	36	4	0	0	0	0	3	0	0	0	100
	Mean	32.67	6.00	7.67	32.33	6.33	3.67	4.00	.00	.00	6.00	.33	.00	1.00	100.00
	StDev	20.21	3.61	10.69	20.74	7.77	6.35	6.93	.00	.00	2.65	.58	.00	1.73	.00
Silvetia (Rockweed)	53	13	14	1	10	0	19	34	0	0	8	1	0	0	100
	237	2	2	0	1	0	93	0	0	0	2	0	0	0	100
	469	8	11	0	1	0	68	0	0	0	12	0	0	0	100
	Mean	7.67	9.00	.33	4.00	.00	60.00	11.33	.00	.00	7.33	.33	.00	.00	100.00
	StDev	5.51	6.24	.58	5.20	.00	37.64	19.63	.00	.00	5.03	.58	.00	.00	.00
Mussels	476	8	3	1	1	0	0	86	0	0	1	0	0	0	100
	477	5	3	2	0	0	0	90	0	0	0	0	0	0	100
	478	8	6	1	0	0	0	81	0	0	2	0	0	2	100
	Mean	7.00	4.00	1.33	.33	.00	.00	85.67	.00	.00	1.00	.00	.00	.67	100.00
	StDev	1.73	1.73	.58	.58	.00	.00	4.51	.00	.00	1.00	.00	.00	1.15	.00

**Table A3. Percent Cover of Index Species
Middle-West, Anacapa Island - Spring 2003 (4/24/03)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	447	57	16	1	18	0	0	0	0	0	7	1	0	0	100
	448	26	1	0	28	0	0	6	2	0	37	0	0	0	100
	449	54	4	0	12	0	0	0	0	0	30	0	0	0	100
	450	36	5	0	26	3	0	0	1	0	29	0	0	0	100
	451	40	0	0	45	0	0	0	0	0	14	1	0	0	100
	Mean	42.60	5.20	.20	25.80	.60	.00	1.20	.60	.00	23.40	.40	.00	.00	100.00
	StDev	12.88	6.38	.45	12.50	1.34	.00	2.68	.89	.00	12.42	.55	.00	.00	.00
Endocladia	457	20	0	2	25	0	0	17	1	0	34	1	0	0	100
	458	47	0	4	28	0	0	8	0	1	11	1	0	0	100
	459	45	0	0	15	0	0	2	0	0	35	3	0	0	100
	460	40	9	0	34	0	0	0	0	0	15	2	0	0	100
	461	26	1	0	67	1	0	0	0	0	5	0	0	0	100
	Mean	35.60	2.00	1.20	33.80	.20	.00	5.40	.20	.20	20.00	1.40	.00	.00	100.00
	StDev	11.97	3.94	1.79	19.79	.45	.00	7.27	.45	.45	13.71	1.14	.00	.00	.00
Silvetia (Rockweed)	452	17	1	1	3	0	68	0	0	0	10	0	0	0	100
	453	6	0	0	3	0	79	0	0	0	12	0	0	0	100
	454	18	0	1	12	0	1	2	2	0	61	3	0	0	100
	455	10	0	1	0	0	69	8	0	0	11	1	0	0	100
	456	13	0	1	0	0	61	9	0	0	14	2	0	0	100
	Mean	12.80	.20	.80	3.60	.00	55.60	3.80	.40	.00	21.60	1.20	.00	.00	100.00
	StDev	4.97	.45	.45	4.93	.00	31.19	4.38	.89	.00	22.07	1.30	.00	.00	.00
Mussels	462	0	30	0	5	0	0	42	2	1	20	0	0	0	100
	463	17	0	3	1	0	0	38	0	0	37	4	0	0	100
	464	17	0	5	5	0	0	38	5	3	24	3	0	0	100
	465	16	1	1	0	0	0	56	1	0	21	4	0	0	100
	466	1	0	0	0	0	0	87	1	0	7	4	0	0	100
	Mean	10.20	6.20	1.80	2.20	.00	.00	52.20	1.80	.80	21.80	3.00	.00	.00	100.00
	StDev	8.87	13.31	2.17	2.59	.00	.00	20.81	1.92	1.30	10.71	1.73	.00	.00	.00

**Table A4. Percent Cover of Index Species
S Frenchy's Cove, Anacapa Island - Spring 2003 (5/20/03)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	249	45	40	0	6	4	0	0	0	0	4	0	1	0	100
	250	25	51	0	24	0	0	0	0	0	0	0	0	0	100
	251	42	55	0	3	0	0	0	0	0	0	0	0	0	100
	252	43	43	0	13	0	0	0	0	0	1	0	0	0	100
	253	42	41	0	15	2	0	0	0	0	0	0	0	0	100
	Mean	39.40	46.00	.00	12.20	1.20	.00	.00	.00	.00	1.00	.00	.20	.00	100.00
	StDev	8.14	6.63	.00	8.23	1.79	.00	.00	.00	.00	1.73	.00	.45	.00	.00
Endocladia	154	34	11	0	54	0	1	0	0	0	0	0	0	0	100
	155	1	0	0	79	0	14	0	0	0	0	0	0	6	100
	256	21	0	0	59	12	5	0	0	0	3	0	0	0	100
	257	7	0	0	92	0	0	0	0	0	1	0	0	0	100
	258	4	0	0	43	0	53	0	0	0	0	0	0	0	100
	Mean	13.40	2.20	.00	65.40	2.40	14.60	.00	.00	.00	.80	.00	.00	1.20	100.00
	StDev	13.83	4.92	.00	19.78	5.37	22.17	.00	.00	.00	1.30	.00	.00	2.68	.00
Silvetia (Rockweed)	259	3	0	0	0	0	96	0	0	0	1	0	0	0	100
	260	16	7	0	5	2	67	0	0	0	3	0	0	0	100
	261	3	0	0	0	0	97	0	0	0	0	0	0	0	100
	262	53	31	0	6	0	9	0	0	0	1	0	0	0	100
	263	7	0	0	2	0	85	0	0	0	6	0	0	0	100
	Mean	16.40	7.60	.00	2.60	.40	70.80	.00	.00	.00	2.20	.00	.00	.00	100.00
	StDev	21.14	13.43	.00	2.79	.89	36.60	.00	.00	.00	2.39	.00	.00	.00	.00
Mussels	201	1	1	0	14	0	0	55	16	0	13	0	0	0	100
	202	4	3	0	3	0	0	75	4	0	11	0	0	0	100
	264	6	1	0	0	0	0	74	8	1	10	0	0	0	100
	265	6	2	0	0	0	0	85	0	0	7	0	0	0	100
	266	15	11	0	1	0	0	63	0	0	10	0	0	0	100
	Mean	6.40	3.60	.00	3.60	.00	.00	70.40	5.60	.20	10.20	.00	.00	.00	100.00
	StDev	5.22	4.22	.00	5.94	.00	.00	11.61	6.69	.45	2.17	.00	.00	.00	.00

**Table A5. Percent Cover of Index Species
Crook Point, San Miguel Island - Spring 2003 (4/11/03)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	137	94	6	0	0	0	0	0	0	0	0	0	0	0	100
	147	63	37	0	0	0	0	0	0	0	0	0	0	0	100
	148	72	28	0	0	0	0	0	0	0	0	0	0	0	100
	149	40	51	0	4	0	0	2	0	0	0	3	0	0	100
	495	33	58	0	7	0	0	1	0	0	1	0	0	0	100
	Mean	60.40	36.00	.00	2.20	.00	.00	.60	.00	.00	.20	.60	.00	.00	100.00
	StDev	24.68	20.46	.00	3.19	.00	.00	.89	.00	.00	.45	1.34	.00	.00	.00
Endocladia	386	37	19	0	31	8	0	0	0	0	3	2	0	0	100
	387	40	5	0	33	0	0	1	0	1	17	3	0	0	100
	388	16	14	0	57	8	0	0	0	0	5	0	0	0	100
	389	24	1	2	38	0	3	26	0	1	4	1	0	0	100
	390	28	11	0	21	0	0	18	0	1	20	1	0	0	100
	Mean	29.00	10.00	.40	36.00	3.20	.60	9.00	.00	.60	9.80	1.40	.00	.00	100.00
	StDev	9.75	7.14	.89	13.27	4.38	1.34	12.21	.00	.55	8.04	1.14	.00	.00	.00
Silvetia (Rockweed)	396	39	6	0	24	0	4	20	0	3	3	1	0	0	100
	397	9	0	0	1	0	0	84	0	0	5	1	0	0	100
	398	41	11	1	7	0	4	18	0	1	16	1	0	0	100
	399	38	2	0	0	0	2	2	4	0	49	3	0	0	100
	400	65	1	2	21	2	0	2	0	0	6	1	0	0	100
	Mean	38.40	4.00	.60	10.60	.40	2.00	25.20	.80	.80	15.80	1.40	.00	.00	100.00
	StDev	19.87	4.53	.89	11.24	.89	2.00	33.96	1.79	1.30	19.23	.89	.00	.00	.00
Mussels	381	19	4	0	0	0	0	43	1	0	30	3	0	0	100
	382	2	0	0	0	0	0	98	0	0	0	0	0	0	100
	383	5	0	0	0	0	0	94	0	0	1	0	0	0	100
	384	16	0	1	0	0	0	70	0	4	9	0	0	0	100
	385	22	2	1	0	0	0	45	0	7	20	3	0	0	100
	Mean	12.80	1.20	.40	.00	.00	.00	70.00	.20	2.20	12.00	1.20	.00	.00	100.00
	StDev	8.81	1.79	.55	.00	.00	.00	26.05	.45	3.19	12.86	1.64	.00	.00	.00

**Table A6. Percent Cover of Index Species
Cuyler Harbor, San Miguel Island - Spring 2003 (4/13/03)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	416	31	68	0	0	0	0	0	0	0	1	0	0	0	100
	417	26	55	0	19	0	0	0	0	0	0	0	0	0	100
	418	30	62	0	7	0	0	0	0	0	1	0	0	0	100
	419	56	21	0	21	0	0	0	0	0	1	1	0	0	100
	420	49	11	0	40	0	0	0	0	0	0	0	0	0	100
	Mean	38.40	43.40	.00	17.40	.00	.00	.00	.00	.00	.60	.20	.00	.00	100.00
	StDev	13.24	25.68	.00	15.31	.00	.00	.00	.00	.00	.55	.45	.00	.00	.00
Endocladia	411	44	0	0	30	0	0	20	1	0	3	2	0	0	100
	412	10	31	0	41	0	0	12	0	0	5	1	0	0	100
	413	38	0	0	21	0	38	1	0	0	2	0	0	0	100
	414	35	0	0	52	0	0	1	0	0	8	4	0	0	100
	415	55	0	0	38	0	0	0	0	0	7	0	0	0	100
	Mean	36.40	6.20	.00	36.40	.00	7.60	6.80	.20	.00	5.00	1.40	.00	.00	100.00
	StDev	16.62	13.86	.00	11.67	.00	16.99	8.87	.45	.00	2.55	1.67	.00	.00	.00
Silvetia (Rockweed)	406	22	0	0	0	0	55	2	0	0	11	10	0	0	100
	407	20	0	0	0	0	56	0	0	0	21	3	0	0	100
	408	12	1	1	0	0	79	0	0	0	7	0	0	0	100
	409	5	1	0	0	0	79	0	0	0	15	0	0	0	100
	410	12	0	0	0	0	82	0	0	0	4	2	0	0	100
	Mean	14.20	.40	.20	.00	.00	70.20	.40	.00	.00	11.60	3.00	.00	.00	100.00
	StDev	6.87	.55	.45	.00	.00	13.48	.89	.00	.00	6.69	4.12	.00	.00	.00
Mussels	401	7	0	3	0	0	0	85	0	5	0	0	0	0	100
	402	3	0	1	0	0	0	92	0	0	1	3	0	0	100
	403	12	0	0	0	0	0	76	0	0	4	8	0	0	100
	404	35	0	16	0	0	0	28	0	0	5	16	0	0	100
	405	39	2	10	0	0	0	32	0	2	6	9	0	0	100
	Mean	19.20	.40	6.00	.00	.00	.00	62.60	.00	1.40	3.20	7.20	.00	.00	100.00
	StDev	16.62	.89	6.82	.00	.00	.00	30.33	.00	2.19	2.59	6.14	.00	.00	.00

**Table A7. Percent Cover of Index Species
Otter Harbor, San Miguel Island - Spring 2003 (4/12/03)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	370	69	6	0	0	0	0	0	0	0	25	0	0	0	100
	371	12	29	0	0	0	0	0	0	0	47	0	12	0	100
	372	36	54	0	0	0	0	0	0	0	8	2	0	0	100
	373	38	50	0	4	0	0	0	0	0	0	0	8	0	100
	374	0	0	0	0	0	0	0	37	0	63	0	0	0	100
	Mean	31.00	27.80	.00	.80	.00	.00	.00	7.40	.00	28.60	.40	4.00	.00	100.00
	StDev	26.65	24.64	.00	1.79	.00	.00	.00	16.55	.00	26.35	.89	5.66	.00	.00
Endocladia	360	12	17	2	29	0	4	4	0	0	30	2	0	0	100
	361	25	0	0	60	0	1	1	0	0	12	1	0	0	100
	362	1	0	0	84	0	1	2	0	0	11	1	0	0	100
	363	3	0	0	65	2	2	0	1	0	27	0	0	0	100
	364	5	0	0	68	2	10	0	0	0	15	0	0	0	100
	Mean	9.20	3.40	.40	61.20	.80	3.60	1.40	.20	.00	19.00	.80	.00	.00	100.00
	StDev	9.76	7.60	.89	20.12	1.10	3.78	1.67	.45	.00	8.86	.84	.00	.00	.00
Silvetia (Rockweed)	355	18	3	0	28	7	10	0	0	0	29	0	5	0	100
	356	2	0	1	21	1	59	0	0	0	16	0	0	0	100
	357	8	0	0	35	0	31	0	0	0	26	0	0	0	100
	358	31	25	0	16	14	0	0	0	0	14	0	0	0	100
	359	9	43	0	9	2	0	0	0	0	33	1	3	0	100
	Mean	13.60	14.20	.20	21.80	4.80	20.00	.00	.00	.00	23.60	.20	1.60	.00	100.00
	StDev	11.28	19.20	.45	10.13	5.81	25.21	.00	.00	.00	8.26	.45	2.30	.00	.00
Mussels	375	7	0	0	0	0	0	57	0	8	23	5	0	0	100
	376	11	0	1	1	0	0	52	1	0	33	1	0	0	100
	378	2	0	0	0	0	0	61	0	9	27	1	0	0	100
	379	4	0	2	0	0	0	58	0	5	31	0	0	0	100
	380	5	0	2	0	0	0	58	0	3	31	1	0	0	100
	Mean	5.80	.00	1.00	.20	.00	.00	57.20	.20	5.00	29.00	1.60	.00	.00	100.00
	StDev	3.42	.00	1.00	.45	.00	.00	3.27	.45	3.67	4.00	1.95	.00	.00	.00

**Table A8. Percent Cover of Index Species
Harris Point, San Miguel Island - Spring 2003 (4/13/03)**

	Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
A-10	Chthamalus/Balanus	440	15	77	0	7	0	0	0	0	1	0	0	0	100
		441	36	63	0	1	0	0	0	0	0	0	0	0	100
		442	9	79	0	10	1	0	0	0	1	0	0	0	100
		443	35	59	0	0	0	0	0	0	1	0	5	0	100
		444	46	51	0	1	0	0	0	0	2	0	0	0	100
		Mean	28.20	65.80	.00	3.80	.20	.00	.00	.00	1.00	.00	1.00	.00	100.00
		StDev	15.55	11.97	.00	4.44	.45	.00	.00	.00	.71	.00	2.24	.00	.00
	Endocladia	431	38	14	5	27	1	0	9	0	5	1	0	0	100
		432	1	1	0	83	11	0	0	0	4	0	0	0	100
		433	1	2	0	90	7	0	0	0	0	0	0	0	100
		434	13	0	0	61	25	0	1	0	0	0	0	0	100
		435	0	0	0	0	0	0	0	0	0	0	0	0	0
		Mean	10.60	3.40	1.00	52.20	8.80	.00	2.00	.00	1.80	.20	.00	.00	80.00
		StDev	16.23	5.98	2.24	38.13	10.11	.00	3.94	.00	2.49	.45	.00	.00	44.72
	Mussels	426	11	5	0	2	0	0	64	3	14	1	0	0	100
		427	0	0	0	0	0	0	0	0	0	0	0	0	0
		428	25	10	0	14	12	0	17	0	21	1	0	0	100
		429	0	0	0	0	0	0	0	0	0	0	0	0	0
		430	12	0	2	0	0	0	68	0	18	0	0	0	100
		Mean	9.60	3.00	.40	3.20	2.40	.00	29.80	.60	10.60	.40	.00	.00	60.00
		StDev	10.36	4.47	.89	6.10	5.37	.00	33.80	1.34	9.99	.55	.00	.00	54.77
	Tetraclita	436	21	14	28	0	0	0	23	0	14	0	0	0	100
		437	10	8	20	0	0	0	29	1	30	2	0	0	100
		438	17	36	16	5	0	0	0	0	26	0	0	0	100
		439	26	1	3	25	0	0	5	0	40	0	0	0	100
		445	44	7	21	2	0	0	0	17	7	2	0	0	100
		Mean	23.60	13.20	17.60	6.40	.00	.00	11.40	3.60	23.40	.80	.00	.00	100.00
		StDev	12.82	13.55	9.24	10.60	.00	.00	13.65	7.50	13.07	1.10	.00	.00	.00
	Hesperophycus	421	22	4	0	22	51	0	0	0	1	0	0	0	100
		422	26	0	0	39	27	0	0	0	7	1	0	0	100
		423	21	0	0	65	9	0	0	0	5	0	0	0	100
		424	8	3	0	16	73	0	0	0	0	0	0	0	100
		425	16	1	0	12	70	0	0	0	1	0	0	0	100
		Mean	18.60	1.60	.00	30.80	46.00	.00	.00	.00	2.80	.20	.00	.00	100.00
		StDev	6.91	1.82	.00	21.72	27.66	.00	.00	.00	3.03	.45	.00	.00	.00

**Table A9. Percent Cover of Index Species
Fraser Cove, Santa Cruz Island - Spring 2003 (3/26/03)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
A-11	Chthamalus/Balanus	876	32	36	0	20	0	0	3	0	0	9	0	0	100
		877	29	7	0	21	0	0	2	0	0	40	1	0	100
		878	46	50	0	2	0	0	0	0	0	0	2	0	100
		879	18	31	0	49	0	0	0	0	1	0	1	0	100
		880	21	55	0	8	0	0	0	0	13	1	2	0	100
		Mean	29.20	35.80	.00	20.00	.00	.00	1.00	.00	12.60	.40	1.00	.00	100.00
		StDev	10.99	18.86	.00	18.10	.00	.00	1.41	.00	16.26	.55	1.00	.00	.00
	Endocladia	881	37	2	0	33	0	0	7	0	0	21	0	0	100
		882	38	4	0	46	0	0	0	0	0	12	0	0	100
		883	16	0	0	73	7	0	0	0	4	0	0	0	100
		884	11	0	0	87	0	0	0	0	1	1	0	0	100
		885	3	5	0	91	0	0	0	0	1	0	0	0	100
		Mean	21.00	2.20	.00	66.00	1.40	.00	1.40	.00	7.80	.20	.00	.00	100.00
		StDev	15.76	2.28	.00	25.51	3.13	.00	3.13	.00	8.64	.45	.00	.00	.00
A-11	Silvetia (Rockweed)	896	18	2	0	8	5	63	0	0	4	0	0	0	100
		897	18	1	0	7	2	56	0	1	15	0	0	0	100
		898	22	4	0	1	0	52	0	0	17	4	0	0	100
		899	22	8	0	5	1	61	0	0	2	1	0	0	100
		900	18	4	0	0	17	59	0	0	2	0	0	0	100
		Mean	19.60	3.80	.00	4.20	5.00	58.20	.00	.20	8.00	1.00	.00	.00	100.00
		StDev	2.19	2.68	.00	3.56	6.96	4.32	.00	.45	7.38	1.73	.00	.00	.00
	Mussels	891	5	0	0	0	0	57	0	0	3	35	0	0	100
		892	19	5	0	0	0	60	0	0	10	6	0	0	100
		893	9	2	0	0	0	71	0	0	4	14	0	0	100
		894	9	2	0	0	0	76	0	3	2	8	0	0	100
		895	13	2	0	0	0	52	0	9	13	11	0	0	100
		Mean	11.00	2.20	.00	.00	.00	63.20	.00	2.40	6.40	14.80	.00	.00	100.00
		StDev	5.29	1.79	.00	.00	.00	9.98	.00	3.91	4.83	11.69	.00	.00	.00
A-11	Pollicipes	901	20	4	5	0	0	44	0	6	18	3	0	0	100
		902	19	2	1	27	0	17	0	10	8	16	0	0	100
		903	2	0	0	0	0	44	0	18	2	34	0	0	100
		904	16	2	6	0	0	55	0	7	8	6	0	0	100
		905	4	0	0	0	0	54	0	16	8	18	0	0	100
		Mean	12.20	1.60	2.40	5.40	.00	42.80	.00	11.40	8.80	15.40	.00	.00	100.00
		StDev	8.56	1.67	2.88	12.07	.00	15.35	.00	5.37	5.76	12.20	.00	.00	.00

**Table A9.Percent Cover of Index Species
Fraser Cove, Santa Cruz Island - Spring 2003 (3/26/03) (continued)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Tar	906	20	21	0	0	0	0	0	0	0	0	0	59	0	100
	907	25	28	0	0	0	0	0	0	0	1	0	46	0	100
	908	18	20	0	0	0	0	0	0	0	0	0	62	0	100
	909	30	16	0	0	0	0	0	0	0	0	0	54	0	100
	910	26	7	0	0	0	0	0	0	0	0	0	67	0	100
	Mean	23.80	18.40	.00	.00	.00	.00	.00	.00	.00	.20	.00	57.60	.00	100.00
	StDev	4.82	7.70	.00	.00	.00	.00	.00	.00	.00	.45	.00	8.02	.00	.00
Hesperophycus	886	73	4	0	12	10	0	0	0	0	1	0	0	0	100
	887	70	4	0	11	5	0	0	0	0	10	0	0	0	100
	888	25	20	0	18	34	2	0	0	1	0	0	0	0	100
	889	54	16	0	13	16	0	0	0	0	1	0	0	0	100
	890	18	12	0	19	18	30	0	0	0	3	0	0	0	100
	Mean	48.00	11.20	.00	14.60	16.60	6.40	.00	.00	.20	3.00	.00	.00	.00	100.00
	StDev	25.37	7.16	.00	3.65	10.99	13.22	.00	.00	.45	4.06	.00	.00	.00	.00

**Table A10. Percent Cover of Index Species
Orizaba Cove, Santa Cruz Island - Spring 2003 (5/19/03)**

	Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
A-13	Chthamalus/Balanus	851	52	41	6	0	0	0	0	0	0	1	0	0	0	100
		852	7	93	0	0	0	0	0	0	0	0	0	0	0	100
		853	24	75	0	0	0	0	1	0	0	0	0	0	0	100
		854	35	48	13	0	0	0	3	0	0	1	0	0	0	100
		855	15	75	1	0	0	0	0	0	0	9	0	0	0	100
		Mean	26.60	66.40	4.00	.00	.00	.00	.80	.00	.00	2.20	.00	.00	.00	100.00
		StDev	17.62	21.44	5.61	.00	.00	.00	1.30	.00	.00	3.83	.00	.00	.00	.00
	Silvetia (Rockweed)	866	30	6	9	2	0	0	5	0	0	48	0	0	0	100
		867	30	5	7	22	0	6	5	0	1	24	0	0	0	100
		868	14	2	7	31	0	3	4	0	0	39	0	0	0	100
		869	23	6	11	29	8	15	1	0	0	7	0	0	0	100
		870	13	5	4	61	0	11	1	0	0	5	0	0	0	100
		Mean	22.00	4.80	7.60	29.00	1.60	7.00	3.20	.00	.20	24.60	.00	.00	.00	100.00
		StDev	8.28	1.64	2.61	21.25	3.58	6.04	2.05	.00	.45	19.03	.00	.00	.00	.00
	Mussels	861	8	0	0	0	0	0	92	0	0	0	0	0	0	100
		862	20	3	0	0	0	2	47	0	4	24	0	0	0	100
		863	11	12	3	0	0	0	27	0	0	47	0	0	0	100
		864	5	13	1	0	0	0	50	0	10	21	0	0	0	100
		865	14	6	0	0	0	0	46	0	6	28	0	0	0	100
		Mean	11.60	6.80	.80	.00	.00	.40	52.40	.00	4.00	24.00	.00	.00	.00	100.00
		StDev	5.77	5.63	1.30	.00	.00	.89	23.92	.00	4.24	16.81	.00	.00	.00	.00
	Tetraclita	871	11	8	37	0	0	0	24	0	0	20	0	0	0	100
		872	9	4	45	0	0	0	28	0	0	14	0	0	0	100
		873	23	5	52	0	0	0	7	0	0	13	0	0	0	100
		874	25	7	45	0	0	0	10	0	0	11	2	0	0	100
		875	36	7	31	3	0	0	12	0	0	9	2	0	0	100
		Mean	20.80	6.20	42.00	.60	.00	.00	16.20	.00	.00	13.40	.80	.00	.00	100.00
		StDev	11.05	1.64	8.12	1.34	.00	.00	9.23	.00	.00	4.16	1.10	.00	.00	.00
	Hesperophycus	856	3	6	0	82	1	0	2	0	0	0	0	6	0	100
		857	0	8	0	83	6	0	0	0	0	3	0	0	0	100
		858	8	8	0	68	8	0	0	0	0	8	0	0	0	100
		859	4	10	0	84	1	0	1	0	0	0	0	0	0	100
		860	11	8	0	78	2	0	0	0	0	1	0	0	0	100
		Mean	5.20	8.00	.00	79.00	3.60	.00	.60	.00	.00	2.40	.00	1.20	.00	100.00
		StDev	4.32	1.41	.00	6.56	3.21	.00	.89	.00	.00	3.36	.00	2.68	.00	.00

**Table A11. Percent Cover of Index Species
Prisoner's Harbor, Santa Cruz Island - Spring 2003 (3/24/03)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
A-14	Chthamalus/Balanus	826	98	0	0	0	0	0	0	0	2	0	0	0	100
		827	72	2	1	8	0	1	2	1	12	1	0	0	100
		828	26	31	1	32	0	2	0	2	6	0	0	0	100
		829	18	46	1	32	0	0	2	0	1	0	0	0	100
		830	57	22	0	19	0	0	0	0	2	0	0	0	100
		Mean	54.20	20.20	.60	18.20	.00	.60	1.00	.00	4.60	.20	.00	.00	100.00
		StDev	32.97	19.52	.55	14.29	.00	.89	1.00	.00	4.56	.45	.00	.00	.00
	Endocladia	831	25	10	0	58	0	0	0	0	7	0	0	0	100
		832	17	8	0	61	12	0	1	0	1	0	0	0	100
		833	12	30	0	51	7	0	0	0	0	0	0	0	100
		834	21	11	0	47	18	0	0	0	3	0	0	0	100
		835	28	1	0	43	27	0	0	0	1	0	0	0	100
		Mean	20.60	12.00	.00	52.00	12.80	.00	.20	.00	2.40	.00	.00	.00	100.00
		StDev	6.35	10.79	.00	7.48	10.33	.00	.45	.00	2.79	.00	.00	.00	.00
A-14	Silvetia (Rockweed)	846	18	9	1	0	19	5	0	0	48	0	0	0	100
		847	35	0	0	0	15	10	0	0	39	1	0	0	100
		848	6	0	0	0	38	0	0	0	55	1	0	0	100
		849	3	0	0	0	50	0	0	0	47	0	0	0	100
		850	1	0	1	0	71	0	0	0	27	0	0	0	100
		Mean	12.60	1.80	.40	.00	38.60	3.00	.00	.00	43.20	.40	.00	.00	100.00
		StDev	14.15	4.02	.55	.00	23.03	4.47	.00	.00	10.69	.55	.00	.00	.00
	Mussels	841	4	3	0	0	0	82	0	0	11	0	0	0	100
		842	36	11	1	0	0	31	7	0	11	3	0	0	100
		843	18	30	2	0	0	22	0	0	23	5	0	0	100
		844	70	0	0	0	0	0	0	0	30	0	0	0	100
		845	6	2	4	0	0	77	0	0	9	2	0	0	100
		Mean	26.80	9.20	1.40	.00	.00	42.40	1.40	.00	16.80	2.00	.00	.00	100.00
		StDev	27.30	12.36	1.67	.00	.00	35.74	3.13	.00	9.23	2.12	.00	.00	.00
A-14	Hesperophycus	836	26	6	0	46	14	1	0	0	4	3	0	0	100
		837	57	3	0	18	19	0	1	0	2	0	0	0	100
		838	42	3	0	27	10	0	0	0	15	3	0	0	100
		839	27	45	0	17	11	0	0	0	0	0	0	0	100
		840	25	24	0	29	18	1	0	0	2	1	0	0	100
		Mean	35.40	16.20	.00	27.40	14.40	.20	.40	.00	4.60	1.40	.00	.00	100.00
		StDev	13.94	18.32	.00	11.67	4.04	.45	.55	.00	5.98	1.52	.00	.00	.00

**Table A12. Percent Cover of Index Species
Scorpion Rock, Santa Cruz Island - Spring 2003 (5/22/03)**

A-15

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	801	19	31	0	50	0	0	0	0	0	0	0	0	0	100
	802	47	33	0	20	0	0	0	0	0	0	0	0	0	100
	803	57	11	1	31	0	0	0	0	0	0	0	0	0	100
	804	26	17	0	57	0	0	0	0	0	0	0	0	0	100
	805	62	38	0	0	0	0	0	0	0	0	0	0	0	100
	Mean	42.20	26.00	.20	31.60	.00	.00	.00	.00	.00	.00	.00	.00	.00	100.00
	StDev	18.94	11.45	.45	23.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Endocladia	806	19	0	0	79	0	0	0	0	0	2	0	0	0	100
	807	24	4	1	67	0	0	1	0	1	1	1	0	0	100
	808	28	4	1	56	0	0	2	0	3	6	0	0	0	100
	809	25	6	0	69	0	0	0	0	0	0	0	0	0	100
	810	60	18	2	16	0	0	1	0	0	3	0	0	0	100
	Mean	31.20	6.40	.80	57.40	.00	.00	.80	.00	.80	2.40	.20	.00	.00	100.00
	StDev	16.42	6.84	.84	24.54	.00	.00	.84	.00	1.30	2.30	.45	.00	.00	.00
Mussels	816	10	22	13	0	0	0	48	0	4	3	0	0	0	100
	817	9	0	2	0	0	0	89	0	0	0	0	0	0	100
	818	4	4	2	0	0	0	78	0	9	3	0	0	0	100
	819	48	10	5	0	0	0	21	0	0	14	2	0	0	100
	820	18	14	8	0	0	0	28	0	0	31	1	0	0	100
	Mean	17.80	10.00	6.00	.00	.00	.00	52.80	.00	2.60	10.20	.60	.00	.00	100.00
	StDev	17.61	8.60	4.64	.00	.00	.00	29.98	.00	3.97	12.79	.89	.00	.00	.00
Tetraclita	821	35	15	11	7	0	0	18	0	10	3	1	0	0	100
	822	29	4	1	25	0	0	37	0	3	1	0	0	0	100
	823	58	2	6	0	0	0	31	0	1	0	2	0	0	100
	824	71	8	9	0	0	0	2	0	0	6	4	0	0	100
	825	49	0	16	0	0	0	31	0	3	1	0	0	0	100
	Mean	48.40	5.80	8.60	6.40	.00	.00	23.80	.00	3.40	2.20	1.40	.00	.00	100.00
	StDev	17.02	5.93	5.59	10.83	.00	.00	14.02	.00	3.91	2.39	1.67	.00	.00	.00
Hesperophycus	811	59	10	0	11	19	0	0	0	1	0	0	0	0	100
	812	32	2	0	33	25	5	0	0	0	3	0	0	0	100
	813	7	1	0	28	50	14	0	0	0	0	0	0	0	100
	814	50	23	0	17	1	8	0	0	0	0	1	0	0	100
	815	33	5	0	21	37	4	0	0	0	0	0	0	0	100
	Mean	36.20	8.20	.00	22.00	26.40	6.20	.00	.00	.20	.60	.20	.00	.00	100.00
	StDev	19.94	8.98	.00	8.72	18.51	5.22	.00	.00	.45	1.34	.45	.00	.00	.00

**Table A13. Percent Cover of Index Species
Trailer, Santa Cruz Island - Spring 2003 (3/25/03)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	911	60	34	0	0	0	0	0	0	0	6	0	0	0	100
	912	73	26	0	0	0	0	0	0	0	0	1	0	0	100
	913	28	54	0	17	0	0	0	0	0	1	0	0	0	100
	914	30	69	0	0	0	0	0	0	0	1	0	0	0	100
	915	38	62	0	0	0	0	0	0	0	0	0	0	0	100
	Mean	45.80	49.00	.00	3.40	.00	.00	.00	.00	.00	1.60	.20	.00	.00	100.00
	StDev	19.80	18.36	.00	7.60	.00	.00	.00	.00	.00	2.51	.45	.00	.00	.00
Silvetia (Rockweed)	926	14	0	0	1	0	72	0	0	0	13	0	0	0	100
	927	31	0	0	0	0	60	0	0	0	9	0	0	0	100
	928	23	3	0	1	0	63	0	0	0	10	0	0	0	100
	929	9	0	0	0	0	85	0	0	0	6	0	0	0	100
	930	8	0	0	0	0	86	0	0	0	6	0	0	0	100
	Mean	17.00	.60	.00	.40	.00	73.20	.00	.00	.00	8.80	.00	.00	.00	100.00
	StDev	9.82	1.34	.00	.55	.00	12.07	.00	.00	.00	2.95	.00	.00	.00	.00
Mussels	921	15	2	2	0	0	0	71	0	1	7	2	0	0	100
	922	9	0	0	0	0	0	47	0	0	44	0	0	0	100
	923	11	2	0	0	0	0	65	0	0	18	4	0	0	100
	924	20	2	0	0	0	0	59	0	0	12	7	0	0	100
	925	25	0	1	1	0	0	65	0	0	8	0	0	0	100
	Mean	16.00	1.20	.60	.20	.00	.00	61.40	.00	.20	17.80	2.60	.00	.00	100.00
	StDev	6.56	1.10	.89	.45	.00	.00	9.10	.00	.45	15.27	2.97	.00	.00	.00
Hesperophycus	916	53	1	0	24	12	10	0	0	0	0	0	0	0	100
	917	26	0	0	22	2	48	0	0	0	2	0	0	0	100
	918	27	1	0	20	14	38	0	0	0	0	0	0	0	100
	919	48	1	0	14	7	28	0	0	0	2	0	0	0	100
	920	32	5	0	34	21	4	0	0	0	4	0	0	0	100
	Mean	37.20	1.60	.00	22.80	11.20	25.60	.00	.00	.00	1.60	.00	.00	.00	100.00
	StDev	12.48	1.95	.00	7.29	7.19	18.51	.00	.00	.00	1.67	.00	.00	.00	.00

Table A14. Percent Cover of Index Species
Willows Anchorage, Santa Cruz Island - Spring 2003 (3/27/03)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Endocladia	931	15	0	0	84	0	0	0	0	0	0	1	0	0	100
	932	22	0	0	76	0	0	0	0	0	1	1	0	0	100
	933	24	0	0	75	0	0	0	0	0	1	0	0	0	100
	934	12	0	1	82	0	0	0	0	0	4	1	0	0	100
	935	33	0	2	60	0	0	0	0	0	5	0	0	0	100
	Mean	21.20	.00	.60	75.40	.00	.00	.00	.00	.00	2.20	.60	.00	.00	100.00
	StDev	8.23	.00	.89	9.42	.00	.00	.00	.00	.00	2.17	.55	.00	.00	.00
Silvetia (Rockweed)	946	16	0	0	69	0	0	0	0	0	15	0	0	0	100
	947	24	0	1	49	0	0	0	0	0	24	2	0	0	100
	948	9	0	0	1	0	84	0	0	0	6	0	0	0	100
	949	2	0	0	0	0	97	0	0	0	1	0	0	0	100
	950	37	0	0	10	0	5	0	0	0	44	4	0	0	100
	Mean	17.60	.00	.20	25.80	.00	37.20	.00	.00	.00	18.00	1.20	.00	.00	100.00
	StDev	13.58	.00	.45	31.36	.00	48.92	.00	.00	.00	16.99	1.79	.00	.00	.00
Mussels	941	20	0	14	0	0	0	31	0	8	21	6	0	0	100
	942	11	0	1	0	0	0	68	0	4	8	8	0	0	100
	943	8	0	0	0	0	0	61	0	9	12	10	0	0	100
	944	7	0	1	0	0	0	67	0	7	10	8	0	0	100
	945	4	0	1	0	0	0	59	0	5	22	9	0	0	100
	Mean	10.00	.00	3.40	.00	.00	.00	57.20	.00	6.60	14.60	8.20	.00	.00	100.00
	StDev	6.12	.00	5.94	.00	.00	.00	15.14	.00	2.07	6.47	1.48	.00	.00	.00
Hesperophycus	936	65	0	0	32	0	0	0	0	0	3	0	0	0	100
	937	57	12	0	0	0	5	0	0	0	25	1	0	0	100
	938	51	14	0	2	0	0	0	0	0	32	1	0	0	100
	939	16	1	0	0	0	66	0	0	0	17	0	0	0	100
	940	34	1	0	11	4	30	0	0	0	17	3	0	0	100
	Mean	44.60	5.60	.00	9.00	.80	20.20	.00	.00	.00	18.80	1.00	.00	.00	100.00
	StDev	19.63	6.80	.00	13.64	1.79	28.46	.00	.00	.00	10.83	1.22	.00	.00	.00

**Table A15. Percent Cover of Index Species
East Point, Santa Rosa Island - Spring 2003 (3/16/03)**

	Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
A-18	Chthamalus/Balanus	575	76	18	0	0	0	0	0	0	0	3	3	0	0	100
		576	25	1	0	6	63	0	0	0	0	4	1	0	0	100
		577	30	27	0	31	8	2	0	0	0	1	1	0	0	100
		578	87	12	0	0	0	0	0	0	0	0	0	1	0	100
		579	77	20	0	3	0	0	0	0	0	0	0	0	0	100
		Mean	59.00	15.60	.00	8.00	14.20	.40	.00	.00	.00	1.60	1.00	.20	.00	100.00
		StDev	29.13	9.76	.00	13.10	27.50	.89	.00	.00	.00	1.82	1.22	.45	.00	.00
	Endocladia	580	7	0	0	15	69	7	0	0	0	1	1	0	0	100
		581	2	0	0	44	50	0	0	0	0	4	0	0	0	100
		582	3	2	0	31	44	13	0	0	0	7	0	0	0	100
		583	11	0	0	57	31	0	0	0	0	0	1	0	0	100
		584	21	0	0	57	21	0	0	0	0	0	1	0	0	100
		Mean	8.80	.40	.00	40.80	43.00	4.00	.00	.00	.00	2.40	.60	.00	.00	100.00
		StDev	7.69	.89	.00	18.01	18.40	5.87	.00	.00	.00	3.05	.55	.00	.00	.00
	Silvetia (Rockweed)	585	11	0	0	5	0	68	1	0	0	14	1	0	0	100
		586	21	0	0	4	0	56	0	0	0	18	1	0	0	100
		587	6	0	0	0	0	61	0	0	0	31	2	0	0	100
		588	4	0	0	0	0	81	0	0	0	12	3	0	0	100
		589	3	0	0	0	0	79	0	0	0	17	1	0	0	100
		Mean	9.00	.00	.00	1.80	.00	69.00	.20	.00	.00	18.40	1.60	.00	.00	100.00
		StDev	7.38	.00	.00	2.49	.00	10.93	.45	.00	.00	7.44	.89	.00	.00	.00
	Mussels	590	1	0	0	0	0	0	74	0	1	21	3	0	0	100
		591	2	0	0	0	0	0	68	9	0	17	4	0	0	100
		592	0	1	0	0	0	0	82	1	0	16	0	0	0	100
		593	2	0	0	0	0	0	90	0	0	7	1	0	0	100
		594	7	0	0	0	0	0	75	0	0	15	3	0	0	100
		Mean	2.40	.20	.00	.00	.00	.00	77.80	2.00	.20	15.20	2.20	.00	.00	100.00
		StDev	2.70	.45	.00	.00	.00	.00	8.44	3.94	.45	5.12	1.64	.00	.00	.00
	Hesperophycus	570	10	0	0	14	75	0	0	0	0	1	0	0	0	100
		571	11	0	0	5	82	0	0	0	0	2	0	0	0	100
		572	10	0	0	3	86	0	0	0	0	1	0	0	0	100
		573	12	1	0	9	77	1	0	0	0	0	0	0	0	100
		574	13	0	0	5	70	6	0	0	0	3	3	0	0	100
		Mean	11.20	.20	.00	7.20	78.00	1.40	.00	.00	.00	1.40	.60	.00	.00	100.00
		StDev	1.30	.45	.00	4.38	6.20	2.61	.00	.00	.00	1.14	1.34	.00	.00	.00

**Table A16. Percent Cover of Index Species
Ford Point, Santa Rosa Island - Spring 2003 (3/18/03)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	520	85	9	0	0	0	0	0	0	0	0	6	0	0	100
	521	73	23	0	0	0	0	0	0	0	4	0	0	0	100
	522	91	8	0	0	0	0	0	0	0	0	1	0	0	100
	523	44	33	0	20	0	0	0	0	0	0	3	0	0	100
	524	83	15	0	0	0	0	0	0	0	1	1	0	0	100
	Mean	75.20	17.60	.00	4.00	.00	.00	.00	.00	.00	1.00	2.20	.00	.00	100.00
	StDev	18.61	10.48	.00	8.94	.00	.00	.00	.00	.00	1.73	2.39	.00	.00	.00
Endocladia	525	30	4	0	50	0	0	6	1	0	9	0	0	0	100
	526	37	3	0	45	0	0	6	0	0	8	1	0	0	100
	527	28	1	0	48	0	0	6	1	0	15	1	0	0	100
	528	24	2	0	46	0	0	8	0	0	19	1	0	0	100
	529	15	0	0	76	0	0	1	0	0	7	1	0	0	100
	Mean	26.80	2.00	.00	53.00	.00	.00	5.40	.40	.00	11.60	.80	.00	.00	100.00
	StDev	8.11	1.58	.00	13.00	.00	.00	2.61	.55	.00	5.18	.45	.00	.00	.00
Mussels	530	73	8	0	0	0	0	8	0	0	2	9	0	0	100
	531	4	0	0	0	0	0	90	0	0	4	2	0	0	100
	532	4	0	0	0	0	0	93	0	0	2	1	0	0	100
	533	35	0	0	0	0	0	40	2	0	22	1	0	0	100
	534	24	3	0	0	0	0	0	33	0	39	1	0	0	100
	Mean	28.00	2.20	.00	.00	.00	.00	46.20	7.00	.00	13.80	2.80	.00	.00	100.00
	StDev	28.47	3.49	.00	.00	.00	.00	43.99	14.56	.00	16.41	3.49	.00	.00	.00

**Table A17. Percent Cover of Index Species
Fossil Reef, Santa Rosa Island - Spring 2003 (3/13/03)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	605	73	25	0	2	0	0	0	0	0	0	0	0	0	100
	606	72	20	0	0	0	0	0	0	0	0	0	8	0	100
	607	70	28	0	0	0	0	0	0	0	0	1	1	0	100
	608	79	21	0	0	0	0	0	0	0	0	0	0	0	100
	609	68	28	0	0	0	0	0	0	0	1	1	2	0	100
	Mean	72.40	24.40	.00	.40	.00	.00	.00	.00	.00	.20	.40	2.20	.00	100.00
	StDev	4.16	3.78	.00	.89	.00	.00	.00	.00	.00	.45	.55	3.35	.00	.00
Endocladia	610	59	20	0	11	0	0	0	0	0	9	0	1	0	100
	611	47	49	0	0	0	0	0	0	0	2	2	0	0	100
	612	56	2	0	0	0	16	1	0	0	22	3	0	0	100
	613	33	1	0	58	0	1	0	0	0	7	0	0	0	100
	614	49	0	0	1	0	43	0	0	0	4	3	0	0	100
	Mean	48.80	14.40	.00	14.00	.00	12.00	.20	.00	.00	8.80	1.60	.20	.00	100.00
	StDev	10.11	21.03	.00	25.03	.00	18.61	.45	.00	.00	7.85	1.52	.45	.00	.00
Silvetia (Rockweed)	615	67	8	0	0	0	0	0	0	0	23	2	0	0	100
	616	58	15	0	6	0	0	0	0	0	20	1	0	0	100
	617	71	3	0	3	0	7	0	0	0	15	1	0	0	100
	618	32	0	0	20	0	17	0	0	0	30	1	0	0	100
	619	40	1	0	34	0	20	0	0	0	4	1	0	0	100
	Mean	53.60	5.40	.00	12.60	.00	8.80	.00	.00	.00	18.40	1.20	.00	.00	100.00
	StDev	16.98	6.19	.00	14.21	.00	9.36	.00	.00	.00	9.71	.45	.00	.00	.00
Mussels	620	11	0	4	0	0	0	20	0	0	39	26	0	0	100
	621	21	1	8	0	0	0	27	0	0	35	8	0	0	100
	622	22	1	13	0	0	0	43	0	1	19	1	0	0	100
	623	25	0	3	0	0	0	41	0	5	23	3	0	0	100
	624	1	0	1	0	0	0	1	18	0	28	51	0	0	100
	Mean	16.00	.40	5.80	.00	.00	.00	26.40	3.60	1.20	28.80	17.80	.00	.00	100.00
	StDev	9.90	.55	4.76	.00	.00	.00	17.14	8.05	2.17	8.26	21.02	.00	.00	.00

**Table A18. Percent Cover of Index Species
Johnson's Lee, Santa Rosa Island - Spring 2003 (3/17/03)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	500	58	41	0	0	0	0	0	0	0	1	0	0	0	100
	501	49	51	0	0	0	0	0	0	0	0	0	0	0	100
	502	79	19	0	0	0	0	1	0	0	0	1	0	0	100
	503	48	28	0	23	0	0	0	0	0	0	1	0	0	100
	504	67	16	0	8	0	0	0	0	0	5	4	0	0	100
	Mean	60.20	31.00	.00	6.20	.00	.00	.20	.00	.00	1.20	1.20	.00	.00	100.00
	StDev	13.03	14.82	.00	10.01	.00	.00	.45	.00	.00	2.17	1.64	.00	.00	.00
Endocladia	505	38	0	0	30	0	0	26	0	0	5	1	0	0	100
	506	47	4	1	46	0	0	0	0	0	0	2	0	0	100
	507	22	1	0	50	0	0	12	0	0	10	5	0	0	100
	508	30	11	1	38	0	0	13	0	2	3	2	0	0	100
	509	27	4	0	64	0	0	0	0	0	5	0	0	0	100
	Mean	32.80	4.00	.40	45.60	.00	.00	10.20	.00	.40	4.60	2.00	.00	.00	100.00
	StDev	9.83	4.30	.55	12.84	.00	.00	10.83	.00	.89	3.65	1.87	.00	.00	.00
Mussels	510	19	1	0	0	0	0	0	3	0	25	52	0	0	100
	511	4	0	0	0	0	0	0	42	0	23	31	0	0	100
	512	36	1	3	0	0	0	52	0	2	5	1	0	0	100
	513	13	0	0	0	0	0	1	26	0	22	38	0	0	100
	514	0	0	0	0	0	0	0	20	0	58	22	0	0	100
	Mean	14.40	.40	.60	.00	.00	.00	10.60	18.20	.40	26.60	28.80	.00	.00	100.00
	StDev	14.19	.55	1.34	.00	.00	.00	23.15	17.27	.89	19.30	19.02	.00	.00	.00

**Table A19. Percent Cover of Index Species
Northwest-Talcott, Santa Rosa Island - Spring 2003 (3/14/03)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	560	72	19	0	5	0	0	0	0	0	0	0	4	0	100
	561	39	59	0	0	0	0	0	0	0	0	1	1	0	100
	562	85	10	0	1	0	0	0	0	0	2	2	0	0	100
	563	45	3	0	8	0	40	0	0	0	4	0	0	0	100
	564	50	43	0	0	0	1	0	0	0	0	6	0	0	100
	Mean	58.20	26.80	.00	2.80	.00	8.20	.00	.00	.00	1.20	1.80	1.00	.00	100.00
	StDev	19.49	23.50	.00	3.56	.00	17.78	.00	.00	.00	1.79	2.49	1.73	.00	.00
Endocladia	555	28	0	0	42	0	27	0	0	0	2	1	0	0	100
	556	81	0	0	15	0	0	0	0	0	4	0	0	0	100
	557	33	0	0	17	0	32	0	5	0	11	2	0	0	100
	558	46	17	1	4	0	0	2	0	0	26	4	0	0	100
	559	68	1	0	1	0	0	0	0	0	29	1	0	0	100
	Mean	51.20	3.60	.20	15.80	.00	11.80	.40	1.00	.00	14.40	1.60	.00	.00	100.00
	StDev	22.73	7.50	.45	16.18	.00	16.25	.89	2.24	.00	12.46	1.52	.00	.00	.00
Silvetia (Rockweed)	565	10	0	0	0	0	86	0	0	0	4	0	0	0	100
	566	15	1	0	0	0	82	0	0	0	2	0	0	0	100
	567	5	0	0	0	0	83	0	1	0	9	2	0	0	100
	568	20	0	0	26	0	54	0	0	0	0	0	0	0	100
	569	68	0	0	2	0	26	0	0	0	3	1	0	0	100
	Mean	23.60	.20	.00	5.60	.00	66.20	.00	.20	.00	3.60	.60	.00	.00	100.00
	StDev	25.44	.45	.00	11.44	.00	25.93	.00	.45	.00	3.36	.89	.00	.00	.00
Mussels	550	25	0	0	0	0	0	49	1	6	14	5	0	0	100
	551	15	0	0	0	0	0	70	0	0	12	3	0	0	100
	552	20	0	0	0	0	0	60	1	8	7	4	0	0	100
	553	38	1	3	0	0	0	27	1	8	20	2	0	0	100
	554	22	0	2	0	0	0	52	0	7	13	4	0	0	100
	Mean	24.00	.20	1.00	.00	.00	.00	51.60	.60	5.80	13.20	3.60	.00	.00	100.00
	StDev	8.63	.45	1.41	.00	.00	.00	15.98	.55	3.35	4.66	1.14	.00	.00	.00

**Table A21. Percent Cover of Index Species
Cat Rock, Anacapa Island - Fall 2003 (1/20/04)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	31	40	11	0	17	32	0	0	0	0	0	0	0	0	100
	32	20	7	0	45	22	6	0	0	0	0	0	0	0	100
	33	27	2	0	14	57	0	0	0	0	0	0	0	0	100
	35	40	16	0	19	23	0	0	0	0	2	0	0	0	100
	36	38	6	0	4	51	1	0	0	0	0	0	0	0	100
	37	7	0	0	2	75	16	0	0	0	0	0	0	0	100
	38	46	36	0	18	0	0	0	0	0	0	0	0	0	100
	39	58	23	0	11	5	2	0	0	0	1	0	0	0	100
	135	45	17	0	4	22	7	0	0	0	5	0	0	0	100
	Mean	35.67	13.11	.00	14.89	31.89	3.56	.00	.00	.00	.89	.00	.00	.00	100.00
	StDev	15.32	11.36	.00	13.02	24.67	5.39	.00	.00	.00	1.69	.00	.00	.00	.00
Endocladia	13	11	18	0	65	0	1	2	0	0	3	0	0	0	100
	14	22	27	7	32	0	0	9	0	0	3	0	0	0	100
	19	7	2	0	55	11	19	0	0	0	6	0	0	0	100
	51	18	2	2	10	0	0	1	19	0	47	1	0	0	100
	52	4	8	3	33	0	0	4	31	0	16	1	0	0	100
	54	4	14	6	31	0	0	0	28	0	16	0	0	1	100
	212	2	3	2	83	0	2	3	0	0	2	0	0	3	100
	467	16	18	4	39	0	2	5	4	0	9	3	0	0	100
	492	18	6	5	48	1	11	1	0	0	10	0	0	0	100
	Mean	11.33	10.89	3.22	44.00	1.33	3.89	2.78	9.11	.00	12.44	.56	.00	.44	100.00
	StDev	7.40	8.82	2.49	21.55	3.64	6.66	2.91	13.11	.00	13.99	1.01	.00	1.01	.00
Silvetia (Rockweed)	2	13	3	0	28	19	33	0	0	0	4	0	0	0	100
	3	42	7	0	4	12	31	0	0	0	4	0	0	0	100
	4	16	2	0	4	0	68	0	0	0	10	0	0	0	100
	5	14	14	0	41	0	14	5	1	0	11	0	0	0	100
	6	6	0	0	8	24	61	0	0	0	1	0	0	0	100
	8	10	0	0	3	7	78	0	0	0	2	0	0	0	100
	9	3	0	0	1	10	84	0	0	0	2	0	0	0	100
	10	9	1	0	3	6	76	0	0	0	5	0	0	0	100
	55	22	20	2	39	1	0	2	0	0	14	0	0	0	100
	Mean	15.00	5.22	.22	14.56	8.78	49.44	.78	.11	.00	5.89	.00	.00	.00	100.00
	StDev	11.57	7.19	.67	16.56	8.47	30.63	1.72	.33	.00	4.62	.00	.00	.00	.00

**Table A21. Percent Cover of Index Species
Cat Rock, Anacapa Island - Fall 2003 (1/20/04) (continued)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Mussels	56	4	19	14	1	0	0	45	0	0	14	1	0	2	100
	164	19	6	5	7	0	0	51	0	0	10	2	0	0	100
	203	13	9	2	1	0	0	60	1	0	14	0	0	0	100
	204	5	1	6	1	0	0	80	0	4	3	0	0	0	100
	468	12	5	3	1	0	0	29	0	0	45	3	0	2	100
	470	34	11	8	9	0	0	17	0	1	18	0	0	2	100
	471	14	19	5	17	0	0	13	0	0	31	1	0	0	100
	472	10	3	11	0	0	0	72	0	1	3	0	0	0	100
	473	32	7	0	8	0	0	28	2	0	20	3	0	0	100
	Mean	15.89	8.89	6.00	5.00	.00	.00	43.89	.33	.67	17.56	1.11	.00	.67	100.00
	StDev	10.72	6.45	4.42	5.72	.00	.00	23.87	.71	1.32	13.45	1.27	.00	1.00	.00

**Table A22. Percent Cover of Index Species
Middle-East, Anacapa Island - Fall 2003 (1/21/04)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	243	56	8	16	6	0	0	3	0	0	10	0	0	1	100
	244	60	7	4	19	0	0	0	0	0	6	0	4	0	100
	245	62	8	5	17	0	0	2	0	0	5	0	0	1	100
	Mean	59.33	7.67	8.33	14.00	.00	.00	1.67	.00	.00	7.00	.00	1.33	.67	100.00
	StDev	3.06	.58	6.66	7.00	.00	.00	1.53	.00	.00	2.65	.00	2.31	.58	.00
Endocladia	240	11	0	2	53	15	15	0	0	0	4	0	0	0	100
	241	46	14	14	16	0	0	6	0	0	4	0	0	0	100
	242	69	4	2	13	10	0	1	0	0	0	0	1	0	100
	Mean	42.00	6.00	6.00	27.33	8.33	5.00	2.33	.00	.00	2.67	.00	.33	.00	100.00
	StDev	29.21	7.21	6.93	22.28	7.64	8.66	3.21	.00	.00	2.31	.00	.58	.00	.00
Silvetia (Rockweed)	53	10	0	2	15	0	23	32	4	0	14	0	0	0	100
	237	2	0	0	0	3	93	0	0	0	2	0	0	0	100
	469	13	0	1	0	0	83	0	0	0	3	0	0	0	100
	Mean	8.33	.00	1.00	5.00	1.00	66.33	10.67	1.33	.00	6.33	.00	.00	.00	100.00
	StDev	5.69	.00	1.00	8.66	1.73	37.86	18.48	2.31	.00	6.66	.00	.00	.00	.00
Mussels	476	2	0	0	0	0	0	95	0	0	3	0	0	0	100
	477	0	0	1	0	0	0	99	0	0	0	0	0	0	100
	478	0	0	0	0	0	0	100	0	0	0	0	0	0	100
	Mean	.67	.00	.33	.00	.00	.00	98.00	.00	.00	1.00	.00	.00	.00	100.00
	StDev	1.15	.00	.58	.00	.00	.00	2.65	.00	.00	1.73	.00	.00	.00	.00

**Table A23. Percent Cover of Index Species
Middle-West, Anacapa Island - Fall 2003 (1/21/04)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	447	77	9	0	13	0	0	0	0	0	1	0	0	0	100
	448	36	7	0	33	0	0	4	1	1	18	0	0	0	100
	449	64	0	0	10	2	0	0	0	0	24	0	0	0	100
	450	71	3	0	14	7	0	0	0	0	5	0	0	0	100
	451	66	2	0	27	0	0	0	0	0	5	0	0	0	100
	Mean	62.80	4.20	.00	19.40	1.80	.00	.80	.20	.20	10.60	.00	.00	.00	100.00
	StDev	15.80	3.70	.00	10.01	3.03	.00	1.79	.45	.45	9.86	.00	.00	.00	.00
Endocladia	457	24	0	1	36	0	0	26	0	0	13	0	0	0	100
	458	45	1	3	25	0	0	19	0	1	6	0	0	0	100
	459	69	0	0	19	0	0	3	0	0	9	0	0	0	100
	460	79	2	0	19	0	0	0	0	0	0	0	0	0	100
	461	50	0	0	49	1	0	0	0	0	0	0	0	0	100
	Mean	53.40	.60	.80	29.60	.20	.00	9.60	.00	.20	5.60	.00	.00	.00	100.00
	StDev	21.48	.89	1.30	12.88	.45	.00	12.10	.00	.45	5.68	.00	.00	.00	.00
Silvetia (Rockweed)	452	64	7	0	1	0	28	0	0	0	0	0	0	0	100
	453	12	0	1	0	0	85	2	0	0	0	0	0	0	100
	454	32	2	1	10	0	1	10	0	0	42	2	0	0	100
	455	13	1	2	3	0	67	10	0	0	4	0	0	0	100
	456	18	0	0	0	0	81	1	0	0	0	0	0	0	100
	Mean	27.80	2.00	.80	2.80	.00	52.40	4.60	.00	.00	9.20	.40	.00	.00	100.00
	StDev	21.75	2.92	.84	4.21	.00	36.51	4.98	.00	.00	18.42	.89	.00	.00	.00
Mussels	462	28	1	2	2	0	0	56	1	1	9	0	0	0	100
	463	30	2	5	1	0	0	48	0	0	12	2	0	0	100
	464	14	0	3	2	0	0	70	0	1	10	0	0	0	100
	465	4	1	1	0	0	0	93	0	0	1	0	0	0	100
	466	1	0	0	0	0	0	90	0	0	9	0	0	0	100
	Mean	15.40	.80	2.20	1.00	.00	.00	71.40	.20	.40	8.20	.40	.00	.00	100.00
	StDev	13.33	.84	1.92	1.00	.00	.00	19.99	.45	.55	4.21	.89	.00	.00	.00

**Table A24. Percent Cover of Index Species
S Frenchy's Cove, Anacapa Island - Fall 2003 (1/19/04)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	249	41	18	0	40	1	0	0	0	0	0	0	0	0	100
	250	36	23	0	41	0	0	0	0	0	0	0	0	0	100
	251	51	37	0	11	0	0	0	0	0	1	0	0	0	100
	252	44	26	0	28	0	0	0	0	0	0	0	2	0	100
	253	24	25	0	35	16	0	0	0	0	0	0	0	0	100
	Mean	39.20	25.80	.00	31.00	3.40	.00	.00	.00	.00	.20	.00	.40	.00	100.00
	StDev	10.08	6.98	.00	12.31	7.06	.00	.00	.00	.00	.45	.00	.89	.00	.00
Endocladia	154	13	1	0	71	0	1	0	0	0	0	0	0	14	100
	155	6	0	0	58	0	34	0	0	0	2	0	0	0	100
	256	34	0	0	50	10	4	0	1	0	1	0	0	0	100
	257	6	0	0	88	4	0	0	0	0	0	0	0	2	100
	258	17	0	0	23	0	60	0	0	0	0	0	0	0	100
	Mean	15.20	.20	.00	58.00	2.80	19.80	.00	.20	.00	.60	.00	.00	3.20	100.00
	StDev	11.52	.45	.00	24.28	4.38	26.52	.00	.45	.00	.89	.00	.00	6.10	.00
Silvetia (Rockweed)	259	3	0	0	0	0	97	0	0	0	0	0	0	0	100
	260	12	5	0	4	3	76	0	0	0	0	0	0	0	100
	261	4	1	0	0	0	94	0	0	0	1	0	0	0	100
	262	18	19	0	49	0	13	0	0	0	1	0	0	0	100
	263	8	0	0	0	0	92	0	0	0	0	0	0	0	100
	Mean	9.00	5.00	.00	10.60	.60	74.40	.00	.00	.00	.40	.00	.00	.00	100.00
	StDev	6.16	8.09	.00	21.54	1.34	35.27	.00	.00	.00	.55	.00	.00	.00	.00
Mussels	201	1	0	0	6	0	0	90	3	0	0	0	0	0	100
	202	4	0	0	0	0	0	87	2	0	7	0	0	0	100
	264	9	0	0	0	0	0	87	3	0	1	0	0	0	100
	265	4	0	0	0	0	0	95	0	1	0	0	0	0	100
	266	13	2	0	1	0	0	79	1	0	4	0	0	0	100
	Mean	6.20	.40	.00	1.40	.00	.00	87.60	1.80	.20	2.40	.00	.00	.00	100.00
	StDev	4.76	.89	.00	2.61	.00	.00	5.81	1.30	.45	3.05	.00	.00	.00	.00

**Table A25. Percent Cover of Index Species
Crook Point, San Miguel Island - Fall 2003 (1/7/04)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	137	91	9	0	0	0	0	0	0	0	0	0	0	0	100
	147	57	43	0	0	0	0	0	0	0	0	0	0	0	100
	148	67	31	0	0	0	0	0	0	0	1	1	0	0	100
	149	40	47	0	11	0	0	2	0	0	0	0	0	0	100
	495	28	63	0	7	0	0	0	0	0	2	0	0	0	100
	Mean	56.60	38.60	.00	3.60	.00	.00	.40	.00	.00	.60	.20	.00	.00	100.00
	StDev	24.42	20.12	.00	5.13	.00	.00	.89	.00	.00	.89	.45	.00	.00	.00
Endocladia	386	51	24	0	17	0	8	0	0	0	0	0	0	0	100
	387	26	9	1	42	0	0	0	0	1	20	1	0	0	100
	388	32	24	0	26	0	8	1	0	0	9	0	0	0	100
	389	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	390	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Mean	21.80	11.40	.20	17.00	.00	3.20	.20	.00	.20	5.80	.20	.00	.00	60.00
	StDev	21.94	12.07	.45	17.92	.00	4.38	.45	.00	.45	8.84	.45	.00	.00	54.77
Silvetia (Rockweed)	396	32	10	0	30	0	8	15	0	3	2	0	0	0	100
	397	15	0	0	0	0	0	85	0	0	0	0	0	0	100
	398	39	23	0	6	0	4	24	0	2	2	0	0	0	100
	399	37	4	0	0	0	2	1	3	0	51	1	0	1	100
	400	70	5	0	20	4	0	0	0	0	0	1	0	0	100
	Mean	38.60	8.40	.00	11.20	.80	2.80	25.00	.60	1.00	11.00	.40	.00	.20	100.00
	StDev	19.93	8.91	.00	13.31	1.79	3.35	35.01	1.34	1.41	22.38	.55	.00	.45	.00
Mussels	381	18	10	0	0	0	0	44	0	1	27	0	0	0	100
	382	1	0	0	0	0	0	99	0	0	0	0	0	0	100
	383	5	0	0	0	0	0	90	0	0	5	0	0	0	100
	384	13	1	0	0	0	0	71	0	4	9	2	0	0	100
	385	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Mean	7.40	2.20	.00	.00	.00	.00	60.80	.00	1.00	8.20	.40	.00	.00	80.00
	StDev	7.83	4.38	.00	.00	.00	.00	39.98	.00	1.73	11.17	.89	.00	.00	44.72

**Table A26. Percent Cover of Index Species
Cuyler Harbor, San Miguel Island - Fall 2003 (1/8/04)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	416	31	65	1	2	0	0	0	0	0	1	0	0	0	100
	417	35	44	0	21	0	0	0	0	0	0	0	0	0	100
	418	28	58	0	13	0	0	0	0	0	1	0	0	0	100
	419	54	13	0	33	0	0	0	0	0	0	0	0	0	100
	420	42	9	0	49	0	0	0	0	0	0	0	0	0	100
	Mean	38.00	37.80	.20	23.60	.00	.00	.00	.00	.00	.40	.00	.00	.00	100.00
	StDev	10.37	25.65	.45	18.16	.00	.00	.00	.00	.00	.55	.00	.00	.00	.00
Endocladia	411	52	0	0	24	0	0	20	0	0	2	2	0	0	100
	412	16	41	0	29	0	0	12	0	1	1	0	0	0	100
	413	19	3	0	23	0	51	1	0	0	3	0	0	0	100
	414	32	1	0	52	0	0	0	0	0	15	0	0	0	100
	415	35	1	0	48	0	0	0	0	0	15	1	0	0	100
	Mean	30.80	9.20	.00	35.20	.00	10.20	6.60	.00	.20	7.20	.60	.00	.00	100.00
	StDev	14.38	17.81	.00	13.77	.00	22.81	9.04	.00	.45	7.16	.89	.00	.00	.00
Silvetia (Rockweed)	406	23	0	0	2	0	47	2	0	0	16	10	0	0	100
	407	18	0	0	0	0	61	0	0	0	18	3	0	0	100
	408	12	0	1	2	0	80	0	0	0	5	0	0	0	100
	409	6	1	0	0	0	84	0	0	0	9	0	0	0	100
	410	17	0	1	0	0	77	0	0	0	3	2	0	0	100
	Mean	15.20	.20	.40	.80	.00	69.80	.40	.00	.00	10.20	3.00	.00	.00	100.00
	StDev	6.46	.45	.55	1.10	.00	15.45	.89	.00	.00	6.61	4.12	.00	.00	.00
Mussels	401	2	0	0	0	0	0	90	0	4	1	3	0	0	100
	402	10	3	1	0	0	0	82	0	2	0	1	0	1	100
	403	12	4	1	0	0	0	69	0	0	4	10	0	0	100
	404	39	5	7	0	0	0	28	0	1	12	8	0	0	100
	405	48	1	14	2	0	0	28	0	1	3	3	0	0	100
	Mean	22.20	2.60	4.60	.40	.00	.00	59.40	.00	1.60	4.00	5.00	.00	.20	100.00
	StDev	20.05	2.07	5.94	.89	.00	.00	29.63	.00	1.52	4.74	3.81	.00	.45	.00

**Table A27. Percent Cover of Index Species
Otter Harbor, San Miguel Island - Fall 2003 (1/6/04)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	370	11	7	0	0	0	0	0	0	0	82	0	0	0	100
	371	7	74	0	0	0	0	0	0	0	9	0	10	0	100
	372	47	50	0	0	0	0	0	0	0	0	2	1	0	100
	373	6	25	0	0	0	0	0	0	0	66	0	3	0	100
	374	4	0	0	0	0	0	0	10	0	86	0	0	0	100
	Mean	15.00	31.20	.00	.00	.00	.00	.00	2.00	.00	48.60	.40	2.80	.00	100.00
	StDev	18.07	30.75	.00	.00	.00	.00	.00	4.47	.00	41.07	.89	4.21	.00	.00
Endocladia	360	24	22	1	28	0	6	3	0	0	16	0	0	0	100
	361	34	0	0	59	0	2	1	0	1	3	0	0	0	100
	362	5	2	0	84	0	1	1	0	1	6	0	0	0	100
	363	8	1	0	66	0	2	0	0	0	23	0	0	0	100
	364	6	0	0	57	0	21	0	0	0	16	0	0	0	100
	Mean	15.40	5.00	.20	58.80	.00	6.40	1.00	.00	.40	12.80	.00	.00	.00	100.00
	StDev	12.95	9.54	.45	20.24	.00	8.38	1.22	.00	.55	8.17	.00	.00	.00	.00
Silvetia (Rockweed)	355	47	7	0	28	0	8	0	0	0	8	0	2	0	100
	356	12	1	1	18	0	50	0	0	0	18	0	0	0	100
	357	25	0	0	29	0	17	0	0	0	29	0	0	0	100
	358	36	27	0	17	0	12	0	0	0	7	1	0	0	100
	359	25	59	0	7	0	0	0	0	0	9	0	0	0	100
	Mean	29.00	18.80	.20	19.80	.00	17.40	.00	.00	.00	14.20	.20	.40	.00	100.00
	StDev	13.17	24.96	.45	9.04	.00	19.26	.00	.00	.00	9.36	.45	.89	.00	.00
Mussels	375	9	3	1	0	0	0	56	0	5	25	1	0	0	100
	376	13	0	0	0	0	0	47	0	2	36	2	0	0	100
	378	4	2	0	0	0	0	48	0	12	34	0	0	0	100
	379	7	1	1	3	0	0	60	0	4	23	1	0	0	100
	380	14	1	0	0	0	0	46	0	2	36	1	0	0	100
	Mean	9.40	1.40	.40	.60	.00	.00	51.40	.00	5.00	30.80	1.00	.00	.00	100.00
	StDev	4.16	1.14	.55	1.34	.00	.00	6.23	.00	4.12	6.30	.71	.00	.00	.00

**Table A28. Percent Cover of Index Species
Harris Point, San Miguel Island - Fall 2003 (1/5/04)**

	Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
A-31	Chthamalus/Balanus	440	22	76	0	1	0	0	0	0	1	0	0	0	100
		441	40	60	0	0	0	0	0	0	0	0	0	0	100
		442	18	78	0	3	0	0	0	0	1	0	0	0	100
		443	44	56	0	0	0	0	0	0	0	0	0	0	100
		444	49	50	0	0	0	0	0	0	1	0	0	0	100
		Mean	34.60	64.00	.00	.80	.00	.00	.00	.00	.60	.00	.00	.00	100.00
		StDev	13.78	12.41	.00	1.30	.00	.00	.00	.00	.55	.00	.00	.00	.00
	Endocladia	431	43	21	5	17	0	0	6	0	7	0	0	1	100
		432	30	31	0	6	21	0	0	0	12	0	0	0	100
		433	57	18	0	3	4	0	0	0	18	0	0	0	100
		434	76	3	1	12	4	0	0	0	4	0	0	0	100
		435	8	4	0	17	61	0	0	0	10	0	0	0	100
		Mean	42.80	15.40	1.20	11.00	18.00	.00	1.20	.00	10.20	.00	.00	.20	100.00
		StDev	25.88	11.89	2.17	6.36	25.37	.00	2.68	.00	5.31	.00	.00	.45	.00
	Mussels	426	24	3	1	1	0	0	57	2	11	1	0	0	100
		427	65	5	1	2	3	0	2	0	22	0	0	0	100
		428	73	6	0	5	2	0	9	0	4	1	0	0	100
		429	33	7	5	0	0	0	48	0	7	0	0	0	100
		430	20	1	4	0	0	0	57	0	16	2	0	0	100
		Mean	43.00	4.40	2.20	1.60	1.00	.00	34.60	.40	12.00	.80	.00	.00	100.00
		StDev	24.36	2.41	2.17	2.07	1.41	.00	26.93	.89	7.18	.84	.00	.00	.00
	Tetraclita	436	27	17	20	0	0	0	23	0	12	1	0	0	100
		437	25	2	21	0	0	0	30	1	20	1	0	0	100
		438	19	11	16	10	0	0	0	0	43	1	0	0	100
		439	46	2	5	7	0	0	3	0	37	0	0	0	100
		445	48	6	22	3	0	0	11	1	9	0	0	0	100
		Mean	33.00	7.60	16.80	4.00	.00	.00	13.40	.40	24.20	.60	.00	.00	100.00
		StDev	13.13	6.43	6.98	4.42	.00	.00	12.86	.55	15.12	.55	.00	.00	.00
	Hesperophycus	421	25	1	0	10	62	0	0	0	2	0	0	0	100
		422	17	0	0	22	53	0	0	0	7	1	0	0	100
		423	20	1	0	28	48	0	0	0	3	0	0	0	100
		424	41	5	0	23	28	0	0	0	3	0	0	0	100
		425	48	0	0	7	41	0	0	0	3	0	0	1	100
		Mean	30.20	1.40	.00	18.00	46.40	.00	.00	.00	3.60	.20	.00	.20	100.00
		StDev	13.59	2.07	.00	9.03	12.82	.00	.00	.00	1.95	.45	.00	.45	.00

**Table A29. Percent Cover of Index Species
Landing Cove, Santa Barbara Island - Fall 2003 (10/24/03)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	315	54	19	7	2	0	0	3	1	0	14	0	0	0	100
	316	24	7	2	5	0	0	0	7	0	54	1	0	0	100
	317	20	4	2	2	0	0	3	17	0	52	0	0	0	100
	318	8	9	23	1	0	0	25	3	1	29	1	0	0	100
	319	59	11	7	0	0	0	0	3	0	18	2	0	0	100
	Mean	33.00	10.00	8.20	2.00	.00	.00	6.20	6.20	.20	33.40	.80	.00	.00	100.00
	StDev	22.32	5.66	8.64	1.87	.00	.00	10.62	6.42	.45	18.73	.84	.00	.00	.00
Silvetia (Rockweed)	310	30	7	0	0	0	0	7	14	0	41	1	0	0	100
	311	30	7	0	0	0	2	0	23	0	37	1	0	0	100
	312	20	4	0	0	0	0	2	25	0	49	0	0	0	100
	313	12	1	0	0	0	0	0	26	0	59	2	0	0	100
	314	19	8	0	0	0	6	0	26	0	39	2	0	0	100
	Mean	22.20	5.40	.00	.00	.00	1.60	1.80	22.80	.00	45.00	1.20	.00	.00	100.00
	StDev	7.76	2.88	.00	.00	.00	2.61	3.03	5.07	.00	9.06	.84	.00	.00	.00
Mussels	325	1	0	3	0	0	0	89	0	3	4	0	0	0	100
	326	0	0	0	0	0	0	97	0	3	0	0	0	0	100
	327	1	0	0	0	0	0	93	0	5	1	0	0	0	100
	328	0	0	1	0	0	0	79	0	1	16	3	0	0	100
	329	3	0	4	1	0	0	80	0	0	10	2	0	0	100
	Mean	1.00	.00	1.60	.20	.00	.00	87.60	.00	2.40	6.20	1.00	.00	.00	100.00
	StDev	1.22	.00	1.82	.45	.00	.00	7.92	.00	1.95	6.72	1.41	.00	.00	.00
Red Algal Turf/	320	1	0	0	0	0	0	0	87	0	12	0	0	0	100
	321	1	0	0	0	0	0	1	64	0	34	0	0	0	100
	322	0	0	0	0	0	0	0	29	0	7	2	0	62	100
	323	0	0	0	0	0	0	0	27	0	14	0	0	59	100
	324	0	0	0	0	0	0	0	47	0	53	0	0	0	100
	Mean	.40	.00	.00	.00	.00	.00	.20	50.80	.00	24.00	.40	.00	24.20	100.00
	StDev	.55	.00	.00	.00	.00	.00	.45	25.20	.00	19.20	.89	.00	33.15	.00

**Table A30. Percent Cover of Index Species
Sea Lion Rookery, Santa Barbara Island - Fall 2003 (10/25/03)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	345	17	2	1	5	0	0	2	1	0	72	0	0	0	100
	346	48	10	0	1	0	0	0	0	0	40	1	0	0	100
	347	38	16	3	0	0	0	0	0	0	43	0	0	0	100
	348	17	0	3	2	0	0	0	0	0	78	0	0	0	100
	349	26	14	3	0	0	0	0	0	0	57	0	0	0	100
	Mean	29.20	8.40	2.00	1.60	.00	.00	.40	.20	.00	58.00	.20	.00	.00	100.00
	StDev	13.59	7.13	1.41	2.07	.00	.00	.89	.45	.00	16.93	.45	.00	.00	.00
Endocladia	335	9	0	16	4	0	0	3	2	0	66	0	0	0	100
	336	23	0	0	4	0	0	0	0	0	73	0	0	0	100
	337	14	2	2	2	0	0	6	3	1	70	0	0	0	100
	338	10	2	7	21	0	0	0	0	0	60	0	0	0	100
	339	15	1	5	24	0	0	0	0	0	55	0	0	0	100
	Mean	14.20	1.00	6.00	11.00	.00	.00	1.80	1.00	.20	64.80	.00	.00	.00	100.00
	StDev	5.54	1.00	6.20	10.58	.00	.00	2.68	1.41	.45	7.33	.00	.00	.00	.00
Silvetia (Rockweed)	330	24	0	13	0	0	0	57	1	0	1	4	0	0	100
	331	10	0	0	3	0	46	2	5	1	33	0	0	0	100
	332	9	0	0	4	0	49	3	5	1	29	0	0	0	100
	333	10	0	1	1	0	39	6	14	0	29	0	0	0	100
	334	7	0	0	2	0	65	0	0	0	26	0	0	0	100
	Mean	12.00	.00	2.80	2.00	.00	39.80	13.60	5.00	.40	23.60	.80	.00	.00	100.00
	StDev	6.82	.00	5.72	1.58	.00	24.20	24.36	5.52	.55	12.88	1.79	.00	.00	.00
Mussels	350	2	0	1	0	0	0	91	0	1	3	2	0	0	100
	351	0	0	0	0	0	0	98	0	2	0	0	0	0	100
	352	2	0	6	0	0	0	90	0	0	2	0	0	0	100
	353	2	0	1	0	0	0	49	4	1	41	2	0	0	100
	354	3	0	4	0	0	0	73	0	9	10	1	0	0	100
	Mean	1.80	.00	2.40	.00	.00	.00	80.20	.80	2.60	11.20	1.00	.00	.00	100.00
	StDev	1.10	.00	2.51	.00	.00	.00	19.72	1.79	3.65	17.08	1.00	.00	.00	.00

**Table A31. Percent Cover of Index Species
Fraser Cove, Santa Cruz Island - Fall 2003 (12/8/03)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	876	43	30	0	24	0	0	2	0	0	1	0	0	0	100
	877	77	4	0	17	0	0	2	0	0	0	0	0	0	100
	878	64	33	0	0	0	0	0	0	0	3	0	0	0	100
	879	55	31	0	0	0	0	0	0	0	14	0	0	0	100
	880	32	46	0	7	0	0	0	0	0	14	0	0	1	100
	Mean	54.20	28.80	.00	9.60	.00	.00	.80	.00	.00	6.40	.00	.00	.20	100.00
	StDev	17.57	15.29	.00	10.64	.00	.00	1.10	.00	.00	7.02	.00	.00	.45	.00
Endocladia	881	49	7	1	27	0	0	10	0	0	6	0	0	0	100
	882	48	31	0	15	0	0	2	0	0	4	0	0	0	100
	883	45	5	0	38	10	0	0	0	0	2	0	0	0	100
	884	22	5	0	73	0	0	0	0	0	0	0	0	0	100
	885	48	6	0	38	0	0	1	0	0	7	0	0	0	100
	Mean	42.40	10.80	.20	38.20	2.00	.00	2.60	.00	.00	3.80	.00	.00	.00	100.00
	StDev	11.50	11.32	.45	21.65	4.47	.00	4.22	.00	.00	2.86	.00	.00	.00	.00
Silvetia (Rockweed)	896	17	1	0	12	11	56	0	0	0	1	1	0	1	100
	897	10	0	0	0	1	78	0	0	0	10	0	0	1	100
	898	19	1	0	0	0	63	0	0	0	16	0	0	1	100
	899	4	1	0	6	12	74	0	0	0	3	0	0	0	100
	900	12	4	0	2	4	78	0	0	0	0	0	0	0	100
	Mean	12.40	1.40	.00	4.00	5.60	69.80	.00	.00	.00	6.00	.20	.00	.60	100.00
	StDev	5.94	1.52	.00	5.10	5.59	9.86	.00	.00	.00	6.82	.45	.00	.55	.00
Mussels	891	12	0	0	0	0	0	66	0	0	2	19	0	1	100
	892	23	0	0	2	0	0	68	0	0	4	2	0	1	100
	893	6	0	0	0	0	0	81	0	0	2	11	0	0	100
	894	11	1	0	0	0	0	84	0	2	1	1	0	0	100
	895	15	0	1	0	0	0	75	0	4	4	1	0	0	100
	Mean	13.40	.20	.20	.40	.00	.00	74.80	.00	1.20	2.60	6.80	.00	.40	100.00
	StDev	6.27	.45	.45	.89	.00	.00	7.85	.00	1.79	1.34	8.01	.00	.55	.00
Pollicipes	901	26	11	6	0	0	0	42	0	8	1	2	0	4	100
	902	21	2	0	30	0	0	20	1	5	9	9	0	3	100
	903	17	1	1	0	0	0	53	1	18	6	3	0	0	100
	904	14	3	6	0	0	0	61	0	5	4	4	0	3	100
	905	7	0	0	0	0	0	61	0	19	13	0	0	0	100
	Mean	17.00	3.40	2.60	6.00	.00	.00	47.40	.40	11.00	6.60	3.60	.00	2.00	100.00
	StDev	7.18	4.39	3.13	13.42	.00	.00	17.18	.55	6.96	4.62	3.36	.00	1.87	.00

**Table A31. Percent Cover of Index Species
Fraser Cove, Santa Cruz Island - Fall 2003 (12/8/03) (continued)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Tar	906	32	18	0	0	0	0	0	0	0	0	0	50	0	100
	907	26	19	0	0	0	0	0	0	0	0	0	55	0	100
	908	22	17	0	0	0	0	0	0	0	0	0	61	0	100
	909	44	10	0	0	0	0	0	0	0	0	0	46	0	100
	910	20	8	0	0	0	0	0	0	0	0	0	72	0	100
	Mean	28.80	14.40	.00	.00	.00	.00	.00	.00	.00	.00	.00	56.80	.00	100.00
	StDev	9.65	5.03	.00	.00	.00	.00	.00	.00	.00	.00	.00	10.18	.00	.00
Hesperophycus	886	55	3	0	15	24	2	0	0	0	1	0	0	0	100
	887	56	5	0	11	16	0	0	0	0	12	0	0	0	100
	888	22	6	0	18	51	2	0	0	0	0	1	0	0	100
	889	37	7	0	18	25	8	0	0	0	3	1	0	1	100
	890	22	11	0	19	11	36	0	0	0	1	0	0	0	100
	Mean	38.40	6.40	.00	16.20	25.40	9.60	.00	.00	.00	3.40	.40	.00	.20	100.00
	StDev	16.77	2.97	.00	3.27	15.44	15.06	.00	.00	.00	4.93	.55	.00	.45	.00

**Table A32. Percent Cover of Index Species
Orizaba Cove, Santa Cruz Island - Fall 2003 (1/22/04)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
A-36	Chthamalus/Balanus	851	no photo available for scoring												
		852	10	88	1	1	0	0	0	0	0	0	0	0	100
		853	49	49	0	0	0	2	0	0	0	0	0	0	100
		854	58	35	2	0	0	4	0	0	0	0	0	1	100
		855	38	54	0	0	0	0	0	0	8	0	0	0	100
		Mean	31.00	45.20	.60	.20	.00	1.20	.00	.00	1.60	.00	.00	.20	80.00
		StDev	25.02	31.90	.89	.45	.00	1.79	.00	.00	3.58	.00	.00	.45	44.72
	Silvetia (Rockweed)	866	43	1	10	4	0	2	0	0	39	1	0	0	100
		867	35	0	1	40	0	5	1	0	18	0	0	0	100
		868	37	0	4	21	0	5	1	0	30	0	0	2	100
		869	34	1	1	20	5	20	0	0	18	0	0	1	100
		870	29	2	5	43	0	11	0	0	9	0	0	1	100
		Mean	35.60	.80	4.20	25.60	1.00	8.20	.80	.00	22.80	.20	.00	.80	100.00
		StDev	5.08	.84	3.70	16.04	2.24	7.66	.84	.00	11.73	.45	.00	.84	.00
	Mussels	861	6	2	2	0	0	0	0	0	90	0	0	0	100
		862	35	0	0	0	0	10	0	0	30	21	0	4	100
		863	11	5	2	0	0	66	0	0	12	2	0	2	100
		864	16	3	1	0	0	26	0	1	46	3	0	4	100
		865	22	4	1	0	0	13	1	1	56	1	0	1	100
		Mean	18.00	2.80	1.20	.00	.00	23.00	.20	.40	46.80	5.40	.00	2.20	100.00
		StDev	11.20	1.92	.84	.00	.00	25.77	.45	.55	29.35	8.79	.00	1.79	.00
	Tetraclita	871	10	5	28	0	0	24	0	0	31	0	0	2	100
		872	29	2	23	0	0	5	0	0	40	1	0	0	100
		873	23	1	46	5	0	1	0	0	21	1	0	0	100
		874	40	0	28	1	0	8	0	0	22	0	0	1	100
		875	29	2	27	7	0	5	0	0	30	0	0	0	100
		Mean	26.20	2.00	30.40	2.60	.00	8.60	.00	.00	28.80	.40	.00	.60	100.00
		StDev	10.94	1.87	8.96	3.21	.00	8.96	.00	.00	7.73	.55	.00	.89	.00
	Hesperophycus	856	9	4	0	75	2	1	0	0	9	0	0	0	100
		857	13	5	2	54	9	3	0	0	14	0	0	0	100
		858	7	2	0	55	16	2	0	0	16	0	0	0	100
		859	10	19	0	66	1	2	0	0	2	0	0	0	100
		860	14	8	0	73	4	0	1	0	0	0	0	0	100
		Mean	10.60	7.60	.40	64.60	6.40	1.60	.20	.00	8.20	.00	.00	.00	100.00
		StDev	2.88	6.73	.89	9.81	6.19	1.14	.45	.00	7.09	.00	.00	.00	.00

**Table A33. Percent Cover of Index Species
Prisoner's Harbor, Santa Cruz Island - Fall 2003 (12/5/03)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	826	23	1	0	17	0	0	0	0	0	59	0	0	0	100
	827	58	14	1	0	0	0	1	0	0	25	1	0	0	100
	828	11	18	0	9	0	0	1	0	0	60	1	0	0	100
	829	11	43	0	17	0	0	1	3	0	25	0	0	0	100
	830	24	12	0	7	0	0	0	0	0	56	1	0	0	100
	Mean	25.40	17.60	.20	10.00	.00	.00	.60	.60	.00	45.00	.60	.00	.00	100.00
	StDev	19.27	15.53	.45	7.21	.00	.00	.55	1.34	.00	18.32	.55	.00	.00	.00
Endocladia	831	19	23	1	38	0	0	4	0	0	15	0	0	0	100
	832	7	23	0	55	9	0	1	0	0	4	1	0	0	100
	833	11	34	0	48	5	0	1	0	0	1	0	0	0	100
	834	24	13	0	53	5	0	0	0	0	4	1	0	0	100
	835	21	3	0	45	28	0	0	0	0	3	0	0	0	100
	Mean	16.40	19.20	.20	47.80	9.40	.00	1.20	.00	.00	5.40	.40	.00	.00	100.00
	StDev	7.13	11.71	.45	6.76	10.88	.00	1.64	.00	.00	5.50	.55	.00	.00	.00
Silvetia (Rockweed)	846	40	5	0	0	0	27	2	0	0	24	2	0	0	100
	847	42	8	1	0	0	10	3	0	0	36	0	0	0	100
	848	11	0	1	0	0	45	0	0	0	41	2	0	0	100
	849	4	0	0	0	0	73	0	0	0	21	2	0	0	100
	850	3	0	0	0	0	86	0	0	0	11	0	0	0	100
	Mean	20.00	2.60	.40	.00	.00	48.20	1.00	.00	.00	26.60	1.20	.00	.00	100.00
	StDev	19.43	3.71	.55	.00	.00	31.48	1.41	.00	.00	12.01	1.10	.00	.00	.00
Mussels	841	0	0	0	0	0	0	3	0	0	95	2	0	0	100
	842	18	21	1	0	0	0	3	1	0	56	0	0	0	100
	843	2	46	2	0	0	0	7	0	0	38	5	0	0	100
	844	0	19	2	0	0	0	6	0	0	41	32	0	0	100
	845	30	7	4	0	0	0	10	0	0	47	2	0	0	100
	Mean	10.00	18.60	1.80	.00	.00	.00	5.80	.20	.00	55.40	8.20	.00	.00	100.00
	StDev	13.49	17.59	1.48	.00	.00	.00	2.95	.45	.00	23.18	13.42	.00	.00	.00
Hesperophycus	836	51	2	0	38	2	0	0	0	0	6	1	0	0	100
	837	59	3	0	21	12	0	1	0	0	0	4	0	0	100
	838	71	0	0	22	6	1	0	0	0	0	0	0	0	100
	839	35	42	0	16	2	4	0	0	0	0	1	0	0	100
	840	41	20	0	25	11	0	0	0	0	1	2	0	0	100
	Mean	51.40	13.40	.00	24.40	6.60	1.00	.20	.00	.00	1.40	1.60	.00	.00	100.00
	StDev	14.31	17.88	.00	8.26	4.77	1.73	.45	.00	.00	2.61	1.52	.00	.00	.00

**Table A34. Percent Cover of Index Species
Scorpion Rock, Santa Cruz Island - Fall 2003 (12/19/03)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
A-38	Chthamalus/Balanus	801	34	24	0	41	0	0	0	0	1	0	0	0	100
		802	44	35	1	18	0	0	0	0	0	0	0	2	100
		803	46	11	0	42	0	0	0	0	1	0	0	0	100
		804	44	21	0	32	0	0	0	0	2	1	0	0	100
		805	58	39	0	0	0	0	0	0	0	1	0	2	100
		Mean	45.20	26.00	.20	26.60	.00	.00	.00	.00	.80	.40	.00	.80	100.00
		StDev	8.56	11.22	.45	17.71	.00	.00	.00	.00	.84	.55	.00	1.10	.00
	Endocladia	806	19	2	0	72	0	1	0	0	6	0	0	0	100
		807	23	6	2	58	0	2	0	2	4	1	0	2	100
		808	37	1	2	45	0	2	0	1	12	0	0	0	100
		809	34	5	0	59	0	0	0	0	2	0	0	0	100
		810	62	5	1	16	0	1	0	0	15	0	0	0	100
		Mean	35.00	3.80	1.00	50.00	.00	1.20	.00	.60	7.80	.20	.00	.40	100.00
		StDev	16.84	2.17	1.00	21.27	.00	.84	.00	.89	5.50	.45	.00	.89	.00
	Mussels	816	5	15	14	0	0	63	0	1	1	0	0	1	100
		817	5	1	1	0	0	93	0	0	0	0	0	0	100
		818	50	18	5	0	0	15	0	3	0	6	0	3	100
		819	59	15	10	1	0	0	0	0	8	0	0	7	100
		820	37	14	8	0	0	7	1	0	30	0	0	3	100
		Mean	31.20	12.60	7.60	.20	.00	35.60	.20	.80	7.80	1.20	.00	2.80	100.00
		StDev	25.16	6.66	4.93	.45	.00	40.48	.45	1.30	12.85	2.68	.00	2.68	.00
	Tetraclita	821	38	17	9	1	0	27	0	7	1	0	0	0	100
		822	43	2	1	9	0	35	0	7	3	0	0	0	100
		823	82	2	2	0	0	0	0	0	10	4	0	0	100
		824	72	3	14	0	0	0	0	0	6	5	0	0	100
		825	71	5	12	0	0	0	0	0	8	2	0	2	100
		Mean	61.20	5.80	7.60	2.00	.00	12.40	.00	2.80	5.60	2.20	.00	.40	100.00
		StDev	19.46	6.38	5.86	3.94	.00	17.21	.00	3.83	3.65	2.28	.00	.89	.00
	Hesperophycus	811	68	5	0	11	14	1	0	1	0	0	0	0	100
		812	36	2	0	28	24	3	0	0	2	0	0	0	100
		813	17	1	0	14	49	0	0	0	0	0	0	0	100
		814	82	0	0	10	0	0	0	0	0	0	0	2	100
		815	28	0	0	22	32	0	0	0	6	0	0	1	100
		Mean	46.20	1.60	.00	17.00	23.80	.80	.00	.20	1.60	.00	.00	.60	100.00
		StDev	27.59	2.07	.00	7.75	18.47	7.19	.00	.45	2.61	.00	.00	.89	.00

**Table A35. Percent Cover of Index Species
Trailer, Santa Cruz Island - Fall 2003 (12/9/03)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	911	59	37	0	1	0	0	0	0	0	0	3	0	0	100
	912	62	34	0	0	0	0	0	0	0	0	4	0	0	100
	913	30	50	0	18	0	0	0	1	0	0	1	0	0	100
	914	13	78	0	0	0	0	0	0	0	0	9	0	0	100
	915	19	77	0	0	0	0	1	0	0	0	3	0	0	100
	Mean	36.60	55.20	.00	3.80	.00	.00	.20	.20	.00	.00	4.00	.00	.00	100.00
	StDev	22.68	21.23	.00	7.95	.00	.00	.45	.45	.00	.00	3.00	.00	.00	.00
Silvetia (Rockweed)	926	6	2	0	0	0	90	0	0	0	2	0	0	0	100
	927	18	4	0	0	0	0	77	0	0	0	1	0	0	100
	928	9	2	0	0	0	0	86	0	0	3	0	0	0	100
	929	6	0	0	0	0	0	89	0	0	5	0	0	0	100
	930	5	1	0	0	0	0	87	0	0	7	0	0	0	100
	Mean	8.80	1.80	.00	.00	.00	85.80	.00	.00	.00	3.40	.20	.00	.00	100.00
	StDev	5.36	1.48	.00	.00	.00	5.17	.00	.00	.00	2.70	.45	.00	.00	.00
Mussels	921	22	4	5	0	0	0	0	0	1	61	7	0	0	100
	922	6	0	0	0	0	0	50	0	0	31	13	0	0	100
	923	7	0	0	0	0	0	70	0	0	14	9	0	0	100
	924	26	2	1	0	0	0	60	0	0	9	2	0	0	100
	925	15	2	0	0	0	0	72	0	1	5	5	0	0	100
	Mean	15.20	1.60	1.20	.00	.00	.00	50.40	.00	.40	24.00	7.20	.00	.00	100.00
	StDev	8.87	1.67	2.17	.00	.00	.00	29.51	.00	.55	22.93	4.15	.00	.00	.00
Hesperophycus	916	53	0	0	19	4	24	0	0	0	0	0	0	0	100
	917	20	1	0	20	0	59	0	0	0	0	0	0	0	100
	918	22	2	0	18	15	43	0	0	0	0	0	0	0	100
	919	81	0	0	8	1	9	0	0	0	0	1	0	0	100
	920	40	8	0	33	11	4	0	0	0	3	1	0	0	100
	Mean	43.20	2.20	.00	19.60	6.20	27.80	.00	.00	.00	.60	.40	.00	.00	100.00
	StDev	25.11	3.35	.00	8.91	6.53	23.12	.00	.00	.00	1.34	.55	.00	.00	.00

**Table A36. Percent Cover of Index Species
Willows Anchorage, Santa Cruz Island - Fall 2003 (12/7/03)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Endocladia	931	19	0	0	77	0	0	2	0	0	2	0	0	0	100
	932	26	1	0	71	0	0	0	0	0	2	0	0	0	100
	933	23	5	0	67	0	0	0	0	0	4	0	0	1	100
	934	21	4	0	68	0	0	0	0	0	7	0	0	0	100
	935	31	9	3	43	0	0	0	0	0	14	0	0	0	100
	Mean	24.00	3.80	.60	65.20	.00	.00	.40	.00	.00	5.80	.00	.00	.20	100.00
	StDev	4.69	3.56	1.34	13.01	.00	.00	.89	.00	.00	5.02	.00	.00	.45	.00
Silvetia (Rockweed)	946	14	0	0	71	0	0	0	3	0	12	0	0	0	100
	947	36	6	0	39	0	0	0	0	0	18	1	0	0	100
	948	11	0	0	1	0	80	0	0	0	8	0	0	0	100
	949	0	0	0	0	0	99	0	0	0	1	0	0	0	100
	950	51	2	0	17	0	5	0	0	0	25	0	0	0	100
	Mean	22.40	1.60	.00	25.60	.00	36.80	.00	.60	.00	12.80	.20	.00	.00	100.00
	StDev	20.65	2.61	.00	29.90	.00	48.62	.00	1.34	.00	9.20	.45	.00	.00	.00
Mussels	941	8	5	13	0	0	0	63	0	6	4	0	0	1	100
	942	6	1	1	0	0	0	81	0	5	3	3	0	0	100
	943	5	1	0	0	0	0	85	0	6	2	0	0	1	100
	944	5	0	0	0	0	0	84	0	9	2	0	0	0	100
	945	0	0	0	0	0	0	96	0	3	1	0	0	0	100
	Mean	4.80	1.40	2.80	.00	.00	.00	81.80	.00	5.80	2.40	.60	.00	.40	100.00
	StDev	2.95	2.07	5.72	.00	.00	.00	11.95	.00	2.17	1.14	1.34	.00	.55	.00
Hesperophycus	936	49	1	0	49	0	0	0	0	0	1	0	0	0	100
	937	69	6	0	0	1	4	0	0	0	20	0	0	0	100
	938	71	5	0	3	0	0	0	0	0	21	0	0	0	100
	939	9	0	0	0	7	77	0	0	0	7	0	0	0	100
	940	62	0	0	8	9	12	0	0	0	9	0	0	0	100
	Mean	52.00	2.40	.00	12.00	3.40	18.60	.00	.00	.00	11.60	.00	.00	.00	100.00
	StDev	25.53	2.88	.00	20.94	4.28	33.01	.00	.00	.00	8.65	.00	.00	.00	.00

**Table A37. Percent Cover of Index Species
East Point, Santa Rosa Island - Fall 2003 (11/22/03)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
A-41	Chthamalus/Balanus	575	77	18	0	0	0	0	0	0	0	5	0	0	100
		576	28	3	0	3	60	0	0	0	4	2	0	0	100
		577	13	41	0	26	6	12	0	0	1	1	0	0	100
		578	76	22	0	1	0	0	0	0	0	0	1	0	100
		579	59	40	0	1	0	0	0	0	0	0	0	0	100
		Mean	50.60	24.80	.00	6.20	13.20	2.40	.00	.00	1.00	1.60	.20	.00	100.00
		StDev	28.88	15.99	.00	11.12	26.29	5.37	.00	.00	1.73	2.07	.45	.00	.00
	Endocladia	580	14	0	0	4	61	18	0	0	3	0	0	0	100
		581	12	0	0	22	62	1	0	0	3	0	0	0	100
		582	17	8	0	41	21	10	0	0	2	1	0	0	100
		583	16	4	0	60	19	0	0	0	1	0	0	0	100
		584	7	5	0	63	24	1	0	0	0	0	0	0	100
		Mean	13.20	3.40	.00	38.00	37.40	6.00	.00	.00	1.80	.20	.00	.00	100.00
		StDev	3.96	3.44	.00	25.15	22.07	7.84	.00	.00	1.30	.45	.00	.00	.00
A-41	Silvetia (Rockweed)	585	4	0	0	3	0	79	0	0	12	2	0	0	100
		586	33	0	0	3	0	44	0	2	17	1	0	0	100
		587	24	0	0	1	0	38	0	0	33	4	0	0	100
		588	5	0	0	1	0	83	0	0	9	2	0	0	100
		589	7	0	0	0	0	83	0	0	10	0	0	0	100
		Mean	14.60	.00	.00	1.60	.00	65.40	.00	.40	16.20	1.80	.00	.00	100.00
		StDev	13.13	.00	.00	1.34	.00	22.43	.00	.89	9.88	1.48	.00	.00	.00
	Mussels	590	3	0	0	0	0	62	2	0	26	7	0	0	100
		591	7	1	0	0	0	65	2	0	20	5	0	0	100
		592	3	0	0	0	0	86	1	0	6	4	0	0	100
		593	0	2	0	0	0	96	0	0	1	1	0	0	100
		594	6	0	1	0	0	91	0	0	2	0	0	0	100
		Mean	3.80	.60	.20	.00	.00	80.00	1.00	.00	11.00	3.40	.00	.00	100.00
		StDev	2.77	.89	.45	.00	.00	15.51	1.00	.00	11.31	2.88	.00	.00	.00
A-41	Hesperophycus	570	30	0	0	18	50	0	0	0	2	0	0	0	100
		571	35	3	0	6	50	1	0	0	4	1	0	0	100
		572	24	3	0	2	68	1	0	0	2	0	0	0	100
		573	19	0	0	6	70	4	0	0	0	1	0	0	100
		574	23	0	0	11	38	14	0	0	13	1	0	0	100
		Mean	26.20	1.20	.00	8.60	55.20	4.00	.00	.00	4.20	.60	.00	.00	100.00
		StDev	6.30	1.64	.00	6.15	13.54	5.79	.00	.00	5.12	.55	.00	.00	.00

**Table A38. Percent Cover of Index Species
Ford Point, Santa Rosa Island - Fall 2003 (11/25/03)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	520	67	19	0	0	0	0	0	0	0	0	14	0	0	100
	521	65	33	0	0	0	0	0	0	0	1	1	0	0	100
	522	85	13	0	0	0	0	0	0	0	0	2	0	0	100
	523	21	43	0	34	0	0	0	0	0	0	2	0	0	100
	524	71	29	0	0	0	0	0	0	0	0	0	0	0	100
	Mean	61.80	27.40	.00	6.80	.00	.00	.00	.00	.00	.20	3.80	.00	.00	100.00
	StDev	24.11	11.78	.00	15.21	.00	.00	.00	.00	.00	.45	5.76	.00	.00	.00
Endocladia	525	16	3	0	57	0	0	5	2	0	17	0	0	0	100
	526	17	16	0	50	0	0	7	0	0	9	1	0	0	100
	527	31	10	0	28	0	0	9	2	0	18	2	0	0	100
	528	19	4	0	48	0	0	2	2	1	23	1	0	0	100
	529	34	9	0	34	0	0	0	0	0	20	3	0	0	100
	Mean	23.40	8.40	.00	43.40	.00	.00	4.60	1.20	.20	17.40	1.40	.00	.00	100.00
	StDev	8.44	5.22	.00	11.99	.00	.00	3.65	1.10	.45	5.22	1.14	.00	.00	.00
Mussels	530	36	9	0	0	0	0	13	0	0	33	9	0	0	100
	531	9	0	0	0	0	0	82	0	6	2	1	0	0	100
	532	1	0	0	0	0	0	96	0	0	2	1	0	0	100
	533	29	1	0	1	0	0	58	0	0	10	1	0	0	100
	534	24	0	0	0	0	0	1	37	0	32	6	0	0	100
	Mean	19.80	2.00	.00	.20	.00	.00	50.00	7.40	1.20	15.80	3.60	.00	.00	100.00
	StDev	14.45	3.94	.00	.45	.00	.00	41.76	16.55	2.68	15.59	3.71	.00	.00	.00

**Table A39. Percent Cover of Index Species
Fossil Reef, Santa Rosa Island - Fall 2003 (11/23/03)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	605	67	31	0	0	0	0	0	0	0	2	0	0	0	100
	606	52	36	0	0	0	0	0	0	0	1	0	11	0	100
	607	67	30	0	0	0	0	0	0	0	0	3	0	0	100
	608	83	17	0	0	0	0	0	0	0	0	0	0	0	100
	609	67	29	0	0	0	0	0	0	0	2	1	1	0	100
	Mean	67.20	28.60	.00	.00	.00	.00	.00	.00	.00	1.00	.80	2.40	.00	100.00
	StDev	10.96	7.02	.00	.00	.00	.00	.00	.00	.00	1.00	1.30	4.83	.00	.00
Endocladia	610	38	33	0	25	0	0	0	0	0	4	0	0	0	100
	611	50	45	0	2	0	0	0	0	0	0	3	0	0	100
	612	73	3	0	0	0	5	0	0	0	17	2	0	0	100
	613	36	4	0	54	0	5	0	0	0	1	0	0	0	100
	614	57	0	0	1	0	34	0	0	0	5	3	0	0	100
	Mean	50.80	17.00	.00	16.40	.00	8.80	.00	.00	.00	5.40	1.60	.00	.00	100.00
	StDev	15.12	20.58	.00	23.46	.00	14.31	.00	.00	.00	6.80	1.52	.00	.00	.00
Silvetia (Rockweed)	615	88	8	0	0	0	0	0	0	0	4	0	0	0	100
	616	73	11	0	6	0	0	0	0	0	9	1	0	0	100
	617	56	5	0	5	0	19	0	0	0	12	3	0	0	100
	618	47	0	0	9	0	32	0	0	0	9	3	0	0	100
	619	24	2	0	23	0	49	0	0	0	1	1	0	0	100
	Mean	57.60	5.20	.00	8.60	.00	20.00	.00	.00	.00	7.00	1.60	.00	.00	100.00
	StDev	24.52	4.44	.00	8.68	.00	21.13	.00	.00	.00	4.42	1.34	.00	.00	.00
Mussels	620	2	0	2	0	0	0	24	5	0	50	17	0	0	100
	621	13	4	5	0	0	0	32	0	0	34	12	0	0	100
	622	23	2	12	0	0	0	45	0	2	12	4	0	0	100
	623	17	1	13	0	0	0	40	0	8	18	3	0	0	100
	624	0	1	2	0	0	0	1	23	0	25	48	0	0	100
	Mean	11.00	1.60	6.80	.00	.00	.00	28.40	5.60	2.00	27.80	16.80	.00	.00	100.00
	StDev	9.82	1.52	5.36	.00	.00	.00	17.27	9.96	3.46	14.87	18.38	.00	.00	.00

**Table A40. Percent Cover of Index Species
Johnson's Lee, Santa Rosa Island - Fall 2003 (11/24/03)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	500	64	36	0	0	0	0	0	0	0	0	0	0	0	100
	501	45	54	0	0	0	0	0	0	0	0	1	0	0	100
	502	82	16	0	0	0	0	0	0	0	0	2	0	0	100
	503	28	42	0	26	0	0	0	0	0	0	4	0	0	100
	504	56	22	1	5	0	0	1	1	0	6	8	0	0	100
	Mean	55.00	34.00	.20	6.20	.00	.00	.20	.20	.00	1.20	3.00	.00	.00	100.00
	StDev	20.25	15.30	.45	11.28	.00	.00	.45	.45	.00	2.68	3.16	.00	.00	.00
Endocladia	505	36	3	0	28	0	0	21	0	1	7	4	0	0	100
	506	36	3	0	28	0	0	21	0	1	7	4	0	0	100
	507	44	14	1	21	0	0	11	0	0	6	3	0	0	100
	508	21	13	0	40	0	0	19	0	2	2	3	0	0	100
	509	37	15	0	40	0	0	0	0	0	6	2	0	0	100
	Mean	34.80	9.60	.20	31.40	.00	.00	14.40	.00	.80	5.60	3.20	.00	.00	100.00
	StDev	8.41	6.07	.45	8.35	.00	.00	9.04	.00	.84	2.07	.84	.00	.00	.00
Mussels	510	3	1	0	0	0	0	0	22	0	23	51	0	0	100
	511	6	0	0	0	0	0	0	5	0	1	88	0	0	100
	512	25	0	2	0	0	0	65	0	3	4	1	0	0	100
	513	5	0	0	0	0	0	1	9	0	6	79	0	0	100
	514	6	0	0	0	0	0	0	2	0	8	84	0	0	100
	Mean	9.00	.20	.40	.00	.00	.00	13.20	7.60	.60	8.40	60.60	.00	.00	100.00
	StDev	9.03	.45	.89	.00	.00	.00	28.96	8.73	1.34	8.56	36.34	.00	.00	.00

**Table A41. Percent Cover of Index Species
Northwest-Talcott, Santa Rosa Island - Fall 2003 (11/21/03)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	560	65	26	0	8	0	0	0	0	0	0	0	1	0	100
	561	23	76	0	0	0	0	0	0	0	0	0	1	0	100
	562	80	14	0	2	0	0	0	0	0	2	2	0	0	100
	563	31	4	0	4	0	57	0	0	0	4	0	0	0	100
	564	18	56	0	0	0	4	0	2	0	18	2	0	0	100
	Mean	43.40	35.20	.00	2.80	.00	12.20	.00	.40	.00	4.80	.80	.40	.00	100.00
	StDev	27.48	30.02	.00	3.35	.00	25.10	.00	.89	.00	7.56	1.10	.55	.00	.00
Endocladia	555	13	0	0	23	0	63	0	0	0	1	0	0	0	100
	556	69	0	0	17	0	10	0	0	0	2	2	0	0	100
	557	33	0	0	19	0	40	0	4	0	4	0	0	0	100
	558	27	54	2	3	0	0	0	0	0	4	10	0	0	100
	559	66	2	1	0	0	0	0	2	0	26	3	0	0	100
	Mean	41.60	11.20	.60	12.40	.00	22.60	.00	1.20	.00	7.40	3.00	.00	.00	100.00
	StDev	24.75	23.94	.89	10.24	.00	27.91	.00	1.79	.00	10.48	4.12	.00	.00	.00
Silvetia (Rockweed)	565	2	0	0	0	0	97	0	0	0	1	0	0	0	100
	566	15	0	0	0	0	84	0	0	0	1	0	0	0	100
	567	2	0	0	0	0	93	0	0	0	3	2	0	0	100
	568	5	0	0	11	0	83	0	0	0	1	0	0	0	100
	569	75	0	0	1	0	17	0	0	0	7	0	0	0	100
	Mean	19.80	.00	.00	2.40	.00	74.80	.00	.00	.00	2.60	.40	.00	.00	100.00
	StDev	31.32	.00	.00	4.83	.00	32.85	.00	.00	.00	2.61	.89	.00	.00	.00
Mussels	550	19	0	0	0	0	0	47	1	10	19	4	0	0	100
	551	13	0	0	0	0	0	81	0	0	2	4	0	0	100
	552	17	0	0	0	0	0	60	0	12	9	2	0	0	100
	553	24	0	4	0	0	0	41	1	9	17	4	0	0	100
	554	16	1	0	0	0	0	59	0	8	15	1	0	0	100
	Mean	17.80	.20	.80	.00	.00	.00	57.60	.40	7.80	12.40	3.00	.00	.00	100.00
	StDev	4.09	.45	1.79	.00	.00	.00	15.36	.55	4.60	6.91	1.41	.00	.00	.00

Appendix B. Trip Reports

The following are trip reports from the Rocky Intertidal Monitoring 2003 field season (March 2003 through January 2004). Reports were prepared by Dan Richards. The reports summarize the work done during each monitoring event, provide a quick summary of the data collected, include many of the data tables and site specific graphs, and serve as metadata for the information collected. Raw and summarized data are presented in tables for each monitoring site.

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Spring 2003 Rocky Intertidal Monitoring Trip Reports

Santa Rosa Island March 12-19, 2003

(Database event #2003-A)

PURPOSE: Rocky intertidal monitoring at Santa Rosa Island

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
Paula Rich, bio-tech, Channel Islands National Park

PROCEDURE: The Ocean Ranger arrived too late in the tide cycle on the 12th to work any of the sites. Monitoring was conducted according to standard procedures. Photoplots were photographed both on film and digitally. All plots were scored in the field. Motile invertebrates were counted in the photoplots, limpets and *Littorina* spp. were sub-sampled in three 20x20cm subplots. When especially abundant, *Littorina* were sampled in three 10x10cm subplots. Sizes of select species of snails and owl limpets were sampled. Measuring giant owl limpets in the circle plots is not a priority in the spring sample but we measured them at Northwest-Talcott, since there was time. Seastars and abalone were counted in timed searches. Three fixed 10m-long point-intercept transects were conducted in the surfgrass zone at Northwest-Talcott and East Point. New temperature loggers (Hobo Tidbits) were placed in the housings at Northwest-Talcott, Johnson's Lee, and East Point. Plot markers were repaired as necessary. We visited China Camp on 3/12/03. There were still about 200 elephant seals on the beach there. We saw a young (radio tagged) bald eagle perched on a bush above China Camp.

RESULTS:

Fossil Reef, March 13, 2003. Low tide -0.2 ft at 1315 hours. Conditions were excellent with calm seas and a light breeze though it was cool with a low fog. We were on site from 0945-1630 hrs. It was a busy area when we arrived with 14 elephant seals 7 harbor seals, 8 Pelagic Cormorants, 6 Western Gulls, 1 Black Turnstone and 12 Black Oystercatchers. An urchin boat was working directly offshore, at least two others were working this section of the island and a lobster boat was picking up traps from the area.

No changes in the site since our last visit were noticed. *Endocladia* and *Silvetia* were present at the site, though both species make a fairly poor showing in the photoplots. *Endocladia muricata* cover was quite variable, from 0-58%. Most of the *Silvetia compressa*, the only rockweed at the site, was represented in the plots by large, old plants with typically sparse cover. *Silvetia* cover in the target plots was 0-20%. The highest cover of *Silvetia* was in an *Endocladia* plot with 43% cover. Young dense *Silvetia* were present higher on the reef. Acorn barnacle plots were consistent with 20-28% *Chthamalus* spp/*Balanus glandula* cover. *Mytilus californianus* was abundant on the outer reef but most of the mussel plots have been impacted by seastars and cover ranged from 1-43%.

A total of 13 black abalone were found ranging from 84-145mm. We did not find any along the western side of the site. No abalone were found in the plots. The full 30x6m seastar transect was searched and there were 23 on the inshore 15m and 32 on the offshore 15m. Only *Pisaster*

ochraceus were found on the transect. *Pycnopodia helianthoides* and *Patiria miniata* were found at the site.

Motile invertebrates were fairly abundant in all plots with small and medium limpets in all plots and *Littorina* spp. present in all but the mussel zone plots. *Acanthina* sp. and *Tegula funebris* were common in all but the mussel plots where *Nucella emarginata*, *Ocenebra circumtexta* and *Lottia gigantea* were more abundant. Purple urchins, *Strongylocentrotus purpuratus*, and the chitons, *Nuttalina* sp. were quite common in the mussel plots. A brief general species list was made for the site.

Photoplot summary – mean percent cover by zone at Fossil Reef, Santa Rosa Island, Spring 2003 (5 plots/zone)

ZoneName	Bare Rock	Barnacle	Tetracita	Endocladia	Hesperophycus	Silvetia	Mussels	Turfweed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle 72.	4	24.4	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.2	0.4	2.2
Endocladia	48.8	14.4	0.0	14.0	0.0	12.0	0.2	0.0	0.0	8.8	1.6	0.2
Silvetia 53.	6	5.4	0.0	12.6	0.0	8.8	0.0	0.0	0.0	18.4	1.2	0.0
Mussels 16.	0	0.4	5.8	0.0	0.0	0.0	26.4	3.6	1.2	28.8	17.8	0.0

Pisaster ochraceus at Fossil Reef, Santa Rosa Island, Spring 2003

Size categories	Inshore (transect 0-15m)	Offshore (transect 15-30m)
Small (<75mm)	0	0
Medium (75-150mm)	23	31
Large (>150mm)	0	1

Motile invertebrate size frequency measurements for Fossil Reef, Santa Rosa Island, Spring 2003

	<i>Nucella</i> sp.	<i>Acanthina</i> spp.	<i>Tegula funebris</i>	<i>Ocenebra circumtexta</i>	<i>Lottia gigantea</i>
count	26 2	6	70	6	24
mean size (mm)	14 1	6	18 15	21	
min size (mm)	8	8	12	11	12
max size (mm)	20 25	23	20	42	

Motile invertebrate counts measurements for Fossil Reef, Santa Rosa Island, Spring 2003

Zone	Barnacle					Endocladia				
plot #	605	606	607	608	609	610	611	612	613	614
Lepidochitona spp.						5			4	4
Nuttalina spp.										
Fissurella volcano										
Pachygrapsus								1		
Pagurus spp.								4		2
large limpets(>15mm)	3				1	2 5				4
S. purpuratus										
Nucella emarginata										
Acanthina spp.	2			1		5 3			8	2
Tegula funebris					1	4		50	6	73
Ocenebra circumtexta										1

Lottia gigantea										
Littorina spp.	500 850	600		900	1000	1075	438	16	1000	7
subsample1	22 11	11		43 49		19 56		5	26	
subsample2	11 38	13		12 21		38 54		0	34	
subsample3	7	19 24		17 10		29 30		0	20	
Limpet < 5 mm	34	0 0		2 2		13	16	22	25	1
subsample1 8			0			0 3		0	4	
subsample2 3			0			4 1		3	3	
subsample3 0			0			0 1		4	1	
Limpet 5-15 mm	116	3	53	3	7	56	178	194	41	144
subsample1	28		0			0 15		10	4 11	
subsample2 8			4			12	20	29	6	20
subsample3	1		13			6 22		23	3 15	

Zone	Silvetia					Mytilus					Total Count
plot #	615	616	617	618	619	620	621	622	623	624	
Lepidochitona spp.	1		2		1		1	3	3		24
Nuttalina spp.						80	100	61	31	104	376
Fissurella volcano						2					2
Pachygrapsus						7	10	8	7	8	41
Pagurus spp.						1					7
large limpets(>15mm)	2	2 5			1 2 2			1		30	
S. purpuratus						42	13	15	6	12	88
Nucella emarginata						3	5	11	5		24
Acanthina spp.	2		1		5						29
Tegula funebris	4	39 10		45	4						236
Ocenebra circumtexta						4		1			6
Lottia gigantea						1	3	18	26		48
Littorina spp.	913 100	30	0	9	72	0	0	4	0	0	7783
subsample1	20	7 19		1	0						
subsample2	48	0 1 2 2									
subsample3	5	1 4 0			21						
Limpet < 5 mm	13	13 1	6	56 88	10	88		128	125	17	666
subsample1	0	3 1		2	13		9	15	23		
subsample2	0	1 4 8			10		9	17	9		
subsample3	4	0 0 8 5					10	9	8		
Limpet 5-15 mm	28 163		84	163	109 35		219	213	175	30	2012
subsample1	3	20 13	13		2		31	27	19		
subsample2	3	18 9 19			13		19	24	23		
subsample3	3	14 5 20			20		20	17	14		

Northwest-Talcott, March 14, 2003. Low tide -0.6ft at 1348 hrs. Conditions were excellent with calm seas and light breeze and mostly sunny sky. Three boats were anchored offshore of the point and surfers were riding the waves there. Two of the surfers came ashore and walked up onto the bluff to the west. Only three Western Gulls were at the site. Brown Pelicans and cormorants were on the point to the east. Black Turnstones were seen near the access beach and

there were recent elephant seal tracks on the beach. There were some fresh breaks in the shale rock and many of the loose flat boulders have been recently tossed around.

Silvetia compressa was the only rockweed present here and though it generally looked good, the cover was somewhat erratic in the *Silvetia* zone plots (26-86% cover). Acorn barnacle cover was often dense but somewhat patchy and the *Chthamalus spp/Balanus glandula* cover in the acorn barnacle zone plots ranged from 3-59% with the lowest cover in plot 563 which has high *S. compressa* cover. *Endocladia muricata* was also healthy but patchy and cover in the plots ranged from 1-42%. Non-coralline algal crusts (mostly *Ralfsia* sp. probably) were common. *Mytilus californianus* cover ranged from 27-70%, the lowest cover in plot 553 that had a large portion of the rock broken off a couple years ago. *Tegula funebris* was abundant and a few *T. gallina* were found. *Littorina* spp. were not very common in most of the plots, though small limpets were. Small *Lottia gigantea* were abundant in all the mussel plots. *Nucella emarginata* were common in some mussel plots and the large specimens (25-33mm) observed last fall were still present. Motile invertebrates were in much lower densities overall compared to Fossil Reef.

A general species was made for the site. Young kelp crabs, *Pugetia producta*, were common under some areas of *Silvetia*. *Pachygrapsus crassipes* were common with both large individuals and juveniles (megalopa stage) present. *Soranthra ulvoidea*, an epiphyte on *Neorhodomela larix*, was very abundant after being almost absent last December. *Ligia occidentalis* was common to abundant here, but was not seen at all at Fossil Reef. Young prickleback eels were common under the flat stones at this site. A few good-sized patches of *Scytosiphon lomentaria* were present. *Sargassum muticum* was very healthy looking and is becoming fairly abundant.

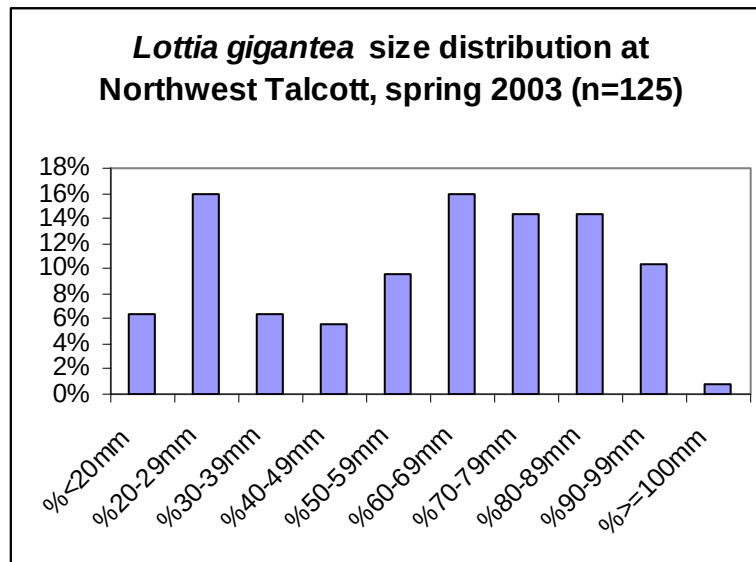
The surfgrass transects were done with the first two having 95-96% cover of *Phyllospadix* spp. The third transect had an overturned boulder near one end and in general the cover was much less dense with more sand and rock showing through, leaving *Phyllospadix* spp. cover at only 49%. Roughly 30% of the surfgrass was bleached and brown. Since there was time, Paula measured the owl limpets in the plots, finding a total of 111 in the five plots, ranging in size from 15-100mm. No abalone were found in a general search and only one seastar (a *Pisaster giganteus*) was found.

Photoplot summary – mean percent cover by zone at Northwest-Talcott, Santa Rosa Island, Spring 2003 (5 plots/zone)

ZoneName	Bare Rock	Barnacle Tetracrita		Endocladia	Hespero- phyucus	Silvetia M	ussels	Turfweed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle 58.	2	26.8	0.0	2.8	0.0	8.2	0.0	0.0	0.0	1.2	1.8	1.0
Endocladia 51.	2	3.6	0.2	15.8	0.0	11.8	0.4	1.0	0.0	14.4	1.6	0.0
Silvetia 23.	6	0.2	0.0	5.6	0.0	66.2	0.0	0.2	0.0	3.6	0.6	0.0
Mussels 24.	0	0.2	1.0	0.0	0.0	0.0	51.6	0.6	5.8	13.2	3.6	0.0

Owl limpet *Lottia gigantea* plot summary at Northwest-Talcott, Santa Rosa Island, Spring 2003

<i>Plot C</i>	<i>ount</i>	<i>Density</i>	<i>MeanSize</i>	<i>StDev</i>	<i>MinSize</i>	<i>MaxSize</i>
701 3	4	10.825	57.74	33.17	15	100
702	25 7.	959	69.08	23.23 17		97
703	30 9.	551	48.47	23.48 17		87
704	22 7.	004	58.36	18.02 20		89
705	14	4.457	61.79	14.76 20		75



Surfgrass transects at Northwest-Talcott, Santa Rosa Island, Spring 2003
(additional taxa removed when not represented)

<i>Species/taxa</i>	<i>Substrate</i>	<i>Transect 1</i>	<i>Transect 2</i>	<i>Transect 3</i>
<i>Phyllospadix</i>	overstory	96 95 49		
<i>Sargassum muticum</i>				2
Crustose coralline algae				1
Erect coralline algae		1	4	3
Other red algae			1	17
Other brown algae				1
Other green algae				4
<i>Anthopleura</i> spp.				4
<i>Phragmatopoma californica</i>				2
Barnacles				1
Rock	2			10
Sand		1 6		

Motile invertebrate counts and size frequency measurements at Northwest-Talcott, Santa Rosa Island, Spring 2003

Zone		Barnacle					Endocladia				
plot #	605	606	607	608	609	610	611	612	613	614	
Lepidochitona spp.						5			4	4	
Nuttalina spp.											
Fissurella volcano											
Pachygrapsus								1			
Pagurus spp.								4		2	
large limpets(>15mm)	3				1	2	5			4	
S. purpuratus											
Nucella emarginata											
Acanthina spp.	2				1	5		3	8	2	
Tegula funebris					1	4		50	6	73	
Ocenebra circumtexta										1	
Lottia gigantea											
Littorina spp.	500	850 600	9	00	1000	1075	438	16	1000	7	
subsample1	22 11		11	43 49		19 56		5	26		
subsample2	11 38		13	12	21	38 54		0	34		
subsample3	7	19 24	17		10	29	30	0	20		
Limpet < 5 mm	34	0 0		2	2	13	16	22	25	1	
subsample1	8		0			0	3	0	4		
subsample2	3		0			4	1	3	3		
subsample3	0		0			0	1	4	1		
Limpet 5-15 mm	116	3 53		3	7	56	178	194	41	144	
subsample1	28		0			0	15	10 4 11			
subsample2	8		4			12	20	29 6 20			
subsample3	1		13			6	22	23	3	15	

Zone		Silvetia					Mytilus					Total Count
plot #	615	616	617	618	619	620	621	622	623	624		
Lepidochitona spp.		1		2		1	1	3	3		24	
Nuttalina spp.						80	100	61	31	104	376	
Fissurella volcano						2					2	
Pachygrapsus						7	10	8	7	8	41	
Pagurus spp.						1					7	
large limpets(>15mm)	2	2 5			1 2 2			1		30		
S. purpuratus						42	13	15	6	12	88	
Nucella emarginata						3	5	11	5		24	
Acanthina spp.		2		1	5						29	
Tegula funebris	4	39 10		45	4						236	
Ocenebra circumtexta						4		1			6	
Lottia gigantea						1	3	18	26		48	
Littorina spp.	913 100	30	0	9	72	0	0	4	0	0	7783	
subsample1	20	7 19	1		0							
subsample2	48	0 1 2 2										
subsample3	5	1 4 0			21							
Limpet < 5 mm	13	13 16	56	88	10	88		128	125	17	666	
subsample1	0	3 1 2			13		9	15	23			

subsample2	0	1 4 8		10	9	17	9		
subsample3	4	0 0 8 5			10	9	8		
Limpet 5-15 mm	28 163	84	163	109 35	219	213	175	30	2012
subsample1	3	20 13	13	2	31	27	19		
subsample2	3	18 9 19		13	19	24	23		
subsample3	3	14 5 20		20	20	17	14		

East Point, March 16, 2003. Low tide –1.0 ft at 1450 hrs. Heavy wind and about 1 inch of rain hit the island on 3/15/03 and we were unable to get out to work. On 3/16, we still had high winds (over 30 kts) and large swells. The tide did not seem to ever get as low as it should have. We had sunshine and reasonable working conditions. Pelicans cormorants and gulls were roosting above the site as we approached, two Black Oystercatchers came in later. No physical changes were observed at the site. We were on site from 1030 to 1830 hrs, though it was not very workable until 1115.

Because of the wet roads, we had to walk from Water Canyon, which took about 2 ½ hrs. The Optic Stowaway temperature logger was still functioning but was replaced by a new Hobo Tidbit temperature logger. Seastars were counted over the main reef, though the tide was advancing quickly by that time. The surfgrass transects were scored, and all photoplots were field scored and motile invertebrates were counted. There were some problems with film jamming in the camera and we do not have slides for the site. The plots were scored in the field and the plots and photo points were all shot with my digital camera.

Numerous juveniles of *Chthamalus/Balanus* and of *Tegula funebris* were observed. Small *Littorina* spp., *Pollicipes polymerus*, and *Mytilus californianus* were also observed in moderate numbers. *M. californianus* cover in the mussel zone was 68-90%. Cover of *Chthamalus spp./Balanus glandula* was only 1-27% in the acorn barnacle zone plots. *Endocladia muricata* was common with high cover (15-57%) in the plots and had a healthy overall appearance and no bleaching. *Hesperophycus californicus* was quite abundant and dominated most of the Endocladia zone plots as well as the Hesperophycus zone plots. *Hesperophycus* cover in the Hesperophycus zone was 70-86%, while in the Endocladia zone it was 21-69%. *Silvetia compressa* cover was 61-81% cover, but these plots typically have high cover, up to 100%.

A total of 120 *Pisaster ochraceus* were counted on the site reef, mostly in the 75-150mm size class. No abalone were found. The moderate number of seastars does not seem to be impacting the mussel beds and there is uniform good cover of mussels. *Silvetia compressa* plants were somewhat sparse with damaged fronds, presumably from wave action this winter. *Nucella emarginata*, *Acanthina* sp. and *Tegula funebris* were all common in the photoplots. Juvenile *Pachygrapsus crassipes* were common in the mussel plots. All three surfgrass transects had high cover of *Phyllospadix* sp.

Photoplot summary – mean percent cover by zone at East Point, Santa Rosa Island, Spring 2003 (5 plots/zone)

ZoneName	Bare Rock	Barnacle	Tetracelasma	Endocladia	Hesperophycus	Silvetia	Mussels	Turfweed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle 59.	0	15.6	0.0	8.0	14.2	0.4	0.0	0.0	0.0	1.6	1.0	0.2
Endocladia	8.8	0.4	0.0 40.	8	43.0	4.0	0.0	0.0	0.0	2.4	0.6	0.0
Silvetia	9.0	0.0	0.0	1.8	0.0	69.0	0.2	0.0	0.0	18.4	1.6	0.0
Mussels	2.4	0.2	0.0	0.0	0.0	0.0	77.8	2.0	0.2	15.2	2.2	0.0
Hesperophycus	11.2	0.2	0.0	7.2	78.0	1.4	0.0	0.0	0.0	1.4	0.6	0.0

***Pisaster ochraceus* at East Point, Santa Rosa Island, Spring 2003**

Size categories	Site reef
Small (<75mm)	12
Medium (75-150mm)	104
Large (>150mm)	4

Surfgrass transects at East Point, Santa Rosa Island, Spring 2003

(additional taxa removed when not represented)

Species/taxa	Substrate	Transect 1	Transect 2	Transect 3
<i>Phyllospadix</i> overstory		99	96 87	
Other red algae			3	5
<i>Phragmatopoma</i> californica				1
Rock				3
Sand		1 1 4		

Motile invertebrate counts and size frequency measurements at East Point, Santa Rosa Island, Spring 2003

	<i>Nucella</i> sp.	<i>Acanthina</i> spp.	<i>Tegula funebris</i>	<i>Ocenebra circumtexta</i>	<i>Lottia gigantea</i>
count	57	89	91	3	18
mean size (mm)	14	13	15	14	18
min size (mm)	10	6	3	13	9
max size (mm)	20	18	22	15	25

Motile invertebrate counts and size frequency measurements at East Point, Santa Rosa Island, Spring 2003

	zone B		arnacle				Endocladia					Silvetia				
	plot #	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589
Lepidochitona spp.			2	1				1	3		2	12	1	6	12	10
Nuttalina spp.													1		1	3
Fissurella volcano																
Pachygrapsus			1				1	1		3					1	
Pagurus spp.			5								1	12	3	4		
Large Limpets															1	1
Nucella emarginata							1					2				1
Acanthina spp.			13				2 4 5 7 6					7 2 8 2				7
Tegula funebris			45				2				5	6	20	41	24	26
Strongylocentrotus purpuratus																1

Ocenebra circumtexta												1						
Amphissa versicolor								1				1						
unidentified snail (Maxwellia?)									1									
Epitonium tinctum																		
Lottia gigantean												1						
Littorina spp.	1263	413	988		3175	4013	47	28	105	281	456	2	13	7	2	11		
subsample1	21	25	30		89	111					64							
subsample2	30	5	13		81	120					64							
subsample3	50	3	36		84	90					18							
Limpet < 5 mm	3	56	28		0	0	20	14	30		9	5	7	11	10	18	44	
subsample1	0	2	3															
subsample2	1	9	4															
subsample3	0	7	2															
Limpet 5-15 mm	53	56	188		1	1	21	8	11		7	29		32	51	21	14	45
subsample1	14	8	24															
subsample2	3	9	19															
subsample3	0	1	17															

	Zone	Hesperophycus						Mytilus				Total Count	
	plot #	570	571	572	573	574	590	591	592	593	594		
Lepidochitona spp.		5	6	11	6	10	1					89	
Nuttalina spp.							5	5	5	6	9	35	
Fissurella volcano							4	2	3		2	11	
Pachygrapsus				1	2		9	8	11	3	6	47	
Pagurus spp.						2	1					28	
Large Limpets			1	5	3							11	
Nucella emarginata						1	26	13	12	7	17	80	
Acanthina spp.		5	5	6	7	3	1		1			91	
Tegula funebris		5	1	1		1	71	1	4	2		255	
Strongylocentrotus purpuratus									1			2	
Ocenebra circumtexta									1		1	3	
Amphissa versicolor												2	
unidentified snail (Maxwellia?)												1	
Epitonium tinctum							1			1		2	
Lottia gigantea							4	1	2	4	6	18	
Littorina spp.		550	1538	613	963	138	275	163	213	2	125	15379	
	subsample1	23	42	21		19	2	7	0	10	5		
	subsample2	15	57	15		26	5	8	8	2	3		
	subsample3	6	24	13	32	4	7	5	5		2		
Limpet < 5 mm		13	56	34	19		25	50	100	169	147	84	952
	subsample1	1	9	1	1	3		8	4	9	3	13	
	subsample2	2	7	1	0	2		3	15	16	24	7	
	subsample3	1	2	9	5	3	5		13	29	20	7	
Limpet 5-15 mm		59	53	72	47	41	75		113	200	231	128	1557
	subsample1	8	3	6		5	5	10	15	21	23	13	
	subsample2	4	9	6	7	4	7		14	15	24	12	
	subsample3	7	5	11		3	4	7	7	28	27	16	

Johnson's Lee, March 17, 2003. Low tide-0.9ft at 1521 hrs. Moderate swell and high wind but clear sky and good working conditions. The sand was all gone from the cobble flat area at the back of the site. No major physical changes or rock breaks were observed. Two Black Oystercatchers were observed. We were on site from 1130-1600hrs. Because of road conditions, we walked from the Johnson's Lee garage to the site. Approximately 25 elephant seal weaners were on Officer's Beach.

The photoplots were all field scored but photoplots were not photographed on to film because of the jammed film from East Point. The plots were all digitally photographed, however. Three 10x2m transects were searched for seastars at the usual transect on the outer reef and parallel to shore in front of plot 511 and through plot 515. Seastar counts in the larger areas were not made. At least two *Pycnopodia helianthoides* were found during a general look around the site. One black abalone (159mm) was found at the east end of the site. No abalone were present in the abalone plots.

Mussels on the upper reef look good, while the lower reef is still covered by *Phragmatopoma californica* and *Anthopleura* spp. with at least moderate numbers of *Pisaster ochraceus* eating the mussels. Only one plot is on the upper shelf and the *Mytilus* cover was 52% there, as opposed to 0-1% for all the plots on the lower level. *Chthamalus* spp./*Balanus glandula* cover ranged from 16-51% cover in the acorn barnacle zone. *Endocladia muricata* looked good with 30-50% cover in that zone.

Tiny (1-2mm) limpets were abundant in all zones with considerable variability between plots. Juvenile *Tegula funebris* were common. *Nucella emarginata* were present in all zones but in relatively lower numbers than other sites this week.

Photoplot summary – mean percent cover by zone at Johnson's Lee, Santa Rosa Island, Spring 2003 (5 plots/zone)

ZoneName	Bare Rock	Barnacle	Tetraclita	Endocladia	Hespero-phycus	Silvetia	Mussels	Turfweed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle	60.2	31.0	0.0	6.2	0.0	0.0	0.2	0.0	0.0	1.2	1.2	0.0
Endocladia 32.	8	4.0	0.4	45.6	0.0	0.0	10.2	0.0	0.4	4.6	2.0	0.0
Mussels 14.	4	0.4	0.6	0.0	0.0	0.0	10.6	18.2	0.4	26.6	28.8	0.0

***Pisaster ochraceus* at Johnson's Lee, Santa Rosa Island, Spring 2003 (all transects 10x2m)**

Size categories	Transect 1	Transect 2	Transect 3
Small (<75mm)	13	9	3
Medium (75-150mm)	29	21	39
Large (>150mm)		0	0

Motile invertebrate size frequency measurements at Johnson's Lee, Santa Rosa Island, Spring 2003

	<i>Nucella</i> sp.	<i>Acanthina</i> spp.	<i>Tegula funebris</i>	<i>Lottia gigantea</i>
count 18		1	24	19
mean size (mm)	17	10	8	28
min size (mm)	6	10	5	9
max size (mm)	20	10	19	51

Motile invertebrate counts measurements at Johnson's Lee, Santa Rosa Island, Spring 2003

Zone	Barnacle				Endocladia								Mytilus				Total Count
plot #	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514		
Lepidochitona spp.													3	1		4	
Nuttalina spp.						1		1	3	2		1	4	2		14	
Fissurella volcano																0	
Pachygrapsus						2	1			2			3			8	
Pagurus spp.												3				3	
large limpets(>15mm)						2	1									3	
S. purpuratus															6	6	
Nucella emarginata				2		2	1	1		2	1	1	8			18	
Acanthina spp.														1		1	
Tegula funebris						2				1		26		10		39	
Ocenebra circumtexta																0	
Lottia gigantea						6	1	3	3				5	1		19	
Epitonium tinctorum														1		1	
Pisaster ochraceus											1					1	
Littorina spp.	1988	2413	888	1313	116	8	128	19	175	59	0	1	72	0	0	7178	
subsample1	78	27	30	33	0		18	2	45	7			8				
subsample2	50	95	41	65	21		9	4	11	6		14					
subsample3	31	71	0	7	16	14		0	0	6			1				
Limpet < 5 mm	1	22	47	50	969	178	84	34	81	697	23	82	163	217	0	2648	
subsample1		1	9	7	101	33	4	2	12	92			30				
subsample2		4	6	7	91	20	12	4	11	69			20				
subsample3		2	0	2	118	4	11	5	3	62			2				
Limpet 5-15 mm	7	188	184	209	366	131	313	159	16	3	122	6	13	234	33	0	2128
subsample1		19	33	21	52	8	32	15	12	23			20				
subsample2		13	23	24	33	19	33	11	25	11			37				
subsample3		28	3	22	32	15	35	25	15	5			18				

Ford Point, March 18, 2003. Low tide -0.6 ft at 1553hrs. Working conditions were generally good despite high winds and swell. One Black Oystercatcher and six Black Turnstones were observed at the site. We were on site working from 1200-1700hrs.

No physical changes to the site were noted. Everything seemed typical in the plots and in general. Photoplots were recorded on both film and digital cameras. The tide and day length were against us for abalone and seastar counts and no general search was made. *Pisaster ochraceus* were very abundant and several were present at the edge of plot 531. *Phragmatopoma californica* were abundant on the lower shelf. Motile invertebrates in the plots were a little more common than at Johnson's Lee, particularly *Nucella emarginata* which were present in all the mussel and Endocladia zone plots. Small *Tegula funebris* were quite common and found in a number of the plots. Small limpets were very abundant in some plots and were sometimes counted in 10x10cm sub-plots.

Chthamalus spp/Balanus glandula recruits were abundant, but general plot cover only ranged from 8-33% cover in the acorn barnacle zone. *Endocladia muricata* cover ranged from 45-75%. *Mytilus californianus* cover ranged form 0-93%. Plot 534 cover was primarily bare rock and various algae with no *M. californianus* present. *Pisaster ochraceus* were abundant at the site. Several of the ochre stars were next to and encroaching into mussel plot 531. Because of the conditions and time available, no seastar count was made.

Photoplot summary – mean percent cover by zone at Ford Point, Santa Rosa Island, Spring 2003 (5 plots/zone)

Zone	Name	Bare Rock	Barnacle	Tetracrita	Endocladia	Hesperophycus	Silvetia	Mussels	Turfweed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle	75.	2	17.6	0.0	4.0	0.0	0.0	0.0	0.0	0.0	1.0	2.2	0.0
Endocladia	26.	8	2.0	0.0	53.0	0.0	0.0	5.4	0.4	0.0	11.6	0.8	0.0
Mussels	28.	0	2.2	0.0	0.0	0.0	0.0	46.2	7.0	0.0	13.8	2.8	0.0

Motile invertebrate size frequency measurements at Ford Point, Santa Rosa Island, Spring 2003

	<i>Nuttalina</i> spp.	<i>Acanthina</i> spp.	<i>Tegula funebris</i>	<i>Ocenebra circumtexta</i>	<i>Lottia gigantea</i>
count	56 1 3		0 3	2	0
mean size (mm)	16 13	12	1	2 3 4	
min size (mm)	9	13	4	12	12
max size (mm)	25 1	3	23 13	64	

Motile invertebrate counts measurements at Ford Point, Santa Rosa Island, Spring 2003

Zone		Barnacle					Endocladia					Mytilus					Total Count
plot #	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534		
Lepidochitona spp.								1					1		1	3	
Nuttalina spp.								2	1	3	4	1	1	1		13	
Fissurella volcano												1	2		2	5	
Pachygrapsus									2	4		2	1	1		10	
Pagurus spp.									2					1		3	
large limpets(>15mm)																0	
S. purpuratus									2			1				3	
Nucella emarginata				3		2 3 5 6 5 2						14	17	3 7		67	
Acanthina spp.														1		1	
Tegula funebris						1		2	6	11				6	4	30	
Ocenebra circumtexta									3							3	
Pisaster ochraceus												1				1	
Lottia gigantea							2	1	2	2	4		2	6	1	20	
Littorina spp.	388	1275	1463	697	747	84	60	200	175	35	150	38 56	51	10		5428	
subsample1	30	55	37	75	41 8			26 2			18 4		2				
subsample2	0	35	50	68	67	9		21 7			2	7	14				
subsample3	1	12	30	80 131		10		17	5		28	1	2				
Limpet < 5 mm	13	6	0	97	15	328	111 322	247		64	900 150		78	24	788	3142	
subsample1	3	0		4	3	7		11	16		31	24	6	32			
subsample2	0	2		5		34		9	30		17	18	12		15		
subsample3	1	0		22 3		4		83	33		24	6	7	16			
Limpet 5-15 mm	375	75	21	322	44	153 108	234	106		52	425 144	113		55	22	2249	
subsample1	49	4		50 25			28		7		51	19	18				
subsample2	33	12		26 14			11		12		24	12	10				
subsample3	38	8		27 10			36		15		61	15	8				

Santa Cruz Island March 24-28, 2003

(Database event #2003-B)

PURPOSE: To monitor rocky intertidal sites at Santa Cruz Island

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
Paula Rich, bio-tech, Channel Islands National Park

PROCEDURE: The Pacific Ranger delivered us to the island on March 24th. Monitoring was conducted according to standard procedures. Photoplots were photographed with film and digital cameras. Willows Anchorage was the only site scored in the field. Motile invertebrates were counted in the photoplots. When abundant, limpets and *Littorina* spp. were sub-sampled in three 20x20cm subplots. When especially abundant, *Littorina* or small limpets were sub-sampled in three 10x10cm subplots. Sizes of select species of snails and owl limpets were sampled. Seastars and abalone were counted in timed searches. Three fixed 10m-long point-intercept transects were conducted in the surfgrass zone at Trailer and Fraser Cove. Plot markers were repaired as necessary. GPS locations were recorded using a Garmin Vista. We returned to Ventura on the Ocean Ranger on March 28. This work was performed (in part) at the University of California Natural Reserve System, Santa Cruz Island Reserve on property owned and managed by The Nature Conservancy.

RESULTS:

Prisoner's Harbor, March 24, 2003. Low tide 0.0 ft at 0946 hours. We did not arrive at the island until two hours after the tide, however the seas were calm and the site was still workable. Conditions were good with calm seas and a light breeze though it was cool with a mostly overcast sky. Water temperature was 13°C. We were on site from 1200-1450 hrs. One black oystercatcher was the only animal in the area.

We were able to shoot the photos of plots and the site (both on film and with digital camera). Motile invertebrates were counted in 12 of the 20 plots, before the waves stopped our work. *Ocenebra circumtexta*, *Acanthina* sp. and *Nucella emarginata* were all fairly common. *N. emarginata* was quite variable in color and even shell texture. There was some variation in size and patterns of *Acanthina* also. Though I did not make a close examination, I suspect both species of *Acanthina* may be present. Seastars were present, but we attempted no count with the tide coming in.

Mytilus californianus beds had large cleared patches throughout, leaving small but dense patches of both young and old mussels. Only plots M1 and M5 had appreciable cover of *M. californianus*. There were some relatively small patches of dense new mussels present outside the plots. *Silvetia compressa* was much reduced in cover with most of the fronds were cropped short, however there was no obvious sign that pigs had been browsing as there was last fall.

Photoplot summary - mean percent cover by zone at Prisoner's Harbor, Santa Cruz Island, Spring 2003 (5 photoplots/zone)

Zone	B	are	Barnacle	Tetra	Endo	Hesperophycus	Silvetia	Mussels	Turf	Leaf	Misc	Misc	Tar
		Rock		clita	cladia				weed	Barnacle	Algae	Animal	
Barnacle	54.	2	20.2	0.6	18.2	0.0	0.6	0.4	1.0	0.0	4.6	0.2	0.0
Endocladia	20.	6	12.0	0.0	52.0	12.8	0.0	0.2	0.0	0.0	2.4	0.0	0.0
Silvetia	12.	6	1.8	0.4	0.0	0.0	38.6	3.0	0.0	0.0	43.2	0.4	0.0
Mussels		26.8	9.2	1.4	0.0	0.0	0.0	42.4	1.4	0.0	16.8	2.0	0.0
Hespero		35.4	16.2	0.0	27.4	14.4	0.2	0.4	0.0	0.0	4.6	1.4	0.0
phycus													

Motile invertebrate size frequency measurements at Prisoner's Harbor, Santa Cruz Island, Spring 2003

	Nu	cella	Acanthina spp.	Tegula	Ocenebra	Lottia gigantea
	emarginata			funnebralis	circumtexta	
count	11		13 8	28		2
avg size (mm)	18.7		12.9	16.4	12.5	45
min size (mm)	10		8	14	8 40	
max size (mm)	28		25	19 18	50	

Motile invertebrate counts measurements at Prisoner's Harbor, Santa Cruz Island, Spring 2003

Zone	Barnacle					Hesperophycus					Mytilus					Total Count
plot #	826	827	828	829	830	836	837	838	839	840	841	842	843	844	845	
Lepidochitona spp.	1	0	1	Not sampled		8	1		1	4		2 2				20
Nuttalina spp.						1	1				2	2	9		6	21
Fissurella volcano									2						1	3
Pachygrapsus	1					3 2 1 1 2							1		7	18
Pagurus spp.											1	2				3
large limpets(>15mm)	5							1	2	4						12
S. purpuratus											1					1
Nucella emarginata									1						10	11
Acanthina spp.						4			1 1 2 2 2						1	13
Tegula funnebralis									8							8
Ocenebra circumtexta							1			2	4	2	9		12	30
Lottia gigantea							2									2
Epitonium tinctum						1										1
Homolipoma						1										1
Petrolisthes															2	2
Littorina spp.	65	0	434			62	6	4 34		128	0	0	0		0	734
subsample1			46							29					0	
subsample2			50							3					0	
subsample3			43							9					0	
Limpet < 5 mm	15	0	28			61	36 36	66		194	28	14	86		738	1301
subsample1			6							1					45	
subsample2			0							44					8	
subsample3			3							17					6	
Limpet 5-15 mm	5	0	53			57 42	16	31	63	18	30	43			109	467
subsample1			9							5					16	
subsample2			4							11					8	
subsample3			4							4					11	

Trailer, March 25, 2003. Low tide -0.2 ft at 1114 hrs. We had excellent conditions with light swell and wind, clear sky, and pleasant temperature. Water temperature was 12°C. Two Black oystercatchers and two Black Turnstones were observed on the site. Eared Grebes, Western Gulls, a cormorant and a harbor seal were observed in the water nearby while on site. Three commercial urchin boats were working the Forney's Cove area with one just offshore. We were on site from 0730-1330hrs.

We counted motile invertebrates in the plots breaking partway through to shoot the photos. *Hesperophycus californicus* plants looked good but the cover was generally poor and *Silvetia compressa* tended to dominate in some of the *Hesperophycus* zone plots. *Silvetia compressa* was quite lush and most plots had a dense cover. *Mytilus californianus* was typical for this site, but there seemed to be numerous juveniles in most plots. Both *Chthamalus* sp. and *Balanus glandula* were abundant with new recruits seen. Motile invertebrates were diverse and abundant in the plots. As many as 209 *Tegula funebris* were found in the *Silvetia* zone plots. *Tegula gallina* were fairly common, being found in six plots, with as many as eight individuals. *Nucella emarginata* were common in the mussel zone plots.

Dan scored the surfgrass transects while Paula counted seastars around the site. *Phyllospadix* sp. cover ranged from 48-66% cover with *Chondracanthus canaliculatus* and other red algae being the next most common taxa. *Pisaster ochraceus* were abundant with over 300 found in the vicinity. The count for the outer rock includes a detached part of the reef beyond the mussel plots. Four *P. giganteus* were found. No abalone were found, though the search concentrated on seastars.

Photoplot summary - mean percent cover by zone at Trailer, Santa Cruz Island, Spring 2003 (5 photoplots/zone)

Zone	Bare Rock	Barnacle	Tetracita	Endo cladia	Hesper ophycus	Silvetia	Mussels	Turfweed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle 45.	8	49.0	0.0	3.4	0.0	0.0	0.0	0.0	0.0	1.6	0.2	0.0
Silvetia	17.0	0.6	0.0	0.4	0.0	73.2	0.0	0.0	0.0	8.8	0.0	0.0
Mussels	16.0	1.2	0.6	0.2	0.0 0.	0	61.4	0.0	0.2	17.8 2.	6	0.0
Hespero phycus	37.2 1.	6	0.0	22.8	11.2	25.6	0.0	0.0	0.0	1.6	0.0	0.0

Seastar (*Pisaster ochraceus*) counts at Trailer, Santa Cruz Island, Spring 2003

<i>Radius (mm)</i>	<i>Site reef</i>	<i>Outer rock</i>
(<75) 18		17
(75-150) 211		95
(>150) 6		0
<i>P. giganteus</i> (<75)	1	0
<i>P. giganteus</i> (75-150)	3	0

Surfgrass transects at Trailer, Santa Cruz Island, Spring 2003 (additional taxa removed when not represented)

<i>Species/taxa Substrate</i>	<i>Transect 1</i>	<i>Transect 2</i>	<i>Transect 3</i>
<i>Phyllospadix</i> overstory	63 66		48
<i>Phyllospadix</i> understory	2	4	1
<i>Egredia menziesii</i>	2 0		14
Crustose coralline algae	1	0	0
Erect coralline algae	3	3	7
Other red algae	20	21	21
<i>Phragmatopoma californica</i>	5 3		4
Barnacles	0	0	1
<i>Mytilus californianus</i>	4 2		0
Rock	2	5	5

Motile invertebrate size frequency measurements at Trailer, Santa Cruz Island, Spring 2003

	<i>Nucella emarginata</i>	<i>Acanthina spp.</i>	<i>Tegula funebris</i>	<i>Tegula gallina</i>	<i>Ocenebra circumtexta</i>	<i>Lottia gigantea</i>
count	60	26	84 23		1	11
avg size (mm)	16.5	15.6 16	.0 14	.5	18	23.9
min size (mm)	10	9	8	8	18	15
max size (mm)	28 22	24	2	0 18		42

Motile invertebrate counts measurements at Trailer, Santa Cruz Island, Spring 2003

<i>Zone</i>	<i>Barnacle</i>					<i>Hesperophycus</i>				
<i>plot #</i>	<i>911</i>	<i>912</i>	<i>913</i>	<i>914</i>	<i>915</i>	<i>916</i>	<i>917</i>	<i>918</i>	<i>919</i>	<i>920</i>
Lepidochitona spp.							1	4		1
Nuttalina spp.										
Fissurella volcano										
Pachygrapsus						1 1 1 3				1
Pagurus spp.										
large limpets(>15mm)		7	1	10		1	3	2		1
<i>S. purpuratus</i>										
<i>Pisaster ochraceus</i>										1
<i>Nucella emarginata</i>					5					3
<i>Acanthina</i> spp.							1	5	2	5
<i>Tegula gallina</i>						4	1	1		
<i>Tegula funebris</i>						13	5	10		8
<i>Ocenebra circumtexta</i>										
<i>Lottia gigantea</i>										

Leptasterias hexactis										
Littorina spp.	174	234	353	547	219	122	28	15	64	64
subsample1		35	28	48	17	25				
subsample2		21	40	85	49	1				
subsample3		19	45	42	4	13				
Limpet < 5 mm	36	50	100	28	281	38	11	5	8	34
subsample1		7	1	4	60	5				
subsample2		7	22	5	20	5				
subsample3		2	9	0	10	2				
Limpet 5-15 mm	43	75	88	106	194	28	9	10	15	52
subsample1		7	1	20	24	3				
subsample2		8	20	12	18	0				
subsample3		9	7	2	20	6				

	<i>zone Mytilus</i>						<i>Silvetia</i>					Total Count
	plot #	<u>921</u>	<u>922</u>	<u>923</u>	<u>924</u>	<u>925</u>	<u>926</u>	<u>927</u>	<u>928</u>	<u>929</u>	<u>930</u>	
Lepidochitona spp.	2				1		3	3	6	5	4	30
Nuttalina spp.	9	9	10	4	1							33
Fissurella volcano	2	2	2		1							7
Pachygrapsus	2		3	1	2	1			2			18
Pagurus spp.								1	4		10	15
large limpets(>15mm)							2	1			2	30
S. purpuratus		1	3	1								5
Pisaster ochraceus												1
Nucella emarginata	18	11	7	20	18							82
Acanthina spp.												13
Tegula gallina												6
Tegula funebris	1			1								38
Ocenebra circumtexta	1											1
Lottia gigantea	2	3	1	4	1							11
Leptasterias hexactis			1									1
Littorina spp.	2	0	0	1	2	6		6	6	5	0	1848
subsample1		0	0									
subsample2		0	0									
subsample3		0	0									
Limpet < 5 mm	97	88	106	197	78	6		9	11	2	1	1186
subsample1	6	7	25	15	10							
subsample2	17	6	3	33	6							
subsample3	8	15	6	15	9							
Limpet 5-15 mm	131	50	81	75	119	11	8	9		16	8	1128
subsample1	13	4	12	8	7							
subsample2	15	4	7	4	13							
subsample3	14	8	7	12	18							

Forney's Cove, March 25, 2003. After finishing at Trailer, we went to Forney's Cove (part of the Fraser Cove site) to photograph and count motile invertebrates in the Silvetia plots there (note- no digital photos were taken of these plots). We were on site there from 1430-1600 hrs. About 100 or more Western Gulls were perched on the low rocks along the outer part of the reef

beyond the monitoring plots. There was good cover of both zones. As at Trailer, the *Hesperophycus californicus* looked good but cover was not especially high. *Silvetia compressa* was common in plots within that zone. *Acanthina* spp. and *Tegula funebris* were common in all the *Silvetia* zone plots and present in some *Hesperophycus* zone plots.

Fraser Cove, March 26, 2003. Low tide -0.4 ft at 1218. 12 Black Oystercatchers were on site when we arrived; at least one was an American oystercatcher. High winds and seas increased through the morning and day. The water temperature was recorded at 12.3°C. We were on site from 0730 to 1400 hours, and then we drove back to the research station.

The weedy red alga, *Porphyra perforata*, was present, but with light cover and in smaller areas compared to some years. Small (1-2 cm) *Velella velella* were washing ashore at the site. All the target species seemed abundant and healthy. There was considerable bleaching in the surfgrass, though plants in the pools looked healthy and had a high cover of the epiphyte *Smithora naiadum*. Except for *Nucella emarginata* in the *Pollicipes* and *Mytilus* zones, the motile invertebrate numbers were fairly low. A total of 75 *Pisaster ochraceus* were counted. This is a slight increase since fall 2002. Only two seastars were counted in spring 2001. One of the *Endocladia* zone plot (885) photos was half exposed because of camera problems.

Photoplot summary - mean percent cover by zone at Fraser Cove, Santa Cruz Island, Spring 2003 (5 photoplots/zone)

Zone	B	are Rock	Barnacle	Tetra clita	Endo cladia	Hesperophycus	Silvetia	Mussels	Turf weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle		29.2	35.8	0.0 20.	0	0.0	0.0	1.0	0.0	0.0	12.6	0.4 1.	0
Endocladia		20.4	1.2	0.0 47.	8	1.4	0.0	1.4	0.0	0.0	7.6	0.2 0.	0
Silvetia		19.6	3.8	0.0	4.2 5.	0 58.	2	0.0	0.2	0.0	8.0	1.0	0.0
Mussels	11.	0	2.2	0.0	0.0	0.0	0.0	63.2	0.0	2.4	6.4	14.8	0.0
Pollicipes	12.2		1.6	2.4	5.4	0.0	0.0 42.8		0.0	11.4 8.8		15.4	0.0
Tar	23.	8	18.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	57.6
Hespero phycus		48.0	11.2	0.0 14.	6	16.6	6.4	0.0	0.0	0.2	3.0	0.0 0.	0

Seastar (*Pisaster ochraceus*) counts at Fraser Cove, Santa Cruz Island, Spring 2003

Radius (mm)	site total
(<75)	7
(75-150)	68
(>150)	0

Surfgrass transects at Fraser Cove, Santa Cruz Island, Spring 2003 (additional taxa removed when not represented)

Species/taxa Substrate	Transect 1	Transect 2	Transect 3
<i>Phyllospadix</i> overstory	53 54		66
<i>Phyllospadix</i> understory	0 2		0
<i>Egregia menziesii</i>	0 1		0
Crustose coralline algae	2	3	0
Non-coralline crust	0	0	1
Erect coralline algae	20	6	16
Other red algae	5	21	13

<i>Anthopleura</i> spp.	6	1	0
<i>Phragmatopoma californica</i>	6	3	0
<i>Mytilus californianus</i>	2	1	0
Barnacles	0	0	2
Rock	4	8	0
Sand	2	2	1
Tar	0	0	1

Motile invertebrate size frequency measurements at Fraser/Forney's Cove, Santa Cruz Island, Spring 2003

	<i>Nucella emarginata</i>	<i>Acanthina</i> spp.	<i>Tegula funebris</i>	<i>Ocenebra circumtexta</i>	<i>Tegula gallina</i>	<i>Lottia gigantea</i>
count	12	45	68	4	5	10
avg size (mm)	14.8	13.6	13.5	15	12	16
min size (mm)	8	5	5	12	9	12
max size (mm)	22	24	28	19	19	49

Motile invertebrate counts measurements at Fraser/Forney's Cove, Santa Cruz Island, Spring 2003

	<i>Zone B</i>		<i>arnacle</i>		<i>Endocladia</i>						<i>Hesperophycus</i>					
	plot #	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890
Lepidochitona spp.									1							3
Nuttalina spp.							6	1								
Fissurella volcano																
Pachygrapsus										1	3					1
Pagurus spp.													1			
large limpets(>15mm)															5	3
S. purpuratus																
Nucella emarginata		4	2					3	7	7	3				1	
Acanthina spp.		6				1		1	1	1	3				1	7
Tegula gallina													4			
Tegula funebris		2										3	10			5
Ocenebra circumtexta																
Lottia gigantea			1													
Littorina spp.		4	52	994	875	163	23	49	7	20	16	156	7	1988	125	128
subsample1				42	58	16						15		96	4	18
subsample2				116	3	10						27		35	16	13
subsample3				160	9	26						8		28	20	10
Limpet < 5 mm		60	8	1	13	109	21	27	9	5	14	5	3	4	18	34
subsample1						21										2
subsample2						9										5
subsample3						5										4
Limpet 5-15 mm		10	16	2	9	6	28	49	17	6	15	48	39	113	106	100
subsample1														8	14	6
subsample2														9	9	11
subsample3														19	11	15

	Zone <i>Silvetia</i>						<i>Mytilus</i>						<i>Pollicipes</i>						<i>Total Count</i>
	plot #	896	897	898	899	900	891	892	893	894	895	901	902	903	904	905			
Lepidochitona spp.		2		1													7		
Nuttalina spp.			2				1	1	1			3	1	1	5		22		
Fissurella volcano																	0		
Pachygrapsus				1			6	2	4	1		2	1		2	1	25		
Pagurus spp.			4	5	1												11		
large limpets(>15mm)	5	2	5			3											23		
S. purpuratus									1		1					1	3		
Nucella emarginata							8	6	20	15	19	21	12	8	23	16	175		
Acanthina spp.	5	1	4	6	6												43		
Tegula gallina				1													5		
Tegula funebris	15	4	11	29	9				1			1	1				91		
Ocenebra circumtexta				3									1				4		
Lottia gigantea							2	2			2		2			1	10		
Littorina spp.	0	0	0	1		5	0	2	0	1		1	8	13	1	0	4638		
subsample1																			
subsample2																			
subsample3																			
Limpet < 5 mm	12	28	11	15		13	10	9	42	33		17	16	18	32	57	19	664	
subsample1																			
subsample2																			
subsample3																			
Limpet 5-15 mm	37	57	43	37		56	43	42	67	69		79	54	31	67	83	69	1398	
subsample1																			
subsample2																			
subsample3																			

Willows Anchorage, March 27, 2003. Low tide -0.5 ft at 1305 hrs. Conditions were good with a clear sky, moderate breeze (strong offshore), and light surge. No birds or mammals were at the site; however, four Black Oystercatchers were on the offshore rock and one harbor seal were seen swimming in the cove. We dropped off Sarah and Lindsey to do vegetation releve plots in Willows Canyon. We were on site from 1000-1600 hrs.

In both the *Silvetia* and *Hesperophycus* zones, the first plot was primarily *Endocladia muricata*. Limpets and *Littorina* spp. are moving back into those plots after being scoured by sand a few years ago. High recruitment was noted in *Littorina* spp. *Chthamalus* spp/ *Balanus glandula* was also having a high recruitment year. *Endocladia muricata* was thick and healthy with no sign of bleaching. *Hesperophycus californicus* was quite sparse. *Silvetia compressa* in the *Hesperophycus* zone was a little denser but still not as lush as around the higher plots (Pe3 and Pe4). *Mytilus californianus* looked fine in the plots where they are well above the seastar front. Lower parts of the reef below the *Endocladia* zone plots and at the end of the BLM transects have been devastated by seastars. The lower edge of the inner reef is mostly bare rock with purple sea urchins. A few juvenile *Aplysia californica* were found.

Motile invertebrates were abundant in all the *Mytilus* zone plots, particularly *Nucella emarginata*. *Nucella*, *Strongylocentrotus purpuratus*, *Fissurella volcano*, *Pachygrapsus*

crassipes, and *Lottia gigantea* were present in most of the plots in relatively high numbers. *Acanthina* spp. were present in all the rockweed plots except He1. Sea stars (all *Pisaster ochraceus*) continued to increase at this site. The small size class (<75mm) had higher representation than any other site.

Photoplot summary - mean percent cover by zone at Willows Anchorage, Santa Cruz Island, Spring 2003 (5 photoplots/zone)

Zone B	are Rock	Barnacle	Tetra clita	Endo cladia	Hesperophycus	Silvetia	Mussels	Turfwe ed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Endocladia 21.	2	0.0	0.6	75.4	0.0	0.0	0.0	0.0	0.0	2.2	0.6	0.0
Silvetia 18.	6	0.0	0.2	25.8	0.0	37.2	0.0	0.0	0.0	20.2	1.2	0.0
Mussels	10.0	0.0	3.4	0.0	0.0	0.0	57.2	0.0	6.6	14.6	8.2	0.0
Hespero phycus	44.6	5.6	0.0	9.0	0.0	8	20.2	0.0	0.0	18.8	1.0	0.0

Seastar (*Pisaster ochraceus*) counts at Willows Anchorage, Santa Cruz Island, Spring 2003

<u>Radius (mm)</u>	<u>Total</u>
(<75)	112
(75-150)	260
(>150)	18

Motile invertebrate size frequency measurements at Willows Anchorage, Santa Cruz Island, Spring 2003

	<i>Nucella emarginata</i>	<i>Acanthina</i> spp.	<i>Ocenebra circumtexta</i>	<i>Lottia gigantea</i>
count	50	28	4	20
avg size (mm)	17.5	13.4	11.5	24.1
min size (mm)	9	6	10	10
max size (mm)	23	19	15	45

Motile invertebrate counts measurements at Willows Anchorage, Santa Cruz Island, Spring 2003

Zone	<i>Endocladia</i>					<i>Hesperophycus</i>				
plot #	931	932	933	934	935	936	937	938	939	940
Lepidochitona spp.					1		1	1	4	2
Nuttalina spp.					1					
Fissurella volcano										
Pachygrapsus	3	3	1	1	4		1		3	1
Pagurus spp.							3		44	4
large limpets(>15mm)			1		1				6	2
S. purpuratus										
Nucella emarginata		1								
Acanthina spp.							2	1	7	8
Tegula funebris										
Leptasterias										
Ocenebra circumtexta										
Lottia gigantea										
Amphissa versicolor										
Littorina spp.	112.5	390.6	209.4	225	42	1125	900	1388	184	50
subsample1	27	66	38	10		42	38	27	39	

	subsample2	6	45	14	3		12	11	57	6	
	subsample3	3	14	15	5		36	23	27	14	
Limpet < 5 mm		8	0	6	53	21	8	1	14	4	26
	subsample1				9						
	subsample2				4						
	subsample3				4						
Limpet 5-15 mm		9	15	24	59	29	24	30	46	45	97
	subsample1				8						
	subsample2				7						
	subsample3				4						

<i>Zone Mytilus</i>							<i>Silvetia</i>				<i>Total Count</i>
plot #	941	942	943	944	945	946	947	948	949	950	
Lepidochitona spp.								5	7	2	23
Nuttalina spp.	38	8	4	18	17		9	1		1	97
Fissurella volcano	1	2	1	3	4						11
Pachygrapsus	8	6		5	6	5	4	3	3	1	58
Pagurus spp.								32	11		94
large limpets(>15mm)		4	2				1	2	2	2	23
S. purpuratus	1	32	20	5							58
Nucella emarginata	13	13	10	3	28			2		1	71
Acanthina spp.						2	1	2	3	2	28
Tegula funebris											0
Leptasterias	1	1	1	1							4
Ocenebra circumtexta					2				2		4
Lottia gigantea	20	2	2	5	1						30
Amphissa versicolor		1		1							2
Littorina spp.	1	1	0	1	2	14	138	17	15	6	4821
	subsample1						17				
	subsample2						10				
	subsample3						17				
Limpet < 5 mm	159	19	17	9	8	79	309	14	2	222	980
	subsample1	41					13			40	
	subsample2	10					50			40	
	subsample3	0					36			36	
Limpet 5-15 mm	109	54	51	56	38	33	225	31	6	222	1204
	subsample1	14					9			24	
	subsample2	11					23			30	
	subsample3	10					40			17	

March 28, 2003. We had hoped to finish the Prisoner's Harbor site before departing the island; however, the high NE winds early in the morning created a very confused travel schedule and doubt about the boat coming at all. When we finally did go to the harbor to check conditions, the site was not workable because of the waves hitting directly on the site.

San Miguel Island April 11-15, 2003

(Database event #2003-C)

PURPOSE: To monitor rocky intertidal sites at San Miguel Island

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
Paula Rich, Bio-tech, Channel Islands National Park
Sarah Chaney, Ecologist, Channel Islands National Park

PROCEDURE: We flew out to San Miguel on an early flight with Channel Islands Aviation. Photoplots were photographed with film and digital cameras, except Crook Point (film only). Crook Point and Otter Harbor photoplots were scored in the field. Motile invertebrates were counted in all photoplots at all sites. When abundant, limpets and *Littorina* spp. were sub-sampled in three 20x20cm subplots. When especially abundant, *Littorina* or small limpets were sub-sampled in three 10x10cm subplots. Sizes of select species of snails and owl limpets were sampled. Seastars and abalone were counted in timed searches. Plot markers were repaired as necessary. GPS site locations were recorded with a Garmin Etrex Vista. GPS mapping of all plots and site features were made with the Trimble GPS at Otter Harbor and Harris point to map the plots added since original maps were made. Paula returned to Ventura and Dan and Sarah moved to Santa Rosa for one day via Channel Islands Aviation on the 15th. We attempted to go to East Point that afternoon but the roads were too muddy from the rain over the weekend.

RESULTS:

Crook Point, April 11, 2003. Low tide -0.1 ft at 1323 hrs. The sky was clear, wind was light and the swell was moderate. There were about 35 elephant seals on the beach just east of the site and 10 at the site. Ten cormorants, two Western Gulls, five Black Turnstones and 24 Black Oystercatchers were observed at the site. We were on site from 1115 to 1700 hours.

Two *Haliotis cracherodii* were found in plot 394. No other abalone were located within the designated area. *Pisaster ochraceus* were abundant and within the designated area (plot 388 to the surge channel and to the lip of the drop-off) there were 6 <75mm, 87 between 75-150mm and 1 >150mm. There were 12 *P. ochraceus* within the abalone plots.

Balanus glandula was dominant in most of the barnacle plots with cover ranging from 6-58%. Plot 148 had a lot of bird guano covering the plot and I noticed that *Littorina* spp. were especially localized in this plot to avoid the guano. Other than littorines and a small number of limpets, there were no other motile invertebrates in the barnacle plots. *Endocladia muricata* was common at the site, and cover in photoplots in that zone ranged from 21-57%. Motile invertebrates in the *Endocladia* zone were comprised mostly of chitons, *Pachygrapsus crassipes*, a few *Nucella emarginata* and moderate to abundant *Littorina* spp. and limpets. *Endocladia* cover was fair in two of the *Silvetia* plots. *Silvetia compressa* was present in only 3 plots with 4% cover the maximum. *Hesperophycus californicus* was in only one plot at 2%. Overall, both rockweed species were uncommon. *Mytilus californianus* were present in all the *Silvetia* plots. *Nucella emarginata* were present in two of the plots and *Tegula funebris* were present in only one plot. Both *N. emarginata* and *T. funebris* were a little more common in the mussel zone. Many of the *T. funebris* and *Littorina* spp. were small, giving the impression of high

recruitment. A small amount of a northern alga species, *Analipus japonica*, was found. *Laminaria setchelli* was common on the edges of the reef and *Plocamium violaceum* was common.

Photoplot summary – mean percent cover by zone at Crook Point, San Miguel Island, Spring 2003 (5 plots/zone)

Zone B	are Rock	Barnacle	Tetraclita	Endocladia	Hespero- phycus	Silvetia	Mussels	Turfweed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle 60.	4	36.0	0.0	2.2	0.0	0.0	0.6	0.0	0.0	0.2	0.6	0.0
Endocladia 29.	0	10.0	0.4	36.0	3.2	0.6	9.0	0.0	0.6	9.8	1.4	0.0
Silvetia 38	.4	4.0	0.6	10.6	0.4	2.0	25.2	0.8	0.8	15.8	1.4	0.0
Mussels 12.	8	1.2	0.4	0.0	0.0	0.0	70.0	0.2	2.2	12.0	1.2	0.0

Seastar (*Pisaster ochraceus*) counts at Crook Point, San Miguel Island, Spring 2003

Size categories	Designated area (388-surge channel)
Small (<75mm)	6
Medium (75-150mm)	87
Large (>150mm)	1

Motile invertebrate size frequency measurements at Crook Point, San Miguel Island, Spring 2003

	<i>Nucella emarginata</i>	<i>Tegula funebris</i>	<i>Lottia gigantea</i>
Count 23		16	1
Mean size (mm)	15 10 25		
Min size (mm)	8	6	25
Max size (mm)	21 17	25	

Motile invertebrate counts measurements at Crook Point, San Miguel Island, Spring 2003

Zone	Barnacle					Endocladia					
plot #	137	147	148	149	150	386	387	388	389	390	
Lepidochitona spp.							1			1	
Nuttalina spp.									1		
Fissurella volcano											
Pachygrapsus						1	1		1	1	
Pagurus spp.											
large limpets(>15mm)		1									
S. purpuratus											
Amphissa versicolor											
Nucella emarginata							3	1		1	
Acanthina spp.											
Tegula funebris											
Ocenebra circumtexta											
Lottia gigantea											
Littorina spp.							11				
Limpet < 5 mm	0	0									
Limpet 5-15 mm	3	11	2								

	Zone <i>Silvetia</i>					<i>Mytilus</i>					Total Count
plot #	396	397	398	399	400	381	382	383	384	385	
Lepidochitona spp.						1	1			1	5
Nuttalina spp.		3	1	1					8	9	23
Fissurella volcano											0
Pachygrapsus	1			1				1	1	3	11
Pagurus spp.											0
large limpets(>15mm)			2			2				3	8
S. purpuratus									9	4	13
Amphissa versicolor											0
Nucella emarginata				4	1 1 1 4 5					2	23
Acanthina spp.											0
Tegula funebris		5					1	15			21
Ocenebra circumtexta											0
Lottia gigantea						1					1
Littorina spp.		51				35	3 5 1			0	106
Limpet < 5 mm		8					1	4			13
Limpet 5-15 mm		44					40	83			183

Otter Harbor, April 12, 2003. Low tide –0.4 ft at 1400 hrs. The sky was mostly cloudy, wind was light, and the swell was high. There were 2 elephant seals and 20 harbor seals on the reef. Five Western Gulls, 10 Black Turnstones and four Black Oystercatchers were observed at the site. We were on site from 1030 to 1640 hours.

There were no black abalone present in any of the five plots. Because of the large swell and the time to complete other tasks, there was no general search for abalone or seastars. *Pisaster ochraceus* were noted as present.

Balanus/Chthamalus were very dense in patches with cover of 6-54% in the barnacle plots. Enteromorpha cover was dense in plots 370 and 371 which may have reduced the apparent barnacle cover there. Barnacle plot 374 had no barnacles and was almost completely covered by red algae (primarily *Chondracanthus canaliculatus* and *Mazzaella affinis*). Plot 374 also had 50 *Tegula funebris* and 22 *Pagurus samuelis*, the most of any plot at the site. *Endocladia* cover was high with 29-84% cover in that zone and a moderate showing in the *Silvetia* zone. Low numbers of many of the motile invertebrates were present in this zone. Rockweed cover ranged from 2-59%. Plots 355-357 are dominated by *Silvetia compressa* while plots 358 and 359 are up in the *Hesperophycus* zone with *H. californicus* the only rockweed. *Balanus/Chthamalus* were actually dominant in those two plots. Motile invertebrates (besides *Littorina* spp. and limpets) were mostly absent from plots 358 and 359. *Nucella emarginata* and *Lottia gigantea* were especially common in the mussel zone plots with a presence in all five plots. *Mytilus californianus* cover in the five plots was consistent with cover ranging from 52-61%.

Photoplot summary – mean percent cover by zone at Otter Harbor, San Miguel Island, Spring 2003 (5 plots/zone)

Zone B	are Rock	Barnacle	Tetraclita	Endocladia	Hespero- phycus	Silvetia	Mussels	Turfweed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle 31.	0	27.8	0.0	0.8	0.0	0.0	0.0	7.4	0.0	28.6	0.4	4.0
Endocladia 9.	2	3.4	0.4	61.2	0.8	3.6	1.4	0.2	0.0	19.0	0.8	0.0
Silvetia 13.	6	14.2	0.2	21.8	4.8	20.0	0.0	0.0	0.0	23.6	0.2	1.6
Mussels 5.	8	0.0	1.0	0.2	0.0	0.0	57.2	0.2	5.0	29.0	1.6	0.0

Motile invertebrate size frequency measurements at Otter Harbor, San Miguel Island, Spring 2003

	<i>Nucella emarginata</i>	<i>Acanthina</i> spp.	<i>Tegula funnebralis</i>	<i>Ocenebra circumtexta</i>	<i>Lottia gigantea</i>
Count	63 2 2		5 3		50
Mean size (mm)	17	13	18	20 30	
Min size (mm)	7	12	7	18	16
Max size (mm)	26 1	3	23 22	59	

Motile invertebrate counts measurements at Otter Harbor, San Miguel Island, Spring 2003

Zone B	arnacle			Endocladia		
plot #	370 371	372 373	374 360	361 362	363	364
Lepidochitona spp.						1
Nuttalina spp.				1	1	1
Fissurella volcano						
Pachygrapsus					1	1
Pagurus spp.			22			2
large limpets(>15mm)	2				1	3
S. purpuratus						
Nucella emarginata			6	1	1	2
Acanthina spp.	1		1			
Tegula funebris			50			7
Ocenebra circumtexta			1			2
Leptasterias hexactis						
Lottia gigantea					2	
Littorina spp.	110		0	51 5 22		38
Limpet < 5 mm	1	2	0	6	5	18
Limpet 5-15 mm	1	10	2 0		25	18

Zone Silve			tia				Mytilus				Total Count
plot #	355	356	357	358	359	375	376	378	379	380	
Lepidochitona spp.		2									4
Nuttalina spp.							4 6 5 2			2	22
Fissurella volcano											0
Pachygrapsus							3	1		1	10
Pagurus spp.		1						1			24
large limpets(>15mm)		5	2	3 2				6		11	46
S. purpuratus											0
Nucella emarginata		2	2				9	14 10	12	14	73
Acanthina spp.											2
Tegula funebris		2	1				3		1		64

<i>Ocenebra circumtexta</i>										3
<i>Leptasterias hexactis</i>							2			2
<i>Lottia gigantea</i>	1		1			16 3 22			15 17 77	
<i>Littorina</i> spp.	57	36	13			0 0 0 0			0	332
Limpet < 5 mm	6 29		97 5		9			49	61	351
Limpet 5-15 mm	14	23	21	5	14		42		49	236

Cuyler Harbor, April 13, 2003. Low tide –0.5 ft at 1433 hrs. The sky was cloudy with occasional drizzle, wind was light and the swell was high. The island received approximately 0.4 inches of rain during the night and morning. There were about 12 elephant seals on the beach. One Whimbrel, four Black Turnstones and three Black Oystercatchers were observed at the site. We were on site from 1355 to 1730 hours.

Nucella emarginata were present in all zones and especially abundant in the mussel zone plots with 20-49 snails in each plot. *Lottia gigantea* were also abundant in the mussel zone, while *Tegula funebris* were abundant in most of the Silvetia and *Endocladia* zone plots. *Acanthina* spp. and *Ocenebra circumtexta* were present but there were few per plot. *Nuttalina* spp. were common in the mussel zone. Because of the swell we did not get counts on *Littorina* spp. or limpets in two of the *Endocladia* plots (414-415). The photoplots will be scored from the slides.

Photoplot summary – mean percent cover by zone at Cuyler Harbor, San Miguel Island, Spring 2003 (5 plots/zone)

Zone B	are Rock	Barnacle	Tetraclita	Endocladia	Hespero- phycus	Silvetia	Mussels	Turfweed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle 38.	4	43.4	0.0	17.4	0.0	0.0	0.0	0.0	0.0	0.6	0.2	0.0
Endocladia 36.	4	6.2	0.0	36.4	0.0	7.6	6.8	0.2	0.0	5.0	1.4	0.0
Silvetia 14.	2	0.4	0.2	0.0	0.0	70.2	0.4	0.0	0.0	11.6	3.0	0.0
Mussels 19.	2	0.4	6.0	0.0	0.0	0.0	62.6	0.0	1.4	3.2	7.2	0.0

Motile invertebrate size frequency measurements at Cuyler Harbor, San Miguel Island, Spring 2003

	<i>Nucella emarginata</i>	<i>Acanthina</i> spp.	<i>Tegula funebris</i>	<i>Ocenebra circumtexta</i>	<i>Lottia gigantea</i>
Count	110	13	65 8 3		5
Mean size (mm)	18.3	16.9 19.2 15.5 24.5			
Min size (mm)	8 13	6	1	4	10
Max size (mm)	27 21	26	17	40	

Motile invertebrate counts measurements at Cuyler Harbor, San Miguel Island, Spring 2003

	Zone B	arnacle					Endocladia				
plot #		416	417	418	419	420	411	412	413	414	415
Lepidochitona spp.				1		1		4			
Nuttalina spp.							3	1			1
Fissurella volcano											
Pachygrapsus											
Pagurus spp.											
large limpets(>15mm)							1	1	3		
S. purpuratus											

Nucella emarginata			1		1	5		20	6	2		
Acanthina spp.				1				4				
Tegula funebris			19				2		29	10	13	
Cerastostoma nuttali												
Ocenebra circumtexta							1					
Mopalia sp.												
Lottia gigantea								1				
Littorina spp.							17			nc	nc	
Limpet < 5 mm	1	2	8	3	0	0		9	1	nc	nc	
Limpet 5-15 mm	12	4	2	12	3		11	18		nc	nc	

	Zone Silvetia						Mytilus				Total Count
plot #	406	407	408	409	410	401	402	403	404	405	
Lepidochitona spp.	15		3	6	9					1	40
Nuttalina spp.	5	1	1		2	9	6	2	28	10	69
Fissurella volcano											0
Pachygrapsus	4		2	3	4	5	5	2	2	1	28
Pagurus spp.											0
large limpets(>15mm)	3	2	3	1	4			1			19
S. purpuratus				1			1	1			3
Nucella emarginata	7	4	15	4	12	33	25	20	49	29	233
Acanthina spp.	1	3		2	1	1					13
Tegula funebris	38	27	1	20		1					160
Cerastostoma nuttali											0
Ocenebra circumtexta		1		2	2			1	1		8
Mopalia sp.							1				1
Lottia gigantea		1				7	4	6	6	23	48
Littorina spp.	20	4		67	29	0	0	0	0	1	138
Limpet < 5 mm	0	0		2	4						30
Limpet 5-15 mm	26	8		10	31						137

nc = not counted

Harris Point, April 14, 2003. Low tide -0.4 ft at 1506 hrs. Water temperature was 12.5°C. The sky was cloudy, wind was light and the swell was high. There were three elephant seals and two harbor seals at the site. Three Black Oystercatchers were observed at the site. The air was cool and we got rained on during the walk back. We were on site from 1100 to 1700 hours.

There was a problem with the camera and several frames overlap on the film resulting in a loss of three plots (435, 427, 429) and the abalone plots. We do have digital photos here though. A large swell kept the tide waters higher than it should have been. We did check the abalone plots finding two *Haliotis cracherodii* in plot 443, however they were in a small area and could not be reached to measure (both were around 110mm). Four *H. cracherodii* were in the crevice below plot 424 (75, 102, 106, 122 mm). There were two *Pisaster ochraceus* in the crevice pool. No general area search was made for abalone or seastars. *Balanus/Chthamalus* were very dense in patches. Limpets tended to be in low abundance in those plots and *Littorina* spp. were quite variable. *Nucella emarginata* were common in most zones especially in the mussel and *Tetraclita* zones with 3-14 and 0-16 per plot respectively. One of the *Tetraclita* zone plots had 19 *Ocenebra circumtexta*. *Pachygrapsus crassipes* were common.

There were patches of dense, young *Hesperophycus californicus*. *Endocladia muricata* seemed to recruit well this winter, with very dense cover in most plots.

Photoplot summary – mean percent cover by zone at Harris Point, San Miguel Island, Spring 2003 (5 plots/zone)

Zone B	are Rock	Barnacle	Tetraclita	Endocladia	Hesper- ophycus	Silvetia	Mussels	Turfweed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle 28.	2	65.8	0.0	3.8	0.2	0.0	0.0	0.0	0.0	1.0	0.0	1.0
Endocladia 10.	6	3.4	1.0	52.2	8.8	0.0	2.0	0.0	0.0	1.8	0.2	0.0
Mussels 4	.6	1.0	0.4	0.4	0.0	0.0	26.4	0.0	0.6	6.4	0.2	0.0
Tetraclita 23.	6	13.2	17.6	6.4	0.0	0.0	11.4	0.0	3.6	23.4	0.8	0.0
Hesperophycus 18.	6	1.6	0.0	30.8	46.0	0.0	0.0	0.0	0.0	2.8	0.2	0.0

Motile invertebrate size frequency measurements at Harris Point, San Miguel Island, Spring 2003

	<i>Nucella emarginata</i>	<i>Ocenebra circumtexta</i>	<i>Lottia gigantea</i>
count	88 17		53
avg size (mm)	15.6	15.4	24.0
min size (mm)	6	8	15
max size (mm)	26	20	45

Motile invertebrate counts measurements at Harris Point, San Miguel Island, Spring 2003

Zone B	arnacle					Endocladia					Hesperophycus				
plot #	440	B1	B2	B3	B4	431	432	433	434	435	421	422	423	424	425
Lepidochitona spp.		1				2					1	1			
Nuttalina spp.						5			1						
Fissurella volcano															
Pachygrapsus			1		1	2	1	2					1		2
Pagurus spp.															
large limpets(>15mm)															1
S. purpuratus															
Amphissa versicolor															
Nucella emarginata					2	14	1	5				1	1	2	2
Acanthina spp.															
Tegula funebris															
Ocenebra circumtexta												2		1	
Lottia gigantea						1									
Littorina spp.								52	59						
Limpet < 5 mm		0		0	2	0	0	10	83		20		0	1	0
Limpet 5-15 mm		20		0	22		15	28	36			16	21	25	6

Zone M	ytilus					Tetraclita					Total Count
plot #	426	427	428	429	430	436	437	438	439	T1	
Lepidochitona spp.	2	4	1		1	6	1		2		22
Nuttalina spp.	7				6	9		2	10	21	61
Fissurella volcano											0
Pachygrapsus	1	2		11	8	2		1	6	2	43
Pagurus spp.		1	1						2		4
large limpets(>15mm)	2		6				9				18

S. purpuratus				3	8						11
Amphissa versicolor											0
Nucella emarginata	6	6	12	14	3	16	5		7	7	104
Acanthina spp.											0
Tegula funebris											0
Ocenebra circumtexta		2	2					1	19		27
Lottia gigantea	6	4		5	8	1	4	16		14	68
Littorina spp.	6	19	53		0	1	0	4	3	3	200
Limpet < 5 mm											116
Limpet 5-15 mm											189

Anacapa Island April 24, 2003

(Database event #2003-D)

PURPOSE: To monitor rocky intertidal sites at Anacapa Island

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
Paula Rich, Bio-tech, Channel Islands National Park
Ian Taniguchi, Marine Biologist, California Department of Fish and Game
Julie Bursek, Channel Islands National Marine Sanctuary
Sean Hastings, Channel Islands National Marine Sanctuary

PROCEDURE: Monitoring was cancelled at Anacapa Island on April 22 and 23 because of high winds and seas in the channel. On 4/24, we departed early from Santa Barbara Harbor on the Marine Sanctuary vessel, Xantu. A south swell was impacting the Cat Rock site so moved to Middle Anacapa to monitor that site. Paula photographed plots and scored them in the field at the West site. Dan photographed the plots with the digital camera. At the East site, the photoplots were shot with film only and corner repairs were made where needed. Nothing else was done at the East site and we did not go to Harbor Seal Arch to check the abalone plots. Dan, and Ian or Julie counted motile invertebrates in the photoplots. Sub-sampling was done for *Littorina* spp. in three 20x20cm subplots in only one plot. The numbers were low enough to count in the entire plot in the rest of the photoplots. Sizes of select species of snails and owl limpets were sampled. Ian and Julie counted Seastars and abalone between the west surge channel and plot 466 at the east-end. Plot corners were repaired with new epoxy as necessary at both sites. GPS locations were recorded with a Garmin Vista.

RESULTS:

Middle Anacapa West, April 24, 2003. Low tide -0.2 ft at 1239 hrs. Water temperature was 14° C. We had excellent conditions on the north side with no swell, mostly clear sky, and only a light breeze. We were on site from 1015-1500 hrs. There were four Black Oystercatchers on the adjacent reef and flying by and a juvenile harbor seal was playing in the surge channel around mid-day.

Mytilus californianus in the target zone ranged from 38-87% with coralline algae and bare rock being the next most abundant categories. *Mytilus* were dense in many areas and patches of small dense mussels indicate that recruitment has been good. The lower edges of the mussel zone have been devastated by the abundant *Pisaster ochraceus* and *Egregia menziesii*, *Endarachne binghamiae* and *Scytosiphon lomentaria* were all abundant in the clearings. *Balanus/Chthamalus* cover was low, ranging from 12-47% cover, which seemed typical of the site overall. *Hesperophycus californicus* was present at 3% cover in one plot. Patches of *Ulva* sp. were present at the site, affecting three plots. *Silvetia compressa* was common with 61-79% cover in four plots and only 1% cover in plot 454 which is at a lower elevation than the others. *Endocladia muricata* was common at the site and cover in the plots ranged from 15-67%.

Motile invertebrates were present in moderate numbers in all the plots. *Littorina* spp. were common, but in mostly low numbers. Small *Lottia gigantea* were common in the mussel zone. *Nucella emarginata*, *Acanthina* sp. and *Ocenebra circumtexta* were present in all zones but not in especially high numbers. No *Tegula gallina* were found and the few *T. funebris* were mostly in pools. *Nuttalina* sp. were common, especially in the mussel zone. Several *Ceratosoma nuttali* were found in plots. Between plot 466 and the west surge channel, Ian and Julie counted 219 *Pisaster ochraceus* (13 <75mm, 203 75-150mm, and 3 >150mm). From the east surge channel about 20 m west they counted 30 <75mm, 108 between 75-150mm, and 15 >150mm. Only a small number of seastars were present on the Middle East reef and no count was made. Two black abalone were found in the Middle West area (101 and 78mm).

A Hobo Tidbit data logger was placed in the housing at the east end of the site.

Photoplot summary - mean percent cover by zone at Middle Anacapa West, Spring 2003 (5 plots/zone)

Zone	Bare Rock	Barnacle	Tetraclita	Endocladia	Hesperophycus	Silvetia	Mussels	Turfweed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle 42.	6	5.2	0.2	25.8	0.6	0.0	1.2	0.6	0.0	23.4	0.4	0.0
Endocladia 35.	6	2.0	1.2	33.8	0.2	0.0	5.4	0.2	0.2	20.0	1.4	0.0
Silvetia 12.	8	0.2	0.8	3.6	0.0	55.6	3.8	0.4	0.0	21.6	1.2	0.0
Mussels 10.	2	6.2	1.8	2.2	0.0	0.0	52.2	1.8	0.8	21.8	3.0	0.0

Motile invertebrate size frequency measurements at Middle Anacapa West, Spring 2003

	<i>Nucella emarginata</i>	<i>Acanthina</i> spp.	<i>Tegula funebris</i>	<i>Ceratosoma nuttali</i>	<i>Ocenebra circumtexta</i>	<i>Lottia gigantea</i>
Mean size (mm)	18	12	26	26	11	29
Std Dev	3	4			2	8
Min size (mm)	14	1	26	26	6	13
Max size (mm)	23	19	26	26	17	44
Count 23		45	1	1	26	37

Motile invertebrate counts measurements at Middle Anacapa West, Spring 2003

Zone	Barnacle					Endocladia				
plot #	447	448	449	450	451	457	458	459	460	461
Lepidochitona spp.										2
Nuttalina spp.		10	3		5 7 9 7 1					
Fissurella volcano	15	13			4	3	16	4	1	
Pachygrapsus	1	2	3	5 2 2				2 1		1
Pagurus spp.		1						3		
large limpets(>15mm)			2	3	1					1
S. purpuratus										
Amphissa versicolor										
Nucella emarginata		1							1	
Acanthina spp.		9	4	2 2 1 4 1 4						1
Tegula funebris			1							
Ceratosoma nuttali		1								
Ocenebra circumtexta						1	1	1		
Lottia gigantea			1			2	3			

Littorina spp.		23	60 89		59	5	3	38 68		206
Limpet < 5 mm	0 10	0		3	3	16	24	24	6	0
Limpet 5-15 mm	4	11	11	5	13 22	33	40	18		7
Homalopoma sp.										
Mopalia sp.										

	Zone Silvetia					Mytilus					Total Count
plot #	452	453	454	455	456	462	463	464	465	466	
Lepidochitona spp.	3	7	1	1	7		1				22
Nuttalina spp.	1	2	7	3	5	9	21	10	8		108
Fissurella volcano			1	7		2	1 8		2	4	81
Pachygrapsus	4	2	1	3 2		7 4		1	1	4	48
Pagurus spp.											4
large limpets(>15mm)		3 1		6	4				1 1		23
S. purpuratus			14	1		4				4	23
Amphissa versicolor					1						1
Nucella emarginata					7	6 4		1	3		23
Acanthina spp.	2	1	1	2 5		2 2		1 1			45
Tegula funebris											1
Ceratostoma nuttali			1								2
Ocenebra circumtexta	1		1	2 2		3		5 1		8	26
Lottia gigantea					6	5 5		2	7	6	37
Littorina spp.	42	14	1	0 4		5 0		0 0		0	617
Limpet < 5 mm	0	0 27		8	2	29	51	58	8 19		288
Limpet 5-15 mm	17	9	63	20	19	71 14		118	65	81	641
Homalopoma sp.										1	1
Mopalia sp.										1	1

Middle East, April 24, 2003. On site from 1400-1430. Dan photographed the plots and repaired corners. A dense patch of relatively small mussels was noted in the area of plot 476. Only a few *Pisaster ochraceus* were present and the large patches of bare rock in the mussel zone at Middle West were not present here.

Photoplot summary - mean percent cover by zone at Middle Anacapa East, Spring 2003 (5 plots/zone)

Zone	Bare Rock	Barnacle	Tetraclita	Endocladia He	spero-phycus	Silvetia	Mussels	Turf	weed	Leaf	Barnacle	Misc Algae	Misc Animal	Other
Barnacle 61.	3	9.7	8.7	10.3	0.0	0.0	3.0	0.0	0.0	0.7	5.0	1.0	0.3	
Endocladia 32.	7	6.0	7.7	32.3	6.3	3.7	4.0	0.0	0.0	0.0	6.0	0.3	1.0	
Rockweed	7.7	9.0	0.3	4.0	0.0	60.0	11.	3	0.0	0.0	7.3	0.3	0.	0
Mussels 7.	0	4.0	1.3	0.3	0.0	0.0	85.7	0.0	0.0	0.0	1.0	0.0	0.7	

Motile invertebrate size frequency measurements for Middle Anacapa East, Spring 2003

<i>Nu</i>	<i>cella</i> <i>emarginata</i>	<i>Acanthina</i> spp.	<i>Ocenebra</i> <i>circumtexta</i>	<i>Lottia gigantea</i>
count 30		19	34	5
mean size (mm)	19.8	16	14.5	33
min size (mm)	10	10	9	11
max size (mm)	26	19	21	53

Motile invertebrate counts measurements for Middle Anacapa East, Spring 2003

Zone Barnacle				Endocladia			Silvetia			Mytilus			Total Count
Plot #	243	244	245	240	241	242	53/ 238	237	469/ 239	476	477	478	
Lepidochitona spp.	3	7	1	3	2		1	5	3		2		27
Nuttalina spp.	4	1	1	1	5	2	5		5	1			25
Fissurella volcano												4	4
Pachygrapsus			1	3		1		3	2		1	3	14
Pagurus spp.							3	2					5
large limpets(>15mm)	2												2
S. purpuratus											1	2	3
Amphissa versicolor											1		1
Nucella emarginata		2	1			3			8		12	4	30
Acanthina spp.	2	1	2					8	4		1	16	34
Tegula funebris													0
Ocenebra circumtexta	3	1	3	1		4			4		7	12	35
Lottia gigantea		2	1						1			1	5
Littorina spp.	219	79	154	32	220	169	0	15	0 0 0 0				888
Limpet < 5 mm	6	68	9	3		7	3	8	8	15	12	34	231
Limpet 5-15 mm	20	6	102	19		42	43	9	53	72	45	53	464

Anacapa Island, Santa Cruz Island May 19-22, 2003

(Database event #2003-E)

PURPOSE: To monitor rocky intertidal sites at Anacapa Island and East Santa Cruz Island

MONITORING PERSONNEL:

Dan Richards, Marine Biologist, Channel Islands National Park
Paula Rich, Bio-tech, Channel Islands National Park
Ian Taniguchi, Marine Biologist, California Department of Fish and Game

PROCEDURE: On 5/19, we departed early from Santa Barbara Harbor on the Marine Sanctuary vessel, Xantu. Paula and Dan photographed the plots at Orizaba Cove and counted Motile invertebrates in some plots, then returned to Santa Barbara in the early afternoon. On 5/20, Paula, Ian, and Dan departed early from Santa Barbara on the Marine Sanctuary vessel *Shearwater* with seabird researchers and worked at South Frenchy's Cove. After spending the night aboard the *Shearwater*, we worked at Cat Rock on 5/21, returning to Santa Barbara that afternoon. On 5/22, Dan went out on the Island Packers Company vessel *Islander* and kayaked to the Scorpion Rock site. At all sites, photoplots were photographed with a Nikonos camera and two Ikelite strobes for even illumination. Plots were not scored in the field, percent cover will be determined later from the slides. Motile invertebrates were counted in the photoplots. Sub-sampling was done for *Littorina* spp. And or small limpets in three 20x20cm or three 10x10cm subplots when abundant. Measurements of target species of snails and owl limpets were made. Area searches were made for seastars and abalone at each site.

RESULTS:

Orizaba Cove, Santa Cruz Island, May 19, 2003. Low tide -1.0 ft at 0729 hrs. Water temperature was 13.5 C. The conditions were pleasant and sunny with only a moderate westerly swell that was broken by Orizaba Rock. Two black Oystercatchers were at the site and one California sea lion was in the cove. We were on site from 0830-1200 hrs. and were back to Santa Barbara by 1330 hrs.

Motile invertebrates were counted in the Tetraclita and Chthamalus/Balanus zones only since we had limited time and motiles were counted in the other zones last fall. Seastars were counted at the point (in the vicinity of the photoplots) and in the cove from B1 to the Hesperophycus plots.

Photoplot summary - mean percent cover by zone at Orizaba Cove, Santa Cruz Island, Spring 2003 (5 plots/zone)

Zone B	are Rock	Barnacle	Tetra clita	Endo cladia	Hesperophycus	Silvetia	Mussels	Turf weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle 26.	6	66.4	4.0	0.0	0.0	0.0	0.8	0.0	0.0	2.2	0.0	0.0
Silvetia 22.	0	4.8	7.6	29.0	1.6	7.0	3.2	0.0	0.2	24.6	0.0	0.0
Mussels 11.	6	6.8	0.8	0.0	0.0	0.4	52.4	0.0	4.0	24.0	0.0	0.0
Tetraclita 20.	8	6.2	42.0	0.6	0.0	0.0	16.2	0.0	0.0	13.4	0.8	0.0
Hespero phycus	5.2 8.	0	0.0	79.0	3.6	0.0	0.6	0.0	0.0	2.4	0.0	1.2

Seastar (*Pisaster ochraceus*) counts at Orizaba Cove, Santa Cruz Island, Spring 2003

<i>Point</i>		<i>Cove</i>
Small (<75mm)	6	5
Medium (75-150mm)	46	67
Large (>150mm)	2	5

Motile invertebrate size frequency measurements at Orizaba Cove, Santa Cruz Island, Spring 2003

	<i>Nu</i>	<i>cella</i>	<i>Tegula funebris</i>	<i>Ocenebra</i>	<i>Lottia gigantea</i>
		<i>emarginata</i>		<i>circumtexta</i>	
count	60	1	19	3	
avg size (mm)	16.4	15	12.3	20.3	
min size (mm)	11	15	6	15	
max size (mm)	22	15	15	25	

Motile invertebrate counts measurements for Middle Anacapa East, Spring 2003

zone Barnacle						Tetracrita					Total Count	
plot #	B1	B2	B3	B4	B5	Te1	Te2	Te3	Te4	Te5		
Lepidochitona spp.								1		1	2	
Nuttalina spp.	1						8	8	22	21	60	
Fissurella volcano											0	
Pachygrapsus							2	1		3	6	
Pagurus spp.									2		2	
large limpets(>15mm)							1	2	4	3	10	
S. purpuratus											0	
Nucella emarginata	7					10	49	13	27	12	118	
Acanthina spp.											0	
Tegula funebris								1			1	
Ocenebra circumtexta						6	5	3	1	4	19	
Lottia gigantea								1	2		3	
Littorina spp.	2825	2538	2138	1450	1	975	613	38	328	188	263	12353
subsample1	105	51	45	29	69	14	10	49	12	28		
subsample2	86	100	67	51	75	15	2	28	27	33		
subsample3	35	52	59	36	14	20	0	28	21	23		
Limpet < 5 mm	4	0	0	4	12	50	256	166	938	319	1748	
subsample1						3	34		5	44	18	
subsample2						4	21	35	20	27		
subsample3						9	27	13	11	57		
Limpet 5-15 mm	37	13	3	12	8	88	228	103	134	291	917	
subsample1						12	26	6	17	17		
subsample2						3	25	14	15	43		
subsample3						13	22	13	11	33		

South Frenchy's Cove, Anacapa Island, May 20, 2003. Low tide -0.7 ft at 0833 hrs. Water temperature was 14° C. We had excellent conditions, though it was foggy and there was a moderate south swell. We were on site from 0900-1215 hrs. There were two Black Oystercatchers and one Western Gull in the area.

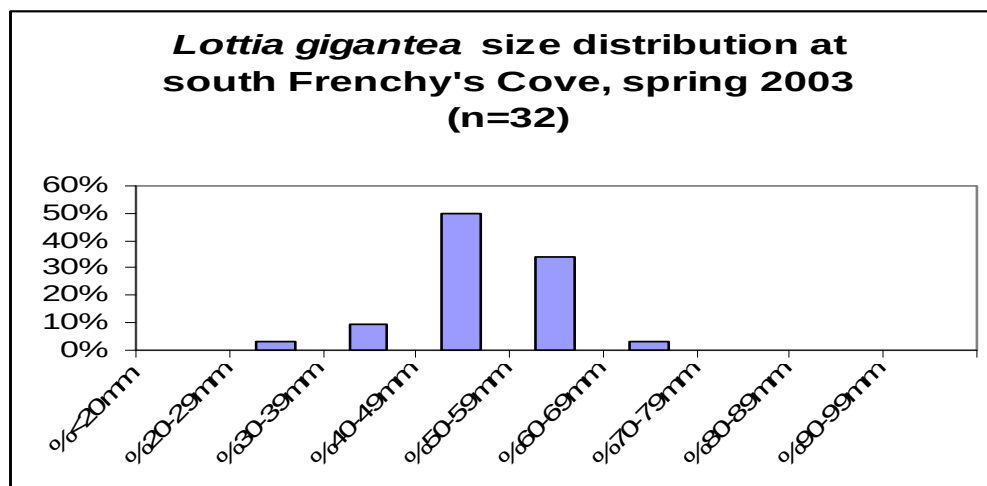
In addition to the film images, the photoplots and owl limpet plots were recorded with a digital camera. Dan and Ian counted motile invertebrates in all 20 photoplots. Giant owl limpets *Lottia gigantea* were measured in the three one-meter radius circle plots. I tried to install a new temperature logger but the bracket did not fit the existing bolt holes. No abalone were found and only one medium *Pisaster ochraceus* was found. *Nucella emarginata* were present in moderate numbers in the mussel zone plots. *Acanthina* spp. And *Nuttalina* spp were present in low numbers. No *Ocenebra circumtexta* were present in the plots. *Hesperophycus californicus* was present and there seemed to be a fairly good recruitment of *Silvetia compressa* this year.

Photoplot summary - mean percent cover by zone at South Frenchy's Cove, Anacapa Island, Spring 2003 (5 plots/zone)

Zone	Bare Rock	Barnacle	Tetra clita	Endo cladia	Hespero phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle	39.4	46.0	0.0	12.2	1.2	0.0	0.0	0.0	0.0	1.0	0.0	0.2
Endocladia	13.8	2.2	0.0	65.6	2.4	15.0	0.0	0.0	0.0	1.0	0.0	0.0
Silvetia	16.4	7.6	0.0	2.6	0.4	70.8	0.0	0.0	0.0	2.2	0.0	0.0
Mussels	6.4	3.6	0.0	3.6	0.0	0.0	70.4	5.6	0.2	10.2	0.0	0.0

***Lottia gigantea* at South Frenchy's Cove, spring 2003**

Plot	Count	Density	MeanSize	S	tDev	MinSize	MaxSize
1	6	1.910	53.00		6.42		59
2	18	5.731	43.17		7.55	24	55
3	8	2.547	52.13		6.17		65



Motile invertebrate size frequency measurements at South Frenchy's Cove, Anacapa Island, Spring 2003

	<i>Nucella emarginata</i>	<i>Acanthina spp.</i>	<i>Tegula funebris</i>
Mean size (mm)	16 14 21		
Std Dev	3	2	
Min size (mm)	11	10	21
Max size (mm)	23	18	21
Count	19	24	1

Motile invertebrate counts measurements at South Frenchy's Cove, Anacapa Island, Spring 2003

<i>zone</i>	<i>Barnacle</i>					<i>Endocladia</i>				
<u>plot #</u>	<u>249</u>	<u>250</u>	<u>251</u>	<u>252</u>	<u>253</u>	<u>154/254</u>	<u>155/255</u>	<u>256</u>	<u>257</u>	<u>258</u>
Lepidochitona spp.								1		
Nuttalina spp.										
Fissurella volcano										
Pachygrapsus	2			1	1		2	2		
Pagurus spp.										
large limpets(>15mm)										
S. purpuratus										
Nucella emarginata										
Acanthina spp.	1							3		
Tegula funebris										
Ocenebra circumtexta										
Lottia gigantea										
Littorina spp.	458	700	741	1175	2462	1512	36	269	84	7
Limpet < 5 mm	0 1 2			0 0		2	2	0 0		0
Limpet 5-15 mm	17 0		9	63	7	11	5	5	4	14
Mopalia sp.										

<i>Zone</i>	<i>Silvetia</i>					<i>Mytilus</i>					<i>Total Count</i>
<u>plot #</u>	<u>259</u>	<u>260</u>	<u>261</u>	<u>262</u>	<u>263</u>	<u>201</u>	<u>202</u>	<u>264</u>	<u>265</u>	<u>266</u>	<u>total</u>
Lepidochitona spp.	1	3		1		1					7
Nuttalina spp.	2		1		5		7	9	5	8	37
Fissurella volcano						4	1				5
Pachygrapsus	2		4		2		11	4	3	5	39
Pagurus spp.											0
large limpets(>15mm)			1	1	1						3
S. purpuratus											0
Nucella emarginata						2	2	5	14		23
Acanthina spp.	4	1 5				4 1		1	3		23
Tegula funebris					1						1
Ocenebra circumtexta											0
Lottia gigantea						3 2					5
Littorina spp.	20	54	29	272	0 0 0			0 1		0	7820
Limpet < 5 mm	0 5		1 0		0	205	4 5		5	11	243
Limpet 5-15 mm	11 24		17 19		24		124	65	109	92	620
Mopalia sp.						1					1

Cat Rock, Anacapa Island, May 21, 2003. Low tide -0.4 ft at 0941 hrs. We started in dense fog but soon overcast in the sun. Good working conditions though there was a moderate south swell. There were two harbor seals in the area when we arrived. There were five black Oystercatchers and one American Oystercatcher in the area. There appeared to be recent landslides from the bluff and as a result, the cobble level was high around the reef. On site from 0800-1300 hrs.

As at Frenchy's, the photoplots were recorded digitally as well as on film. Motile invertebrates were counted in all 36 plots. Relatively low numbers of motile invertebrates were found. There were no *Nucella emarginata* present and *Ocenebra circumtexta* were the most common snail in contrast to South Frenchy's Cove. Repairs were made to missing plot corners or number tags. Ian made a search of the site and found one black abalone (123mm) but no seastars. Algae generally seemed to be more lush here than at Frenchy's. *Egregia* and *Eisenia* were abundant along the sides of the reef and surge channels. Both rockweeds were doing very well. *Mazzaella affinis* formed dense mats in some of the lower rocks and *Chondracanthus canaliculatus* was very dense and more widespread than at Frenchy's. *Tegula gallina* were present in low numbers.

Photoplot summary - mean percent cover by zone at Cat Rock, Anacapa Island, Spring 2003 (9 plots/zone)

Zone B	are Rock	Barnacle T	etra- clita	Endo- cladia	Hesperophycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle 45.	8	15.7	0.0	8.9	25.7	0.2	0.0	0.0	0.0	3.7	0.1	0.0
Endocladia	16.4	7.9	4.9	44.8	2.7	3.3	1.3	7.0	0.0	11.4	0.2	0.0
Silvetia 14.	8	6.8	1.2	12.9	8.6	46.0	0.6	0.0	0.0	9.2	0.0	0.0
Mussels 21.	2	12.9	11.4	1.9	0.0	0.0	37.1	0.0	0.3	13.9	0.9	0.0

Motile invertebrate size frequency measurements at Cat Rock, Anacapa Island, Spring 2003

	<i>Acanthina</i> spp.	<i>Tegula funebris</i>	<i>Tegula gallina</i>	<i>Ocenebra circumtexta</i>
count	2	1	2	1
avg size (mm)		14.6	20.5	23
min size (mm)		10	20	23
max size (mm)		20	21	23

Motile invertebrate counts measurements at Cat Rock, Anacapa Island, Spring 2003

Zone B	arnacle									Endocladia								
plot #	33	37	135	31	35	38	32	36	39	212	14	51/18	54	13	467/17	52	53	19
Lepidochitona spp.		2	3											1				1
Nuttalina spp.										2	26	8	7	3	9	8	6	
Fissurella volcano											1							
Pachygrapsus	1	3	1	3				2			5		1	1	1			
Pagurus spp.																		
large limpets(>15mm)	5	2						1			2			1	2			1
S. purpuratus																		
Nucella emarginata																		
Acanthina spp.	6	2	5															1
Tegula funebris		2																
Tegula gallina		1																

Ocenebra circumtexta									2			1							
Lottia gigantea									4						2		1		
Littorina spp.	138	88	450	1200	888	463	813	163	1025	3	22	47	3	25	3	3	13	59	
<i>subsample 1</i>	6	2	15	35	28	1	18	10	38	1	7	15	1	5	1	1	3	6	
<i>subsample 2</i>	5	5	8	27	39	19	14	2	10	0	0	0	0	2	0	0	0	7	
<i>subsample 3</i>	0	0	13	34	4	17	33	1	34	0	0	0	0	1	0	0	1	6	
Limpet < 5 mm	0	0	0	0	0	0	0	0	0	6	0	0	16	3	0	19	9	0	
<i>subsample 1</i>	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	5	0	0	
<i>subsample 2</i>	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	
<i>subsample 3</i>	0	0	0	0	0	0	0	0	0	2	0	0	1	1	0	0	3	0	
Limpet 5-15 mm	22	6	6	13	13	19	3	13	19	47	47	72	81	69	41	63	22	13	
<i>subsample 1</i>	2	1	0	3	0	3	0	0	2	1	4	15	13	3	8	16	4	1	
<i>subsample 2</i>	0	1	0	0	0	2	0	3	0	4	8	6	10	10	4	4	0	0	
<i>subsample 3</i>	5	0	2	1	4	1	1	1	4	10	3	2	3	9	1	0	3	3	

Zone	Silvetia										Mytilus								Total count
plot #	<u>2</u>	<u>55/7</u>	<u>9</u>	<u>3</u>	<u>5</u>	<u>6</u>	<u>4</u>	<u>8</u>	<u>10</u>	<u>56</u>	<u>471</u>	<u>164</u>	<u>470</u>	<u>204</u>	<u>468</u>	<u>203</u>	<u>473</u>	<u>472</u>	
Lepidochitona spp.	1	4			1					3	1	2				2	2	4	27
Nuttalina spp.		3			4	1				49	26	30	33	24	49	25	8	23	344
Fissurella volcano										1		2	1	11				6	22
Pachygrapsus	1	4	1	1	2		1	1	4	1		4	1	9	2	3	1	3	57
Pagurus spp.																			0
large limpets(>15mm)		1	1	1	2	3	2	2			1	1				1	1		30
S. purpuratus																			0
Nucella emarginata																			0
Acanthina spp.	4					3													21
Tegula funebris																			2
Tegula gallina																			1
Ocenebra circumtexta		1	1		3					6	2	8	1	6	3	5		4	43
Lottia gigantea										3	1	4	14	2	1	2	5	2	41
Littorina spp.	41	238	0	288	56	66	125	38	0	0	56	28	22	0	0	13	94	0	6466
<i>subsample 1</i>	0	15	0	10	7	11	8	3	0	0	6	6	0	0	0	2	8	0	
<i>subsample 2</i>	6	29	0	2	5	7	2	0	0	0	8	0	0	0	0	1	17	0	
<i>subsample 3</i>	7	32	0	11	6	3	0	0	0	0	4	3	7	0	0	1	5	0	
Limpet < 5 mm	0	9	0	0	0	0	0	13	0	50	3	3	13	0	0	16	6	0	166
<i>subsample 1</i>	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	
<i>subsample 2</i>	0	2	0	0	0	0	0	1	0	1	0	0	1	0	0	5	1	0	
<i>subsample 3</i>	0	1	0	0	0	0	0	0	0	2	1	0	0	0	0	0	1	0	
Limpet 5-15 mm	13	97	9	22	59	50	28	50	6	213	113	100	200	84	113	109	69	134	2034
<i>subsample 1</i>	3	9	1	5	2	4	1	3	1	6	6	16	10	5	5	12	10	16	
<i>subsample 2</i>	0	14	1	2	8	9	3	1	0	7	14	3	3	8	3	17	6	12	
<i>subsample 3</i>	1	8	1	0	9	3	5	0	1	4	16	13	3	14	1	6	6	15	

Scorpion Rock, Santa Cruz Island, May 22, 2003. Low tide -0.1 ft at 1046 hrs. Conditions were good with light swell and fog. Two black Oystercatchers and one California sea lion were observed in the area. Numerous Western Brown Pelicans were on the main Scorpion Rock. On site from 1130-1330 hrs.

I went out on Island Packers Co. and kayaked to the site from Scorpion Anchorage, working alone.

There were numerous large *Pisaster ochraceus* impacting the lower mussel zone at the main site. *Mytilus californianus* in the upper reaches were very dense, with all sizes present. Plot M1 had a partial open area in the mussels that was occupied by dense *Tetracrita rubescens*. Plot M5 had a more recent opening with most of the plot cleared of mussels and heavy diatom growth on the bare rocks. *Tetracrita* in the target plots were all large and widely spaced. Large *Lottia gigantea* were present in several of the *Tetracrita* zone plots. *Hesperophycus californicus* were mostly lush in the target plots, though plot He1 had damage to most of the plants with their fronds torn off above the holdfasts. There appeared to be some new recruitment there. Plot He4 was mostly bare, but this plot is on a boulder that moved several meters from its original location and rotated last winter. Motile invertebrates were not counted because of the lack of time.

Photoplot summary - mean percent cover by zone at Scorpion Rock, Santa Cruz Island, Spring 2003 (5 plots/zone)

Zone	B	are Rock	Barnacle	Tetracrita	Endo Cladia	Hespero- phycus	Silvetia	Mussels	Turfweed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle		42.2	26.0	0.2	31.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Endocladia		31.2	6.4	0.8	57.4	0.0	0.0	0.8	0.0	0.8	2.4	0.2	0.0
Mussels	17.	8	10.0	6.0	0.0	0.0	0.0	52.8	0.0	2.6	10.2	0.6	0.0
Tetracrita		48.4	5.8	8.6	6.4	0.0	0.0	23.8	0.0	3.4	2.2	1.4	0.0
Hespero phycus		36.2	8.2	0.0	22.0	26.4	6.2	0.0	0.0	0.2	0.6	0.2	0.0

Seastar (*Pisaster ochraceus*) counts at Scorpion Rock, Santa Cruz Island, Spring 2003

	Area A –entire rock
Small (<75mm)	2
Medium (75-150mm)	73
Large (>150mm)	13
Other species	2

Fall 2003 Rocky Intertidal Monitoring Trip Reports

Santa Barbara Island October 23-28, 2003

(Database event #2003-F)

PURPOSE: To monitor rocky intertidal sites at Santa Barbara Island

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
Paula Rich, bio-tech, Channel Islands National Park
Ken Niessen, VIP
Lindsay Martin, SCA-VIP

PROCEDURE and general observations: We had a late departure on the Sea Ranger II, arriving approximately 1300 hrs, not expecting to be able to work the first day but found relatively calm conditions and a lower than expected tide. Standard procedures were used for monitoring both sites. We were still getting aquatinted with the new Olympus 5050 digital camera so shot photos with both digital and film using the usual Nikonos V and Ikelite strobes. All photoplots were scored in the field. Motile invertebrates were counted in all the photoplots using the protocol from the handbook. Seastars and abalone were searched for within the defined areas of the reef. Seastars were measured with calipers at Landing Cove. The maximum number of shorebirds and pinnipeds seen at any one time was recorded. Plot repairs were conducted as needed.

23 October 2003, Landing Cove. Low tide +0.4 ft at 1438 hrs, excellent weather with no wind and light swell. There were over 40 California sea lion youngsters in the cove, one black turnstone and 2 western gulls. There was one dead gull chick above the west area. We were on site from 1400-1600 hrs. Because of the tide level we only scored and counted the *Silvetia* zone plots.

Small but healthy plants of *Silvetia* were present in the area. *Mazzaella affinis*, *Gelidium* sp., some *Ulva* sp. and a short turfey Ceramiales were common in the plots.

24 October 2003, Landing Cove. Low tide -0.2 ft at 1320. Nice weather but the swells had become moderate to high by afternoon. Over 120 California Sea Lions were present in the cove and were much higher up the bluffs than the day before. There were more shorebirds with two Black Oystercatchers, two Black Turnstones, and one Wandering Tattler. We were on site from 1230 to 1530 hrs.

We scored and counted three of the mussel plots and all the barnacle plots today. The swell was too high to work the turfweed or the last two mussel plots. Small *Ocenebra circumtexta* were quite common. Small *Acanthina* sp. were also present. Littorine snails were present but never abundant. *Ulva* was partly covering barnacle plots 316 and 317. *Endarachne binghamii* was present but not abundant or large. A HoboTemp TidbiT temperature logger was installed in the housing at the foot of the crane. There has not been a logger there for the last year.

26 October 2003, Landing Cove. Low tide -0.8 ft at 1553 hrs. Santa Ana conditions prevailed on the mainland, but it was calm at the island. On the mainland it was windy

and fires were burning. Ashes were falling on the island and smoke was heavy in the air. There was a moderate swell. We were onsite from 1330 to 1700 hrs.

We finished scoring and counting the mussel zone plots and the turfweed plots. We did not find the bolts for mussel plot 326 and placed the quadrat as best we could with the inter-plot measurements and recollection. The immediate area was fairly uniform with a very dense layer of 2-3 cm long *Mytilus californianus*. *Phyllospadix* sp. was still prominent in turfweed plots 322 and 323. Turfweed plot 324 looked about the same as usual with coralline algae, *Egorgia menziesii* and some other red algae present. Plots 321 and 322 were dense turf. Mussel cover was high in all the plots. Ken counted sea stars on the reef, finding 309 *Pisaster ochraceus*; all but two were in the small or medium size category. A total of 69 *P. ochraceus* were found in the 18 x2 m transect. Paula measured 50 *P. ochraceus* with (radius) sizes ranging from 38-128 mm. No abalone were found.

We installed two bolts in the upper corners of turfweed plot 320 to aid in locating it in the future. Some number corners were no longer legible and new epoxy corners were added. Notches were cut into the upper left corner bolts of the mussel plots (except 326) with the number of notches corresponding with the plot order.

27 October 2003, Landing Cove. Low tide –0.8 ft at 1646 hrs. There was still a significant swell. Only about 20 young sea lions were in the cove this day. One Black Oystercatcher was in the area. We were thankful for the extra days so that we did not have to take many chances with the swell.

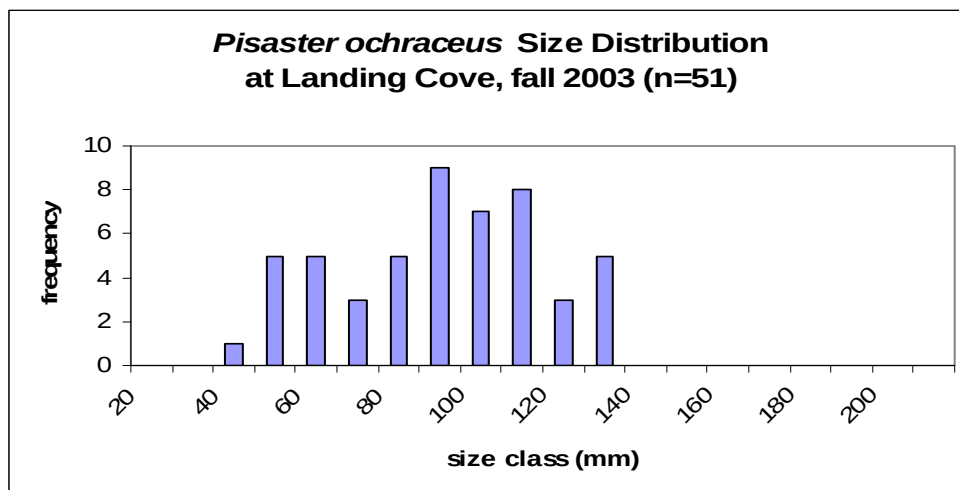
We photographed the plots in relation to the surrounding area. Plot frames were placed over them for recognition of relation among plots and perspective on the surrounds

Photoplot summary – mean % cover by zone at Landing Cove, Santa Barbara Island, fall 2003 (5 plots/zone)

Zone B	are Rock	Barn- acle	Tetra- clita	Endo- cladia	Hesper- ophycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar Phyllo- spadix
Barnacle	33.0	10.0	8.2	2.0	0.0	0.0	6.2	6.2	0.2	33.4	0.8	0.0 0.
Silvetia	22.2	5.4	0.0	0.0	0.0	1.6	1.8	22.8	0.0	45.0	1.2	0.0 0.
Mussels	1.0	0.0	1.6	0.2	0.0	0.0	87.6	0.0	2.4	6.2 1.	0	0.0 0.
Red Algal Turf	0.4 0.	0	0.0	0.0	0.0	0.0	0.2	50.8	0.0	24.0	0.4	0.0 24.2

***Pisaster ochraceus* size classes at Landing Cove, fall 2003**

Radius (mm)	<75 mm	75-150 mm	>150 mm
<i>Pisaster ochraceus</i>	158 1	49	2



25 October 2003, Sea Lion Rookery. Low tide -0.6 ft at 1605 hrs. It was a foggy morning but the afternoon was warm and calm and the swell was light. We were on site from 1330 to 1800 hrs. We got to the site as soon as the rocks were exposed. Sea lion scat and *Ulva* were prominent on the upper rocks. Over 100 California Sea Lions were present in the general area though we often see more than this in this area. Three Black Oystercatchers and one Black Turnstone were present through the afternoon.

All 20 photoplots were scored and counted. Relatively few motile invertebrates were found in barnacle and *Endocladia* zone plots. *Ocenebra circumtexta*, *Fissurella volcano* and *Strongylocentrotus purpuratus* were the most common motile invertebrates in the mussel plots. *Pachygrapsus crassipes* and *Pagurus* sp. were common in the *Endocladia* zone. *Mytilus* cover was high in all the mussel plots. *Ulva/Enteromorpha* was the dominant cover in the barnacle and *Endocladia* zones. *Silvetia* was well represented in the *Silvetia* plots except plot 330 which is a little lower on the reef and was primarily *Mytilus californianus* and *Tetracita rubescens*. A search was made for seastars and only six *Pisaster ochraceus* were found. No abalone were found.

Repairs were made where photoplot corners were missing. Two bolts were installed in plot 354 in the lower corners since only the upper right bolt was found. The upper left bolt of each mussel plot was notched corresponding with the plot order since the numbers can rarely be found.

Photoplot summary – mean % cover by zone at Sea Lion Rookery, Santa Barbara Island (5 plots/zone)

Zone B	are Rock	Barnacle	Tetra- clita	Endo- cladia	Hesper- ophycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle 29.	2	8.4	2.0	1.6	0.0	0.0	0.4	0.2	0.0	58.0	0.2	0
Endocladia 14.	2	1.0	6.0	11.0	0.0	0.0	1.8	1.0	0.2	64.8	0.0	0.0
Silvetia 12.	0	0.0	2.8	2.0	0.0	39.8	13.6	5.0	0.4	23.6	0.8	0.0
Mussels 1.	8	0.0	2.4	0.0	0.0	0.0	80.2	0.8	2.6	11.2	1.0	0.0

***Pisaster ochraceus* size classes at Sea Lion Rookery, fall 2003**

Radius (mm)	<75 mm	75-150 mm	>150 mm
<i>Pisaster ochraceus</i>	0	4	2

Motile invertebrate counts measurements at Cat Rock, Anacapa Island, spring 2003

<i>Endocladia</i>		<i>Silvetia</i>										<i>Barnacle</i>					<i>Mytilus</i>				
	plot #	335	336	337	338	339	330	331	332	333	334	345	346	347	348	349	350	351	352	353	354
<i>Lepidochitona</i> spp.		0	0	0	0	0	7	0	2	1	10		0	0	0	00		0	5	1	0
<i>Nuttalina</i> spp.		0	0	3	0	0	1	1	2	3	1	0	0	0	0	04		0	1	2	2
<i>Fissurella volcano</i>		0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	15	2	6	39	9
<i>Pachygrapsus</i>		0	0	0	0	0	19	3	1	5	01		0	2	0	2	2	0	0	4	4
<i>Pagurus</i> spp.		0	0	14	0	0	5	0	46 54		14	0	0	0	0	0	0	0	00		0
large limpets(>15mm)		0	1	1	1	0	8	2	5	4	23		0	0	2	0	0	0	0	0	0
<i>Nucella emarginata</i>		0	0	0	0	0	0	0	0	00			0	0	0	00		0	0	0	0
<i>S. purpuratus</i>																	3 6		6	28	23
<i>Acanthina</i> spp.		0	0	1	8	0	4	1	4	3	00		0	0	0	0	0	0	0	1	2
<i>Tegula funebris</i>		0	0	0	0	0	0	0	0	00			0	0	0	0	0	0	0	0	0
<i>Ceratostoma nuttali</i>																	10		1	2	3
<i>Ocenebra circumtexta</i>		1	1	1	0	0	2	2	2	1	2	0	0	0	00		11	0	66		5
<i>Lottia gigantean</i>		0	0	2			1	2	01		0	1	0	0	0	0	1	4	0	0	3
<i>Littorina</i> spp.		0	10	26	7	13	1	2	3	0	0	23	190	99	8	980		0	0	0	0
Limpet < 5 mm		2	0	0	0	0	0	0	0	00			0	0	0	0	0	0	2	11	5
Limpet 5-15 mm		1	0	7	1	4	32	32	10	8	11	2	0	0	1	0	48	102	75	23	80

Motile invertebrate counts measurements at Landing Cove, Santa Barbara Island, fall 2003

Zone	Red algal turf					Silvetia					Barnacle					Mytilus				
plot #	320	321	322	323	324	310	311	312	313	314	315	316	317	318	319	325	326	327	328	329
<i>Lepidochitona</i> spp.	0	0 0 0 0				1	5 0 1			0	0	1	1 0 1			1	0 0 1 1			
<i>Nuttalina</i> spp.	0	0 0 0 0				0	4 3 2			1	0	0	3	19	10	3	0 3		15	7
<i>Fissurella volcano</i>	3	3 3 1 0				0	0 1 0			0	0	0	0	0	0	0	0 2 6 2			
<i>Pachygrapsis</i>	0	0 0 0 0				0	1 1 1			1	1	1	1 2		0	2	0 0 0 2			
<i>Pagurus</i> spp.	0	0 0 0 0				0	0	11	34	0	0	0	0 0		0	0	0 0 0 1			
Large limpets(>15mm)	0	0 0 0 0				0	0 2 0			1	0	1	0 0		0	0	0 0 0 0			
<i>S. purpuratus</i>	0	0 0 0 0				0	0 0 0			0	0	0	0 0 0			0	6 9 9 6			
<i>Amphissa</i>	0	0 0 0 0				0	0 0 0			0	0	0	0 0		0	0	3 1 0 7			
<i>Nucella emarginata</i>	0	0 0 0 0				0	0 0 0			0	0	0	0 0		0	0	0 0 0 0			
<i>Acanthina</i> spp.	0	0 0 0 0				5	2 9		20	8	0	0	0 0		0	1	0 1 5 9			
<i>Tegula funebris</i>	0	0 0 0 0				0	0 0 1			0	0	0	0 0		0	0	0 0 0 0			
<i>Cerastoma nuttali</i>	0	0 0 0 0				0	0 0 0			0	0	0	0 0		0	0	0 0 0 0			
<i>Ocenebra circumtexta</i>	0	0 0 0 0				4	2 1 0			3	0	5	4	11	1	12	0 5		23	14
<i>Lottia gigantea</i>	0	0 0 0 0				0	0 0 0			1	0	0	1 0		0	14	0 0 0 0			
<i>Littorina</i> spp.	1	0 0 0 0				9	5 5 4			7	70	9	11	40	50	1	0 0 1 1			
Limpet < 5 mm	0	1 0 0 0				0	9 6 5			7	0	26	19	91	17	3	12	23	9	10
Limpet 5-15 mm	3	6 1 0 0				56	121	105	90	181	32	32	41	222	85	161	32	61	110	111

Santa Rosa Island November 19-26, 2003
(Database event #2003-G)

PURPOSE: To monitor rocky intertidal sites at Santa Rosa Island

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
Paula Rich, bio-tech, Channel Islands National Park
Ken Niessen, Volunteer
Anna Toline, Director of Mediterranean Coast Learning Center

PROCEDURE and general observations: The Sea Ranger II took us to Santa Rosa Island, arriving there approximately 1100 hrs. Standard procedures were used for monitoring the rocky intertidal sites. We were still getting aquatinted with the new Olympus 5050 digital camera so shot photos with both digital and film using the usual Nikonos V and Ikelite strobes. We experimented with the digital settings and feel that the most important thing is to shade the sun from the plots to reduce the contrast in the photo. All photoplots were scored in the field. Giant owl limpets were measured in 1m-radius plots at all sites except East Point where there are no owl limpet plots. Surfgrass transects were read at Northwest-Talcott and East Point. Black abalone were searched for in defined areas and measured when encountered. The maximum number of shorebirds and pinnipeds seen at any one time was recorded. Plot repairs were conducted as needed. We conducted beachwalk surveys at eight beaches according to standard protocol established for the beachwalk monitoring on Santa Cruz Island. This was done primarily for counting beached organisms as part of the monitoring associated with the bald eagle reintroduction.

19 October 2003, beachwalk Skunk Point. Low tide +1.5 ft at 1232 hrs, excellent weather with no wind and light swell. We found seven pinniped carcasses, probably all California sea lion, and seven seabirds including four Northern Fulmars, a Western Grebe, a Western Gull, and a Surf Scoter. Live birds were numerous with over 30 Western Sandpipers, nine Black Oystercatchers, at least ten Western Gulls, over 100 Black-bellied Plovers, over 200 Sanderlings, and nine Snowy Plovers. Pelicans, harbor seals, and Surf Scoters were present offshore. Debris quantities were relatively low with plastic bottles, buckets and barrels, balloons, and straws dominating. Only small amounts of weathered tar were present.

20 November 2003, beachwalk surveys of Tecalote, Arlington and Soledad beaches. Tide +0.6ft at 1315hrs. The weather was calm and overcast. We were able to walk from Tecalote to Soledad on the beach. Tecalote/Arlington beaches had five Northern Fulmars, one Sooty Shearwater, one Rhinoceros Auklet, one horn shark and one California Sea Lion carcass. There were 30-40 unidentified ducks that flew off when we approached the lagoon in Tecalote canyon. There was a large amount of kelp and surfgrass wrack on the beach. Low amounts of debris and tar (weathered) were found. The debris included lobster traps and floats and plastic articles. A note was found in a bottle.

Soledad Beach had 14 dead Northern Fulmar, one Double-Crested Cormorant, five Western Gulls, and two California sea lions and on the beach. There was nothing noteworthy about the Northern Fulmars. It seems a large flock was moving down the coast and these may have been young birds unable to handle storms or find enough food. A large number of fulmars were found on the beaches near Monterey recently. The only live birds on the beach were six Killdeer and two Black Oystercatchers. The wrack and debris was about the same as on Arlington. We did find a glass float, a survival suit in pretty good shape, and a note in a bottle with some change requesting some rum.

We helped with the release of two fox back into the wild this evening.

21 November 2003, Northwest-Talcott. Low tide -0.2 ft at 1359 hrs. We had fair conditions with moderate wind and swell, it was clear but cold. Water temperature was 14.5°C. We were on site from about 1100 to 1600hrs. The only shorebirds were one Wandering Tattler and two Western Gulls.

Silvetia compressa was lush and long and hanging over the rocks in the abalone plots, and even dominated a few of the Endocladia plots. *Chthamalus* spp/*Balanus glandula* were abundant overall but only two of the barnacle plots had over 50% cover of barnacles. *Tegula funebris* seemed to be less abundant than at past times here, but were abundant overall. Large specimens of *Ocenebra circumtexta* and *Acanthina* sp. were common in the plots. During the abalone search we found numerous stichead fish and one large northern clingfish. Only one small octopus was found. *Ophioplocus esmarkii* were common.

I replaced one of the temperature logger brackets and replaced the unit with #601551. The old unit was all black and I suspect it had a small leak. I had trouble downloading with the shuttle, but it worked later when attached directly to the reader, and seemed to have functioned OK with a maximum temperature reading of 35°C and minimum of 7.3°C.

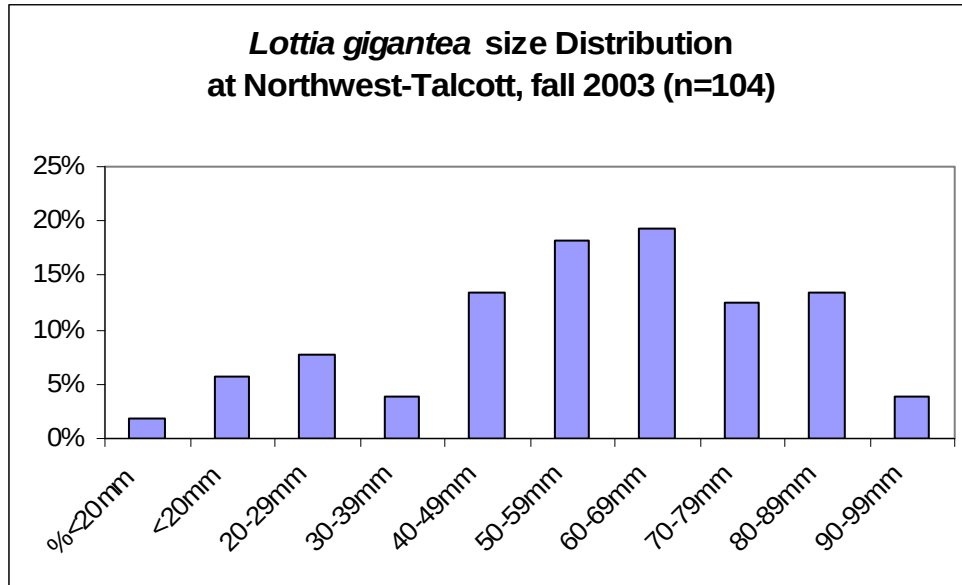
Only one abalone was found (154mm). As in the past, sea stars were rare and we only found three *Pisaster ochraceus* and two *P. brevispinous*. *Lottia gigantea* plots seemed to have more small animals, though the mean size (67mm) is actually the highest in several years. The overall size range was from 10-103mm.

Photoplot summary – mean % cover by zone at Northwest-Talcott, Santa Rosa Island (5 plots/zone)

Zone B	are Rock	Barnacle Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia Mussels	Turf weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle 43.	4	35.2	0.0	2.8	0.0	12.2	0.0	0.4	0.8	0.4
Endocladia 41.	6	11.2	0.6	12.4	0.0	22.6	0.0	1.2	7.4	3.0
Silvetia 19.	8	0.0	0.0	2.4	0.0	74.8	0.0	0.0	2.6	0.4
Mussels 17.	8	0.2	0.8	0.0	0.0	0.0	57.6	0.4	12.4	3.0

***Lottia gigantea* at Northwest-Talcott, fall 2003**

<i>Plot C</i>	<i>ount</i>	<i>Density</i>	<i>MeanSize</i>	<i>StDev</i>	<i>MinSize</i>	<i>MaxSize</i>
701	21	6.686 8	0.62 2	6.85	17	103
702	20	6.367 7	7.75 1	6.43	35	101
703	29	9.233	59.31 18	.93	19	87
704	22	7.004	59.55 1	9.15	28	91
705	12	3.820	58.83 18	.33	20	77



***Pisaster ochraceus* size classes at Northwest-Talcott, fall 2003**

<i>Radius (mm)</i>	<i><75 mm</i>	<i>75-150 mm</i>	<i>>150 mm</i>
<i>Pisaster ochraceus</i>	1	2	
<i>Pisaster brevispinous</i>	2		

Surfgrass transects at Northwest-Talcott, fall 2003 (additional taxa with 0 values deleted from table)

<i>Location</i>	<i>East Point</i>	<i>Site Code</i>	<i>SRNWT</i>
Date	21-Nov-03		
Recorders	Dan Richards		
<i>Taxa</i>	<i>Transect 1</i>	<i>Transect 2</i>	<i>Transect 3</i>
<i>Egria menziesii</i>			3
<i>Sargassum muticum</i>			2
<i>Erect coralline</i>	2		5
<i>Non-coralline crust</i>		1	
<i>other green algae</i>	1	2	
<i>other red algae</i>			12
<i>Phyllospadix</i> sp. overstory	98	98	76
<i>Phyllospadix</i> sp. understory			1
total	100	100	101

22 November 2003, East Point. Low tide -0.9 ft at 1444 hrs. We had clear sky with light swell but a strong cold wind, though it was fairly pleasant at the site. When we arrived there were 16 Brown Pelicans, over 30 cormorants, over 100 western Gulls and one Black Oystercatcher. We were on site from 1140-1530 after surveying Water Canyon beach in the morning.

At Water Canyon we found three dead Northern Fulmars, three Western Gulls, one barn owl, a Pelagic Cormorant, a Double-Crested Cormorant, and a California sea lion. Two Killdeer were the only live shorebirds. There was very little debris including some plastic bottles and balloons. There were 6-8 ravens and several Western Gulls at the ranch dump with a strong smell of rotting flesh in the air. Some cable pieces were falling out of the dump as the cliff erodes.

Temperature logger #601549 was downloaded and replaced back in the housing at East Point. Lush algae covered most of the site reef. *Silvetia* and *Endocladia* were abundant. *Hesperophycus* was less so, noted as common overall, though still over 50% cover in 4 of 5 plots and in two *Endocladia* plots. *Chthamalus* spp./*Balanus glandula* and *Mytilus californianus* were also recorded as abundant overall though the barnacles were generally low cover in the plots. No black abalone were found. *Pisaster ochraceus* were abundant. Seastars were not measured, but were placed in size categories.

Photoplot summary – mean % cover by zone at East Point, Santa Rosa Island (5 plots/zone)

Zone B	are Rock	Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle 50.	6	24.8	0.0	6.2	13.2	2.4	0.0	0.0	0.0	1.0	1.6	0.2
Endocladia	13.2	3.4	0.0	38.0	37.4	6.0	0.0	0.0	0.0	1.8	0.2	0.0
Silvetia 14.	6	0.0	0.0	1.6	0.0	65.4	0.0	0.4	0.0	16.2	1.8	0.0
Mussels 3.	8 0.	6	0.2	0.0	0.0	0.0	80.0	1.0	0.0	11.0	3.4	0.0
Hespero- phycus	26.2 1.	2	0.0	8.6	55.2	4.0	0.0	0.0	0.0	4.2	0.6	0.0

***Pisaster ochraceus* size classes at East Point, fall 2003**

<i>Radius (mm)</i>	<75 mm	75-150 mm	>150 mm
<i>Pisaster ochraceus</i>	5	76	24
<i>Patiria miniata</i>	2		

Surfgrass transects at East Point, fall 2003 (additional taxa with 0 values deleted from table)

Location	East Point	Site Code	SREP
Date:22-Nov-03		Recorders: Dan Richards	
Surf Grass Taxa	Transect 1	Transect 2	Transect 3
<i>Egria menziesii</i>	4		
other red algae		1	4
<i>Phyllospadix</i> sp. overstory	96	99	95
<i>Phyllospadix</i> sp. understory	4		
<i>Phragmatopoma californica</i>			1
total	104 1	00	100

23 November 2003, Fossil Reef, Sandy Point. Low tide -1.3 ft at 1530 hrs. Partly cloudy with moderate wind and swell but very workable. Water temperature was 13°C. There had been a recent small landslide of the bluff along the side of the reef. When we arrived there were about 60 cormorants and 20 Western Gulls. There were also 14 Oystercatchers including one American/Black hybrid. We were on site from 1200-1700 hrs after surveying the beach at Sandy Point.

On Sandy Point beach we found five dead Northern Fulmars and three California Sea Lions. Live animals included five Western Gulls, two Black Oystercatchers, three elephant seals (there were about 60 more on the crescent beach), four Killdeer, one Western Sandpiper, one American Pipit, and six Black Turnstones. Debris was moderate with trawl floats, boat bumpers, balloons, and plastic bottles being noted.

The *Lottia gigantea* density was the same as in 2002 and a little less than in 2001. The mean size was larger this year, at 55mm. There were six *L. gigantea* under 15 mm that were not measured or entered into the database; however I am confident in their identification. I measured seastars in the two 15x6m transects and measured a total of 50 *P. ochraceus*, (size range 70-170mm). Counts by size class were done for the west reef flat and east reef flat areas. Sixteen black abalone (91-155mm) were found in the reef area, none in plots.

Most of the target species were patchy in their distribution with none of the plots very well represented by species. One Endocladia plot was the only one to have over 50% of any target species or any other taxa for that matter. *Phragmatopoma californica* and *Tegula funebris* were both abundant. *Sargassum Muticum* was quite common in some of the pools around the site. Purple sea urchins which had been so common in the past were noted as being uncommon.

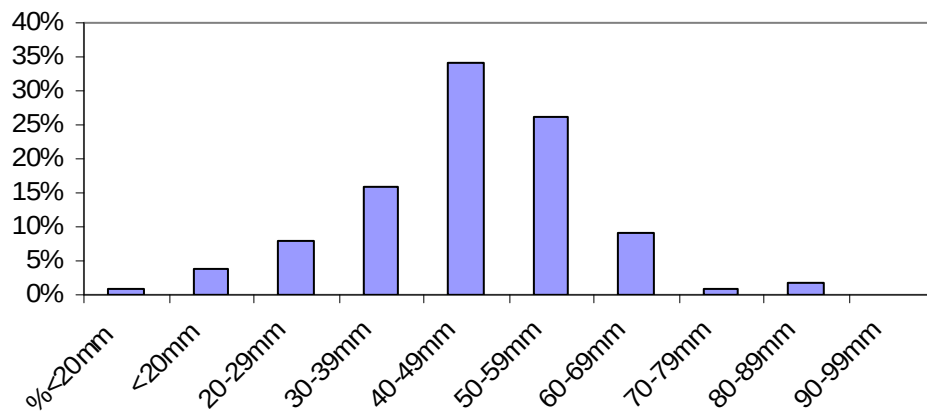
**Photoplot summary – mean % cover by zone at Fossil Reef, Santa Rosa Island
(5 plots/zone)**

Zone B	are Rock	Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle	67.2	28.6	0.0	0.0	0.0 0.	0	0.0	0.0	0.0	1.0	0.8	2.4
Endocladia	50.8	17.0	0.0	16.4	0.0 8.	8	0.0	0.0	0.0	5.4	1.6	0.0
Silvetia 57.	6	5.2	0.0	8.6	0.0	20.0	0.0	0.0	0.0	7.0	1.6	0.0
Mussels 11.	0	1.6	6.8	0.0	0.0	0.0	28.4	5.6	2.0	27.8	16.8	0.0

***Lottia gigantea* at Fossil Reef, fall 2003**

Plot	Count	Density	MeanSize	StDev	MinSize	MaxSize	
1	9	2.865	53.89	1	1.59	28	68
2 18		5.731	57.22	8.93	45	77	
3 4	1	13.053	69.51	13.04	28	92	
4 8	1	25.788	52.98	11.66	16	75	
5 9	2	29.290	50.74	11.30	21	73	

***Lottia gigantea* Size Distribution
at Fossil Reef, fall 2003 (n=241)**



Seastars at Fossil Reef, fall 2003

Pisaster ochraceus

Radius (mm)

30x6m
transect

Middle
Reef

East flat
area

West flat
area

Small (<75)

3

2

5

13

Medium (75-150)

67

47

68

107

Large (>150)

2

1

1

22

Pisaster giganteus

0

0

13

23

Pycnopodia helianthoides

0

0

3

0

Patiria miniata

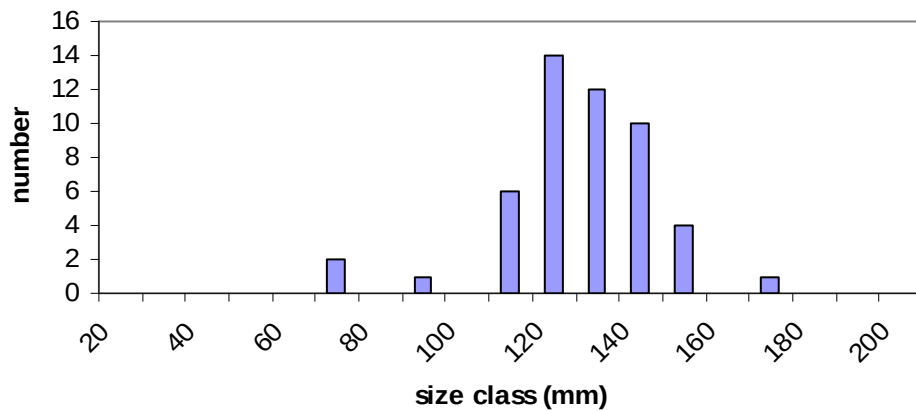
0

0

1

2

***Pisaster ochraceus* Size Distribution
at Fossil Reef, fall 2003 (n=50)**



24 November 2003, Johnson's Lee, China Camp. Low tide-1.5 ft at 1619 hrs. the day was mostly cloudy with light wind and swell. There were two Black Oystercatchers at the reef. The sand level in the big tide pool and the back reef was very high. We were on site from 1240 to 1630 after surveying the China Camp/Cluster Point beaches in the morning.

The beach survey at China and Cluster Point beaches were a little difficult because of all the Elephant seals now using the beaches around China Camp. We were able to survey the entire beach by binoculars where we could not walk. We found five dead Northern Fulmars, two Western Gulls, three California Sea Lions, three elephant seals (including a large male, mummified but intact), and one unidentified pinniped. Live birds included 30 American Pipit, eight Song Sparrows, eight Horned Larks, and there were 100 or so Elephant seals. There was a large amount of kelp wrack at Cluster Point. Debris was uncommon with balloons, plastic pieces, and a few lobster floats being the most obvious items.

Small *Lottia gigantea* were present in each of the owl limpet plots and the numbers increased slightly over the last two years. Mussels were common in limpet plots 4 and 5 and barnacles were common in the first three. Three large black abalone (151,158,168 mm) were found near the east end of the site, no abalone were in the plots. The seastar transect had 35 small *Pisaster ochraceus* and 10 medium. Many were under 50mm radius. One *Pisaster giganteus* also fell within the transect. Ken measured 50 *Pisaster ochraceus* mostly towards the east end of the site and found a size range of 59-151mm. The mean size was 92mm. He also found a small *Pycnopodia helianthoides* and two *Pisaster giganteus*. There was no are count of seastars.

Mytilus californianus were common on the upper reef where the *P. ochraceus* could not reach them, and only plot 512 (on the upper reef) had many mussels. The lower reef is still dominated *Phragmatopoma californica* following the *Pisaster* wave. The *Endocladia* and barnacles had good cover in their zones but bare rock was still the highest cover category.

The temperature logger and housing was gone, apparently the brackets rusted out and broke. I replaced the brackets and housing and installed a new TidbiT (#601550)

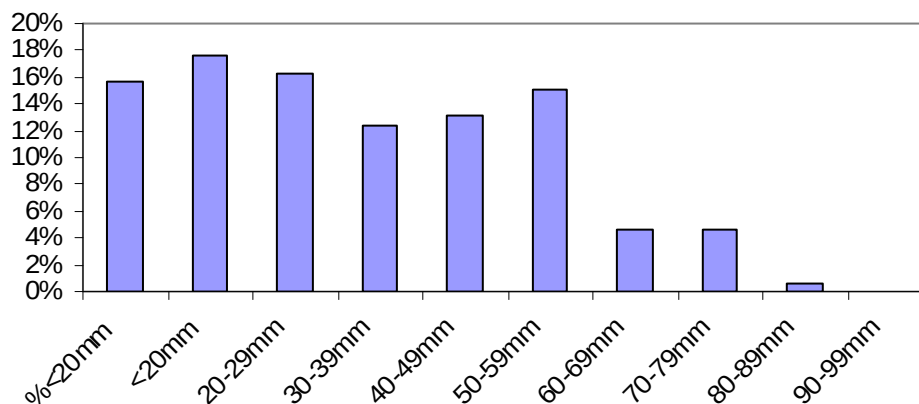
Photoplot summary – mean % cover by zone at Johnson's Lee, Santa Rosa Island (5 plots/zone)

Zone	Bare Rock	Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Turf weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle 55.	0	34.0	0.2	6.2	0.0	0.0	0.2	0.2	0.0	1.2	3.0	0.0
Endocladia 34.	8	9.6	0.2	31.4	0.0	0.0	14.4	0.0	0.8	5.6	3.2	0.0
Mussels 9.	0	0.2	0.4	0.0	0.0	0.0	13.2	7.6	0.6	8.4	60.6	0.0

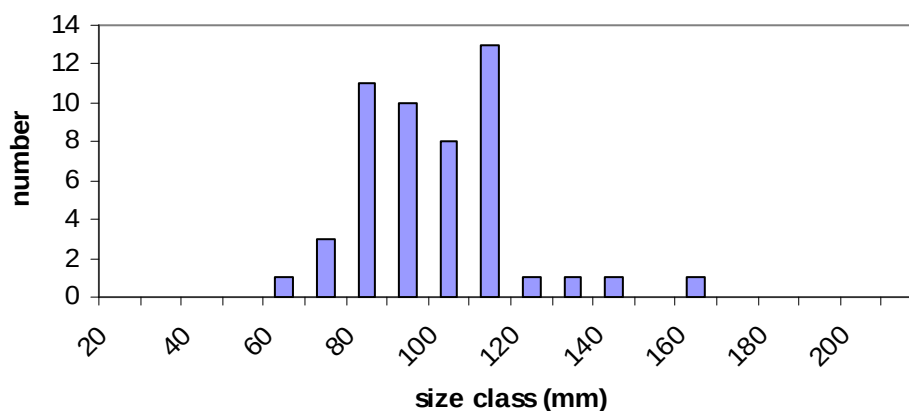
***Lottia gigantea* at Johnson's Lee, fall 2003**

<i>Plot C</i>	<i>ount</i>	<i>Density</i>	<i>MeanSize</i>	<i>StDev</i>	<i>MinSize</i>	<i>MaxSize</i>
595	6	1.910 4	5.33 1	7.88	14	64
596	27	8.596 54	.30 23	.43	18	88
597	17	5.412 37	.47	15.65	15	61
598	49	15.600	40.41	21.56	14	92
599	54	17.192	39.19	17.42	11	69

***Lottia gigantea* Size Distribution
at Johnson's Lee, fall 2003 (n=153)**



***Pisaster ochraceus* size distribution
at Johnson's Lee, fall 2003 (n=50)**



25 November 2003 Ford Point. Low tide -1.4 ft at 1711 hrs. Fair conditions with clear sky, moderate wind and moderate to low swell. The low tides have countered any swell this week making each site very workable. There were six Black Oystercatchers and seven Black Turnstones at the site. We were on site from 1300-1700 hrs.

Phragmatopoma californica was very abundant and seems to have had high recruitment this year. *Chthamalus* spp./*Balanus glandula* was abundant with high recruitment *Endocladia muricata* was doing well with fair cover in all the *Endocladia* zone plots. Mussels had high cover with most plots having multiple layers except for plot 534 which may have been affected by seastars or by waves. *Pisaster ochraceus* were abundant and were beginning to encroach on plot 531. Fifty *P. ochraceus* were measured, but there was no overall count. No abalone were present in the plots; however, eight were found at the site ranging from 102-160mm.

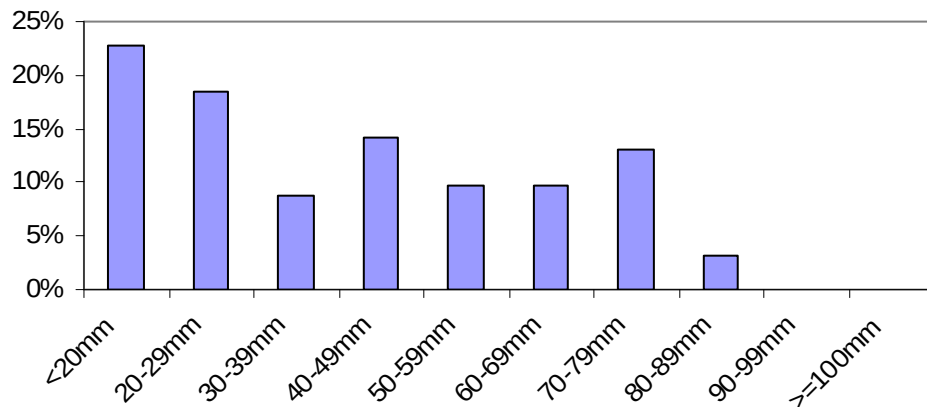
**Photoplot summary – mean % cover by zone at Ford Point, Santa Rosa Island
(5 plots/zone)**

Zone B	are Rock	Barnacle Tetra	clita	Endo- cladia	Hespero- phycus	Silvetia Mussels	Turf weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle 61.	8	27.4	0.0	6.8	0.0	0.0	0.0	0.0	0.2	3.8	0.0
Endocladia	23.4	8.4	0.0	43.4	0.0	0.0	1.2	0.2	17.4	1.4	0.0
Mussels 19.	8	2.0	0.0	0.2	0.0	0.0	7.4	1.2	15.8	3.6	0.0

***Lottia gigantea* at Ford Point, fall 2003**

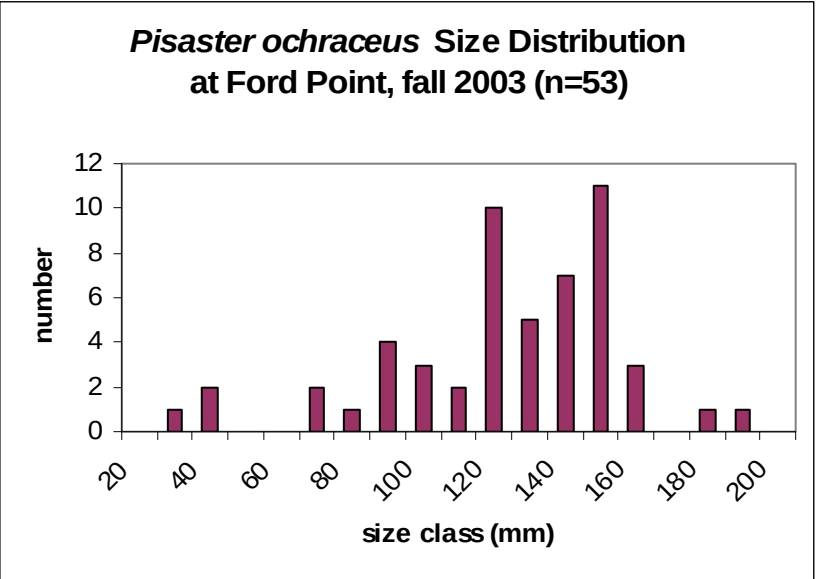
Plot C	ount	Density	MeanSize	StDev	MinSize	MaxSize
600	21	6.686	49.10 1	8.88	15	82
601	6	1.910	39.17 2	6.90	17	76
602	15	4.776	54.27 22	.47	15	88
603	8	2.547	56.25 2	4.54	12	87
604	42	13.372	30.62	17.14	12	71

***Lottia gigantea* Size Distribution
at Ford Point, fall 2003 (n=92)**



***Pisaster ochraceus* size classes at Ford Point, fall 2003 (only 50 measured)**

<i>Radius (mm)</i>	<i><75 mm</i>	<i>75-150 mm</i>	<i>>150 mm</i>
<i>Pisaster ochraceus</i>	5	43	5



Santa Cruz Island December 5-10, 2003, December 19, 2003

(Database event #2003-H, #2003-I)

PURPOSE: To monitor rocky intertidal sites at Santa Cruz Island

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
Sarah Chaney, Channel Islands National Park (12/5-8)

PROCEDURE and general observations: We arrived at Prisoners Harbor, Santa Cruz about 1100 hrs on the Pacific Ranger. Standard procedures were used for monitoring at monitoring sites at Prisoners Harbor, Willows Anchorage, Fraser Cove and Trailer. Photos were taken with an Olympus 5050 digital camera. Photoplots were scored in the field only at Prisoners and Trailer. Seastars and abalone were searched for within the defined areas of the reef. Seastars were measured with calipers at all sites. The maximum number of shorebirds and pinnipeds seen at any one time was recorded. We returned to the mainland on the Ocean Ranger. This work was performed (in part) at the University of California Natural Reserve System, Santa Cruz Island Reserve on property owned and managed by The Nature Conservancy.

5 December 2003, Prisoners Harbor. Low tide +0.2 ft at 1413 hrs, excellent weather with no wind and no swell. The only bird on the reef was a Black Phoebe catching flies. On the beach I found a scavenged Northern Fulmar. Pig tracks were present on the beach. We were on site from 1330-1630. I scored the photoplots in the field and made a cursory count of seastars.

The mussel plots had been stripped of all large mussels. The only *Mytilus* present on the flat part of the reef were recent recruits less than 2 cm in length. There were large mussels on the vertical edge of the reef on the west side by the cobble beach. The mussel population on the eastern side of the reef, where the reef slopes at a high angle, appeared unchanged with a dense aggregation of mussels of several sizes. Observations of pigs foraging on the reef last year and scat on the reef at that time lead me to suspect pigs were responsible for the lack of mussels on the western reef. *Silvetia compressa* on that same reef were all short with blunt tips as if browsed, whereas the *Silvetia* on the eastern slope were undamaged, long and lush. A film of small filamentous red algae (Ceramiales) covered the mussel plots. *Balanus glandula* and thick mats of articulate coralline algae were common in the mussel plots also. *Lottia gigantea* had small and very obvious territories in the red algal fields. *Scytosiphon dotyi* was abundant on the upper edges of the littoral zone and *Endarachne binghamiae* was common on the reef. *Balanus glandula* and *Chthamalus* sp. both appear to have had good recruitment recently with high cover in the upper zone. *Littorina* spp. were abundant. Some *Tegula funebris* were present. *Hesperophycus californicus* was sparse in the plots though seemed to be doing well at the south end of the reef. *Silvetia compressa* was common below the *Hesperophycus* plots. *Endocladia muricata* was nice and dark and was common on the eastern reef. *Sargassum muticum* was common on the just above the *Egregia* band on the east reef. I counted 49 *Pisaster ochraceus*, most in the medium size class (75-150mm arm length).

6 December 2003, Prisoners Harbor. Low tide –0.1 ft at 1445 hrs. Nice weather but the swells had become moderate to high by afternoon. After inspecting the vehicle wreck (eagle crew and UC vehicle near the isthmus fenceline) site for sensitive plant issues, we were on site from 1330 to 1445 hrs.

Shot all of the photos of the plots and pans from the reference points. Something to add to the protocol for camera set up- after batteries have been out of the camera for five minutes, it is necessary to reset the time/date and the photo quality setting, which wasn't done at this site. Settings were HQ (high quality), aperture setting at F4.0 with Autoflash. Seastars were measured with a total of 67 *P. ochraceus* and one *P. giganteus* were found. No abalone were found.

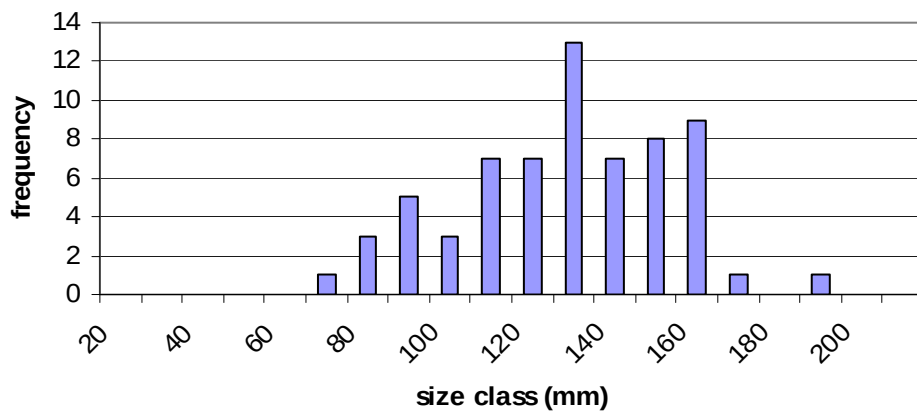
Photoplot summary – mean % cover by zone at Prisoners Harbor, Santa Cruz Island, fall 2003 (5 plots/zone)

Zone	Bare Rock	Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal
Barnacle 2	5.4	17.6	0.2	10.0	0.0	0	0.6	0.6	0.0	45.0	0.6
Endocladia 16.4		19.2	0.2	47.8	9.4	0.0	1.2	0.0	0.0	5.4	0.4
Silvetia 20.	0	2.6	0.4	0.0	0.0	48	2	1.0	0.0	26.6	1.2
Mussels	10.0	18.6	1.8	0.0	0.0	0	5.8	0.2	0.0	55.4	8.2
Hespero-phycus	51.4	13.4	0.0	24.4	6.6	1.0	0.2	0.0	0.0	1.4	1.6

***Pisaster* spp. size classes at Prisoners Harbor, fall 2003**

Radius (mm)	<75 mm	75-150 mm	>150 mm
<i>Pisaster giganteus</i>	0	1	0
<i>Pisaster ochraceus</i>	2	48	17

***Pisaster ochraceus* Size Distribution at Prisoner's Harbor, fall 2003 (n=65)**



7 December 2003, Willows Anchorage. Low tide -0.3 ft at 1516 hrs. There was a foggy misty rain throughout much of the day but it did not amount to much of a total rain. There were occasional large swells but no problems for the monitoring. Shorebirds at the site included one Western Gull, two Black Oystercatchers, one Black Phoebe, and one Common Raven. We were on site from 1330- 1615 hrs.

I measured 74 *Pisaster ochraceus* along the outer reef but did not do a total count. Carol Blanchette (UCSB) had been out recently doing counts of sea stars. The sizes of the *P. ochraceus* ranged from 17mm to 150 mm arm length. The mean was 87 mm with a std. dev of 28. Overall *P. ochraceus* were abundant with most in the mussel zone below the Endocladia plots. Despite the abundance of sea stars, *Mytilus californianus* was abundant and appeared to be enjoying a good recruitment year with a high abundance of juvenile mussels present.

Endocladia was about as dense as I have seen it at this site, though it was slightly bleached. Recruitment this year seemed to be high for *E. muricata* here. *Hesperophycus* and *Silvetia* were both common. *Hesperophycus* plants were especially lush on the slope above the plots where the blades were wide and healthy. *Chondracanthus canaliculatus* was mostly rare and primarily restricted to the inshore reef. Young *Halidrys dioica* plants were abundant in the lower zone. *Psuedolithoderma nigra* was also noted as abundant here. *Chthamalus/Balanus* spp. were just present overall while *Tetraclita rubescens* were abundant, especially between the Endocladia and mussel plots.

Shore crabs, *Pachygrapsus crassipes*, were common with a medium level of recruits, demonstrated by immature crabs in the mussel zone. Both the chiton *Nuttalina* sp. and the whelk *Nucella emarginata* were noted as abundant.

Photoplot summary – mean % cover by zone at Willows Anchorage, Santa Cruz Island, fall 2003 (5 plots/zone)

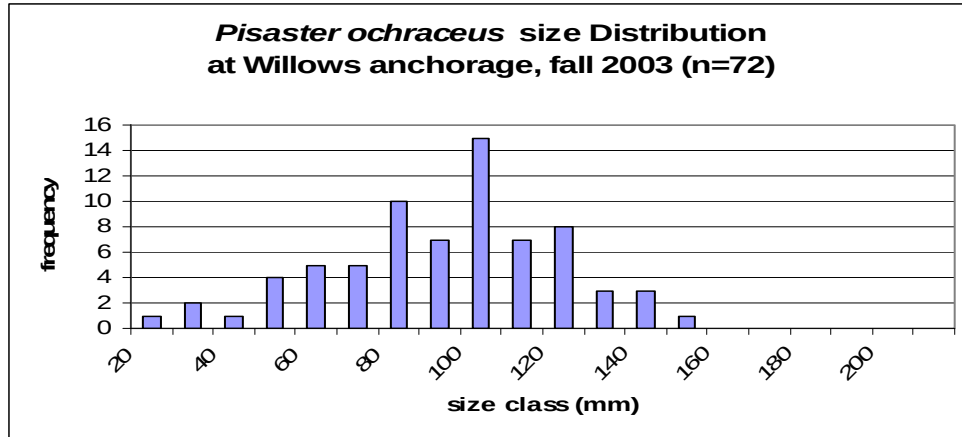
Zone	Bare Rock	Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Other
Endocladia	24.0	3.8	0.6	65.2	0.0	0.0	0.4	0.0	0.0	5.8	0.0	0.2
Silvetia	22.4	1.6	0.0	25.6	0.0	36.8	0.0	0.6	0.0	12.8	0.2	0.0
Mussels	4.8	1.4	2.8	0.0	0.0	0.0	81.8	0.0	5.8	2.4	0.6	0.4
Hespero-phycus	52.0	2.4	0.0	12.0	3.4	18.6	0.0	0.0	0.0	11.6	0.0	0.0

***Lottia gigantea* by plot at Willows Anchorage, fall 2003**

Plot	Count	Density	Area	Density	Count	MeanSize	StDev	MinSize	MaxSize
1	3	8	3.14	12.098	38	26.61	12.87	10	65
2	23	23	3.14	7.323	23	29.78	15.09	11	59
3	3	4	3.14	10.825	34	28.85	13.81	14	62
4	26	26	3.14	8.278	26	34.00	14.54	14	58
5	9	9	3.14	2.865	9	31.89	11.83	16	50

***Pisaster* spp. size classes at Willows Anchorage, fall 2003 (only part of reef surveyed and only 72 measured)**

Radius (mm)	<75 mm	75-150 mm	>150 mm
<i>Pisaster giganteus</i>	0	0	0
<i>Pisaster ochraceus</i>	23	51	0



8 December 2003, Fraser and Forney's Cove. Low tide -0.4 ft at 1549 hrs. Good weather and pleasant day, but there was a large swell that almost prevented completion of the surfgrass transects. There were 10 Black Oystercatchers at Fraser Cove. An additional five Black Oystercatchers were at Forney's Cove plot area and many Western Gulls, Brown Pelicans and cormorants on the rocks further out. I was on site from 1300-1630 hrs. Sarah returned to the mainland today.

I conducted a beachwalk at Christy Beach between 1100 and 1215. There were mounds of kelp wrack at the south end of the beach and pieces of kelp floats all along the beach. The only beached animals were one rotting pinniped (I would speculate an elephant seal from the size and amount of blubber) that was in two pieces. Several gulls and a raven were scavenging the remains. I also found a set of wings and a skeleton that I determined to both be from a Cassin's Auklet from the size and markings. Live birds included 25 Killdeer, about 10 American Pipits, and an Osprey flying back and forth over the beach. Only small amounts of plastic debris and tar were observed. No live *Arundo donax* was found.

Hesperophycus californicus was common but *Silvetia compressa* was more abundant even in the *Hesperophycus* plots. Both species looked healthy. *Endocladia muricata* was common but not nearly as lush as it can get at this site. Both mussels and *Pollicipes polymerus* were present in high density in the plots. High surf made scoring the surfgrass transects difficult but all three were completed. *Phyllospadix* spp. overstory ranged from 60-84%. The condition of the surfgrass was generally good with mostly low occurrence of epiphytes and abrasion or bleaching. The limpet plots were not photographed and no effort was made to search for abalone or seastars because of the swell.

Lottia gigantea were measured in 1m radius plots with only 5-18 found per plot. Individuals ranged in size from 16-80mm.

We camped at the Trailer lean-to this night.

Photoplot summary – mean % cover by zone at Fraser Cove, Santa Cruz Island, fall 2003 (5 plots/zone)

Zone	Bare Rock	Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other
Barnacle 54.	2	28.8	0.0	9.6	0.0	0.0	0.8	0.0	0.0	6.4	0.0	0.0	0.2
Endocladia 42.	4	10.8	0.2	38.2	2.0	0.0	2.6	0.0	0.0	3.8	0.0	0.0	0.0
Silvetia 1	2.4	1.4	0.0	4.0	5.6	69.8	0.0	0.0	0.0	6.0	0.2	0.0	0.6
Mussels 13.	4	0.2	0.2	0.4	0.0	0.0	74.8	0.0	1.2	2.6	6.8	0.0	0.4
Pollicipes 17.0		3.4	2.6	6.0	0.0	0.0	47.4	0.4	11.0	6.6	3.6	0.0	2.0
Tar 28.	8	14.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	57	0.0
Hespero-phycus	38.4	6.4	0.0	16.2	25.4	9.6	0.0	0.0	0.0	3.4	0.4	0.0	0.2

Surfgrass transects at Fraser Cove, fall 2003 (additional taxa removed when not represented, understory was counted as a layer, so total may be greater than 100)

<i>Location: Fraser Cove</i>		<i>Site Code: SCFC</i>		
Date: 12/8/03		Recorders: Dan Richards		
Surf Grass Taxa	Transect 1	Transect 2	Transect 3	
Rock	4	1	5	
Sand 1		0	0	
Egregia menziesii	1	2	2	
Erect coralline	18	0	6	
other red algae	9	10	7	
Phyllospadix sp. overstory	60	84	78	
Phyllospadix sp. understory	0	2	0	
Mytilus californianus	3	1	0	
Anthopleura spp.	4	0	0	
Phragmatopoma californica	0	1	2	
Chthamalus/Balanus 0		1	0	
total	100	102	100	

***Lottia gigantea* by plot at Fraser Cove, fall 2003**

Plot	Densi	ty	Area	Density	Count	MeanSize	StDev	MinSize	MaxSize
1	14		3.14	4.457	14	49.57	16.89	18	73
2	5		3.14	1.592	5	53.80	22.33	23	79
3	10		3.14	3.184	10	48.80	12.55	31	80
4	18		3.14	5.731	18	36.39	8.83	16	48
5	11		3.14	3.502	11	49.55	8.03	36	60

9 December 2003, Trailer. Low tide -0.4 ft at 1623 hrs. Good weather conditions with only moderate swell, which presented no problems for the monitoring. Only two Black Oystercatchers were present in the afternoon though in the morning I saw a group of ten flying around. I was onsite from 1300- 1700 hrs, and then drove back to the research station as rain was predicted.

Hesperophycus plots had more *Silvetia compressa* than *H. californicus*. *Silvetia* plots all had good cover of *S. compressa*. *Balanus glandula* was abundant in plots at Fraser Cove and mussel cover was high in all plots except M1 where no mussels were present and three *Pisaster ochraceus* were just outside the plot. *P. ochraceus* were abundant at the site. Because of time limitations I only measured fifty seastars and classified the others into small (<75mm) medium (75-150mm) and large (>150mm) on the first reef (mussel plot area) and Lottia L1-L3 rocks. The measured seastars ranged from 38-134 mm with a mean of 85 mm and std dev of 20. The reef had a total of 46 small, 95 medium, and no large *P. ochraceus*, and no other species found. No abalone were found.

A total of 111 *L. gigantea* were present in the plots ranging from 16-95mm. Plot 3 only had three limpets present with *Phragmatopoma californica* covering about half of the plot.

Photoplots Pe4 and M4 were each missing the upper right corner bolt. In plot He4, the rock broke away on the left side taking the lower left bolt and about a third of the plot area. No repairs were made. All the photoplots were scored in the field.

Photoplot summary – mean % cover by zone at Trailer, Santa Cruz Island, fall 2003 (5 plots/zone)

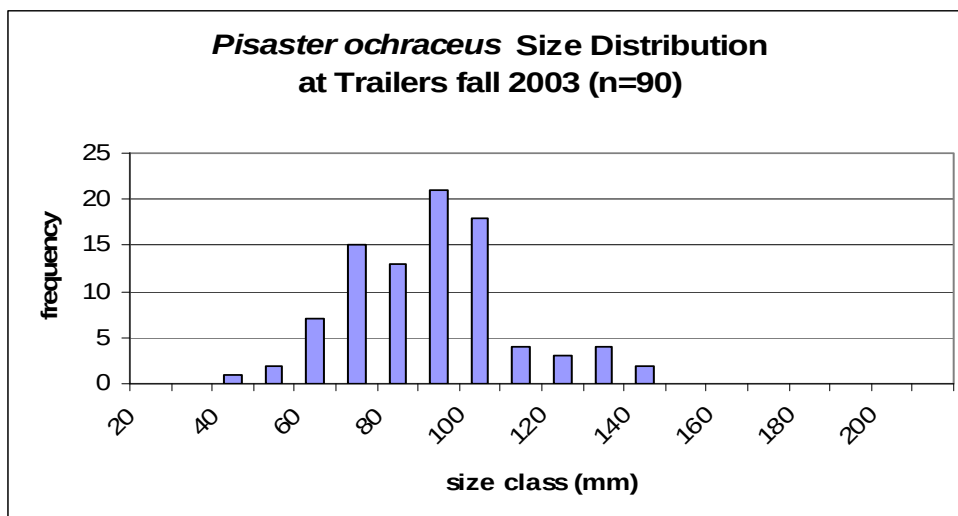
Zone	Bare Rock	Barnacle	Tetraclita	Endocladia	Hesperophycus	Silvetia	Mussels	Turfweed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle	36.6	55.2	0.0	3.8	0.0	0.0	0.0	2	0.0	0.0	4.0	0.0
Silvetia	8.8	1.8	0.0	0.0	0.0	85.8	0.0	0.0	0.0	3.4	0.0	0.0
Mussels	15.2	1.6	1.2	0.0	0.0	0.0	50.0	4	0.4	24.0	7.2	0.0
Hesperophycus	43.2	2.2	0.0	19.6	6.2	27.8	0.0	0.0	0.0	0.6	0.0	0.0

***Lottia gigantea* by plot at Trailer, fall 2003**

Plot	Density	Area	Density	Count	MeanSize	StDev	MinSize	MaxSize
1 2	6	3.14	8.278	26	71.96	20.98	19	95
2 3	0	3.14	9.551	30	55.57	20.86	18	90
3 3		3.14	.955	3	55.33	18.77	35	72
4 31		3.14	9.869	31	50.23	18.38	16	73
5 21		3.14	6.686	21	35.86	13.80	20	67

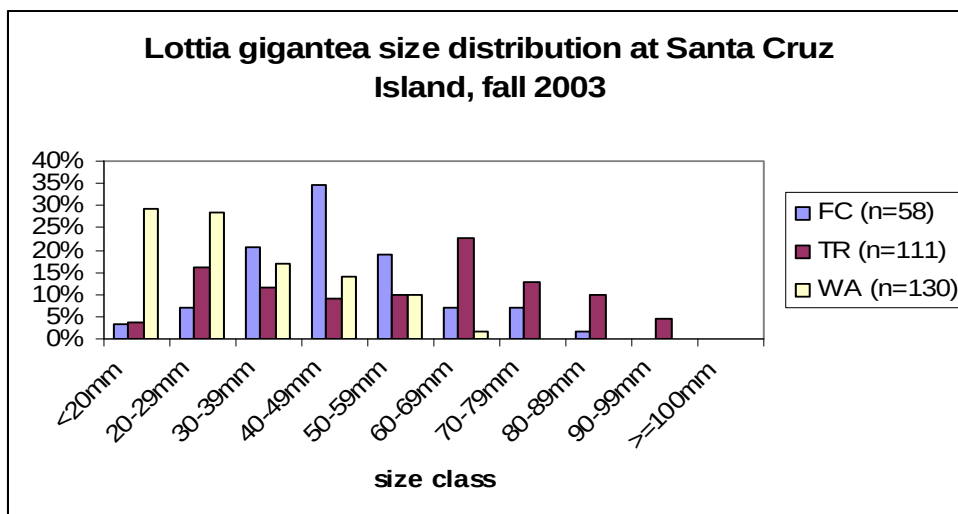
***Pisaster* spp. size classes at Trailer, fall 2003 (only part of reef surveyed)**

Radius (mm)	<75 mm	75-150 mm	>150 mm
<i>Pisaster giganteus</i>	0	0	0
<i>Pisaster ochraceus</i>	46	95	0



Surfgrass transects at Trailer, fall 2003 (additional taxa removed when not represented, understory counted as a layer so total may be greater than 100)

<i>Location: Trailer</i>	<i>Site Code: SCTR</i>		
Date: 9-Dec-04	recorder: Dan Richards		
Surf Grass Taxa	Transect 1	Transect 2	Transect 3
Rock	1	2	6
Egregia menziesii	1		1
Erect coralline	3	6	13
Encrusting coralline			2
other red algae	5	10	23
Phyllospadix sp. overstory	88	71	50
Phyllospadix sp. understory	0	1	1
Mytilus californianus	1	2	0
Phragmatopoma californica	1	8	5
Chthamalus/Balanus		1	
total	100	1	01



19 December 2003, Scorpion Rock. Low tide +0.1 ft at 1304 hrs. Weather conditions were good with partly cloudy sky and a cool breeze. Birds on the site area included one Western Gull, one Wandering Tattler, and one black Oystercatcher and one American oystercatcher. One Belted Kingfisher was seen west of the pier.

I spent the night at Scorpion and kayaked to the site. On 20 December, I did a beachwalk survey at Smugglers Cove beach.

Large *Balanus glandula* and *Tetraclita rubescens* were present over the reef. *Endocladia muricata* was abundant and widespread. *Mytilus californianus* were generally abundant but none were present in plot M3 and M4 which were now dominated by *Tetraclita*. *Pisaster ochraceus* were common to abundant and had cleared most mussels below the level of plot Te2. Plot Te3 was mostly covered by mussels. *Corallina* sp. and *Egorgia menziesii* generally dominate below the seastar band. Purple sea urchins, anemones, worms, and *Codium fragile* were present also. *Pisaster ochraceus* ranged from 51-200 mm with a mean of 128 mm and std dev of 31.

Because of the marginal tide and working alone, motile invertebrates were not counted, and plots were scored in the office.

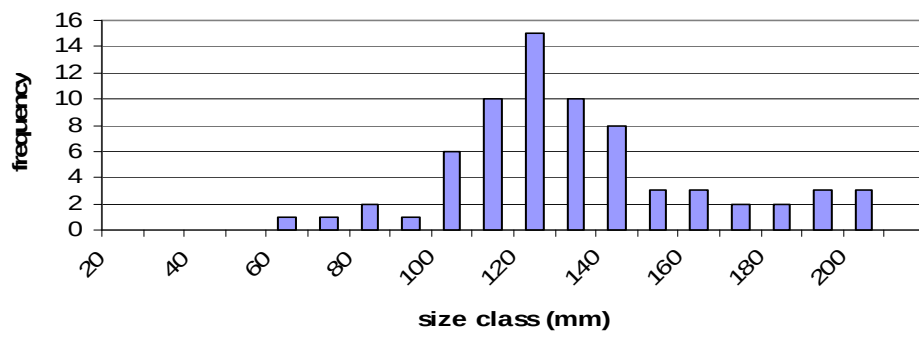
Photoplot summary – mean % cover by zone at Scorpion rock, Santa Cruz Island, fall 2003 (5 plots/zone)

Zone B	are Rock	Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Other
Barnacle 45.	2	26.0	0.2	26.6	0.0	0.0	0.0	0.0	0.0	0.8	0.4	0.8
Endocladia 35.	0	3.8	1.0	50.0	0.0	0.0	1.2	0.0	0.6	7.8	0.2	0.4
Mussels 31.	2	12.6	7.6	0.2	0.0	0.0	35.6	0.2	0.8	7.8	1.2	2.8
Tetraclita 61.	2	5.8	7.6	2.0	0.0	0.0	12.4	0.0	2.8	5.6	2.2	0.4
Hespero- phycus	46.2 1.	6	0.0	17.0	23.8	8.2	0.8	0.0	0.2	1.6	0.0	0.6

***Pisaster* spp. size classes at Scorpion Rock, fall 2003**

Radius (mm)	<75 mm	75-150 mm	>150 mm
<i>Pisaster giganteus</i>	0 3		0
<i>Pisaster ochraceus</i>	2 56		15

***Pisaster ochraceus* Size Distribution
at Scorpion Rock, fall 2003 (n=70)**



San Miguel Island January 5-10, 2004

(Database event #2003-J)

PURPOSE: To monitor rocky intertidal sites at San Miguel Island

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
Sarah Chaney, Ecologist, Channel Islands National Park
Dan Black, seasonal ranger, Channel Islands National Park
Anna Toline, Director of Mediterranean Coast Learning Center

PROCEDURE and general observations: we flew out to the island in strong Santa Ana wind conditions on the mainland leaving light south-east breeze on San Miguel Island. The pleasant calm conditions lasted the entire week. We hiked to different sites each day and photographed the plots and general site area with the digital Olympus camera, counted and measured seastars (radius) and abalone (shell length) in site-wide searches, checked the fixed plots for abalone, counted and measured owl limpets in fixed plots, and counted shorebirds and pinnipeds at each site.

5 January 2004, Harris Point. Low tide was -0.5ft at 1518 hrs. Weather conditions were excellent with clear sky, light wind and swell. There had been about two inches of rain several days before we arrived. There were four Black Oystercatchers and one harbor seal at the site during our stay. We were on site from 1400-1630hrs.

Mastocarpus papillatus and *Mazzaella affinis* were abundant through the lower zones including the abalone plots. A crustose alga, probably *Hildenbrandia*, was abundant. *Prionitis lanceolata* was common and about half of it was bleached. *Endocladia muricata* was common, and seemed to have had a good recruitment year with new plants on plot corners for instance.

Lottia gigantea were abundant in general and we found a fair number of small ones (<15mm) in the plots. Overall sizes were quite small with sizes ranging from 9-64mm, and a mean size of 35mm. Two *Haliotis cracherodii* were found in plot 3. Three abalone were found in the crevice transect. Overall we found 24 black abalone with all of us searching. Sizes ranged from 70-148mm. Seastars were uncommon at the site with none in the transect and only eight *Pisaster ochraceus* overall with sizes from 60-180mm.

I attempted to replace the temperature logger housing. All four bolts are still present but I could not make the brackets fit, so gave up until next spring.

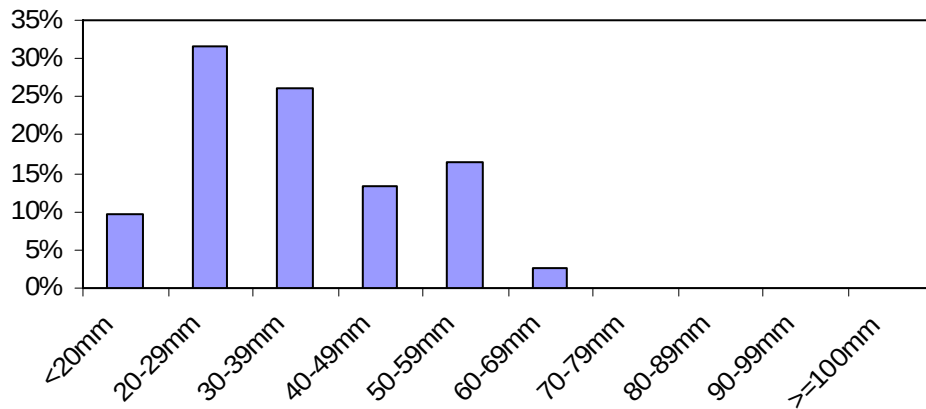
**Photoplot summary – mean % cover by zone at Harris Point, San Miguel Island
(5 plots/zone)**

Zone	Barnacle	Tetraclita	Endocladia	Hespero-phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Other
Barnacle	34.6	64.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0
Endocladia 42.	8	15.4	1.2	11.0	18.0	0.0	1.2	0.0	10.2	0.0
Mussels 43.	0	4.4	2.2	1.6	1.0	0.0	34.6	0.4	12.0	0.8
Tetraclita	33.0	7.6	16.8	4.0	0.0	0.0	13.4	0.4	24.2	0.6
Hespero-phycus	30.2	1.4	0.0	18.0	46.4	0.0	0.0	0.0	3.6	0.2

***Lottia gigantea* size distribution at Harris Point, fall 2003**

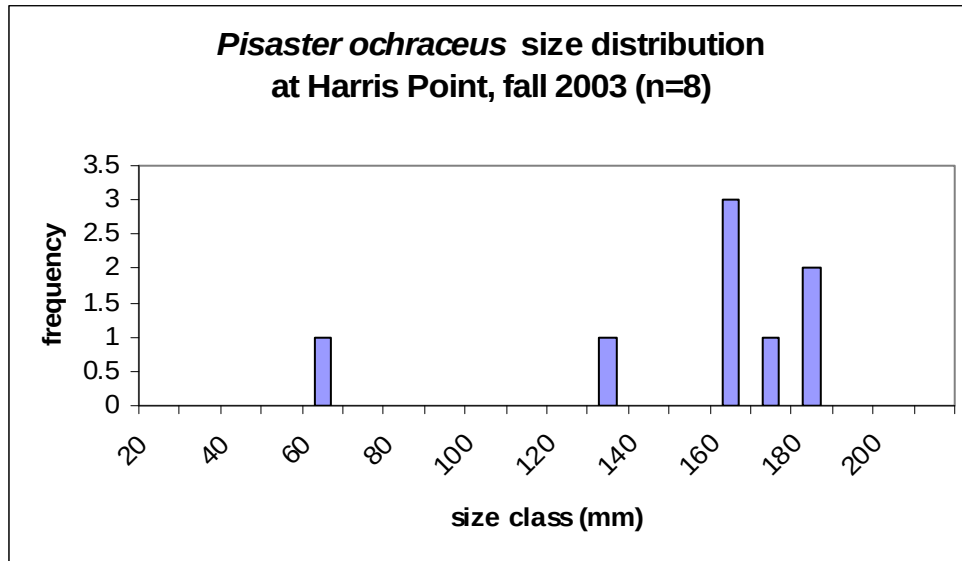
Plot	Count	Density	MeanSize	StDev	MinSize	MaxSize
1	7	.229	38.57	11.67	18	50
2	13	4.139	48.08	11.10	26	58
3	67	21.331	30.45	10.70	15	62
4	64	20.376	29.11	7.17	17	51
5	36	11.461	47.17	12.74	16	64

***Lottia gigantea* Size Distribution,
Harris Point, fall 2003 (n=187)**



Seastar size classes at Harris Point, fall 2003

<i>Radius (mm)</i>	<i><75 mm</i>	<i>75-150 mm</i>	<i>>150 mm</i>
<i>Pisaster ochraceus</i>	1	1	6
<i>Patiria miniata</i>	7	0	0



6 January 2004, Otter Harbor. Low tide -0.7ft at 1550 hrs. Good conditions with calm sea and light wind. Cloud cover increased throughout the day and some drizzle fell in the late afternoon and evening. Water Temperature was 12°C. At the site (including the outer rocks) there were 26 harbor seals, nine Black oystercatchers, two Whimbrels, two Black Turnstones, seven Willets, and 14 Black-bellied Plovers. No elephant seals were on or immediately adjacent to the site and only six seals were on the sandy beach to the east. We were on site from 1300-1700 hrs.

Bangia covered the upper rocks along with some small *Porphyra perforata*. *Endocladia muricata* was abundant overall. In general this seems to be a good year for *E. muricata*. Both *Chthamalus* spp. and *Balanus glandula* were abundant and doing well. Rockweeds were common overall and healthy but not very abundant. *Mytilus californianus* was abundant.

Lottia gigantea seemed to be abundant with large numbers but small sizes in the plots. Sizes ranged from 14-79mm however owl limpets over 50mm were not common and the mean size was under 31mm. Seastars were measured over the entire site as were abalone. Because of the good conditions, we spent over 1 hour searching with multiple people during most of it, concentrating on black abalone. A total of 87 black abalone were measured ranging from 50-156mm. Most of the abalone were in aggregations of two or more within one meter of one another. No abalone were present in the fixed plots.

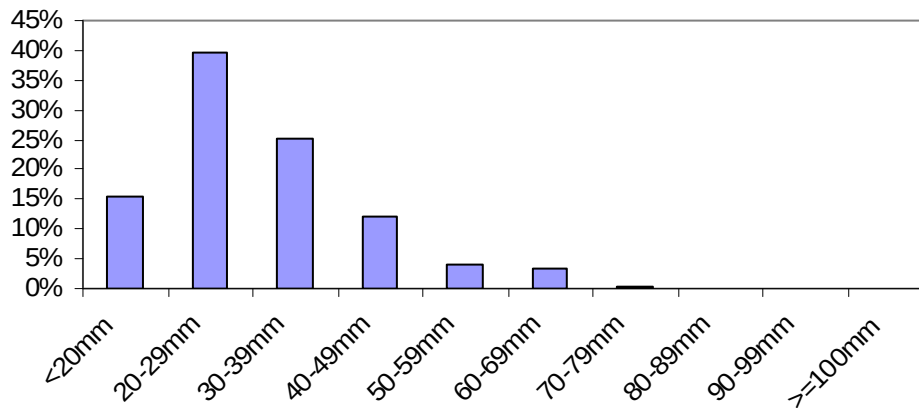
**Photoplot summary – mean % cover by zone at Otter Harbor, San Miguel Island
(5 plots/zone)**

Zone B	are Rock	Barnacle	Tetraclita	Endocladia	Silvetia	Mussels	Turfweed	Leaf Barnacle	Misc Algae	Misc Animal	Tar		
Barnacle	15.0	31.2	0.0	0.0	0.0	0.	0	2.0	0.0	48.	6	0.4	2.8
Endocladia	15.4	5.0	0.2	58.8	6.4	1.	0	0.0	0.4	12.	8	0.0	0.0
Silvetia 29.	0	18.8	0.2	19.8	17.4		0.0	0.0	0.0		14.2	0.2	0.4
Mussels 9	.4	1.4	0.4	0.6	0.0		51.4	0.0	5.0		30.8	1.0	0.0

***Lottia gigantea* at Otter Harbor, fall 2003**

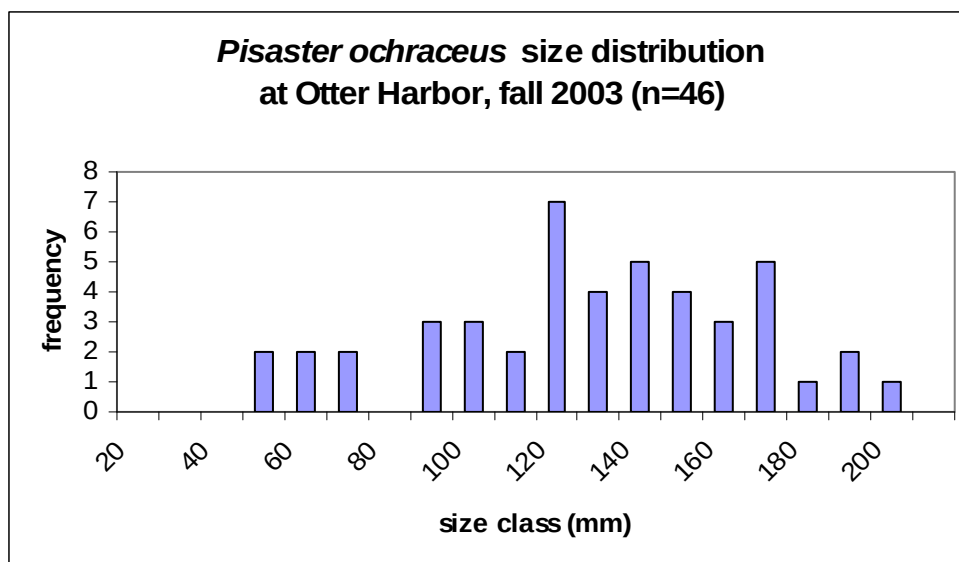
<i>Plot</i>	<i>Count</i>	<i>Density</i>	<i>MeanSize</i>	<i>StDev</i>	<i>MinSize</i>	<i>MaxSize</i>	
1	5	0	15.918	32.30	12.39	14	65
2	65	20.694	31.89	13.56	15	74	
3	78	24.833	30.37	12.59	14	69	
4	35	11.143	30.57	12.37	14	56	
5	72	22.923	28.24	8.87	15	53	

***Lottia gigantea* Size Distribution,
Otter Harbor, fall 2003 (n=300)**



Seastar size classes at Otter Harbor, fall 2003

Radius (mm)	<75 mm	75-150 mm	>150 mm
<i>Pisaster ochraceus</i>	6	29	12
<i>Patiria miniata</i>	2	0	0
<i>Pisaster giganteus</i>	1	3	0



7 January 2004, Crook Point. Low tide -0.7ft at 1621hrs. Excellent conditions- partly cloudy and very calm. When we arrived there were 17 cormorants and one western gull, we were later visited by two Black Oystercatchers, One American oystercatcher and one Black Turnstone. Elephant seals were on the adjacent beaches and a large bull elephant seal came into the surge channel for a little while we were on site. California sea lions and surf scoters were seen offshore. We were on site from 1200-1645hrs.

The site looked typical for this area. *Anthopleura* spp. were abundant. *Phragmatopoma californica* was abundant. *Pisaster ochraceus* and *Strongylocentrotus purpuratus* were abundant. Both *Chthamalus* spp. and *Balanus glandula* were abundant and generally dense in the plots. *Mytilus californianus* was abundant. *Prionitis lanceolata* was heavily bleached.

There was one black abalone in plot 391. Overall 53 black abalone were measured on the outer reef with sizes ranging from 60-170mm. Conditions were excellent and 2 people searched for about an hour. *Pisaster ochraceus* were abundant and ranged from 38-160mm.

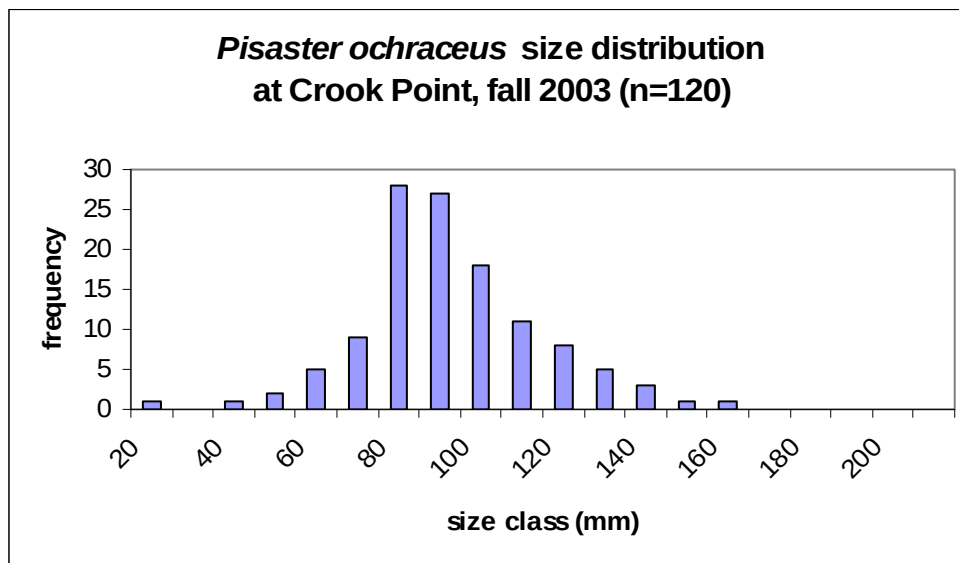
I replaced the brackets and housing for the temperature logger but was unable to launch the TidbiT logger without the shuttle so did not install it. I gave the unit to Ian Williams and he installed it 19 February 2004 at 1630hrs.

**Photoplot summary – mean % cover by zone at Crook Point, San Miguel Island
(5 plots/zone)**

Zone B	are Rock	Barnacle Tetra- clita	Endo- cladia	Hespero- phyucus	Silvetia Mussels	Turfweed	Leaf Barnacle	Misc Algae	Misc Animal	Other
Barnacle 56.	6	38.6	0.0	3.6	0.0	0.4	0.0	0.6	0.2	0.0
Endocladia	21.8	11.4	0.2	17.0	0.0	3.2	0.2	0.0	5.8	0.0
Silvetia 38.	6	8.4	0.0	11.2	0.8	2.8	25.0	0.6	1.0	11.0
Mussels 7.	4	2.2	0.0	0.0	0.0	0.0	60.8	0.0	1.0	8.2

Seastar size classes at Crook Point, fall 2003

Radius (mm)	<75 mm	75-150 mm	>150 mm
<i>Pisaster ochraceus</i>	31	90	1



8 January 2004, Cuyler Harbor. Low tide -0.7ft at 1653hrs. Excellent weather again with clear sky and calm wind and surf. Nine Black Oystercatchers were on the reef. Seven Heermann's Gulls and several Western Gulls were on the beach. Dozens of elephant seals were on the beach with at least six pups between gull rocks and the site. After conducting a beach survey on Simonton Beach in the morning, we were on site at Cuyler Harbor from 1430-1630 hrs.

The carcass count on Simonton Beach was 19 Northern Fulmars, one Double-crested Cormorant, one bird (possibly a Rhinoceros Auklet), and 9 California Sea lions. There was only one Snowy Plover on the beach. Three male, two female and one new pup elephant seals were in residence. A few strands of *Nereocystis leutkeana* were washed up on the beach. Much of the debris consisted of floats and other large items. Light bulbs, shoes, and bottles were other common items.

Silvetia was healthy and lush within the limited zone. No *Hesperophycus* was seen. Large mussels still dominate the mussel plots and they seemed abundant. Acorn barnacles were abundant; however, barnacle plot 420 was dominated by *Endocladia muricata*, which was doing well here as it has been everywhere else. *Phyllospadix* on the point was green and healthy. *Phragmatopoma californica* was neither abundant nor uncommon.

No abalone were found. Danny and Anna searched for seastars finding over 100 on the site reef plus another 38, mostly large *Pisaster ochraceus*, on the outer reef. *Pisaster ochraceus* radius lengths ranged from 22-205mm.

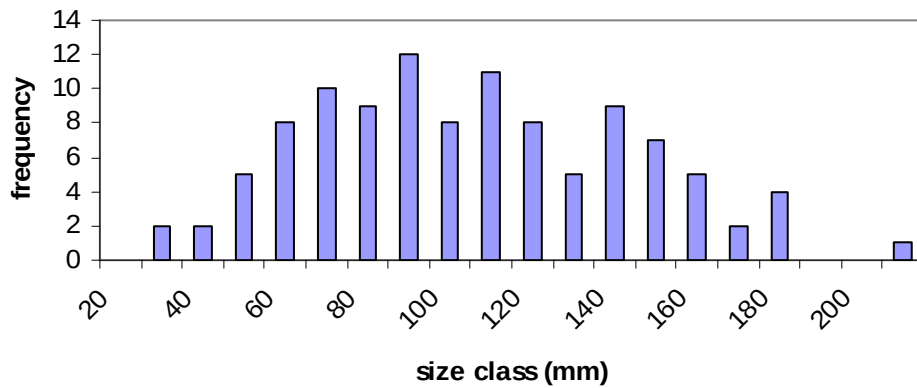
**Photoplot summary – mean % cover by zone at Cuyler Harbor, San Miguel Island
(5 plots/zone)**

<i>Zone B</i>	<i>are</i>	<i>Barnacle</i>		<i>Endocladia</i>	<i>Hespero-</i>	<i>Silvetia</i>		<i>Turfweed</i>	<i>Leaf</i>	<i>Misc</i>	<i>Misc</i>	<i>Other</i>
	<i>Rock</i>		<i>Tetracrita</i>		<i>phycus</i>	<i>Mussels</i>			<i>Barnacle</i>	<i>Algae</i>	<i>Animal</i>	
Barnacle 38.	0	37.8	0.2	23.6	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0
Endocladia	30.8	9.2	0.0	35.2	0.0	10.2	6.6	0.0	0.2	7.2	0.6	0.0
Silvetia	15.2	0.2	0.4	0.8	0.0	69.8	0.4	0.0	0.0	10.2	3.0	0.0
Mussels 22.	2	2.6	4.6	0.4	0.0	0.0	59.4	0.0	1.6	4.0	5.0	0.2

Seastar size classes at Cuyler Harbor, fall 2003

<i>Radius (mm)</i>	<i><75 mm</i>	<i>75-150 mm</i>	<i>>150 mm</i>
<i>Pisaster ochraceus</i>	29	70	12
<i>Patiria miniata</i>	2	0	0

***Pisaster ochraceus* size distribution
at Cuyler Harbor, fall 2003 (n=108)**



Anacapa Island, Santa Cruz Island January 19-22, 2004
(Database event #2003-K)

PURPOSE: To monitor rocky intertidal sites at Anacapa, Santa Cruz Island

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
David Kushner, Channel Islands National Park (1/20-22)
Laura Francis, Channel Islands National Marine Sanctuary (1/20)
Julie Bursek, Channel Islands National Marine Sanctuary (1/20)
Sarah MacWilliams, Channel Islands National Marine Sanctuary (1/19)
Russell Galipeau, Channel Islands National Park (1/19)
Margi Galipeau, Volunteer (1/19)
Thomas Kelly, Virgin Islands NP (1/19)
Kate Faulkner, Channel Islands National Park (1/19)
Jessie Altstatt, Volunteer (1/20-21)
Simon Allen, Volunteer (1/21)
Charlie Lara, *R/V Shearwater* Mate
Terrance Shinn *R/V Shearwater* Captain

PROCEDURE and general observations: Day trips were run each day to the sites using the Marine Sanctuary Vessel *R/V Shearwater*. Photos were taken with an Olympus 5050 digital camera. Photoplots were not scored in the field at any of the sites. Motile invertebrate counts were made for each plot at all sites. Seastars and abalone were searched for within the defined areas of the reef. Owl limpets were counted and measured in fixed plots. Seastars were measured with calipers at all sites. The maximum number of shorebirds and pinnipeds seen at any one time was recorded.

19 January 2004, South Frenchy's Cove. Low tide -1.3 ft at 1430 hrs, excellent weather with no wind and light swell. Water temperature was 14°C. There were no birds on site; however there was a Black Oystercatcher at North Frenchy's Cove and a harbor seal offshore. Brown pelicans were on nests in and around the "amphitheater" area on the north side. A large herd of common dolphin was encountered just north of Anacapa in the morning. We were on site from 1130 to 1600 hrs.

Kate and Russell shot the photos while I counted invertebrates. No abalone were found. There were four *Pisaster ochraceus* on the monitoring reef and more to the west on the "BLM" reef. Both *Hesperophycus* and *Silvetia* appeared to have had a moderate recruitment year with many young plants around. *Endocladia muricata*, *Chondracanthus canaliculatus*, and *Mastocarpus papillatus* were all noted as being abundant. *Acanthina* spp. were present in the upper plots in low numbers. *Nucella emarginata* and *Acanthina* spp. were common in the mussel and *Silvetia* zones. *Littorina* spp. were abundant in the barnacle zone, but mostly uncommon in the other plots. A total of 38 *Lottia gigantea* were measured in the three plots ranging from 22-63mm with a mean size of 43mm. Four *Pisaster ochraceus* ranging from 50-97 mm were present.

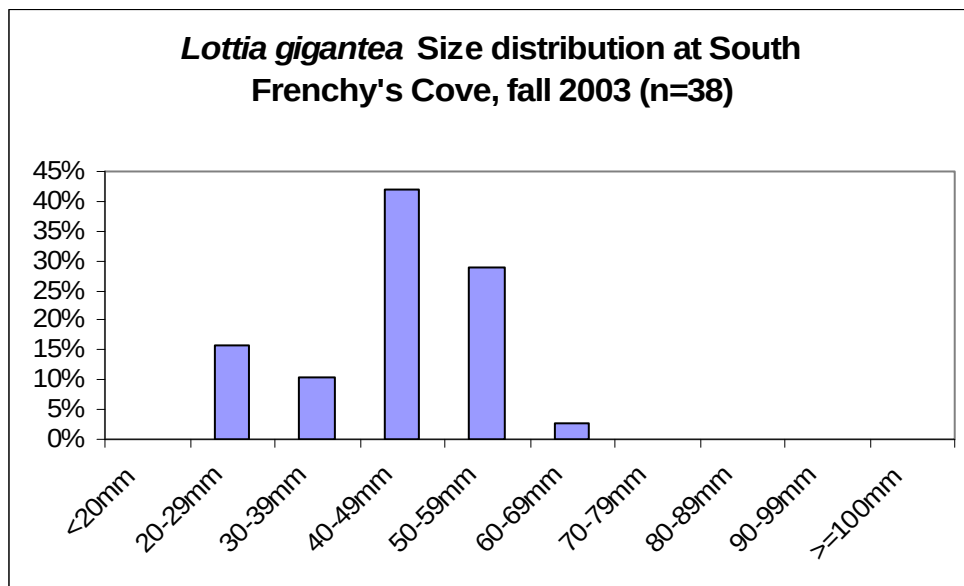
I replaced the missing brackets and temperature logger housing and installed a new TidbiT logger.

**Photoplot summary – mean % cover by zone at South Frenchy's Cove, fall 2003
(5 plots/zone)**

Zone B	are Rock	Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other
Barnacle	39.2	25.8	0.0	31.0	3.4	0.0	0.0	0	0.0	0.2	0	0.4	0.0
Endocladia	15.2	0.2	0.0	58.0	2.8	19.8	0.0	2	0.0	0.6	0	0.0	3.2
Silvetia	9.0	5.0	0.0	10.6	0.6	74.4	0.0	0.0	0.0	0.4	0.0	0.0	0.0
Mussels	6.2	0.4	0.0	1.4	0.0	0.0	87.6	1.8	0.2	2.4	0.0	0.0	0.0

***Lottia gigantea* at South Frenchy's Cove, fall 2003**

Plot	Count	Density	MeanSize	StDev	MinSize	MaxSize
1	82	.547	42.75	10.50	22	58
2	23	7.323	40.30	10.15	22	57
3	7	2.229	52.14	6.54	41	63



20 January 2004, Cat Rock, Low tide -1.6 ft at 1513 hrs. Good conditions though it was cool with a light breeze and overcast all day. We had two western Gulls and two Black Oystercatchers on the site. Five Black Oystercatchers were on the reef to the east. There was an unusual occurrence of a mature bull elephant seal on a small beach between Frenchy's and the blowhole area.

All of us were involved with counting motile invertebrates. Julie searched for abalone and seastars, I shot the photos, and Laura and Jessie measured limpets. One black abalone (130mm) and seven *Pisaster ochraceus* were found. Partly because of the calm conditions, it was apparent that purple sea urchins and *Eisenia arborea* were common in the surge channels.

Both *Hesperophycus* and *Silvetia* were abundant and invading many of the higher zone plots. *Silvetia* seemed to have a moderate amount of new recruitment at the site. *Mytilus californianus* seemed to have had a good recruitment as many young mussels were present. No *Nucella emarginata* were recorded in the motile invertebrate counts. *Acanthina* spp. and *Ocenebra circumtexta* were fairly common especially in the lower plots. Small *Lottia gigantea* were common in the mussel plots as well. *Nuttalina* spp. were abundant in many of the plots. Numerous nemertean worms were noted in some of the mussel plots also.

A total of 128 *Lottia gigantea* were in the three plots ranging from 16-66mm with a mean size of 32mm.

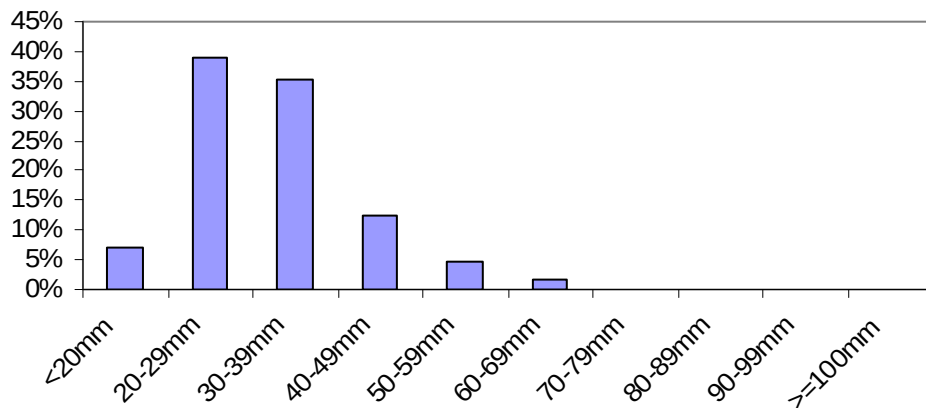
**Photoplot summary – mean % cover by zone at Cat Rock Anacapa, fall 2003
(9 plots/zone)**

Zone	Bare Rock	Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Other
Barnacle	35.7	13.1	0.0	14.9	31.9	3.6	0.0	0.0	0.0	9	0.0	0.0
Endocladia	11.3	10.9	3.2	44.0	1.3	3.9	2.8	9.1	0	12.4	0.6	0.4
Silvetia	15.0	5.2	0.2	14.6	8.8	49.4	0.8	0.1	0.5	9	0.0	0.0
Mussels	15.9	8.9	6.0	5.0	0.0	0.0	43.9	0.3	0	17.6	1.1	0.7

***Lottia gigantea* at Cat Rock, fall 2003**

Plot	Count	Density	MeanSize	StDev	MinSize	MaxSize
1	79	25.151	27.99	7.45	16	48
2	41	13.053	37.34	9.71	16	61
3	8	2.547	37.63	16.35	21	66

***Lottia gigantea* Size Distribution
at Cat Rock, fall 2003 (n=128)**



Seastars size classes at Cat Rock, fall 2003

<i>Radius (mm)</i>	<i><75 mm</i>	<i>75-150 mm</i>	<i>>150 mm</i>
<i>Pisaster giganteus</i>	0	1	0
<i>Pisaster ochraceus</i>	2	4	1

21 January 2004, Middle Anacapa, low tide -1.6ft at 1555hrs. Weather conditions were fair with clear sky, moderate wind and swell. Water temperature was 13.8°C. No birds or pinnipeds were at the main site but hundreds of Western gulls were on the Harbor Seal Arch area. We were on site from 1300-1630 hrs completing both East and West sites.

Mussel recruitment was apparent at both areas. Many small *Lottia gigantea* were found in the mussel plots. *Nucella emarginata*, *Acanthina* spp. and *Ocenebra circumtexta* were all common in the motile invertebrate counts. *Silvetia* and *Hesperophycus* were both present and healthy around the site, but fairly limited in distribution.

No abalone were found at the photoplot area and we did not visit Harbor Seal Arch to search for abalone because of time and risky wave conditions. Jessie measured 77 ochre stars and ranked the rest from the defined site in size categories. *Pisaster ochraceus* were abundant with sizes ranging from 50-205 mm. The mean size was 122 mm, standard deviation was 27.

Photoplot summary – mean % cover by zone at Middle Anacapa- East, fall 2003 (3 plots/zone)

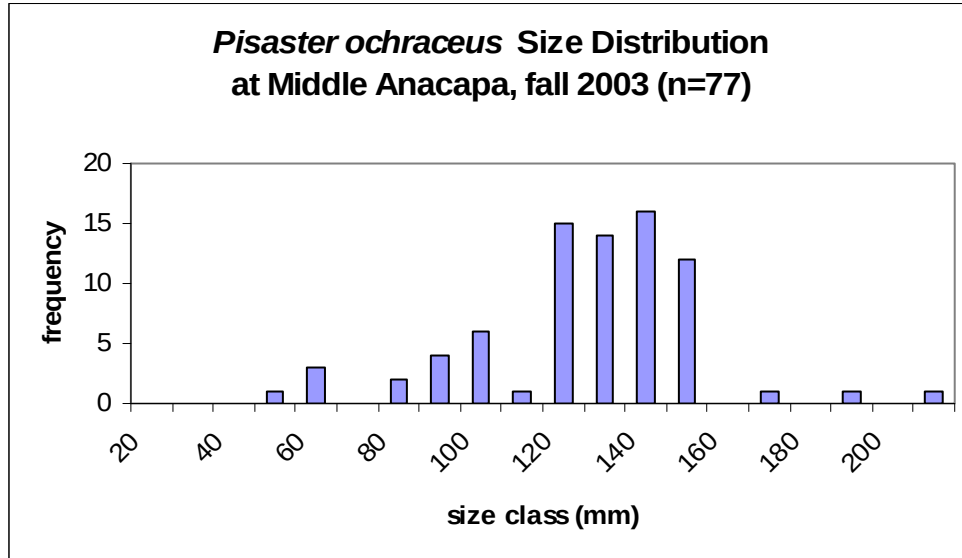
Zone B	are Rock	Barnacle Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar Other		
Barnacle	59.3	7.7	8.3	14.0	0.0	0.0	1.7	0.0 0.	0	7.0	0.0	1.3	0.7
Endocladia	42.0	6.0	6.0	27.3	8.3	5.0	2.3	0.0 0.	0	2.7	0.0	0.3	0.0
Rock-weed	8.3	0.0 1.	0	5.0 1.	0	66.3	10.7	1.3 0.	0 6.	3	0.0	0.0	0.0
Mussels	0.7	0.0 0.	3	0.0 0.	0	0.0	98.0	0.0 0.	0 1.	0	0.0	0.0	0.0

Photoplot summary – mean % cover by zone at Middle Anacapa- West, fall 2003 (5 plots/zone)

Zone B	are Rock	Barnacle Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar Other			
Barnacle	62.8	4.2	0.0	19.4	1.8	0.0	0.8	0.2 0.	2	10.6	0.0	0.0	0.0
Endocladia	53.4	0.6 0.	8	29.6	0.2	0.0	9.6 0.	0 0.	2 5.	6	0.0	0.0	0.0
Rock-weed	27.8	2.0 0.	8	2.8 0.	0	52.4	4.6 0.	0 0.	0 9.	2	0.4	0.0	0.0
Mussels	15.4	0.8 2.	2	1.0 0.	0	0.0	71.4	0.2 0.	4 8.	2	0.4	0.0	0.0

Seastars size classes at Middle West, fall 2003

<i>Radius (mm)</i>	<i><75 mm</i>	<i>75-150 mm</i>	<i>>150 mm</i>
<i>Pisaster giganteus</i>	0	0	0
<i>Pisaster ochraceus</i>	9	194	13



22 January 2004, Orizaba Cove, low tide-1.5 ft at 1636 hrs. Conditions were excellent with clear sky, calm wind and seas, light swell. No birds or mammals were on the site; however there were 16 Black Oystercatchers and approximately 30 Brown Pelicans on Orizaba Rock. On site from 1200-approximately 1630 hrs.

We had to wait until almost 1300 hrs before the plots were exposed enough to work. All plots were scored for motile invertebrates and photographed. Abalone and seastars were searched for over the entire site. *Tetraclita rubescens* and *Balanus glandula* were both abundant and well represented in their respective zones. *Endocladia muricata* was abundant this season. *Hesperophycus* and *Silvetia* were both present; however *Silvetia* plants were sparse in those plots and *Endocladia* dominated in the *Hesperophycus* zone plots. The photo for plot 851 in the barnacle zone was not recorded somehow and since we scored the plots from the photo there is no score.

Seven black abalone were found ranging from 60-120mm; however, two of them were actually east of the normal site boundary. *Pisaster ochraceus* were abundant with sizes ranging from 40-197 mm, mean=104 mm, std dev= 31. Several small *Patiria miniata* were observed but not counted.

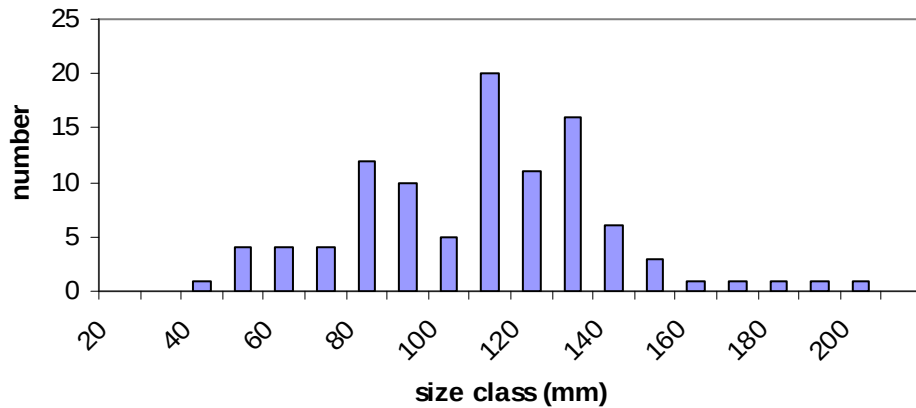
**Photoplot summary – mean % cover by zone at Orizaba Cove, Santa Cruz Island,
fall 2003 (5 plots/zone)**

<i>Zone B</i>	<i>are Rock</i>	<i>Barnacle Tetra- clita</i>	<i>Endo- cladia</i>	<i>Hespero- phycus</i>	<i>Silvetia</i>	<i>Mussels</i>	<i>Turf- weed</i>	<i>Leaf Barnacle</i>	<i>Misc Algae</i>	<i>Misc Animal</i>	<i>Tar Other</i>		
Barnacle 31.	0	45.2	0.6	0.2	0.0	0.0	1.2	0.0	0.0	1.6	0.0	0.0	0.2
Silvetia	35.6	0.8	4.2	25.6	1.0	8.2	0.8	0.0	0.0	22.8	0.2	0.0	0.8
Mussels	18.0	2.8	1.2	0.0	0.0	0.0	23.0	0.2	0.4	46.8	5.4	0.0	2.2
Tetraclita 26.	2	2.0	30.4	2.6	0.0	0.4	8.6	0.0	0.0	28.8	0.4	0.0	0.6
Hespero- phycus	10.6	7.6	0.4	64.6	6.4	0.4	1.6	0.2	0.0	8.2	0.0	0.0	0.0

Seastars size classes at Orizaba Rock, fall 2003

<i>Radius (mm)</i>	<i><75 mm</i>	<i>75-150 mm</i>	<i>>150 mm</i>
<i>Pisaster giganteus</i>	0	1	0
<i>Pisaster ochraceus</i>	20	153	13

***Pisaster ochraceus* Size Distribution
at Orizaba Cove, fall 2003 (n=101)**



ANSFC fall 2003		Motile Invertebrate Counts 1/19/04 Dan Richards																			
zone		Barnacle					Endocladia					Silvetia					Mytilus				
	plot #	249	250	251	252	253	154	155	256	257	258	259	260	261	262	263	201	202	264	265	266
Lepidochitona spp.													5								
Nuttalina spp.													2				11	3	1	1	1
Fissurella volcano										1				1							
Pachygrapsus						1			2				1	1					3	3	2
Pagurus spp.																					
large limpets(>15mm)												1	1	4		2					
S. purpuratus																		1		1	
Amphissa versicolor																					
Nucella emarginata									1	1			1		2		2	2	3	2	8
Acanthina spp.	2				3	1		1			1	9	5	4		1	1	1			3
Tegula funebris												1									
Ceratostoma nuttali																					
Ocenebra circumtexta	1										1										
Lottia gigantea																		2		2	
Littorina spp.		537	387	1350	912	1112	76	18	3	131			19	4	128	1	000			00	
Limpet < 5 mm		20		5	0	0	001			030			213			4	633			72	
Limpet 5-15 mm		5	3	0	30	5	9	4	4	1	7	3	1625	24		17	5437	45		7450	

ANCR fall 2003		Motile Invertebrates Counts				1/20/2004		Dan Richards, David Kushner, Julie Bursek, Jessie Altstatt											
zone						Barnacle				Endocladia									
	plot #	33	37	135	31	35	38	32	36	39	212	14	51/18	54	13	467/17	52	53	19
Lepidochitona spp.											5	1	2			1	2	2	
Nuttalina spp.		2	3	1				2				17	5	21	4		11	2	
Fissurella volcano											1	1	6	2		2	9	2	
Pachygrapsus		1				1	3		1			4						5	1
Pagurus spp.																			
large limpets(>15mm)		4	2		1		1		1		2			2		15	2		
S. purpuratus																			
Amphissa versicolor																			
Nucella emarginata																			
Acanthina spp.		4	8	2	5	3		3	3	1								1	5
Tegula funebris																			
Ceratostoma nuttali																			
Ocenebra circumtexta								3				8			4		2	8	1
Lottia gigantea											1	4				2		1	
Littorina spp.		157	39	713	1174	1612	95	287	425	1524	3	29	41	0	200	0	28	43	44
Limpet < 5 mm		11	15	12	3	2	15	3	6	2	3	3	10	6	2	2	5	4	2
Limpet 5-15 mm		17	16	5	10	26	21	10	14	5	26	29	101	35	43	17	65	62	18

ANCR fall 2003		Motile Invertebrate Counts 1/20/2004									Dan Richards, David Kushner, Julie Bursek, Jessie Alistatt								
zone		Silvetia									Mytilus								
plot #	2	55/7	9	3	5	6	4	8	10	56	471	164	470	204	468	203	473	472	
Lepidochitona spp.		1			3	4	2	1		8	3	5 6 1			11	2 6		4	
Nuttalina spp.		4			1	2			2	56	17	22 35	15	51		28 17		34	
Fissurella volcano			1	1			1			4	3	3	1 1		5	2 3		2	
Pachygrapsus	4	1	3		4	2		5	1	1	2	6		1	3 3		1 2		
Pagurus spp.																6			
large limpets(>15mm)	1		4			5		2	2					1					
S. purpuratus															1				
Amphissa versicolor																			
Nucella emarginata																			
Acanthina spp.	1		5	3		5	1	10	4										
Tegula funebris																			
Ceratostoma nuttali	1																		
Ocenebra circumtexta	3	1			6	1		1			1	6 4 6 1				3 2		4	
Lottia gigantea										2	1	10	16	1	5	2	2	4	
Littorina spp.	60	263	10	200	29	47	9	128	1	2	99	18	51	1	0 34		90 0		
Limpet < 5 mm	3	6	3	2	2	3	0	1	3	2	1	2 1 1 4				1 1		5	
Limpet 5-15 mm	29	22	20	16	31	28	0	18	13	78	71	74 61	68		88	75 51		11	

ANMW fall 2003 Motile Invertebrate Counts 1/21/04 David Kushner, J. Altstatt

zone	Barnacle					Endocladia					Silvetia					Mytilus				
plot #	447	448	449	450	451	457	458	459	460	461	452	453	454	455	456	462	463	464	465	466
Lepidochitona spp.			2				2			3	2	1		2	4					
Nuttalina spp.	6		6	5	6		8	6		2		6		3	3	9	13	12	4	2
Fissurella volcano						3	2						6	3		4	1	8		6
Pachygrapsus	2 3			1 3 2 4 1 2							3 4 2 3 6 7 2 2 1 2									
Pagurus spp.				2																
large limpets(>15mm)			1				3	1						7	12					4
S. purpuratus	5												5	1	1					4
Amphissa versicolor																		1		
Nucella emarginata															4	3	6	5	6	
Acanthina spp.	2		5		7	9 3 4 8				1	4 3 5				3	1			3	
Tegula funebris																				
Ceratostoma nuttali																				
Ocenebra circumtexta		3		4		2	3					1	8		1	2	2	7	7	17
Lottia gigantea		1					7				2				5	10	2	1	19	9
Littorina spp.	837	3	29	55	20	0	34	48	105	33 33 22			1 1 1 5 0 0 1 0							
Limpet < 5 mm	0 10	5		9	7	12	16	19	18	7	1	2	4	7	3	18 9 12		8 20		
Limpet 5-15 mm	37 59	32		26	92	112	45 56		22	12 37	26	50		7	15	76 84	92	55	80	
Homalopoma														1						

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[illegible]

SCOC fall 2003, Motile Invertebrate counts 1/22/03 by Dan Richards and David Kushner (continued).

<u>zone</u>	<u>Mytilus</u>					<u>Tetraclita</u>				
<u>plot #</u>	<u>M1</u>	<u>M2</u>	<u>M3</u>	<u>M4</u>	<u>M5</u>	<u>Te1</u>	<u>Te2</u>	<u>Te3</u>	<u>Te4</u>	<u>Te5</u>
Lepidochitona spp.		7		1					3	
Nuttalina spp.		12	15		16	5 4 1			17	5
Fissurella volcano					8			1		
Pachygrapsus	1	1		1				1	1	1
Pagurus spp.				1						
large limpets (>15mm)										
S. purpuratus		10	5		4					
Amphissa versicolor		1								
Nucella emarginata		13		7 1		3	31	6	27	16
Acanthina spp.										
Tegula funebris										
Cerastostoma nuttali										
Ocenebra circumtexta	2	20	7	12 1		13	5	9	21	12
Lottia gigantea									2	
Pisaster ochraceus		11	4							
Pugetia sp.				1						
Total Littorina spp. subsample1	0	0	0	0 0		49	0	78	26	23
subsample2										
subsample3										
Limpet < 5 mm	0	206	303	197	313	2	13	6	134	88
subsample1		30 23		13 13			1	1	6	
subsample2		28	57	19 11			3	1	21	
subsample3		8	17	31 1			0	0	16	
Limpet 5-15 mm	8	81	100	188	575	23	94	150	297	216
subsample1		15	8	20	12		19	7	21	
subsample2		7	17	24	25		10	26	33	
subsample3		4	7	16	9		1	15	41	

Appendix C: Program Notes

In general, we had good working conditions in 2003 and we were able to sample at all the sites. We were hampered by a few days of rain or swell and we had to work many tides that were not as low as we would have liked, making it difficult to complete all the sampling within the working window of low water. Channel Islands National Marine Sanctuary provided assistance through eight days of vessel time for monitoring at Anacapa and Santa Cruz Islands.

Paula Rich did much of the field scoring and almost all the office scoring for the spring sample. Motile invertebrate counts which were very time consuming in the field, were mostly done by Dan Richards. Paula was new to the program, but caught on well and did motile counts also.

No changes to the protocol were made in 2003 except the shift to using a digital camera. Motile invertebrate counts (including sub-sampling methodology) were standardized finally, though changes from 2002 were slight. A new draft handbook was written to accommodate changes spawned by the program review and standardization adopted by the Multi-Agency Rocky Intertidal Network (MARINE) (see Richards et al. 2007). We began efforts to accurately map the sites, beginning with obtaining accurate latitude and longitude with Global Positioning System (GPS). We also began using GPS to accurately map the plots and reef structure at sites to create maps using Geographic Information System (GIS). Jill Komoto volunteered, spending many hours working creating maps in GIS with the data taken from a Trimble GPS. We also made progress on the major task of digitizing the thousands of slides from twenty years of monitoring.

The shift to digital imaging will be a great benefit to the monitoring. Film cost is no longer a factor, so it will be easier to document the overall area or individual organisms. Images can be reviewed in the field, though quality and detail is difficult to see especially in the housing. Most MARINE groups began using digital cameras for sampling in the spring. Dan's Sony F707 was used to shoot digital images in the spring along with the Nikonos film camera. We shifted completely over to digital imaging using an Olympus camera in the fall sampling.

Images were shot as high resolution jpg files since the size of tif format images made storage a problem and for viewing on computer monitors there did not seem to be any advantage to tif files. Some of the advantages of the new system are that the camera is fully waterproof in its housing; it is lighter to carry, and it is more sensitive in low light. We did not use an external flash which is something to be considered for the future. The on-camera flash provides minimal illumination through the housing at the subject distance we are shooting the plots. One thing we discovered was that it was necessary to shade the plots in sunlight to cut down on the contrast between shadows and contrast. A diffuser screen was purchased to provide even lighting without blocking all light transmission. However, this makes it difficult now for one person to shoot the photos without assistance from a helper to hold the screen.

Great progress made in the Multi-Agency Rocky Intertidal Network (MARINE) with emphasis on the combined database and standardization of the protocols. The database is being administered by the Southern California Coastal Water Research Project (SCCWRP) (MARINE website, Engle 2005). The database was up and running in September 2003, and there were

immediately requests for use of the data by outside researchers. A taxonomy workshop in was held in October 2003, with emphasis on identification of chitons, red algal turf, coralline algae, and small snails.

Temperature loggers were maintained at Middle Anacapa West, East Point, and Northwest-Talcott. The brackets at Harris Point were problematic and no unit was there all year. Brackets were also a problem at South Frenchy's Cove and there was no logger out most of the year. The logger was missing from Landing Cove until fall when a new one was installed. The logger at Northwest-Talcott appeared to have leaked but was finally downloaded with a maximum temperature reading of 35°C and minimum of 7.3°C. The logger in its housing was missing at Johnson's Lee in the fall. We installed new brackets and housing with a logger in the fall.

There generally was not time to conduct species surveys. A species list was made at Northwest-Talcott only. The new field log form has a list of the core species and space for additional species for noting relative abundance and general health of the taxa, only species considered noteworthy are reported here.

In 2003, we received requests for black abalone data for a status review for National Marine Fisheries Service, a request for the power analysis from the 2001 status review by contractors working on the Exxon Valdez spill, and requests for the intertidal monitoring handbook from the National Park Service, Northeast Temperate Network, and from Maine Sea Grant Program.

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