



Rocky Intertidal Community Monitoring at Channel Islands National Park

2002 Annual Report

Natural Resource Report NPS/MEDN/NRTR—2010/362



ON THE COVER

Pisaster ochraceus at Ford Point, Santa Rosa Island with *Mytilus californianus* and *Pollicipes polymerus*, December 2002.

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August 2010

U.S. Department of the Interior
National Park Service
Natural Resource Program Center
Fort Collins, Colorado

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Please cite this publication as:

Richards, D. V., D. Lerma, and P. Rich. 2010. Rocky intertidal community monitoring at Channel Islands National Park: 2002 Annual Report. Natural Resource Technical Report NPS/MEDN/NRTR—2010/362. National Park Service, Fort Collins, Colorado.

Contents

	Page
Figures.....	v
Tables.....	vii
Appendixes	ix
Executive Summary	xi
Acknowledgments.....	xiii
Introduction.....	1
Methods.....	3
Study Area	3
Monitoring	5
Data Analysis.....	7
Results.....	11
2002 Sampling Events	11
Photoplots	11
Motile Invertebrates.....	13
Black Abalone (<i>Haliotis cracherodii</i>)	17
Owl Limpets (<i>Lottia gigantea</i>)	19
Seastars (<i>Pisaster ochraceus</i>)	24
Surfgrass (<i>Phyllospadix</i> spp.)	25
Shorebirds and Pinnipeds	26
Visitation.....	28
Trip Reports and General Observations	30
Species Diversity	31
Discussion	33

References.....	39
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Figures

	Page
Figure 1. Rocky intertidal community monitoring site locations in Channel Islands National Park.	4
Figure 2. Middle Anacapa-East mussel plot 476 in spring 2002 (left) and fall 2002 (right).	12
Figure 3. Percent cover of target taxa within fixed plots by zone, spring 2002.	14
Figure 4. Percent cover of target taxa within fixed plots by zone, fall 2002.	15
Figure 5. Percent cover of target taxa within fixed plots by zone, 2002 (note not all zones are represented at all sites).	16
Figure 6. <i>Haliotis cracherodii</i> size distribution by season 2002. All sites combined (spring n=162, fall n=116).	18
Figure 7. <i>Haliotis cracherodii</i> size distribution by island fall 2002.	18
Figure 8. <i>Lottia gigantea</i> at Santa Cruz Island. Bars represent mean size (mm) and lines represent mean density from five fixed plots.	20
Figure 9. <i>Lottia gigantea</i> at Santa Rosa Island 1998-2002. Bars represent mean size (mm) and lines represent mean density from five fixed plots.	21
Figure 10. <i>Lottia gigantea</i> at San Miguel Island. Bars represent mean size (mm) and lines represent mean density from five fixed plots.	22
Figure 11. <i>Lottia gigantea</i> at Anacapa Island. Bars represent mean size (mm) and lines represent mean density from three fixed plots.	22
Figure 12. <i>Phyllospadix</i> spp. cover trends on 10m point-intercept transects at Santa Cruz Island 1998-2002.	25
Figure 13. <i>Phyllospadix</i> spp. cover trends on 10m point-intercept transects at Santa Rosa Island 2002.	26
Figure 14. Visitation at Frenchy's Cove, Anacapa (Island Packers visitors).	30
Figure 15. Annual Commercial Visitation at Frenchy's Cove, Anacapa (Island Packers visitors) 1993-2002 (number of visitors per year).	30
Figure 16. 2002 sea temperature anomalies by three month running mean (NOAA Climate Prediction Center website).	33
Figure 17. Wave damage to Santa Barbara Island Boathouse, November 2002.	34

Figure 18.Coastal Biodiversity Survey at Johnson’s Lee, Santa Rosa Island, fall 2002.....	35
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Tables

	Page
Table 1. Core species, higher taxa, and substrates scored in photoplots, point intercept transects, circular plots, abalone/seastars, and mobile invertebrate counts at all CINP sites in 2002.	8
Table 2. 2002 Sampling dates for rocky intertidal monitoring sites.....	11
Table 3. <i>Haliotis cracherodii</i> density and sizes pooled by island in 2002	18
Table 4. <i>Lottia gigantea</i> density and size summary by island (sizes in mm).	19
Table 5. <i>Lottia gigantea</i> size distribution by island (sizes in mm).	19
Table 6. Sea star and black abalone searches in 2002. (-- indicates no plot or transect, ns indicates no sample performed, P.o.= <i>Pisaster ochraceus</i> , P.g.= <i>P. giganteus</i> , A.m.= <i>Patiria miniata</i>).	23
Table 7. Shorebirds and pinnipeds at monitoring sites in spring 2002 (maximum seen at any one time) (*= nearby but not on reef).	27
Table 8. Shorebirds and pinnipeds at monitoring sites in fall 2002 (maximum seen at any one time) (*= nearby but not on reef).	28
Table 9. Visitors to South Frenchy's Cove, Anacapa Island in 2002 (visitation with Island Packers).	29

Appendixes

	Page
Appendix A. Photoquadrat Data Tables	A-1
Appendix B. Trip Reports	B-1
Table of Contents for Appendix B.....	B-2
Appendix C. Program Notes and Accomplishments	C-1

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 2002 sampling year efforts (from February 2002 to February 2003) 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.

Twenty one sites were established between 1982 and 1994 (Figure 1). Sites were selected to represent a range of exposures, rock types, and human impacts. In 2002, sites were monitored in spring (Feb-Jun) and fall (Nov-Feb 2003) (Table 2). The monitoring protocol is detailed in Richards and Davis (1988). An additional protocol for Santa Cruz Island is detailed in Engle *et al.* (1998). Updated protocol summaries can be found in Richards and Lerma (2000).

A workshop was held in 2001 to review the Rocky Intertidal Monitoring Program to see if the goals and objectives were being met (Lafferty 2001). Following recommendations from the workshop, additional photoplots were added at Harris Point and East Point. Surfgrass monitoring was added at East Point with the establishment of three surfgrass transects in 2002. We also implemented logistical recommendations to conduct motile invertebrate counts in the spring and owl limpet measurements in the fall.

We worked with the Multi-Agency Rocky Intertidal Network (MARINe) (www.marine.gov [accessed 9 June 2010]) to refine sampling for motile invertebrates and protocol standardization with other groups. Data sheets were revised and the list of core species scored in the photoplots was adjusted to conform with MARINe.

Black abalone, *Haliotis cracherodii*, were found at all the islands in 2002, though not at all sites. Only San Miguel Island had any abalone found within fixed plots, and the density there was very low. Otter Harbor had the most abalone found (64) and there was a decline from 2001. Three sites (Otter Harbor, Harris Point and Fossil Reef) accounted for 81% of the total black abalone

found in 2002. Overall, a total of 162 black abalone were found at all sites during the spring samples (plus the one from Santa Barbara Island sampled only in fall). Withering Syndrome was observed in three slightly shrunken black abalone from Santa Rosa Island.

Densities of giant owl limpets, *Lottia gigantea*, changed little from 2001, but continued a slow decline at nearly all sites since 1998. No reason for the decline was apparent.

The highest numbers of seastars, *Pisaster ochraceus*, were seen at Landing Cove, Willows Anchorage, Ford Point, Johnson's Lee, and Crook Point as in recent years. East Point, Orizaba Cove, Middle Anacapa, and Prisoner's Harbor, however, all had relatively high numbers of *Pisaster ochraceus* in 2002 in what seemed to be sharp increases over previous years. Sea Lion Rookery, South Frenchy's Cove, Cat Rock, Fraser Cove and Northwest Talcott all had very low numbers of seastars in 2002.

Black Oystercatchers were the most common shorebird seen with at least one observed at all but two of the sampling sites during the 2002 sampling. Other common birds seen foraging in the littoral zone included black turnstones, wandering tattlers, semi-palmated plovers, western gulls, and song sparrows.

February and March were the peak months for visitation at Frenchy's Cove and 76% of the visitation occurred between February and May. The total of 2,733 passengers brought to the island by concession boats was slightly above the mean for the last ten years.

Acknowledgments

The National Park Service, Channel Islands National Park (CINP) provided funding for this program. California Department of Fish and Game and Channel Islands National Marine Sanctuary (CINMS) provided staff and general assistance with the monitoring. Temperature loggers were provided the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO) Marine Science Institute, University of California, Santa Barbara (UCSB). United States Geological Service/ Biological Resources Division supported the program review and provided general support in database maintenance and development.

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.

After several years as a marine biotech at Channel Islands National Park, Derek Lerma left us for other work in November 2002. His knowledge and assistance on this project was greatly appreciated. Paula Rich stepped into the biotech position following Derek and also did an excellent job.

We are especially grateful to Jayson Smith who helped out with the monitoring whenever he could spare time from his own sampling while we were at the islands. Jayson performed many of the motile invertebrate counts. Melinda Chambers also assisted in the monitoring while collecting information for her graduate studies, most often conducting the abalone counts.

During the 2002 field season we received approximately 252 hours donated by volunteers and other agencies. The following assisted us with data collection in the field on one or more trips: Danny Black, Cassity Bromley, Sarah Chaney, Sam Coture, Jill Komoto, Erin Maloney. David Kushner, Simon Pitallba, Stacey Lehmann, Kara Randall, Jayson Smith, Dave and Karen Steichen, Ian Williams.

We are grateful to Linda Mutch for editorial comments.

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 five northern Channel Islands 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 management of marine resources.

The “undisturbed tide pools” are one of the unique features specifically mentioned in the enabling legislation for Channel Islands National Park. The law establishing the park (16-USC-410) also mandated 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) with an emphasis on monitoring trampling 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.

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.

This report summarizes the 2002 sampling year efforts (from February 2002 to January 2003) 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. 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 comprise eight islands in the Southern California Bight, five of which are included in the Channel Islands National Park. The five park islands include 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.

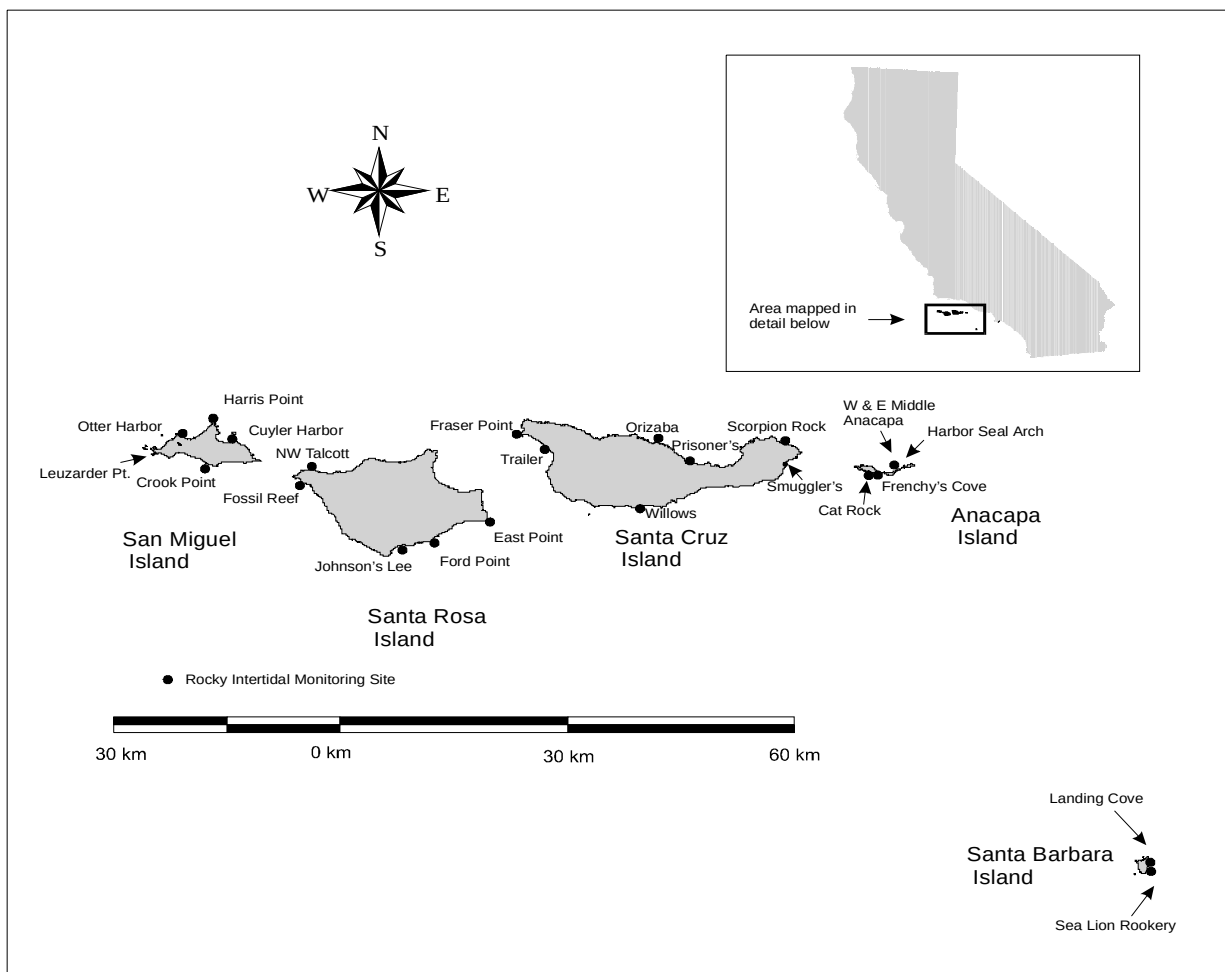


Figure 1. Rocky intertidal community monitoring site locations in Channel Islands National Park.

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 2002, sites were monitored in spring (Feb-Jun) and fall (Nov-Feb 2003). The 2002 sampling periods were unusual in the inclusion of February sampling days but this was necessary to complete the monitoring at all sites. Typically, daytime low tides occur from fall through spring in southern California. This sampling regime allows us to sample following the summer growth period and winter storm period. 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). See appendix C for additional program notes for 2002.

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 computer 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).

Fixed plots (50 x 75 cm) were photographed on each visit and the percent cover of core organisms (Table 1) was determined either in the field by laying a grid over the plot or in the office, projecting the slide onto a grid of 100 evenly spaced points. Target species are those species that are often common and are generally used to define a band or zone within the intertidal zone. Usually five photoplots were established within the zone of common target species at each site. We used a Nikonos V camera with two strobes for even illumination and Ektachrome-100 film for the photography. New Ikelite underwater strobes were purchased in April 2002, replacing the old Nikon flash units. Organisms or bare substrate under each point were counted as one percent cover.

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). *Lottia* sampling was conducted in the fall following review workshop recommendations. Spring samples were collected at the Anacapa sites for additional information following the rat eradication there.

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.

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 changed in fall 2002 to follow the new MARINE protocol of adding *Phyllospadix* spp. understory for surfgrass covered by algae. New transects were established at East Point. These were the only changes to the protocol. 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.

Due to the nature of their mobility, seastars (*Pisaster ochraceus*, *Pisaster giganteus*, and *Patiria miniata*) were counted in 30-minute counts, rather than fixed plots. This usually covers most of the monitoring reef area at each site. At Johnson's Lee we defined three adjoining areas of the site for counts to enable us to follow distribution within the site. Some sites consistently had seastars in a relatively small area and we have been able to maintain transects counts at Landing Cove, Fossil Reef, and Johnson's Lee. Tide or sea conditions do not always allow us to conduct the counts at every site. Seastars were counted in transects for the comprehensive surveys.

Following recommendations from the review workshop (Lafferty 2001), additional photoplots (one Tetraclita, four Chthamalus/Balanus plots) were added at Harris Point, and the existing barnacle plots were re-designated into two new target zones: Chthamalus/Balanus or Tetraclita. Five new plots were established in the Hesperophycus zone at East Point. Three replicate surfgrass transects were established at East Point.

Motile invertebrates (Table1) were counted in the photoplots by carefully searching through the entire plot. Sampling of abundant littorine snails and small limpets was done by sub-dividing the plots into 16 blocks and counting each of the four corner blocks. In 2002, we implemented the workshop's recommendation to conduct motile invertebrate counts in the spring and owl limpet measurements in the fall. Our collaboration with MARINE led to more refined sampling for motile invertebrates and standardization with other programs. Motile invertebrates were counted in photoplots at all sites in the spring and at Santa Barbara in the fall. Motile invertebrates at the Anacapa Island sites, Scorpion Rock and Orizaba Cove were also counted in the fall for additional information since the rats were eradicated from Anacapa in fall 2002. With MARINE, we also revised data sheets and the list of core species scored in the photoplots. As part of the motile invertebrate protocol, we began measuring the first ten snails (*Nucella emarginata*, *Acanthina* spp., *Tegula* spp., *Ocenebra circumtexta*, and *Lottia gigantea*) found in each plot to determine size distribution. We used size categories (<5mm, 5–15mm, and >15mm) for the smaller limpets. We also began counting seastars within size classes (small <75mm, medium 75–150mm, or large >150mm).

Shorebirds and pinnipeds within the monitoring site area were counted during each visit. The maximum number of each species seen during our working time at a site was recorded. Often the maximum number is present at arrival.

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

Data Analysis

The purpose of this report is simply to report the data from 2002 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 species, higher taxa, and substrates scored in photoplots, point intercept transects, circular plots, abalone/seastars, and mobile invertebrate counts at all CINP sites in 2002.

(Target species are shown in bold.)	Photoplots	Surfgrass Transects	Circular Plots	Abalone/ Seastar	Motile Inverts
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			
<i>Hesperophycus californicus</i> (= <i>H. harveyanus</i>)	X				
<i>Sargassum muticum</i>		X			
<i>Scytosiphon</i> spp.	X				
<i>Silvetia compressa</i> (= <i>Pelvetia fastigiata</i>)(Rockweed)	X				
Other Brown Algae (any browns not listed above)*	X	X			
Ephemeral browns	X				
RED ALGAE					
<i>Endocladia muricata</i> (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					
<i>Phyllospadix scouleri/torreyi</i> (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 Species, Higher Taxa, and Substrates Scored in Photoplots, Point Intercept Transects, Circular Plots, Abalone/Seastars, and Mobile Invertebrate Counts at all CINP sites in 2002 (continued).

(Target species are shown in bold.)	Photoplots	Surfgrass Transects	Circular Plots	Abalone/ Seastar	Motile Inverts
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 & 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

2002 Sampling Events

We monitored all 21 Rocky Intertidal Monitoring sites at least once during the 2002 sampling season between February 25, 2002 and February 1, 2003 (Table 2). Spring sampling at Santa Barbara Island was not done because of potential disturbance of nesting California brown pelicans. We completed implementation of recommendations from the program review (Lafferty 2001) including adding photoplots at Harris Point and East Point and establishing surfgrass transects at East Point.

Table 2. 2002 Sampling dates for rocky intertidal monitoring sites.

Site	Site Codes	Spring	Fall
Cuyler Harbor, San Miguel Island	SMCH	3/24/02	12/31/02
Crook Point, San Miguel Island	SMCP	3/26/02	1/14/03
Otter Harbor, San Miguel Island	SMOH	3/25/02	1/15/03
Harris Point, San Miguel Island	SMHP	3/27/02	1/16/03
Fossil Reef, Santa Rosa Island	SRFR	4/20/02	12/3/02
Johnson's Lee, Santa Rosa Island	SRJL	4/22/02	12/1/02
Ford Point, Santa Rosa Island	SRFP	4/22/02	12/5/02
Northwest-Talcott, Santa Rosa Island	SRNWT	4/21/02	12/2/02
East Point, Santa Rosa Island	SREP	4/19, 4/23/02	12/4/02
Fraser Cove, Santa Cruz Island	SCFC	5/14, 5/15/02	11/3/02
Trailer, Santa Cruz Island	SCTR	5/14/02	11/2/02
Willows Anchorage, Santa Cruz Island	SCWA	5/15/02	11/4/02
Scorpion Rock, Santa Cruz Island	SCSR	6/27/02	1/31, 2/1/03
Prisoner's Harbor, Santa Cruz Island	SCPH	5/16/02	11/1, 11/5/02
Orizaba Cove, Santa Cruz Island	SCOC	2/25/02	1/30/03
Cat Rock, Anacapa Island	ANCR	3/11/02	1/28/03
South Frenchy's Cove, Anacapa Island	ANSFC	3/8/02	1/27/03
Middle Anacapa-West	ANMW	3/12/02	1/29/03
Middle Anacapa-East	ANME	3/26/02	1/29/03
Landing Cove, Santa Barbara Island	SBLC	--	11/19, 11/21/02
Sea Lion Rookery, Santa Barbara Island	SBSLR	--	11/20/02

--no spring sample because of nesting pelicans

Photoplots

Photoplot data are summarized in Figures 3-5 for each target zone and season. Mean percent cover is the pooled value of all replicate plots per zone by site and season, and is compared to the range and mean cover across all years. Percent cover values of core taxa in each plot are presented in Appendix A. Summary tables (by zone) for each site can be found in the trip reports (Appendix B).

On average, cover values for each target species were within the mid-range of long-term observations and usually near the long-term mean. Usually within any one season, there are a few sites above or below the mean and 2002 was no exception. *Mytilus californianus* cover (24%) at Sea Lion Rookery was well below the running mean of about 64% as several plots suffered massive clearing. At both Orizaba Cove and Fossil Reef, *Silvetia compressa* cover was well below the long-term mean, a trend that has continued since at least 1999. Orizaba Cove had

a noteworthy recruitment of *Balanus glandula* during the previous year and abundance was quite high.

Endocladia muricata showed the most seasonal difference among our target species. Seasonal changes in *E. muricata* cover; however, were not as apparent as in 2002 as in 2000 and 2001. One of the biggest seasonal changes in 2002 was a drop in *Silvetia* cover in from 91% in spring to 45% in the fall sample at Prisoner's Harbor. The *Silvetia* cover was lower and non-coralline crust was much more prevalent.

Hesperophycus californicus cover has shown a downward trend at all sites since plots were established. However, in 2002, *H. californicus* cover was showing some increase from lows in 1998 and 1999. Scorpion Rock and East Point were the only sites to average over 50% cover of *H. californicus*. Both Orizaba Cove and Willows Anchorage had less than 5% *H. californicus* cover, while at Trailer the average was just under 12%. *Hesperophycus californicus* was common in several of the barnacle plots at Cat Rock. *Hesperophycus* cover was especially high in the spring with average cover among plots at 44% then dropping to 28% in the fall sample.

As an example of the dynamics of this ecosystem, we noted that *Mytilus californianus* cover increased at Middle Anacapa-East. The increase appeared to be from open spaces filling in with larger mussels rather than high recruitment of juveniles (see Figure 2).

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.

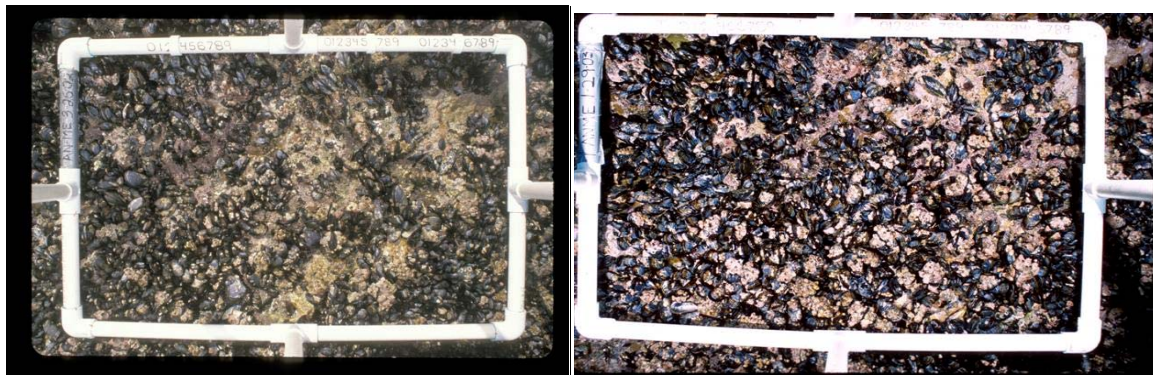


Figure 2. Middle Anacapa-East mussel plot 476 in spring 2002 (left) and fall 2002 (right).

Motile Invertebrates

Motile invertebrates inside the plots primarily include small snails, limpets, and chitons. Motile invertebrates were sampled at all sites in spring and at eight sites in the fall (Landing Cove, Sea Lion Rookery, South Frenchy's Cove, Cat Rock, Middle-East, Middle-West, Orizaba Cove, and Scorpion Rock). Summary tables are found in trip reports in Appendix. B.

Motile invertebrate diversity varied by zone at most sites and we hope that as we gather more data, we might be able to characterize the zones not just by the target species but also by the general species assemblages associated with them. For example, in the barnacle zone, small limpets and *Littorina* spp. (periwinkles) tend to be very common but other species are typically rare. Chitons, *Lepidochitona hartwegii*, are most common under dense *Silvetia compressa* as are black turban snails, *Tegula funebris*. Periwinkles, *Littorina* spp., are typically rare among mussels, but purple sea urchins, *Strongylocentrotus purpuratus*, and owl limpets, *Lottia gigantea*, are found almost exclusively with mussels in our photoplots.

Nucella emarginata, *Ocenebra circumtexta*, and *Acanthina* spp. are common predatory snails at the Channel Islands that feed on barnacles and small mussels (Morris et al. 1980). All three are often found together; however, their relative abundance often varied by site. The highest abundances of *N. emarginata* were at Cuyler Harbor and Harris Point with 7 and 5.5 per plot, respectively. Middle Anacapa, Fraser Cove, Trailer, and Willows Anchorage all had counts above two per plot. *Acanthina* spp. were most common at Middle Anacapa, Prisoner's Harbor, and East Point with mean densities between two and four per plot. *Ocenebra circumtexta* were most abundant at Orizaba Cove with a mean density of 6.1 snails per plot followed by Middle Anacapa, Scorpion Rock, and Prisoner's Harbor. (Note that these numbers are averages for all plots at a site and that the animals may not be uniformly distributed across all zones.)

Nuttalina spp. are small chitons often found in deep home scars in the rock. They are typically most common in the mussel zone and can be quite numerous in areas. Fossil Reef had a mean density of 10.5 per plot while Cat Rock and Middle Anacapa had over eight per plot and Willows Anchorage had nearly six. *Tegula funebris* were quite variable in distribution across sites. These grazers can occur in very high densities and tend to be clustered according to microhabitat. Readers are cautioned about making comparisons between sites because of variability of habitat. Trailer had the highest density of 15.6 *T. funebris* per plot, but that site has both *Silvetia* and *Hesperophycus* zones. Fraser Cove, East Point, Fossil Reef, and Cuyler Harbor also had high densities of *T. funebris*. Northwest-Talcott, where the grazing *Tegula* occur in large numbers on some parts of the reef, averaged only one *T. funebris* per plot.

Lined shore crabs, *Pachygrapsus crassipes*, were common at most sites and averaged nearly three per plot at Scorpion Rock, Prisoners Harbor and Crook Point. These highly mobile crabs were found in all zones except the acorn barnacles, but were most numerous among mussels. Juveniles and recently settled crabs were most commonly found in the plots.

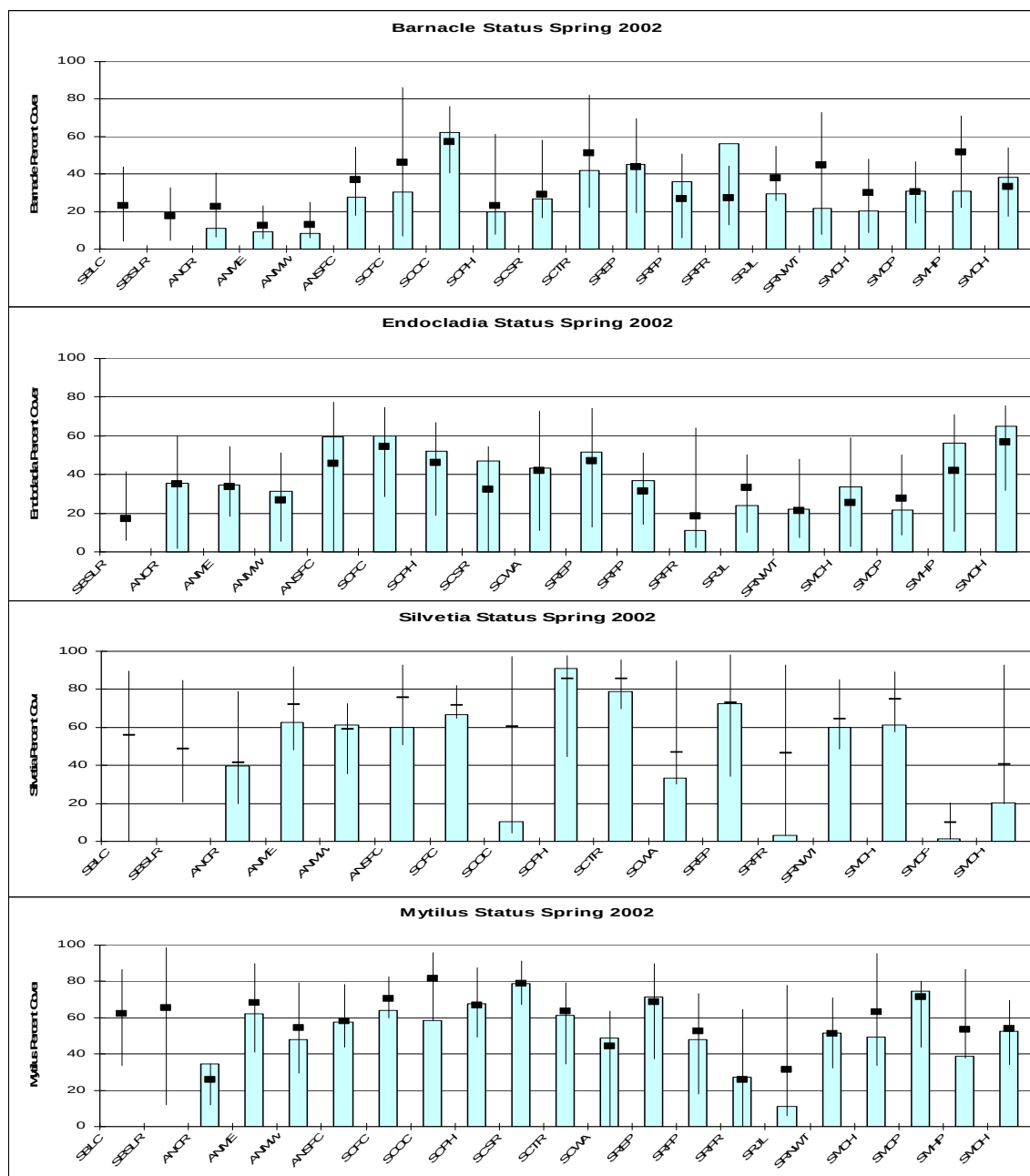


Figure 3. Percent cover of target taxa within fixed plots by zone, spring 2002. Bars represent the spring 2002 mean percent cover from five plots within that zone. Vertical lines represent the range of means since monitoring began at that site. Horizontal tick marks represent the overall mean for all years at that site. Sites without bars were not sampled this season. See Table 2 for site codes.

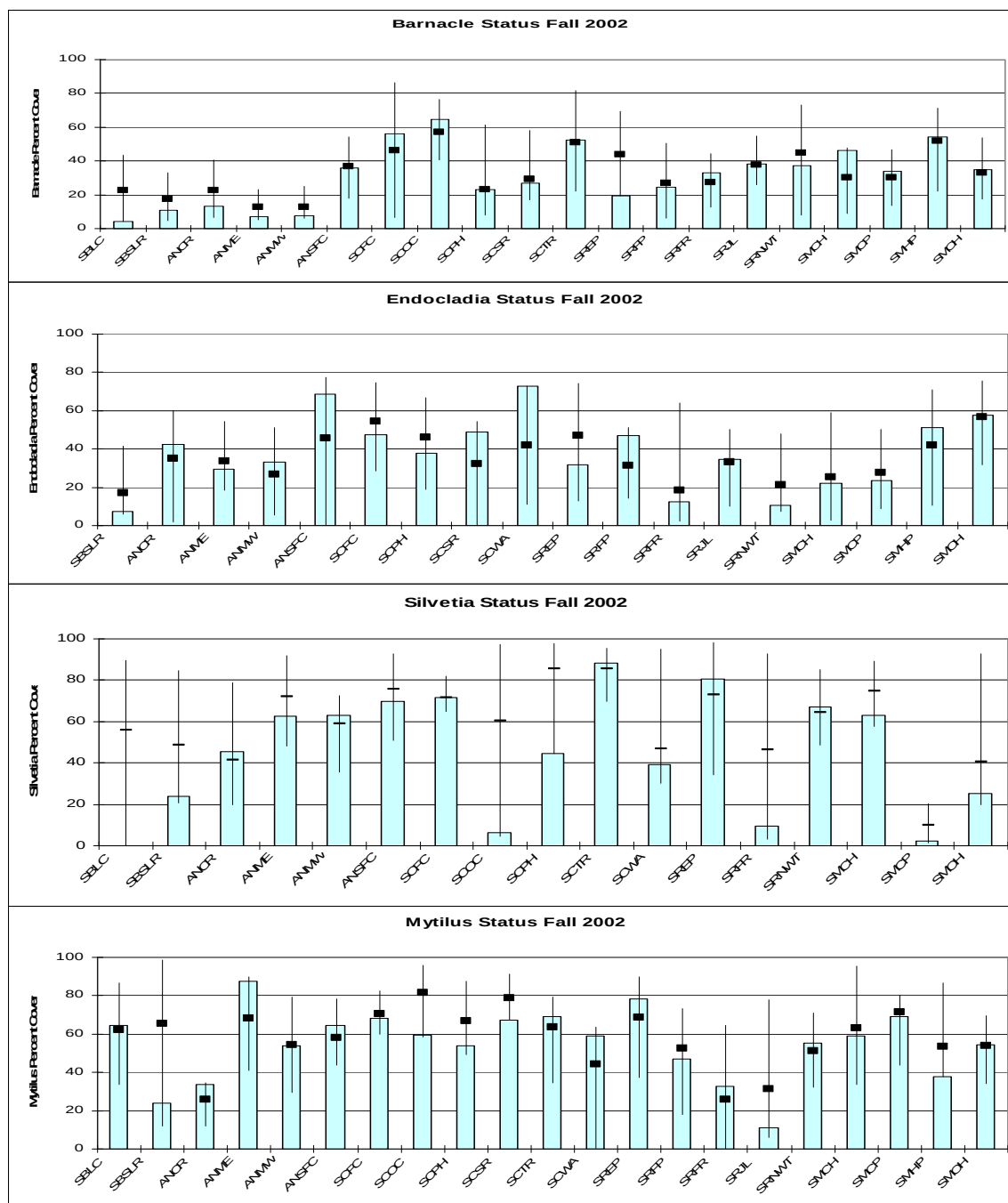


Figure 4. Percent cover of target taxa within fixed plots by zone, fall 2002. Bars represent the fall 2002 mean percent cover from five plots within that zone. Vertical lines represent the range of means since monitoring began at that site. Horizontal tick marks represent the overall mean for all years at that site. Sites without bars were not sampled this season. See Table 2 for site codes.

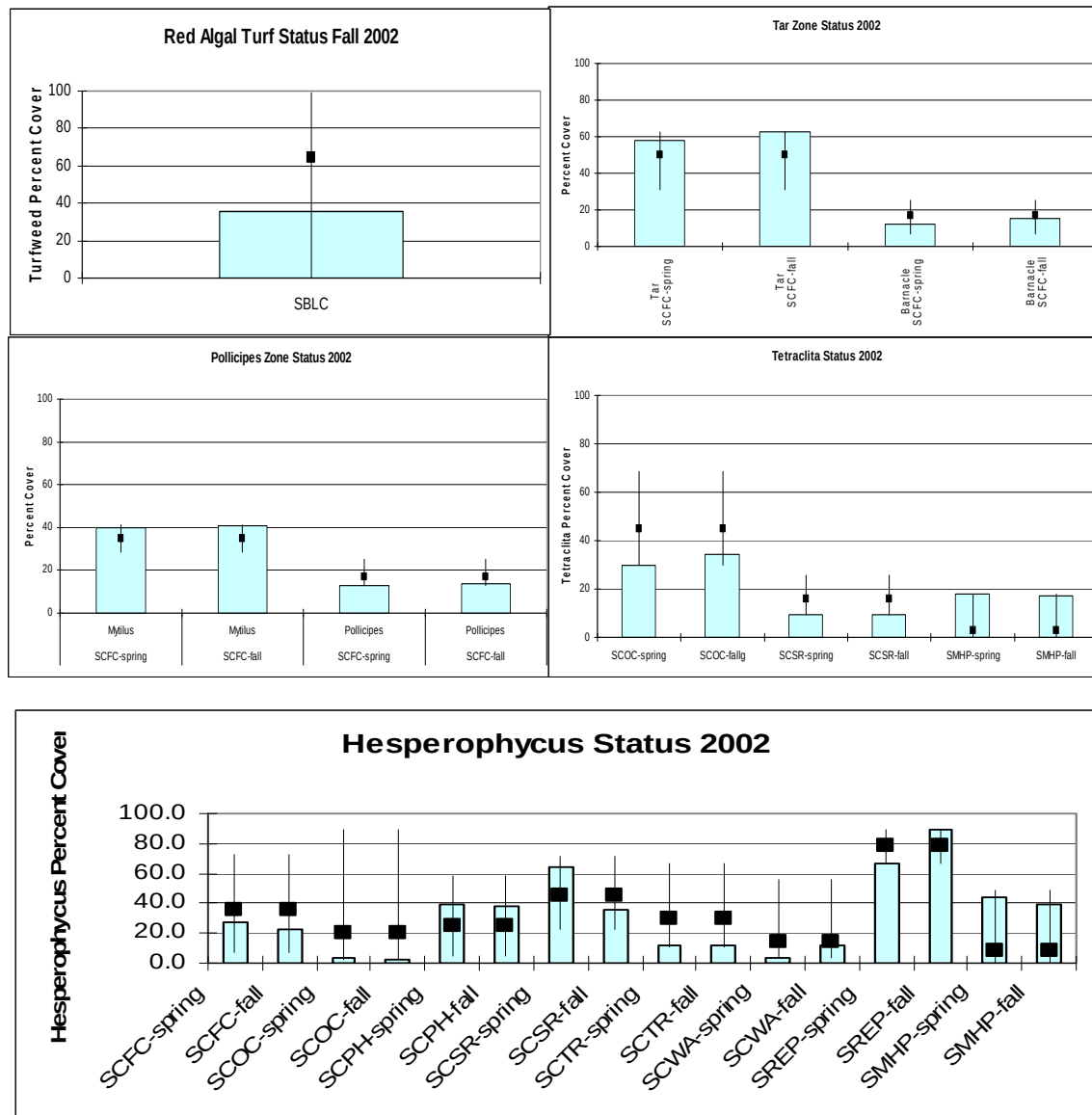


Figure 5. Percent cover of target taxa within fixed plots by zone, 2002 (note not all zones are represented at all sites). Bars represent the 2002 mean percent cover from five plots within that zone. Vertical lines represent the range of means since monitoring began at that site. Horizontal tick marks represent the overall mean for all years at that site. Sites without bars were not sampled this season. See Table 2 for site codes.

Black Abalone (*Haliotis cracherodii*)

Haliotis cracherodii counts and size information are presented in Table 3, and are pooled by island for each season. Information about abalone counts is presented in Table 6. Given the low abalone densities at the islands, fixed plots are of little use for monitoring. Black abalone; however, were found at all the islands in 2002 during timed searches. Only San Miguel Island had any abalone found within fixed plots (Table 6), and the density was very low. Otter Harbor had the highest abundance of black abalone (spring, n=67). That was a 24% decrease from fall 2001 in the same area (n=84). Three sites (Otter Harbor, Harris Point, and Fossil Reef) accounted for 81% of the total black abalone found in 2002.

Overall, a high count of 162 black abalone across all sites was found in 2002 (using the spring counts plus the one from Santa Barbara Island). Their actual sizes ranged from 23-158 mm (Figure 6). We found 12 abalone 60 mm or smaller in the spring sample. There was a slight shift in the size distribution from spring (mean size 98 mm) to fall (mean size 108 mm) when larger animals were found.

The fall size distribution by island (Figure 7) shows a lack of small abalone at Santa Rosa. The mean size at Santa Rosa was 129 mm compared to 106 mm at San Miguel and 99 mm at Santa Cruz. One small abalone was found at Santa Rosa Island in the spring, but the basic shape of the size distribution was similar in both seasons.

The only indications of Withering Syndrome were two slightly shrunken and discolored abalone at Fossil Reef, and one slightly shrunken near Northwest-Talcott. We found a pycnogonid (sea spider) on the mantle of the abalone from Northwest-Talcott, something we had seen on sick abalone especially at that site in the 1990s, though correlation between the sea spider and the disease is unknown.

Table 3. *Haliotis cracherodii* density and sizes pooled by island in 2002

Island Code	Year	Season	Count Random	Count Density	Area (m ²)	Density (m ⁻²)	MeanSize (mm)	StDev	MinSize (mm)	MaxSize (mm)
AN	2002	spring	2	0		.000	104.00	16.97	92	116
AN	2002	fall	0	0		.000				
SB	2002	fall	1	0	31.3	.000	70.00		70	70
SC	2002	spring	10	0		.000	86.30	31.71	25	135
SC	2002	fall	16	0		.000	98.50	25.45	56	147
SM	2002	spring	110	7	58.2	.120	91.99	20.39	40	139
SM	2002	fall	72	6	26.5	.226	105.81	24.48	48	154
SR	2002	spring	32	0	143.0	.000	121.72	26.61	23	158
SR	2002	fall	21	0		.000	129.48	20.76	82	154

*Count Density = abalone found within fixed plots. Counts include 30-minute search effort.

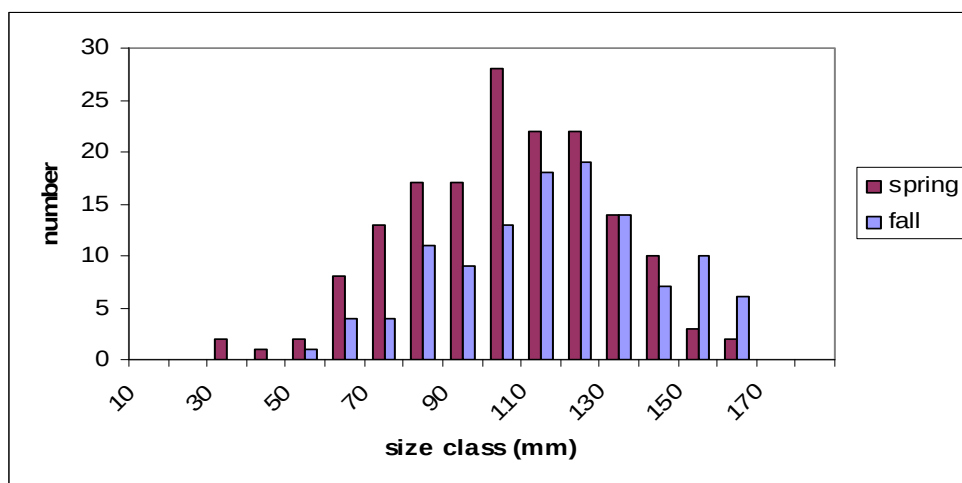


Figure 6. *Haliotis cracherodii* size distribution by season 2002. All sites combined (spring n=162, fall n=116).

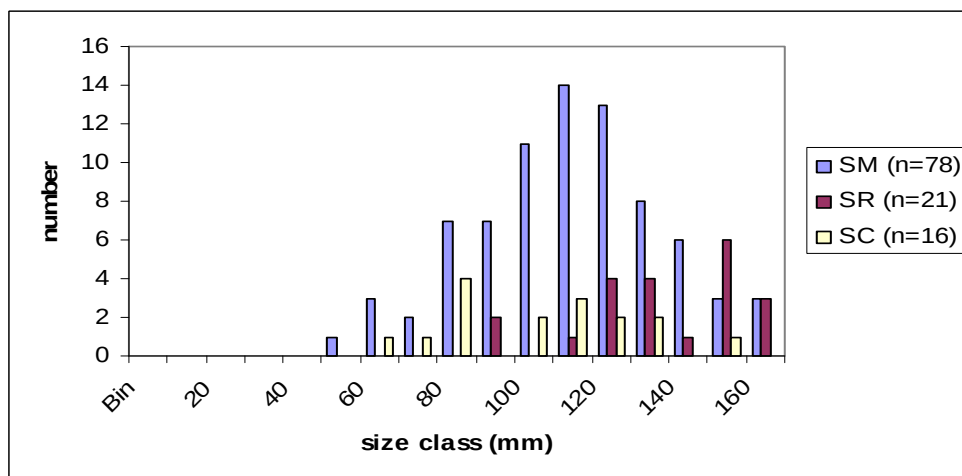


Figure 7. *Haliotis cracherodii* size distribution by island fall 2002.

Owl Limpets (*Lottia gigantea*)

Lottia gigantea densities showed a slight but mostly steady decline at the Santa Cruz Island sites since 1998 (Figure 8). Abundance and size trends for the other islands are shown in Figures 9-11. The lowest density of owl limpets was 5 m⁻² at Santa Cruz Island. San Miguel Island had the highest cumulative density of owl limpets (Table 4), though Fossil Reef on Santa Rosa Island had the highest single plot density with 30 m⁻² (Appendix B). Owl limpets were only sampled in the fall except at San Miguel where the cumulative density dropped by 2 m⁻² from the spring sample. The greatest difference was in the smallest size classes suggesting the possibility of recruitment during the spring. Random variation may be a more likely explanation since the fall count was higher than the spring count in 2001.

The mean size of limpets at Santa Cruz Island was the second largest at 48 mm to Santa Rosa Island's 50 mm mean size (Table 4). Cat Rock had the smallest mean size (29 mm) of all the sites; Northwest-Talcott had the largest (61 mm). Table 5 shows the distribution of *L. gigantea* within size classes at each island. Size distributions at each site are found in trip reports in Appendix B.

Table 4. *Lottia gigantea* density and size summary by island (sizes in mm).

Island Code	Year	Season	Area (m2)	Density	Count	Sized	MeanSize	StDev	MinSize	MaxSize
AN	2002	fall	18.85	6.6	124		33.8	12.38	15	65
SC	2002	fall	47.12	5.1	240		48.2	18.80	15	92
SM	2002	spring	31.41	13.6	426		34.9	11.88	15	80
SM	2002	fall	31.41	11.7	366		37.1	12.99	15	77
SR	2002	fall	62.82	9.3	583		50.1	21.17	15	103

Table 5. *Lottia gigantea* size distribution by island (sizes in mm).

Island Code	Season	%<20mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	%>=100mm
AN	fall	12.90%	27.42%	25.81%	20.16%	11.29%	2.42%	0.00%	0.00%	0.00%	0.00%
SC	fall	7.08%	8.75%	20.42%	18.33%	19.17%	10.42%	9.17%	5.83%	0.83%	0.00%
SM	spring	5.40%	32.39%	30.52%	19.01%	9.39%	2.82%	0.23%	0.23%	0.00%	0.00%
SM	fall	5.19%	27.87%	29.51%	16.12%	14.21%	6.28%	0.82%	0.00%	0.00%	0.00%
SR	fall	10.63%	9.61%	10.29%	16.47%	20.24%	13.89%	9.78%	5.49%	3.26%	0.34%

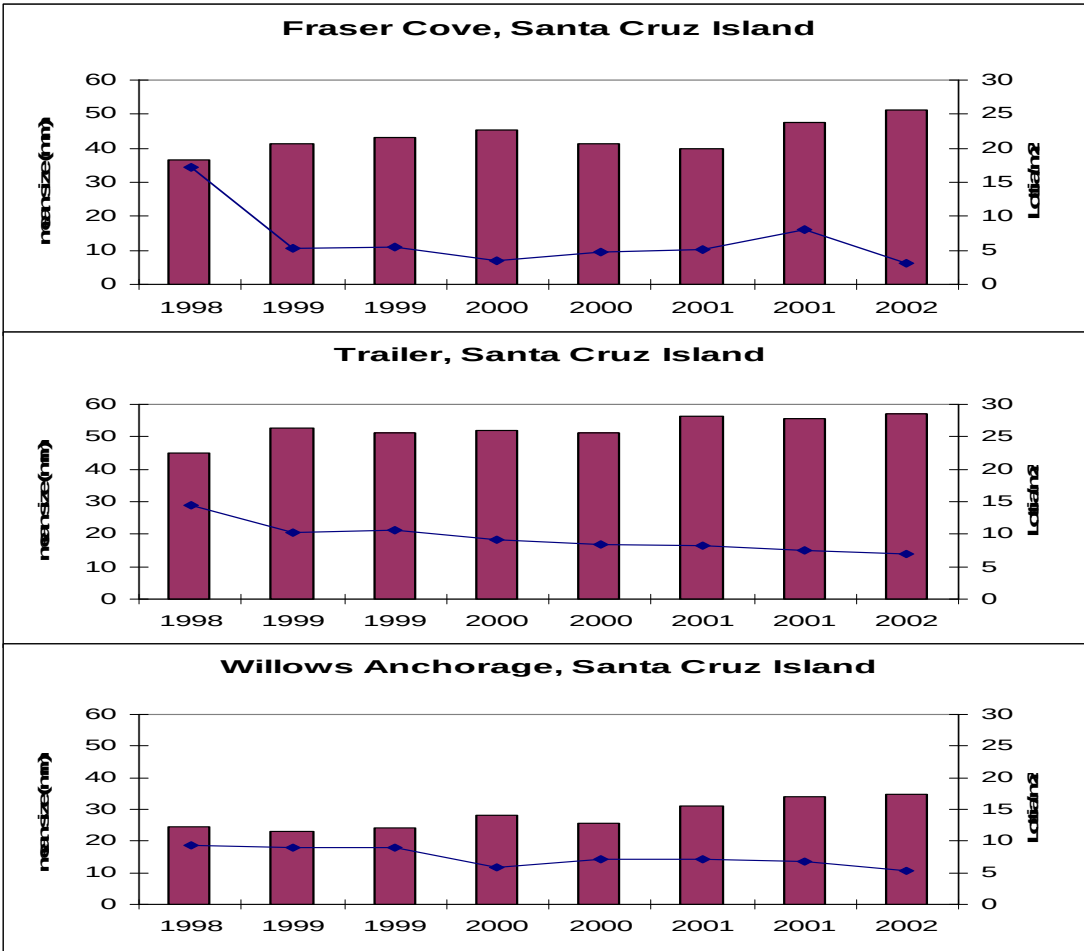


Figure 8. *Lottia gigantea* at Santa Cruz Island. Bars represent mean size (mm) and lines represent mean density from five fixed plots.

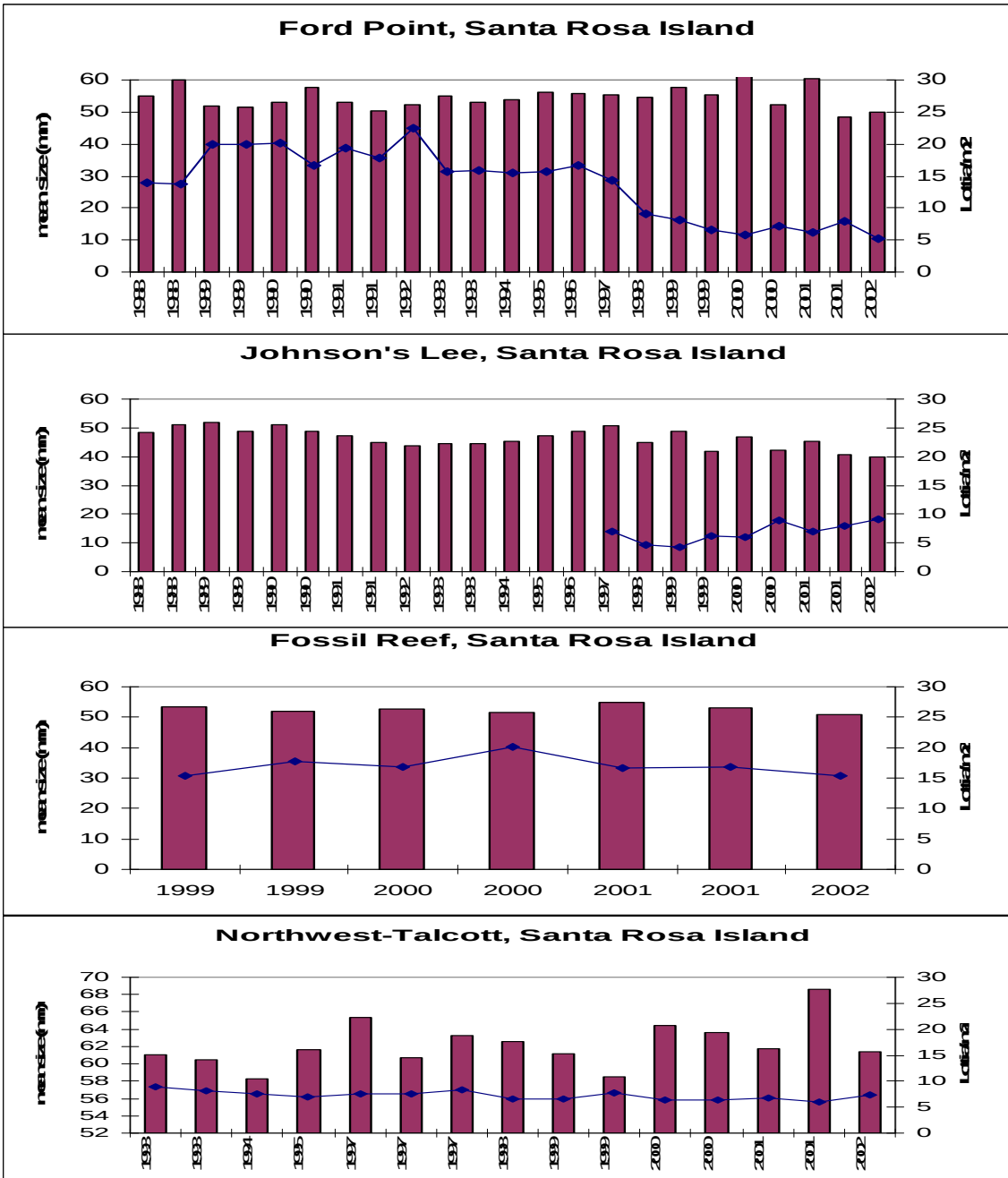


Figure 9. *Lottia gigantea* at Santa Rosa Island 1998-2002. Bars represent mean size (mm) and lines represent mean density from five fixed plots.

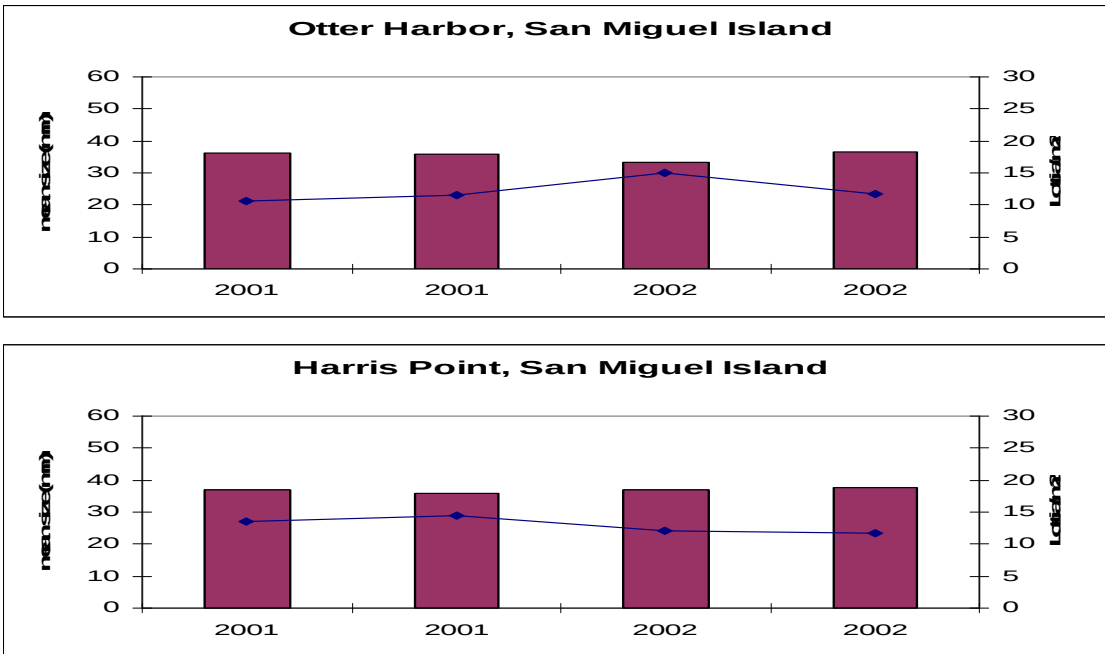


Figure 10. *Lottia gigantea* at San Miguel Island. Bars represent mean size (mm) and lines represent mean density from five fixed plots.

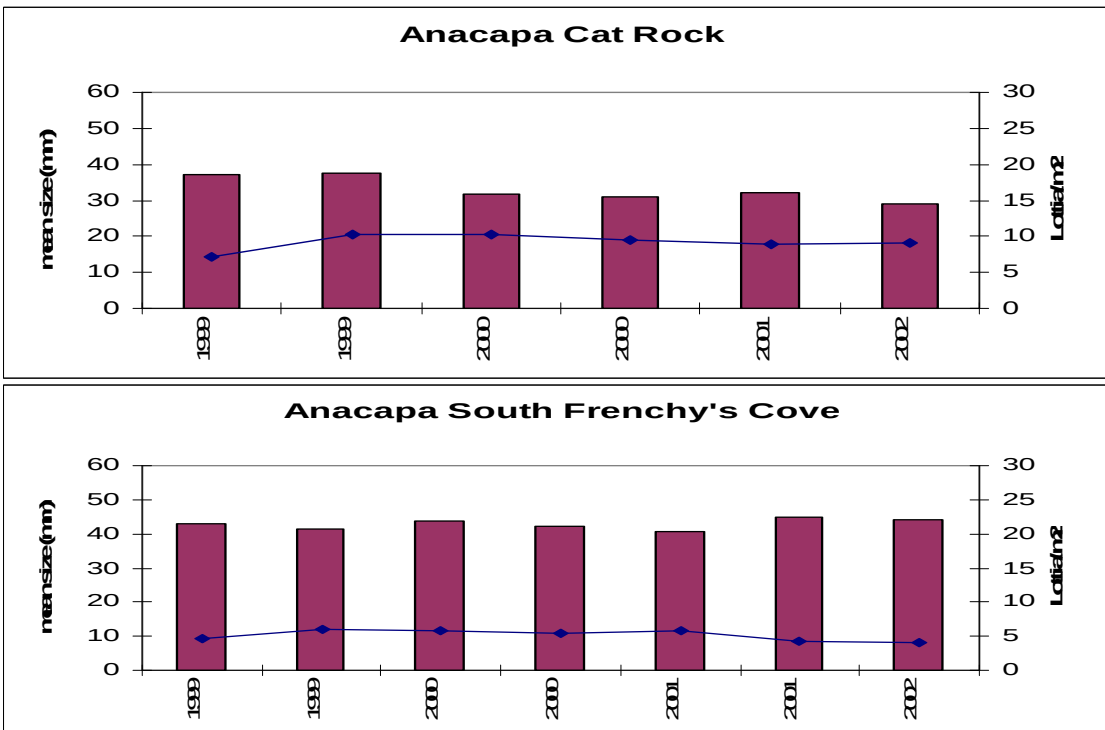


Figure 11. *Lottia gigantea* at Anacapa Island. Bars represent mean size (mm) and lines represent mean density from three fixed plots.

Table 6. Sea star and black abalone searches in 2002. (-- indicates no plot or transect, ns indicates no sample performed, P.o.= *Pisaster ochraceus*, P.g.=*P. giganteus*, A.m.= *Patiria miniata*).

Site	Seastars in 30 min	Sea Stars in Transects	Abalone in Plots	Abalone in 30 Minutes
San Miguel Island				
Crook Point- <i>spring</i>	Ns	5 P.o. in ab plots 2x20m=20 P.o. 2x20m=28 P.o. 2x20m=21 P.o.	0	12
Crook Point - <i>fall</i>	51 P.o. (defined area)	--	0	5 (+17 outside defined area)
Otter Harbor <i>spring</i>	22 P.o., 4 P.g., 1 A.m.	--	2	64
Otter Harbor <i>fall</i>	41 P.o.	--	0	41 (30 min)
Cuyler Harbor <i>spring</i>	18 P.o.	--	-	0
Cuyler Harbor <i>fall</i>	31 P.o.	--	-	0
Harris Point <i>spring</i>	8 P.o., 7 A.m.	nc	6	33
Harris Point <i>fall</i>	(just the two in the transect)	2x12m= 2 P.o.	6	35 (30 min)
Santa Rosa Island				
Ford Point <i>spring</i>	(63 P.o. in 10 min)	10x2m= 84 P.o., 10x2m=22 P.o., 1 P.g. 10x2m=14 P.o.	0	3
Ford Point <i>fall</i>	494 P.o. 8 P.g.	--	0	3 (60 min)
Fossil Reef <i>spring</i>	ns	6x15m=4 P.o.1 P.g. 1 A.m. 6x15m=14 P.o.	0	26
Fossil Reef <i>fall</i>	ns	6x15m= 25 P.o. 6x15m= 38 P.o.	0	15 (120 min)
Northwest Talcott <i>spring</i>	6 P.g., 10 A.m.	--	0	3
Northwest Talcott <i>fall</i>	Patiria present	--	0	2 (120+)
Johnson's Lee <i>spring</i>	Area1=110 P.o. Area2=116 P.o. Area3=159 P.o.	10x2m= 68 P.o.	0	1
Johnson's Lee <i>fall</i>	A1-145 P.o., A2 57 P.o. A3 138 P.o.	10x2= 64 P.o.	0	2 (120 min)
East Point <i>spring</i>	74 P.o.	--	0	1
East Point <i>fall</i>	124 P.o. 1 p.g. 1a.m.	--	0	0 (60 min)

Table 6 (continued). Sea star and black abalone searches in 2002. (-- indicates no plot or transect, ns indicates no sample performed, P.o.= *Pisaster ochraceus*, P.g.=*P. giganteus*, A.m.= *Patiria miniata*).

Site	Seastars in 30 min	Sea Stars in Transects	Abalone in Plots	Abalone in 30 Minutes
Santa Cruz Island				
Orizaba Cove winter	145 P.o.	--	--	1
Scorpion Rock <i>spring</i>	ns	--	--	Ns
Scorpion Rock <i>fall</i>	131 P.o., 7 p.g.	--	--	1
Trailer <i>spring</i>	25 P.o.	--	--	7
Trailer <i>fall</i>	78 P.o., 9 p.g.	--	--	9
Fraser Cove <i>spring</i>	0	--	--	0
Fraser Cove <i>fall</i>	61 P.o.	--	--	1
Willows Anchorage <i>spring</i>	226 P.o., 2 P.g.	--	--	0
Willows Anchorage – <i>fall</i>	310 P.o., 3 A.m.	--	--	5
Prisoner's Harbor <i>spring</i>	110 P.o.	--	--	2
Prisoner's Harbor <i>fall</i>	49 P.o., 2 P.g.	--	--	0
Anacapa Island				
Cat Rock <i>spring</i>	1 P.o.	--	0	1
Cat Rock <i>fall</i>	8 P.o.	--	0	0
S. Frenchy's Cove <i>spring</i>	0	--	--	0
S. Frenchy's Cove <i>fall</i>	0	--	--	0
Middle Anacapa <i>spring</i>	201 P.o.	--	nc	1
Middle Anacapa <i>fall</i>	ns (many)	--	0	0
Santa Barbara Island				
Landing Cove <i>fall</i>	254 P.o.	2x16m=45 P.o.	--	1
Sea Lion rookery <i>fall</i>	43 P.o.	--	0	0

Seastars (*Pisaster ochraceus*)

Data for sea star counts conducted in 2002 sampling are summarized in Table 6. Landing Cove, Ford Point, Johnson's Lee, and Crook Point have consistently had the highest numbers of seastars. Willows Anchorage, East Point, Orizaba Cove, Middle Anacapa and Prisoner's Harbor all had relatively high numbers of *Pisaster ochraceus* in 2002, at least doubling the number in counts since 1999 (see previous annual reports from this program). Other sites (Sea Lion Rookery, South Frenchy's Cove, Cat Rock, Fraser Cove and Northwest-Talcott) typically had very few sea stars and continued to have a low abundance in 2002.

In the fall sample, we counted *Pisaster ochraceus* in three size categories (small=less than 75mm radius; medium=75-150 mm; large=greater than 150mm) and these data are presented in the trip reports (Appendix B). Sizes, as well as abundance, were variable even among sites on one island. As an example, at San Miguel Island, Crook Point had a high abundance of *P. ochraceus* and the majority were small, while both Otter Harbor and Cuyler Harbor had moderate abundance. Large *P. ochraceus* were numerically dominant at Otter Harbor and an even distribution among the three size classes was found at Cuyler Harbor. Ochre sea stars were uncommon at Harris Point (Appendix B). Abundance of *P. ochraceus* at Cuyler Harbor seems to be increasing in recent years. At Johnson's Lee, the numbers of *P. ochraceus* were much higher in areas 1 and 2, and in

the transect in 2002 than in 2001 (Richards and Lerma 2005b). Seasonal differences between the spring and fall samples at Johnson's Lee (Table 6) shows how variable the counts can be.

Surfgrass (*Phyllospadix* spp.)

Surfgrass was monitored at two sites on Santa Rosa (Northwest-Talcott and East Point) and two sites on Santa Cruz (Fraser Cove and Trailer) in 2002 (figs. 12 and 13).

Complete results from transects are presented in tabular format in trip reports (Appendix. B).

Surfgrass cover has remained fairly stable at the two Santa Cruz Island sites since at least 1998 (Figure 12), though individual transects vary annually.

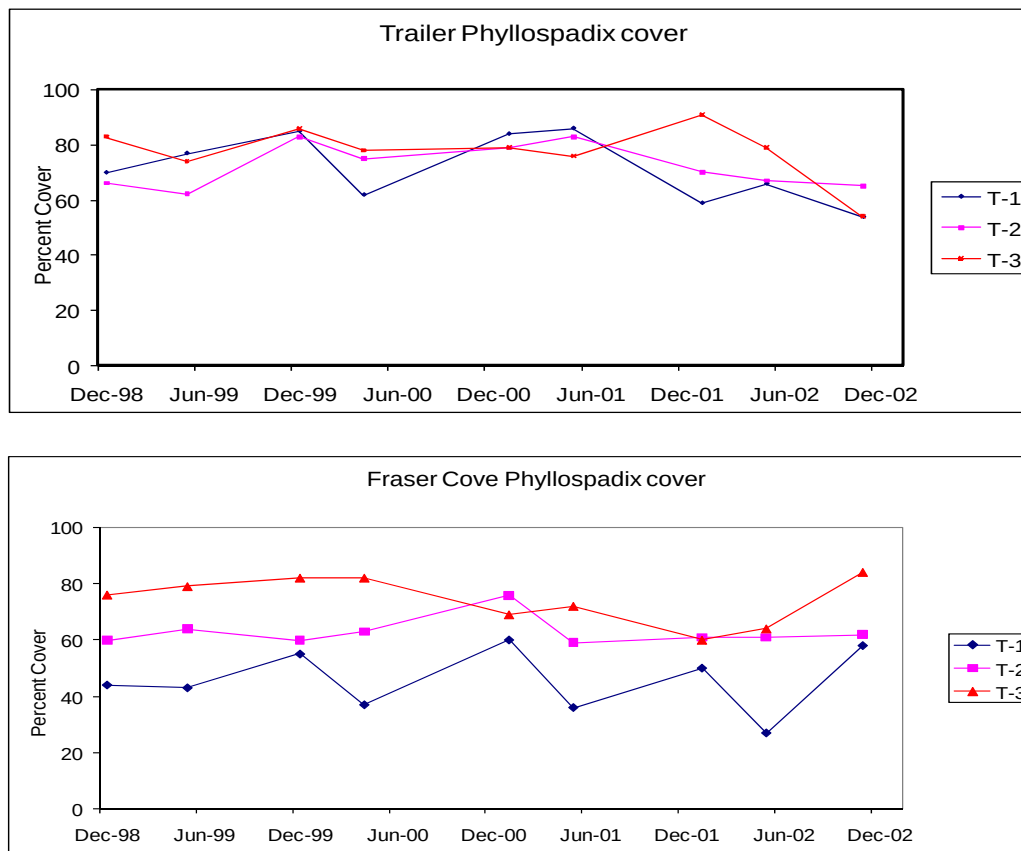


Figure 12. *Phyllospadix* spp. cover trends on 10m point-intercept transects at Santa Cruz Island 1998-2002.

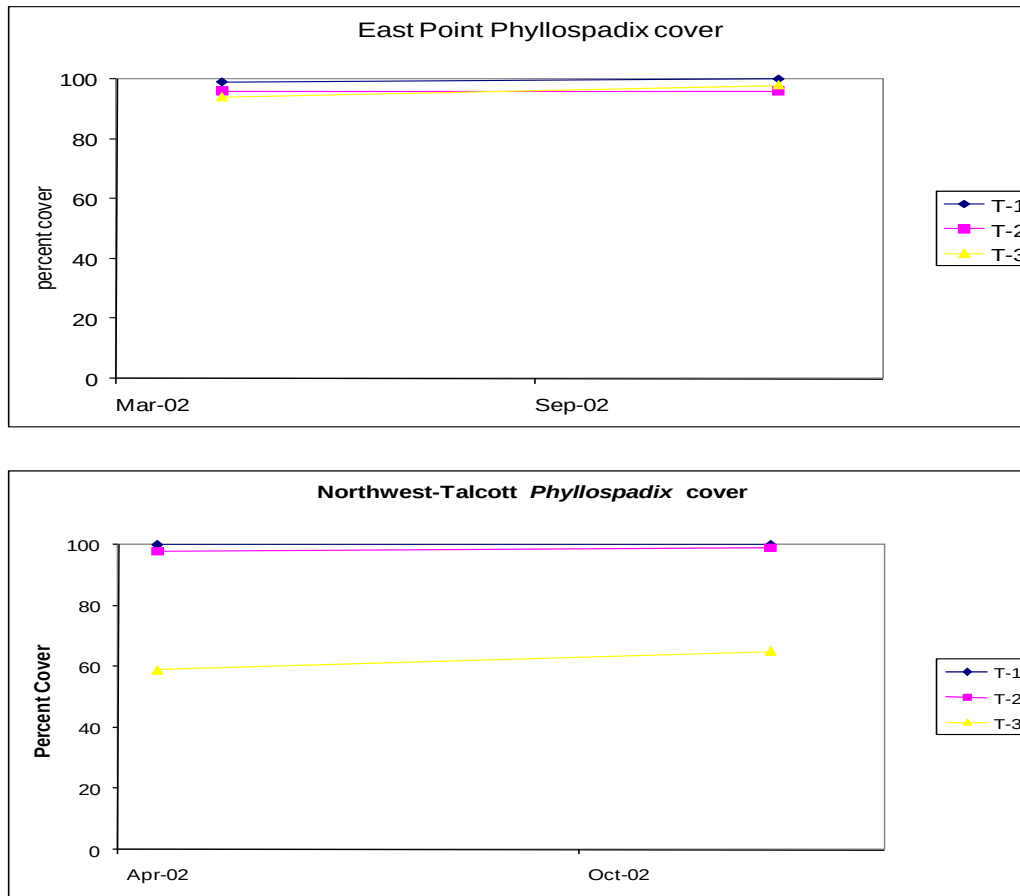


Figure 13. *Phyllospadix* spp. cover trends on 10m point-intercept transects at Santa Rosa Island 2002.

Shorebirds and Pinnipeds

A summary of the shorebirds and pinnipeds observed on monitoring dates is presented in Tables 7 and 8. Further natural history notes including birds observed off-site can be found in the trip reports section (Appendix. B). Black oystercatchers, *Haematopus bachmani*, were the most common shorebird and were observed at least once during sampling at all but two sites (Middle West Anacapa and Ford Point) in 2002. Only one American oystercatcher, *Haematopus palliatus*, was observed in 2002, at Fraser Cove. In the past we have referred to these birds as hybrids between American and Black Oystercatchers. Our observations generally are not close enough to distinguish full American oystercatchers from hybrids. However, in the past, many of the birds observed appeared to have only patchy white markings, while more recent sightings have been birds with the full white belly and markings of American oystercatchers. The largest aggregation of oystercatchers was 19 birds at Fossil Reef. Other shorebirds included black-bellied plovers, *Pluvialis squatarola*, wandering tattler, *Heteroscelus incanus*, and semi-palmated plovers, *Charadrius semipalmatus*. Roosting seabirds were common at several locations and included Western gulls, *Larus occidentalis*, Hermann's gulls, *Larus heermanni*, cormorants, *Phalacrocorax* spp., and California brown pelicans, *Pelicanus occidentalis*. Belted Kingfishers, *Ceryle alcyon*, were observed feeding nearshore at Cat Rock and Ford Point. Song Sparrows, *Melospiza meodia* were observed foraging either on the monitoring reef or adjacent splash zone at several sites.

Harbor seals, *Phoca vitulina*, were observed at, or very near, 9 of the 21 monitoring sites in 2002 (Tables 7 and 8). Presumably seals haul out on the rocks at those sites occasionally where they were seen nearby. California sea lions, *Zalophus californianus*, were common at both Santa Barbara Island sites. Elephant seals, *Mirounga angustirostris* were observed at Otter Harbor, Crook Point, and Fossil Reef. Elephant seals prefer the beaches adjacent to the monitoring reefs and unlike sea lions, rarely lay on the rocks where the plots are.

Table 7. Shorebirds and pinnipeds at monitoring sites in spring 2002 (maximum seen at any one time) (*= nearby but not on reef).

Site	Black Oystercatcher/ (American)	Black Turnstone	Other Birds	<i>Phoca vitulina</i>	<i>Mirounga Angustirostris</i>	<i>Zalophus californianus</i>
ANCR	3		1Belted Kingfisher*, 5 Western Gull 8 Western Gull	20*		
ANMW				2*		
ANME				2*		
ANSFC				2*		
SCFC (Forneys)	5		100 Western Gull, 1 Semi-palmated plover			
SCFC (Fraser)	3 (1 American Oystercatcher)		1 Wandering Tattler, 2 Western Gull			
SCTR	4					
SCWA	3					
SCSR	3		27 Brown Pelican			
SREP	2		1 Brown Pelican, 30 Cormorants, 4 Western gull	1*		
SRFP		1				
SRFR	5		1 Song Sparrow, 30 Western gull 4 Western gull	16	4	
SRJL	2					
NWT	4	7*		14, 4*		
SMCH	1					
SMCP	6	9			1, 27*	
SMHP	3					
SMOH	3		10 Western gull	25	1	

Table 8. Shorebirds and pinnipeds at monitoring sites in fall 2002 (maximum seen at any one time) (*= nearby but not on reef).

<i>Site</i>	Black Oystercatcher/ (American)	Black Turnstone	Other Birds	<i>Phoca vitulina</i>	<i>Mirounga Angustirostris</i>	<i>Zalophus californianus</i>
SBLC	2	2	2 Wandering tattler			40
SBSLR		5				150
ANCR	2		2 Western gull			
Middle – all	2		1 Western gull			
SCFC	7		1 Western gull			
SCTR	3		2 Western gull			
SCWA						
SCSR	3		2 Western gull			
SREP	3		40 Cormorants, 60 Western Gulls			
SRFP	2	1	1 Great Blue Heron*, 2 Belted Kingfisher*			
SRFR	19	2	10 Western gull, 10 Herrmann's Gulls, 40 cormorants		2	
SRJL		2	1 cormorant			
SRNWT	3					
SMCH	2					
SMCP			13 Double-crested cormorant, 1 Western gull		3*	
SMHP			2 Western gull	9		
SMOH	3		4 Western gull	59		

Visitation

Visitation to Frenchy's Cove on Anacapa Island is reported here since trips there are usually specifically to visit tidepools there. 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. Island Packers Company generally conducts classroom programs, combining oceanography with the tidepool experience for area school groups in the winter and spring months.

Visitation numbers for Frenchy's Cove are available from monthly reports based on concessionaire reporting from Island Packers Company and Truth Aquatics (Table 9, Figure14). 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 recorded visitation on concession boats in 2002 was 2733 passengers (Table 10), considerably more than the 1850 passengers in 2001, but more representative of the mean yearly visitation. The 2002 number of passengers was slightly above the long term average of 2538 visitors per year at Frenchy's between 1993 and 2002 (Figure 15). In 2002, February and March were the highest visitation months, where typical peak visitation occurs during March and April. More actual trips were made in April, 2002 however. The peak monthly average number of passengers per trip was over 70 (in March), while the overall mean for the year was 40 per trip. Seventy-six percent of the visitation occurred in the spring (February-May), which is equivalent to the percentage of spring visitors in 2001. The number of trips increased in 2002 over previous totals.

East Point on Santa Rosa Island is the only other site that receives regular visitation, and visitation figures are not available. Occasional boaters will land, but we rarely encounter people at any of the sites. Four private boaters with two dogs were seen at South Frenchy's Cove site in March, however.

Table 9. Visitors to South Frenchy's Cove, Anacapa Island in 2002 (visitation with Island Packers).

Year	Month	# Passengers	# Trips	Pass/Trip
2002	January	208	3	69
2002	February	821	12	68
2002	March	648	9	72
2002	April	494	38	13
2002	May	120	2	60
2002	June	0	0	0
2002	July	185	3	0
2002	August	199	4	50
2002	September	0	0	0
2002	October	0	0	0
2002	November	0	0	0
2002	December	58	1	58
2002	Total	2,733	72	Mean=40

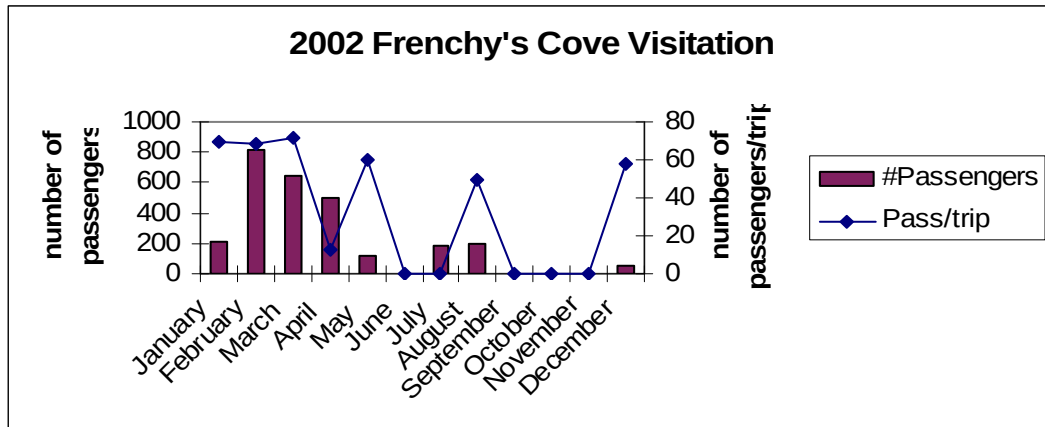


Figure 14. Visitation at Frenchy's Cove, Anacapa (Island Packers visitors).

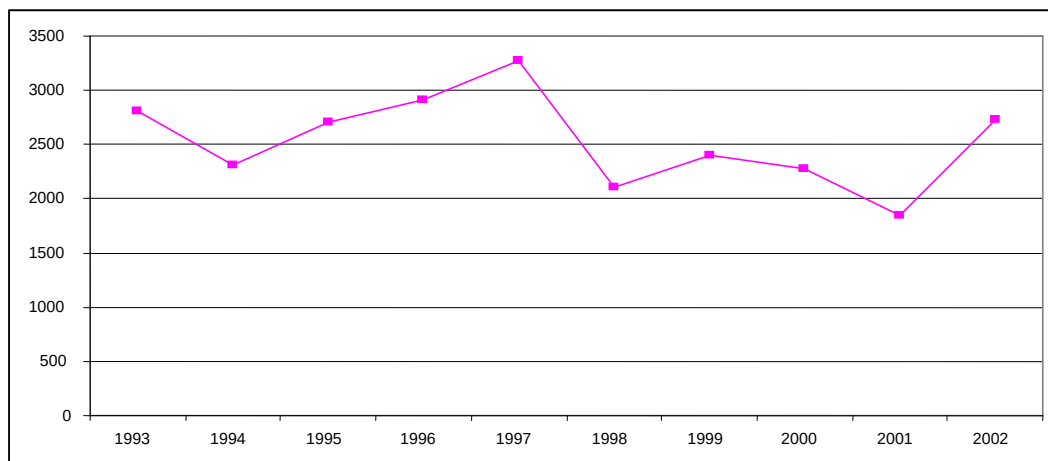


Figure 15. Annual Commercial Visitation at Frenchy's Cove, Anacapa (Island Packers visitors) 1993-2002 (number of visitors per year).

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. Photoplot data tables use the combinations of species in lumped categories used in previous reporting (most notable, *Hesperophycus* and *Silvetia* which were reported together as rockweed. 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.

In 2002, vast numbers of *Veleva veleva* were cast ashore in the spring, along with some pelagic red crabs, *Pleuroncodes planipes*, at San Miguel and Santa Rosa Islands. *Veleva*, or by-the-

wind-sailors, are pelagic Cnidarians and though not often, occasionally strand in large numbers on shore.

2002 was a relatively mild year with few storm wave events and little rain. The springtime conditions were generally cool, but there was very little rain after early January. The summer was overcast and mild mostly. The fall was mostly warm and calm. Strong Santa Ana Winds occurred on several occasions in the fall. Bleached *Endocladia muricata* and occasionally other red algae were observed at Willows Anchorage in fall 2002. Heavy rains fell in December 2002 and early January 2003. The average yearly mean temperature from the all of the Channel Islands National Park Kelp Forest Monitoring Data was 14.4°C (NPS unpublished).

Other general observations included the high abundance of *Porphyra perforata* at Fraser Point in the spring sample. The cover made it difficult to observe target species in the photoplots and it was difficult and time consuming to search for owl limpets in the plots. Trailer and Crook Point also had abundant *P. perforata* while most other sites had only low to moderate cover.

There was a large incidence of Domoic Acid Poisoning in April and May 2002. Domoic acid is a by-product of diatoms, *Psuedo-nitzschia* sp. The phenomenon was first recorded in California in 1991 (Langlois 2005). Many dolphin, sea lions, and pelicans were affected by domoic acid which builds up in filter feeding fish and causes brain lesions and sometimes death in the carnivores. Though the toxin also is found in filter feeding mussels, scallops, and other invertebrates, the residence time in invertebrates is short-lived and it is not thought to cause any problems to intertidal organisms.

Species Diversity

General species surveys were performed at 13 sites in spring 2002. Species lists were also generated from the comprehensive surveys by the UCSC biologists (see Coastal Biodiversity Surveys website). Crook Point stands out for having some unusual algal species in higher abundance than elsewhere at the islands. For example, *Microcladia borealis* was abundant in the spring at Crook Point, but was not noted elsewhere. *Laminaria setchelli*, seen at other San Miguel Island sites, was most common at Crook Point.

Porphyra perforata was common at several sites in 2002, and was particularly abundant at most of the Santa Cruz and San Miguel Island sites. Overall, Northwest-Talcott was once again the most diverse site with especially high diversity among algae, sponges, arthropods, and nudibranchs.

Discussion

Intertidal organisms are often limited in their distribution by physical factors such as temperature extremes (Ricketts et al. 1985). The Channel Islands also lie at the transition between the Oregonian and Californian Biogeographic Provinces (Seapy and Littler 1980). Organisms at the islands are representative of rocky intertidal zones both up and down coast on the mainland of California and the community as a whole may display a broader range of tolerances. Air temperatures during exposure at low tides can subject organisms to freezing, overheating, or excessive drying. Small variations in water temperature when prolonged can affect both larval and adult survival, and increase disease prevalence. In 2002, sea-surface temperature anomalies were above normal throughout the Eastern Pacific (NOAA Climate Prediction Center website) (Fig. 16).

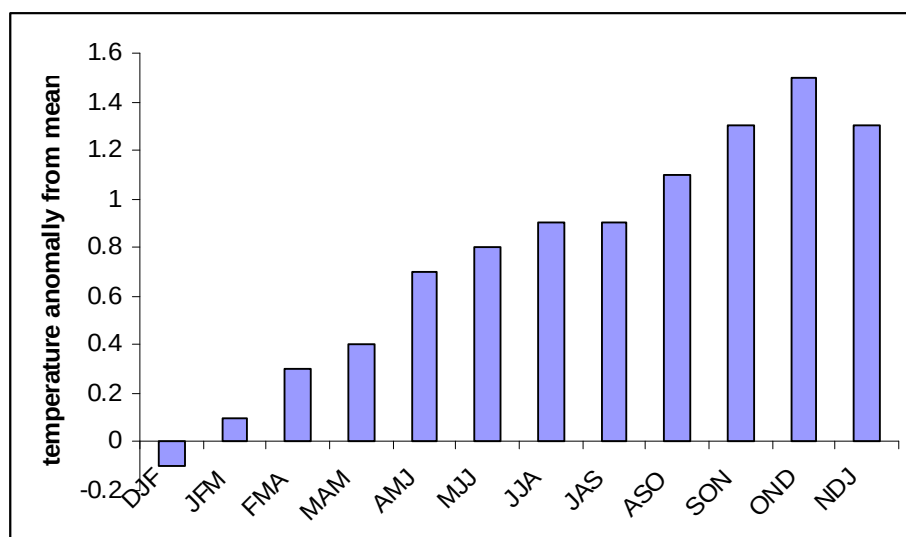


Figure 16. 2002 sea temperature anomalies by three month running mean (NOAA Climate Prediction Center website).

Sometimes associated with El Niños, there were some extreme storm events in 2002. Large waves struck Santa Barbara Island in an early season storm just weeks before we conducted the monitoring. Waves approximately five meters high damaged the wharf and boathouse (Figure 17), but the monitoring sites did not appear to sustain much damage. There was more bare rock in the plots at Landing Cove in fall 2002 compared to 2001; however, there was no obvious fresh damage.



Figure 17. Wave damage to Santa Barbara Island Boathouse, November 2002.

There were several strong Santa Ana wind events and during a low tide period in the fall. The dry warm air can negatively affect organisms as we observed with bleached algae at Willows Anchorage. We observed algal bleaching at Orizaba Cove, South Frenchy's Cove, and Otter Harbor in spring of 2002 that may have been related to Santa Ana conditions or just periods of coincidental calm seas, bright sun, and low tides. Strong Santa Ana winds in early February 2002 caused high seas and surf and were responsible for the capsizing of a patrol boat on a mooring at Scorpion Anchorage. A squid fishing boat went aground on the main beach at Scorpion Anchorage on February 7, 2002. About 750 gallons of diesel fuel was pumped from the wreck, though there was only minor spillage.

Although water temperatures seemed to be above normal and sites were hit by high waves and drying winds, there was little evidence of direct impact to the rocky intertidal zone. Algal and sessile invertebrate cover between spring and fall sampling did not demonstrate any obvious change, particularly as an overall trend, other than some algal bleaching. Bleaching may be temporary and is not necessarily bad for the algae in the long-term. Decline in cover or bleaching of eelgrass might be expected in the same conditions but most transects had increased cover, as seems to be the pattern. There is always the possibility of effects being seen farther down the road as it is possible that stressed organisms will show health or reproductive effects further into the future. It is also possible that some of the stresses could have been too late in the year to have been seen in this sampling. Some evidence of disease was seen in sea urchins and black abalone. Low levels of disease have been observed in both sea urchins and abalone over the last decade in both subtidal and intertidal animals.

The *Velella velella* stranding along with some pelagic red crabs, *Pleuroncodes planipes*, cast ashore in the spring, at San Miguel and Santa Rosa Islands is just an indication of some of the unusual sea conditions we observed in 2002. *Pleuroncodes* is often an indicator of El Niño and warm waters coming up from Mexico. Other indicators of warm water were seen in diseased purple sea urchins at Santa Rosa and San Miguel islands. No diseased sea stars were observed but these are more commonly seen in the warmer summer months (Eckert et al. 1999). Black abalone were found with symptoms of Withering Syndrome (WS) at two sites on Santa Rosa

Island indicating that WS is still a problem for black abalone recovery and may still be an factor in declining abalone numbers.

Pisaster ochraceus, the dominant seastar in the rocky intertidal zone and a keystone predator in the community has been increasing at several sites over the last four years. *Pisaster* numbers plummeted in the rocky intertidal due to a wasting disease prevalent in the warm waters during the El Niño period of 1997/1998 (Blanchette et al. 2005). Several sites (Landing Cove, Ford Point, Johnson's Lee, and Crook Point) have consistently had abundant seastars since the mid-1990's. Other sites (Willows Anchorage, East Point, Orizaba Cove, Middle Anacapa, and Prisoner's Harbor) have seen *P. ochraceus* numbers at least double since 1999. There is a great deal of variation among sites and islands with regard to the numbers of *P. ochraceus*. Despite the above average water temperatures in 2002 we did not notice a high incidence of seastar wasting disease at the rocky intertidal sites.



Figure 18. Coastal Biodiversity Survey at Johnson's Lee, Santa Rosa Island, fall 2002.

Little seasonal difference has been seen in previous motile invertebrate or owl limpet monitoring. Because we have not observed seasonal differences, we will begin monitoring motile invertebrates only in the spring sample. Alternating these counts Owl limpet counts in fall will ease the time pressure in the field. The standardized methods for motile invertebrate counts, developed among the MARINE groups, will allow us to make general comparisons between the mainland and island sites, and provide consistent data through the years.

Two graduate students worked with us in 2002. Both of these studies will add to the general pool of knowledge about the ecosystem and will be useful to future management decisions. Jayson Smith from University of California, Los Angeles collected mussel core (5 X 20 cm diameter core) samples from various sites at Anacapa, Santa Cruz, Santa Rosa and San Miguel islands, as well as mainland sites, for biomass and biodiversity comparison with historic data from west coast mussel beds as part of his dissertation project (Smith 2005). Jayson found an overall decrease in the percent cover of mussels from historic levels along with changes in the thickness of mussel beds, a significant decline in biomass, and declines in species diversity in southern California (Smith et al. 2006a and 2006b).

Melinda Chambers from University of Washington collected tissue samples from black abalone at Santa Cruz, Santa Rosa, San Miguel, San Clemente, and San Nicolas Island for genetic comparison in fall 2002 as part of her dissertation project (Chambers 2004). From the three park islands, 237 tissue samples (tentacle clips) were taken. She found significant differences in the genetic isolation between islands and mainland, and in general, adult abalones were more highly differentiated among locations and characterized by less overall genetic diversity than juveniles. This could be a result of selective pressures from Withering Syndrome (WS) on the surviving adults. Santa Cruz Island was the most genetically isolated of the island locations that she sampled. She speculates either the warm water currents isolate that island from the other three or that fishing pressure combined with Withering Syndrome associated declines may have functioned to shape the genetic structure of those populations. Black abalone densities on all the islands were extremely low in 2002. Juveniles are essentially lacking indicating that there is little input or survival of larvae. The Chambers (2004) data would seem to support the assumption that populations are too low for successful reproduction.

As part of the overall goal of restoring the natural ecosystem functions at the islands, rat eradication underwent the second and final phase at Anacapa Island fall 2002 with aerial application of brodifacoum in November and December. The eradication was successful (Howald et al. 2005). In addition to impacting seabirds and terrestrial plants and animals, rats were feeding in the intertidal zone on snails, limpets, and crabs (Erickson and Halvorson 1990). No apparent effects of the eradication were observed in the rocky intertidal. Biannual motile invertebrate counts will continue at the Anacapa sites because snails and limpets may be some of the most likely species to show changes as a result of the release from rat predation.

Feral pigs were observed in the rocky intertidal on Santa Cruz Island in 2002, feeding on invertebrates. Steve Murray and the CSU Fullerton crew observed feral pigs eating mussels at Prisoner's Harbor in spring 2002 (pers. comm.). One of the mussel plots there was devastated overnight. Overall *Mytilus californianus* cover in the mussel plots declined from 67.6% in spring to 44.8% in the fall. *Mytilus* cover in spring 2001 was at 83% but had declined to 54% in the fall of 2001. One pig is certainly capable of doing a lot of damage in a relatively short time but there is no way for us to know how much of the loss can be attributed to the pigs feeding there. Dan Richards observed evidence of pigs feeding on seastars at Coches Prietos (south Santa Cruz Island) during a visit there in May. In November, we observed pig scat on the intertidal rocks and a pig was observed on the nearby beach foraging in wrack. It appeared to us that pigs had also been grazing on rockweed, *Silvetia compressa*, at Prisoner's Harbor. All of the *S. compressa* thalli appeared to be clipped off about at the same height; roughly 5-10 cm. Percent cover of *S.*

compressa fell from 91% in spring 2002 to just 44.8% in the fall, much greater than we typically see. The mussel bed on that portion of the reef was mostly bare on the upper horizontal surfaces only, leading us to suspect that feral pigs were responsible.

Future monitoring may reveal changes resulting from the removal of feral pigs and rats from the islands. Pig damage is probably quite localized since few reefs are accessible to pigs and most of the marine organisms are wide-spread. Rats are also omnivorous, feeding on a variety of snails and crabs primarily (Erickson and Halverson 1990). The predation on snails by rats maybe insignificant compared to their predation on seabird eggs, but community changes are worth looking for following decades of rat presence.

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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 *Pterocladia capillacea*. The mussel taxon is *Mytilus* spp. with *Mytilus californianus* dominating at all sites. In 2002, horse mussels, *Septifer bifurcates* or *Brachidontes adamsianus* (two similar species that are difficult to distinguish in the field) were scored as their own category, but are included here as miscellaneous invertebrates in the following tables. Misc. Algae and Misc. Animals include a variety of different species. In the past these species have not been identified, however, we are beginning to note the species and add them to the database. Species identified in 2001 may be identified in the database but 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 2002 was used only for *Phyllospadix* spp. at Landing Cove.

Appendix A Tables

	Page
Table A1. Percent Cover of Index Species Cat Rock, Anacapa Island - Spring 2002 (3/11/02).....	A-5
Table A2. Percent Cover of Index Species Middle-East, Anacapa Island - Spring 2002 (3/26/02).....	A-7
Table A3. Percent Cover of Index Species Middle-West, Anacapa Island - Spring 2002 (3/12/02).....	A-8
Table A4. Percent Cover of Index Species S Frenchy's Cove, Anacapa Island - Spring 2002 (3/8/02).....	A-9
Table A5. Percent Cover of Index Species Crook Point, San Miguel Island - Spring 2002 (3/26/02).....	A-10
Table A6. Percent Cover of Index Species Cuyler Harbor, San Miguel Island - Spring 2002 (3/24/02).....	A-11
Table A7. Percent Cover of Index Species Harris Point, San Miguel Island - Spring 2002 (3/27/02).....	A-12
Table A8. Percent Cover of Index Species Otter Harbor, San Miguel Island - Spring 2002 (3/25/02).....	A-13
Table A9. Percent Cover of Index Species Fraser Cove, Santa Cruz Island - Spring 2002 (5/14/02).....	A-14
Table A10. Percent Cover of Index Species Orizaba Cove, Santa Cruz Island - Spring 2002 (2/25/02).....	A-16
Table A11. Percent Cover of Index Species Prisoner's Harbor, Santa Cruz Island - Spring 2002 (5/17/02).....	A-17
Table A12. Percent Cover of Index Species Scorpion Rock, Santa Cruz Island - Spring 2002 (6/27/02).....	A-18
Table A13. Percent Cover of Index Species Trailer, Santa Cruz Island - Spring 2002 (5/14/02).....	A-19
Table A14. Percent Cover of Index Species Willows Anchorage, Santa Cruz Island - Spring 2002 (5/16/02).....	A-20
Table A15. Percent Cover of Index Species East Point, Santa Rosa Island - Spring 2002 (4/19/02).....	A-21

Table A16. Percent Cover of Index Species Ford Point, Santa Rosa Island - Spring 2002 (4/22/02).....	A-22
Table A17. Percent Cover of Index Species Fossil Reef, Santa Rosa Island - Spring 2002 (4/20/02).....	A-23
Table A18. Percent Cover of Index Species Johnson's Lee, Santa Rosa Island - Spring 2002 (4/22/02).....	A-24
Table A19. Percent Cover of Index Species Northwest Talcott, Santa Rosa Island - Spring 2002 (4/21/02).....	A-25
Table A20. Percent Cover of Index Species Cat Rock, Anacapa Island - Fall 2002 (1/28/03).....	A-26
Table A21. Percent Cover of Index Species Middle-East, Anacapa Island - Fall 2002 (1/29/03).....	A-28
Table A22. Percent Cover of Index Species Middle-West, Anacapa Island - Fall 2002 (1/29/03).....	A-29
Table A23. Percent Cover of Index Species S Frenchy's Cove, Anacapa Island - Fall 2002 (1/27/03)	A-30
Table A24. Percent Cover of Index Species Crook Point, San Miguel Island - Fall 2002 (1/14/03).....	A-31
Table A25. Percent Cover of Index Species Cuyler Harbor, San Miguel Island - Fall 2002 (12/31/02)	A-32
Table A26. Percent Cover of Index Species Harris Point, San Miguel Island - Fall 2002 (1/16/03).....	A-33
Table A27. Percent Cover of Index Species Otter Harbor, San Miguel Island - Fall 2002 (1/15/03).....	A-34
Table A28. Percent Cover of Index Species Landing Cove, Santa Barbara Island - Fall 2002 (11/21/02)	A-35
Table A29. Percent Cover of Index Species Sea Lion Rookery, Santa Barbara Island - Fall 2002 (11/20/02)	A-36
Table A30. Percent Cover of Index Species Fraser Cove, Santa Cruz Island - Fall 2002 (11/3/02).....	A-37
Table A31. Percent Cover of Index Species Orizaba Cove, Santa Cruz Island - Fall 2002 (1/30/03)	A-39

Table A32. Percent Cover of Index Species Prisoner's Harbor, Santa Cruz Island - Fall 2002 (11/5/02)	A-40
Table A33. Percent Cover of Index Species Scorpion Rock, Santa Cruz Island - Fall 2002 (1/31/03)	A-41
Table A34. Percent Cover of Index Species Trailer, Santa Cruz Island - Fall 2002 (11/2/02).....	A-42
Table A35. Percent Cover of Index Species Willows Anchorage, Santa Cruz Island - Fall 2002 (11/4/02)	A-43
Table A36. Percent Cover of Index Species East Point, Santa Rosa Island - Fall 2002 (12/4/02).....	A-44
Table A37. Percent Cover of Index Species Ford Point, Santa Rosa Island - Fall 2002 (12/5/02).....	A-45
Table A38. Percent Cover of Index Species Fossil Reef, Santa Rosa Island - Fall 2002 (12/3/02).....	A-46
Table A39. Percent Cover of Index Species Johnson's Lee, Santa Rosa Island - Fall 2002 (12/1/02)	A-47
Table A40. Percent Cover of Index Species Northwest Talcott, Santa Rosa Island - Fall 2002 (12/2/02)	A-48

**Table A1. Percent Cover of Index Species
Cat Rock, Anacapa Island - Spring 2002 (3/11/02)**

<u>Zone</u>	<u>Plot</u>	<u>Bare Rock</u>	<u>Acorn Barnacle</u>	<u>Tetra- clita</u>	<u>Endo- cladia</u>	<u>Hespero- phycus</u>	<u>Silvetia</u>	<u>Mussels</u>	<u>Turf- weed</u>	<u>Leaf Barnacle</u>	<u>Misc Algae</u>	<u>Misc Animal</u>	<u>Tar</u>	<u>Other</u>	<u>Total</u>
Chthamalus/Balanus	31	41	21	0	15	23	0	0	0	0	0	0	0	0	100
	32	17	3	0	26	46	3	0	0	0	5	0	0	0	100
	33	11	2	0	6	68	0	0	0	0	13	0	0	0	100
	35	27	10	0	7	54	0	0	0	0	2	0	0	0	100
	36	16	4	0	6	56	0	0	2	0	15	1	0	0	100
	37	17	9	0	12	43	6	0	0	0	13	0	0	0	100
	38	56	38	0	4	0	0	0	0	0	2	0	0	0	100
	39	36	10	0	6	45	0	0	0	0	2	0	1	0	100
	135	21	4	0	8	57	4	0	0	0	6	0	0	0	100
	Mean	26.89	11.22	.00	10.00	43.56	1.44	.00	.22	.00	6.44	.11	.11	.00	100.00
	StDev	14.71	11.61	.00	6.91	20.53	2.30	.00	.67	.00	5.73	.33	.33	.00	.00
Endocladia	13	31	4	12	43	0	0	2	0	0	7	1	0	0	100
	14	47	4	10	28	0	0	4	0	0	3	4	0	0	100
	19	21	3	0	32	22	18	0	0	0	3	1	0	0	100
	51	14	6	0	11	0	0	0	12	0	49	8	0	0	100
	52	5	0	4	36	0	0	4	13	0	28	10	0	0	100
	54	7	2	18	22	0	0	2	13	0	29	7	0	0	100
	212	19	8	8	59	0	0	4	0	0	2	0	0	0	100
	467	26	0	16	42	0	0	8	0	0	5	3	0	0	100
	492	15	1	4	46	11	8	2	0	0	9	4	0	0	100
	Mean	20.56	3.11	8.00	35.44	3.67	2.89	2.89	4.22	.00	15.00	4.22	.00	.00	100.00
	StDev	12.94	2.71	6.56	14.20	7.78	6.25	2.47	6.34	.00	16.50	3.46	.00	.00	.00
Silvetia (Rockweed)	2	30	1	0	15	20	25	0	0	0	9	0	0	0	100
	3	10	2	0	0	72	5	1	0	0	9	1	0	0	100
	4	8	0	0	3	27	51	0	0	0	11	0	0	0	100
	5	27	12	10	25	0	3	4	0	0	14	5	0	0	100
	6	10	0	0	16	20	46	0	0	1	7	0	0	0	100
	8	14	0	0	0	4	78	0	0	0	4	0	0	0	100
	9	1	0	0	2	3	89	0	0	0	5	0	0	0	100
	10	2	1	0	2	22	61	0	0	0	12	0	0	0	100
	55	35	20	9	20	0	0	1	1	0	10	4	0	0	100
	Mean	15.22	4.00	2.11	9.22	18.67	39.78	.67	.11	.11	9.00	1.11	.00	.00	100.00
	StDev	12.42	7.12	4.20	9.73	22.60	33.28	1.32	.33	.33	3.24	1.96	.00	.00	.00

**Table A1 (continued). Percent Cover of Index Species
Cat Rock, Anacapa Island - Spring 2002 (3/11/02)**

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	8	0	40	0	0	0	25	0	0	19	8	0	0	100
	164	15	0	19	1	0	0	44	0	2	8	11	0	0	100
	203	17	0	9	0	0	0	45	0	1	9	19	0	0	100
	204	5	2	8	4	0	0	66	0	0	4	11	0	0	100
	468	14	0	26	7	0	0	19	1	0	25	8	0	0	100
	470	39	5	21	2	0	0	18	0	1	9	5	0	0	100
	471	27	2	17	6	0	0	12	0	0	33	3	0	0	100
	472	5	0	24	1	0	0	51	1	4	9	5	0	0	100
	473	26	2	17	1	0	0	33	0	0	9	12	0	0	100
	Mean	17.33	1.22	20.11	2.44	.00	.00	34.78	.22	.89	13.89	9.11	.00	.00	100.00
	StDev	11.43	1.72	9.60	2.60	.00	.00	17.94	.44	1.36	9.64	4.83	.00	.00	.00

**Table A2. Percent Cover of Index Species
Middle-East, Anacapa Island - Spring 2002 (3/26/02)**

<u>Zone</u>	<u>Plot</u>	<u>Bare Rock</u>	<u>Acorn Barnacle</u>	<u>Tetra- clita</u>	<u>Endo- cladia</u>	<u>Hespero- phycus</u>	<u>Silvetia</u>	<u>Mussels</u>	<u>Turf- weed</u>	<u>Leaf Barnacle</u>	<u>Misc Algae</u>	<u>Misc Animal</u>	<u>Tar</u>	<u>Other</u>	<u>Total</u>
Chthamalus/Balanus	243	34	8	18	11	0	0	7	0	1	20	1	0	0	100
	244	46	13	4	17	1	0	1	0	0	17	1	0	0	100
	245	65	6	7	12	0	0	1	0	1	8	0	0	0	100
	Mean	48.33	9.00	9.67	13.33	.33	.00	3.00	.00	.67	15.00	.67	.00	.00	100.00
	StDev	15.63	3.61	7.37	3.21	.58	.00	3.46	.00	.58	6.24	.58	.00	.00	.00
Endocladia	240	4	0	1	52	2	20	0	3	0	18	0	0	0	100
	241	33	0	25	14	2	0	6	0	0	20	0	0	0	100
	242	20	3	2	38	2	0	2	0	0	32	1	0	0	100
	Mean	19.00	1.00	9.33	34.67	2.00	6.67	2.67	1.00	.00	23.33	.33	.00	.00	100.00
	StDev	14.53	1.73	13.58	19.22	.00	11.55	3.06	1.73	.00	7.57	.58	.00	.00	.00
Silvetia (Rockweed)	53	10	0	4	13	0	34	13	0	0	24	2	0	0	100
	237	7	0	0	6	2	74	1	0	0	10	0	0	0	100
	469	5	0	2	0	0	80	0	0	0	13	0	0	0	100
	Mean	7.33	.00	2.00	6.33	.67	62.67	4.67	.00	.00	15.67	.67	.00	.00	100.00
	StDev	2.52	.00	2.00	6.51	1.15	25.01	7.23	.00	.00	7.37	1.15	.00	.00	.00
Mussels	476	5	0	3	0	0	0	66	0	0	25	1	0	0	100
	477	2	0	9	0	0	0	65	0	1	22	1	0	0	100
	478	4	0	2	0	0	0	56	0	1	33	4	0	0	100
	Mean	3.67	.00	4.67	.00	.00	.00	62.33	.00	.67	26.67	2.00	.00	.00	100.00
	StDev	1.53	.00	3.79	.00	.00	.00	5.51	.00	.58	5.69	1.73	.00	.00	.00

**Table A3. Percent Cover of Index Species
Middle-West, Anacapa Island - Spring 2002 (3/12/02)**

<u>Zone</u>	<u>Plot</u>	<u>Bare Rock</u>	<u>Acorn Barnacle</u>	<u>Tetra- clita</u>	<u>Endo- cladia</u>	<u>Hespero- phycus</u>	<u>Silvetia</u>	<u>Mussels</u>	<u>Turf- weed</u>	<u>Leaf Barnacle</u>	<u>Misc Algae</u>	<u>Misc Animal</u>	<u>Tar</u>	<u>Other</u>	<u>Total</u>
Chthamalus/Balanus	447	34	22	0	31	0	0	1	0	0	12	0	0	0	100
	448	33	3	2	34	0	0	6	1	1	20	0	0	0	100
	449	37	4	0	15	7	0	0	0	0	37	0	0	0	100
	450	39	10	0	23	0	0	0	0	0	28	0	0	0	100
	451	47	3	1	28	0	0	0	0	0	21	0	0	0	100
	Mean	38.00	8.40	.60	26.20	1.40	.00	1.40	.20	.20	23.60	.00	.00	.00	100.00
	StDev	5.57	8.14	.89	7.46	3.13	.00	2.61	.45	.45	9.40	.00	.00	.00	.00
Endocladia	457	25	0	0	20	0	0	13	1	0	40	1	0	0	100
	458	59	2	0	16	0	0	10	0	2	10	1	0	0	100
	459	50	1	0	11	0	0	1	0	0	37	0	0	0	100
	460	45	8	0	41	0	0	0	0	0	6	0	0	0	100
	461	18	0	0	68	2	0	0	0	0	12	0	0	0	100
	Mean	39.40	2.20	.00	31.20	.40	.00	4.80	.20	.40	21.00	.40	.00	.00	100.00
	StDev	17.27	3.35	.00	23.53	.89	.00	6.22	.45	.89	16.16	.55	.00	.00	.00
Silvetia (Rockweed)	452	17	1	2	6	0	66	0	0	0	8	0	0	0	100
	453	6	0	1	3	0	84	0	0	0	6	0	0	0	100
	454	26	0	11	7	0	0	3	0	0	46	7	0	0	100
	455	2	0	0	4	0	77	4	0	0	8	5	0	0	100
	456	11	0	0	1	0	80	2	0	0	6	0	0	0	100
	Mean	12.40	.20	2.80	4.20	.00	61.40	1.80	.00	.00	14.80	2.40	.00	.00	100.00
	StDev	9.45	.45	4.66	2.39	.00	34.97	1.79	.00	.00	17.47	3.36	.00	.00	.00
Mussels	462	16	1	4	1	0	0	49	0	3	24	2	0	0	100
	463	26	0	6	1	0	0	31	0	0	35	1	0	0	100
	464	27	0	6	4	0	0	31	0	0	30	2	0	0	100
	465	20	0	4	0	0	0	49	0	1	22	4	0	0	100
	466	1	0	0	2	0	0	79	0	0	12	6	0	0	100
	Mean	18.00	.20	4.00	1.60	.00	.00	47.80	.00	.80	24.60	3.00	.00	.00	100.00
	StDev	10.51	.45	2.45	1.52	.00	.00	19.63	.00	1.30	8.71	2.00	.00	.00	.00

**Table A4. Percent Cover of Index Species
S Frenchy's Cove, Anacapa Island - Spring 2002 (3/8/02)**

<u>Zone</u>	<u>Plot</u>	<u>Bare Rock</u>	<u>Acorn Barnacle</u>	<u>Tetra- clita</u>	<u>Endo- cladia</u>	<u>Hespero- phycus</u>	<u>Silvetia</u>	<u>Mussels</u>	<u>Turf- weed</u>	<u>Leaf Barnacle</u>	<u>Misc Algae</u>	<u>Misc Animal</u>	<u>Tar</u>	<u>Other</u>	<u>Total</u>
Chthamalus/Balanus	249	56	18	0	20	0	0	0	0	1	1	4	0	0	100
	250	51	27	0	17	0	0	0	0	0	0	0	5	0	100
	251	64	31	0	3	0	0	0	0	0	0	2	0	0	100
	252	64	29	0	3	0	0	0	0	0	3	0	1	0	100
	253	43	34	0	22	1	0	0	0	0	0	0	0	0	100
	Mean	55.60	27.80	.00	13.00	.20	.00	.00	.00	.20	.80	1.20	1.20	.00	100.00
	StDev	8.96	6.06	.00	9.30	.45	.00	.00	.00	.45	1.30	1.79	2.17	.00	.00
Endocladia	154	31	9	0	52	0	1	0	0	0	2	5	0	0	100
	155	10	3	0	71	0	15	0	0	0	0	0	1	0	100
	256	31	1	0	49	10	3	0	0	0	6	0	0	0	100
	257	10	0	0	86	0	0	0	1	0	3	0	0	0	100
	258	14	0	0	40	0	44	0	0	0	2	0	0	0	100
	Mean	19.20	2.60	.00	59.60	2.00	12.60	.00	.20	.00	2.60	1.00	.20	.00	100.00
	StDev	10.89	3.78	.00	18.58	4.47	18.56	.00	.45	.00	2.19	2.24	.45	.00	.00
Silvetia (Rockweed)	259	10	0	0	1	0	87	0	0	0	2	0	0	0	100
	260	21	11	0	5	6	48	0	0	0	9	0	0	0	100
	261	3	0	0	0	0	82	0	0	0	11	4	0	0	100
	262	46	26	0	8	0	5	0	0	0	12	3	0	0	100
	263	17	0	0	0	0	77	0	0	0	5	1	0	0	100
	Mean	19.40	7.40	.00	2.80	1.20	59.80	.00	.00	.00	7.80	1.60	.00	.00	100.00
	StDev	16.38	11.44	.00	3.56	2.68	34.17	.00	.00	.00	4.21	1.82	.00	.00	.00
Mussels	201	6	0	0	9	0	0	47	14	0	22	2	0	0	100
	202	9	0	0	2	0	0	64	9	0	16	0	0	0	100
	264	3	0	2	2	0	0	62	8	0	19	4	0	0	100
	265	9	0	3	0	0	0	70	2	0	13	3	0	0	100
	266	17	5	3	5	0	0	46	7	1	12	4	0	0	100
	Mean	8.80	1.00	1.60	3.60	.00	.00	57.80	8.00	.20	16.40	2.60	.00	.00	100.00
	StDev	5.22	2.24	1.52	3.51	.00	.00	10.73	4.30	.45	4.16	1.67	.00	.00	.00

**Table A5. Percent Cover of Index Species
Crook Point, San Miguel Island - Spring 2002 (3/26/02)**

<u>Zone</u>	<u>Plot</u>	<u>Bare Rock</u>	<u>Acorn Barnacle</u>	<u>Tetra- clita</u>	<u>Endo- cladia</u>	<u>Hespero- phycus</u>	<u>Silvetia</u>	<u>Mussels</u>	<u>Turf- weed</u>	<u>Leaf Barnacle</u>	<u>Misc Algae</u>	<u>Misc Animal</u>	<u>Tar</u>	<u>Other</u>	<u>Total</u>
Chthamalus/Balanus	137	91	9	0	0	0	0	0	0	0	0	0	0	0	100
	147	63	36	0	0	0	0	0	0	0	0	1	0	0	100
	148	65	35	0	0	0	0	0	0	0	0	0	0	0	100
	149	48	47	0	4	0	0	1	0	0	0	0	0	0	100
	495	41	53	0	5	0	0	1	0	0	0	0	0	0	100
	Mean	61.60	36.00	.00	1.80	.00	.00	.40	.00	.00	.00	.20	.00	.00	100.00
	StDev	19.28	16.88	.00	2.49	.00	.00	.55	.00	.00	.00	.45	.00	.00	.00
Endocladia	386	38	28	0	28	2	0	0	0	0	3	1	0	0	100
	387	42	5	1	18	0	0	0	0	0	31	3	0	0	100
	388	23	37	0	34	0	0	0	0	0	5	1	0	0	100
	389	29	10	2	13	6	6	29	0	1	4	0	0	0	100
	390	20	22	0	15	0	0	16	0	2	25	0	0	0	100
	Mean	30.40	20.40	.60	21.60	1.60	1.20	9.00	.00	.60	13.60	1.00	.00	.00	100.00
	StDev	9.45	13.05	.89	9.02	2.61	2.68	13.15	.00	.89	13.33	1.22	.00	.00	.00
Silvetia (Rockweed)	396	34	16	0	17	0	2	17	0	5	9	0	0	0	100
	397	1	2	0	0	0	0	90	0	0	7	0	0	0	100
	398	42	25	0	2	0	2	17	0	1	11	0	0	0	100
	399	23	7	0	4	0	1	2	2	0	60	1	0	0	100
	400	51	15	0	14	2	1	3	0	0	14	0	0	0	100
	Mean	30.20	13.00	.00	7.40	.40	1.20	25.80	.40	1.20	20.20	.20	.00	.00	100.00
	StDev	19.31	8.86	.00	7.60	.89	.84	36.62	.89	2.17	22.40	.45	.00	.00	.00
Mussels	381	14	13	0	0	0	0	50	1	0	18	4	0	0	100
	382	3	0	0	0	0	0	96	0	0	1	0	0	0	100
	383	4	0	0	0	0	0	93	0	0	3	0	0	0	100
	384	8	2	1	0	0	0	80	0	4	4	1	0	0	100
	385	12	8	1	0	0	0	55	0	8	16	0	0	0	100
	Mean	8.20	4.60	.40	.00	.00	.00	74.80	.20	2.40	8.40	1.00	.00	.00	100.00
	StDev	4.82	5.73	.55	.00	.00	.00	21.30	.45	3.58	7.96	1.73	.00	.00	.00

**Table A6. Percent Cover of Index Species
Cuyler Harbor, San Miguel Island - Spring 2002 (3/24/02)**

<u>Zone</u>	<u>Plot</u>	<u>Bare Rock</u>	<u>Acorn Barnacle</u>	<u>Tetra- clita</u>	<u>Endo- cladia</u>	<u>Hespero- phycus</u>	<u>Silvetia</u>	<u>Mussels</u>	<u>Turf- weed</u>	<u>Leaf Barnacle</u>	<u>Misc Algae</u>	<u>Misc Animal</u>	<u>Tar</u>	<u>Other</u>	<u>Total</u>
Chthamalus/Balanus	416	47	53	0	0	0	0	0	0	0	0	0	0	0	100
	417	25	72	0	3	0	0	0	0	0	0	0	0	0	100
	418	43	56	0	0	0	0	1	0	0	0	0	0	0	100
	419	78	16	0	6	0	0	0	0	0	0	0	0	0	100
	420	58	28	0	14	0	0	0	0	0	0	0	0	0	100
	Mean	50.20	45.00	.00	4.60	.00	.00	.20	.00	.00	.00	.00	.00	.00	100.00
	StDev	19.56	22.61	.00	5.81	.00	.00	.45	.00	.00	.00	.00	.00	.00	.00
Endocladia	411	62	3	0	16	0	0	10	0	0	4	5	0	0	100
	412	28	40	0	21	0	0	9	0	0	2	0	0	0	100
	413	38	0	0	19	0	40	0	0	0	2	1	0	0	100
	414	14	0	0	83	0	0	0	0	0	3	0	0	0	100
	415	57	1	0	30	0	0	0	0	0	12	0	0	0	100
	Mean	39.80	8.80	.00	33.80	.00	8.00	3.80	.00	.00	4.60	1.20	.00	.00	100.00
	StDev	19.98	17.48	.00	27.99	.00	17.89	5.22	.00	.00	4.22	2.17	.00	.00	.00
Silvetia (Rockweed)	406	24	1	0	0	0	42	0	0	0	14	19	0	0	100
	407	20	0	0	0	0	61	0	0	0	14	5	0	0	100
	408	20	0	2	0	0	66	0	0	1	8	3	0	0	100
	409	17	0	0	0	0	65	0	0	0	11	7	0	0	100
	410	17	0	0	0	0	73	0	0	0	5	5	0	0	100
	Mean	19.60	.20	.40	.00	.00	61.40	.00	.00	.20	10.40	7.80	.00	.00	100.00
	StDev	2.88	.45	.89	.00	.00	11.67	.00	.00	.45	3.91	6.42	.00	.00	.00
Mussels	401	11	0	2	0	0	0	75	0	4	2	6	0	0	100
	402	12	0	0	0	0	0	69	0	4	5	10	0	0	100
	403	23	0	2	0	0	0	51	1	2	7	14	0	0	100
	404	32	0	11	0	0	0	31	0	1	6	19	0	0	100
	405	50	0	13	0	0	0	21	0	0	3	13	0	0	100
	Mean	25.60	.00	5.60	.00	.00	.00	49.40	.20	2.20	4.60	12.40	.00	.00	100.00
	StDev	16.13	.00	5.94	.00	.00	.00	23.38	.45	1.79	2.07	4.83	.00	.00	.00

**Table A7. Percent Cover of Index Species
Harris Point, San Miguel Island - Spring 2002 (3/27/02)**

<u>Zone</u>	<u>Plot</u>	<u>Bare Rock</u>	<u>Acorn Barnacle</u>	<u>Tetra- clita</u>	<u>Endo- cladia</u>	<u>Hespero- phycus</u>	<u>Silvetia</u>	<u>Mussels</u>	<u>Leaf Barnacle</u>	<u>Misc Algae</u>	<u>Misc Animal</u>	<u>Tar</u>	<u>Other</u>	<u>Total</u>
Chthamalus/Balanus	440	27	68	0	3	0	0	0	0	2	0	0	0	100
	441	52	47	0	1	0	0	0	0	0	0	0	0	100
	442	7	85	0	7	0	0	0	0	1	0	0	0	100
	443	54	41	0	0	0	0	0	0	0	0	5	0	100
	444	58	39	0	1	0	0	0	0	2	0	0	0	100
	Mean	39.60	56.00	.00	2.40	.00	.00	.00	.00	1.00	.00	1.00	.00	100.00
	StDev	21.92	19.87	.00	2.79	.00	.00	.00	.00	1.00	.00	2.24	.00	.00
Endocladia	431	19	16	2	38	0	0	8	0	15	2	0	0	100
	432	5	12	0	74	1	0	0	0	7	0	0	1	100
	433	13	14	0	72	0	0	0	0	1	0	0	0	100
	434	13	1	0	55	30	0	0	0	1	0	0	0	100
	435	18	0	0	42	28	0	0	0	12	0	0	0	100
	Mean	13.60	8.60	.40	56.20	11.80	.00	1.60	.00	7.20	.40	.00	.20	100.00
	StDev	5.55	7.54	.89	16.59	15.72	.00	3.58	.00	6.34	.89	.00	.45	.00
Mussels	426	17	1	3	4	0	0	45	2	27	1	0	0	100
	427	15	0	5	14	5	0	12	0	46	3	0	0	100
	428	35	1	4	0	0	0	24	0	36	0	0	0	100
	429	24	6	6	1	0	0	52	0	11	0	0	0	100
	430	15	0	3	0	0	0	61	1	20	0	0	0	100
	Mean	21.20	1.60	4.20	3.80	1.00	.00	38.80	.60	28.00	.80	.00	.00	100.00
	StDev	8.56	2.51	1.30	5.93	2.24	.00	20.27	.89	13.62	1.30	.00	.00	.00
Tetraclita	436	25	7	30	0	0	0	14	0	23	1	0	0	100
	437	11	0	19	0	0	0	25	2	39	4	0	0	100
	438	30	0	10	0	0	0	1	0	51	8	0	0	100
	439	4	0	5	23	0	0	3	0	65	0	0	0	100
	445	22	0	26	5	0	0	8	0	35	4	0	0	100
	Mean	18.40	1.40	18.00	5.60	.00	.00	10.20	.40	42.60	3.40	.00	.00	100.00
	StDev	10.64	3.13	10.51	9.96	.00	.00	9.68	.89	16.02	3.13	.00	.00	.00
Hesperophycus	421	10	1	0	21	67	0	0	0	1	0	0	0	100
	422	14	5	0	30	40	0	0	0	10	1	0	0	100
	423	1	0	0	39	56	0	0	0	4	0	0	0	100
	424	17	8	0	33	38	0	0	0	3	1	0	0	100
	425	50	1	0	11	22	0	0	0	16	0	0	0	100
	Mean	18.40	3.00	.00	26.80	44.60	.00	.00	.00	6.80	.40	.00	.00	100.00
	StDev	18.66	3.39	.00	10.96	17.37	.00	.00	.00	6.14	.55	.00	.00	.00

**Table A8. Percent Cover of Index Species
Otter Harbor, San Miguel Island - Spring 2002 (3/25/02)**

<u>Zone</u>	<u>Plot</u>	<u>Bare Rock</u>	<u>Acorn Barnacle</u>	<u>Tetra- clita</u>	<u>Endo- cladia</u>	<u>Hespero- phycus</u>	<u>Silvetia</u>	<u>Mussels</u>	<u>Turf- weed</u>	<u>Leaf Barnacle</u>	<u>Misc Algae</u>	<u>Misc Animal</u>	<u>Tar</u>	<u>Other</u>	<u>Total</u>
Chthamalus/Balanus	370	26	7	0	0	0	0	0	0	0	67	0	0	0	100
	371	10	69	0	0	0	0	0	0	0	18	0	3	0	100
	372	67	32	0	0	0	0	0	0	0	0	1	0	0	100
	373	51	40	0	0	0	0	0	0	0	1	0	8	0	100
	374	1	0	0	0	0	0	0	26	0	73	0	0	0	100
	Mean	31.00	29.60	.00	.00	.00	.00	.00	5.20	.00	31.80	.20	2.20	.00	100.00
	StDev	27.67	27.63	.00	.00	.00	.00	.00	11.63	.00	35.66	.45	3.49	.00	.00
Endocladia	360	13	26	2	33	0	8	2	0	0	16	0	0	0	100
	361	23	0	0	61	0	6	0	0	0	10	0	0	0	100
	362	2	0	1	89	0	0	1	0	1	6	0	0	0	100
	363	11	0	0	71	0	2	0	0	0	16	0	0	0	100
	364	5	0	0	70	0	2	1	0	0	22	0	0	0	100
	Mean	10.80	5.20	.60	64.80	.00	3.60	.80	.00	.20	14.00	.00	.00	.00	100.00
	StDev	8.14	11.63	.89	20.47	.00	3.29	.84	.00	.45	6.16	.00	.00	.00	.00
Silvetia (Rockweed)	355	10	0	0	26	5	35	0	0	0	24	0	0	0	100
	356	1	4	1	21	0	48	0	0	0	25	0	0	0	100
	357	14	0	0	36	1	19	0	0	0	28	2	0	0	100
	358	43	12	0	25	8	0	0	0	0	12	0	0	0	100
	359	24	65	0	9	0	0	0	0	0	0	0	2	0	100
	Mean	18.40	16.20	.20	23.40	2.80	20.40	.00	.00	.00	17.80	.40	.40	.00	100.00
	StDev	16.04	27.72	.45	9.76	3.56	21.27	.00	.00	.00	11.67	.89	.89	.00	.00
Mussels	375	5	1	0	0	0	0	58	0	5	31	0	0	0	100
	376	11	1	0	2	0	0	43	0	0	40	3	0	0	100
	378	2	0	1	0	0	0	47	0	14	35	1	0	0	100
	379	9	0	2	0	0	0	52	0	8	29	0	0	0	100
	380	6	0	2	0	0	0	62	0	4	26	0	0	0	100
	Mean	6.60	.40	1.00	.40	.00	.00	52.40	.00	6.20	32.20	.80	.00	.00	100.00
	StDev	3.51	.55	1.00	.89	.00	.00	7.77	.00	5.22	5.45	1.30	.00	.00	.00

**Table A9. Percent Cover of Index Species
Fraser Cove, Santa Cruz Island - Spring 2002 (5/14/02)**

<u>Zone</u>	<u>Plot</u>	<u>Bare Rock</u>	<u>Acorn Barnacle</u>	<u>Tetra- clita</u>	<u>Endo- cladia</u>	<u>Hespero- phycus</u>	<u>Silvetia</u>	<u>Mussels</u>	<u>Turf- weed</u>	<u>Leaf Barnacle</u>	<u>Misc Algae</u>	<u>Misc Animal</u>	<u>Tar</u>	<u>Other</u>	<u>Total</u>
Chthamalus/Balanus	876	2	8	0	3	0	0	1	0	1	85	0	0	0	100
	877	3	3	0	13	0	0	0	0	0	81	0	0	0	100
	878	41	47	0	5	0	0	0	0	0	1	0	6	0	100
	879	18	58	0	15	0	0	0	0	0	1	0	8	0	100
	880	25	36	0	9	0	0	0	0	0	29	1	0	0	100
	Mean	17.80	30.40	.00	9.00	.00	.00	.20	.00	.20	39.40	.20	2.80	.00	100.00
	StDev	16.27	24.09	.00	5.10	.00	.00	.45	.00	.45	41.43	.45	3.90	.00	.00
Endocladia	881	8	24	0	39	0	0	1	0	0	28	0	0	0	100
	882	19	24	0	33	0	0	1	0	0	23	0	0	0	100
	883	11	7	0	53	21	0	0	0	0	7	1	0	0	100
	884	5	3	0	92	0	0	0	0	0	0	0	0	0	100
	885	9	3	0	83	0	0	1	0	0	1	0	3	0	100
	Mean	10.40	12.20	.00	60.00	4.20	.00	.60	.00	.00	11.80	.20	.60	.00	100.00
	StDev	5.27	10.89	.00	26.32	9.39	.00	.55	.00	.00	12.91	.45	1.34	.00	.00
Silvetia (Rockweed)	896	7	0	0	11	11	70	0	0	0	0	0	1	0	100
	897	18	0	0	2	10	49	0	0	0	21	0	0	0	100
	898	13	0	0	2	0	80	0	0	0	4	1	0	0	100
	899	21	3	0	3	4	66	0	0	0	3	0	0	0	100
	900	8	6	0	2	14	68	0	0	0	2	0	0	0	100
	Mean	13.40	1.80	.00	4.00	7.80	66.60	.00	.00	.00	6.00	.20	.20	.00	100.00
	StDev	6.11	2.68	.00	3.94	5.67	11.22	.00	.00	.00	8.51	.45	.45	.00	.00
Mussels	891	7	0	0	0	0	0	57	0	0	3	33	0	0	100
	892	22	7	0	0	0	0	55	0	1	10	5	0	0	100
	893	4	1	0	0	0	0	79	0	1	2	13	0	0	100
	894	5	1	1	0	0	0	72	0	5	6	10	0	0	100
	895	10	5	0	0	0	0	58	0	7	6	14	0	0	100
	Mean	9.60	2.80	.20	.00	.00	.00	64.20	.00	2.80	5.40	15.00	.00	.00	100.00
	StDev	7.30	3.03	.45	.00	.00	.00	10.66	.00	3.03	3.13	10.65	.00	.00	.00
Pollicipes	901	24	16	6	1	0	0	36	0	4	9	4	0	0	100
	902	35	3	1	12	0	0	18	0	9	8	14	0	0	100
	903	2	0	0	0	0	0	48	0	21	4	25	0	0	100
	904	9	12	3	0	0	0	49	0	9	4	14	0	0	100
	905	1	4	0	0	0	0	48	0	22	7	18	0	0	100
	Mean	14.20	7.00	2.00	2.60	.00	.00	39.80	.00	13.00	6.40	15.00	.00	.00	100.00
	StDev	14.82	6.71	2.55	5.27	.00	.00	13.31	.00	8.03	2.30	7.62	.00	.00	.00

**Table A9 (continued). Percent Cover of Index Species
Fraser Cove, Santa Cruz Island - Spring 2002 (5/14/02)**

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	15	6	0	0	0	0	0	0	0	26	0	53	0	100
	907	20	16	0	0	0	0	0	0	0	21	0	43	0	100
	908	14	20	0	0	0	0	0	0	0	3	0	63	0	100
	909	24	10	0	0	0	0	0	0	0	6	0	60	0	100
	910	21	9	0	0	0	0	0	0	0	0	0	70	0	100
	Mean	18.80	12.20	.00	.00	.00	.00	.00	.00	.00	11.20	.00	57.80	.00	100.00
	StDev	4.21	5.67	.00	.00	.00	.00	.00	.00	.00	11.56	.00	10.28	.00	.00
Hesperophycus	886	79	5	0	8	6	0	0	0	0	1	1	0	0	100
	887	44	4	0	8	32	0	0	0	0	12	0	0	0	100
	888	16	13	0	32	34	3	0	0	1	0	1	0	0	100
	889	54	15	0	12	14	3	0	0	0	0	2	0	0	100
	890	14	6	0	12	49	18	0	0	0	1	0	0	0	100
	Mean	41.40	8.60	.00	14.40	27.00	4.80	.00	.00	.20	2.80	.80	.00	.00	100.00
	StDev	27.27	5.03	.00	10.04	17.09	7.53	.00	.00	.45	5.17	.84	.00	.00	.00

**Table A10. Percent Cover of Index Species
Orizaba Cove, Santa Cruz Island - Spring 2002 (2/25/02)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	851	48	39	7	0	0	0	1	0	5	0	0	0	100
	852	10	83	1	5	0	0	0	0	0	1	0	0	100
	853	31	63	1	4	0	0	0	0	1	0	0	0	100
	854	27	57	4	1	0	0	0	0	11	0	0	0	100
	855	17	69	1	3	0	0	0	0	10	0	0	0	100
	Mean	26.60	62.20	2.80	2.60	.00	.00	.20	.00	5.40	.20	.00	.00	100.00
	StDev	14.54	16.16	2.68	2.07	.00	.00	.45	.00	5.03	.45	.00	.00	.00
Silvetia (Rockweed)	866	38	2	20	1	0	3	0	0	36	0	0	0	100
	867	26	2	4	12	0	15	0	0	41	0	0	0	100
	868	23	5	5	6	0	7	0	0	54	0	0	0	100
	869	24	4	10	11	4	15	0	0	32	0	0	0	100
	870	16	18	5	27	8	11	0	0	14	1	0	0	100
	Mean	25.40	6.20	8.80	11.40	2.40	10.20	.00	.00	35.40	.20	.00	.00	100.00
	StDev	7.99	6.72	6.69	9.76	3.58	5.22	.00	.00	14.55	.45	.00	.00	.00
Mussels	861	1	0	1	0	0	0	97	0	1	0	0	0	100
	862	2	16	0	0	0	0	31	0	51	0	0	0	100
	863	9	3	1	0	0	0	66	2	17	2	0	0	100
	864	6	11	0	0	0	0	36	0	46	1	0	0	100
	865	3	0	1	0	0	0	62	2	32	0	0	0	100
	Mean	4.20	6.00	.60	.00	.00	.00	58.40	.80	29.40	.60	.00	.00	100.00
	StDev	3.27	7.18	.55	.00	.00	.00	26.52	1.10	20.67	.89	.00	.00	.00
Tetraclita	871	18	12	35	2	0	0	5	0	28	0	0	0	100
	872	16	2	31	0	0	0	30	0	21	0	0	0	100
	873	24	1	34	3	0	0	4	0	34	0	0	0	100
	874	29	6	26	0	0	0	13	1	25	0	0	0	100
	875	19	9	23	15	0	0	13	0	21	0	0	0	100
	Mean	21.20	6.00	29.80	4.00	.00	.00	13.00	.20	25.80	.00	.00	.00	100.00
	StDev	5.26	4.64	5.17	6.28	.00	.00	10.42	.45	5.45	.00	.00	.00	.00
Hesperophycus	856	5	7	0	76	0	0	0	0	12	0	0	0	100
	857	12	7	1	65	2	1	0	0	12	0	0	0	100
	858	7	1	0	62	18	3	0	0	9	0	0	0	100
	859	9	6	83	0	0	0	0	0	2	0	0	0	100
	860	20	17	0	60	0	0	0	0	3	0	0	0	100
	Mean	10.60	7.60	16.80	52.60	4.00	.80	.00	.00	7.60	.00	.00	.00	100.00
	StDev	5.86	5.81	37.01	30.05	7.87	1.30	.00	.00	4.83	.00	.00	.00	.00

**Table A11. Percent Cover of Index Species
Prisoner's Harbor, Santa Cruz Island - Spring 2002 (5/17/02)**

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	92	2	0	0	0	0	0	0	0	6	0	0	0	100
	827	74	0	0	2	0	10	1	0	1	11	0	1	0	100
	828	32	20	0	19	0	19	1	0	0	8	1	0	0	100
	829	23	52	1	16	1	0	0	0	0	4	3	0	0	100
	830	52	25	0	20	0	0	0	0	0	0	3	0	0	100
	Mean	54.60	19.80	.20	11.40	.20	5.80	.40	.00	.20	5.80	1.40	.20	.00	100.00
	StDev	28.68	21.05	.45	9.63	.45	8.56	.55	.00	.45	4.15	1.52	.45	.00	.00
Endocladia	831	23	14	0	55	0	0	1	0	0	5	2	0	0	100
	832	12	15	0	48	12	0	0	0	0	11	2	0	0	100
	833	15	23	0	51	6	0	0	0	0	5	0	0	0	100
	834	10	9	0	59	19	0	0	0	0	2	1	0	0	100
	835	26	4	0	47	13	0	0	0	0	8	2	0	0	100
	Mean	17.20	13.00	.00	52.00	10.00	.00	.20	.00	.00	6.20	1.40	.00	.00	100.00
	StDev	6.98	7.11	.00	5.00	7.25	.00	.45	.00	.00	3.42	.89	.00	.00	.00
Silvetia (Rockweed)	846	0	0	0	0	0	97	0	0	0	3	0	0	0	100
	847	8	0	0	0	0	80	0	0	0	12	0	0	0	100
	848	0	0	0	0	0	95	0	0	0	5	0	0	0	100
	849	0	0	0	0	0	96	0	0	0	4	0	0	0	100
	850	0	0	0	0	0	87	0	0	0	13	0	0	0	100
	Mean	1.60	.00	.00	.00	.00	91.00	.00	.00	.00	7.40	.00	.00	.00	100.00
	StDev	3.58	.00	.00	.00	.00	7.31	.00	.00	.00	4.72	.00	.00	.00	.00
Mussels	841	5	2	0	0	0	0	79	0	0	13	1	0	0	100
	842	11	7	0	0	0	0	17	0	0	65	0	0	0	100
	843	5	4	1	0	0	0	70	0	0	17	3	0	0	100
	844	0	0	0	0	0	0	100	0	0	0	0	0	0	100
	845	6	2	1	0	0	0	72	0	0	19	0	0	0	100
	Mean	5.40	3.00	.40	.00	.00	.00	67.60	.00	.00	22.80	.80	.00	.00	100.00
	StDev	3.91	2.65	.55	.00	.00	.00	30.68	.00	.00	24.72	1.30	.00	.00	.00
Hesperophycus	836	20	1	0	28	40	0	1	0	0	10	0	0	0	100
	837	10	3	0	9	47	0	0	0	0	31	0	0	0	100
	838	12	0	0	14	38	1	0	0	0	34	1	0	0	100
	839	25	32	0	11	31	0	0	0	0	0	0	1	0	100
	840	28	11	0	17	40	0	0	0	0	4	0	0	0	100
	Mean	19.00	9.40	.00	15.80	39.20	.20	.20	.00	.00	15.80	.20	.20	.00	100.00
	StDev	7.87	13.35	.00	7.46	5.72	.45	.45	.00	.00	15.69	.45	.45	.00	.00

**Table A12. Percent Cover of Index Species
Scorpion Rock, Santa Cruz Island - Spring 2002 (6/27/02)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	801	17	26	0	57	0	0	0	0	0	0	0	0	100
	802	46	30	1	23	0	0	0	0	0	0	0	0	100
	803	45	7	0	47	0	0	1	0	0	0	0	0	100
	804	45	25	1	28	0	0	0	0	1	0	0	0	100
	805	55	45	0	0	0	0	0	0	0	0	0	0	100
	Mean	41.60	26.60	.40	31.00	.00	.00	.20	.00	.20	.00	.00	.00	100.00
	StDev	14.38	13.58	.55	22.17	.00	.00	.45	.00	.45	.00	.00	.00	.00
Endocladia	806	26	2	0	65	0	0	0	0	7	0	0	0	100
	807	23	3	2	47	0	0	0	1	24	0	0	0	100
	808	32	1	0	48	0	0	6	4	9	0	0	0	100
	809	27	8	0	63	0	0	0	0	1	1	0	0	100
	810	66	12	0	11	0	0	0	3	8	0	0	0	100
	Mean	34.80	5.20	.40	46.80	.00	.00	1.20	1.60	9.80	.20	.00	.00	100.00
	StDev	17.74	4.66	.89	21.66	.00	.00	2.68	1.82	8.53	.45	.00	.00	.00
Mussels	816	40	15	2	0	0	0	41	1	1	0	0	0	100
	817	4	1	1	1	0	0	91	1	1	0	0	0	100
	818	5	1	1	0	0	0	89	3	1	0	0	0	100
	819	4	1	3	0	0	0	88	4	0	0	0	0	100
	820	11	0	5	0	0	0	84	0	0	0	0	0	100
	Mean	12.80	3.60	2.40	.20	.00	.00	78.60	1.80	.60	.00	.00	.00	100.00
	StDev	15.48	6.39	1.67	.45	.00	.00	21.17	1.64	.55	.00	.00	.00	.00
Tetraclita	821	38	16	11	16	0	0	10	8	1	0	0	0	100
	822	33	1	2	26	0	0	25	10	2	1	0	0	100
	823	47	1	7	0	0	0	36	5	0	4	0	0	100
	824	57	0	15	1	0	0	24	1	0	2	0	0	100
	825	50	1	11	1	0	0	29	4	3	1	0	0	100
	Mean	45.00	3.80	9.20	8.80	.00	.00	24.80	5.60	1.20	1.60	.00	.00	100.00
	StDev	9.57	6.83	4.92	11.69	.00	.00	9.52	3.51	1.30	1.52	.00	.00	.00
Hesperophycus	811	2	0	0	3	95	0	0	0	0	0	0	0	100
	812	16	0	0	21	51	10	0	0	2	0	0	0	100
	813	12	0	0	12	63	13	0	0	0	0	0	0	100
	814	21	0	1	20	31	10	0	0	17	0	0	0	100
	815	4	0	0	9	83	3	0	0	1	0	0	0	100
	Mean	11.00	.00	.20	13.00	64.60	7.20	.00	.00	4.00	.00	.00	.00	100.00
	StDev	8.00	.00	.45	7.58	25.39	5.45	.00	.00	7.31	.00	.00	.00	.00

**Table A13. Percent Cover of Index Species
Trailer, Santa Cruz Island - Spring 2002 (5/14/02)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	911	80	18	0	0	0	0	0	0	0	2	0	0	100
	912	68	31	0	0	0	0	0	0	0	1	0	0	100
	913	47	35	0	17	0	0	0	0	1	0	0	0	100
	914	42	58	0	0	0	0	0	0	0	0	0	0	100
	915	29	68	0	0	0	0	0	0	0	3	0	0	100
	Mean	53.20	42.00	.00	3.40	.00	.00	.00	.00	.20	1.20	.00	.00	100.00
	StDev	20.54	20.48	.00	7.60	.00	.00	.00	.00	.45	1.30	.00	.00	.00
Silvetia (Rockweed)	926	12	0	0	0	0	80	0	0	8	0	0	0	100
	927	19	3	0	0	0	75	0	0	3	0	0	0	100
	928	7	4	0	4	0	74	0	0	11	0	0	0	100
	929	4	0	0	0	0	92	0	0	4	0	0	0	100
	930	14	1	0	1	0	74	0	0	10	0	0	0	100
	Mean	11.20	1.60	.00	1.00	.00	79.00	.00	.00	7.20	.00	.00	.00	100.00
	StDev	5.89	1.82	.00	1.73	.00	7.68	.00	.00	3.56	.00	.00	.00	.00
Mussels	921	16	0	3	0	0	0	58	0	9	14	0	0	100
	922	16	0	0	0	0	0	59	0	17	8	0	0	100
	923	13	1	0	0	0	0	58	0	11	17	0	0	100
	924	17	0	1	0	0	0	73	0	3	6	0	0	100
	925	27	2	0	1	0	0	59	2	1	8	0	0	100
	Mean	17.80	.60	.80	.20	.00	.00	61.40	.40	8.20	10.60	.00	.00	100.00
	StDev	5.36	.89	1.30	.45	.00	.00	6.50	.89	6.42	4.67	.00	.00	.00
Hesperophycus	916	51	2	0	22	19	6	0	0	0	0	0	0	100
	917	34	4	0	14	4	44	0	0	0	0	0	0	100
	918	42	2	0	13	6	37	0	0	0	0	0	0	100
	919	53	6	0	17	9	14	0	0	1	0	0	0	100
	920	43	10	0	16	21	5	1	0	4	0	0	0	100
	Mean	44.60	4.80	.00	16.40	11.80	21.20	.20	.00	1.00	.00	.00	.00	100.00
	StDev	7.64	3.35	.00	3.51	7.73	18.13	.45	.00	1.73	.00	.00	.00	.00

**Table A14. Percent Cover of Index Species
Willows Anchorage, Santa Cruz Island - Spring 2002 (5/16/02)**

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	25	0	0	73	0	0	0	0	0	1	1	0	0	100
	932	56	0	0	42	0	0	0	0	0	0	2	0	0	100
	933	49	0	0	0	49	0	0	0	0	0	2	0	0	100
	934	21	0	0	74	0	0	1	0	0	3	1	0	0	100
	935	62	0	2	28	0	0	0	0	0	6	2	0	0	100
	Mean	42.60	.00	.40	43.40	9.80	.00	.20	.00	.00	2.00	1.60	.00	.00	100.00
	StDev	18.53	.00	.89	31.37	21.91	.00	.45	.00	.00	2.55	.55	.00	.00	.00
Silvetia (Rockweed)	946	19	0	0	65	0	0	0	0	0	14	2	0	0	100
	947	37	0	0	41	0	0	0	0	0	22	0	0	0	100
	948	13	0	0	1	0	72	0	0	0	12	2	0	0	100
	949	0	0	0	0	0	90	0	0	0	10	0	0	0	100
	950	53	0	0	2	0	5	0	0	0	37	3	0	0	100
	Mean	24.40	.00	.00	21.80	.00	33.40	.00	.00	.00	19.00	1.40	.00	.00	100.00
	StDev	20.80	.00	.00	29.73	.00	43.96	.00	.00	.00	11.05	1.34	.00	.00	.00
Mussels	941	10	0	21	0	0	0	38	0	5	22	4	0	0	100
	942	15	0	1	0	0	0	63	0	5	13	3	0	0	100
	943	9	0	2	0	0	0	46	0	23	16	4	0	0	100
	944	11	0	2	0	0	0	50	0	18	13	6	0	0	100
	945	6	0	4	0	0	0	48	0	4	31	7	0	0	100
	Mean	10.20	.00	6.00	.00	.00	.00	49.00	.00	11.00	19.00	4.80	.00	.00	100.00
	StDev	3.27	.00	8.46	.00	.00	.00	9.06	.00	8.86	7.65	1.64	.00	.00	.00
Hesperophycus	936	76	2	0	21	0	0	0	0	0	1	0	0	0	100
	937	64	10	0	1	3	5	0	0	0	17	0	0	0	100
	938	69	7	0	1	4	0	0	0	0	17	2	0	0	100
	939	37	0	0	1	0	44	0	0	0	18	0	0	0	100
	940	36	1	0	6	13	24	0	0	0	18	2	0	0	100
	Mean	56.40	4.00	.00	6.00	4.00	14.60	.00	.00	.00	14.20	.80	.00	.00	100.00
	StDev	18.66	4.30	.00	8.66	5.34	19.18	.00	.00	.00	7.40	1.10	.00	.00	.00

**Table A15. Percent Cover of Index Species
East Point, Santa Rosa Island - Spring 2002 (4/19/02)**

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	575	69	31	0	0	0	0	0	0	0	0	0	0	0	100
	576	30	2	0	12	51	0	0	1	0	4	0	0	0	100
	577	28	42	0	22	7	0	1	0	0	0	0	0	0	100
	578	91	8	0	1	0	0	0	0	0	0	0	0	0	100
	579	69	25	0	6	0	0	0	0	0	0	0	0	0	100
	Mean	57.40	21.60	.00	8.20	11.60	.00	.20	.20	.00	.80	.00	.00	.00	100.00
	StDev	27.45	16.47	.00	9.07	22.23	.00	.45	.45	.00	1.79	.00	.00	.00	.00
Endocladia	580	7	0	0	39	48	6	0	0	0	0	0	0	0	100
	581	16	5	0	61	18	0	0	0	0	0	0	0	0	100
	582	21	0	0	52	19	7	0	0	0	1	0	0	0	100
	583	17	6	0	64	9	0	0	0	0	4	0	0	0	100
	584	27	2	0	42	16	0	1	0	0	2	10	0	0	100
	Mean	17.60	2.60	.00	51.60	22.00	2.60	.20	.00	.00	1.40	2.00	.00	.00	100.00
	StDev	7.33	2.79	.00	11.10	15.05	3.58	.45	.00	.00	1.67	4.47	.00	.00	.00
Silvetia (Rockweed)	585	10	0	0	4	0	61	0	0	0	24	1	0	0	100
	586	19	0	0	0	0	67	0	0	0	13	1	0	0	100
	587	2	0	0	0	0	87	1	0	0	9	1	0	0	100
	588	4	1	0	0	0	80	0	0	0	13	2	0	0	100
	589	10	0	0	2	0	67	1	0	0	18	2	0	0	100
	Mean	9.00	.20	.00	1.20	.00	72.40	.40	.00	.00	15.40	1.40	.00	.00	100.00
	StDev	6.63	.45	.00	1.79	.00	10.71	.55	.00	.00	5.77	.55	.00	.00	.00
Mussels	590	7	0	0	1	0	0	68	2	0	19	3	0	0	100
	591	8	4	1	0	0	0	58	5	1	16	7	0	0	100
	592	4	2	0	0	0	0	79	0	0	10	5	0	0	100
	593	5	1	0	0	0	0	84	0	0	4	6	0	0	100
	594	12	1	1	0	0	0	69	0	0	9	8	0	0	100
	Mean	7.20	1.60	.40	.20	.00	.00	71.60	1.40	.20	11.60	5.80	.00	.00	100.00
	StDev	3.11	1.52	.55	.45	.00	.00	10.16	2.19	.45	5.94	1.92	.00	.00	.00
Hesperophycus	570	9	0	0	25	65	0	0	0	0	0	1	0	0	100
	571	18	0	0	14	67	1	0	0	0	0	0	0	0	100
	572	7	2	0	18	72	0	0	0	0	1	0	0	0	100
	573	9	5	0	22	64	0	0	0	0	0	0	0	0	100
	574	15	1	0	8	68	7	0	0	0	0	1	0	0	100
	Mean	11.60	1.60	.00	17.40	67.20	1.60	.00	.00	.00	.20	.40	.00	.00	100.00
	StDev	4.67	2.07	.00	6.69	3.11	3.05	.00	.00	.00	.45	.55	.00	.00	.00

**Table A16. Percent Cover of Index Species
Ford Point, Santa Rosa Island - Spring 2002 (4/22/02)**

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	71	9	0	0	0	0	0	0	0	9	11	0	0	100
	521	60	37	0	0	0	0	0	0	0	1	2	0	0	100
	522	87	6	0	0	0	0	0	0	0	7	0	0	0	100
	523	52	34	0	7	0	0	0	0	0	4	3	0	0	100
	524	85	15	0	0	0	0	0	0	0	0	0	0	0	100
	Mean	71.00	20.20	.00	1.40	.00	.00	.00	.00	.00	4.20	3.20	.00	.00	100.00
	StDev	15.28	14.38	.00	3.13	.00	.00	.00	.00	.00	3.83	4.55	.00	.00	.00
Endocladia	525	39	7	0	36	0	0	4	1	0	8	5	0	0	100
	526	51	2	0	28	0	0	5	0	0	12	2	0	0	100
	527	31	4	0	28	0	0	6	0	0	30	1	0	0	100
	528	28	1	1	41	0	0	8	2	0	14	5	0	0	100
	529	33	0	0	51	0	0	2	0	0	13	1	0	0	100
	Mean	36.40	2.80	.20	36.80	.00	.00	5.00	.60	.00	15.40	2.80	.00	.00	100.00
	StDev	9.10	2.77	.45	9.68	.00	.00	2.24	.89	.00	8.47	2.05	.00	.00	.00
Mussels	530	61	6	0	0	0	0	13	0	0	13	7	0	0	100
	531	8	0	0	0	0	0	89	0	0	0	3	0	0	100
	532	7	0	0	0	0	0	84	0	0	6	3	0	0	100
	533	46	0	0	0	0	0	36	1	0	17	0	0	0	100
	534	40	1	0	0	0	0	18	5	0	28	8	0	0	100
	Mean	32.40	1.40	.00	.00	.00	.00	48.00	1.20	.00	12.80	4.20	.00	.00	100.00
	StDev	23.99	2.61	.00	.00	.00	.00	36.21	2.17	.00	10.71	3.27	.00	.00	.00

**Table A17. Percent Cover of Index Species
Fossil Reef, Santa Rosa Island - Spring 2002 (4/20/02)**

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	50	37	0	1	0	0	0	0	0	11	1	0	0	100
	606	58	29	0	0	0	0	0	0	0	6	0	7	0	100
	607	58	37	0	0	0	0	0	0	0	4	1	0	0	100
	608	62	23	0	0	0	0	0	0	0	15	0	0	0	100
	609	57	28	0	0	0	0	0	0	0	14	1	0	0	100
	Mean	57.00	30.80	.00	.20	.00	.00	.00	.00	.00	10.00	.60	1.40	.00	100.00
	StDev	4.36	6.10	.00	.45	.00	.00	.00	.00	.00	4.85	.55	3.13	.00	.00
Endocladia	610	46	36	0	10	0	0	0	0	0	8	0	0	0	100
	611	46	41	0	0	0	0	0	0	0	8	5	0	0	100
	612	50	2	0	0	0	34	1	0	0	9	3	1	0	100
	613	38	9	0	45	0	2	0	0	0	5	1	0	0	100
	614	34	0	0	1	0	61	0	0	0	4	0	0	0	100
	Mean	42.80	17.60	.00	11.20	.00	19.40	.20	.00	.00	6.80	1.80	.20	.00	100.00
	StDev	6.57	19.45	.00	19.36	.00	27.38	.45	.00	.00	2.17	2.17	.45	.00	.00
Silvetia (Rockweed)	615	79	5	0	0	0	0	0	0	0	16	0	0	0	100
	616	51	14	0	4	0	0	0	4	0	26	1	0	0	100
	617	70	3	0	9	0	6	0	0	0	11	1	0	0	100
	618	60	0	0	26	0	1	0	2	0	10	1	0	0	100
	619	49	2	0	31	0	9	0	0	0	8	1	0	0	100
	Mean	61.80	4.80	.00	14.00	.00	3.20	.00	1.20	.00	14.20	.80	.00	.00	100.00
	StDev	12.72	5.45	.00	13.73	.00	4.09	.00	1.79	.00	7.22	.45	.00	.00	.00
Mussels	620	6	0	4	0	0	0	30	0	0	45	15	0	0	100
	621	14	1	7	0	0	0	34	0	0	19	25	0	0	100
	622	14	0	18	0	0	0	38	0	4	18	8	0	0	100
	623	20	10	0	0	0	0	33	0	9	24	4	0	0	100
	624	1	1	1	0	0	0	0	24	0	33	40	0	0	100
	Mean	11.00	2.40	6.00	.00	.00	.00	27.00	4.80	2.60	27.80	18.40	.00	.00	100.00
	StDev	7.48	4.28	7.25	.00	.00	.00	15.36	10.73	3.97	11.30	14.47	.00	.00	.00

**Table A18. Percent Cover of Index Species
Johnson's Lee, Santa Rosa Island - Spring 2002 (4/22/02)**

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	62	38	0	0	0	0	0	0	0	0	0	0	0	100
	501	48	50	0	1	0	0	0	0	0	0	1	0	0	100
	502	79	20	0	0	0	0	1	0	0	0	0	0	0	100
	503	45	38	0	15	0	0	1	0	0	0	1	0	0	100
	504	85	9	0	1	0	0	0	0	0	2	3	0	0	100
	Mean	63.80	31.00	.00	3.40	.00	.00	.40	.00	.00	.40	1.00	.00	.00	100.00
	StDev	17.94	16.31	.00	6.50	.00	.00	.55	.00	.00	.89	1.22	.00	.00	.00
Endocladia	505	51	2	2	11	0	0	30	0	2	2	0	0	0	100
	506	62	15	0	19	0	0	1	0	0	0	3	0	0	100
	507	53	4	1	20	0	0	13	0	0	7	2	0	0	100
	508	34	6	0	39	0	0	13	0	2	4	2	0	0	100
	509	59	1	0	31	0	0	5	0	0	3	1	0	0	100
	Mean	51.80	5.60	.60	24.00	.00	.00	12.40	.00	.80	3.20	1.60	.00	.00	100.00
	StDev	10.89	5.59	.89	11.00	.00	.00	11.13	.00	1.10	2.59	1.14	.00	.00	.00
Mussels	510	2	1	0	2	0	0	0	2	0	0	93	0	0	100
	511	11	2	0	0	0	0	1	8	1	40	37	0	0	100
	512	45	0	0	0	0	0	50	0	1	2	2	0	0	100
	513	35	2	3	0	0	0	5	7	0	14	34	0	0	100
	514	1	0	0	0	0	0	0	3	0	11	85	0	0	100
	Mean	18.80	1.00	.60	.40	.00	.00	11.20	4.00	.40	13.40	50.20	.00	.00	100.00
	StDev	20.05	1.00	1.34	.89	.00	.00	21.79	3.39	.55	15.99	38.09	.00	.00	.00

**Table A19. Percent Cover of Index Species
Northwest Talcott, Santa Rosa Island - Spring 2002 (4/21/02)**

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	58	37	0	1	0	0	0	0	0	1	1	2	0	100
	561	44	54	0	0	0	0	0	0	0	1	0	1	0	100
	562	75	24	0	0	0	0	0	0	0	0	1	0	0	100
	563	47	4	0	5	0	41	0	0	0	3	0	0	0	100
	564	19	73	0	0	0	1	0	0	0	3	3	1	0	100
	Mean	48.60	38.40	.00	1.20	.00	8.40	.00	.00	.00	1.60	1.00	.80	.00	100.00
	StDev	20.53	26.61	.00	2.17	.00	18.23	.00	.00	.00	1.34	1.22	.84	.00	.00
Endocladia	555	30	0	0	43	0	26	0	0	0	1	0	0	0	100
	556	77	3	0	18	0	0	0	0	0	2	0	0	0	100
	557	20	0	0	24	0	51	0	1	0	4	0	0	0	100
	558	68	1	0	1	0	0	0	0	0	28	2	0	0	100
	559	41	15	1	24	0	0	0	0	0	14	5	0	0	100
	Mean	47.20	3.80	.20	22.00	.00	15.40	.00	.20	.00	9.80	1.40	.00	.00	100.00
	StDev	24.47	6.38	.45	15.05	.00	22.86	.00	.45	.00	11.41	2.19	.00	.00	.00
Silvetia (Rockweed)	565	16	0	0	0	0	76	0	0	0	8	0	0	0	100
	566	11	0	0	0	0	89	0	0	0	0	0	0	0	100
	567	9	0	0	0	0	85	0	0	0	2	4	0	0	100
	568	28	0	0	37	0	34	0	0	0	1	0	0	0	100
	569	77	0	0	2	0	16	0	0	0	4	1	0	0	100
	Mean	28.20	.00	.00	7.80	.00	60.00	.00	.00	.00	3.00	1.00	.00	.00	100.00
	StDev	28.26	.00	.00	16.35	.00	32.92	.00	.00	.00	3.16	1.73	.00	.00	.00
Mussels	550	23	1	1	0	0	0	52	0	12	4	7	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	59	0	11	6	4	0	0	100
	553	37	2	4	0	0	0	31	0	11	10	5	0	0	100
	554	18	0	2	0	0	0	47	0	12	17	4	0	0	100
	Mean	22.60	.60	1.40	.00	.00	.00	51.80	.00	9.20	9.80	4.60	.00	.00	100.00
	StDev	8.56	.89	1.67	.00	.00	.00	14.48	.00	5.17	5.12	1.52	.00	.00	.00

**Table A20. Percent Cover of Index Species
Cat Rock, Anacapa Island - Fall 2002 (1/28/03)**

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	31	29	27	0	18	25	0	0	0	0	1	0	0	0	100
	32	27	4	0	41	27	0	0	0	0	1	0	0	0	100
	33	48	3	0	10	27	0	0	0	0	12	0	0	0	100
	35	49	16	0	10	19	0	0	0	0	6	0	0	0	100
	36	22	2	0	4	53	1	0	0	0	18	0	0	0	100
	37	16	3	0	7	63	5	0	0	0	6	0	0	0	100
	38	36	47	0	12	0	0	0	0	0	3	2	0	0	100
	39	72	10	0	4	11	0	0	0	0	3	0	0	0	100
	135	46	5	0	6	28	9	0	0	0	6	0	0	0	100
	Mean	38.33	13.00	.00	12.44	28.11	1.67	.00	.00	.00	6.22	.22	.00	.00	100.00
	StDev	17.27	15.15	.00	11.58	19.41	3.20	.00	.00	.00	5.56	.67	.00	.00	.00
Endocladia	13	18	4	9	60	0	0	4	0	0	4	1	0	0	100
	14	27	2	19	29	0	0	10	0	0	9	4	0	0	100
	19	7	2	0	46	9	32	0	0	0	4	0	0	0	100
	51	19	0	6	12	0	0	0	12	0	44	7	0	0	100
	52	9	6	6	37	0	0	4	17	0	21	0	0	0	100
	54	16	0	13	25	0	0	1	15	0	24	6	0	0	100
	212	6	3	0	82	0	0	0	0	0	7	2	0	0	100
	467	22	0	13	43	0	0	10	2	0	5	5	0	0	100
	492	19	6	5	47	0	7	7	0	0	8	1	0	0	100
	Mean	15.89	2.56	7.89	42.33	1.00	4.33	4.00	5.11	.00	14.00	2.89	.00	.00	100.00
	StDev	7.15	2.40	6.29	20.46	3.00	10.63	4.15	7.30	.00	13.42	2.67	.00	.00	.00
Silvetia (Rockweed)	2	15	8	1	21	16	31	0	0	0	8	0	0	0	100
	3	13	5	1	3	36	25	0	0	0	17	0	0	0	100
	4	13	1	0	2	22	56	0	0	0	6	0	0	0	100
	5	15	16	6	36	0	10	4	1	0	12	0	0	0	100
	6	7	0	0	7	39	38	0	0	0	9	0	0	0	100
	8	17	1	0	2	3	76	0	0	0	1	0	0	0	100
	9	2	0	0	0	2	96	0	0	0	0	0	0	0	100
	10	4	0	0	0	13	79	0	0	0	4	0	0	0	100
	55	15	24	11	34	0	0	3	2	0	11	0	0	0	100
	Mean	11.22	6.11	2.11	11.67	14.56	45.67	.78	.33	.00	7.56	.00	.00	.00	100.00
	StDev	5.45	8.57	3.86	14.72	15.13	33.03	1.56	.71	.00	5.46	.00	.00	.00	.00

**Table A20 (continued). Percent Cover of Index Species
Cat Rock, Anacapa Island - Fall 2002 (1/28/03)**

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
Mussels	56	7	12	24	0	0	39	2	0	0	16	0	0	0	100
	164	17	7	11	0	0	0	55	0	1	9	0	0	0	100
	203	20	7	8	0	0	0	41	2	0	22	0	0	0	100
	204	12	3	11	0	0	0	62	0	3	9	0	0	0	100
	468	10	11	20	1	0	0	25	0	0	32	1	0	0	100
	470	45	10	12	1	0	0	16	0	1	13	2	0	0	100
	471	24	7	19	8	0	0	12	0	0	29	1	0	0	100
	472	7	6	12	0	0	0	58	0	8	9	0	0	0	100
	473	34	5	13	0	0	0	32	0	0	14	2	0	0	100
	Mean	19.56	7.56	14.44	1.11	.00	4.33	33.67	.22	1.44	17.00	.67	.00	.00	100.00
	StDev	12.97	2.92	5.27	2.62	.00	13.00	21.70	.67	2.65	8.75	.87	.00	.00	.00

**Table A21. Percent Cover of Index Species
Middle-East, Anacapa Island - Fall 2002 (1/29/03)**

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	38	11	22	5	0	0	2	0	0	21	1	0	0	100
	244	57	6	8	19	0	0	1	0	0	8	1	0	0	100
	245	71	4	4	13	0	0	2	0	1	4	1	0	0	100
	Mean	55.33	7.00	11.33	12.33	.00	.00	1.67	.00	.33	11.00	1.00	.00	.00	100.00
	StDev	16.56	3.61	9.45	7.02	.00	.00	.58	.00	.58	8.89	.00	.00	.00	.00
Endocladia	240	2	0	4	45	21	14	0	0	0	14	0	0	0	100
	241	29	1	18	10	2	0	7	0	0	29	4	0	0	100
	242	28	4	7	34	14	0	0	0	0	13	0	0	0	100
	Mean	19.67	1.67	9.67	29.67	12.33	4.67	2.33	.00	.00	18.67	1.33	.00	.00	100.00
	StDev	15.31	2.08	7.37	17.90	9.61	8.08	4.04	.00	.00	8.96	2.31	.00	.00	.00
Silvetia (Rockweed)	53	6	0	1	8	0	32	21	3	0	26	3	0	0	100
	237	2	0	0	1	6	81	0	2	0	7	1	0	0	100
	469	1	0	2	2	0	75	0	0	1	18	1	0	0	100
	Mean	3.00	.00	1.00	3.67	2.00	62.67	7.00	1.67	.33	17.00	1.67	.00	.00	100.00
	StDev	2.65	.00	1.00	3.79	3.46	26.73	12.12	1.53	.58	9.54	1.15	.00	.00	.00
Mussels	476	5	0	0	0	0	0	86	0	1	7	1	0	0	100
	477	0	0	3	0	0	0	92	0	0	2	3	0	0	100
	478	5	0	0	0	0	0	84	0	0	9	2	0	0	100
	Mean	3.33	.00	1.00	.00	.00	.00	87.33	.00	.33	6.00	2.00	.00	.00	100.00
	StDev	2.89	.00	1.73	.00	.00	.00	4.16	.00	.58	3.61	1.00	.00	.00	.00

**Table A22. Percent Cover of Index Species
Middle-West, Anacapa Island - Fall 2002 (1/29/03)**

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	55	20	0	22	0	0	0	0	0	3	0	0	0	100
	448	33	3	0	34	0	0	2	3	1	24	0	0	0	100
	449	46	7	0	13	0	0	0	0	0	33	1	0	0	100
	450	41	5	0	18	4	0	0	0	0	32	0	0	0	100
	451	46	2	0	31	0	0	2	0	0	16	3	0	0	100
	Mean	44.20	7.40	.00	23.60	.80	.00	.80	.60	.20	21.60	.80	.00	.00	100.00
	StDev	8.04	7.30	.00	8.79	1.79	.00	1.10	1.34	.45	12.46	1.30	.00	.00	.00
Endocladia	457	27	0	1	31	0	0	2	0	0	38	1	0	0	100
	458	42	0	0	22	0	0	4	0	3	26	3	0	0	100
	459	48	0	0	13	0	0	2	0	0	34	3	0	0	100
	460	43	11	0	29	0	0	0	1	0	15	1	0	0	100
	461	20	0	0	70	4	0	0	0	0	6	0	0	0	100
	Mean	36.00	2.20	.20	33.00	.80	.00	1.60	.20	.60	23.80	1.60	.00	.00	100.00
	StDev	11.90	4.92	.45	21.85	1.79	.00	1.67	.45	1.34	13.27	1.34	.00	.00	.00
Silvetia (Rockweed)	452	15	1	1	4	0	74	0	0	0	5	0	0	0	100
	453	7	0	1	1	0	88	0	0	0	3	0	0	0	100
	454	22	0	6	11	0	0	6	0	0	47	8	0	0	100
	455	3	0	3	3	0	72	5	0	1	11	2	0	0	100
	456	8	0	1	0	0	81	3	0	0	6	1	0	0	100
	Mean	11.00	.20	2.40	3.80	.00	63.00	2.80	.00	.20	14.40	2.20	.00	.00	100.00
	StDev	7.52	.45	2.19	4.32	.00	35.78	2.77	.00	.45	18.46	3.35	.00	.00	.00
Mussels	462	25	1	2	1	0	0	51	0	2	16	2	0	0	100
	463	16	0	5	1	0	0	36	0	0	42	0	0	0	100
	464	15	0	4	4	0	0	47	0	0	29	1	0	0	100
	465	11	0	4	0	0	0	60	0	11	14	0	0	0	100
	466	13	0	0	0	0	0	76	0	0	7	4	0	0	100
	Mean	16.00	.20	3.00	1.20	.00	.00	54.00	.00	2.60	21.60	1.40	.00	.00	100.00
	StDev	5.39	.45	2.00	1.64	.00	.00	15.02	.00	4.77	13.90	1.67	.00	.00	.00

**Table A23. Percent Cover of Index Species
S Frenchy's Cove, Anacapa Island - Fall 2002 (1/27/03)**

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
Chthamalus/Balanus	249	38	37	0	17	6	0	0	0	0	0	2	0	0	100
	250	29	51	0	19	0	0	0	0	0	0	0	1	0	100
	251	55	38	0	6	0	0	0	0	0	1	0	0	0	100
	252	50	32	0	12	0	0	0	0	0	1	3	2	0	100
	253	39	22	0	38	1	0	0	0	0	0	0	0	0	100
	Mean	42.20	36.00	.00	18.40	1.40	.00	.00	.00	.00	.40	1.00	.60	.00	100.00
	StDev	10.33	10.51	.00	12.05	2.61	.00	.00	.00	.00	.55	1.41	.89	.00	.00
Endocladia	154	21	7	0	71	0	0	0	0	0	1	0	0	0	100
	155	2	2	0	79	0	15	0	0	0	2	0	0	0	100
	256	16	0	0	66	4	3	0	1	0	10	0	0	0	100
	257	7	0	0	91	0	0	0	0	0	2	0	0	0	100
	258	7	0	0	36	0	57	0	0	0	0	0	0	0	100
	Mean	10.60	1.80	.00	68.60	.80	15.00	.00	.20	.00	3.00	.00	.00	.00	100.00
	StDev	7.70	3.03	.00	20.53	1.79	24.28	.00	.45	.00	4.00	.00	.00	.00	.00
Silvetia (Rockweed)	259	0	0	0	0	0	98	0	0	0	2	0	0	0	100
	260	13	12	0	7	1	65	0	0	0	2	0	0	0	100
	261	2	0	0	0	0	89	0	0	0	9	0	0	0	100
	262	40	33	0	17	0	6	0	0	0	2	2	0	0	100
	263	6	0	0	1	0	90	0	1	0	2	0	0	0	100
	Mean	12.20	9.00	.00	5.00	.20	69.60	.00	.20	.00	3.40	.40	.00	.00	100.00
	StDev	16.32	14.39	.00	7.31	.45	37.63	.00	.45	.00	3.13	.89	.00	.00	.00
Mussels	201	1	0	0	0	0	0	48	10	0	41	0	0	0	100
	202	9	0	0	0	0	0	68	2	0	21	0	0	0	100
	264	0	0	0	0	0	0	70	8	0	20	2	0	0	100
	265	6	1	0	0	0	0	79	0	0	14	0	0	0	100
	266	31	1	0	1	0	0	57	3	0	7	0	0	0	100
	Mean	9.40	.40	.00	.20	.00	.00	64.40	4.60	.00	20.60	.40	.00	.00	100.00
	StDev	12.62	.55	.00	.45	.00	.00	12.05	4.22	.00	12.70	.89	.00	.00	.00

**Table A24. Percent Cover of Index Species
Crook Point, San Miguel Island - Fall 2002 (1/14/03)**

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	137	88	10	0	0	0	0	0	0	0	0	2	0	0	100
	147	59	34	0	0	0	0	0	0	0	0	7	0	0	100
	148	67	29	0	0	0	0	0	0	0	2	2	0	0	100
	149	45	49	0	3	0	0	2	0	0	0	1	0	0	100
	495	45	48	0	1	0	0	1	0	0	1	4	0	0	100
	Mean	60.80	34.00	.00	.80	.00	.00	.60	.00	.00	.60	3.20	.00	.00	100.00
	StDev	17.89	15.98	.00	1.30	.00	.00	.89	.00	.00	.89	2.39	.00	.00	.00
Endocladia	386	52	27	0	7	0	7	0	0	0	4	3	0	0	100
	387	40	4	0	29	0	0	0	0	0	23	4	0	0	100
	388	20	26	0	39	0	8	0	0	0	7	0	0	0	100
	389	24	5	1	26	0	5	27	0	0	12	0	0	0	100
	390	29	24	0	16	0	0	20	0	1	10	0	0	0	100
	Mean	33.00	17.20	.20	23.40	.00	4.00	9.40	.00	.20	11.20	1.40	.00	.00	100.00
	StDev	13.00	11.65	.45	12.30	.00	3.81	13.11	.00	.45	7.26	1.95	.00	.00	.00
Silvetia (Rockweed)	396	36	13	0	20	0	2	15	0	6	8	0	0	0	100
	397	7	2	0	0	0	0	85	0	0	6	0	0	0	100
	398	36	21	0	6	0	4	23	0	1	7	2	0	0	100
	399	32	4	0	1	0	3	3	1	0	56	0	0	0	100
	400	56	8	0	22	0	2	2	0	0	10	0	0	0	100
	Mean	33.40	9.60	.00	9.80	.00	2.20	25.60	.20	1.40	17.40	.40	.00	.00	100.00
	StDev	17.49	7.64	.00	10.50	.00	1.48	34.33	.45	2.61	21.63	.89	.00	.00	.00
Mussels	381	18	4	0	2	0	0	38	2	0	35	1	0	0	100
	382	3	0	0	0	0	0	97	0	0	0	0	0	0	100
	383	4	0	0	0	0	0	94	0	0	2	0	0	0	100
	384	17	1	1	0	0	0	65	0	4	9	3	0	0	100
	385	19	3	0	0	0	0	51	0	10	17	0	0	0	100
	Mean	12.20	1.60	.20	.40	.00	.00	69.00	.40	2.80	12.60	.80	.00	.00	100.00
	StDev	7.98	1.82	.45	.89	.00	.00	26.03	.89	4.38	14.19	1.30	.00	.00	.00

**Table A25. Percent Cover of Index Species
Cuyler Harbor, San Miguel Island - Fall 2002 (12/31/02)**

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	38	62	0	0	0	0	0	0	0	0	0	0	0	100
	417	32	61	0	7	0	0	0	0	0	0	0	0	0	100
	418	34	62	0	3	0	0	0	0	0	0	1	0	0	100
	419	63	23	0	13	0	1	0	0	0	0	0	0	0	100
	420	50	24	0	25	0	0	0	0	0	0	1	0	0	100
	Mean	43.40	46.40	.00	9.60	.00	.20	.00	.00	.00	.00	.40	.00	.00	100.00
	StDev	12.99	20.91	.00	9.89	.00	.45	.00	.00	.00	.00	.55	.00	.00	.00
Endocladia	411	53	1	0	13	0	0	21	0	0	5	7	0	0	100
	412	18	43	0	27	0	0	11	0	0	1	0	0	0	100
	413	27	3	0	15	0	51	1	0	0	3	0	0	0	100
	414	57	0	0	29	0	0	1	1	0	6	6	0	0	100
	415	68	0	0	26	0	0	0	0	0	5	1	0	0	100
	Mean	44.60	9.40	.00	22.00	.00	10.20	6.80	.20	.00	4.00	2.80	.00	.00	100.00
	StDev	21.15	18.82	.00	7.42	.00	22.81	9.12	.45	.00	2.00	3.42	.00	.00	.00
Silvetia (Rockweed)	406	21	0	0	1	0	54	1	0	0	6	17	0	0	100
	407	25	1	0	0	0	48	0	0	0	20	6	0	0	100
	408	16	0	3	1	0	74	0	0	0	5	1	0	0	100
	409	21	0	0	0	0	64	0	0	0	9	6	0	0	100
	410	15	0	1	0	0	75	0	0	0	4	5	0	0	100
	Mean	19.60	.20	.80	.40	.00	63.00	.20	.00	.00	8.80	7.00	.00	.00	100.00
	StDev	4.10	.45	1.30	.55	.00	11.96	.45	.00	.00	6.53	5.96	.00	.00	.00
Mussels	401	4	0	4	0	0	0	86	0	4	0	2	0	0	100
	402	11	0	1	0	0	0	83	0	2	1	2	0	0	100
	403	15	0	1	2	0	0	69	0	2	6	5	0	0	100
	404	31	0	14	0	0	0	37	0	0	3	15	0	0	100
	405	49	1	11	3	0	0	20	0	1	5	10	0	0	100
	Mean	22.00	.20	6.20	1.00	.00	.00	59.00	.00	1.80	3.00	6.80	.00	.00	100.00
	StDev	18.06	.45	5.97	1.41	.00	.00	29.20	.00	1.48	2.55	5.63	.00	.00	.00

**Table A26. Percent Cover of Index Species
Harris Point, San Miguel Island - Fall 2002 (1/16/03)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	440	34	57	0	5	0	0	0	0	4	0	0	0	100
	441	45	54	0	1	0	0	0	0	0	0	0	0	100
	442	16	77	0	7	0	0	0	0	0	0	0	0	100
	443	49	46	0	1	0	0	0	0	0	0	4	0	100
	444	60	38	0	1	0	0	0	0	1	0	0	0	100
	Mean	40.80	54.40	.00	3.00	.00	.00	.00	.00	1.00	.00	.80	.00	100.00
	StDev	16.69	14.64	.00	2.83	.00	.00	.00	.00	1.73	.00	1.79	.00	.00
Endocladia	431	14	12	1	22	0	0	6	0	41	4	0	0	100
	432	2	4	0	76	9	0	0	0	9	0	0	0	100
	433	10	5	0	81	3	0	0	0	1	0	0	0	100
	434	35	0	0	45	18	0	0	0	2	0	0	0	100
	435	9	0	0	31	42	0	0	0	18	0	0	0	100
	Mean	14.00	4.20	.20	51.00	14.40	.00	1.20	.00	14.20	.80	.00	.00	100.00
	StDev	12.51	4.92	.45	26.47	16.89	.00	2.68	.00	16.45	1.79	.00	.00	.00
Mussels	426	4	0	1	1	0	0	58	5	30	1	0	0	100
	427	7	0	2	10	7	0	7	0	65	2	0	0	100
	428	12	0	0	3	5	0	15	0	61	4	0	0	100
	429	28	0	6	0	0	0	49	0	16	1	0	0	100
	430	10	0	2	0	0	0	59	0	26	3	0	0	100
	Mean	12.20	.00	2.20	2.80	2.40	.00	37.60	1.00	39.60	2.20	.00	.00	100.00
	StDev	9.34	.00	2.28	4.21	3.36	.00	24.75	2.24	22.01	1.30	.00	.00	.00
Tetraclita	436	11	1	21	0	0	0	23	0	38	6	0	0	100
	437	10	0	28	0	0	0	19	0	38	5	0	0	100
	438	7	30	11	4	0	0	0	0	45	3	0	0	100
	439	1	0	2	22	0	0	4	0	67	4	0	0	100
	445	6	2	24	2	0	0	10	0	54	2	0	0	100
	Mean	7.00	6.60	17.20	5.60	.00	.00	11.20	.00	48.40	4.00	.00	.00	100.00
	StDev	3.94	13.11	10.57	9.32	.00	.00	9.73	.00	12.30	1.58	.00	.00	.00
Hesperophycus	421	26	1	0	24	46	0	0	0	3	0	0	0	100
	422	25	1	0	30	24	0	0	0	19	1	0	0	100
	423	12	1	0	47	14	0	0	0	26	0	0	0	100
	424	23	5	0	14	56	0	0	0	1	0	1	0	100
	425	21	1	0	11	58	0	0	0	9	0	0	0	100
	Mean	21.40	1.80	.00	25.20	39.60	.00	.00	.00	11.60	.20	.20	.00	100.00
	StDev	5.59	1.79	.00	14.38	19.67	.00	.00	.00	10.67	.45	.45	.00	.00

**Table A27. Percent Cover of Index Species
Otter Harbor, San Miguel Island - Fall 2002 (1/15/03)**

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	0	12	0	0	0	0	0	0	0	88	0	0	0	100
	371	13	65	0	0	0	0	0	0	0	17	1	4	0	100
	372	41	56	0	0	0	0	0	0	0	1	2	0	0	100
	373	30	42	0	1	0	0	0	0	0	22	0	5	0	100
	374	1	0	0	0	0	0	0	35	0	64	0	0	0	100
	Mean	17.00	35.00	.00	.20	.00	.00	.00	7.00	.00	38.40	.60	1.80	.00	100.00
	StDev	18.07	28.04	.00	.45	.00	.00	.00	15.65	.00	36.20	.89	2.49	.00	.00
Endocladia	360	9	31	2	23	0	6	3	1	1	22	2	0	0	100
	361	22	0	0	56	0	0	3	0	0	18	0	1	0	100
	362	1	0	0	84	0	0	1	0	0	14	0	0	0	100
	363	8	0	0	67	0	3	0	0	0	20	0	2	0	100
	364	8	0	0	58	0	9	0	0	0	25	0	0	0	100
	Mean	9.60	6.20	.40	57.60	.00	3.60	1.40	.20	.20	19.80	.40	.60	.00	100.00
	StDev	7.64	13.86	.89	22.28	.00	3.91	1.52	.45	.45	4.15	.89	.89	.00	.00
Silvetia (Rockweed)	355	9	2	0	24	0	27	0	0	0	36	0	2	0	100
	356	1	0	2	14	0	54	0	0	0	29	0	0	0	100
	357	12	0	0	31	0	35	0	0	0	22	0	0	0	100
	358	12	26	0	19	0	10	0	0	0	33	0	0	0	100
	359	9	78	0	9	0	1	0	0	0	3	0	0	0	100
	Mean	8.60	21.20	.40	19.40	.00	25.40	.00	.00	.00	24.60	.00	.40	.00	100.00
	StDev	4.51	33.60	.89	8.56	.00	20.89	.00	.00	.00	13.16	.00	.89	.00	.00
Mussels	375	4	0	1	0	0	0	54	0	13	26	2	0	0	100
	376	4	0	1	0	0	0	55	0	0	38	2	0	0	100
	378	0	0	0	0	0	0	55	0	11	33	1	0	0	100
	379	3	0	2	0	0	0	52	0	10	33	0	0	0	100
	380	0	0	0	0	0	0	57	0	2	41	0	0	0	100
	Mean	2.20	.00	.80	.00	.00	.00	54.60	.00	7.20	34.20	1.00	.00	.00	100.00
	StDev	2.05	.00	.84	.00	.00	.00	1.82	.00	5.81	5.72	1.00	.00	.00	.00

**Table A28. Percent Cover of Index Species
Landing Cove, Santa Barbara Island - Fall 2002 (11/21/02)**

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	74	7	11	2	0	0	0	0	0	6	0	0	0	100
	316	24	6	2	7	0	0	0	1	0	60	0	0	0	100
	317	33	2	8	4	0	0	4	3	0	46	0	0	0	100
	318	23	3	37	1	0	0	31	0	0	5	0	0	0	100
	319	56	3	4	0	0	0	0	1	0	36	0	0	0	100
	Mean	42.00	4.20	12.40	2.80	.00	.00	7.00	1.00	.00	30.60	.00	.00	.00	100.00
	StDev	22.28	2.17	14.19	2.77	.00	.00	13.53	1.22	.00	24.45	.00	.00	.00	.00
Silvetia (Rockweed)	310	42	32	4	2	0	0	5	0	0	14	1	0	0	100
	311	53	28	3	0	0	0	3	0	0	11	2	0	0	100
	312	57	21	0	0	0	0	3	0	0	19	0	0	0	100
	313	53	11	0	0	0	0	1	3	0	29	3	0	0	100
	314	54	18	0	0	0	0	2	0	0	22	4	0	0	100
	Mean	51.80	22.00	1.40	.40	.00	.00	2.80	.60	.00	19.00	2.00	.00	.00	100.00
	StDev	5.72	8.28	1.95	.89	.00	.00	1.48	1.34	.00	7.04	1.58	.00	.00	.00
Mussels	325	0	0	1	0	0	0	90	0	3	3	3	0	0	100
	326	8	0	1	0	0	0	62	0	2	21	6	0	0	100
	327	8	0	1	1	0	0	25	0	4	61	0	0	0	100
	328	2	0	8	0	0	0	72	0	0	14	4	0	0	100
	329	12	0	6	0	0	0	73	0	1	4	4	0	0	100
	Mean	6.00	.00	3.40	.20	.00	.00	64.40	.00	2.00	20.60	3.40	.00	.00	100.00
	StDev	4.90	.00	3.36	.45	.00	.00	24.21	.00	1.58	23.78	2.19	.00	.00	.00
Red Algal Turf/	320	1	0	0	0	0	0	0	54	0	45	0	0	0	100
	321	14	0	0	0	0	0	1	47	0	38	0	0	0	100
	322	0	0	0	0	0	0	0	44	0	11	1	0	44	100
	323	0	0	0	0	0	0	0	7	0	5	4	0	84	100
	324	0	0	0	0	0	0	0	27	0	73	0	0	0	100
	Mean	3.00	.00	.00	.00	.00	.00	.20	35.80	.00	34.40	1.00	.00	25.60	100.00
	StDev	6.16	.00	.00	.00	.00	.00	.45	18.91	.00	27.51	1.73	.00	37.80	.00

**Table A29. Percent Cover of Index Species
Sea Lion Rookery, Santa Barbara Island - Fall 2002 (11/20/02)**

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	42	11	4	3	0	0	2	4	2	32	0	0	0	100
	346	51	17	0	0	0	0	0	0	0	32	0	0	0	100
	347	33	19	1	0	0	0	0	0	0	47	0	0	0	100
	348	31	3	3	2	0	0	0	0	0	61	0	0	0	100
	349	29	5	2	0	0	0	0	0	0	64	0	0	0	100
	Mean	37.20	11.00	2.00	1.00	.00	.00	.40	.80	.40	47.20	.00	.00	.00	100.00
	StDev	9.18	7.07	1.58	1.41	.00	.00	.89	1.79	.89	15.29	.00	.00	.00	.00
Endocladia	335	48	1	24	3	0	0	1	0	2	21	0	0	0	100
	336	20	0	2	0	0	0	0	0	0	78	0	0	0	100
	337	15	1	4	5	0	0	10	0	9	56	0	0	0	100
	338	29	0	6	12	0	0	0	0	0	53	0	0	0	100
	339	29	0	15	16	0	0	0	0	0	40	0	0	0	100
	Mean	28.20	.40	10.20	7.20	.00	.00	2.20	.00	2.20	49.60	.00	.00	.00	100.00
	StDev	12.60	.55	9.18	6.61	.00	.00	4.38	.00	3.90	21.03	.00	.00	.00	.00
Silvetia (Rockweed)	330	26	0	14	0	0	0	55	0	0	0	5	0	0	100
	331	26	0	0	2	0	31	1	2	2	36	0	0	0	100
	332	12	0	0	4	0	32	3	3	0	45	1	0	0	100
	333	11	0	3	0	0	25	12	8	0	38	3	0	0	100
	334	18	0	0	2	0	32	2	0	0	38	8	0	0	100
	Mean	18.60	.00	3.40	1.60	.00	24.00	14.60	2.60	.40	31.40	3.40	.00	.00	100.00
	StDev	7.27	.00	6.07	1.67	.00	13.73	23.01	3.29	.89	17.88	3.21	.00	.00	.00
Mussels	350	5	0	0	0	0	0	15	9	0	68	3	0	0	100
	351	1	0	0	0	0	0	80	0	0	17	2	0	0	100
	352	6	0	0	0	0	0	4	0	0	90	0	0	0	100
	353	4	0	0	0	0	0	5	0	0	89	2	0	0	100
	354	3	0	1	0	0	0	16	0	6	71	3	0	0	100
	Mean	3.80	.00	.20	.00	.00	.00	24.00	1.80	1.20	67.00	2.00	.00	.00	100.00
	StDev	1.92	.00	.45	.00	.00	.00	31.79	4.02	2.68	29.71	1.22	.00	.00	.00

**Table A30. Percent Cover of Index Species
Fraser Cove, Santa Cruz Island - Fall 2002 (11/3/02)**

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	5	41	0	6	0	0	3	0	0	45	0	0	0	100
	877	17	36	0	16	0	0	2	0	0	29	0	0	0	100
	878	25	73	0	0	0	0	0	0	0	0	0	2	0	100
	879	4	69	0	23	0	0	0	0	0	1	0	3	0	100
	880	28	61	0	0	0	0	0	0	0	8	0	3	0	100
	Mean	15.80	56.00	.00	9.00	.00	.00	1.00	.00	.00	16.60	.00	1.60	.00	100.00
	StDev	11.08	16.64	.00	10.20	.00	.00	1.41	.00	.00	19.71	.00	1.52	.00	.00
Endocladia	881	27	14	0	23	0	0	6	0	0	29	1	0	0	100
	882	21	18	0	34	0	0	0	0	0	27	0	0	0	100
	883	19	9	0	52	9	0	0	0	0	11	0	0	0	100
	884	17	9	0	65	0	0	0	0	0	8	0	1	0	100
	885	14	15	0	63	0	0	0	0	0	6	0	2	0	100
	Mean	19.60	13.00	.00	47.40	1.80	.00	1.20	.00	.00	16.20	.20	.60	.00	100.00
	StDev	4.88	3.94	.00	18.37	4.02	.00	2.68	.00	.00	10.94	.45	.89	.00	.00
Silvetia (Rockweed)	896	17	0	0	10	11	60	0	0	0	2	0	0	0	100
	897	7	0	0	2	12	68	0	0	0	11	0	0	0	100
	898	14	1	0	0	0	84	0	0	0	1	0	0	0	100
	899	15	8	0	4	3	65	0	0	0	4	1	0	0	100
	900	5	2	0	1	11	80	0	0	0	0	1	0	0	100
	Mean	11.60	2.20	.00	3.40	7.40	71.40	.00	.00	.00	3.60	.40	.00	.00	100.00
	StDev	5.27	3.35	.00	3.97	5.50	10.19	.00	.00	.00	4.39	.55	.00	.00	.00
Mussels	891	4	0	0	0	0	0	60	0	0	5	31	0	0	100
	892	18	0	0	0	0	0	63	0	1	7	11	0	0	100
	893	3	0	0	0	0	0	80	0	1	2	14	0	0	100
	894	4	3	0	0	0	0	80	0	2	1	10	0	0	100
	895	13	4	0	0	0	0	57	0	10	3	13	0	0	100
	Mean	8.40	1.40	.00	.00	.00	.00	68.00	.00	2.80	3.60	15.80	.00	.00	100.00
	StDev	6.73	1.95	.00	.00	.00	.00	11.16	.00	4.09	2.41	8.64	.00	.00	.00
Pollicipes	901	18	22	6	0	0	0	39	0	6	7	2	0	0	100
	902	20	14	0	8	0	0	14	0	8	22	14	0	0	100
	903	2	0	0	0	0	0	45	2	24	7	20	0	0	100
	904	7	10	5	0	0	0	58	0	7	9	4	0	0	100
	905	2	0	0	0	0	0	47	0	24	11	16	0	0	100
	Mean	9.80	9.20	2.20	1.60	.00	.00	40.60	.40	13.80	11.20	11.20	.00	.00	100.00
	StDev	8.67	9.44	3.03	3.58	.00	.00	16.38	.89	9.34	6.26	7.82	.00	.00	.00

**Table A30 (continued). Percent Cover of Index Species
Fraser Cove, Santa Cruz Island - Fall 2002 (11/3/02)**

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	12	14	0	0	0	0	0	0	0	16	0	58	0	100
	907	7	19	0	0	0	0	0	0	0	23	0	51	0	100
	908	8	23	0	0	0	0	0	0	0	2	0	67	0	100
	909	21	13	0	0	0	0	0	0	0	3	0	63	0	100
	910	18	7	0	0	0	0	0	0	0	0	0	75	0	100
	Mean	13.20	15.20	.00	.00	.00	.00	.00	.00	.00	8.80	.00	62.80	.00	100.00
	StDev	6.14	6.10	.00	.00	.00	.00	.00	.00	.00	10.13	.00	9.07	.00	.00
Hesperophycus	886	79	5	0	7	8	0	0	0	0	1	0	0	0	100
	887	65	6	0	14	1	5	0	0	0	9	0	0	0	100
	888	20	24	0	13	40	3	0	0	0	0	0	0	0	100
	889	52	19	0	9	19	1	0	0	0	0	0	0	0	100
	890	11	10	0	11	45	23	0	0	0	0	0	0	0	100
	Mean	45.40	12.80	.00	10.80	22.60	6.40	.00	.00	.00	2.00	.00	.00	.00	100.00
	StDev	29.09	8.35	.00	2.86	19.35	9.48	.00	.00	.00	3.94	.00	.00	.00	.00

**Table A31. Percent Cover of Index Species
Orizaba Cove, Santa Cruz Island - Fall 2002 (1/30/03)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	851	51	36	7	0	0	0	0	0	5	1	0	0	100
	852	5	87	0	8	0	0	0	0	0	0	0	0	100
	853	27	73	0	0	0	0	0	0	0	0	0	0	100
	854	36	52	5	0	0	0	0	0	7	0	0	0	100
	855	11	75	0	0	0	0	0	0	14	0	0	0	100
	Mean	26.00	64.60	2.40	1.60	.00	.00	.00	.00	5.20	.20	.00	.00	100.00
	StDev	18.65	20.35	3.36	3.58	.00	.00	.00	.00	5.81	.45	.00	.00	.00
Silvetia (Rockweed)	866	0	0	0	0	0	0	0	0	0	0	0	0	0
	867	33	3	5	30	1	7	1	0	20	0	0	0	100
	868	17	9	9	18	1	3	6	0	36	1	0	0	100
	869	22	0	9	27	6	10	0	0	25	1	0	0	100
	870	21	12	5	36	0	11	0	0	13	2	0	0	100
	Mean	18.60	4.80	5.60	22.20	1.60	6.20	1.40	.00	18.80	.80	.00	.00	80.00
	StDev	11.97	5.45	3.71	14.01	2.51	4.66	2.61	.00	13.44	.84	.00	.00	44.72
Mussels	861	1	0	0	0	0	0	99	0	0	0	0	0	100
	862	11	2	5	0	0	0	35	1	39	7	0	0	100
	863	7	6	2	0	0	0	47	0	29	9	0	0	100
	864	17	6	4	0	0	0	43	6	22	2	0	0	100
	865	2	0	3	0	0	0	74	6	14	1	0	0	100
	Mean	7.60	2.80	2.80	.00	.00	.00	59.60	2.60	20.80	3.80	.00	.00	100.00
	StDev	6.62	3.03	1.92	.00	.00	.00	26.45	3.13	14.82	3.96	.00	.00	.00
Tetraclita	871	10	19	26	0	0	0	23	0	22	0	0	0	100
	872	15	1	41	0	0	0	30	2	9	2	0	0	100
	873	23	3	48	0	0	0	4	0	20	2	0	0	100
	874	19	11	32	0	0	0	15	2	14	7	0	0	100
	875	28	11	25	3	0	0	13	1	16	3	0	0	100
	Mean	19.00	9.00	34.40	.60	.00	.00	17.00	1.00	16.20	2.80	.00	.00	100.00
	StDev	6.96	7.21	9.91	1.34	.00	.00	9.92	1.00	5.12	2.59	.00	.00	.00
Hesperophycus	856	4	28	0	58	0	0	0	0	10	0	0	0	100
	857	3	7	0	67	7	0	0	0	16	0	0	0	100
	858	10	16	0	52	5	2	0	0	15	0	0	0	100
	859	7	21	0	68	1	0	0	0	3	0	0	0	100
	860	8	19	0	69	0	0	0	0	4	0	0	0	100
	Mean	6.40	18.20	.00	62.80	2.60	.40	.00	.00	9.60	.00	.00	.00	100.00
	StDev	2.88	7.66	.00	7.46	3.21	.89	.00	.00	6.02	.00	.00	.00	.00

**Table A32. Percent Cover of Index Species
Prisoner's Harbor, Santa Cruz Island - Fall 2002 (11/5/02)**

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	29	1	0	0	0	0	0	0	0	69	1	0	0	100
	827	84	0	2	0	0	2	2	0	0	8	2	0	0	100
	828	50	24	0	15	0	2	0	0	0	7	2	0	0	100
	829	19	65	0	10	0	0	0	0	0	4	2	0	0	100
	830	62	26	0	9	0	0	0	0	0	2	0	1	0	100
	Mean	48.80	23.20	.40	6.80	.00	.80	.40	.00	.00	18.00	1.40	.20	.00	100.00
	StDev	25.96	26.40	.89	6.61	.00	1.10	.89	.00	.00	28.61	.89	.45	.00	.00
Endocladia	831	35	33	0	21	0	0	0	0	0	10	1	0	0	100
	832	14	27	0	42	13	0	2	0	0	2	0	0	0	100
	833	15	27	0	53	4	0	0	0	0	0	1	0	0	100
	834	19	15	0	33	31	0	1	0	0	0	1	0	0	100
	835	29	2	0	40	23	0	0	0	0	4	2	0	0	100
	Mean	22.40	20.80	.00	37.80	14.20	.00	.60	.00	.00	3.20	1.00	.00	.00	100.00
	StDev	9.21	12.38	.00	11.82	12.91	.00	.89	.00	.00	4.15	.71	.00	.00	.00
Silvetia (Rockweed)	846	9	0	1	0	0	23	2	0	0	64	1	0	0	100
	847	15	0	1	0	0	17	12	1	0	52	2	0	0	100
	848	0	0	0	0	0	51	1	0	0	46	2	0	0	100
	849	0	0	0	0	0	64	0	0	0	32	4	0	0	100
	850	1	0	1	0	0	69	0	0	0	29	0	0	0	100
	Mean	5.00	.00	.60	.00	.00	44.80	3.00	.20	.00	44.60	1.80	.00	.00	100.00
	StDev	6.75	.00	.55	.00	.00	23.67	5.10	.45	.00	14.45	1.48	.00	.00	.00
Mussels	841	1	0	0	0	0	0	80	1	0	10	1	0	7	100
	842	10	16	4	0	0	0	30	0	0	36	0	0	4	100
	843	21	13	3	0	0	0	4	0	0	26	4	0	29	100
	844	2	0	0	0	0	0	76	0	0	3	0	0	19	100
	845	3	2	3	0	0	0	79	0	1	12	0	0	0	100
	Mean	7.40	6.20	2.00	.00	.00	.00	53.80	.20	.20	17.40	1.00	.00	11.80	100.00
	StDev	8.38	7.69	1.87	.00	.00	.00	34.86	.45	.45	13.33	1.73	.00	11.95	.00
Hesperophycus	836	39	0	0	26	30	0	3	0	0	2	0	0	0	100
	837	33	1	0	9	56	0	1	0	0	0	0	0	0	100
	838	46	0	0	22	29	0	0	0	0	2	1	0	0	100
	839	15	42	0	7	36	0	0	0	0	0	0	0	0	100
	840	34	16	0	11	37	0	0	0	0	0	2	0	0	100
	Mean	33.40	11.80	.00	15.00	37.60	.00	.80	.00	.00	.80	.60	.00	.00	100.00
	StDev	11.50	18.20	.00	8.46	10.88	.00	1.30	.00	.00	1.10	.89	.00	.00	.00

**Table A33. Percent Cover of Index Species
Scorpion Rock, Santa Cruz Island - Fall 2002 (1/31/03)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	801	25	23	0	52	0	0	0	0	0	0	0	0	100
	802	51	38	1	10	0	0	0	0	0	0	0	0	100
	803	53	9	0	37	0	0	1	0	0	0	0	0	100
	804	31	25	0	44	0	0	0	0	0	0	0	0	100
	805	60	40	0	0	0	0	0	0	0	0	0	0	100
	Mean	44.00	27.00	.20	28.60	.00	.00	.20	.00	.00	.00	.00	.00	100.00
	StDev	15.13	12.59	.45	22.47	.00	.00	.45	.00	.00	.00	.00	.00	.00
Endocladia	806	19	1	2	66	0	0	0	0	12	0	0	0	100
	807	17	2	1	57	0	0	0	2	21	0	0	0	100
	808	29	0	2	49	0	0	3	4	13	0	0	0	100
	809	32	6	0	62	0	0	0	0	0	0	0	0	100
	810	71	6	2	10	0	0	0	1	10	0	0	0	100
	Mean	33.60	3.00	1.40	48.80	.00	.00	.60	1.40	11.20	.00	.00	.00	100.00
	StDev	21.86	2.83	.89	22.60	.00	.00	1.34	1.67	7.53	.00	.00	.00	.00
Mussels	816	12	29	7	0	0	0	50	0	2	0	0	0	100
	817	11	0	5	0	0	0	82	1	1	0	0	0	100
	818	4	1	1	0	0	0	86	8	0	0	0	0	100
	819	32	3	6	0	0	0	52	1	5	1	0	0	100
	820	16	3	3	0	0	0	67	0	10	1	0	0	100
	Mean	15.00	7.20	4.40	.00	.00	.00	67.40	2.00	3.60	.40	.00	.00	100.00
	StDev	10.44	12.26	2.41	.00	.00	.00	16.58	3.39	4.04	.55	.00	.00	.00
Tetraclita	821	34	19	8	9	0	0	12	12	5	1	0	0	100
	822	28	1	2	19	0	0	31	9	10	0	0	0	100
	823	53	1	3	0	0	0	35	2	3	3	0	0	100
	824	48	0	14	0	0	0	26	0	8	4	0	0	100
	825	45	2	20	0	0	0	29	2	1	1	0	0	100
	Mean	41.60	4.60	9.40	5.60	.00	.00	26.60	5.00	5.40	1.80	.00	.00	100.00
	StDev	10.31	8.08	7.60	8.44	.00	.00	8.79	5.20	3.65	1.64	.00	.00	.00
Hesperophycus	811	36	3	0	6	36	0	0	2	17	0	0	0	100
	812	34	0	0	7	39	12	1	0	7	0	0	0	100
	813	7	3	0	26	48	16	0	0	0	0	0	0	100
	814	41	7	0	21	8	11	0	0	12	0	0	0	100
	815	24	0	0	19	48	5	0	0	4	0	0	0	100
	Mean	28.40	2.60	.00	15.80	35.80	8.80	.20	.40	8.00	.00	.00	.00	100.00
	StDev	13.46	2.88	.00	8.87	16.44	6.30	.45	.89	6.67	.00	.00	.00	.00

**Table A34. Percent Cover of Index Species
Trailer, Santa Cruz Island - Fall 2002 (11/2/02)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	911	62	36	0	0	0	0	0	0	0	2	0	0	100
	912	72	27	0	0	0	0	0	0	0	1	0	0	100
	913	43	45	0	12	0	0	0	0	0	0	0	0	100
	914	23	76	0	0	0	0	0	0	0	1	0	0	100
	915	21	77	0	0	0	0	0	0	0	2	0	0	100
	Mean	44.20	52.20	.00	2.40	.00	.00	.00	.00	.00	1.20	.00	.00	100.00
	StDev	22.80	23.08	.00	5.37	.00	.00	.00	.00	.00	.84	.00	.00	.00
Silvetia (Rockweed)	926	5	0	0	0	0	90	0	0	5	0	0	0	100
	927	15	0	0	0	0	83	0	0	2	0	0	0	100
	928	16	1	0	3	0	73	0	0	7	0	0	0	100
	929	2	0	0	0	0	98	0	0	0	0	0	0	100
	930	3	0	0	0	0	97	0	0	0	0	0	0	100
	Mean	8.20	.20	.00	.60	.00	88.20	.00	.00	2.80	.00	.00	.00	100.00
	StDev	6.76	.45	.00	1.34	.00	10.43	.00	.00	3.11	.00	.00	.00	.00
Mussels	921	19	2	2	0	0	0	64	1	12	0	0	0	100
	922	9	2	0	0	0	0	56	0	33	0	0	0	100
	923	12	2	0	0	0	0	75	0	11	0	0	0	100
	924	15	2	0	0	0	0	75	0	7	1	0	0	100
	925	15	1	2	1	0	0	76	1	4	0	0	0	100
	Mean	14.00	1.80	.80	.20	.00	.00	69.20	.40	13.40	.20	.00	.00	100.00
	StDev	3.74	.45	1.10	.45	.00	.00	8.87	.55	11.41	.45	.00	.00	.00
Hesperophycus	916	62	1	0	12	19	3	0	0	2	1	0	0	100
	917	33	0	0	19	4	44	0	0	0	0	0	0	100
	918	50	0	0	14	8	28	0	0	0	0	0	0	100
	919	58	5	0	3	4	28	0	0	1	1	0	0	100
	920	49	8	0	19	23	1	0	0	0	0	0	0	100
	Mean	50.40	2.80	.00	13.40	11.60	20.80	.00	.00	.60	.40	.00	.00	100.00
	StDev	11.15	3.56	.00	6.58	8.85	18.38	.00	.00	.89	.55	.00	.00	.00

**Table A35. Percent Cover of Index Species
Willows Anchorage, Santa Cruz Island - Fall 2002 (11/4/02)**

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	12	0	0	86	0	0	0	0	0	1	1	0	0	100
	932	22	0	0	77	0	0	0	0	0	0	1	0	0	100
	933	22	0	0	74	0	0	0	0	0	4	0	0	0	100
	934	16	0	1	74	0	0	0	0	0	7	2	0	0	100
	935	35	0	4	53	0	0	0	0	0	8	0	0	0	100
	Mean	21.40	.00	1.00	72.80	.00	.00	.00	.00	.00	4.00	.80	.00	.00	100.00
	StDev	8.71	.00	1.73	12.11	.00	.00	.00	.00	.00	3.54	.84	.00	.00	.00
Silvetia (Rockweed)	946	12	0	0	63	0	0	0	0	0	25	0	0	0	100
	947	17	0	0	42	0	0	0	0	0	41	0	0	0	100
	948	8	0	0	0	0	90	0	0	0	2	0	0	0	100
	949	0	0	0	0	0	100	0	0	0	0	0	0	0	100
	950	49	0	0	7	0	5	0	1	0	34	4	0	0	100
	Mean	17.20	.00	.00	22.40	.00	39.00	.00	.20	.00	20.40	.80	.00	.00	100.00
	StDev	18.83	.00	.00	28.61	.00	51.28	.00	.45	.00	18.61	1.79	.00	.00	.00
Mussels	941	10	0	22	0	0	0	34	0	2	26	6	0	0	100
	942	13	0	4	0	0	0	64	0	7	9	3	0	0	100
	943	5	0	0	0	0	0	65	0	13	7	10	0	0	100
	944	8	0	0	0	0	0	65	0	13	11	3	0	0	100
	945	3	0	0	0	0	0	68	0	4	22	3	0	0	100
	Mean	7.80	.00	5.20	.00	.00	.00	59.20	.00	7.80	15.00	5.00	.00	.00	100.00
	StDev	3.96	.00	9.55	.00	.00	.00	14.17	.00	5.07	8.46	3.08	.00	.00	.00
Hesperophycus	936	72	0	0	25	0	0	0	1	0	2	0	0	0	100
	937	58	6	0	0	8	7	1	0	0	18	2	0	0	100
	938	64	10	0	1	1	0	0	0	0	23	1	0	0	100
	939	13	0	0	0	0	84	0	0	0	3	0	0	0	100
	940	46	1	0	3	6	31	0	0	0	11	2	0	0	100
	Mean	50.60	3.40	.00	5.80	3.00	24.40	.20	.20	.00	11.40	1.00	.00	.00	100.00
	StDev	23.06	4.45	.00	10.80	3.74	35.67	.45	.45	.00	9.18	1.00	.00	.00	.00

**Table A36. Percent Cover of Index Species
East Point, Santa Rosa Island - Fall 2002 (12/4/02)**

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	575	75	25	0	0	0	0	0	0	0	0	0	0	0	100
	576	28	0	0	3	64	0	0	0	0	4	1	0	0	100
	577	26	40	0	19	11	2	0	0	0	2	0	0	0	100
	578	88	12	0	0	0	0	0	0	0	0	0	0	0	100
	579	79	20	0	1	0	0	0	0	0	0	0	0	0	100
	Mean	59.20	19.40	.00	4.60	15.00	.40	.00	.00	.00	1.20	.20	.00	.00	100.00
	StDev	29.78	14.89	.00	8.14	27.80	.89	.00	.00	.00	1.79	.45	.00	.00	.00
Endocladia	580	3	0	0	7	79	11	0	0	0	0	0	0	0	100
	581	6	1	0	34	56	1	0	0	0	2	0	0	0	100
	582	3	0	0	30	47	18	0	0	0	2	0	0	0	100
	583	11	1	0	49	38	0	0	0	0	1	0	0	0	100
	584	33	1	0	38	25	0	0	0	0	2	1	0	0	100
	Mean	11.20	.60	.00	31.60	49.00	6.00	.00	.00	.00	1.40	.20	.00	.00	100.00
	StDev	12.62	.55	.00	15.47	20.31	8.15	.00	.00	.00	.89	.45	.00	.00	.00
Silvetia (Rockweed)	585	14	0	0	2	0	67	0	0	0	17	0	0	0	100
	586	17	0	0	3	1	68	0	0	0	11	0	0	0	100
	587	11	0	0	0	0	77	0	0	0	12	0	0	0	100
	588	0	0	0	0	0	96	0	0	0	4	0	0	0	100
	589	2	0	0	0	0	95	0	0	0	3	0	0	0	100
	Mean	8.80	.00	.00	1.00	.20	80.60	.00	.00	.00	9.40	.00	.00	.00	100.00
	StDev	7.46	.00	.00	1.41	.45	14.15	.00	.00	.00	5.86	.00	.00	.00	.00
Mussels	590	2	1	0	0	0	0	73	0	0	23	1	0	0	100
	591	1	1	0	0	0	0	79	4	0	14	1	0	0	100
	592	5	0	0	0	0	0	78	0	0	14	3	0	0	100
	593	1	0	0	0	0	0	89	0	0	9	1	0	0	100
	594	7	0	0	0	0	0	76	0	0	15	2	0	0	100
	Mean	3.20	.40	.00	.00	.00	.00	79.00	.80	.00	15.00	1.60	.00	.00	100.00
	StDev	2.68	.55	.00	.00	.00	.00	6.04	1.79	.00	5.05	.89	.00	.00	.00
Hesperophycus	570	2	0	0	7	91	0	0	0	0	0	0	0	0	100
	571	6	0	0	5	88	0	0	0	0	0	1	0	0	100
	572	3	0	0	2	95	0	0	0	0	0	0	0	0	100
	573	3	0	0	5	89	3	0	0	0	0	0	0	0	100
	574	5	0	0	3	84	7	0	0	0	1	0	0	0	100
	Mean	3.80	.00	.00	4.40	89.40	2.00	.00	.00	.00	.20	.20	.00	.00	100.00
	StDev	1.64	.00	.00	1.95	4.04	3.08	.00	.00	.00	.45	.45	.00	.00	.00

**Table A37. Percent Cover of Index Species
Ford Point, Santa Rosa Island - Fall 2002 (12/5/02)**

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	79	16	0	0	0	0	0	0	0	1	4	0	0	100
	521	71	28	0	0	0	0	0	0	0	1	0	0	0	100
	522	84	15	0	0	0	0	0	0	0	0	1	0	0	100
	523	38	43	0	11	0	0	0	0	0	5	3	0	0	100
	524	78	21	0	0	0	0	0	0	0	1	0	0	0	100
	Mean	70.00	24.60	.00	2.20	.00	.00	.00	.00	.00	1.60	1.60	.00	.00	100.00
	StDev	18.48	11.50	.00	4.92	.00	.00	.00	.00	.00	1.95	1.82	.00	.00	.00
Endocladia	525	15	7	0	56	0	0	5	1	0	16	0	0	0	100
	526	49	2	0	29	0	0	6	0	0	12	2	0	0	100
	527	36	2	0	41	0	0	6	0	0	12	3	0	0	100
	528	26	1	1	46	0	0	7	3	0	16	0	0	0	100
	529	24	1	1	62	0	0	4	0	0	8	0	0	0	100
	Mean	30.00	2.60	.40	46.80	.00	.00	5.60	.80	.00	12.80	1.00	.00	.00	100.00
	StDev	12.98	2.51	.55	12.91	.00	.00	1.14	1.30	.00	3.35	1.41	.00	.00	.00
Mussels	530	60	23	0	0	0	0	8	0	0	5	4	0	0	100
	531	5	0	0	0	0	0	92	0	0	2	1	0	0	100
	532	3	0	0	0	0	0	91	0	0	5	1	0	0	100
	533	38	0	0	0	0	0	44	3	0	15	0	0	0	100
	534	27	1	0	0	0	0	0	15	0	57	0	0	0	100
	Mean	26.60	4.80	.00	.00	.00	.00	47.00	3.60	.00	16.80	1.20	.00	.00	100.00
	StDev	23.82	10.18	.00	.00	.00	.00	43.87	6.50	.00	23.00	1.64	.00	.00	.00

**Table A38. Percent Cover of Index Species
Fossil Reef, Santa Rosa Island - Fall 2002 (12/3/02)**

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	65	33	0	2	0	0	0	0	0	0	0	0	0	100
	606	58	39	0	0	0	0	0	0	0	0	0	3	0	100
	607	53	46	0	0	0	0	0	0	0	0	0	1	0	100
	608	83	17	0	0	0	0	0	0	0	0	0	0	0	100
	609	67	31	0	0	0	0	0	0	0	1	0	1	0	100
	Mean	65.20	33.20	.00	.40	.00	.00	.00	.00	.00	.20	.00	1.00	.00	100.00
	StDev	11.41	10.78	.00	.89	.00	.00	.00	.00	.00	.45	.00	1.22	.00	.00
Endocladia	610	45	39	0	15	0	0	0	0	0	1	0	0	0	100
	611	50	47	0	0	0	0	0	0	0	0	3	0	0	100
	612	75	3	0	0	0	18	1	0	0	1	1	1	0	100
	613	46	6	0	46	0	2	0	0	0	0	0	0	0	100
	614	49	0	0	1	0	48	1	0	0	1	0	0	0	100
	Mean	53.00	19.00	.00	12.40	.00	13.60	.40	.00	.00	.60	.80	.20	.00	100.00
	StDev	12.47	22.19	.00	19.83	.00	20.66	.55	.00	.00	.55	1.30	.45	.00	.00
Silvetia (Rockweed)	615	86	12	0	0	0	0	0	0	0	2	0	0	0	100
	616	78	11	0	3	0	0	0	0	0	6	2	0	0	100
	617	76	3	0	3	0	9	0	0	0	8	1	0	0	100
	618	62	0	0	14	0	17	0	0	0	7	0	0	0	100
	619	58	0	0	20	0	21	0	0	0	1	0	0	0	100
	Mean	72.00	5.20	.00	8.00	.00	9.40	.00	.00	.00	4.80	.60	.00	.00	100.00
	StDev	11.66	5.89	.00	8.57	.00	9.61	.00	.00	.00	3.11	.89	.00	.00	.00
Mussels	620	8	0	3	0	0	0	42	0	0	14	33	0	0	100
	621	31	0	6	0	0	0	37	0	0	16	10	0	0	100
	622	33	0	8	0	0	0	42	0	1	13	3	0	0	100
	623	33	0	6	0	0	0	43	0	5	9	4	0	0	100
	624	1	0	3	0	0	0	0	0	0	8	88	0	0	100
	Mean	21.20	.00	5.20	.00	.00	.00	32.80	.00	1.20	12.00	27.60	.00	.00	100.00
	StDev	15.47	.00	2.17	.00	.00	.00	18.49	.00	2.17	3.39	35.88	.00	.00	.00

**Table A39. Percent Cover of Index Species
Johnson's Lee, Santa Rosa Island - Fall 2002 (12/1/02)**

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	45	55	0	0	0	0	0	0	0	0	0	0	0	100
	501	40	60	0	0	0	0	0	0	0	0	0	0	0	100
	502	78	22	0	0	0	0	0	0	0	0	0	0	0	100
	503	38	44	0	17	0	0	0	0	0	0	1	0	0	100
	504	61	9	0	5	0	0	0	0	0	13	12	0	0	100
	Mean	52.40	38.00	.00	4.40	.00	.00	.00	.00	.00	2.60	2.60	.00	.00	100.00
	StDev	16.92	21.83	.00	7.37	.00	.00	.00	.00	.00	5.81	5.27	.00	.00	.00
Endocladia	505	57	0	0	16	0	0	21	0	4	0	2	0	0	100
	506	48	14	0	38	0	0	0	0	0	0	0	0	0	100
	507	38	1	2	46	0	0	10	0	0	3	0	0	0	100
	508	43	12	0	29	0	0	15	0	1	0	0	0	0	100
	509	48	3	0	44	0	0	0	0	0	5	0	0	0	100
	Mean	46.80	6.00	.40	34.60	.00	.00	9.20	.00	1.00	1.60	.40	.00	.00	100.00
	StDev	7.05	6.52	.89	12.32	.00	.00	9.26	.00	1.73	2.30	.89	.00	.00	.00
Mussels	510	0	0	0	0	0	0	0	0	0	1	99	0	0	100
	511	5	0	0	0	0	0	0	32	0	13	50	0	0	100
	512	38	0	4	0	0	0	52	0	4	1	1	0	0	100
	513	9	0	0	0	0	0	3	12	0	41	35	0	0	100
	514	0	0	0	0	0	0	0	4	0	56	40	0	0	100
	Mean	10.40	.00	.80	.00	.00	.00	11.00	9.60	.80	22.40	45.00	.00	.00	100.00
	StDev	15.88	.00	1.79	.00	.00	.00	22.96	13.45	1.79	24.90	35.36	.00	.00	.00

**Table A40. Percent Cover of Index Species
Northwest Talcott, Santa Rosa Island - Fall 2002 (12/2/02)**

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	67	30	0	2	0	0	0	0	0	0	0	1	0	100
	561	38	61	0	0	0	0	0	0	0	0	0	1	0	100
	562	66	31	0	0	0	0	0	0	0	2	1	0	0	100
	563	30	3	0	1	0	65	0	0	1	0	0	0	0	100
	564	20	61	0	0	0	15	0	0	0	1	3	0	0	100
	Mean	44.20	37.20	.00	.60	.00	16.00	.00	.00	.20	.60	.80	.40	.00	100.00
	StDev	21.34	24.46	.00	.89	.00	28.15	.00	.00	.45	.89	1.30	.55	.00	.00
Endocladia	555	30	0	0	28	0	40	0	0	0	2	0	0	0	100
	556	78	9	0	11	0	2	0	0	0	0	0	0	0	100
	557	31	0	0	13	0	44	0	4	0	6	2	0	0	100
	558	42	29	1	1	0	0	3	0	0	21	3	0	0	100
	559	72	4	0	0	0	0	0	0	0	21	3	0	0	100
	Mean	50.60	8.40	.20	10.60	.00	17.20	.60	.80	.00	10.00	1.60	.00	.00	100.00
	StDev	22.86	12.10	.45	11.33	.00	22.70	1.34	1.79	.00	10.27	1.52	.00	.00	.00
Silvetia (Rockweed)	565	9	0	0	0	0	89	0	0	0	1	0	1	0	100
	566	11	0	0	0	0	88	0	0	0	1	0	0	0	100
	567	7	0	0	0	0	85	0	0	0	8	0	0	0	100
	568	29	0	0	16	0	55	0	0	0	0	0	0	0	100
	569	77	1	0	0	0	19	0	0	0	2	1	0	0	100
	Mean	26.60	.20	.00	3.20	.00	67.20	.00	.00	.00	2.40	.20	.20	.00	100.00
	StDev	29.51	.45	.00	7.16	.00	30.40	.00	.00	.00	3.21	.45	.45	.00	.00
Mussels	550	28	0	0	0	0	0	50	0	8	7	7	0	0	100
	551	14	0	0	0	0	0	76	0	0	8	2	0	0	100
	552	17	0	0	0	0	0	64	0	12	6	1	0	0	100
	553	38	2	5	0	0	0	33	0	8	9	5	0	0	100
	554	26	0	2	0	0	0	54	0	11	5	2	0	0	100
	Mean	24.60	.40	1.40	.00	.00	.00	55.40	.00	7.80	7.00	3.40	.00	.00	100.00
	StDev	9.53	.89	2.19	.00	.00	.00	16.06	.00	4.71	1.58	2.51	.00	.00	.00

Appendix B. Trip Reports

The following are trip reports from the Rocky Intertidal Monitoring 2002 field season (February 2002 through January 2003). Reports were prepared by Dan Richards, Derek Lerma, David Kushner, and Paula Rich. 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.

Table of Contents for Appendix B

Spring 2002 Rocky Intertidal Monitoring Trip Reports	B-3
Santa Cruz Island February 25, 2002 (Database event #2002-A)	B-3
Anacapa Island March 8-12th, 2002 (Database event #2002-B).....	B-5
San Miguel Island March 24-28, 2002 (Database event #2002-C)	B-13
Santa Rosa Island April 19-24, 2002 (Database event #2002-D).....	B-25
Santa Cruz Island May 13-17, 2002 (Database event #2002-E).....	B-37
Santa Cruz Island June 26-27, 2002 (Database event #2002-F).....	B-48
Fall 2002 Rocky Intertidal Monitoring Trip Reports	B-51
Santa Cruz Island November 1-6, 2002 (Database event #2002-G).....	B-51
Santa Barbara Island November 19-22, 2002 (Database event #2002-H).....	B-59
Santa Rosa Island December 1-6, 2002 (Database event #2002-I)	B-64
San Miguel Island December 31, 2002, and January 14-18, 2003 (Database event 2002-J).....	B-73
Anacapa Island January 27-29, 2003 (Database event #2002-K).....	B-79
Santa Cruz Island January 30-Feb. 2, 2003 (database event # 2002-L)	B-88

Spring 2002 Rocky Intertidal Monitoring Trip Reports

Prepared by Dan Richards, Derek Lerma, David Kushner, and Paula Rich

Santa Cruz Island February 25, 2002 (Database event #2002-A)

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
Derek Lerma, Biological Technician, Channel Islands National Park

PROCEDURE: Departed headquarters via the Sea Ranger on regular transportation. Sea Ranger dropped off other park personnel at both Scorpion anchorage and Prisoners Harbor before dropping of us at Orizaba Cove. We arrived on site at approximately 1130 and departed at 1500 hrs. Standard protocol sampling was performed including photographing photoplots, counting motile invertebrates within photoplots, and general notes on conditions and occurrences. Photoplots were scored in the office.

RESULTS:

Orizaba Cove 25 February 2002. Conditions were excellent for sampling with a low tide of – 1.3 ft at 1449 hrs. Skies were clear, winds calm and surge light.

Overall the site appeared healthy and undisturbed with the exception of a few bare patches within the mussel zone. *Balanus sp.* covered nearly 100% of available space in the barnacle plots and contained a high density of *Littorina* spp. *Hesperophycus californica* plots contained some *H. californica* and *Silvetia compressa* but were dominated mostly by *Endocladia muricata* with some *Balanus sp.* Open spaces within *H. californica* plots had high densities of new *Chthamalus sp.* recruit's. *Silvetia compressa* plots had low rockweed cover (3-15%) with *E. muricata* and *Ulva spp.* common. *Tetraclita rubescens* covered 23-36% of available space within its respective plots. Mussel zone plots ranged from 31-97% cover with some bare spots present. Fifty-five *Pisaster ochraceus* were counted on the outer reef between M5 and B3, 90 *P. ochraceus* on the inner reef from B2 to He1 with most individuals in the medium to large category. One abalone (48mm) was found. Algal bleaching was common and widespread. Recruitment was noted for *Chthamalus sp.*, *Tetraclita rubescens*, and *Megabalanus sp.* Motile invertebrate counts varied by zone with relatively high densities and diversity observed. *Ocenebra circumtexta* was common throughout the site and within plots. Photoplots were scored in the office from slides and noted within the database.

Photoplot summary – mean percent of core taxa by zone at Orizaba Cove, Santa Cruz Island, spring 2002 (5 plots/zone)

Zone	Rock	Barn	Tetraclita	Endocladia	Hesperophycus	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal
Barnacle	26.6	62.2	2.8	2.6	0.0	0.0	0.2	0.0	5.4	0.2
Rockweed	25.4	6.2	8.8	11.4	2.4	10.2	0.0	0.0	35.4	0.2
Mussels	4.2	6.0	0.6	0.0	0.0	0.0	58.4	0.8	29.4	0.6
Tetraclita	21.2	6.0	29.8	4.0	0.0	0.0	13.0	0.2	25.8	0.0
Hesperophycus	10.6	7.6	16.8	52.6	4.0	0.8	0.0	0.0	7.6	0.0

Motile invertebrate counts for Orizaba Cove, Santa Cruz Island, spring 2002

	<i>Zone</i>		<i>Barnacle</i>					<i>Hesperophycus</i>					<i>Silvetia</i>			
	<u>plot #</u>	<u>851</u>	<u>852</u>	<u>853</u>	<u>854</u>	<u>855</u>	<u>856</u>	<u>857</u>	<u>858</u>	<u>859</u>	<u>860</u>	<u>866</u>	<u>867</u>	<u>868</u>	<u>869</u>	<u>870</u>
Lepidochitona spp.	1															3
Nuttalina spp.	1											1			2	2
Fissurella volcano													1			
Pachygrapsus			1					1		1		2	1		1	
Pagurus spp.	3											1	1	1		1
Limpets	52	18	5	14	13	13	9	19	13	11	36	24	27	32	25	
S. purpuratus																
Nucella emarginata	1			1							5	5	1	5	11	7
Acanthina spp.												1	3	2		
Tegula funebris																
Ocenebra circumtexta	1				2		2	5	3		3	10	1	11	8	1
Lottia gigantea																
Pisaster ochraceus																
Amphissa versicolor																
Littorina spp.	992	1792	1196	936	1236	572	572	260	632	520	356	304	252	112	212	
Subsample1	56	70	101	24	64	35	45	15	65	17	48	20	17	5	2	
Subsample2	40	129	61	64	106	11	22	27	47	34	21	14	24	15	8	
Subsample3	71	131	64	54	117	46	52	12	16	31	14	33	0	2	19	
Subsample4	81	118	73	92	22	51	24	11	30	48	6	9	22	6	24	

<i>Zone</i>	<i>Mytilus</i>						<i>Tetraclita</i>					<i>Total Count</i> <i>(25 plots)</i>
<u>plot #</u>	<u>861</u>	<u>862</u>	<u>863</u>	<u>864</u>	<u>865</u>	<u>871</u>	<u>872</u>	<u>873</u>	<u>874</u>	<u>875</u>		
Lepidochitona spp.								1	3		8	
Nuttalina spp.		1	8	3	13	1	15	4	23	9	83	
Fissurella volcano			1	1	1						4	
Pachygrapsus	2	1	7	5	4	2	4	1	4	4	41	
Pagurus spp.											7	
Limpets	11	8	34	16	46	31	84	48	46	43	678	
S. purpuratus											0	
Nucella emarginata	2	5		9	4	7	26	10	39	26	164	
Acanthina spp.											6	
Tegula funebris	1										1	
Ocenebra circumtexta	8	4	1	10	15	12	20	31	27	21	196	
Lottia gigantea									1		1	
Pisaster ochraceus			6	1	6						13	
Amphissa versicolor									1		1	
Littorina spp.	4					68	128	164	152	160	10620	
subsample1						1	18	8	6	5		
subsample2						1	5	19	19	16		
subsample3						13	1	6	13	15		
subsample4						2	8	8	0	4		

Anacapa Island March 8-12th, 2002 (Database event #2002-B)

PURPOSE: To monitor rocky intertidal sites at Anacapa Island.

PERSONNEL:

Derek Lerma, Biological Technician, Channel Islands National Park
David Kushner, Marine Biologist, Channel Islands National Park
Jayson Smith, Ph.D. Student, UCLA (3/11 and 3/12)
Dan Richards, Marine Biologist, Channel Islands National Park (3/11)
Danny Black, Volunteer, Student Oxnard Community College (3/8)
Simon Pitallba, Volunteer, Student Oxnard Community College (3/8)
Cassity Bromley, Biological Technician, Santa Monica Mountains National Recreation Area (3/8)
Sam Coture, Volunteer, UCSB (3/12)

PROCEDURE: All trips to Anacapa sites were day trips utilizing regular transportation aboard the Ocean Ranger. March 8th trip was to South Frenchy's cove departing head quarters at 0830. March 11th trip was to Cat Rock departing head quarters at 0500 to drop personnel at Santa Cruz Island, Prisoners Harbor and make a training dive on the backside of Anacapa. March 12th trip was to Middle West departing headquarters at 0830. Standard protocol sampling was performed at all sites in accordance to the Rocky Intertidal Monitoring handbook, photoplots were scored in the field, and motile invertebrate counts were made within photoplots. Owl limpets were not monitored as per the review recommendation to only sample in the fall. Jayson Smith, Ph.D. candidate from UCLA collected five mussel cores (approximately 20cm in diameter) from both Cat Rock and the north side of South Frenchy's Cove.

RESULTS:

South Frenchy's Cove, 3/8/2002. Low tide -0.3 @ 1315, Wind 5-10 WNW, skies clear, surge light and waves 1-2 ft. Air temp.-16°C, water temp.-14°C. Two harbor seals (offshore) and no seabirds were observed on site. The site appeared very different from the previous visit with sand levels throughout the site extremely high and evidence of scouring obvious. Overall zone assemblages appeared relatively unchanged from previous visits. Barnacles were common with light recruitment evident. *Endocladia muricata* was common but noticeably tattered. Rockweeds, *Hesperophycus californica* and *Silvetia compressa*, were common but patchy and nearly all plants were tattered and dried from recent weather conditions. Mussels were common with many small individuals present. The mussel zone continues to be a diverse assemblage of both algae and invertebrates including *Tetraclita rubescens*, *Pollicipes polymerus*, *Chondracanthus canaliculatus*, and erect corallines. Light recruitment was noted for both species of barnacle and mussels (*Mytilus californianus*). Several algal species had light to moderate bleaching including *Chondracanthus canaliculatus*, *Mazzaella affinis*, *Prionitis* sp. and *Phyllospadix* sp. No seastars or abalone were observed during a 30-minute general search of the site. Motile invertebrate counts were performed in each of the twenty photoplots with *Acanthina* sp., Littorines, and limpets common. Four people with two dogs were contacted at the site. Several plot repairs were

made and two new Limpet plots located. No temperature data was down loaded as the shuttle unit was missing.

Photoplot summary – mean percent cover by zone at South Frenchy's Cove, Anacapa Island, spring 2002 (5 plots/zone)

<i>Zone</i>	<i>Rock</i>	<i>Barn</i>	<i>Tetra clita</i>	<i>Endoc ladia</i>	<i>Hesperoph ycus</i>	<i>Silvetia</i>	<i>Mussels</i>	<i>Leaf Barn</i>	<i>Misc Algae</i>	<i>Misc Animal</i>	<i>Tar</i>
Barnacle	55.6	27.8	0.0	13.0	0.2	0.0	0.0	0.2	0.8	1.2	1.2
Endocladia	19.2	2.6	0.0	59.6	2.0	12.6	0.0	0.0	2.8	1.0	0.2
Rockweed	19.4	7.4	0.0	2.8	1.2	59.8	0.0	0.0	7.8	1.6	0.0
Mussels	8.8	1.0	1.6	3.6	0.0	0.0	57.8	0.2	24.4	2.6	0.0

Motile invertebrate counts at South Frenchy's Cove, Anacapa Island, spring 2002

<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</u>	<u>155</u>	<u>256</u>	<u>257</u>	<u>258</u>	
Lepidochitona spp.		2			1		1				
Nuttalina spp.										1	
Fissurella volcano											
Pachygrapsus	1		1		2						
Pagurus spp.											
Limpets	6	2	9	9	12	11	1	1	4	12	
S. purpuratus											
Amphissa versicolor											
Nucella emarginata											
Acanthina spp.		3			1				2	1	
Tegula funebris							1			1	
Ceratostoma nuttali											
Ocenebra circumtexta											
Lottia gigantea											
Littorina spp.	960	1552	1300	780	2032	344	232	11	66	9	
subsample 1	50	95	96	54	132	25	45				
subsample 2	59	110	56	38	108	7	5				
subsample 3	62	86	92	41	148	32	2				
subsample 4	69	97	81	62	120	22	6				

<i>zone</i>	<i>Silvetia</i>					<i>Mytilus</i>					
<u>plot #</u>	<u>259</u> <u>no</u> <u>count</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.			4							1	9
Nuttalina spp.			1			26	6	9	6	6	55
Fissurella volcano							1				1
Pachygrapsus		1	3		1	1	1	2	2	3	18
Pagurus spp.											0
limpets		7	11	15	19	27	25	27	33	31	262
S. purpuratus											0
Amphissa versicolor											0
Nucella emarginata						2	6	3	1	3	15
Acanthina spp.		6	13		1	6	1	6		4	44
Tegula funebris											2

Ceratostoma nuttali										0
Ocenebra circumtexta							1			1
Lottia gigantea			1							1
Littorina spp.	168	24	300	1	0	0	0	0	0	7779
subsample 1	21	0	27							
subsample 2	16	2	23							
subsample 3	0	0	13							
subsample 4	5	4	12							

Cat Rock, 3/11/2002. Low tide -0.9 @ 1442, Wind 5 W, skies mostly clear, surge light and waves 1-2 ft. Air temp. 17°C, water temp. 14.5°C. Approximately twenty harbor seals, including pups, were observed offshore. One kingfisher, three black oystercatchers, and five western gulls were observed. A large group of school kids (Island Packers trip) was seen near the South Frenchy's Cove site. Barnacle plots were mostly dominated by *Hesperophycus californica*, typical for this site. *Silvetia compressa* and *H. californica* both appeared healthy and abundant though very desiccated throughout the site. Mussel plots continue to have low percent cover, though several areas adjacent to plots had much higher mussel cover. *Endocladia muricata* was common and well represented over the entire site. Some recruitment of mussels was evident within the last two years. Juvenile *Ocenebra circumtexta* were common and adults abundant. *Nucella emarginata* was noticeably absent. A 30-minute general search of the area located one *Pisaster ochraceus* and one black abalone (116 mm). Little time was available for area observations as the number of plots and transportation limited the scope of work.

Photoplot summary – mean percent cover by zone at Cat Rock, Anacapa Island, spring 2002 (9 plots/zone)

Zone	Rock	Barn	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal	Tar
Barnacle	26.9	11.2	0.0	10.0	43.6	1.4	0.0	0.0	6.7	0.1	0.1
Endocladia	20.6	3.1	8.0	35.4	3.7	2.9	2.9	0.0	19.2	4.2	0.0
Rockweed	15.2	4.0	2.1	9.2	18.7	39.8	0.7	0.1	9.1	1.1	0.0
Mussels	17.3	1.2	20.1	2.4	0.0	0.0	34.8	0.9	14.1	9.1	0.0

Motile invertebrate counts at Cat Rock, Anacapa Island, spring 2002

Invertebrate Counts at Oak Ridge, Pinalo Co. Arizona, Spring 2002									
Zone	Barnacle								
plot #	<u>33</u>	<u>37</u>	<u>135</u>	<u>31</u>	<u>35</u>	<u>38</u>	<u>32</u>	<u>36</u>	<u>39</u>
Lepidochitona spp.	1	3	1	1					1
Nuttalina spp.		1							
Fissurella volcano									
Pachygrapsus	1	2	4		1				1
Pagurus spp.									
Limpets	12	13	20	6	14	11	8	10	19
Subsample 1									
Subsample 2									
Subsample 3									
Subsample 4									
S. purpuratus									
Amphissa versicolor									

Nucella emarginata									
Acanthina spp.	5	7	8	3	1		3	5	3
Tegula funebris		1							
Cerastostoma nuttali									
Ocenebra circumtexta									
Lottia gigantea									
Littorina spp.	212	144	104	1600	404	224	161	76	708
Subsample 1	11	14	15	81	46	14		4	76
Subsample 2	11	16	2	85	37	26		3	48
Subsample 3	22	4	2	108	13	13		5	7
Subsample 4	9	2	7	126	5	3		7	46

Zone		Endocladia							
<u>plot #</u>	<u>212</u>	<u>14</u>	<u>51/18</u>	<u>54</u>	<u>13</u>	<u>467/17</u>	<u>52</u>	<u>53</u>	<u>19</u>
Lepidochitona spp.				1			5		3
Nuttalina spp.		5	5	17	4	16	19	15	1
Fissurella volcano			3	2		2	6	1	
Pachygrapsus			4		1		2	1	1
Pagurus spp.									
Limpets		64	96	68	35	64	124	24	11
subsample 1		4	15				13		
subsample 2		2	7				11		
subsample 3		6	0				5		
subsample 4		4	2				2		
S. purpuratus									
Amphissa versicolor									
Nucella emarginata									
Acanthina spp.									4
Tegula funebris									
Cerastostoma nuttali									
Ocenebra circumtexta		1		2	2				
Lottia gigantea		6				2		2	
Littorina spp.		136	56	0	140	3	0	11	26
subsample 1		6	5		18				
subsample 2		4	9		7				
subsample 3		5	0		8				
subsample 4		19	0		2				

Zone		Silvetia							
<u>plot #</u>	<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>
Lepidochitona spp.					2		1		
Nuttalina spp.		3			3				
Fissurella volcano									
Pachygrapsus	3		2	1	1	2	2	2	1
Pagurus spp.									
Limpets	35	64	9	17	33	17	22	9	7
subsample 1		5							
subsample 2		4							
subsample 3		6							
subsample 4		1							

S. purpuratus									
Amphissa versicolor									
Nucella emarginata									
Acanthina spp.			7	1	1	4		7	1
Tegula funebris									
Ceratostoma nuttali									
Ocenebra circumtexta	1			1	1				
Lottia gigantea									
Littorina spp.	109	352	6	13	35	18	24	7	7
subsample 1		27							
subsample 2		30							
subsample 3		20							
subsample 4		11							

<i>Zone</i>	<i>Mytilus</i>								
<u>plot #</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.	2				1	1	1	1	
Nuttalina spp.	47	13	17	21	15	43	26	6	26
Fissurella volcano			1	1		3		1	8
Pachygrapsus			1	1	2	2	5		
Pagurus spp.									
Limpets	112	116	104	128	92	100	156	100	180
subsample 1	6	10	6	6	6	7	11	10	19
subsample 2	8	8	10	12	7	7	5	4	10
subsample 3	5	6	5	12	4	6	11	6	5
subsample 4	9	5	5	2	6	5	12	5	11
S. purpuratus									
Amphissa versicolor									
Nucella emarginata									
Acanthina spp.									
Tegula funebris									
Ceratostoma nuttali									
Ocenebra circumtexta	1	1	9	2	4	7	10	3	9
Lottia gigantea	5	3	4	13	2	4	2	3	2
Littorina spp.	16	144	64	76	0	24	22	160	0
subsample 1	2	5	11	6		3		4	
subsample 2	2	12	4	2		0		5	
subsample 3	0	9	0	3		2		18	
subsample 4	0	10	1	8		1		13	

<i>Total counts at ANCR</i>	
	Total Count (36 plots)
Lepidochitona spp.	25
Nuttalina spp.	303
Fissurella volcano	28
Pachygrapsus	43
Pagurus spp.	0
limpets	1900
S. purpuratus	0
Amphissa versicolor	0

Nucella emarginata	0
Acanthina spp.	60
Tegula funebris	1
Ceratostoma nuttali	0
Ocenebra circumtexta	54
Lottia gigantea	48
Littorina spp.	5082

Middle West, 3/12/2002, Low tide -0.4 @ 1517, Wind 10-15 W, skies clear, surge light and waves 1-3ft. Air temp. 17°C, water temp. 14.5°C. Two harbor seals were observed offshore. Eight western gulls were present on site on arrival. Acorn barnacles were common and mostly large. *Endocladia muricata* was abundant, healthy, and expansive. *Hesperophycus californica* was common with the majority of the plants older and well established. *Silvetia compressa* was rare overall but healthy and lush near plots 452 and 455. The mussel zone was wide and highly variable with the low zone dominated by large mussels and cover near 95%. The upper mussel zone is much more diverse. *Tetraclita rubescens*, coralline crusts and erect coralline algae were well represented. *Ulva* sp. and non-coralline algae were common. No obvious recruitment of any kind was noted. A 30-minute search of the site located 201 *Pisaster ochraceus* and one black abalone (92 mm). The temperature unit failed to download and appeared to have water in it and was removed for replacement. After sampling was completed we skiffed back to South Frenchy's Cove to drill holes for the Limpet plots and down load the temperature unit.

Photoplot summary – mean percent cover by zone at Middle West, Anacapa Island, spring 2002 (5 plots/zone)

Zone	Rock	Barn	Tetraclita	Endocladia	Hesperophycus	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal
Barnacle	38.0	8.4	0.6	26.2	1.4	0.0	1.4	0.2	23.8	0.0
Endocladia	39.4	2.2	0.0	31.2	0.4	0.0	4.8	0.4	21.2	0.4
Rockweed	12.4	0.2	2.8	4.2	0.0	61.4	1.8	0.0	14.8	2.4
Mussels	18.0	0.2	4.0	1.6	0.0	0.0	47.8	0.8	24.6	3.0

Motile invertebrate counts at Middle West, Anacapa Island, spring 2002

Zone	Barnacle					Endocladia					Silvetia				
plot #	447	448	449	450	451	457	458	459	460	461	452	453	454	455	456
Lepidochitona spp.		2	2		1		1				1	1	2		
Nuttalina spp.		9	6		2	11	4	7	1			1	11		2
Fissurella volcano						1									
Pachygrapsus		1	1	1			1				3	5	2	4	2
Pagurus spp.		1	3			3		16	1						
Limpets	4	33	9	6	26	29	34	17	10	8	11	5	58	11	8
S. purpuratus															
Haliotis cracherodii															1
Nucella emarginata					1		1								5
Acanthina spp.		2	7	6	3	12	5	6		1	4	7		2	
Tegula funebris															
Ceratostoma nuttali															
Ocenebra circumtexta		7			1	2	1	1						5	1

Lottia gigantea	3				1	3	9				1	1	3	1	4
Littorina spp.	268	48	17	116	6	6	3	8	29	104	14	16	2	1	2
subsample 1	12	6		10						6					
subsample 2	8	1		2						5					
subsample 3	23	3		16						10					
subsample 4	24	2		1						5					

	<i>Mytilus</i>					Total Count (20 plots)
plot #	462	463	464	465	466	
Lepidochitona spp.			3			13
Nuttalina spp.	9	20	14	7		104
Fissurella volcano			1	12		14
Pachygrapsus			3	1	1	25
Pagurus spp.		2			7	33
limpets	27	51	47	48	14	456
S. purpuratus						0
Haliotis cracherodii						1
Nucella emarginata	3	1	6	6		23
Acanthina spp.	3	5	1	4		68
Tegula funebris						0
Ceratostoma nuttali						0
Ocenebra circumtexta	7	1	3	3	6	38
Lottia gigantea	4	4	1	10		45
Littorina spp.	0	2	0	0	2	644
subsample 1						
subsample 2						
subsample 3						
subsample 4						

Middle East, 3/26/2002. Low tide -1.0 @ 1416, Wind 10 mph WNW, skies clear, surge moderate and waves 1-3ft. Air temp.-17°C, water temp.-14.0°C. Two harbor seals were observed offshore. Acorn barnacles were common within plots but overall rare compared to other monitoring sites. *Tetraclita rubescens* were abundant and well represented in all zones. *Endocladia muricata* cover was 31% with associated plots but most patches were sparse and dry. *Hesperophycus californicus* was rare and most abundant in acorn barnacle plots. *Silvetia compressa* was common with most plants appearing healthy and large. *Egregia menziesii* was abundant and lush within the lower zone. Several algal species displayed bleaching with the most noticeably impacted being erect coralline algae. No obvious recruitment of any kind was observed. The temperature unit at MW was installed at approximately 1000. Little time was available for additional observations outside the photoplots and motile invertebrate scoring due to limited personnel and transportation.

Photoplot summary – mean percent cover by zone at Middle East, Anacapa Island, spring 2002 (3 plots/zone)

<i>Zone</i>	<i>Rock</i>	<i>Barn</i>	<i>Tetra-clita</i>	<i>Endo-cladia</i>	<i>Hespero-phycus</i>	<i>Silvetia</i>	<i>Mussels</i>	<i>Leaf Barn</i>	<i>Misc Algae</i>	<i>Misc Animal</i>
Barnacle	48.3	9.0	9.7	13.3	0.3	0.0	3.0	0.7	15.0	0.7
Endocladia	19.0	1.0	9.3	34.7	2.0	6.7	2.7	0.0	24.3	0.3
Rockweed	7.3	0.0	2.0	6.3	0.7	62.7	4.7	0.0	15.7	0.7
Mussels	3.7	0.0	4.7	0.0	0.0	0.0	62.3	0.7	26.7	2.0

Motile invertebrate Counts at Middle East, Anacapa Island, spring 2002

	<i>Barnacle</i>			<i>Endocladia</i>			<i>Silvetia</i>			<i>Mytilus</i>			<i>Total Count (12 plots)</i>
<u>plot #</u>	<u>243</u>	<u>244</u>	<u>245</u>	<u>240</u>	<u>241</u>	<u>242</u>	<u>53/238</u>	<u>237</u>	<u>469/239</u>	<u>476</u>	<u>477</u>	<u>478</u>	
Lepidochitona spp.				2	1	1			3		3	1	11
Nuttalina spp.	2				4	1	1		6	3	3		20
Fissurella volcano										3	6	1	10
Pachygrapsus	2				2		1	1	2	3	5	2	18
Pagurus spp.								4					4
large limpets(>10mm)	12	12	21	7	23	10	64	14	16	36	31	27	273
S. purpuratus												2	2
Amphissa versicolor										1	1		2
Nucella emarginata	3				1					5		3	12
Acanthina spp.	2					1	1	1	4				9
Tegula funebris													
Ceratostoma nuttali											1	1	2
Ocenebra circumtexta					1		2			8	12	4	27
Lottia gigantea		2			1					3	1		7
Littorina spp.	48	92	140	29	96	296	1	16	0	1	2	0	721
subsample 1	2	11	1		9	26							
subsample 2	3	5	6		6	18							
subsample 3	2	1	10		4	19							
subsample 4	5	6	18		5	11							

San Miguel Island March 24-28, 2002 (Database event #2002-C)

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
David Kushner, Marine Biologist, Channel Islands National Park
Jayson Smith, Graduate Student UCLA, VIP
Ian Williams, Island Ranger, Channel Islands National Park
Stacey Lehmann, Fox Tech, Channel Islands National Park

PROCEDURE: Arrived via the CIA Islander at 1000 on 3/24. After settling into the bunkhouse we went down to Cuyler Harbor. On Monday 3/25 we hiked to Otter Harbor, on 3/26 we hiked to Crook Point and on 3/27 we hiked to Harris Point. Tom Lorensen from USGS flew out to the island on 3/26 to collect tar from the shoreline. Ian hiked him along the north shore on 3/27, and David took him to Cardwell point on 3/28. Tom and Ian reported a (common?) dolphin carcass on the rocks west of Otter Harbor.

Standard procedures were used for monitoring sites. All plots were photographed and scored in the field, motile invertebrates were counted in the photoplots, abalone and seastars were counted within the defined sites, shore birds and pinnipeds were counted at each site, and a general species list was made. At Harris Point and Otter Harbor we measured owl limpets in the one-meter radius circle plots. Abalone plots were checked and abalone were measured. Seastars were counted in swath transects at Crook Point.

Jayson collected five 20 cm diameter cores in mussel zones at Cuyler Harbor and Crook Point as part of his dissertation work. He is sampling biomass and biodiversity at sites throughout California that had previous information, in this case the BLM-OCS sites sampled in the late 1970s. He helped with motile invertebrate plots at the other two sites particularly.

RESULTS:

Cuyler Harbor, 3/24/2002. Low tide -0.6 ft at 1309 hrs, wind NW at 20 mph, clear sky, air temp 14.5° water temp 12.7°, waves 3-4 ft with moderate surge. We were on site from 1130-1600 hours. There was one Black Oystercatcher on the site. Two Snowy Plovers were on the beach just west of the site. The sand was gone from middle rocks making passage difficult. About ten elephant seals were on various parts of the beach, two black oystercatchers were at middle rocks and about 100 western gulls were present. Pelagic red crabs, sand crab parts and a few drift bull kelp, *Nereocystis leutkeana*, stipes were on the beach.

Balanus glandula were abundant in patches, *Chthamalus fissus/dalli* were present and much less conspicuous than the *B. glandula*. *Tetraclita rubescens* were common in the mussel zone, though they did not compose a high percentage of the cover. *Endocladia muricata* was dense in areas, particularly around plots 414 and 415. *Silvetia compressa* was the only rockweed noted and was doing well within the narrow zone. Several species of encrusting tunicates were common in the lower zones on the outer reef slope. *Archidistoma psamion* was the most common. Sandcastle worms, *Phragmatopoma californica*, were common but not filling the small crevices as they have been observed to do. Small California mussels were present among the byssal threads of

adults indicating a good recent recruitment. The large mussel within plot 402 was found to be dead though the shell is still attached.

Periwinkle snails, *Littorina* spp., were common, though in decreasing abundance in lower zones with none present in the mussel plots. *Acanthina* sp. were relatively common and *Nucella emarginata* were quite common especially among the mussels where they were laying eggs. Shore crabs were common in all but the barnacle plots.

No abalone were found within the site boundaries (the main reef as mapped). A total of 18 ochre stars were found three were small (<50mm arm length), 2 medium (50-100 mm) and 13 were large (>100 mm).

Photoplot summary – mean percent cover by zone at Cuyler Harbor, San Miguel Island, spring 2002 (5 plots/zone)

Zone	Rock	Barn	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal
Barnacle	50.2	45.0	0.0	4.6	0.0	0.0	0.2	0.0	0.0	0.0
Endocladia	39.8	8.8	0.0	33.8	0.0	8.0	3.8	0.0	4.6	1.2
Rockweed	19.6	0.2	0.4	0.0	0.0	61.4	0.0	0.2	10.4	7.8
Mussels	25.6	0.0	5.6	0.0	0.0	0.0	49.4	2.2	4.8	12.4

Seastar Abundance at Cuyler Harbor, San Miguel Island, spring 2002

<i>Pisaster ochraceus</i> radius (mm)	total
Small (<50)	3
Medium (50-100)	2
Large (>100)	13
Total	18

Motile Invertebrate counts at Cuyler Harbor, San Miguel Island, spring 2002

Zone	Barnacle					Endocladia					Silvetia				
plot #	416	417	418	419	420	411	412	413	414	415	406	407	408	409	416
Lepidochitona spp.						2	2	5		1	8	6	11	4	
Nuttalina spp.										1	2		3	3	
Fissurella volcano															
Pachygrapsus						3	5	1	2	3	2	1	2	3	
Pagurus spp.															
large limpets(>15mm)															
S. purpuratus															
Amphissa versicolor															
Nucella emarginata			1			4	8	5	3		3		1	2	
Acanthina spp.						1		6	4				1	6	
Tegula funebris	1		1			2	1	27	3	40	28	42	1	13	1
Cerastostoma nuttalli															
Ocenebra circumtexta															
Lottia gigantea						2							1		
Littorina spp.	588	716	492	644	232	10	100	16	4	32	0	4	36	28	68
subsample1	12	66	23	52	14		5	0	1	0	0	0	2	1	1
subsample2	46	27	51	31	17		4	4	0	7	0	0	1	0	0

	subsample3	53	26	30	27	12		14	0	0	0	0	1	6	0	8
Limpets		9	5	18	26	25	50	58	25	33	42	20	17	33	24	9
Mopalia sp.		1														1
Leptasterias hexactis																

	<i>Mytilus</i>					Total Count (20 plots)
	plot #	401	402	403	404	405
Lepidochitona spp.						51
Nuttalina spp.		5	5	4	20	18
Fissurella volcano			1			1
Pachygrapsus		4	5	3	4	1
Pagurus spp.						0
large limpets(>15mm)						0
S. purpuratus						0
Amphissa versicolor						0
Nucella emarginata		19	36	18	13	8
Acanthina spp.				1		
Tegula funebris						163
Ceratostoma nuttali						0
Ocenebra circumtexta			1			1
Lottia gigantea		2	1	7	7	23
Littorina spp.		0	0	0	0	0
Limpets		36	39	64	49	57
Mopalia sp.						1
Leptasterias hexactis				1		1

Otter Harbor, 3/25/2002. Low tide -0.9 ft at 1347hrs. wind NW at 5 mph, air temp 20° water temp 13°, waves 1 ft, surge light, high thin clouds, nice day. We were on site from 1030-1600 hrs. Pelagic red crabs and By-the-Wind-Sailors, *Velevella velevella*, on many of the beaches along the north shore. There were 25 harbor seals and one elephant seal on the reef next to the site, another harbor seal with a new pup and weaner elephant seal were on the small beach next to the site. Three Black Oystercatchers and 8-10 Western Gulls were present on the site.

Endocladia was doing very well at this site. *Balanus glandula* was very dense in patches. In some of the higher areas however it was covered by *Ulva* sp. There was some *Porphyra perforata* throughout the site but it was mostly scattered. *Bryopsis corticulans* was quite common. California mussels were fairly dense though cover only ranged around 50% in plots. Both *Silvetia* and *Hesperophycus* were present. I realized that during the recent evaluation of plots we should have considered this site for additional plots as plots 358 and 359 were established over *Hesperophycus* and the other three are *Silvetia* predominantly. There were a lot of bleached algae at this site, including *Ulva*, *Mazzaella affinis*, *Laurencia spectabilis* and *Egregia menziesii*. The small six-armed seastar *Leptasterias hexactis* was common and often brooding eggs. Several purple urchins exhibited symptoms of disease (losing spines).

There was some confusion about the new site boundary (we should go to the edge of the reef and not stop at the bolt). An additional 37 black abalone were found east of the R1 bolt. It is clearer to just say the east edge of the reef. A total of 105 abalone were found including the 37 and the

two in plot 369. Sizes ranged from 40- 140 mm. Two old (55, 58 mm) and one fresh (66 mm) black abalone shells were found. Five medium and 17 large ochre stars were found along with four giant-spined stars and one bat star.

Giant owl limpets were measured because the plots were just established last spring. Before that we were measuring limpets in the abalone plots. Several of the plots showed considerable variability in numbers from last year with increases in three plots, particularly in the smaller size categories, indicating there may have been recent recruitment. Shore crabs and dog whelks were less abundant in motile invertebrate counts at this site than the others.

Photoplot summary – mean percent cover by zone at Otter Harbor, San Miguel Island, spring 2002 (5 plots/zone)

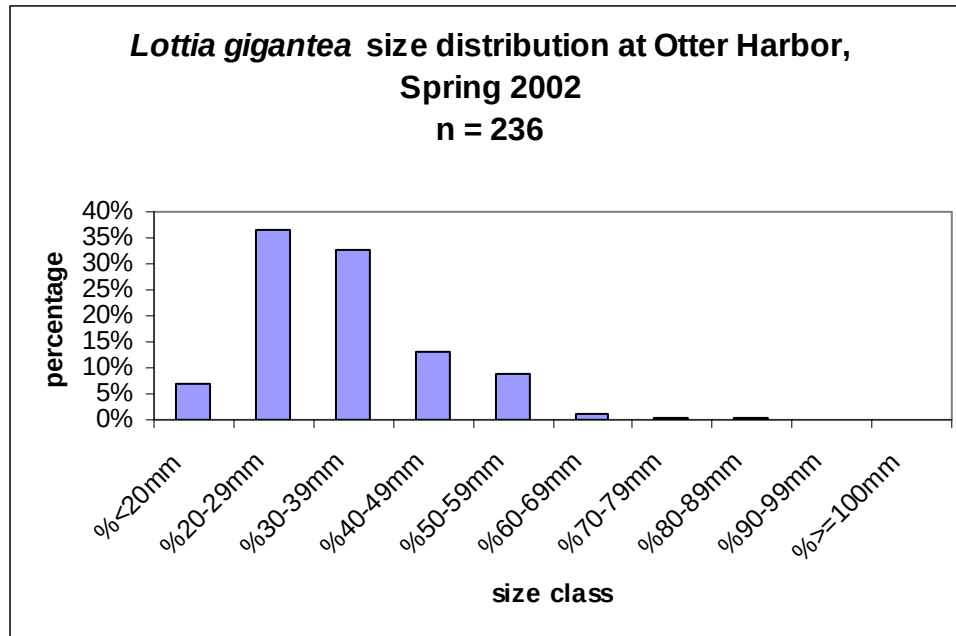
Zone	Rock	Barn	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal	Tar
Barnacle	31.0	29.6	0.0	0.0	0.0	0.0	0.0	0.0	37.0	0.2	2.2
Endocladia	10.8	5.2	0.6	64.8	0.0	3.6	0.8	0.2	14.0	0.0	0.0
Rockweed	18.4	16.2	0.2	23.4	2.8	20.4	0.0	0.0	17.8	0.4	0.4
Mussels	6.6	0.4	1.0	0.4	0.0	0.0	52.4	6.2	32.2	0.8	0.0

Owl Limpet *Lottia gigantea* plot summary at Otter Harbor, San Miguel Island, spring 2002

Plot	Area	Density	Count	MeanSize	StDev	MinSize	MaxSize
1	3.14	12.098	38	35.95	12.15	18	60
2	3.14	11.780	37	41.03	11.90	21	74
3	3.14	14.327	45	36.93	14.09	15	80
4	3.14	13.690	43	29.12	8.97	15	57
5	3.14	23.241	73	27.75	6.84	17	47

Owl Limpet *Lottia gigantea* size distribution within plots at Otter Harbor, San Miguel Island, spring 2002

Plot	%<20mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%>80mm
1	5.26%	28.95%	34.21%	13.16%	15.79%	2.63%	0.00%	0.00%
2	0.00%	16.22%	32.43%	29.73%	18.92%	0.00%	2.70%	2.70%
3	6.67%	24.44%	35.56%	13.33%	13.33%	4.44%	0.00%	0.00%
4	9.30%	51.16%	27.91%	6.98%	4.65%	0.00%	0.00%	0.00%
5	9.59%	49.32%	32.88%	8.22%	0.00%	0.00%	0.00%	0.00%



Seastar Abundance at Otter Harbor, San Miguel Island, spring 2002

<i>Pisaster ochraceus</i> radius (mm)	total
Small (<50)	0
Medium (50-100)	5
Large (>100)	17
Total	22
<i>Additional species:</i>	
<i>Pisaster giganteus</i>	4
<i>Patiria miniata</i>	1

Abalone Density within plots at Otter Harbor, San Miguel Island, spring 2002

Count	Density	Area	Density
2	.097	20.60	

Abalone size distribution for Otter Harbor, San Miguel Island, spring 2002

Count	Mean	StDev	Min	Max	%<45m	%45-126mm	%127-145mm	%>145mm
Sized	Size		Size	Size	m			
67	91.24	20.42	40	139	1.49%	97.01%	1.49%	-

Motile invertebrate counts at Otter Harbor, San Miguel Island, spring 2002

zone	Barnacle					Endocladia					Silvetia				
Plot #	370	371	372	373	374	360	361	362	363	364	355	356	357	358	359
Lepidochitona spp.								1		2		2			
Nuttalina spp.										5		1			
Fissurella volcano															
Pachygrapsus									2	3		1			
Pagurus spp.					4							1			

large limpets(>15mm)															
S. purpuratus															
Amphissa versicolor															
Nucella emarginata			1			3	2	1		1		4			
Acanthina spp.															
Tegula funebris					29	1			1	2		1	1		
Ceratostoma nuttali															
Ocenebra circumtexta												1			
Lottia gigantea											1		2		
Littorina spp.	1004	1772	260	536	0	380	96	4	32	32	36	12	3	320	2420
subsample1	55	106	28	44		19	9	0	8	2	1	0		10	192
subsample2	23	151	3	18		32	5	0	0	2	7	3		2	161
subsample3	146	97	2	35		9	8	0	0	3	1	0		58	110
subsample4	27	89	32	37		35	2	1	0	1	0	0		10	142
Limpets	1	0	17	4	0	29	46	12	36	16	13	33	29	12	6
Leptasterias hexactis															

	<i>Mytilus</i>					Total Count (20 plots)
	plot #	375	376	378	379	380
Lepidochitona spp.						5
Nuttalina spp.	2	4	5	6	2	25
Fissurella volcano					1	1
Pachygrapsus			1	1		8
Pagurus spp.						5
large limpets(>15mm)						0
S. purpuratus				1		1
Amphissa versicolor						0
Nucella emarginata	10	10	9	10	11	62
Acanthina spp.						0
Tegula funebris			11	1	3	50
Ceratostoma nuttali						0
Ocenebra circumtexta						1
Lottia gigantea	8	7	7	12	4	41
Littorina spp.	8	0	4	0	0	6919
subsample1	2		1	0	0	
subsample2	0		0	0	0	
subsample3	0		0	0	0	
subsample4	0		0	0	0	
Limpets	32	20	43	29	34	412
Leptasterias hexactis			1			5

Crook Point, 3/26/2002. Low tide –1.0 ft at 1424 hrs, wind W at 10-15 mph, air temp 15°, water temp 13°, surge light, mostly clear sky, cool and breezy but great working conditions. We were on site from 1030-1600 hrs. There was one elephant seal on the reef and 27 on the beach next to site. Nine Black Turnstones and six Black Oystercatchers were observed. Two trap boats and a diver were working offshore. The sand had cleared out of the surge channel. The temperature logger downloaded successfully after several failed attempts with the reader.

No abalone were found within the abalone plots and only 12 were found within the site boundary on the outer reef (from 388 to the surge channel below 391). Seastars were counted in 20 m swath transects run vertically at 3, 15, and 30 m along the biodiversity survey baseline. Transect 3 had 8 small, 7 medium, and 13 large ochre stars, transect 15 had 5 small 14 medium, and 9 large ochre stars and 5 black abalone (80-100 mm), and transect 30 had 8 medium and 13 large ochre stars. Note that the transects are outside the site definition for counting abalone. Five ochre stars were within the abalone plots.

Hesperophycus was small like we see at Harris Point and was uncommon. *Silvetia* was not common and was usually abraded. *Endocladia* was doing well over most of the site but showed some bleaching. Several other species of algae showed extensive bleaching including *Chaetomorpha lineum*, *Corallina* spp., *Ulva* sp., *Chondracanthus canaliculatus*, and *Gelidium coulteri*. *Balanus glandula* was abundant with a heavy recent recruitment. Mussels also apparently recruited recently with many small (1-3 mm) individuals among the byssal threads. Mussel cover in the mussel zone was quite high (from 50-96% cover). Mussel cover was high in plot 397, a rockweed plot, as well. *Ulva* sp. was often dense growing on top of the mussel shells and the high mussel cover belies the *Ulva* cover over them. At the end of the inshore reef, beyond our plots, it appears that there were large patches of mussels torn out presumably by waves. Brooding six-arm seastars, *Leptasterias hexactis* were common here. Periwinkle snails (*Littorina* spp.) were present in all the plots with especially high abundance in the barnacle plots. Shore crabs were common. Numerous purple urchins exhibited symptoms of disease (loosing spines).

Photoplot summary – mean percent cover by zone at Crook Point, San Miguel Island, spring 2002 (5 plots/zone)

Zone	Rock	Barn	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal
Barnacle	61.6	36.0	0.0	1.8	0.0	0.0	0.4	0.0	0.0	0.2
Endocladia	30.4	20.4	0.6	21.6	1.6	1.2	9.0	0.6	13.6	1.0
Rockweed	30.2	13.0	0.0	7.4	0.4	1.2	25.8	1.2	20.6	0.2
Mussels	8.2	4.6	0.4	0.0	0.0	0.0	74.8	2.4	8.6	1.0

Vertical seastar transects at Crook Point, San Miguel Island, spring 2002 (all *Pisaster ochraceus*)

Baseline Transect meter number	Total Length(m)	<50 mm	50-100 mm	>100 mm
3	20	8	7	13
15	20	5	14	9
30	20	0	8	13

Abalone Density within plots at Crook Point, San Miguel Island, spring 2002

Count	Density	Area	Density
0	11.10	.000	

Abalone size distribution for Crook Point, San Miguel Island, spring 2002

Count	Sized	Mean Size	StDev	MinSize	MaxSize	%<45mm	%45-126mm	%127-145mm	%>145mm
12		96.08	17.49	73	121	-	100.00%	-	-

Motile invertebrate counts at Crook Point, San Miguel Island, spring 2002

zone	Barnacle					Endocladia						Silvetia			
plot #	137	147	148	149	150	386	387	388	389	390	396	397	398	399	400
Lepidochitona spp.									2			1	3		
Nuttalina spp.							3		1			1			
Fissurella volcano															
Pachygrapsus							1		3	5		2		3	3
Pagurus spp.															
large limpets(>15mm)															
S. purpuratus															
Amphissa versicolor															
Nucella emarginata						2	2		4	2	2				10
Acanthina spp.															
Tegula funebris															
Ceratostoma nuttali															
Ocenebra circumtexta															
Lottia gigantea															
Littorina spp.	356	1944	548	2116	1136	620	2	804	180	820	480	17	152	100	104
subsample1	34	11	21	135	27	29		39	2	32	7		21	7	5
subsample2	3	36	16	128	133	8		39	11	54	36		12	7	3
subsample3	20	149	38	142	48	54		74	18	86	39		5	11	2
subsample4	32	290	62	124	76	64		49	14	33	38		0	0	16
Limpets	4	16	0	112	36	244	152	308	116	104	164	10	72	204	156
subsample1	0	0	0	12	3	9	8	4	2	7	26		9	0	4
subsample2	1	1	0	4	4	10	15	13	8	13	1		3	8	21
subsample3	0	2	0	6	0	22	5	11	15	3	8		6	35	10
subsample4	0	1	0	6	2	20	10	49	4	3	6		0	8	4
Leptasterias hexactis															

	plot #	Mytilus					Total Count
		381	382	383	384	385	
Lepidochitona spp.		1	1				8
Nuttalina spp.		1		2	8	4	20
Fissurella volcano							0
Pachygrapsus		1	4	3	6	11	42
Pagurus spp.							0
large limpets(>15mm)							0
S. purpuratus					6	10	16
Nucella emarginata		1	2		5	23	53
Acanthina spp.							0
Tegula funebris			1	14			15
Ocenebra circumtexta							0
Lottia gigantea		1				1	2
Littorina spp.		20	9	9	1	2	9420
Limpets		92	15	25	184	164	2178
subsample1		5			23	7	
subsample2		11			3	5	
subsample3		3			10	20	
subsample4		4			10	9	
Leptasterias hexactis					2	2	4

Harris Point, 3/27/2002. Low tide-0.9 at 1459 hrs, wind light from NW, no surge, very nice day. No seals on the site. Three Black Oystercatchers present. We were on site from 1015 to 1615 hours.

Endocladia and *Hesperophycus* were about equally distributed and often fully mixed. There are several patches of high density *Balanus glandula*. Dense red algal turf, mostly *Mazzaella affinis* and *Mastocarpus papillatus*, covered most of the rocks and was dominant in the abalone plots.

We are now designating plots 436, 437, 438, and 439 as *Tetraclita* zone. *Endocladia* and other algae dominate plot 439, with only 5% cover of *Tetraclita rubescens* present. A new plot was installed below the temperature logger (between 421 and 437) and is labeled T1. Four new *Balanus* zone plots were added to plot 440 to complete that zone. The new plots all have a high cover of *Balanus glandula* (39-85%). There are now 25 photoplots at this site. We tried to replace the temperature logger housing but the new brackets don't fit with the existing bolt holes.

A total of eight black abalone were found in three plots, doubling the number from last year. An additional 33 abalone were found in the site area. Eight large (>100 mm) ochre stars and seven bat stars were found. Two of the sea stars and three of the abalone were within the old crevice transect. There were six groups of abalone of two to seven animals within a half-meter of each other. Two fresh abalone shells were found; a red, 42 mm long and a black 111 mm long.

Owl limpets were measured because the plots were installed just last spring. These plots have shown a great deal of variability over the three samples. Dog whelks, *Nucella emarginata* were common in many of the photoplots. Periwinkle snails were common in most plots as were small limpets. *Lottia gigantea* were common in several of the high plots and were usually associated with the presence of chitons, *Nuttalina californica*. *Tegula funebris* were common and a few large *T. gallina* and one *T. brunnea* were found in the species list search. Several purple urchins exhibited symptoms of disease (loosing spines).

Photoplot summary – mean percent cover by zone at Harris Point, San Miguel Island, spring 2002 (5 plots/zone)

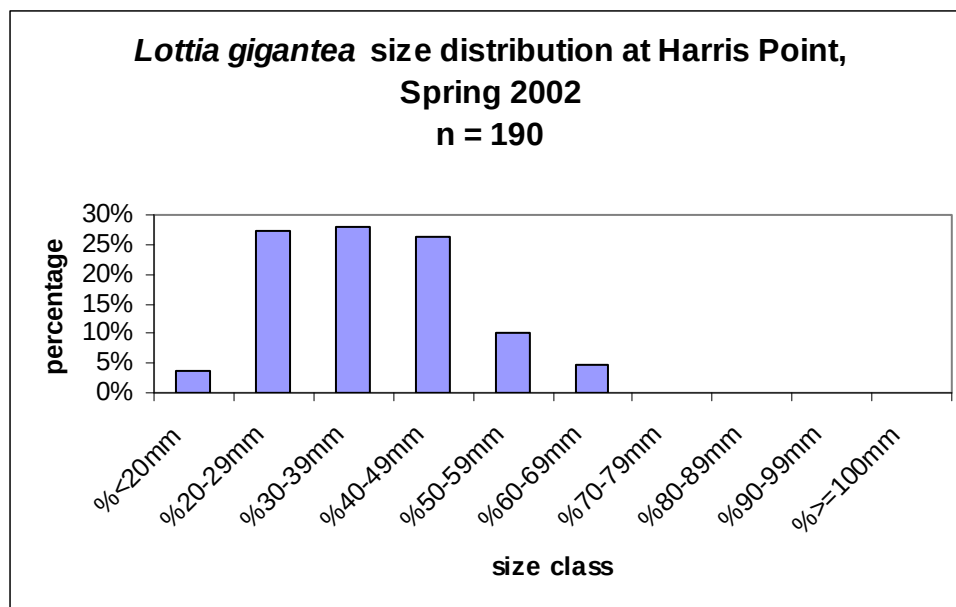
Zone	Rock	Barn	Tetraclita	Endo-cladia	Hesperop hycus	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal	Tar	Phyllo-spadix
Barnacle	39.6	56.0	0.0	2.4	0.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0
Endocladia	13.6	8.6	0.4	56.2	11.8	0.0	1.6	0.0	7.2	0.4	0.0	0.2
Rockweed	18.4	3.0	0.0	26.8	44.6	0.0	0.0	0.0	6.8	0.4	0.0	0.0
Mussels	21.2	1.6	4.2	3.8	1.0	0.0	38.8	0.6	28.0	0.8	0.0	0.0
Tetraclita	18.4	1.4	18.0	5.6	0.0	0.0	10.2	0.4	42.6	3.4	0.0	0.0

Owl Limpet *Lottia gigantea* plot summary at Harris Point, San Miguel Island, spring 2002

Plot	Area	Density	Count	Size	Mean	StDev	Min	Max
1	3.14	7.004	22	36.09	8.98	23	52	
2	3.14	9.233	29	45.41	10.13	26	62	
3	3.14	14.645	46	30.09	9.83	15	58	
4	3.14	17.510	55	30.58	7.94	16	49	
5	3.14	12.098	38	48.63	8.03	36	66	

Owl Limpet *Lottia gigantea* size distribution within plots at Harris Point, San Miguel Island, spring 2002

Plot	% <20mm	% 20-29mm	% 30-39mm	% 40-49mm	% 50-59mm	% 60-69mm	% >70mm
1	0.00%	27.27%	31.82%	36.36%	4.55%	0.00%	0.00%
2	0.00%	3.45%	27.59%	37.93%	17.24%	13.79%	0.00%
3	4.35%	50.00%	28.26%	13.04%	4.35%	0.00%	0.00%
4	9.09%	40.00%	36.36%	14.55%	0.00%	0.00%	0.00%
5	0.00%	0.00%	13.16%	44.74%	28.95%	13.16%	0.00%



Seastar abundance at Harris Point, San Miguel Island, spring 2002

<i>Pisaster ochraceus</i> radius (mm)	total
Small (<50)	0
Medium (50-100)	0
Large (>100)	8
Total	8
Additional species:	
<i>Patiria miniata</i>	7

Abalone Density within plots at Harris Point, San Miguel Island, spring 2002

<i>Count</i>	<i>Density</i>	<i>Area</i>	<i>Density</i>
5		26.50	.189

Abalone size distribution for Harris Point, San Miguel Island, spring 2002

<i>Count</i>	<i>Mean</i>	<i>StDe</i>	<i>Min</i>	<i>Max</i>	<i>%<45m</i>	<i>%45-126mm</i>	<i>%127-145mm</i>	<i>%>145m</i>
<i>Sized</i>	<i>Size</i>	<i>v</i>	<i>Size</i>	<i>Size</i>	<i>m</i>			<i>m</i>
38	92.03	21.49	50	135	-	92.11%	7.89%	-

Motile invertebrate counts at Harris Point, San Miguel Island, spring 2002

<i>zone</i>	<i>Barnacle</i>					<i>Endocladia</i>					<i>Hesperophycus</i>				
<i>Plot #</i>	<i>440</i>	<i>B1</i>	<i>B2</i>	<i>B3</i>	<i>B4</i>	<i>431</i>	<i>432</i>	<i>433</i>	<i>434</i>	<i>435</i>	<i>421</i>	<i>422</i>	<i>423</i>	<i>424</i>	<i>425</i>
Lepidochitona spp.						4				1					
Nuttalina spp.						7			1	2	2				
Fissurella volcano															
Pachygrapsus						3			1		2	1			2
Pagurus spp.															
large limpets(>15mm)															
S. purpuratus															
Amphissa versicolor															
Nucella emarginata						7			5		3	6	5	1	
Acanthina spp.															
Tegula funebris															
Ceratostoma nuttali															
Ocenebra circumtexta															
Lottia gigantea						1									
Littorina spp.	536	228	728	552	420	148	144	96	48	64	100	176	76	92	308
subsample1	51	3	54	18	19	10	11	1	9	12	12	11	8	8	24
subsample2	23	1	44	55	18	6	10	11	3	0	10	9	5	4	15
subsample3	34	25	39	48	46	4	7	8	0	4	0	6	3	11	14
subsample4	26	28	45	17	22	17	8	4	0	0	3	18	3	0	24
Limpet	28	8	12	0	4	64	12	48	88	52	36	20	8	20	8
subsample1	0	1	0		0	5	2	5	8	2	2	2	0	0	0
subsample2	1	0	3		1	4	0	6	6	2	0	1	1	0	0
subsample3	2	1	0		0	5	0	0	7	7	4	1	0	2	1
subsample4	4	0	0		0	2	1	1	1	2	3	1	1	3	1
Leptasterias hexactis															

Motile invertebrate counts at Harris Point, San Miguel Island, spring 2002

Zone		Mytilus					Tetraclita				Total Count
plot #	426	427	428	429	430	436	437	438	439	T1	
Lepidochitona spp.		1	1			5	1	1			14
Nuttalina spp.	2				2	21	32	2	3	14	88
Fissurella volcano				1							1
Pachygrapsus crassipes	2		1	5	3		1		2	2	25
Pagurus spp.									1		1
large limpets(>15mm)											0
S. purpuratus				4	9				1		14
Amphissa versicolor											0
Nucella emarginata	13	5	13	9	13	19	2		17	19	137
Acanthina spp.											0
Tegula funebris											0
Ceratostoma nuttali											0
Ocenebra circumtexta											0
Lottia gigantea	8			2	1					12	24
Littorina spp.	32	60	52	56	4					4	3924
subsample1	0	5	2	5	0					0	
subsample2	0	3	4	3	0					0	
subsample3	8	3	4	4	1					0	
subsample4	0	4	3	2	0					1	
Limpet	80	112	33	100	72					64	869
subsample1	5	4		10	5					0	
subsample2	4	12		5	4					5	
subsample3	9	4		7	6					8	
subsample4	2	8		3	3					3	
Leptasterias hexactis											2

Santa Rosa Island April 19-24, 2002 (Database event #2002-D)

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
Derek Lerma, Biological Technician, Channel Islands National Park
Jayson Smith, University of California, Los Angeles

PROCEDURE: We flew out to Santa Rosa Island on Channel Islands Aviation arriving about 0940 on 4/19/2002. We went immediately out to East Point to work the site there. The work routine was about the same at all sites. Derek scored photoplots in the field, Jayson conducted the motile invertebrate counts, Dan shot photos of the plots and overview and wrote field notes. The new Ikelite strobes were used and seem to be working fine, there were some problems with the shutter speed dial turning when film was advanced so the exposure maybe off on some shots where the change was missed. Shore birds and pinnipeds were counted on arrival and noted if more arrived during our stay. Depending on availability, one or more of us would conduct a search for abalone and sea stars within a defined area. At some sites, transects were laid out for counting sea stars. At Johnson's Lee and Carrington Point, Jayson collected five 20 cm diameter plots from the mussel zone to compare biomass and other parameters with past studies (BLM-OCS) from the same areas. At each site, Dan developed a species list by searching for usually about 30-minutes, noting species and relative abundance. Plot corners were repaired where needed. Temperature loggers were downloaded at the three sites (EP, NWT, JL) where they are placed. The unit from NWT was brought in until a missing cap can be replaced on the housing. Surfgrass point-intercept transects were read at NWT and EP. Owl limpets will be monitored only in the fall. The new abalone size frequency/sea star data sheet is an improvement but there needs some additional blank spaces to write in larger sizes.

RESULTS:

East Point, 4/19/2002. Low tide 0.2 ft at 1030 hrs, air temperature 27°C, water temperature 13°C, wind N at 15 mph, surge light. Nice working conditions. We were on site from 1045-1530 hrs. We observed 30 cormorants, 40 Western Gulls, 1 Brown Pelican at the site when we arrived. Two Black Oystercatchers also visited the site while we were there. There was a single harbor seal watching us from the water most of the day.

We had planned to establish surfgrass transects but the tide was not low enough to work in that zone on 4/19. We were able to establish five new photoplots in the *Hesperophycus* zone and complete all the other monitoring. Most of the new *Hesperophycus* plots are on the slope above plots 580 and 587 and to the south. Plot H-5 is near the edge of the surge channel SW of plot 584. Repairs were needed in only one plot and were completed. The temperature logger was downloaded.

Sand had built up in the surge channels and there was some sand in the over the rocks in the lower zones. There was a large pile of mussels in the tidepool which is documented in photopoint 1. Cover of most of the target organisms was moderate. *Hesperophycus californica* was common inside the Endocladia zone plots (9-48% cover). *Phragmatopoma californica* was only moderately abundant but was spread throughout the site. Acorn barnacle cover was mostly light and acorn barnacle cover in that zone only ranged from 2-42% cover. Motile invertebrates were common in general in the photoplots. *Tegula funebris*, *Acanthina* sp., *Lepidochitona* spp.,

and *Pachygrapsus crassipes* were found in plots throughout the zones. *Littorina* spp. were abundant in most of the zones and present in all but three plots. *Mytilus californianus*, *Chthamalus* sp. and *Littorina* spp. were all noted as having recent recruitment. Only one *Haliotis cracherodii* (120 mm) was found. There were 2 small (<50 mm) 18 medium (50-100 mm) and 54 large (>100 mm) *Pisaster ochraceus* within the site boundaries of the two sand channels.

Photoplot summary – mean percent cover by zone at East Point, Santa Rosa Island, spring 2002 (5 plots/zone)

Zone	Rock	Barn- acle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal	Tar
Barnacle	57.4	21.6	0.0	8.2	11.6	0.0	0.2	0.0	1.0	0.0	0.0
Endocladia	17.6	2.6	0.0	51.6	22.0	2.6	0.2	0.0	1.4	2.0	0.0
Rockweed	10.3	0.9	0.0	9.3	33.6	37.0	0.2	0.0	7.8	0.9	0.0
Mussels	7.2	1.6	0.4	0.2	0.0	0.0	71.6	0.2	13.0	5.8	0.0

Seastar abundance at East Point, Santa Rosa Island, spring 2002

<i>Pisaster ochraceus</i> radius (mm)	total
Small (<50)	2
Medium (50-100)	18
Large (>100)	54
Total	74

Surfgrass transects at East Point, Santa Rosa Island, spring 2002

(additional taxa with no values deleted from table)

Location: East Point **Site Code:** SREP

Date: 23-Apr-02

Recorders: Derek Lerma, Dan Richards

<u>Surf Grass Taxa</u>	<u>Transect</u>	<u>Transect</u>	<u>Transect</u>
	<u>1</u>	<u>2</u>	<u>3</u>
Cystoseira/Halidrys			2
Erect coralline	1		
Chondracanthus canaliculatus		3	3
other red algae		1	
Polysiphonia sp.			1
Phyllospadix sp.	99	96	94
total	100	100	100

Motile invertebrate counts at East Point, Santa Rosa Island, spring 2002

<i>zone</i>	<i>Barnacle</i>					<i>Endocladia</i>					<i>Silvetia</i>				
<u>Plot #</u>	<u>575</u>	<u>576</u>	<u>577</u>	<u>578</u>	<u>579</u>	<u>580</u>	<u>581</u>	<u>582</u>	<u>583</u>	<u>584</u>	<u>585</u>	<u>586</u>	<u>587</u>	<u>588</u>	<u>589</u>
Lepidochitona spp.		2				1		2	1		1		6	11	8
Nuttalina spp.												3			4
Fissurella volcano															
Pachygrapsus		1				1				1	3	3	2	2	2
Pagurus spp.													3	2	
Limpets	44	24	76	0	0	32	28	32	28	24	9	18	4	7	36
Subsample 1	0	2	7			0	1	3	1	1					1
Subsample 2	10	2	8			5	3	2	3	1					1
Subsample 3	0	2	0			3	0	0	3	1					1
Subsample 4	1	0	4			0	3	3	0	3					6
Nucella emarginata															
Acanthina spp.		4				4		3	2		6	5	11	3	2
Tegula funebris		8				1					17	18	43	3	13
Strongylocentrotus purpuratus															
Ocenebra circumtexta											1		3	8	2
Lottia gigantea															
Epitonium spp.															
Littorina spp.	664	796	280	1480	1452	88	92	332	364	308	1	2	2	0	0
Subsample 1	45	43	3	92	107	10	9	46	17	12					0
Subsample 2	47	35	16	116	95	3	2	14	8	13					0
Subsample 3	16	61	24	94	103	7	4	13	46	30					0
Subsample 4	58	60	27	68	58	2	8	10	20	22					0

<i>Zone</i>	<i>Hesperophycus</i>					<i>Mytilus</i>					<i>Total Count</i>
<u>plot #</u>	<u>570</u>	<u>571</u>	<u>572</u>	<u>573</u>	<u>574</u>	<u>590</u>	<u>591</u>	<u>592</u>	<u>593</u>	<u>594</u>	
Lepidochitona spp.		1	5	1	7		1	2			52
Nuttalina spp.							11	6	4	6	34
Fissurella volcano							2	2	3	4	11
Pachygrapsus	2		1		2		3	1	1		25
Pagurus spp.							1				6
Limpets	32	32	32	32	24	84	80	96	168	96	1038
subsample 1	5	0	1	1	2	5	3	6	13	5	
subsample 2	0	3	1	1	3	6	9	6	10	7	
subsample 3	0	0	1	0	0	7	4	7	9	7	
subsample 4	3	5	5	6	1	3	4	5	10	5	
Nucella emarginata						5	5	8	9	9	36
Acanthina spp.	1		2	3	10			2	1		59
Tegula funebris	1				24	2	2				132
Strongylocentrotus purpuratus								1			1
Ocenebra circumtexta	1						1				16
Lottia gigantea								1	2	1	4
Epitonium spp.					1		1				2
Littorina spp.	40	180	152	248	56	16	20	8	4	32	6617
subsample 1	2	23	22	25	6	2	1	0	0	3	
subsample 2	4	1	3	12	0	1	1	2	0	5	
subsample 3	2	10	8	21	4	0	2	0	0	0	

subsample 4	2	11	5	4	4	1	1	0	1	0
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Fossil Reef, 4/20/2002. Low tide 0.0 ft at 1145 hrs, air temperature 14°C, water temperature 12.5°C, wind NW 15 mph, surge light. The morning started foggy and the day was cool but conditions were near perfect for working. We were on site from 0945-1430 hrs. About 30 Western Gulls, 16 harbor seals and 4 elephant seals were on site when we arrived. Five Black Oystercatchers and one Song Sparrow were also at the site. There were piles of *Velella velella* on the rocks.

We had planned to add *Hesperophycus* plots here if we could find appropriate quantities but there was no *Hesperophycus* present and the *Silvetia compressa* was in pretty poor shape. *Phragmatopoma californica* abundance was high in the mussel plots though *Mytilus californianus* was still 30-50% cover in all plots except 624 which was mostly *P. californica* with *Chondracanthus canaliculatus* and other algae growing on or among the sand tubes. Barnacle plots had fair cover (23-37%) of mostly *Chthamalus* sp. Barnacle plot 606 was covered by drift *Velella velella* which was cleared before scoring, photos were taken before and after removing the wrack. *Nuttalina* spp. were present in high numbers in the mussel plots. *Tegula funebris*, *Acanthina* sp., *Ocenebra circumtexta* and *Nucella emarginata* were present, though not in particularly high numbers. A total of 26 *Haliotis cracherodii* were found ranging from 23-147 mm in length within the site area. A crevice to the west of the site had a number of black abalone though and one was 170 mm. The first 15 x 6 m seastar transect had 14 *Pisaster ochraceus* and the outer 15 x 6 m had 6 *P. ochraceus*, one *P. giganteus* and one *Patiria miniata*. Bald (diseased?) *Strongylocentrotus purpuratus* were noted and the number of empty tests seemed higher than usual. Only a small amount of surfgrass was present at the site, much of it was bleached as it tends to be exposed for a long time on these tides.

Photoplot summary – mean percent cover by zone at Fossil Reef, Santa Rosa Island, spring 2002 (5 plots/zone)

Zone	Rock	Barnacle	Tetraclytia	Endocladia	Hesperophycus	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal	Tar
Barnacle	57.0	30.8	0.0	0.2	0.0	0.0	0.0	0.0	10.0	0.6	1.4
Endocladia	42.8	17.6	0.0	11.2	0.0	19.4	0.2	0.0	6.8	1.8	0.2
Rockweed	61.8	4.8	0.0	14.0	0.0	3.2	0.0	0.0	15.4	0.8	0.0
Mussels	11.0	2.4	6.0	0.0	0.0	0.0	27.0	2.6	32.6	18.4	0.0

Abalone Density within plots at Fossil Reef, Santa Rosa Island, spring 2002

Count	Density	Area	Density
0		26.9	.000

Abalone size distribution for Fossil Reef, Santa Rosa Island, spring 2002

Count	Sized	Mean Size	StDev	Min Size	Max Size	%<45mm	%45-126mm	%127-145mm	%>145mm
25		117.56	26.83	23	147	4.00%	52.00%	40.00%	4.00%

Motile invertebrate counts at Fossil Reef, Santa Rosa Island, spring 2002

	<i>zone</i>		<i>Barnacle</i>					<i>Endocladia</i>				
	<u>plot #</u>	<u>605</u>	<u>606</u>	<u>607</u>	<u>608</u>	<u>609</u>	<u>610</u>	<u>611</u>	<u>612</u>	<u>613</u>	<u>614</u>	
Lepidochitona spp.						2	1				4	
Nuttalina spp.							1					
Fissurella volcano												
Pachygrapsus									1		1	
Pagurus spp.									6			
Limpets		156	4	60	1	6	40	168	156	68	100	
subsample 1		24		3			1	4	20	8	6	
subsample 2		4		0			1	8	10	2	4	
subsample 3		10		5			3	17	8	1	12	
subsample 4		1		7			5	13	1	6	3	
Nucella emarginata												
Acanthina spp.							2		3	6	3	
Tegula funebris							2		6	1	84	
Strongylocentrotus purpuratus									1			
Ocenebra circumtexta												
Lottia gigantea												
Littorina spp.		344	180	464	944	552	660	384	84	724	36	
subsample 1		28	14	28	101	51	23	18	15	51	5	
subsample 2		45	12	22	38	48	41	63	4	18	2	
subsample 3		5	7	33	44	13	45	12	0	51	2	
subsample 4		8	12	33	53	26	56	3	2	61	0	
<i>zone</i>		<i>Rockweed</i>					<i>Mytilus</i>					<i>Total Count</i>
	<u>plot #</u>	<u>615</u>	<u>616</u>	<u>617</u>	<u>618</u>	<u>619</u>	<u>620</u>	<u>621</u>	<u>622</u>	<u>623</u>	<u>624</u>	
Lepidochitona spp.			2		1							10
Nuttalina spp.					4	1	37	67	41	25	34	210
Fissurella volcano											1	1
Pachygrapsus			1	1	3		2	3	4	1		17
Pagurus spp.			1		1		4					12
Limpets		48	96	32	120	200	72	100	188	228	40	1883
subsample 1		1	6	2	6	9	7	3	16	14	4	
subsample 2		2	7	1	13	19	8	5	11	21	2	
subsample 3		8	4	4	10	11	2	8	10	11	0	
subsample 4		1	7	1	1	11	1	9	10	11	4	
Nucella emarginata							1	5	8	13		27
Acanthina spp.					2							16
Tegula funebris			6	1	44							144
Strongylocentrotus purpuratus							24	6	6	2	11	50
Ocenebra circumtexta					2		2					4
Leptasterias hexactis										2		2
Lottia gigantea								2	8	14		24
Henricia juv. sp.							1					1
Littorina spp.		596	252	100	0	484	0	0	0	0	0	5804
subsample 1		36	10	16	0	13	0	0	0	0	0	
subsample 2		43	9	5	0	16	0	0	0	0	0	
subsample 3		36	36	0	0	52	0	0	0	0	0	
subsample 4		34	8	4	0	40	0	0	0	0	0	

Northwest Talcott, 4/21/2002. Low tide -0.2 ft at 1242 hrs, air temperature 14.5°C, water temperature 14.5°C, wind NW 8 mph, no surge. Beautiful day, though cool. We were on site from 1030-1430 hrs. We observed 14 harbor seals at the site and four more near the access beach. There was a dead harbor seal on the beach. Four Black Oystercatchers were seen on site. Near the access beach, there were seven Black Turnstones. Pelagic Cormorants were observed nesting in the bluffs to the east of the access point and there were two Great Blue Heron nests near Jaw Gulch. We helped shuttle Mark Senning and Derek and Holly Lohuis to our site to begin a walk along the north shore. Derek later reported many cormorant nests and around 200 harbor seals along that stretch of coast. He also noted 8 dead sea lions; 3 near Tecolote Canyon, 2 at Arlington Canyon, two at Soledad Canyon and one at Dry Canyon.

Pelagic red crabs, *Pleuroncodes planipes*, and *Velella velella* were abundant on the beach along with some *Macrocystis* drift. Both fresh and weathered tar was present. A number of plot corner repairs were made; some of the brass tags were no longer readable and were replaced with epoxy numbers. The temperature logger was downloaded but not replaced as the cap was missing from the housing. We considered adding *Tetraclita* zone plots at this site but the densities were not high enough to distinguish them from mussel plots. This site probably has some of the highest *Tetraclita rubescens* densities of the sites on this island however.

Pollicipes polymerus were in moderate densities throughout the mussel zone. Small *Chthamalus* sp. were present in the barnacle zone. *Silvetia compressa* cover was fairly high and the plants were in much better shape than at Fossil Reef. *Neorhodomela larix* was quite common. All low zone algae (e.g. *Prionitis lanceolata*, *Chondracanthus spinosus*, *Halidrys dioica* and *Egregia menziesii*) appeared to be quite lush. *Desmarestia ligulata* was fairly common. *Endocladia muricata* was healthy but sparsely distributed. There was some bleaching in the *Phyllospadix* spp., but most of it looked good and densities were high. Most of the surfgrass was *Phyllospadix torreyi*. The three transects were read 59-100% *Phyllospadix* cover. Transect 3 had the lowest cover and much of that was actually a mix of *Ulva* sp. and surfgrass with the upper layer scored. Only three *Haliotis cracherodii* were found (122-150 mm). No *Pisaster ochraceus* were found, though there were 6 *P. giganteus* and 10 *Patiria miniata*. *Tegula funebris* were common but were in lower numbers than the past. *Pachygrapsus crassipes* were fairly abundant.

Photoplot summary – mean percent cover by zone at Northwest Talcott, Santa Rosa Island, spring 2002 (5 plots/zone)

Zone	Rock	Barnacle	Tetraclita	Endocladia	Hesperophycus	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal	Tar
Barnacle	48.6	38.4	0.0	1.2	0.0	8.4	0.0	0.0	1.6	1.0	0.8
Endocladia	47.2	3.8	0.2	22.0	0.0	15.4	0.0	0.0	10.0	1.4	0.0
Rockweed	28.2	0.0	0.0	7.8	0.0	60.0	0.0	0.0	3.0	1.0	0.0
Mussels	22.6	0.6	1.4	0.0	0.0	0.0	51.8	9.2	9.8	4.6	0.0

Abalone Density within plots at Northwest Talcott, Santa Rosa Island, spring 2002

Count	Density	Area	Density
0		38.9	.000

Abalone size distribution for Northwest Talcott, Santa Rosa Island, spring 2002

Count Sized	Mean Size	StDev	Min Size	Max Size	%<45mm	%45-126mm	%127-145mm	%>145mm
3	134.00	14.42	122	150	-	33.33%	33.33%	33.33%

Surfgrass transects at Northwest Talcott, Santa Rosa Island, spring 2002

(additional taxa with no values deleted from table)

Location: Northwest Talcott **Site Code:** SRNWT

Date: 21-Apr-02

Recorders: Derek Lerma, Dan Richards

<u>Surf Grass Taxa</u>	<u>Transect 1</u>	<u>Transect 2</u>	<u>Transect 3</u>
Sand			3
Cystoseira/Halidrys			26
Erect coralline		1	
Encrusting coralline		1	
Chondracanthus canaliculatus			7
Ceramium spp.			1
Neorhodomela larix			3
Phyllospadix sp.	100	98	59
Anthopleura spp.			1
total	100	100	100

Motile invertebrate counts at Northwest-Talcott, Santa Rosa Island, spring 2002

<u>Zone</u>	<u>Barnacle</u>					<u>Endocladia</u>				
<u>plot #</u>	<u>560</u>	<u>561</u>	<u>562</u>	<u>563</u>	<u>564</u>	<u>555</u>	<u>556</u>	<u>557</u>	<u>558</u>	<u>559</u>
Lepidochitona spp.									1	
Nuttalina spp.									6	8
Fissurella volcano									1	
Pachygrapsus		1			1		2	3	1	1
Pagurus spp.										
Limpets	3	8	164	48	172	28	48	112	92	20
subsample 1			9	4	8	6	3	7	6	
subsample 2			12	3	5	0	4	3	5	
subsample 3			6	2	18	1	1	12	6	
subsample 4			14	3	12	0	4	6	6	
S. purpuratus										
Nucella emarginata								1		
Acanthina spp.								6		
Tegula funebris							1	1		
Ocenebra circumtexta									1	
Lottia gigantea			1							2
Littorina spp.	1768	120	348	8	128	4	12	4	12	0
subsample 1	109	7	26	0	5	0	0	0	0	0
subsample 2	92	4	37	0	5	0	1	0	0	0
subsample 3	115	7	15	1	20	0	0	0	0	0
subsample 4	126	12	9	1	2	1	2	1	3	0

zone	Silvetia					Mytilus					Total Count
plot #	565	566	567	568	569	550	551	552	553	554	
Lepidochitona spp.	3	1	4					1	1		11
Nuttalina spp.			1			6	2	4	8	22	57
Fissurella volcano						1	3	1	1	2	9
Pachygrapsus	4		2	1	1	1	7	4	4	7	40
Pagurus spp.							2				2
Limpets	64	6	13	19	11	156	64	168	88	108	1392
subsample 1	0					8	6	10	11	5	
subsample 2	4					8	6	7	1	6	
subsample 3	2					10	3	12	5	9	
subsample 4	10					13	1	13	5	7	
S. purpuratus							1		11		12
Nucella emarginata			1			4	5	8	3	10	32
Acanthina spp.											6
Tegula funebris	6	2	6		3						19
Ocenebra circumtexta			1				1	1			4
Lottia gigantea					1	8	5	9	11	5	42
Littorina spp.	16	0	1	2	0	0	0	0	0	0	2423
subsample 1	1	0			0	0	0	0	0	0	
subsample 2	3	0			0	0	0	0	0	0	
subsample 3	0	0			0	0	0	0	0	0	
subsample 4	0	0			0	0	0	0	0	0	

Ford Point, 4/22/2002. Low tide -0.4 ft at 1330 hrs, air temperature 23°C, water temperature 13.5°C, wind calm, surge moderate due to a south swell. We were on site from 0900-1200 hrs then proceeded to Johnson's Lee. One Black Turnstone was the only shorebird observed at the site. There were no pinnipeds.

Endocladia muricata was healthy but spotty in distribution. *Mytilus californianus* were large and dense in the lower plots. *Phragmatopoma californica* was abundant, filling the gaps in the low mussel bed where seastars have made clearings, including covering much of the substrate inside abalone plots. Owl limpet densities appear to be down though we did not monitor owl limpet plots. There were many large individuals present however. Small limpets (*Lottia digitalis* and *Lottia scabra*) were abundant throughout the site. Only a quick species list was noted as the tide was dropping as we wanted to get to Johnson's Lee also on this day. A few plots were missing corners and repairs were made.

Three *Haliotis cracherodii* were found (98-151 mm). *Pisaster ochraceus* were very numerous. Jayson counted 63 in 10 minutes (about 1/3 of the site) before we decided to try various transects. We ran five vertical transects from the comprehensive survey baseline with total lengths of 14-19 m searching one meter to each side, however less than five meters of each transect was in seastar habitat. We also ran three (horizontal) (10 x 2 m) transects through seastar habitat

Photoplot summary – mean percent cover by zone at Ford Point, Santa Rosa Island, spring 2002 (5 plots/zone)

Zone	Rock	Barnacle	Tetraclitia	Endocladia	Hesperophycus	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal	Tar
Barnacle	71.0	20.2	0.0	1.4	0.0	0.0	0.0	0.0	4.2	3.2	0.0
Endocladia	36.4	2.8	0.2	36.8	0.0	0.0	5.0	0.0	16.0	2.8	0.0
Mussels	32.4	1.4	0.0	0.0	0.0	0.0	48.0	0.0	14.0	4.2	0.0

Vertical seastar transects at Ford Point, Santa Rosa Island, spring 2002 (all *Pisaster ochraceus*)

Baseline Transect meter number	Total Length(m)	<50 mm	50-100 mm	>100 mm
3	19	0	0	2
8	19	1	0	5
15	15	0	2	3
21	14	0	0	0
28	15	0	0	6

Horizontal seastar transects at Ford Point, Santa Rosa Island, spring 2002 (*P. ochraceus* unless otherwise noted)

Transect size	<50 mm	50-100 mm	>100 mm	<i>P. giganteus</i>
10 x 2 m	23	30	31	0
10 x 2 m	1	7	14	2 small
10 x 2 m	0	2	12	0

Abalone Density within plots at Ford Point, Santa Rosa Island, spring 2002

Count	Density	Area	Density
0	14.400	.000	

Abalone size distribution for Ford Point, Santa Rosa Island, spring 2002

Count	Sized	Mean Size	StDev	Min Size	Max Size	%<45mm	%45-126mm	%127-145mm	%>145mm
3		132.00	29.51	98	151	-	33.33%	-	66.67%

Motile invertebrate counts at Ford Point, Santa Rosa Island, spring 2002

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
Nuttalina spp.						4		1	2	2	7				11	27
Fissurella volcano													2			2
Pachygrapsus							1		1		2		2	1		7
Pagurus spp.																0
Limpets	264	68	15	180	12	192	148	144	60	112	120	28	56	32	52	1483
subsample 1	18	3		10		12	16	7	3	5	13	2	4	2	2	
subsample 2	10	5		13		19	8	12	3	8	7	3	5	3	3	
subsample 3	23	4		14		9	7	11	7	6	9	0	2	2	7	
subsample 4	15	5		8		8	6	6	2	9	1	2	3	1	1	
Nucella emarginata									1	1		2	6	8	1	19
Acanthina spp.								2								2
Tegula funebris									8					12	1	21

Strongylocentrotus purpuratus																2	2	
Ocenebra circumtexta																1	1	
Lottia gigantea	2								1	1	4	3	2	4	4	4	2	27
Littorina spp.	328	560	532	388	396	72	200	96	76	60	8	12	0	60	0	2788		
subsample 1	18	73	33	51	28	0	20	3	4	1	0	2	0	7	0			
subsample 2	2	20	37	17	16	9	12	8	2	7	1	0	0	3	0			
subsample 3	31	31	28	18	11	4	8	12	8	1	1	1	0	4	0			
subsample 4	31	16	35	11	44	5	10	1	5	6	0	0	0	1	0			

Johnson's Lee, 4/22/2002. Low tide -0.4 ft at 1330 hrs, air temperature 18°C, water temperature 15°C, wind W at less than 5 mph, surge light. The day was very warm and nice. We were on site from 1300-1600 hrs after taking Jayson to the old Johnson's Lee pier to collect mussel samples from the BLM site there. Four Western Gulls were present on the site and two Black Oystercatchers came and went. Approximately 200 northern elephant seals (mostly weaners but some to 3 years old) were noted on beaches between the pier and Officers Beach.

Jayson collected five 20 cm cores in the mussel zone near the old pier where we remember the BLM-OCS site being, though we could find no markers. At the site we downloaded the temperature logger, searched for abalone and seastars and completed the plot monitoring. Repairs were made to corners of four plots. Both *Balanus glandula* and *Chthamalus* sp. had moderate cover. There were many large *B. glandula*. *Mytilus californianus* were large but not very dense on most of the upper reef. The lower reef is still dominated by *Phragmatopoma californica* and *Anthopleura solis*. There were some patches of small *M. californianus* all tightly compressed. *Pollicipes polymerus* were in relatively high densities on the upper reef. *Endocladia muricata* was only moderate to low density. Copepods, *Tigriopus californicus*, were present in high densities in the high pools. *Tetraclita rubescens* was common but there were no good patches for new photoplots.

Only one *Haliotis cracherodii* was found. Seastars were counted within the three zones previously defined. A 10 x 2 m transect was counted on the outer reef in the usual place.

Photoplot summary – mean % cover by zone at Johnson's Lee, Santa Rosa Island, spring 2002 (5 plots/zone)

Zone	Rock	Barn- acle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal	Tar
Barnacle	63.8	31.0	0.0	3.4	0.0	0.0	0.4	0.0	0.4	1.0	0.0
Endocladia	51.8	5.6	0.6	24.0	0.0	0.0	12.4	0.8	3.2	1.6	0.0
Mussels	18.8	1.0	0.6	0.4	0.0	0.0	11.2	0.4	17.4	50.2	0.0

***Pisaster ochraceus* at Johnson's Lee, Santa Rosa Island, spring 2002.**

Area	<50 mm	50-100 mm	>100 mm
Area 1	11	73	26
Area 2	10	90	16
Area 3	5	66	88
10 x m transect	3	50	15

Motile invertebrate counts at Johnson's Lee, Santa Rosa Island, spring 2002

zone	Barnacle					Endocladia					Mytilus					Total Count
plot #	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	
Lepidochitona spp.													1			1
Nuttalina spp.									1			1	4	6		12
Fissurella volcano												1		2	1	4
Pachygrapsus													3		1	4
Pagurus spp.																0
Limpets	4	100	144	132	688	292	376	220	180	380	18	17	76	400	0	3027
subsample 1	1	16	7	3	13	20	19	30	10	16			3	13		
subsample 2	0	2	0	10	38	6	27	14	22	25			6	47		
subsample 3	0	0	4	20	48	23	30	6	6	28			7	19		
subsample 4	0	7	25	0	73	24	18	5	7	26			3	21		
S. purpuratus															11	11
Nucella emarginata		2						2 w/eggs	2	4		3	2	1	1	15
Acanthina spp.														2		2
Tegula funebris						2						3	2	17	2	26
Ocenebra circumtexta																0
Lottia gigantea						6	1	3	3	1			3			17
Pisaster ochraceus											1				1	2
Cancer spp.															1	1
Ligia occidentalis														2		2
Littorina spp.	1132	1052	684	652	4	40	136	88	108	88	0	0	20	60	1	4065
subsample 1	74	90	6	60	0	2	1	6	3	3			0	5		
subsample 2	68	66	11	56	0	4	18	10	16	6			0	2		
subsample 3	103	25	117	29	1	2	8	5	0	4			2	2		
subsample 4	38	82	37	18	0	2	7	1	8	9			3	6		

East Point, 4/23/2002, and Carrington Point. Low tide -0.5 ft at 1408 hrs. The day was calm and warm, with essentially no surge.

We checked on the greenhouse for Sarah and watered some plants not on timers, then went out to Carrington Point and dropped off Jayson to collect his samples at 1030 hrs. A raft of California sea lions was present off the point. One sea lion was on the rocks and though alive appeared very lethargic and was not concerned, if aware of our presence. The only information we had about the BLM-OCS site there was the name of the point. There were several small reefs with mussels exposed when we arrived though all the beds were fairly thin. Jayson ended up collecting his five 20 cm cores from a reef a little south of the point. We went on to East Point, arriving at 1300 hrs, to set up the surfgrass transects there.

Three surfgrass transects were installed with stainless steel bolts epoxied into the rock at each end of the 10 meter transects. The high end bolts are all labeled SG-1, 2 or 3. All were placed on the surfgrass flat on the northeast side of the site. Transects 1 and 2 are southeast of photoplot 592, and run northeast at 40° and 18° respectively. Transect 3 is a little to the north with the high bolt at the east end of the transect along the high reef about 20 m east of plot 591. This transect runs about 195° from the high bolt. All three transects had high cover of *Phyllospadix torreyi* (99%, 96%, 94% respectively). We were at the site for only 1.5 hours then went back to Carrington Point to pick up Jayson.

Santa Cruz Island May 13-17, 2002 (Database event #2002-E)

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
Derek Lerma, Biological Technician, Channel Islands National Park
Jayson Smith, University of California, Los Angeles
Kara Randall, (5/16 only)

PROCEDURE: We boated out to Santa Cruz Island on the Surf Ranger arriving about 1130 on 5/13/2002. After helping with the unloading we went to the field station to get organized with vehicles and then drove out to the West End trailer site to set up camp arriving about 1630 hrs. The work routine was about the same at all sites. Derek scored photoplots in the field, Jayson conducted most of the motile invertebrate counts, Dan shot photos of the plots and overview and wrote field notes. The new Ikelite strobes were used and everything seems to be working fine. Shore birds and pinnipeds were counted on arrival and noted if more arrived during our stay. Dan conducted abalone and sea star searches within defined areas at each site. At Willows Anchorage and Prisoner's Harbor, Jayson collected mussels from five 20-cm diameter plots within the mussel zone to compare biomass and other parameters with past studies (BLM-OCS) from the same areas. At each site Dan developed a species list by searching, usually for about 30-minutes, noting species and relative abundance. Plot corners were repaired where needed. Surfgrass point-intercept transects were read at Trailer and Fraser Point. Owl limpets will be monitored only in the fall. Derek and Jayson returned on the Ocean Ranger on Friday, Dan remained to meet with TNC and university biologists to discuss marine management and returned on the Ocean Ranger on Monday 5/20. Low tide times are based on predicted values for Prisoner's Harbor.

RESULTS:

Trailers, 5/14/2002. Low tide -0.5 ft at 0556 hrs, air temperature 11°C, water temperature 12 °C, wind NW at 10 mph, surge moderate. Clear, very windy with mean looking seas offshore, fair working conditions. We were on site from 0600-0830 hrs. We observed four Black Oystercatchers at the site. No pinnipeds were present. Only a small amount of fresh and weathered tar was present.

The cobble beach adjacent to the site was steeper than usual indicating some recent large waves. The plots in all zones seemed to be representative of the overall site. *Balanus glandula* were especially dense in patches and abundant in general. Most of the *Hesperophycus californicus* were small young plants. *Silvetia compressa* looked healthy with robust plants. *Phragmatopoma californica* were abundant with some dense patches on the reef where it looked like surfgrass and mussels had been cleared off. *Tegula funebris* were common to abundant in the rockweed zone. Overall, about 1% of the *Tegula* were *T. gallina*. All of the *Chondracanthus canaliculatus* appeared to be small young plants often growing up through *Phragmatopoma*. Hermit crabs were common. *Porphyra* was common. The surfgrass transects had 66-79% cover of *Phyllospadix* spp. but most of that was bleached and abraded.

Photoplot summary – mean percent cover of core taxa by zone at Trailers, Santa Cruz Island, spring 2002 (5 plots/zone)

Zone	Bare Rock	Barnacle	Tetraclita	Endo-cladia	Hespero-phycus	Silvetia	Mussel	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle	53.2	42.0	0.0	3.4	0.0	0.0	0.0	0.0	0.2	1.2	0.0
Rockweed	11.2	1.6	0.0	1.0	0.0	79.0	0.0	0.0	7.2	0.0	0.0
Mussels	17.8	0.6	0.8	0.2	0.0	0.0	61.4	0.4	8.2	10.6	0.0
Hesperophycus	44.6	4.8	0.0	16.4	11.8	21.2	0.2	0.0	1.0	0.0	0.0

Seastar Abundance at Trailers, Santa Cruz, spring 2002

<i>Pisaster ochraceus</i> radius (mm)	total
Small (<50)	4
Medium (50-100)	21
Large (>100)	0
Total	25

Abalone size distribution for Trailers, Santa Cruz Island, spring 2002

Count Sized	Mean Size	StDev	Min Size	Max Size	%<45mm	%45-126mm	%127-145mm	%>145mm
7	98.86	20.76	70	135	-	85.71%	14.29%	-

Surfgrass transects at Trailers, Santa Cruz Island, spring 2002

(additional taxa with no values deleted from table)

Location: Trailer **Site Code:** SCTR

Date: 14-May-02

Recorders: Dan Richards, Derek Lerma

<u>Surf Grass Taxa</u>	<u>Transect 1</u>	<u>Transect 2</u>	<u>Transect 3</u>
Rock	3	1	
Egregia menziesii	6		
Erect coralline	3	1	3
Chondracanthus canaliculatus	7	12	10
Chondracanthus spinosus	1	1	
Prionitis spp.	2	1	
Mazzaella affinis	1	3	
Mastocarpus sp.	2	3	1
Phyllospadix sp.	66	67	79
Mytilus californianus	1	3	3
Phragmatopoma californica	3	5	3
Chthamalus/Balanus	4	2	
Tetraclita rubescens	1	1	
Pollicipes			1
total	100	100	100

Motile invertebrate counts at Trailers, Santa Cruz Island, spring 2002

Zone	plot #	Barnacle					Hesperophycus				
		911	912	913	914	915	916	917	918	919	920
Lepidochitona spp.									1		2
Nuttalina spp.											
Fissurella volcano											
Pachygrapsus							2				
Pagurus spp.											
Limpets		60	88	68	28	204	13	6	11	4	164
subsample1		3	3	0	2	13					11
subsample2		9	1	1	2	25					14
subsample3		2	14	3	3	8					2
subsample4		1	4	13	0	5					14
S. purpuratus											
Nucella emarginata											
Acanthina spp.											
Tegula gallina											
Tegula funebris								3	2		
Ocenebra circumtexta											
Lottia gigantea											
Littorina spp.		340	372	456	392	280	56	60	44	80	232
subsample1		7	23	17	11	16	4	5	2	0	12
subsample2		51	32	32	14	38	2	9	1	6	1
subsample3		10	27	16	32	5	3	1	6	7	26
subsample4		17	11	49	41	11	5	0	2	7	19

Zone	plot #	Mytilus					Silvetia					Total Count
		921	922	923	924	925	926	927	928	929	930	
Lepidochitona spp.							2	5	2	9	9	30
Nuttalina spp.		6	3	1	2	2						14
Fissurella volcano		1		1								2
Pachygrapsus				1			1		1			5
Pagurus spp.								2		1	31	34
Limpets		140	72	96	128	116	36	8	28	24	36	1330
subsample1		8	3	3	8	3	1	1	2	3	1	
subsample2		12	5	10	6	6	4	1	1	1	3	
subsample3		6	4	6	4	12	2	0	3	0	3	
subsample4		9	6	5	14	8	2	0	1	2	2	
S. purpuratus												0
Nucella emarginata		10	18	12	7	6						53
Acanthina spp.			1				4	2	2	5	11	25
Tegula gallina								1	1	3	11	16
Tegula funebris		1					6	20	40	64	160	296
Ocenebra circumtexta		4	1	2		1			1			9
Lottia gigantea			1		2	1						4
Littorina spp.		0	0	0	0	4	4	0	4	0	0	2324
subsample1		0	0	0	0	0	0	0	0	0	0	
subsample2		0	0	0	0	1	1	0	0	0	0	
subsample3		0	0	0	0	0	0	0	0	0	0	
subsample4		0	0	0	0	0	0	0	1	0	0	

Forney's Cove, 5/14/2002. Low tide 0.2 ft at 1647 hrs, air temperature 15°C, water temperature 13°C, wind NW 30+ mph, surge moderate. Mostly clear sky with windy but fair working conditions. We were on site from 1600-1730 hrs. About 100 Western Gulls were present on the beach at arrival, one semi-palmated plover was present, and five black oystercatchers were on the beach at departure. *Velella velella* were washing ashore and there was a fair amount of kelp wrack on the rocks.

The beach at Forney's Cove was eroded with many rocks showing. We worked the evening tide to ensure we could finish Fraser the next day. All the plots were exposed so it worked out well. Both rockweeds were healthy looking and very lush. Barnacles, mostly *Chthamalus* sp. were

dense on some of the rocks. Except for *Tegula funebris* and a few *T. gallina*, there were not many snails in the plots. The tide did not allow for much extra searching.

Fraser Cove, 5/15/2002. low tide -0.4 ft at 0641 hrs, air temperature 12°C, water temperature 11°C, wind NW 15 mph, light surge. Foggy and cool. We were on site from 0630-1000 hrs. We observed three Black Oystercatchers, one hybrid American/Black Oystercatcher, 1 Wandering Tattler and 2 Western Gulls on site.

Pelagic red crabs, *Pleuroncodes planipes*, and *Velella velella* were present on the beach along with some surfgrass drift. Both fresh and weathered tar was present. Several plot corner bolts were loose and were secured with epoxy.

The plots in all zones appeared to be representative of the area as a whole. *Chthamalus* sp. were abundant in the higher plots and *Balanus glandula* were very dense and fairly wide spread with a high recent recruitment. *Porphyra perforata* was common especially in the lower *Endocladia* zone and was dominant in some Barnacle and *Endocladia* plots.

There were no apparent changes in the mussel or Pollicipes zone plots. No abalone or seastars were found. Fresh tar had appeared in the tar plots with some bolts partially covered. Surfgrass cover ranged from only 27-64% cover with erect coralline algae and *Chondracanthus canaliculatus* being common. *Nucella emarginata* were very common with only moderate numbers of the other snails present in plots.

Photoplot summary – mean percent cover of core taxa by zone at Fraser/Forney Cove, Santa Cruz Island, spring 2002 (5 plots/zone)

Zone	Bare Rock	Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal	Tar
Barnacle	17.8	30.4	0.0	9.0	0.0	0.0	0.2	0.2	39.4	0.2	2.8
Endocladia	10.4	12.2	0.0	60.0	4.2	0.0	0.6	0.0	11.8	0.2	0.6
Rockweed	13.4	1.8	0.0	4.0	7.8	66.6	0.0	0.0	6.0	0.2	0.2
Mussels	9.6	2.8	0.2	0.0	0.0	0.0	64.2	2.8	5.4	15.0	0.0
Pollicipes	14.2	7.0	2.0	2.6	0.0	0.0	39.8	13.0	6.4	15.0	0.0
Tar	18.8	12.2	0.0	0.0	0.0	0.0	0.0	0.0	11.2	0.0	57.8
Hesperophycus	41.4	8.6	0.0	14.4	27.0	4.8	0.0	0.2	2.8	0.8	0.0

Surfgrass transects at Fraser Cove, Santa Cruz Island, spring 2002
(additional taxa with no values deleted from table)

Location: Fraser Cove **Site Code:** SCFC

Date: 15-May-02

Recorders: Dan Richards

<u>Surf Grass Taxa</u>	<u>Transect 1</u>	<u>Transect 2</u>	<u>Transect 3</u>
Rock	4	3	
Sand			1
Ulva			4
Endocladia muricata			1
Erect coralline	42	7	6
Encrusting coralline	1		
Chondracanthus canaliculatus	8	13	7
Porphyra perforata		1	3
Prionitis spp.		3	1
Mastocarpus sp.	1	1	
other red algae	2	1	6
Gelidium sp.	2	2	
Gastroclonium sp.		2	
Ceramium spp.			3
Phyllospadix sp.	27	61	64
Mytilus californianus	2	4	
Anthopleura spp.	9		2
Phragmatopoma californica	1	2	2
Chthamalus/Balanus	1		
total	100	100	100

Motile invertebrate counts at Fraser and Forney's Cove, Santa Cruz Island, spring 2002

<u>Zone</u>	<u>Barnacle</u>					<u>Endocladia</u>					<u>Hesperophycus</u>				
<u>Plot #</u>	<u>876</u>	<u>877</u>	<u>878</u>	<u>879</u>	<u>880</u>	<u>881</u>	<u>882</u>	<u>883</u>	<u>884</u>	<u>885</u>	<u>886</u>	<u>887</u>	<u>888</u>	<u>889</u>	<u>890</u>
Lepidochitona spp.															
Nuttalina spp.	1					2	4		1						
Fissurella volcano															
Pachygrapsus	1		1				1							1	
Pagurus spp.															
Pagurus samuelis															
Limpets	44	16		4	24	24	40	20	7	12	28	60	40	128	48
subsample1	8	0		0	2	0	1	2		0	1	4	0	6	3
subsample2	1	1		0	4	2	2	0		0	2	3	5	5	2
subsample3	1	1		0	0	2	2	2		2	1	0	4	11	2
subsample4	1	2		1	0	2	5	1		1	3	8	1	10	5
S. purpuratus															
Nucella emarginata	12	4				3				2					
Acanthina spp.	8	2													
Tegula gallina															
Tegula funebris						1		1				23			5
Ocenebra circumtexta															
Lottia gigantea															

Littorina spp.	80	112	900	688	248	160	308	164	160	112	168	88	520	216	120
subsample1	8	3	33	42	6	0	19	12	9	8	16	3	28	20	10
subsample2	6	7	85	73	35	8	38	6	10	9	19	3	23	11	0
subsample3	5	17	46	42	8	9	7	10	7	5	1	8	20	2	9
subsample4	1	1	61	15	13	23	13	13	14	6	6	8	59	21	11

<i>Zone</i>	<i>Silvetia</i>					<i>Mytilus</i>					<i>Pollicipes</i>				
<u>plot #</u>	<u>896</u>	<u>897</u>	<u>898</u>	<u>899</u>	<u>900</u>	<u>891</u>	<u>892</u>	<u>893</u>	<u>894</u>	<u>895</u>	<u>901</u>	<u>902</u>	<u>903</u>	<u>904</u>	<u>905</u>
Lepidochitona spp.	2		3						1					1	
Nuttalina spp.			1			1	1				5	3	3	1	1
Fissurella volcano														1	
Pachygrapsus					1	1			1	1	3	1	1	1	2
Pagurus spp.															
Pagurus samuelis	3									1					
Limpets	28	48	44	68	32	128	92	104	140	212	80	96	152	228	156
subsample1	1	6	3	5	2	5	3	7	9	10	3	5	16	21	5
subsample2	6	0	3	6	2	4	7	4	8	13	6	3	9	13	10
subsample3	0	0	0	2	1	16	8	9	12	14	4	11	7	10	15
subsample4	0	6	5	4	3	7	5	6	6	16	7	5	6	13	9
S. purpuratus												1			
Nucella emarginata						3	10	13	5	20	16	13	9	19	4
Acanthina spp.	2		3	1								2			
Tegula gallina				1											
Tegula funebris	2	20	25	21	2								1		
Ocenebra circumtexta											1	1			
Lottia gigantea							1	1		1	1	3			
Littorina spp.				16	12		12	4	20	4	24	64		8	
subsample1				0	0		0	1	1	0	4	6		0	
subsample2				4	3		2	0	0	0	0	2		2	
subsample3				0	0		0	0	0	1	2	0		0	
subsample4				0	0		1	0	4	0	0	8		0	

<i>Zone</i>	<i>Tar</i>		<i>Total Count</i>		
<u>plot #</u>	<u>906</u>	<u>907</u>	<u>908</u>	<u>909</u>	<u>910</u>
Lepidochitona spp.					7
Nuttalina spp.					24
Fissurella volcano					1
Pachygrapsus					16
Pagurus spp.					0
Pagurus samuelis					4
Limpets			1		2104
subsample1					
subsample2					
subsample3					
subsample4					
S. purpuratus					1
Nucella emarginata					133
Acanthina spp.					18
Tegula gallina					1

Tegula funebris						101
Ocenebra circumtexta						2
Lottia gigantea						7
Littorina spp.	88	152	256	132	60	4896
subsample1	0	10	7	0	7	
subsample2	16	10	14	5	3	
subsample3	6	7	11	12	1	
subsample4	0	11	32	16	4	

Willows Anchorage, 5/16/2002. Low tide -0.3 ft at 0735 hrs, air temperature 15°C, water temperature 13.5°C, wind SW at 8 mph, light surge. We were on site from 0730-1030 hrs. Three Black Oystercatchers were present and swifts and ravens were seen overhead. There were no pinnipeds. One sailboat and a squid-light boat were anchored in the cove.

The plots all seemed representative of their zones here. *Endocladia muricata* plants were pale but not as bleached as they appeared in March after the Santa Ana winds. *Hesperophycus californicus* plants were very mature with inflated tips, though cover was sparse. *Silvetia compressa* were lush though only in a relatively small area. *Silvetia* zone plots 1 and 2 were dominated by *Endocladia* and plot 5 was mostly bare rock. *Tetraclita rubescens* were very common and large. Juveniles *Strongylocentrotus purpuratus* and *Pisaster ochraceus* were common among the lower mussel zone. Juvenile *Aplysia californica* were common scattered around the site. *Pachygrapsus crassipes*, *Nucella emarginata*, *Nuttalina californica*, and *Lepidochitona hartwegii* all seemed abundant. High densities of *Lottia limatula* were present on the inner reef. No abalone were found. Over 200 seastars were found, mostly on the outer reef. Some large patches of mussels have been cleared on the outer reef. Jayson sampled the mussel bed below the *Endocladia* plots.

Photoplot summary – mean percent cover of core taxa by zone at Willows Anchorage, Santa Cruz Island, spring 2002 (5 plots/zone)

Zone	Bare Rock	Barnacle	<i>Tetraclita</i>	<i>Endocladia</i>	<i>Hesperophycus</i>	<i>Silvetia</i>	Mussel	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Endocladia	42.6	0.0	0.4	43.4	9.8	0.0	0.2	0.0	2.0	1.6	0.0
Rockweed	24.4	0.0	0.0	21.8	0.0	33.4	0.0	0.0	19.0	1.4	0.0
Mussels	10.2	0.0	6.0	0.0	0.0	0.0	49.0	11.0	19.0	4.8	0.0
Hesperophycus	56.4	4.0	0.0	6.0	4.0	14.6	0.0	0.0	14.2	0.8	0.0

Seastar abundance at Willows Anchorage, Santa Cruz Island, spring 2002

<i>Pisaster ochraceus</i> radius (mm)	total
Small (<50)	30
Medium (50-100)	91
Large (>100)	105
Total	226
Additional species:	total
<i>Pisaster giganteus</i>	2

Motile invertebrate counts at Willows Anchorage, Santa Cruz Island, spring 2002

	<i>Zone</i>		<i>Endocladia</i>					<i>Hesperophycus</i>			
	<u>plot #</u>	<u>931</u>	<u>932</u>	<u>933</u>	<u>934</u>	<u>935</u>	<u>936</u>	<u>937</u>	<u>938</u>	<u>939</u>	<u>940</u>
Lepidochitona spp.					1	3		2	1	3	5
Nuttalina spp.		1			1	2		1			
Fissurella volcano											
Pachygrapsus					1					1	1
Pagurus spp.											
Pagurus samuelis								2		8	5
Limpets		24	84	44	64	104	32	104	136	84	92
	subsample1	1	6	4	1	3	0	4	9	6	7
	subsample2	3	4	3	0	9	4	8	3	3	0
	subsample3	1	8	1	5	8	0	6	11	6	10
	subsample4	1	3	3	10	6	4	8	11	6	6
S. purpuratus											
Nucella emarginata				1		1					
Acanthina spp.										10	1
Tegula eiseni								1			
Tegula funebris											1
Ocenebra circumtexta											
Lottia gigantea											
Norrisia norrisi											
Leptasterias hexactis											
Littorina spp.		524	1044	624	332	272	644	764	744	244	92
	subsample1	41	51	38	32	24	35	51	42	16	4
	subsample2	24	59	44	26	12	23	61	61	4	7
	subsample3	36	47	30	6	7	67	33	44	30	1
	subsample4	30	104	44	19	25	36	46	39	11	11

	<i>Zone</i>		<i>Mytilus</i>					<i>Silvetia</i>				<i>Total Count</i>
	<u>plot #</u>	<u>941</u>	<u>942</u>	<u>943</u>	<u>944</u>	<u>945</u>	<u>946</u>	<u>947</u>	<u>948</u>	<u>949</u>	<u>950</u>	
Lepidochitona spp.						1	2	6	13		4	41
Nuttalina spp.		56	5	15	29	18		2	2	11		143
Fissurella volcano			1	3	5	2						11
Pachygrapsus		7	4	6	3	13	1	6	2	4	4	53
Pagurus spp.												0
Pagurus samuelis						1			31	5	3	55
Limpets		164	92	132	128	168	92	176	56	24	340	2140
	subsample1	15	3	16	7	14	15	13	2	3	19	
	subsample2	9	9	6	6	11	3	16	3	1	27	
	subsample3	9	8	7	9	7	2	12	8	2	20	
	subsample4	8	3	4	10	10	3	3	1	0	19	
S. purpuratus		1	12	17	2	3						35
Nucella emarginata		19		12	5	9	2	4	1	1		55
Acanthina spp.						1			6	1	6	25
Tegula eiseni												1
Tegula funebris												1
Ocenebra circumtexta				1				1	1			3
Lottia gigantea		4	2	3	2							11

Norrissia norrisi	1								1
Leptasterias hexactis	1	1	1						3
Littorina spp.				152	108	32	28	64	5668
subsample1				2	3	1	1	2	
subsample2				13	8	0	6	6	
subsample3				6	6	5	0	2	
subsample4				17	10	2	0	6	

Prisoner's Harbor, 5/17/2002. Low tide -0.2 ft at 0837 hrs, air temperature 17°C, water temperature 13°C, wind calm, surge light. Excellent conditions. We were on site from 0715-1030 hrs. The main beach was mostly cobblestones at this time.

Jayson collected five 20 cm cores in the mussel zone on the east reef. Two *Haliotis cracherodii* were found. One was only 25 mm, found among mussels on the east reef, the other was 98 mm found in a crevice on the west reef. Overall there were 110 seastars at the site.

Open patches in mussel plots 1, 2 and 5 were still mostly bare rock except for small algae. Diatoms covered the bare rock generally. *Porphyra perforata* was dense between the *Hesperophycus* and mussel zones. Horse mussels, *Septifer/Brachydontes*, seemed especially common. *Silvetia compressa* was thick on the western reef in its zone. *Hesperophycus* and *Endocladia* appeared normal. *Balanus glandula* had a recent recruitment and were dense in patches. Either *Endocladia* or *Silvetia* or both dominated some of the barnacle plots. Plot B1 had only one percent cover of barnacles, as cobbles cover most of that plot. Juvenile *Ligia occidentalis* were present throughout the site.

Photoplot summary – mean percent cover of core taxa by zone at Prisoner's Harbor, Santa Cruz Island, spring 2002 (5 plots/zone).

Zone	Bare Rock	Barnacle	Tetraclita	Endocladia	Hesperophycus	Silvetia	Mussel	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle	54.6	19.8	0.2	11.4	0.2	5.8	0.4	0.2	5.8	1.4	0.2
Endocladia	17.2	13.0	0.0	52.0	10.0	0.0	0.2	0.0	6.2	1.4	0.0
Rockweed	1.6	0.0	0.0	0.0	0.0	91.0	0.0	0.0	7.4	0.0	0.0
Mussels	5.4	3.0	0.4	0.0	0.0	0.0	67.6	0.0	22.8	0.8	0.0
Hesperophycus	19.0	9.4	0.0	15.8	39.2	0.2	0.2	0.0	15.8	0.2	0.2

***Pisaster ochraceus* at Prisoner's Harbor, Santa Cruz Island, spring 2002**

Area	size	<50 mm	50-100 mm	>100 mm
East reef		1	31	6
West reef		0	50	22

We visited Fraser Point in the afternoon with site visit by The Nature Conservancy marine managers. The site has the highest density of *Pollicipes polymerus* I have noted at the islands. Fresh tar, large owl limpets and large mussel bed also.

Motile invertebrates at Prisoner's Harbor, Santa Cruz Island, spring 2002

zone		Barnacle					Endocladia					Hesperophycus				
	plot #	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840
Lepidochitona spp.			1					1			1		2	1		
Nuttalina spp.												1	1			
Fissurella volcano																
Pachygrapsus							2	6	4	7	1		2	1		2
Pagurus spp.																
Limpets			40	4	4		44	28	12	16	32	36	24	8	4	16
	subsample1		4	0	0		3	0	1	0	1	4	2	0	0	0
	subsample2		3	0	1		5	5	1	4	1	1	4	1	1	1
	subsample3		0	1	0		0	2	1	0	1	3	0	1	0	0
	subsample4		3	0	0		3	0	0	0	5	1	0	0	0	3
S. purpuratus																
Nucella emarginata																
Acanthina spp.								8		3		4	9	2		1
Tegula funebris								2		1				3		
Ocenebra circumtexta								2		1	1		1			
Lottia gigantea																
Littorina spp.			140	212	668	1204	440	396	576	332	308	560	288	248	844	1048
	subsample1		18	3	105	75	48	48	39	30	19	61	29	9	38	78
	subsample2		8	3	35	12	20	16	24	16	20	8	30	9	56	66
	subsample3		0	39	10	170	23	24	51	14	25	35	1	13	57	73
	subsample4		9	8	17	44	19	11	30	23	13	36	12	31	60	45

<i>zone</i>		<i>Mytilus</i>					<i>Silvetia</i>					<i>Total Count</i>	
<u>plot #</u>		<u>841</u>	<u>842</u>	<u>843</u>	<u>844</u>	<u>845</u>	<u>846</u>	<u>847</u>	<u>848</u>	<u>849</u>	<u>850</u>		
Lepidochitona spp.				3		3	8	6	17	9	4	56	
Nuttalina spp.		6	2	12		12				4		38	
Fissurella volcano			1		1	2	2			1		7	
Pachygrapsus			4	11	15	12		5	1	4	4	81	
Pagurus spp.						1						1	
Limpets		252	108	184	128	652	48	72	100	108	24	1944	
subsample1		16	9	14	4	61	4	17	10	2	0		
subsample2		13	7	3	9	22	4	0	7	4	1		
subsample3		5	3	5	8	58	2	1	3	4	2		
subsample4		29	8	26	11	22	2	0	5	19	3		
S. purpuratus												0	
Nucella emarginata		2		4	1	8	5	2	2	1	3	28	
Acanthina spp.		26		3	2	2	1		2	3		66	
Tegula funebris							4			5		15	
Ocenebra circumtexta		3		6	12	16		1	3	3	3	52	
Lottia gigantea								2				2	
Littorina spp.							104	68	48	124	120	7728	
subsample1							12	7	3	18	16		
subsample2							8	6	0	3	0		
subsample3							1	4	5	4	12		
subsample4							5	0	4	6	2		

Coches Prietos, 5/18/2002. On site about 1030-1130 hrs. The site has similarities to Willows Anchorage, though there were more *Pollicipes polymerus* on the point. *Tetraclita rubescens* were common. There were some dense bands of young *Mytilus californianus* present and a fair number of *Pisaster ochraceus* on the reef. *Endocladia muricata* was not as common as at Willows and there was no rockweed present. *Phragmatopoma californica* were abundant. No black abalone were found in a brief search. I did make the observation that a feral pig had been feeding on seastars on the reef. Tracks were abundant on the beach and went out to the reef. Several *Pisaster* were found with arms detached and the undersides (tubefeet) scraped clean.

Santa Cruz Island June 26-27, 2002 (Database event #2002-F)

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park

PROCEDURE: I boated out to Santa Cruz Island on the Sunfish (IPCO) Surf Ranger arriving about 1000 hrs. on 6/26/2002. I set up in a bunkroom and then hiked to Smugglers Cove to begin the beach walk surveys. The entire beach at Smugglers and Yellowbanks and most of Middle Anchorage to Sandstone Point was walked looking specifically for beached animals. Human presence and activities were recorded along with shorebirds on the beaches. Debris was also noted.

On 6/27/02, I kayaked to Scorpion Rock and conducted the intertidal monitoring there according to standard procedures for photographing plots and counting motile invertebrates and shorebirds. Returned to Ventura on the NPS vessel Surf Ranger departing island at 1900 hrs.

RESULTS:

6/26/2002, Smugglers Cove area beaches, high tide was 3.4 ft at 1238 hrs. Weather was excellent with a light breeze, partly cloudy with a pleasant temperature.

A low tide would be optimal for accessing the beach but I did not have any difficulties and I don't think the survey results were affected. The beach was quite clean. The only beached animal found was a single small thornback ray that was mummified at Smugglers Cove. Shorebirds observed were Great Blue Heron (1), Western Gulls (~40, ~200, ~60) Brown Pelicans (59, 9), Killdeer (6), Double-crested cormorant (~60), Herrmann's Gull (few mixed with WEGU) and Black Oystercatchers (2 (one was a hybrid American/ Black). There were 19 people ashore at Smugglers Cove, 5 were boaters walking on the beach and the others were boy scouts camped at Scorpion.

Hiking back, I noticed one of the boys had a rake. I inquired about it and he reported he found it in some bushes and was going to use it to kill pigs. I explained about cultural artifacts and asked him to put it back where he found it. A little farther up the trail I ran into another kid sitting in the trail. The father was present too. He appeared to be exhausted and I checked for signs of heat exhaustion. He seemed okay, but very tired. I suggested he continue to keep sipping water and walked back with them to be sure.

Other observations from the beach walk: the rock louse *Ligia occidentalis* was very common in the cobble, pigs had been rooting in kelp wrack (presumably for beach hoppers) at Yellowbanks. I counted 125 wire traps and assorted pieces along the entire beach, about two-thirds were beyond Yellowbanks along the base of the bluffs. Removal of these traps might make a good volunteer project, though some are partially buried and would be difficult to dig out. I recommend that future surveys only include Smugglers Cove and Yellowbanks beaches. There are not likely to be many beached animals further down and the walking is difficult on the

cobble. Also there seem to be numerous roosting seabirds and shorebirds there and the disturbance is not worth the information.

Scorpion Rock, 6/27/2002. Low tide –0.7 ft at 0637 hrs, conditions were excellent with overcast sky and calm seas and wind NW at 5 mph. Three black oystercatchers and 27 brown pelicans were roosting at the site. The large islet of Scorpion Rock proper had many western gulls and brown pelicans. At least 15 pigeon guillemots were rafting in the Scorpion Anchorage area.

I started with the *Hesperophycus* plot area. All the plots had good cover of mature *Hesperophycus californicus* plus some new young plants. Four of the plots had at least some *Silvetia compressa*. *Endocladia muricata* was also present in all the plots. *Endocladia muricata* was doing very well overall and even dominated some of the acorn barnacle plots. Motile invertebrates were counted in all plots except two barnacle zone plots missed at the end with the rising tide. There were some very high numbers of *Littorina* spp. and of small limpets. Very large *Tetraclita rubescens* were present in the Tetraclita and mussel zones with no apparent recruitment this year. The leaf barnacle, *Pollicipes polymerus*, was abundant, as were young *Mytilus californianus*. There were several large *Pisaster ochraceus*, but no seastar count was made before the tide came in. No repairs were made though some mussel zone corner bolts were not located. The mussel bed was very dense and obscured some bolts that were eventually found. At least two corners were found for all plots except M2, which was positioned using site photographs. Area photos were taken from the reference bolts.

Note: Steve Murray, UCSC SWAT team, and CSUF students at Prisoners Harbor re-sampling BLM –OCS transects 6/27-28.

Photoplot summary- mean percent cover of core taxa by zone at Scorpion Rock, Santa Cruz Island, spring 2002 (5 plots/zone)

Zone	Bare Rock	Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussel	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle	41.6	26.6	0.4	31.0	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0
Endocladia	34.8	5.2	0.4	46.8	0.0	0.0	1.2	0.0	1.6	9.8	0.2	0.0
Mussels	12.8	3.6	2.4	0.2	0.0	0.0	78.6	0.0	1.8	0.6	0.0	0.0
Tetraclita	45.0	3.8	9.2	8.8	0.0	0.0	24.8	0.0	5.6	1.2	1.6	0.0
Hespero-phycus	11.0	0.0	0.2	13.0	64.6	7.2	0.0	0.0	0.0	4.0	0.0	0.0

Motile invertebrates per plot at Scorpion Rock, Santa Cruz Island, spring 2002.

Zone	Barnacle					Endocladia					Hesperophycus				
plot #	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815
Lepidochitona spp.		not sampled			not sampled		1						1	4	2
Nuttalina spp.						1		1						1	1
Fissurella volcano														5	
Pachygrapsus						3	1	1	1				1	2	3
Pagurus spp.															
Limpets	2		40	20		12	56	92	16	24	18	22	4	20	13
subsample1			1	0		2	1	1	1	2					

subsample2		2	0		1	1	2	2	0					
subsample3		3	2		0	7	12	0	1					
subsample4		4	3		0	5	8	1	3					
S. purpuratus														
Nucella emarginata									1					
Acanthina spp.									1		1	6		
Tegula funebris												2		
Tegula eiseni														
Ocenebra circumtexta		1						1						
Lottia gigantea														
Littorina spp.	228	760	944		424	332	428	388	780	96	81	41	17	4
subsample1	14	56	30		27	19	30	32	48	14				
subsample2	12	76	71		24	34	31	11	53	9				
subsample3	17	38	93		31	13	15	18	53	1				
subsample4	14	20	42		24	17	31	36	41	0				

Zone		Mytilus					Tetraclita					Total Count	
plot #	816	817	818	819	820	821	822	823	824	825			
Lepidochitona spp.	1					1						10	
Nuttalina spp.	1			4	1	2	2		2	4		20	
Fissurella volcano	1			2	3	1						12	
Pachygrapsus	8	12	6	14	4	3	6	6	1	1		73	
Pagurus spp.												0	
Limpets	63	88	236	328	184	224	296	144	212	224		2338	
subsample1			19	14	8	6	9	16	19	16			
subsample2			8	36	18	16	28	11	12	17			
subsample3			13	13	11	9	12	7	10	9			
subsample4			19	19	9	25	25	2	12	14			
S. purpuratus												0	
Nucella emarginata	1		1				1					4	
Acanthina spp.								1		1		10	
Tegula funebris												2	
Tegula eiseni		2										2	
Ocenebra circumtexta	8	4	11	10	5	6	4	2	1	4		57	
Lottia gigantea			7		2		1	4				14	
Littorina spp.				2	10	204	72	1	52	152		5016	
subsample1						13	2		7	0			
subsample2						6	0		6	25			
subsample3						11	9		0	2			
subsample4						21	7		0	11			

Fall 2002 Rocky Intertidal Monitoring Trip Reports

Santa Cruz Island November 1-6, 2002 (Database event #2002-G)

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
Paula Rich, bio-tech, Channel Islands National Park
Melinda Chambers, Univ. of Washington

PROCEDURE: Out to the island via Island Packers. We stayed at the UC Field station but camped at the west end of the island while working there. We conducted standard sampling protocol at all sites; photographing the plots and scoring them in the field when possible. Some plots were scored in the office from the slides later. General searches (usually for 30 minutes) were made for seastars and abalone over each site. Abalone were measured with calipers to nearest millimeter and seastars were counted by size categories. Owl limpets were counted and measured in fixed circular plots of one-meter radius. Surfgrass cover was determined along fixed point-intercept transects. The maximum number of shorebirds and pinnipeds seen at one time were recorded each day. Melinda conducted additional searches for black abalone to collect tissue samples and measurements.

RESULTS:

Prisoners Harbor, 11/1/2002. Low tide 1.0 ft at 1300 hrs. Partly cloudy, calm, low surge, water temp 16°C. We arrived at the Harbor on the IPCO boat at 1415 hrs and finally got set up on site about 1500 hrs. No birds or marine mammals were present. Paula took pictures of the plots with Melinda recording and Dan recorded the field log and instructed Paula. There was one pig on the beach foraging among the wrack near some pig bones. Pig scat was present on the rocks in the upper intertidal which supports the Murray lab's observations of pigs eating mussels at this site last spring. *Silvetia compressa* appeared to be mowed at a length of 5-8 cm making me wonder if the pigs have been grazing on the algae here. Otherwise the *Silvetia* had good color and appeared very healthy. *Hesperophycus californicus* was very robust and healthy looking. *Balanus* and *Chthamalus* were both quite dense here. There were large gaps in the mussel bed with the patches being mostly bare. Otherwise the mussels seemed fine. *Tegula funebris* was common, *T. gallina* was present. *Acanthina* and *Nucella* were both common. The tide was too high to shoot the mussel plots and B1. The rest were all photographed. No field scoring was attempted. No abalone or sea star search was made.

Photoplot summary - mean percent cover of core taxa by zone at Prisoners Harbor, Santa Cruz Island, fall 2002 (5 photoplots/zone)

Zone	Bare Rock	Barnacle	Tetra-clita	Endo-cladia	Hesperophycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other
Barnacle	48.8	23.2	0.4	6.8	0.0	0.8	0.4	0.0	18.0	1.4	0.2	0.0
Endocladia	22.4	20.8	0.0	37.8	14.2	0.0	0.6	0.0	3.2	1.0	0.0	0.0
Rockweed	5.0	0.0	0.6	0.0	0.0	44.8	3.0	0.0	44.8	1.8	0.0	0.0
Mussels	7.4	6.2	2.0	0.0	0.0	0.0	53.8	0.2	17.6	1.0	0.0	11.8
Hesperophycus	33.4	11.8	0.0	15.0	37.6	0.0	0.8	0.0	0.8	0.6	0.0	0.0

Trailer, 11/2/2002. Low tide 0.2 ft at 1345 hrs. Weather was partly cloudy, calm. low surge, water temp 15.5°C. The conditions were very workable. We drove over from the field station and

unloaded gear at the field station. We were on site about 1200 hrs. Three black oystercatchers and two western gulls were on site. We saw a black shouldered kite and a large flock of western meadowlarks on the way over this morning. Two fishing boats were in Forney's Cove that evening.

Melinda began searching for black abalone, eventually finding nine black abalone in the site area and about 20 including those down coast. She got tissue samples for genetic analysis from 10 animals. I worked with Paula on the giant owl limpet plots, then we scored the surfgrass transects. Paula then counted and measured seastars in the site while Dan photographed all the plots.

Barnacles were dense. *Silvetia compressa* was dense and very luxuriant with long fronds, very different from that at Prisoner's Harbor. Numerous young plants were seen. *Hesperophycus californicus* was a healthy green and mostly fertile. Mussels seemed about the same as usual. *Phyllospadix* spp. covered 54-65% of the transects. We used the new MARINE protocol for the transects, scoring *Phyllospadix* covered by other algae as a separate category. Using this category gives a score of over 100% but a better idea of the overall amount of surfgrass. This data can be ignored to compare with past data where only the top layer is scored. A total of 109 owl limpets were found in the plots ranging from 19-92 mm long. Large file limpets, *Lottia limatula* were common in some plots. A total of 78 *Pisaster ochraceus* and 9 *Pisaster giganteus* were found. Most were small (<75 mm) or medium (75-150 mm). With this sample we are beginning to use new size breaks used by MARINE.

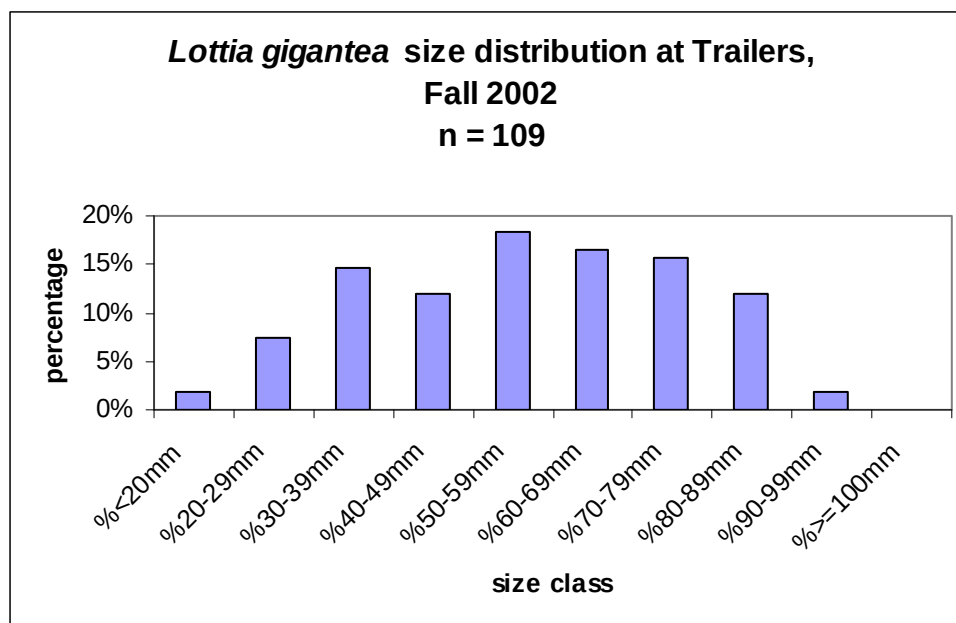
Chondracanthus leptorynchus was present. *Leptasterias hexactis* was common.

Photoplot summary - mean percent cover of core taxa by zone at Trailer, Santa Cruz Island, fall 2002 (5 photoplots/zone)

Zone	Bare Rock	Barnacle	Tetraclita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle	44.2	52.2	0.0	2.4	0.0	0.0	0.0	0.0	0.0	1.2	0.0
Rockweed	8.2	0.2	0.0	0.6	0.0	88.2	0.0	0.0	2.8	0.0	0.0
Mussels	14.0	1.8	0.8	0.2	0.0	0.0	69.2	0.4	13.4	0.2	0.0
Hespero-phycus	50.4	2.8	0.0	13.4	11.6	20.8	0.0	0.0	0.6	0.4	0.0

Owl Limpet *Lottia gigantea* plot summary at Trailers, Santa Cruz Island, fall 2002

Plot	Area	Density	Count	Sized	MeanSize	StDev	MinSize	MaxSize
1	3.14	8.596	27		70.74	17.32	27	92
2	3.14	7.004	22		64.05	19.89	25	91
3	3.14	6.049	19		48.63	16.38	25	74
4	3.14	7.959	25		52.64	11.20	29	75
5	3.14	5.094	16		40.88	14.28	19	68



Seastar abundance at Trailers, Santa Cruz Island, fall 2002

<i>Pisaster ochraceus</i> radius (mm)	total
Small (<75)	37
Medium (75-150)	38
Large (>150)	3
Total	78

Additional species:	total
<i>Pisaster giganteus</i>	9

Abalone size distribution for Trailers, Santa Cruz Island, fall 2002

Count	Sized	Mean Size	StDev	Min Size	Max Size	%<45mm	%45-126mm	%127-145mm	%>145mm
9		110.22	25.24	68	147	-	77.78%	11.11%	11.11%

Surfgrass transects at Trailers, Santa Cruz Island, fall 2002

(additional taxa with no values deleted from table)

Location: Trailer **Site Code:** SCTR

Recorder: Dan Richards **Date:** 2-Nov-02

<u>Surf Grass Taxa</u>	<u>Transect 1</u>	<u>Transect 2</u>	<u>Transect 3</u>
Rock			3
Ulva		1	
Egregia menziesii	24		22
Erect coralline		1	4
Encrusting coralline			1
Chondracanthus canaliculatus	5	17	9
Chondracanthus spinosus	4	2	1
Prionitis spp.	1		1
Mazzaella affinis	2	6	1
Gastroclonium sp.			2
Phyllospadix sp. overstory	54	65	54
Phyllospadix sp. understory	22	4	5
Mytilus californianus	6	2	
Phragmatopoma californica	4	4	2
Chthamalus/Balanus		1	
Tetraclita rubescens		1	
total	122	104	105

Fraser/Forney's Cove, 11/3/2002. Low tide -0.4 at 1430 hrs. light swell and wind, water temp 14.7°C. On site from 1100-1745 hrs. Very good conditions. The Island Tak and Sea Jay were fishing just outside the kelp bed this morning. The kelp bed along this coast inside Forney's is very extensive this year. Squid boats off SE Santa Rosa Island tonight.

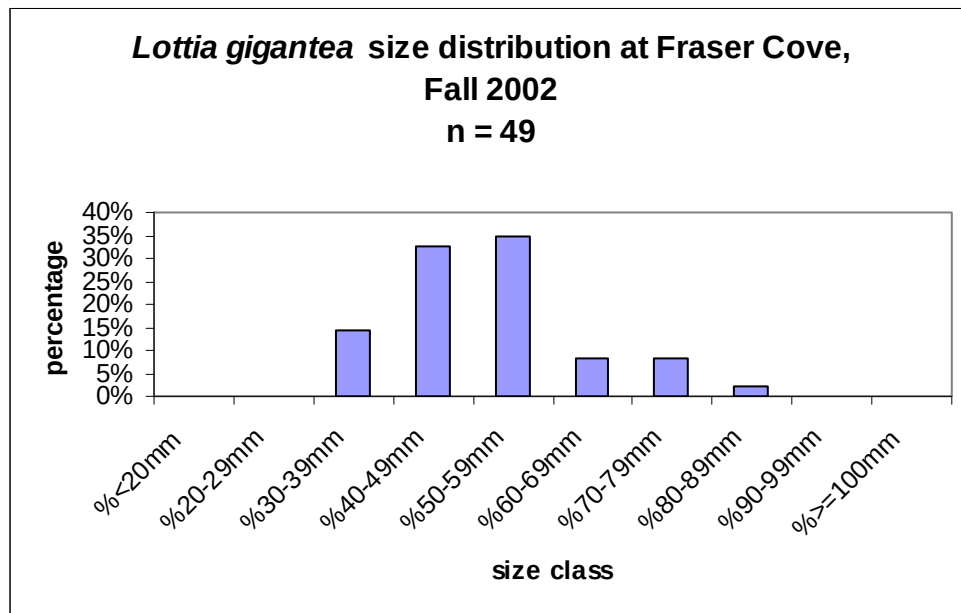
Melinda went to the west end of Fraser and found about 47 black abalone and was able to sample 31 for genetics. Paula and I worked together to photograph all 35 plots, count and measure giant owl limpets, score surfgrass transects, and score 25 photoplots. Barnacle and tar zone plots were not scored because of darkness. A 30-minute search turned up 17 small and 44 medium *Pisaster ochraceus*. One black abalone was found within the site. Surfgrass transects had 58-84% *Phyllospadix (torreyi)* cover. *Melobesia* was an abundant epiphyte on the grass. Some bleaching was apparent but most of it looked healthy. The total number of owl limpets within plots was only 49. We may have to go back to 1.5-m radius plots here. The size range was 30-82 mm with most under 60mm.

Photoplot summary - mean percent cover of core taxa by zone at Fraser Cove, fall 2002 (5 photoplots/zone)

Zone	Bare Rock	Barnacle	Tetra-clita	Endo-cladia	Hesperophycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle	15.8	56.0	0.0	9.0	0.0	0.0	1.0	0.0	16.6	0.0	1.6
Endocladia	19.6	13.0	0.0	47.4	1.8	0.0	1.2	0.0	16.2	0.2	0.6
Rockweed	11.6	2.2	0.0	3.4	7.4	71.4	0.0	0.0	3.6	0.4	0.0
Mussels	8.4	1.4	0.0	0.0	0.0	0.0	68.0	2.8	3.6	15.8	0.0
Pollicipes	9.8	9.2	2.2	1.6	0.0	0.0	40.6	13.8	11.6	11.2	0.0
Tar	13.2	15.2	0.0	0.0	0.0	0.0	0.0	0.0	8.8	0.0	62.8
Hesperophycus	45.4	12.8	0.0	10.8	22.6	6.4	0.0	0.0	2.0	0.0	0.0

Owl Limpet *Lottia gigantea* plot summary at Fraser Cove, Santa Cruz Island, fall 2002

Plot	Area	Density	Count	Size	MeanSize	StDev	MinSize	MaxSize
1	3.14	3.820	12		55.42	14.69	30	82
2	3.14	1.910	6		61.00	17.09	36	78
3	3.14	2.547	8		46.50	6.50	37	56
4	3.14	3.820	12		42.08	4.91	36	52
5	3.14	3.502	11		54.36	3.67	50	61



Seastar abundance at Fraser Cove, Santa Cruz Island, fall 2002

<i>Pisaster ochraceus</i> radius (mm)	total
Small (<75)	17
Medium (75-150)	44
Large (>150)	0
Total	61

Surfgrass transects at Fraser Cove, Santa Cruz Island, fall 2002

(additional taxa with no values deleted from table)

Location: Fraser Cove **Site Code:** SCFC

Date: 3-Nov-02

Recorder: Dan Richards

<u>Surf Grass Taxa</u>	<u>Transect 1</u>	<u>Transect 2</u>	<u>Transect 3</u>
Rock	1	2	1
Sand	3		
Ulva	1	1	
Egregia menziesii	1	8	1
Erect coralline	7	1	3
Encrusting coralline			1
Chondracanthus canaliculatus	11	12	5
Chondracanthus spinosus		1	
Porphyra perforata			3
other red algae	4	5	
Phyllospadix sp. overstory	58	62	84
Phyllospadix sp. understory	1	6	1
Mytilus californianus	3	1	
Anthopleura spp.	5	3	1
Phragmatopoma californica	5	4	1
Chthamalus/Balanus	1		
total	101	106	101

Willows Anchorage, 11/4/2002. Low tide –0.8 at 1516 hrs, no wind, light swell clear sky, water temp 17°C. There were many mussel shells on the beach with several lobster molts.

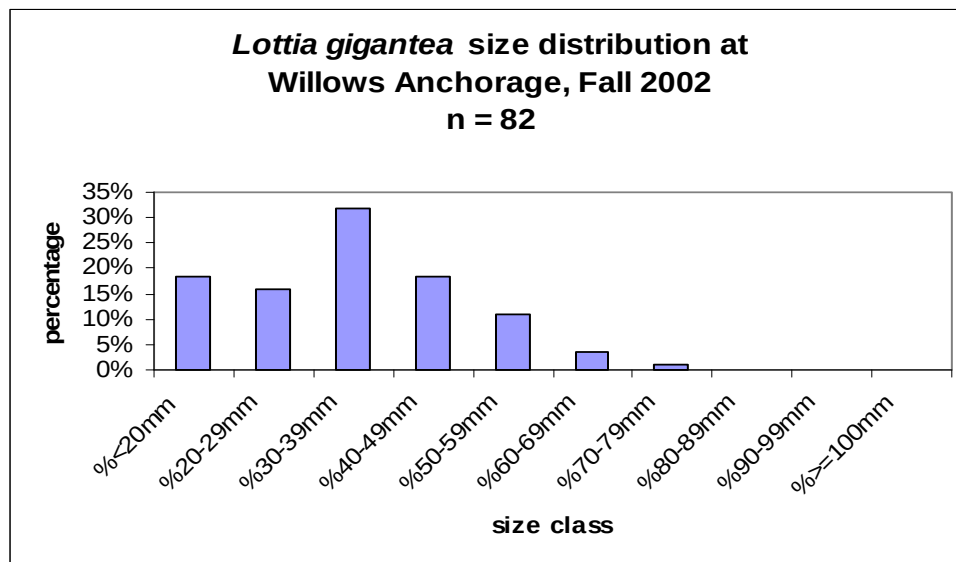
We were able to complete all the monitoring. Melinda found five black abalone within the site area and one to the west. She collected tissue samples from five. Abalone sizes ranged from 56-79 mm. Seastars were very abundant with over 200 at the site mostly in the small and medium size categories. A total of 82 owl limpets were measured in the plots with sizes ranging from 15-74 mm. Most were under 50 mm. All plots were photographed and field scored. Endocladia was dark and lush, the best I have seen it looking in years. The rockweed plots that were bare a couple of years ago now have thick Endocladia and a few young *Silvetia* plants. Most of the mussel beds looked good but the first reef where the BLM transects cross had few mussels.

Photoplot summary - mean percent cover of core taxa by zone at Willows Anchorage, fall 2002 (5 photoplots/zone)

<i>Zone</i>	<i>Bare Rock</i>	<i>Barnacle</i>	<i>Tetraclita</i>	<i>Endo-cladia</i>	<i>Hesperophycus</i>	<i>Silvetia</i>	<i>Mussels</i>	<i>Leaf Barnacle</i>	<i>Misc Algae</i>	<i>Misc Animal</i>	<i>Tar</i>
Endocladia	21.4	0.0	1.0	72.8	0.0	0.0	0.0	0.0	4.0	0.8	0.0
Rockweed	17.2	0.0	0.0	22.4	0.0	39.0	0.0	0.0	20.6	0.8	0.0
Mussels	7.8	0.0	5.2	0.0	0.0	0.0	59.2	7.8	15.0	5.0	0.0
Hesperophycus	50.6	3.4	0.0	5.8	3.0	24.4	0.2	0.0	11.6	1.0	0.0

Owl Limpet *Lottia gigantea* plot summary at Willows Anchorage, Santa Cruz Island, fall 2002

Plot	Area	Density	Count	Size	Mean Size	StDev	Min Size	Max Size
1	3.14	5.731	18		33.61	13.97	17	62
2	3.14	4.776	15		29.53	9.90	16	52
3	3.14	8.596	27		31.85	12.83	15	58
4	3.14	5.731	18		42.00	11.89	17	61
5	3.14	1.273	4		45.00	22.14	21	74



Seastar abundance at Willows Anchorage, Santa Cruz Island, fall 2002

<i>Pisaster ochraceus</i> radius (mm)	total
Small (<75)	113
Medium (75-150)	121
Large (>150)	76
Total	310

Abalone size distribution for Willows Anchorage, Santa Cruz Island, fall 2002

Count	Size	Mean Size	StDev	Min Size	Max Size	%<45mm	%45-126mm	%127-145mm	%>145mm
5		75.40	12.84	56	92	-	100.00%	-	-

Prisoner's Harbor, 11/5/2002. Low tide -1.0 at 1630 hrs, no wind light swell overcast sky.

We finished the photos for the site with the mussel plots and the barnacle plot (826) that was covered by the rising tide on the November 1. This barnacle plot has been covered by cobble typically in the last several years, but was exposed with *Endarachne* and other algae and a few barnacles. All 25 plots were scored in the field. New epoxy corners were placed at 826. No abalone, 49 *Pisaster ochraceus*, and two *P. giganteus* were found. Melinda went out to Christy

Ranch with Brian Gurerro and found 15 *Haliotis cracherodii* around Black Point collecting 10 more tissue samples. The PISCO group was out collecting the larval sampling devices.

Seastar abundance at Prisoner's Harbor, Santa Cruz Island, fall 2002

<i>Pisaster ochraceus radius (mm)</i>	<i>total</i>
Small (<75)	1
Medium (75-150)	45
Large (>150)	3
Total	49
<i>Additional species:</i>	<i>total</i>
<i>Pisaster giganteus</i>	2

Santa Barbara Island November 19-22, 2002 (Database event #2002-H)

PERSONNEL:

Dan Richards, Marine Biologist, Channel Islands National Park

Paula Rich, bio-tech, Channel Islands National Park

Jill Komoto, bio-tech, Channel Islands National Park

PROCEDURE and general observations: We traveled to the island on the Sea Ranger II observing three blue sharks, as well as auklets, phalaropes, loons, and northern fulmar on the way. Near the island we observed two whales, possibly sei whales. We arrived at 1200 hrs on the island. We conducted standard sampling protocol at both sites photographing the plots and scoring them in the field. Motile invertebrates were counted in the photoplots. Five 10x10 cm subplots were used for small limpets and littorine snails when abundant. Limpets were placed in size categories and larger snails were measured for size distribution. General searches were made for seastars and abalone over the sites. Abalone were measured and seastars were placed in size categories.

RESULTS:

Landing Cove, 11/19/2002. Low tide -0.1 ft at 1516 hrs. Light wind and swell, excellent conditions. There were no shorebirds present, about 40 young sealions were laying around on the rocks. We were on site from 1400-1730 hrs. There was evidence of heavy swells recently, probably with the storm at the beginning of the month. No one has been on the island for a while. Deck planks were missing from the lower landing, the sealion fence was damaged, and the boathouse door was damaged.

In the north area photoplots, Motile invertebrates were counted and plots were field scored. Only a few plots on the south-side were counted before it got too dark. The site was completed on Nov. 21. Very few invertebrates were present in the red algal turf plots. *Chondracanthus canaliculatus* was generally the most abundant algae in the red algal turf plots followed by *Gelidium/Pterocladia* and erect coralline algae. *Phyllospadix* sp. was abundant in two of the plots and *Egregia* in one. Only one corner of plot 320 was found, though the cover in the surrounding area had little variation and plot placement would have little difference. Rockweed was missing in all the *Silvetia* plots which were mostly bare rock with a mixture of various algae and barnacles. *Balanus/Chthamalus* were common in the *Silvetia* plots. *Endarachne/Petalonia* was dominant in three of the barnacle plots. *Mytilus californianus* were abundant in all mussel plots except 327 where various algae dominated most of the space following the plot being mostly bare rock in 2001.

Photoplot summary – mean percent cover by zone at Landing Cove, Santa Barbara Island, fall 2002 (5 plots/zone)

Zone	Bare Rock	Barnacle	Tetracita	Endocladia	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Phyllospadix
Barnacle	42.0	4.2	12.4	2.8	0.0	7.0	0.0	31.6	0.0	0.0
Rockweed	51.8	22.0	1.4	0.4	0.0	2.8	0.0	19.6	2.0	0.0
Mussels	6.0	0.0	3.4	0.2	0.0	64.2	2.0	20.8	3.4	0.0
Red Algal Turf	3.0	0.0	0.0	0.0	0.0	0.2	0.0	70.2	1.0	25.6

Sea Lion Rookery, 11/20/2002. Low tide –0.2 ft at 1540 hrs. moderate surge and light wind. Very good working conditions. We were experiencing Santa Ana conditions with it being very hot on the island (high of 98° F). We were on site from 1200-1730 hrs. Five black turnstones and about 150 California sea lions were observed at the site. We were able to complete all the motile invertebrate counts and all but two plots were scored. Plot markers were repaired and a general search of the area was made for abalone and seastars.

Most of the higher plots were dominated by short *Ulva* sp. and had very few motile invertebrates in the plots. *Egorgia menziesii* was common throughout the mussel plot area and not much recovery to the mussel population has occurred with in the areas cleared last year. *Silvetia compressa* was growing again in the rockweed plots except in plot 330 which is a little lower and is now dominated by *Tetracita rubescens* and *Mytilus californianus*. No abalone were found in the plots or in a general search of the reef. *Littorina* spp were subsampled in mussel plots using four 10x10cm plots, extrapolated numbers are presented in the motile invertebrate count table below without the subsamples.

Photoplot summary – mean percent cover by zone at SE Sea Lion Rookery, Santa Barbara Island, fall 2002 (5 plots/zone)

Zone	Bare Rock	Barnacle	Tetracita	Endocladia	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal
Barnacle	37.2	11.0	2.0	1.0	0.0	0.4	0.4	48.0	0.0
Endocladia	28.2	0.4	10.2	7.2	0.0	2.2	2.2	49.6	0.0
Rockweed	18.6	0.0	3.4	1.6	24.0	14.6	0.4	34.0	3.4
Mussels	3.8	0.0	0.2	0.0	0.0	24.0	1.2	68.8	2.0

Seastar abundance at SE Sea Lion Rookery, Santa Barbara, Island, fall 2002 (30 minute search)

<i>Pisaster ochraceus</i> radius (mm)	total
Small (<75)	3
Medium (75-150)	26
Large (>150)	14
Total	43

Motile invertebrate counts and size frequencies at Sea Lion Rookery, Santa Barbara Island, fall 2002 (*Littorina* spp subsampled in mussel plots)

Sizes in mm	<i>Nucella</i> <i>emarginata</i>	<i>Acanthina</i> <i>spp.</i>	<i>Tegula</i> <i>funnebralis</i>	<i>Ocenebra</i> <i>circumtexta</i>	<i>Lottia</i> <i>gigantea</i>	<i>Ceratostoma</i> <i>nuttali</i>	<i>Tegula</i> <i>gallina</i>
count				32	16	3	
mean size				12	27.25	20	
min size				8	13	18	
max size				18	37	24	

zone	<i>Endocladia</i>					<i>Silvetia</i>					<i>Barnacle</i>				
plot #	335	336	337	338	339	330	331	332	333	334	345	346	347	348	349
Lepidochitona spp.						1	2	1	2	5					
Nuttalina spp.			4			4	2	3	2	2					
Fissurella volcano															
Pachygrapsus						5									
Pagurus spp.						3		6	20						
large limpets(>15mm)	1	2	2			8	15	7	5	11					2
<i>S. purpuratus</i>															
<i>Amphissa versicolor</i>															
<i>Nucella emarginata</i>															
<i>Acanthina</i> spp.															
<i>Tegula funnebralis</i>															
<i>Ceratostoma nuttali</i>															
<i>Ocenebra circumtexta</i>		2				5	2	1	2	9		1		1	1
<i>Lottia gigantea</i>			1			7	3	1	0	0	1				
<i>Littorina</i> spp.	0	1	4	4	2	1	0	0	0	0	270	262	233	23	368
Limpet < 5 mm	0	0	5	0	0	0	0	0	0	0					
Limpet 5-15 mm	7	2	28	4	2	52	44	10	21	22					2
Zone	Mytilus					Total Count									
plot #	350	351	352	353	354										
Lepidochitona spp.				1		12									
Nuttalina spp.		1		1	1	20									
Fissurella volcano	2	1	6	18	7	34									
Pachygrapsus	2	3	1	2	1	14									
Pagurus spp.						29									
large limpets(>15mm)	2		1	3	1	60									
<i>S. purpuratus</i>		6	3	3	6	18									
<i>Amphissa versicolor</i>	1					1									
<i>Nucella emarginata</i>						0									
<i>Acanthina</i> spp.						0									
<i>Tegula funnebralis</i>						0									
<i>Ceratostoma nuttali</i>	1	1		2		4									
<i>Ocenebra circumtexta</i>	5	1	0	1	1	32									
<i>Lottia gigantea</i>	1		1	1	1	17									
<i>Littorina</i> spp.						1168									
Limpet < 5 mm		6	4	4		19									
Limpet 5-15 mm	44	54	42	39	48	421									

Landing Cove, 11/21/2002. Low tide -0.2 at 1617 hrs. Excellent conditions again. We were on site from 1300-1630 hrs. Two black oystercatchers, 2 black turnstones, and two wandering tattlers were recorded on site. We completed the motile invertebrate counts and plot scoring. The photoplots were re-photographed since the original pictures were shot at the wrong f-stop. Seastars were counted in the transect and on the entire south site reef. A total of 45 *Pisaster ochraceus* were found in the 2x 18 m transect between plots 327 and 329. One black abalone (70 mm) was found among the mussels beyond plot 326. The temperature logger was removed since it did not download (probably a dead battery).

Seastar abundance at Landing Cove, Santa Barbara Island, fall 2002 (30 minute search – south reef)

<i>Pisaster ochraceus</i> radius (mm)	total
Small (<75)	100
Medium (75-150)	151
Large (>150)	3
Total	154

Motile invertebrate counts and size frequencies at Landing Cove, Santa Barbara Island, fall 2002

Sizes in mm	<i>Nucella emarginata</i>	<i>Acanthina</i> spp.	<i>Tegula funebris</i>	<i>Ocenebra circumtexta</i>	<i>Lottia gigantea</i>	<i>Ceratostoma nuttali</i>	<i>Tegula gallina</i>
count			1	76	7	4	1
mean size			11	11	14	10.75	9
min size			11	3	10	8	9
max size			11	15	16	17	9

zone	Red algal turf					Silvetia					Barnacle				
plot #	320	321	322	323	324	310	311	312	313	314	315	316	317	318	319
Lepidochitona spp.							1	1	2	1			2	2	
Nuttalina spp.								1						16	4
Fissurella volcano				1											
Pachygrapsus			1			1		1		2					
Pagurus spp.															
large limpets(>15mm)	1	2				2	2	8	1	2	1				
S. purpuratus															
Amphissa versicolor															
Nucella emarginata															
Acanthina spp.															
Tegula funebris								1							
Tegula gallina										1					
Ceratostoma nuttali															
Ocenebra circumtexta						9	7	7	4	6	1		5	10	1
Lottia gigantea						1		1	1	1				2	
Littorina spp.						13	19	11	8	17	55	45	3	32	26
Limpet < 5 mm						2		1	5	5			6	10	1
Limpet 5-15 mm		16			1	107	110	140	179	158	25	19	36	136	42
Pisaster ochraceus															

Zone	Mytilus	Total Count
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<u>plot #</u>	<u>325</u>	<u>326</u>	<u>327</u>	<u>328</u>	<u>329</u>	
Lepidochitona spp.	1					10
Nuttalina spp.	2	1		7	7	38
Fissurella volcano			3	4		8
Pachygrapsus						5
Pagurus spp.						0
large limpets(>15mm)						19
S. purpuratus		11		2	1	14
Amphissa versicolor						0
Nucella emarginata						0
Acanthina spp.						0
Tegula funebris						1
Tegula gallina						1
Ceratostoma nuttali		2	1	1		4
Ocenebra circumtexta	12	2	1	6	5	76
Lottia gigantea	3					9
Littorina spp.				2		231
Limpet < 5 mm			5	6	4	45
Limpet 5-15 mm	218	20	25	109	120	1461
Pisaster ochraceus		2				2

Santa Rosa Island December 1-6, 2002 (Database event #2002-I)

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
Paula Rich, bio-tech, Channel Islands National Park
Melinda Chambers, Univ. of Washington

PROCEDURE: Flew out on Channel Islands Aviation Sunday morning. Conducted field work as per the hand book , photographing photoplots at all sites, measuring all owl limpets inside one-meter radius plots (four sites), and conducting point contact fixed transects in surfgrass. All photoplots were scored in the field. Pinnipeds and Shorebirds were counted at each site. Repairs were made to fixed plot markers as needed in most cases. A general field log was completed for each site. Melinda collected tissue samples for genetic analysis at Fossil Reef. The intertidal crew from UCSC (the SWAT team) was here Dec 1-4 re-sampling the comprehensive survey transects at Johnson's Lee.

RESULTS:

Johnson's Lee, 12/1/2002. Low tide -0.3 ft at 1339 hrs. Partly cloudy, calm, moderate surge, water temp 16.5 °C. We flew out this morning along with the PISCO SWAT team here to resample the comprehensive surveys at Johnson's Lee. After moving our gear into the housing, we headed over to Johnson's Lee. The roads were a little wet from Friday's 0.55 in of rain, but we had no problems. We worked the site from 1230-1730 hrs.

The only animals at the site were one cormorant and two black turnstones. The SWAT team had no problems setting up their transects and were able to complete the majority of the work today. Melinda searched for black abalone and only found one at the east end of the site. She searched beyond both ends of the site. That abalone was about 120 mm but was too hard to reach for a tissue sample.

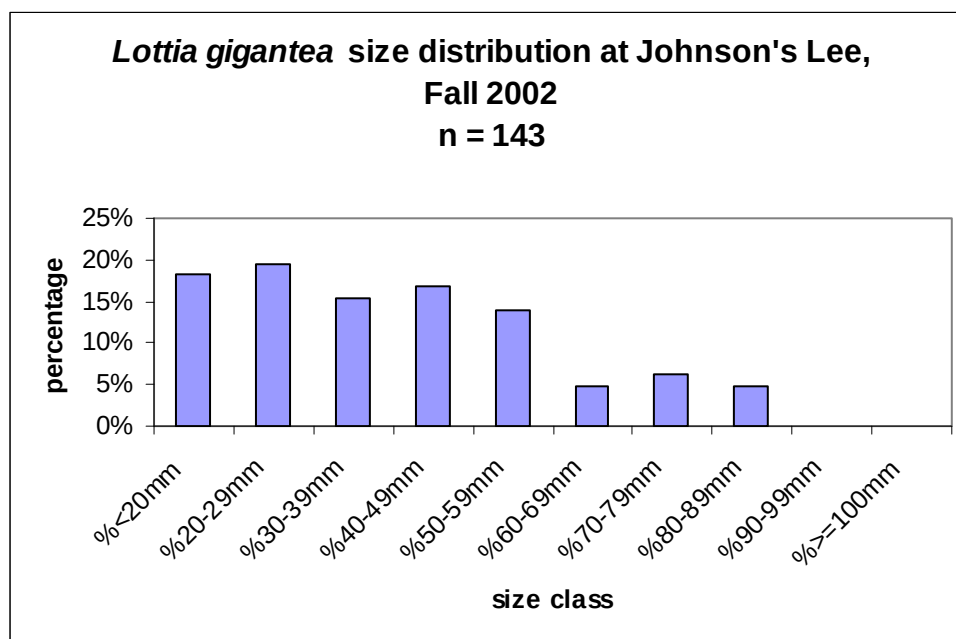
Paula measured all the giant owl limpets while I photographed and scored the photo plots. Plots were also photographed digitally. The photopod legs got mixed up with the alternate scoring frame so the camera had to be handheld over the plot frame. Several plot corners were missing but the plots were all easily found. Repairs were made to the missing corners. I noticed how the silicon-bronze bolts, even the owl limpet plot bolts, are getting very thin and should be replaced in the next year or so. Seastars were counted on the 10x2 m transect (31 small, 32 medium *Pisaster ochraceus*) and in the three areas of the site. Giant owl limpet numbers seemed pretty good with many in the smaller size classes.

Photoplot summary - mean percent cover of core taxa by zone at Johnson's Lee, Santa Rosa Island, fall 2002 (5 plots/zone)

Zone	Bare Rock	Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle	52.4	38.0	0.0	4.4	0.0	0.0	0.0	0.0	2.6	2.6	0.0
Endocladia	46.8	6.0	0.4	34.6	0.0	0.0	9.2	1.0	1.6	0.4	0.0
Mussels	10.4	0.0	0.8	0.0	0.0	0.0	11.0	0.8	32.0	45.0	0.0

Owl Limpet *Lottia gigantea* plot summary at Johnson's Lee, Santa Rosa Island, fall 2002

Plot	Area	Density	Count	Size	MeanSize	StDev	MinSize	MaxSize
595	3.14	3.820	12	27.83	14.38	15	54	
596	3.14	10.188	32	45.41	25.97	15	86	
597	3.14	3.820	12	32.17	15.44	15	58	
598	3.14	13.372	42	40.00	18.87	15	88	
599	3.14	14.327	45	40.60	16.48	16	72	



Sea stars (*Pisaster ochraceus*) at Johnson's Lee, Santa Rosa Island, fall 2002

Radius (mm)	Area 1	Area 2	Area 3
Small (<75)	44	29	12
Medium (75-150)	101	28	115
Large (>150)			11

The site generally looked good. Mussels were abundant and both *Chthamalus* spp. and *Balanus glandula* were large and abundant. *Endocladia muricata* was common though the band was fairly narrow. *Phragmatopoma californica* was abundant on the lower shelf and was quite thick in places, probably a result of relative calm. *Phragmatopoma* covered plot 510 completely except for a few anemones and one mussel. *Tegula* spp were not common but there were some including some juveniles. Both *Nucella emarginata* and *Acanthina* sp. were present along with *Littorina* spp. *Pachygrapsus* were uncommon or missing.

Northwest Talcott, 12/2/2002. Low tide -0.9 ft at 1436 hrs, moderate wind and swell, partly cloudy, but excellent working conditions. We were onsite from 1130-1630 hrs. It took nearly 3 hours to get on site and we were pushing the tide out. There is more kelp on the north side, between Brockway Point to offshore of Jaw Gulch than there has been in many years. At least six commercial boats were fishing the kelp bed. There were three black oystercatchers at the site,

numerous cormorants on the tip of the access point to the east. Two boaters were surfing the break when we arrived.

The site looked very good with extremely lush growth of *Silvetia compressa*. *Silvetia* was having a good recruitment this year with many young plants scattered through the barnacle zone including a heavy invasion into plot 534. There was good cover of acorn barnacles and *Mytilus*. *Endocladia muricata* looked dark and healthy but the cover was not very high and the two plots 558 and 559 have not had much *Endocladia* for years. All the photo plots were photographed both on film and digitally. All plots were scored in the field. Giant owl limpet plots were counted with sizes ranging from 15-103 mm. The densities seem normal. Surfgrass transects were scored with high cover on all plots. *Phyllospadix torreyi* was thick over the reef flat and was mostly in good shape with a little bleaching and *Melobesia* epiphytes being common. Melinda searched for abalone extensively within the whole area and found three total taking samples from two. One abalone was slightly shrunken and had a pycnogonid on the side of the mantle making a small lesion. Melinda collected the sea spider. No *Pisaster* sp. were found but she noted several *Patiria miniata* though did not count them.

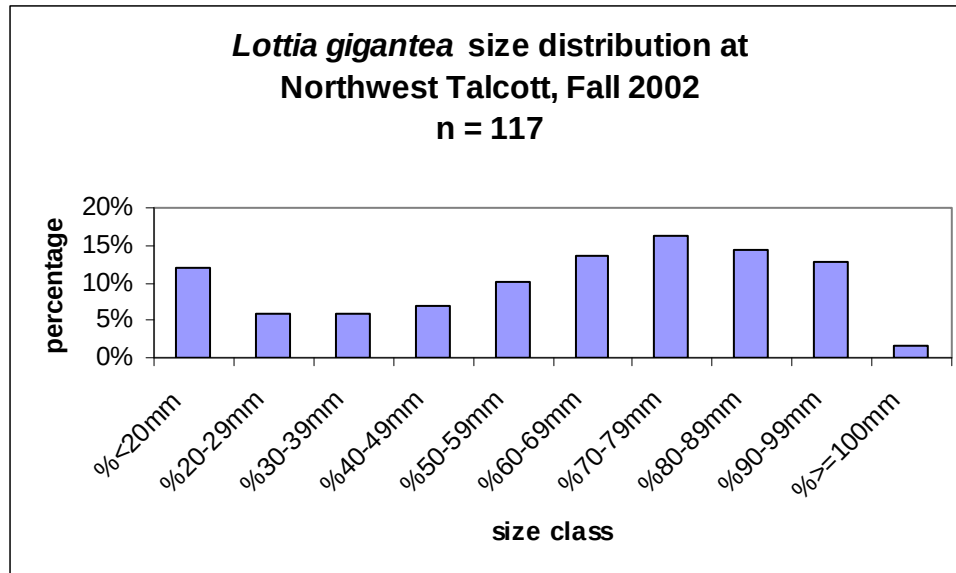
I noticed several extremely large *Nucella* snails, particularly in the vicinity of plot 550. Some shells were approximately 3 cm or so, about twice the usual size of *N. emarginata*. Later we felt that maybe we should have collected some specimens, to check against a large Mexican species that has been collected from Catalina Island last spring. After later discussion with Jack Engle, we feel it is probably just an unusually large specimen of *N. emarginata*.

Photoplot summary - mean percent cover of core taxa by zone at Northwest Talcott, Santa Rosa Island, fall 2002 (5 plots/zone)

Zone	Bare Rock	Barnacle	Tetraclita	Endocladia	Hespero-phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle	44.2	37.2	0.0	0.6	0.0	16.0	0.0	0.2	0.6	0.8	0.4
Endocladia	50.6	8.4	0.2	10.6	0.0	17.2	0.6	0.0	10.8	1.6	0.0
Rockweed	26.6	0.2	0.0	3.2	0.0	67.2	0.0	0.0	2.4	0.2	0.2
Mussels	24.6	0.4	1.4	0.0	0.0	0.0	55.4	7.8	7.0	3.4	0.0

Owl Limpet *Lottia gigantea* plot summary at Northwest Talcott, Santa Rosa Island, fall 2002

Plot	Area	Density	Count	Size	MeanSize	StDev	MinSize	MaxSize
701	3.14	9.869	31		67.19	31.29	16	100
702	3.14	7.641	24		66.38	24.93	16	98
703	3.14	8.914	28		55.50	24.18	15	103
704	3.14	6.686	21		54.52	23.70	17	89
705	3.14	4.139	13		62.31	16.78	15	77



Surfgrass transects at Northwest Talcott, Santa Cruz Island, fall 2002
(additional taxa with no values deleted from table)

Location: Northwest Talcott **Site Code:** SRNWT

Date: 2-Dec-02

Recorders: Dan Richards

<u>Surf Grass Taxa</u>	<u>Transect 1</u>	<u>Transect 2</u>	<u>Transect 3</u>
Rock			7
Sand			3
Ulva			7
Egria menziesii			1
Erect coralline		1	3
Chondracanthus canaliculatus			5
Chondracanthus spinosus			1
other red algae			8
Phyllospadix sp. overstory	100	99	65
Phyllospadix sp. understory			1
total	100	100	101

Fossil Reef, 12/3/2002. Low tide –1.3 ft at 1522 hrs, light wind and swell, mostly sunny, excellent conditions. Water temperature 15.5 °C. We were onsite from 1130-1600 hrs. Shorebirds present included two black turnstones and 19 black oystercatchers. Approximately 10 western gulls and 10 Heermann's gulls were roosting along with at least 40 cormorants (mostly Brandt's). Two elephant seals were in the water in the site area. Over 200 elephant seals and over 32 harbor seals were present on the long beach to the west of the site.

All photoplots were scored in the field and photographed both on film and digitally. The Swat team finished at Johnson's Lee yesterday so helped out today with measuring giant owl limpets and seastar transects they also helped Melinda with collecting abalone samples. Melinda was able to get 76 tissue samples from black abalone, mostly just west of the site. She found 15 in the

site area. The overall abalone size range was from 68 to well over 150 mm. Two abalone were slightly shrunken and discolored. A number of black abalone were found in the cave surrounded by *Phragmatopoma californica*. No abalone were found within the abalone plots.

Chthamalus were abundant and were numerous in Endocladia and Silvetia zone plots as well since both of those algae were relatively uncommon. The Silvetia present tended to be large old plants though there was some indication of recent recruitment. *Pisaster ochraceus* were present high on the reef having a noticeable effect on the mussels. Elsewhere the mussels were doing fine. *Phragmatopoma* was abundant and dominated much of the lower mussel bed that had been impacted by the seastars. *Sargassum muticum* was common on the west side of the site. *Phyllospadix* sp. was doing well with minimal bleaching compared to last spring.

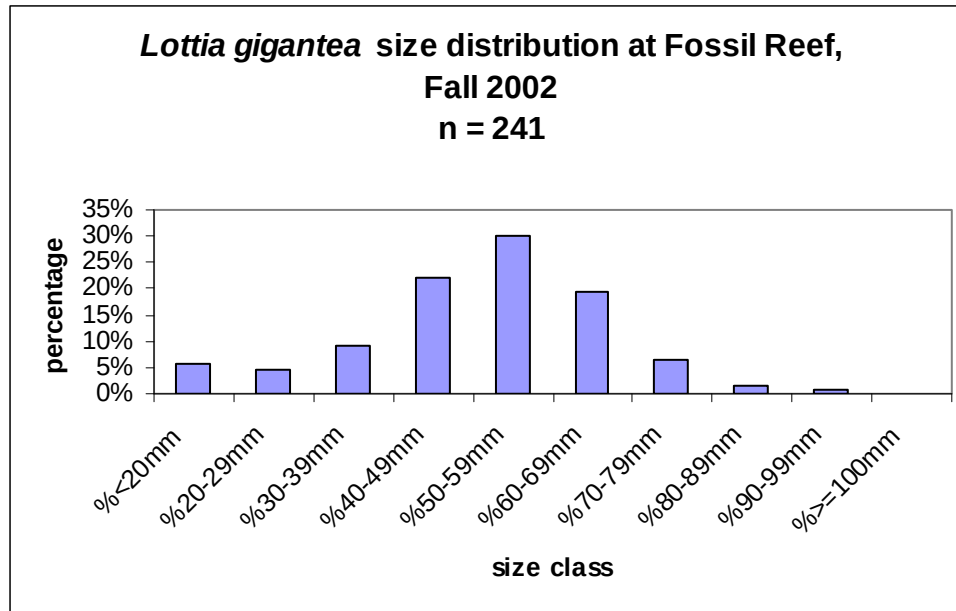
Lottia gigantea were very abundant with over 200 measured within the plots. Sizes ranged from 11-93 mm (note: only those over 15 mm are entered into the database for consistency of identification). Black cyano-bacteria seemed especially common this event. *Lottia limatula* were noted as being common and large in the high pools next to the access area. *Ligia occidentalis* were common, as they have been at the other sites.

Photoplot summary - mean percent cover of core taxa by zone at Fossil Reef, Santa Rosa Island, fall 2002 (5 plots/zone)

Zone	Bare Rock	Barnacle	Tetracrita	Endocladia	Hesperophycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle	65.2	33.2	0.0	0.4	0.0	0.0	0.0	0.0	0.2	0.0	1.0
Endocladia	53.0	19.0	0.0	12.4	0.0	13.6	0.4	0.0	0.6	0.8	0.2
Rockweed	72.0	5.2	0.0	8.0	0.0	9.4	0.0	0.0	4.8	0.6	0.0
Mussels	21.2	0.0	5.2	0.0	0.0	0.0	32.8	1.2	12.0	27.6	0.0

Owl Limpet *Lottia gigantea* plot summary at Fossil Reef, Santa Rosa Island, fall 2002

Plot	Area	Density	Count	Size	MeanSize	StDev	MinSize	MaxSize
1	3.14	4.139	13		48.15	8.78	35	63
2	3.14	6.367	20		48.50	9.19	31	69
3	3.14	11.143	35		69.06	12.57	38	93
4	3.14	24.833	78		51.67	11.83	16	71
5	3.14	30.245	95		43.98	15.78	15	70



Abalone Density within plots at Fossil Reef, Santa Rosa Island, fall 2002

Count	Density	Area	Density
0			.000

Abalone size distribution for Fossil Reef, Santa Rosa Island, fall 2002

Count	Sized	Mean Size	StDev	Min Size	Max Size	% <45mm	% 45-126mm	% 127-145mm	% >145mm
15		125.33	21.85	82	152	-	53.33%	20.00%	15

East Point, 12/4/2002. Low tide –1.4 ft at 1608 hrs. Excellent conditions. We were on site from 1300 to 1630 hrs. There were about 40 cormorants and 60 gulls at the point when we arrived. Three black oystercatchers were also in the area. At abalone rocks there were 70-100 harbor seals hauling out even before low tide. Many gulls were also in the area and numerous pelicans and an estimated 1000 cormorants were feeding just offshore. There were nine squid boats in Beecher's Bay all day and more tonight. There were three or four more squid boats around East Point. The SWAT team flew over to San Miguel Island this morning to work at Cuyler Harbor.

The site looked good with dark lush *Endocladia* being common and both *Silvetia* and *Hesperophycus* growing very well. *Hesperophycus* was dominant in most of the *Endocladia* zone plots and had very high cover in the *Hesperophycus* zone plots. *Hesperophycus* cover was also high in two of the barnacle zone plots. *Mytilus californianus* cover was high in all plots. I noticed that both *Pollicipes* and *Phragmatopoma* were essentially absent from the mussel zone plots and *Mytilus* alone dominates a large part of the reef with *Balanus*, *Endocladia* and *Gelidium* growing on the shells.

There was no problem finding the bolts for the surfgrass transects even though the cover was a dense 100% over most of the transects. *Smithora* was common on about half of the plants but

there was relatively little bleaching of the surfgrass. Melinda was unable to find any abalone. A count of the seastars on the site gave numbers of 32 small (<75mm), 56 medium, and 36 large (>150 mm) *Pisaster ochraceus*. There was one *P. giganteus* and one *Patiria miniata*.

Photoplot summary - mean percent cover of core taxa by zone at East Point, Santa Rosa Island, fall 2002 (5 plots/zone)

Zone	Bare Rock	Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal
Barnacle	59.2	19.4	0.0	4.6	15.0	0.4	0.0	0.0	1.2	0.2
Endocladia	11.2	0.6	0.0	31.6	49.0	6.0	0.0	0.0	1.4	0.2
Rockweed	8.8	0.0	0.0	1.0	0.2	80.6	0.0	0.0	9.4	0.0
Mussels	3.2	0.4	0.0	0.0	0.0	0.0	78.4	0.0	16.4	1.6
Hesperophycus	3.8	0.0	0.0	4.4	89.4	2.0	0.0	0.0	0.2	0.2

Seastar abundance at East Point, Santa Rosa Island, fall 2002

<i>Pisaster ochraceus</i> radius (mm)	total
Small (<50)	32
Medium (50-100)	56
Large (>100)	36
Total	124
Additional species:	total
<i>Pisaster giganteus</i>	1
<i>Patiria miniata</i>	1

Surfgrass transects at East Point, Santa Cruz Island, fall 2002

(additional taxa with no values deleted from table)

Location: East Point **Site Code:** SREP

Date: 4-Dec-02

Recorder: Dan Richards

<u>Surf Grass Taxa</u>	<u>Transect 1</u>	<u>Transect 2</u>	<u>Transect 3</u>
Chondracanthus canaliculatus		3	1
Chondracanthus spinosus		1	
Phyllospadix sp. overstory	100	96	98
Phragmatopoma californica			1
total	100	100	100

Ford Point, 12/5/2002. Low tide -1.3 ft at 1655 hrs. Excellent conditions, calm and overcast. No animals on the site itself but two black oystercatchers and one black turnstone were in the area. One belted kingfisher and a great blue heron were observed flying over. Two peregrine falcons were in the area today also. Squid boats are still anchored off the south coast today.

A total of 83 *Lottia gigantea* were measured in the plots with a size range of 15-92 mm. Plot 601 only had 4 limpets but 604 had 38. Melinda found three black abalone 125-154 mm. Seastars continue to be very abundant with 638 *Pisaster ochraceus* counted on the site. Dense patches of stars are devastating the mussel beds. In spite of the predation the *Mytilus californianus* seem to be doing well with dense adult patches and small sizes mixed among them. Endocladia appears

healthy as it did at the other sites this week. *Balanus* and *Chthamalus* were both common. There was the usual abundance of small limpets. *Lepidochitona* spp seemed especially abundant.

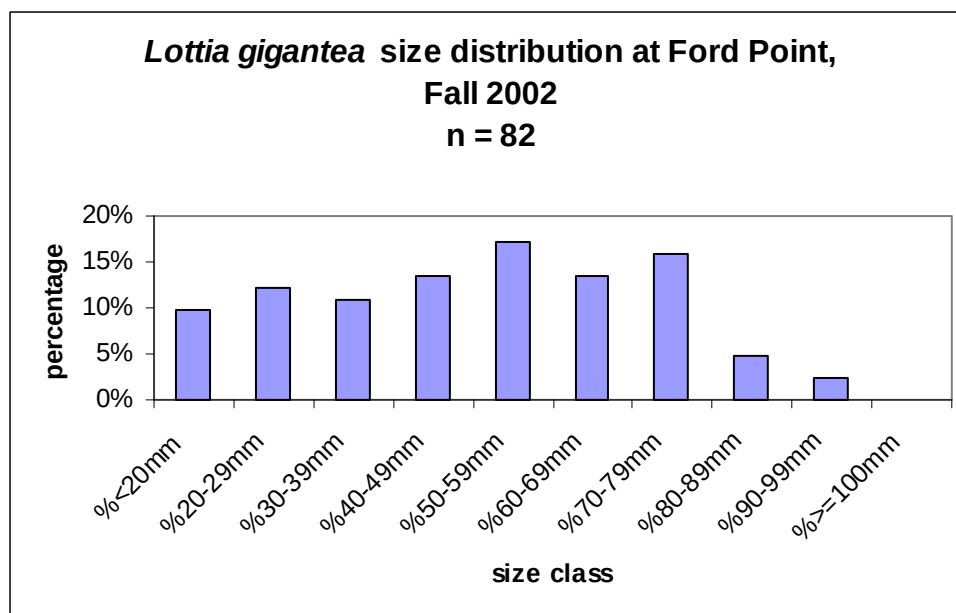
I did try to relocate the abalone plot corners and photographed the plots. Only about half of the bolts were found. All are very worn down and the rock is worn away or gone.

Photoplot summary - mean percent cover of core taxa by zone at Ford Point, Santa Rosa Island, fall 2002 (5 plots/zone)

Zone	Bare Rock	Barnacle	Tetracrita	Endocladia	Hesperophycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle	70.0	24.6	0.0	2.2	0.0	0.0	0.0	0.0	1.6	1.6	0.0
Endocladia	31.2	2.6	0.4	46.8	0.0	0.0	5.6	0.0	12.4	1.0	0.0
Mussels	26.6	4.8	0.0	0.0	0.0	0.0	47.0	0.0	20.4	1.2	0.0

Owl Limpet *Lottia gigantea* plot summary at Ford Point, Santa Rosa Island, fall 2002

Plot	Area	Density	Count	Sized	MeanSize	StDev	MinSize	MaxSize
600	3.14	5.094	16		58.06	18.48	23	86
601	3.14	1.273	4		66.75	3.20	62	69
602	3.14	5.094	16		64.06	18.19	19	91
603	3.14	2.865	9		52.78	25.44	17	92
604	3.14	11.780	37		37.86	18.53	15	80



Seastar abundance at Ford Point, Santa Rosa Island, fall 2002

<i>Pisaster ochraceus</i> radius (mm)	<i>total</i>
Small (<50)	212
Medium (50-100)	266
Large (>100)	160
Total	638
<i>Additional species:</i>	<i>total</i>
<i>Pisaster giganteus</i>	8

San Miguel Island December 31, 2002, and January 14-18, 2003 (Database event 2002-J)

PERSONNEL:

December 31, 2002:

David Kushner, Marine Biologist, Channel Islands National Park

David Steichen, Volunteer, Channel Islands National Park

Karen Steichen, Volunteer, Channel Islands National Park

January 14-18, 2003:

David Kushner, Marine Biologist, Channel Islands National Park

Paula Rich, Biological Technician, Channel Islands National Park

Melinda Chambers, Graduate Student, University of Washington

Erin Maloney, PISCO, University of California, Santa Cruz

PROCEDURE: David Kushner conducted the monitoring at the Cuyler Harbor site on Dec. 31st, 2002. The main purpose of the trip was to care for the foxes in the absence of the fox tech over the Holidays. The sampling at Cuyler was conducted so we would have an extra day during the regularly scheduled intertidal trip (Jan 14-18) to help collect *Haliotis cracherodii* samples for Melinda Chambers from the Southwest side of San Miguel Island.

David Kushner, Paula Rich, Melinda Chambers, and Erin Maloney arrived on the CIA Islander about 10:15 am on January 14th. The flight was delayed about an hour due to foggy conditions on the Island. After settling into the bunkhouse we hiked to Crook Point. On 1/15 we hiked to Otter Harbor and on 1/16 to Harris Point. The weather was sunny, warm and clear the entire week, with little wind.

Standard procedures were used for monitoring sites. Photoplots were photographed at all sites, owl limpets were counted and measured inside one-meter radius plots, abalone were counted and measured within defined plots, and seastars were counted in timed searches. All photoplots were scored in the field. Pinnipeds and shorebirds were counted at each site. Repairs were made to fixed plot markers as needed. A general field log was completed for each site. Melinda collected tissue samples from black abalone for genetic analysis for her graduate research project. When time allowed, we helped Melinda search for and sample abalone inside and outside our site.

On 1/17 we hiked to Point Bennett, where we met with Bob Delong who hiked with us over to the Judith Rock area. Bob counted and flushed the California Sea Lions on the point so that we could conduct our search for *Haliotis cracherodii*. We assisted Melinda in locating *H. cracherodii* and collecting tissue samples for her genetics work.

We flew back to Camarillo Airport via CIA on Jan. 18th at about 10:00 hours. The flight was delayed about an hour due to fog.

RESULTS:

Cuyler Harbor, 12/31/2002. Low tide –1.4 at 1330 hrs, wind about 15 knots, about 50% cloud cover, and a moderate wind. There had been recent rain, about 0.02 inches. The swell was big,

about 8 feet. David, et al., were on site from about 1310 to about 1630 hours. There was no noticeable fresh tar on site. Two Black Oystercatchers were observed on the site. No Snowy Plovers were observed on the beach just west of the site, and about 15 Elephant seals were observed on various parts of the beach from the trail head to the site. Only one strobe was used with the camera because the other was in the shop for repair.

All photoplots were photographed and scored in the field, and repairs were made to corners as needed.

Anthopleura spp. were common. *Phragmatopoma californica* was moderately abundant in the low intertidal, similar to previous years. *Balanus glandula* were the most abundant barnacle at the site. Overall, there were no noticeable changes from my recent visits to this site.

A total of 31 sea stars were found in a 15 minute timed search. There were 10 small (<50mm arm length), 9 medium (50-100mm), and 12 large (>100mm). No *Haliotis cracherodii* were observed.

Photoplot summary – mean % cover by zone at Cuyler Harbor, San Miguel Island, fall 2002 (5 plots/zone):

Zone Name	Bare Rock	Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc. Algae	Misc. Animal
Barnacle	43.4	46.4	0.0	9.6	0.0	0.2	0.0	0.0	0.0	0.0	0.4
Endocladia	44.6	9.4	0.0	22.0	0.0	10.2	6.8	0.2	0.0	4.0	2.8
Rockweed	19.6	0.2	0.8	0.4	0.0	63.0	0.2	0.0	0.0	8.8	7.0
Mussels	22.0	0.2	6.2	1.0	0.0	0.0	59.0	0.0	1.8	3.0	6.8

Seastar abundance at Cuyler Harbor, San Miguel Island, fall 2002

<i>Pisaster ochraceus</i> radius (mm)	total
Small (<50)	10
Medium (50-100)	9
Large (>100)	12
Total	31

Crook Point, 1/14/2003. Low tide –0.1 feet at about 1400 hrs, wind at 23+ mph, water temp 15°C, and a swell of 8 ft with a moderate surge, spraying over the reef onto the site. We were on site from 1245 to 1630 hrs. Working conditions were a little difficult due to the wind and swell. We observed 13 Cormorants, which departed the site as we arrived, and one Western Gull. There were three male Elephant Seals on the beach to the east. On this beach there was little sand and it was mostly exposed rock. I had never observed this beach with so little sand. There was noticeably less sand on all the nearby beaches. One sea urchin boat was observed inshore of the Wyckoff Ledge kelp forest monitoring site.

All the photoplots were located and scored. However only one bolt was found for 382, so we took a photo of the approximate location of the plot using the bolt as the upper right corner, and it was scored this direction. We could not locate the abalone plots, so did not count *Lottia gigantea*. These plots will need to be relocated and repaired so that they are not permanently lost. Repairs were made to those plots missing corners, except for plot #382.

Melinda conducted a 30-minute abalone search, finding five *Haliotis cracherodii* on the site. Three of these were found together and two were solitary. Seventeen more Black Abalone were found within about 30 meters of the site. Fourteen were together in a crack, two others were together, and one was solitary. Melinda took tissue samples from every available abalone. A 30-minute sea star search yielded 33 small, 16 medium, and 2 large *Pisaster ochraceus*.

Porphyra perforata was abundant and made some of the rocks dangerously slippery. *Ulva* sp. was abundant in patches and covered several of the *Mytilus* plots as usual for this time of year. *Phragmatopoma californica* was common, but did not appear to be increasing at this site. There were no noticeable unusual changes at this site.

Photoplot summary – mean % cover by zone at Crook Point, San Miguel, fall 2002 (5 plots/zone)

Zone Name	Bare Rock	Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc. Algae	Misc. Animal
Barnacle	60.8	34.0	0.0	0.8	0.0	0.0	0.6	0.0	0.0	0.6	3.2
Endocladia	33.0	17.2	0.2	23.4	0.0	4.0	9.4	0.0	0.2	11.2	1.4
Rockweed	33.4	9.6	0.0	9.8	0.0	2.2	25.6	0.2	1.4	17.4	0.4
Mussels	12.2	1.6	0.2	0.4	0.0	0.0	69.0	0.4	2.8	12.6	0.8

Seastar abundance at Crook Point, Santa Rosa Island, fall 2002

<i>Pisaster ochraceus</i> radius (mm)	total
Small (<50)	33
Medium (50-100)	16
Large (>100)	2
Total	

Abalone Density within plots at Crook Point, San Miguel Island, fall 2002

Count	Density	Area	Density
0			.000

Abalone size distribution for Crook Point, San Miguel Island, fall 2002

Count	Sized	Mean Size	StDev	Min Size	Max Size	%<45mm	%45-126mm	%127-145mm	%>145mm
5		87.20	32.01	57	137	-	80.00%	20.00%	-

Otter Harbor, 1/15/2003. Low tide –0.5 ft at 1500 hrs, wind NW at <5 knots, water temp 14°C, swell 4 ft. We were on site from 1130-1700 hrs. Calm, sunny, warm weather made work enjoyable. Three Oystercatchers and four Western Gulls were observed. There were 59 Harbor Seals on site; all entered the water as we approached, although a few hauled out again while we were working on site. We did not count the Elephant Seals in the cove to the east because we did not want to disturb any more Harbor Seals - many more would have been visible. Diatom scum was very abundant, causing slippery conditions on the rocks and we used extra caution moving around.

All the photoplots were photographed and scored. Missing corners were replaced with epoxy. *Lottia gigantea* were counted and measured in the five *L. gigantea* plots.

Melinda searched for Black Abalone and in a timed 30 minute search within the site she found 40, 9 of which were not measurable. We also found moderate numbers of Abalone on either side of the site. To the east we found 24 more and to the west at least 100 were observed, including two small ones at 31mm and 29mm. A 30 minute timed sea star search yielded 7 small, 10 medium, and 24 large *Pisaster ochraceus*.

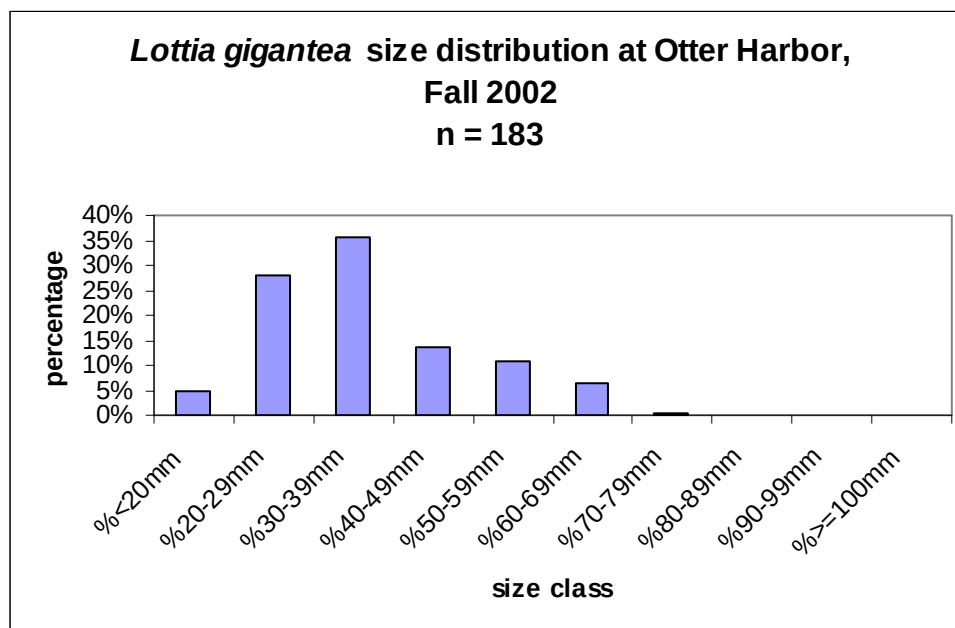
Porphyra sp. was notably abundant at this site similar to what we observed at Crook Point. Diatom scum was also more abundant than usual for this site. No other noticeable changes were observed and all of the plots appeared similar to recent visits.

Photoplot summary – mean % cover by zone at Otter Harbor, San Miguel Island, fall 2002 (5 plots/zone)

Zone Name	Bare Rock	Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc. Algae	Misc. Animal	Tar
Barnacle	17.0	35.0	0.0	0.2	0.0	0.0	0.0	7.0	0.0	38.4	0.6	1.8
Endocladia	9.6	6.2	0.4	57.6	0.0	3.6	1.4	0.2	0.2	19.8	0.4	0.6
Rockweed	8.6	21.2	0.4	19.4	0.0	25.4	0.0	0.0	0.0	24.6	0.0	0.4
Mussels	2.2	0.0	0.8	0.0	0.0	0.0	54.6	0.0	7.2	34.2	1.0	0.0

Owl Limpet *Lottia gigantea* plot summary at Otter Harbor, San Miguel Island, fall 2002

Plot	Area	Density	Count	Size	MeanSize	StDev	MinSize	MaxSize
1	3.14	12.735	40		39.20	13.21	17	66
2	3.14	13.690	43		41.23	14.03	15	77
3	3.14	10.825	34		37.06	12.85	21	67
4	3.14	8.914	28		31.36	10.55	15	56
5	3.14	12.098	38		31.76	7.31	19	50



Seastar abundance at Otter Harbor, San Miguel Island, fall 2002

<i>Pisaster ochraceus</i> radius (mm)	total
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Small (<50)	7
Medium (50-100)	10
Large (>100)	24
Total	41

Abalone size distribution for Otter Harbor, San Miguel Island, fall 2002

Count Sized	Mean Size	StDev	Min Size	Max Size	%<45m m	%45- 126mm	%127- 145mm	%>145m m
32	103.34	21.83	48	150	-	93.75%	3.13%	3.13%

Harris Point, 1/16/2003. Low tide –0.8 ft at 1517 hrs, wind E 5 knots or less, water temp 15°C, swell 2 ft. Warm, calm, and sunny conditions ideal for work. We observed 2 Western Gulls on the site and that was it for birds. Nine harbor seals were on site (mostly on or around the large tar patch) and entered the water as we approached. There were many large patches of tar as usual for this site. Pedro Gonzalez (fox tech) hiked over and joined us at the end of the day and hiked back to the bunkhouse with us. We were on site from 1130-1700 hrs. This was the calmest day I have ever experienced on San Miguel

All the photoplots were photographed and scored. Missing corners were replaced with epoxy. *Lottia gigantea* were counted and measured in the five *L. gigantea* plots.

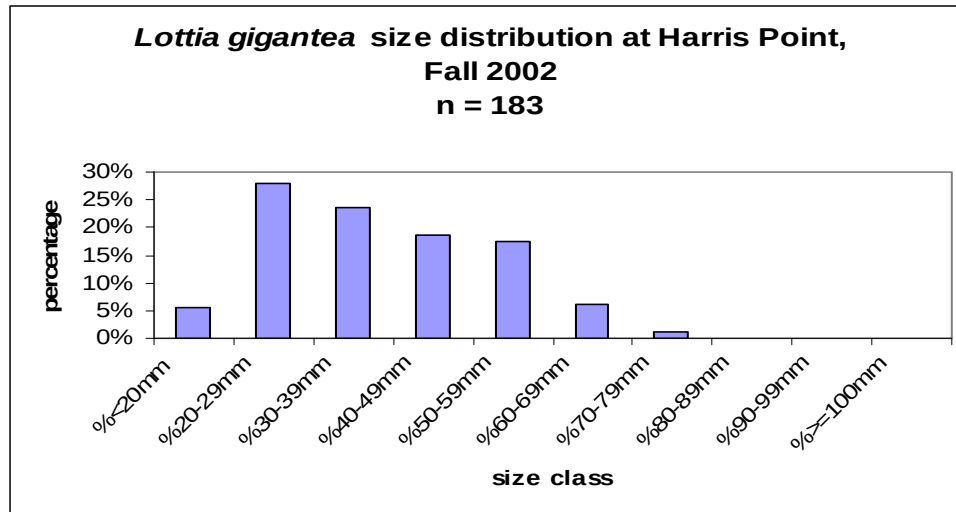
The five abalone plots were located, although the upper right bolt for 442, the lower right bolt for 443 and the lower right and left bolts for 444 could not be located. We approximated the plot size using the map. A total of 6 *Haliotis cracherodii* were found among 4 of the 5 plots. In a 30-minute timed search of the site a total of 34 *H. cracherodii* were found, including the 5 in the plots. Three more were found in the crevice transect and one Red Abalone was found measuring 89mm. Two large sea stars, *Pisaster ochraceus*, were also found in the crevice. No timed search for sea stars was made. Our work was done by about 1600 hrs and we worked another hour helping Melinda find and sample *H. cracherodii*.

Photoplot summary – mean % cover by zone at Harris Point, San Miguel, fall 2002 (5 plots/zone)

Zone Name	Bare Rock	Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc. Algae	Misc. Animal	Tar	Other
Barnacle	40.8	54.4	0.0	3.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.8	0.0
Endocladia	14.0	4.2	0.2	51.0	14.4	0.0	1.2	0.0	0.0	14.2	0.8	0.0	0.0
Mussels	12.2	0.0	2.2	2.8	2.4	0.0	37.6	0.0	1.0	39.6	2.2	0.0	0.0
Tetracrita	7.0	6.6	17.2	5.6	0.0	0.0	11.2	0.0	0.0	48.4	4.0	0.0	0.0
Hesperophycus	21.4	1.8	0.0	25.2	39.6	0.0	0.0	0.0	0.0	11.6	0.2	0.2	0.0

Owl Limpet *Lottia gigantea* plot summary at Harris Point, San Miguel Island, fall 2002

Plot	Area	Density	CountSized	MeanSize	StDev	MinSize	MaxSize
1	3.14	6.686	21	36.48	12.06	20	53
2	3.14	6.367	20	50.25	7.85	37	71
3	3.14	12.735	40	33.33	11.66	18	64
4	3.14	20.694	65	30.17	8.75	15	53
5	3.14	11.780	37	49.43	13.02	19	71



Abalone Density within plots at Harris Point, San Miguel Island, fall 2002

<i>Count</i>	<i>Density</i>	<i>Area</i>	<i>Density</i>
6		26.5	.226

Abalone size distribution for Harris Point, San Miguel Island, fall 2002

<i>Count</i>	<i>Size</i>	<i>Mean Size</i>	<i>StDev</i>	<i>Min Size</i>	<i>Max Size</i>	<i>%<45mm</i>	<i>%45-126mm</i>	<i>%127-145mm</i>	<i>%>145mm</i>
41		110.00	24.81	68	154	-	75.61%	12.20%	12.20%

Anacapa Island January 27-29, 2003 (Database event #2002-K)

PERSONNEL:

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

PROCEDURE: We were on the Pacific Ranger with John Provo as captain. We skiffed ashore each day and spent the nights anchored at Smugglers Cove. The UCSC/CSUF crew of 8 was conducting surveys on the reef immediately west of the South Frenchy's Cove reef repeating the BLM transect there from the 1970s. We discussed the monitoring with them but did not participate. On 1/30 we worked at Orizaba Cove on Santa Cruz Island and this is reported in the Santa Cruz Island trip report. The Pacific Ranger returned to Ventura on 1/30. Photos were taken of all photoplots with Nikonos V camera and Ikelite strobes on Fuji 100 ASA film. Photoplots were scored in the field if possible. Motile invertebrates were counted in photoplots by searching entire plot for motile species (the first 10 individuals of select snails and owl limpets were measured). Other limpets were placed in categories (<5 mm, 5-15 mm, >15 mm) and the two smaller sizes were generally sub-sampled in three 20x20 cm plots in upper left, center and lower right of photoplot. Littorina snails were generally sub-sampled in the 20x20 cm plots or if abundant were sub-sampled in upper left 10x10cm of the three limpet subplots. A general search was made for abalone and seastars around the site. Owl limpets were measured within one-meter radius of fixed bolts in plots at Frenchy's and Cat Rock.

RESULTS:

South Frenchy's Cove, 1/27/2003. Low tide -0.2 ft at 1249 hrs. Excellent weather conditions with light surf and wind, partly cloudy sky. Water temperature 15°C. We were on site from 1000-1700 hrs. No shorebirds or marine mammals were present near the site. The temperature logger housing was missing, the brackets apparently rusted away.

No abalone or seastars were found at the site. The BLM reef about 40m west of the site had 8-10 *Pisaster ochraceus* though. All the photoplots were field scored. Motile invertebrates were counted in all plots. *Acanthina* spp. and *Nucella emarginata* were present in moderate numbers in the mussel plots, but generally rare in the other zones. Only one *Ocenebra circumtexta* and one *Tegula funebris* were found in plots. *Littorina* spp. were most abundant in the Balanus/Chthamalus zone plots.

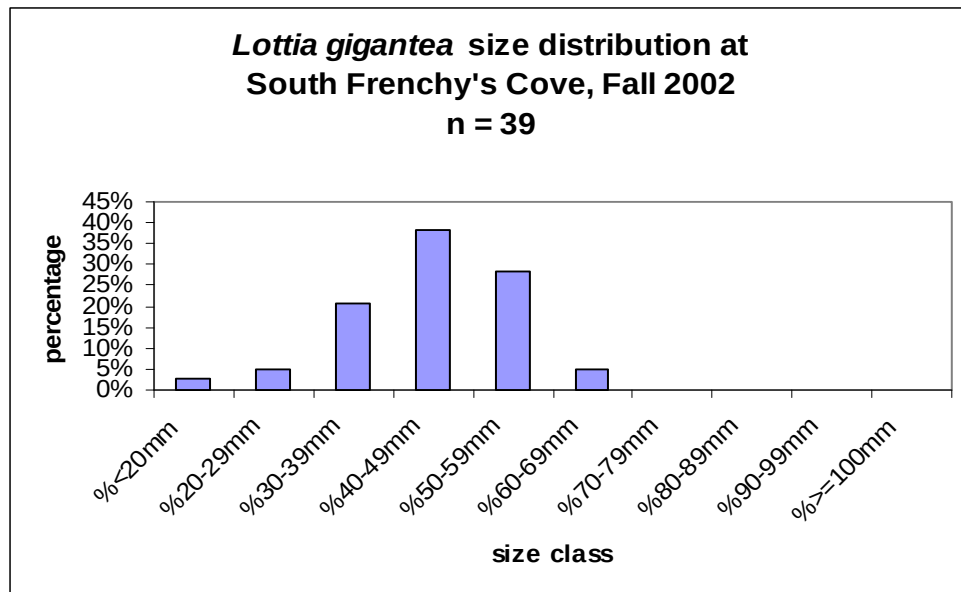
Some bleaching was noted with *Ulva* sp. and *Mazzaella affinis*. *Endocladia muricata* was common and appeared to have considerable new growth. Cover of *E. muricata* in the target zone ranged from 36 to 91%. Plot 258 with the lowest *E. muricata* cover had a 57% cover of *Silvetia compressa*. Juvenile mussels and *Littorina* spp. were present in moderate numbers. *Mytilus californianus* cover ranged from 48-79%. Rockweed cover was high in four of the plots (65-98% *Silvetia compressa*). Plot 262 had only 6% *S. compressa* cover with bare rock and *E. muricata* occupying most of the space. *Hesperophycus californicus* was uncommon at the site.

Photoplot summary - mean percent cover of core taxa by zone at South Frenchy's Cove, Anacapa Island, fall 2002 (5 photoplots/zone)

Zone	Bare Rock	Barnacle	Tetraclitia	Endocladia	Hesperophycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle	42.2	36.0	0.0	18.4	1.4	0.0	0.0	0.0	0.4	1.0	0.6
Endocladia	10.6	1.8	0.0	68.6	0.8	15.0	0.0	0.0	3.2	0.0	0.0
Rockweed	12.2	9.0	0.0	5.0	0.2	69.6	0.0	0.0	3.6	0.4	0.0
Mussels	9.4	0.4	0.0	0.2	0.0	0.0	64.4	0.0	25.2	0.4	0.0

Owl Limpet *Lottia gigantea* plot summary at South Frenchy's Cove, Anacapa Island, fall 2002

Plot	Area	Density	Count	Size	MeanSize	StDev	MinSize	MaxSize
1	3.14	3.184	10		46.80	11.21	27	62
2	3.14	6.686	21		40.19	9.70	18	57
3	3.14	2.547	8		50.88	6.01	44	63



Motile invertebrate size frequencies at South Frenchy's Cove, Anacapa Island, fall 2002

Sizes in mm	<i>Nucella emarginata</i>	<i>Acanthina</i> spp.	<i>Tegula funebris</i>	<i>Ocenebra circumtexta</i>	<i>Lottia gigantea</i>	<i>Ceratostoma nuttali</i>	<i>Tegula gallina</i>
count	32	49	1	1	1		
mean size	16.4	14.6	23	12	46		
min size	11	9	23	12	46		
max size	20	21	23	12	46		

Motile invertebrate counts at South Frenchy's Cove, Anacapa Island, fall 2002

<i>zone</i>	<i>Barnacle</i>					<i>Endocladia</i>					<i>Silvetia</i>				
<u>plot #</u>	<u>249</u>	<u>250</u>	<u>251</u>	<u>252</u>	<u>253</u>	<u>154</u>	<u>155</u>	<u>256</u>	<u>257</u>	<u>258</u>	<u>259</u>	<u>260</u>	<u>261</u>	<u>262</u>	<u>263</u>
Lepidochitona spp.												1	1		1
Nuttalina spp.												1	2		
Fissurella volcano													1		
Pachygrapsus												3			1
Pagurus spp.															
large limpets(>15mm)												1		1	1
S. purpuratus															
Amphissa versicolor															
Nucella emarginata				1		1					1				
Acanthina spp.				2				1			3	4	5		
Tegula funebris											1				
Ceratostoma nuttali															
Ocenebra circumtexta															
Lottia gigantea															1
Littorina spp.	1074	1425	1475	825	2700	425	188	12	9	12	12	41	0	247	0
Limpet < 5 mm	3	0	3	16	0	12	0	3	0	0	6	16	3	44	9
Limpet 5-15 mm	3	3	9	41	3	9	0	9	0	12	9	16	16	41	41
Mopalia spp.															
Leptasterias hexactis															

<i>zone</i>	<i>Mytilus</i>					<i>Total count</i>
<u>plot #</u>	<u>249</u>	<u>250</u>	<u>251</u>	<u>252</u>	<u>253</u>	
Lepidochitona spp.						7
Nuttalina spp.						48
Fissurella volcano						4
Pachygrapsus						19
Pagurus spp.						0
large limpets(>15mm)						3
S. purpuratus						0
Amphissa versicolor						0
Nucella emarginata					1	32
Acanthina spp.					2	49
Tegula funebris						1
Ceratostoma nuttali						0
Ocenebra circumtexta						1
Lottia gigantea						1
Littorina spp.	1074	1425	1475	825	2700	8445
Limpet < 5 mm	3	0	3	16	0	445
Limpet 5-15 mm	3	3	9	41	3	481
Mopalia spp.						7
Leptasterias hexactis						48

Cat Rock, 1/28/2003. Low tide –0.7 ft at 1341 hrs. Excellent weather with clear sky, no wind but moderate swell. We were on site from 1030-1730 hrs. Two Black Oystercatchers and two Western Gulls were at the site.

Several fresh (and fairly significant) landslides from the bluff backing the site had left fresh rock fall on the upper beach on both sides of the site. All plots were easily found but several are in need of repair, mostly to number tags that are not easily readable. We did not have time for repairs. Barnacle and Endocladia zone plots were field scored, the rest were scored from slides. Motile invertebrates were counted in all plots.

No abalone were found in 30-minute search of the area. Three small (<75mm) and five medium (75-150mm) *Pisaster ochraceus* were found along with one *P. giganteus*. *Ocenebra circumtexta* were the most common snails in the motile invertebrate counts, though *Acanthina* spp. were more common in the barnacle and rockweed plots. The chiton, *Nuttalina* spp. was common in mussel and Endocladia zone plots and present in higher numbers than at South Frenchy's Cove. *Littorina* spp. were generally less common.

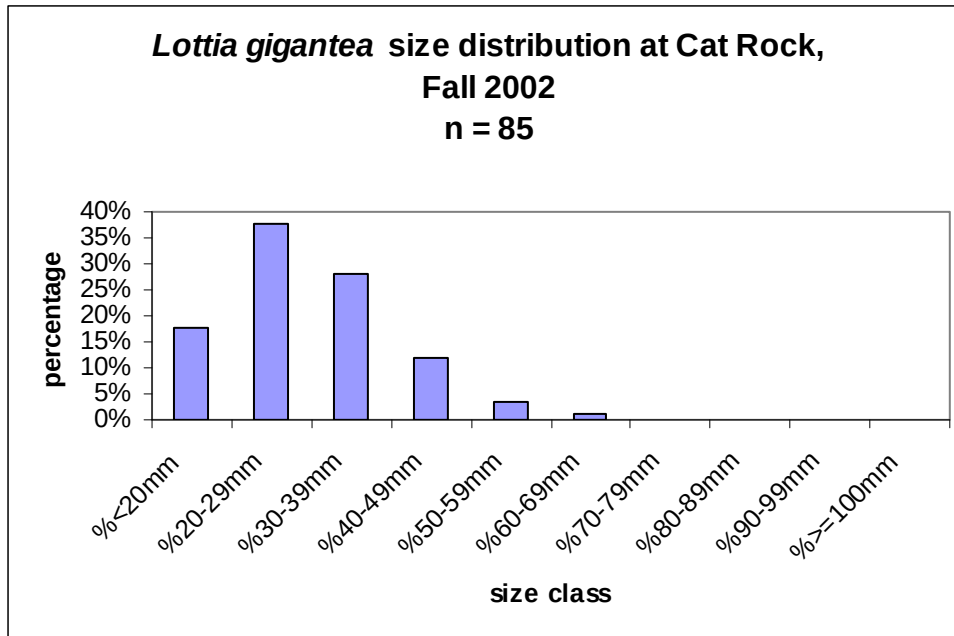
Organism cover at this site does not fit into the target zones as cleanly as at most other sites. There is not a clear pattern from the (scrape, trample and control) treatments of twenty years ago. *Hesperophycus californicus* is present in many of the higher plots. This site tends to have more coralline and other red algae in the plots than many of the sites.

Photoplot summary - mean percent cover of core taxa by zone at Cat Rock, Anacapa Island, fall 2002 (9 photoplots /zone)

Zone	Bare Rock	Barnacle	Tetra-clita	Endo-cladia	Hesper-ophycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle	38.3	13.0	0.0	12.4	28.1	1.7	0.0	0.0	6.2	0.2	0.0
Endocladia	15.9	2.6	7.9	42.3	1.0	4.3	4.0	0.0	19.1	2.9	0.0
Rockweed	11.2	6.1	2.1	11.7	14.6	45.7	0.8	0.0	7.9	0.0	0.0
Mussels	19.6	7.6	14.4	1.1	0.0	4.3	33.7	1.4	17.2	0.7	0.0

Owl Limpet *Lottia gigantea* plot summary at Cat Rock, Anacapa Island, fall 2002

Plot	Area	Density	CountSized	MeanSize	StDev	MinSize	MaxSize
1	3.14	17.8	56	25.18	6.46	15	43
2	3.14	7.3	23	33.96	10.60	15	51
3	3.14	1.9	6	47.00	12.21	32	65



Seastar abundance at Cat Rock, Anacapa Island, fall 2002

<i>Pisaster ochraceus</i> radius (mm)	total
Small (<50)	3
Medium (50-100)	5
Large (>100)	0
Total	8

Motile invertebrate size frequencies at Cat Rock, Anacapa Island, fall 2002

Sizes in mm	<i>Nucella emarginata</i>	<i>Acanthina</i> spp.	<i>Tegula funebris</i>	<i>Ocenebra circumtexta</i>	<i>Lottia gigantea</i>	<i>Ceratosoma nuttali</i>	<i>Tegula gallina</i>
count	6	45		40	38		
mean size	13	15		12	27		
min size	10	10		6	12		
max size	16	21		18	54		

Motile invertebrate counts at Cat Rock, Anacapa Island, fall 2002

zone	Barnacle								
plot #	<u>33</u>	<u>37</u>	<u>135</u>	<u>31</u>	<u>35</u>	<u>38</u>	<u>32</u>	<u>36</u>	<u>39</u>
Lepidochitona spp.		1							
Nuttalina spp.									
Fissurella volcano									
Pachygrapsus		2	1	1		1	1	1	
Pagurus spp.					1				
large limpets(>15mm)									
S. purpuratus									
Amphissa versicolor									
Nucella emarginata									
Acanthina spp.			4	3	2		6		1
Tegula funebris									
Ceratostoma nuttali									

Ocenebra circumtexta									
Lottia gigantea									
Littorina spp.	97	53	372	1013	653	125	306	134	786
Limpet < 5 mm	0	0	0	6	0	3	0	0	12
Limpet 5-15 mm	41	16	28	19	25	75	6	41	12

<i>zone</i>	<i>Endocladia</i>								
<u>plot #</u>	<u>212</u>	<u>14</u>	<u>51/18</u>	<u>54</u>	<u>13</u>	<u>467/17</u>	<u>52</u>	<u>53</u>	<u>19</u>
Lepidochitona spp.	2	2	7	1	3	4	1	6	
Nuttalina spp.	6	21	7	34	7	19	11	9	
Fissurella volcano			3	1		2	11	1	
Pachygrapsus	4		1			2		7	2
Pagurus spp.									
large limpets(>15mm)			1				1	1	
S. purpuratus									
Amphissa versicolor									
Nucella emarginata									
Acanthina spp.									4
Tegula funebris									
Ceratostoma nuttali									
Ocenebra circumtexta	1	5			1				
Lottia gigantea		4			1			2	
Littorina spp.	0	31	0	1	119	0	0	34	59
Limpet < 5 mm	16	6	3	6	31	8	12	12	0
Limpet 5-15 mm	87	62	41	84	22	39	66	56	34

<i>zone</i>	<i>Silvetia</i>								
<u>plot #</u>	<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>
Lepidochitona spp.		2		2			3	1	
Nuttalina spp.	21	7							1
Fissurella volcano									
Pachygrapsus	4		1	1			1	2	2
Pagurus spp.									
large limpets(>15mm)	2		1			1	4	3	
S. purpuratus									
Amphissa versicolor									
Nucella emarginata									
Acanthina spp.	6		4			6	1	7	1
Tegula funebris									
Ceratostoma nuttali									
Ocenebra circumtexta									
Lottia gigantea									
Littorina spp.	153	394	5	78		25	16	59	9
Limpet < 5 mm	0	0	1	3		0	3	3	0
Limpet 5-15 mm	44	78	11	62		28	47	12	8

<i>zone</i>	<i>Mytilus</i>								
<u>plot #</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.		3	2	1		7	2	3	1
Nuttalina spp.	55	15	15	28	19	48	18	18	24
Fissurella volcano					1	3		3	4

Pachygrapsus		1	2	3	1		2	3
Pagurus spp.								
large limpets(>15mm)								
S. purpuratus								
Amphissa versicolor								
Nucella emarginata								
Acanthina spp.								
Tegula funebris								
Ceratostoma nuttali								
Ocenebra circumtexta	5	2	2	5	7	7	2	4
Lottia gigantea	4	1	5	13	2	2	3	3
Littorina spp.	6	172	75	106	0	3	28	116
Limpet < 5 mm	0	12	3	6	6	0	0	0
Limpet 5-15 mm	147	122	103	81	109	113	128	75

<i>Total Count</i>	
Lepidochitona spp.	54
Nuttalina spp.	383
Fissurella volcano	29
Pachygrapsus	46
Pagurus spp.	1
large limpets(>15mm)	14
S. purpuratus	0
Amphissa versicolor	0
Nucella emarginata	0
Acanthina spp.	45
Tegula funebris	0
Ceratostoma nuttali	0
Ocenebra circumtexta	45
Lottia gigantea	42
Littorina spp.	5028
Limpet < 5 mm	152
Limpet 5-15 mm	2035

Middle Anacapa –all sites, 1/29/2003. Low tide –1.1 at 1425 hrs. Excellent conditions with only light wind and swell, partly cloudy sky. We were on site from 1100- 1800 hrs. Two Black Oystercatchers and one Western Gull were present at the site. No marine mammals present in the area. The temperature logger failed to download, probably because of a battery failure in the logger.

All photoplots were field scored and motile invertebrates were counted in all plots at both East and West sites. No abalone were found, including a search of the Harbor Seal Arch abalone plots. *Phragmatopoma californica*, *Serpulorbis squamigerus*, *Salmacina tribraciata*, *Tetraclita rubescens* and a tunicate occupied most of the space in the abalone plots. *Pisaster ochraceus* were abundant at the West site but we did not have time for a count.

Ocenebra circumtexta, *Nucella emarginata* and *Acanthina* spp. were all fairly common. *Lottia gigantea* were common in the mussel zone plot. *Littorina* spp were relatively uncommon in all zones. The barnacle zone plots had low cover of barnacles and higher cover of Endocladia but the other zones were generally well represented by the target species.

Photoplot summary - mean percent cover of core taxa by zone at Middle Anacapa East and West, fall 2002 (Middle West- five photoplots/zone, Middle East- 3 photoplots/zone)

Site	Zone	Bare Rock	Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal
ME	Barnacle	55.3	7.0	11.3	12.3	0.0	0.0	1.7	0.3	11.0	1.0
ME	Endocladia	19.7	1.7	9.7	29.7	12.3	4.7	2.3	0.0	18.7	1.3
ME	Rockweed	3.0	0.0	1.0	3.7	2.0	62.7	7.0	0.3	18.7	1.7
ME	Mussels	3.3	0.0	1.0	0.0	0.0	0.0	87.3	0.3	6.0	2.0
MW	Barnacle	44.2	7.4	0.0	23.6	0.8	0.0	0.8	0.2	22.2	0.8
MW	Endocladia	36.0	2.2	0.2	33.0	0.8	0.0	1.6	0.6	24.0	1.6
MW	Rockweed	11.0	0.2	2.4	3.8	0.0	63.0	2.8	0.2	14.4	2.2
MW	Mussels	16.0	0.2	3.0	1.2	0.0	0.0	54.0	2.6	21.6	1.4

Motile invertebrate size frequencies at Middle Anacapa East, fall 2002

Sizes in mm	<i>Nucella emarginata</i>	<i>Acanthina</i> spp.	<i>Tegula funebris</i>	<i>Ocenebra circumtexta</i>	<i>Lottia gigantea</i>	<i>Ceratostoma nuttali</i>	<i>Tegula gallina</i>
count	25	15		21	4		
mean size	18.9	15.3		13.1	34.8		
min size	12	10		8	18		
max size	24	20		18	56		

Motile invertebrate counts at Middle Anacapa East, fall 2002

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			2	4				9
Nuttalina spp.	2		1		8	1	5		11	3	2	1	34
Fissurella volcano													0
Pachygrapsus			2	3	3		2	2	3	5	2	6	28
Pagurus spp.							2	6					8
large limpets(>15mm)	1												1
S. purpuratus											2	5	7
Amphissa versicolor										1	1	1	3
Nucella emarginata	10				2		2		4	6	3	2	29
Acanthina spp.		2	3	1			1	3		1			11
Tegula funebris													0
Ceratostoma nuttali													0
Ocenebra circumtexta	4		1		1					3	2	10	21
Lottia gigantea		1			2				1		1		5
Littorina spp.	53	106	128	49	166	188	0	5	0	0	0	0	695
Limpet < 5 mm	0	0	12	0	31	0	22	7	3	84	41	59	259
Limpet 5-15 mm	62	31	91	4	116	6	75	18	29	50	97	66	645
s. franciscanus												1	1

Motile invertebrate size frequencies at Middle Anacapa West, fall 2002

<i>Sizes in mm</i>	<i>Nucella emarginata</i>	<i>Acanthina spp.</i>	<i>Tegula funnebris</i>	<i>Ocenebra circumtexta</i>	<i>Lottia gigantea</i>	<i>Ceratostoma nuttali</i>	<i>Tegula gallina</i>
count	33	68		43	40		
avg size	17.4	13		11.3	29.2		
min size	9	9		5	18		
max size	26	18		16	44		

Motile invertebrate counts at Middle Anacapa West, fall 2002

<i>zone</i>	<i>Barnacle</i>					<i>Endocladia</i>					<i>Silvetia</i>				
<i>plot #</i>	<u>447</u>	<u>448</u>	<u>449</u>	<u>450</u>	<u>451</u>	<u>457</u>	<u>458</u>	<u>459</u>	<u>460</u>	<u>461</u>	<u>452</u>	<u>453</u>	<u>454</u>	<u>455</u>	<u>456</u>
Lepidochitona spp.							1	3			3	1	1	1	2
Nuttalina spp.		11	5	2	4	12	9	14	4			1	4	3	2
Fissurella volcano						2							1	4	
Pachygrapsus		1	1	1	4	5	3	4	4		2	3	1	4	
Pagurus spp.		2	1					9			1				
large limpets(>15mm)			2	2	1		3		1		1	1		3	5
S. purpuratus				1	1	2		1					14	1	
Amphissa versicolor															
Nucella emarginata		1	1	1			1							1	8
Acanthina spp.		5	2	2	3	2	2	6	8	1	7	9	1	7	4
Tegula funnebris															
Ceratostoma nuttali															
Ocenebra circumtexta		3				4	4		1		1	1	6	3	7
Lottia gigantea						2	7							2	6
Littorina spp.	421	3	16	38	38	1	16	9	84	72	7	11	0	0	0
Limpet < 5 mm	0	3	3	3	0	0	3	16	3	0	0	0	0	2	0
Limpet 5-15 mm	19	66	50	19	38	56	56	38	31	16	22	5	54	16	2

<i>zone</i>	<i>Mytilus</i>					<i>Total Count</i>
<i>plot #</i>	<u>462</u>	<u>463</u>	<u>464</u>	<u>465</u>	<u>466</u>	
Lepidochitona spp.	1		3			16
Nuttalina spp.	4	20	18	4	2	119
Fissurella volcano		1	5	2		15
Pachygrapsus	1	2	4	3	3	46
Pagurus spp.					1	14
large limpets(>15mm)				1	3	23
S. purpuratus	1				6	27
Amphissa versicolor	1				3	4
Nucella emarginata	5	11	3	1		33
Acanthina spp.		5	3	9		76
Tegula funnebris						0
Ceratostoma nuttali						0
Ocenebra circumtexta	3	4	3	1	2	43
Lottia gigantea	3	2	1	11	7	41
Littorina spp.	2	0	0	0	0	718
Limpet < 5 mm	3	0	12	0	0	48
Limpet 5-15 mm	34	56	116	137	106	937

Santa Cruz Island January 30-Feb. 2, 2003 (database event # 2002-L)

PERSONNEL:

Dan Richards, Marine Biologist, Channel Islands National Park
Sarah Chaney, Ecologist, Channel Islands National Park

PROCEDURE: On 1/31 we went out to Scorpion on the Sea Ranger and used kayaks to paddle to Scorpion Rock. We worked in the native plant nursery in the mornings. Return to Ventura via IPCO on 2/2.

RESULTS:

Orizaba Cove, 1/30/2003. Low tide -1.2 ft at 1505 hrs. Excellent conditions with light wind and swell. We were on site from 1100 to 1400 hrs, departing early to return to Ventura. There were two harbor seals in the cove across from the monitoring reef. No shorebirds were on the reef, but Orizaba Rock had 22 Oystercatchers including an American (or hybrid). There were a number of Brown Pelicans, Western Gulls, Heermann's gulls, Royal Terns and Double-Crested Cormorants also.

All plots were photographed and area photos were shot from the reference bolts. Motile invertebrates were counted in all plots from the *Hesperophycus*, *Silvetia*, and Mussel zones (there was not enough time to count in *Balanus* and *Tetraclita* zones). *Mytilus californianus* were extremely dense in places probably limiting the individual sizes somewhat. There are openings in the mussel beds where the *Pisaster ochraceus* were feeding. These are mostly below the monitoring plots. *Pisaster ochraceus* were dense on the point with large individuals present. *Balanus glandula* occurred in nearly 100% density. *Endocladia muricata* and *Chthamalus fissus/dalli* combined for near complete cover of several of the *Hesperophycus* zone plots. Young plants of *Hesperophycus californicus* and a few young *Silvetia compressa* were coming up through the *E. muricata* in most plots. *Silvetia compressa* were sparse in the *Silvetia* zone plots with most of the plants being young or abraded. *Endocladia*, *Mytilus*, *Tetraclita* and *Ulva* were common in the *Silvetia* zone plots.

Photoplot summary - mean percent cover of core taxa at Orizaba Cove, Santa Cruz Island, fall 2002.

Zone	Bare Rock	Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle	26.0	64.6	2.4	1.6	0.0	0.0	0.0	0.0	5.2	0.2	0.0
Rockweed	18.6	4.8	5.6	22.2	1.6	6.2	1.4	0.0	18.8	0.8	0.0
Mussels	7.6	2.8	2.8	0.0	0.0	0.0	59.6	2.6	20.8	3.8	0.0
Tetraclita	19.0	9.0	34.4	0.6	0.0	0.0	17.0	1.0	16.2	2.8	0.0
Hespero-phycus	6.4	18.2	0.0	62.8	2.6	0.4	0.0	0.0	9.6	0.0	0.0

Motile invertebrate size frequency measurements at Orizaba Cove, Santa Cruz Island, fall 2002

	<i>Nucella emarginata</i>	<i>Acanthina</i> spp.	<i>Tegula funebris</i>	<i>Ocenebra circumtexta</i>
Count	47	6	3	88
mean size (mm)	17.4	15.7	12.7	12.1
min size (mm)	10	9	12	6
max size (mm)	27	20	14	17

Motile invertebrate counts measurements at Orizaba Cove, Santa Cruz Island, fall 2002

Zone	<i>Hesperophycus</i>					<i>Silvetia</i>					<i>Mytilus</i>					Total Count
plot #	He1	He2	He3	He4	He5	Pe1	Pe2	Pe3	Pe4	Pe5	M1	M2	M3	M4	M5	
Lepidochitona spp.									2	1		2			1	6
Nuttalina spp.						2	1	2	3	2		3	11	5	13	42
Fissurella volcano												2		4	4	10
Pachygrapsus		1			1		1	2	3		2	4	2	4	2	22
Pagurus spp.						2					6	1				9
large limpets(>15mm)			1				1		2	1					1	6
S. purpuratus												9	3	11	1	24
Nucella emarginata		1			1	2	5	2	4	1	6	2	2	16	5	47
Acanthina spp.						2	3						1			6
Tegula funebris					2						1					3
Ocenebra circumtexta	8	4	2	6	8	1	2	2	3		6	14	15	13	8	92
Lottia gigantea																0
Pisaster ochraceus												1	1	1		3
Amphissa versicolor												2				2
Littorina spp.	703	313	300	688	131	197	309	194	138	575	0	0	0	3	3	3553
subsample1	65	8	13	30	5	19	7	37	15	13	0	0	0	0	1	
subsample2	90	11	9	7	25	7	43	23	14	25	0	0	0	1	0	
subsample3	70	6	2	18	12	37	49	2	15	8	0	0	0	0	0	
Limpet < 5 mm	31	56	0	6	6	56	34	31	69	22	9	75	103	78	84	663
subsample1	1	7	0	0	1	6	7	6	4	7	0	5	14	8	21	
subsample2	8	6	0	0	1	7	0	2	6	0	1	2	6	10	4	
subsample3	1	5	0	2	0	5	4	2	12	0	2	17	13	7	2	
Limpet 5-15 mm	19	9	6	13	6	88	63	13	28	28	78	50	109	75	103	688
subsample1	1	1	2	0	0	6	13	2	2	1	12	6	15	13	26	
subsample2	4	2	0	1	1	9	4	0	3	4	7	2	12	8	4	
subsample3	1	0	0	3	1	13	3	2	4	4	6	8	8	3	3	

Scorpion Rock, 1/31/2005. Low tide –1.2 ft at 1542 hrs. Excellent conditions with light wind and waves until the wind picked up in late afternoon. We were on site from 1030-1630 hrs. There were two Western Gulls and 2 Black Oystercatchers at the Hesperophycus plot area, a brown pelican on the main sampling rock.

All plots were photographed and motile invertebrates were counted in plots from the mussel, Tetraclita, and Hesperophycus zones. The snails, *Acanthina* sp. and *Nucella emarginata* were uncommon and *Ocenebra circumtexta* were only a moderate presence. *Modiolus capax* were common in the Mussel plots, most visible where there had been some disturbance and the lower layers could be seen. *Mytilus californianus* was generally quite dense and a few bolts were not

found, presumably buried by mussels. *Tetraclita rubescens* were dense on bare rock in an opening in mussel plot1. A few *Mytilus gallo-provincialis* were noticed in some plots, usually Tetraclita plots. Sea stars were abundant and on the monitoring reef and I counted 131 *Pisaster ochraceus* and 7 *P. giganteus*. One black abalone was found (102 mm).

Photoplot summary - mean percent cover of core taxa at Scorpion Rock, Santa Cruz Island, fall 2002

Zone	Bare Rock	Barnacle	Tetraclita	Endocladia	Hespero- phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal
Barnacle	44.0	27.0	0.2	28.6	0.0	0.0	0.2	0.0	0.0	0.0
Endocladia	33.6	3.0	1.4	48.8	0.0	0.0	0.6	1.4	11.2	0.0
Mussels	15.0	7.2	4.4	0.0	0.0	0.0	67.4	2.0	3.6	0.4
Tetraclita	41.6	4.6	9.4	5.6	0.0	0.0	26.6	5.0	5.4	1.8
Hespero- phycus	28.4	2.6	0.0	15.8	35.8	8.8	0.2	0.4	8.0	0.0

Seastar abundance at Scorpion Rock, Santa Cruz Island, fall 2002

<i>Pisaster ochraceus</i> radius (mm)	number
Small (<75)	3
Medium (75-150)	110
Large (>150)	18
total	131
Additional species:	total
<i>Pisaster giganteus</i>	7

Acorn barnacle cover was high with dense *Balanus glandula*. *Endocladia muricata* looked healthy and had moderate cover. Large *Tetraclita rubescens* were present in the red thatched barnacle plots along with low numbers of *Lottia gigantea* and *Lottia limatula* in some. *Endocladia muricata* was present in the highest *Tetraclita* plot. *Littorina* spp. were common but not as abundant as at Anacapa and variability between plots seemed high. There were tiny individuals indicative of recruitment. *Nuttalina* and *Lepidochitona* spp. were present but not very abundant in most plots.

February 1st, Scorpion Rock. Low tide -1.1 ft at 1616 hrs. The wind and waves increased through the day but there were no problems with the actual monitoring. We were on site from 1200-1400 hrs. There was one Western Gull on the reef.

The motile invertebrate counts of the acorn barnacle and Endocladia plots were completed. Increasing wind and seas did not entice us to linger at the site.

Locations were taken with a Garmin Vista GPS at N 34°02.731' W 119°32.811' for the main rock and N 34°02.811 W 119°32.842' at the Hesperophycus plots on 2/2/03.

Motile invertebrate size frequency measurements for Scorpion Rock, Santa Cruz Island, fall 2002

	<i>Nucella emarginata</i>	<i>Acanthina spp.</i>	<i>Tegula funebris</i>	<i>Ocenebra circumtexta</i>
count	5	16	2	56
mean size (mm)	15.4	16.2	11	11.6
min size (mm)	13	6	8	6
max size (mm)	18	21	14	18

Motile invertebrate counts measurements for Scorpion Rock, Santa Cruz Island, fall 2002

	Zone	Barnacle				Endocladia						Hesperophycus				
	plot #	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815
Lepidochitona spp.					1				2			3	2	1	1	2
Nuttalina spp.			1	1			1								1	
Fissurella volcano																
Pachygrapsus					1									2	1	1
Pagurus spp.																
large limpets(>15mm)				2				1		2			2	1	1	
S. purpuratus																
Amphissa versicolor																
Nucella emarginata								1	1	1	2					
Acanthina spp.				1		1				4	1			3	1	3
Tegula funebris																2
Ocenebra circumtexta				2	1		2		2	1	2		1			
Lottia gigantea																
Epitonium tinctum																
Littorina spp.		525	625	363	250	1238	381	300	225	344	500	8	106	3	2	1
subsample1		43	27	71	24	47	61	42	38	83	57		25			
subsample2		89	23	40	22	30	28	25	27	9	79		1			
subsample3		36	0	5	34	22	33	29	7	18	24		8			
Limpet < 5 mm		31	0	13	13	6	0	9	6	22	34	0	0	0	5	5
subsample1		1		0	1	0	0	1	1	0	0					
subsample2		7		1	1	1	0	0	1	4	1					
subsample3		2		3	2	1	0	2	0	3	10					
Limpet 5-15 mm		34	7	22	16	13	31	44	34	44	22	31	44	7	35	15
subsample1		5		3	2	3	5	7	1	5	3	4	4			
subsample2		2		1	0	1	1	2	5	0	1	2	5			
subsample3		4		3	3	0	4	5	5	9	3	4	5			

Zone		Mytilus					Tetraclita					Total Count
plot #	816	817	818	819	820	821	822	823	824	825		
Lepidochitona spp.	2				5		1	1			21	
Nuttalina spp.				1	4	3	7	2		7	28	
Fissurella volcano	1	1			13						15	
Pachygrapsus	1	3	2	1	1	2	2		3	2	22	
Pagurus spp.				1	1		1				3	
large limpets(>15mm)	1	2			1		3	10	13	4	43	
S. purpuratus											0	
Amphissa versicolor	1	1									2	
Nucella emarginata	2										7	
Acanthina spp.								2			16	
Tegula funebris											2	
Ocenebra circumtexta	7	8	5	2	1	3	7	4		8	56	
Lottia gigantea		1			1			5	3		10	
Epitonium tinctum		1									1	
Littorina spp.	0	0	1	2	1	134	9	1	10	66	5094	
subsample1						3				1		
subsample2						16				9		
subsample3						24				11		
Limpet < 5 mm	16	28	22	9	59	47	47	31	13	41	457	
subsample1	1	2	5	3	9	7	5	0	0	6		
subsample2	2	4	0	0	5	3	6	7	2	5		
subsample3	2	3	2	0	5	5	4	3	2	2		
Limpet 5-15 mm	150	234	175	109	169	125	144	116	153	175	1948	
subsample1	13	23	19	14	26	13	14	2	24	23		
subsample2	14	27	19	11	12	13	16	15	11	18		
subsample3	21	25	18	10	16	14	16	20	14	15		

Appendix C. Program Notes and Accomplishments

These notes are provided to document the history of the personnel and events in the program that may affect future analysis and planning.

Field work was primarily conducted by Dan Richards, Derek Lerma, and Paula Rich. David Kushner assisted as a primary collector at San Miguel during the fall sample. We had a personnel change in the program as Derek Lerma left the park after the spring and Paula Rich began working on the project in the fall. Other helpers (see acknowledgements) primarily assisted with data recording and seastar counts, though in 2002, two graduate students, Jayson Smith and Melinda Chambers, assisted with surveys at several islands.

Several changes were implemented into the monitoring program in 2002. Following recommendations from the review workshop (Richards 2002), additional photoplots were added at Harris Point for better resolution of the barnacle zones there. Plots were established at East Point to monitor the *Hesperophycus* zone, which is prominent there. Three surfgrass transects were established at East Point in 2002 to monitor the extensive *Phyllospadix* spp. there. This follows up on new owl limpet plots at Harris Point and Otter Harbor and surfgrass transects at Northwest-Talcott established in 2001 to complete the recommended additions. With MARINE, we have also revised data sheets and the list of core species scored in the photoplots. Size distribution measurements were added for select motile invertebrates and seastars. Motile invertebrate counts were formalized to give consistent information on a set of organisms not easily monitored from the photos. Characterizing the population dynamics of the invertebrates will help us better understand the intertidal zone ecology.

The Multi-Agency Rocky Intertidal Network (MARINE) made great progress in 2002. The centralized database with information from 54 mainland and island sites was nearing completion in 2002. The list of core species for the monitoring was revised with ways to connect with the past categories that all the different programs used over the years (this was a monumental task coordinated by Dr. J. Engle). Data sheets were standardized for consistent data collection in each program. A general handbook is available through MARINE (Engle 2005). Minerals Management Service has been a driving force and primary financial sponsor of the MARINE program.

We helped research programs from the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO) at University of California, Santa Cruz, (UCSC), and UC Santa Barbara (UCSB) by providing logistics and field assistance for conducting comprehensive surveys (SMCH, SMCP, SRJL, SCFC (both Fraser and Forney's areas), SCPH, SCTR, and SCWA) (see Coastal Biodiversity Survey website) (Fig.18). We also assisted CSU Fullerton biologists with re-sampling of BLM transects (SCPH, SCWA, ANSFC) which were last sampled in 1979. These studies have a different level of detail than our regular surveys and will help in our overall understanding of the dynamics of the rocky intertidal system. We also assisted Tom Lorensen of US Geological Survey to collect tar samples from San Miguel Island, part of a program to identify beach tar sources (Hostettler *et al.* 2004).

We continued to service temperature loggers at several of the sites. PISCO supplied the loggers and replaced the Optic Stowaway units with the newer Tidbit models (both products of Hobo Loggers from Onset Corporation). PISCO maintained the data from the loggers and those data are not presented in this report. There were some problems with several units reaching the end of their battery life, resulting in data gaps. There were problems with some loggers lost when brackets rusted out and broke away.

In other program notes; Dan Richards presented a poster at the International Temperate Reef Symposium, titled “Black Abalone, *Haliotis cracherodii*, Struggling for Survival at the California Channel Islands”. Requests included database file structure, datasheets and handbook, which were sent to Ben Becker at Point Reyes (Research Learning Center).

The Department of the Interior protects and manages the nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its special responsibilities to American Indians, Alaska Natives, and affiliated Island Communities.

NPS 159/105317, August 2010

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