



Rocky Intertidal Community Monitoring at Channel Islands National Park

2005 Annual Report

Natural Resource Data Series NPS/CHIS/NRDS—2012/370



ON THE COVER

A dense carpet of *Chondracanthus canaliculatus* with *Phragmatopoma californica* colonies dominate the lower intertidal zone, replacing *Mytilus californianus* that were eaten by *Pisaster ochraceus* at Johnson's Lee, Santa Rosa Island

Photograph by: Paula Rich

Rocky Intertidal Community Monitoring at Channel Islands National Park

2005 Annual Report

Natural Resource Data Series NPS/CHIS/NRDS—2012/370

Daniel V. Richards

Paula J. Rich

Stephen G. Whitaker

National Park Service
Channel Islands National Park
1901 Spinnaker Drive
Ventura, CA 93001

September 2012

U.S. Department of the Interior
National Park Service
Natural Resource Stewardship and Science
Fort Collins, Colorado

The National Park Service, Natural Resource Stewardship and Science office in Fort Collins, Colorado, publishes a range of reports that address natural resource topics. These reports are of interest and applicability to a broad audience in the National Park Service and others in natural resource management, including scientists, conservation and environmental constituencies, and the public.

The Natural Resource Data Series is intended for timely release of basic data sets and data summaries. Care has been taken to assure accuracy of raw data values, but a thorough analysis and interpretation of the data has not been completed. Consequently, the initial analyses of data in this report are provisional and subject to change.

All manuscripts in the series receive the appropriate level of peer review to ensure that the information is scientifically credible, technically accurate, appropriately written for the intended audience and designed and published in a professional manner.

This report received informal peer review by subject-matter experts who were not directly involved in the collection, analysis, or reporting of the data. Data in this report were collected using methods based on established, peer-reviewed protocols and were analyzed and interpreted within the guidelines of the protocols.

Views, statements, findings, conclusions, recommendations and data in this report do not necessarily reflect views and policies of the National Park Service, U.S. Department of the Interior. Mention of trade names or commercial products does not constitute endorsement or recommendation for use by the U.S. Government.

This report is also available from the Natural Resource Publications Management website (<http://www.nature.nps.gov/publications/nrpm/>) or the Mediterranean Coast Network (<http://science.nature.nps.gov/im/units/medn/>) on the Internet.

Please cite this publication as:

Richards, D. V., P. J. Rich and S. G. Whitaker. 2012. Rocky intertidal community monitoring: 2005 annual report. Natural Resource Data Series NPS/CHIS/NRDS—2012/370. National Park Service, Fort Collins, Colorado.

Contents

	Page
Figures.....	v
Tables.....	vi
Page.....	vi
Executive Summary	vii
Acknowledgments.....	x
List of Acronyms	xi
Introduction.....	1
Methods.....	3
Study Area	3
Monitoring	4
Data Analysis.....	6
Results.....	9
2005 Sampling Event.....	9
Photoplots	10
Motile Invertebrates.....	15
<i>Haliotis cracherodii</i>	15
<i>Lottia gigantea</i>	19
Sea stars	25
<i>Phyllospadix</i> spp.	28
Shorebirds and Pinnipeds	31
Visitation.....	34
Trip Reports	36
Discussion	37

Contents (continued)

	Page
Literature Cited	41
Appendix A: Program Notes.....	A-1
Appendix B. Photoquadrat Data Tables.....	B-1
Appendix C. Trip Reports.....	C-1

Figures

	Page
Figure 1. Rocky Intertidal Community Monitoring Site Locations in Channel Islands National Park.	3
Figure 2. Percent cover of target species (<i>Chthamalus/Balanus</i> , <i>Endocladia muricata</i> , <i>Silvetia compressa</i> and <i>Mytilus californianus</i>) in fixed plots by zone in spring 2005.	12
Figure 3. Percent cover of target species (<i>Chthamalus/Balanus</i> , <i>Endocladia muricata</i> , <i>Silvetia compressa</i> and <i>Mytilus californianus</i>) in fixed plots by zone in fall 2005.	13
Figure 4. Percent cover of target taxa (Red algal turf, Tar, <i>Tetraclita rubescens</i> , <i>Pollicipes polymerus</i> and <i>Hesperophycus californicus</i>) in fixed plots by zone in 2005..	14
Figure 5. <i>Haliotis cracherodii</i> size distribution in spring and fall 2005, all sites combined.	16
Figure 6. <i>Lottia gigantea</i> at Anacapa Island 1999-2005.	21
Figure 7. <i>Lottia gigantea</i> at Santa Cruz Island 1998-2005.	22
Figure 8. <i>Lottia gigantea</i> at Santa Rosa Island 1998-2005.	23
Figure 9. <i>Lottia gigantea</i> at San Miguel Island 2001-2005.	24
Figure 10. <i>Pisaster ochraceus</i> sizes at all sites in fall 2005..	26
Figure 11. <i>Pisaster ochraceus</i> counts at each site from 1999-2010.	27
Figure 12. <i>Phyllospadix</i> spp. cover on 10m point-intercept transects at Santa Cruz Island.	29
Figure 13. <i>Phyllospadix</i> spp. cover on 10m point-intercept transects at Santa Rosa Island.	30
Figure 14. Visitation at Frenchy's Cove, Anacapa (Island Packers visitors).	35
Figure 15. Annual Commercial Visitation at Frenchy's Cove, Anacapa (Island Packers visitors) 1993-2005.	35
Figure 16. Feral pig damage to mussel bed at Prisoners Harbor.	37
Figure 17. <i>Pisaster ochraceus</i> mostly buried by sand at Johnson's Lee, Santa Rosa Island.	38
Figure 18. <i>Caulacanthus ustulatus</i> (the bright red alga here) growing over and among <i>Mytilus californianus</i> at Middle East Anacapa Island.	40

Tables

	Page
Table 1. Core Species, Higher Taxa and Substrates Scored in Photoplots, Point Intercept Transects, Circular Plots, Abalone/Sea stars and Mobile Invertebrate Counts at all CINP sites.	7
Table 2. 2005 Sampling dates for Rocky Intertidal Monitoring sites.....	9
Table 3. <i>Haliotis cracherodii</i> , black abalone, counts from 2005 sampling.....	16
Table 4. Sea star and black abalone searches in spring 2005	18
Table 5. Sea star and black abalone searches in fall 2005	18
Table 6. <i>Lottia gigantea</i> plot count and size information.....	20
Table 7. <i>Lottia gigantea</i> plot count and size summary information by site for fall 2005.	20
Table 8. Size distribution of <i>Lottia gigantea</i> 2005.....	20
Table 9. Shorebirds and Pinnipeds at monitoring sites in spring 2005 (maximum seen at any onetime).....	32
Table 10. Shorebirds and Pinnipeds at monitoring sites in fall 2005 (maximum seen at any onetime).....	33
Table 11. Visitors to South Frenchy's Cove, Anacapa Island in 2005 (visitation with Island Packers).	34

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. Approximately 80% of the 176 miles of coastline around the islands 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 2005 sampling year efforts (from March 2005 to January 2006) and findings of the Channel Islands National Park (CINP) Rocky Intertidal Monitoring Program.

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) and 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.

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

Sites were established between 1982 and 1994. Site selection considered visitation, accessibility, presence of representative organisms, wildlife disturbance and safety. The monitoring protocol is detailed in Richards and Davis (1988). Additional protocol for Santa Cruz Island is detailed in Engle *et al.* (1998). Updated protocol summaries can be found in Richards and Lerma (2000) and Richards *et al.* (2010).

During the 2005 sampling season, we monitored 20 of the 21 sites at least once (Table 2), but due to logistical problems we were not able to monitor Orizaba Cove or Middle Anacapa East in the spring or Scorpion Rock in the fall. To avoid disturbing nesting California brown pelicans and breeding sea lions, we do not monitor Santa Barbara Island in the spring. Because pelicans started nesting in mid-November 2005 (before our fall sampling), we were unable to monitor Sea Lion Rookery in 2005.

We used digital cameras for all photos taken in 2005. Photoplots were either scored in the field or from digital images on the computer with grids digitally overlaid. Mussel, *Mytilus*

californianus, cover was at a record high at Willows Anchorage but at a record low at Trailer. Acorn barnacle *Balanus/Chthamalus* cover was high at many sites and record levels were reached at Cat Rock, South Frenchy's Cove and Harris Point. Turfweed, *Endocladia muricata*, reached record high cover at Ford Point and Scorpion Rock while at Middle Anacapa East and Fraser Cove it was at the lowest level since monitoring began. Rockweed, *Hesperophycus californicus* and *Silvetia compressa*, cover was mostly below average (Figures 2-4).

Caulacanthus ustulatus, an invasive filamentous red alga that has been spreading along the southern California coast since 1999 was found at Anacapa Middle East site in a small patch around one plot. This was the first record of this alga at the islands.

A total of 186 black abalone, *Haliotis cracherodii*, were found at all the sites in fall 2005. Low numbers were counted at all sites with only three San Miguel Island sites having more than 10 individuals. Juvenile abalone (20-40mm) were found at both San Miguel and Santa Cruz Islands. No symptoms of Withering Syndrome were seen. Black abalone population levels at the islands remain less than one percent of 1985 population levels.

The smallest owl limpets, *Lottia gigantea*, were found at Anacapa and San Miguel Islands (mean sizes = 33.3 mm and 34.4 mm, respectively) (Table 6). Santa Cruz and Santa Rosa both had mean sizes near 50 mm. The size distributions show that Anacapa and San Miguel Islands had large portions of the population in the smaller size classes while Santa Cruz (14-96 mm) and especially Santa Rosa Islands (12-110 mm) had greater ranges of sizes (Tables 6,8). The largest individual owl limpets were found at Northwest-Talcott though Trailer had the largest mean size (110 mm). The greatest *L. gigantea* densities were at San Miguel and Santa Rosa Islands. Densities in 2005 appeared to have increased following declines observed in 2004.

Most sites had a fairly broad range of *Pisaster ochraceus* sizes but notable exceptions include Scorpion Rock, Harris Point, Fossil Reef (spring) and Prisoners Harbor which were skewed towards larger sizes with all individuals being greater than 90 mm. The only site skewed towards smaller individuals was Johnson's Lee; juvenile seastars were dominant during both seasons.

Four of the five sites on Santa Rosa Island had exceptionally high numbers of *P. ochraceus*. Other sites with high abundances of *P. ochraceus* were: Willows Anchorage, Orizaba Cove, Cuyler Harbor, Crook Point and Valley Anchorage at Santa Cruz Island. Scorpion Rock also had high numbers especially considering the size of the site. Four sites: Harris Point, Northwest-Talcott, Cat Rock and South Frenchy's Cove, typically have very low numbers of seastars, as seen in 2005.

At least two *P. ochraceus* were found at Landing Cove that exhibited symptoms consistent with wasting disease and several others had healed wounds that appeared to have been caused by the infection.

Phyllospadix spp., surfgrass, cover was monitored at two sites each on Santa Cruz Island and Santa Rosa Island. Bleached and abraded blades were noted as moderate in the spring surveys at Fraser Cove and Northwest-Talcott. Surfgrass at the other two sites was recorded as being in good condition. Surfgrass was in good condition at all sites in the fall, though moderate bleaching was recorded at East Point. Relatively little change in *Phyllospadix* cover has occurred

at the four sites since we began monitoring and most transects had small to moderate increases in *Phyllospadix* cover in 2004 and 2005.

In 2005 we had a total of six sightings of American oystercatchers, *Haematopus palliatus*; three in spring and three in fall from four different sites. Black oystercatchers, *H. bachmani*, were again the most ubiquitous shorebird. Prisoner's Harbor was the only site where we did not see black oystercatchers at least once during sampling in 2005. The largest group of black oystercatchers was at Fossil Reef where we saw 17 (plus one American oystercatcher). Black turnstones are usually common at several sites, but none were seen in the spring and only small groups were seen at four sites in the fall. Five other species of shorebirds were seen at monitoring sites in 2005.

Harbor seals, *Phoca vitulina*, were observed at or near eight different sites. They were most numerous at Otter Harbor where they haul out on the protected flat rocky bench to rest at low tide. Harbor seals were more common in the fall sample. Northern elephant seals, *Mirounga angustirostris*, are a common sight at beaches around Crook Point and Fossil Reef in the spring when weaned pups are present. Elephant seals gave birth to pups behind the Johnson's Lee site for the first time in 2005. California sea lions, *Zalophus californianus*, were common at both Santa Barbara Island sites where they can be very numerous.

South Frenchy's Cove is the most visited rocky intertidal area at the park, due to proximity to the mainland and relative ease of access. In 2005, Island Packers Company ran 30 trips to Frenchy's Cove, Anacapa to visit the tidepools. Total visitation was 1,491 passengers (Table 11), the lowest number of visitors since 1993 (Figure. 15). April had the highest monthly visitation with 525 passengers on 6 trips. Nearly 74 percent of the visitation occurred in the spring (March-May). The pattern of visitation was the same as previous years, but there has been a drop in the overall number of trips each month. The trend for monthly visitation to Frenchy's Cove is shown in Figure 14.

Acknowledgments

The National Park Service, Channel Islands National Park (CINP) funded this program. Vessel assistance for transportation to Anacapa and Santa Cruz Islands came from Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO) Marine Science Institute, University of California, Santa Barbara (UCSB).

As with any large project there are many people “behind the scenes” that make it possible to actually conduct the work. We are indebted to the administrative clerks, dispatchers, boat operators, maintenance workers and rangers of Channel Islands National Park that help with the day-to-day operations.

Special thanks to the Santa Barbara Channel Keepers (SBCK) for providing boat time and staff assistance with the monitoring at Orizaba Cove. Thanks also to Carol Blanchette, Haven Livingston and others from the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO) Marine Science Institute, University of California, Santa Barbara (UCSB) and UC Santa Cruz (UCSC) for their collaboration including the use of boat time on the RV Cormorant to monitor Anacapa Island.

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.

We are grateful to the many people that assisted with the monitoring during the 2005 sampling, including: Jessie Altstatt (SBCK), Carol Blanchette (UCSB-PISCO), Ann Fossum, Ken Niessen, Jacob Osborn, Penny Owen (SBCK), Rocky Rudolph, Ian Taniguchi (CDFG), Tom Tidyman, Susie Tharratt (CINP), Thomas Young. Randy Bidwell assisted us with inter-island travel at Anacapa. We especially appreciate Rocky Rudolph who was a (Student Conservation Association SCA) intern in 2005. In addition to his excellent help in the field, he mapped many of the sites and cataloged over 10,000 images to organize the data images in the program.

List of Acronyms

<i>Acronym</i>	<i>Description</i>
ANI	Anacapa Island
ANCR	Anacapa, Cat Rock
ANSFC	Anacapa, South Frenchy's Cove
ANMW	Anacapa, Middle West
ANME	Anacapa, Middle East
CDFG	California Department of Fish and Game
CINP	Channel Islands National Park
CINMS	Channel Islands National Marine Sanctuary
ENSO	El Niño Southern Oscillation
GIS	Geographic Information System
MARINe	Multi-Agency Rocky Intertidal Network
NMFS	National Marine Fisheries Service
NOAA	National Oceanographic and Atmospheric Administration
NPS	National Park Service
PISCO	Partnership for Interdisciplinary Studies of Coastal Oceans
PIT	Passive Integrated Transponder
SCA	Student Conservation Association
SBI	Santa Barbara Island
SBLC	Santa Barbara, Landing Cove
SBSLR	Santa Barbara, Sea Lion Rookery
SCI	Santa Cruz Island
SCFC	Santa Cruz, Fraser Cove
SCTR	Santa Cruz, Trailer
SCWA	Santa Cruz, Willows Anchorage
SCSR	Santa Cruz, Scorpion Rock
SCPH	Santa Cruz, Prisoners Harbor
SCOC	Santa Cruz, Orizaba Cove
SMCA	State Marine Conservation Area
SMI	San Miguel Island
SMCH	San Miguel, Cuyler Harbor
SMCP	San Miguel, Crook Point
SMOH	San Miguel, Otter Harbor
SMHP	San Miguel, Harris Point
SMR	State Marine Reserve
SRI	Santa Rosa Island
SRFR	Santa Rosa, Fossil Reef
SRJL	Santa Rosa, Johnson's Lee
SRFP	Santa Rosa, Ford Point
SRNWT	Santa Rosa, Northwest-Talcott
SREP	Santa Rosa, East Point
TNC	The Nature Conservancy
UCLA	University of California Los Angeles
UCSB	University of California Santa Barbara
UCSC	University of California Santa Cruz
WS	Withering Syndrome

Introduction

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

Channel Islands National Park (CINP) and National Marine Sanctuary (CINMS) encompass the four northern Channel Islands and Santa Barbara Island off the coast of southern California. The park islands and surrounding waters bear the designation of an International Biosphere Reserve and State of California Areas of Special Biological Significance. The State of California maintains jurisdiction over the marine resources and manages them through the California Department of Fish and Game. In 2003, a network of marine reserves was established around the Channel Islands. Four of the rocky intertidal monitoring sites fall inside marine reserves and two more are adjacent to reserve boundaries (Figure 1).

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

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

Rocky intertidal monitoring began at Anacapa Island (VTN Oregon 1984) initially with an emphasis on monitoring trampling effects, based on concerns for visitor impacts (Littler 1978). The program was expanded in 1985 to include the other park islands and to look more broadly at the ecology and possible impacts in other areas. Impacts from harvest, oil spills and climate change may be of particular interest as future management concerns. Fixed plots are used to minimize natural variance. A disadvantage of fixed plots is that inferences to the entire study area may not be valid.

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, www.marine.gov). 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 Baja, Mexico to Alaska including the Channel Islands. By working with MARINe we will have access to consistent data that can be used for a much broader regional analysis of changes to the intertidal communities.

This report summarizes the 2005 sampling year efforts (from March 2005 to January 2006) 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, Richards *et al.* 2010 and Richards and Rich 2009, 2010. Additional black abalone monitoring results have been presented in Haaker *et al.* 1992, Davis *et al.* 1992 and Richards and Davis 1993.

Methods

Study Area

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

The park islands span the transition zone between cooler waters of the Oregonian biogeographic province and the warmer Californian waters from the south. Mean annual air temperature along the mainland in this area is 15°C. Mean rainfall in 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, cloud cover and 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.

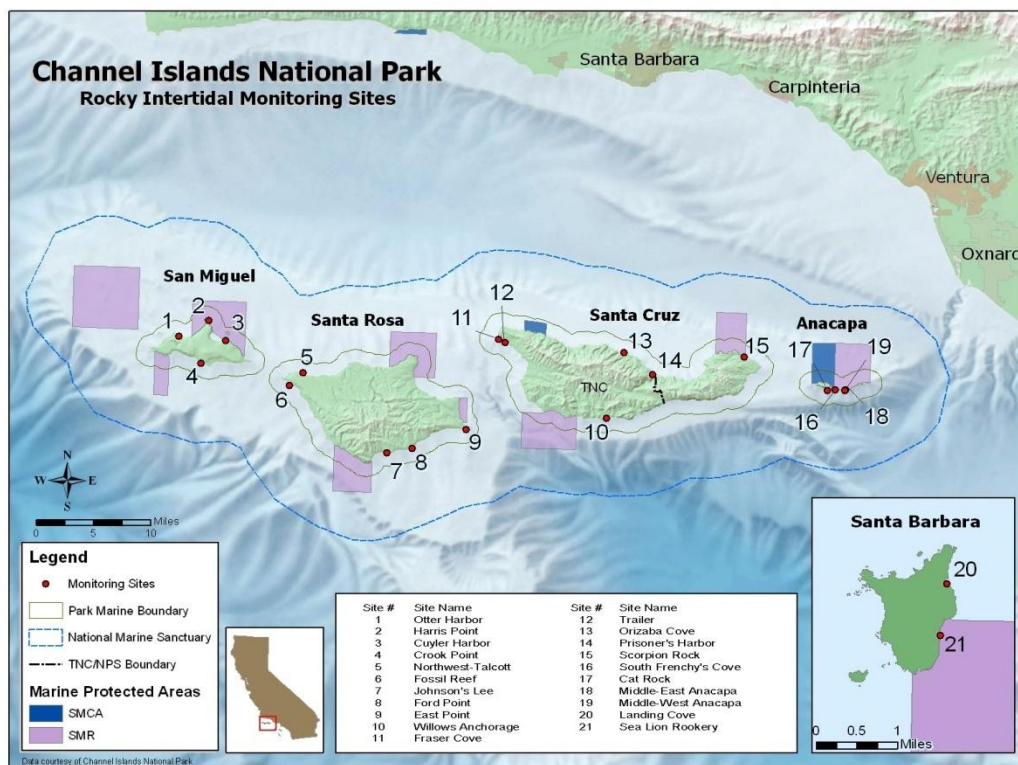


Figure 1. Rocky Intertidal Community Monitoring Site Locations in Channel Islands National Park.

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 2005, 17 sites were monitored in spring (March-June) and 19 were monitored in fall (October-January 2006) (Table 2). The monitoring protocol is detailed in Richards and Davis (1988). Additional protocol for Santa Cruz Island is detailed in Engle *et al.* (1998). Updated protocol summaries can be found in Richards and Lerma (2000) and Richards *et al.* (2010). Also see Engle (2005) for updated MARINE protocols.

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

Thirteen core species or species groups are targeted for monitoring in fixed photoplots to determine percent cover (Table 1). 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.) and gooseneck barnacles (*Pollicipes polymerus*). Tar which occurs naturally from oil seeps in the channel and can form a thick persistent cover over the substratum is also monitored at one site. Additionally, 32 taxa or substrates are monitored when present (see Table 1 for list of taxa¹). The fixed plots (50 x 75 cm) are photographed on each visit. In most cases, there are five replicate plots in each zone that were initially established over high densities of the target species. Not all core species (zones) are represented at each site.

In 2005, all photos were photographed digitally. Photoplots were photographed with a digital Olympus Camedia Z-5050. The percent cover of core organisms was determined either in the field by laying a grid (50 x 75 cm) of one hundred evenly-spaced points (10 x 10) over the plot (Figure 2), or when conditions were unfavorable or insufficient time was available, in the office from the digital images. In the office, a digitized grid (evenly spaced) was created in Adobe Photoshop and overlaid on the image to provide complete coverage of the plot. Under both scoring protocols, layered organisms were not counted separately. Therefore the total cover of the top-most layer (with few exceptions – see Engle 2008) summed 100%. Data were recorded onto pre-printed data sheets then entered into the database.

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

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.

were measured within fixed circular plots of one-meter radius (3 to 5 plots per site). *Pisaster ochraceus*, ochre sea stars, were counted in a general search of the reef (for 30-minutes). When possible, 50-100 *P. ochraceus* were measured (longest radius) for size distribution. At three sites (Johnson's Lee, Fossil Reef and Landing Cove) where *P. ochraceus* were abundant, fixed transects were sampled as a rough measure of density within that area.

Motile invertebrates (Table 1) were counted in the photoplots by carefully searching each entire plot. Select species were measured for size-frequency distribution. Abundant littorine snails and small limpets were sub-sampled in three small plots (either 20cm x 20cm or 10cm x 10cm, depending on density) within the photoplot area. This sub-sampling is a shift from previous sub-sampling and is now standardized with other MARINe sampling. Motile invertebrate sampling is usually done in the spring, alternating with *Lottia* counts in the fall. Motile invertebrate counts were added in 2002 as a means to better understand the dynamics of small predatory snails and small invertebrates within the photoplots.

Phyllospadix spp., surfgrass, cover was measured on fixed point-intercept transects (10 m long, 100 points) (three transects per site) at four sites (Trailer, Fraser Cove, East Point, Northwest-Talcott). Special circumstances and general conditions that may have affected sampling were described on daily logs and reported in the trip reports. Surfgrass transect scoring methods follow the MARINe protocol, adding *Phyllospadix* spp. understory for surfgrass covered by algae (Engle 2005). Point totals for the cover may now be over 100%; however, the understory category can be ignored to compare with past data where only the top layer was scored.

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

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

Taxonomy and nomenclature follow Smith and Carlton (1975), Abbott and Hollenberg (1976), McLean (1978) and Morris *et al.* (1980), with algal nomenclature updated by Paul Silva and Kathy-Ann Miller (http://ucjeps.berkeley.edu/california_seaweeds.html).

Data Analysis

The purpose of this report is to present data collected in 2005. Statistical analysis of the data has not been performed. Any trends presented are simple summary statistics and should be viewed as preliminary. 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 taxa were not pooled from different zones 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. Readers are cautioned that although densities are provided for comparative purposes, plots were chosen within high density areas and should not be considered to be representative of a larger area. Trends of surfgrass were plotted for temporal reference but no statistical analyses were 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. However, 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/sea stars and mobile invertebrate counts at all cinp sites.

(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 (continued).

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

Results

2005 Sampling Event

We sampled most sites in both spring and fall in 2005 (Table 2) We do not sample Santa Barbara Island in the spring because of difficulties accessing sites due to nesting California brown pelicans and breeding sea lions. Pelicans began nesting unusually early in November 2005 and we were unable to conduct the fall monitoring at Sea Lion Rookery without disturbing nesting pelicans. Due to logistical issues we were not able to monitor at Orizaba Cove or Middle Anacapa East in the spring or at Scorpion Rock in the fall.

Table 2. 2005 Sampling dates for Rocky Intertidal Monitoring sites.

<i>Site</i>	<i>Site code</i>	<i>Spring</i>	<i>Fall</i>
Cuyler Harbor, SMI	SMCH	28 April 05	28 Jan 06
Crook Point, SMI	SMCP	30 April 05	25 Jan 06
Otter Harbor, SMI	SMOH	1 May 05	26 Jan 06
Harris Point, SMI	SMHP	29 April 05	27 Jan 06
Fossil Reef, SRI	SRFR	30 May 05	12 Jan 06
Johnson's Lee, SRI	SRJL	27 May 05	10 Jan 06
Ford Point, SRI	SRFP	26 May 05	14 Jan 06
Northwest-Talcott, SRI	SRNWT	29 May 05	11 Jan 06
East Point, SRI	SREP	28 May 05	13,15 Jan 06
Fraser Cove, SCI	SCFC	8 March 05	15,17 Oct 05
Trailer, SCI	SCTR	9 March 05	15,17 Oct 05
Willows Anchorage, SCI	SCWA	10 March 05	16 Oct 05
Scorpion Rock, SCI	SCSR	19 April 05	*
Prisoner's Harbor, SCI	SCPH	7 March 05	14 Oct 05
Orizaba Cove, SCI	SCOC	*	1 Dec 05
Cat Rock, ANI	ANCR	24,25 June 05	11,12 Dec 05
South Frenchy's Cove, ANI	ANSFC	24,25 June 05	14 Dec 05
Middle Anacapa-West	ANMW	23 June 05	13 Dec 05
Middle Anacapa-East	ANME	*	13 Dec 05
Landing Cove, SBI	SBLC	--	11-13 Nov 05
Sea Lion Rookery, SBI	SBSLR	--	--

--no sample because of nesting pelicans

* no sampling due to logistical problems

Photoplots

Photoplot data are summarized in Figures 2-4 for each target zone and season. Mean percent cover is pooled for 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 B. Summary tables (by zone) for each site can be found in the trip reports (Appendix C).

Acorn barnacle cover fell below the long-term mean at seven sites and was above average at five sites in spring. Contrastingly, in fall *Chthamalus* spp./ *Balanus glandula* increased above the long-term mean at most sites in fall 2005 (Figure 3) perhaps as a result of high levels of recruitment in the summer. At 11 sites barnacle cover measured greater than one standard error above the long-term mean; record-high densities occurred at Cat Rock, South Frenchy's Cove and Harris Point. Below average barnacle cover was measured at only two sites (Landing Cove and Fraser Cove) in the fall.

Endocladia muricata cover was above average at ten sites in spring (Figure 2), but declined in fall; six sites measured greater than and six sites fell below the grand means for each site (Figure 3). Ford Point and Scorpion Rock reached record high levels of *E. muricata* cover in spring while Middle Anacapa East and Fraser Cove declined to their lowest levels in fall since monitoring began.

Silvetia compressa cover was at or below average at all sites in both spring and fall 2005. Five sites (Cat Rock, Trailer, Cuyler Harbor, Crook Point and Northwest-Talcott) were within one standard error of their long-term mean in the spring. Fossil Reef was close to the grand mean in fall but Cuyler Harbor and Crook Point dropped below. Harris Point was the only site to have above average cover of *Hesperophycus californica* (Figure 4). The *H. californica* at Harris Point is a different form than *Hesperophycus* at other sites with much shorter and narrower thalli, resembling *Pelvetiopsis limitata* which does not occur in southern California and does not possess the sterile hairs that appear to be present in the Harris Point alga (Abbott and Hollenberg 1976). *Hesperophycus* cover at other sites was well below average in the spring but increased closer to the grand means at nearly all sites in the fall sample. However, record low abundances of the rockweed were measured at East Point during both seasons.

Mytilus californianus cover was above average at four sites in the spring (Cat Rock, Middle Anacapa West, Prisoners Harbor and Willow's Anchorage) and five sites in the fall (Cat Rock, Middle Anacapa East, Middle Anacapa West, South Frenchy's Cove and Willow's Anchorage). Of note, all the Anacapa Islands sites had above average mussel cover and long-term trends have all been positive. In fall, *M. californianus* cover at Willows Anchorage was the highest yet since monitoring began there in 1994. Mussels were so dense at Willow's Anchorage that we had difficulty finding many of the corner bolts that mark the plots. In contrast, *M. Californianus* cover at Trailer was the lowest in fall since monitoring began. Mussel cover at Johnson's Lee remained low where large numbers of *Pisaster ochraceus* appeared to negatively affect mussel recovery on the lower reef.

Tetraclita rubescens cover was low at both Santa Cruz Island sites and slightly above the long-term mean at Harris Point (Figure 4). Cover of *Tetraclita* in plots at Orizaba Cove was more than

double that at Scorpion Rock and Harris Point. Site comparisons should be made with caution as plot selections can be arbitrary and may not accurately reflect the cover for that entire site.

At Fraser Cove, the only site where it is monitored, tar cover changed very little since monitoring began (Figure 4). Cover of *P. polymerus* was lower than the long-term mean during both spring and fall 2005 (Figure 4). *Pollicipes polymerus* plots at Fraser Cove differ little from the mussel zone plots and the primary cover is *Mytilus californianus*.

The red algal turf zone at Landing Cove is composed primarily of *Chondracanthus canaliculatus*, *Pterocliadiella* sp and *Gelidium* sp. Other algae may be common, especially *Egregia menziesii* which rapidly colonizes any bare rock following a disturbance. *Phragmatopoma californica* forms low mats of sand tubes under and between the algae in some plots throughout this zone. From casual observations it appears that overall the red algal turf is healthy and the decline in cover in the photoplots is due to increased abundances of *Phyllospadix torreyi* in two red algal turf plots (Figure 4).

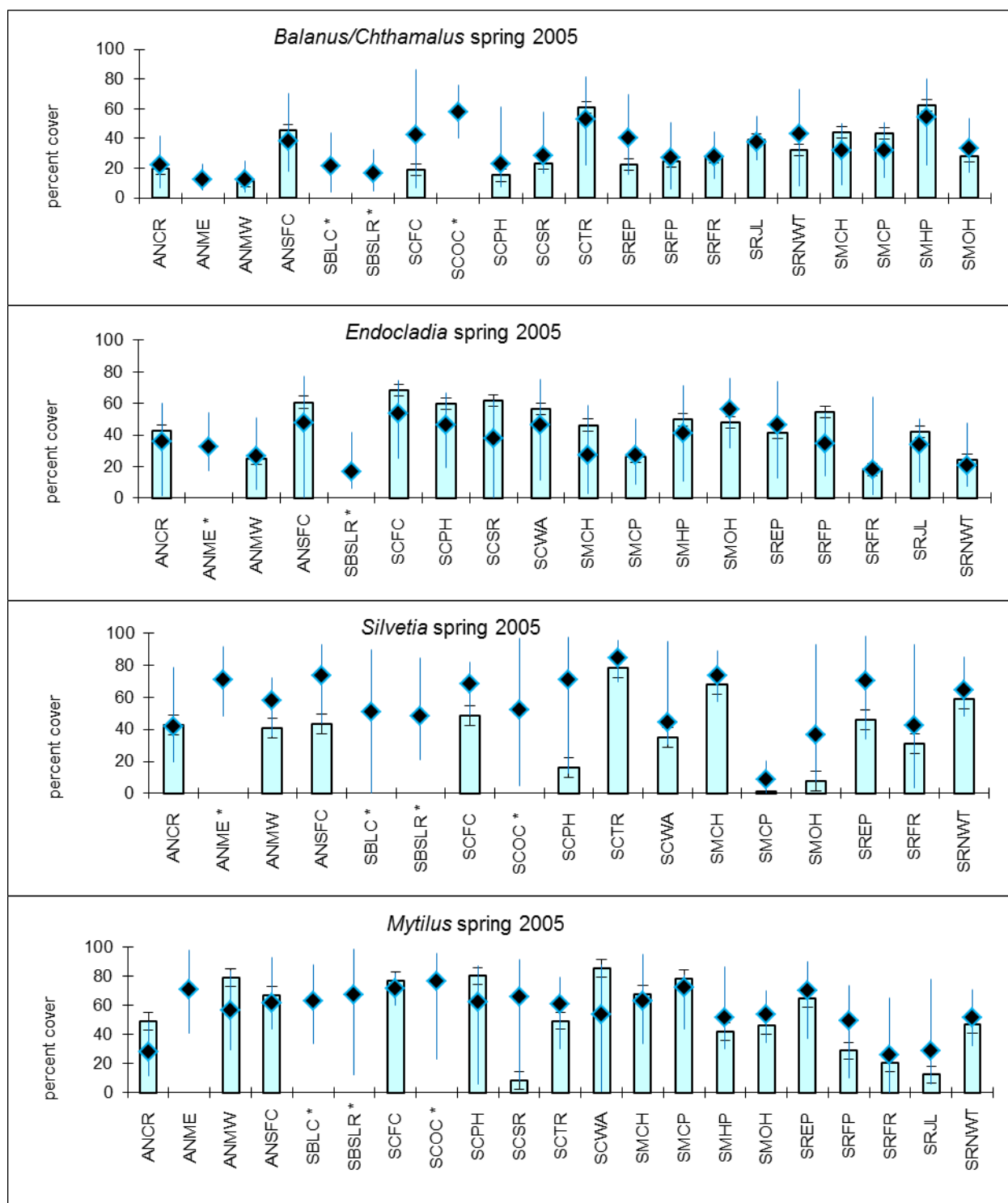


Figure 2. Percent cover of target species (*Chthamalus/Balanus*, *Endocladia muricata*, *Silvetia compressa* and *Mytilus californianus*) in fixed plots by zone in spring 2005. Bars represent the seasonal mean percent cover from five plots within that zone; error bars represent standard error of the plots at that site. Vertical lines represent the range of means since monitoring began at that site. Diamonds represent the overall mean for all years at that site. See table 2 for site names. (* indicates that site was not sampled).

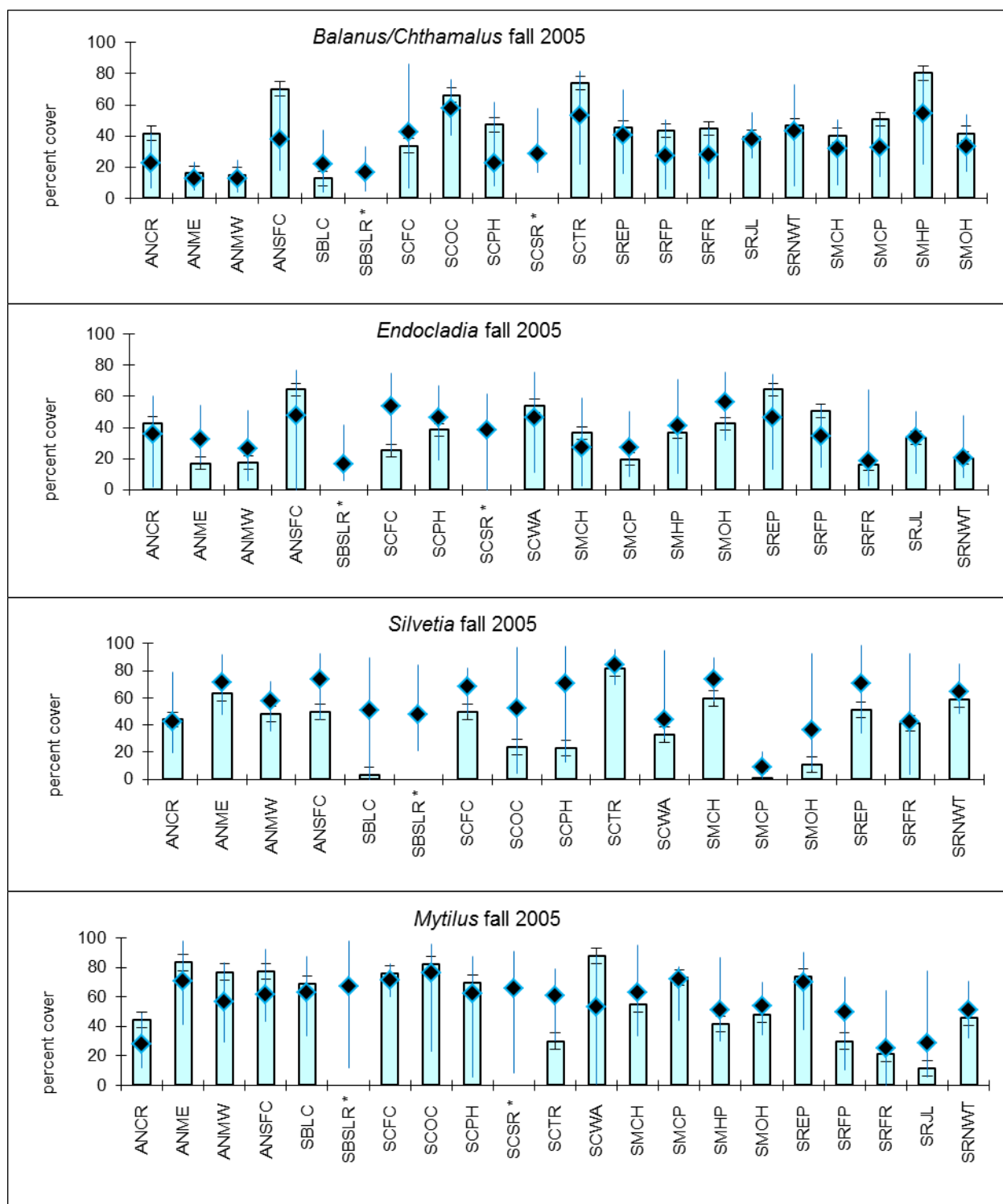


Figure 3. Percent cover of target species (*Chthamalus/Balanus*, *Endocladia muricata*, *Silvetia compressa* and *Mytilus californianus*) in fixed plots by zone in fall 2005. Bars represent the seasonal mean percent cover from five plots within that zone; error bars represent standard error of the plots at that site. Vertical lines represent the range of means since monitoring began at that site. Diamonds represent the overall mean for all years at that site. See table 2 for site names. (* indicates that site was not sampled).

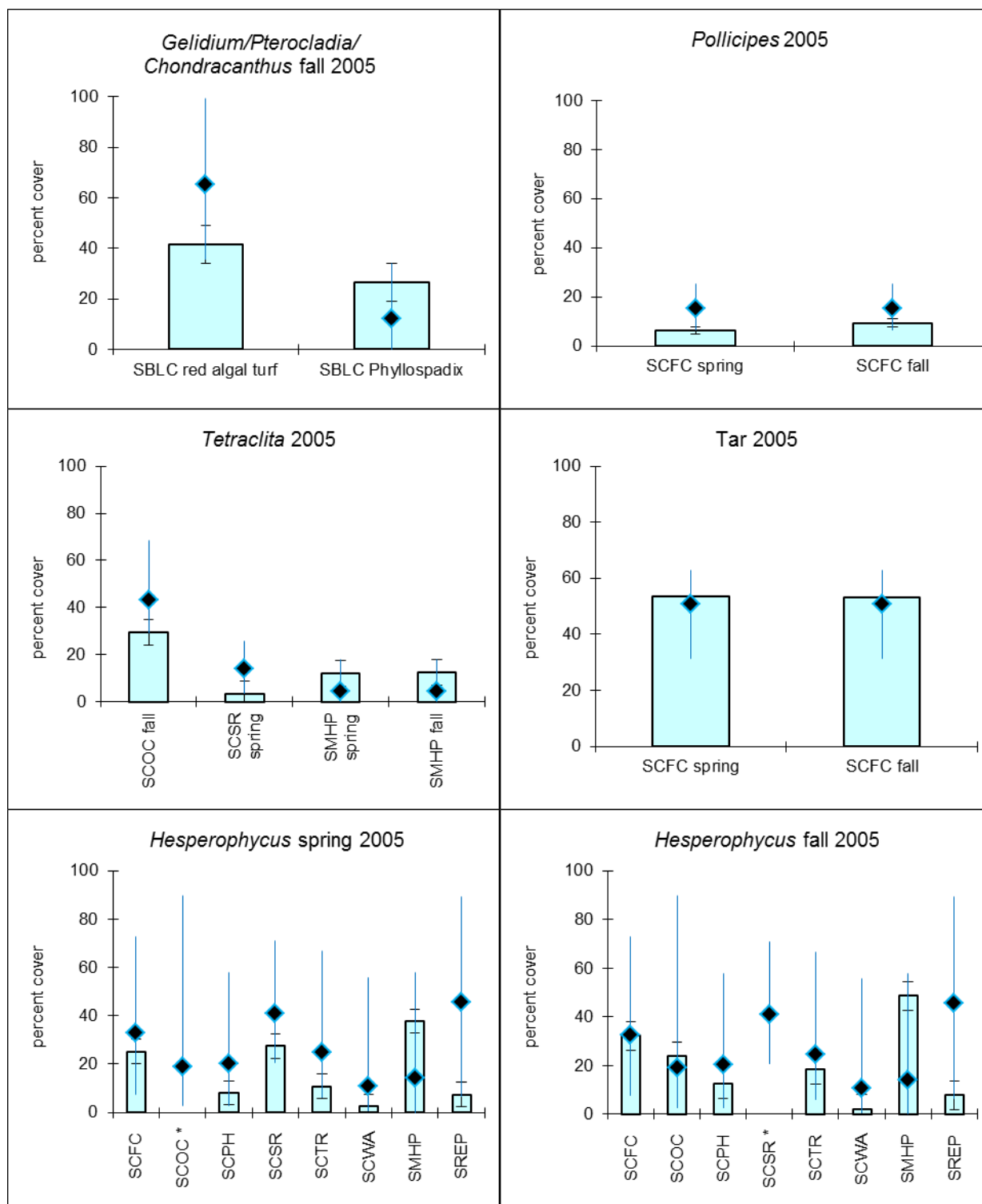


Figure 4. Percent cover of target taxa (Red algal turf, Tar, *Tetraclita rubescens*, *Pollicipes polymerus* and *Hesperophycus californicus*) in fixed plots by zone in 2005. Bars represent the seasonal mean percent cover from five plots within that zone; error bars represent standard error of the plots at that site. Vertical lines represent the range of means since monitoring began at that site. Diamonds represent the overall mean for all years at that site. See table 2 for site names. (* indicates that site was not sampled).

Motile Invertebrates

Motile invertebrates (small snails, limpets, chitons, crabs) counted within photoplots are presented in tables in the trip reports (Appendix C).

Nucella emarginata and *Acanthina* sp. were common at South Frenchy's Cove but rare at Cat Rock while *Ocenebra circumtexta* had the opposite distribution. This exemplifies the high variability that can occur over a short geographical distance. *Nucella emarginata* were exceptionally common at Cuyler Harbor with a mean of 81 per mussel zone plot. *Nucella* were very common at Harris Point as well. Otter Harbor and Crook Point only had moderate numbers of *Nucella*. Some zonal distribution is becoming evident with some species. *Tegula* spp. are much more abundant in the *Silvetia* and *Hesperophycus* zones, while predatory snails tend to be most abundant in the *Mytilus* zone. *Littorina* spp are most abundant in the higher zones, especially among *Balanus/Chthamalus*.

Haliotis cracherodii

Abalone counts were completed at all sites monitored in 2005. The total count for all islands was 186 in the fall sample (Table 3). Because of variability in swell and tide conditions and observer experience, comparisons should be made with caution. Values only reflect how many abalone could be found during a search of each site (generally 30-minutes per site)

Figure 5 shows the size distribution of all the abalone found at all sites in both spring and fall of 2005. Most encouraging was that several *H. cracherodii* in the 20-40 mm size range were found at both San Miguel and Santa Cruz Islands in 2005.

Tables 4 and 5 show the number of abalone found at each site in both spring and fall samples. Abalone search time was generally 30-minutes; however, extended timed-searches were made at Otter Harbor, Fossil Reef and Northwest-Talcott, where we were able to cover a larger portion of the reef area. We searched for 45-minutes at Otter Harbor, but much of the extra time was spent measuring abalone. At Northwest-Talcott, Ian Taniguchi was able to dedicate 2.5 hours to searching among the flat rocks that used to provide good habitat, but he only found three *H. cracherodii* there. We also checked the adjacent reef located west of the site and found no abalone. The number of *H. cracherodii* found at Fossil Reef in the expanded search included the group of abalone known on an adjacent reef. These are only counted when time permits and the counts are kept separate. Only one black abalone was found in the regular 30 minute search. At Most of the Santa Cruz Island sites it was too rough to conduct an abalone search in the spring. One *H. cracherodii* was seen opportunistically at the Forney area of Fraser Point though.

Otter Harbor once again had the highest count, followed by Crook Point in fall and Harris Point in spring. A total of three *H. cracherodii* were found within the fixed plots at Otter Harbor, Crook Point and Harris Point in fall (Table 5). No other sites had plots with abalone. More abalone were present in the vicinity of the Otter Harbor site, but we limited the count to the area between reference bolts. One juvenile *Haliotis rufescens* (red abalone) was found in the mussel bed at Orizaba Cove. We did not find any abalone at Santa Barbara Island but only one count was done all year. Only three abalone were found at Anacapa in spring and two in fall. One of

the Cat Rock abalone appeared shrunken but it was firmly attached to the rock and was feeding. No other sick or dead abalone were found in 2005.

Table 3. *Haliotis cracherodii*, black abalone, counts from 2005 sampling. Data from sites are combined by island. CountRandom is the number of abalone from 30-minute search, CountInPlot is the number of abalone found in fixed plots (not all sites were monitored each season, thus area size is different).

Island Code	Year	Season	Count Random	Count Density	Area (m ²)	Density (m ⁻²)	Count Sized	MeanSize (mm)	StDev	MinSize (mm)	MaxSize (mm)
SB	2005	fall	0	0		.000	0	-	-	-	-
AN	2005	spring	3	0		.000	3	126	14.42	110	138
AN	2005	fall	0	0		.000	2	113	4.24	110	116
SC	2005	fall	9	0		.000	9	49.78	16.60	28	82
SM	2005	spring	93	2	5.9	.339	95	97.99	34.46	26	159
SM	2005	fall	117	3	58.2	.052	114	92.22	32.62	34	151
SR	2005	spring	46	0		.000	46	127.89	22.55	66	180
SR	2005	fall	60	0		.000	42	131.83	21.80	80	177

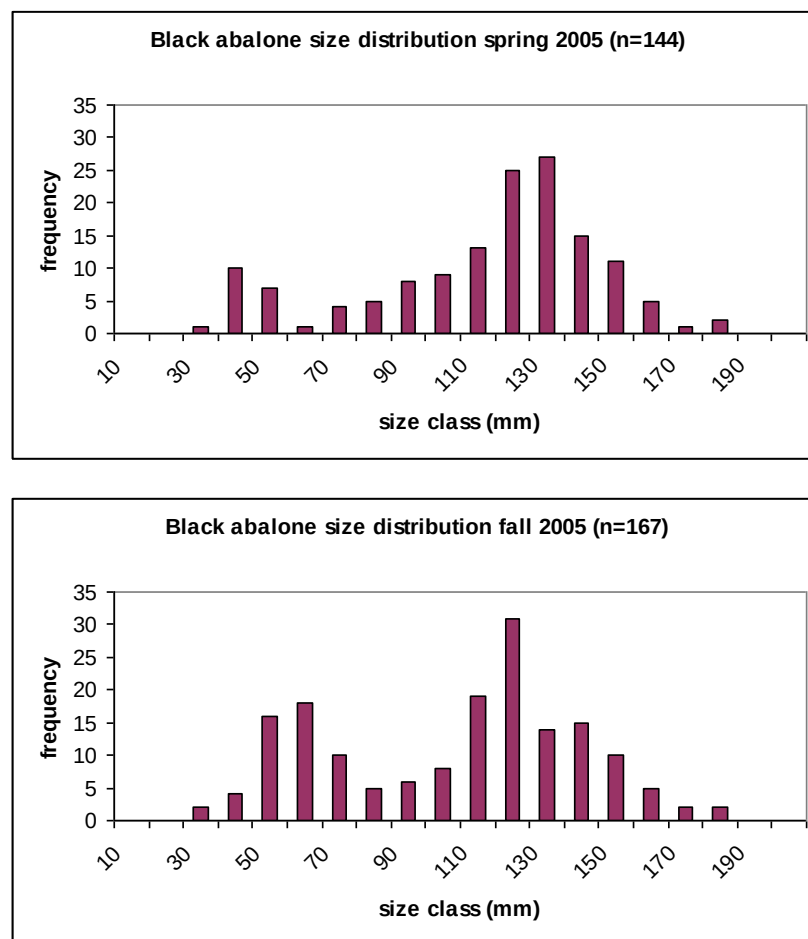


Figure 5. *Haliotis cracherodii* size distribution in spring and fall 2005, all sites combined.

Table 4. Sea star and black abalone searches in spring 2005. (x indicates no plot or transect, nc indicates no count performed, *=searched beyond 30 minutes (see text), **=no timed count. P.o.= *Pisaster ochraceus*, P.g.=*P. giganteus*, P.h.=*Pycnopodia helianthoides*, P.m.= *Patiria miniata*.) It was too rough to count abalone at SCI.

Site	Sampling Date	Seastars in 30 min P.o. P.g. P.m. P.h.	Seastars in transects	Abalone in plots	Abalone search
Cuyler Harbor, SMI	4/28/05	91	x	x	nc
Crook Point, SMI	4/30/05	37	x	0	2
Otter Harbor, SMI	5/1/05	61 5 1	x	0	75
Harris Point, SMI	4/29/05	21 1 6 1	3 P.o. (1x12)	2	18 total
Fossil Reef, SRI	5/30/05	127 0 1.	41 P.o. (30x6)	0	1 (45*)
Johnson's Lee, SRI	5/27/05	183 area 1 161 area 2 90 area 3	29 P.o. (10x2)	0	4
Ford Point, SRI	5/25/05	168	x	0	7
Northwest-Talcott, SRI	5/29/05	0 20 (2 hr)	x	0	3*
East Point, SRI	5/28/05	109	x	x	2
Fraser Cove, SCI	3/8/05	nc	x	x	1 **
Trailer, SCI	3/9/05	93			nc
Willows Anchorage, SCI	3/10/05	86	x	x	nc
Scorpion Rock, SCI	4/19/05	71	x	x	nc
Prisoner's Harbor, SCI	3/7/05	53	x	x	0
Orizaba Cove, SCI	ns				
Cat Rock, ANI	6/24/05	1	x	0	3
South Frenchy's Cove, ANI	6/24/05	1	x	x	0
Middle Anacapa-West	6/23/05	137	x	nc	nc

Table 5. Sea star and black abalone searches in fall 2005. (x indicates no plot or transect, nc indicates no count performed, *=searched beyond 30 minutes (see text). P.o.= *Pisaster ochraceus*, P.g.=*P. giganteus*, P.h.=*Pycnopodia helianthoides*, P.m.= *Patiria miniata*.)

Site	Sampling Date	Seastars in 30 min P.o. P.g. P.m. P.h.	Seastars in transects	Abalone in plots	Abalone search
Cuyler Harbor, SMI	1/28/06	103	x	x	0
Crook Point, SMI	1/25/06	119		1	24
Otter Harbor, SMI	1/26/06	55 6	x	1	80*
Harris Point, SMI	1/27/06	4 4 24	4 P.o. (1x12)	1	15
Fossil Reef, SRI	1/12/06	310 8 4 1	65 P.o. (30x6)	0	12
Johnson's Lee, SRI	1/10/06	109 area 1, 86 1 area 2 141 4 area 3	54 P.o. (10x2)	0	5
Ford Point, SRI	1/14/06	328 6	x	0	4
Northwest-Talcott, SRI	1/11/06	0 2 2	x	0	1
East Point, SRI	1/13/06	129 2	x	x	1
Fraser Cove, SCI	10/15/05	63	x	x	0
Trailer, SCI	10/17/05	nc	x	x	nc
Willows Anchorage, SCI	10/16/05	184	x	x	9
Valley Anchorage ¹	10/18/05	130	x	x	1
Scorpion Rock, SCI	ns				
Prisoner's Harbor, SCI	10/18/05	15			1
Orizaba Cove, SCI	12/1/05	169 1	x	x	1 <i>H. rufescens</i>
Cat Rock, ANI	12/11/05	2	x	0	1
South Frenchy's Cove, ANI	12/14/05	8	8 (CBS)	x	nc
Middle Anacapa-West	12/13/05	nc	x	0	1
Sea Lion Rookery, SBI	ns				
Landing Cove, SBI	11/13/05	65	14 (18x2)	x	0

¹ Valley Anchorage on south Santa Cruz Island is not a regular site, but sampled by PISCO regularly. CBS= Coastal Biodiversity Survey transects.

Lottia gigantea

Lottia gigantea are usually only sampled in the fall, alternating with motile invertebrate counts in the spring due to time constraints in the field. One site, Northwest-Talcott, was monitored in the spring because we had time. Total counts, density and mean maximum and minimum sizes are shown in Table 6 for data pooled by island. Table 7 presents counts, density and size summary statistics for the fall sample at each site. Table 8 gives size class percentages by island. Trends of mean size and density by island are shown in Figures 6-9. Individual plot data and size histograms for each site are presented in the trip reports (Appendix C).

Lottia gigantea densities were slightly higher in 2005 than in 2004 but were still lower than the 2003 levels. Santa Cruz Island was the only island to show a slight decline from 2004. As in 2004, the highest island density was recorded at San Miguel Island (12.5 m^{-2}) and the lowest density (3.1 m^{-2}) occurred at Santa Cruz Island (Table 6). Fossil Reef and Harris Point had essentially the same density at nearly 13 m^{-2} (Table 7). Fraser Cove has always had relatively low limpet densities and once again ranked the lowest (2 m^{-2}) compared with other sites. Densities are given for general information only. Readers are cautioned that plots were not randomly selected and should only be used for temporal comparisons within sites.

The smallest mean sizes were found at Anacapa and San Miguel Islands (33.3 mm and 34.4 mm, respectively) (Table 6). Santa Cruz and Santa Rosa both had mean sizes near 50 mm. Spring statistics for Santa Rosa Island only apply to Northwest-Talcott which had the largest individual limpets (110 mm) of any site. The size distributions show that Anacapa and San Miguel Islands had large portions of the population in the smaller size classes while Santa Cruz and especially Santa Rosa Islands had greater ranges of sizes (Table 8). The size distributions also vary greatly between sites. Willows Anchorage *L. gigantea* are skewed towards the smaller sizes and have a mean size of 38 mm while Fraser Cove is skewed towards larger sizes and a mean of 49 mm (fall Santa Cruz Island trip report – Appendix C). Trailer had the largest mean size for owl limpets of all sites followed by Northwest-Talcott.

The number of owl limpets at Johnson's Lee showed a slight upturn in 2005; however, the density is still quite low compared to the 1980s and early 1990s. A broad range of sizes were represented at the site. Juvenile *L. gigantea* were seen at Ford Point and the population density was stable but low between 2004 and 2005. Owl limpet densities at both Johnson's Lee and Ford Point have declined over time for unknown reasons (Figure 8).

There was a high degree of variability among plots at individual sites with some plots having few or no *L. gigantea* present in 2005. Willows Anchorage, Trailer and Johnson's Lee each had one plot with no limpets present. Plot L5 at Willows Anchorage is mostly covered with a coralline algae turf and has not had many *L. gigantea* since it was established. Plot 5 at Trailer has gone through a series of changes with high densities of *Mytilus* and algae. In fall 2005, the plot was populated with barnacles and *Porphyra perforata*, a weedy alga. Sand occasionally covers the lower portion of plot 1 at Johnson's Lee and *Phragmatopoma californica* and *Anthopleura elegantissima* dominated the lower half of the plot in 2005.

Table 6. *Lottia gigantea* plot count and size information. All sites poled by island. (*spring sample at Santa Rosa Island included only one of four sites).

Island Code	Year	Season	Number of plots	Count	Area	Density	MeanSize	StDev	MinSize	MaxSize
AN	2005	fall	6	121	18.85	6.4	33.3	12.14	13	65
SC	2005	fall	15	128	40.83	3.1	52.7	21.09	14	96
SM	2005	fall	10	391	31.41	12.5	34.4	13.52	10	78
SR	2005	spring*	5	105	15.71	6.7	66.5	20.95	18	109
SR	2005	fall	20	488	62.82	7.8	49.4	22.82	12	110

Table 7. *Lottia gigantea* plot count and size summary information by site for fall 2005. See table 2 for site names.

Island Code	Site Code	Year	Season	Count	Number of plots	Density	MeanSize	StDev	MinSize	MaxSize
AN	CR	2005	fall	82	3	8.7	32.2	9.85	14	65
AN	SFC	2005	fall	39	3	4.1	35.6	15.83	13	62
SC	FC	2005	fall	32	5	2.0	51.5	12.95	18	81
SC	TR	2005	fall	40	5	3.2	74.7	14.88	29	96
SC	WA	2005	fall	56	5	4.5	37.8	14.00	14	73
SM	HP	2005	fall	199	5	12.7	36.1	13.53	10	78
SM	OH	2005	fall	192	5	12.2	32.8	13.35	12	75
SR	FP	2005	fall	67	5	4.3	32.1	20.36	13	76
SR	FR	2005	fall	201	5	12.8	50.7	16.43	15	92
SR	JL	2005	fall	107	5	8.6	42.7	22.78	13	91
SR	NWT	2005	fall	113	5	7.2	63.7	24.85	12	110

Table 8. Size distribution of *Lottia gigantea* 2005. All sites pooled by island.

Island Code	Season	%<20 mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	%≥100 mm
AN	fall	15.70	26.45	27.27	19.83	8.26	2.48	0.00	0.00	0.00	0.00
SC	fall	5.47	8.59	15.63	17.97	14.84	12.50	9.38	11.72	3.91	0.00
SM	fall	11.25	30.69	26.60	17.39	7.67	4.60	1.79	0.00	0.00	0.00
SR	spring	0.95	6.67	3.81	8.57	14.29	13.33	22.86	19.05	5.71	4.76
SR	fall	12.30	14.34	9.43	9.84	19.47	13.32	10.45	7.99	1.84	1.02

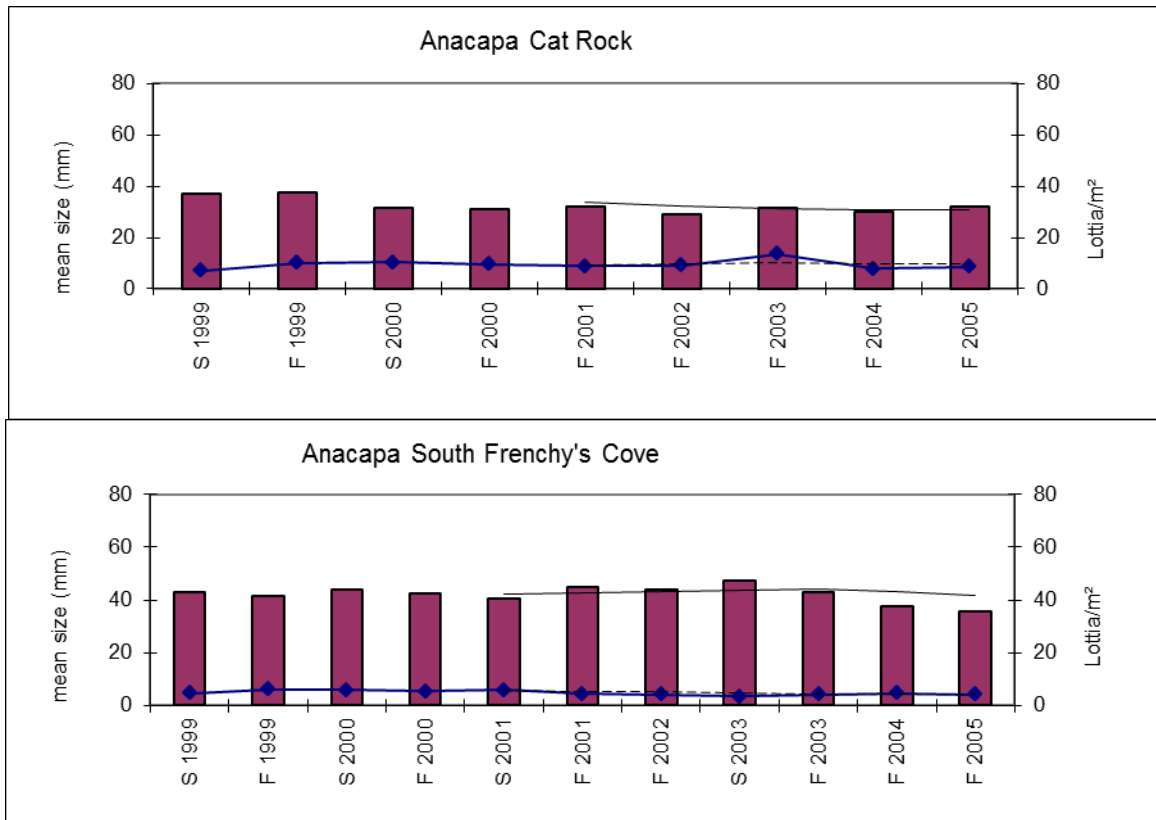


Figure 6. *Lottia gigantea* at Anacapa Island 1999-2005. Bars represent mean size (mm), blue diamonds and corresponding lines represent mean density from three fixed plots, black lines indicate five-sample moving trends for mean size and dashed lines indicate five-sample moving trends for mean density. S=spring samples, F=fall samples.

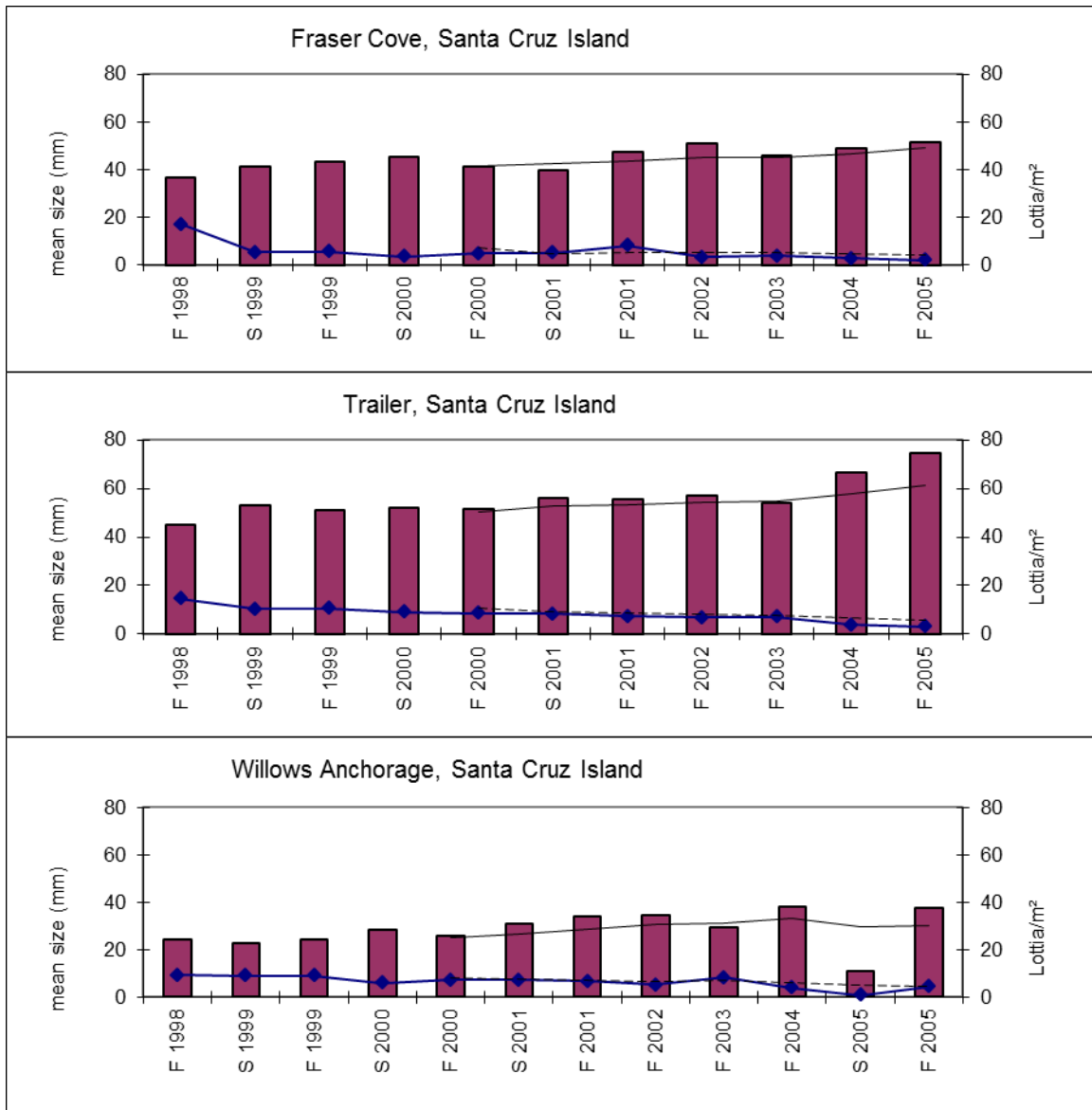


Figure 7. *Lottia gigantea* at Santa Cruz Island 1998-2005. Bars represent mean size (mm), blue diamonds and corresponding lines represent mean density from three fixed plots, black lines indicate five-sample moving trends for mean size and dashed lines indicate five-sample moving trends for mean density. S=spring samples, F=fall samples.

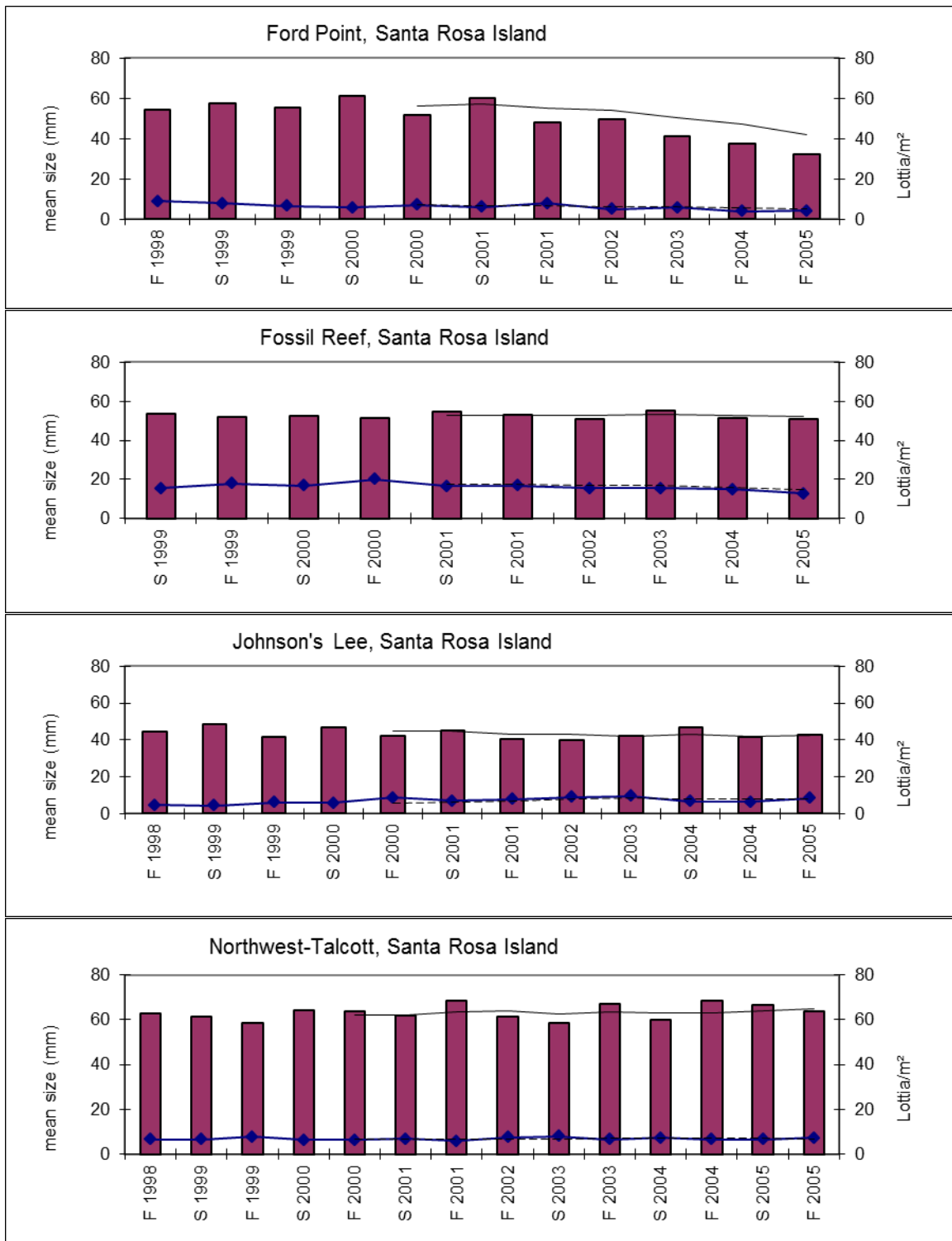


Figure 8. *Lottia gigantea* at Santa Rosa Island 1998-2005. Bars represent mean size (mm), blue diamonds and corresponding lines represent mean density from three fixed plots, black lines indicate five-sample moving trends for mean size and dashed lines indicate five-sample moving trends for mean density. S=spring samples, F=fall samples.

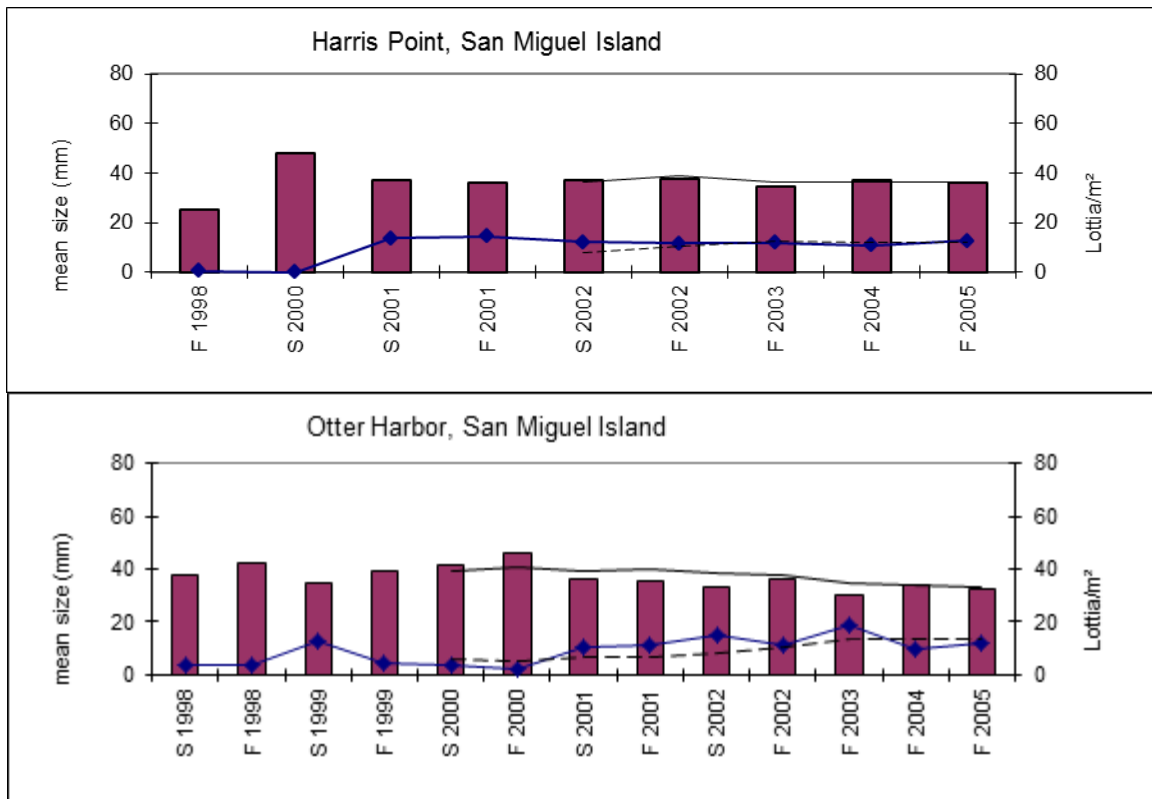


Figure 9. *Lottia gigantea* at San Miguel Island 2001-2005. Bars represent mean size (mm), blue diamonds and corresponding lines represent mean density from three fixed plots, black lines indicate five-sample moving trends for mean size and dashed lines indicate five-sample moving trends for mean density. S=spring samples, F=fall samples.

Sea stars

Pisaster ochraceus are the most common sea star in the rocky intertidal zone. Because they can be highly mobile, occupying different areas of reef, we generally monitor the species by conducting timed-counts rather than sampling within fixed plots. Figure 11 displays data from timed counts conducted from 1999 to 2005. There are a few areas where we consistently find aggregations of *P. ochraceus* and transects have been used to follow density changes within those areas. Information from timed searches and transects is shown in Tables 4 and 5. Surveys could not be done at all sites in all seasons because of high swell or poor tides; however, all sites except Sea Lion Rookery were sampled at least once.

Size frequency results are summarized in Figures 10 and 11. When conditions allowed, maximum arm length measurements of *P. ochraceus* were taken to produce size histograms presented in the trip reports (Appendix C). Most sites had a fairly broad range of sizes, but notable exceptions include Scorpion Rock, Harris Point, Fossil Reef (spring) and Prisoners Harbor which all had populations of *P. ochraceus* that were skewed toward larger sizes (greater than 90 mm). Note that some of these sites have small sample sizes which is often characteristic of sites with large seastars. Other sites that had populations skewed toward larger sizes were Cuyler Harbor and Otter Harbor though some smaller *P. ochraceus* were also present. The only site skewed towards smaller individuals was Johnson's Lee; juvenile seastars were dominant during both seasons.

Tables 4 and 5 show the numbers of seastars counted in 30 minutes. Four of the five sites on Santa Rosa Island had exceptionally high numbers of *P. ochraceus*. A large number of *P. ochraceus* at Ford Point were noted as being small and cryptic. Other sites with high abundances of *P. ochraceus* were: Willows Anchorage, Orizaba Cove, Cuyler Harbor, Crook Point and Valley Anchorage at Santa Cruz Island. Scorpion Rock also had high numbers especially considering the size of the site. Four sites: Harris Point, Northwest-Talcott, Cat Rock and South Frenchy's Cove, typically have very low numbers of seastars, as seen in 2005.

At least two *P. ochraceus* were found at Landing Cove that exhibited symptoms consistent with wasting disease and several others had healed-over wounds that appeared to have resulted from previous bouts of the infection.

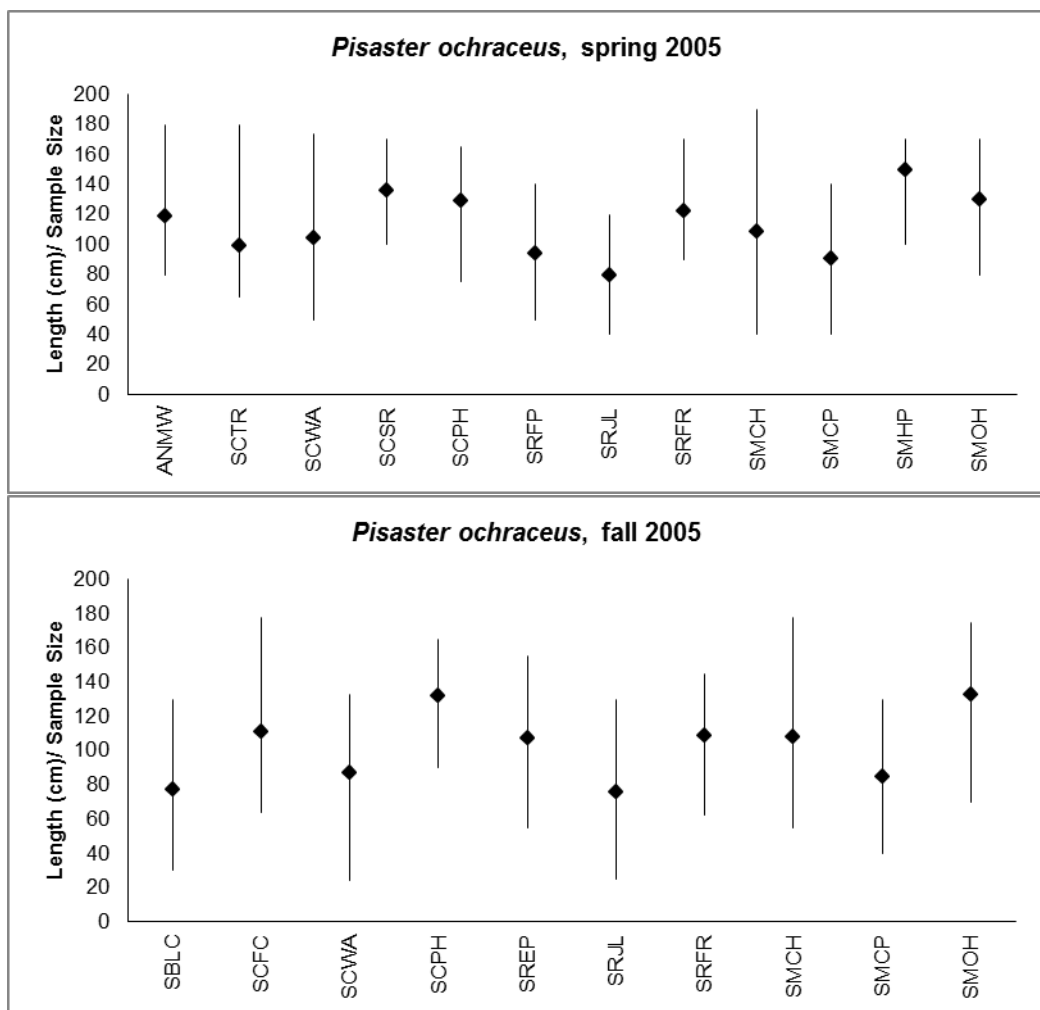


Figure 10. *Pisaster ochraceus* sizes at all sites in fall 2005. Mean sizes are represented by the diamonds and the size range is represented by the black line. See table 2 for site names.

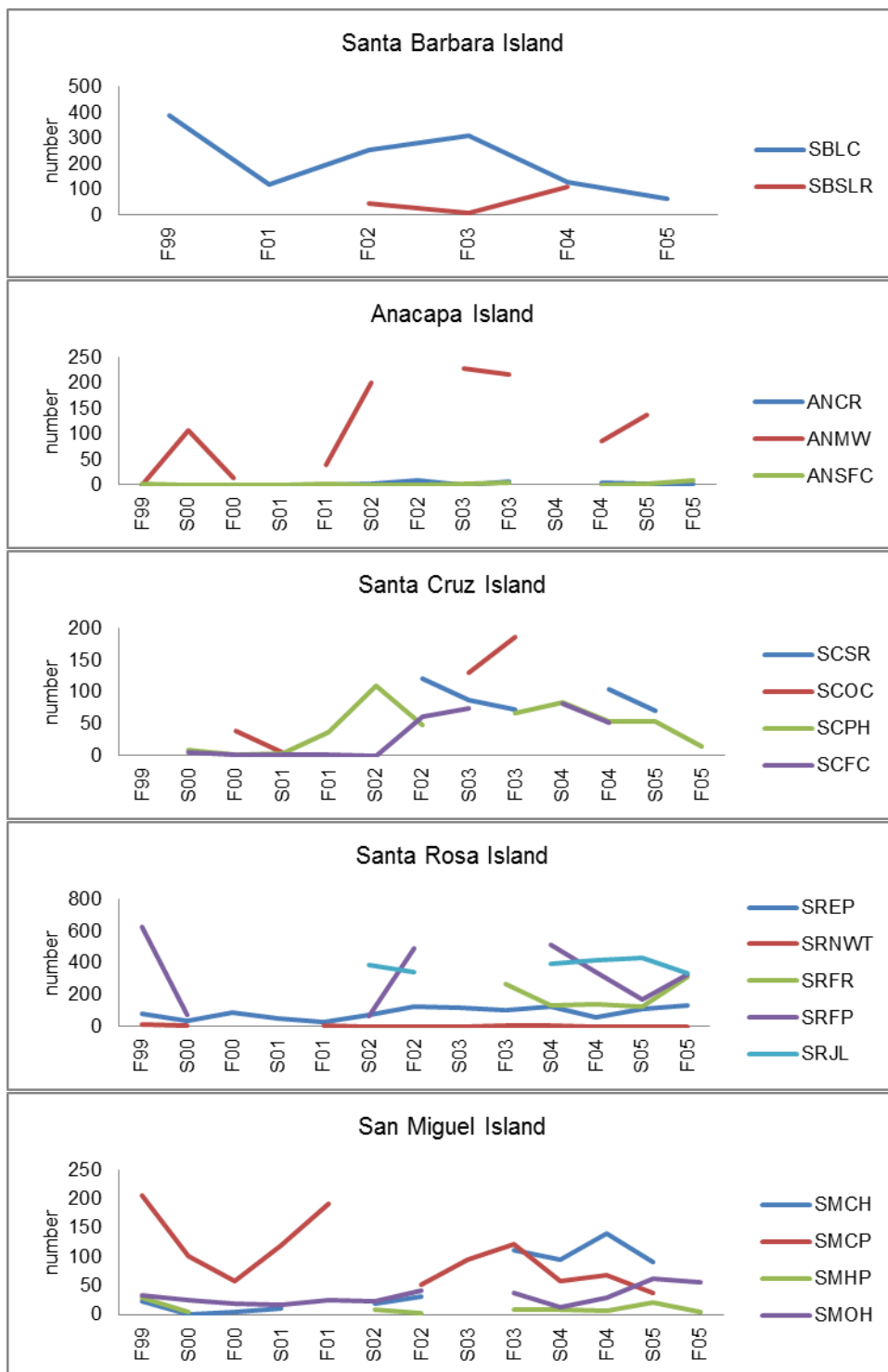


Figure 11. *Pisaster ochraceus* counts at each site from 1999-2010. Count data were derived from site-wide and timed-searches. Note that y-axes vary by graph.

***Phyllospadix* spp.**

Phyllospadix spp., surfgrass cover has been monitored at two sites on Santa Cruz Island since fall 1998, and at two sites on Santa Rosa Island since spring 2002 (Figures 12 and 13 and Appendix C). The four sites were chosen for study based on the relatively high density of surfgrass habitat present. *Phyllospadix torreyi* has been the dominant species in most transects but some *P. scouleri* has also been present.

Strong seasonal patterns have been observed over the years at the Santa Cruz Island sites (Fraser Cove and Trailer) whereby surfgrass overstory cover has routinely declined in spring and increased in fall. The same trend occurred in 2005 to some degree on all three transects at both sites. Five-sample moving trends indicate that surfgrass abundances on all transects except Transect-2 at Trailer gradually increased during 2005. *Phyllospadix* cover on Transect-2 declined slightly.

Santa Rosa Island sites, East Point and Northwest-Talcott, typically have not displayed a strong seasonal pattern in *Phyllospadix* spp. abundances. Instead, surfgrasses on all three transects at East Point and two at Northwest-Talcott have remained relatively stable over time. Transect-3 surfgrasses at the latter site declined once in 2003 by approximately 20% and have been gradually increasing since then. In 2005, the five other transects remained stable in terms of surfgrass abundance.

Bleached and abraded blades were noted as moderate in the spring surveys at Fraser Cove and Northwest-Talcott. The other two sites were recorded as being in good condition. At all sites, surfgrass was in good condition in the fall, though moderate bleaching was recorded at East Point.

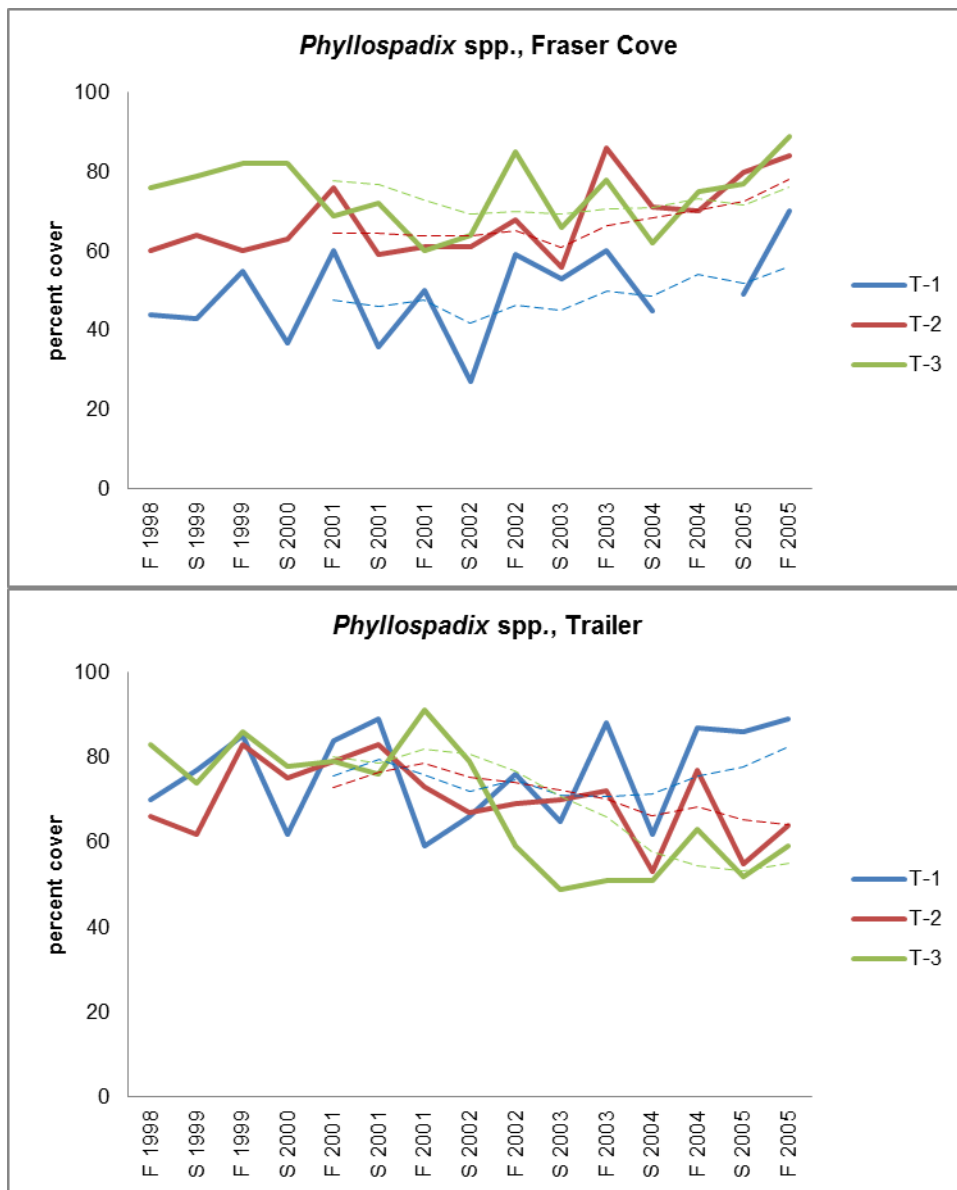


Figure 12. *Phyllospadix* spp. cover trends on 10m point-intercept transects at Santa Cruz Island. Dashed lines indicate five-sample moving trends for percent cover of *Phyllospadix* spp. cover on each transect.

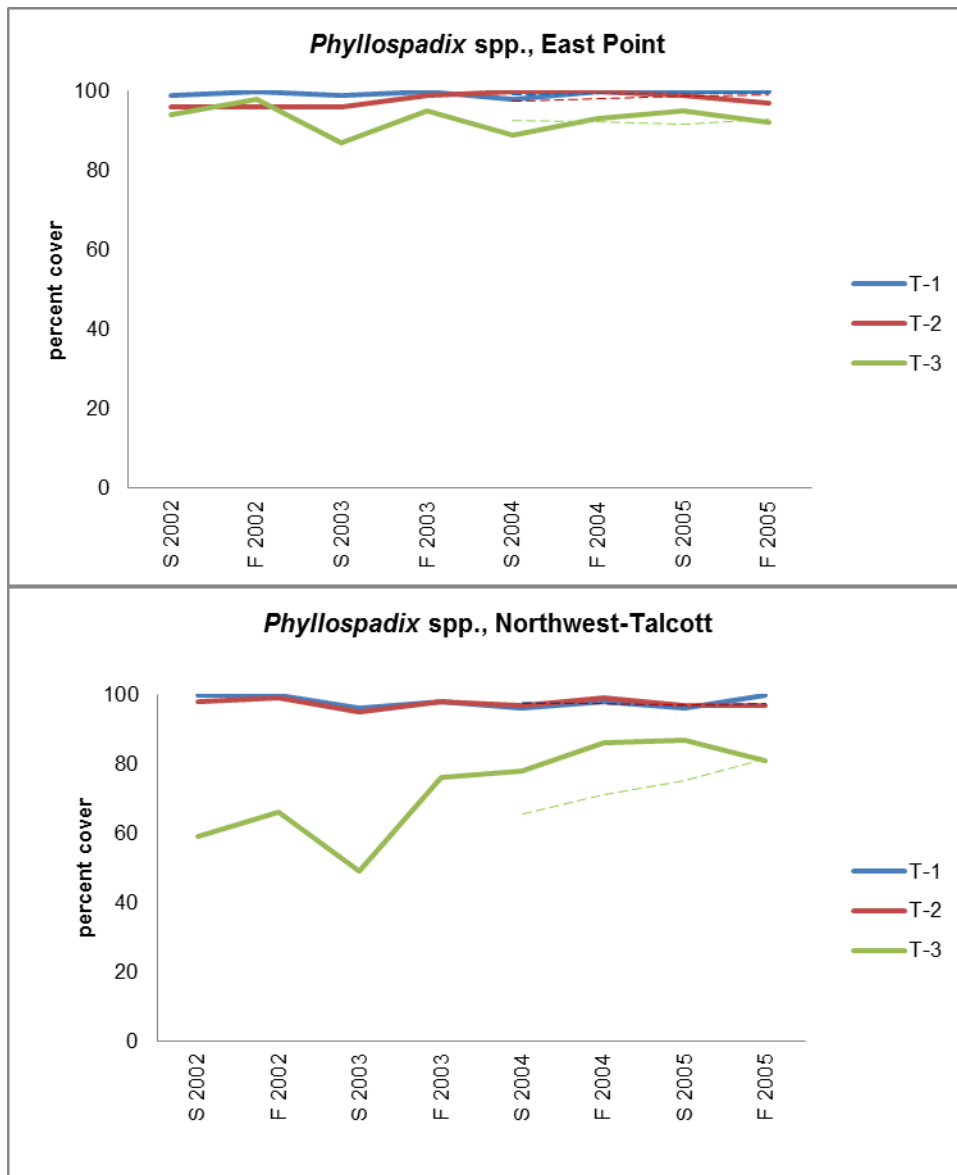


Figure 13. *Phyllospadix* spp. cover trends on 10m point-intercept transects at Santa Rosa Island. Dashed lines indicate five-sample moving trends for percent cover of *Phyllospadix* spp. cover on each transect.

Shorebirds and Pinnipeds

Tables 9 and 10 present a summary of the shorebirds and pinnipeds observed at the sites in 2005. In 2005 we had a total of six sightings of American Oystercatchers (*Haematopus palliatus*); three in spring and three in fall from four different sites. Black Oystercatchers (*H. bachmani*) were again the most ubiquitous shorebird. Prisoner's Harbor was the only site where we did not see black oystercatchers at least once during sampling in 2005. The largest group of black oystercatchers was at Fossil Reef, where we saw 17 (plus one American oystercatcher).

Black turnstones (*Arenaria melanocephala*) are usually common at several sites, but were not seen at all in spring and only small groups were seen at only four sites in fall. Other shorebirds seen at the monitoring sites were killdeer (*Charadrius vociferus*), ruddy turnstones (*Arenaria interpres*), wandering tattler (*Heteroscelus incanus*), sanderling (*Calidris alba*) and western sandpipers (*Calidris mauri*).

Seabirds such as pelicans and cormorants frequently use rocky points and islets as roosting areas. Western gulls (*Larus occidentalis*) are often seen foraging among the mussel beds and adjacent beaches. Terrestrial birds such as Say's phoebe (*Sayornis saya*), black phoebe (*Sayornis nigricans*) and American pipit (*Anthus rubescens*) occasionally feed on kelp flies in the intertidal zone. Common ravens (*Corvus corax*) frequent marine mammal carcasses along the shore but are often seen picking invertebrates from the mussel beds. Occasionally we see belted kingfishers (*Ceryle alcyon*) feeding in tidepools as we did at Orizaba Cove and Middle Anacapa in fall 2005. The great egret (*Casmerodius albus*) seen near South Frenchy's Cove was an unusual sighting. More extensive shorebird counts are reported in the beachwalk surveys (Richards and Rich, 2006).

Harbor seals, *Phoca vitulina*, were observed at or near eight different sites, including Prisoner's Harbor and Willows Anchorage. Due to boat traffic we often don't see seals nearby Prisoner's Harbor and Willows Anchorage. Often the pinnipeds we see are in the water watching us. Harbor seals were most numerous at Otter Harbor where they haul out on the protected flat rocky bench to rest at low tide. Most sightings occurred in fall.

Northern elephant seals, *Mirounga angustirostris*, usually prefer sandy beaches to rocky shelves to haul out. They are a common sight at Crook Point and Fossil Reef in the spring when we find weaned pups that haven't gone to sea yet or adults coming ashore to molt. Both sites have small sandy beaches adjacent to the reef. The beaches near Cuyler Harbor and Otter Harbor attract elephant seals into the vicinity of the rocky reef. Elephant seals gave birth to pups behind the Johnson's Lee site for the first time in 2005. At Northwest-Talcott more elephant seals than usual were present on the beach near the access.

California sea lions, *Zalophus californianus*, were common at both Santa Barbara Island sites where they can be very numerous. We were unable to sample Sea Lion Rookery because of pelican nests on the slope, but sea lions were observed from the trail overlook and were numerous on the reef as usual.

Table 9. Shorebirds and Pinnipeds at monitoring sites in spring 2005 (maximum seen at any onetime).
 (*= nearby but not on monitoring reef). See table 2 for site names.

<i>Site</i>	<i>Black Oystercatcher (American Oystercatcher)</i>	<i>Black Turnstone</i>	<i>Other birds</i>	<i>Phoca vitulina</i>	<i>Mirounga Angustirostris</i>	<i>Zalophus californianus</i>
ANCR	5			1		1
ANMW/ANME	3					
ANSFC	3					
SCFC	4		1 western gull			
(Forneys)						
SCFC	8					
(Fraser)						
SCPH			3 Killdeer*	1*		
SCSR	5 (1)					
SCTR	1		1 western gull			
SCWA	1*		Western gulls present	1*		
SREP	4		1 brown pelican, 3 cormorant, 30 western gull			
SRFP	2					
SRFR	3(1)		1 cormorant, 2 western gull	2	3	1
SRJL	4		7 western gull		23	
SRNWT					30*	
SMCH	4				15	
SMCP	4		1 ruddy turnstone, 2 wandering tattler, 15 western gull		17	
SMHP	5					
SMOH	8(1)		15 western gull	10	40 (incl. beach)	

Table 10. Shorebirds and Pinnipeds at monitoring sites in fall 2005 (maximum seen at any onetime).
 (*= nearby but not on monitoring reef). See table 2 for site names.

Site	Black Oystercatcher (American Oystercatcher)	Black Turnstone	Other birds	Phoca vitulina	Mirounga Angustirostris	Zalophus californianus
SBLC	2	3			1	120
ANCR	3(1*)		1 western gull, 1 great egret			
ANMW/ANME	4		1 belted kingfisher			
ANSFC	1		1 Say's phoebe	1		
SCFC	2		10 western gull,			
(Forneys)			200 sanderling			
SCFC	19		14 common raven			
(Fraser)						
SCOC	4		1 belted kingfisher	3		
SCPH			1 common raven, 3 killdeer, 2 western sandpiper			
SCTR	2					
SCWA						
SREP	3	3	10 cormorant, 5 western gull, 35 sanderling			
SRFP	6					
SRFR	17(1)	3	1 American pipit, 1 black phoebe, 60 cormorant, 30 western gull	1	1	
SRJL	2		30 western gull	1	2	
SRNWT	2		2western gull		1	
SMCH	3					
SMCP	6	2	30 cormorant, 2 western gull		2	
SMHP	7			6		
SMOH	6(1)		2 western gull	19	1	

Visitation

Visitation to Frenchy's Cove on Anacapa Island is reported here since trips to the site are usually conducted to visit tidepools. Most visitor experiences in the rocky intertidal occur at Frenchy's Cove, though some Santa Rosa Island visitors explore East Point tidepools with either a Park naturalist or on their own. Island Packers Company generally conducts classroom programs, combining oceanography with the tidepool experience for area school groups in the winter and spring months.

Visitation numbers for Frenchy's Cove are available from monthly reports based on concessionaire reporting from Island Packers Company and Truth Aquatics (Table 11, Figure 14). No records are available for the number of private boaters going ashore there, but that number is probably quite low. Visitation figures for East Point, Santa Rosa Island, another popular site with visitors, are not available.

The total visitation from concession boats in 2005 was only 1491 passengers (Table 11), the lowest number of visitors since 1993 (Figure 15). Weather, time of day that low tide occurs and various other factors all can affect visitation. April had the highest monthly visitation with 525 passengers during 6 trips. Nearly 74 percent of the visitation occurred in the spring (March-May). Visitation by the concession boats did not occur during June, August, September and December. Summertime low tides typically take place in the early morning, so visitation at the tidepools in the summer is difficult. The pattern of visitation was similar to previous years, but the overall number of trips each month has decreased. The trend for monthly visitation to Frenchy's Cove is shown in Figure 14.

Table 11. Visitors to South Frenchy's Cove, Anacapa Island in 2005 (visitation with Island Packers).

YEAR	MONTH	#Passengers	#TRIPS	Pass/trip
2005	January	42	1	42
2005	February	62	2	31
2005	March	426	5	85
2005	April	525	6	88
2005	May	152	3	51
2005	June	0	0	0
2005	July	107	1	107
2005	August	0	0	0
2005	September	0	0	0
2005	October	2	1	2
2005	November	175	3	58
2005	December	0	0	0
2005	total	1491	22	68

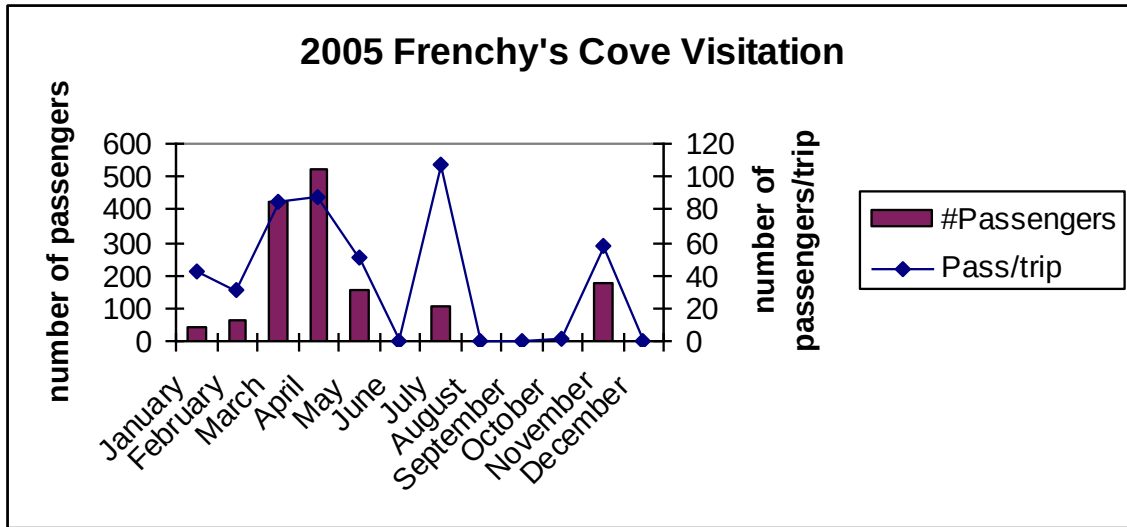


Figure 14. Visitation at Frenchy's Cove, Anacapa (Island Packers visitors).

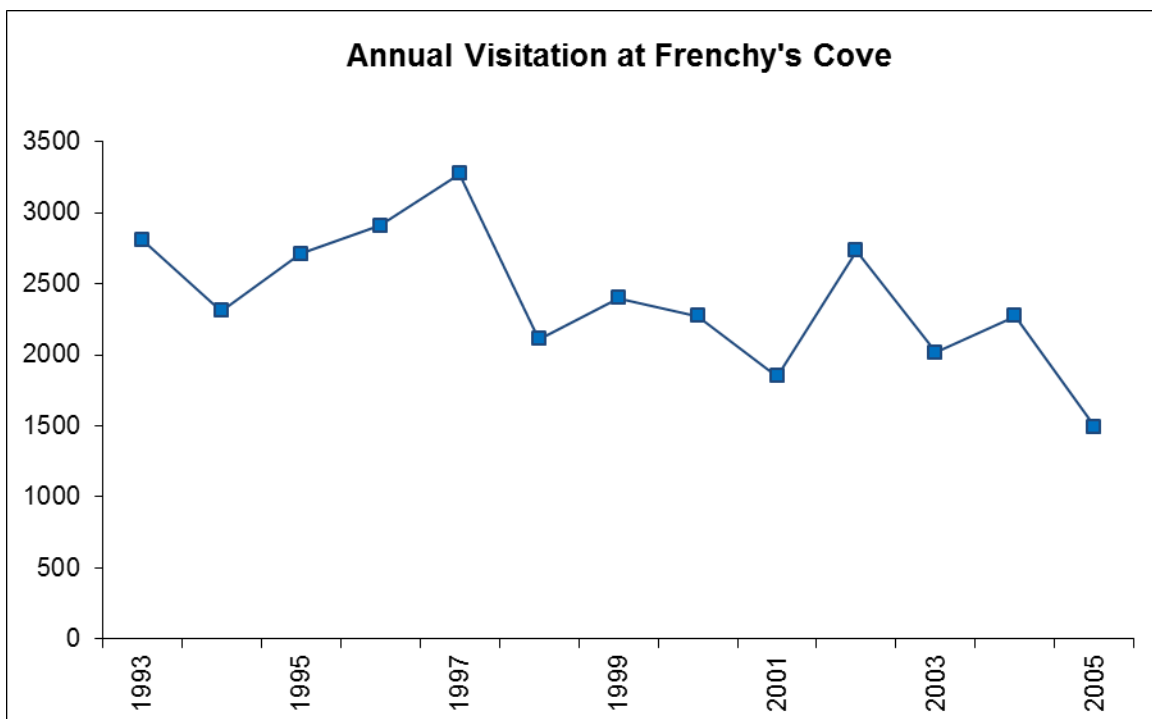


Figure 15. Annual Commercial Visitation at Frenchy's Cove, Anacapa (Island Packers visitors) 1993-2005.

Trip Reports

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 C. Explanations for missing or incomplete data are usually found there. Summary tables and figures in the trip reports present additional information on species monitored. For simplicity, photoplot data tables display the combinations of species in lumped categories used in previous reporting (non-core species are combined in miscellaneous plants or animals). Complete results of seastar, surfgrass and motile invertebrate sampling are presented in the daily trip reports. Trip reports generally reflect work done and species of note.

Observations on species not monitored can be found in the trip reports including island-wide bird lists, notes on unusual or interesting algae, or octopus sightings. For example we had two somewhat unusual brown alga sightings at San Miguel Island. *Costaria costata* was common at Harris Point in the spring and *Analipus japonica* was present at Crook Point again. Feral pigs were observed feeding on mussels at Prisoners Harbor in October.

Field logs (data sheets completed in the field for each site) indicate the relative abundance, health and recruitment for approximately 35 species or taxa. These forms along with all the original data sheets are scanned and stored with the digital images for each site.

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

Discussion

Climate-wise, 2005 was a fairly average year for the rocky intertidal community. During the later part of 2004 and early 2005, the NOAA Climate Prediction Center reported temperature anomalies slightly above average (NOAA Climate Prediction Center website). 2005 ended with a few months of a slight negative anomaly. We received heavy rain during the first three months of 2005, but storm events did not seem to be particularly devastating and no major impacts were recorded.

Acorn barnacle recruitment was high during the summer and we saw high cover of both *Chthamalus* sp and *Balanus glandula* in the fall samples. *Mytilus californianus* recruitment seemed high throughout the year and cover was at record levels at some sites. Algal cover was generally high but rockweeds (*Silvetia compressa* and *Hesperophycus californicus*) continued to decline at nearly all sites. High variability was the most consistent aspect of the photoplot monitoring.

Possibly because of the high recruitment experienced in 2005, there was high cover of *Mytilus californianus* in the mussel plots at Prisoners Harbor. In 2003, the outer reef had been nearly stripped of all mussels and feral pigs were suspected of causing much of the damage. Pigs had been observed on that part of the reef in 2004 feeding on mussels (Richards and Rich 2010). We observed a pig on the inner reef eating mussels in October of 2005 (Figure 16). The majority of pigs had been eradicated from Santa Cruz Island by the end of 2005 and the final pigs were eliminated in 2006.



Figure 16. Feral pig damage to mussel bed at Prisoners Harbor. A pig was observed feeding on mussels in October 2005. This area had complete mussel cover two days before.

Sand influx can greatly impact the rocky intertidal. Sand movement over a reef can scour organisms down to bare rock. Many of the plants and animals in the intertidal zone can tolerate some sand burial, but if they remain buried too long, they can suffocate or starve. When we arrived at Johnson's Lee in January 2006, the sand level was quite high and plots were completely buried (Figure 17). We have seen sand bury the cobblestones behind the site before but had not observed this sort of direct impact to the plots before. Such an influx may be short lived and we were just lucky enough to see it this time. Sand burial might be responsible for some of the declines we have seen in invertebrates and algae in some plots. *Lottia gigantea* numbers declined in the last decade and plots with the largest decline were partially buried by sand in January. Frequent sand burial may cause the limpets to migrate away from the plots.



Figure 17. *Pisaster ochraceus* mostly buried by sand at Johnson's Lee, Santa Rosa Island.

In general, *Haliotis cracherodii* numbers remained at very low levels. We did see an increase in *H. cracherodii* recruitment at San Miguel and Santa Cruz Islands. Willows Anchorage especially showed promise for at least a small recovery. Yet, we still only saw nine abalone at Willows Anchorage. Five of those nine were under 50 mm and all were under 100 mm. There appears to be a strong age class entering the emergent abalone population, seen in the bimodal curve in fall (Figure 5). Based on length to age estimates (Haaker *et al.* 1995), 2000-2001 seems to have been a good larval settlement year. The trend for mean size at San Miguel is almost flat while it declined at Santa Cruz Island indicating increased numbers of juveniles and the hope of some growth in the population. The emergent abalone we saw in 2005 were probably about the right

age to correspond with the recruitment observed at San Nicolas Island in 2001-2002 (Van Blaricom pers. com.). We also found an empty 30 mm shell at Willows. This exemplifies concern for survival of juvenile abalone, with increasing populations of *Pisaster ochraceus* at many of the sites, including Willows Anchorage. At Santa Rosa Island, black abalone sizes were skewed toward larger sizes, indicating an aging population (see Santa Rosa Island fall trip report. Appendix C). We have not seen any sign of recruitment in recent years at Santa Rosa Island.

In 2005 one abalone was recorded as being withered, though it was apparently feeding and strongly holding the rock. This may be an indication that Withering Syndrome is still present (Haake *et al.* 1992, Richards and Davis 1993) At least two *P. ochraceus* were found at Landing Cove that exhibited symptoms of wasting disease and several others had healed-over wounds consistent with previous bouts of the infection. We typically observe disease symptoms during warm water events (Lafferty 1993, J. Engle pers. com.)

Lottia gigantea densities at all islands exhibited declining trends over the last 5-10 years. In 2005, the densities at all sites seemed to stabilize somewhat with either slight declines or small increases. We found small *L. gigantea* (<20 mm) at all sites except Trailer. The largest *L. gigantea* were typically at the sites with smooth sandstone or shale. The smallest maximum sizes were found at the sites that tend to have a high number of mussels or other organisms in the plots.

We focused on Anacapa motile invertebrates with interest in changes that may be a result of the black rat eradication completed in 2002 (Howald *et al.* 2005). Trends between 2000 and 2005 were positive for *Nucella emarginata* at Middle West and South Frenchy's Cove. *Ocenebra circumtexta* showed a slightly positive trend at Cat Rock, though the numbers were low overall. Cat Rock was quite different from the other two sites with very low abundances of all species except *Nuttalina* spp. which had a positive trend. At the other two Anacapa sites *Nuttalina* spp. had a declining trend. *Acanthina* sp. had a declining trend at all three sites. Smaller sizes have also been found at the Anacapa sites since 2002. Increased recruitment could be a coincidence and further analysis is required. It may still be too soon to make any conclusions about the recovery of small snails in the absence of rats.

A small red alga was discovered growing on and among mussels just to the upper right of plot 53 at the Anacapa Middle East site. Members of the Coastal Biodiversity Transect Team agreed it looked like *Caulacanthus ustulatus*. A voucher was collected for confirmation and sent to the Jepson Herbarium. Initial analysis from Kathy-Ann Miller confirmed the identification. This is the first discovery of this alien alga at the northern islands. The only patch found was about 30cm in diameter but was well-mixed into the matrix of the reef community (Figure 18).



Figure 18. *Caulacanthus ustulatus* (the bright red alga here) growing over and among *Mytilus californianus* at Middle East Anacapa Island.

Caulacanthus ustulatus has been spreading throughout southern California since 1999 and appears to occupy large areas of the mid to upper intertidal zones at monitoring sites in Orange County (Whiteside *et al.* 2007). This red alga had not been found at the islands previously. It is unknown what the ecological impacts will be and whether it will crowd out other species or be acceptable as forage for native invertebrates. Because of the possibility of fragments spreading the colony further, we did not try to eradicate the alga. This alga looks similar to *Endocladia muricata* and could also be mistaken for a *Gelidium* sp.; however, it appears to be brighter red color and the branch tips are more pointed.

Sargassum muticum is the only other non-indigenous species of alga known from the northern islands in 2005. *Sargassum muticum* has been in the area for at least 25 years and is commonly found at all the islands, both intertidally and subtidally. It does not appear to cause problems by forming dense monocultures in the intertidal zone where it generally occurs sporadically in tidal pools. *Sargassum muticum* may create cover for some organisms in pools but there it mostly has tough woody stipes and may not be a preferred food item. *Undaria pinnatifolia* had been found in mainland harbors and is known from one location on Catalina Island. It is still unknown on the northern Channel Islands (Miller and Engle 2009).

This monitoring program remains important for documenting the status of species of concern like the black abalone, monitoring the occurrence and distribution of alien species and collecting baseline information which will lead to greater understanding of the marine ecosystem.

Literature Cited

- Abbott, I. A. and G. J. Hollenberg. 1976. Marine Algae of California. Stanford University Press, Stanford, CA.
- Coastal Biodiversity Survey website, University of California Santa Cruz. Available at <http://cbsurveys.ucsc.edu/index.html> (accessed February 2009).
- Dailey, M. D., J. W. Anderson, D. J. Reish and D. S. Gorsline. 1993. The southern California Bight: background and setting. Pages 1-18 in Dailey, M. D., D. J. Reish and J. W. Anderson, editors. Ecology of the Southern California Bight, A Synthesis and Interpretation. University of California Press, Berkeley, CA.
- Davis, G. E., D. V. Richards, P. L. Haaker and D. O. Parker. 1992. Abalone population declines and fishery management in southern California. Pages 237-249 in S. A. Shepherd, M. J. Tegner and S. A. Guzmán del Prío, editors. Abalone of the World. Blackwell Scientific Publications, Oxford, England.
- Dunaway, M. E., Ambrose, R. A., Campbell, J., Engle, J. M., Hill, M., Hymanson, Z. and D. Richards. 1998. Establishing a Southern California rocky intertidal monitoring network. Pages 1278-1294 in Magoon, O. T., Converse, H., Baird, B. and M. Miller-Henson, editors. California and the World Ocean '97. American Society of Civil Engineers, Reston, VA.
- Engle, J. M. 2005. Unified Monitoring Protocols for the Multi-Agency Rocky Intertidal Network (November 2005 Update). OCS Study MMS 05-. Minerals Management Service. Camarillo, CA.
- Engle, J. M. D. L. Martin, J. Altstatt, R. F. Ambrose and P. T. Raimondi. 1998. Rocky Intertidal Monitoring Handbook for Santa Cruz Island. Santa Cruz Island Shoreline Inventory, Appendix A. Prepared for: California Coastal Commission.
- Engle J. M. and D. V. Richards. 2001. New and unusual marine invertebrates discovered at the California Channel Islands during the 1997-1998 El Nino. Southern California Academy of Sciences. 100(3):186-198.
- Haaker, P.L., D. O. Parker, C. S. Y. Chun. 1995. Growth of black abalone, *Haliotis cracherodii* Leach, at San Miguel Island and Point Arguello, California. J. Shellfish Research. 14:519-525.
- Haaker, P. L., D. V. Richards, C. S. Friedman, G. E. Davis, D. O. Parker and H. A. Togstad. 1992. Mass mortality and withering syndrome in black abalone, *Haliotis cracherodii*, in California. Pages 214-224 in S. A. Shepherd, M. J. Tegner and S. A. Guzmán del Prío, editors. Abalone of the World. Blackwell Scientific Publications, Oxford, England.
- Howald, G. R., K. R. Faulkner, B. Tershy, B. Keitt, H. Gellerman, E. M. Creel, M. Grennell, S. T. Ortega and D. Croll. 2005. Eradication of Black Rats from Anacapa Island: Biological and Social Considerations. Pages 299-312 in Garcelon, D. K. and C. A. Schwemm eds.

- Proceedings of the sixth Channel Islands symposium 2005. National Park Service Technical Publication CHIS-05-01, Institute for Wildlife Studies, Arcata, CA.
- Lafferty, K. D. and A. M. Kuris. 1993. Mass mortality of abalone *Haliotis cracherodii* on the California Channel Islands: Tests of epidemiological hypotheses. Marine Ecology Progressive Series 96:239–248.
- Littler, M. M. 1978. Assessments of visitor impact on spatial variations in the distribution and abundance of rocky intertidal organisms on Anacapa Island, California. United States National Park Service, Contract No. CX 8000-8-0010, Ventura, CA.
- MARINE, Multi-Agency Rocky Intertidal Network website: www.marine.gov. Accessed July 2009.
- McLean, J. H. 1978. Marine Shells of Southern California. Natural History Museum of Los Angeles County, Science Series 24, Revised Edition: 1-104.
- Miller, K. A. and J. M. Engle. 2009. The natural history of *Undaria pinnatifida* and *Sargassum filicinum* at the California Channel Islands: non-native seaweeds with different invasion styles. Pages 131-140 in Damiani, C. C. and D. K. Garcelon, eds. Proceedings of the Seventh California Islands Symposium, Oxnard, California, February 5-8, 2008. Institute of Wildlife Studies, Arcata California.
- Morris, R.D., D.P. Abbott and E. Haderlie. 1980. Intertidal Invertebrates of California. Stanford University Press, Stanford, CA.
- Murray, S.N., R.F. Ambrose and M.N. Dethier. 2006. Monitoring Rocky Shores. University of California Press, Berkeley and Los Angeles, CA.
- NOAA Climate Prediction Center website:
http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ensostuff/ensoyears.shtml. Accessed February 2009.
- Richards, D. V. 1986. Rocky intertidal ecological monitoring at Channel Islands National Park, California 1982-1985. Channel Islands National Park and National Marine Sanctuary Natural Science Reports, CHIS-86-002.
- Richards, D. V. 1988. Rocky intertidal ecological monitoring at Channel Islands National Park, California 1986-1987. Channel Islands National Park Natural Science Reports, CHIS-88-001.
- Richards, D. V. 1998. Rocky Intertidal Community Monitoring, Channel Islands National Park, 1997 Annual Report. Channel Islands National Park Technical Report 98-07.
- Richards, D. V. and G. E. Davis. 1988. Rocky Intertidal Communities Monitoring Handbook. National Park Service. Channel Islands National Park. Ventura, CA. NTIS.

- Richards, D. V. and G. E. Davis. 1993. Early warnings of modern population collapse in black abalone *Haliotis cracherodii*, Leach, 1814 at the California Channel Islands. *Journal of Shellfish Research* 12(2): 189-194.
- Richards, D. V. and D. Lerma. 2000. Rocky Intertidal Community Monitoring, Channel Islands National Park, 1998 Annual Report. Channel Islands National Park Technical Report 2000-03.
- Richards, D. V. and D. Lerma. 2002. Rocky Intertidal Community Monitoring, Channel Islands National Park, 1999 Annual Report. Channel Islands National Park Technical Report 2002-03.
- Richards, D. V. and D. Lerma. 2005a. Rocky Intertidal Community Monitoring, Channel Islands National Park, 2000 Annual Report. Channel Islands National Park Technical Report 2005-05. Richards, D. V. and D. Lerma. 2005b. Rocky Intertidal Community Monitoring, Channel Islands National Park, 2001 Annual Report. Channel Islands National Park Technical Report 2005-08.
- Richards, D. V. and D. Lerma. 2005b. Rocky Intertidal Community Monitoring, Channel Islands National Park, 2001 Annual Report. Channel Islands National Park Technical Report 2005-08.
- Richards, D. V., D. Lerma and P. J. Rich. 2010. Rocky Intertidal Community Monitoring at Channel Islands National Park, 2002 Annual Report. Natural Resource Technical Report NPS/CHIS/NRTR—2010/362. National Park Service, Fort Collins, CO.
- Richards, D. and P. Rich. 2006. Beachwalk monitoring on the northern Channel Islands, California, 2005 Annual Report. Technical Report CHIS-06-01.
- Richards, D. V. and P. J. Rich. 2009. Rocky Intertidal Community Monitoring, 2003 Annual Report. Natural Resource Technical Report NPS/CHIS/NRTR—2009/263. National Park Service, Fort Collins, CO.
- Richards, D. V. and P. J. Rich. 2010. Rocky intertidal community monitoring at Channel Islands National Park: 2004 Annual Report. Natural Resource Data Series NPS/CHIS/NRDS—2010/064. National Park Service, Fort Collins, CO.
- Silva P. and K. A. Miller http://ucjeps.berkeley.edu/california_seaweeds.html Accessed 9 June 2010.
- Smith, R. I. and J. T. Carlton, editors. 1975. *Light's Manual: Intertidal Invertebrates of the Central California Coast* (3rd edition). University of California Press, Berkeley, CA.
- VTN Oregon, Inc. 1984. Visitor impact and recover on Channel Islands tide pools: Management Report. U.S. National Park Service, Contract No. CX 8000-1-0054. Ventura, CA.

Whiteside, K. E. J. R. Smith, S. N Murray. 2007. Distribution, habitat utilization and reproductive patterns in *Caulacanthus ustulatus* (Caulacanthaceae, Gigartinales), a newly established seaweed on southern California shores. Bulletin- Southern California Academy of Sciences, 106(2) 8.

Appendix A: Program Notes

Dan Richards and Paula Rich led the 2005 sampling effort and conducted most of the samples. In 2005 we conducted beachwalk surveys primarily to locate and enumerate carcasses on the island beaches to learn about potential food sources for bald eagles as part of their re-introduction to the Channel Islands (Richards and Rich 2006). The beachwalk surveys were funded by the Montrose Settlement Restoration Program and were done on the two western islands in conjunction with the rocky intertidal monitoring trips.

There were some significant personnel changes in 2005. Paula Rich was biotech on the rocky Intertidal monitoring through spring 2005 and helped with report editing, data entry and did most of the plot scoring over several years. She left the park in mid-2005. Susie Tharratt was hired as the new biotech in late January 2006 after several delays in the process. The result was that Dan did much of the fall monitoring alone or with volunteers. Rocky Rudolph was hired as a Student Conservation Association intern in January 2005 to assist with the rocky intertidal monitoring program. He helped with fieldwork for the last of the fall 2004 sampling and the spring 2005 sampling. Rocky was primarily assigned the task of organizing the digital images into portfolio catalogs and adding metadata. Together we came up with procedures for naming files, organizing files and adding metadata. He also worked with the GIS site maps that Jill Komoto had started, and did some additional mapping and file cleanup of those maps.

Logistically we were unable to visit all the sites in each season because we were unable to secure boat transportation to Orizaba. We did not have time while working the morning tide at Anacapa to visit the ANME site in spring. Pelicans began nesting the week we arrived on Santa Barbara Island on 9 November and a large number were building nests on the hillside above Sea Lion Rookery. We also got over 0.8 inches of rain in two days that week. The island apparently got about 1.2-1.5 inches in October.

The only changes to sampling were the addition of two new plots. We created a new *Hesperophycus* zone plot at Trailer in spring 2005. A rock break in one of the plots (He4) broke off about a third of the rock face and that seemed to change the rock level which may affect the plot as future *Hesperophycus* habitat. We will continue to monitor both the new and old plots in the future. We also replaced the mussel plot (531) at Ford Point that was lost in 2004 when a large part of the reef broke apart. The new mussel plot is higher on the reef and has similar density to the original plot in 2003, before it was damaged.

Some images of photoplots at East Point were lost due to a bad memory card. The site was visited two days later to reshoot the missing plots, however. Generally the digital camera has worked out very well with overall fewer glitches than film.

Dense mussels made it difficult to locate all the plot corners at some sites. We had to rely on inter-plot distance and bearing measurements to place plot 266 at South Frenchy's Cove since we could find none of the corner markers.

Sand levels were very high in the fall sampling at Johnson's Lee and sand at least partially covered several photoplots and Lottia plots. Normally the area behind the rocky bench may see

dramatic fluctuations in sand level, but we haven't seen it impact the plots very often. Sand may have impacted *Lottia* plots before without our seeing it and that may be one reason *Lottia gigantea* numbers have declined there.

Furthering the program and relationships with others, Dan presented a summary of the CINP monitoring program to the MARINe workshop in Santa Cruz including some trend data. In addition to the photoplot data, we sent motile invert data to Melissa Miner at UCSC who will be the "keeper of this data" for MARINe.

We assisted Julie Bursek (CINMS) with LiMPETS program at Frenchy's by providing graphs, maps and discussion of monitoring. We were unable to attend the LiMPETS field trip 3/5/05.

The Coastal Biodiversity Surveys (<http://www.piscoweb.org/research/science-by-discipline/ecosystem-monitoring/rocky-shore-monitoring>) were conducted at Anacapa in the fall in a joint monitoring trip between the park and PISCO. PISCO continued sampling barnacle and mussel recruitment at five Santa Cruz Island sites. They also monitor temperature and in 2005 began using temperature loggers embedded in black epoxy shaped like mussels. These "robo-mussels" mimic the thermal characteristics of real mussels were placed at various tide heights within the range of the mussel bed.

Temperature loggers were placed at a number of sites in a cooperative study with PISCO (UCSB). Optic Stowaway temperature loggers from Onset Computer Corporation were placed in PVC (Polyvinyl Chloride) pipe housings strapped to rocks near the mean tide line. Units were downloaded in the field to an Optic Shuttle device and processed with Onset's Boxcar software.

We hosted Sonya Fairbanks and Connie Jenkins for the Artists in the Park program, that allowed artists to spend time in the field with biologists to see different parts of the park not often visited. They both spent time with us at Santa Rosa Island and both painters were inspired to create works on the rocky intertidal.

Ian Taniguchi from California Department of Fish and Game joined us for part of the spring monitoring at Santa Rosa Island to assess the black abalone and help us with the monitoring.

Beachwalk surveys (shorebirds, pinnipeds and carcass counts) were conducted in conjunction with the rocky intertidal monitoring on San Miguel and Santa Rosa Islands making use of the personnel and island time. Western snowy plover surveys on Santa Rosa Island were conducted during the winter and spring rocky intertidal field trip.

Several events happened during the year which did or could impact the rocky intertidal at the Channel Islands. We had extreme weather with lots of rain in January 2005. During that month there was a large landslide in La Conchita, between Ventura and Santa Barbara on the mainland coast. Though a large amount of soil slumped; burying houses and roads, there was no apparent direct impact to the nearshore zones which are mostly sandy in that area. Subsequent sedimentation was slow and probably did not impact the island environment. We experienced rough conditions including rain, strong winds and heavy surf at several sites that prevented or limited our seastar and abalone searches. There was significant rain over New Years 2006 dumping 3-4 inches in some areas. There was heavy run-off from the islands, but roads were

okay on Santa Rosa Island by January 10. We got one day of light rain on January 14. The rest of the month was dry with Santa Ana winds common.

A large 'mystery' oil spill along the mainland coast in January 2005 was determined to be from natural seep around Platform Holly. We saw some fresh tar at Frenchy's Cove in January that was not necessarily associated with the event. Numerous birds were oiled between Santa Barbara and Ventura, but no effects were noted at the islands. We reported on this event in the 2004 report (Richards and Rich 2010).

The passenger fishing vessel *Charger* went aground in Bechers Bay on rocks below the Torrey Pines. It broke up, losing about 400 gal of diesel. Bill Strubble did the investigation and reported a sheen that spread northwest of the wreck and stayed in the area at least two days because of the calm conditions.

A pig was observed feeding on mussels by Carol Blanchette and Dan on 10/18/05 at Prisoners Harbor when we arrived at the site. Another pig was observed eating *Zostera* drift on the cobble beach west of the Prisoners Harbor site. Pig eradication on Santa Cruz Island began in early April 2005 and was completed in 2006.

Appendix B. 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 2005, horse mussels, *Septifer bifurcates* or *Brachidontes adamsianus* were scored as their own category, but are included in miscellaneous invertebrates in the tables. Misc. Algae and Misc. Animals include a variety of different species. Since 2001, we have identified most organisms to the species level and have added to them to the database; however, because most are rare and for ease of comparison to past data, they are lumped here for convenience. Bare Rock is just that, however we had no way to detect the presence of Cyanobacteria. The *Other* category is a “catch-all” category including unidentified points.

**Table B1. Percent Cover of Index Species
Cat Rock, Anacapa Island - Spring 2005 (6/24/05)**

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	52	19	0	16	11	0	0	0	0	2	0	0	0	100
	32	55	28	0	16	1	0	0	0	0	0	0	0	0	100
	33	16	1	0	5	78	0	0	0	0	0	0	0	0	100
	35	37	21	0	13	28	0	0	0	0	1	0	0	0	100
	36	41	4	0	8	47	0	0	0	0	0	0	0	0	100
	37	47	4	0	4	36	8	0	0	0	1	0	0	0	100
	38	54	34	0	12	0	0	0	0	0	0	0	0	0	100
	39	59	34	0	0	7	0	0	0	0	0	0	0	0	100
	135	56	33	0	3	6	2	0	0	0	0	0	0	0	100
	Mean	46.33	19.78	.00	8.56	23.78	1.11	.00	.00	.00	.44	.00	.00	.00	100.00
	StDev	13.49	13.69	.00	5.92	26.20	2.67	.00	.00	.00	.73	.00	.00	.00	.00
Endocladia	13	17	10	8	61	0	0	4	0	0	0	0	0	0	100
	14	29	15	17	25	0	0	11	0	0	3	0	0	0	100
	19	17	2	0	55	12	13	0	0	0	1	0	0	0	100
	51	19	22	5	12	0	0	0	4	0	36	2	0	0	100
	52	14	4	8	35	0	0	10	13	1	15	0	0	0	100
	54	13	1	14	29	0	0	3	20	0	18	2	0	0	100
	212	10	5	2	79	0	0	3	0	0	1	0	0	0	100
	467	18	8	12	36	0	0	12	4	0	9	1	0	0	100
	492	20	5	7	52	1	11	0	0	0	2	2	0	0	100
	Mean	17.44	8.00	8.11	42.67	1.44	2.67	4.78	4.56	.11	9.44	.78	.00	.00	100.00
	StDev	5.36	6.78	5.51	20.73	3.97	5.32	4.92	7.20	.33	11.93	.97	.00	.00	.00
Silvetia (Rockweed)	2	34	11	0	24	9	22	0	0	0	0	0	0	0	100
	3	42	14	0	5	14	24	0	0	0	1	0	0	0	100
	4	18	9	0	9	7	57	0	0	0	0	0	0	0	100
	5	15	22	7	31	0	13	5	0	0	7	0	0	0	100
	6	15	5	0	11	6	61	0	0	0	2	0	0	0	100
	8	19	5	0	2	0	74	0	0	0	0	0	0	0	100
	9	9	3	0	4	6	78	0	0	0	0	0	0	0	100
	10	21	11	0	9	1	58	0	0	0	0	0	0	0	100
	55	22	31	2	28	4	0	2	0	0	11	0	0	0	100
	Mean	21.67	12.33	1.00	13.67	5.22	43.00	.78	.00	.00	2.33	.00	.00	.00	100.00
	StDev	10.22	9.04	2.35	11.00	4.60	28.46	1.72	.00	.00	3.97	.00	.00	.00	.00

**Table B1. Percent Cover of Index Species
Cat Rock, Anacapa Island - Spring 2005 (6/24/05) (continued)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Mussels	56	15	8	27	0	0	0	45	0	0	5	0	0	0	100
	164	20	5	17	2	0	0	55	0	0	1	0	0	0	100
	203	24	7	8	0	0	0	57	0	0	4	0	0	0	100
	204	5	1	11	0	0	0	78	0	0	5	0	0	0	100
	468	21	6	14	0	0	0	43	1	0	15	0	0	0	100
	470	31	4	22	4	0	0	31	0	0	8	0	0	0	100
	471	23	11	17	11	0	0	16	0	0	22	0	0	0	100
	472	9	3	8	0	0	0	77	0	0	3	0	0	0	100
	473	29	7	6	4	0	0	37	0	0	16	1	0	0	100
	Mean	19.67	5.78	14.44	2.33	.00	.00	48.78	.11	.00	8.78	.11	.00	.00	100.00
	StDev	8.65	2.95	7.02	3.67	.00	.00	20.41	.33	.00	7.17	.33	.00	.00	.00

**Table B2. Percent Cover of Index Species
Middle-West, Anacapa Island - Spring 2005 (6/23/05)**

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	69	23	0	2	0	0	0	0	0	2	0	0	4	100
	448	37	14	0	27	0	0	6	1	1	13	0	0	1	100
	449	39	4	0	17	0	0	0	0	0	39	1	0	0	100
	450	43	7	0	20	1	0	0	0	0	29	0	0	0	100
	451	43	10	0	37	0	0	1	0	0	9	0	0	0	100
	Mean	46.20	11.60	.00	20.60	.20	.00	1.40	.20	.20	18.40	.20	.00	1.00	100.00
	StDev	13.01	7.37	.00	12.93	.45	.00	2.61	.45	.45	15.19	.45	.00	1.73	.00
Endocladia	457	19	2	2	25	0	0	42	0	0	10	0	0	0	100
	458	37	4	4	27	0	0	24	0	1	2	1	0	0	100
	459	55	15	1	20	0	0	6	0	0	3	0	0	0	100
	460	45	18	0	35	0	0	0	0	0	2	0	0	0	100
	461	76	4	0	18	0	0	0	0	0	2	0	0	0	100
	Mean	46.40	8.60	1.40	25.00	.00	.00	14.40	.00	.20	3.80	.20	.00	.00	100.00
	StDev	21.16	7.33	1.67	6.67	.00	.00	18.30	.00	.45	3.49	.45	.00	.00	.00
Silvetia (Rockweed)	452	34	4	0	2	0	59	0	0	0	1	0	0	0	100
	453	33	0	0	0	0	62	0	0	0	5	0	0	0	100
	454	11	1	0	13	0	0	0	18	0	57	0	0	0	100
	455	32	2	0	6	0	35	2	3	0	20	0	0	0	100
	456	37	2	1	0	0	48	1	0	0	11	0	0	0	100
	Mean	29.40	1.80	.20	4.20	.00	40.80	.60	4.20	.00	18.80	.00	.00	.00	100.00
	StDev	10.45	1.48	.45	5.50	.00	25.15	.89	7.82	.00	22.52	.00	.00	.00	.00
Mussels	462	17	4	1	2	0	0	70	0	1	4	1	0	0	100
	463	18	4	3	0	0	0	65	0	0	10	0	0	0	100
	464	13	1	1	0	0	0	81	1	0	3	0	0	0	100
	465	6	4	0	2	0	0	82	0	0	6	0	0	0	100
	466	2	0	0	0	0	0	96	0	0	2	0	0	0	100
	Mean	11.20	2.60	1.00	.80	.00	.00	78.80	.20	.20	5.00	.20	.00	.00	100.00
	StDev	6.98	1.95	1.22	1.10	.00	.00	12.03	.45	.45	3.16	.45	.00	.00	.00

**Table B3. Percent Cover of Index Species
S. Frenchy's Cove, Anacapa Island - Spring 2005 (6/24/05)**

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	37	36	0	24	3	0	0	0	0	0	0	0	0	100
	250	36	48	0	16	0	0	0	0	0	0	0	0	0	100
	251	42	48	0	9	1	0	0	0	0	0	0	0	0	100
	252	28	54	0	17	0	0	0	0	0	0	0	1	0	100
	253	41	41	0	11	7	0	0	0	0	0	0	0	0	100
	Mean	36.80	45.40	.00	15.40	2.20	.00	.00	.00	.00	.00	.00	.20	.00	100.00
	StDev	5.54	6.99	.00	5.86	2.95	.00	.00	.00	.00	.00	.00	.45	.00	.00
Endocladia	154	33	14	0	49	0	0	0	0	0	0	0	0	4	100
	155	14	0	0	69	0	17	0	0	0	0	0	0	0	100
	256	27	2	0	64	0	6	0	0	0	1	0	0	0	100
	257	19	1	0	79	0	0	0	0	0	1	0	0	0	100
	258	14	0	0	42	0	43	0	0	0	1	0	0	0	100
	Mean	21.40	3.40	.00	60.60	.00	13.20	.00	.00	.00	.60	.00	.00	.80	100.00
	StDev	8.38	5.98	.00	15.01	.00	18.05	.00	.00	.00	.55	.00	.00	1.79	.00
Silvetia (Rockweed)	259	17	2	0	0	0	74	0	0	0	7	0	0	0	100
	260	19	3	0	6	0	71	0	0	0	0	1	0	0	100
	261	31	5	0	0	0	59	0	0	0	5	0	0	0	100
	262	40	28	0	18	0	14	0	0	0	0	0	0	0	100
	263	8	2	0	1	0	0	87	0	0	1	0	0	1	100
	Mean	23.00	8.00	.00	5.00	.00	43.60	17.40	.00	.00	2.60	.20	.00	.20	100.00
	StDev	12.55	11.25	.00	7.68	.00	34.24	38.91	.00	.00	3.21	.45	.00	.45	.00
Mussels	201	0	0	0	1	0	0	88	0	0	11	0	0	0	100
	202	8	0	0	0	0	0	71	5	0	16	0	0	0	100
	264	6	0	0	0	0	0	80	9	0	4	1	0	0	100
	265	3	0	0	0	0	0	95	0	0	2	0	0	0	100
	266	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Mean	3.40	.00	.00	.20	.00	.00	66.80	2.80	.00	6.60	.20	.00	.00	80.00
	StDev	3.58	.00	.00	.45	.00	.00	38.40	4.09	.00	6.69	.45	.00	.00	44.72

**Table B4. Percent Cover of Index Species
Crook Point, San Miguel Island - Spring 2005 (4/30/05)**

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	73	27	0	0	0	0	0	0	0	0	0	0	0	100
	147	63	35	0	0	0	0	0	0	0	0	2	0	0	100
	148	49	50	0	0	0	0	0	0	0	0	1	0	0	100
	149	46	43	0	6	0	0	5	0	0	0	0	0	0	100
	495	27	63	0	9	0	0	1	0	0	0	0	0	0	100
	Mean	51.60	43.60	.00	3.00	.00	.00	1.20	.00	.00	.00	.60	.00	.00	100.00
	StDev	17.54	13.85	.00	4.24	.00	.00	2.17	.00	.00	.00	.89	.00	.00	.00
Endocladia	386	42	6	0	36	13	0	0	0	0	3	0	0	0	100
	387	37	0	5	9	0	0	0	0	2	45	2	0	0	100
	388	23	9	0	41	17	0	0	0	0	8	2	0	0	100
	389	15	7	1	24	6	1	44	0	1	1	0	0	0	100
	390	32	17	0	22	0	0	17	1	2	8	1	0	0	100
	Mean	29.80	7.80	1.20	26.40	7.20	.20	12.20	.20	1.00	13.00	1.00	.00	.00	100.00
	StDev	10.85	6.14	2.17	12.58	7.66	.45	19.24	.45	1.00	18.15	1.00	.00	.00	.00
Silvetia (Rockweed)	396	34	13	0	23	2	2	20	0	4	2	0	0	0	100
	397	5	2	0	0	0	0	92	0	0	1	0	0	0	100
	398	41	19	1	6	0	2	22	0	2	7	0	0	0	100
	399	38	5	0	0	0	1	2	7	0	46	1	0	0	100
	400	54	3	0	33	3	0	2	0	1	3	1	0	0	100
	Mean	34.40	8.40	.20	12.40	1.00	1.00	27.60	1.40	1.40	11.80	.40	.00	.00	100.00
	StDev	18.06	7.33	.45	14.88	1.41	1.00	37.24	3.13	1.67	19.25	.55	.00	.00	.00
Mussels	381	17	1	0	0	0	0	56	0	3	23	0	0	0	100
	382	6	0	0	0	0	0	78	0	0	16	0	0	0	100
	383	2	0	0	0	0	0	93	0	0	5	0	0	0	100
	384	6	1	0	0	0	0	86	0	0	7	0	0	0	100
	385	7	1	0	0	0	0	79	0	2	9	2	0	0	100
	Mean	7.60	.60	.00	.00	.00	.00	78.40	.00	1.00	12.00	.40	.00	.00	100.00
	StDev	5.59	.55	.00	.00	.00	.00	13.90	.00	1.41	7.42	.89	.00	.00	.00

**Table B5. Percent Cover of Index Species
Cuyler Harbor, San Miguel Island - Spring 2005 (4/28/05)**

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	21	78	0	1	0	0	0	0	0	0	0	0	0	100
	417	24	44	0	32	0	0	0	0	0	0	0	0	0	100
	418	14	68	0	18	0	0	0	0	0	0	0	0	0	100
	419	38	26	0	34	0	1	0	0	0	1	0	0	0	100
	420	39	4	0	57	0	0	0	0	0	0	0	0	0	100
	Mean	27.20	44.00	.00	28.40	.00	.20	.00	.00	.00	.20	.00	.00	.00	100.00
	StDev	10.94	30.23	.00	20.74	.00	.45	.00	.00	.00	.45	.00	.00	.00	.00
Endocladia	411	34	0	2	38	0	0	18	0	0	7	1	0	0	100
	412	14	36	0	25	0	0	20	0	0	4	1	0	0	100
	413	14	2	1	28	0	48	0	1	0	6	0	0	0	100
	414	15	0	0	73	0	0	2	2	0	7	1	0	0	100
	415	18	0	0	67	0	3	0	0	0	12	0	0	0	100
	Mean	19.00	7.60	.60	46.20	.00	10.20	8.00	.60	.00	7.20	.60	.00	.00	100.00
	StDev	8.54	15.90	.89	22.35	.00	21.17	10.10	.89	.00	2.95	.55	.00	.00	.00
Silvetia (Rockweed)	406	25	0	0	3	0	49	1	0	0	14	8	0	0	100
	407	14	0	0	0	0	77	0	0	0	7	2	0	0	100
	408	12	1	1	3	0	70	0	0	1	8	4	0	0	100
	409	8	0	0	0	0	81	0	0	0	8	3	0	0	100
	410	19	1	4	0	0	64	0	0	0	5	7	0	0	100
	Mean	15.60	.40	1.00	1.20	.00	68.20	.20	.00	.20	8.40	4.80	.00	.00	100.00
	StDev	6.58	.55	1.73	1.64	.00	12.56	.45	.00	.45	3.36	2.59	.00	.00	.00
Mussels	401	8	0	1	0	0	0	79	0	5	1	6	0	0	100
	402	4	0	0	0	0	0	90	0	2	0	4	0	0	100
	403	8	0	2	0	0	0	85	0	1	1	3	0	0	100
	404	24	0	13	0	0	0	46	0	2	2	13	0	0	100
	405	29	0	21	0	0	0	37	0	3	4	6	0	0	100
	Mean	14.60	.00	7.40	.00	.00	.00	67.40	.00	2.60	1.60	6.40	.00	.00	100.00
	StDev	11.13	.00	9.24	.00	.00	.00	24.17	.00	1.52	1.52	3.91	.00	.00	.00

**Table B6. Percent Cover of Index Species
Harris Point, San Miguel Island - Spring 2005 (4/29/05)**

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	440	10	75	0	13	1	0	0	0	0	0	1	0	0	100
	441	19	79	0	2	0	0	0	0	0	0	0	0	0	100
	442	0	45	0	15	0	0	0	0	0	40	0	0	0	100
	443	36	60	0	0	0	0	0	0	0	0	0	4	0	100
	444	43	53	0	4	0	0	0	0	0	0	0	0	0	100
	Mean	21.60	62.40	.00	6.80	.20	.00	.00	.00	.00	8.00	.20	.80	.00	100.00
	StDev	17.84	14.42	.00	6.76	.45	.00	.00	.00	.00	17.89	.45	1.79	.00	.00
Endocladia	431	8	27	1	47	2	0	11	1	0	3	0	0	0	100
	432	14	23	1	49	6	0	0	1	0	6	0	0	0	100
	433	9	29	0	54	6	0	0	0	0	1	1	0	0	100
	434	16	0	0	65	18	0	0	0	0	1	0	0	0	100
	435	31	0	0	33	25	0	0	0	0	11	0	0	0	100
	Mean	15.60	15.80	.40	49.60	11.40	.00	2.20	.40	.00	4.40	.20	.00	.00	100.00
	StDev	9.24	14.58	.55	11.61	9.69	.00	4.92	.55	.00	4.22	.45	.00	.00	.00
Mussels	426	18	0	2	1	0	0	62	0	2	15	0	0	0	100
	427	7	0	2	20	10	0	2	0	0	59	0	0	0	100
	428	44	9	6	12	1	0	8	0	0	19	1	0	0	100
	429	12	23	2	0	0	0	58	0	0	4	1	0	0	100
	430	9	0	1	0	0	0	80	0	0	9	1	0	0	100
	Mean	18.00	6.40	2.60	6.60	2.20	.00	42.00	.00	.40	21.20	.60	.00	.00	100.00
	StDev	15.12	10.06	1.95	9.04	4.38	.00	34.84	.00	.89	21.89	.55	.00	.00	.00
Tetraclita	436	23	3	22	0	0	0	35	1	0	16	0	0	0	100
	437	8	3	20	0	0	0	26	0	0	42	1	0	0	100
	438	8	0	0	12	0	0	0	4	0	76	0	0	0	100
	439	12	0	2	15	2	0	1	2	0	66	0	0	0	100
	445	51	2	16	1	0	0	17	3	0	8	2	0	0	100
	Mean	20.40	1.60	12.00	5.60	.40	.00	15.80	2.00	.00	41.60	.60	.00	.00	100.00
	StDev	18.17	1.52	10.30	7.30	.89	.00	15.35	1.58	.00	29.85	.89	.00	.00	.00
Hesperophycus	421	30	3	1	26	37	0	0	0	0	3	0	0	0	100
	422	23	3	0	44	16	0	0	0	0	12	2	0	0	100
	423	16	5	0	70	5	0	0	0	0	4	0	0	0	100
	424	8	3	0	21	67	0	0	0	0	1	0	0	0	100
	425	23	0	0	9	64	0	0	0	0	4	0	0	0	100
	Mean	20.00	2.80	.20	34.00	37.80	.00	.00	.00	.00	4.80	.40	.00	.00	100.00
	StDev	8.34	1.79	.45	23.74	27.80	.00	.00	.00	.00	4.21	.89	.00	.00	.00

**Table B7. Percent Cover of Index Species
Otter Harbor, San Miguel Island - Spring 2005 (5/1/05)**

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	85	12	0	0	0	0	0	0	0	3	0	0	0	100
	371	2	15	0	0	0	0	0	0	0	73	1	9	0	100
	372	39	57	0	0	0	0	0	0	0	1	1	2	0	100
	373	34	55	0	0	0	0	0	0	0	4	0	7	0	100
	374	0	0	0	0	0	0	0	13	0	87	0	0	0	100
	Mean	32.00	27.80	.00	.00	.00	.00	.00	2.60	.00	33.60	.40	3.60	.00	100.00
	StDev	34.59	26.36	.00	.00	.00	.00	.00	5.81	.00	42.66	.55	4.16	.00	.00
Endocladia	360	27	23	2	16	0	14	4	0	0	14	0	0	0	100
	361	60	0	0	31	0	1	0	0	0	8	0	0	0	100
	362	10	0	0	81	0	0	0	1	1	7	0	0	0	100
	363	17	0	0	45	0	0	0	1	0	37	0	0	0	100
	364	3	0	0	67	4	10	0	0	0	16	0	0	0	100
	Mean	23.40	4.60	.40	48.00	.80	5.00	.80	.40	.20	16.40	.00	.00	.00	100.00
	StDev	22.30	10.29	.89	26.32	1.79	6.56	1.79	.55	.45	12.14	.00	.00	.00	.00
Silvetia (Rockweed)	355	51	8	0	9	0	0	0	0	0	30	0	2	0	100
	356	25	0	1	26	0	30	0	0	0	18	0	0	0	100
	357	22	0	0	39	0	7	0	0	0	32	0	0	0	100
	358	34	35	0	20	4	0	0	0	0	5	2	0	0	100
	359	26	48	0	9	0	0	0	0	0	16	0	1	0	100
	Mean	31.60	18.20	.20	20.60	.80	7.40	.00	.00	.00	20.20	.40	.60	.00	100.00
	StDev	11.72	22.00	.45	12.62	1.79	12.99	.00	.00	.00	11.05	.89	.89	.00	.00
Mussels	375	25	0	1	1	0	0	53	0	7	11	2	0	0	100
	376	39	0	0	0	0	0	36	4	0	19	2	0	0	100
	378	20	0	1	1	0	0	46	0	9	21	2	0	0	100
	379	19	0	2	0	0	0	55	2	4	18	0	0	0	100
	380	25	0	0	0	0	0	40	0	2	33	0	0	0	100
	Mean	25.60	.00	.80	.40	.00	.00	46.00	1.20	4.40	20.40	1.20	.00	.00	100.00
	StDev	7.99	.00	.84	.55	.00	.00	8.15	1.79	3.65	7.99	1.10	.00	.00	.00

**Table B8. Percent Cover of Index Species
Fraser Cove, Santa Cruz Island - Spring 2005 (3/8/05)**

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	37	4	0	26	0	0	2	2	1	28	0	0	0	100
	877	59	0	0	19	0	0	2	0	0	20	0	0	0	100
	878	29	61	0	9	0	0	0	0	0	1	0	0	0	100
	879	10	15	0	50	0	0	0	0	0	24	0	1	0	100
	880	34	16	0	12	0	0	0	0	0	38	0	0	0	100
	Mean	33.80	19.20	.00	23.20	.00	.00	.80	.40	.20	22.20	.00	.20	.00	100.00
	StDev	17.57	24.37	.00	16.36	.00	.00	1.10	.89	.45	13.61	.00	.45	.00	.00
Endocladia	881	26	0	0	46	0	0	5	0	0	22	1	0	0	100
	882	39	3	0	40	0	0	0	1	0	17	0	0	0	100
	883	12	0	0	84	3	0	0	0	0	1	0	0	0	100
	884	17	0	0	81	0	0	0	0	0	2	0	0	0	100
	885	5	0	0	91	0	0	0	0	0	4	0	0	0	100
	Mean	19.80	.60	.00	68.40	.60	.00	1.00	.20	.00	9.20	.20	.00	.00	100.00
	StDev	13.18	1.34	.00	23.56	1.34	.00	2.24	.45	.00	9.63	.45	.00	.00	.00
Silvetia (Rockweed)	896	34	2	0	13	22	25	0	0	0	2	2	0	0	100
	897	26	2	0	4	5	54	0	0	0	9	0	0	0	100
	898	22	1	0	0	0	68	0	0	0	8	1	0	0	100
	899	15	2	0	6	10	62	0	0	0	3	2	0	0	100
	900	21	10	0	23	12	34	0	0	0	0	0	0	0	100
	Mean	23.60	3.40	.00	9.20	9.80	48.60	.00	.00	.00	4.40	1.00	.00	.00	100.00
	StDev	7.02	3.71	.00	9.04	8.26	18.41	.00	.00	.00	3.91	1.00	.00	.00	.00
Mussels	891	13	0	0	0	0	0	79	0	0	2	6	0	0	100
	892	25	0	0	1	0	0	68	0	0	4	2	0	0	100
	893	10	0	0	0	0	0	78	0	0	4	8	0	0	100
	894	16	0	0	0	0	0	76	0	1	2	5	0	0	100
	895	8	0	0	0	0	0	83	0	3	3	3	0	0	100
	Mean	14.40	.00	.00	.20	.00	.00	76.80	.00	.80	3.00	4.80	.00	.00	100.00
	StDev	6.66	.00	.00	.45	.00	.00	5.54	.00	1.30	1.00	2.39	.00	.00	.00
Pollicipes	901	27	3	5	0	0	0	45	3	6	9	2	0	0	100
	902	16	4	2	39	0	0	12	0	0	2	25	0	0	100
	903	7	1	0	0	0	0	66	1	9	1	15	0	0	100
	904	19	5	3	0	0	0	63	0	5	2	3	0	0	100
	905	5	0	0	0	0	0	69	0	12	5	9	0	0	100
	Mean	14.80	2.60	2.00	7.80	.00	.00	51.00	.80	6.40	3.80	10.80	.00	.00	100.00
	StDev	9.01	2.07	2.12	17.44	.00	.00	23.72	1.30	4.51	3.27	9.50	.00	.00	.00

**Table B8. Percent Cover of Index Species
Fraser Cove, Santa Cruz Island - Spring 2005 (3/8/05)(continued)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Tar	906	27	16	0	0	0	0	0	0	0	7	0	50	0	100
	907	38	22	0	0	0	0	0	0	0	4	0	36	0	100
	908	25	14	0	0	0	0	0	0	0	0	0	61	0	100
	909	35	10	0	0	0	0	0	0	0	0	0	55	0	100
	910	26	9	0	0	0	0	0	0	0	0	0	65	0	100
	Mean	30.20	14.20	.00	.00	.00	.00	.00	.00	.00	2.20	.00	53.40	.00	100.00
	StDev	5.89	5.22	.00	.00	.00	.00	.00	.00	.00	3.19	.00	11.28	.00	.00
Hesperophycus	886	51	4	0	20	23	0	0	0	0	1	1	0	0	100
	887	50	1	0	18	8	0	0	1	0	22	0	0	0	100
	888	26	11	0	27	31	4	0	0	0	1	0	0	0	100
	889	20	7	0	17	51	4	0	0	0	1	0	0	0	100
	890	18	11	0	26	13	32	0	0	0	0	0	0	0	100
	Mean	33.00	6.80	.00	21.60	25.20	8.00	.00	.20	.00	5.00	.20	.00	.00	100.00
	StDev	16.25	4.38	.00	4.62	16.95	13.56	.00	.45	.00	9.51	.45	.00	.00	.00

**Table B9. Percent Cover of Index Species
Prisoner's Harbor, Santa Cruz Island - Spring 2005 (3/7/05)**

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	57	3	0	0	0	0	0	0	0	39	1	0	0	100
	827	23	7	1	0	0	0	2	1	0	64	2	0	0	100
	828	15	20	0	33	1	0	1	4	0	26	0	0	0	100
	829	5	31	0	18	5	0	3	1	0	37	0	0	0	100
	830	15	15	0	8	0	0	0	3	0	59	0	0	0	100
	Mean	23.00	15.20	.20	11.80	1.20	.00	1.20	1.80	.00	45.00	.60	.00	.00	100.00
	StDev	20.05	11.05	.45	13.97	2.17	.00	1.30	1.64	.00	15.95	.89	.00	.00	.00
Endocladia	831	30	0	0	51	0	0	2	0	0	16	1	0	0	100
	832	12	9	0	63	6	0	4	0	0	5	1	0	0	100
	833	8	32	0	55	2	0	0	0	0	2	1	0	0	100
	834	6	21	0	68	3	0	1	0	0	1	0	0	0	100
	835	18	3	0	62	10	0	4	0	0	2	1	0	0	100
	Mean	14.80	13.00	.00	59.80	4.20	.00	2.20	.00	.00	5.20	.80	.00	.00	100.00
	StDev	9.65	13.32	.00	6.76	3.90	.00	1.79	.00	.00	6.22	.45	.00	.00	.00
Silvetia (Rockweed)	846	39	1	1	0	0	3	3	3	0	50	0	0	0	100
	847	46	2	2	0	0	1	11	0	0	37	1	0	0	100
	848	25	0	1	0	0	8	6	4	0	55	1	0	0	100
	849	18	0	0	0	0	24	1	0	0	56	1	0	0	100
	850	2	0	3	0	0	44	0	0	0	50	1	0	0	100
	Mean	26.00	.60	1.40	.00	.00	16.00	4.20	1.40	.00	49.60	.80	.00	.00	100.00
	StDev	17.39	.89	1.14	.00	.00	18.07	4.44	1.95	.00	7.57	.45	.00	.00	.00
Mussels	841	12	4	0	0	0	0	80	0	0	4	0	0	0	100
	842	0	1	0	0	0	0	95	0	0	4	0	0	0	100
	843	6	16	6	0	0	0	67	0	0	5	0	0	0	100
	844	16	2	1	0	0	0	70	1	0	7	3	0	0	100
	845	2	2	4	0	0	0	88	0	1	2	1	0	0	100
	Mean	7.20	5.00	2.20	.00	.00	.00	80.00	.20	.20	4.40	.80	.00	.00	100.00
	StDev	6.72	6.24	2.68	.00	.00	.00	11.81	.45	.45	1.82	1.30	.00	.00	.00
Hesperophycus	836	44	8	0	37	8	0	0	0	0	3	0	0	0	100
	837	47	15	0	20	6	0	0	0	0	11	1	0	0	100
	838	45	17	0	21	1	0	0	0	0	15	1	0	0	100
	839	27	37	0	18	17	1	0	0	0	0	0	0	0	100
	840	44	23	0	22	8	1	1	0	0	0	1	0	0	100
	Mean	41.40	20.00	.00	23.60	8.00	.40	.20	.00	.00	5.80	.60	.00	.00	100.00
	StDev	8.14	10.91	.00	7.64	5.79	.55	.45	.00	.00	6.83	.55	.00	.00	.00

**Table B10. Percent Cover of Index Species
Scorpion Rock, Santa Cruz Island - Spring 2005 (4/19/05)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	801	22	26	0	51	0	0	0	0	0	0	0	0	1	100
	802	38	14	2	45	0	0	0	0	0	0	0	0	1	100
	803	39	10	0	48	0	0	0	0	1	1	0	0	1	100
	804	22	15	0	61	0	0	0	0	0	0	0	0	2	100
	805	46	52	0	0	0	0	0	0	0	0	0	0	2	100
	Mean	33.40	23.40	.40	41.00	.00	.00	.00	.00	.20	.20	.00	.00	1.40	100.00
	StDev	10.85	17.05	.89	23.70	.00	.00	.00	.00	.45	.45	.00	.00	.55	.00
Endocladia	806	17	1	0	71	0	0	2	0	0	2	0	5	2	100
	807	11	2	0	66	0	0	4	0	0	4	0	13	0	100
	808	10	1	1	64	0	0	7	0	3	11	0	2	1	100
	809	24	9	0	64	0	0	0	0	0	3	0	0	0	100
	810	34	10	0	44	0	0	0	0	1	10	0	1	0	100
	Mean	19.20	4.60	.20	61.80	.00	.00	2.60	.00	.80	6.00	.00	4.20	.60	100.00
	StDev	9.98	4.51	.45	10.35	.00	.00	2.97	.00	1.30	4.18	.00	5.26	.89	.00
Mussels	816	20	23	15	2	0	0	12	0	0	26	0	0	2	100
	817	31	4	3	5	0	0	2	0	0	37	1	0	17	100
	818	15	14	10	12	0	0	15	0	0	30	4	0	0	100
	819	7	46	17	4	0	0	5	0	0	20	1	0	0	100
	820	17	23	18	2	0	0	7	2	0	29	0	0	2	100
	Mean	18.00	22.00	12.60	5.00	.00	.00	8.20	.40	.00	28.40	1.20	.00	4.20	100.00
	StDev	8.72	15.54	6.19	4.12	.00	.00	5.26	.89	.00	6.19	1.64	.00	7.22	.00
Tetraclita	821	29	26	7	3	0	0	26	1	0	7	1	0	0	100
	822	37	20	1	17	0	0	14	0	0	11	0	0	0	100
	823	63	30	0	1	0	0	2	0	0	3	1	0	0	100
	824	34	39	5	10	0	0	0	0	0	11	1	0	0	100
	825	26	52	5	0	0	0	7	0	0	9	1	0	0	100
	Mean	37.80	33.40	3.60	6.20	.00	.00	9.80	.20	.00	8.20	.80	.00	.00	100.00
	StDev	14.72	12.48	2.97	7.19	.00	.00	10.55	.45	.00	3.35	.45	.00	.00	.00
Hesperophycus	811	42	3	0	9	46	0	0	0	0	0	0	0	0	100
	812	35	2	0	24	33	3	1	0	0	2	0	0	0	100
	813	14	4	0	32	22	26	0	0	0	2	0	0	0	100
	814	74	4	0	14	1	5	0	0	0	2	0	0	0	100
	815	20	3	0	33	35	7	0	0	0	2	0	0	0	100
	Mean	37.00	3.20	.00	22.40	27.40	8.20	.20	.00	.00	1.60	.00	.00	.00	100.00
	StDev	23.54	.84	.00	10.69	17.04	10.28	.45	.00	.00	.89	.00	.00	.00	.00

**Table B11. Percent Cover of Index Species
Trailer, Santa Cruz Island - Spring 2005 (3/9/05)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	911	44	53	0	3	0	0	0	0	0	0	0	0	0	100
	912	43	55	0	0	0	0	0	0	0	0	2	0	0	100
	913	26	51	0	19	0	0	0	2	0	1	1	0	0	100
	914	17	81	0	0	0	0	0	0	0	0	2	0	0	100
	915	33	65	0	0	0	0	0	0	0	0	2	0	0	100
	Mean	32.60	61.00	.00	4.40	.00	.00	.00	.40	.00	.20	1.40	.00	.00	100.00
	StDev	11.46	12.41	.00	8.26	.00	.00	.00	.89	.00	.45	.89	.00	.00	.00
Silvetia (Rockweed)	926	9	0	0	0	0	82	0	0	0	9	0	0	0	100
	927	29	3	0	0	0	59	0	0	0	9	0	0	0	100
	928	7	4	0	3	0	77	0	0	0	9	0	0	0	100
	929	7	0	0	0	0	92	0	0	0	1	0	0	0	100
	930	7	2	0	0	0	81	0	0	0	10	0	0	0	100
	Mean	11.80	1.80	.00	.60	.00	78.20	.00	.00	.00	7.60	.00	.00	.00	100.00
	StDev	9.65	1.79	.00	1.34	.00	12.07	.00	.00	.00	3.71	.00	.00	.00	.00
Mussels	921	12	0	1	1	0	0	0	9	0	62	15	0	0	100
	922	12	0	0	0	0	0	40	0	0	32	16	0	0	100
	923	5	0	0	0	0	0	81	0	0	11	3	0	0	100
	924	9	0	1	0	0	0	74	0	0	9	7	0	0	100
	925	20	0	1	0	0	0	51	0	0	17	11	0	0	100
	Mean	11.60	.00	.60	.20	.00	.00	49.20	1.80	.00	26.20	10.40	.00	.00	100.00
	StDev	5.50	.00	.55	.45	.00	.00	32.15	4.02	.00	21.95	5.46	.00	.00	.00
Hesperophycus	916	36	0	0	18	13	33	0	0	0	0	0	0	0	100
	917	12	0	0	23	2	63	0	0	0	0	0	0	0	100
	918	12	0	0	15	9	64	0	0	0	0	0	0	0	100
	919	81	8	0	8	1	1	0	0	0	0	1	0	0	100
	920	19	6	0	41	23	7	0	0	0	4	0	0	0	100
	951	51	16	0	16	17	0	0	0	0	0	0	0	0	100
	Mean	35.17	5.00	.00	20.17	10.83	28.00	.00	.00	.00	.67	.17	.00	.00	100.00
	StDev	27.15	6.42	.00	11.30	8.59	30.00	.00	.00	.00	1.63	.41	.00	.00	.00

**Table B12. Percent Cover of Index Species
Willows Anchorage, Santa Cruz Island - Spring 2005 (3/10/05)**

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	22	0	0	0	75	0	0	0	0	2	1	0	0	100
	932	19	1	0	0	78	0	0	0	0	2	0	0	0	100
	933	32	1	0	0	60	0	0	0	0	5	2	0	0	100
	934	31	0	0	0	50	0	0	0	0	17	2	0	0	100
	935	45	4	5	0	19	0	0	0	0	27	0	0	0	100
	Mean	29.80	1.20	1.00	.00	56.40	.00	.00	.00	.00	10.60	1.00	.00	.00	100.00
	StDev	10.18	1.64	2.24	.00	23.80	.00	.00	.00	.00	11.06	1.00	.00	.00	.00
Silvetia (Rockweed)	946	16	2	0	56	0	0	0	2	0	24	0	0	0	100
	947	14	1	0	44	0	0	1	0	0	40	0	0	0	100
	948	8	3	0	2	0	76	0	0	0	10	1	0	0	100
	949	0	0	0	0	0	98	0	0	0	2	0	0	0	100
	950	27	14	0	19	0	2	0	2	0	34	2	0	0	100
	Mean	13.00	4.00	.00	24.20	.00	35.20	.20	.80	.00	22.00	.60	.00	.00	100.00
	StDev	10.00	5.70	.00	25.04	.00	47.93	.45	1.10	.00	15.94	.89	.00	.00	.00
Mussels	941	9	0	12	0	0	0	67	0	2	7	3	0	0	100
	942	9	0	0	0	0	0	89	0	0	1	1	0	0	100
	943	4	0	0	0	0	0	96	0	0	0	0	0	0	100
	944	7	0	0	0	0	0	91	0	0	1	1	0	0	100
	945	7	0	0	0	0	0	84	0	0	6	3	0	0	100
	Mean	7.20	.00	2.40	.00	.00	.00	85.40	.00	.40	3.00	1.60	.00	.00	100.00
	StDev	2.05	.00	5.37	.00	.00	.00	11.15	.00	.89	3.24	1.34	.00	.00	.00
Hesperophycus	936	28	4	0	66	0	0	0	0	0	2	0	0	0	100
	937	52	23	0	1	1	7	0	0	0	16	0	0	0	100
	938	66	12	0	3	0	0	0	0	0	19	0	0	0	100
	939	5	0	0	0	1	91	0	0	0	3	0	0	0	100
	940	7	0	0	5	11	63	0	0	0	13	1	0	0	100
	Mean	31.60	7.80	.00	15.00	2.60	32.20	.00	.00	.00	10.60	.20	.00	.00	100.00
	StDev	27.04	9.81	.00	28.57	4.72	42.17	.00	.00	.00	7.70	.45	.00	.00	.00

**Table B13. Percent Cover of Index Species
East Point, Santa Rosa Island - Spring 2005 (5/28/05)**

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	68	7	0	12	7	2	0	0	0	2	2	0	0	100
	577	27	16	0	41	15	1	0	0	0	0	0	0	0	100
	578	76	23	0	1	0	0	0	0	0	0	0	0	0	100
	579	57	40	0	3	0	0	0	0	0	0	0	0	0	100
	Mean	60.60	22.20	.00	11.40	4.40	.60	.00	.00	.00	.40	.40	.00	.00	100.00
	StDev	20.26	12.19	.00	17.21	6.66	.89	.00	.00	.00	.89	.89	.00	.00	.00
Endocladia	580	66	2	0	29	2	1	0	0	0	0	0	0	0	100
	581	43	7	0	44	2	3	0	0	0	1	0	0	0	100
	582	38	1	0	51	4	0	0	0	0	6	0	0	0	100
	583	60	2	0	36	0	0	0	0	0	2	0	0	0	100
	584	30	8	0	47	10	0	0	0	0	0	5	0	0	100
	Mean	47.40	4.00	.00	41.40	3.60	.80	.00	.00	.00	1.80	1.00	.00	.00	100.00
	StDev	15.13	3.24	.00	8.85	3.85	1.30	.00	.00	.00	2.49	2.24	.00	.00	.00
Silvetia (Rockweed)	585	43	1	0	6	0	19	0	0	0	27	4	0	0	100
	586	38	0	0	5	7	32	0	0	0	14	4	0	0	100
	587	60	0	0	0	1	15	0	1	0	23	0	0	0	100
	588	6	0	0	1	0	85	0	0	0	7	1	0	0	100
	589	9	0	0	0	0	78	0	0	0	11	2	0	0	100
	Mean	31.20	.20	.00	2.40	1.60	45.80	.00	.20	.00	16.40	2.20	.00	.00	100.00
	StDev	23.15	.45	.00	2.88	3.05	33.28	.00	.45	.00	8.35	1.79	.00	.00	.00
Mussels	590	2	3	0	0	0	0	59	9	0	19	8	0	0	100
	591	3	13	0	0	0	0	28	23	0	28	5	0	0	100
	592	8	1	0	0	0	0	71	1	0	11	8	0	0	100
	593	2	1	0	0	0	0	86	1	0	6	4	0	0	100
	594	5	2	0	0	0	0	79	0	0	10	4	0	0	100
	Mean	4.00	4.00	.00	.00	.00	.00	64.60	6.80	.00	14.80	5.80	.00	.00	100.00
	StDev	2.55	5.10	.00	.00	.00	.00	22.79	9.76	.00	8.76	2.05	.00	.00	.00
Hesperophycus	570	59	2	0	36	2	0	0	0	0	1	0	0	0	100
	571	61	4	0	16	17	0	0	0	0	2	0	0	0	100
	572	72	18	0	7	2	0	0	0	0	1	0	0	0	100
	573	60	20	0	13	1	4	0	0	0	0	0	2	0	100
	574	28	33	0	20	15	3	0	0	0	0	0	1	0	100
	Mean	56.00	15.40	.00	18.40	7.40	1.40	.00	.00	.00	.80	.00	.60	.00	100.00
	StDev	16.51	12.72	.00	10.92	7.89	1.95	.00	.00	.00	.84	.00	.89	.00	.00

**Table B14. Percent Cover of Index Species
Ford Point, Santa Rosa Island - Spring 2005 (5/26/05)**

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	73	18	0	0	0	0	0	0	0	0	9	0	0	100
	521	64	34	0	0	0	0	0	0	0	1	1	0	0	100
	522	73	22	0	0	0	0	0	0	0	0	5	0	0	100
	523	53	8	0	38	0	0	0	0	0	0	1	0	0	100
	524	59	40	0	0	0	0	0	0	0	0	1	0	0	100
	Mean	64.40	24.40	.00	7.60	.00	.00	.00	.00	.00	.20	3.40	.00	.00	100.00
	StDev	8.76	12.76	.00	16.99	.00	.00	.00	.00	.00	.45	3.58	.00	.00	.00
Endocladia	525	31	0	0	53	0	0	6	1	0	8	1	0	0	100
	526	47	2	0	41	0	0	7	0	0	2	1	0	0	100
	527	19	0	0	48	0	0	4	1	0	27	1	0	0	100
	528	22	0	0	60	0	0	0	3	0	15	0	0	0	100
	529	24	0	0	70	0	0	0	0	0	5	1	0	0	100
	Mean	28.60	.40	.00	54.40	.00	.00	3.40	1.00	.00	11.40	.80	.00	.00	100.00
	StDev	11.19	.89	.00	11.15	.00	.00	3.29	1.22	.00	9.96	.45	.00	.00	.00
Mussels	530	69	3	0	1	0	0	13	0	0	1	13	0	0	100
	531	14	0	0	0	0	0	78	0	1	4	3	0	0	100
	532	2	2	0	0	0	0	0	4	0	88	4	0	0	100
	533	39	0	0	0	0	0	52	0	0	9	0	0	0	100
	534	12	4	0	0	0	0	0	32	0	40	12	0	0	100
	Mean	27.20	1.80	.00	.20	.00	.00	28.60	7.20	.20	28.40	6.40	.00	.00	100.00
	StDev	27.05	1.79	.00	.45	.00	.00	34.88	13.97	.45	36.77	5.77	.00	.00	.00

**Table B15. Percent Cover of Index Species
Fossil Reef, Santa Rosa Island - Spring 2005 (5/30/05)**

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	58	42	0	0	0	0	0	0	0	0	0	0	0	100
	606	60	32	0	0	0	0	0	0	0	0	0	8	0	100
	607	68	31	0	0	0	0	0	0	0	0	1	0	0	100
	608	86	13	0	0	0	0	0	0	0	1	0	0	0	100
	609	79	19	0	0	0	0	0	0	0	0	2	0	0	100
	Mean	70.20	27.40	.00	.00	.00	.00	.00	.00	.00	.20	.60	1.60	.00	100.00
	StDev	12.09	11.46	.00	.00	.00	.00	.00	.00	.00	.45	.89	3.58	.00	.00
Endocladia	610	36	28	0	34	0	0	0	0	0	2	0	0	0	100
	611	30	60	0	7	0	0	0	0	0	0	3	0	0	100
	612	73	21	0	0	0	0	0	0	0	5	1	0	0	100
	613	23	8	0	46	0	19	0	0	0	1	2	1	0	100
	614	66	10	0	3	0	14	0	0	0	5	2	0	0	100
	Mean	45.60	25.40	.00	18.00	.00	6.60	.00	.00	.00	2.60	1.60	.20	.00	100.00
	StDev	22.43	21.00	.00	20.68	.00	9.21	.00	.00	.00	2.30	1.14	.45	.00	.00
Silvetia (Rockweed)	615	57	26	0	7	0	0	0	0	0	6	4	0	0	100
	616	46	18	0	19	0	0	0	0	0	13	4	0	0	100
	617	51	5	0	10	0	33	0	0	0	0	1	0	0	100
	618	27	0	0	18	0	52	0	0	0	3	0	0	0	100
	619	12	1	0	15	0	71	0	0	0	1	0	0	0	100
	Mean	38.60	10.00	.00	13.80	.00	31.20	.00	.00	.00	4.60	1.80	.00	.00	100.00
	StDev	18.64	11.47	.00	5.17	.00	31.49	.00	.00	.00	5.22	2.05	.00	.00	.00
Mussels	620	3	2	1	2	0	0	6	18	0	51	17	0	0	100
	621	10	9	10	0	0	0	0	1	0	65	5	0	0	100
	622	17	0	13	0	0	0	52	0	2	14	2	0	0	100
	623	18	0	10	0	0	0	43	0	7	17	5	0	0	100
	624	2	0	1	0	0	0	0	55	0	32	10	0	0	100
	Mean	10.00	2.20	7.00	.40	.00	.00	20.20	14.80	1.80	35.80	7.80	.00	.00	100.00
	StDev	7.52	3.90	5.61	.89	.00	.00	25.24	23.74	3.03	21.95	5.89	.00	.00	.00

**Table B16. Percent Cover of Index Species
Johnson's Lee, Santa Rosa Island - Spring 2005 (5/27/05)**

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	49	51	0	0	0	0	0	0	0	0	0	0	0	100
	501	38	62	0	0	0	0	0	0	0	0	0	0	0	100
	502	68	30	0	0	0	0	0	0	0	1	1	0	0	100
	503	27	46	0	26	0	0	0	0	0	0	1	0	0	100
	504	75	9	0	4	0	0	0	0	0	4	8	0	0	100
	Mean	51.40	39.60	.00	6.00	.00	.00	.00	.00	.00	1.00	2.00	.00	.00	100.00
	StDev	20.08	20.62	.00	11.31	.00	.00	.00	.00	.00	1.73	3.39	.00	.00	.00
Endocladia	505	50	1	0	33	0	0	13	0	1	0	2	0	0	100
	506	48	2	0	45	0	0	0	0	0	0	5	0	0	100
	507	33	2	0	49	0	0	12	0	0	4	0	0	0	100
	508	36	13	1	25	0	0	18	0	2	1	4	0	0	100
	509	37	1	0	58	0	0	0	0	0	2	2	0	0	100
	Mean	40.80	3.80	.20	42.00	.00	.00	8.60	.00	.60	1.40	2.60	.00	.00	100.00
	StDev	7.66	5.17	.45	13.08	.00	.00	8.17	.00	.89	1.67	1.95	.00	.00	.00
Mussels	510	2	0	0	0	0	0	0	2	0	77	19	0	0	100
	511	5	0	0	0	0	0	0	1	0	74	20	0	0	100
	512	31	0	1	0	0	0	61	0	2	1	4	0	0	100
	513	8	4	0	0	0	0	0	15	0	49	24	0	0	100
	514	0	0	0	0	0	0	0	14	0	19	67	0	0	100
	Mean	9.20	.80	.20	.00	.00	.00	12.20	6.40	.40	44.00	26.80	.00	.00	100.00
	StDev	12.56	1.79	.45	.00	.00	.00	27.28	7.44	.89	33.50	23.72	.00	.00	.00

**Table B17. Percent Cover of Index Species
Northwest-Talcott, Santa Rosa Island - Spring 2005 (5/29/05)**

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	48	40	0	10	0	0	0	0	0	0	0	2	0	100
	561	33	65	0	2	0	0	0	0	0	0	0	0	0	100
	562	49	47	0	1	0	0	0	0	0	1	2	0	0	100
	563	57	3	0	6	0	30	0	0	0	3	1	0	0	100
	564	90	7	0	0	0	0	0	0	0	0	3	0	0	100
	Mean	55.40	32.40	.00	3.80	.00	6.00	.00	.00	.00	.80	1.20	.40	.00	100.00
	StDev	21.20	26.66	.00	4.15	.00	13.42	.00	.00	.00	1.30	1.30	.89	.00	.00
Endocladia	555	23	0	0	33	0	40	0	0	0	4	0	0	0	100
	556	66	3	0	20	0	9	0	0	0	2	0	0	0	100
	557	27	0	0	38	0	18	0	7	0	6	4	0	0	100
	558	43	0	0	28	0	0	0	4	0	25	0	0	0	100
	559	86	2	1	1	0	0	1	0	0	8	1	0	0	100
	Mean	49.00	1.00	.20	24.00	.00	13.40	.20	2.20	.00	9.00	1.00	.00	.00	100.00
	StDev	26.71	1.41	.45	14.47	.00	16.64	.45	3.19	.00	9.22	1.73	.00	.00	.00
Silvetia (Rockweed)	565	12	0	0	0	0	83	0	0	0	5	0	0	0	100
	566	27	0	0	0	0	69	0	0	0	3	0	1	0	100
	567	22	0	1	0	0	55	0	5	0	11	6	0	0	100
	568	18	0	0	5	0	77	0	0	0	0	0	0	0	100
	569	80	2	0	4	0	12	1	0	0	1	0	0	0	100
	Mean	31.80	.40	.20	1.80	.00	59.20	.20	1.00	.00	4.00	1.20	.20	.00	100.00
	StDev	27.50	.89	.45	2.49	.00	28.39	.45	2.24	.00	4.36	2.68	.45	.00	.00
Mussels	550	24	1	0	0	0	0	37	6	3	20	9	0	0	100
	551	16	0	0	0	0	0	68	1	0	12	3	0	0	100
	552	19	1	0	0	0	0	49	3	12	11	5	0	0	100
	553	29	0	3	0	0	0	33	3	11	18	3	0	0	100
	554	24	0	0	0	0	0	46	1	10	15	4	0	0	100
	Mean	22.40	.40	.60	.00	.00	.00	46.60	2.80	7.20	15.20	4.80	.00	.00	100.00
	StDev	5.03	.55	1.34	.00	.00	.00	13.61	2.05	5.36	3.83	2.49	.00	.00	.00

**Table B18. Percent Cover of Index Species
Cat Rock, Anacapa Island - Fall 2005 (12/11/05)**

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	19	40	0	23	18	0	0	0	0	0	0	0	0	100
	32	19	56	0	25	0	0	0	0	0	0	0	0	0	100
	33	11	10	0	17	53	0	0	0	0	9	0	0	0	100
	35	24	38	0	15	20	0	0	0	0	3	0	0	0	100
	36	35	22	0	7	29	1	0	0	0	6	0	0	0	100
	37	27	18	0	5	24	7	0	0	0	19	0	0	0	100
	38	28	61	0	10	0	0	0	0	0	1	0	0	0	100
	39	29	66	0	1	3	0	0	0	0	1	0	0	0	100
	135	26	64	0	5	4	0	0	0	0	1	0	0	0	100
	Mean	24.22	41.67	.00	12.00	16.78	.89	.00	.00	.00	4.44	.00	.00	.00	100.00
	StDev	7.01	21.32	.00	8.46	17.47	2.32	.00	.00	.00	6.25	.00	.00	.00	.00
Endocladia	13	13	15	11	51	0	0	4	0	0	5	1	0	0	100
	14	21	7	18	32	0	0	11	0	0	5	6	0	0	100
	19	14	7	0	52	3	18	0	0	0	6	0	0	0	100
	51	11	9	6	8	0	0	1	6	0	49	10	0	0	100
	52	5	3	11	41	0	0	6	22	0	10	2	0	0	100
	54	7	3	16	27	0	0	3	24	0	13	7	0	0	100
	212	7	2	4	80	0	0	2	1	0	3	1	0	0	100
	467	13	0	23	40	0	0	10	2	0	7	5	0	0	100
	492	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Mean	10.11	5.11	9.89	36.78	.33	2.00	4.11	6.11	.00	10.89	3.56	.00	.00	88.89
	StDev	6.11	4.88	8.08	24.06	1.00	6.00	4.11	9.78	.00	14.78	3.57	.00	.00	33.33
Silvetia (Rockweed)	2	13	22	0	31	7	17	0	0	0	10	0	0	0	100
	3	31	36	0	3	5	23	0	0	0	1	1	0	0	100
	4	15	12	0	7	8	54	0	0	0	4	0	0	0	100
	5	10	25	4	33	0	3	5	4	0	16	0	0	0	100
	6	18	1	0	10	3	64	0	0	0	4	0	0	0	100
	8	19	1	0	1	2	76	0	0	0	1	0	0	0	100
	9	2	0	0	7	2	86	0	0	0	3	0	0	0	100
	10	10	6	0	5	0	72	0	0	0	5	2	0	0	100
	55	10	33	10	27	0	0	3	1	0	14	2	0	0	100
	Mean	14.22	15.11	1.56	13.78	3.00	43.89	.89	.56	.00	6.44	.56	.00	.00	100.00
	StDev	8.09	14.23	3.43	12.76	3.04	33.28	1.83	1.33	.00	5.55	.88	.00	.00	.00

**Table B18. Percent Cover of Index Species
Cat Rock, Anacapa Island - Fall 2005 (12/11/05)(continued)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Mussels	56	12	2	32	0	0	0	30	0	0	17	7	0	0	100
	164	13	3	19	0	0	0	48	0	2	12	3	0	0	100
	203	15	3	8	0	0	0	43	4	0	22	5	0	0	100
	204	9	0	9	0	0	0	73	0	0	6	3	0	0	100
	468	5	0	23	0	0	0	32	1	0	34	5	0	0	100
	470	26	8	17	3	0	0	24	0	0	21	1	0	0	100
	471	11	2	24	12	0	0	27	0	0	23	1	0	0	100
	472	1	0	11	0	0	0	82	0	2	3	1	0	0	100
	473	26	6	10	3	0	0	41	0	0	13	1	0	0	100
	Mean	13.11	2.67	17.00	2.00	.00	.00	44.44	.56	.44	16.78	3.00	.00	.00	100.00
	StDev	8.45	2.78	8.25	3.97	.00	.00	20.43	1.33	.88	9.51	2.24	.00	.00	.00

**Table B19. Percent Cover of Index Species
Middle-East, Anacapa Island - Fall 2005 (12/13/05)**

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	34	21	19	2	0	0	7	0	0	17	0	0	0	100
	244	51	14	6	18	0	0	0	0	1	1	0	9	0	100
	245	55	13	7	6	0	0	6	0	0	0	3	10	0	100
	Mean	46.67	16.00	10.67	8.67	.00	.00	4.33	.00	.33	6.00	1.00	6.33	.00	100.00
	StDev	11.15	4.36	7.23	8.33	.00	.00	3.79	.00	.58	9.54	1.73	5.51	.00	.00
Endocladia	240	18	1	1	33	3	29	0	0	0	10	0	0	5	100
	241	35	12	16	9	0	0	13	1	0	14	0	0	0	100
	242	59	18	1	9	1	0	1	0	0	11	0	0	0	100
	Mean	37.33	10.33	6.00	17.00	1.33	9.67	4.67	.33	.00	11.67	.00	.00	1.67	100.00
	StDev	20.60	8.62	8.66	13.86	1.53	16.74	7.23	.58	.00	2.08	.00	.00	2.89	.00
Silvetia (Rockweed)	53	0	0	1	5	0	31	19	16	0	26	0	0	2	100
	237	10	0	0	0	0	84	0	0	0	6	0	0	0	100
	469	9	0	3	0	0	74	1	0	0	13	0	0	0	100
	Mean	6.33	.00	1.33	1.67	.00	63.00	6.67	5.33	.00	15.00	.00	.00	.67	100.00
	StDev	5.51	.00	1.53	2.89	.00	28.16	10.69	9.24	.00	10.15	.00	.00	1.15	.00
Mussels	476	2	2	0	0	0	0	93	0	0	3	0	0	0	100
	477	2	2	0	0	0	0	74	0	0	20	0	0	2	100
	478	5	2	0	0	1	0	83	0	0	9	0	0	0	100
	Mean	3.00	2.00	.00	.00	.33	.00	83.33	.00	.00	10.67	.00	.00	.67	100.00
	StDev	1.73	.00	.00	.00	.58	.00	9.50	.00	.00	8.62	.00	.00	1.15	.00

**Table B20. Percent Cover of Index Species
Middle-West, Anacapa Island - Fall 2005 (12/13/05)**

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	68	29	1	0	0	0	0	0	0	2	0	0	0	100
	448	15	11	0	24	0	0	10	5	0	35	0	0	0	100
	449	42	9	0	12	0	0	1	0	0	36	0	0	0	100
	450	46	12	0	6	0	0	0	0	0	36	0	0	0	100
	451	24	14	0	31	0	0	1	0	0	30	0	0	0	100
	Mean	39.00	15.00	.20	14.60	.00	.00	2.40	1.00	.00	27.80	.00	.00	.00	100.00
	StDev	20.62	8.03	.45	12.76	.00	.00	4.28	2.24	.00	14.64	.00	.00	.00	.00
Endocladia	457	2	1	0	28	0	0	54	0	1	14	0	0	0	100
	458	24	4	2	18	0	0	27	0	1	21	3	0	0	100
	459	23	8	0	14	0	0	7	1	0	46	1	0	0	100
	460	36	24	0	21	0	0	0	0	0	18	0	0	1	100
	461	66	7	0	6	0	0	0	0	0	21	0	0	0	100
	Mean	30.20	8.80	.40	17.40	.00	.00	17.60	.20	.40	24.00	.80	.00	.20	100.00
	StDev	23.46	8.93	.89	8.17	.00	.00	23.16	.45	.55	12.63	1.30	.00	.45	.00
Silvetia (Rockweed)	452	16	6	1	2	0	67	2	0	0	5	1	0	0	100
	453	17	5	4	0	0	66	0	0	0	8	0	0	0	100
	454	5	1	1	17	0	0	0	10	0	64	2	0	0	100
	455	10	4	0	5	0	54	1	4	0	22	0	0	0	100
	456	11	7	0	1	0	52	2	1	0	26	0	0	0	100
	Mean	11.80	4.60	1.20	5.00	.00	47.80	1.00	3.00	.00	25.00	.60	.00	.00	100.00
	StDev	4.87	2.30	1.64	6.96	.00	27.57	1.00	4.24	.00	23.56	.89	.00	.00	.00
Mussels	462	14	0	3	1	0	0	65	0	1	16	0	0	0	100
	463	6	1	4	0	0	0	52	0	0	35	2	0	0	100
	464	6	0	1	0	0	0	83	0	0	10	0	0	0	100
	465	5	1	0	0	0	0	87	0	0	6	1	0	0	100
	466	2	0	0	0	0	0	98	0	0	0	0	0	0	100
	Mean	6.60	.40	1.60	.20	.00	.00	77.00	.00	.20	13.40	.60	.00	.00	100.00
	StDev	4.45	.55	1.82	.45	.00	.00	18.34	.00	.45	13.41	.89	.00	.00	.00

**Table B21. Percent Cover of Index Species
S. Frenchy's Cove, Anacapa Island - Fall 2005 (12/14/05)**

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	10	61	0	25	1	0	0	0	0	2	1	0	0	100
	250	11	67	0	17	0	0	0	0	0	3	0	2	0	100
	251	18	78	0	3	0	0	0	0	0	1	0	0	0	100
	252	21	70	0	7	0	0	0	0	0	0	1	1	0	100
	253	9	75	0	12	4	0	0	0	0	0	0	0	0	100
	Mean	13.80	70.20	.00	12.80	1.00	.00	.00	.00	.00	1.20	.40	.60	.00	100.00
	StDev	5.36	6.69	.00	8.61	1.73	.00	.00	.00	.00	1.30	.55	.89	.00	.00
Endocladia	154	9	26	0	62	0	0	0	0	0	1	1	1	0	100
	155	2	0	0	82	0	16	0	0	0	0	0	0	0	100
	256	21	3	0	52	2	20	0	0	0	2	0	0	0	100
	257	9	3	0	83	0	0	0	0	0	5	0	0	0	100
	258	12	1	0	43	0	43	0	0	0	1	0	0	0	100
	Mean	10.60	6.60	.00	64.40	.40	15.80	.00	.00	.00	1.80	.20	.20	.00	100.00
	StDev	6.88	10.92	.00	17.84	.89	17.73	.00	.00	.00	1.92	.45	.45	.00	.00
Silvetia (Rockweed)	259	4	0	0	0	0	86	0	0	0	8	2	0	0	100
	260	9	4	0	2	0	76	0	0	0	9	0	0	0	100
	261	11	4	0	0	0	61	0	4	0	17	3	0	0	100
	262	15	33	0	14	0	25	0	1	0	12	0	0	0	100
	263	5	0	0	0	0	0	94	0	0	1	0	0	0	100
	Mean	8.80	8.20	.00	3.20	.00	49.60	18.80	1.00	.00	9.40	1.00	.00	.00	100.00
	StDev	4.49	14.01	.00	6.10	.00	36.12	42.04	1.73	.00	5.86	1.41	.00	.00	.00
Mussels	201	0	0	0	0	0	0	86	2	0	11	1	0	0	100
	202	3	1	0	0	0	0	71	4	0	16	5	0	0	100
	264	2	0	0	0	0	0	89	4	0	3	2	0	0	100
	265	2	0	1	0	0	0	83	1	1	7	5	0	0	100
	266	10	1	0	0	0	0	58	9	0	15	7	0	0	100
	Mean	3.40	.40	.20	.00	.00	.00	77.40	4.00	.20	10.40	4.00	.00	.00	100.00
	StDev	3.85	.55	.45	.00	.00	.00	12.82	3.08	.45	5.46	2.45	.00	.00	.00

**Table B22. Percent Cover of Index Species
Crook Point, San Miguel Island - Fall 2005 (1/25/06)**

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	64	36	0	0	0	0	0	0	0	0	0	0	0	100
	147	56	44	0	0	0	0	0	0	0	0	0	0	0	100
	148	40	60	0	0	0	0	0	0	0	0	0	0	0	100
	149	44	41	0	10	0	0	5	0	0	0	0	0	0	100
	495	19	72	0	8	0	0	1	0	0	0	0	0	0	100
	Mean	44.60	50.60	.00	3.60	.00	.00	1.20	.00	.00	.00	.00	.00	.00	100.00
	StDev	17.20	14.96	.00	4.98	.00	.00	2.17	.00	.00	.00	.00	.00	.00	.00
Endocladia	386	55	17	0	19	6	0	0	0	0	1	2	0	0	100
	387	55	0	7	13	0	0	2	0	0	19	4	0	0	100
	388	43	16	0	18	9	0	0	0	0	13	1	0	0	100
	389	8	8	1	26	11	0	44	0	0	2	0	0	0	100
	390	18	19	0	22	1	0	16	0	1	23	0	0	0	100
	Mean	35.80	12.00	1.60	19.60	5.40	.00	12.40	.00	.20	11.60	1.40	.00	.00	100.00
	StDev	21.67	7.91	3.05	4.83	4.83	.00	18.89	.00	.45	9.89	1.67	.00	.00	.00
Silvetia (Rockweed)	396	21	14	0	33	5	0	20	0	2	5	0	0	0	100
	397	3	3	0	0	0	0	94	0	0	0	0	0	0	100
	398	30	33	0	6	0	1	27	0	2	1	0	0	0	100
	399	45	0	0	0	0	1	0	10	0	43	1	0	0	100
	400	45	3	1	43	5	0	0	0	1	2	0	0	0	100
	Mean	28.80	10.60	.20	16.40	2.00	.40	28.20	2.00	1.00	10.20	.20	.00	.00	100.00
	StDev	17.70	13.61	.45	20.18	2.74	.55	38.69	4.47	1.00	18.43	.45	.00	.00	.00
Mussels	381	22	1	0	0	0	0	46	0	3	27	1	0	0	100
	382	8	0	0	0	0	0	82	1	0	9	0	0	0	100
	383	10	0	0	0	0	0	86	1	0	3	0	0	0	100
	384	9	0	0	0	0	0	85	0	1	4	1	0	0	100
	385	16	2	2	0	0	0	68	0	3	7	2	0	0	100
	Mean	13.00	.60	.40	.00	.00	.00	73.40	.40	1.40	10.00	.80	.00	.00	100.00
	StDev	5.92	.89	.89	.00	.00	.00	16.94	.55	1.52	9.80	.84	.00	.00	.00

**Table B23. Percent Cover of Index Species
Cuyler Harbor, San Miguel Island - Fall 2005 (1/28/06)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	416	31	67	0	1	0	0	0	0	0	0	1	0	0	100
	417	38	41	0	21	0	0	0	0	0	0	0	0	0	100
	418	23	56	0	18	0	0	0	0	0	3	0	0	0	100
	419	41	22	0	28	0	9	0	0	0	0	0	0	0	100
	420	29	16	0	54	0	0	0	0	0	0	1	0	0	100
	Mean	32.40	40.40	.00	24.40	.00	1.80	.00	.00	.00	.60	.40	.00	.00	100.00
	StDev	7.20	21.71	.00	19.30	.00	4.02	.00	.00	.00	1.34	.55	.00	.00	.00
Endocladia	411	21	0	0	41	0	0	21	4	0	12	1	0	0	100
	412	22	28	0	18	0	0	28	0	0	2	2	0	0	100
	413	13	0	0	18	0	62	0	1	0	6	0	0	0	100
	414	14	1	0	67	0	0	2	1	0	15	0	0	0	100
	415	33	0	0	38	0	5	0	1	0	23	0	0	0	100
	Mean	20.60	5.80	.00	36.40	.00	13.40	10.20	1.40	.00	11.60	.60	.00	.00	100.00
	StDev	8.02	12.42	.00	20.23	.00	27.25	13.31	1.52	.00	8.14	.89	.00	.00	.00
Silvetia (Rockweed)	406	18	0	1	0	0	48	1	2	0	23	7	0	0	100
	407	19	0	0	0	0	60	0	0	0	18	3	0	0	100
	408	9	2	1	1	0	64	0	1	0	19	3	0	0	100
	409	7	0	0	0	0	69	0	1	0	17	6	0	0	100
	410	18	1	4	1	0	55	0	0	2	15	4	0	0	100
	Mean	14.20	.60	1.20	.40	.00	59.20	.20	.80	.40	18.40	4.60	.00	.00	100.00
	StDev	5.72	.89	1.64	.55	.00	8.11	.45	.84	.89	2.97	1.82	.00	.00	.00
Mussels	401	15	2	2	0	0	0	61	0	5	6	9	0	0	100
	402	3	0	0	0	0	0	74	0	3	14	6	0	0	100
	403	9	0	0	0	0	0	69	0	5	8	9	0	0	100
	404	13	0	13	0	0	0	32	11	2	22	7	0	0	100
	405	25	0	9	1	0	0	40	7	3	10	5	0	0	100
	Mean	13.00	.40	4.80	.20	.00	.00	55.20	3.60	3.60	12.00	7.20	.00	.00	100.00
	StDev	8.12	.89	5.89	.45	.00	.00	18.35	5.13	1.34	6.32	1.79	.00	.00	.00

**Table B24. Percent Cover of Index Species
Harris Point, San Miguel Island - Fall 2005 (1/27/06)**

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	440	2	88	0	7	0	0	0	0	0	3	0	0	0	100
	441	13	87	0	0	0	0	0	0	0	0	0	0	0	100
	442	15	75	0	7	0	0	0	0	0	3	0	0	0	100
	443	15	81	0	0	0	0	0	0	0	0	0	4	0	100
	444	27	71	0	1	0	0	1	0	0	0	0	0	0	100
	Mean	14.40	80.40	.00	3.00	.00	.00	.20	.00	.00	1.20	.00	.80	.00	100.00
	StDev	8.88	7.40	.00	3.67	.00	.00	.45	.00	.00	1.64	.00	1.79	.00	.00
Endocladia	431	17	31	0	37	0	0	8	0	0	7	0	0	0	100
	432	10	41	0	27	10	0	1	0	0	11	0	0	0	100
	433	4	39	0	31	18	0	0	0	0	8	0	0	0	100
	434	18	1	0	56	21	0	0	0	0	4	0	0	0	100
	435	11	1	0	34	43	0	0	0	0	11	0	0	0	100
	Mean	12.00	22.60	.00	37.00	18.40	.00	1.80	.00	.00	8.20	.00	.00	.00	100.00
	StDev	5.70	20.07	.00	11.25	15.98	.00	3.49	.00	.00	2.95	.00	.00	.00	.00
Mussels	426	13	4	0	0	1	0	62	0	4	16	0	0	0	100
	427	39	2	0	9	11	0	2	0	0	34	1	2	0	100
	428	44	23	1	7	3	0	4	0	0	17	1	0	0	100
	429	16	10	2	0	0	0	69	0	1	1	1	0	0	100
	430	9	3	2	0	0	0	72	0	0	14	0	0	0	100
	Mean	24.20	8.40	1.00	3.20	3.00	.00	41.80	.00	1.00	16.40	.60	.40	.00	100.00
	StDev	16.08	8.73	1.00	4.44	4.64	.00	35.61	.00	1.73	11.76	.55	.89	.00	.00
Tetraclita	436	13	3	19	0	0	0	44	0	0	21	0	0	0	100
	437	3	3	25	0	0	0	34	0	0	32	3	0	0	100
	438	16	0	0	4	0	0	0	11	0	67	2	0	0	100
	439	9	6	0	11	0	0	0	1	0	72	1	0	0	100
	445	27	2	19	1	0	0	28	0	0	21	2	0	0	100
	Mean	13.60	2.80	12.60	3.20	.00	.00	21.20	2.40	.00	42.60	1.60	.00	.00	100.00
	StDev	8.93	2.17	11.76	4.66	.00	.00	20.18	4.83	.00	25.03	1.14	.00	.00	.00
Hesperophycus	421	4	17	0	28	50	0	0	0	0	0	0	1	0	100
	422	14	6	0	18	52	0	0	0	0	9	1	0	0	100
	423	14	7	0	28	30	0	0	0	0	20	1	0	0	100
	424	10	10	0	18	57	0	0	0	0	5	0	0	0	100
	425	15	12	0	8	54	0	0	0	0	10	1	0	0	100
	Mean	11.40	10.40	.00	20.00	48.60	.00	.00	.00	.00	8.80	.60	.20	.00	100.00
	StDev	4.56	4.39	.00	8.37	10.71	.00	.00	.00	.00	7.40	.55	.45	.00	.00

**Table B25. Percent Cover of Index Species
Otter Harbor, San Miguel Island - Fall 2005 (1/26/06)**

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	59	23	0	0	0	0	0	0	0	18	0	0	0	100
	371	14	74	0	0	0	0	0	0	0	2	0	10	0	100
	372	35	61	0	0	0	0	0	0	0	0	3	1	0	100
	373	20	50	0	0	0	0	0	0	0	29	0	1	0	100
	374	1	0	0	0	0	0	0	16	0	83	0	0	0	100
	Mean	25.80	41.60	.00	.00	.00	.00	.00	3.20	.00	26.40	.60	2.40	.00	100.00
	StDev	22.22	29.89	.00	.00	.00	.00	.00	7.16	.00	33.81	1.34	4.28	.00	.00
Endocladia	360	19	24	7	18	0	20	7	0	0	4	1	0	0	100
	361	54	7	0	35	0	1	0	0	1	1	1	0	0	100
	362	9	0	0	77	0	0	0	0	1	13	0	0	0	100
	363	25	0	0	33	0	0	0	0	0	42	0	0	0	100
	364	4	0	0	50	0	19	0	0	0	27	0	0	0	100
	Mean	22.20	6.20	1.40	42.60	.00	8.00	1.40	.00	.40	17.40	.40	.00	.00	100.00
	StDev	19.59	10.40	3.13	22.32	.00	10.51	3.13	.00	.55	17.07	.55	.00	.00	.00
Silvetia (Rockweed)	355	60	16	0	0	0	0	0	0	0	19	1	4	0	100
	356	16	2	0	18	0	45	0	0	1	18	0	0	0	100
	357	29	1	0	26	0	10	0	0	0	34	0	0	0	100
	358	33	46	0	16	0	0	0	0	0	5	0	0	0	100
	359	17	68	0	8	0	0	0	0	0	5	2	0	0	100
	Mean	31.00	26.60	.00	13.60	.00	11.00	.00	.00	.20	16.20	.60	.80	.00	100.00
	StDev	17.82	29.42	.00	9.94	.00	19.49	.00	.00	.45	12.03	.89	1.79	.00	.00
Mussels	375	22	1	0	1	0	1	56	0	6	11	2	0	0	100
	376	26	0	1	1	0	0	43	0	9	18	2	0	0	100
	378	22	1	0	1	0	0	45	0	8	21	2	0	0	100
	379	21	0	0	2	0	0	52	0	4	20	1	0	0	100
	380	28	1	0	0	0	0	45	0	3	22	1	0	0	100
	Mean	23.80	.60	.20	1.00	.00	.20	48.20	.00	6.00	18.40	1.60	.00	.00	100.00
	StDev	3.03	.55	.45	.71	.00	.45	5.54	.00	2.55	4.39	.55	.00	.00	.00

**Table B26. Percent Cover of Index Species
Landing Cove, Santa Barbara Island - Fall 2005 (11/11/05)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Phyllo-spadiX	Total
Chthamalus/Balanus	315	57	24	13	6	0	0	0	0	0	0	0	0	0	100
	316	58	11	9	11	0	0	0	1	0	7	3	0	0	100
	317	55	6	22	1	0	0	10	0	0	6	0	0	0	100
	318	13	0	42	0	0	0	42	0	0	3	0	0	0	100
	319	52	22	12	6	0	0	3	2	0	2	1	0	0	100
	Mean	47.00	12.60	19.60	4.80	.00	.00	11.00	.60	.00	3.60	.80	.00	.00	100.00
	StDev	19.14	10.29	13.43	4.44	.00	.00	17.80	.89	.00	2.88	1.30	.00	.00	.00
Silvetia (Rockweed)	310	22	1	0	0	0	2	3	14	0	55	3	0	0	100
	311	32	2	1	0	0	1	2	11	0	50	1	0	0	100
	312	25	0	1	0	0	1	2	18	0	52	1	0	0	100
	313	14	0	0	0	0	0	0	21	0	64	1	0	0	100
	314	36	1	0	0	0	10	0	12	0	40	1	0	0	100
	Mean	25.80	.80	.40	.00	.00	2.80	1.40	15.20	.00	52.20	1.40	.00	.00	100.00
	StDev	8.61	.84	.55	.00	.00	4.09	1.34	4.21	.00	8.67	.89	.00	.00	.00
Mussels	325	2	0	6	0	0	0	85	0	2	1	4	0	0	100
	326	0	0	0	0	0	0	100	0	0	0	0	0	0	100
	327	2	0	0	0	0	0	38	0	1	49	10	0	0	100
	328	0	0	3	0	0	0	71	0	0	24	2	0	0	100
	329	4	0	15	0	0	0	50	0	1	19	11	0	0	100
	Mean	1.60	.00	4.80	.00	.00	.00	68.80	.00	.80	18.60	5.40	.00	.00	100.00
	StDev	1.67	.00	6.22	.00	.00	.00	25.21	.00	.84	20.06	4.88	.00	.00	.00
Red Algal Turf	320	0	0	0	0	0	0	0	76	0	22	2	0	0	100
	321	0	0	0	0	0	0	38	40	0	21	1	0	0	100
	322	0	0	0	0	0	0	6	6	0	24	0	0	59	100
	323	0	0	0	0	0	0	0	15	0	11	0	0	74	100
	324	1	0	0	0	0	0	0	71	0	28	0	0	0	100
	Mean	.20	.00	.00	.00	.00	.00	8.80	41.60	.00	22.20	.60	.00	26.60	100.00
	StDev	.45	.00	.00	.00	.00	.00	16.53	31.72	.00	7.19	.89	.00	36.81	.00

**Table B27. Percent Cover of Index Species
Fraser Cove, Santa Cruz Island - Fall 2005 (10/15/05)**

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	16	28	0	20	0	0	0	0	0	35	1	0	0	100
	877	49	11	0	17	0	0	3	0	0	20	0	0	0	100
	878	10	79	0	6	0	0	0	0	0	2	0	3	0	100
	879	22	45	0	21	0	0	0	0	0	7	0	0	5	100
	880	73	5	0	0	0	0	0	0	0	21	0	1	0	100
	Mean	34.00	33.60	.00	12.80	.00	.00	.60	.00	.00	17.00	.20	.80	1.00	100.00
	StDev	26.41	29.80	.00	9.31	.00	.00	1.34	.00	.00	12.98	.45	1.30	2.24	.00
Endocladia	881	35	10	0	19	0	0	7	0	0	29	0	0	0	100
	882	22	20	0	24	0	0	0	0	0	34	0	0	0	100
	883	25	15	0	31	13	0	1	0	0	15	0	0	0	100
	884	36	6	0	26	0	0	0	20	0	12	0	0	0	100
	885	37	18	0	26	0	0	0	4	0	15	0	0	0	100
	Mean	31.00	13.80	.00	25.20	2.60	.00	1.60	4.80	.00	21.00	.00	.00	.00	100.00
	StDev	6.96	5.76	.00	4.32	5.81	.00	3.05	8.67	.00	9.82	.00	.00	.00	.00
Silvetia (Rockweed)	896	24	11	0	7	14	25	0	0	0	19	0	0	0	100
	897	4	0	0	3	16	54	0	0	0	23	0	0	0	100
	898	2	1	0	0	2	61	0	0	0	33	1	0	0	100
	899	10	6	0	4	16	47	0	0	0	17	0	0	0	100
	900	13	11	0	4	8	61	0	0	0	3	0	0	0	100
	Mean	10.60	5.80	.00	3.60	11.20	49.60	.00	.00	.00	19.00	.20	.00	.00	100.00
	StDev	8.71	5.26	.00	2.51	6.10	14.93	.00	.00	.00	10.86	.45	.00	.00	.00
Mussels	891	5	1	0	1	0	1	78	0	0	14	0	0	0	100
	892	19	0	0	0	0	0	67	0	1	13	0	0	0	100
	893	13	1	0	0	0	0	77	0	0	9	0	0	0	100
	894	13	0	0	0	0	0	77	1	0	9	0	0	0	100
	895	8	1	0	0	0	0	82	0	4	5	0	0	0	100
	Mean	11.60	.60	.00	.20	.00	.20	76.20	.20	1.00	10.00	.00	.00	.00	100.00
	StDev	5.37	.55	.00	.45	.00	.45	5.54	.45	1.73	3.61	.00	.00	.00	.00
Pollicipes	901	16	10	4	0	0	0	42	2	4	22	0	0	0	100
	902	9	3	1	21	0	0	14	3	6	24	13	0	6	100
	903	3	7	0	0	0	2	63	4	10	11	0	0	0	100
	904	8	8	0	0	0	0	73	0	7	4	0	0	0	100
	905	6	5	0	0	0	1	58	0	20	8	0	0	2	100
	Mean	8.40	6.60	1.00	4.20	.00	.60	50.00	1.80	9.40	13.80	2.60	.00	1.60	100.00
	StDev	4.83	2.70	1.73	9.39	.00	.89	23.03	1.79	6.31	8.79	5.81	.00	2.61	.00

**Table B27. Percent Cover of Index Species
Fraser Cove, Santa Cruz Island - Fall 2005 (10/15/05)(continued)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Tar	906	10	37	0	0	0	0	0	0	0	3	0	50	0	100
	907	19	33	0	0	0	0	0	0	0	1	0	47	0	100
	908	12	25	0	0	0	0	0	0	0	0	0	63	0	100
	909	27	34	0	0	0	0	0	0	0	0	0	39	0	100
	910	13	20	0	0	0	0	0	0	0	0	0	67	0	100
	Mean	16.20	29.80	.00	.00	.00	.00	.00	.00	.00	.80	.00	53.20	.00	100.00
	StDev	6.91	7.05	.00	.00	.00	.00	.00	.00	.00	1.30	.00	11.58	.00	.00
Hesperophycus	886	36	16	0	14	30	3	0	0	0	1	0	0	0	100
	887	32	10	0	19	26	0	1	0	0	12	0	0	0	100
	888	24	37	0	15	21	2	0	0	1	0	0	0	0	100
	889	8	20	0	11	54	4	0	0	0	1	2	0	0	100
	890	5	13	0	22	30	30	0	0	0	0	0	0	0	100
	Mean	21.00	19.20	.00	16.20	32.20	7.80	.20	.00	.20	2.80	.40	.00	.00	100.00
	StDev	13.96	10.62	.00	4.32	12.74	12.50	.45	.00	.45	5.17	.89	.00	.00	.00

**Table B28. Percent Cover of Index Species
Orizaba Cove, Santa Cruz Island - Fall 2005 (12/1/05)**

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	851	26	50	12	1	0	0	4	0	0	7	0	0	0	100
	852	20	80	0	0	0	0	0	0	0	0	0	0	0	100
	853	29	71	0	0	0	0	0	0	0	0	0	0	0	100
	854	25	56	4	1	0	0	8	0	0	6	0	0	0	100
	855	10	74	0	0	0	0	9	0	0	7	0	0	0	100
	Mean	22.00	66.20	3.20	.40	.00	.00	4.20	.00	.00	4.00	.00	.00	.00	100.00
	StDev	7.45	12.66	5.22	.55	.00	.00	4.27	.00	.00	3.67	.00	.00	.00	.00
Silvetia (Rockweed)	866	18	2	14	4	8	1	29	0	0	23	1	0	0	100
	867	6	1	3	15	15	30	6	0	1	23	0	0	0	100
	868	4	4	3	7	16	15	12	0	0	39	0	0	0	100
	869	12	1	1	8	14	45	0	1	0	18	0	0	0	100
	870	5	2	4	25	18	26	0	0	0	20	0	0	0	100
	Mean	9.00	2.00	5.00	11.80	14.20	23.40	9.40	.20	.20	24.60	.20	.00	.00	100.00
	StDev	5.92	1.22	5.15	8.41	3.77	16.50	12.03	.45	.45	8.32	.45	.00	.00	.00
Mussels	861	1	1	4	0	0	0	88	1	5	0	0	0	0	100
	862	5	2	4	0	0	0	30	0	5	54	0	0	0	100
	863	0	0	0	0	0	0	100	0	0	0	0	0	0	100
	864	0	0	1	0	0	0	94	0	2	3	0	0	0	100
	865	0	0	0	0	0	0	100	0	0	0	0	0	0	100
	Mean	1.20	.60	1.80	.00	.00	.00	82.40	.20	2.40	11.40	.00	.00	.00	100.00
	StDev	2.17	.89	2.05	.00	.00	.00	29.71	.45	2.51	23.85	.00	.00	.00	.00
Tetraclita	871	4	4	23	0	0	0	63	0	0	5	1	0	0	100
	872	3	1	8	0	0	0	80	0	0	7	1	0	0	100
	873	6	2	45	4	0	4	14	0	0	25	0	0	0	100
	874	4	2	44	0	0	0	39	0	1	10	0	0	0	100
	875	17	3	27	3	0	0	21	0	0	29	0	0	0	100
	Mean	6.80	2.40	29.40	1.40	.00	.80	43.40	.00	.20	15.20	.40	.00	.00	100.00
	StDev	5.81	1.14	15.50	1.95	.00	1.79	27.88	.00	.45	11.01	.55	.00	.00	.00
Hesperophycus	856	3	17	0	41	8	0	0	1	0	30	0	0	0	100
	857	3	8	1	23	16	11	10	0	0	28	0	0	0	100
	858	2	1	0	13	46	6	2	0	0	30	0	0	0	100
	859	7	27	0	31	9	0	23	0	0	3	0	0	0	100
	860	4	17	0	29	40	0	0	0	0	10	0	0	0	100
	Mean	3.80	14.00	.20	27.40	23.80	3.40	7.00	.20	.00	20.20	.00	.00	.00	100.00
	StDev	1.92	9.90	.45	10.33	17.92	4.98	9.85	.45	.00	12.77	.00	.00	.00	.00

**Table B29. Percent Cover of Index Species
Prisoner's Harbor, Santa Cruz Island - Fall 2005 (10/14/05)**

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	77	2	0	0	0	0	0	0	0	21	0	0	0	100
	827	39	40	1	0	0	0	2	0	0	18	0	0	0	100
	828	7	73	0	19	0	0	0	0	0	1	0	0	0	100
	829	6	64	0	16	4	0	5	3	0	2	0	0	0	100
	830	18	57	0	23	0	0	0	0	0	1	1	0	0	100
	Mean	29.40	47.20	.20	11.60	.80	.00	1.40	.60	.00	8.60	.20	.00	.00	100.00
	StDev	29.74	28.01	.45	10.88	1.79	.00	2.19	1.34	.00	10.01	.45	.00	.00	.00
Endocladia	831	54	0	1	26	0	0	2	0	0	16	1	0	0	100
	832	29	18	0	41	7	1	2	0	0	2	0	0	0	100
	833	5	44	0	43	4	0	1	0	0	3	0	0	0	100
	834	6	45	0	41	4	0	3	0	0	1	0	0	0	100
	835	13	23	0	42	17	0	3	0	0	2	0	0	0	100
	Mean	21.40	26.00	.20	38.60	6.40	.20	2.20	.00	.00	4.80	.20	.00	.00	100.00
	StDev	20.60	18.93	.45	7.09	6.43	.45	.84	.00	.00	6.30	.45	.00	.00	.00
Silvetia (Rockweed)	846	16	39	2	4	0	0	2	0	0	34	2	0	1	100
	847	22	52	4	0	0	1	5	0	0	11	5	0	0	100
	848	16	41	1	1	0	15	6	1	0	17	2	0	0	100
	849	13	18	2	0	0	44	0	0	0	23	0	0	0	100
	850	6	11	1	0	0	56	0	0	0	26	0	0	0	100
	Mean	14.60	32.20	2.00	1.00	.00	23.20	2.60	.20	.00	22.20	1.80	.00	.20	100.00
	StDev	5.81	17.08	1.22	1.73	.00	25.53	2.79	.45	.00	8.76	2.05	.00	.45	.00
Mussels	841	7	6	0	0	0	0	73	0	0	14	0	0	0	100
	842	3	1	0	0	0	0	88	0	0	8	0	0	0	100
	843	3	9	3	0	0	0	63	0	0	19	2	0	1	100
	844	6	9	1	0	0	0	23	0	0	59	0	0	2	100
	845	0	0	0	0	0	0	100	0	0	0	0	0	0	100
	Mean	3.80	5.00	.80	.00	.00	.00	69.40	.00	.00	20.00	.40	.00	.60	100.00
	StDev	2.77	4.30	1.30	.00	.00	.00	29.53	.00	.00	22.92	.89	.00	.89	.00
Hesperophycus	836	18	35	0	31	14	0	0	0	0	2	0	0	0	100
	837	19	48	0	20	12	0	0	0	0	1	0	0	0	100
	838	30	42	0	14	7	2	0	0	0	5	0	0	0	100
	839	16	55	0	5	22	2	0	0	0	0	0	0	0	100
	840	31	47	0	13	8	0	0	0	0	1	0	0	0	100
	Mean	22.80	45.40	.00	16.60	12.60	.80	.00	.00	.00	1.80	.00	.00	.00	100.00
	StDev	7.12	7.44	.00	9.66	5.98	1.10	.00	.00	.00	1.92	.00	.00	.00	.00

**Table B30. Percent Cover of Index Species
Trailer, Santa Cruz Island - Fall 2005 (10/15/05)**

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	911	24	67	0	4	0	0	0	0	0	4	1	0	0	100
	912	22	75	0	0	0	0	0	0	0	1	2	0	0	100
	913	16	66	0	16	0	0	0	0	0	2	0	0	0	100
	914	18	79	0	0	0	0	0	0	0	3	0	0	0	100
	915	15	83	0	0	0	0	0	0	0	2	0	0	0	100
	Mean	19.00	74.00	.00	4.00	.00	.00	.00	.00	.00	2.40	.60	.00	.00	100.00
	StDev	3.87	7.42	.00	6.93	.00	.00	.00	.00	.00	1.14	.89	.00	.00	.00
Silvetia (Rockweed)	926	3	2	0	0	0	92	0	0	0	3	0	0	0	100
	927	8	12	0	0	0	79	0	0	0	1	0	0	0	100
	928	2	5	0	1	0	77	0	1	0	14	0	0	0	100
	929	2	8	0	0	0	82	0	0	0	8	0	0	0	100
	930	3	5	0	0	0	79	0	0	0	13	0	0	0	100
	Mean	3.60	6.40	.00	.20	.00	81.80	.00	.20	.00	7.80	.00	.00	.00	100.00
	StDev	2.51	3.78	.00	.45	.00	5.97	.00	.45	.00	5.81	.00	.00	.00	.00
Mussels	921	10	7	1	0	0	0	0	33	0	49	0	0	0	100
	922	5	7	0	0	0	0	36	1	0	51	0	0	0	100
	923	7	11	0	0	0	0	10	4	0	63	3	0	2	100
	924	5	5	1	0	0	0	56	5	1	21	6	0	0	100
	925	9	3	0	0	1	0	48	4	0	34	1	0	0	100
	Mean	7.20	6.60	.40	.00	.20	.00	30.00	9.40	.20	43.60	2.00	.00	.40	100.00
	StDev	2.28	2.97	.55	.00	.45	.00	24.17	13.28	.45	16.30	2.55	.00	.89	.00
Hesperophycus	916	16	12	0	0	34	38	0	0	0	0	0	0	0	100
	917	12	8	0	17	6	56	0	0	0	1	0	0	0	100
	918	9	8	0	8	10	61	0	0	0	4	0	0	0	100
	919	42	49	0	5	2	0	0	0	0	2	0	0	0	100
	920	5	24	0	17	44	4	0	0	0	6	0	0	0	100
	951	38	33	0	13	15	0	0	0	0	1	0	0	0	100
	Mean	20.33	22.33	.00	10.00	18.50	26.50	.00	.00	.00	2.33	.00	.00	.00	100.00
	StDev	15.71	16.40	.00	6.87	16.75	28.65	.00	.00	.00	2.25	.00	.00	.00	.00

**Table B31. Percent Cover of Index Species
Willows Anchorage, Santa Cruz Island - Fall 2005 (10/16/05)**

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	26	5	0	62	0	0	0	0	0	7	0	0	0	100
	932	9	4	0	76	0	0	0	0	0	11	0	0	0	100
	933	25	8	0	51	0	0	0	0	0	16	0	0	0	100
	934	16	4	0	52	0	0	0	0	0	27	1	0	0	100
	935	22	26	0	29	0	0	0	0	0	22	1	0	0	100
	Mean	19.60	9.40	.00	54.00	.00	.00	.00	.00	.00	16.60	.40	.00	.00	100.00
	StDev	7.09	9.42	.00	17.22	.00	.00	.00	.00	.00	8.08	.55	.00	.00	.00
Silvetia (Rockweed)	946	4	10	0	48	0	0	0	0	0	38	0	0	0	100
	947	6	11	0	27	0	0	0	2	0	54	0	0	0	100
	948	0	5	0	3	0	78	0	0	0	14	0	0	0	100
	949	2	0	0	0	0	84	0	0	0	14	0	0	0	100
	950	16	24	0	21	0	1	0	0	0	37	1	0	0	100
	Mean	5.60	10.00	.00	19.80	.00	32.60	.00	.40	.00	31.40	.20	.00	.00	100.00
	StDev	6.23	8.97	.00	19.51	.00	44.24	.00	.89	.00	17.26	.45	.00	.00	.00
Mussels	941	5	4	6	0	0	0	77	0	2	6	0	0	0	100
	942	0	1	0	0	0	0	88	0	3	6	2	0	0	100
	943	2	0	0	0	0	0	98	0	0	0	0	0	0	100
	944	1	0	0	0	0	0	87	0	0	12	0	0	0	100
	945	2	1	0	0	0	0	90	0	0	7	0	0	0	100
	Mean	2.00	1.20	1.20	.00	.00	.00	88.00	.00	1.00	6.20	.40	.00	.00	100.00
	StDev	1.87	1.64	2.68	.00	.00	.00	7.52	.00	1.41	4.27	.89	.00	.00	.00
Hesperophycus	936	15	16	0	63	0	0	1	0	0	5	0	0	0	100
	937	6	2	0	1	3	76	0	0	0	11	0	0	1	100
	938	28	42	0	0	0	0	0	0	0	28	1	0	1	100
	939	30	39	0	5	0	0	0	0	0	26	0	0	0	100
	940	11	11	0	6	7	44	0	0	0	21	0	0	0	100
	Mean	18.00	22.00	.00	15.00	2.00	24.00	.20	.00	.00	18.20	.20	.00	.40	100.00
	StDev	10.56	17.65	.00	26.95	3.08	34.76	.45	.00	.00	9.88	.45	.00	.55	.00

**Table B32. Percent Cover of Index Species
East Point, Santa Rosa Island - Fall 2005 (1/15/06)**

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	48	51	0	0	0	0	0	0	0	0	1	0	0	100
	576	34	37	0	10	15	0	0	0	0	2	2	0	0	100
	577	6	32	0	39	20	2	0	0	0	1	0	0	0	100
	578	58	42	0	0	0	0	0	0	0	0	0	0	0	100
	579	31	65	0	4	0	0	0	0	0	0	0	0	0	100
	Mean	35.40	45.40	.00	10.60	7.00	.40	.00	.00	.00	.60	.60	.00	.00	100.00
	StDev	19.72	13.01	.00	16.40	9.75	.89	.00	.00	.00	.89	.89	.00	.00	.00
Endocladia	580	44	14	0	38	1	3	0	0	0	0	0	0	0	100
	581	17	10	0	71	1	0	0	0	0	1	0	0	0	100
	582	18	2	0	77	3	0	0	0	0	0	0	0	0	100
	583	18	11	0	68	2	0	0	0	0	1	0	0	0	100
	584	8	22	0	68	2	0	0	0	0	0	0	0	0	100
	Mean	21.00	11.80	.00	64.40	1.80	.60	.00	.00	.00	.40	.00	.00	.00	100.00
	StDev	13.53	7.22	.00	15.21	.84	1.34	.00	.00	.00	.55	.00	.00	.00	.00
Silvetia (Rockweed)	585	37	12	0	10	0	28	0	0	0	13	0	0	0	100
	586	31	5	0	11	0	39	0	2	0	11	1	0	0	100
	587	61	4	0	0	0	9	0	5	0	21	0	0	0	100
	588	3	1	0	0	0	92	0	0	0	4	0	0	0	100
	589	4	0	0	0	0	86	0	0	0	10	0	0	0	100
	Mean	27.20	4.40	.00	4.20	.00	50.80	.00	1.40	.00	11.80	.20	.00	.00	100.00
	StDev	24.38	4.72	.00	5.76	.00	36.55	.00	2.19	.00	6.14	.45	.00	.00	.00
Mussels	590	4	0	0	0	0	0	73	10	0	10	3	0	0	100
	591	8	5	0	0	0	0	28	20	0	34	5	0	0	100
	592	3	0	1	0	0	0	80	0	0	11	5	0	0	100
	593	1	0	0	0	0	0	96	0	0	2	1	0	0	100
	594	2	1	1	0	0	0	92	0	0	3	1	0	0	100
	Mean	3.60	1.20	.40	.00	.00	.00	73.80	6.00	.00	12.00	3.00	.00	.00	100.00
	StDev	2.70	2.17	.55	.00	.00	.00	27.21	8.94	.00	12.94	2.00	.00	.00	.00
Hesperophycus	570	42	11	0	43	4	0	0	0	0	0	0	0	0	100
	571	44	23	0	18	15	0	0	0	0	0	0	0	0	100
	572	27	57	0	11	4	0	0	0	0	0	1	0	0	100
	573	8	75	0	14	0	3	0	0	0	0	0	0	0	100
	574	6	35	0	40	16	1	0	1	0	1	0	0	0	100
	Mean	25.40	40.20	.00	25.20	7.80	.80	.00	.20	.00	.20	.20	.00	.00	100.00
	StDev	18.05	25.83	.00	15.12	7.22	1.30	.00	.45	.00	.45	.45	.00	.00	.00

**Table B33. Percent Cover of Index Species
Ford Point, Santa Rosa Island - Fall 2005 (1/14/06)**

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	53	37	0	0	0	0	0	0	0	2	8	0	0	100
	521	37	59	0	0	0	0	0	0	0	3	1	0	0	100
	522	63	35	0	0	0	0	0	0	0	0	2	0	0	100
	523	46	15	0	38	0	1	0	0	0	0	0	0	0	100
	524	27	71	0	2	0	0	0	0	0	0	0	0	0	100
	Mean	45.20	43.40	.00	8.00	.00	.20	.00	.00	.00	1.00	2.20	.00	.00	100.00
	StDev	13.94	21.93	.00	16.79	.00	.45	.00	.00	.00	1.41	3.35	.00	.00	.00
Endocladia	525	23	2	0	56	0	0	6	0	0	13	0	0	0	100
	526	36	1	0	44	0	0	7	0	0	11	1	0	0	100
	527	27	0	0	35	0	0	1	0	0	37	0	0	0	100
	528	15	3	1	49	0	0	0	0	0	32	0	0	0	100
	529	14	2	1	69	0	0	0	0	0	12	2	0	0	100
	Mean	23.00	1.60	.40	50.60	.00	.00	2.80	.00	.00	21.00	.60	.00	.00	100.00
	StDev	9.08	1.14	.55	12.82	.00	.00	3.42	.00	.00	12.47	.89	.00	.00	.00
Mussels	530	65	6	0	0	0	0	12	0	1	3	13	0	0	100
	531	5	0	0	0	0	0	86	0	0	8	1	0	0	100
	532	9	2	0	0	0	0	1	5	0	83	0	0	0	100
	533	36	2	0	3	0	0	50	0	0	8	1	0	0	100
	534	17	4	0	0	0	0	1	54	0	19	5	0	0	100
	Mean	26.40	2.80	.00	.60	.00	.00	30.00	11.80	.20	24.20	4.00	.00	.00	100.00
	StDev	24.65	2.28	.00	1.34	.00	.00	37.22	23.69	.45	33.39	5.39	.00	.00	.00

**Table B34. Percent Cover of Index Species
Fossil Reef, Santa Rosa Island - Fall 2005 (1/12/06)**

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	39	57	0	1	0	0	0	0	0	1	2	0	0	100
	606	43	46	0	0	0	0	0	0	0	4	1	6	0	100
	607	35	61	0	0	0	0	0	0	0	0	4	0	0	100
	608	70	27	0	0	0	0	0	0	0	3	0	0	0	100
	609	60	33	0	0	0	0	0	0	0	6	1	0	0	100
	Mean	49.40	44.80	.00	.20	.00	.00	.00	.00	.00	2.80	1.60	1.20	.00	100.00
	StDev	14.94	14.74	.00	.45	.00	.00	.00	.00	.00	2.39	1.52	2.68	.00	.00
Endocladia	610	20	45	0	26	0	0	0	0	0	9	0	0	0	100
	611	12	71	0	15	0	0	0	0	0	0	2	0	0	100
	612	33	48	0	1	0	0	0	0	0	17	1	0	0	100
	613	18	12	0	34	0	31	0	0	0	3	2	0	0	100
	614	39	37	0	6	3	7	0	0	0	8	0	0	0	100
	Mean	24.40	42.60	.00	16.40	.60	7.60	.00	.00	.00	7.40	1.00	.00	.00	100.00
	StDev	11.19	21.27	.00	13.69	1.34	13.43	.00	.00	.00	6.50	1.00	.00	.00	.00
Silvetia (Rockweed)	615	35	55	0	5	0	0	0	0	0	3	2	0	0	100
	616	44	24	0	9	0	1	0	0	0	22	0	0	0	100
	617	23	12	0	10	0	48	0	0	0	5	2	0	0	100
	618	12	2	0	6	0	73	0	0	0	7	0	0	0	100
	619	8	2	0	6	0	84	0	0	0	0	0	0	0	100
	Mean	24.40	19.00	.00	7.20	.00	41.20	.00	.00	.00	7.40	.80	.00	.00	100.00
	StDev	15.18	22.07	.00	2.17	.00	39.38	.00	.00	.00	8.56	1.10	.00	.00	.00
Mussels	620	0	2	1	2	0	0	0	16	0	51	28	0	0	100
	621	4	14	1	0	0	0	0	4	0	68	9	0	0	100
	622	14	8	4	0	0	0	57	0	2	15	0	0	0	100
	623	10	3	7	0	0	0	48	0	7	25	0	0	0	100
	624	0	1	0	0	0	0	0	45	0	18	36	0	0	100
	Mean	5.60	5.60	2.60	.40	.00	.00	21.00	13.00	1.80	35.40	14.60	.00	.00	100.00
	StDev	6.23	5.41	2.88	.89	.00	.00	28.93	19.05	3.03	23.09	16.55	.00	.00	.00

**Table B35. Percent Cover of Index Species
Johnson's Lee, Santa Rosa Island - Fall 2005 (1/10/06)**

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	50	50	0	0	0	0	0	0	0	0	0	0	0	100
	501	44	56	0	0	0	0	0	0	0	0	0	0	0	100
	502	57	42	0	0	0	0	0	0	0	0	1	0	0	100
	503	33	49	0	16	0	0	0	0	0	0	2	0	0	100
	504	100	0	0	0	0	0	0	0	0	0	0	0	0	100
	Mean	56.80	39.40	.00	3.20	.00	.00	.00	.00	.00	.00	.60	.00	.00	100.00
	StDev	25.70	22.58	.00	7.16	.00	.00	.00	.00	.00	.00	.89	.00	.00	.00
Endocladia	505	58	3	0	22	0	0	16	0	0	0	1	0	0	100
	506	56	1	0	41	0	0	0	0	0	0	1	1	0	100
	507	45	4	0	29	0	0	17	0	0	3	2	0	0	100
	508	35	18	0	22	0	0	23	0	0	0	2	0	0	100
	509	44	1	1	53	0	0	0	0	0	1	0	0	0	100
	Mean	47.60	5.40	.20	33.40	.00	.00	11.20	.00	.00	.80	1.20	.20	.00	100.00
	StDev	9.45	7.16	.45	13.43	.00	.00	10.57	.00	.00	1.30	.84	.45	.00	.00
Mussels	510	11	0	1	0	0	0	0	26	0	28	34	0	0	100
	511	24	0	0	0	0	0	0	14	0	25	37	0	0	100
	512	40	0	1	0	0	0	55	0	2	2	0	0	0	100
	513	43	1	0	0	0	0	1	9	0	2	44	0	0	100
	514	0	0	0	0	0	0	0	7	0	21	72	0	0	100
	Mean	23.60	.20	.40	.00	.00	.00	11.20	11.20	.40	15.60	37.40	.00	.00	100.00
	StDev	18.45	.45	.55	.00	.00	.00	24.49	9.68	.89	12.66	25.74	.00	.00	.00

**Table B36. Percent Cover of Index Species
Northwest-Talcott, Santa Rosa Island - Fall 2005 (1/11/06)**

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	40	54	0	6	0	0	0	0	0	0	0	0	0	100
	561	35	61	0	0	0	4	0	0	0	0	0	0	0	100
	562	25	71	0	0	0	0	0	0	0	1	3	0	0	100
	563	20	11	0	2	0	67	0	0	0	0	0	0	0	100
	564	60	35	0	0	0	0	2	0	0	2	1	0	0	100
	Mean	36.00	46.40	.00	1.60	.00	14.20	.40	.00	.00	.60	.80	.00	.00	100.00
	StDev	15.57	23.77	.00	2.61	.00	29.57	.89	.00	.00	.89	1.30	.00	.00	.00
Endocladia	555	17	0	0	25	0	48	0	0	0	10	0	0	0	100
	556	62	2	0	30	0	6	0	0	0	0	0	0	0	100
	557	33	0	0	17	0	31	0	13	0	4	2	0	0	100
	558	41	0	0	22	0	0	0	0	0	34	3	0	0	100
	559	57	0	0	7	0	0	0	1	0	33	2	0	0	100
	Mean	42.00	.40	.00	20.20	.00	17.00	.00	2.80	.00	16.20	1.40	.00	.00	100.00
	StDev	18.25	.89	.00	8.76	.00	21.54	.00	5.72	.00	16.19	1.34	.00	.00	.00
Silvetia (Rockweed)	565	16	0	0	0	0	83	0	0	0	1	0	0	0	100
	566	28	9	0	0	0	60	0	0	0	3	0	0	0	100
	567	26	6	0	1	0	54	0	0	0	11	2	0	0	100
	568	14	2	0	6	0	74	0	0	0	2	2	0	0	100
	569	61	5	0	6	0	22	0	0	0	6	0	0	0	100
	Mean	29.00	4.40	.00	2.60	.00	58.60	.00	.00	.00	4.60	.80	.00	.00	100.00
	StDev	18.89	3.51	.00	3.13	.00	23.43	.00	.00	.00	4.04	1.10	.00	.00	.00
Mussels	550	26	0	0	0	0	0	31	17	4	18	4	0	0	100
	551	11	0	0	0	0	0	68	8	0	12	1	0	0	100
	552	18	0	0	0	0	0	54	1	10	13	4	0	0	100
	553	28	0	1	0	0	0	32	1	11	24	3	0	0	100
	554	20	0	0	0	0	0	43	1	5	28	3	0	0	100
	Mean	20.60	.00	.20	.00	.00	.00	45.60	5.60	6.00	19.00	3.00	.00	.00	100.00
	StDev	6.77	.00	.45	.00	.00	.00	15.63	7.06	4.53	6.93	1.22	.00	.00	.00

Appendix C. Trip Reports

The following are trip reports from the Rocky Intertidal Monitoring 2004 field season (March 2004 through January 2005). Reports were prepared by Dan Richards 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.

General note about motile invertebrate tables: the numbers of *Littorina* spp., limpets <5 mm and limpets 5-15 mm are extrapolated values for the full 50x75 cm plot calculated from either 10x10 cm or 20x20 cm sub-samples.

Table of Contents for Appendix C.

	Page
Appendix C. Trip Reports.....	C-1
Spring 2005 Rocky Intertidal Monitoring Trip Reports	C-2
<u> </u> Santa Cruz Island, March 7-11, 2005	C-2
<u> </u> Santa Cruz Island, April 19, 2005.....	C-16
<u> </u> San Miguel Island, April 27 – May 2, 2005	C-19
<u> </u> San Rosa Island, May 24-31, 2005	C-31
<u> </u> Anacapa Island, June 22-25, 2005	C-47
Fall 2005 Rocky Intertidal Monitoring Trip Reports	C-55
<u> </u> Santa Cruz Island, October 14-19, 2005	C-55
<u> </u> Santa Barbara Island, November 9-16, 2005	C-62
<u> </u> Santa Cruz Island, December 1, 2005.....	C-66
<u> </u> Anacapa Island, December 11-14, 2005	C-69
<u> </u> Santa Rosa Island, January 10-18, 2006	C-78
<u> </u> San Miguel Island, January 24-31, 2006	C-87

Spring 2005 Rocky Intertidal Monitoring Trip Reports

Santa Cruz Island, March 7-11, 2005

(Database event #2005-A)

Personnel: Dan Richards, Marine Biologist, Channel Islands National Park
Paula Rich, Biological Technician, Channel Islands National Park
Ann Fossum, SCA intern
Rocky Rudolph, SCA intern

Procedure and general observations: We took the Island Packer vessel *Island Adventure* to Santa Cruz Island, arriving at Prisoners at approximately 1000 hrs. Standard procedures were used for monitoring the rocky intertidal sites. All plots and site overviews were photographed with an Olympus C-5050 digital camera. Scoring was done in the field for all but a few plots at Fraser Cove. Motile invertebrates were counted in all the photoplots. Sub-sampling was done for Littorines or small limpets when abundant, using three 20x20 cm or 10x10 cm subplots. Surfgrass transects were read at Trailer and Fraser Cove. Seastars were counted and measured at all sites. The maximum number of shorebirds and pinnipeds seen at any one time was recorded. Abalone searches were restricted to time during sea star measurements due to the surf and limited time. Ann and Rocky used the Trimble GPS to map the plots and other features of the reefs to improve the site maps. Carol Blanchette and Bernardo Broitman from PISCO were out changing settlement plates and conducting thirty minute seastar counts at each site.

7 March , Prisoners Harbor. Low tide -1.2 ft at 1406 hrs. Conditions were excellent with calm seas and no wind. The sky was clear and the air was warm. Water temperature was 17°C. There were no shorebirds or pinnipeds at the site but there were three killdeer on the beach and a harbor seal watched us from the water. We were onsite from 1200-1645 hrs.

Photoplots were all photographed and field scored. The diffuser screen was used for the photos because of the bright sun. Pans from each of the reference bolts and other area photos were taken.

There were 53 *Pisaster ochraceus* in the cracks between the mussel plots and along the front slope, 42 were measured. Sizes ranged from 75-165 mm radius. The majority were over 100 mm.

There seemed to be high mussel recruitment again with dense beds of small mussels ranging from 2 to 40 mm. Mussel cover ranged from 77%-95% in the plots. About five percent appeared to be *Mytilus galloprovincialis*. There were some small clearings with nothing but byssal threads present. In general the reef looked good.

Barnacle recruitment was incredibly dense in some areas and heavy all over. *Chthamalus* sp appeared to be the most abundant. There were also lots of tiny *Littorina* spp. *Scytosiphon dotyi* was thicker than I ever remembered seeing it. Small black-green cyanobacteria tufts were present.

Silvetia compressa was sparse and appeared to be cropped, but only on the flat part of the reef, as it did when we suspected the pigs of browsing on it. It may still be suffering browsing. *Silvetia compressa* cover ranged from only 1%-44%. *Hesperophycus californica* was very sparse in general and cover ranged from only 1%-17%.

Motile invertebrates were common in nearly all plots. Other than *Littorina* spp., *Acanthina* sp. was the most abundant snail and was present in all four zones. The mussel plots were difficult to count because of the densely packed mussels.

We stayed at the UC Reserve station tonight. Because of the high flow in the Prisoners Valley stream we had to drive up and around to Valley Anchorage to get to the Central Valley.

Table 7. Photoplot summary. Mean percent cover by zone at Prisoners Harbor, spring 2005. (5 plots/zone).

Zone Name	Bare Rock	Barnacle	Tetraclita	Endocladia	Hespero-phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc. Algae	Misc. Animal	Tar
Barnacle	23.0	15.2	0.2	11.8	1.2	0.0	1.2	1.8	0.0	45.0	0.6	0.0
Endocladia	14.8	13.0	0.0	59.8	4.2	0.0	2.2	0.0	0.0	5.2	0.8	0.0
Rockweed	26.0	0.6	1.4	0.0	0.0	16.0	4.2	1.4	0.0	49.6	0.8	0.0
Mussels	7.2	5.0	2.2	0.0	0.0	0.0	80.0	0.2	0.2	4.4	0.8	0.0
Hespero-phycus	41.4	20.0	0.0	23.6	8.0	0.4	0.2	0.0	0.0	5.8	0.6	0.0

Table 8. Seastar (*Pisaster ochraceus*) counts at Prisoners Harbor, Santa Cruz Island, spring 2005. (sizes in mm).

Total	42
Min size	75
Max size	165
Mean size	129

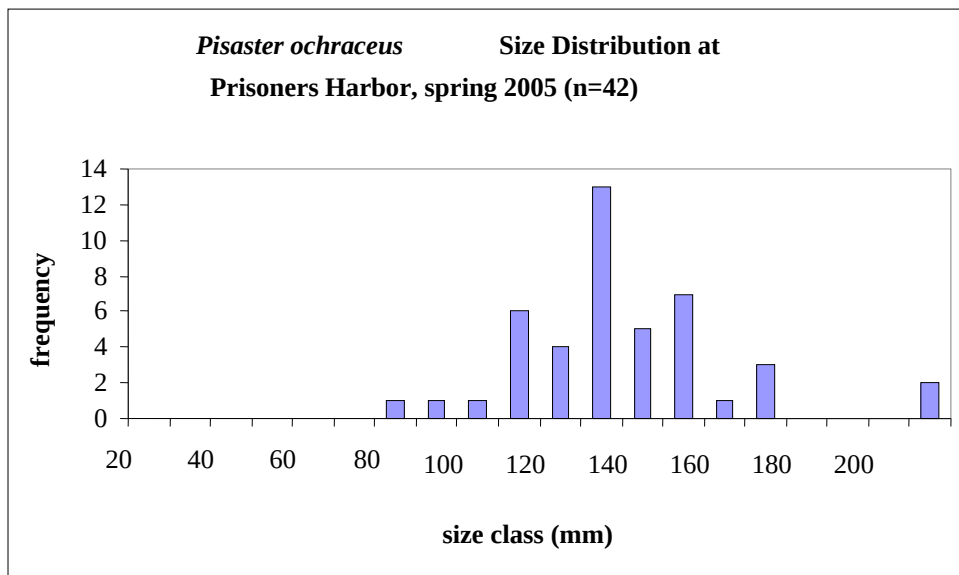


Figure 19. *Pisaster ochraceus* size distribution at Prisoners Harbor, Santa Cruz Island, spring 2005.

Table 9. Motile invertebrate size frequencies, Prisoners Harbor, Santa Cruz Island, spring 2005. (sizes in mm).

	<i>Nucella emarginata</i>	<i>Acanthina</i> spp.	<i>Tegula funebris</i>	<i>Ocenebra circumtexta</i>	<i>Lottia gigantea</i>	<i>Tegula gallina</i>
count	15	90	12	16	1	1
avg size	16	14	16	14	35	11
min size	12	6	9	9	35	11
max size	22	22	22	18	35	11

Table 10. Motile invertebrate counts, Prisoners Harbor, Santa Cruz Island, spring 2005.

zone		Barnacle						Endocladia			
	plot #	826	827	828	829	830	831	832	833	834	835
Lepidochitona spp.		2	1	1	2	4	2	1			2
Nuttalina spp.		1	1								
Fissurella volcano											1
Pachygrapsus		2	1		2	4	4	6	1	8	
Pagurus spp.											
large											
limpets(>15mm)		8	1		1		1				1
S. purpuratus											
Nucella emarginata								3	1	1	1
Acanthina spp.					3	5	6	9	4	15	13
Tegula gallina											
Tegula funebris								1		2	3
Ceratostoma nuttali											
Ocenebra						1	1				4
circumtexta											
Lottia gigantea											
Epitonium tinctum											
Littorina spp.		52	681	184	297	163	73	113	278	194	109
subsample1			52	4	18	23		20	50	22	23
subsample2			114	27	13	22		16	10	22	9
subsample3			52	28	64	7		0	29	18	3
Limpet < 5 mm		2	34	5	5	2	8	7	4	4	1
subsample1			7								
subsample2			3								
subsample3			1								
Limpet 5-15 mm		45	81.25	49	23	27	66	18	10	4	17
subsample1			17								
subsample2			4								

zone		Hesperophycus						Mytilus			
	plot #	836	837	838	839	840	841	842	843	844	845
Lepidochitona spp.		2	3	1		1				1	1
Nuttalina spp.							1	2	13	3	18
Fissurella volcano										5	1
Pachygrapsus		2						2	1	5	2
Pagurus spp.											
large											
limpets(>15mm)							1				
S. purpuratus											
Nucella emarginata		3							1		4
Acanthina spp.			3	4			15	3	3	15	
Tegula gallina			1								
Tegula funebris		3	1	1							
Ceratostoma nuttali											
Ocenebra				1							
circumtexta							1	1			6
Lottia gigantea											
Epitonium tinctum											
Littorina spp.		75	256	113	1075	453	0	0	0	0	0
subsample1		9	30	27	65	79					
subsample2		8	21	14	13	39					
subsample3		7	31	6	8	27					
Limpet < 5 mm		3	3	3	0	3	1	0	36	3	29
subsample1		1	0	0							
subsample2		0	0	1							
subsample3		0	1	0							
Limpet 5-15 mm		19	25	31	9	16	12	8	27	7	20
subsample1		2	0	3							
subsample2		1	3	3							

zone		<i>Silvetia</i>				
	plot #	846	847	848	849	850
Lepidochitona spp.			3	6	2	2
Nuttalina spp.						
Fissurella volcano						
Pachygrapsus			1			
Pagurus spp.				2		
large limpets(>15mm)			2	1	3	4
S. purpuratus						
Nucella emarginata				1		
Acanthina spp.			3	2	2	
Tegula gallina						
Tegula funebris					1	
Ceratostoma nuttali						
Ocenebra circumtexta						1
Lottia gigantea				1		
Epitonium tinctum				1		
Littorina spp.		422	40	11	75	69
subsample1		98				19
subsample2		22				0
subsample3		15				3
Limpet < 5 mm		17	15	22	30	88
subsample1						1
subsample2						24
subsample3						3
Limpet 5-15 mm		118	216	83	79	106
subsample1			19			4
subsample2			26			19

8 March, Fraser Cove. Low tide -1.3 ft at 1442 hrs. We had thick fog but fairly pleasant temperatures. The wind was light and the swell was moderate. At Forney's Cove, there were four black oystercatchers and at Fraser Cove there were eight black oystercatchers and a western gull. One American oystercatcher was among the group. We were on site from about 1220 to 1745 hrs.

We drove the land cruiser with trailer, departing at 0800. Carol and Bernardo drove out in the truck for the day. Most of the road was not bad and there were no real challenges on the road, just slow going. We made it to the west end, but had to try a couple of times to get back up the black adobe slope on the way back to Christy. We were back at Christy about 1930 hrs.

It took nearly two hours to complete everything at the Forney's area and get back to Fraser Cove. We were able to complete the surfgrass transects and lower plot counts without getting too wet. *Phyllospadix* spp. there was pretty abraded and showed a fair amount of bleaching. *Phyllospadix* cover ranged from 48-80 percent. At the end of the day, we still had motile invertebrates to count in the tar and Endocladia zone and scoring in the barnacle, tar and four Pollicipes zone plots.

Both *Hesperophycus californica* and *Silvetia compressa* looked great. They were very lush with good color. There was some rock breakage near the reference bolt and a small area near plot He3 that took the upper right bolt.

Endocladia muricata was doing very well with dense extensive cover. There was not much *Porphyra perforata* obscuring the plots so the *Lottia gigantea* seemed common.

We did not measure seastars because of the surf conditions. No effort was made to search for black abalone, though we did see one at Forney's.

Motile invertebrates were common in all zones. *Tegula funebris* and *Nucella emarginata* were the most common snails. *Acanthina* spp. were common in the rockweed plots. In general, *Littorina* spp. were not that abundant, though a couple plots did have high abundances of them. *Littorina* spp. were the only motile invertebrates in the tar plots

Mussel cover ranged from 68-83% cover. Tar was present only in the tar zone plots and there it ranged from 36-65 percent cover.

Table 11. Photoplot summary. Mean percent cover by zone at Fraser Cove, Santa Cruz Island, spring 2005.

Zone Name	Bare Rock	Barnacle	Tetracelia	Endocladia	Hesperophycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc. Algae	Misc. Animal	Tar
Barnacle	33.8	19.2	0.0	23.2	0.0	0.0	0.8	0.4	0.2	22.2	0.0	0.2
Endocladia	19.8	0.6	0.0	68.4	0.6	0.0	1.0	0.2	0.0	9.2	0.2	0.0
Rockweed	23.6	3.4	0.0	9.2	9.8	48.6	0.0	0.0	0.0	4.4	1.0	0.0
Mussels	14.4	0.0	0.0	0.2	0.0	0.0	76.8	0.0	0.8	3.0	4.8	0.0
Pollicipes	14.8	2.6	2.0	7.8	0.0	0.0	51.0	0.8	6.4	3.8	10.8	0.0
Tar	30.2	14.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	53.4
Hesperophycus	33.0	6.8	0.0	21.6	25.2	8.0	0.0	0.2	0.0	5.0	0.2	0.0

Table 12. Surfgrass transects at Fraser Cove, Santa Cruz Island, spring 2005. (Additional taxa removed when not represented).

Location: Fraser Cove Site Code: SCFC			
Date: 8-Mar-05 Recorders: Dan Richards			
Surf Grass Taxa	Transect 1	Transect 2	Transect 3
Rock	9	1	1
Sand	9	1	
<i>Egregia menziesii</i>		1	
Erect coralline	16	4	11
Encrusting coralline	1		
other red algae	13	9	9
<i>Phyllospadix</i> sp. overstory	48	80	77
<i>Phyllospadix</i> sp. understory	1		
<i>Mytilus californianus</i>	2	1	
<i>Anthopleura</i> spp.		1	
<i>Phragmatopoma californica</i>	2	2	2
total	101	100	100

Table 13. Motile invertebrate size frequencies, Fraser Cove, Santa Cruz Island, spring 2005. (sizes in mm).

	<i>Nucella emarginata</i>	<i>Acanthina</i> spp.	<i>Tegula funebris</i>	<i>Ocenebra circumtexta</i>	<i>Lottia gigantea</i>	<i>Tegula gallina</i>
count	96	31	124	5	7	3
avg size	15	15	14	13	31	14
min size	8	8	5	8	23	10

max size	26	22	27	19	50	17
----------	----	----	----	----	----	----

Table 14. Motile invertebrate counts, Fraser Cove, Santa Cruz Island, spring 2005.

zone	Barnacle					Endocladia				
plot #	876	877	878	879	880	881	882	883	884	885
Lepidochitona spp.										
Nuttalina spp.						4				
Fissurella volcano										
Pachygrapsus	1			2				1	2	
Pagurus spp.	1		1							
large limpets(>15mm)				1						
S. purpuratus										
Pisaster ochraceus										
Nucella emarginata	3					3		2	1	
Acanthina spp.	2						1	6		
Tegula gallina				1						
Tegula funebris	10		7	9		1	5	5		3
Ocenebra circumtexta	1									
Lottia gigantea										
Epitonium tinctum										
Mitrella				1						
Littorina spp.	24	26	2925	275	14	23	225			
subsample1			60	27			12	9	4	0
subsample2			55	5			4			
subsample3			119	56			2			
Limpet < 5 mm	1	0	0	4	0	0	0	1	1	0
subsample1										
subsample2										
subsample3										
Limpet 5-15 mm	16	3	5	4	5	11	31	8	0	1
subsample1										
subsample2										
subsample3										

zone	Hesperophycus					Silvetia				
plot #	886	887	888	889	890	896	897	898	899	900
Lepidochitona spp.				4	2		5	2	4	4
Nuttalina spp.										
Fissurella volcano							1			
Pachygrapsus	2	1	2				2		3	1
Pagurus spp.		5					2	3		
large limpets(>15mm)				4	1	2	2	1	3	1
S. purpuratus										
Pisaster ochraceus										
Nucella emarginata			1							

Acanthina spp.	1		1	3	11	1			3	1
Tegula gallina								1		1
Tegula funebris	6	46		2	31	1	6	115	60	15
Ocenebra circumtexta							1	2		1
Lottia gigantea										
Epitonium										
Mitrella										
Littorina spp.	56	1	297	31	2	5	4	0	1	25
subsample1	3		52							
subsample2	14		31							
subsample3	1		12							
Limpet < 5 mm	2	1	5	21	10	9	20	1	3	8
subsample1										
subsample2										
subsample3										
Limpet 5-15 mm	16	15	30	49	40	26	36	22	26	39
subsample1										
subsample2										
subsample3										

zone	<i>Mytilus</i>					<i>Pollicipes</i>				
plot #	891	892	893	894	895	901	902	903	904	905
Lepidochitona spp.						2				2
Nuttalina spp.						5		1		2
Fissurella volcano										
Pachygrapsus	1	2	3	2	1	3	1	4		1
Pagurus spp.										
large limpets(>15mm)										
S. purpuratus					1		3			
Pisaster ochraceus										
Nucella emarginata	2	11	6	15	12	16	3	10	14	17
Acanthina spp.		1								
Tegula gallina										
Tegula funebris	4	14				1				
Ocenebra circumtexta										
Lottia gigantea	1	3	1				2			
Epitonium tinctorum						1				
Mitrella										
Littorina spp.	0	3	2	2	0	4	1	0	0	0
subsample1										
subsample2										
subsample3										
Limpet < 5 mm	3	4	6	6	3	11	5	12	21	12
subsample1										
subsample2										
subsample3										

Limpet 5-15 mm	21	27	51	61	41	78	34	63	60	40
subsample1										
subsample2										
subsample3										

9 March, Trailer and Forney's Cove. Low tide -1.1 ft at 1516 hrs. Dense heavy fog and fairly cool conditions. The swell was huge with surf reaching 10 feet or greater. Surf at Trailer was only 2-4 ft. There were three black oystercatchers and one western Gull at Trailer. At Fraser there were four black oystercatchers and eight black turnstones were on the beach at the back of the cove. We were onsite from 1200-1800 hrs.

We drove from Christy to the top of the black adobe hill and walked from there first to Fraser to finish, then on to Trailer arriving at 1400 hrs. At noon the waves were still occasionally washing to the base of the cliffs, so we were challenged to work even in the higher zone plots. Conditions did not allow scoring the *Pollicipes* zone plots or B5. We got back to Christy Ranch about 1930 hrs.

We made repairs to plot corners at Trailer and created a new *Hesperophycus* plot (H6), placed near R2, because the changes to the broken rock in plot He4 may not be conducive to *Hesperophycus* in that plot anymore.

Ann measured 93 *Pisaster ochraceus* at trailer. The majority were less than 120 mm though a few large individuals were found. Carol did a 30-minute seastar count. Carol also reported a black abalone at Trailer.

Motile invertebrates were fairly abundant in all zones except the barnacle zone. *Nucella emarginata*, *Tegula funebris* and *Acanthina* spp. were all common. *T. funebris* were very dense in the *Silvetia* zone with a high of 151 in plot Pe5. A few *Ocenebra circumtexta* were present in the mussel zone. *Littorina* spp. were abundant in the barnacle zone only. Several *Tegula gallina* were found.

Mytilus californianus cover ranged from 0 (plot M1) to 81 percent. Plot M5 with 51% cover had three *Pisaster ochraceus* on the margin of the plot.

Both *Hesperophycus californica* and *Silvetia compressa* appeared to be quite healthy overall. Cover of *H. californica* only ranged from 1-23% in the plots but the plants were robust and doing well. *Silvetia compressa* was long and lush.

Barnacle cover was quite high with dense patches of recruitment in evidence.

Table 15. Photoplot summary. Mean percent cover by zone at Trailer, Santa Cruz Island, spring 2005.

Zone Name	Bare Rock	Barnacle	Tetracita	Endocladia	Hesperophycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc. Algae	Misc. Animal	Tar
Barnacle	32.6	61.0	0.0	4.4	0.0	0.0	0.0	0.4	0.0	0.2	1.4	0.0
Rockweed	11.8	1.8	0.0	0.6	0.0	78.2	0.0	0.0	0.0	7.6	0.0	0.0
Mussels	11.6	0.0	0.6	0.2	0.0	0.0	49.2	1.8	0.0	26.2	10.4	0.0
Hesperophycus	35.2	5.0	0.0	20.2	10.8	28.0	0.0	0.0	0.0	0.7	0.2	0.0

Table 16. Seastar (*Pisaster ochraceus*) counts at Trailer, Santa Cruz Island, spring 2005. (Sizes in mm). Information on colors collected for comparative purposes.

Total	93	Radius	Orange	Brown/purple
Min size	65	<75mm	0	9
Max size	180	75-150mm	23	60
Mean size	99	>150mm	0	1
Other species: None				

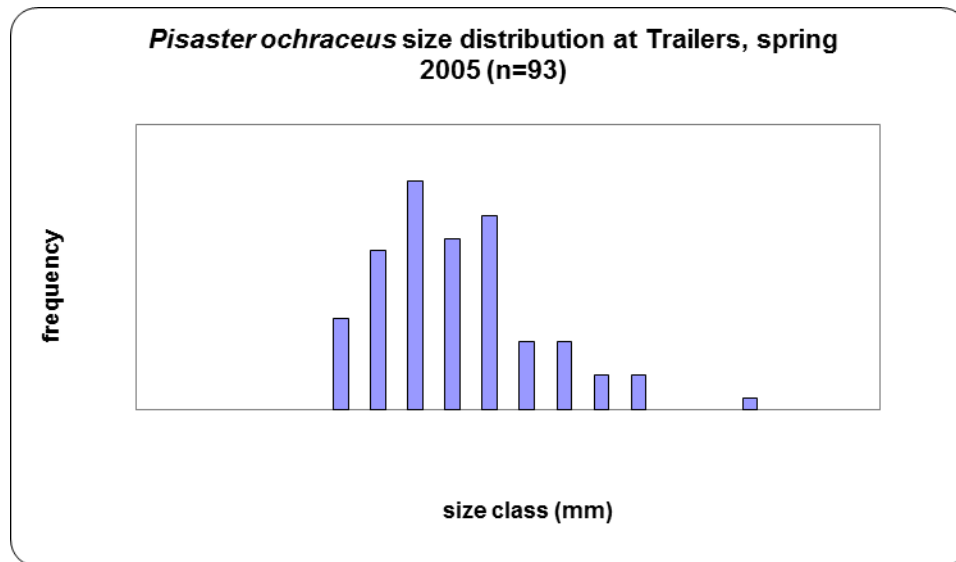


Figure 20. *Pisaster ochraceus* size distribution at Trailers, Santa Cruz Island, spring 2005.

Table 17. Surfgrass transects at Trailer, Santa Cruz Island, spring 2005. (additional taxa removed when not represented).

Location: Trailer Site Code: SCTR			
Date: 9-Mar-05 Recorders: Dan Richards			
Surf Grass Taxa	Transect 1	Transect 2	Transect 3
Rock	2	3	2
<i>Egregia menziesii</i>			2
Erect coralline	2	5	12
Encrusting coralline		1	1
other red algae	10	28	27
<i>Phyllospadix</i> sp. overstory	86	54	52
<i>Phyllospadix</i> sp. understory		1	
<i>Phragmatopoma californica</i>		7	3
<i>Chthamalus/Balanus</i>		2	1
total	100	101	100

Table 18. Motile invertebrate size frequencies, Trailer, Santa Cruz Island, spring 2005. (all sizes in mm).

	<i>Nucella emarginata</i>	<i>Acanthina</i> spp.	<i>Tegula funebris</i>	<i>Ocenebra circumtexta</i>	<i>Lottia gigantea</i>	<i>Tegula gallina</i>
count	35	24	81	9	5	5
avg. size	16	16	17	12	24	14
min. size	10	11	8	9	12	13
max. size	27	20	24	15	44	16

Table 19. Motile invertebrate Counts, Trailer, Santa Cruz Island, spring 2005.

zone	Barnacle					Hesperophycus				
plot #	911	912	913	914	915	916	917	918	919	920
Lepidochitona spp.						1		1		3
Nuttalina spp.										
Fissurella volcano										
Pachygrapsus			1			1	1	2		
Pagurus spp.										
large limpets(>15mm)										1
S. purpuratus										
Pisaster ochraceus										
Nucella emarginata			1		3					1
Acanthina spp.							6	4		4
Tegula gallina							1	2		
Tegula funebris						6	26	28	2	7
Ocenebra circumtexta										
Lottia gigantea										
Leptasterias hexactis										
Littorina spp.	1113	450	688	875	263	68	8	13	64	48
subsample1	32	14	21	16	1					
subsample2	27	8	19	29	10					
subsample3	30	14	15	25	10					
Limpet < 5 mm	25	16	63	50	150	4	0	0	1	6
subsample1	3	5	1	5	5					
subsample2	3	0	15	6	4					
subsample3	2	0	4	5	3					
Limpet 5-15 mm	122	116	97	206	263	15	2	6	14	17
subsample1	11	11	10	31	5					
subsample2	17	12	19	27	6					
subsample3	11	14	2	8	10					

zone	Mytilus					Silvetia				
plot #	921	922	923	924	925	926	927	928	929	930
Lepidochitona spp.				1	1	6	1	3	2	1
Nuttalina spp.	2	2	6	1	2	1				
Fissurella volcano	1			1						
Pachygrapsus	1	4	2	7	4		1			
Pagurus spp.								2		11
large limpets(>15mm)		1				6		2		2
S. purpuratus			3	1						
Pisaster ochraceus			1		3					
Nucella emarginata		5	3	8	14		1			
Acanthina spp.						1	2	2		5
Tegula gallina										2
Tegula funebris						4	32	75	66	151
Ocenebra circumtexta	2	1		1				5		
Lottia gigantea				4	1					

Leptasterias hexactis		1	1							
Littorina spp.	2	0	0	0	0	7	11	0	1	0
subsample1										
subsample2										
subsample3										
Limpet < 5 mm	87	4	3	20	15	1	1	2	0	5
subsample1										
subsample2										
subsample3										
Limpet 5-15 mm	34	26	6	35	24	10	20	4	7	0
subsample1										
subsample2										
subsample3										

10 March, Willows Anchorage. Low tide -0.7 ft at 1548 hrs. The weather was foggy but mostly pleasant. The swell was moderate with sets chasing us up the reef when working the outer plots. No shorebirds were on the reef. About a dozen western gulls came down to the mouth of the creek. Carol reported a dead sea lion on the eastern portion of the beach on 9 March. We were on site from 1330-1730 hrs.

We stopped at Willows on the way back from Christy Ranch, leaving the trailer on the hill. Carol had left us a message that the Willows Road was drivable so we drove to the usual parking spot, then had to negotiate the running stream all the way to the beach. After picking up the trailer on the way back tonight, we got a flat tire on the cruiser about a mile from the station. It was 2100 hrs before we got the gear to the station and fixed dinner. Because of a large group, there was no room at the station, so Brian sent us to the TNC cabins which were nice and quiet.

We found all the plots at Willows, though a few of the bolts for mussel plot corners were obscured or missing. We found the limpet plot L5 and Paula measured the three *Lottia gigantea* there. She was unable to locate the plot last fall. The bolts are all bent and sand blasted, so are difficult to find. Plot L5 was mostly clear of mussels and large *Lottia scabra* and *Lottia limatula* were the most prominent organisms.

Mytilus californianus cover was high with mussels densely packed, making it very difficult to look for snails. *Nucella emarginata* were present, but seemed smaller and less numerous than previous samples here. It was, in fact, smaller than in previous years and less numerous than in 2003. In 2004, the counts were lower but we had moderate swell and very dense mussels in the plots that may have affected the counts.

Endocladia muricata was abundant and more widespread than usual. *Hesperophycus californica* was in generally poor shape with very low cover. *Silvetia compressa* was long and lush and had generally high cover.

A few *Tegula gallina* were found. Hermit crabs, *Pagurus* spp. were common. *Pachygrapsus crassipes* were particularly common at Willows. At all the sites this week there were numerous small shore crabs (<1cm) present.

Table 20. Photoplot summary. Mean percent cover by zone at Willows, Santa Cruz Island, spring 2005. (5 plots/zone).

Zone Name	Bare Rock	Barnacle	Tetracclita	Endocladia	Hesperophycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc. Algae	Misc. Animal	Tar
Endocladia	29.8	1.2	1.0	0.0	56.4	0.0	0.0	0.0	0.0	10.6	1.0	0.0
Rockweed	13.0	4.0	0.0	24.2	0.0	35.2	0.2	0.8	0.0	22.0	0.6	0.0
Mussels	7.2	0.0	2.4	0.0	0.0	0.0	85.4	0.0	0.4	3.0	1.6	0.0
Hesperophycus	31.6	7.8	0.0	15.0	2.6	32.2	0.0	0.0	0.0	10.6	0.2	0.0

Table 21. Seastar (*Pisaster ochraceus*) counts at Willows, Santa Cruz Island, spring 2005. (sizes in mm).

Total	76	Radius	orange	brown/purple
Min size	50	<75mm	3	2
Max size	174	75-150mm	18	51
Mean size	104	>150mm	1	1
Other species: None				

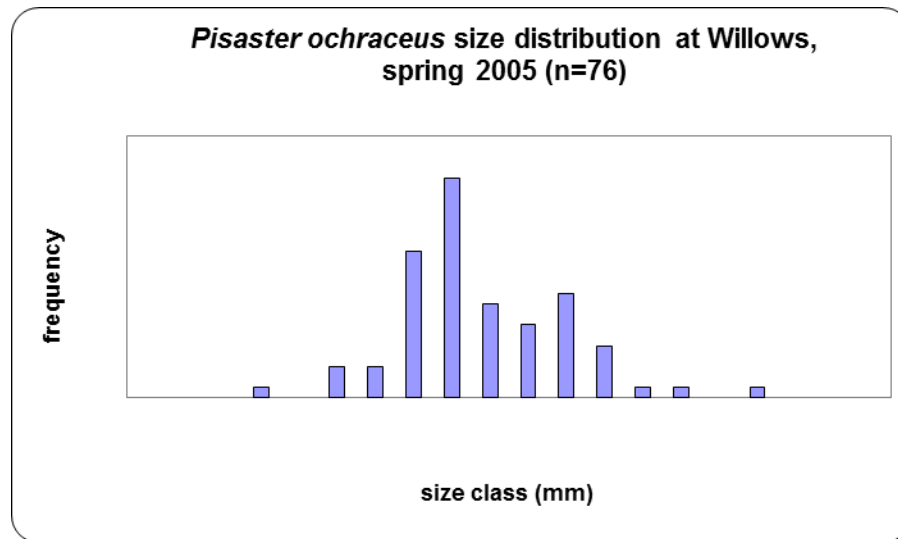


Figure 21. *Pisaster ochraceus* size distribution at Willows, Santa Cruz Island, spring 2005.

Table 22. Motile invertebrate size frequencies, Willows, Santa Cruz Island, spring 2005. (sizes in mm).

	<i>Nucella emarginata</i>	<i>Acanthina</i> spp.	<i>Tegula funebris</i>	<i>Ocenebra circumtexta</i>	<i>Lottia gigantea</i>	<i>Tegula gallina</i>
count	38	44	6	6	3	3
avg. size	15	14	18	12	24	14
min. size	9	7	16	9	16	11
max. size	22	18	25	18	34	18

Table 23. Motile invertebrate counts, Willows, Santa Cruz Island, spring 2005.

zone	<i>Endocladia</i>						<i>Hesperophycus</i>			
plot #	931	932	933	934	935	936	937	938	939	940
Lepidochitona spp.	1	1	1		5	1	4		11	20
Nuttalina spp.			1	3	6					
Fissurella volcano										
Pachygrapsus	1				2				1	1
Pagurus spp.							16	3	24	12
large limpets(>15mm)		1		1	2		1		7	5
S. purpuratus										1
Amphissa versicolor										
Nucella emarginata	1		2	2	6					2
Acanthina spp.					1		4	2	7	12
Tegula gallina									1	1

Tegula funebris									2	4
Ceratostoma nuttali										
Ocenebra circumtexta										
Lottia gigantea										
Epitonium tinctum										
Littorina spp.	291	600	500	263	250	297	1150	-75	15	65
subsample1	28	35	22	5	9	53	29	20		
subsample2	30	9	4	6	6	18	56	40		
subsample3	35	4	14	10	5	24	7	22		
Limpet < 5 mm	5	1	0	4	2	28	13	47	3	12
subsample1						7	1	0		
subsample2						2	2	4		
subsample3						0	1	11		
Limpet 5-15 mm	17	10	15	34	13	12.5	25	46.875	18	39
subsample1						3	1	5		
subsample2						0	1	6		
subsample3						1	6	4		

zone		Mytilus					Silvetia			
plot #	941	942	943	944	945	946	947	948	949	950
Lepidochitona spp.						1		24	3	6
Nuttalina spp.	6	1		1			7	1		2
Fissurella volcano	2	2	1	1	3					
Pachygrapsus	12	2	2	3	1	1	1	1	2	
Pagurus spp.								27	6	13
large limpets(>15mm)		1			2			5		3
S. purpuratus		8		2						
Amphissa versicolor										
Nucella emarginata	15				12			2		1
Acanthina spp.	1					2	1	11	2	6
Tegula gallina						1				
Tegula funebris										
Ceratostoma nuttali										
Ocenebra circumtexta	1					1		2	2	
Lottia gigantea			1	1	1					
Epitonium tinctum										
Littorina spp.	0	0	0	0	0	11	69	10	3	0
subsample1							6			
subsample2							7			
subsample3							9			
Limpet < 5 mm	6	1	0	0	3	51	397	22	0	31

subsample1							23			
subsample2							45			
subsample3							59			
Limpet 5-15 mm	24	27	22	26	33	47	69	17	6	91
subsample1							4			
subsample2							10			
subsample3							8			

11 March. Replaced the flat tire and retrieved the cruiser. Packed and wrote trip report before returning to Ventura on an Island Packers boat.

Santa Cruz Island, April 19, 2005

(Database event #2005-B)

Personnel: Dan Richards, Marine Biologist, Channel Islands National Park
Rocky Rudolph, SCA intern

Procedure and general observations: We took the Island Packer vessel *Island Adventure* to Santa Cruz Island, arriving at Scorpion Anchorage at approximately 1100 hrs after watching a humpback whale north of Santa Cruz Island. We paddled kayaks to Scorpion Rock, working first at Area B and then moved to Area A after finishing the *Hesperophycus* plots at approximately 1215 hrs. The swell was a little rough and landing at the Area A rock was difficult. Evan (boat captain) was kind enough to pick us up at Little Scorpion which gave us nearly an extra hour of working time and saved us from the uphill paddle. Standard procedures were used for monitoring. All plots and site overviews were photographed with an Olympus C-5050 digital camera. Cover scoring will be done later from the digital images in the office. Motile invertebrates were counted in photoplots in the *Hesperophycus*, *Chthamalus/Balanus* and *Endocladia* zones only. The high surf and short time did not allow us to begin the other two zones. Sub-sampling was done for littorines, or small limpets when abundant, using three 20x20 cm or 10x10 cm subplots. Seastars were counted and measured by Rocky. The maximum number of shorebirds and pinnipeds seen at any one time was recorded.

19 April, Scorpion Rock. Low tide +0.2 ft at 1358 hrs. Conditions were clear and sunny with a moderate swell and moderate wind of about 10-15 kts. There were five black oystercatchers and one American oystercatcher. No pinnipeds were present. Young pelicans were very numerous on the main part of Scorpion Rock. We were onsite from 1130-1500 hrs.

The diffuser screen was used for the photos because of the bright sun but was a challenge because of the wind. Pans from each of the reference bolts and other area photos were taken. There was not sufficient time to field score the plots.

Pisaster ochraceus were common in the tidepools of Area A. Rocky measured 71 of the seastars, with sizes ranging from 100-170 mm. The mean size was 136 mm (SD 16) and 17 of the stars were orange

Large *Balanus glandula* were present in most of the barnacle plots, though plot 805 was dominated by *Chthamalus* spp. *Endocladia muricata* was common in all the barnacle plots except 805. *Endocladia* cover was high in the *Endocladia* zone. *Hesperophycus californica* was doing well in all the *Hesperophycus* zone plots except plot 804 which was mostly bare rock with some *E. muricata* and *Silvetia compressa*. *Mytilus* zone plots were almost devoid of *Mytilus californianus*. *Tetraclita rubescens* dominated in most of the mussel zone plots. Some *M. californianus* were present on the reef but it appears the *Pisaster ochraceus* have devastated the reef. While *T. rubescens* looked great in several of the mussel plots, *Chthamalus/Balanus* seemed more dominant in most of the *Tetraclita* zone plots. All of the large *Lottia gigantea* that used to be present in the *Tetraclita* zone plots were gone.

There was a small rock break in the upper left corner of plot Te3 (803) that apparently caused the loss of the upper left marker bolt. One bolt each from plot B2 (802) and M4 (819) were also missing.

Table 24. Photoplot summary. Mean percent cover by zone at Scorpion Rock, Santa Cruz Island, spring 2005.

Zone name	Bare Rock	Barnacle	Tetraclita	Endocladia	Hesperophycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other
Barnacle	33.4	23.4	0.4	41.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	1.4
Endocladia	19.2	4.6	0.2	61.8	0.0	0.0	2.6	0.0	0.8	6.0	0.0	4.2	0.6
Mussels	18.0	22.0	12.6	5.0	0.0	0.0	8.2	0.4	0.0	28.4	1.2	0.0	4.2
Tetraclita	37.8	33.4	3.6	6.2	0.0	0.0	9.8	0.2	0.0	8.2	0.8	0.0	0.0
Hesperophycus	37.0	3.2	0.0	22.4	27.4	8.2	0.2	0.0	0.0	1.6	0.0	0.0	0.0

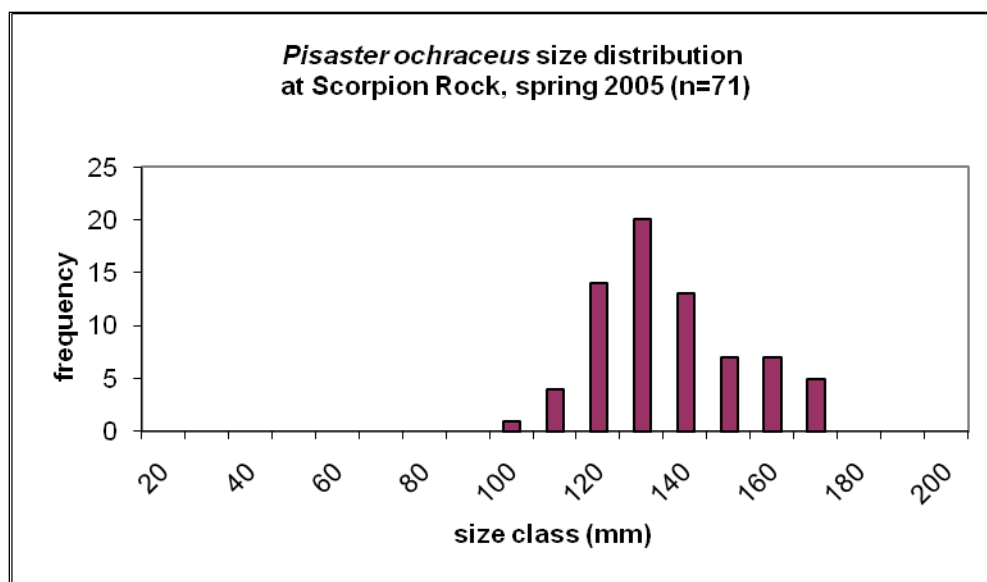


Figure 22. *Pisaster ochraceus* size distribution at Scorpion Rock, Santa Cruz Island, spring 2005.

Pisaster ochraceus sizes at Scorpion Rock

count	71
min	100
max	170
mean	136.0
stdv	16.8

Table 25. Motile invertebrate counts from photoplots at Scorpion Rock, Santa Cruz Island, spring 2005. No counts in *Mytilus* or *Tetraclita* zones due to swell and lack of time.

zone	Barnacle					Endocladia					Hesperophycus				
plot #	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815
Lepidochitona spp.								1					3		
Nuttalina spp.								1				1			3
Fissurella volcano															1
Pachygrapsus						1						1	2		1
Pagurus spp.															
large limpets (>15mm)					2			2	1		2		5		1
S. purpuratus															1
Amphissa versicolor															
Nucella emarginata						1			1		1	1			
Acanthina spp.					5			5		1	1				
Tegula gallina															2
Tegula funebris															7
Ceratostoma nuttali															
Ocenebra circumtexta						2		2		1					2
Lottia gigantea															
Epitonium tinctum								4							
Littorina spp.	688	800	563	763	1838	463	250	88	788	750	219	113	48	31	0
subsample1	7	39	22	20	76	21	13	11	35	18	34	17		4	
subsample2	32	23	12	18	34	8	4	14	23	37	27	11		4	
subsample3	16	2	11	23	37	8	3	3	5	5	9	8		2	
Limpet < 5 mm	0	0	0	0	0	0	3	0	0	0	0	0	1	3	2
subsample1				0			0	0	0	0	0	0		0	
subsample2				0			1	0	0	0	0	0		0	
subsample3				0			0	0	0	0	0	0		1	
Limpet 5-15 mm	2	3	3	13	2	8	25	38	19	19	59	91	6	59	25
subsample1				4			2	2	2	1	6	9		2	
subsample2				0			2	8	1	1	5	14		12	
subsample3				0			4	2	3	4	8	6		5	

San Miguel Island, April 27 – May 2, 2005

(Database event #2005-C)

Personnel: Dan Richards, Marine Biologist, Channel Islands National Park
Paula Rich, Biological Technician, Channel Islands National Park
Rocky Rudolph, SCA intern

Procedure and general observations: On 4/27, we flew out with CIA landing around 1630 hrs. We returned to Ventura via CIA on 5/2 arriving at the office about 1730 hrs. Standard procedures were used for monitoring the rocky intertidal sites. All plots and site overviews were photographed with an Olympus C-5050 digital camera. Motile invertebrates were counted in all photoplots. Sub-sampling was done for littorine snails and small limpets when abundant, using three 20x20 cm or 10x10 cm subplots. *Haliotis cracherodii* and *Pisaster ochraceus* were counted and measured at all sites. The maximum number of shorebirds and pinnipeds seen at any one time was recorded.

28 April, Cuyler Harbor. Low tide -0.6 ft at 0803 hrs. Conditions were excellent with calm seas and no wind. The sky was partly cloudy. There were a few light showers yesterday and a thunderstorm last night leaving 0.7 inches of rain. Water temperature was 13°C. The sand level was high and there was no problem getting past Middle Rocks. There were four black oystercatchers at the site. We saw as many as five at one time on the beach. One black turnstone was seen around the corner to the north and 36 whimbrels were on the beach. There were 15 elephant seals playing in the waves at the base of the site. There were 63 elephant seals at the east end of the beach when we departed including those watching us that were back ashore then. Two seals were tagged both yellow on the right rear flipper B696 and B674. We were onsite from 0645-1215 hrs.

Photoplots were all photographed and field scored. The diffuser screen was used for some photos when the sun broke out from behind the clouds. Pans from the top of the site and from the big rock were taken along with some of the specific features around the site.

Rocky measured 91 *Pisaster ochraceus* in a 30-minute search. Sizes ranged from 40-190 mm radius. No abalone were found.

The organisms all looked very good. *Balanus glandula* was abundant and dense in and around the plots, *Chthamalus/Balanus* cover ranged from 4-78%. *Endocladia muricata* was common in the barnacle zone as well as the Endocladia zone. Cover of *E. muricata* ranged from 25-73% in the Endocladia zone and almost 50% in the barnacle zone. The *E. muricata* was all a nice dark color with no signs of bleaching. *Mytilus californianus* was common and fairly dense in plots with many large individuals. Cover of *M. californianus* ranged from 46-90%. *Silvetia compressa* plants were healthy and doing well in the areas it usually grows ranging from 49-81% cover. There were several *Hesperophycus californicus* in a patch above plot 410. The usual algae and *Phyllospadix* spp. were doing well on the point. *Smithora naiadum* was very dense on the surfgrass blades. *Phragmatopoma californica* was also doing well with tall colonies mostly along the north edge of the surge channel.

Motile invertebrates were pretty astonishing with *Nucella emarginata* in all plots and with a mean of 81 per mussel zone plot. *Lottia gigantea* were common in all the mussel zone plots. *Ocenebra circumtexta*, *Acanthina* spp. and *Tegula funebris* were all fairly common though not as widely distributed as *N. emarginata*. *Pachygrapsus crassipes* were very common outside the barnacle zone plots. Chitons in general were not particularly common.

Rocky and I walked the beach west to the palm trees last evening finding approximately 250 elephant seals, one harbor seal, five black oystercatchers, about a dozen whimbrel and a couple willets. There were no dead animals. On the beach today we counted 88 elephant seals east of the rock jumble and about estimated 200 between there and the palm trees (we did not walk the west part of the beach past Nidever Canyon). We also saw 6 western gulls, eight black oystercatchers, 37 whimbrel, 10 brown pelicans and one immature glaucous or glaucous-winged gull. Surf scoters and at least one common loon were seen out on the water. There were four carcasses on the beach; two decomposing elephant seals, one western gull that appeared predated and one harbor seal pup that was decapitated.

Table 26. Photoplot summary. Mean percent cover by zone at Cuyler Harbor, San Miguel Island, spring 2005.

Zone Name	Bare Rock	Barnacle	Tetracrita	Endocladia	Hesperophycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc. Algae	Misc. Animal
Barnacle	27.2	44.0	0.0	28.4	0.0	0.2	0.0	0.0	0.0	0.2	0.0
Endocladia	19.0	7.6	0.6	46.2	0.0	10.2	8.0	0.6	0.0	7.2	0.6
Silvetia	15.6	0.4	1.0	1.2	0.0	68.2	0.2	0.0	0.2	8.4	4.8
Mussels	14.6	0.0	7.4	0.0	0.0	0.0	67.4	0.0	2.6	1.6	6.4

Table 27. Seastar (*Pisaster ochraceus*) counts at Cuyler Harbor, San Miguel Island, spring 2005. (Sizes in mm).

Total	91	Radius	Orange	Brown/purple
Min size	40	<75mm	4	4
Max size	190	75-150mm	10	64
Mean size	109	>150mm	2	7

Other species: None

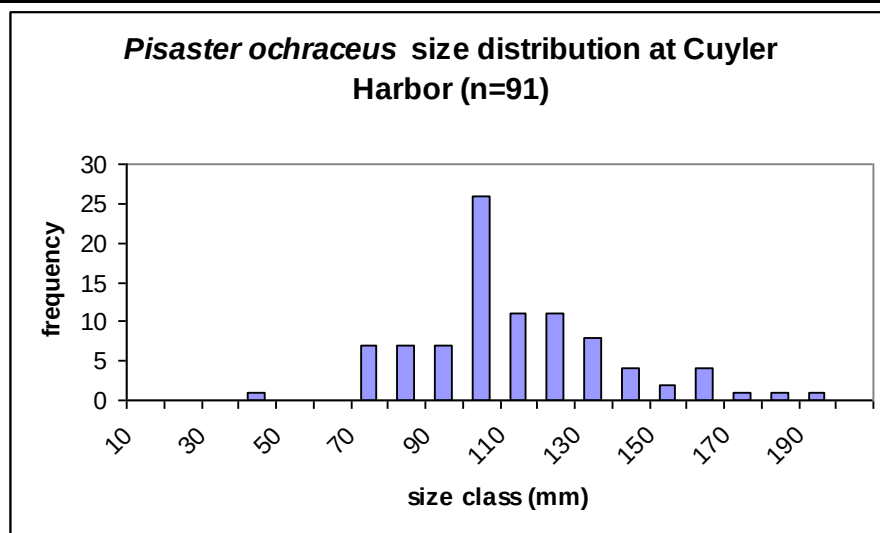


Figure 23. *Pisaster ochraceus* size distribution at Cuyler Harbor, San Miguel Island, spring 2005.

Table 28. Motile invertebrate size frequencies at Cuyler Harbor, San Miguel Island, spring 2005.

	<i>Nucella</i> sp.	<i>Acanthina</i> spp.	<i>Tegula funebris</i>	<i>Ocenebra circumtexta</i>	<i>Lottia gigantea</i>	<i>Tegula gallina</i>
Count	174	46	102	25	38	1
Mean (mm)	17	15	16	13	27	16
Min (mm)	8	9	6	9	16	16
Max (mm)	27	22	29	18	42	16

Table 29. Motile invertebrate counts at Cuyler Harbor, San Miguel Island, spring 2005.

zone	Barnacle					Endocladia					
plot #	416	417	418	419	420	411	412	413	414	415	
Lepidochitona spp.						2		4			
Nuttalina spp.						3					

Fissurella volcano										
Pachygrapsus					1	8	3	4	1	
Pagurus spp.									1	2
large limpets(>15mm)								3		2
S. purpuratus										
Amphissa versicolor										
Nucella emarginata	4	14	2	1	4	57	52	13	7	6
Acanthina spp.	1		1			3	1	19	3	5
Tegula funebris	3				12	21		14	19	30
Tegula gallina								1		
Ocenebra circumtexta					1			2	4	1
Lottia gigantea						1				
Leptasterias hexactis										
Littorina spp.	1288	913	688	1088	325	35	391	81	22	85
subsample1	24	23	23	29	49		28	12		
subsample2	41	30	17	23	35		72	8		
subsample3	38	20	15	35	20		25	6		
Limpet < 5 mm	3	16	6	3	3	13	38	9	28	12
subsample1	1	0	1	1	0		2	2		
subsample2	0	5	1	0	1		6	0		
subsample3	0	0	0	0	0		4	1		
Limpet 5-15 mm	9	16	13	6	34	9	41	28	26	13
subsample1	3	0	1	1	7		5	2		
subsample2	0	3	0	0	3		3	2		
subsample3	0	2	3	1	1		5	5		

zone	Silvetia					Mytilus					Total Count
plot #	406	407	408	409	410	401	402	403	404	405	
Lepidochitona spp.	2	1	3	5	3						20
Nuttalina spp.	4	1		2		4	1	3	14	14	46
Fissurella volcano								1		1	2
Pachygrapsus	3	3	3	5	3	13	8	11	7	10	83
Pagurus spp.	2	6		4							15
large limpets(>15mm)	3		1	1	1		1				12
S. purpuratus	1										1
Amphissa versicolor		1									1
Nucella emarginata	13	4	35	6	35	62	69	80	84	70	618
Acanthina spp.	6	6		7	1						53
Tegula funebris	40	15	1	11		3					169
Tegula gallina											1
Ocenebra circumtexta	1	1	2	4	1	6	1		1		25
Lottia gigantea						4	4	9	8	13	39
Leptasterias hexactis						1					1
Littorina spp.	95	63	80	10	64	0	0	0	0	0	5226
subsample1											188
subsample2											226
subsample3											159
Limpet < 5 mm	9	2	7	5	5	28	28	19	38	56	328
subsample1						1	5	1	4	6	24
subsample2						3	3	2	4	7	32

subsample3						5	1	3	4	5	23
Limpet 5-15 mm	20	7	23	6	32	134	78	141	91	91	817
subsample1						9	7	14	3	7	59
subsample2						18	12	15	10	10	76
subsample3						16	6	16	16	12	83

29 April Harris Point. Low tide -0.4 ft at 0910 hrs. Conditions were excellent with clear sky and light wind most of the day. The swell was 2-4 ft but not very troublesome. Water temperature was 14°C. Three harbor seals were at the site and five black oystercatchers were seen flying around the cove or on the outer rocks. We were on site from 0745-1430 hrs.

I conducted an abalone search and found two abs within the plots. An additional 16 were found in the general search. Three of those were in the crevice transect area. Sizes ranged from 87-159 mm. Most were single but there were three groups, two of three and one of two. Rocky found 21 *Pisaster ochraceus*. Large sizes dominated. I found six *Patiria miniata*, one *Pisaster gigantea* and one *Pycnopodia helianthoides*.

Algal growth was lush and there was high diversity. *Costaria costata* was found growing in the pool near plot 444. The rocks near the abalone plots were covered with *Hildenbrandia* or another reddish crust. *Balanus glandula* cover was high and growth was very dense. *Endocladia muricata* was dense and had high cover in most plots. *Mytilus californianus* cover was highly variable in the mussel zone plots. *Hesperophycus californicus* cover was not particularly high but there were many young plants in most of the plots.

Motile invertebrates were abundant in the plots with *Nucella emarginata* again being the most numerous. *Nucella emarginata* were common in all the mussel zones plots, but were not as numerous as at Cuyler Harbor. *Nuttalina* spp. were common in the Tetraclita zone. *Tegula funebris* were only found in one plot (438). Plot 438 was dominated by algae, primarily *Mazzaella affinis*.

We conducted a beachwalk survey on Simonton Beach after from 1530-1700 hrs. We found 10 carcasses. One young harbor sea, one California sea lion and the rest were seabirds, including two rhinoceros auklets, two Cassin's auklets, a pacific loon, a common murre, a Brandt's cormorant and a northern fulmar. There was a great deal of *Arundo donax* sticks piled on the beach. We pulled up seven sprouting plants. There were also tree parts in the wrack including one willow tree trunk that was sprouting. We looked for snowy plovers and saw none. The upper beach has been stabilized by the driftwood and the vegetation (mostly *Cakile maritima*) was abundant on the back beach. The pile of driftwood *A. donax* was a daunting fence 3-5 m wide below which was a 2 ft sheer drop where the sand was being cut away.

Table 30. Photoplot summary mean percent cover by zone at Harris Point, San Miguel Island, spring 2005.

Zone Name	Bare Rock	Barnacle	Tetraclita	Endocladia	Hesperophycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc. Algae	Misc. Animal	Tar
Barnacle	21.6	62.4	0.0	6.8	0.2	0.0	0.0	0.0	0.0	8.0	0.2	0.8
Endocladia	15.6	15.8	0.4	49.6	11.4	0.0	2.2	0.4	0.0	4.4	0.2	0.0
Mussels	18.0	6.4	2.6	6.6	2.2	0.0	42.0	0.0	0.4	21.2	0.6	0.0
Tetraclita	20.4	1.6	12.0	5.6	0.4	0.0	15.8	2.0	0.0	41.6	0.6	0.0
Hesperophycus	20.0	2.8	0.2	34.0	37.8	0.0	0.0	0.0	0.0	4.8	0.4	0.0

Table 31. Seastar (*Pisaster ochraceus*) counts at Harris Point, San Miguel Island, spring 2005.

Total	21	Radius	Orange	Brown/purple
Min size (mm)	100	<75mm	0	0
Max size (mm)	170	75-150mm	6	6
Mean size (mm)	151	>150mm	3	6
Other species: 1 <i>Pisaster giganteus</i> , 6 <i>Patiria miniata</i> , 1 <i>Pycnopodia helianthoides</i>				

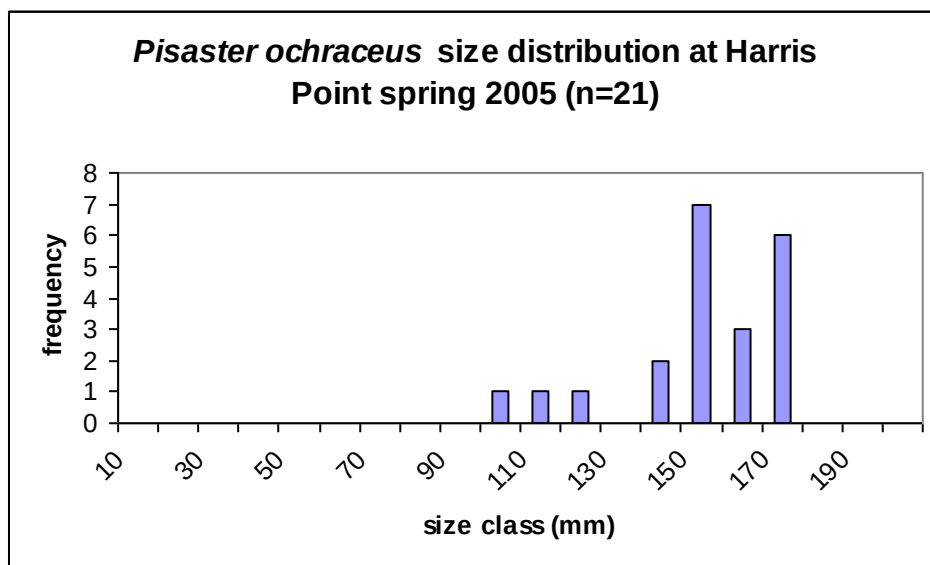


Figure 24. *Pisaster ochraceus* size distribution at Harris Point, San Miguel Island, spring 2005.

Table 32. *Haliotis cracherodii* density within plots at Harris Point, San Miguel Island, spring 2005.

Plot	Count	Density	Area	Density
1	1		3.40	.294
3	1		2.50	.400

Table 33. *Haliotis cracherodii* size distribution at Harris Point, San Miguel Island, spring 2005.

Site	Density	Count	Mean	St	Min	Max	%<45mm	%45-126mm	%127-145mm	%>145mm
		Size	Size	Dev	Size	Size				
Harris Point	.339	18	123.11	19.08	87	159	-	66.67%	16.67%	16.67%

Table 34. Motile invertebrate size frequency at Harris Point, San Miguel Island, spring 2005.

	<i>Nucella sp.</i>	<i>Tegula funebris</i>	<i>Ocenebra circumtexta</i>	<i>Lottia gigantea</i>
Count	117	12	23	36
Mean (mm)	17	24	17	24
Min (mm)	4	10	6	13
Max (mm)	25	28	20	53

Table 35. Motile invertebrate counts at Harris Point, San Miguel Island, spring 2005.

zone	Barnacle					Endocladia					Hesperophycus				
plot #	440	B1	B2	B3	B4	431	432	433	434	435	421	422	423	424	425
Lepidochitona spp.										1					1
Nuttalina spp.						2				1					
Fissurella volcano															
Pachygrapsus															2
Pagurus spp.						1									
large limpets(>15mm)						1				1					5
Nucella emarginata						13	1		1		1		1	4	

Acanthina spp.																
Tegula funebris																
Ocenebra circumtexta															1	
Lottia gigantea																
S. purpuratus																
Littorina spp.	700	1013	363	1825	738	213	350	463	69	50	263	150	100	178	213	
subsample1	10	30	8	54	23	13	22	23		8	9	23	5	20	23	
subsample2	21	32	53	45	18	1	1	5		7	4	12	17	19	24	
subsample3	25	19	55	47	18	3	5	9		1	8	13	10	18	21	
Limpet < 5 mm	3	0	0	0	0	25	6	31	22	6	9	0	0	0	3	
subsample1	0	0	0	0	0	5	0	7		1	0	0	0	0	0	
subsample2	1	0	0	0	0	1	1	2		1	2	0	0	0	0	
subsample3	0	0	0	0	0	2	1	1		0	1	0	0	0	1	
Limpet 5-15 mm	25	28	0	0	13	75	81	56	29	34	31	25	9	72	19	
subsample1	1	7	0	0	1	5	13	8		8	3	1	0	9	2	
subsample2	3	1	0	0	2	9	9	5		3	5	3	1	13	1	
subsample3	4	1	0	0	1	10	4	5		0	2	4	2	1	3	

zone	Mytilus					Tetracita					Total Count	
plot #	426	427	428	429	430	436	437	438	439	T1		
Lepidochitona spp.						3	7		3	2	17	
Nuttalina spp.	4	1		1		22	47	1	6	20	105	
Fissurella volcano	1						2		1	3	7	
Pachygrapsus	3			6	7	7	4		3	5	37	
Pagurus spp.			1						9	1	12	
large limpets(>15mm)		2	7						1		17	
Nucella emarginata	20	7	19	31	29	48	60		16	45	296	
Acanthina spp.											0	
Tegula funebris								16			16	
Ocenebra circumtexta		1	7		3			3	11		26	
Lottia gigantea	14				1	4	13		1	12	45	
S. purpuratus				2	2						4	
Littorina spp.	22	34	84	363	9	34	9	1	1	47	7290	
subsample1	6	7	5	14	2	0	0			0	305	
subsample2	0	2	15	15	0	9	3			10	313	
subsample3	1	2	7	0	1	2	0			5	270	
Limpet < 5 mm	9	19	28	69	31	47	22	15	7	94	447	
subsample1	1	3	1	2	2	3	3			1	29	
subsample2	1	1	5	5	2	4	3			6	35	
subsample3	1	2	3	15	6	8	1			23	65	
Limpet 5-15 mm	63	41	125	109	191	159	147	15	7	181	1535	
subsample1	4	4	9	7	15	18	15			12	142	
subsample2	9	4	13	11	27	16	19			22	176	
subsample3	7	5	18	17	19	17	13			24	157	

30 April Crook Point. Low tide -0.4 ft at 1037 hrs. Conditions were good, though cool and with occasional large swells. Water temperature was 13.5°C. There were 17 elephant seals playing or sleeping in the surge channel in the middle of the monitoring site. There were five black oystercatchers, one black turnstone, two wandering tattlers, one pelagic cormorant and about 15 western gulls observed at the site. We were on site from 0745-1415 hrs.

After monitoring I checked the beach to the west for snowy plovers and found none. There were 51 elephant seal carcasses on the beach in various states of decay. There were two harbor seal pups both in advanced state of decay. I tried to walk beaches to the east but there were about 200 Brandt's cormorants roosting and nesting on the bluff by the No Landing sign. Western gulls were numerous in that area and were acting territorial but I did not observe any nest bowls.

The big change here from the previous sites was that there were few motile invertebrates except for *Littorina* spp. and small limpets. *Pachygrapsus crassipes* were common but not very abundant. *Nuttalina* sp. were present only in a few plots. *Nucella emarginata* and *Tegula funebris* were common only in the mussel zone plots and not nearly as abundant as the other sites. No other predatory snails were found in the plots.

Mytilus californianus cover was high in all the mussel plots but most of the mussels had either *Porphyra perforata* or *Ulva* sp. growing on the shells. *Silvetia compressa* was limited to a few scraggly old plants that happened to mostly fall inside the rockweed plots. *Hesperophycus californica* was short and sparse like we see at Harris Point but was actually fairly common on the outer reef when one got a search image for young plants. In the Endocladia zone plots, *H. californicus* averaged 7% in the five plots. *Endocladia muricata* was common overall but covered less than 50% of Endocladia zone plots. Barnacle cover was high with most barnacle zone plots near 50% cover. *Balanus glandula* dominated and was large and dense. General algal cover was high with dense growth of various red algae on the edge of the surge channel.

I measured *Pisaster ochraceus* in the defined section of the reef and found only 37 total. This was much lower than we found just a couple of years ago. Sizes ranged from 40-140. I searched the outer reef for black abalone and only found two. They were together in one crevice and both were about 125 mm. There were no abalone in any of the plots. There were five *P. ochraceus* in the abalone plots.

Analipus japonica, a brown alga that I have been consistently finding at this site for several years now, was patchy but widespread on the outer reef. It is noteworthy in that this is a southern range extension for this species.

Eriogonum grande v. *rubescens* was growing abundantly on the lower bluff. I did not notice any *Castilleja hololeuca* this time.

Table 36. Photoplot summary. Mean percent cover by zone at Crook Point, San Miguel Island, spring 2005.

Zone Name	Rock	Barnacle	Tetracrita	Endocladia	Hesperophycus	Silvetia	Mussels	Turfweed	Leaf Barnacle	Misc. Algae	Misc. Animal
Barnacle	51.6	43.6	0.0	3.0	0.0	0.0	1.2	0.0	0.0	0.0	0.6
Endocladia	29.8	7.8	1.2	26.4	7.2	0.2	12.2	0.2	1.0	13.0	1.0
Silvetia	34.4	8.4	0.2	12.4	1.0	1.0	27.6	1.4	1.4	11.8	0.4
Mussels	7.6	0.6	0.0	0.0	0.0	0.0	78.4	0.0	1.0	12.0	0.4

Table 37. Seastar (*Pisaster ochraceus*) counts at Crook Point, San Miguel Island, spring 2005.

Total	37	Radius	Orange	Brown/purple
Min size	40	<75mm	1	5
Max size	140	75-150mm	12	19
Mean size	91	>150mm	0	0

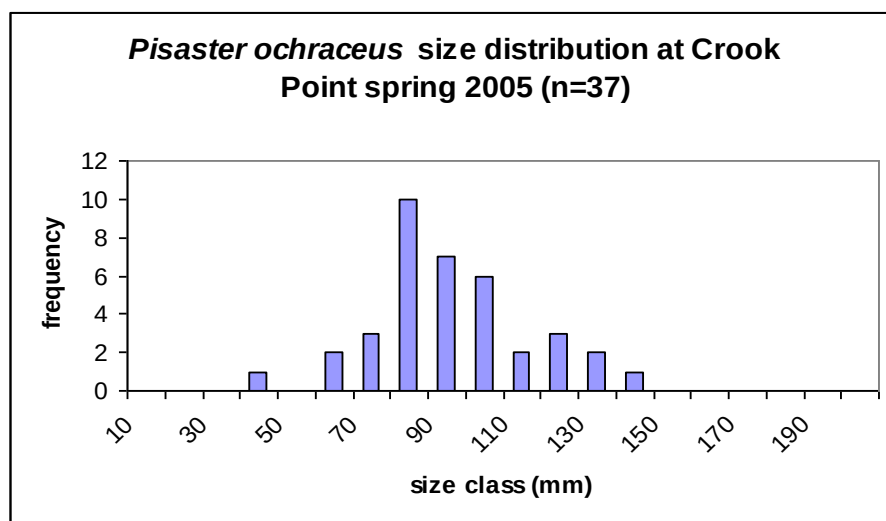


Figure 25. *Pisaster ochraceus* size distribution at Crook Point, San Miguel Island, spring 2005.

Table 38. *Haliotis cracherodii* size distribution for Crook Point, San Miguel Island, spring 2005.

Site	Density	Count Size	Mean Size	St Dev	Min Size	Max Size	%<45mm	%45- 126mm	%127- 145mm	%>145mm
Crook Point	.000	2	125.00	.00	125	125	-	100.00%	-	-

Table 39. Motile invertebrate size frequency measurements at Crook Point, San Miguel Island, spring 2005.

	<i>Nucella sp.</i>	<i>Tegula funebris</i>	<i>Lottia gigantea</i>
Count	31	24	2
Mean (mm)	17	12	33
Min (mm)	12	8	13
Max (mm)	21	18	52

Table 40. Motile invertebrate counts at Crook Point, San Miguel Island, spring 2005.

zone	Barnacle					Endocladia				
plot #	137	147	148	149	150	386	387	388	389	390
Lepidochitona spp.									1	
Nuttalina spp.									1	
Fissurella volcano										
Pachygrapsus								1	3	
Pagurus spp.										
large limpets(>15mm)										
S. purpuratus										
Nucella emarginata							1		2	
Acanthina spp.										
Tegula funebris										
Lottia gigantea										
Littorina spp.	1000	4313	1263	2800	3638	150	41	334	413	1175
subsample1	14	80	17	49	67	10	5	49	20	19

subsample2	32	123	54	96	137	13	3	22	12	33
subsample3	34	142	30	79	87	25	5	36	1	42
Limpet < 5 mm	0	153	0	9	6	219	609	309	75	0
subsample1		41		0	1	19	32	31	1	0
subsample2		7		0	1	21	53	6	3	0
subsample3		1		3	0	30	110	62	20	0
Limpet 5-15 mm	11	84	1	81	103	263	213	197	47	28
subsample1		14		8	17	26	1	29	2	3
subsample2		9		7	12	24	34	10	6	1
subsample3		4		11	4	34	33	24	7	5

zone	<i>Silvetia</i>					<i>Mytilus</i>					Total Count
plot #	396	397	398	399	400	381	382	383	384	385	
Lepidochitona spp.										2	3
Nuttalina spp.		1				1			5	11	19
Fissurella volcano											0
Pachygrapsus	2	2	1	1			1	1	2	5	19
Pagurus spp.											0
large limpets(>15mm)						2					2
S. purpuratus									1	2	3
Nucella emarginata						2	2	2	13	23	45
Acanthina spp.											0
Tegula funebris		3				1	8	20			32
Lottia gigantea						2					2
Littorina spp.	1150	33	838	116	188	297	84	100	0	0	17930
subsample1	51		18	13	17	24	9	13	0	0	475
subsample2	39		21	14	20	54	17	11	0	0	701
subsample3	2		28	10	23	17	1	8	0	0	570
Limpet < 5 mm	50	27	19	191	228	119	6	16	150	216	2402
subsample1	0		0	14	17	5	1	0	3	18	183
subsample2	0		0	18	33	16	0	3	9	7	177
subsample3	16		6	29	23	17	1	2	36	44	400
Limpet 5-15 mm	134	16	56	69	178	38	13	41	131	188	1891
subsample1	10		6	10	10	7	2	3	7	12	167
subsample2	11		9	8	22	5	0	5	12	19	194
subsample3	22		3	4	25	0	2	5	23	29	235

1 May, Otter Harbor. Low tide -0.4 ft at 1144 hrs. Conditions were excellent all day, with mostly clear sky, light wind and almost no waves. We had plenty of time to work without feeling rushed by the tide. Water temperature was measured at 16°C. There were some *Arundo donax* sticks on the rocks but the area was mostly clean. Old weathered tar was common on the rocks. There were nine noisy black oystercatchers in the area, mostly on the outer reef. One was an American oystercatcher or a hybrid showing a white belly and somewhat tawny wings. Ten harbor seals and about 40 elephant seals were in the immediate area including the small beach adjacent to the site. We were on site from 0900-1500 hrs.

Pachygrapsus crassipes was abundant scurrying around when we arrived and were present in many of the plots. *Nucella emarginata* were abundant in all the mussel plots, as were *Lottia gigantea*. *Tegula funebris* of all sizes were present in the barnacle plot turned red turf (#374) where I counted 222. *Silvetia compressa* cover was fairly poor. *Hesperophycus californicus* was a little more common but wasn't present in many plots. *Endocladia muricata* was common and little denser than the other sites. *Balanus/Chthamalus* was common over the site with dense and fairly large *Balanus glandula*. *Chthamalus* sp. was common also but overshadowed by its larger neighbor. *Mytilus*

californianus was doing well and though none of the mussel zone plots had solid cover, all had moderately high *M. californianus* cover.

I measured *Haliotis cracherodii* for about 45 minutes covering the area between the two reference bolts and found 75 abalone, with sizes ranging from 26-154 mm. There were 18 with shells 50 mm or less. There were nine groups (individuals within one meter of each other) consisting of two to 26 abalone. No apparent signs of disease were observed and all seemed firmly attached to the rocks. A few were out in the open but most were hidden in crevices.

I also measured *Pisaster ochraceus* in a separate 30-minute search and found 42 brown/purple and 19 orange *P. ochraceus*. I also found five *Pisaster giganteus* and one *Patiria miniata*.

Two octopuses (probably *O. bimaculatus*) were found. *Cumagloia andersonii* was present in low numbers. *Tigriopus californica*, the tidepool copepod, was abundant in several of the pools. *Ulva* sp. was very common on the upper reef. *Porphyra perforata* was present in some plots, but had mostly low cover.

Rocky and I hiked over to Pt. Bennett to see it. California sea lions, elephant seals and a few northern fur seals were present. Hiking back from Point Bennett in the evening we saw two pacific golden plovers.

Table 41. Photoplot summary. Mean percent cover by zone at Otter Harbor, San Miguel Island, spring 2005 (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	32.0	27.8	0.0	0.0	0.0	0.0	0.0	2.6	0.0	33.6	0.4	3.6
Endocladia	23.4	4.6	0.4	48.0	0.8	5.0	0.8	0.4	0.2	16.4	0.0	0.0
Silvetia	31.6	18.2	0.2	20.6	0.8	7.4	0.0	0.0	0.0	20.2	0.4	0.6
Mussels	25.6	0.0	0.8	0.4	0.0	0.0	46.0	1.2	4.4	20.4	1.2	0.0

Table 42. Seastar (*Pisaster ochraceus*) counts at Otter Harbor, San Miguel Island, spring 2005.

Total	61	Radius	Orange	Brown/purple
Min size (mm)	80	<75mm	0	0
Max size (mm)	170	75-150mm	17	39
Mean size (mm)	130	>150mm	2	3

Other species: 5 *Pisaster giganteus*, 1 *Patiria miniata*

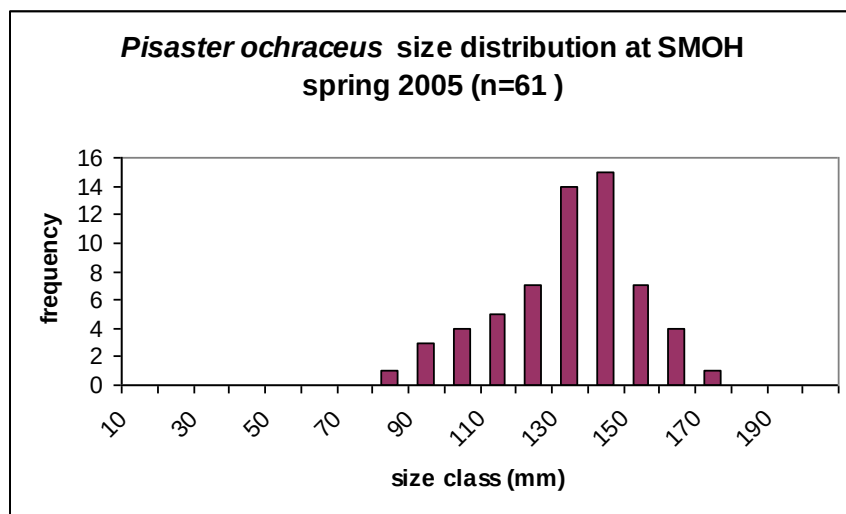


Figure 26. *Pisaster ochraceus* size distribution at Otter Harbor, San Miguel Island, spring 2005.

Table 43. *Haliotis cracherodii* size distribution at Otter Harbor, San Miguel Island, spring 2005.

Site	Density	Count Size	Mean Size	St Dev	Min Size	Max Size	%<45 mm	%45- 126 mm	%127- 145 mm	%>145 mm
Otter Harbor	.000	75	91.24	34.72	26	154	18.67%	69.33%	10.67%	1.33%

Table 44. Motile invertebrate size frequency measurements at Otter Harbor, San Miguel Island, spring 2005.

	<i>Nucella</i> spp.	<i>Acanthina</i> spp.	<i>Tegula funeralis</i>	<i>Ocenebra circumtexta</i>	<i>Lottia gigantea</i>
Count	55	1	32	4	58
Mean (mm)	18	15	14	13	28
Min (mm)	8	15	4	10	12
Max (mm)	23	15	25	15	51

Table 45. Motile invertebrate counts at Otter Harbor, San Miguel Island, spring 2005.

zone	Barnacle						Endocladia				
plot #	370	371	372	373	374	360	361	362	363	364	
Lepidochitona spp.											
Nuttalina spp.										1	
Fissurella volcano											
Pachygrapsus						1	1		2	3	
Pagurus spp.										1	
large limpets(>15mm)			1		1	1	1			2	
Nucella emarginata						4				1	
Acanthina spp.					1						
Tegula funebris					222	3		2		4	
Ocenebra circumtexta					2	1					
Lottia gigantea						2	1		1		
Littorina spp.	106	1038	513	756	2	291	78	14	25	41	
subsample1	17	24	14	58		52	2				
subsample2	8	23	21	154		32	8				
subsample3	9	36	6	30		9	15				
Limpet < 5 mm	6	0	100	0	1	13	34	0	39	3	
subsample1	2	0	3	0		0	3				
subsample2	0	0	5	0		4	4				
subsample3	0	0	24	0		0	4				
Limpet 5-15 mm	3	9	163	3	1	6	144	23	24	1	
subsample1	0	3	11	0		1	23				
subsample2	0	0	18	1		0	6				
subsample3	1	0	23	0		1	17				

zone	Silvetia					Mytilus					Total Count
plot #	355	356	357	358	359	375	376	378	379	380	
Lepidochitona spp.											0
Nuttalina spp.		1				5	6	4	1	14	32
Fissurella volcano										1	1
Pachygrapsus		2	1			3	3	2	4	3	25
Pagurus spp.							4				5

large limpets(>15mm)	8	1		9	1		6	1			32
Nucella emarginata						12	7	9	14	11	58
Acanthina spp.											1
Tegula funebris		2					8	1			242
Ocenebra circumtexta		1									4
Lottia gigantea						16	9	9	16	15	69
Littorina spp.	163	116	69	819	1000	0	3	0	0	3	5035
subsample1	0	7	11	29	31	0	1	0	0	1	247
subsample2	41	26	2	108	27	0	0	0	0	0	450
subsample3	11	4	9	125	22	0	0	0	0	0	276
Limpet < 5 mm	13	31	81	0	9	44	119	59	28	59	640
subsample1	0	3	11	0	0	2	9	5	3	3	44
subsample2	0	2	4	0	1	8	17	2	3	9	59
subsample3	4	5	11	0	2	4	12	12	3	7	88
Limpet 5-15 mm	63	100	59	41	84	113	134	94	109	175	1349
subsample1	12	26	8	6	2	17	15	13	6	23	166
subsample2	2	5	7	3	13	7	5	9	12	13	101
subsample3	6	1	4	4	12	12	23	8	17	20	149

San Rosa Island, May 24-31, 2005

(Database event #2005-D)

Purpose: To monitor rocky intertidal sites at Santa Rosa Island, conduct beachwalk sampling and count snowy plovers.

Personnel: Dan Richards, Marine Biologist, Channel Islands National Park
Paula Rich, Biological Technician, Channel Islands National Park
Rocky Rudolph, SCA intern
Ian Taniguchi, Marine Biologist, California Department of Fish and Game

Procedure and general observations: The NPS vessel Ocean Ranger delivered us to the island about 1130 hrs. on 24 May. Ian came out on Island Packers on 27 May. Ian flew off with Fish and Game on 31 May and the rest of us returned on the Ocean Ranger that day. Standard beach walk procedures were used to conduct carcass surveys of beaches and special attention was given to searching for western snowy plovers. Standard procedures were used for monitoring the rocky intertidal sites. All plots and site overviews were photographed with an Olympus C-5050 digital camera. Motile invertebrates were counted in all photoplots. Sub-sampling was done for littorine snails and small limpets when abundant, using three 20x20 cm or 10x10 cm subplots. *Haliotis cracherodii* and *Pisaster ochraceus* were counted and measured at all sites. The maximum number of shorebirds and pinnipeds seen at any one time was recorded.

Results: We counted snowy plovers on Skunk Point-Abalone Rocks beaches, Water Canyon, Tecalote, Arlington, Soledad and Dry Canyon, Sandy Point, Bee Rock beaches, China Camp, Cluster Point, Whetstone Canyon, Officers Beach and Ford Point and found a total of 37 (35 in the Skunk Point complex and two on Bee Rock West).

We conducted Beach walk surveys of all those beaches finding very few fresh carcasses, few old ones and lots of *Arundo donax* debris. Sprouting *A. donax* was found at Tecalote, Arlington, Soledad, Officers Beach, Skunk Point and Water Canyon. Mallard duck families were found at Tecalote, Arlington and Old Ranch House Canyon Lagoons. The lagoon at Dry Canyon had 37 adult ducks but we did not see any ducklings there. We also saw two sets of killdeer chicks at stream crossings.

Elephant seals were numerous especially on the southwest beaches. There were over 200 on the main beach at Sandy Point, many on the southwest beaches around fossil reef, over 500 on the Cluster Point beaches, many in Johnson's Lee area including some at our intertidal site (a first) and 15 on Ford Point Beach.

Conditions were generally excellent for the intertidal surveys and all the monitoring was completed. We found a total of 74 black abalone including searches of areas beyond the normal extent of our sites at Fossil Reef and Northwest-Talcott. Otherwise the intertidal community seemed to be doing well, no big changes were noted. Algal diversity was high and most plants were very lush though rockweeds were in a recovery phase at some sites. We established a new mussel plot at Ford Point to replace the one lost when a large part of the reef broke off last year.

24 May, Arlington and Tecalote beaches. It was after 1400 hrs when we got everyone settled in housing and headed out. The day started foggy but the sun made an appearance in the afternoon. The wind was light and overall it was very pleasant. We saw a peregrine falcon hunting horned larks just past Black Mountain. Along Signal Road I spotted and pulled out, two Australasian fireweed plants. There is considerable Italian thistle growing in the Arlington Canyon area and even a little up Signal Road. Tecalote Canyon had a large over-wash lagoon with at least 22 mallard ducks plus 7 ducklings. Gulls were numerous on the beach. The beach was covered by *Arundo donax* debris. We found about 20 shoots sprouting in the back beach and pulled and removed what we found. There was considerable debris on the beach, most of which was nursery material; mostly pots, but some irrigation supplies. Several lobster traps were on the beach along with the usual assortment of plastic bottles and toys, though not a large quantity. There were a few willow tree trunks.

The tide was low enough to walk from Tecalote to Arlington. At Arlington Canyon, the river had formed a small lagoon at the mouth at there were 4 adult mallards and 3 small ducklings. One Killdeer was present near the lagoon. Four black oystercatchers and five double crested cormorants were present on the rocks between beaches. Song sparrows, American pipits and a black phoebe were present catching flies. Western gulls were numerous on both

beaches and a few immature glaucous or glaucous winged gulls were present. No snowy plovers were found. *Arundo donax* was common though not covering the beach as much as at Tecalote. *Lithopoma (Megastraea) undosum* shells were abundant on both beaches among the *A. donax* and *Macrocystis pyrifera* holdfasts. Large tar pancakes were present at the east end of Arlington Beach. We began monitoring at Tecalote at 1545 hrs and completed Arlington at 1730 hrs.

25 May, Skunk Point area and Soledad beaches. Departed housing about 0800 hrs. Surveyed beaches and counted snowy plovers along Southeast Anchorage, Skunk Point, Oat Point and Abalone Rocks beaches. No snowy plovers were seen at SE Anchorage. We found one pigeon guillemot and one Brandt's cormorant carcass. I noticed numerous bloodworms in the sand there. We counted 15 snowy plovers on skunk point. Western gulls, royal terns, a couple pelicans and one long-billed curlew at the far end. We counted 16 black oystercatchers on the rocks near SE Anchorage including a few on the beaches. There was a very emaciated sea lion youngster on the west end of Skunk Point beach. One partial eggshell that appeared to be from a western gull was found on skunk point- no nest in the area. *Arundo donax* was present but not as thick as on the north-side beaches. We did find some sprouting sticks especially at the base of the dunes on the south side of Skunk Point

Overall, 20 more snowy plovers were counted between skunk point and abalone rocks. One bird had bands but we couldn't get a close enough look to discern the colors. A dolphin carcass, probably an immature Risso's dolphin was found on the south side of the point, photos, GPS location and a tooth were taken. The over-wash pond at Oat Point was full, no birds were present though. There was good water flow out of Old Ranch Canyon (ORC) lagoon. Several snowy plovers were there at the mouth and 6 ducks took off from the lagoon (3 Mallards and 3 (American widgeon?)). On Old Ranch House Canyon (ORHC) lagoon there were a pair of surf scoters and two mallards with 9 ducklings. No snowy plovers there, just one killdeer. *Dudleya blochmanii* looked like it had a good year with bloom stalks all over the bare dirt patches around ORC mouth. The ORHC lagoon fingers have eroded up the road a fair distance. The road just keeps getting pushed around into the grass.

After a quick lunch we went to Soledad and Dry Canyon beaches. *Arundo donax* and kelp holdfasts were common on the beaches but there was little in the way of dead animals and we saw no snowy plovers. There were 37 mallards on the lagoon at the mouth of dry canyon. Song sparrows were active on the back beach. There was abundant drift kelp on the beach and beach hoppers and rove beetles were active and abundant. Numerous gardening pots were on Soledad as they were on Arlington and Tecalote. We only found a few sprouting *A. donax* shoots.

Peregrine falcons have apparently learned to follow the vehicles and catch horned larks flushed by the vehicle as it drives along the roads. We also saw a harrier with prey in its talons near Lobo Canyon. On the return to housing we saw a killdeer with two chicks harbored under its wings at green canyon. A killdeer with four slightly older chicks were in the creek by the ranch.

26 May, Ford Point and China Camp beaches. Low tide -1.3 ft at 0658 hrs. The surge was moderate, but conditions were otherwise very good, with a marine layer breaking up about the time we finished and the wind was calm. Water temperature was 15°C. There were two black oystercatchers on the site. One elephant seal was in the water just offshore. Numerous cormorants and pelicans were feeding in the kelp bed offshore. We were on site from 0720-1120 hrs. We scanned Ford Point beach with binoculars at 1130 and saw no plovers but there were 15 elephant seals on the beach. Connie Jenkins, a visiting artist in the park, went along with us to see the area today.

I found seven black abalone, all appeared healthy, the sizes ranged from 130-147 mm. Only two were close together. *Pisaster ochraceus* didn't seem quite as numerous as on previous visits; however, they were abundant and there were many juveniles. Rocky counted 168 *P. ochraceus* and measured 102. There were few mussels on the east point of the site and plot 532 was typical of the area with only a few juvenile mussels hidden under dense *Ulva californica*. Everything else looked pretty good.

We installed a new plot 531 since the original plot was lost last year when the rocks broke away from that part of the reef. The new plot is upslope on the reef from the original on the edge of a tide pool. The plot is marked with stainless steel bolts. We also installed a single bolt in the upper left corner of plot 534. Numerous other plot corner markers needed replacing.

Ligia occidentalis were common at Ford Point. They were observed at all the sites on Santa Rosa this spring but in varying abundance

We started out this morning at 0610 and returned at 1300 to housing for lunch, then went out to China Camp from 1330 to 1800 to survey the beaches. Connie and Dave Begun (interpretation volunteer) joined us for the China Camp trip. We walked China Camp, Cluster and Whetstone beaches finding no snowy plovers. We also walked through the dune area without finding any birds. There were over 500 elephant seals on the beaches. The only carcasses we found were two decomposed immature elephant seals. Cluster Point had about 100 roosting cormorants and 20 brown pelicans. There was very little tar or plastic debris on the beaches.

Table 46. Photoplot summary. Mean percent cover by zone at Ford Point, Santa Rosa Island, spring 2005.

Zone Name	Bare Rock	Barnacle	Tetracrita	Endocladia	Hesperophycus	Silvetia	Mussels	Turfweed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle	64.4	24.4	0.0	7.6	0.0	0.0	0.0	0.0	0.0	0.2	3.4	0.0
Endocladia	28.6	0.4	0.0	54.4	0.0	0.0	3.4	1.0	0.0	11.4	0.8	0.0
Mussels	27.2	1.8	0.0	0.2	0.0	0.0	28.6	7.2	0.2	28.4	6.4	0.0

Table 47. Seastar (*Pisaster ochraceus*) counts at Ford Point, Santa Rosa Island, spring 2005.

Total	168	Radius	Orange	Brown/purple
Min size (mm)	50	<75mm	15	39
Max size (mm)	140	75-150mm	26	82
Mean size (mm)	94	>150mm	1	5

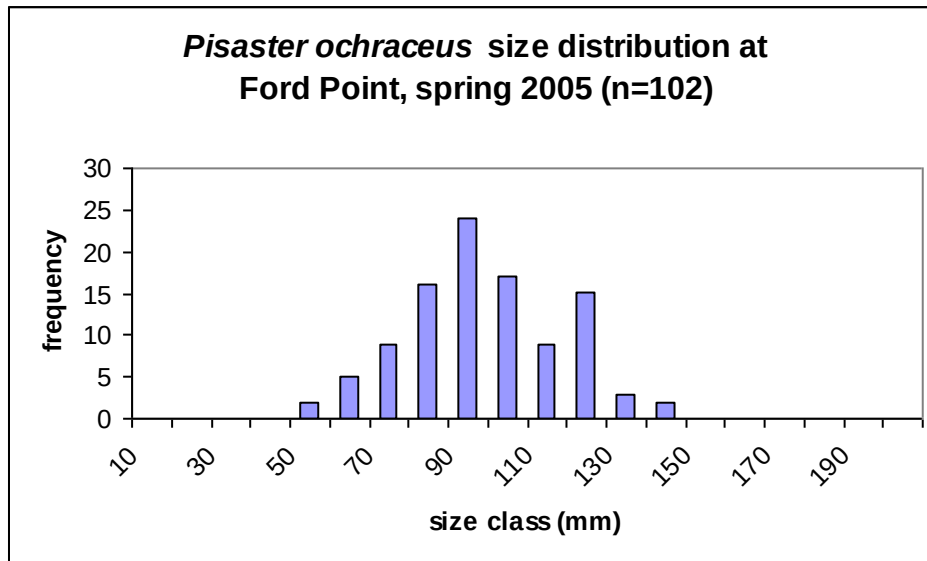


Figure 27. *Pisaster ochraceus* size distribution at Ford Point, Santa Rosa Island, spring 2005.

Table 48. Motile invertebrate counts and size frequency measurements at Ford Point, Santa Rosa Island, spring 2005.

	<i>Nucella</i> sp.	<i>Acanthina</i> spp.	<i>Tegula funebris</i>	<i>Ocenebra circumtexta</i>	<i>Lottia gigantea</i>
count	33	2	16	2	5
mean size	14	14	16	9	19
min size	4	12	10	8	12

max size	22	15	20	10	31
----------	----	----	----	----	----

Table 49. Motile invertebrate counts at Ford Point, Santa Rosa Island, spring 2005.

zone	Barnacle							Endocladia		
plot #	<u>520</u>	<u>521</u>	<u>522</u>	<u>523</u>	<u>524</u>	<u>525</u>	<u>526</u>	<u>527</u>	<u>528</u>	<u>529</u>
Lepidochitona spp.		1								1
Nuttalina spp.						2			1	
Fissurella volcano										
Pachygrapsus							1		2	1
Pagurus spp.									1	
large limpets (>15mm)		2					2	1	3	
S. purpuratus						1			1	
Nucella emarginata								4	2	2
Acanthina spp.								1		
Tegula funebris		1							3	6
Ocenebra circumtexta										
Lottia gigantea										
Littorina spp.	313	1463	2850	725	1025	188	163	309	88	175
subsample1	12	14	88	6	22	5	1	25	3	17
subsample2	7	84	81	34	33	4	4	43	2	21
subsample3	6	19	59	18	27	6	8	31	2	18
Limpet < 5 mm	75	25	0	338	0	513	1063	134	625	194
subsample1	1	0	0	14	0	15	15	0	27	6
subsample2	3	2	0	2	0	13	51	8	19	21
subsample3	2	0	0	11	0	13	19	35	4	35
Limpet 5-15 mm	613	63	100	438	100	225	488	94	100	219
subsample1	10	0	3	17	8	1	10	0	1	7
subsample2	19	4	3	11	0	4	17	14	4	21
subsample3	20	1	2	7	0	13	12	16	3	42

zone	Mussel					Total
plot #	<u>530</u>	<u>531</u>	<u>532</u>	<u>533</u>	<u>534</u>	<u>count</u>
Lepidochitona spp.	2	1			2	7
Nuttalina spp.	7	1			1	12
Fissurella volcano			7	1		8
Pachygrapsus	2	5	4	4	1	20
Pagurus spp.						1
large limpets (>15mm)				4	1	13
S. purpuratus		8	2			12

Nucella emarginata	2	7	2	19	4	42
Acanthina spp.				1		2
Tegula funebris				6		16
Ocenebra circumtexta			1		1	2
Lottia gigantea	1	4				5
Littorina spp.	12	9	0	241	3	7562
subsample1		0		15	0	208
subsample2		2		37	1	353
subsample3		1		25	0	220
Limpet < 5 mm	1013	59	193	106	484	4821
subsample1	27	9		9	87	210
subsample2	18	5		24	53	219
subsample3	36	5		1	15	176
Limpet 5-15 mm	1238	197	44	159	78	4153
subsample1	39	19		21	14	150
subsample2	40	30		17	6	190
subsample3	20	14		13	5	168

27 May. Johnson's Lee, Officers Beach, Water Canyon Beach. Low tide -1.0 at 0758 (check) hrs. Excellent conditions with calm seas and wind, moderate temperature and a marine layer keeping the glare down. Water temperature was 14.5°C. Four black oystercatchers and seven western gulls were at the site. There were 23 elephant seals lounging on the sand behind the reef or at the east end of the reef. This was the first time I remember elephant seals hauled out there. We were on site from 0720-1100 hrs.

I found four black abalone, ranging from 69-177mm. The largest and smallest were together in the same crevice at the east end of the site, the others were singles. *Pisaster ochraceus* were abundant and most were fairly small in size, nothing over 120 mm radius. We also counted 29 *P. ochraceus* in the 10 m transect on the outer rocks. *Mytilus californianus* and *Pollicipes polymerus* were common above the lowest step of the reef which was dominated by *Phragmatopoma californica* and *Anthopleura sola*. *Ulva* sp. was common growing on the worm tubes. Red algae were abundant in the lower zones especially, including *Odonthalia floccosa* and *Gastroclonium subarticulatum*. *Phyllospadix torreyi* was abundant in the low zone and was heavily epiphytized by *Smithora naiadum* and *Melobesia mediocris*. *Notoacmea palacea* was noted also. *Nemalion helminthoides* and *Cumagloia andersonii* were present, as they were at Ford Point. *Lottia gigantea* were common throughout the site and looked okay in the owl limpet plots, though we did not do counts. Juvenile *Egorgia* and *Macrocystis* sp. were common. *Littorina* spp. and small limpets were abundant in nearly every zone. *Nucella emarginata* and *Tegula funebris* were common in a few plots but there was nothing remarkable about the motile invertebrates.

We checked Officers Beach on the way back and there were about 50 elephant seals but no snowy plovers. We did find and pull up, several *Arundo donax* shoots. After lunch we walked Water Canyon beach and found only a few sets of gull wings and the skeleton of the buck deer found last fall. There were two raven, six sanderlings, one black oystercatcher and several gulls and pelicans that were part of a huge feeding flock of cormorants just outside the surf zone. Surf scoters were offshore. We also found a few *A. donax* shoots and removed them. Skunk tracks all over the beach but no snowy plovers were seen. Island Packers boat was out today with a group of campers and several folks were on the beach. Ian Taniguchi came out on the boat to help with the monitoring and collect black abalone.

Table 50. Photoplot summary – mean percent cover by zone at Johnson's Lee, Santa Rosa Island, spring 2005.

Zone name	Bare Rock	Barnacle	Tetraclitia	Endocladia	Hesperophycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle	51.4	39.6	0.0	6.0	0.0	0.0	0.0	0.0	0.0	1.0	2.0	0.0
Endocladia	40.8	3.8	0.2	42.0	0.0	0.0	8.6	0.0	0.6	1.4	2.6	0.0
Mussels	9.2	0.8	0.2	0.0	0.0	0.0	12.2	6.4	0.4	44.0	26.8	0.0

Table 51. Seastar (*Pisaster ochraceus*) counts at Johnson's Lee, Santa Rosa Island, spring 2005.

		Area 1		Area 2	Area 3
	Total	Radius	Orange	Brown/purple	
Min size (mm)	434	<75mm	38	77	12
Max size (mm)	40	75-150mm	19	49	78
Mean size (mm)	120	>150mm	0	0	0

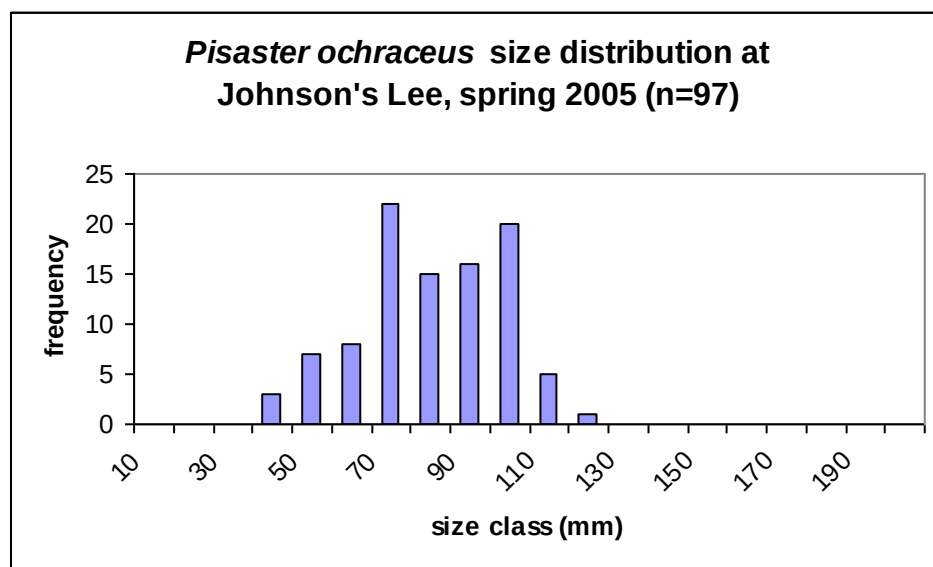


Figure 28. *Pisaster ochraceus* size distribution at Johnson's Lee, spring 2005.

Table 52. Motile invertebrate size frequency measurements at Johnson's Lee, Santa Rosa Island, spring 2005. (sizes in mm).

	<i>Nucella sp.</i>	<i>Tegula funebris</i>	<i>Lottia gigantea</i>
count	31	27	9
mean size	16	10	35
min size	11	5	14
max size	22	23	63

Table 53. Motile invertebrate counts at Johnson's Lee, Santa Rosa Island, spring 2005.

zone	Barnacle				Endocladia				Mussel				Total			
plot #	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	Count
Lepidochitona spp.						1							9			10

Nuttalina spp.								1	2	1			1	1		6
Fissurella volcano																0
Pachygrapsus	1				2				1	1	2	8	9	5	7	36
Pagurus spp.											6	5			1	12
large limpets (>15mm)								1					5			6
S. purpuratus											2				29	31
Nucella emarginata		2			1			5	10			1	24	2		45
Acanthina spp.																0
Tegula funebris					4					1		12	10	1		28
Ocenebra circumtexta																0
Lottia gigantea					3			2	3					1		9
Pisaster giganteus													1			1
Pisaster ochraceus												1				1
Littorina spp.	2550	2275	1638	1363	13	113	225	63	275	47	0	1	100	1	0	8661
subsample1	68	12	34	23	0	7	12	4	5	1			6			172
subsample2	40	96	48	64	1	2	5	1	15	9			20			301
subsample3	96	74	49	22	0	0	1	0	2	5			6			255
Limpet < 5 mm	213	163	203	63	1288	713	200	213	175	538	513	325	156	613	0	5372
subsample1	17	0	1	3	37	15	4	9	1	16	41	19	16	49		228
subsample2	0	13	12	1	23	24	3	7	7	9	0	7	24	0		130
subsample3	0	0	52	1	43	18	9	1	6	18	0	0	10	0		158
Limpet 5-15 mm	200	200	256	288	650	388	400	225	338	375	14	113	116	138	0	3698
subsample1	13	0	7	10	21	3	10	6	9	5		4	16	11		115
subsample2	0	13	28	8	15	15	10	6	6	9		5	11	0		126
subsample3	3	3	47	5	16	13	12	6	12	16		0	10	0		143

28 May East Point, low tide 0.8 ft at 0856. Conditions were excellent with a heavy marine layer in the morning, but calm air and seas. Water temperature was 14°C. Sonya Fairbanks (another artist-in-the-park) and her husband Bill came along with us to see different areas. At East Point there were one pelican, three cormorants, about 30 western gulls and four black oystercatchers. The iceplant and grass on the bluff above the site was all trampled and there was a large amount of guano indicating the area has been used extensively by roosting seabirds. There was a broken western gull egg on the rocks but no obvious nest in the area. We were conducting the monitoring from 0740-1200 hrs. not including the hike from the lagoon area.

Being the start of Memorial Day weekend, there were numerous boats in the area including the *Vision* and a skiff off a sailboat that was buzzing through the kelp beds just off the point. About 30 harbor seals were hauled out at Abalone Rocks. A female California sea lion was observed hauling out on the beach at Old Ranch House Canyon. It moved like it was okay, but unusual to see them using that beach.

The *Phyllospadix* spp. transects had nearly 100% cover of surf grass except at the ends. Ian did an extensive search for abalone and found only two black abalone (121 and 141 mm). Ian also counted seastars, finding 109 in a 30-minute search. *Silvetia compressa* looked somewhat battered from this winter but most of it was in good shape and

cover was high. *Hesperophycus californicus* was mostly missing from the plots. The plants that were present looked very robust though a little brown. The *Hesperophycus* zone plots were mostly bare. *Endocladia muricata* was abundant and *Mytilus californianus* looked good with some new recruits. *Balanus/Chthamalus* were abundant with lots of new recruitment especially in the lower zones. Motile invertebrates were abundant, particularly in the *Mytilus* and *Silvetia* zones with *Nucella emarginata*, *Acanthina* sp. *Tegula funebris* and *Lottia gigantea* well represented.

Table 54. Photoplot summary – mean percent cover by zone at East Point, Santa Rosa Island, spring 2005.

Zone Name	Bare Rock	Barnacle	Tetracrita	Endocladia	Hesperophycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle	60.6	22.2	0.0	11.4	4.4	0.6	0.0	0.0	0.0	0.4	0.4	0.0
Endocladia	47.4	4.0	0.0	41.4	3.6	0.8	0.0	0.0	0.0	1.8	1.0	0.0
Silvetia	31.2	0.2	0.0	2.4	1.6	45.8	0.0	0.2	0.0	16.4	2.2	0.0
Mussels	4.0	4.0	0.0	0.0	0.0	0.0	64.6	6.8	0.0	14.8	5.8	0.0
Hesperophycus	56.0	15.4	0.0	18.4	7.4	1.4	0.0	0.0	0.0	0.8	0.0	0.6

Table 55. Seastar (*Pisaster ochraceus*) counts at East Point, Santa Rosa Island, spring 2005.

Total	102	Radius
		<75mm
		75-150mm
		>150mm
no size frequencies		

Table 56. Surfgrass transects at East Point, Santa Rosa Island, spring 2005.

Location: East Point Site Code: SREP				
Date 28-May-05 Recorders: Dan Richards				
Surf Grass Taxa	Transect 1		Transect 2	Transect 3
other red algae			1	5
Phyllospadix sp. overstory	100		99	95
total	100		100	100

Table 57. Motile invertebrate size frequency measurements at East Point, Santa Rosa Island, spring 2005.

	<i>Nucella</i> sp.	<i>Acanthina</i> spp.	<i>Tegula funebris</i>	<i>Ocenebra circumtexta</i>	<i>Lottia gigantea</i>
count	66	49	70	3	16
mean size (mm)	13	13	15	10	18
min size (mm)	2	8	7	9	10
max size (mm)	19	18	22	11	29

Table 58. Motile invertebrate counts at East Point, Santa Rosa Island, spring 2005.

zone	Barnacle					Endocladia					Silvetia				
plot #	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589
Lepidochitona spp.												6	4	17	13
Nuttalina spp.											1	1			
Fissurella volcano															
Pachygrapsus											4	3	4	6	2

Pagurus spp.															1
Large Limpets											2	1	1		
Nucella emarginata	9	2			2	1	4	1				1		1	2
Acanthina spp.											20	14	27	6	1
Tegula funebris	18										30	24	19	24	23
Strongylocentrotus purpuratus															
Ocenebra circumtexta															2
Lottia gigantea															
Littorina spp.	525	888	472	1563	1213	863	913	688	1200	825	263	122	1125	6	247
subsample1	52	27	37	39	23	17	19	4	33	10	14	2	8	0	12
subsample2	61	36	77	30	36	24	31	24	13	35	6	14	68	1	24
subsample3	55	8	37	56	38	28	23	27	50	21	1	23	14	1	43
Limpet < 5 mm	1	8	19	0	0	9	9	16	13	3	100	72	53	19	88
subsample1			1	0	0	0	1	1	3	0	8	5	3	2	2
subsample2			2	0	0	1	2	2	1	0	18	11	1	2	14
subsample3			3	0	0	2	0	2	0	1	6	7	13	2	12
Limpet 5-15 mm	8	9	53	0	3	31	50	16	28	13	128	63	59	19	19
subsample1			6	0	0	1	6	2	5	0	9	2	9	4	0
subsample2			7	0	1	2	8	2	3	0	24	12	7	1	1
subsample3			4	0	0	7	2	1	1	4	8	6	3	1	5

zone		Hesperophycus					Mytilus						
	plot #	570	571	572	573	574	590	591	592	593	594	Total	
Lepidochitona spp.			1			1	2				2	46	
Nuttalina spp.							10	18	6	5	4	45	
Fissurella volcano							4	1	5	2	3	15	
Pachygrapsus			1			2	11	8	9	13	7	70	
Pagurus spp.							1					2	
Large Limpets					1	2						7	
Nucella emarginata						1	12	4	5	11	24	80	
Acanthina spp.						1	1	4				74	
Tegula funebris								1	2			141	
Strongylocentrotus purpuratus											1	1	
Ocenebra circumtexta										1		3	
Lottia gigantea							2	1	5	4	4	16	
Littorina spp.		700	1325	1188	1000	1200	1	41	6	0	19	16389	
subsample1		14	21	31	22	19		6	0	0	3		
subsample2		22	44	51	34	42		1	0	0	3		
subsample3		20	41	13	24	35		6	2	0	0		
Limpet < 5 mm		6	0	6	0	4	288	488	225	238	50	1713	
subsample1		0	0	1	0		13	8	10	4	2		
subsample2		0	0	0	0		5	22	6	11	2		

	subsample3	2	0	1	0		5	9	2	4	0	
Limpet 5-15 mm		31	75	22	53	3	225	113	275	388	213	1895
	subsample1	6	2	3	3		6	7	7	10	5	
	subsample2	2	15	1	7		8	2	5	7	6	
	subsample3	2	7	3	7		4	0	10	14	6	

29 May Northwest-Talcott. Low tide -0.5 ft at 0959 hrs. Water temperature was 16°C. There were no shorebirds at the site. Pelicans and cormorants were on the point where we access the beach. There were 30 elephant seals on the access beach when we arrived at the coast and 40 when we left. A western gull nest with three eggs was on the point where we access the beach. We were on site from 0830-1230 hrs.

Ian did a thorough search of the site over 2-3 hours and only found three black abalone. He continued to search to the west, to about the area of transect two from Joan Rudiger's thesis project (about 300 m west of our site) and didn't find any more. I helped him search for the transect bolts but we only found transect one. The tide was too high for us to get to transect three at that time and transect two looked different, as if there had been some rock breakage on that reef. No *Pisaster ochraceus* were found but ten small and ten medium sized *P. giganteus* were in the site area.

Algal diversity was high and growth was lush. *Ulva* and *Enteromorpha* spp. were common with *Enteromorpha* sp growing quite heavy on the *Phyllospadix* sp. The surfgrass plots all had high cover of *Phyllospadix* sp. but there was still a high degree of abraded or bleached grass blades.

There were large aggregations of *Tegula funebris* and *Acanthina* sp. around the reef flat. *T. funebris* were well abundant in a few of the photo plots but motile invertebrates were not particularly abundant. The giant *Nucella emarginata* were not as apparent as they were in recent visits there. *Ocenebra circumtexta* and *Acanthina* sp were generally not common in the plots. *Ligia occidentalis* were common around the base of the cliffs.

Balanus/Chthamalus cover was generally pretty high. *Endocladia muricata* was common but the cover was not particularly high. *Mytilus californianus* cover was about average for this site. *Silvetia compressa* cover was fairly high in all but plot 569 and plants were usually long and lush, not showing the abraded thalli that we saw at East Point.

In the afternoon we walked the Bee Rock beaches finding only a pair of snowy plovers on Bee Rock West. The male had bands AO:YA. An elephant seal was lying in front of the cave at the west end of the beach looking like a dragon guarding its lair. There was generally little *Arundo donax* on the beach and we did not find any sprouting.

Table 59. Photoplot summary. Mean percent cover by zone at Northwest-Talcott, Santa Rosa Island, spring 2005.

Zone Name	Bare Rock	Barnacle	Tetracrita	Endocladia	Hesperophycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle	55.4	32.4	0.0	3.8	0.0	6.0	0.0	0.0	0.0	0.8	1.2	0.4
Endocladia	49.0	1.0	0.2	24.0	0.0	13.4	0.2	2.2	0.0	9.0	1.0	0.0
Silvetia	31.8	0.4	0.2	1.8	0.0	59.2	0.2	1.0	0.0	4.0	1.2	0.2
Mussels	22.4	0.4	0.6	0.0	0.0	0.0	46.6	2.8	7.2	15.2	4.8	0.0

Table 60. *Lottia gigantea* size distribution and density at Northwest-Talcott, Santa Rosa Island, spring 2005.

Plot	Count	Density	Mean Size	St. Dev.	Min. Size	Max. Size
701	22	7.004	77.73	24.38	18	109

702	22	7.004	75.68	13.71	49	99
703	27	8.596	60.63	19.37	20	87
704	21	6.686	58.90	18.97	22	88
705	13	4.139	56.38	18.68	29	79

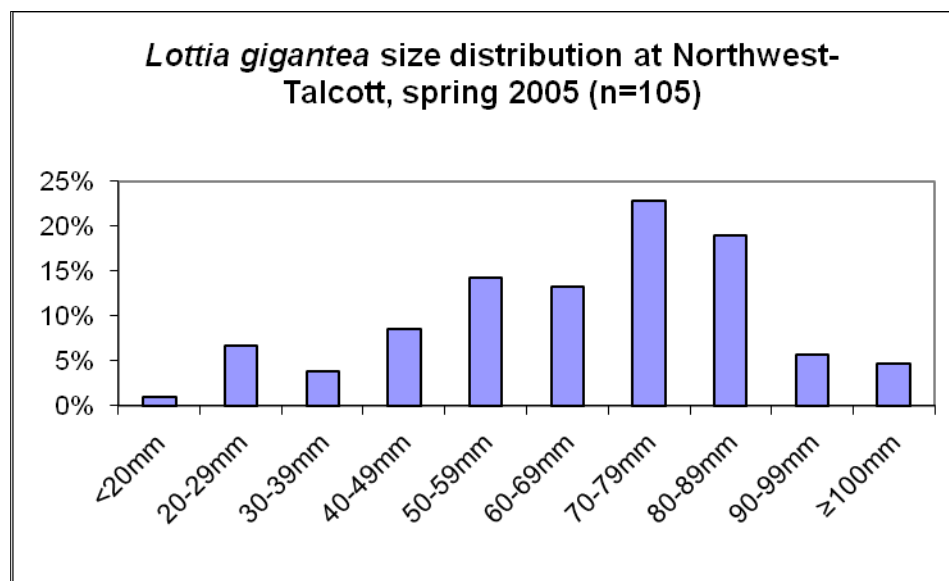


Figure 29. *Lottia gigantea* size distribution at Northwest-Talcott, Santa Rosa Island, spring 2005.

Table 55. Surfgrass Transects at Northwest-Talcott, Santa Rosa Island, spring 2005.

Location: Northwest-Talcott Site Code: SRNWT			
Date: 29-May-05 Recorders: Dan Richards			
Surf Grass Taxa	Transect 1	Transect 2	Transect 3
Rock	2	1	
Erect coralline	1	2	
Encrusting coralline	1		
other green algae			3
other red algae			10
Phyllospadix sp. overstory	96	97	87
Phyllospadix sp. understory			1
total	100	100	101

Table 56. Motile invertebrate size frequency measurements at Northwest-Talcott, Santa Rosa Island, spring 2005.

	<i>Nucella</i> sp.	<i>Acanthina</i> spp.	<i>Tegula funebris</i>	<i>Ocenebra circumtexta</i>	<i>Lottia gigantea</i>
count	12	8	46	10	33
mean size	18	14	22	15	38
min size	5	6	9	9	9
max size	26	21	31	20	87

Table 61. Motile invertebrate counts at Northwest-Talcott, Santa Rosa Island, spring 2005.

zone		Barnacle					Endocladia				
	plot #	560	561	562	563	564	555	556	557	558	559
Lepidochitona spp.					2		3			2	
Nuttalina spp.										2	5
Fissurella volcano										1	1
Pachygrapsus			2				4		3	3	
Pagurus spp.											
large limpets (>15mm)					3		3	1	2	1	
S. purpuratus											
Nucella emarginata										1	1
Acanthina spp.				1		1		3	1		
Tegula funebris			1		100		12	48	2		1
Ocenebra circumtexta					1			2			
Lottia gigantea											3
Mopalia											
Leptasterias											
Homalopoma sp.								2			
Littorina spp.		388	434	3	5	0	2	0	0	16	6
subsample1		7	45	1					0	1	2
subsample2		24	80	0					0	4	0
subsample3		0	14	0					0	0	0
Limpet < 5 mm		125	0	0	0	3	7	31	38	219	56
subsample1		10	0	0				6	2	15	8
subsample2		0	0	0				3	1	32	3
subsample3		0	0	0				1	9	23	7
Limpet 5-15 mm		50	16	116	26	27	16	25	106	88	56
subsample1		4	1	11				2	10	12	6
subsample2		0	2	13				4	9	12	3
subsample3		0	2	13				2	15	4	9

zone		Silvetia					Mytilus					Total
	plot#	565	566	567	568	569	550	551	552	553	554	count
Lepidochitona spp.		4	2	2	6							21
Nuttalina spp.							7	2	5	6	8	35
Fissurella volcano							8	3	4	3	4	24
Pachygrapsus		2		2	1		4	5	3	2	1	32
Pagurus spp.												0
large limpets(>15mm)		6	7	1	3	3		4		1	1	36
S. purpuratus									1	1	1	3
Nucella emarginata									7		3	12
Acanthina spp.			1		1							8
Tegula funebris		8	2		1	1						176
Ocenebra circumtexta							7					10
Lottia gigantea							7	3	5	4	10	32
Mopalia					1							1
Leptasterias								4				4
Homalopoma sp.												2

Littorina spp.	63	20	11	4	1	0	0	0	0	0	953
subsample1											56
subsample2											108
subsample3											14
Limpet < 5 mm	1	0	3	0	19	69	81	94	66	81	892
subsample1						4	8	12	7	1	73
subsample2						4	10	11	3	12	79
subsample3						14	8	7	11	13	93
Limpet 5-15 mm	12	10	37	17	31	159	163	159	134	119	1367
subsample1						12	22	24	13	14	131
subsample2						21	18	15	10	14	121
subsample3						18	12	12	20	10	117

30 May Fossil Reef. Low tide -0.1 ft at 1056 hrs. We had good conditions with the marine layer breaking up early to clear sky and a cool wind of 10-15 mph. Water temperature was 14°C. There were three elephant seals and a California sea lion at the site when we arrived. Two harbor seals swam into the cove later looking at us. There were three black oystercatchers and one American oystercatcher. Only one cormorant and two gulls were on the rocks in the area. Several elephant seals were using the beach immediately to the west and the large beach to the west was loaded with elephant seals and some harbor seals (no count). We were on site from 0810-1245 hrs

Pisaster ochraceus were counted in the 6 x 30 m transect on the outer reef (41 total). Rocky also did a 30-minute search counting 124 *P. ochraceus* (90-170 mm). One *Pycnopodia helianthoides* and one *Patiria miniata* were found.

Ian conducted a thorough search for black abalone finding a total of 58, though most were on adjacent reefs. He collected 13 of those for a genetics and culture experiment by the CDFG pathologist. On later examination, one of the collected abalone appeared slightly shrunken. Most were very robust and active (all later made the trip to Bodega Bay Marine Lab fine). I helped Ian with part of the search which covered from the cave to the west of the site to the rocks past the owl limpet plots. Only two were found on the main monitoring reef (one in the *Pisaster* transect). Most of the abalone were on the west slope of the western reef bordering the monitoring site.

Silvetia compressa generally was not very dense at the site but there were many young plants. *Endocladia muricata* and *Balanus/Chthamalus* were both abundant. *Mytilus californianus* were common on the outer reef and were doing well in two mussel plots. The other mussel plots were dominated by *Phragmatopoma californica* and algae. *Strongylocentrotus purpuratus* were abundant in the tidepools.

Nucella emarginata and to a lesser extent, *Ocenebra circumtexta* were present in the mussel zone plots while *Acanthina* sp. and *Tegula funebris* were common in the *Endocladia* and *Silvetia* zone. *Tegula funebris* were common and widely dispersed throughout the site area. One *Tegula gallina* was found but not in a plot. *Nuttalina* spp. were particularly common in the mussel zone. *Pachygrapsus crassipes* were common and have been common to abundant at every site during this event.

We checked Sandy Point beach for snowy plovers and found none. *Arundo* sticks were common on the beaches that had not recently washed to the cliff. We did not see any sprouts. There were over 200 elephant seals on the beach, mostly at either end. I also found a new population of *Dudleya* sp. that looks like the Cluster Point variety.

Table 62. Photoplot summary. Mean percent cover by zone at Fossil Reef, Santa Rosa Island, spring 2005.

Zone Name	Bare Rock	Barnacle	Tetraclitia	Endocladia	Hesperophycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle	70.2	27.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.6	1.6
Endocladia	45.6	25.4	0.0	18.0	0.0	6.6	0.0	0.0	0.0	2.6	1.6	0.2
Silvetia	38.6	10.0	0.0	13.8	0.0	31.2	0.0	0.0	0.0	4.6	1.8	0.0
Mussels	10.0	2.2	7.0	0.4	0.0	0.0	20.2	14.8	1.8	35.8	7.8	0.0

Table 63. Seastar (*Pisaster ochraceus*) counts at Fossil Reef, Santa Rosa Island, spring 2005.

count	127	Radius	Orange	Brown/purple
mean size (mm)	122	<75mm	0	0
min size (mm)	90	75-150mm	32	90
max size (mm)	170	>150mm	3	2

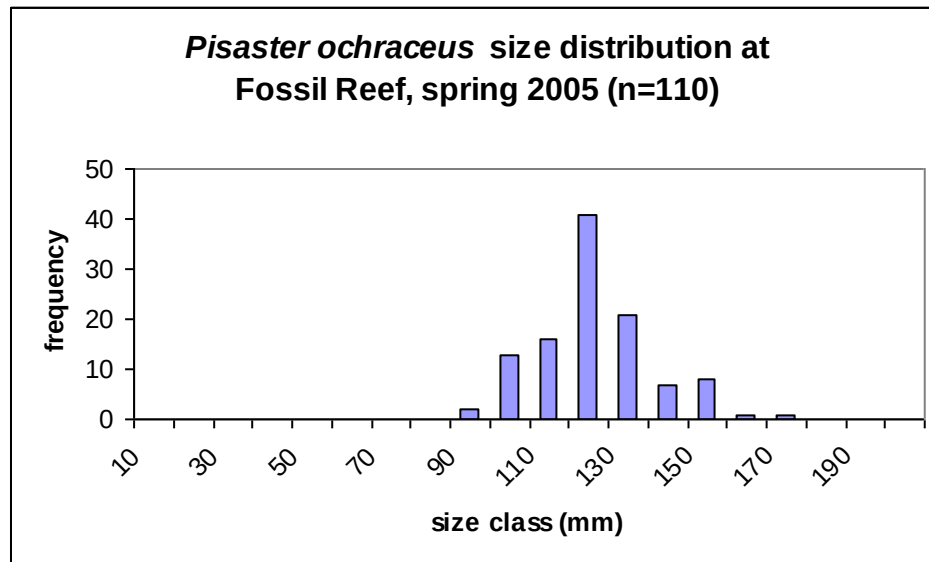


Figure 30. *Pisaster ochraceus* size distribution at Fossil Reef, Santa Cruz Island, spring 2005.

Table 64. *Haliotis cracherodii* size distribution at Santa Rosa Island (all sites), spring 2005.

Site	Count	Mean Size	St Dev	Min Size	Max Size	%<45 mm	%45-126 mm	%127-145 mm	%>145 mm
East Point	2	131.00	14.14	121	141	-	50.00%	50.00%	-
Ford Point	6	137.17	6.82	130	147	-	-	83.33%	16.67%
Fossil Reef	31	126.84	22.40	66	180	-	45.16%	38.71%	16.13%
Johnson's Lee	4	117.75	44.92	69	177	-	75.00%	-	25.00%
Northwest-Talcott	3	131.67	12.66	122	146	-	33.33%	33.33%	33.33%

Table 65. Motile invertebrate size frequency measurements at Fossil Reef, Santa Rosa Island, spring 2005.

	<i>Nucella</i> sp.	<i>Acanthina</i> spp.	<i>Tegula</i> <i>funnebralis</i>	<i>Ocenebra</i> <i>circumtexta</i>	<i>Lottia</i> <i>gigantea</i>
count	18	32	63	4	21
mean size (mm)	16	15	17	11	21
min size (mm)	7	9	6	9	14
max size (mm)	20	19	25	14	32

Table 66. Motile invertebrate counts at Fossil Reef, Santa Rosa Island, spring 2005.

zone	Barnacle					Endocladia				
plot #	605	606	607	608	609	610	611	612	613	614
Lepidochitona spp.									3	1
Nuttalina spp.										
subsample1										
subsample2										
subsample3										
Fissurella volcano										
Pachygrapsus						2			2	1
Pagurus spp.										1
large limpets(>15mm)								4	1	8
S. purpuratus										
Nucella emarginata										
Acanthina spp.						5		1	11	3
Tegula funnebralis						6		8	2	44
Ocenebra circumtexta										
Lottia gigantea										
Mopalia										
Leptasterias										
Littorina spp.	675	613	550	638	700	388	700	156	363	181
subsample1	21	13	10	30	26	18	10	13	12	18
subsample2	29	15	10	13	25	4	17	17	15	26
subsample3	4	21	24	8	5	9	29	20	2	14
Limpet < 5 mm	75	0	0	0	19	0	13	9	13	59
subsample1	6	0	0	0	1	0	0	3	1	1
subsample2	0	0	0	0	4	0	1	0	0	12
subsample3	0	0	0	0	1	0	3	0	3	6
Limpet 5-15 mm	138	0	38	0	38	50	178	269	25	172
subsample1	3	0	1	0	4	4	12	22	3	11
subsample2	5	0	2	0	4	7	27	26	3	23
subsample3	3	0	9	0	4	5	18	38	2	21

zone	Silvetia					Mytilus					Total
plot #	615	616	617	618	619	620	621	622	623	624	count
Lepidochitona spp.		1	1	4	4			1		1	16
Nuttalina spp.						38	46	19	15	97	215
subsample1										28	28
subsample2										3	3
subsample3										0	0
Fissurella volcano									1	1	2

Pachygrapsus			1	2	2	3	4	13	6	2	38
Pagurus spp.				6		1					8
large limpets(>15mm)	1	1						1	1		17
S. purpuratus						8	4	7	12	6	37
Nucella emarginata							1	6	11		18
Acanthina spp.	5	1	2	4							32
Tegula funebris	23	22	160	7							272
Ocenebra circumtexta						1	3				4
Lottia gigantea							1	20	19		40
Mopalia			1								1
Leptasterias								1	1		2
Littorina spp.	1538	413	106	0	72	1	1	19	1	0	7112
subsample1	32	9	20	0	9			4			245
subsample2	41	5	7	0	8			0			232
subsample3	50	19	7	0	6			2			220
Limpet < 5 mm	6	78	9	25	28	184	563	197	363	6	1647
subsample1	0	1	0	7	0	27	13	25	13	2	100
subsample2	2	13	1	0	4	27	15	21	5	0	105
subsample3	0	11	2	1	5	5	17	17	11	0	82
Limpet 5-15 mm	91	113	63	116	119	81	91	131	150	9	1869
subsample1	13	4	10	15	9	21	13	19	10	3	177
subsample2	4	17	1	11	7	5	9	15	23	0	189
subsample3	12	15	9	11	22	0	7	8	15	0	199

Anacapa Island, June 22-25, 2005

(Database event #2005-E)

Personnel: Dan Richards, Marine Biologist, Channel Islands National Park
Rocky Rudolph, SCA intern
Tom Tidyman, SCA intern

Procedure and general observations: The NPS vessel Sea Ranger II delivered us to East Anacapa Island about mid-morning on 22 June. Standard procedures were used for monitoring the rocky intertidal sites. All plots and site overviews were photographed with an Olympus C-5050 digital camera. Motile invertebrates were counted in all photoplots. Sub-sampling was done for littorine snails and small limpets when abundant, using three 20x20 cm or 10x10 cm subplots. *Haliotis cracherodii* and *Pisaster ochraceus* were counted and measured at all sites. The maximum number of shorebirds and pinnipeds seen at any one time was recorded. Randy Bidwell skiffed us over each morning from East Anacapa, dropping us off and picking us up later.

23 June Middle Anacapa West. Low tide -1.5 ft at 0548 hrs. There was a moderate breeze, but the surge was light and conditions were very good. The sky was mostly clear except for a little cloud in early morning. Water temperature was 16°C. There were three black oystercatchers on the site. Western gulls were nesting on the slopes above but there were not in the intertidal zone. We were on site from 0615-1050 hrs.

Rocky counted and measured *Pisaster ochraceus* while I downloaded the temperature logger. Since we were working the incoming tide I counted motile invertebrates in the *Mytilus* zone first, also letting the sun rise a little higher before photographing plots. With the tide lapping at my heels, we finished up the last plot just as Randy headed our way to pick us up. There was no time to field score the plots or to visit Middle Anacapa East plots.

Silvetia compressa was doing well with nice fresh growth in most of the plots. Plot 454 is a bit of an anomaly on the edge of a pool and is lower than most of the *Silvetia* zone, which may explain the dominance of mussels and lack of *S. compressa*. *Endocladia muricata* was doing well and was common the barnacle plots as well. *Mytilus californianus* were abundant in all the mussel zone plots.

Nucella emarginata, *Acanthina* sp. and *Ocenebra circumtexta* were all common especially in the mussel zone. *Pachygrapsus crassipes* were abundant throughout the plots. *Littorina* spp. were not especially common.

Rocky counted 137 *Pisaster ochraceus* with most falling between 100 and 130 mm. Rocky returned to mainland on IPCO and Tom Tidyman came out today.

Table 67. Photoplot summary. Mean percent cover by zone at Middle-West, Anacapa Island, spring 2005.

Zone Name	Bare Rock	Barnacle	Tetracita	Endocladia	Hesperophycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other
Barnacle	46.2	11.6	0.0	20.6	0.2	0.0	1.4	0.2	0.2	18.4	0.2	0.0	1.0
Endocladia	46.4	8.6	1.4	25.0	0.0	0.0	14.4	0.0	0.2	3.8	0.2	0.0	0.0
Silvetia	29.4	1.8	0.2	4.2	0.0	40.8	0.6	4.2	0.0	18.8	0.0	0.0	0.0
Mussels	11.2	2.6	1.0	0.8	0.0	0.0	78.8	0.2	0.2	5.0	0.2	0.0	0.0

Table 68. Motile invertebrate counts at Middle West, Anacapa Island, spring 2005.

zone	Barnacle					Endocladia				
plot #	447	448	449	450	451	457	458	459	460	461
Lepidochitona spp.						1		2	1	
Nuttalina spp.		4	1			1	9	5		

Fissurella volcano										
Pachygrapsus	1	3	1	1	3	3	1	3	1	
Pagurus spp.			1				2			
large limpets (>15mm)					1		3			
S. purpuratus										
Pisaster ochraceus										
Nucella emarginata	2					1				
Acanthina spp.	3		1	1	3	3	5			
Tegula funebris										
Ocenebra circumtexta		2				2				
Lottia gigantea	1					3				
Homalopoma										
Littorina spp.	363	66	188	78	59	0	56	209	184	231
subsample1	15	12	6	19	4	0	7	16	7	35
subsample2	5	0	13	6	5	0	7	50	26	21
subsample3	9	9	41	0	10	0	4	1	26	18
Limpet < 5 mm	0	34	22	0	0	0	34	6	6	6
subsample1	0	1	0	0	0	0	5	0	1	0
subsample2	0	6	5	0	0	0	2	2	1	0
subsample3	0	4	2	0	0	0	4	0	0	2
Limpet 5-15 mm	28	88	88	13	63	119	159	116	44	3
subsample1	1	11	3	1	3	16	20	10	3	0
subsample2	1	7	8	0	2	5	9	14	2	1
subsample3	7	10	17	3	15	17	22	13	9	0

	zone		Silvetia					Mytilus				
	plot #	<u>452</u>	<u>453</u>	<u>454</u>	<u>455</u>	<u>456</u>	<u>462</u>	<u>463</u>	<u>464</u>	<u>465</u>	<u>466</u>	total
Lepidochitona spp.		3	5		5	7	1	1	1			27
Nuttalina spp.				1		1	1	7	5	1		36
Fissurella volcano						3	2	1	3	8	2	19
Pachygrapsus		12	4	5	4	8	11	12	8	4	4	89
Pagurus spp.												3
large limpets (>15mm)			1		3	4					9	21
S. purpuratus												0
Pisaster ochraceus							1					1
Nucella emarginata							2	11	5	4	2	27
Acanthina spp.		2								1	5	24
Tegula funebris												0
Ocenebra circumtexta					2		6	3	5	1	5	26
Lottia gigantea		1				2	3	6	4			20
Homalopoma									3			3

Littorina spp.	144	41	0	6	0	50	3	0	0	0	1678
subsample1	12	9		0	0	16	0	0	0	0	
subsample2	7	4		0	0	0	1	0	0	0	
subsample3	27	0		2	0	0	0	0	0	0	
Limpet < 5 mm	3	9	9	22	6	6	13	13	6	3	200
subsample1	0	0		0	0	0	3	3	2	0	
subsample2	1	0		0	2	0	0	0	0	0	
subsample3	0	3		7	0	2	1	1	0	1	
Limpet 5-15 mm	56	28	55	78	50	191	222	250	131	175	1955
subsample1	5	3		3	11	15	31	31	16	15	
subsample2	4	0		1	1	20	24	24	12	23	
subsample3	9	6		21	4	26	16	25	14	18	

Table 69. Size frequency measurements (mm) of selected motile invertebrates at Middle West, Anacapa Island, spring 2005.

	<i>Nucella emarginata</i>	<i>Acanthina</i> spp.	<i>Ocenebra circumtexta</i>	<i>Lottia gigantea</i>
mean	22	13	12	26
st.dev.	4	3	4	10
min	11	7	6	9
max	30	19	30	42
total	26	24	26	20

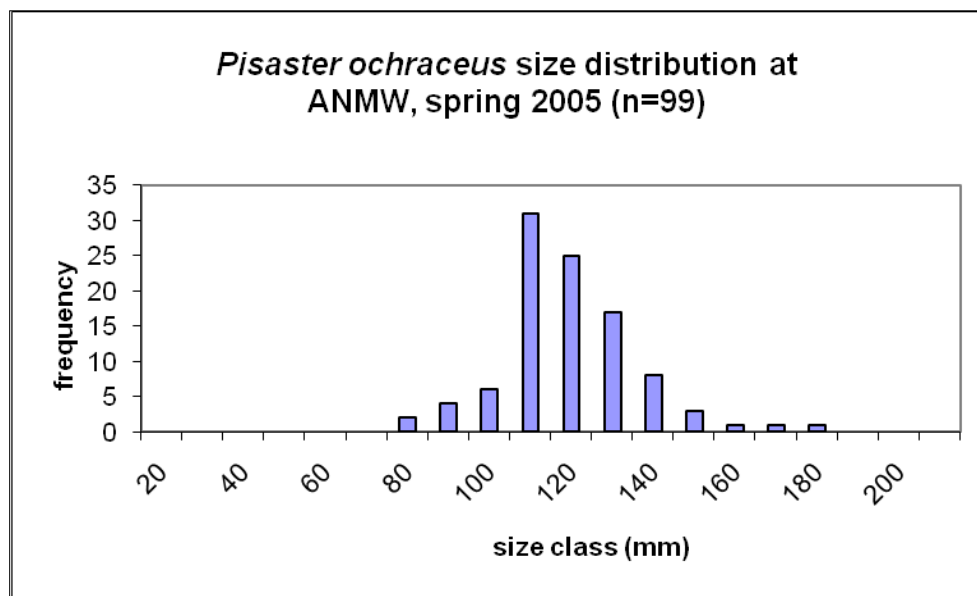


Figure 31. *Pisaster ochraceus* size distribution at Middle-West, Anacapa Island, spring 2005.

24 June, South Frenchy's Cove/Cat Rock. Low tide -1.4 at 0636 hrs. conditions were much like yesterday with light breeze and excellent conditions. Water Temperature was 16.5 °C. Tom helped me today with photos and the diffuser screen. Randy dropped us off at Frenchy's a little after 0600 hrs. There was a fair pile of *Arundo donax* sticks on the back beach at South Frenchy's Cove (SFC). A male sea lion was asleep on the beach when we arrived. There were two black oystercatchers and one American or American/black hybrid at South Frenchy's Cove and two more black oystercatchers were at Cat Rock. A harbor seal was in the surf watching us at Cat Rock.

Because I had Tom helping today by holding the diffuser screen, I shot photos at both Cat Rock and South Frenchy's Cove. I did an abalone search at Cat Rock and found three *Haliotis cracherodii* (110-138mm). The largest was obviously shrunken, but it did appear to be feeding and it was able to hang on well to the rock despite having at least a finger width of space between the shell edge and the mantle. The other two were in crevices near plot 55 and were 110 and 130 mm.

Pachygrapsus crassipes and *Ligia occidentalis* were abundant all along the shore between Cat Rock and South Frenchy's Cove. A wide range of sizes of both species were seen. *Tegula gallina* were common midway between the two sites but were uncommon at both sites. *Tegula funebris* were present, but I estimate at least 90% of the *Tegula* seen were *T. gallina*. I counted motile invertebrates in all but the mussel plots at SFC. I tried to download the temperature logger but was unable to remove the housing cap. I removed the housing and discovered one of the brackets was rusted out and broke as I removed it. the unit was later downloaded at the office.

Motile invertebrates were not very common in any of the SFC plots. *Acanthina* spp. were the most common snails.

I noticed a small anemone with white tentacles in a tidepool at North Frenchy's that I do not recognize. I did not get a photo of it but it is something we should keep an eye out as a possible alien species.

Table 70. Photoplot summary. Mean percent cover by zone at South Frenchy's Cove, Anacapa Island, spring 2005. (5 plots/zone).

Zone Name	Bare Rock	Barnacle	Tetraclytia	Endocladia	Hesperophycus	Silvetia	Mussels	Turfweed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other
Barnacle	36.8	45.4	0.0	15.4	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0
Endocladia	21.4	3.4	0.0	60.6	0.0	13.2	0.0	0.0	0.0	0.6	0.0	0.0	0.8
Silvetia	23.0	8.0	0.0	5.0	0.0	43.6	17.4	0.0	0.0	2.6	0.2	0.0	0.2
Mussels	3.4	0.0	0.0	0.2	0.0	0.0	66.8	2.8	0.0	6.6	0.2	0.0	0.0

Table 71. Motile Invertebrate Counts South Frenchy's Cove, Anacapa Island, spring 2005.

zone	Barnacle					Endocladia					
	plot #	249	250	251	252	253	154	155	256	257	258
Lepidochitona spp.											
Nuttalina spp.											
Fissurella volcano											
Pachygrapsis						3					1
Pagurus spp.											
large limpets(>15mm)											1
S. purpuratus											
Nucella emarginata											
Acanthina spp.									1		
Tegula funebris											1
Ocenebra circumtexta											
Lottia gigantea											
Epitonium tinctum											
Littorina spp.		463	1225	875	613	1125	288	75	128	16	38
	subsample 1	5	39	15	14	14	7	21	6	4	1
	subsample 2	17	25	31	18	34	10	1	22	1	4

	subsample 3	15	34	24	17	42	6	2	13	0	7
Limpet < 5 mm		0	0	0	0	0	0	0	0	0	6
	subsample 1	0		0	0		0	0	0	0	0
	subsample 2	0		0	0		0	0	0	0	0
	subsample 3	0		0	0		0	0	0	0	2
Limpet 5-15 mm		13	0	3	9	0	34	3	3	0	47
	subsample 1	0		1	0		4	1	0	0	3
	subsample 2	0		0	1		3	0	0	0	4
	subsample 3	4		0	2		4	0	1	0	8

	zone	<i>Silvetia</i>					<i>Mytilus</i>					Total
	plot #	259	260	261	262	263	201	202	264	265	266	
Lepidochitona spp.			2			4						6
Nuttalina spp.					1		4	1	1	1	3	11
Fissurella volcano							4	1	1			6
Pachygrapsis	3	2	2				2	3	6	1	3	26
Pagurus spp.												0
large limpets(>15mm)			2			4						7
S. purpuratus												0
Nucella emarginata							18	3	7	13	3	44
Acanthina spp.	3	1	4				3		6	2	5	25
Tegula funebris	2											3
Ocenebra circumtexta									1	1		2
Lottia gigantea					1		1	2	1			5
Epitonium tinctorum							1					1
Littorina spp.		28	25	13	75	9	0	0	0	0	0	4994
	subsample 1	8	4	1	7	2	0	0	0	0	0	
	subsample 2	1	4	2	9	1	0	0	0	0	0	
	subsample 3	0	0	1	8	0	0	0	0	0	0	
Limpet < 5 mm		6	13	6	0	3	19	9	16	31	16	125
	subsample 1	1	4	1	0	0	3	0	0	0	2	
	subsample 2	1	0	1	0	0	1	1	2	5	1	
	subsample 3	0	0	0	0	1	2	2	3	5	2	
Limpet 5-15 mm		38	56	34	19	47	150	109	131	128	116	941
	subsample 1	3	4	2	1	8	22	12	14	9	12	
	subsample 2	8	7	4	1	3	6	10	20	9	16	
	subsample 3	1	7	5	4	4	20	13	8	23	9	

Table 72. Size frequency measurements (mm) of selected motile invertebrates at South Frenchy's Cove, Anacapa Island, spring 2005.

	<i>Nucella emarginata</i>	<i>Acanthina spp.</i>	<i>Tegula funebris</i>	<i>Ocenebra circumtexta</i>	<i>Lottia gigantea</i>
mean	19	15	19	13	19
St.dev.	3	3	6	1	16

min	8	11	13	12	9
max	24	21	24	13	47
count	36	25	3	2	5

25 June Cat Rock and South Frenchy's Cove. Low tide -1.1 at 0725 hrs. Conditions were very good again but the south swell was a little larger. I caught the sea lion sleeping-in again at Frenchy's Cove and the same oystercatchers were still around. I also saw a rock wren down in the intertidal zone. I was able to work from 0600 to 1100 hrs.

I counted motile invertebrates in the mussel zone at SFC first. Still no luck finding the corner markers of 266, so the count was made in the approximate area. I ran down to Cat Rock and started counting motile invertebrates at 0730 finishing right at 1100. In the rush to finish plots, I forgot to reinstall the temp logger first thing this morning with new brackets. I tried to return later but the tide was too high.

There were fair numbers of *Nucella emarginata* and *Acanthina* sp. in the SFC mussel plots. *Nemalion helminthoides* was abundant on the outer reef. *Ocenebra circumtexta* and *Lottia gigantea* were the main features of the mussel plots along with large numbers of *Nuttalina* sp. Except for *Littorina* spp., the numbers of gastropods were usually pretty low in the other zones. I didn't find any *Nucella emarginata* in any of the Cat Rock plots. *Tegula gallina* were fairly common in tidepools but there were none in plots. *Tegula gallina* appeared to be more common than *T. funebris*.

I went back on Island Packers in the evening of the 25th.

Table 73. Photoplot summary. Mean percent cover by zone at Cat Rock, Anacapa Island, spring 2005. (9 plots/zone).

Zone Name	Bare Rock	Barnacle	Tetracita	Endocladia	Hesperophycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other
Barnacle	46.3	19.8	0.0	8.6	23.8	1.1	0.0	0.0	0.0	0.4	0.0	0.0	0.0
Endocladia	17.4	8.0	8.1	42.7	1.4	2.7	4.8	4.6	0.1	9.4	0.8	0.0	0.0
Silvetia	21.7	12.3	1.0	13.7	5.2	43.0	0.8	0.0	0.0	2.3	0.0	0.0	0.0
Mussels	19.7	5.8	14.4	2.3	0.0	0.0	48.8	0.1	0.0	8.8	0.1	0.0	0.0

Table 74. Motile Invertebrate Counts Cat Rock, Anacapa Island, spring 2005.

zone	Barnacle										Endocladia									
	plot #	Total	33	37	135	31	35	38	32	36	39	212	14	51/18	54	13	467/17	52	53	19
Lepidochitona spp.	27			2	3											1				1
Nuttalina spp.	344											2	26	8	7	3	9	8	6	
Fissurella volcano	22												1							
Pachygrapsus	57		1	3	1		3			2			5		1	1	1			
Pagurus spp.	0																			
large limpets (>15mm)	30		5	2					1				2			1	2			1
S. purpuratus	0																			
Nucella emarginata	0																			
Acanthina spp.	21		6	2	5															1
Tegula funebris	2			2																
Tegula gallina	1			1																

Ocenebra circumtexta	43											2		1					
Lottia gigantea	41											4				2		1	
Littorina spp.	6466	138	88	450	1200	888	463	813	163	1025	3	22	47	3	25	3	3	13	59
subsample 1	269	6	2	15	35	28	1	18	10	38	1	7	15	1	5	1	1	3	6
subsample 2	215	5	5	8	27	39	19	14	2	10	0	0	0	0	2	0	0	0	7
subsample 3	223	0	0	13	34	4	17	33	1	34	0	0	0	0	1	0	0	1	6
Limpet < 5 mm	166	0	0	0	0	0	0	0	0	0	6	0	0	16	3	0	19	9	0
subsample 1	9	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	5	0	0
subsample 2	14	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0
subsample 3	12	0	0	0	0	0	0	0	0	0	2	0	0	1	1	0	0	3	0
Limpet 5-15 mm	2034	22	6	6	13	13	19	3	13	19	47	47	72	81	69	41	63	22	13
subsample 1	191	2	1	0	3	0	3	0	0	2	1	4	15	13	3	8	16	4	1
subsample 2	163	0	1	0	0	0	2	0	3	0	4	8	6	10	10	4	4	0	0
subsample 3	159	5	0	2	1	4	1	1	1	4	10	3	2	3	9	1	0	3	3

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

<i>subsample 2</i>	0	14	1	2	8	9	3	1	0	7	14	3	3	8	3	17	6	12
<i>subsample 3</i>	1	8	1	0	9	3	5	0	1	4	16	13	3	14	1	6	6	15

Table 75. Size frequency measurements (mm) of selected motile invertebrates at Cat Rock, Anacapa Island, spring 2005.

	<i>Acanthina</i> <i>spp.</i>	<i>Tegula</i> <i>funnebralis</i>	<i>Tegula</i> <i>gallina</i>	<i>Ocenebra</i> <i>circumtexta</i>	<i>Lottia</i> <i>gigantea</i>
count	21	2	1	43	37
avg. size	14.6	20.5	23	12.3	27.9
min size	10	20	23	9	9
max size	20	21	23	17	57

Fall 2005 Rocky Intertidal Monitoring Trip Reports

Santa Cruz Island, October 14-19, 2005

(Database event #2005-F)

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

Jacob Osborn, volunteer, UCSB Student

Carol Blanchette, PISCO, UCSB

Thomas Young, PISCO, UCSB

- Procedure and general observations: We took the Island Packer vessel *Island Adventure* to Santa Cruz Island, arriving at Prisoners at approximately 1300 hrs. Standard procedures were used for monitoring the rocky intertidal sites. All plots and site overviews were photographed with an Olympus C-5050 digital camera. Scoring was done from digital images in the office except for the five barnacle plots at Fraser Cove. Owl limpets were measured within 1m radius circular plots. Surfgrass transects were read at Trailers and Fraser Cove. Seastars were counted and measured at all sites. The maximum number of shorebirds and pinnipeds seen at any one time was recorded. Except at Willows Anchorage, abalone searches were restricted to concurrent searches with seastar search and measurements due to the surf and limited time. Carol Blanchette and Thomas Young from PISCO came out on 10/16 to change settlement plates and tuffies and helped me with seastar counts and *Lottia* measurements. We stayed at the University of California Natural Reserve field station.

14 October, Prisoners Harbor. Low tide +1.2 ft at 1417 hrs. Conditions were excellent with calm seas and no wind. The sky was clear and the air was warm. Water temperature was 17°C. When we arrived, there were three killdeer and one common raven on the reef and two sandpipers (probably western sandpipers) flying in the area. We were onsite from 1340-1530 hrs.

Photoplots were all photographed and field scored. The diffuser screen was used for the photos because of the bright sun. Pans from each of the reference bolts and other area photos were taken.

Pisaster ochraceus were not common but the tide was still above their range. Jacob started to count seastars but we were not getting a good numbers because of the high water. The table below is from sea star counts done on 18 October during a lower tide.

Nice healthy plants of *Hesperophycus californicus* were present on the west side above plot Pe4. *Chthamalus* sp. were especially dense in the upper barnacle plots. *Balanus glandula* was common also and were common on mussel shells in the lower intertidal. *Mytilus californianus* were mostly small and dense in the mussel zone plots. *Endocladia muricata* was fairly short and mostly bleached but seemed to be fairly high cover overall. *Nucella emarginata*, *Acanthina* sp. and *Tegula funebris* all seemed fairly common. I did find a few *T. gallina* also. *Ceramium* sp. was common and *Endarachne binghamiae* was common in patches. *Scytosiphon* was common on the western reef especially in the area of Pe1 and Pe2 where there was no *Silvetia* growing.

Table 76. Photoplot summary. Mean percent cover by zone at Prisoners Harbor, Santa Cruz Island, fall 2005. (5 plots/zone).

Zone Name	Bare Rock	Barnacle	Tetracita	Endocladia	Hesperophycus	Silvetia	Mussels	Turfweed	Leaf Barnacle	Misc. Algae	Misc. Animal	Tar	Other
Barnacle	29.4	47.2	0.2	11.6	0.8	0.0	1.4	0.6	0.0	8.6	0.2	0.0	0.0
Endocladia	21.4	26.0	0.2	38.6	6.4	0.2	2.2	0.0	0.0	4.8	0.2	0.0	0.0
Rockweed	14.6	32.2	2.0	1.0	0.0	23.2	2.6	0.2	0.0	22.2	1.8	0.0	0.2
Mussels	3.8	5.0	0.8	0.0	0.0	0.0	69.4	0.0	0.0	20.0	0.4	0.0	0.6
Hesperophycus	22.8	45.4	0.0	16.6	12.6	0.8	0.0	0.0	0.0	1.8	0.0	0.0	0.0

Table 77. Seastar (*Pisaster ochraceus*) counts at Prisoners Harbor, Santa Cruz Island, fall 2005.

Total	15
Min size (mm)	90
Max size (mm)	165
Mean size (mm)	132

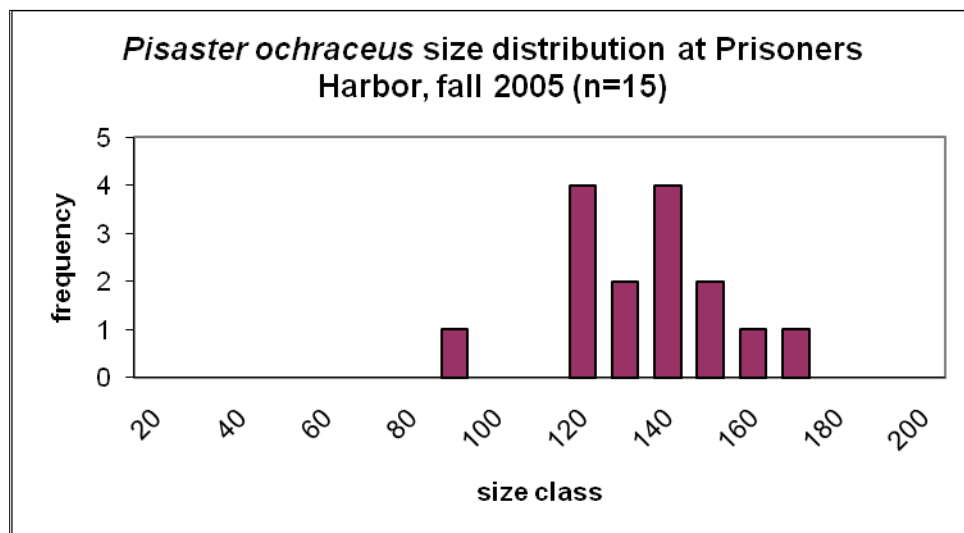


Figure 32. *Pisaster ochraceus* size distribution at Prisoner's Harbor, Santa Cruz Island, fall 2005.

15 October, Trailer and Fraser Cove. Low tide +0.4 ft at 1501 hrs. It was generally sunny but Windy with some low clouds and fog. The swell was moderate at 3-4 ft and made working a little difficult with the marginal tide. At Forney's Cove (a remote part of the Fraser Cove site) there were two black oystercatchers, 10 western gulls and a flock of about 200 sanderlings flying around. At Fraser Cove there were 19 black oystercatchers on the reef and 14 common ravens on the beach. At Trailer there were western gulls overhead and two black oystercatchers on the reef. We were in the intertidal from about 1200-1600 hrs.

Because of the marginal tide level and Jacob leaving on the 16th, we concentrated on the photos of the plots. With the digital camera the quality is of the image makes even light from the diffuser screen very important but the screen is difficult to use in the wind. We started at Trailer but the mussel plots were still getting too much wave action so moved on to Forney's, then Fraser. We accomplished all the photoplots but did not even attempt to photograph the *Lottia* plots or the surfgrass transects. Because of the wind and blowing spray I put off the area photos mostly as well. We went back to Trailer and were able to get to the mussel plots between waves. I was also able to measure *Lottia gigantea* in the owl limpet plots. Kelp fragments and surfgrass drift were common on much of the Fraser Cove reef and I generally tried to remove them from the plot photos.

Lottia gigantea sizes at Trailers ranged from 29-96 mm, with most well above 50mm. Only plots L1 and L2 had many owl limpets. Plots L3 and L5 were mostly low turf alga with only one limpet between them. Plot L4 had only three owl limpets but the rock was primarily bare. Normally full of mussels, L5 had none.

We arrived back at the research station at 1800 hrs. I downloaded the photos and labeled them after we returned and filled in the field log.

Table 78. Photoplot summary. Mean percent cover by zone at Trailers, Santa Cruz Island, fall 2005. (5 plots/zone).

Zone Name	Bare Rock	Barnacle	Tetraclitia	Endocladia	Hesperophycus	Silvetia	Muss-els	Turf-weed	Leaf Barnacle	Misc. Algae	Misc. Animal	Tar	Other
Barnacle	19.0	74.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	2.4	0.6	0.0	0.0

Rockweed	3.6	6.4	0.0	0.2	0.0	81.8	0.0	0.2	0.0	7.8	0.0	0.0	0.0
Mussels	7.2	6.6	0.4	0.0	0.2	0.0	30.0	9.4	0.2	43.6	2.0	0.0	0.4
Hespero-phycus	20.3	22.3	0.0	10.0	18.5	26.5	0.0	0.0	0.0	2.3	0.0	0.0	0.0

Table 79. Photoplot summary. Mean percent cover by zone at Fraser Cove, Santa Cruz Island, fall 2005. (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	34.0	33.6	0.0	12.8	0.0	0.0	0.6	0.0	0.0	17.0	0.2	0.8	1.0
Endocladia	31.0	13.8	0.0	25.2	2.6	0.0	1.6	4.8	0.0	21.0	0.0	0.0	0.0
Rockweed	10.6	5.8	0.0	3.6	11.2	49.6	0.0	0.0	0.0	19.0	0.2	0.0	0.0
Mussels	11.6	0.6	0.0	0.2	0.0	0.2	76.2	0.2	1.0	10.0	0.0	0.0	0.0
Pollicipes	8.4	6.6	1.0	4.2	0.0	0.6	50.0	1.8	9.4	13.8	2.6	0.0	1.6
Tar	16.2	29.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.0	53.2	0.0
Hesperophycus	21.0	19.2	0.0	16.2	32.2	7.8	0.2	0.0	0.2	2.8	0.4	0.0	0.0

Table 80. *Lottia gigantea* plot summary at Trailer, Santa Cruz Island, fall 2005.

Plot	Count Density	Area	Density	Count Sized	Mean Size	St.Dev.	Min. Size	Max. Size
1	15	3.14	4.776	15	85.33	7.18	68	96
2	21	3.14	6.686	21	67.14	14.25	29	91
3	1	3.14	.318	1	48.00		48	48
4	3	3.14	.955	3	83.00	4.58	78	87
5	0		.000	0				

16 October, Willows Anchorage. Low tide -0.1 ft at 15458 hrs. The weather was mostly sunny and pleasant. The wind was light and the swell was mostly light. We had a few rain sprinkles throughout the day but the sun prevailed. No shorebirds were on the reef. Numerous pig tracks were on the beach. The dive boat Vision was off shore. We were on site from 1400-1650 hrs. Jacob went in this morning on IPCO and Carol and Thom came out.

Carol replaced the PISCO temperature loggers. They are now using loggers imbedded in fake mussels to mimic the heat stress that mussels receive at different levels of the intertidal. New fake seastars (a sponge material around a logger, held down by plastic mesh) were also placed out to test the heat stress on those. Thom helped with a thirty-minute seastar count and then measured stars. There was enough cloud cover and shadow that I could shoot the photos without the diffuser. Carol and Thom both helped with the *Lottia* plots. I had difficulty finding corner bolts of the mussel plots and a couple *Lottia* plots because of the dense mussels. Plot range and bearings and photos were used to relocate plots, but I did not find any corners of M2 and only one corner each for M3 and M4. I placed epoxy at the approximate center of the L2 and L4 *Lottia* plots as the bolts are apparently gone (bolts were later found and I had placed the epoxy near the center of each plot so the correct location was sampled).

The north end of the site had good growth of *Endocladia muricata* in the Pe1 and He1 plots but there were no rockweeds. *Silvetia compressa* was only present in the Pe4 plot and was not as lush there as it usually is. There was a little *Silvetia* in the *Hesperophycus* plots and *Hesperophycus californicus* was present on the inner edge of the reef though mostly looking pretty dry and ragged. *Endocladia* on the outer reef was almost all white, apparently bleached by the Santa Ana conditions of the last few weeks.

I was able to find nine juvenile black abalone on the outer reef during a 20 minute search (28-82 mm range). Thom found a fresh abalone shell 30mm long. Abalone were in the wet crevices extending from the pool west of the *Endocladia* plots and were also found along the edge of the mussel beds next to clearings in the beds.

Lottia gigantea did not seem very common (55 total in the plots) and as is typical here, they were not very large (14-73 mm) with most below 60 mm. *Pisaster ochraceus* ranged in size from 24-133 mm arm length. Small *Pisaster*

were fairly common down among the mussels. Thom counted 184 *P. ochraceus* in a thirty-minute count. He measured 64 for the size frequency.

Table 81. Photoplot summary. Mean percent cover by zone at Willows, fall 2005. (5 plots/zone).

Zone Name	Bare Rock	Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Sily-etia	Muss-els	Turf-weed	Leaf Barnacle	Misc. Algae	Misc. Animal	Tar	Other
Endocladia	19.6	9.4	0.0	54.0	0.0	0.0	0.0	0.0	0.0	16.6	0.4	0.0	0.0
Rockweed	5.6	10.0	0.0	19.8	0.0	32.6	0.0	0.4	0.0	31.4	0.2	0.0	0.0
Mussels	2.0	1.2	1.2	0.0	0.0	0.0	88.0	0.0	1.0	6.2	0.4	0.0	0.0
Hespero-phycus	18.0	22.0	0.0	15.0	2.0	24.0	0.2	0.0	0.0	18.2	0.2	0.0	0.4

Table 82. *Lottia gigantea* plot summary at Willows Anchorage, fall 2005.

Plot	Count Density	Area	Density	Count Sized	Mean Size	St. Dev.	Min Size	Max Size
1	14	3.14	4.457	14	36.71	13.87	14	63
2	11	3.14	3.502	11	35.09	18.93	14	73
3	17	3.14	5.412	17	35.24	11.31	19	62
4	14	3.14	4.457	14	44.00	12.11	21	63
5	0		.000	0				

Table 83. Seastar (*Pisaster ochraceus*) counts at Willows Anchorage, fall 2005.

Total	64
Min size (mm)	24
Max size (mm)	133
Mean size (mm)	87

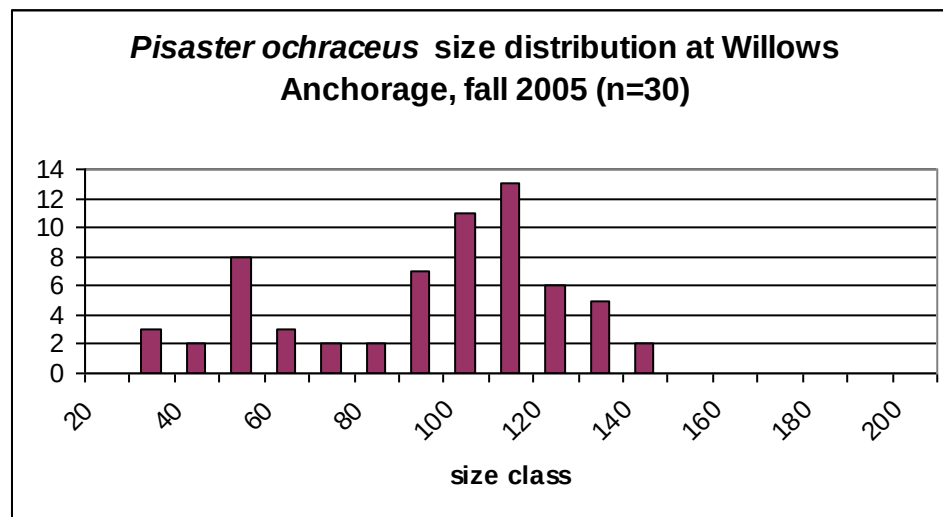


Figure 33. *Pisaster ochraceus* size distribution at Willows Anchorage, Santa Cruz Island, fall 2005.

Table 84. *Haliotis cracherodii* at Willows Anchorage, Santa Cruz Island, fall 2005.

Count (Random)	Mean Size	StDev	Min Size	Max Size	%< 45mm	%45-126mm	%> 126mm
9	49.78	16.60	28	82	44.44	55.56	0

17 October, Trailers and Fraser Cove. Low tide -0.4 ft at 1628 hrs. Just as we arrived at the site, the clouds got very dark and it started to rain. There was thunder nearby and we may have gotten as much as 0.5 inches in two or three hours. The surf at both sites was relatively light, in the 2-3 ft range. There were ten Black Oystercatchers at Fraser Cove and one Great Blue Heron on the beach there as we arrived. No shorebirds were present at Trailers. We were onsite from 1400-1630 hrs.

The rain arrived earlier and harder than expected. We decided to go ahead and finish the critical tasks at both sites. Thom helped me with Lottia plots at Fraser Cove and surfgrass transects at both sites. I also scored *Balanus* plots in the field at Fraser and shot area photos. Thom conducted a thirty-minute seastar search at Fraser. Carol replaced the settling plates and temperature loggers at both sites.

With rain pouring over us, I didn't spend a long time observing the sites in detail. Scoring the *Balanus* plots in the field was important because there were many tiny barnacles in the plots. There was some *Porphyra perforata* present but the *Lottia* plots were not as bad as we have seen in some years, with probably less than 10% *Porphyra* cover. I did a good search in each plot but the numbers were low (31 total). There were some just outside the 1 m radius especially near plot 2. I would have measured 1.5m radius also if we were not pressed for time. The size range was 18-81 mm.

Thom found a total of 63 *Pisaster ochraceus* in a 30-minute search and measured 30. Sizes ranged from 64-178 mm. Seastars were not counted at Trailers because of the limited time, but *P. ochraceus* were common on the reef. *Phyllospadix* spp. cover was typical at both sites and the grass appeared healthy with no unusual disturbance or bleaching noted.

We were able to drive back to the last hill before dropping down to Christy area. The jeep was sliding at that point so we parked and hiked to the adobe and joined the Prohunt crew. They fed us and gave us beds for the night and a ride part way to the field station in the morning. Despite the threat of rain, 10/18 was dry and we would have been able to retrieve the jeep that day if we stayed longer on the island.

Table 85. *Lottia gigantea* plot summary at Fraser Cove, Santa Cruz Island, fall 2005.

Plot	Count Density	Area	Density	Count Sized	Mean Size	St. Dev.	Min. Size	Max. Size
1	8	3.14	2.547	8	54.50	16.20	18	71
2	2	3.14	.637	2	61.50	16.26	50	73
3	6	3.14	1.910	6	55.33	15.06	39	81
4	9	3.14	2.865	9	42.44	6.13	32	53
5	7	3.14	2.229	7	53.71	9.38	40	68

Table 86. Surfgrass transects at Trailer, Santa Cruz Island, fall 2005. (additional taxa removed from table when not present)

Location: Trailer Site Code: SCTR			
Date: 17-Oct-05 Recorder: Dan Richards			
Surfgrass Taxa	Transect 1	Transect 2	Transect 3
Rock		1	3
Sand		2	
<i>Egregia menziesii</i>	2		2
Erect coralline	2	5	7
Non-coralline crust			1
other red algae	8	26	26
<i>Phyllospadix</i> sp. overstory	87	64	59
<i>Phyllospadix</i> sp. understory	2		
<i>Phragmatopoma californica</i>	1	1	1
<i>Chthamalus/Balanus</i>		1	
other brown algae (<i>Macrocystis</i>)			1

	total	102	100	100
--	-------	-----	-----	-----

Table 87. Surfgrass transects at Fraser Cove, fall 2005 (additional taxa removed from table when not present)

Location: Fraser Cove Site Code: SCFC
Date: 17-Oct-05 Recorders: Dan Richards

Surfgrass Taxa	Transect 1	Transect 2	Transect 3
Rock	2	1	2
Sand	2		
<i>Egregia menziesii</i>			4
Erect coralline	8	1	1
other red algae	14	7	7
<i>Phyllospadix</i> sp. overstory	70	83	85
<i>Phyllospadix</i> sp. understory		1	4
<i>Mytilus californianus</i>	2	3	
<i>Phragmatopoma californica</i>	2	5	
Other green algae			1
total	100	101	104

Table 88. Seastar (*Pisaster ochraceus*) counts at Fraser Cove, Santa Cruz Island, fall 2005.

Total	30
Min size (mm)	64
Max size (mm)	178
Mean size (mm)	111

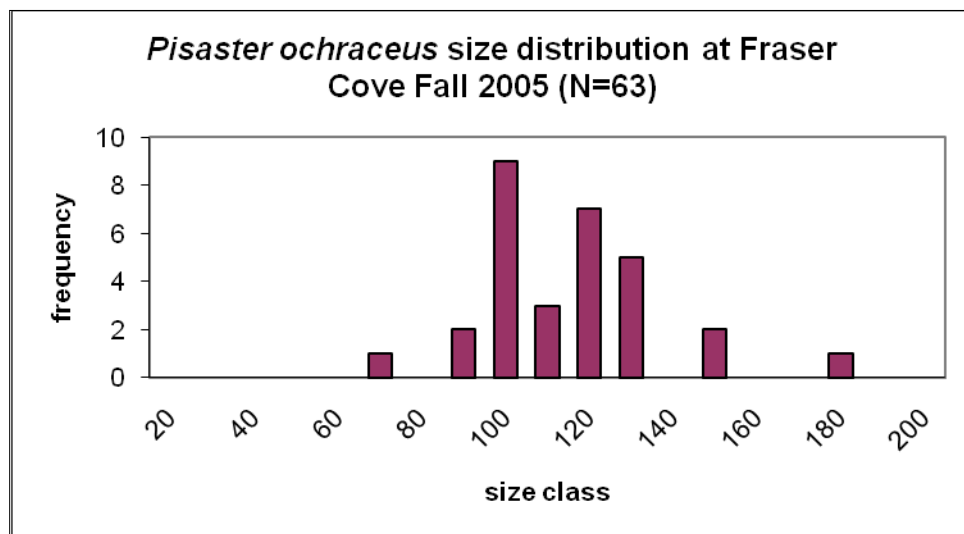


Figure 34. *Pisaster ochraceus* size distribution at Fraser Cove, Santa Cruz Island, fall 2005.

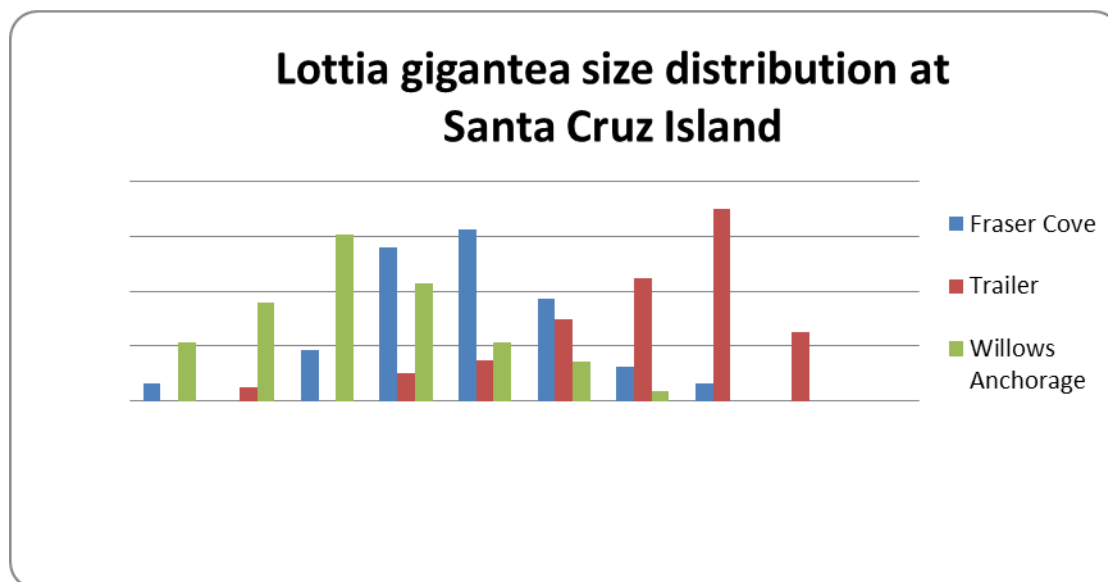


Figure 35. Size frequency distribution of owl limpets at Fraser Cove, Trailer and Willows Anchorage, Santa Cruz Island, fall 2005.

18 October, Prisoners Harbor and Valley Anchorage. Low tide -0.5 ft at 1712. The weather was fairly nice, partly cloudy all day with light wind and light swell. There were no shorebirds at Valley and only two common ravens at Prisoners Harbor. We visited Valley Anchorage first arriving about 1515 hrs and then worked at Prisoners from about 1630 to 1730 hrs.

Carol and Thom replaced settlement plates and temperature loggers and I counted seastars at both sites. At Valley Anchorage I counted 130 *Pisaster ochraceus* and one black abalone (~110 mm) in a 30 minute search. At Prisoners I found and measured 15 *P. ochraceus* in a 30 min search of the reef. I found one black abalone in the rocks west of the site (110 mm).

When we arrived at Prisoners Harbor there was a black and white pig on the front part of the reef foraging on mussels. We were so surprised that we didn't have a chance to photograph it, but there was another one on the cobble beach west of the site that was photographed with drift *Zostera* (eelgrass) in its mouth. I tried to re-photograph the mussel area on the reef (shot on the 14th) but the battery died on the camera.

19 October, Prisoners Harbor. Low tide -0.4 ft at 1757. Calm partly cloudy weather. We brought our gear to the pier about 1530 and saw a pig (looked like the same one) on the reef down in the mussels again. This time we were able to get a picture and I photographed the mussel bed showing the damage with broken shells and bare rock and byssal threads where the mussels had been.

We returned to Ventura at 1800 hrs on Island Packers.

Santa Barbara Island, November 9-16, 2005

(Database event #2005-G)

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

Ken Niessen, volunteer, Channel Islands National Park

Denise Greig, Marine Mammal Center

Tenaya Norris, Marine Mammal Center

- Procedure and general observations: Diane and Dwight delivered us to the island on the Ocean Ranger after stops to rescue a boater at Smugglers, drop off cargo at Scorpion and drop off personnel at Anacapa. Not the ideal schedule this week but this is what worked with the once-a-week boat schedule. Denise had requested to come to SBI several months ago to collect sea lion tissue for a genetic study and this trip worked out well for coordinating all the work. Ken is also doing some GPS work for Sarah and Kathryn and we both will collect seeds for vegetation restoration. Standard procedures were used for monitoring the rocky intertidal sites. All plots and site overviews were photographed with an Olympus C-5050 digital camera. Scoring was done from digital photos in the office. Seastars were counted and measured at all sites. The maximum number of shorebirds and pinnipeds seen at any one time was recorded. Abalone searches were restricted to time during sea star measurements due to the surf and limited time.

9 November, low tide +2.7 ft at 0954 hrs. We did not get to the island until 1500 hrs because of the stops. Dwight and I skiffed in to the beach at Smugglers cove on Santa Cruz Island to retrieve a boater whose small power boat had gone up on the beach during the night apparently after dragging anchor in the high winds over-night. We dropped him off on the coast guard boat (which had no skiff to pick him up with). We had a pretty good rain last night and this morning with some gusty winds and moderate swell from the southeast.) There was 0.42 inches of rain in the SBI rain gauge the morning of 11/10/05.

10 November, low tide +2.0 ft at 1109 hrs. We hiked around the island in the morning observing the island condition and looking for the *Dudleya traskii* plantings. Things were still a little damp for seed collecting. There were hundreds of brown pelicans roosting at Cliff Canyon and at Webster Point. When we got to the sea lion rookery overlook there were hundreds of pelicans on the slope below and to the north towards graveyard canyon. There were at least a dozen or two birds sitting on nests and some collecting vegetation for nest material. The birds were not bothered by our presence at the overlook.

Sea lions were observed having climbed to the top of Webster Point again. There were probably less than 20 elephant seals on the northside beaches. The kelp bed off Webster Point and to the north of it appeared to be growing well. A peregrine falcon flew out of the rocks at the head of the landing cove canyon as we walked up the trail and was again seen above elephant seal cove and then along the west side cliff. Only one bird was seen at any time. A Merlin was seen at north peak. It rained pretty steady all afternoon. I went down to the Landing Cove at 2300hrs at a 0.2 ft tide to observe what was going on there. I saw a few deer mice but not much else.

11 November, Landing Cove. Low tide +1.2 ft at 1205 hrs. Beautiful day today, very calm and mostly clear. We had another 0.41 inches of rain over night. In the morning Tenaya took a plankton sample from the landing cove. The density was low but there was a nice variety of dinoflagellates and diatoms. Even though the tide was not very low, it was so calm I was able to score plots on the south area of Landing Cove. There were two black oystercatchers on the rocks and there may have been as many as five in the area. Three black turnstones were also foraging on the reef. Eighty-five California sea lions were in the cove when we started and about 120 were on the rocks when we ended. One elephant seal was in the cove. We were onsite from 1030-1400 hrs.

I scored all of the barnacle and the mussel plots and did the motile invertebrate counts in them. The tide was not low enough for seastar counts. Only the upper left bolt of plot 326 was found but all the others were in pretty good shape. *Mytilus californianus* densities were high. Plot 326 had very densely packed small mussels. Motile invertebrate counts were not particularly high because of the densely packed mussels leaving little space. *Nuttalina* sp. and *Ocenebra circumtexta* were the most common invertebrates besides limpets. *Littorina* spp. were quite scarce. *Tetraclita rubescens* were more common than *Balanus/Chthamalus* in most of the barnacle plots. Mussels were abundant in a couple of the plots.

12 November, Landing Cove. Low tide +0.5 ft at 1253 hrs. Partly cloudy day, cool, but calm. 1-2 ft. surge, but generally good working conditions. About the same number of sea lions and the same shorebirds present as on 11/11. We were on site from 1130-1500 hrs.

I scored and counted motile invertebrates in the *Silvetia* zone plots. Scored two of the red algal turf plots and decided to score the others in the office since they were being washed by waves and the cover changed with every wave. We did not count motile invertebrates because this zone is unique, we do not see many invertebrates and it was always being washed by waves.

All plots were photographed and some area shots were taken. By the time we finished with photos the tide was too high for a good seastar search.

There were a number of small *Silvetia compressa* plants both inside the plots and on the higher rocks in the center of the area. Most of the plots were still dominated by *Mazzaella affinis* and other red algae. Mussels appeared more common than they were with 3% being the highest mussel cover for these plots. The red algal turf plots were quite diverse but *Phyllospadix* sp. dominated plots 322 and 323 as usual.

Photos were downloaded and labeled in the evening. The images were good quality.

13 November, Landing Cove. low tide -0.2 ft at 1337 hrs. The weather was mostly clear and warm. Ken and I checked and mapped *Dudleya traskaei* outplants in Middle Canyon in the afternoon and Cat Canyon in the evening. I spent about an hour pulling *Malva* this morning.

After lunch, I went to Landing Cove for an hour to count and measure *Pisaster ochraceus*. Sealions and shorebirds were the same numbers. I found 65 *P. ochraceus* on the south reef ranging from 30-130 mm, the mean size was 77mm. The 2x18m transect had a total of 14 *P. ochraceus*. At least two stars exhibited symptoms of wasting disease and several others had healed over stumpy arms.

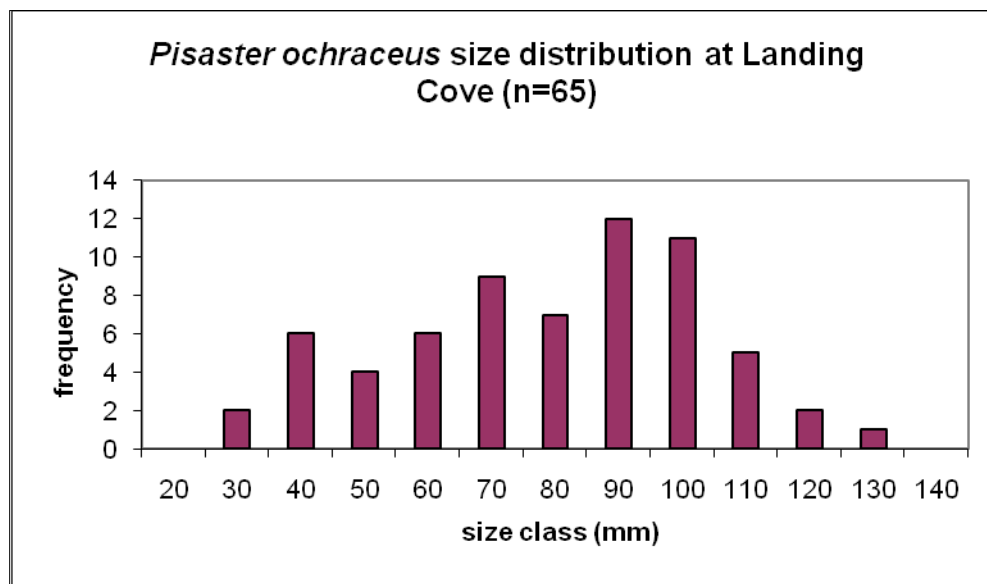


Figure 36. *Pisaster ochraceus* size distribution at Landing Cove, Santa Barbara Island, fall 2005.

14 November, Sea Lion Rookery. low tide -0.6 ft at 1419 hrs. We went down to the rookery near the south point of the island to avoid pelicans nesting on the slope. The number of nests doubled since the first day that we observed them this week. The weather was excellent, warm and sunny with no wind. The island was shrouded in a low fog most of the morning which worked to our advantage to avoid disturbing animals. Denise was able to collect five specimens from dead pups around the rookery. We had hoped to get to the intertidal monitoring site along the beach but a cliff blocked our seaward passage and pelicans were too low on the hill just above that site so there will be no monitoring of SBSLR this spring, unless we come back by boat sometime, not likely.

I sat at the overlook and studied the monitoring site. I counted at least 7 orange *Pisaster ochraceus*. The mussel bed looks good and all the mussel plots appear to have high cover of *Mytilus californianus*. There were about 150 California sea lions on the rocks in the upper intertidal just in the monitoring site boundary. The upper intertidal zone rocks were covered with *Ulva* primarily. I could see no *Endocladia muricata* or evidence of dense barnacles (difficult from that distance but the color should have been noticeable).

At the south end of the rookery there were seven black turnstones, two black oystercatchers and one wandering tattler. Dozens of double-crested cormorants and western gulls were roosting on the lower slope and intertidal rocks and hundreds of brown pelicans were roosting on the slope with several dozen sitting on nests. When we first went down the intertidal there was a peregrine falcon that had just killed an immature western gull and proceeded to pluck it while we were there. I photographed the carcass when we went by later and the falcon was not there. After we walked by, the falcon came back and flew over the kill and us. We continued to move on and unseen by us, the falcon apparently retrieved the carcass and took it off someplace else. We removed a couple of shark hooks and about five meters of wire rope that we found wrapped on rocks in the rookery.

Ken finished mapping the *Dudleya* outplants.

15 November, low tide -0.8 ft at 1500 hrs. We went to Webster Point and were able to go down into the sea lion rookery on the north side of the point with no disturbance of pelicans and only minor disturbance of the small number of sea lions present. Denise and Tenaya were able to collect tissue from nine young sea lion carcasses. They also got the tag number off an adult female sea lion with an orange tag on the right flipper (orange is from one of the marine mammal rehab centers). Ken and I collected more seed of *Eryophyllum* and *Eriogonum* from the north peak area for restoration projects.

16 November, low tide -0.8 ft at 1542 hrs. We were packed and had the place clean early but the boat was delayed by Navy operations in the test range so we did not get back to Ventura until 1800 hrs.

Nat history notes: numerous solitary bees out, lots of burrowing into the trails. They appear to be sweat bees, with a silver banded abdomen and a bluish-green thorax, they appear to be attracted to the blue marker flags near the mouse grid. We found many dead mice on the trail, many were missing their head. I suspect many died during the two rainy nights and were cannibalized after. On 11/11 we noticed that many were being buried by beetles or something. The soil would be all worked up around the body and it appeared the bodies were almost being pulled into the earth. On 11/14 we relocated the mouse and only the last inch of tail was extending from the soil.

Birds for the week

Belted Kingfisher	Say's Phoebe	Burrowing Owl
Great Egret	White-crowned sparrow	Barn Owl
Northern Harrier	Lincoln's sparrow?	Black Oystercatcher
American Kestrel	Horned lark	Black Turnstone
Peregrine falcon	Western Meadowlark	Brown Pelican
Merlin	Hermit thrush	Western Gull
Northern Flicker	European Starling	Brandt's Cormorant
House Wren	Redwing Blackbird (female)	Double-crested cormorant
Rock wren	Yellow-rumped warbler	
Black Phoebe	Townsend's warbler	

Table 89. Photoplot summary. Mean percent cover by zone at Landing Cove, fall 2005. (5 plots/zone).

Zone Name	Bare Rock	Barnacle	Tetracelia	Endocladia	Hesperophycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc. Algae	Misc. Animal	Tar	Phyllospadix
Barnacle	47.0	12.6	19.6	4.8	0.0	0.0	11.0	0.6	0.0	3.6	0.8	0.0	
Silvetia	25.8	0.8	0.4	0.0	0.0	2.8	1.4	15.2	0.0	52.2	1.4	0.0	
Mussels	1.6	0.0	4.8	0.0	0.0	0.0	68.8	0.0	0.8	18.6	5.4	0.0	
Red Algal Turf/Gelidium-pterocladia	0.2	0.0	0.0	0.0	0.0	0.0	8.8	41.6	0.0	22.2	0.6	0.0	26.6

Table 90. Motile invertebrate size frequency measurements for Landing Cove, Santa Barbara Island, fall 2005.

<i>Acanthina</i> spp.		<i>Ceratosoma nuttali</i>		<i>Ocenebra circumtexta</i>	
count	11	count	1	count	43
mean	11	mean	12	mean	12
min	6	min	12	min	6
max	14	max	12	max	15

Table 91. Motile invertebrate counts for Landing Cove, Santa Barbara Island, fall 2005.

zone	<i>Silvetia</i>					Barnacle					<i>Mytilus</i>					
plot #	310	311	312	313	314	315	316	317	318	319	325	326	327	328	329	total
Lepidochitona spp.					2		4	1	3	1						11
Nuttalina spp.					1		3	4	18	5	2		6	6	8	53
Fissurella volcano													6	2	1	9
Pachygrapsus														1		1
Pagurus spp.				2									1			3
large limpets(>15mm)	2	1			1											4
S. purpuratus												7	5			12
Amphissa versicolor																0
Nucella emarginata																0
Acanthina spp.	1		3	4	3											11
Tegula funebris																0
Ceratosoma nuttali	1											3				4
Ocenebra circumtexta	1				1			3	4		15					24
Lottia gigantea											2					2
Pisaster ochraceus											6		1			7
Littorina spp.	0	0	0	0	2	47	3	0	3	6	10	0	0	0	0	71
subsample 1						5	0	0	1	2	6		0	0	0	
subsample 2						5	1	0	0	0	0		0	0	0	
subsample 3						5	0	0	0	0	0		0	0	0	
Limpet < 5 mm	0	0	0	0	0	0	3	6	19	3	3	0	0	0	3	38
subsample 1						0	1	0	5	0	0		0	0	0	
subsample 2						0	0	0	0	1	1		0	0	0	
subsample 3						0	0	2	1	0	0		0	0	1	
Limpet 5-15 mm	38	56	72	23	92	56	178	1094	297	197	150	4	59	38	56	2410
subsample 1						0	22	24	34	12	24		14	5	10	
subsample 2						12	14	314	38	28	12		3	3	8	
subsample 3						6	21	12	23	23	12		2	4	0	

Santa Cruz Island, December 1, 2005

(Database event #2005-H)

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

Jessie Altstatt, Santa Barbara ChannelKeeper

Penny Owens, Santa Barbara ChannelKeeper

- Procedure and general observations: We departed Santa Barbara Harbor about 0845 on the Channel Keeper boat, proceeding directly to Orizaba Cove. The tide was still high when we arrived so we did a dive in the cove, conducting a roving diver fish count and also counted seastars and Jessie shot photos. Standard procedures were followed for the intertidal monitoring. Photoplots were located and photographed with the digital camera on the quadrapod, seastars were counted near low tide during a 30-minute search and motile invertebrates were counted in the photoplots. Photoplots were scored in the office from digital images

• **1 December, Orizaba Cove.** low tide -0.9 ft at 1548 hrs. Conditions were excellent with calm seas and wind. There was some low fog and clouds with occasional partial clearing. We were on site from 1300-1530 hrs. The diffuser screen was used for some photos but clouds blocked the direct sun most of the time. There were three harbor seals in the cove on the west side away from the site. There was a belted kingfish and four black oystercatchers in the area.

Having been over a year since we last visited this site, the bolts were heavily overgrown with barnacles and algae. All the plots were found and the only missing corner bolts were in three mussel plots that may have been obscured by the dense mussels. I did full motile invertebrate counts in the mussel zone plots and one each in *Tetraclita* and *Hesperophycus* zones with Penny recording. Jessie shot the plot photos. The batteries gave out so we did not shoot area photos. Jessie counted motile invertebrates, not including limpets and littorines in the *Balanus* and *Silvetia* plots and did a 30-minute *Pisaster* count over the whole site. A total of 169 *Pisaster ochraceus* (121 purple, 48 orange) and one *P. giganteus* were found. No size measurements of seastars were made

Mytilus californianus has apparently been recruiting well and growing well as the beds were quite dense. *Pollicipes polymerus* were abundant and scattered throughout the mussel bed. One juvenile red abalone, *Haliotis rufescens*, was found in one of the mussel plots. Both *Nucella emarginata* and *Ocenebra circumtexta* were common in the plots. *Nuttalina* sp. and *Fissurella volcano* were present in most plots. There was not dense coverage by either of the rockweeds, but new plants of both *Hesperophycus californicus* and *Silvetia compressa* were fairly common. *Endocladia muricata* grew densely in the *Hesperophycus* plots. *Balanus glandula* was growing very densely in the upper zones. *Tetraclita rubescens* were large and dense just above the *Mytilus* zone.

Table 92. Photoplot summary. Mean percent cover by zone at Orizaba Cove, Santa Cruz Island, fall 2005.

Zone Name	Bare Rock	Barnacle	Tetraclita	Endocladia	Hesperophycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc. Algae	Misc. Animal	Tar
Barnacle	22.0	66.2	3.2	0.4	0.0	0.0	4.2	0.0	0.0	4.0	0.0	0.0
Silvetia	9.0	2.0	5.0	11.8	14.2	23.4	9.4	0.2	0.2	24.6	0.2	0.0
Mussels	1.2	0.6	1.8	0.0	0.0	0.0	82.4	0.2	2.4	11.4	0.0	0.0
Tetraclita	6.8	2.4	29.4	1.4	0.0	0.8	43.4	0.0	0.2	15.2	0.4	0.0
Hesperophycus	3.8	14.0	0.2	27.4	23.8	3.4	7.0	0.2	0.0	20.2	0.0	0.0

Table 93. Motile invertebrate size frequencies for Orizaba Cove, Santa Cruz Island, fall 2005.

	<i>Nucella emarginata</i>	<i>Acanthina</i> spp.	<i>Ocenebra circumtexta</i>	<i>Tegula funebris</i>
count	42	9	45	3
avg size	16	19	12	15
min size	8	17	7	7
max size	25	21	18	23

Table 94. Motile invertebrate counts for Orizaba Cove, Santa Cruz Island, fall 2005.

zone	Barnacle					Hesperophycus					Silvetia				
plot #	B1	B2	B3	B4	B5	He1	He2	He3	He4	He5	Pe1	Pe2	Pe3	Pe4	Pe5
Lepidochitona spp.						1	1	6	2	nc				1	3
Nuttalina spp.							3			nc	1	1		4	4
Fissurella volcano										nc					1
Pachygrapsus				1			1	1	3	nc		4	4	4	4
Pagurus spp.										nc			3		
large limpets(>15mm)										nc					
S. purpuratus										nc					
Nucella emarginata	3	2				3	4	1		nc	4	1	2	5	4
Acanthina spp.										nc	2	4	3		
Tegula funebris										nc			1		2
Ocenebra circumtexta						1	3		4	nc	1		1	4	2
Lottia gigantea										nc					
Haliotis rufecens										nc					
Mopalia muscosa							2			nc					
Littorina spp.	nc	nc	nc	nc	nc	94	nc	nc	nc	nc	nc	nc	nc	nc	nc
subsample1						2									
subsample2						3									
subsample3						25									
Limpet < 5 mm	nc	nc	nc	nc	nc	0	nc	nc	nc	nc	nc	nc	nc	nc	nc
subsample1						0									
subsample2						0									
subsample3						0									
Limpet 5-15 mm	nc	nc	nc	nc	nc	3	nc	nc	nc	nc	nc	nc	nc	nc	nc
subsample1						0									
subsample2						1									
subsample3						0									

zone		<i>Mytilus</i>					<i>Tetraclita</i>					total
	plot #	M1	M2	M3	M4	M5	Te1	Te2	Te3	Te4	Te5	
Lepidochitona spp.			2					nc	nc	nc	nc	2
Nuttalina spp.	12	19	2		3		4	nc	nc	nc	nc	40
Fissurella volcano			8		1	1		nc	nc	nc	nc	10
Pachygrapsus					1		1	nc	nc	nc	nc	2
Pagurus spp.				1				nc	nc	nc	nc	1
large limpets (>15mm)								nc	nc	nc	nc	0
Nucella emarginata	11			4	5	1	18	nc	nc	nc	nc	39
Acanthina spp.								nc	nc	nc	nc	0
Tegula funebris								nc	nc	nc	nc	0
Ocenebra circumtexta	5	10	6	7	9	9	14	nc	nc	nc	nc	51
Lottia gigantea								nc	nc	nc	nc	0
Haliotis rufecens				1				nc	nc	nc	nc	1
Mopalia muscosa	1							nc	nc	nc	nc	1
Strongylocentrotus purpuratus			1	1				nc	nc	nc	nc	2
Littorina spp.	1	0	0	0	0	0	150	nc	nc	nc	nc	151
subsample1			0	0	0	0	1					
subsample2			0	0	0	0	11					
subsample3			0	0	0	0	0					
Limpet < 5 mm	6	13	13	25	0	0	13	nc	nc	nc	nc	69
subsample1			0	0	0	0	0					
subsample2			4	0	1	0	1					
subsample3			0	1	1	0	0					
Limpet 5-15 mm	51	109	188	200	28	28	100	nc	nc	nc	nc	676
subsample1			8	7	5	3	0					
subsample2			20	4	4	2	4					
subsample3			7	4	7	4	4					

Anacapa Island, December 11-14, 2005

(Database event #2005-I)

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

Haven Livingston, UCSC, PISCO

Kirsten Kusic, UCSC, PISCO

Rani Gaddam, UCSC, PISCO

Walter Heady, UCSC

Elizabeth Sassone, UCSC

Eric Nickisch, UCSB, skipper

- Procedure and general observations: We used the R/V *Cormorant* departing 0730 hrs. on the 11th. The UCSC crew was conducting the coastal biodiversity surveys (aka SWAT transects) I was working alone mostly with some help from Elizabeth recording and occasionally from Walter with help on motile invertebrates. Standard procedures were used for monitoring the rocky intertidal sites. All plots and site overviews were photographed with an Olympus C-5050 digital camera. Photoplots were field scored at Cat Rock and South Frenchy's Cove and the Middle Anacapa plots will be scored in the office. Abalone and Seastars were counted on all the biodiversity survey transects and in a general search at Cat Rock. The maximum number of shorebirds and pinnipeds seen at any one time was recorded.

11 December, Cat Rock. low tide 0.0 ft at 1314 hrs. We skiffed ashore at 1130 next to the site and began setting up. The weather was excellent with partly cloudy sky and little or no wind or waves. There were three black oystercatchers and one western gull in the area. A great egret was standing on floating kelp just offshore. Kristen had seen an American oystercatcher near Cat Rock as we approached. We saw what looked like an osprey catch a fish in the kelp bed offshore but none of us could confirm it. There were numerous dive and fishing boats on the back side of Anacapa. We were on site from 1130 to 1730 hrs.

12 December, Cat Rock, low tide -0.5 ft at 1359 hrs. It was so calm we spent the night anchored off Cat Rock. We went ashore at 1000 hrs. Weather was excellent again. Four black oystercatchers were in the area along with several western gulls. Later we saw the American oystercatcher again. We completed work at Cat Rock and walked down to South Frenchy's Cove. The SWAT crew had a couple hours there and made good progress. I got to Frenchy's about 1615 so only had time to count motile invertebrates in 4 plots before we needed to meet Eric on the north side for a pickup.

Table 95. Photoplot summary. Mean percent cover by zone at Cat Rock, Anacapa Island, fall 2005. (9 plots/zone).

Zone Name	Bare Rock	Barnacle	Tetracrita	Endocladia	Hesperophycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc. Algae	Misc. Animal	Tar
Barnacle	24.2	41.7	0.0	12.0	16.8	0.9	0.0	0.0	0.0	4.4	0.0	0.0
Endocladia	11.0	5.8	10.4	42.8	0.3	3.1	4.4	6.3	0.0	12.0	3.8	0.0
Silvetia	14.2	15.1	1.6	13.8	3.0	43.9	0.9	0.6	0.0	6.4	0.6	0.0
Mussels	13.1	2.7	17.0	2.0	0.0	0.0	44.4	0.6	0.4	16.8	3.0	0.0

Table 96. *Lottia gigantea* at Cat Rock, Anacapa Island, fall 2005.

Plot	Area	Density	Count	Sized	Mean Size	St. Dev.	Min. Size	Max. Size
1	3.14	13.372	42		29.43	7.65	17	53
2	3.14	11.780	37		34.30	10.38	14	54
3	3.14	.955	3		44.33	17.93	33	65

13 December, Middle Anacapa, low tide -0.8 at 1441. There was a little more breeze today but the weather was about the same with some high clouds and generally calm conditions. We went ashore about 1030. Three black

Oystercatchers were in the area and there was a belted kingfisher by Harbor Seal Arch. One harbor seal watched us from the water but I didn't see any hauled out.

I shot photos and cleaned the plot corners at Middle-East first, then shot photos at Middle-West. I counted motile invertebrates in all plots but skipped littorines and limpets in the mussel plots because of time pressures. I checked the abalone plots at harbor seal arch and found nothing.

There was some suspicious looking red algae growing on mussels just to the upper right of plot 53. Kristen and Haven agreed it looked like *Caulacanthus ustulatus*. If confirmed this is the first time it has been found at the northern islands. The only patch I found was about 30cm in diameter. A voucher was collected for confirmation from Kathy-Ann Miller at the Jepson Herbarium.

Snails were common in all zones. Even the barnacle zone had several *Acanthina* in most plots. *Nucella emarginata*, *Acanthina* sp. and *Ocenebra circumtexta* were common. *Ocenebra interfossa* may have also been present and would have been included with *O. circumtexta* in measurements and counts.

Table 97. Photoplot summary. Mean percent cover by zone at Middle East, Anacapa Island, fall 2005. (3 plots/zone).

Zone Name	Bare Rock	Barnacle	Tetracrita	Endocladia	Hesperophycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc. Algae	Misc. Animal	Tar	Unscorable
Barnacle	46.7	16.0	10.7	8.7	0.0	0.0	4.3	0.0	0.3	6.0	1.0	6.3	0.0
Endocladia	37.3	10.3	6.0	17.0	1.3	3.0	4.7	0.3	0.0	11.7	0.0	0.0	1.7
Silvetia	6.3	0.0	1.3	1.7	0.0	63.0	6.7	5.3	0.0	14.0	0.0	0.0	0.7
Mussels	3.0	2.0	0.0	0.0	0.3	0.0	83.3	0.0	0.0	10.7	0.0	0.0	0.7

Table 98. Photoplot summary. Mean percent cover by zone at Middle West, Anacapa Island, fall 2005. (5 plots/zone).

Zone Name	Bare Rock	Barnacle	Tetracrita	Endocladia	Hesperophycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc. Algae	Misc. Animal	Tar	Unscorable
Barnacle	39.0	15.0	0.2	14.6	0.0	0.0	2.4	1.0	0.0	27.8	0.0	0.0	0.0
Endocladia	30.2	8.8	0.4	17.4	0.0	0.0	17.6	0.2	0.4	24.0	0.8	0.0	0.2
Silvetia	11.8	4.6	1.2	5.0	0.0	47.8	1.0	3.0	0.0	25.0	0.6	0.0	0.0
Mussels	6.6	0.4	1.6	0.2	0.0	0.0	77.0	0.0	0.2	13.4	0.6	0.0	0.0

14 December, South Frenchy's Cove. Low tide -0.9 ft at 1520. Excellent conditions again today with very light wind and waves. The sand level at south Frenchy's was very high. There was only one Say's Phoebe catching flies in the back beach and one Oystercatcher flying around. One harbor seal was watching us offshore. We were at the site from 1130 to 1630 hrs.

The SWAT crew finished all of the biodiversity transects. I finished the motile invert counts and photographed and scored the plots. Since they finished first, the SWAT crew measured *Lottia gigantea* for me in the plots. Due to the late hour, we did not try to go back to Middle Anacapa to count and measure *Pisaster*. I did kayak over to the sites at Middle earlier this morning to get GPS numbers for the ends of the site areas. I did not do a seastar/abalone search but the biodiversity transects were searched and eight *Pisaster ochraceus* were found, no abalone. No seastars were apparent in the usual reef area, they were all down in the channels and often well hidden.

Littorina snails and limpets were not very common. A fair number of snails were common in the *Mytilus* plots. *Nucella emarginata* were most common, followed by *Acanthina* sp. and a few *Ocenebra* spp. A total of 39 *Lottia gigantea* were found in the three plots ranging in size from 13 to 58 mm.

I did not find any plot corners for plot 266 but shot the photo where I thought it should be and was almost right on when compared to previous years.

We returned to Santa Barbara harbor about 1945 hrs and I got back to Ventura at 2100 hrs.

Table 99. Photoplot summary. Mean percent cover by zone at South Frenchy's Cove, Anacapa Island, fall 2005. (5 plots/zone).

Zone Name	Bare Rock	Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silv-etia	Mussels	Turf-weed	Leaf Barnacle	Misc. Algae	Misc. Animal	Tar
Barnacle	13.8	70.2	0.0	12.8	1.0	0.0	0.0	0.0	0.0	1.2	0.4	0.6
Endocladia	10.6	6.6	0.0	64.4	0.4	15.8	0.0	0.0	0.0	1.8	0.2	0.2
Silvetia	8.8	8.2	0.0	3.2	0.0	49.6	18.8	1.0	0.0	9.4	1.0	0.0
Mussels	3.4	0.4	0.2	0.0	0.0	0.0	77.4	4.0	0.2	10.4	4.0	0.0

Table 100. *Lottia gigantea* at South Frenchy's Cove, Anacapa Island, fall 2005.

Plot	Density	Count	Sized	Mean Size	St. Dev.	Min. Size	Max. Size
1	3.502	11		39.64	18.62	13	62
2	6.367	20		30.85	13.33	14	51
3	2.547	8		41.88	15.73	16	56

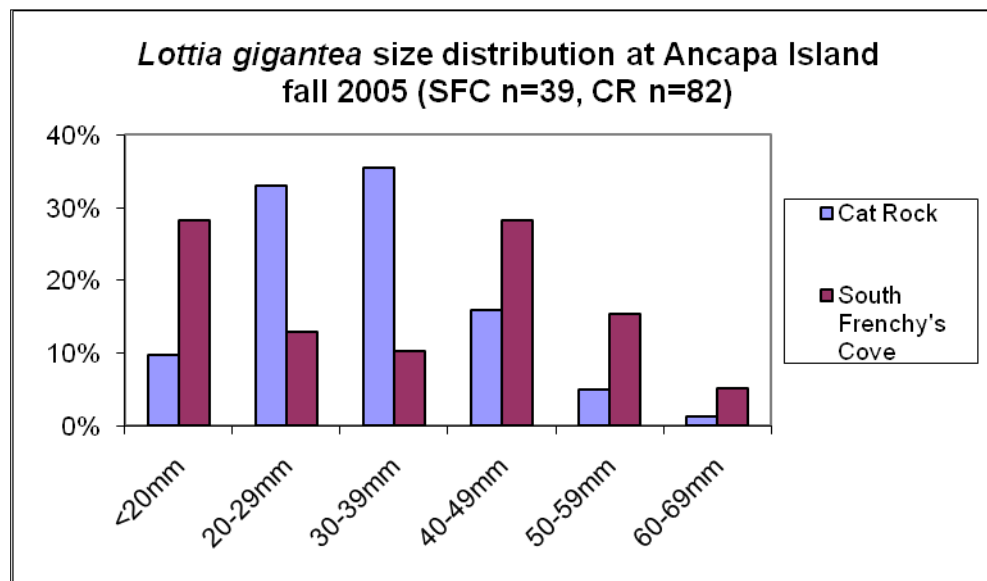


Figure 37. *Lottia gigantea* distribution at Cat Rock and South Frenchy's Cove, Anacapa Island, fall 2005.

Table 101. Size frequency measurements (mm) of selected motile invertebrates at Cat Rock, Anacapa Island, fall 2005.

	<i>Nucella emarginata</i>	<i>Acanthina</i> spp.	<i>Tegula funebris</i>	<i>Ocenebra circumtexta</i>	<i>Lottia gigantea</i>
mean		16		12	37
St. dev.		2		3	15
min	0	12	23	3	23
max	0	21	23	18	58
count	0	32	1	55	7

Table 102. Motile invertebrate counts at Cat Rock, Anacapa Island, fall 2005.

zone	totals	Barnacle zone										Endocladia zone									
plot #		33	37	135	31	35	38	32	36	39	212	14	51	54	13	467	52	53	19		
Lepidochitona spp.	56	2	6	1		1		2			8	2	1	2	2	2	6	1			
Nuttalina spp.	357										6	31	8	32	7	20	26	10			
Fissurella volcano	26										3	2	2	2	2	2	9				
Pachygrapsus	20	1	1			1					1	2		1			2	2			
Pagurus spp.	0																				
large limpets(>15mm)	46	4	2			1		1	1			1				2		1	2		
S. purpuratus	0																				
Amphissa versicolor	0																				
Nucella emarginata	0																				
Acanthina spp.	37	1	1		3	2		1	1												
Tegula funebris	1		1																		
Ceratostoma nuttali	0																				
Ocenebra circumtexta	57											8		3		2	3				
Lottia gigantea	44											2			2	2		1			
Mopalia sp.	4										1			1	1			1			
Littorina spp.	1643	13	9	nc	81	109	325	263	25	128	0	16	0	0	56	0	0	31	0		
subsample 1		1	2		20	24	1	10	0	0	0		0	0	15	0	0	10			
subsample 2		2	1		2	11	8	11	0	16	0		0	0	0	0	0	0			
subsample 3		1	0		4	0	17	0	8	25	0		0	0	3	0	0	0			
Limpet < 5 mm	294	0	0	0	0	0	0	0	0	0	16	28	84	16	53	0	72	16	0		
subsample 1		0	0	0	0	0	0	0	0	0	1	4	9	1	6	0	8	2			
subsample 2		0	0	0	0	0	0	0	0	0	2	2	16	2	5	0	11	2			
subsample 3		0	0	0	0	0	0	0	0	0	2	3	2	2	6	0	4	1			
Limpet 5-15 mm	1926	3	25	19	0	3	22	0	16	3	38	28	47	38	34	56	16	13	5		
subsample 1		0	7	0	0	0	3	0	1	0	4	2	11	4	3	11	3	3			
subsample 2		0	0	0	0	0	3	0	2	1	4	3	4	4	3	3	2	1			
subsample 3		1	1	6	0	1	1	0	2	0	4	4	0	4	5	4	0	0			

zone	Silvetia										Mytilus									
plot #	2	55/7	9	3	5	6	4	8	10	56	471	164	470	204	468	203	473	472		
Lepidochitona spp.	1	2	1		2		1			3	3		1			5	1			
Nuttalina spp.		5			2	1				40	13	20	33	7	37	24	15	20		
Fissurella volcano					1						1				2					
Pachygrapsus				1	1	2		1		2				1	1					
Pagurus spp.																				
large limpets(>15mm)	5		1	1	3	1	7	2	2		2	2	1				4			
S. purpuratus																				
Amphissa versicolor																				
Nucella emarginata																				
Acanthina spp.			13	3		3	1	6	2											
Tegula funebris																				
Ceratostoma nuttali																				
Ocenebra circumtexta					5					4	1	5	2	3	2	7	6	6		
Lottia gigantea										6	4	6	15		2	2	2			

Mopalia sp.																		
Littorina spp.	70	263	3	197	9	6	19	0	1	0	6	3	3	0	0	3	3	0
<i>subsample 1</i>		8		14	3	2	6	0		0	2	0	0	0	0	0	0	0
<i>subsample 2</i>		8		36	0	0	0	0		0	0	0	0	0	0	1	0	0
<i>subsample 3</i>		5		13	0	0	0	0		0	0	1	1	0	0	0	1	0
Limpet < 5 mm	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
<i>subsample 1</i>		0		0	0	0	0	0		0	0	0	0	0	0	1	0	0
<i>subsample 2</i>		2		0	0	0	0	0		0	0	0	0	0	0	0	0	0
<i>subsample 3</i>		0		0	0	0	0	0		0	0	0	0	0	0	0	0	0
Limpet 5-15 mm	16	119	20	50	88	41	19	28	7	225	91	100	213	66	109	100	113	159
<i>subsample 1</i>		8		5	2	5	2	2		7	7	10	7	5	10	14	13	19
<i>subsample 2</i>		21		4	15	6	2	4		6	10	10	5	6	15	11	12	16
<i>subsample 3</i>		9		7	11	2	2	3		5	12	12	5	10	10	7	11	16

Table 103. Size frequency measurements (mm) of selected motile invertebrates at South Frenchy's Cove, fall 2005.

	<i>Nucella emarginata</i>	<i>Acanthina</i> spp.	<i>Tegula funebris</i>	<i>Ocenebra</i> spp.	<i>Lottia gigantea</i>
mean	19.4	15.1		13.6	13.7
stddev	3.2	2.3		2.4	1.5
min	11	11	28	9	12
max	25	19	28	17	15
count	52	35	1	8	3

Table 104. Motile invertebrate counts at Cat Rock, fall 2005.

	zone		Barnacle					Endocladia			
	plot #	249	250	251	252	253	154	155	256	257	258
Lepidochitona spp.										1	
Nuttalina spp.											
Fissurella volcano											
Pachygrapsis					1				1		
Pagurus spp.											
large limpets(>15mm)											
S. purpuratus											
Nucella emarginata											
Acanthina spp.						2					
Tegula funebris											
Ocenebra spp.											
Lottia gigantea											
Epitonium tinctum											
Petrolisthes sp.											
Mopalia muscosa											
Littorina spp.		413	263	450	163	363	25	88	0	0	0
subsample 1		7	2	3	6	11	2	4	0	0	
subsample 2		24	9	18	5	14	0	3	0	0	
subsample 3		2	10	15	2	4	0	0	0	0	
Limpet < 5 mm		0	0	0	13	0	13	0	0	0	0
subsample 1		0	0	0	0	0	0	0	0	0	
subsample 2		0	0	0	0	0	0	0	0	0	
subsample 3		0	0	0	1	0	1	0	0	0	
Limpet 5-15 mm		0	0	0	25	0	0	0	0	0	11
subsample 1		0	0	0	1	0	0	0	0	0	
subsample 2		0	0	0	0	0	0	0	0	0	
subsample 3		0	0	0	1	0	0	0	0	0	

zone	<i>Silvetia</i>					<i>Mytilus</i>					
plot #	<u>259</u>	<u>260</u>	<u>261</u>	<u>262</u>	<u>263</u>	<u>201</u>	<u>202</u>	<u>264</u>	<u>265</u>	<u>266</u>	<u>total</u>
Lepidochitona spp.	3	3									7
Nuttalina spp.		1				4	1	1	1	3	11
Fissurella volcano					1	3	3		1	1	9
Pachygrapsis	1	4			1	1		3	5	3	20
Pagurus spp.							5				5
large limpets(>15mm)	1	2	1	2	5				1		12
<i>S. purpuratus</i>											0
<i>Nucella emarginata</i>					1	11	7	9	17	14	59
<i>Acanthina</i> spp.	11	3	2		2	3	2			10	35
<i>Tegula funebris</i>	1										1
<i>Ocenebra</i> spp.								6	2		8
<i>Lottia gigantea</i>							3				3
<i>Epitonium tinctorum</i>									1		1
<i>Petrolisthes</i> sp.						1					
<i>Mopalia muscosa</i>					1						
<i>Littorina</i> spp.	0	0	0	0	0	0	0	0	0	0	1763
subsample 1				0		0	0	0	0	0	
subsample 2				0		0	0	0	0	0	
subsample 3				0		0	0	0	0	0	
Limpet < 5 mm	0	0	0	0	1	13	0	6	0	19	64
subsample 1				0		1	0	0	0	1	
subsample 2				0		0	0	2	0	2	
subsample 3				0		3	0	0	0	3	
Limpet 5-15 mm	10	8	2	50	22	91	103	66	59	191	637
subsample 1				3		8	9	5	6	13	
subsample 2				6		11	17	8	3	33	
subsample 3				7		10	7	8	10	15	

Table 105. Size frequency measurements (mm) of selected motile invertebrates at Middle West, Anacapa Island, fall 2005.

	<i>Nucella emarginata</i>	<i>Acanthina</i> spp.	<i>Ocenebra circumtexta</i>	<i>Lottia gigantea</i>
count	35	68	49	20
min	5	9	5	18
max	29	20	17	42
mean	18	15	12	27.3
stdev	5	3	2	6.2

Table 106. Motile invertebrate counts at Middle-West, Anacapa Island, fall 2005.

zone		Barnacle zone					Endocladia zone				
	plot #	<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>
Lepidochitona spp.		1	1		1	3			1		
Nuttalina spp.			2	1		4	1	1	1		
Fissurella volcano											
Pachygrapsus			4		2	2	1	2	3	1	2
Pagurus spp.									4		
large limpets(>15mm)				1	1	2			2	1	
S. purpuratus											
Pisaster ochraceus											
Nucella emarginata			3						1		
Acanthina spp.			2	3	2	4	1	9	8	3	1
Tegula funebris											
Ocenebra spp.			1				8	3	1		
Lottia gigantea			1				1	5			
Amphissa versicolor											
Littorina spp.		147	19	3	3	16	0	6	0	25	66
subsample1		10	6	1	1	0	0	2	0	0	8
subsample2		19	0	0	0	5	0	0	0	2	4
subsample3		18	0	0	0	0	0	0	0	6	9
Limpet < 5 mm		0	44	0	0	13	9	0	13	0	0
subsample1		0	3	0	0	2	1	0	0	0	0
subsample2		0	6	0	0	2	1	0	1	0	0
subsample3		0	5	0	0	0	1	0	3	0	0
Limpet 5-15 mm		44	78	31	13	94	141	163	119	38	9
subsample1		5	11	8	3	14	14	8	12	9	0
subsample2		4	7	1	0	5	7	3	13	1	1
subsample3		5	7	1	1	11	24	2	13	2	2

zone		Silvetia zone					Mytilus zone					
	plot #	<u>452</u>	<u>453</u>	<u>454</u>	<u>455</u>	<u>456</u>	<u>462</u>	<u>463</u>	<u>464</u>	<u>465</u>	<u>466</u>	<u>total</u>
Lepidochitona spp.	1				2	2						12
Nuttalina spp.					2	6	1	4	3			26
Fissurella volcano						2	1	1				4
Pachygrapsus	31	3	1	2	2	2				2		60
Pagurus spp.								3				7
large limpets(>15mm)	1	3			10	11				2	11	45
S. purpuratus												0
Pisaster ochraceus												0
Nucella emarginata							12	11	1	8	1	37
Acanthina spp.	9	1	1	1	7	11	5	2				70
Tegula funebris												0

Ocenebra spp.				7	3	5	4	8	7	4	51
Lottia gigantea	2	1			1	1	5	1	2		20
Amphissa versicolor									2	2	4
Littorina spp.	9	0	0	0	0	no count	no count	no count	no count	no count	294
subsample1	0	0		0	0						
subsample2	0	0		0	0						
subsample3	3	0		0	0						
Limpet < 5 mm	3	9	0	3	19	no count	no count	no count	no count	no count	113
subsample1	0	2		0	0						
subsample2	1	1		0	5						
subsample3	0	0		1	1						
Limpet 5-15 mm	56	16	24	97	72	no count	no count	no count	no count	no count	993
subsample1	14	2		6	6						
subsample2	0	2		6	8						
subsample3	4	1		19	9						

Santa Rosa Island, January 10-18, 2006

(Database event #2005-J)

Purpose: To monitor rocky intertidal sites at Santa Rosa Island, conduct beachwalk sampling and count snowy plovers.

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

Procedure and general observations: The NPS vessel *Ocean Ranger* delivered us to the island about 1100 hrs. on 10 January. I returned on the *Sea Ranger* on the 18th. Standard procedures were used for monitoring the rocky intertidal sites. All plots and site overviews were photographed with an Olympus C-5050 digital camera. Owl limpets, *Lottia gigantea*, were measured in one-meter radius circle plots. Black abalone, *Haliotis cracherodii* and seastars, *Pisaster ochraceus* were counted and measured at all sites. The maximum number of shorebirds and pinnipeds seen at any one time was recorded. Surfgrass cover was determined on 10-m point-intercept transects monitored at Northwest-Talcott and East Point. Plots were scored in the field when time allowed. Major beaches were surveyed for wintering western snowy plovers. Beachwalk procedures for carcass surveys were followed when possible but had to be modified because of the elephant seals breeding on many of the beaches. I removed the temperature logger and housing from the Johnson's Lee and Northwest-Talcott sites as PISCO is monitoring sea temperatures in other ways now. A Garmin *etrex* GPS was used to collect location coordinates from various points to show the spatial extent of each monitoring site for MARINE.

RESULTS: I counted snowy plovers on Skunk Point area Rocks beaches, Water Canyon, Arlington, Soledad West, Sandy Point, Bee Rock beaches, China Camp, Cluster Point, Ford Point and Mud Tank finding a total of .218 snowy plovers. Beach walk surveys were done on each of those beaches as far as possible with all the elephant seals present.

Elephant seals were numerous, especially on the southwest beaches. Only Arlington and Soledad West did not have pups.

Conditions were generally very good for the intertidal surveys and all the monitoring was completed. I found a total of 23 black abalone within site boundaries (all sites) and an additional 37 adjacent to Fossil Reef. A total of 487 owl limpets were measured in plots at the four sites with limpet plots. Surfgrass cover was high in the transects at Northwest-Talcott and East Point. Seastars, *Pisaster ochraceus*, were abundant at all sites except Northwest-Talcott. Otherwise the intertidal community seemed to be doing well, no big changes were noted. Rock breakage and movement was apparent at Ford Point and Northwest-Talcott.

10 January, Johnson's Lee. Low tide -0.6 ft at 1410 hrs. Conditions were excellent. The sky was clear and the wind and surge were light with no trace of the large waves pounding the north side of the island and Bechers Bay. Water temperature was 14°C. The sand level was very high, covering the cobble behind the site and burying plot 504 under 8-14 cm of sand. There was one bull elephant seal on the sand and there was another just offshore. There were about 30 Western Gulls at the site when I arrived and there were two black Oystercatchers. I was on site from 1330-1730 hrs.

I measured a total of 107 *Lottia gigantea* in the plots. There were none in plot 595. Sizes ranged from 13-91 mm. I found five black abalone ranging from 90-177 mm that were in approximately the same positions as last spring. I counted *Pisaster ochraceus* in the three zones covering the entire reef, finding 109, 286 and 141 respectively. Five *P. giganteus* were found. There were 54 *P. ochraceus* in the 10x2 m transect. A total of 74 *P. ochraceus* were measured with a range of sizes from 25-130 mm.

There were no problems shooting the photos. I field-scored the *Mytilus* zone plots but there wasn't time before sunset to score any others. Plot 512 was the only one not dominated by *Phragmatopoma*. Except for the barnacle plot 504 being completely buried by sand, everything looked pretty normal. *Endocladia muricata* looked healthy and had good cover in the most plots. *Balanus glandula* was the dominant barnacle and seemed to have high cover.

Table 107. Photoplot summary. Mean percent cover by zone at Johnson's Lee, Santa Rosa Island, fall 2005 (5 plots/zone).

Zone Name	Bare Rock	Barnacle	Tetracita	Endocladia	Hesperophycus	Silvetia	Mussels	Turfweed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle	56.8	39.4	0.0	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0
Endocladia	47.6	5.4	0.2	33.4	0.0	0.0	11.2	0.0	0.0	0.8	1.2	0.2
Mussels	23.6	0.2	0.4	0.0	0.0	0.0	11.2	11.2	0.4	15.6	37.4	0.0

Table 108. *Haliotis cracherodii* at Johnson's Lee, fall 2005.

Count Sized	Mean Size	St. Dev.	Min. Size	Max. Size
5	124.00	32.93	90	177

Table 109. *Lottia gigantea* at Johnson's Lee, fall 2005.

Plot	Density	Count	Mean Size	St. Dev.	Min. Size	Max. Size
595	0	0				
596	7.004	22	56.91	25.20	21	85
597	4.457	14	30.71	10.40	20	56
598	9.869	31	43.87	24.31	17	91
599	12.735	40	38.15	19.75	13	69

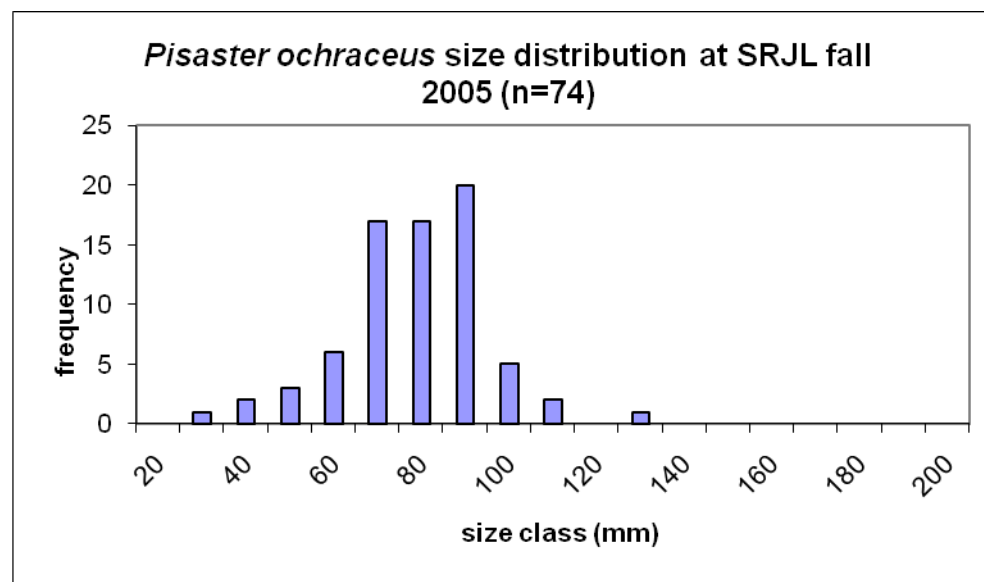


Figure 38. *Pisaster ochraceus* size distribution at Johnson's Lee, Santa Rosa Island, fall 2005.

11 January, China Camp/Cluster Point Beaches, Northwest-Talcott. Low tide -0.8 ft at 1450 hrs. Cold and windy conditions with low fog most of the day, moderate winds and heavy seas. There was a large bull elephant seal on the beach near the access point. The only shorebirds seen were two black oystercatchers. There were several broken rocks in the vicinity of abalone plot 592 and there were even a couple of new boulders up on the surfgrass flat between transects 1 and 2. There was a fair cover of sand in the upper beach zone. I was on site from 1145 to 1630 hrs.

Hundreds of elephant seals were on the beach at China Camp and Cluster Point with many new pups. No count was attempted. No snowy plovers were seen. No carcasses were seen. Two immature bald eagles were spotted perched

on the bluff above the seal aggregations. Along with numerous ravens and gulls, they are apparently after the seal afterbirths which must input a huge amount of nutrients into the ecosystem this time of year for the birds.

I measured 113 *Lottia gigantea* in the plots with sizes ranging from 12-110mm. The limpets just continue to keep growing and this year has been very good to them apparently. I only found one black abalone in a 30-minute search (166 mm). I found only two *Pisaster giganteus* and two *Patiria miniata* (no *P. ochraceus*). In checking the boulder area I found the usual assortment of clingfish, pricklebacks and juvenile monkeyfaced eels. There were also juvenile opaleye and sculpins in the tidepools. Synaptid cucumbers were numerous under one rock, I don't recall finding them before. Cirrolana isopods were common. No octopuses were found. *Ligia occidentalis* were abundant in the upper intertidal.

Surfgrass, mostly *Phyllospadix torreyi*, was doing well with little bleaching apparent. The epiphytic *Enteromorpha* that was so common last spring was gone. Some of the blades were nearly covered with *Melobesia* though. All three transects had high cover of surfgrass. Surfgrass was abundant overall. In the upper intertidal there were large patches of naked rhizomes that appear to have had all the blades torn off by large waves.

Tegula funebris was common but did not seem as abundant as other times. The snails may have moved out because of the influx of sand at the present. *Sargassum muticum* seemed abundant in some areas. *Endocladia* and *Silvetia* were both doing well with moderate cover but healthy looking plants. *Mytilus* cover was good in all the plots. *Pollicipes polymerus* seemed abundant. *Balanus glandula* had good cover. *Mytilus* and *Endocladia* plots were scored in the field. *Neorhodomela larix* was common

Table 110. Photoplot summary. Mean percent cover by zone at Northwest-Talcott, Santa Rosa Island, fall 2005. (5 plots/zone).

Zone Name	Bare Rock	Barnacle	Tetraclytia	Endocladia	Hesperophycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc. Algae	Misc. Animal	Tar
Barnacle	36.0	46.4	0.0	1.6	0.0	14.2	0.4	0.0	0.0	0.6	0.8	0.0
Endocladia	42.0	0.4	0.0	20.2	0.0	17.0	0.0	2.8	0.0	16.2	1.4	0.0
Silvetia	29.0	4.4	0.0	2.6	0.0	58.6	0.0	0.0	0.0	4.6	0.8	0.0
Mussels	20.6	0.0	0.2	0.0	0.0	0.0	45.6	5.6	6.0	19.0	3.0	0.0

Table 111. *Haliotis cracherodii* at Northwest-Talcott, Santa Rosa Island, fall 2005.

Count	Mean Size	Min Size	Max Size
1	66.00	166	166

Table 112. *Lottia gigantea* at Northwest-Talcott, Santa Rosa Island, fall 2005.

Plot	Density	Count	Mean Size	StDev	Min. Size	Max. Size
701	8.596	27	70.70	30.97	14	110
702	8.278	26	65.35	25.95	14	91
703	9.233	29	63.52	17.10	20	88
704	6.049	19	59.63	24.55	12	93
705	3.820	12	50.75	20.56	22	78

Table 113. *Phyllospadix* spp. transects at Northwest-Talcott, Santa Rosa Island, fall 2005.

Location: Northwest-Talcott Site Code: SRNWT			
Date: 11-Jan-06 Recorders: Dan Richards			
Surf Grass Taxa	Transect 1	Transect 2	Transect 3
Rock		1	
Erect coralline		1	

Encrusting coralline		1	
other red algae			19
<i>Phyllospadix</i> sp. overstory.	100	97	81
total	100	100	100

12 January, Bee Rock Beach, Sandy Point Beach, Fossil Reef. Low tide -0.9 ft at 1526 hrs. Conditions were very good with fog coming in and out, light wind and moderate surf. On arrival about 60 cormorants were on the bluff and there were about 30 gulls and 17 black oystercatchers. Later one American oystercatcher joined those remaining at the site. There were three black turnstones, one American pipit and one black phoebe also in the area. One harbor seal and one elephant seal were at the site, but numerous seals were on the beach to the west. I was on site at Fossil Reef from 1230-1700 hrs.

I was on Bee Rock Beach between 0900 and 1000 and there were 216 elephant seals including at least 31 pups. I counted 81 snowy plovers, plus five sanderlings and one American pipit. Two of the snowy plovers had bands (YA:YO and AG:WA). I did not find any carcasses and I saw no live *Arundo donax*. One eagle was seen in silhouette in the sky when I arrived at the beach.

On Sandy Point there were at least 19 pups and about 40-50 adults. I saw no carcasses or snowy plovers. Much of the sand was eroded off the beach exposing more rock than normal though the sand level at the bluff did not look that low. Some *Arundo* sticks were still present in coves and on some sections of beach causing walls where it was holding the sand.

There were at least 200-300 elephant seals on the beach just west of Fossil Reef and about 30 harbor seals were seen; though it appeared more came later on. From the top of the hill I looked down on the beach below Mud Tank at the end of the day and it looked like several hundred harbor seals but they turned out to be elephant seals (see 16 January).

A 30-minute search of the site yielded 12 *Haliotis cracherodii* from 110 to 175 mm. What these abalone are lacking in numbers they are making up for in size. I also measured abalone on the reef just west of the site because the conditions were good. There I found a total of 37 on the reef to the west and measured 19 of those, ranging from 80-155 mm.

I counted 310 *Pisaster ochraceus* in a 30-minute search and also found 8 *P. giganteus*, 4 *Patiria miniata* and one *Pycnopodia helianthoides*. Within the 30 x 6 m transect there were a total of 65 *P. ochraceus*; 24 in the inshore 15m and 41 in the offshore 15m. I measured 61 *P. ochraceus* with a range of 62-145mm,

A total of 201 *Lottia gigantea* were measured in the five plots, with most in just two plots. Sizes ranged from 15-92mm.

Table 114. Photoplot summary. Mean percent cover by zone at Fossil Reef, Santa Rosa Island, fall 2005. (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	49.4	44.8	0.0	0.2	0.0	0.0	0.0	0.0	0.0	2.8	1.6	1.2
Endocladia	24.4	42.6	0.0	16.4	0.6	7.6	0.0	0.0	0.0	7.4	1.0	0.0
Silvetia	24.4	19.0	0.0	7.2	0.0	41.2	0.0	0.0	0.0	7.4	0.8	0.0
Mussels	5.6	5.6	2.6	0.4	0.0	0.0	21.0	13.0	1.8	35.4	14.6	0.0

Table 115. *Haliotis cracherodii* at Fossil Reef, Santa Rosa Island, fall 2005.

Count	Mean Size	StDev	Min. Size	Max. Size
12	137.33	19.38	110	175

Table 116. *Lottia gigantea* at Fossil Reef, Santa Rosa Island, fall 2005.

Plot	Density	Count	Mean Size	StDev	Min. Size	Max. Size
1	1.273	4	60.25	2.63	58	64
2	3.820	12	54.50	6.79	43	69
3	11.461	36	65.81	17.19	20	92
4	23.241	73	48.93	13.86	16	70
5	24.196	76	44.17	15.10	15	76

Though cover in the plots was not particularly high, *Silvetia compressa* seemed to be doing very well with new recruitment on the reef near plots 615 and 616 that have been bare for so long. Most of the plants were large and healthy. As I noticed last spring, *S. compressa* on the upper part of the reef (above plot 605) looks quite different from the *S. compressa* on the lower part of the reef (around plot 617). The upper plants are paler in color and stunted.

Mytilus californianus cover at this site remains low because of sea star predation. The two plots on the higher part of the reef had higher coverage of mussels. Plots on the lower reef were dominated by *Phragmatopoma californica* and *Anthopleura* spp. Some mussel recruitment was occurring but only small mussels were found in this area.

Sargassum muticum was abundant on the main reef flat, while the *Phyllospadix* sp. in that area was mostly abraded or broken off short and mostly bleached. *Tegula funebris* were abundant on the reef flat and *Pagurus* spp. were abundant in *Tegula* shells. While searching for abalone among the cobble and boulders I found *Pachygrapsus crassipes* to be abundant and *Petrolisthes* spp. were abundant under the rocks. *Serpulrobia squamigerous* were abundant. Other species noted as present were *Cancer antenariar*, *Cycloanthops* sp. (a small crab), *Tonicella lineata* and *Cibidichys violaceus*.

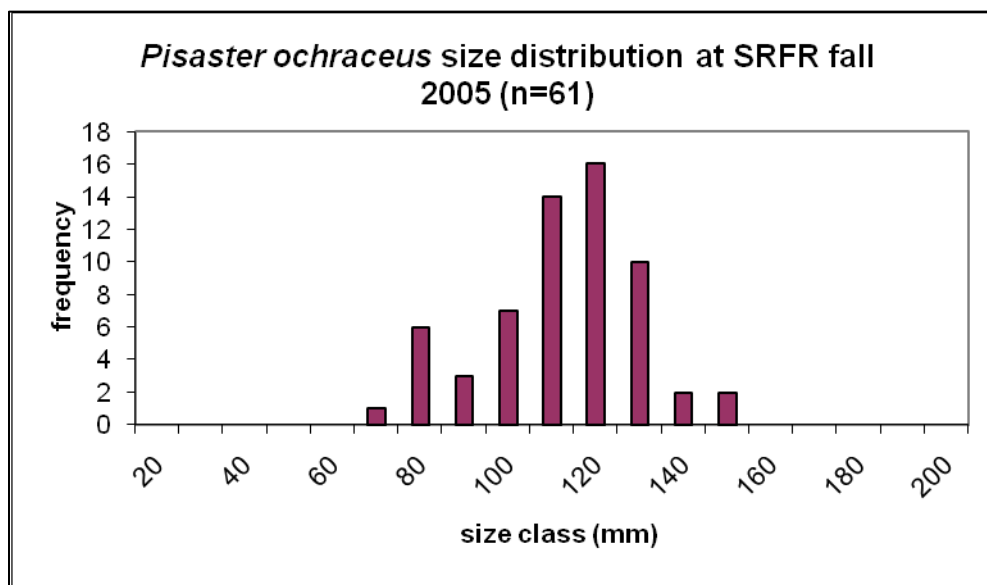


Figure 39. *Pisaster ochraceus* size distribution at Fossil Reef, Santa Rosa Island, fall 2005.

13 January, Skunk Point beaches, East Point. Low tide -0.9 ft at 1558 hrs. Conditions were good with an “on and off” fog and clouds much of the day. The wind was a little brisk but the surge was light. At the intertidal site there were about 45 cormorants, two western gulls and two black oystercatchers. I was on site at East Point from 1145-1630 hrs.

Brent Wilson helped me leave a vehicle at the lagoon and shuttle back to Southeast Anchorage to walk Skunk Point in the morning. From about 0800 to 1100, I walked the point to count snowy plovers. I found 17 western snowy

plovers on the Southeast Anchorage beach and 120 on Skunk Point. There were no plovers on the back side beaches. Additionally, there were over 500 sanderlings, over 200 black-bellied plovers, 20 black oystercatchers, one long-billed curlew, six whimbrel, six western sandpipers, five common ravens, two unidentified sandpipers or dunlins and one American pipit. At the mouth of Old Ranch Creek, there were many birds in or around the lagoon. Birds there included a Tundra Swan (possibly a first record for the island), a Great Blue Heron, two double-crested cormorants, 50 American Coots, 42 American Widgeon, one mallard, 3 ruddy ducks and one pintail. At Old Ranch House Canyon Lagoon, there were four western sandpipers, one black bellied plover and one bull elephant seal.

I was able to score all but the *Mytilus* zone plots in the field. The compact flash card in the camera was not functioning correctly and it turned out that it did not record several of the plots. (I was able to return on 15 January to re-shoot those). I did a 30 minute count for seastars and abalone finding one black abalone (140 mm) and 129 *Pisaster ochraceus* and two *P. giganteus*. Ochre star sizes ranged from 55 to 155 mm.

Phyllospadix spp. were healthy with little bleaching or abrasion overall. Epiphyte cover was low. *Chthamalus fissus/dalli* were the dominant barnacle in the upper intertidal zone and cover was quite high. Only plot 577 was primarily *Balanus glandula* and it had the lowest barnacle cover. *Endocladia muricata* cover was high in most plots. Though *Silvetia compressa* was abundant overall for the site, it had relatively low cover in all but two plots. *Hesperophycus californica* was even lower with both *E. muricata* and barnacles dominating those plots.

Note: David Kushner had found the temperature logger on a nearby beach (about 200 m away) while just walking around in December. It downloaded okay and the data will be sent to UCSB.

Table 117. Photoplot summary. Mean percent cover by zone at East Point, Santa Rosa Island, fall 2005. (5 plots/zone).

Zone Name	Bare Rock	Barnacle	<i>Tetraclita</i>	<i>Endocladia</i>	<i>Hesperophycus</i>	<i>Silvetia</i>	Mussels	Turf-weed	Leaf Barnacle	Misc. Algae	Misc. Animal	Tar
Barnacle	35.4	45.4	0.0	10.6	7.0	0.4	0.0	0.0	0.0	0.6	0.6	0.0
Endocladia	21.0	11.8	0.0	64.4	1.8	0.6	0.0	0.0	0.0	0.4	0.0	0.0
Silvetia	27.2	4.4	0.0	4.2	0.0	50.8	0.0	1.4	0.0	11.8	0.2	0.0
Mussels	3.6	1.2	0.4	0.0	0.0	0.0	73.8	6.0	0.0	12.0	3.0	0.0
<i>Hesperophycus</i>	25.4	40.2	0.0	25.2	7.8	0.8	0.0	0.2	0.0	0.2	0.2	0.0

Table 118. *Haliotis cracherodii* at East Point, Santa Rosa Island, fall 2005.

Count	Mean Size	StDev	Min. Size	Max. Size
1	140.00		140	140

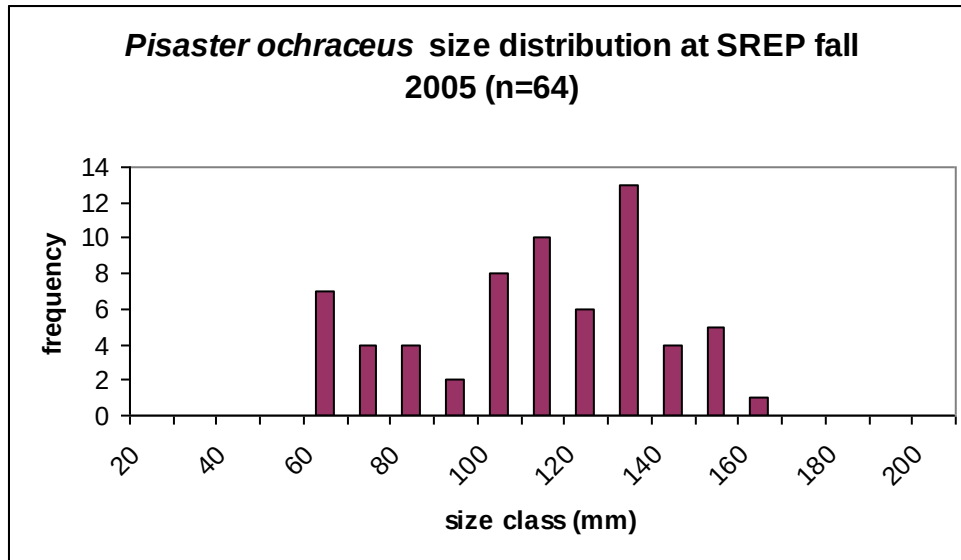


Figure 40. *Pisaster ochraceus* size distribution at East Point, Santa Rosa Island, fall 2005.

Table 119. *Phyllospadix* spp. transects, East Point, Santa Rosa Island, fall 2005.

Location: East Point Site Code: SREP				
Date: 13-Jan-06 Recorders: Dan Richards				
Surf Grass Taxa		Transect 1	Transect 2	Transect 3
Sand			2	4
Erect coralline				1
other red algae			1	3
<i>Phyllospadix</i> sp. overstory		100	97	92
	total	100	100	100

14 January, Ford Point. Low tide -0.8 ft at 1629 hrs. We had rain this morning so I worked on this report and finished labeling images from the past few days. The afternoon had broken clouds and was mostly sunny. There were a few rain squalls going by but they all bypassed Ford Point. Conditions were nice with light wind and only moderate surf which wasn't a problem with the low tide. The only shore birds were six black oystercatchers that kept flying past. I was on site from 1330-1645 hrs.

The site looked good. There had been more rock movement; I think some more of the reef blocks that broke off a year ago have moved out. The section of reef where plot 531 was originally has really changed now with little trace of that section of ridge evident now.

I found a total of 66 *Lottia gigantea* in the five plots. Sizes ranged from 13 to 76 mm. The numbers were about the same as last year. Many small owl limpets are present in plots, especially in plot 604, so hopefully the numbers will come back to what they once were. Large owl limpets are present throughout the site so it seems the declines were not system-wide and overall the population seems okay.

I found four *Haliotis cracherodii* in a 30-minute search with sizes ranging from 135 to 154 mm. One of the large ones was near plot 534 and I recall it being in about the same spot last spring. I found 328 *Pisaster ochraceus* and six *P. giganteus* in the 30-minute search. Because of a general lack of time, no measurements were taken of the seastars.

Ford Point Beach had 47 adult elephant seals and 22 pups that I could see from the bluff. The next beach to the east had another 10 elephant seals on it.

Table 120. Photoplot summary. Mean percent cover by zone at Ford Point, Santa Rosa Island, fall 2005. (5 plots/zone).

Zone Name	Bare Rock	Barnacle	Tetraclitia	Endocladia	Hesperophycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc. Algae	Misc. Animal	Tar
Barnacle	45.2	43.4	0.0	8.0	0.0	0.2	0.0	0.0	0.0	1.0	2.2	0.0
Endocladia	23.0	1.6	0.4	50.6	0.0	0.0	2.8	0.0	0.0	21.0	0.6	0.0
Mussels	26.4	2.8	0.0	0.6	0.0	0.0	30.0	11.8	0.2	24.2	4.0	0.0

Table 121. *Haliotis cracherodii* at Ford Point, Ford Point, Santa Rosa Island, fall 2005.

Count	Mean Size	StDev	Min. Size	Max. Size
4	147.25	9.00	135	154

Table 122. *Lottia gigantea* at Ford Point, Santa Rosa Island, fall 2005.

Plot	Density	Count	Mean Size	StDev	Min. Size	Max. Size
600	2.547	8	44.75	24.31	19	75
601	1.273	4	50.50	22.75	28	76
602	1.592	5	57.60	22.14	23	76
603	4.139	13	29.08	19.56	13	76
604	11.780	37	25.00	14.18	13	65

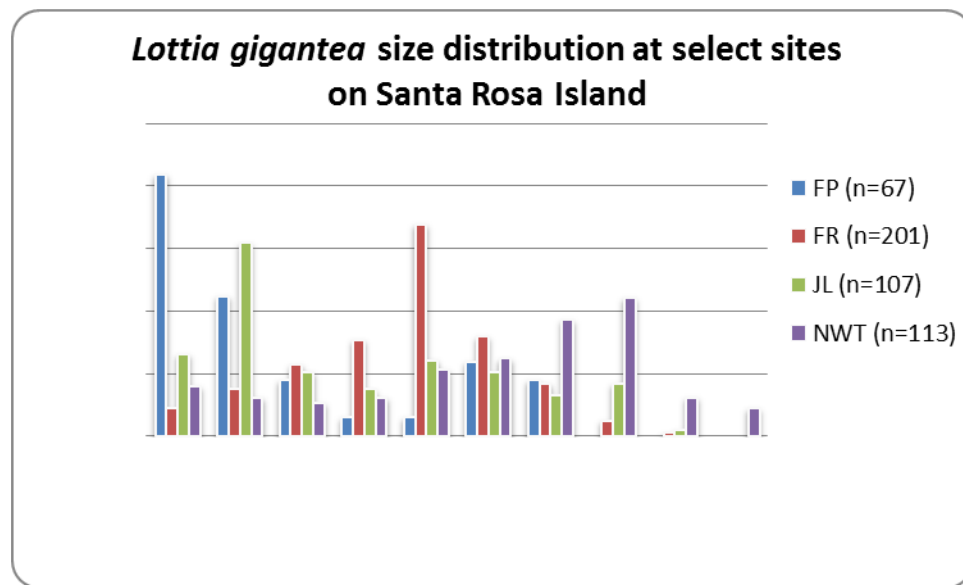


Figure 41. *Lottia gigantea* size distribution at Ford Point, Fossil Reef, Johnson's Lee and Northwest-Talcott, Santa Rosa Island, fall 2005.

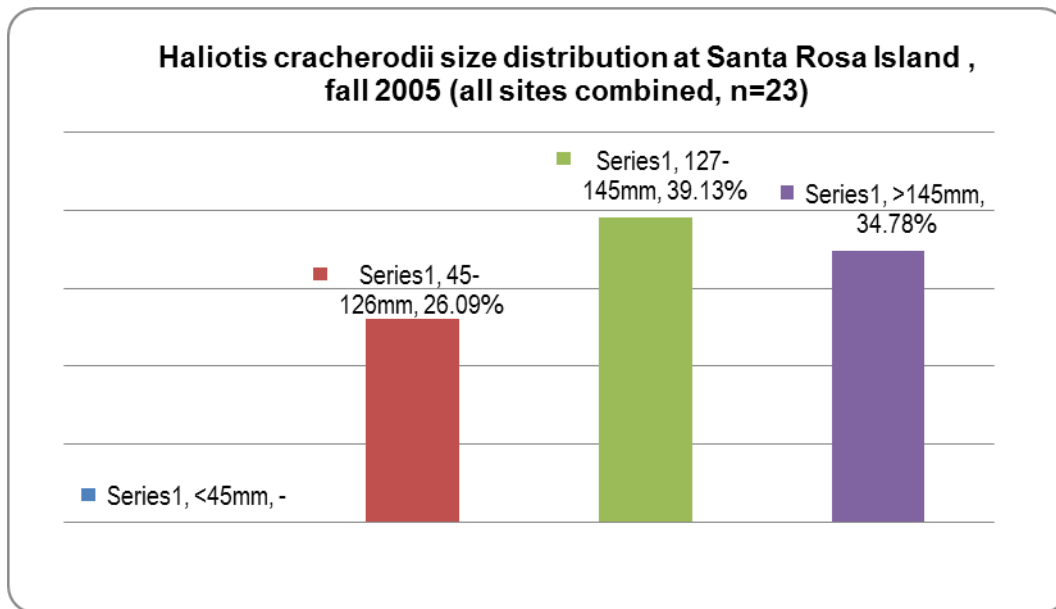


Figure 42. *Haliotis cracherodii* size distribution from all sites (combined) on Santa Rosa Island, fall 2005.

15 January, East Point, Soledad West and Arlington Canyon Beaches. Low tide -0.7 ft at 1658 hrs. It was mostly sunny but very windy and cold. I returned to East Point to re-shoot the photoplots. There were 10 cormorants and five gulls when I arrived. Three black oystercatchers, three black turnstones and 35 sandlerlings were on the reef, trying not to be blown out to sea. There was a Black Brant near the Old Ranch House Canyon Lagoon. I was at the site from 1400 to 1600 hrs.

In the morning I walked Arlington Canyon and Soledad West beaches. I did not find any snowy plovers. At the Arlington lagoon, there were over 100 ducks, mostly mallards with about 20 green-winged teal and five American coots. There were nine elephant seals on the beach and in the lagoon, most were males. On Soledad beach there were two male elephant seals and I found one carcass of a large bull California sea lion.

Except for struggling with the diffuser screen in the wind, the sampling at East Point went fine and the photos came out fine this time. I scored the mussel plots so all the photoplots were field-scored at East Point.

16 January, Mud Tank and Water Canyon Beaches. Low tide -0.4 ft at 1726 hrs.

I checked the beach below Mud Tank on the southwest part of the island between 1030 and 1130 hrs. There were at least 60 elephant seal pups and easily twice that many adult seals on the beach. There were no snowy plovers that I saw. I did see 12 black turnstones on one of the rocky points in the area. I returned to the east end of the island and walked Water Canyon Beach. The beach there had been washed clean by the high tides. One long-billed curlew and one whimbrel were at the north end of the beach

San Miguel Island, January 24-31, 2006

(Database event #2005-K)

Personnel: Dan Richards, Marine Biologist, Channel Islands National Park
Susie Tharratt, Bio-tech, Channel Islands National Park

Procedure and general observations: We flew out on 1/24 departing Camarillo at 1145 hrs. All plots and site overviews were photographed with an Olympus C-5050 digital camera. Owl limpets, *Lottia gigantea*, were measured in one-meter radius circle plots. Black abalone, *Haliotis cracherodii* and seastars, *Pisaster ochraceus* were counted and measured at all sites. The maximum number of shorebirds and pinnipeds seen at any one time was recorded. Plots were scored in the field when time allowed, only plots at Crook Point and Cuyler Harbor were field scored. Otter Harbor and Harris Point photoplots were scored from the digital images in the office. Major beaches were surveyed for wintering western snowy plovers. Beachwalk procedures for carcass surveys were followed when possible but had to be modified because of the elephant seals breeding on many of the beaches. A Garmin etrex GPS was used to collect location coordinates from various points to show the spatial extent of each monitoring site for MARINE.

Results:

We counted snowy plovers on Cardwell Beach, Simonton Cove and east Cuyler Harbor finding a total of two snowy plovers. Beach walk surveys were done on each of those beaches as far as possible with all the elephant seals present. Very few carcasses were found. Shorebirds were not very abundant. Elephant seals were abundant all around the island with new pups on all major beaches

A golden eagle was seen on 1/26 about 1000 hrs near the coast in North Green Mountain Canyon. Cormorants were seen in full breeding plumage and Dr. Robert DeLong confirmed that he had seen Brandt's and Pelagic cormorants sitting on nests.

Conditions were generally very good for the intertidal surveys and all the monitoring was completed. I found a total of 105 black abalone within site boundaries. A total of 391 owl limpets were measured in plots at the two sites with limpet plots. Seastars, *Pisaster ochraceus* were numerous at all sites except Harris Point. Otherwise the intertidal community seemed to be doing well, no big changes were noted.

24 January, Cardwell Point Beach. Low tide 0.3 ft at 1253 hrs. Conditions were excellent. The sky was clear and the wind and surge were light. Santa Ana conditions were making the mainland windy but resulting in nearly calm conditions on the island. Hundreds of elephant seals were on the beach with many pups of all ages. No snowy plovers were seen. Western gulls were common waiting to feed on placentas with each elephant seal birth. At least two black oystercatchers were seen on the rocky point and surf scoters were present offshore.

25 January, Crook Point. Low tide -0.3 ft at 1332 hrs. Conditions were very good with light surge and calm wind. The sky was mostly overcast all day with low clouds and fog. About 30 cormorants (mostly pelagic but also some double-crested) were present on the bench when we arrived. There were also two western gulls, six black oystercatchers and two black turnstones on the reef. We were on site from 1015 to 1630 hrs. Hiking to and from the site took about an hour and a half each way.

We worked together, with Susie learning our methods. She shot the photos and then we both searched for abalone and seastars. We found 119 *Pisaster ochraceus*, no other species of large stars (*Leptasterias hexactis* were found). Most were medium sized with sizes ranging from 40 to 130 mm. There were 12 *P. ochraceus* in the five abalone plots. One small black abalone (62mm) was in plot 394. In thirty minutes we found a total of 24 black abalone ranging in size from 62 to 151 mm. Four could not be measured. There were three groups (within one meter of others) of six, two and four abalone.

Photoplots were all field-scored by Dan. Young rockweeds were present but most appeared to be *Hesperophycus californicus*. *Silvetia compressa* was rare and only made up a couple of points in all the plots. *Hesperophycus californicus* was a little more common in the Endocladia zone. *Balanus glandula* were fairly abundant with high

cover in most barnacle plots. *Mytilus californianus* was abundant with very high cover in several plots including 94% cover in plot 397, a rockweed plot. *Endocladia muricata* was common overall but only about 20% cover in the Endocladia zone plots. *Analipus japonicus* was present in many areas of the reef though all the plants were small; it is a northern species found only at Crook Point. Several *Tonicella lineata*, the lined chiton, were found. *Laminaria setchelli* was common in the low zones. The highest rocks had a long thin *Porphyra* sp. growing there. *Chondracanthus canaliculatus* was common but it was all bleached to a pink color. *Phragmatopoma californica* was abundant and growing over abalone plots 391, 392 and 393. Plot corner repairs were made where needed.

Table 123. Photoplot summary. Mean percent cover by zone at Crook Point, San Miguel Island, fall 2005. (5 plots/zone).

Zone Name	Bare Rock	Barnacle	Tetracclita	Endocladia	Hesperophycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc. Algae	Misc. Animal	Tar
Barnacle	44.6	50.6	0.0	3.6	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0
Endocladia	35.8	12.0	1.6	19.6	5.4	0.0	12.4	0.0	0.2	11.6	1.4	0.0
Silvetia	28.8	10.6	0.2	16.4	2.0	0.4	28.2	2.0	1.0	10.2	0.2	0.0
Mussels	13.0	0.6	0.4	0.0	0.0	0.0	73.4	0.4	1.4	10.0	0.8	0.0

Table 124. *Haliotis cracherodii* at Crook Point, San Miguel Island, fall 2005.

Count (random)	Mean Size	StDev	Min. Size	Max. Size
24	109.57	21.22	62	151

Table 125. *Pisaster ochraceus* at Crook Point, San Miguel Island, fall 2005.

Count	Mean Size	StDev	Min. Size	Max. Size
74	85	23	40	130

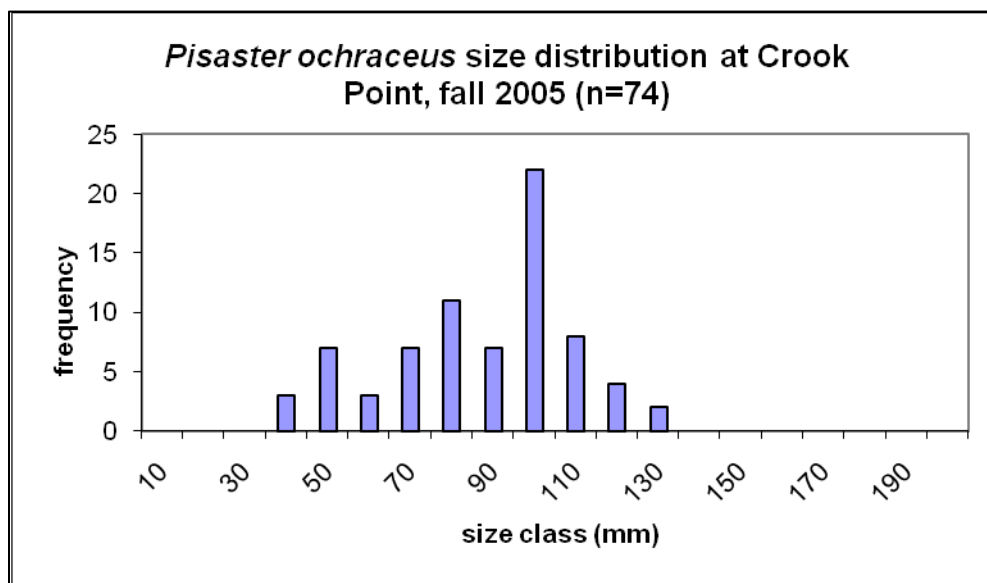


Figure 43. *Pisaster ochraceus* size distribution at Crook Point, San Miguel Island, fall 2005.

26 January, Otter Harbor. Low tide -0.6 at 1416 hrs. Water temperature 13°C. Conditions were very good with light wind until around 1500 hrs when the cold front passed over and wind came up and temperature dropped. The seas were calm but there was a substantial long-period swell. On the site, there were 19 harbor seals, one elephant seal, six black oystercatchers, one American oystercatcher and two western gulls. To the east, while approaching the site there another 20 harbor seals, 15 black oystercatchers, two willets and one wandering tattler. There were five

new elephant seal pups on the beach to the east of the site with about eight adults. The hiking took about 2.5 hours each way. We were on site from 1050 to 1600 hrs.

Rockweeds in general were not particularly abundant and *Hesperophycus californicus* was a little more common than *Silvetia compressa*. Plants of both species seemed small. *Mytilus californianus* were not particularly dense. Some recruitment was seen with small mussels noticed growing in *Lottia* plots. *Septifer/Brachydontes* were present in the plots. *Endocladia muricata* was lush and abundant throughout the site. *Balanus* was abundant in most areas of the upper intertidal. The slope including plots 374 and 365 was all covered by red algae, primarily *Mastocarpus papillatus*, *Mazzaella affinis* and *Chondracanthus canaliculatus* with some coralline crust and petrocellis stage crusts. *Leptasterias hexactis* were common and *Nuttalina* sp. were abundant. *Phragmatopoma californica* was abundant especially in the area around abalone plot 366.

We measured a total of 192 *Lottia gigantea* in the plots, a slight increase over last year, with sizes ranging from 12-75 mm and most under 50 mm long. In a 45 minute search I found 80 *Haliotis cracherodii* ranging in size from 34 to 147 mm. One small black abalone was in plot 366. Only three were solitary, the rest were in 13 groups of 2 to 27 within one meter of others. Susie found a total of 62 *Pisaster ochraceus* and six *P. giganteus* in a 30 minute search. Most of the stars were over 150 mm radius. Plot corner repairs were made.

Table 126. Photoplot summary. Mean percent cover by zone at Otter Harbor, San Miguel Island, fall 2005. (5 plots/zone).

Zone Name	Bare Rock	Barnacle	Tetraclitia	Endocladia	Hesperophycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc. Algae	Misc. Animal	Tar
Barnacle	25.8	41.6	0.0	0.0	0.0	0.0	0.0	3.2	0.0	26.4	0.6	2.4
Endocladia	22.2	6.2	1.4	42.6	0.0	8.0	1.4	0.0	0.4	17.4	0.4	0.0
Silvetia	31.0	26.6	0.0	13.6	0.0	11.0	0.0	0.0	0.2	16.2	0.6	0.8
Mussels	23.8	0.6	0.2	1.0	0.0	0.2	48.2	0.0	6.0	18.4	1.6	0.0

Table 127. *Haliotis cracherodii* at Otter Harbor, San Miguel Island, fall 2005.

Count (Random)	Mean Size	StDev	Min. Size	Max. Size
79	83.24	32.55	34	147

Table 128. *Lottia gigantea* at Otter Harbor, San Miguel Island, fall 2005.

Plot	Count	Density	Mean Size	StDev	Min. Size	Max. Size
1	36	11.461	28.17	10.35	12	54
2	40	12.735	37.43	15.37	14	75
3	43	13.690	34.70	12.40	16	67
4	34	10.825	27.12	13.17	14	62
5	39	12.416	35.03	12.36	17	67

Table 129. *Pisaster ochraceus* at Otter Harbor, San Miguel Island, fall 2005.

Count	Mean Size	StDev	Min. Size	Max. Size
49	133	24	70	175

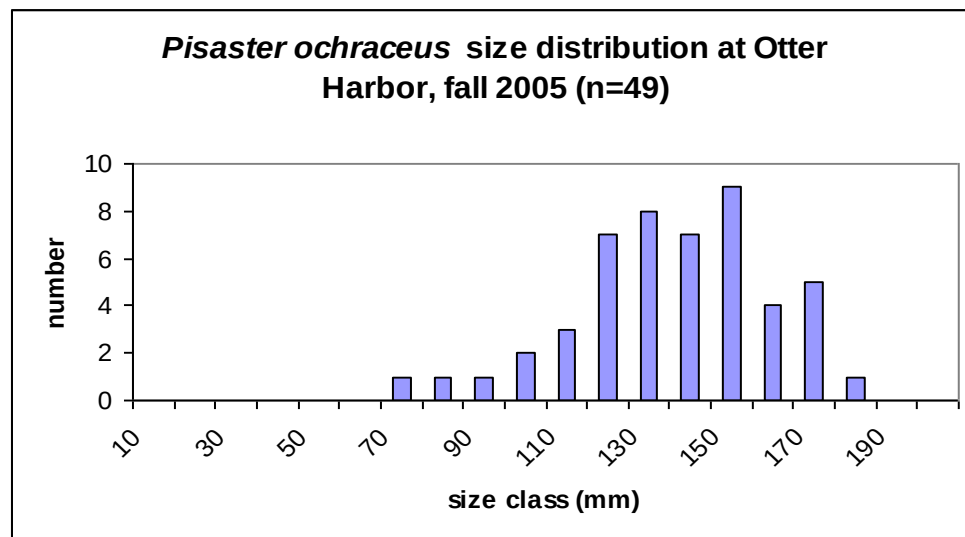


Figure 44. *Pisaster ochraceus* size distribution at Otter Harbor, San Miguel Island, fall 2005.

27 January, Harris Point. Low tide -1.4 ft at 1454 hrs. Conditions were generally good but cold and windy. Surge was only moderate, the sky was clear. Water temperature was 12°C. There were six harbor seals at the site and seven black oystercatchers. We were on site from 1300 to 1630 hrs.

We surveyed north Simonton Beach from 1100 to 1230 hrs. On the beach there were 11 black oystercatchers, 10 western gulls, 10 common ravens, four black turnstones, about 15 song sparrows, 53 adult and 19 new pup elephant seals. There was one partial mummified unidentified gull and decomposing and scavenged carcasses of an elephant seal pup, a harbor seal adult and an immature California sea lion. There was also a skull, partial skeleton and hide of another unidentified pinniped, but photos were taken. There was still a considerable amount of wood debris on the beach. The debris included both tree trunks and *Arundo Donax* sticks. We hauled one piece of trawl net up into the dunes (away from the pinnipeds) but otherwise most of the debris as unremarkable.

We found at least 15 black abalone with sizes ranging from 70-146 mm. One was present in plot 443. There were two groups of two and a group of four (within one meter of each other), the rest were solitary. Three small red abalone shells were found. The only *Pisaster ochraceus* within the site boundary were the four large ones in the crevice transect. There were four *P. giganteus* and 24 *Patiria miniata*. We both measured owl limpets in the plots. There was a total of 199 *Lottia gigantea*, slightly more than last year, with sizes ranging from 10 to 78 mm. Most were less than 50mm.

Endocladia muricata was common. *Hesperophycus californicus* was common but all the plants were small; mostly less than 5 cm long. *Balanus glandula* was dense with nearly 100% cover in areas. *Chthamalus* sp. was rare. *Mytilus californianus* was common but cover was low in most of the photoplots. No noticeable change in the tar from previous visits was noted. While turning rocks looking for juvenile abalone, I found juvenile *Cibidichthys violaceus* (monkeyface eels) to be common. *Cirrolana* sp. isopods were abundant and I found several sipunculids under the rocks. *Petalochonchus* sp. tubes were very common and very dense. Some *Serpulorbis squamigerous* were present. *Costaria costata*, an unusual kelp at the islands, was present below abalone plot 444, as it was last year. *Mastocarpus papillatus*, *Mazzaella affinis* and *Chondracanthus canaliculatus* dominated the lower rocks around the abalone plots. Red sponge was common in the area also. Several large chitons including *Mopalia muscosa* and others unidentified were found. Missing corners were minor, but repairs were not made.

Table 130. Photoplot summary – mean percent cover by zone at Harris Point, San Miguel Island, fall 2005(5 plots/zone).

Zone Name	Bare Rock	Barnacle	Tetraclita	Endo-cladia	Hesperophycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc. Algae	Misc. Animal	Tar
Chthamalus/Balanus (Barnacle)	14.4	80.4	0.0	3.0	0.0	0.0	0.2	0.0	0.0	1.2	0.0	0.8
Endocladia	12.0	22.6	0.0	37.0	18.4	0.0	1.8	0.0	0.0	8.2	0.0	0.0
Mussels	24.2	8.4	1.0	3.2	3.0	0.0	41.8	0.0	1.0	16.4	0.6	0.4
Tetraclita	13.6	2.8	12.6	3.2	0.0	0.0	21.2	2.4	0.0	42.6	1.6	0.0
Hesperophycus	11.4	10.4	0.0	20.0	48.6	0.0	0.0	0.0	0.0	8.8	0.6	0.2

Table 131. *Haliotis cracherodii* at Harris Point, fall 2005.

CountRandom	MeanSize	StDev	MinSize	MaxSize
15	119.46	20.71	70	146

Table 132. *Lottia gigantea* at Harris Point, fall 2005.

Plot	Count	Density	MeanSize	StDev	MinSize	MaxSize
1	8	2.547	33.88	9.33	24	51
2	25	7.959	42.84	14.11	18	67
3	66	21.012	34.50	10.42	10	63
4	68	21.649	28.97	7.50	14	44
5	32	10.188	49.53	17.47	19	78

28 January, Cuyler Harbor. Low tide -1.6 ft at 1532 hrs. Conditions were mostly clear with high clouds but it was cold and windy. Conditions were generally good because of the extreme low tide and despite the heavy surf and wind, we were not getting sprayed. Water temperature was 13°C. There were three black oystercatchers at the site. We surveyed Cuyler Beach on the way out and saw three dead elephant seal pups. We did not make a count of living seals but estimated 150-200 seals. There were two snowy plovers at the east end with the elephant seals there. By the middle rocks there were six Whimbrels, one black oystercatcher, one black turnstone and about 60 gulls (western and herring). We were on site from 1300-1715 hrs.

Phragmatopoma californica was abundant at the site with large mats in the surge channel and on the reef. *Laminaria setchelli* was abundant in the surge channel. *Silvetia compressa* was abundant with high cover in that zone. I did not see any *Hesperophycus californica*. *Mastocarpus papillatus* was abundant in much of the upper areas of the reef. *Mazzaella affinis* was very common in the Mytilus plots. *Balanus glandula* and *Endocladia muricata* were both abundant. *Gelidium purpureus* and *Prionitis lanceolata* were abundant in the surge channel. *Phyllospadix* sp. was abundant on the point and *Smithora naiadum* was common on the lower plants. Susie scored all the photoplots in the field.

No abalone were found during a 30-minute search. *Pisaster ochraceus* were abundant with a broad range of sizes (55 to 175mm). Plot corners were in good shape and repairs were made at a few plot corners where needed.

Table 133. Photoplot summary – mean percent cover by zone at Cuyler Harbor, San Miguel Island, fall 2005 (5 plots/zone).

Zone Name	Bare Rock	Barnacle	Tetracita	Endocladia	Hesperophycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc. Algae	Misc. Animal	Tar
Chthamalus/Balanus (Barnacle)	32.4	40.4	0.0	24.4	0.0	1.8	0.0	0.0	0.0	0.6	0.4	0.0
Endocladia	20.6	5.8	0.0	36.4	0.0	13.4	10.2	1.4	0.0	11.6	0.6	0.0
Silvetia (Rockweed)	14.2	0.6	1.2	0.4	0.0	59.2	0.2	0.8	0.4	18.4	4.6	0.0
Mussels	13.0	0.4	4.8	0.2	0.0	0.0	55.2	3.6	3.6	12.0	7.2	0.0

Table 134. *Pisaster ochraceus* at Cuyler Harbor.

SMCH	total
count	69
min size	55
max size	175
mean size	108
sddev	36

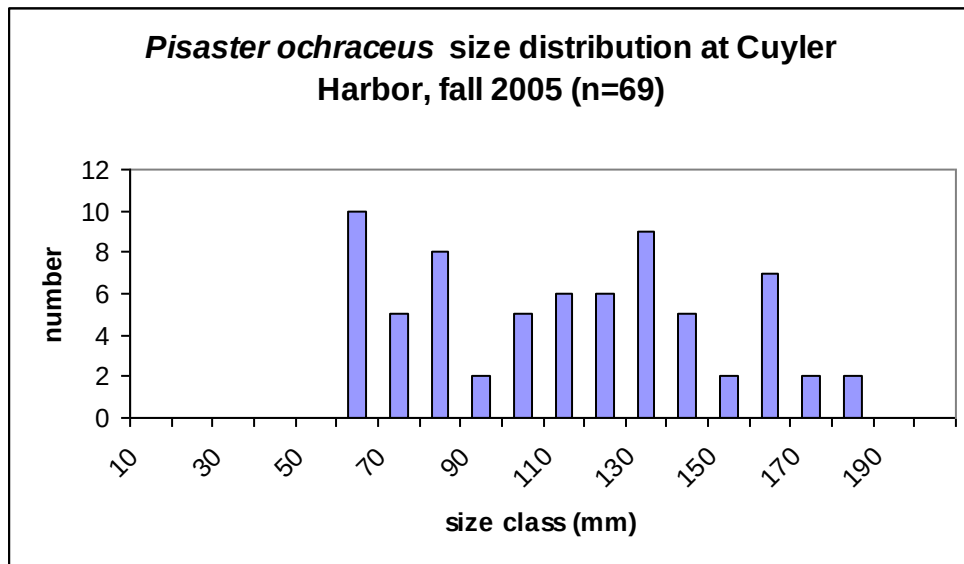


Figure 45. *Pisaster ochraceus* size distribution at Cuyler Harbor, San Miguel Island, fall 2005.

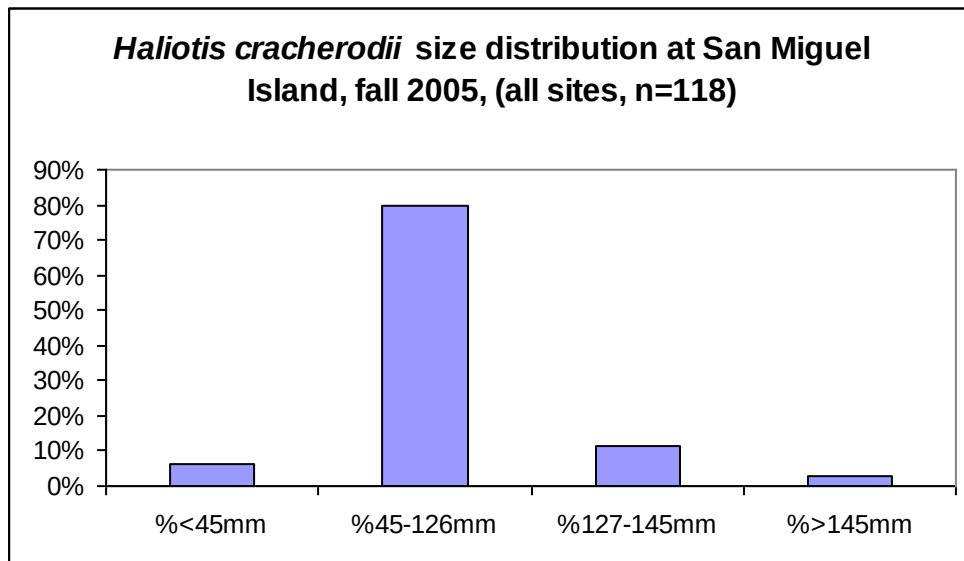


Figure 46. *Haliotis cracherodii* size distribution at San Miguel Island (all sites combined), fall 2005.

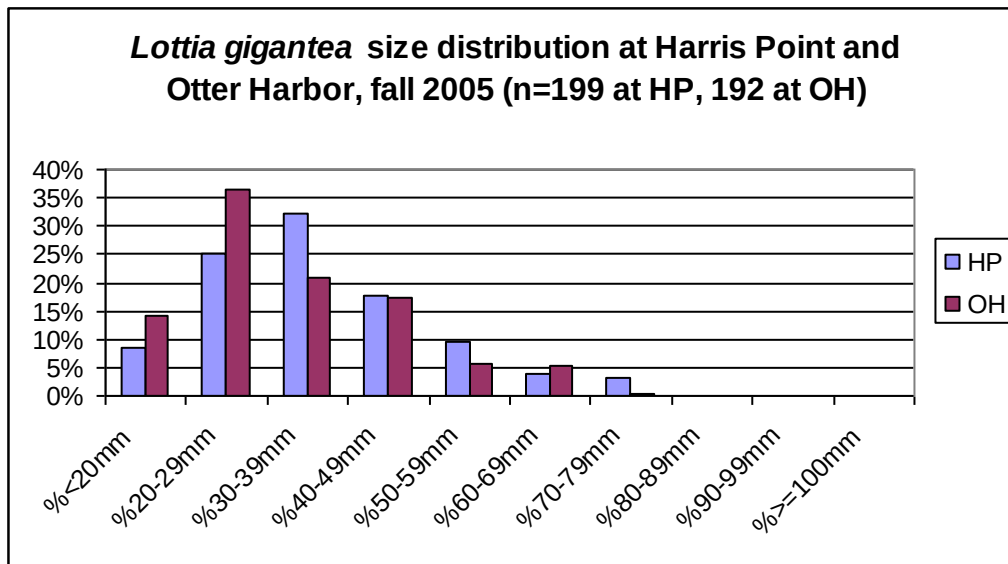


Figure 47. *Lottia gigantea* size distribution at Harris Point and Otter Harbor, San Miguel Island, fall 2005.