

Rocky Intertidal Community Monitoring

2001 Annual Report



CHANNEL ISLANDS NATIONAL PARK

National Park Service
Channel Islands National Park

Technical Report

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Abstract

The 2001 results are presented for the Channel Islands National Park Rocky Intertidal Monitoring Program. This program is part of the long-term ecological monitoring and began in 1982 with four sites at Anacapa Island. Twenty-one permanent sites covering all five park islands were monitored in spring and fall of 2001. This report covers sampling between March 2001 and January 2002. Permanent photoplots were monitored for changes in percent cover of selected indicator organisms. Abundance (density) and size distributions of black abalone, *Haliotis cracherodii*, were taken in both fixed plots and in timed searches. Owl limpets, *Lottia gigantea*, density and size distributions were taken within fixed plots. Seastar (generally *Pisaster ochraceus*) relative abundance was measured in timed searches or fixed transects. Temperature loggers collected hourly temperature data at nine sites. Comprehensive surveys were performed at 15 sites by a team from UCSC/PISCO. No significant trends or anomalies were found in 2001.

Cover photo: Derek Lerma and Sean Hastings scoring mussel zone photoplot at East Point Santa Rosa Island, April 2001. Photo by Dan Richards

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Executive Summary

The Channel Islands National Park Rocky Intertidal Monitoring Program monitored 21 established sites on the five park islands in 2001. Sites were monitored in spring (March through May) and fall (October through January 2002). Sites were established between 1982 and 1994 and have been monitored regularly since then following established protocols (Richards and Davis 1988).

Data show that 2001 was a fairly average year for the most species. Rockweeds, *Hesperophycus californicus* and *Silvetia compressa*, mussels, *Mytilus californianus*, and leaf barnacles, *Pollicipes polymerus*, were near the long-term mean cover at most sites. Cover of the red alga *Endocladia muricata*, was fairly dense at many of the sites and the photoplot data support that observation with the mean cover being higher than the long-term mean at most sites. Acorn barnacles, *Chthamalus* spp. and *Balanus glandula*, and red thatched barnacles, *Tetraclita rubescens*, were both slightly below the long-term mean.

2001 was a fairly typical year for weather and sea temperature. The average yearly mean temperature from the all of the Channel Islands National Park Kelp Forest Monitoring Data was 14.5°C. Temperature anomalies reported by the National Oceanographic and Atmospheric Administration were negative during most months in 2001 but slightly positive in the summer months.

The Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO)/University of California, Santa Cruz intertidal crew joined us in fall 2001 to conduct biodiversity survey transects at 17 sites on the park islands. The biodiversity surveys analyzed by species lists generated from the transects were found to cluster by water temperature with San Miguel, San Nicolas, Santa Rosa, western Santa Cruz, and South Frenchy's Cove clustering together in a cold water group. Eastern Santa Cruz, Middle Anacapa, and Santa Barbara Island clustered together in a middle group, and sites at Catalina clustered in their own warm water group.

Motile invertebrate counts have been employed to gain a better understanding of the whole intertidal community. From the photoplots we get information about the cover of

algae and sessile invertebrates but it is difficult to see smaller snails, crabs, and chitons from the photos and even field scoring does not adequately record their presence because they are relatively rare and are typically hidden under other organisms. The photoplots provide useful information about the cover and overall change over the years which can be used to understand the distribution of motile invertebrates.

A decline was seen in owl limpet numbers at all Santa Cruz Island sites. We watched the numbers drop at Johnson's Lee and Ford Point on Santa Rosa Island in the 1990s without ever determining a cause, and there is no apparent cause of the decline at Santa Cruz Island. The Santa Cruz Island decline is very gradual but the populations were lower to begin with.

In January 2001, a program review workshop for the Channel Islands National Park rocky intertidal monitoring was held in at the Rancho Marino University of California Natural Reserve in Cambria, California (Lafferty 2001). Power analyses of the data were performed and the results were presented at the workshop (Minchinton and Raimondi 2001). The power of the sampling met the goals of detecting 20% change 80% of the time and recommendations were to keep the sampling sites and frequency as is.

Thirty participants discussed the program and provided useful suggestions for improving the monitoring. Recommendations included expanding monitoring sites to accommodate additional photoplot zones, owl limpet plots, and surfgrass transects where practical. Further recommendations were aimed towards standardizing the information gathered with other programs within the Multi-Agency Rocky Intertidal Network (MARINE). Some of these recommendations had already begun being phased in prior to 2001, based on general MARINE protocol.

In 2001, we continued assessing the monitoring sites for practical additions and later convened a small group to make final decisions. Owl limpet plots were added to two sites on San Miguel Island and surfgrass transects were added to one site on Santa Rosa Island. Reference marks were added for consistent area photos and site boundaries were defined for more consistent seastar and black abalone counts.

Channel Islands National Park staff participated in the Minerals Management Service (MMS) sponsored taxonomic workshop for MARINe in fall 2001. The workshop was a chance to learn new species, accept name changes, and discuss standard methods from the different groups.

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 predation. 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 area that they cannot live without the alternating exposure to both the air and sea.

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

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

This report summarizes the 2001 sampling year efforts (from March 2001 to January 2002) and findings of the Rocky Intertidal Monitoring Program. Monitoring results were previously reported in Richards (1986, 1988, and 1998), Richards and Lerma (2000, 2002 and 2005). 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 included in the Channel Islands National Park. The five park islands possess 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 of the cooler Oregonian biogeographic province and the warmer Californian waters coming up from the south. Mean annual air temperature along the mainland in this area is 15°C. Mean rainfall is about 38 cm per year (Daily et al. 1993). There is a gradient across the island chain with San Miguel Island having the most precipitation, most cloud cover, and most wind. Santa Barbara Island to the southeast is the warmest and driest. The mean monthly sea temperatures range from 13°C in April at San Miguel Island to nearly 20°C at Santa Barbara Island in August and September (Engle and Richards 2001). Swell varies through the year with winter storms bringing high northwest waves during the winter and spring, and distant southern hemisphere storms sending large swells to the south facing shores in summer.

Monitoring

The Channel Islands National Park Rocky Intertidal Monitoring Program has 21 permanent sites on the five park islands (Figure 1). Sites are generally monitored each spring (Feb.-May) and fall (Oct.-Jan.). Site selection considered visitation, accessibility, presence of representative organisms, wildlife disturbance, and safety. Sites were established between 1982 and 1994. 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).

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.

Fixed plots (50 x 75 cm) were photographed on each visit and the percent cover of target organisms was determined either in the field by laying a string grid over the plot or in the office, projecting the slide onto a grid of 100 evenly spaced points. We used a Nikonos V camera with two Ikelite strobes for even illumination and Ektachrome 100 film for the photography. Organisms or bare substrate under each point were counted as one percent cover. *Haliotis cracherodii*, black abalone, were counted and measured in fixed irregular plots (5 plots per site) where plots have been established. At each site a search of a defined area of the reef (or 30-minutes) was made to obtain a relative abundance of abalone. *Lottia gigantea*, giant owl limpets, were measured within fixed circular plots of one-meter radius (3 to 5 plots per site). *Pisaster ochraceus*, ochre sea stars, were counted in a general search of the reef. *Phyllospadix* spp., surfgrass, cover was measured on fixed point-intercept transects (3 transects per site). Special circumstances and general conditions that may have affected sampling were described on daily logs, and reported in the trip reports. Motile invertebrates were counted in the photoplots by carefully searching through the entire plot. Sub-sampling of abundant littorine snails and small limpets was done by dividing the plots into 16 areas and counting within blocks in each of the four corners, counting in one-fourth of the overall plot.

In spring 2001 we installed five new one-meter radius circle plots to monitor *Lottia gigantea* at Harris Point. We also established five one-meter radius circle plot for *L. gigantea* at Otter Harbor, encompassing the majority of owl limpet habitat in the abalone plots where *L. gigantea* had been measured since 1988. The transformation to circle plots will make the monitoring consistent with other sites.

Field work was primarily conducted by Dan Richards and Derek Lerma. David Kushner was also a primary collector at some sites including scoring and motile invertebrate counts. Other helpers (see acknowledgements) primarily assisted with data recording and seastar counts.

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

Comprehensive surveys were conducted at many of the sites in 2001 as part of the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO) program. Members of PISCO from UCSC and UCSB joined us during our monitoring to set up transects and conduct the monitoring. The core members of the team were Erin Maloney, Kristin Kusic, Megan Williams, and Allison Kendall. We provided logistics and helped with the surveys to the extent possible after completing the regular monitoring.

Details about the comprehensive survey procedures and results can be found at the Coastal Biodiversity Survey website <http://cbsurveys.ucsc.edu/index.html> . The team surveyed 17 sites that overlapped with park monitoring sites (sites not surveyed were: Anacapa Middle-East, Otter Harbor, Harris Point, Scorpion Rock, Orizaba Cove) in the park during fall 2001, including sites on all five park islands. Also surveyed were Valley Anchorage where we don't have a site and Forney's Cove which we include as part of Fraser Cove.

Basic procedures included establishing two 30 m parallel baselines perpendicular to the shore (one in the high zone, one in the low zone) to use as reference for eleven vertical transects spaced 3 m apart; running from the high intertidal to the mean low tide level (typically the beginning of the *Phyllospadix* zone). The transects were then of variable length depending on the slope of the shore at each site. On each transect, 100 points were scored with distance between points varying according to the length of the transect. Scoring was done for the organisms under the point on the tape and included all layering as well as noting nearest neighbor species. Abalone and seastars were counted within one meter of each side of the transects and motile invertebrates were identified and enumerated in 50x50 cm random plots in the high, mid, and low zones of each transect. Stainless steel carriage bolts were drilled into the rock to mark the transects for future reference. Epoxy around the bolts was labeled as "OT#" identifying which corner it marked. Topographic maps of each sampling area were made using a laser level and stadia rod.

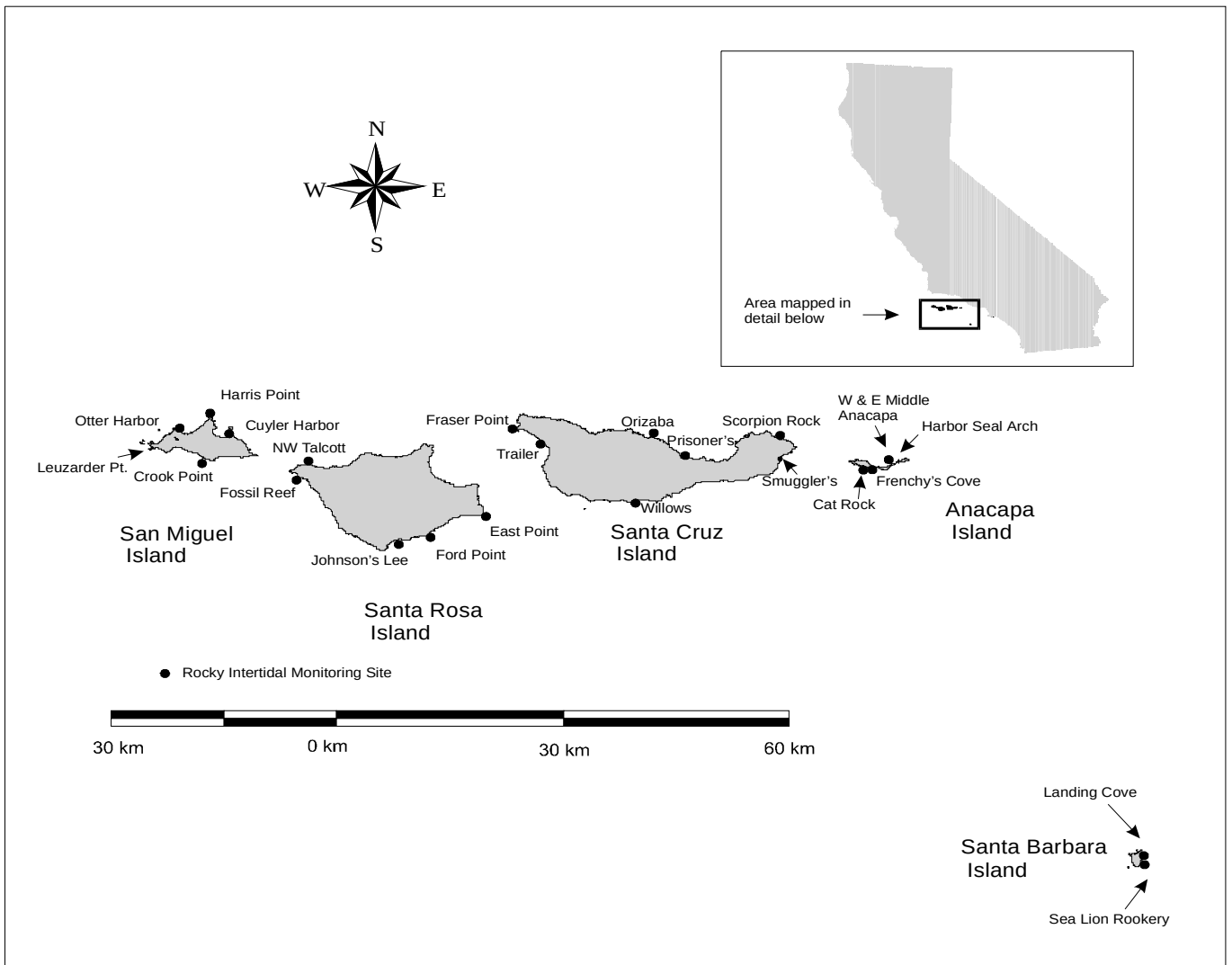


Figure 1. Rocky Intertidal Community Monitoring Site Locations in Channel Islands National Park

Results

All 21 monitoring sites were visited at least once in during the 2001 sampling season between March 2001 and January 2002 (table1). Spring sampling at Santa Barbara Island was not done because of conflicts with nesting western brown pelicans and we were unable to schedule work at three of the Anacapa Island sites in spring because of logistical limitations. Orizaba Cove monitoring was scheduled for early winter (fall) but the weather and sea conditions forced cancellation of that trip with no makeup possibilities.

Table 1. 2001 Sampling dates for Rocky Intertidal Monitoring sites

Site	Site Codes	Spring	Fall
Cuyler Harbor, SMI	SMCH	April 6, 2001	Nov. 13, 2001
Crook Point, SMI	SMCP	April 5, 2001	Nov. 14, 2001
Otter Harbor, SMI	SMOH	April 4, 2001	Nov. 15, 2001
Harris Point, SMI	SMHP	April 3, 2001	Nov. 16, 2001
Fossil Reef, SRI	SRFR	April 27, 2001	Dec. 12, 2001
Johnson's Lee, SRI	SRJL	April 29, May 1, 2001	Dec. 14, 2001
Ford Point, SRI	SRFP	April 26, 2001	Dec. 15, 2001
Northwest-Talcott, SRI	SRNWT	April 30, 2001	Dec. 13, 2001
East Point, SRI	SREP	April 28, 2001	Dec. 11, 2001
Fraser Cove, SCI	SCFC	May 27, 2001	Jan. 9,11, 2002
Trailer, SCI	SCTR	May 26, 2001	Jan. 10, 2002
Willows Anchorage, SCI	SCWA	May 28, 2001	Jan. 12, 2002
Scorpion Rock, SCI	SCSR	March 19, 2001	Jan. 28, 2002
Prisoner's Harbor, SCI	SCPH	April 2, 21001	Jan. 8, 2002
Orizaba Cove, SCI	SCOC	March 21, 2001	*
Cat Rock, ANI	ANCR	!	Oct. 18, 2001
South Frenchy's Cove, ANI	ANSFC	March 20, 2001	Oct. 16, 2001
Middle Anacapa-West	ANMW	!	Oct. 17, 2001
Middle Anacapa-East	ANME	!	Oct. 17, 2001
Landing Cove, SBI	SBLC	-- (Jan 2001-see 2000 rpt)	Nov. 30, Dec. 2, 2001
Sea Lion Rookery, SBI	SBSLR	--	Dec. 1, 2001

! not sampled due to logistical difficulties

--no spring sample because of nesting pelicans

*2/8/01 trip cancelled for high seas

Photoplots

Photoplot summary data are presented in Figures 2-4 for each indicator taxa by zone. Mean percent cover values for each site (based on pooled values for all plots in each zone) in spring and fall, are compared to the range and mean of yearly cover values for all years at that site in the figures. Cover values for all of the target species were generally near the long-term average and within the long-term range of values observed in the past. Tables of photoplot data by plot are presented in Appendix A. Summary tables for each site can be found in the trip reports in Appendix B.

Endocladia muricata tends to show the most seasonal variation and cover was slightly above the long-term mean for 11 of the 14 sites sampled in the spring 2001. Fall cover was slightly lower than the long-term mean at most sites. The minimum *E. muricata* cover in Endocladia zone plots in 2001 was 8% at Fossil Reef and at Sea Lion Rookery; the maximum cover was 72% at Willows Anchorage in the fall sample. Cover in fall samples tended to be higher than the spring. The overall mean for all Endocladia zone

plots (all sites) was 40%. Bare rock was the second most abundant category at 27% in this zone.

As in 2000, except at San Miguel Island, *Chthamalus/Balanus* (acorn barnacle) cover was mostly below average in both the spring and fall samples. Barnacle cover at Landing Cove, Scorpion Rock, and East Point were noteworthy as cover was near the lower range limits at those sites. The lowest cover of acorn barnacles in the barnacle zone was at Landing Cove (5%) and Sea Lion Rookery (8%). The mean for all barnacle zone plots was 29% in 2001. Bare Rock was the highest category in that zone, occupying about 46% of the space. Combined algae typically *Porphyra* sp. or *Ulva* sp. was common in the zone. *Endocladia muricata* was common in some plots and *Hesperophycus californicus* covered 52% of the plots at Cat Rock.

Cover of red thatched barnacles, *Tetracita rubescens*, was typically low, even in the target zone plots (fig. 4). *Tetracita rubescens* had the highest cover at Orizaba Cove with 38%. For all sites, bare rock accounted for a mean of 32%, and miscellaneous algae covered 26% of the plots.

Silvetia compressa cover was nearly at or slightly above the long-term mean at 6 of 15 sites during the fall when it is at its best. Orizaba Cove, Fossil Reef and Crook Point had the lowest *S. compressa* cover, all below 10% cover and all markedly below the long-term means for the sites (fig. 2-3). Only Prisoners Harbor and Trailer had *Silvetia* cover over 80%. At Landing Cove, other algae (primarily *Ulva/Enteromorpha*) dominated the plots and cover averaged only 0.2% (fig 3). The mean cover in all plots was 49% with bare rock accounting for 21%.

Hesperophycus californicus was below the mean at most of the sites in the spring with about half the sites improving in the fall. There was a large seasonal difference. The densest cover was 55% at Scorpion Rock. The Cat Rock barnacle zone plots had 52% *H. californicus* cover. Harris Point (49%) and Prisoners Harbor (36%) were also doing well in the fall. Orizaba Cove had the lowest cover at 7% followed by Willows Anchorage at only 8% cover of *H. californicus*. Bare rock occupied a mean of 35% in all the plots followed by *Endocladia muricata* at 18%. *Silvetia compressa* was common at a few sites.

Mussel cover, *Mytilus californianus*, typically is fairly stable without much variation between seasons or years. Mussel cover was low at Sea Lion Rookery because of unexplained but presumably natural clearing covering several of the plots (figure 3). Occasionally as the shell mass builds up, the mussel beds are vulnerable to being torn out by heavy surf and that is apparently what happened there. The low cover of mussels at Johnson's Lee was a result of the large *Pisaster ochraceus* population there for many years. The low mussel cover at Harris Point is harder to explain as there were few seastars there, and the population, at least within the plots, appears to just be in general decline. The mussels there were relatively large and there was little apparent recruitment of juveniles. *Mytilus californianus* cover in the mussel zone ranged from 10% at Johnson's Lee in the (fall) to 84% at Scorpion Rock (spring). *Tetraclita rubescens* was common in mussel zone plots at Cat Rock. The mean mussel cover for all sites was 54% with bare rock (13%) and miscellaneous algae (18%) the next most abundant taxa.

Mussels and leaf barnacles, *Pollicipes polymerus*, remained stable in the *Pollicipes* zone plots at Fraser Cove (figure 4). Mussels in those plots cover about 40% of the plots vs. nearly 70% in the mussel zone plots.

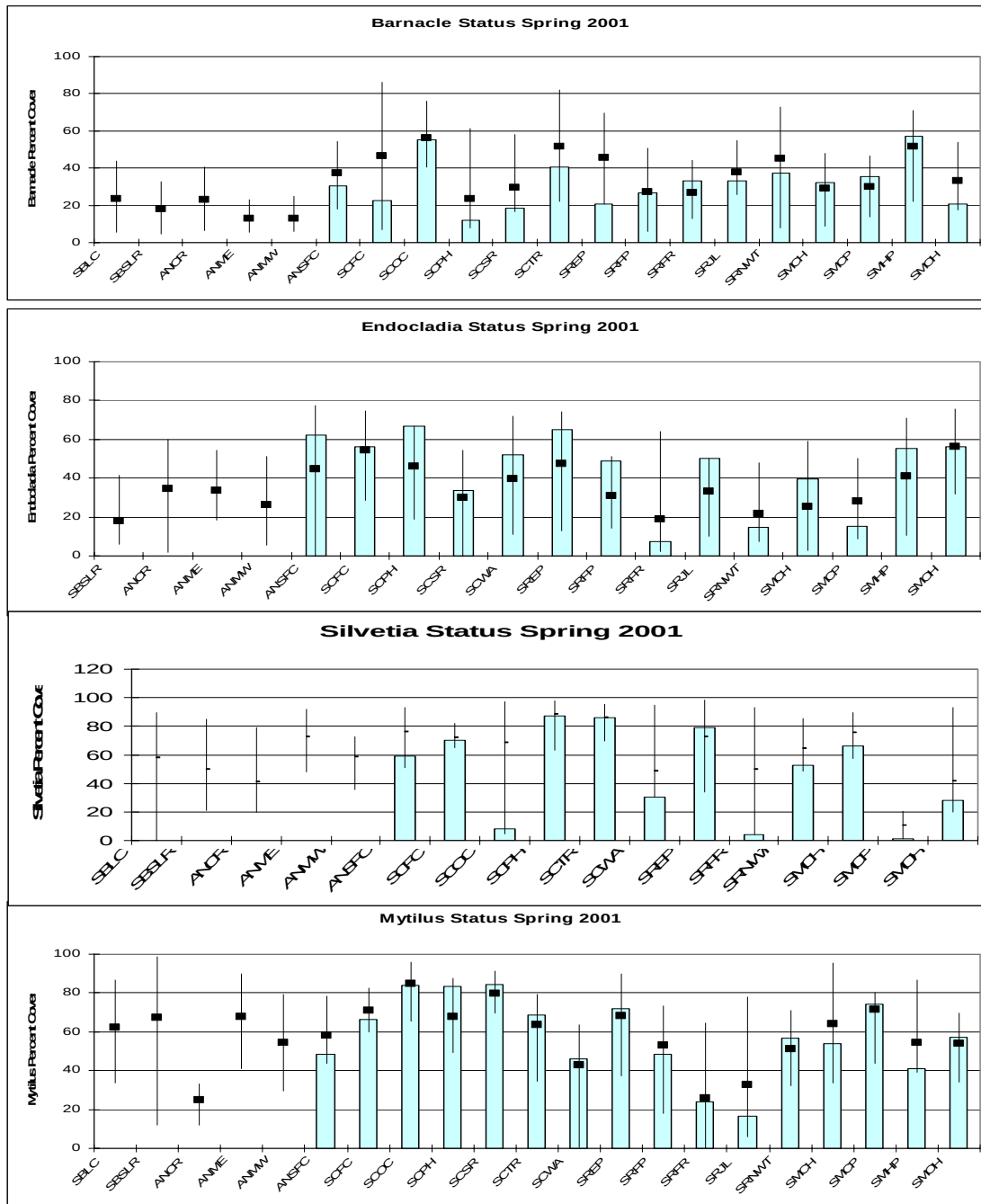
Tar is a target species in plots at Fraser Cove where it was abundant on rocks in the high intertidal zone (figure 4). Tar presumably comes from natural seeps in the Santa Barbara Channel and is monitored to observe persistence or accumulation over time. Tar cover has not varied much since 1998. In 2001, tar cover (56%) was near the upper limits of its range since 1998. The most common living organisms in the zone are *Chthamalus* spp. and weedy algae, usually *Porphyra perforata* or *Ulva* sp.

Red algal turf is a unique target taxa monitored at Landing Cove. *Gelidium* sp., *Pterocladia* sp. and *Chondracanthus canaliculatus* are the primary species of this assemblage. In 2001, the red algal turf or turfweed cover (42%), was again below the long-term mean (figure 4). One primary reason was that *Phyllospadix* sp. cover has been increasing in two of the plots and occupied 31% of the combined cover in the plots.

Porphyra perforata (reported as misc. algae in Appx. A) was dense at Fraser Cove especially in the *Balanus/Chthamalus* and *Endocladia* zones. Because plots were scored for the primary cover, epiphytic algae overlaying a barnacle or *Endocladia* plant

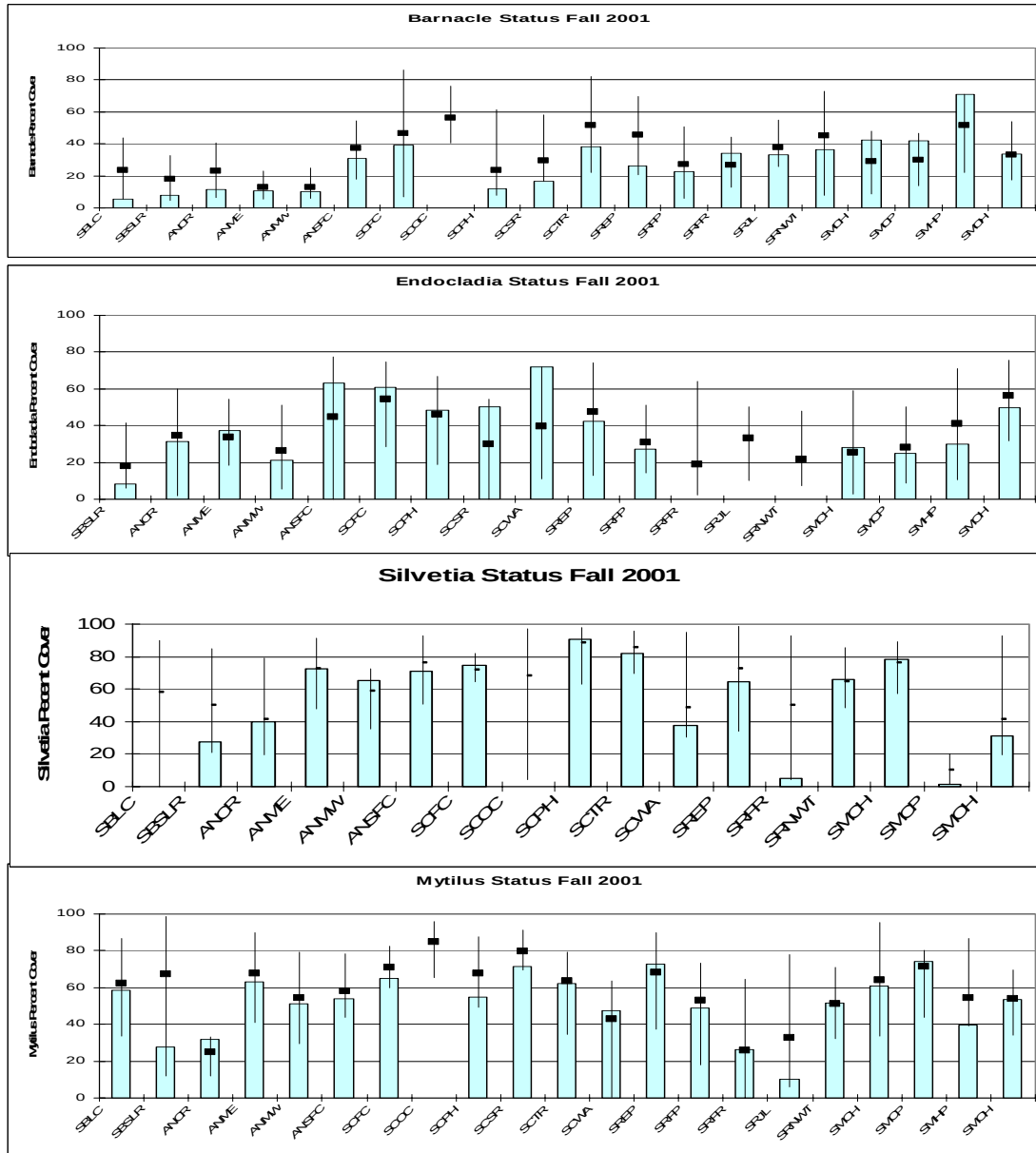
was not counted and so the actual cover of *Porphyra* was probably higher than the numbers show.

Figure 2. Percent cover of target taxa within fixed plots by zone, spring 2001.



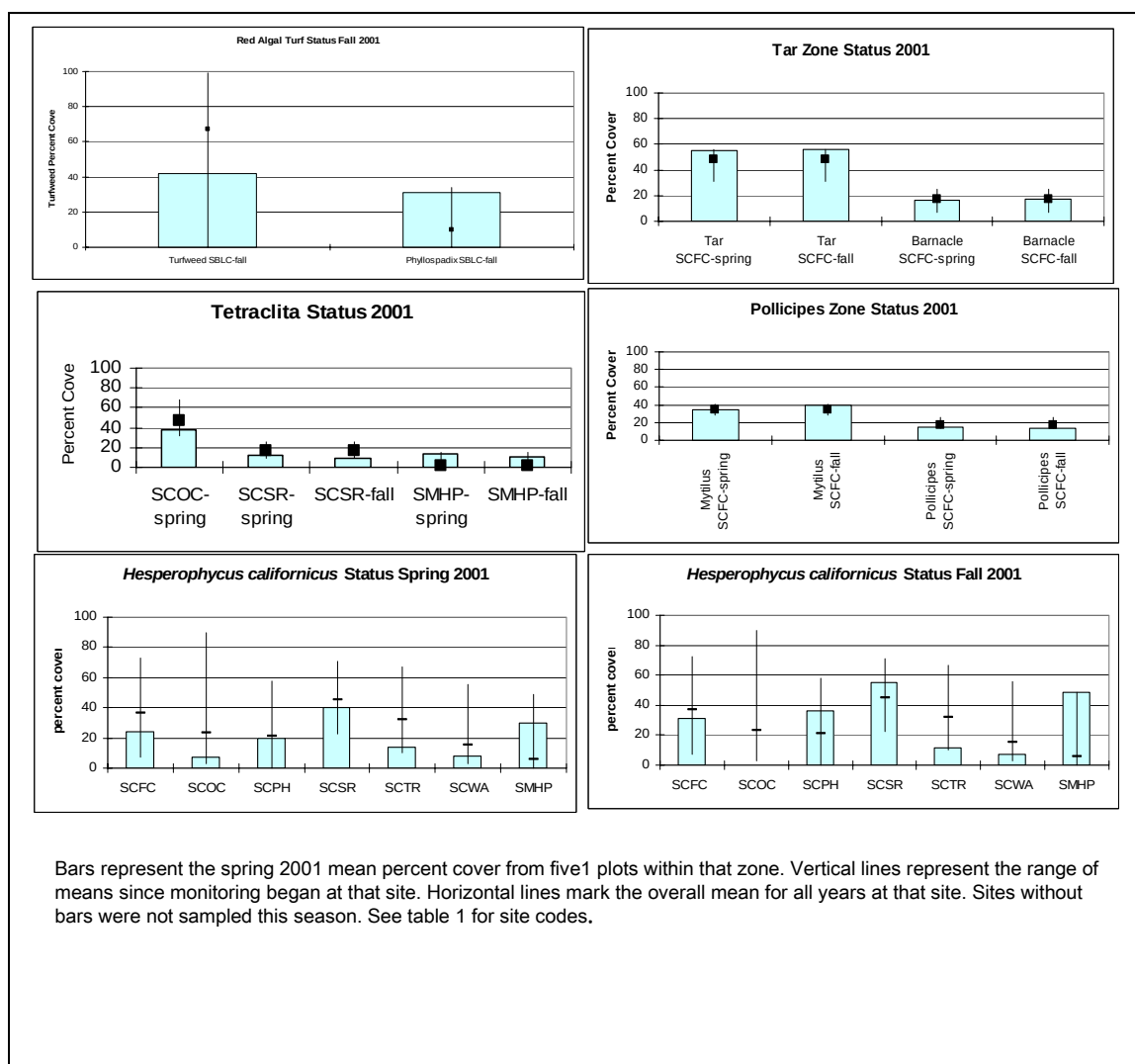
Bars represent the spring 2001 mean percent cover from five 1 plots within that zone. Vertical lines represent the range of means since monitoring began at that site. Horizontal lines mark the overall mean for all years at that site. Sites without bars were not sampled this season. See table 1 for site codes.

Figure 3. Percent cover of target taxa within fixed plots by zone, fall 2001.



Bars represent the spring 2001 mean percent cover from five plots within that zone. Vertical lines represent the range of means since monitoring began at that site. Horizontal lines mark the overall mean for all years at that site. Sites without bars were not sampled this season. See table 1 for site codes.

Figure 4. Percent cover of target taxa within fixed plots by zone in 2001 (zones not represented at all sites).



Motile invertebrates

Motile invertebrates within the photoplots were primarily comprised of small snails, limpets, and chitons. These were counted within photoplots at sites during the fall sample. Results tables are included in trip reports in Appendix. B.

Motile invertebrates were counted at 12 sites in the 2001 sampling year. Counts were not made at any of the San Miguel Island sites, Prisoners Harbor, Orizaba Cove, Cat Rock, Anacapa Middle-West, or Anacapa Middle-East. Limpets and *Littorina* spp. were abundant at all sites. Certain species were consistently present in moderate amounts such as *Pachygrapsus crassipes* (shore crabs), *Nuttalina* spp. (chiton) and *Lottia gigantea*. *Lepidochitona* spp. (chiton) and *Fissurella volcano* (keyhole limpet) were present at most sites but in generally low numbers. *Pagurus* spp. (hermit crabs) and *Strongylocentrotus purpuratus* (purple sea urchin) were infrequent but were occasionally common, for example *S. purpuratus* at Willows Anchorage or *Pagurus* spp. at Sea Lion Rookery. *Tegula funebris* were generally abundant when present. *Tegula gallina* were common only at Trailer, but appeared at a few other sites.

The variability among predatory snails in the counts was interesting, with differences in dominance and abundance among sites. *Ocenebra circumtexta* was most abundant at both Santa Barbara Island sites and at Scorpion Rock. At most other sites *O. circumtexta* was not even present. *Nucella emarginata* was the most numerous predatory snail at nearly all the other sites. The only exception was south Frenchy's Cove where snail numbers were low in general and *Acanthina* sp. was the most numerous (besides limpets and littorines). Overall, numbers there were still low compared to other sites. *Acanthina* sp. was common at several sites. East Point had the greatest number of *Acanthina* sp. with 82 total in all plots. Other snails were also common at East Point and *Nucella emarginata* was most numerous there with 129. (Fraser Cove actually had a higher total but has almost double the number of plots).

Black Abalone (Haliotis cracherodii)

There was some rock breakage at Otter Harbor that changed the abalone habitat slightly within plot 369. Since no abalone were using that part of the rock anymore it is unlikely that the change will have any effect on current numbers. However, if the abalone

population does make a full recovery that plot will not have exactly the same habitat as before. The rock there is soft sandstone and continuously erodes over time. Sandstone in plots at Ford Point, Johnson's Lee, and Crook Point is also eroding to some degree, slowly changing the micro habitats of the rock. The erosion is slow and often goes undetected. Abalone have been absent from most of those plots for years.

Black abalone counts and size information are presented in Table 2, pooled by island. Individual site information about abalone is presented in Table 3. Fixed plots have little utility with the abalone densities remaining at the islands. Only San Miguel Island had any abalone found in within fixed plots, and the density there was very low. Otter Harbor had the most abalone found (84), but the total number found in about one hour of searching was less than what used to be found in one plot. Only limited searches were made for abalone at Santa Rosa Island in spring 2001 because of working conditions. No abalone were found at Santa Barbara Island or Anacapa Island. Searches there were abbreviated because of time spent with the biodiversity surveys. No abalone were found in biodiversity surveys at Santa Barbara or Anacapa.

Table 2. *Haliotis cracherodii* density and sizes pooled by island in 2001.

Island Code	Year	Season	Count	*Count Density	Area (m ²)	Density	Count Sized	Mean Size	StDev	Min Size	Max Size
AN	2001	Spring	0	0		0.000	0				
AN	2001	Fall	0	0	11.0	0.000	0				
SB	2001	Fall	0	0	31.3	0.000	0				
SC	2001	Spring	22	0		0.000	22	99.86	27.55	60	157
SC	2001	Fall	7	0		0.000	7	94.43	29.07	58	141
SM	2001	Spring	76	8	58.2	0.137	84	90.30	25.79	39	164
SM	2001	Fall	83	5	58.2	0.086	88	90.27	21.98	40	148
SR	2001	Spring	0	0	143.0	0.000	0				
SR	2001	Fall	18	0	143.0	0.000	18	120.28	18.65	66	149

*Density counts were abalone found within fixed plots. Counts include 30-minute search effort.

Owl Limpets (Lottia gigantea)

Lottia gigantea density showed a slight but mostly steady decline at the Santa Cruz Island sites (fig. 5). The mean size of limpets at those sites has been showing a slight increase during those years. There has been a slight increase in the percentage of the larger size classes since 1998, but there has also been a sharp decline in the smallest size class (<20mm) indicating little recruitment at those sites. The numbers at Santa Rosa Island, though down from the highs in the 1990s, have been mostly stable at current levels for several years (fig. 6). Densities at both Anacapa and San Miguel Islands (Figs. 7-8) were low but stable.

Figure 5. Owl limpets, *Lottia gigantea*, at Santa Cruz Island.

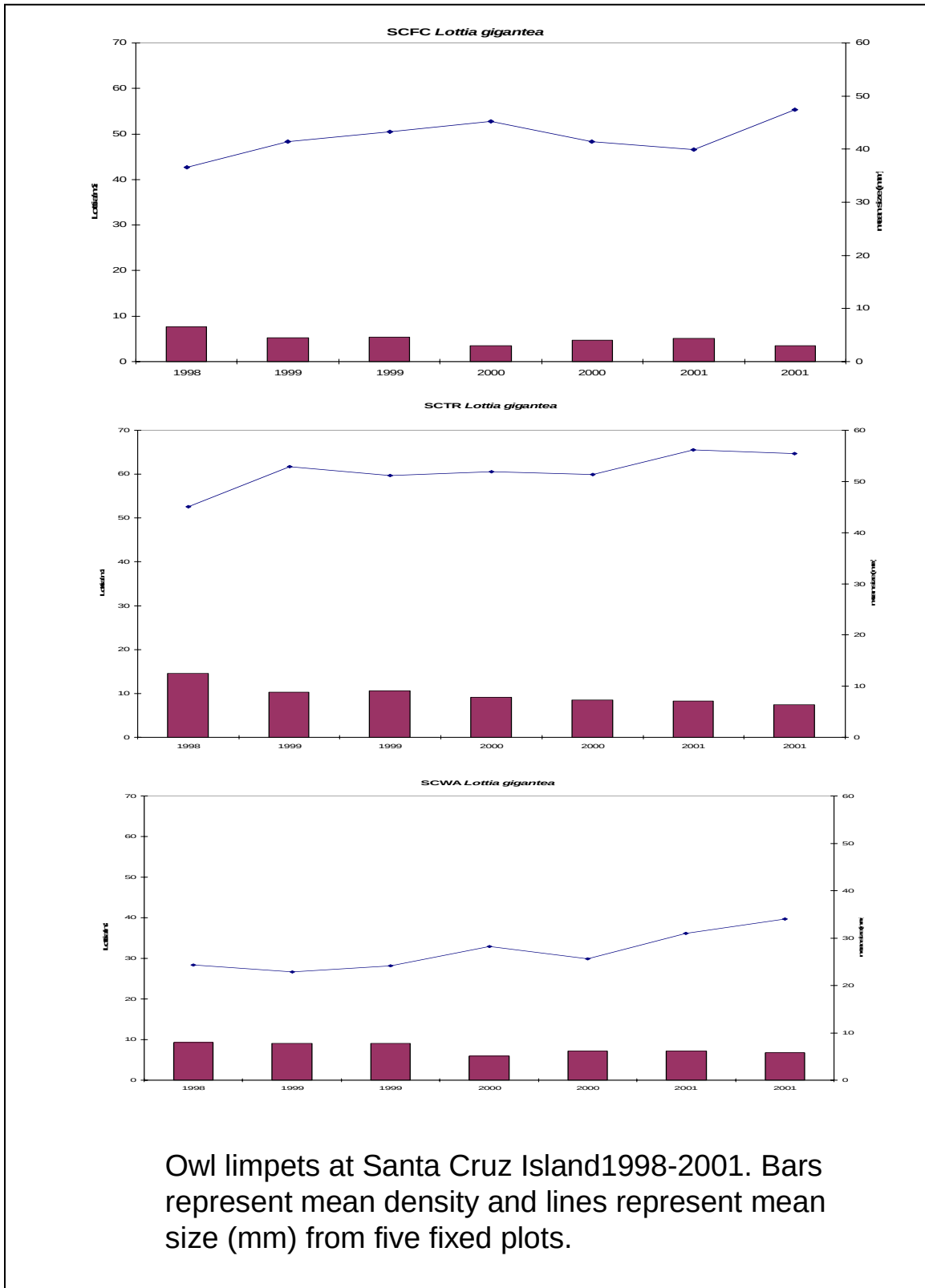


Figure 6. Owl limpets, *Lottia gigantea*, at Santa Rosa Island.

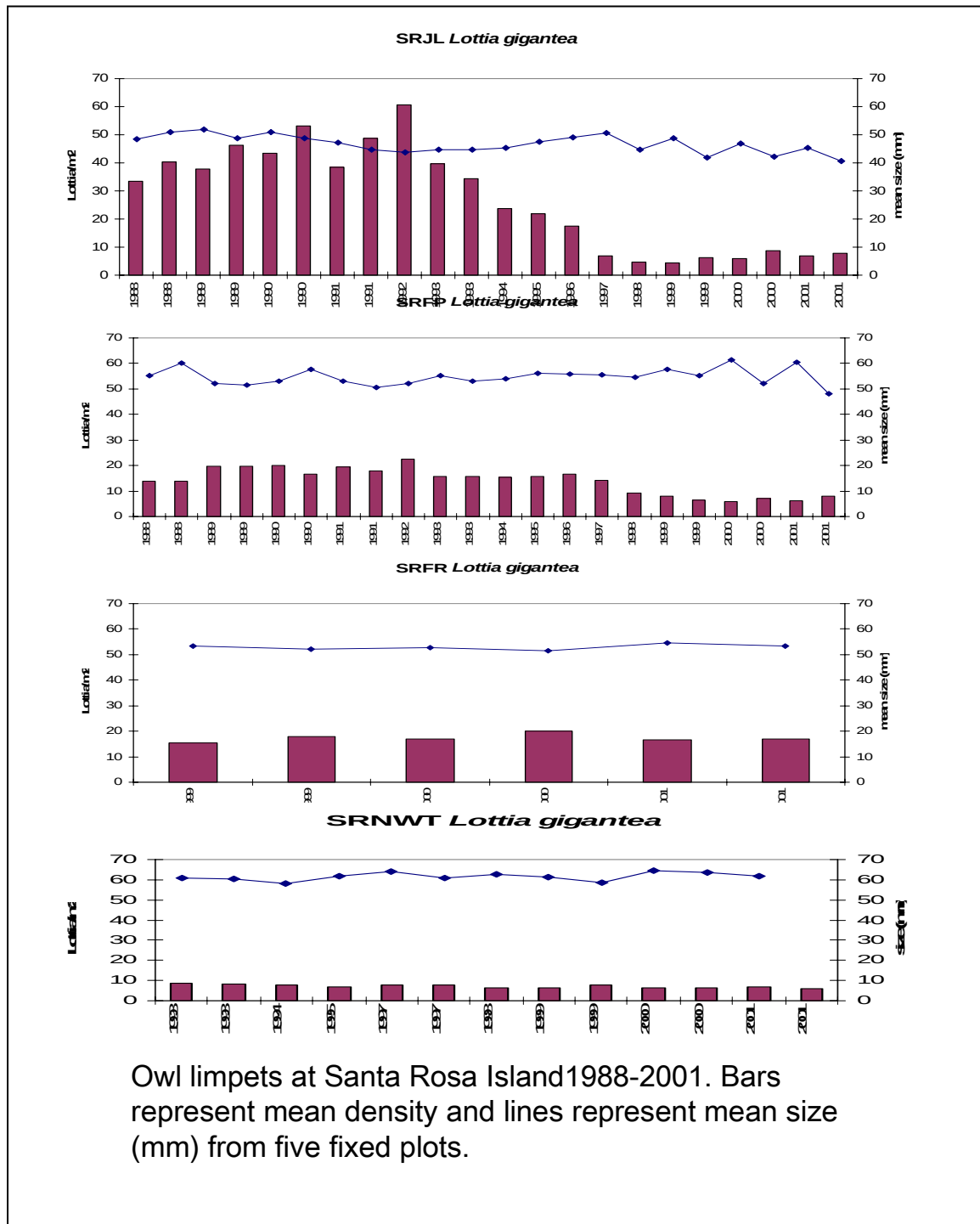


Figure 7. Owl limpets, *Lottia gigantea* at San Miguel Island.

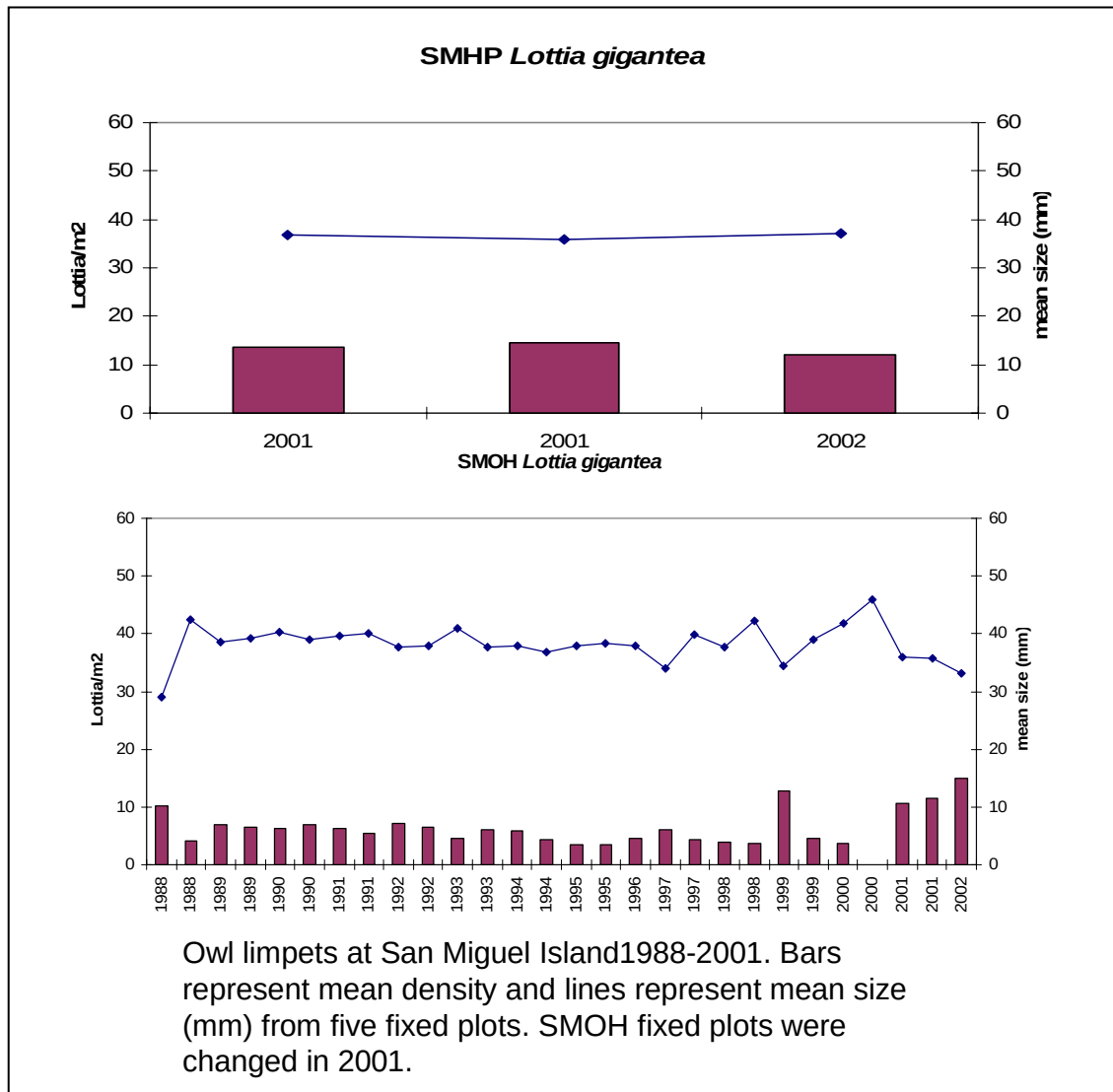


Figure 8. Owl limpets, *Lottia gigantea* at Anacapa Island.

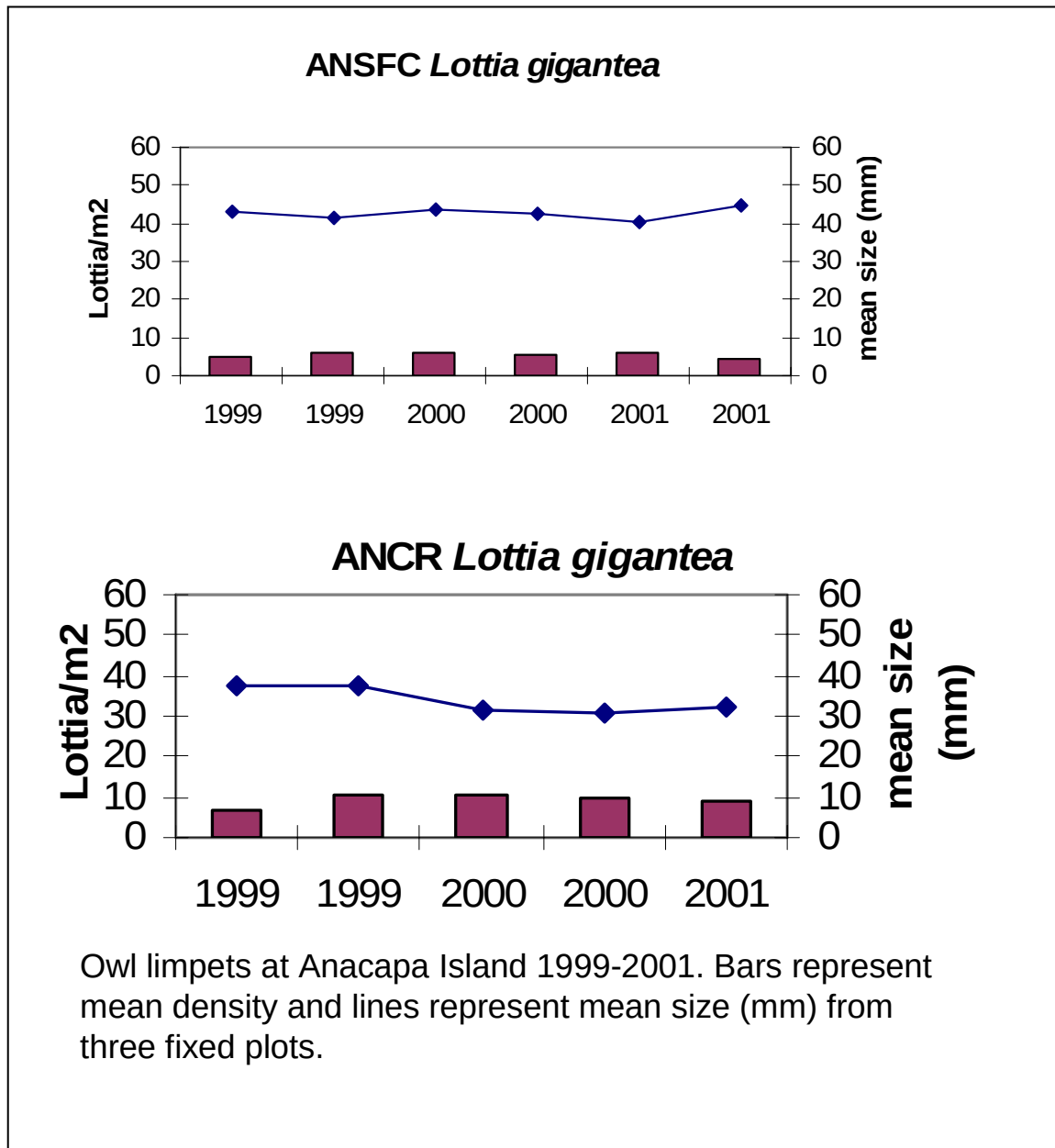


Table 3. Sea star and black abalone searches in 2001. (-- indicates no plot or transect, nc indicate no count performed, Po= *Pisaster ochraceus*, Pg=*P. giganteus*, Am= *Asterina miniata*, compsurvey= counts made during Comprehensive Surveys))

Site	Seastars in 30 min	Sea stars in transects	Abalone in plots	Abalone in 30 minutes
San Miguel Island				
Crook Point 4/01	119	-	1	35 (15 in 30 min)
Otter harbor 4/01	16 Po 2 Pg	-	3	70 (46 in 30 min)
Cuyler harbor 4/01	10Po	-	-	0
Harris Point 4/01	Ns	2 Po 1 A.m.	4	36 (17 in 30 min)
Cuyler Harbor 11/01	Ns	24 Po in comp survey	-	Ns
Otter Harbor 11/01	25 Po		1	84
Crook Point 11/01	Ns	191 Po in comp survey	0	10 in comp survey transects
Harris Point 11/01	Ns		4	Ns
Santa Rosa Island				
Ford Point 4/01	Ns	--	0	0
Fossil Reef 4/01	Ns	6x15m=19 Po, 5x15m=18Po	0	6x30m=5
Northwest Talcott 4/01	Ns	--	0	ns
Johnson's Lee 4/01	Zone 1-57 Po, zone2-110 Po, zone 3-81 Po	10x2 m= 32 Po	0	1
East Point 4/01	49 Po	-	0	ns
East Point 12/01	27 Po	--	0	1
Johnson's Lee 12/01		10x2m=15 Po	0	0
Ford Point 12/01	Ns	~150 in comprehensive survey transects	0	4
Fossil Reef 12/01	Ns	6x15m=15 Po, 6x15m=24 Po, 1 A.m, 1Pg	0	12
Northwest Talcott 12/01	2P.o., 1 A.m.	--	0	1
Santa Cruz Island				
Orizaba Cove3/01	6 Po	-	-	0
Scorpion Rock3/01	30 Po	-	-	1
Trailer 5/01	22 Po, 4 A.m.	-	-	18
Fraser Cove 5/01	2 Po	-	-	2
Willows Anchorage 5/01	165 Po, 3 A m	-	-	0 (1 outside site area)
Prisoner's Harbor 4/01	4	-	-	0
Willows Anchorage -1/02	Ns	-)	-	1 on comp survey transects
Trailer1/02	1 Po, 6 Pg, 1Am	-	-	2
Prisoner's Harbor01/02	36 Po, 1 Pg	-	-	2
Fraser Cove1/02	1 Pg	-	-	0
Scorpion Rock1/02				
Anacapa Island				
Cat Rock	ns in spring			ns in spring
S. Frenchy's Cove 3/01	0	-	-	0
Middle Anacapa	ns in spring			ns in spring
S. Frenchy's Cove 10/01	Ns	1 in comp surveys	-	0
Cat Rock 10/01	Ns	0 in comp surveys	0	0
Middle Anacapa 10/01	Ns	40 Po in comp surveys	ns	Ns
Santa Barbara Island				
Sea Lion Rookery 12/01	Ns	2 Po in comp survey	0	Ns
Landing Cove 12/01	117 Po	16x2m=14 Po	-	0

Seastars (Pisaster ochraceus)

Due to the nature of their mobility, we generally count seastars in 30 minute counts, which usually cover most of the monitoring reef area at each site. At Johnson's Lee we have defined three adjacent areas of the site for counts to see if the distribution within the site might change. Some sites consistently have seastars in a relatively small area and we have consistently been doing counts in transects at Landing Cove, Fossil Reef, and Johnson's Lee. We were not always able to conduct timed searches because of the tide or sea conditions. Seastars were counted in transects of the comprehensive surveys. Data for all these methods are presented in Table 3.

Landing Cove, Willows Anchorage, Ford Point, Johnson's Lee, and Crook Point have consistently had the highest numbers of seastars. Other sites (Sea lion Rookery, South Frenchy's Cove, Cat Rock, Fraser Cove and Northwest Talcott) typically had very few seastars.

Surfgrass (Phyllospadix spp.)

Surfgrass was monitored at only two sites in 2001 (Fraser Cove and Trailer). Three new transects were installed in December 2001 at Northwest Talcott to begin monitoring surfgrass there. Complete results from the transects are presented in the trip reports in Appx. B. Though there has been some variability between transects and within individual transects over time, surfgrass has remained fairly stable since at least 1998 (Figure 9).

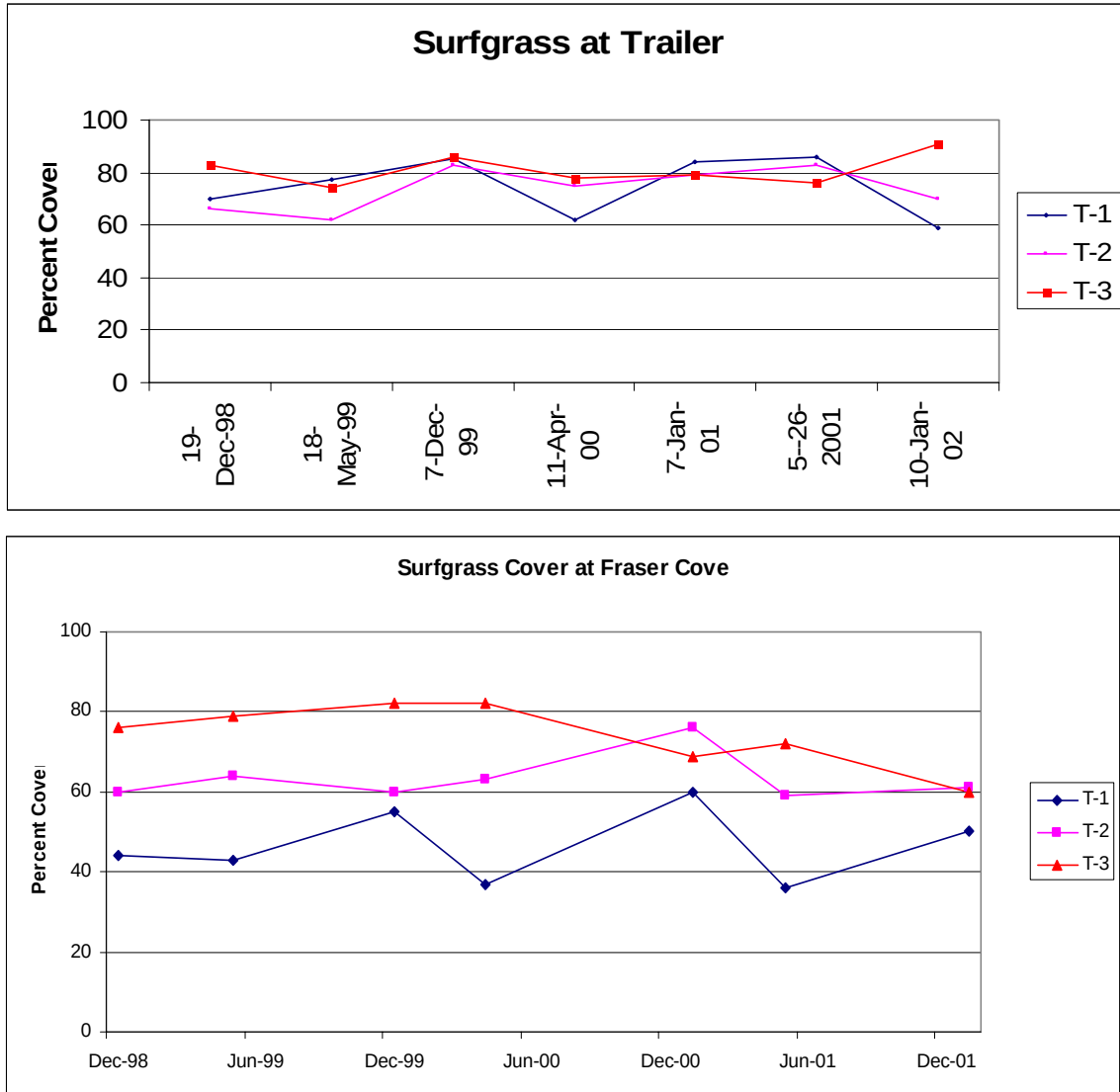


Figure 9. *Phyllospadix* spp. overstory layer on 10 m point intercept transects at SCTR and SCFC 1998-2001.

Shorebirds and Pinnipeds

A summary of the shorebirds and pinnipeds observed on monitoring dates is presented in Tables 5 and 6. Further natural history notes including birds observed off-site can be found in the trip reports section (Appx. B). Black oystercatchers, *Haematopus bachmani*, were the most common shorebird and were observed at all but two sites (Orizaba Cove and Prisoners Harbor) in 2001. Hybrid oystercatchers with white bellies and all black upper parts were seen at Trailer and Fraser Cove (as they were in 2000).

The largest aggregation of oystercatchers was 13 birds at Fossil Reef. Other shorebirds included, whimbrels, *Neumenius phaeopus*, willets, *Cataptrophorus semipalmatus*, wandering tattler, *Heteroscelus incanus*, semi-palmated plovers, *Charadrius semipalmatus*, surfbirds, *Aphariza virigata*, (unconfirmed), and sanderlings, *Calidris alba*. Roosting seabirds were common at several locations and included Western gulls, *Larus occidentalis*, cormorants, *Phalacrocorax* spp., and brown pelicans, *Pelicanus occidentalis*. Song Sparrows, *Melospiza meodia*, rock wrens, *Salpinctes obsoletus*, and a peregrine falcon, *Falco peregrinus*, were observed either on the monitoring reef or immediately nearby. Song sparrows and rock wrens are often seen foraging on kelp flies or other insects in the upper intertidal zone.

Harbor seals, *Phoca vitulina*, were observed at or very near 12 of the 21 monitoring sites (Table 5, 6). Presumably seals haul out on the rocks at those sites occasionally where they were seen nearby. California sea lions, *Zalophus californianus*, were observed at Willows Anchorage though they do not commonly haul out there. Sea lions do however commonly use the reefs at both Santa Barbara Island sites. Elephant seals, *Mirounga angustirostris* were observed at Otter Harbor, Crook Point, and Fossil Reef. Elephant seals prefer the beaches adjacent to the monitoring reefs and rarely lay on the rocks where the plots are, unlike sea lions.

Table 4. Shorebirds and pinnipeds at monitoring sites in spring 2001 (maximum seen at any one time) (*= nearby but not on reef).

Spring 2001						
site	Black Oystercatcher/ Hybrid American/Black	Black Turnstone	other birds	Phoca vitulina	Mirounga Angustirostris	Zalophus californianus
ANSFC	5					
SCSR	2		4 Western Gull	2*		
SCOC				6		
SCFC	3 / 1					
SCTR	2 / 1	1	1 Surfbird	3*		
SCPH				1*		
SREP	4	2	2 Pelagic Cormorant			
SRFP	2		1 Peregrine Falcon*, 6 Sanderling	1*		
SRFR	13		4 Western Gull, 1 Peregrine Falcon 1 Pelagic Cormorant	6	Present*	
SRJL	5		1 Western Gull			
SRNWT	3	5*				
SMCH	1	1	23 Willet*, 10 Whimbrel*			
SMCP	4		12 Pelagic Cormorant	3	6	
SMHP	2			6		
SMOH	4		21 Willet, Western Gulls	11	2	

Table 5. Shorebirds and pinnipeds at monitoring sites in fall 2001 (maximum seen at any one time) (*= nearby but not on reef).

Fall 2001						
site	Black Oystercatcher/ Hybrid American/Black	Black Turnstone	other birds	Phoca vitulina	Mirounga Angustirostris	Zalophus californianus
SBLC	2	6	2 Western Gull		30	
SBSLR	3		many western Gulls		200*	
ANCR	1			2*		
ANMW	2		1 rock wren			
ANSFC			2 Wandering tattler			
SCSR				1*		
SCTR	1	6		2*		
SCFC	8 / 1					
SCPH						
SCWA	2					1*
SREP	1		2 Brown Pelican, 30 Double-crested Cormorants	2*		
SRFR	6		9 Western Gull, 22 cormorants		2*	
SRJL			2 Western Gull	1*		
SRNWT			2 Semi-palmated plovers			
SMCH	2		20 Whimbrel*			
SMCP	5	1	1 Western Gull, 1 Rock Wren, 30 Brandt's Cormorants			
SMOH	4	10	2 Song Sparrow, 1 Western Gull, 16 Willet	12	2	
SMHP				2		

Visitation

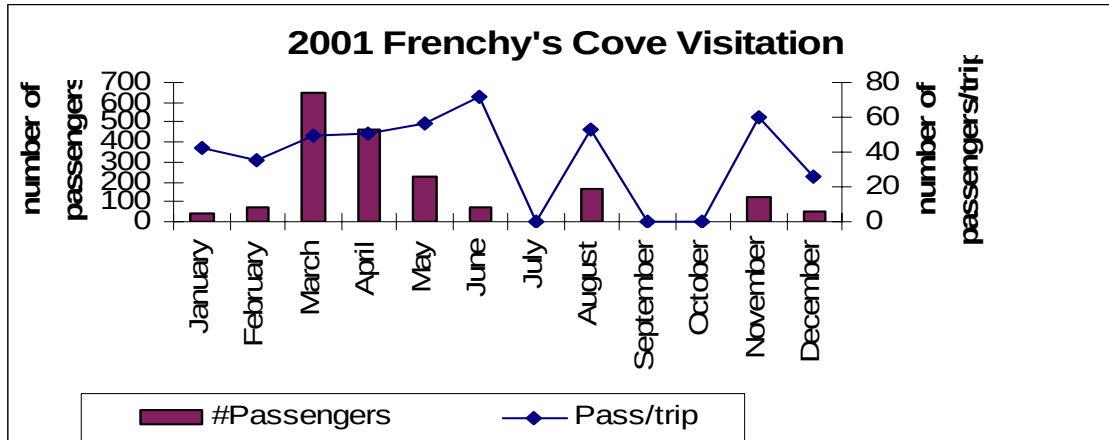
Visitation numbers for Frenchy's Cove are available from monthly reports based on concessionaire reporting from Island Packers Company and Truth Aquatics (Table 7, figure10). No records are available for the number of private boaters actually going ashore there.

The total visitation from concession boats in 2001 was only 1850 passengers (table 7) which was considerably less than the 2401 passengers in 1999. March was once again the top month for visitation with 646 passengers on 13 trips. Seventy-six percent of the visitation occurred in the spring (February-May). Visitation by the concession boats was spread throughout the year with no visitation in July and September. No data were available for October, but visitation is typically low then and there were not any particularly good tides that month.

Table 6. Visitors to South Frenchy's Cove, Anacapa Island in 2001 (visitation with Island Packers)

YEAR	MONTH	#Passengers	#TRIPS	Pass/trip
2001	January	42	1	42
2001	February	71	2	36
2001	March	646	13	50
2001	April	460	9	51
2001	May	227	4	57
2001	June	72	1	72
2001	July	0	0	0
2001	August	160	3	53
2001	September	0	0	0
2001	October	nd	nd	nd
2001	November	120	2	60
2001	December	52	2	26
2001	Total	1850	37	50

Figure 10. Visitation at Frenchy's Cove, Anacapa Island by month. Island Packers visitation figures.



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 B. Explanations for missing or incomplete data are usually found there. Summary tables and figures in the trip reports present additional information on species monitored. Photoplot data tables use the combinations of species in lumped categories used in previous reporting (most notable, *Hesperophycus* and *Silvetia* which were reported together as rockweed. Complete results of seastar, surfgrass and motile invertebrate sampling are presented in the daily trip reports.

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

Species Diversity

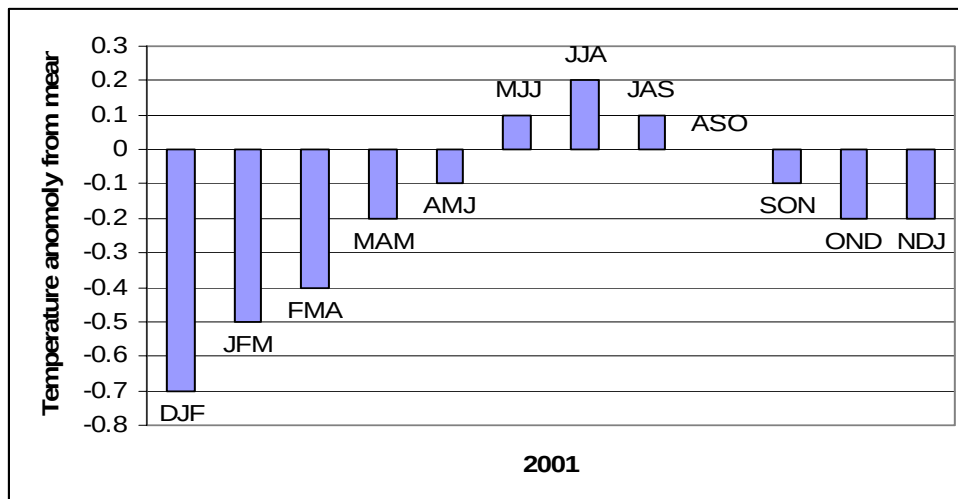
General species surveys were done only at the four San Miguel Island sites in spring 2001. Species lists were also generated from the comprehensive surveys by the UCSC crew. *Analipus japonica* was again found at Crook Point in spring 2001.

Discussion

Data show that 2001 was a fairly average year for the rockweeds, *Hesperophycus californicus* and *Silvetia compressa*, mussels, *Mytilus californianus*, and leaf barnacles, *Pollicipes polymerus*. Cover of the red alga *Endocladia muricata*, was fairly dense at many of the sites and the photoplot data support that observation with the mean cover being higher than the long-term mean at most sites. Acorn barnacles, *Chthamalus* spp. and *Balanus glandula*, and red thatched barnacles, *Tetraclita rubescens*, were both slightly below the long-term mean.

2001 was a fairly typical year for weather and sea temperature. The average yearly mean temperature from the all of the Channel Islands National Park Kelp Forest Monitoring Data was 14.5°C (NPS unpublished). Though the kelp forest mean temperature from the kelp forest monitoring was essentially the same as it was in 2000, the sea-surface temperatures (Fig. 11) were not as anomalous as in 2000 and were even above the running mean in early summer while in 2000 anomalies for all months stayed below normal (NOAA Climate Prediction Center website).

Figure 11. 2001 sea temperature anomalies by three month running mean (NOAA Climate Prediction Center website)



The PISCO intertidal team from UC Santa Cruz joined us in fall 2001 to conduct biodiversity survey transects at 17 of the sites. Besides getting a lot of work done we had a good time and we all learned a lot. The biodiversity surveys cluster sites by species

lists generated from the transects, and found them to cluster by water temperature with San Miguel, San Nicolas, Santa Rosa, western Santa Cruz, and South Frenchy's cove clustering together in a cold water group. Eastern Santa Cruz, Middle Anacapa, and Santa Barbara Island clustered together in a middle group, and sites at Catalina clustered in their own warm water group. (See <http://cbsurveys.ucsc.edu/findings/islandpatterns.html>).

Withering Syndrome, a prokaryote infection, caused the massive die off of black abalone in the mid-1980's (Richards and Davis 1993). As of 2001, there had been no real sign of recovery in the population. Abalone searches received less than optimal effort in 2001 particularly at Santa Rosa Island because of conditions and time spent with the biodiversity surveys. This won't affect the long-term picture because little annual change is expected or has been seen to this point. The most abalone found in about an hour of searching at one site was 84 at Otter Harbor, about what used to be present in one of the monitoring plots. We did find a couple of juvenile abalone at San Miguel Island (40 mm or less) indicating there has been some recruitment in the last three years; however, juveniles remain extremely rare. Large abalone were found at Santa Cruz, Santa Rosa, and San Miguel Islands indicating that some animals survived the plague and continue to thrive.

No diseased abalone were observed in 2001 however we did see some diseased purple sea urchins, *Strongylocentrotus purpuratus* at Harris Point, and Otter Harbor. A bacterial infection (Lafferty and Kushner 1999) causes lesions in the shell and loss of spines on the affected urchins. We do not monitor sea urchins in the intertidal; however, sea urchin numbers in the subtidal increased at San Miguel Island in 2000 (Kushner et al. 2001).

The decline in owl limpet numbers at all Santa Cruz Island sites is hard to explain. We watched the numbers drop at Johnson's Lee and Ford Point on Santa Rosa Island in the 1990s without ever determining a cause. The limpet numbers at those two sites were extremely dense at the beginning of monitoring. Densities are now in line with other sites at other islands and the populations seem to be relatively stable. The Santa Cruz Island decline is very gradual but the populations were lower to begin with. As we observed at Santa Rosa Island, the drop in numbers corresponds to an increase in the mean size. The population of owl limpets appears to be shifting towards larger (older) individuals

with a decline in the smallest size groups in recent years which may signal a recruitment failure. All three sites on Santa Cruz Island have plots on mostly horizontal surfaces among the mussel beds so there may be some competition at play between the two species. At the least, we would expect to see mussels colonize the open areas of the plots if owl limpets decline.

Some of the decline we have seen may just be a factor of the initial plot selection. Plots were identified in areas having high densities of adult owl limpets. Juveniles were generally avoided or certainly not targeted because of the difficulty in finding them and distinguishing them from other species. For the later reason we do not generally count individuals that are less than 15 mm in shell length.

Willows Anchorage is noteworthy because it has smaller limpets than other sites. The plots there are within the upper reaches of the mussel zone on mostly horizontal rock. Plots at many of the other sites are on large boulders or on sloping surfaces. Limpet plots at Otter Harbor are mostly horizontal and there are numerous mussels within the plots.

Motile invertebrate counts have been employed to gain a better understanding of the whole intertidal community. From the photoplots we get information about the cover of algae and sessile invertebrates but it is difficult to see smaller snails, crabs, and chitons from the photos and even field scoring does not adequately record their presence because they are relatively rare and are typically hidden under other organisms. Counts within the photoplots may not be as statistically rigorous as they would be in random plots, but the photoplots provide useful information about the cover and overall change over the years. The methodology of the counts has been evolving somewhat mostly as we try to deal with sub-sampling hundreds or even thousands of littorine snails and small limpets.

As the data set grows the patterns will become clearer and the usefulness of these data will increase. We expect to see some patterns related to zonation, for example littorines being most abundant in the barnacle zone or *Lepidochitona* spp. in the *Silvetia* zone. One of the striking observations is how different the predatory snails can be between sites and islands. The predatory snail, *Nucella emarginata*, was typically common at

most sites but rare at both Santa Barbara Island sites and at Scorpion Rock where another snail, *Ocenebra circumtexta* was abundant. *Ocenebra* were rare at most other sites. Another predatory snail, *Acanthina* spp. could be abundant where *N. emarginata* was also common. *Tegula gallina*, speckled tegula (turban snails), have a more southerly distribution than *Tegula funebris*, (black turban snails) with their northern range listed as Santa Barbara (McLean 1978), so it is noteworthy when we find them at the northern islands. In 2001, *T. gallina* were found at Harris Point, Willows, Trailer, Fraser Cove, Willows Anchorage, and Sea Lion Rookery

In January 2001, a program review workshop for the CINP rocky intertidal monitoring was held in at the Rancho Marino UC Natural Reserve in Cambria, California (Lafferty 2001). Power analyses of the data were performed and the results were presented at the workshop (Minchinton and Raimondi 2001). As summarized in Lafferty's (2001) report, in most cases that met the assumptions for Before-After-Control-Impact analysis, it was possible to detect a 20% change 80% of the time (the target goal of the monitoring program). Comparisons using the Endocladia zone assemblage had the weakest power, most likely because of inherent seasonal variability. Addition of sites and more frequent sampling was not called for; however, the existing multiple sites and twice annual sampling provide a high degree of flexibility for analysis. In other words, the recommendation was to keep the same sites and sampling frequency. Lafferty (2001) also points out that negative trends in the data may be over represented because of the initial selection of high density quadrats.

Thirty participants discussed the program and provided useful suggestions for improving the monitoring. Recommendations included expanding monitoring sites to accommodate additional photoplot zones, owl limpet plots, and surfgrass transects where practical. Recommendations were aimed towards covering the full range of key species monitored on each island and standardizing the information gathered with other programs within the Multi-Agency Rocky Intertidal Network (MARINE). To achieve this recommendation, plans were made to split barnacle plots into *Balanus/Chthamalus* and/or *Tetraclita rubescens* zones and split rockweed plots into *Silvetia* or *Hesperophycus* zones, adding additional plots where needed. It was also recommended that we expand the list of species identified in the scoring. Some of these recommendations had already begun being phased in prior to 2001, based on general

MARINe protocol. Those protocol changes were summarized in Richards and Lerma (2000).

In 2001, we continued assessing the monitoring sites for practical additions and later convened a small group to make some final decisions. We had already added owl limpet plots at two Anacapa Island sites in 1999. In 2001, we added owl limpet plots at two sites on San Miguel Island and added a set of three surfgrass transects on Santa Rosa Island. We also began to carefully define the site areas for more consistent seastar and black abalone counts and add reference marks for consistent area photos.

Further recommendations were delayed until 2002 as field time allowed. These recommendations included adding photoplots in additional target zones, and new surfgrass transects at East Point. Some suggested additions would be logistically difficult (because of limited access to certain sites) and these recommendations may be held for future consideration. We decided that future monitoring will include owl limpet monitoring only in the fall and motile invertebrates only in the spring to avoid overloading on tasks for the minimal number of tides. Those species tend not to vary seasonally and annual sampling should be adequate. Current operations make it very difficult to visit a site more than once a season so we are limited to what one crew can do during one low tide cycle. Larger crews are difficult because of the constraints of transportation and island housing. If funding were available, additional trained staff could be used to form the core of a second crew so that monitoring could occur at two islands at the same time.

Continued participation in MARINe was called for and recommendations were made for taxonomy workshops with other intertidal monitoring crews (MARINe) to continue to work towards standardization of techniques and taxonomy. The Minerals Management Service (MMS) sponsored taxonomic workshop for MARINe in fall 2001 was a big success. Everyone learned new species as well as a number of name changes. We also had a chance to discuss standardization of procedures and the central database.

Acknowledgments

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Members of the PISCO SWAT- Erin Maloney, Kristin Kusic, Megan Williams, Allison Kendall, Lydia Bergen, Jenny Raum (volunteer), Shawna Resewitz (volunteer), Jeff Hinke (volunteer), Alex Wyndham (UCSB), Carol Blanchette, John Kovach, Clara Svedlund, Kara Cox, (Sherri, Maria, Melissa PISCO Oregon).

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Appendix A. Photoquadrat Data

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 primarily *Mytilus* spp. with *Mytilus californianus* dominating at all sites, but may include *Septifer bifurcates* or *Brachidontes adamsianus*. Misc. Algae and Misc. animals include a variety of different species. In the past these species have not been identified, however, we are beginning to note the species and add them to the database. Species identified in 2001 may be identified in the database but are lumped here for convenience. Bare Rock is just that, however we had no way to detect the presence of Cyanobacteria. The other category is a “catch-all” category and in 2001 was used only for *Phyllospadix* spp. at Landing Cove.

Percent Cover of Index Species S Frenchy's Cove, Anacapa Island - Spring 2001 (3/20/01)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	249	38	28	0	33	0	0	0	0	0	0	0	1	0	100
	250	46	30	0	13	0	0	0	0	0	8	0	3	0	100
	251	71	26	0	2	0	0	0	0	0	0	1	0	0	100
	252	59	27	0	5	0	0	0	0	0	9	0	0	0	100
	253	36	40	0	21	0	1	0	0	0	0	1	1	0	100
	Mean	50.00	30.20	.00	14.80	.00	.20	.00	.00	.00	3.40	.40	1.00	.00	100.00
	StDev	14.82	5.67	.00	12.58	.00	.45	.00	.00	.00	4.67	.55	1.22	.00	.00
Endocladia	154	30	7	0	63	0	0	0	0	0	0	0	0	0	100
	155	11	1	0	72	0	15	0	0	0	0	0	1	0	100
	256	13	1	0	51	19	2	0	0	0	14	0	0	0	100
	257	9	0	0	88	0	0	0	0	0	3	0	0	0	100
	258	12	0	0	36	0	50	0	0	0	2	0	0	0	100
	Mean	15.00	1.80	.00	62.00	3.80	13.40	.00	.00	.00	3.80	.00	.20	.00	100.00
	StDev	8.51	2.95	.00	19.84	8.50	21.40	.00	.00	.00	5.85	.00	.45	.00	.00
Silvetia (Rockweed)	259	0	0	0	0	0	95	0	0	0	4	1	0	0	100
	260	22	10	0	9	9	32	1	0	0	17	0	0	0	100
	261	1	0	0	0	0	87	0	0	0	10	2	0	0	100
	262	46	19	0	9	0	4	0	0	0	22	0	0	0	100
	263	11	0	0	1	0	77	0	0	0	11	0	0	0	100
	Mean	16.00	5.80	.00	3.80	1.80	59.00	.20	.00	.00	12.80	.60	.00	.00	100.00
	StDev	18.99	8.56	.00	4.76	4.02	39.24	.45	.00	.00	6.91	.89	.00	.00	.00
Mussels	201	0	0	0	0	0	0	28	0	0	72	0	0	0	100
	202	1	0	2	0	0	0	59	0	0	33	5	0	0	100
	264	1	0	0	0	0	0	48	0	0	47	4	0	0	100
	265	5	1	3	0	0	0	62	0	0	29	0	0	0	100
	266	13	2	8	0	0	0	46	0	0	29	2	0	0	100
	Mean	4.00	.60	2.60	.00	.00	.00	48.60	.00	.00	42.00	2.20	.00	.00	100.00
	StDev	5.39	.89	3.29	.00	.00	.00	13.41	.00	.00	18.33	2.28	.00	.00	.00

Percent Cover of Index Species
Crook Point, San Miguel Island - Spring 2001 (4/5/01)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	137	82	18	0	0	0	0	0	0	0	0	0	0	100
	147	58	29	0	0	0	0	0	0	10	3	0	0	100
	148	65	35	0	0	0	0	0	0	0	0	0	0	100
	149	49	40	0	3	0	0	4	0	0	4	0	0	100
	495	36	56	0	7	0	0	0	0	0	1	0	0	100
	Mean	58.00	35.60	.00	2.00	.00	.00	.80	.00	2.00	1.60	.00	.00	100.00
	StDev	17.25	14.05	.00	3.08	.00	.00	1.79	.00	4.47	1.82	.00	.00	.00
Endocladia	386	54	25	0	16	0	1	1	0	0	3	0	0	100
	387	30	11	2	9	0	0	1	0	43	4	0	0	100
	388	34	29	0	28	0	0	0	0	7	2	0	0	100
	389	35	23	0	7	1	2	28	0	3	1	0	0	100
	390	28	15	0	17	0	0	12	1	27	0	0	0	100
	Mean	36.20	20.60	.40	15.40	.20	.60	8.40	.20	16.00	2.00	.00	.00	100.00
	StDev	10.35	7.40	.89	8.26	.45	.89	12.01	.45	18.41	1.58	.00	.00	.00
Silvetia (Rockweed)	396	40	23	0	10	0	2	14	6	5	0	0	0	100
	397	8	4	0	0	0	0	75	0	13	0	0	0	100
	398	40	17	1	3	0	1	26	0	12	0	0	0	100
	399	31	2	0	0	0	1	0	0	65	1	0	0	100
	400	43	32	2	8	0	2	0	0	7	6	0	0	100
	Mean	32.40	15.60	.60	4.20	.00	1.20	23.00	1.20	20.40	1.40	.00	.00	100.00
	StDev	14.36	12.70	.89	4.60	.00	.84	31.03	2.68	25.16	2.61	.00	.00	.00
Mussels	381	16	15	0	0	0	0	41	2	26	0	0	0	100
	382	1	0	0	0	0	0	99	0	0	0	0	0	100
	383	4	0	0	0	0	0	86	0	9	1	0	0	100
	384	7	1	1	0	0	0	79	7	4	1	0	0	100
	385	7	2	2	0	0	0	66	7	12	4	0	0	100
	Mean	7.00	3.60	.60	.00	.00	.00	74.20	3.20	10.20	1.20	.00	.00	100.00
	StDev	5.61	6.43	.89	.00	.00	.00	22.06	3.56	9.96	1.64	.00	.00	.00

Percent Cover of Index Species Cuyler Harbor, San Miguel Island - Spring 2001 (4/6/01)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	416	64	35	0	0	0	0	0	0	0	1	0	0	100
	417	47	49	0	3	0	0	0	0	0	0	1	0	100
	418	53	44	0	1	0	0	0	0	1	1	0	0	100
	419	69	16	0	14	0	0	0	0	1	0	0	0	100
	420	60	17	0	21	0	0	0	0	0	2	0	0	100
	Mean	58.60	32.20	.00	7.80	.00	.00	.00	.00	.40	.80	.20	.00	100.00
	StDev	8.73	15.19	.00	9.26	.00	.00	.00	.00	.55	.84	.45	.00	.00
Endocladia	411	42	2	0	25	0	0	15	0	10	6	0	0	100
	412	30	28	1	25	0	1	10	0	4	1	0	0	100
	413	35	1	0	22	0	36	0	0	6	0	0	0	100
	414	21	1	0	75	0	0	0	0	3	0	0	0	100
	415	44	0	0	52	0	0	0	0	3	1	0	0	100
	Mean	34.40	6.40	.20	39.80	.00	7.40	5.00	.00	5.20	1.60	.00	.00	100.00
	StDev	9.34	12.10	.45	23.15	.00	15.99	7.07	.00	2.95	2.51	.00	.00	.00
Silvetia (Rockweed)	406	21	0	1	0	0	48	1	0	13	16	0	0	100
	407	15	0	0	0	0	71	0	0	10	4	0	0	100
	408	20	0	0	0	0	65	0	0	10	5	0	0	100
	409	11	0	1	0	0	77	0	0	11	0	0	0	100
	410	17	0	1	0	0	69	0	0	9	4	0	0	100
	Mean	16.80	.00	.60	.00	.00	66.00	.20	.00	10.60	5.80	.00	.00	100.00
	StDev	4.02	.00	.55	.00	.00	10.95	.45	.00	1.52	6.02	.00	.00	.00
Mussels	401	17	0	3	0	0	0	71	2	1	6	0	0	100
	402	7	0	1	0	0	0	81	3	1	7	0	0	100
	403	19	0	1	0	0	0	64	2	2	12	0	0	100
	404	31	1	16	0	0	0	31	0	10	11	0	0	100
	405	46	1	6	0	0	0	22	0	7	18	0	0	100
	Mean	24.00	.40	5.40	.00	.00	.00	53.80	1.40	4.20	10.80	.00	.00	100.00
	StDev	14.97	.55	6.27	.00	.00	.00	25.84	1.34	4.09	4.76	.00	.00	.00

Percent Cover of Index Species
Harris Point, San Miguel Island - Spring 2001 (4/3/01)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetraclita	Endocladia	Hesperophycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	440	35	57	0	4	0	0	0	0	3	1	0	0	100
	Mean StDev	35.00	57.00	.00	4.00	.00	.00	.00	.00	3.00	1.00	.00	.00	100.00
Endocladia	431	33	29	3	16	0	0	5	0	13	1	0	0	100
	432	3	7	0	80	0	0	0	0	10	0	0	0	100
	433	9	3	1	87	0	0	0	0	0	0	0	0	100
	434	25	5	0	55	12	0	0	0	3	0	0	0	100
	435	8	1	0	38	43	0	0	0	10	0	0	0	100
	Mean	15.60	9.00	.80	55.20	11.00	.00	1.00	.00	7.20	.20	.00	.00	100.00
	StDev	12.76	11.40	1.30	29.41	18.63	.00	2.24	.00	5.45	.45	.00	.00	.00
Mussels	426	19	0	0	4	0	0	54	5	17	1	0	0	100
	427	32	1	9	11	0	0	19	0	28	0	0	0	100
	428	40	9	0	3	0	0	24	0	20	4	0	0	100
	429	35	2	3	1	0	0	53	0	4	2	0	0	100
	430	16	0	3	0	0	0	55	1	24	1	0	0	100
	Mean	28.40	2.40	3.00	3.80	.00	.00	41.00	1.20	18.60	1.60	.00	.00	100.00
	StDev	10.41	3.78	3.67	4.32	.00	.00	17.90	2.17	9.15	1.52	.00	.00	.00
Tetraclita	436	29	4	29	0	0	0	13	0	25	0	0	0	100
	437	17	0	20	0	0	0	25	0	38	0	0	0	100
	438	38	2	3	0	0	0	0	0	52	5	0	0	100
	439	26	1	3	19	0	0	8	0	43	0	0	0	100
	Mean StDev	27.50 8.66	1.75 1.71	13.75 12.95	4.75 9.50	.00 .00	.00 .00	11.50 10.47	.00 .00	39.50 11.27	1.25 2.50	.00 .00	.00 .00	100.00 .00
Hesperophycus	421	29	3	0	31	37	0	0	0	0	0	0	0	100
	422	29	2	0	34	20	0	0	0	14	1	0	0	100
	423	28	6	0	50	14	0	0	0	2	0	0	0	100
	424	27	6	0	32	35	0	0	0	0	0	0	0	100
	425	37	5	0	8	43	0	0	0	7	0	0	0	100
	Mean	30.00	4.40	.00	31.00	29.80	.00	.00	.00	4.60	.20	.00	.00	100.00
	StDev	4.00	1.82	.00	15.00	12.24	.00	.00	.00	5.98	.45	.00	.00	.00

Percent Cover of Index Species
Otter Harbor, San Miguel Island - Spring 2001 (4/4/01)

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	15	8	0	0	0	0	0	0	0	77	0	0	0	100
	371	13	21	0	0	0	0	0	0	0	57	0	9	0	100
	372	55	41	0	0	0	0	0	0	0	0	4	0	0	100
	373	51	33	0	1	0	0	0	0	0	10	0	5	0	100
	374	0	0	0	0	0	0	0	0	0	100	0	0	0	100
	Mean	26.80	20.60	.00	.20	.00	.00	.00	.00	.00	48.80	.80	2.80	.00	100.00
	StDev	24.64	16.98	.00	.45	.00	.00	.00	.00	.00	42.93	1.79	4.09	.00	.00
Endocladia	360	13	21	0	42	0	11	2	0	3	8	0	0	0	100
	361	15	0	0	66	0	6	1	0	0	12	0	0	0	100
	362	7	0	0	74	0	0	2	0	0	17	0	0	0	100
	363	2	0	0	39	0	32	0	0	0	27	0	0	0	100
	364	9	0	0	59	0	10	0	0	0	22	0	0	0	100
	Mean	9.20	4.20	.00	56.00	.00	11.80	1.00	.00	.60	17.20	.00	.00	.00	100.00
	StDev	5.12	9.39	.00	15.15	.00	12.09	1.00	.00	1.34	7.60	.00	.00	.00	.00
Silvetia (Rockweed)	355	10	0	0	41	0	38	0	0	0	9	0	2	0	100
	356	9	1	0	10	0	65	0	0	0	15	0	0	0	100
	357	15	0	1	29	0	37	0	0	0	18	0	0	0	100
	358	47	4	0	25	6	0	0	0	0	15	1	2	0	100
	359	23	48	0	15	0	0	0	0	0	12	2	0	0	100
	Mean	20.80	10.60	.20	24.00	1.20	28.00	.00	.00	.00	13.80	.60	.80	.00	100.00
	StDev	15.66	20.97	.45	12.17	2.68	27.92	.00	.00	.00	3.42	.89	1.10	.00	.00
Mussels	375	10	0	0	0	0	0	63	0	8	18	1	0	0	100
	376	21	0	1	0	0	0	53	0	0	24	1	0	0	100
	378	5	1	2	0	0	0	48	0	12	32	0	0	0	100
	379	12	0	1	0	0	0	59	0	15	13	0	0	0	100
	380	4	0	0	1	0	0	63	0	4	28	0	0	0	100
	Mean	10.40	.20	.80	.20	.00	.00	57.20	.00	7.80	23.00	.40	.00	.00	100.00
	StDev	6.80	.45	.84	.45	.00	.00	6.57	.00	6.02	7.62	.55	.00	.00	.00

Percent Cover of Index Species Fraser Cove, Santa Cruz Island - Spring 2001 (5/27/01)

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	0	0	0	3	0	0	0	0	0	97	0	0	0	100
	877	0	0	0	11	0	0	0	0	0	89	0	0	0	100
	878	51	38	0	2	0	0	0	0	0	2	0	7	0	100
	879	29	61	0	7	0	0	0	0	0	3	0	0	0	100
	880	25	13	0	13	0	0	0	0	0	49	0	0	0	100
	Mean	21.00	22.40	.00	7.20	.00	.00	.00	.00	.00	48.00	.00	1.40	.00	100.00
	StDev	21.58	26.58	.00	4.82	.00	.00	.00	.00	.00	45.34	.00	3.13	.00	.00
Endocladia	881	12	2	0	31	0	0	1	0	0	53	1	0	0	100
	882	8	1	0	18	0	0	0	0	0	73	0	0	0	100
	883	4	0	0	59	9	0	0	0	0	28	0	0	0	100
	884	7	5	0	85	0	0	0	0	0	3	0	0	0	100
	885	7	0	0	87	0	0	0	0	0	6	0	0	0	100
	Mean	7.60	1.60	.00	56.00	1.80	.00	.20	.00	.00	32.60	.20	.00	.00	100.00
	StDev	2.88	2.07	.00	31.14	4.02	.00	.45	.00	.00	30.22	.45	.00	.00	.00
Silvetia (Rockweed)	896	4	0	0	4	29	63	0	0	0	0	0	0	0	100
	897	5	0	0	1	10	55	0	0	0	29	0	0	0	100
	898	5	0	0	2	0	91	0	0	0	1	1	0	0	100
	899	14	4	0	4	1	65	0	0	0	12	0	0	0	100
	900	4	0	0	0	20	76	0	0	0	0	0	0	0	100
	Mean	6.40	.80	.00	2.20	12.00	70.00	.00	.00	.00	8.40	.20	.00	.00	100.00
	StDev	4.28	1.79	.00	1.79	12.47	13.93	.00	.00	.00	12.58	.45	.00	.00	.00
Mussels	891	13	0	0	0	0	0	50	0	0	6	31	0	0	100
	892	29	3	0	0	0	0	50	0	0	11	7	0	0	100
	893	5	1	0	0	0	0	74	0	2	1	17	0	0	100
	894	8	1	1	0	0	0	79	0	3	1	7	0	0	100
	895	7	1	1	0	0	0	79	0	3	2	7	0	0	100
	Mean	12.40	1.20	.40	.00	.00	.00	66.40	.00	1.60	4.20	13.80	.00	.00	100.00
	StDev	9.74	1.10	.55	.00	.00	.00	15.11	.00	1.52	4.32	10.55	.00	.00	.00
Pollicipes	901	22	3	9	2	0	0	38	0	11	11	4	0	0	100
	902	16	1	0	29	0	0	18	0	11	14	11	0	0	100
	903	2	2	0	0	0	0	34	0	22	8	32	0	0	100
	904	17	8	4	0	0	0	39	0	13	6	13	0	0	100
	905	4	2	0	0	0	0	42	0	19	6	27	0	0	100
	Mean	12.20	3.20	2.60	6.20	.00	.00	34.20	.00	15.20	9.00	17.40	.00	.00	100.00
	StDev	8.73	2.77	3.97	12.77	.00	.00	9.50	.00	5.02	3.46	11.67	.00	.00	.00

Percent Cover of Index Species
Fraser Cove, Santa Cruz Island - Spring 2001 (5/27/01)

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	10	0	0	0	0	0	0	0	20	0	60	0	100
	907	18	25	0	0	0	0	0	0	0	19	0	38	0	100
	908	20	25	0	0	0	0	0	0	0	0	0	55	0	100
	909	27	16	0	0	0	0	0	0	0	5	0	52	0	100
	910	24	4	0	0	0	0	0	0	0	1	0	71	0	100
	Mean	19.80	16.00	.00	.00	.00	.00	.00	.00	.00	9.00	.00	55.20	.00	100.00
	StDev	6.50	9.25	.00	.00	.00	.00	.00	.00	.00	9.77	.00	12.03	.00	.00
Hesperophycus	886	82	6	0	2	7	0	0	0	0	3	0	0	0	100
	887	52	4	0	4	30	0	0	0	0	10	0	0	0	100
	888	30	21	0	19	19	11	0	0	0	0	0	0	0	100
	889	40	9	0	5	8	1	0	0	0	37	0	0	0	100
	890	15	4	0	12	56	10	0	0	0	3	0	0	0	100
	Mean	43.80	8.80	.00	8.40	24.00	4.40	.00	.00	.00	10.60	.00	.00	.00	100.00
	StDev	25.30	7.12	.00	7.02	20.19	5.59	.00	.00	.00	15.21	.00	.00	.00	.00

Percent Cover of Index Species
Orizaba Cove, Santa Cruz Island - Spring 2001 (3/21/01)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetraclita	Endocladia	Hesperophycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	851	73	17	8	0	0	0	0	0	2	0	0	0	100
	852	13	84	0	0	0	0	0	0	3	0	0	0	100
	853	36	62	0	0	0	0	0	0	1	1	0	0	100
	854	37	46	2	0	0	0	1	0	14	0	0	0	100
	855	25	68	1	0	0	0	0	0	6	0	0	0	100
	Mean	36.80	55.40	2.20	.00	.00	.00	.20	.00	5.20	.20	.00	.00	100.00
	StDev	22.45	25.41	3.35	.00	.00	.00	.45	.00	5.26	.45	.00	.00	.00
Silvetia (Rockweed)	866	45	4	6	0	0	1	22	0	20	2	0	0	100
	867	47	5	6	1	0	20	0	0	21	0	0	0	100
	868	25	32	10	2	0	4	8	0	18	1	0	0	100
	869	46	11	11	1	0	5	0	0	23	3	0	0	100
	870	36	14	11	8	2	11	0	0	16	2	0	0	100
	Mean	39.80	13.20	8.80	2.40	.40	8.20	6.00	.00	19.60	1.60	.00	.00	100.00
	StDev	9.36	11.30	2.59	3.21	.89	7.53	9.59	.00	2.70	1.14	.00	.00	.00
Mussels	861	7	2	4	0	0	0	87	0	0	0	0	0	100
	862	1	0	0	0	0	0	96	3	0	0	0	0	100
	863	2	0	1	0	0	0	91	2	4	0	0	0	100
	864	3	0	1	0	0	0	93	2	1	0	0	0	100
	865	11	0	0	0	0	0	52	9	25	3	0	0	100
	Mean	4.80	.40	1.20	.00	.00	.00	83.80	3.20	6.00	.60	.00	.00	100.00
	StDev	4.15	.89	1.64	.00	.00	.00	18.07	3.42	10.75	1.34	.00	.00	.00
Tetraclita	871	11	16	40	1	0	0	9	0	22	1	0	0	100
	872	26	1	37	0	0	0	17	3	8	8	0	0	100
	873	38	1	42	2	0	0	4	0	10	3	0	0	100
	874	20	0	43	0	0	0	8	4	17	8	0	0	100
	875	43	3	27	2	0	0	14	1	8	2	0	0	100
	Mean	27.60	4.20	37.80	1.00	.00	.00	10.40	1.60	13.00	4.40	.00	.00	100.00
	StDev	13.05	6.69	6.46	1.00	.00	.00	5.13	1.82	6.24	3.36	.00	.00	.00
Hesperophycus	856	13	10	0	58	11	1	3	0	4	0	0	0	100
	857	28	13	3	48	1	0	0	0	7	0	0	0	100
	858	35	1	0	37	23	2	0	0	2	0	0	0	100
	859	16	17	0	67	0	0	0	0	0	0	0	0	100
	860	30	18	0	46	1	0	0	0	4	0	1	0	100
	Mean	24.40	11.80	.60	51.20	7.20	.60	.60	.00	3.40	.00	.20	.00	100.00
	StDev	9.45	6.83	1.34	11.56	9.91	.89	1.34	.00	2.61	.00	.45	.00	.00

Percent Cover of Index Species
Prisoner's Harbor, Santa Cruz Island - Spring 2001 (4/2/01)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	826	52	0	0	0	0	0	0	0	48	0	0	0	100
	827	20	0	0	5	0	25	0	0	50	0	0	0	100
	828	30	11	0	35	0	17	0	0	7	0	0	0	100
	829	41	29	1	17	0	0	0	0	11	1	0	0	100
	830	56	19	0	16	0	4	0	0	4	1	0	0	100
	Mean	39.80	11.80	.20	14.60	.00	9.20	.00	.00	24.00	.40	.00	.00	100.00
	StDev	15.01	12.52	.45	13.50	.00	11.26	.00	.00	22.97	.55	.00	.00	.00
Endocladia	831	12	5	0	78	1	0	0	0	3	1	0	0	100
	832	6	8	0	71	14	0	0	0	1	0	0	0	100
	833	14	23	0	60	2	0	0	0	1	0	0	0	100
	834	15	16	0	61	6	0	0	0	2	0	0	0	100
	835	10	9	0	65	14	0	0	0	2	0	0	0	100
	Mean	11.40	12.20	.00	67.00	7.40	.00	.00	.00	1.80	.20	.00	.00	100.00
	StDev	3.58	7.26	.00	7.52	6.31	.00	.00	.00	.84	.45	.00	.00	.00
Silvetia (Rockweed)	846	2	0	0	0	0	94	0	0	4	0	0	0	100
	847	9	0	0	0	0	74	1	0	16	0	0	0	100
	848	0	0	0	0	0	90	0	0	10	0	0	0	100
	849	0	0	0	0	0	96	0	0	4	0	0	0	100
	850	1	0	0	0	0	81	0	0	18	0	0	0	100
	Mean	2.40	.00	.00	.00	.00	87.00	.20	.00	10.40	.00	.00	.00	100.00
	StDev	3.78	.00	.00	.00	.00	9.27	.45	.00	6.54	.00	.00	.00	.00
Mussels	841	2	0	0	0	0	0	84	0	3	11	0	0	100
	842	3	0	0	0	0	0	92	0	3	2	0	0	100
	843	3	0	0	0	0	0	96	0	0	1	0	0	100
	844	2	0	0	0	0	0	92	0	3	3	0	0	100
	845	19	0	4	0	0	0	52	1	17	7	0	0	100
	Mean	5.80	.00	.80	.00	.00	.00	83.20	.20	5.20	4.80	.00	.00	100.00
	StDev	7.40	.00	1.79	.00	.00	.00	17.98	.45	6.72	4.15	.00	.00	.00
Hesperophycus	836	23	11	0	35	30	0	0	0	1	0	0	0	100
	837	43	18	0	26	10	0	0	0	3	0	0	0	100
	838	40	4	0	16	32	0	0	0	8	0	0	0	100
	839	47	31	0	14	6	2	0	0	0	0	0	0	100
	840	30	28	0	19	19	0	0	0	1	3	0	0	100
	Mean	36.60	18.40	.00	22.00	19.40	.40	.00	.00	2.60	.60	.00	.00	100.00
	StDev	9.86	11.33	.00	8.57	11.61	.89	.00	.00	3.21	1.34	.00	.00	.00

Percent Cover of Index Species
Willows Anchorage, Santa Cruz Island - Spring 2001 (5/28/01)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Endocladia	931	33	0	0	66	0	0	0	0	1	0	0	0	100
	932	47	0	0	52	0	0	0	0	1	0	0	0	100
	933	46	1	0	53	0	0	0	0	0	0	0	0	100
	934	43	0	0	56	0	0	0	0	1	0	0	0	100
	935	61	0	3	34	0	0	0	0	2	0	0	0	100
	Mean	46.00	.20	.60	52.20	.00	.00	.00	.00	1.00	.00	.00	.00	100.00
	StDev	10.05	.45	1.34	11.58	.00	.00	.00	.00	.71	.00	.00	.00	.00
Silvetia (Rockweed)	946	1	0	0	0	0	91	0	0	8	0	0	0	100
	947	27	0	0	1	0	54	0	0	16	2	0	0	100
	948	75	0	0	24	0	0	0	0	1	0	0	0	100
	949	49	0	0	45	0	0	0	0	6	0	0	0	100
	950	74	0	0	1	0	7	0	0	10	8	0	0	100
	Mean	45.20	.00	.00	14.20	.00	30.40	.00	.00	8.20	2.00	.00	.00	100.00
	StDev	31.69	.00	.00	19.97	.00	40.70	.00	.00	5.50	3.46	.00	.00	.00
Mussels	941	13	0	24	0	0	0	27	4	30	2	0	0	100
	942	22	0	1	0	0	0	46	14	14	3	0	0	100
	943	9	0	1	0	0	0	48	14	19	9	0	0	100
	944	12	0	2	0	0	0	47	13	15	11	0	0	100
	945	9	0	0	0	0	0	63	0	23	5	0	0	100
	Mean	13.00	.00	5.60	.00	.00	.00	46.20	9.00	20.20	6.00	.00	.00	100.00
	StDev	5.34	.00	10.31	.00	.00	.00	12.79	6.56	6.53	3.87	.00	.00	.00
Hesperophycus	936	96	0	0	4	0	0	0	0	0	0	0	0	100
	937	85	3	0	3	2	0	0	0	7	0	0	0	100
	938	89	4	0	1	3	0	0	0	3	0	0	0	100
	939	49	0	0	0	3	34	0	0	13	1	0	0	100
	940	44	0	0	6	31	3	0	0	15	1	0	0	100
	Mean	72.60	1.40	.00	2.80	7.80	7.40	.00	.00	7.60	.40	.00	.00	100.00
	StDev	24.21	1.95	.00	2.39	13.03	14.93	.00	.00	6.39	.55	.00	.00	.00

Percent Cover of Index Species Scorpion Rock, Santa Cruz Island - Spring 2001 (3/19/01)

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	20	20	1	59	0	0	0	0	0	0	0	0	0	100
	802	55	16	1	28	0	0	0	0	0	0	0	0	0	100
	803	66	8	0	21	0	0	1	0	0	3	1	0	0	100
	804	37	19	0	41	0	0	0	0	0	3	0	0	0	100
	805	69	30	0	0	0	0	0	0	0	1	0	0	0	100
	Mean	49.40	18.60	.40	29.80	.00	.00	.20	.00	.00	1.40	.20	.00	.00	100.00
	StDev	20.67	7.92	.55	22.06	.00	.00	.45	.00	.00	1.52	.45	.00	.00	.00
Endocladia	806	37	2	0	47	0	0	0	0	0	14	0	0	0	100
	807	28	3	7	35	0	0	1	0	0	26	0	0	0	100
	808	26	2	0	37	0	0	3	0	7	23	2	0	0	100
	809	41	12	0	43	0	0	1	0	0	2	1	0	0	100
	810	73	6	0	7	0	0	0	0	2	12	0	0	0	100
	Mean	41.00	5.00	1.40	33.80	.00	.00	1.00	.00	1.80	15.40	.60	.00	.00	100.00
	StDev	18.93	4.24	3.13	15.72	.00	.00	1.22	.00	3.03	9.53	.89	.00	.00	.00
Mussels	816	1	0	0	0	0	0	98	0	0	1	0	0	0	100
	817	11	0	2	0	0	0	71	0	0	13	3	0	0	100
	818	7	0	2	0	0	0	83	0	6	1	1	0	0	100
	819	10	1	1	0	0	0	81	0	2	5	0	0	0	100
	820	4	0	1	0	0	0	89	0	0	5	1	0	0	100
	Mean	6.60	.20	1.20	.00	.00	.00	84.40	.00	1.60	5.00	1.00	.00	.00	100.00
	StDev	4.16	.45	.84	.00	.00	.00	9.99	.00	2.61	4.90	1.22	.00	.00	.00
Tetraclita	821	32	5	19	11	0	0	6	0	6	20	1	0	0	100
	822	32	0	4	20	0	0	26	0	1	16	1	0	0	100
	823	53	0	6	0	0	0	29	0	0	10	2	0	0	100
	824	48	2	14	0	0	0	27	0	1	6	2	0	0	100
	825	35	0	14	0	0	0	27	0	0	21	3	0	0	100
	Mean	40.00	1.40	11.40	6.20	.00	.00	23.00	.00	1.60	14.60	1.80	.00	.00	100.00
	StDev	9.82	2.19	6.23	9.07	.00	.00	9.57	.00	2.51	6.47	.84	.00	.00	.00
Hesperophycus	811	21	2	0	32	41	0	0	0	0	4	0	0	0	100
	812	13	0	0	35	32	6	0	0	0	12	2	0	0	100
	813	11	0	0	19	26	39	0	0	0	5	0	0	0	100
	814	8	0	0	12	41	10	0	0	0	28	1	0	0	100
	815	6	0	0	27	59	0	0	0	0	8	0	0	0	100
	Mean	11.80	.40	.00	25.00	39.80	11.00	.00	.00	.00	11.40	.60	.00	.00	100.00
	StDev	5.81	.89	.00	9.46	12.48	16.22	.00	.00	.00	9.79	.89	.00	.00	.00

Percent Cover of Index Species
Trailer, Santa Cruz Island - Spring 2001 (5/26/01)

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	66	18	0	5	0	0	0	0	0	11	0	0	0	100
	912	74	26	0	0	0	0	0	0	0	0	0	0	0	100
	913	45	44	0	11	0	0	0	0	0	0	0	0	0	100
	914	52	48	0	0	0	0	0	0	0	0	0	0	0	100
	915	33	67	0	0	0	0	0	0	0	0	0	0	0	100
	Mean	54.00	40.60	.00	3.20	.00	.00	.00	.00	.00	2.20	.00	.00	.00	100.00
	StDev	16.36	19.28	.00	4.87	.00	.00	.00	.00	.00	4.92	.00	.00	.00	.00
Silvetia (Rockweed)	926	6	0	0	0	0	94	0	0	0	0	0	0	0	100
	927	22	0	0	0	0	77	0	0	0	1	0	0	0	100
	928	21	3	0	4	0	72	0	0	0	0	0	0	0	100
	929	5	0	0	0	0	90	0	0	0	5	0	0	0	100
	930	2	1	0	0	0	97	0	0	0	0	0	0	0	100
	Mean	11.20	.80	.00	.80	.00	86.00	.00	.00	.00	1.20	.00	.00	.00	100.00
	StDev	9.52	1.30	.00	1.79	.00	10.93	.00	.00	.00	2.17	.00	.00	.00	.00
Mussels	921	14	2	2	0	0	0	73	0	4	4	1	0	0	100
	922	12	0	0	0	0	0	68	0	0	12	8	0	0	100
	923	12	0	0	0	0	0	66	0	1	12	9	0	0	100
	924	20	3	5	0	0	0	64	0	4	0	4	0	0	100
	925	14	1	1	2	0	0	72	0	2	3	5	0	0	100
	Mean	14.40	1.20	1.60	.40	.00	.00	68.60	.00	2.20	6.20	5.40	.00	.00	100.00
	StDev	3.29	1.30	2.07	.89	.00	.00	3.85	.00	1.79	5.50	3.21	.00	.00	.00
Hesperophycus	916	65	2	0	15	11	7	0	0	0	0	0	0	0	100
	917	24	0	0	17	12	47	0	0	0	0	0	0	0	100
	918	47	3	0	24	3	21	0	0	0	2	0	0	0	100
	919	46	3	0	5	28	18	0	0	0	0	0	0	0	100
	920	58	10	0	9	16	3	0	0	0	4	0	0	0	100
	Mean	48.00	3.60	.00	14.00	14.00	19.20	.00	.00	.00	1.20	.00	.00	.00	100.00
	StDev	15.57	3.78	.00	7.35	9.14	17.24	.00	.00	.00	1.79	.00	.00	.00	.00

Percent Cover of Index Species
East Point, Santa Rosa Island - Spring 2001 (4/28/01)

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	77	21	0	0	0	0	0	0	0	1	1	0	0	100
	576	22	11	0	31	31	1	0	0	0	4	0	0	0	100
	577	24	40	0	34	0	2	0	0	0	0	0	0	0	100
	578	89	11	0	0	0	0	0	0	0	0	0	0	0	100
	579	79	20	0	1	0	0	0	0	0	0	0	0	0	100
	Mean StDev	58.20 32.46	20.60 11.84	.00 .00	13.20 17.66	6.20 13.86	.60 .89	.00 .00	.00 .00	.00 .00	1.00 1.73	.20 .45	.00 .00	.00 .00	100.00 .00
Endocladia	580	17	0	0	64	13	5	1	0	0	0	0	0	0	100
	581	17	0	0	72	10	0	0	0	0	1	0	0	0	100
	582	8	0	0	42	42	8	0	0	0	0	0	0	0	100
	583	20	2	0	66	11	0	0	0	0	1	0	0	0	100
	584	11	1	0	80	8	0	0	0	0	0	0	0	0	100
	Mean StDev	14.60 4.93	.60 .89	.00 .00	64.80 14.18	16.80 14.20	2.60 3.71	.20 .45	.00 .00	.00 .00	.40 .55	.00 .00	.00 .00	.00 .00	100.00 .00
Silvetia (Rockweed)	585	10	0	0	1	0	69	0	0	0	20	0	0	0	100
	586	14	0	0	1	0	71	0	0	0	11	3	0	0	100
	587	4	0	0	0	0	93	0	0	0	3	0	0	0	100
	588	5	0	0	0	0	85	0	0	0	9	1	0	0	100
	589	11	0	0	3	0	76	0	0	0	10	0	0	0	100
	Mean StDev	8.80 4.21	.00 .00	.00 .00	1.00 1.22	.00 .00	78.80 10.06	.00 .00	.00 .00	.00 .00	10.60 6.11	.80 1.30	.00 .00	.00 .00	100.00 .00
Mussels	590	10	0	0	0	0	0	67	0	0	15	8	0	0	100
	591	11	0	0	0	0	0	63	0	0	14	12	0	0	100
	592	6	0	0	0	0	0	70	0	0	13	11	0	0	100
	593	1	0	0	0	0	0	91	0	0	4	4	0	0	100
	594	11	0	0	0	0	0	69	0	0	12	8	0	0	100
	Mean StDev	7.80 4.32	.00 .00	.00 .00	.00 .00	.00 .00	.00 .00	72.00 10.95	.00 .00	.00 .00	11.60 4.39	8.60 3.13	.00 .00	.00 .00	100.00 .00

Percent Cover of Index Species
Ford Point, Santa Rosa Island - Spring 2001 (4/26/01)

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	12	0	0	0	0	0	0	0	8	7	0	0	100
	521	45	54	0	0	0	0	0	0	0	0	1	0	0	100
	522	85	14	0	0	0	0	0	0	0	0	1	0	0	100
	523	23	35	0	39	0	0	0	0	0	0	3	0	0	100
	524	81	19	0	0	0	0	0	0	0	0	0	0	0	100
	Mean	61.40	26.80	.00	7.80	.00	.00	.00	.00	.00	1.60	2.40	.00	.00	100.00
	StDev	26.55	17.68	.00	17.44	.00	.00	.00	.00	.00	3.58	2.79	.00	.00	.00
Endocladia	525	21	1	0	62	0	0	2	0	0	11	3	0	0	100
	526	34	7	0	49	0	0	7	0	0	2	1	0	0	100
	527	30	1	0	47	0	0	2	0	0	18	2	0	0	100
	528	41	1	0	38	0	0	8	0	0	8	4	0	0	100
	529	39	3	1	48	0	0	2	0	0	6	1	0	0	100
	Mean	33.00	2.60	.20	48.80	.00	.00	4.20	.00	.00	9.00	2.20	.00	.00	100.00
	StDev	7.97	2.61	.45	8.58	.00	.00	3.03	.00	.00	6.00	1.30	.00	.00	.00
Mussels	530	25	2	0	1	0	0	13	0	0	57	2	0	0	100
	531	9	0	0	0	0	0	86	0	0	2	3	0	0	100
	532	14	0	0	0	0	0	77	0	0	3	6	0	0	100
	533	41	0	0	0	0	0	43	0	0	15	1	0	0	100
	534	23	0	0	0	0	0	22	0	1	39	15	0	0	100
	Mean	22.40	.40	.00	.20	.00	.00	48.20	.00	.20	23.20	5.40	.00	.00	100.00
	StDev	12.28	.89	.00	.45	.00	.00	32.45	.00	.45	24.07	5.68	.00	.00	.00

Percent Cover of Index Species
Fossil Reef, Santa Rosa Island - Spring 2001 (4/27/01)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	605	67	31	0	1	0	0	0	0	0	0	1	0	0	100
	606	57	36	0	0	0	0	0	0	0	5	0	2	0	100
	607	55	44	0	0	0	0	0	0	0	0	0	1	0	100
	608	77	20	0	0	0	0	0	0	0	3	0	0	0	100
	609	66	34	0	0	0	0	0	0	0	0	0	0	0	100
	Mean	64.40	33.00	.00	.20	.00	.00	.00	.00	.00	1.60	.20	.60	.00	100.00
	StDev	8.82	8.72	.00	.45	.00	.00	.00	.00	.00	2.30	.45	.89	.00	.00
Endocladia	610	45	45	0	9	0	0	0	0	0	1	0	0	0	100
	611	67	30	0	0	0	0	0	0	0	0	3	0	0	100
	612	54	1	0	0	0	42	0	0	0	0	3	0	0	100
	613	58	9	0	29	0	2	0	0	0	0	2	0	0	100
	614	28	0	0	0	0	67	0	0	0	5	0	0	0	100
	Mean	50.40	17.00	.00	7.60	.00	22.20	.00	.00	.00	1.20	1.60	.00	.00	100.00
	StDev	14.81	19.76	.00	12.58	.00	30.79	.00	.00	.00	2.17	1.52	.00	.00	.00
Silvetia (Rockweed)	615	83	5	0	0	0	0	1	0	0	11	0	0	0	100
	616	79	9	0	1	0	0	0	0	0	10	1	0	0	100
	617	66	4	0	4	0	21	0	0	0	4	1	0	0	100
	618	60	2	0	17	0	0	0	0	0	19	2	0	0	100
	619	78	3	0	9	0	0	0	0	0	5	5	0	0	100
	Mean	73.20	4.60	.00	6.20	.00	4.20	.20	.00	.00	9.80	1.80	.00	.00	100.00
	StDev	9.73	2.70	.00	6.98	.00	9.39	.45	.00	.00	5.97	1.92	.00	.00	.00
Mussels	620	9	0	7	1	0	0	25	0	0	21	37	0	0	100
	621	22	1	7	0	0	0	23	0	0	17	30	0	0	100
	622	23	1	23	0	0	0	36	0	1	7	9	0	0	100
	623	24	0	11	0	0	0	34	0	7	15	9	0	0	100
	624	6	0	1	0	0	0	2	0	0	41	50	0	0	100
	Mean	16.80	.40	9.80	.20	.00	.00	24.00	.00	1.60	20.20	27.00	.00	.00	100.00
	StDev	8.58	.55	8.20	.45	.00	.00	13.51	.00	3.05	12.70	17.93	.00	.00	.00

Percent Cover of Index Species
Johnson's Lee, Santa Rosa Island - Spring 2001 (4/29/01)

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	54	45	0	1	0	0	0	0	0	0	0	0	0	100
	501	52	48	0	0	0	0	0	0	0	0	0	0	0	100
	502	79	18	0	0	0	0	0	0	0	0	3	0	0	100
	503	21	32	0	45	0	0	1	0	0	0	1	0	0	100
	504	69	22	1	2	0	0	0	0	0	1	5	0	0	100
	Mean	55.00	33.00	.20	9.60	.00	.00	.20	.00	.00	.20	1.80	.00	.00	100.00
	StDev	22.01	13.38	.45	19.81	.00	.00	.45	.00	.00	.45	2.17	.00	.00	.00
Endocladia	505	30	2	1	34	0	0	31	0	0	1	1	0	0	100
	506	29	1	1	69	0	0	0	0	0	0	0	0	0	100
	507	28	0	0	58	0	0	11	0	0	2	1	0	0	100
	508	32	9	0	38	0	0	14	0	2	3	2	0	0	100
	509	47	0	0	52	0	0	0	0	0	1	0	0	0	100
	Mean	33.20	2.40	.40	50.20	.00	.00	11.20	.00	.40	1.40	.80	.00	.00	100.00
	StDev	7.85	3.78	.55	14.39	.00	.00	12.76	.00	.89	1.14	.84	.00	.00	.00
Mussels	510	3	1	1	3	0	0	1	0	0	46	45	0	0	100
	511	9	3	0	0	0	0	2	0	0	23	63	0	0	100
	512	30	0	1	0	0	0	55	0	6	6	2	0	0	100
	513	14	0	1	0	0	0	24	0	0	29	32	0	0	100
	514	6	0	0	0	0	0	2	0	1	49	42	0	0	100
	Mean	12.40	.80	.60	.60	.00	.00	16.80	.00	1.40	30.60	36.80	.00	.00	100.00
	StDev	10.64	1.30	.55	1.34	.00	.00	23.45	.00	2.61	17.62	22.44	.00	.00	.00

Percent Cover of Index Species NW Talcott, Santa Rosa Island - Spring 2001 (4/30/01)

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	52	41	0	4	0	0	0	0	0	0	0	3	0	100
	561	52	43	0	2	0	0	0	0	0	1	1	1	0	100
	562	67	29	0	0	0	0	0	0	0	1	3	0	0	100
	563	55	2	0	1	0	39	0	0	0	1	2	0	0	100
	564	24	72	0	0	0	0	0	0	0	2	2	0	0	100
	Mean	50.00	37.40	.00	1.40	.00	7.80	.00	.00	.00	1.00	1.60	.80	.00	100.00
	StDev	15.80	25.32	.00	1.67	.00	17.44	.00	.00	.00	.71	1.14	1.30	.00	.00
Endocladia	555	37	0	0	42	0	21	0	0	0	0	0	0	0	100
	556	78	7	0	5	0	0	0	0	0	7	3	0	0	100
	557	22	0	0	11	0	51	0	0	0	11	5	0	0	100
	558	25	29	0	15	0	0	1	0	0	29	1	0	0	100
	559	67	1	0	1	0	0	0	0	0	29	2	0	0	100
	Mean	45.80	7.40	.00	14.80	.00	14.40	.20	.00	.00	15.20	2.20	.00	.00	100.00
	StDev	25.31	12.42	.00	16.13	.00	22.39	.45	.00	.00	13.20	1.92	.00	.00	.00
Silvetia (Rockweed)	565	19	0	0	0	0	73	0	0	0	8	0	0	0	100
	566	25	0	0	0	0	74	0	0	0	1	0	0	0	100
	567	10	0	0	0	0	76	0	0	0	9	5	0	0	100
	568	36	0	0	36	0	27	0	0	0	1	0	0	0	100
	569	80	2	0	0	0	13	0	0	0	3	2	0	0	100
	Mean	34.00	.40	.00	7.20	.00	52.60	.00	.00	.00	4.40	1.40	.00	.00	100.00
	StDev	27.40	.89	.00	16.10	.00	30.19	.00	.00	.00	3.85	2.19	.00	.00	.00
Mussels	550	14	1	0	0	0	0	68	0	8	4	5	0	0	100
	551	17	0	1	0	0	0	73	0	0	6	3	0	0	100
	552	18	0	1	0	0	0	63	0	12	3	3	0	0	100
	553	47	0	2	0	0	0	28	0	0	11	12	0	0	100
	554	25	0	3	0	0	0	51	0	5	11	5	0	0	100
	Mean	24.20	.20	1.40	.00	.00	.00	56.60	.00	5.00	7.00	5.60	.00	.00	100.00
	StDev	13.37	.45	1.14	.00	.00	.00	17.95	.00	5.20	3.81	3.71	.00	.00	.00

Percent Cover of Index Species Cat Rock, Anacapa Island - Fall 2001 (10/18/01)

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	35	24	0	23	16	0	0	0	0	0	2	0	0	100
	32	15	6	0	31	41	3	0	0	0	4	0	0	0	100
	33	4	3	0	1	91	0	0	0	0	1	0	0	0	100
	35	15	4	0	5	74	0	0	0	0	2	0	0	0	100
	36	12	4	0	4	70	2	0	0	0	6	2	0	0	100
	37	15	6	0	5	61	5	0	0	0	7	1	0	0	100
	38	51	40	0	5	0	0	0	0	0	3	1	0	0	100
	39	28	15	0	5	50	1	0	0	0	1	0	0	0	100
	135	21	2	0	3	63	5	0	0	0	6	0	0	0	100
	Mean	21.78	11.56	.00	9.11	51.78	1.78	.00	.00	.00	3.33	.67	.00	.00	100.00
	StDev	14.22	12.83	.00	10.42	28.84	2.11	.00	.00	.00	2.55	.87	.00	.00	.00
Endocladia	13	21	7	14	45	0	0	0	0	0	10	3	0	0	100
	14	24	8	20	22	0	0	2	0	0	16	8	0	0	100
	19	16	0	0	16	47	17	0	0	0	4	0	0	0	100
	51	9	0	9	4	0	0	1	24	0	47	6	0	0	100
	52	5	0	2	39	0	0	1	14	0	39	0	0	0	100
	54	0	2	12	20	0	0	1	29	0	33	3	0	0	100
	212	17	6	3	57	0	4	5	0	0	8	0	0	0	100
	467	15	3	19	37	0	0	2	3	0	19	2	0	0	100
	492	17	6	2	43	3	10	0	0	0	16	3	0	0	100
	Mean	13.78	3.56	9.00	31.44	5.56	3.44	1.33	7.78	.00	21.33	2.78	.00	.00	100.00
	StDev	7.69	3.24	7.66	16.85	15.57	6.11	1.58	11.61	.00	14.90	2.77	.00	.00	.00
Silvetia (Rockweed)	2	20	6	0	7	28	32	0	0	0	6	1	0	0	100
	3	3	0	0	1	89	2	0	0	0	5	0	0	0	100
	4	4	1	0	1	44	45	0	0	0	5	0	0	0	100
	5	15	11	16	25	4	8	3	0	0	13	5	0	0	100
	6	5	0	0	8	36	47	0	0	0	4	0	0	0	100
	8	9	0	0	0	13	78	0	0	0	0	0	0	0	100
	9	2	0	0	6	10	78	0	0	0	4	0	0	0	100
	10	1	0	0	0	27	68	0	0	0	4	0	0	0	100
	55	21	24	9	26	0	0	2	0	0	16	2	0	0	100
	Mean	8.89	4.67	2.78	8.22	27.89	39.78	.56	.00	.00	6.33	.89	.00	.00	100.00
	StDev	7.83	8.20	5.78	10.27	27.27	31.38	1.13	.00	.00	4.97	1.69	.00	.00	.00

Percent Cover of Index Species
Cat Rock, Anacapa Island - Fall 2001 (10/18/01)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	Silvetia	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Mussels	56	7	3	31	0	0	0	24	0	2	28	5	0	0	100
	164	14	1	20	0	0	0	43	0	3	16	3	0	0	100
	203	16	1	18	0	0	0	36	0	0	24	5	0	0	100
	204	4	1	11	0	0	0	59	0	0	21	4	0	0	100
	468	3	2	19	0	0	0	11	4	0	55	6	0	0	100
	470	28	4	18	2	0	0	20	0	0	25	3	0	0	100
	471	23	0	22	8	0	0	6	1	2	37	1	0	0	100
	472	2	0	14	0	0	0	58	1	2	20	3	0	0	100
	473	27	1	16	0	0	0	31	0	0	21	4	0	0	100
	Mean	13.78	1.44	18.78	1.11	.00	.00	32.00	.67	1.00	27.44	3.78	.00	.00	100.00
	StDev	10.39	1.33	5.63	2.67	.00	.00	18.93	1.32	1.22	11.93	1.48	.00	.00	.00

Percent Cover of Index Species
Middle-East, Anacapa Island - Fall 2001 (10/17/01)

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	44	16	18	7	0	0	2	0	0	12	1	0	0	100
	244	59	9	4	23	0	0	0	0	0	4	1	0	0	100
	245	60	7	10	18	0	0	2	0	1	2	0	0	0	100
	Mean	54.33	10.67	10.67	16.00	.00	.00	1.33	.00	.33	6.00	.67	.00	.00	100.00
	StDev	8.96	4.73	7.02	8.19	.00	.00	1.15	.00	.58	5.29	.58	.00	.00	.00
Endocladia	240	18	0	2	49	5	15	0	0	0	11	0	0	0	100
	241	24	2	10	18	7	0	6	0	0	33	0	0	0	100
	242	27	0	0	45	10	0	1	0	0	17	0	0	0	100
	Mean	23.00	.67	4.00	37.33	7.33	5.00	2.33	.00	.00	20.33	.00	.00	.00	100.00
	StDev	4.58	1.15	5.29	16.86	2.52	8.66	3.21	.00	.00	11.37	.00	.00	.00	.00
Silvetia (Rockweed)	53	13	0	0	8	0	37	11	3	0	28	0	0	0	100
	237	0	0	0	1	1	91	0	0	0	7	0	0	0	100
	469	0	0	1	1	0	90	0	0	0	8	0	0	0	100
	Mean	4.33	.00	.33	3.33	.33	72.67	3.67	1.00	.00	14.33	.00	.00	.00	100.00
	StDev	7.51	.00	.58	4.04	.58	30.89	6.35	1.73	.00	11.85	.00	.00	.00	.00
Mussels	476	7	0	4	0	0	0	65	0	0	24	0	0	0	100
	477	3	0	7	0	0	0	64	1	0	24	1	0	0	100
	478	0	0	1	0	0	0	61	0	0	37	1	0	0	100
	Mean	3.33	.00	4.00	.00	.00	.00	63.33	.33	.00	28.33	.67	.00	.00	100.00
	StDev	3.51	.00	3.00	.00	.00	.00	2.08	.58	.00	7.51	.58	.00	.00	.00

Percent Cover of Index Species
Middle-West, Anacapa Island - Fall 2001 (10/17/01)

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	40	16	0	28	0	0	2	0	0	14	0	0	0	100
	448	26	11	0	23	0	0	5	2	0	33	0	0	0	100
	449	44	8	0	0	7	0	0	0	0	41	0	0	0	100
	450	44	11	0	14	4	0	0	0	0	26	1	0	0	100
	451	53	4	0	29	0	0	0	0	0	13	1	0	0	100
	Mean StDev	41.40 9.84	10.00 4.42	.00 .00	18.80 12.07	2.20 3.19	.00 .00	1.40 2.19	.40 .89	.00 .00	25.40 12.10	.40 .55	.00 .00	.00 .00	100.00 .00
Endocladia	457	29	0	1	19	0	0	8	1	0	39	3	0	0	100
	458	53	2	1	11	0	0	5	0	1	24	3	0	0	100
	459	50	0	0	10	0	0	2	1	0	33	4	0	0	100
	460	48	7	0	30	0	0	0	0	0	15	0	0	0	100
	461	45	2	0	37	11	0	1	0	0	4	0	0	0	100
	Mean StDev	45.00 9.41	2.20 2.86	.40 .55	21.40 11.84	2.20 4.92	.00 .00	3.20 3.27	.40 .55	.20 .45	23.00 13.98	2.00 1.87	.00 .00	.00 .00	100.00 .00
Silvetia (Rockweed)	452	11	2	2	6	0	72	0	0	0	7	0	0	0	100
	453	9	0	1	2	0	85	0	0	0	3	0	0	0	100
	454	18	1	10	0	0	2	22	0	2	40	5	0	0	100
	455	3	0	0	2	0	84	0	3	0	5	3	0	0	100
	456	10	0	0	0	0	84	2	0	0	4	0	0	0	100
	Mean StDev	10.20 5.36	.60 .89	2.60 4.22	2.00 2.45	.00 .00	65.40 35.84	4.80 9.65	.60 1.34	.40 .89	11.80 15.83	1.60 2.30	.00 .00	.00 .00	100.00 .00
Mussels	462	14	0	3	0	0	0	52	2	1	28	0	0	0	100
	463	25	0	6	0	0	0	31	0	0	36	2	0	0	100
	464	15	0	6	0	0	0	35	0	3	40	1	0	0	100
	465	17	0	1	0	0	0	54	0	1	27	0	0	0	100
	466	3	0	0	0	0	0	84	0	0	12	1	0	0	100
	Mean StDev	14.80 7.89	.00 .00	3.20 2.77	.00 .00	.00 .00	.00 .00	51.20 20.95	.40 .89	1.00 1.22	28.60 10.76	.80 .84	.00 .00	.00 .00	100.00 .00

Percent Cover of Index Species
S Frenchy's Cove, Anacapa Island - Fall 2001 (10/16/01)

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	31	27	0	40	0	0	0	0	0	0	1	1	0	100
	250	43	30	0	19	0	0	0	0	0	4	2	2	0	100
	251	61	28	0	2	0	0	0	0	0	7	2	0	0	100
	252	34	32	0	13	0	0	0	0	0	18	3	0	0	100
	253	38	37	0	22	3	0	0	0	0	0	0	0	0	100
	Mean	41.40	30.80	.00	19.20	.60	.00	.00	.00	.00	5.80	1.60	.60	.00	100.00
	StDev	11.84	3.96	.00	13.92	1.34	.00	.00	.00	.00	7.43	1.14	.89	.00	.00
Endocladia	154	7	7	0	74	0	0	0	0	0	10	2	0	0	100
	155	1	3	0	83	0	8	0	0	0	2	2	1	0	100
	256	7	0	0	49	11	3	0	1	0	29	0	0	0	100
	257	14	0	0	71	0	0	0	2	0	13	0	0	0	100
	258	5	0	0	38	0	57	0	0	0	0	0	0	0	100
	Mean	6.80	2.00	.00	63.00	2.20	13.60	.00	.60	.00	10.80	.80	.20	.00	100.00
	StDev	4.71	3.08	.00	18.75	4.92	24.48	.00	.89	.00	11.52	1.10	.45	.00	.00
Silvetia (Rockweed)	259	0	0	0	0	0	97	0	0	0	3	0	0	0	100
	260	7	8	0	6	10	54	0	1	0	14	0	0	0	100
	261	0	0	0	0	0	100	0	0	0	0	0	0	0	100
	262	54	0	0	23	0	5	0	0	0	15	3	0	0	100
	263	1	0	0	0	0	98	0	0	0	0	1	0	0	100
	Mean	12.40	1.60	.00	5.80	2.00	70.80	.00	.20	.00	6.40	.80	.00	.00	100.00
	StDev	23.44	3.58	.00	9.96	4.47	41.51	.00	.45	.00	7.50	1.30	.00	.00	.00
Mussels	201	0	0	0	0	0	0	26	20	0	53	1	0	0	100
	202	2	0	0	0	0	0	58	8	0	32	0	0	0	100
	264	1	0	1	0	0	0	64	13	0	21	0	0	0	100
	265	3	0	0	0	0	0	71	5	0	21	0	0	0	100
	266	3	3	0	0	0	0	51	6	1	36	0	0	0	100
	Mean	1.80	.60	.20	.00	.00	.00	54.00	10.40	.20	32.60	.20	.00	.00	100.00
	StDev	1.30	1.34	.45	.00	.00	.00	17.31	6.19	.45	13.20	.45	.00	.00	.00

Percent Cover of Index Species
Crook Point, San Miguel Island - Fall 2001 (11/14/01)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	137	81	11	0	0	0	0	0	0	0	8	0	0	100
	147	51	40	0	0	0	0	0	0	0	9	0	0	100
	148	56	41	0	0	0	0	0	0	0	3	0	0	100
	149	35	57	0	4	0	0	2	0	0	2	0	0	100
	495	29	61	0	6	0	0	1	0	1	2	0	0	100
	Mean	50.40	42.00	.00	2.00	.00	.00	.60	.00	.20	4.80	.00	.00	100.00
	StDev	20.39	19.70	.00	2.83	.00	.00	.89	.00	.45	3.42	.00	.00	.00
Endocladia	386	33	28	0	27	0	5	1	0	1	5	0	0	100
	387	23	0	2	21	0	0	0	0	49	5	0	0	100
	388	20	26	0	35	0	1	0	0	18	0	0	0	100
	389	27	10	1	20	0	9	27	1	4	1	0	0	100
	390	27	9	0	22	0	0	18	2	22	0	0	0	100
	Mean	26.00	14.60	.60	25.00	.00	3.00	9.20	.60	18.80	2.20	.00	.00	100.00
	StDev	4.90	11.99	.89	6.20	.00	3.94	12.56	.89	19.10	2.59	.00	.00	.00
Silvetia (Rockweed)	396	40	11	0	15	0	4	16	6	5	3	0	0	100
	397	6	5	0	0	0	0	82	0	7	0	0	0	100
	398	28	25	0	6	0	1	22	1	13	4	0	0	100
	399	40	3	0	1	0	2	0	0	53	1	0	0	100
	400	48	16	3	16	0	2	1	0	11	3	0	0	100
	Mean	32.40	12.00	.60	7.60	.00	1.80	24.20	1.40	17.80	2.20	.00	.00	100.00
	StDev	16.40	8.89	1.34	7.57	.00	1.48	33.68	2.61	19.93	1.64	.00	.00	.00
Mussels	381	5	9	0	0	0	0	48	3	35	0	0	0	100
	382	0	0	0	0	0	0	100	0	0	0	0	0	100
	383	6	0	0	0	0	0	89	0	5	0	0	0	100
	384	7	0	1	0	0	0	77	5	10	0	0	0	100
	385	18	4	0	0	0	0	57	11	9	1	0	0	100
	Mean	7.20	2.60	.20	.00	.00	.00	74.20	3.80	11.80	.20	.00	.00	100.00
	StDev	6.61	3.97	.45	.00	.00	.00	21.65	4.55	13.55	.45	.00	.00	.00

Percent Cover of Index Species Cuyler Harbor, San Miguel Island - Fall 2001 (11/13/01)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	416	44	56	0	0	0	0	0	0	0	0	0	0	100
	417	33	66	0	0	0	0	0	0	1	0	0	0	100
	418	44	53	0	1	0	0	0	0	1	1	0	0	100
	419	73	21	0	6	0	0	0	0	0	0	0	0	100
	420	67	16	0	16	0	0	0	0	1	0	0	0	100
	Mean	52.20	42.40	.00	4.60	.00	.00	.00	.00	.60	.20	.00	.00	100.00
	StDev	16.99	22.41	.00	6.84	.00	.00	.00	.00	.55	.45	.00	.00	.00
Endocladia	411	57	1	0	16	0	0	11	0	5	10	0	0	100
	412	29	45	1	16	0	0	7	0	2	0	0	0	100
	413	34	0	0	12	0	43	5	0	5	1	0	0	100
	414	21	1	0	73	0	0	0	0	5	0	0	0	100
	415	64	0	0	23	0	0	0	0	7	6	0	0	100
	Mean	41.00	9.40	.20	28.00	.00	8.60	4.60	.00	4.80	3.40	.00	.00	100.00
	StDev	18.56	19.91	.45	25.47	.00	19.23	4.72	.00	1.79	4.45	.00	.00	.00
Silvetia (Rockweed)	406	18	0	0	0	0	63	0	0	13	6	0	0	100
	407	15	0	0	0	0	65	0	0	16	4	0	0	100
	408	4	0	0	0	0	85	0	0	8	3	0	0	100
	409	6	0	0	0	0	86	0	0	5	3	0	0	100
	410	5	0	0	0	0	92	0	0	3	0	0	0	100
	Mean	9.60	.00	.00	.00	.00	78.20	.00	.00	9.00	3.20	.00	.00	100.00
	StDev	6.43	.00	.00	.00	.00	13.26	.00	.00	5.43	2.17	.00	.00	.00
Mussels	401	10	1	4	1	0	0	80	2	0	2	0	0	100
	402	6	0	0	0	0	0	87	0	5	2	0	0	100
	403	12	1	0	0	0	0	67	2	10	8	0	0	100
	404	27	0	4	0	0	0	42	0	20	7	0	0	100
	405	35	0	9	0	0	0	28	0	19	9	0	0	100
	Mean	18.00	.40	3.40	.20	.00	.00	60.80	.80	10.80	5.60	.00	.00	100.00
	StDev	12.39	.55	3.71	.45	.00	.00	25.11	1.10	8.70	3.36	.00	.00	.00

Percent Cover of Index Species Harris Point, San Miguel Island - Fall 2001 (11/16/01)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetraclita	Endocladia	Hesperophycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	440	23	71	0	2	0	0	0	0	3	1	0	0	100
	Mean StDev	23.00	71.00	.00	2.00	.00	.00	.00	.00	3.00	1.00	.00	.00	100.00
Endocladia	431	24	22	1	27	0	0	8	0	14	4	0	0	100
	432	13	25	0	40	1	0	1	0	19	1	0	0	100
	433	33	30	0	24	0	0	0	0	10	3	0	0	100
	434	35	2	0	30	27	0	0	0	5	1	0	0	100
	435	11	0	0	28	47	0	0	0	13	1	0	0	100
	Mean StDev	23.20	15.80	.20	29.80	15.00	.00	1.80	.00	12.20	2.00	.00	.00	100.00
Mussels	426	17	0	2	1	0	0	51	0	25	4	0	0	100
	427	19	2	2	6	2	0	15	0	50	4	0	0	100
	428	34	1	1	3	0	0	27	0	30	4	0	0	100
	429	26	1	4	1	0	0	52	0	12	4	0	0	100
	430	15	0	1	0	0	0	54	1	25	4	0	0	100
	Mean StDev	22.20	.80	2.00	2.20	.40	.00	39.80	.20	28.40	4.00	.00	.00	100.00
Tetraclita	436	7	3	23	1	0	0	15	0	45	6	0	0	100
	437	8	1	17	0	0	0	26	3	44	1	0	0	100
	438	16	0	0	5	0	0	1	0	76	2	0	0	100
	439	13	1	2	23	0	0	2	0	58	1	0	0	100
	Mean StDev	11.00	1.25	10.50	7.25	.00	.00	11.00	.75	55.75	2.50	.00	.00	100.00
		4.24	1.26	11.27	10.72	.00	.00	11.86	1.50	14.93	2.38	.00	.00	.00
Hesperophycus	421	13	2	0	18	62	0	0	0	4	1	0	0	100
	422	13	1	0	9	61	0	0	0	14	2	0	0	100
	423	8	0	0	24	64	0	0	0	4	0	0	0	100
	424	37	3	0	15	41	0	0	0	1	3	0	0	100
	425	53	0	0	13	16	0	0	0	18	0	0	0	100
	Mean StDev	24.80	1.20	.00	15.80	48.80	.00	.00	.00	8.20	1.20	.00	.00	100.00
		19.40	1.30	.00	5.63	20.56	.00	.00	.00	7.36	1.30	.00	.00	.00

Percent Cover of Index Species Otter Harbor, San Miguel Island - Fall 2001 (11/15/01)

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	79	21	0	0	0	0	0	0	0	0	0	0	0	100
	371	39	53	0	0	0	0	0	0	0	0	1	7	0	100
	372	50	47	0	0	0	0	0	0	0	1	2	0	0	100
	373	37	48	0	0	0	0	0	0	0	3	3	9	0	100
	374	0	0	0	0	0	0	0	28	0	72	0	0	0	100
	Mean	41.00	33.80	.00	.00	.00	.00	.00	5.60	.00	15.20	1.20	3.20	.00	100.00
	StDev	28.40	22.64	.00	.00	.00	.00	.00	12.52	.00	31.78	1.30	4.44	.00	.00
Endocladia	360	10	24	4	24	0	12	1	0	1	24	0	0	0	100
	361	19	1	0	43	0	10	0	0	0	25	2	0	0	100
	362	4	0	0	80	0	0	2	0	0	14	0	0	0	100
	363	9	0	0	49	0	10	0	0	0	32	0	0	0	100
	364	12	0	0	52	0	7	0	0	0	28	1	0	0	100
	Mean	10.80	5.00	.80	49.60	.00	7.80	.60	.00	.20	24.60	.60	.00	.00	100.00
	StDev	5.45	10.63	1.79	20.18	.00	4.71	.89	.00	.45	6.69	.89	.00	.00	.00
Silvetia (Rockweed)	355	4	0	0	18	6	54	0	0	0	16	0	2	0	100
	356	2	0	1	12	0	69	0	0	0	16	0	0	0	100
	357	10	0	0	21	0	34	0	0	0	34	1	0	0	100
	358	43	8	0	16	10	0	0	0	0	19	3	1	0	100
	359	22	57	0	8	0	0	0	0	0	5	6	2	0	100
	Mean	16.20	13.00	.20	15.00	3.20	31.40	.00	.00	.00	18.00	2.00	1.00	.00	100.00
	StDev	16.89	24.84	.45	5.10	4.60	31.24	.00	.00	.00	10.42	2.55	1.00	.00	.00
Mussels	375	5	0	1	0	0	0	60	0	5	29	0	0	0	100
	376	4	0	0	0	0	0	46	0	1	49	0	0	0	100
	378	3	0	0	0	0	0	47	0	11	39	0	0	0	100
	379	5	0	2	0	0	0	47	0	12	34	0	0	0	100
	380	3	0	0	0	0	0	67	0	2	28	0	0	0	100
	Mean	4.00	.00	.60	.00	.00	.00	53.40	.00	6.20	35.80	.00	.00	.00	100.00
	StDev	1.00	.00	.89	.00	.00	.00	9.56	.00	5.07	8.58	.00	.00	.00	.00

Percent Cover of Index Species Landing Cove, Santa Barbara Island - Fall 2001 (11/30/01)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	315	52	16	10	8	0	0	1	0	0	13	0	0	0	100
	316	17	4	8	8	0	0	0	0	0	63	0	0	0	100
	317	41	3	16	5	0	0	2	0	1	32	0	0	0	100
	318	21	1	28	0	0	0	32	0	0	14	4	0	0	100
	319	53	3	3	1	0	0	0	0	0	38	2	0	0	100
	Mean	36.80	5.40	13.00	4.40	.00	.00	7.00	.00	.20	32.00	1.20	.00	.00	100.00
	StDev	16.98	6.02	9.59	3.78	.00	.00	14.00	.00	.45	20.51	1.79	.00	.00	.00
Silvetia (Rockweed)	310	18	4	0	0	0	0	7	0	0	71	0	0	0	100
	311	26	6	2	0	0	0	0	0	0	66	0	0	0	100
	312	22	4	0	0	0	1	0	0	0	73	0	0	0	100
	313	18	3	0	0	0	0	0	10	0	69	0	0	0	100
	314	37	0	0	0	0	0	1	11	0	51	0	0	0	100
	Mean	24.20	3.40	.40	.00	.00	.20	1.60	4.20	.00	66.00	.00	.00	.00	100.00
	StDev	7.89	2.19	.89	.00	.00	.45	3.05	5.76	.00	8.77	.00	.00	.00	.00
Mussels	325	2	0	2	0	0	0	84	0	4	4	4	0	0	100
	326	8	0	0	0	0	0	39	0	3	31	19	0	0	100
	327	60	0	0	0	0	0	26	0	0	8	6	0	0	100
	328	21	0	0	0	0	0	72	0	1	3	3	0	0	100
	329	12	0	6	0	0	0	72	0	0	6	4	0	0	100
	Mean	20.60	.00	1.60	.00	.00	.00	58.60	.00	1.60	10.40	7.20	.00	.00	100.00
	StDev	23.08	.00	2.61	.00	.00	.00	24.75	.00	1.82	11.67	6.69	.00	.00	.00
Red Algal Turf/	320	4	0	0	0	0	0	0	74	0	18	4	0	0	100
	321	5	0	0	0	0	0	0	66	0	25	4	0	0	100
	322	0	0	0	0	0	0	0	9	0	6	0	0	85	100
	323	0	0	0	0	0	0	0	5	0	8	17	0	70	100
	324	0	0	0	0	0	0	0	55	0	41	4	0	0	100
	Mean	1.80	.00	.00	.00	.00	.00	.00	41.80	.00	19.60	5.80	.00	31.00	100.00
	StDev	2.49	.00	.00	.00	.00	.00	.00	32.51	.00	14.22	6.50	.00	42.78	.00

Percent Cover of Index Species Sea Lion Rookery, Santa Barbara Island - Fall 2001 (12/1/01)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	345	43	6	2	3	0	0	1	0	1	43	1	0	0	100
	346	44	8	1	1	0	0	0	0	0	46	0	0	0	100
	347	43	16	2	0	0	0	0	0	0	38	1	0	0	100
	348	20	2	3	0	0	0	0	0	0	75	0	0	0	100
	349	20	8	0	0	0	0	0	0	0	72	0	0	0	100
	Mean	34.00	8.00	1.60	.80	.00	.00	.20	.00	.20	54.80	.40	.00	.00	100.00
	StDev	12.79	5.10	1.14	1.30	.00	.00	.45	.00	.45	17.34	.55	.00	.00	.00
Endocladia	335	23	6	14	6	0	0	1	0	2	48	0	0	0	100
	336	43	2	3	0	0	0	0	0	0	51	1	0	0	100
	337	14	2	3	5	0	0	12	0	8	55	1	0	0	100
	338	16	2	4	14	0	0	0	0	0	64	0	0	0	100
	339	21	1	10	16	0	0	0	0	0	52	0	0	0	100
	Mean	23.40	2.60	6.80	8.20	.00	.00	2.60	.00	2.00	54.00	.40	.00	.00	100.00
	StDev	11.55	1.95	4.97	6.65	.00	.00	5.27	.00	3.46	6.12	.55	.00	.00	.00
Silvetia (Rockweed)	330	32	0	11	0	0	0	54	0	0	0	3	0	0	100
	331	42	0	1	3	0	23	1	0	3	27	0	0	0	100
	332	13	1	0	0	0	47	2	5	0	32	0	0	0	100
	333	10	0	4	0	0	32	6	0	0	45	3	0	0	100
	334	25	0	0	1	0	34	2	0	0	38	0	0	0	100
	Mean	24.40	.20	3.20	.80	.00	27.20	13.00	1.00	.60	28.40	1.20	.00	.00	100.00
	StDev	13.28	.45	4.66	1.30	.00	17.46	23.00	2.24	1.34	17.24	1.64	.00	.00	.00
Mussels	350	40	0	0	0	0	0	27	0	0	5	28	0	0	100
	351	11	0	2	0	0	0	61	0	1	0	25	0	0	100
	352	34	0	1	0	0	0	8	0	0	9	48	0	0	100
	353	23	0	1	0	0	0	18	0	3	3	52	0	0	100
	354	22	0	0	0	0	0	24	0	5	3	46	0	0	100
	Mean	26.00	.00	.80	.00	.00	.00	27.60	.00	1.80	4.00	39.80	.00	.00	100.00
	StDev	11.29	.00	.84	.00	.00	.00	20.03	.00	2.17	3.32	12.38	.00	.00	.00

Percent Cover of Index Species Fraser Cove, Santa Cruz Island - Fall 2001 (1/9/02)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	876	35	42	0	14	0	0	1	0	1	7	0	0	0	100
	877	36	28	0	25	0	0	2	0	0	8	1	0	0	100
	878	49	35	0	11	0	0	0	0	0	0	1	4	0	100
	879	25	54	0	19	0	0	0	0	0	0	2	0	0	100
	880	38	36	0	21	0	0	1	0	0	3	0	1	0	100
	Mean	36.60	39.00	.00	18.00	.00	.00	.80	.00	.20	3.60	.80	1.00	.00	100.00
	StDev	8.56	9.75	.00	5.57	.00	.00	.84	.00	.45	3.78	.84	1.73	.00	.00
Endocladia	881	33	9	0	43	0	0	6	0	0	8	1	0	0	100
	882	43	15	0	30	0	0	0	0	0	11	1	0	0	100
	883	15	2	0	64	19	0	0	0	0	0	0	0	0	100
	884	8	3	0	89	0	0	0	0	0	0	0	0	0	100
	885	14	0	0	77	0	0	0	0	0	9	0	0	0	100
	Mean	22.60	5.80	.00	60.60	3.80	.00	1.20	.00	.00	5.60	.40	.00	.00	100.00
	StDev	14.74	6.14	.00	24.15	8.50	.00	2.68	.00	.00	5.22	.55	.00	.00	.00
Silvetia (Rockweed)	896	3	0	0	5	11	76	0	0	0	5	0	0	0	100
	897	10	2	0	0	4	66	0	1	0	17	0	0	0	100
	898	12	0	0	1	0	84	0	0	0	2	1	0	0	100
	899	14	1	0	4	4	71	0	0	0	6	0	0	0	100
	900	8	1	0	0	13	77	0	0	0	0	1	0	0	100
	Mean	9.40	.80	.00	2.00	6.40	74.80	.00	.20	.00	6.00	.40	.00	.00	100.00
	StDev	4.22	.84	.00	2.35	5.41	6.76	.00	.45	.00	6.60	.55	.00	.00	.00
Mussels	891	10	2	0	0	0	0	55	0	0	11	22	0	0	100
	892	28	1	0	0	0	0	56	0	0	8	7	0	0	100
	893	12	1	0	0	0	0	77	0	0	3	7	0	0	100
	894	11	0	1	1	0	0	71	0	1	5	10	0	0	100
	895	11	1	1	0	0	0	66	0	8	6	7	0	0	100
	Mean	14.40	1.00	.40	.20	.00	.00	65.00	.00	1.80	6.60	10.60	.00	.00	100.00
	StDev	7.64	.71	.55	.45	.00	.00	9.51	.00	3.49	3.05	6.50	.00	.00	.00
Pollicipes	901	22	13	7	0	0	0	39	0	5	9	5	0	0	100
	902	18	0	2	23	0	0	23	0	10	3	21	0	0	100
	903	0	1	0	0	0	0	36	0	22	5	36	0	0	100
	904	19	6	3	0	0	0	44	0	11	7	10	0	0	100
	905	3	0	0	0	0	0	53	0	18	2	24	0	0	100
	Mean	12.40	4.00	2.40	4.60	.00	.00	39.00	.00	13.20	5.20	19.20	.00	.00	100.00
	StDev	10.11	5.61	2.88	10.29	.00	.00	11.02	.00	6.76	2.86	12.19	.00	.00	.00

Percent Cover of Index Species
Fraser Cove, Santa Cruz Island - Fall 2001 (1/9/02)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Tar	906	23	20	0	0	0	0	0	0	0	2	0	55	0	100
	907	29	21	0	0	0	0	0	0	0	0	0	50	0	100
	908	23	27	0	0	0	0	0	0	0	0	1	49	0	100
	909	30	12	0	0	0	0	0	0	0	0	0	58	0	100
	910	24	6	0	0	0	0	0	0	0	0	1	69	0	100
	Mean	25.80	17.20	.00	.00	.00	.00	.00	.00	.00	.40	.40	56.20	.00	100.00
	StDev	3.42	8.23	.00	.00	.00	.00	.00	.00	.00	.89	.55	8.04	.00	.00
Hesperophycus	886	72	6	0	9	8	1	0	0	0	4	0	0	0	100
	887	44	1	0	4	36	0	0	0	0	15	0	0	0	100
	888	12	13	0	23	47	3	0	0	2	0	0	0	0	100
	889	55	10	0	10	20	3	0	0	0	1	1	0	0	100
	890	16	4	0	11	45	24	0	0	0	0	0	0	0	100
	Mean	39.80	6.80	.00	11.40	31.20	6.20	.00	.00	.40	4.00	.20	.00	.00	100.00
	StDev	25.62	4.76	.00	7.02	16.78	10.03	.00	.00	.89	6.36	.45	.00	.00	.00

Percent Cover of Index Species Prisoner's Harbor, Santa Cruz Island - Fall 2001 (1/8/02)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	826	96	0	0	0	0	0	0	0	4	0	0	0	100
	827	11	0	0	0	0	12	0	0	77	0	0	0	100
	828	42	6	1	17	0	16	0	0	18	0	0	0	100
	829	13	47	0	7	0	0	0	0	29	4	0	0	100
	830	11	7	0	4	0	1	0	0	77	0	0	0	100
	Mean	34.60	12.00	.20	5.60	.00	5.80	.00	.00	41.00	.80	.00	.00	100.00
	StDev	36.76	19.84	.45	7.02	.00	7.63	.00	.00	34.04	1.79	.00	.00	.00
Endocladia	831	38	11	0	26	0	0	0	0	23	2	0	0	100
	832	7	13	0	45	23	0	0	0	10	2	0	0	100
	833	10	31	0	49	7	0	0	0	2	1	0	0	100
	834	5	13	0	60	16	0	0	0	6	0	0	0	100
	835	6	11	0	63	13	0	0	0	7	0	0	0	100
	Mean	13.20	15.80	.00	48.60	11.80	.00	.00	.00	9.60	1.00	.00	.00	100.00
	StDev	13.99	8.56	.00	14.67	8.76	.00	.00	.00	8.02	1.00	.00	.00	.00
Silvetia (Rockweed)	846	1	0	0	0	0	96	0	0	3	0	0	0	100
	847	8	0	0	0	0	75	1	0	16	0	0	0	100
	848	0	0	0	0	0	97	0	0	3	0	0	0	100
	849	0	0	0	0	0	97	0	0	3	0	0	0	100
	850	1	0	0	0	0	87	0	0	12	0	0	0	100
	Mean	2.00	.00	.00	.00	.00	90.40	.20	.00	7.40	.00	.00	.00	100.00
	StDev	3.39	.00	.00	.00	.00	9.58	.45	.00	6.19	.00	.00	.00	.00
Mussels	841	11	0	0	0	0	0	58	0	31	0	0	0	100
	842	5	0	0	0	0	0	15	0	80	0	0	0	100
	843	13	1	0	0	0	0	57	0	28	1	0	0	100
	844	1	0	0	0	0	0	96	0	3	0	0	0	100
	845	15	0	2	0	0	0	48	0	35	0	0	0	100
	Mean	9.00	.20	.40	.00	.00	.00	54.80	.00	35.40	.20	.00	.00	100.00
	StDev	5.83	.45	.89	.00	.00	.00	28.91	.00	27.90	.45	.00	.00	.00
Hesperophycus	836	24	7	0	21	33	0	0	0	15	0	0	0	100
	837	28	8	0	12	43	0	0	0	8	1	0	0	100
	838	27	0	0	16	45	0	0	0	11	1	0	0	100
	839	19	43	0	8	27	0	0	0	2	1	0	0	100
	840	21	23	0	19	33	2	0	0	0	2	0	0	100
	Mean	23.80	16.20	.00	15.20	36.20	.40	.00	.00	7.20	1.00	.00	.00	100.00
	StDev	3.83	17.17	.00	5.26	7.56	.89	.00	.00	6.22	.71	.00	.00	.00

Percent Cover of Index Species
Willows Anchorage, Santa Cruz Island - Fall 2001 (1/12/02)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Endocladia	931	11	0	0	88	0	0	0	0	0	1	0	0	100
	932	26	0	0	74	0	0	0	0	0	0	0	0	100
	933	32	0	0	66	0	0	0	0	2	0	0	0	100
	934	13	0	0	84	0	0	0	0	3	0	0	0	100
	935	36	1	4	48	0	0	0	0	9	2	0	0	100
	Mean	23.60	.20	.80	72.00	.00	.00	.00	.00	2.80	.60	.00	.00	100.00
	StDev	11.19	.45	1.79	15.94	.00	.00	.00	.00	3.70	.89	.00	.00	.00
Silvetia (Rockweed)	946	16	0	0	70	0	0	0	0	14	0	0	0	100
	947	21	0	0	40	0	0	0	0	36	3	0	0	100
	948	13	0	0	1	0	76	0	0	10	0	0	0	100
	949	0	0	0	0	0	99	0	0	1	0	0	0	100
	950	37	0	0	4	0	12	0	0	41	6	0	0	100
	Mean	17.40	.00	.00	23.00	.00	37.40	.00	.00	20.40	1.80	.00	.00	100.00
	StDev	13.43	.00	.00	31.11	.00	46.71	.00	.00	17.27	2.68	.00	.00	.00
Mussels	941	7	0	23	0	0	0	29	4	34	3	0	0	100
	942	9	0	1	0	0	0	63	5	13	9	0	0	100
	943	5	0	2	0	0	0	49	19	11	14	0	0	100
	944	8	0	2	0	0	0	53	13	15	9	0	0	100
	945	4	0	0	0	0	0	43	6	39	8	0	0	100
	Mean	6.60	.00	5.60	.00	.00	.00	47.40	9.40	22.40	8.60	.00	.00	100.00
	StDev	2.07	.00	9.76	.00	.00	.00	12.60	6.43	13.07	3.91	.00	.00	.00
Hesperophycus	936	69	0	0	20	0	0	0	0	8	3	0	0	100
	937	54	11	0	1	8	2	0	0	22	2	0	0	100
	938	58	5	0	2	5	0	0	0	27	3	0	0	100
	939	32	0	0	0	1	50	0	0	17	0	0	0	100
	940	30	0	0	4	24	24	0	0	18	0	0	0	100
	Mean	48.60	3.20	.00	5.40	7.60	15.20	.00	.00	18.40	1.60	.00	.00	100.00
	StDev	16.99	4.87	.00	8.29	9.71	21.94	.00	.00	7.02	1.52	.00	.00	.00

Percent Cover of Index Species
Trailer, Santa Cruz Island - Fall 2001 (1/10/02)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	911	75	16	0	3	0	0	1	0	0	0	5	0	0	100
	912	70	26	0	0	0	0	0	0	0	1	3	0	0	100
	913	38	41	0	19	0	0	0	0	0	2	0	0	0	100
	914	46	53	0	0	0	0	0	0	0	0	1	0	0	100
	915	34	55	0	0	0	0	1	0	0	0	10	0	0	100
	Mean	52.60	38.20	.00	4.40	.00	.00	.40	.00	.00	.60	3.80	.00	.00	100.00
	StDev	18.76	16.96	.00	8.26	.00	.00	.55	.00	.00	.89	3.96	.00	.00	.00
Silvetia (Rockweed)	926	3	1	0	0	0	91	0	0	0	5	0	0	0	100
	927	18	1	0	0	0	76	0	0	0	5	0	0	0	100
	928	18	2	0	2	0	71	0	0	0	6	1	0	0	100
	929	9	0	0	0	0	88	0	0	0	3	0	0	0	100
	930	7	2	0	0	0	83	0	0	0	7	1	0	0	100
	Mean	11.00	1.20	.00	.40	.00	81.80	.00	.00	.00	5.20	.40	.00	.00	100.00
	StDev	6.75	.84	.00	.89	.00	8.29	.00	.00	.00	1.48	.55	.00	.00	.00
Mussels	921	19	3	0	0	0	0	67	0	0	9	2	0	0	100
	922	9	0	0	0	0	0	64	1	0	20	6	0	0	100
	923	11	0	0	0	0	0	58	1	0	22	8	0	0	100
	924	22	1	2	0	0	0	63	0	0	7	5	0	0	100
	925	23	0	1	0	0	0	60	0	2	8	6	0	0	100
	Mean	16.80	.80	.60	.00	.00	.00	62.40	.40	.40	13.20	5.40	.00	.00	100.00
	StDev	6.42	1.30	.89	.00	.00	.00	3.51	.55	.89	7.19	2.19	.00	.00	.00
Hesperophycus	916	57	0	0	18	16	9	0	0	0	0	0	0	0	100
	917	24	0	0	13	8	55	0	0	0	0	0	0	0	100
	918	43	0	0	18	3	35	0	0	0	1	0	0	0	100
	919	54	5	0	12	12	16	0	0	0	0	1	0	0	100
	920	41	11	0	15	20	4	0	0	0	8	1	0	0	100
	Mean	43.80	3.20	.00	15.20	11.80	23.80	.00	.00	.00	1.80	.40	.00	.00	100.00
	StDev	13.03	4.87	.00	2.77	6.65	21.04	.00	.00	.00	3.49	.55	.00	.00	.00

Percent Cover of Index Species East Point, Santa Rosa Island - Fall 2001 (12/11/01)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	575	69	27	0	0	0	0	0	0	0	0	4	0	0	100
	576	25	10	0	13	46	1	0	0	0	3	2	0	0	100
	577	26	47	0	20	1	4	0	0	0	2	0	0	0	100
	578	82	15	0	0	0	0	0	0	0	0	3	0	0	100
	579	67	32	0	1	0	0	0	0	0	0	0	0	0	100
	Mean	53.80	26.20	.00	6.80	9.40	1.00	.00	.00	.00	1.00	1.80	.00	.00	100.00
	StDev	26.47	14.62	.00	9.20	20.46	1.73	.00	.00	.00	1.41	1.79	.00	.00	.00
Endocladia	580	22	0	0	39	32	5	0	0	0	2	0	0	0	100
	581	25	5	0	53	13	0	0	0	0	4	0	0	0	100
	582	16	0	0	28	30	10	0	0	0	15	1	0	0	100
	583	19	9	0	55	7	1	0	0	0	8	1	0	0	100
	584	41	1	0	37	14	0	0	0	0	2	5	0	0	100
	Mean	24.60	3.00	.00	42.40	19.20	3.20	.00	.00	.00	6.20	1.40	.00	.00	100.00
	StDev	9.76	3.94	.00	11.39	11.12	4.32	.00	.00	.00	5.50	2.07	.00	.00	.00
Silvetia (Rockweed)	585	6	0	0	1	0	61	0	0	0	31	1	0	0	100
	586	6	0	0	2	83	0	0	0	0	8	1	0	0	100
	587	5	0	0	0	0	88	0	0	0	6	1	0	0	100
	588	1	0	0	0	0	89	0	0	0	9	1	0	0	100
	589	6	0	0	0	0	84	0	0	0	10	0	0	0	100
	Mean	4.80	.00	.00	.60	16.60	64.40	.00	.00	.00	12.80	.80	.00	.00	100.00
	StDev	2.17	.00	.00	.89	37.12	37.77	.00	.00	.00	10.28	.45	.00	.00	.00
Mussels	590	4	0	0	0	0	0	76	4	0	15	1	0	0	100
	591	0	0	1	0	0	0	64	6	0	22	7	0	0	100
	592	3	0	0	0	0	0	73	0	0	19	5	0	0	100
	593	1	0	0	0	0	0	78	0	0	20	1	0	0	100
	594	3	1	1	0	0	0	73	0	0	16	6	0	0	100
	Mean	2.20	.20	.40	.00	.00	.00	72.80	2.00	.00	18.40	4.00	.00	.00	100.00
	StDev	1.64	.45	.55	.00	.00	.00	5.36	2.83	.00	2.88	2.83	.00	.00	.00

Percent Cover of Index Species
Ford Point, Santa Rosa Island - Fall 2001 (12/15/01)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	520	79	10	0	0	0	0	0	0	0	3	8	0	0	100
	521	52	40	0	0	0	0	0	1	0	1	6	0	0	100
	522	80	13	0	0	0	0	0	0	0	4	3	0	0	100
	523	39	37	0	13	0	0	0	0	0	7	4	0	0	100
	524	84	13	0	0	0	0	0	0	0	0	3	0	0	100
	Mean	66.80	22.60	.00	2.60	.00	.00	.00	.20	.00	3.00	4.80	.00	.00	100.00
	StDev	20.07	14.60	.00	5.81	.00	.00	.00	.45	.00	2.74	2.17	.00	.00	.00
Endocladia	525	27	1	0	25	0	0	6	3	0	37	1	0	0	100
	526	51	6	0	18	0	0	5	0	0	17	3	0	0	100
	527	22	1	0	24	0	0	4	0	0	49	0	0	0	100
	528	27	1	0	31	0	0	11	1	1	26	2	0	0	100
	529	36	0	0	37	0	0	5	0	1	17	4	0	0	100
	Mean	32.60	1.80	.00	27.00	.00	.00	6.20	.80	.40	29.20	2.00	.00	.00	100.00
	StDev	11.46	2.39	.00	7.25	.00	.00	2.77	1.30	.55	13.79	1.58	.00	.00	.00
Mussels	530	69	12	0	0	0	0	12	0	0	5	2	0	0	100
	531	5	0	0	0	0	0	88	0	0	4	3	0	0	100
	532	10	0	0	0	0	0	80	0	0	7	3	0	0	100
	533	30	0	0	0	0	0	49	1	0	20	0	0	0	100
	534	42	0	0	0	0	0	15	13	1	24	5	0	0	100
	Mean	31.20	2.40	.00	.00	.00	.00	48.80	2.80	.20	12.00	2.60	.00	.00	100.00
	StDev	25.90	5.37	.00	.00	.00	.00	35.38	5.72	.45	9.30	1.82	.00	.00	.00

Percent Cover of Index Species
Fossil Reef, Santa Rosa Island - Fall 2001 (12/13/01)

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	59	36	0	3	0	0	0	0	0	0	2	0	0	100
	606	50	38	0	0	0	0	0	0	0	5	1	6	0	100
	607	46	43	0	0	0	0	0	0	0	7	4	0	0	100
	608	72	21	0	0	0	0	0	0	0	7	0	0	0	100
	609	60	32	0	0	0	0	0	0	0	6	2	0	0	100
	Mean	57.40	34.00	.00	.60	.00	.00	.00	.00	.00	5.00	1.80	1.20	.00	100.00
	StDev	10.09	8.28	.00	1.34	.00	.00	.00	.00	.00	2.92	1.48	2.68	.00	.00
Endocladia	610	43	40	0	11	0	0	0	0	0	2	3	1	0	100
	611	55	36	0	0	0	0	0	0	0	7	2	0	0	100
	612	48	2	0	0	0	42	0	0	0	6	2	0	0	100
	613	47	9	0	38	0	0	0	0	0	3	2	1	0	100
	614	32	0	0	0	0	63	0	0	0	4	1	0	0	100
	Mean	45.00	17.40	.00	9.80	.00	21.00	.00	.00	.00	4.40	2.00	.40	.00	100.00
	StDev	8.46	19.15	.00	16.47	.00	29.70	.00	.00	.00	2.07	.71	.55	.00	.00
Silvetia (Rockweed)	615	82	3	0	0	0	0	0	0	0	14	1	0	0	100
	616	59	14	0	6	0	0	0	0	0	14	7	0	0	100
	617	71	2	0	4	0	11	0	0	0	9	3	0	0	100
	618	61	0	0	23	0	2	0	0	0	10	4	0	0	100
	619	66	2	1	12	0	11	0	0	0	8	0	0	0	100
	Mean	67.80	4.20	.20	9.00	.00	4.80	.00	.00	.00	11.00	3.00	.00	.00	100.00
	StDev	9.20	5.59	.45	8.94	.00	5.72	.00	.00	.00	2.83	2.74	.00	.00	.00
Mussels	620	6	0	5	0	0	0	31	0	0	35	23	0	0	100
	621	13	0	5	0	0	0	29	0	0	40	13	0	0	100
	622	23	2	15	0	0	0	37	0	3	14	6	0	0	100
	623	22	0	11	0	0	0	35	0	8	20	4	0	0	100
	624	0	0	1	0	0	0	0	31	0	46	22	0	0	100
	Mean	12.80	.40	7.40	.00	.00	.00	26.40	6.20	2.20	31.00	13.60	.00	.00	100.00
	StDev	9.98	.89	5.55	.00	.00	.00	15.09	13.86	3.49	13.53	8.79	.00	.00	.00

Percent Cover of Index Species
Johnson's Lee, Santa Rosa Island - Fall 2001 (12/14/01)

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	48	47	0	0	0	0	0	0	0	1	4	0	0	100
	501	36	62	0	1	0	0	0	0	0	0	1	0	0	100
	502	81	16	0	0	0	0	0	0	0	0	3	0	0	100
	503	39	38	0	19	0	0	0	0	0	0	4	0	0	100
	504	74	3	0	1	0	0	0	0	0	7	15	0	0	100
	Mean	55.60	33.20	.00	4.20	.00	.00	.00	.00	.00	1.60	5.40	.00	.00	100.00
	StDev	20.62	23.72	.00	8.29	.00	.00	.00	.00	.00	3.05	5.50	.00	.00	.00
Endocladia	505	45	4	1	15	0	0	29	0	1	4	1	0	0	100
	506	58	13	0	22	0	0	1	0	0	1	5	0	0	100
	507	53	6	0	14	0	0	7	0	0	15	5	0	0	100
	508	29	5	0	41	0	0	12	0	3	8	2	0	0	100
	509	43	3	0	25	0	0	6	0	0	17	6	0	0	100
	Mean	45.60	6.20	.20	23.40	.00	.00	11.00	.00	.80	9.00	3.80	.00	.00	100.00
	StDev	11.08	3.96	.45	10.88	.00	.00	10.79	.00	1.30	6.89	2.17	.00	.00	.00
Mussels	510	4	0	0	0	0	0	0	10	1	16	69	0	0	100
	511	5	0	0	0	0	0	1	11	1	53	29	0	0	100
	512	34	0	3	0	0	0	45	0	6	10	2	0	0	100
	513	31	1	1	0	0	0	5	15	0	19	28	0	0	100
	514	1	0	0	0	0	0	0	9	0	30	60	0	0	100
	Mean	15.00	.20	.80	.00	.00	.00	10.20	9.00	1.60	25.60	37.60	.00	.00	100.00
	StDev	16.08	.45	1.30	.00	.00	.00	19.56	5.52	2.51	16.95	27.02	.00	.00	.00

Percent Cover of Index Species
NW Talcott, Santa Rosa Island - Fall 2001 (12/12/01)

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	47	44	0	4	0	0	0	0	0	0	3	2	0	100
	561	48	49	0	0	0	0	0	0	0	0	2	1	0	100
	562	75	23	0	0	0	0	0	0	0	0	2	0	0	100
	563	26	1	0	1	0	71	0	0	0	1	0	0	0	100
	564	23	66	0	0	0	6	0	0	0	4	1	0	0	100
	Mean	43.80	36.60	.00	1.00	.00	15.40	.00	.00	.00	1.00	1.60	.60	.00	100.00
	StDev	20.92	25.13	.00	1.73	.00	31.19	.00	.00	.00	1.73	1.14	.89	.00	.00
Endocladia	555	21	0	0	31	0	43	0	0	0	5	0	0	0	100
	556	76	3	0	16	0	2	0	0	0	3	0	0	0	100
	557	22	0	0	16	0	54	0	4	0	4	0	0	0	100
	558	28	11	0	10	0	0	0	3	0	48	0	0	0	100
	559	67	1	0	2	0	0	0	0	0	28	2	0	0	100
	Mean	42.80	3.00	.00	15.00	.00	19.80	.00	1.40	.00	17.60	.40	.00	.00	100.00
	StDev	26.53	4.64	.00	10.63	.00	26.50	.00	1.95	.00	19.93	.89	.00	.00	.00
Silvetia (Rockweed)	565	7	0	0	0	0	87	0	0	0	6	0	0	0	100
	566	10	0	0	0	0	90	0	0	0	0	0	0	0	100
	567	5	0	0	0	0	88	0	0	0	4	3	0	0	100
	568	23	0	0	21	0	54	0	0	0	2	0	0	0	100
	569	81	0	0	3	0	12	0	0	0	3	1	0	0	100
	Mean	25.20	.00	.00	4.80	.00	66.20	.00	.00	.00	3.00	.80	.00	.00	100.00
	StDev	31.97	.00	.00	9.15	.00	33.77	.00	.00	.00	2.24	1.30	.00	.00	.00
Mussels	550	19	0	0	0	0	0	55	0	10	5	11	0	0	100
	551	12	0	0	0	0	0	76	0	1	8	3	0	0	100
	552	16	0	0	0	0	0	58	0	17	7	2	0	0	100
	553	39	0	4	0	0	0	23	0	7	20	7	0	0	100
	554	20	0	3	0	0	0	46	0	11	16	4	0	0	100
	Mean	21.20	.00	1.40	.00	.00	.00	51.60	.00	9.20	11.20	5.40	.00	.00	100.00
	StDev	10.43	.00	1.95	.00	.00	.00	19.35	.00	5.85	6.46	3.65	.00	.00	.00

Appendix B. Trip Reports

The following are trip reports from the Rocky Intertidal Monitoring 2001 field season (March 2001 through January 2002). Reports were written by Dan Richards, and Derek Lerma. The reports summarize the work done during each monitoring event, provide a quick summary of the data collected, and serve as metadata for the information collected.

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Spring 2001 Rocky Intertidal Monitoring Trip Reports

Santa Cruz Island, Scorpion Rock

March 19, 2001 (Database event #2001-A)

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

PROCEDURE: Utilizing the regular Santa Cruz Island transportation we were dropped off at Scorpion Anchorage at 0930 with the double kayak. About 1030 we deemed the tide workable and paddled to the *Hesperophycus* plot area. Derek scored the plots, I photographed them and we both counted motile invertebrates within the plots. Some panorama photographs were shot from a high rock on the south side of the site. We paddled to the other monitoring area at 1130 with the tide still dropping. Sampling duties remained the same as at the first area and I performed a count of abalone and seastars as well.

RESULTS: In area one, at Scorpion Rock, all plots had good cover of *Hesperophycus* sp. and a little *Silvetia* sp. was present. Juvenile *Septifer* sp. were very common in some areas, especially plots 811 and 812. There was a large patch of *Pollicipes* sp. on the vertical face below 811 and a large clone of *Anthopleura elegantissima* on the vertical face below 812. One of the strobes was not functioning properly but all the plots seemed well lit by the bright sun. Both *Chthamalus* sp. and *Balanus* sp. were present with *Balanus* sp. dominant in only one plot. *Endocladia muricata* was common in four of the five barnacle plots and doing well in the *Endocladia* zone plots. It was growing thick and lush. *Tetraclita rubescens* were doing well with large individuals common in the plots. *Mytilus* sp. covered a high percentage of all the plots in the mussel zone. *Spirobranchus spinosa* and *Phragmatopoma californica* were present. *Tetraclita* sp. and *Pollicipes* sp. were commonly growing on mussels. We had difficulty finding several mussel plots partly because we have not been to the site recently and also the mussels were overgrowing some of the bolts. Mussel plots 816, 817 and 820 were all missing lower bolts. Motile invertebrates counts made in all plots included all limpets and littorines with sub-sampling being performed when needed. All sizes of limpets were counted but only *Lottia gigantea* were separated. *Lottia scabra*, *L. digitalis*, *L. strigatella*, *L. limatula* and possibly others were present. One black abalone was found (78 mm) and thirty seastars, all *Pisaster ochraceus*, were located in a complete search of area two. A few *Tegula* sp., *Acanthina* sp., *Ocenebra* sp. and a few *Nucella* sp. were present. It's important to note that subsampling for motile invertebrates was performed for the first time with the sequence being upper left, lower right, upper right, lower left with the frame divided into sixteenths. In all cases when subsampling was performed a total of one quarter of the plot was sampled.

Photoplot summary – mean percent cover by zone at Scorpion Rock, Santa Cruz Island, Spring 2001 (5 plots/zone)

Zone	Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal	Tar
Barnacle	49.4	19.0	29.8	0.0	0.2	1.4	0.2	0.0
Endocladia	41.0	6.4	33.8	0.0	1.0	15.4	2.4	0.0
Mussels	6.6	1.4	0.0	0.0	84.4	5.0	2.6	0.0
Tetraclita	40.0	12.8	6.2	0.0	23.0	14.6	3.4	0.0
Hesperophycus	11.8	0.4	25.0	50.8	0.0	11.4	0.6	0.0

Motile invertebrate counts at Scorpion Rock, Santa Cruz Island, Spring 2001

Zone	Barnacle					Endocladia					Hesperophycus				
plot #	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815
Lepidochitona spp.								1				1	2		
Nuttalina spp.						1		1	1	1				2	
Fissurella volcano															
Pachygrapsus crassipes				1	1							1		1	3
Pagurus spp.															
Limpets	12	8	24	24	28	36	80	52	44	40	7	8	7	11	8
Subsample1	2	1	0	3	2	2	5	2	0	4					
Subsample2	1	1	0	2	2	2	2	3	7	2					
Subsample3	0	0	0	0	0	1	8	2	2	0					
Subsample4	0	0	6	1	3	4	5	6	2	4					
Siphonaria spp.															
S. purpuratus															
Amphissa versicolor															1
Nucella emarginata															
Acanthina spp.					2								3		7
Tegula funebris															1
Tegula gallina														1	
Ocenebra circumtexta	1					1	1	1	1						
Lottia gigantea															
Pisaster ochraceus															
Epitonium spp.															
Littorina spp.	192	404	284	492	568	580	448	140	204	204	184	148	252	72	12
subsample1	8	25	19	9	45	29	25	19	14	6	11	5	33	12	0
subsample2	16	13	12	31	19	31	12	4	14	17	11	6	12	0	3
subsample3	19	36	28	68	36	50	46	5	6	16	15	17	11	4	0
subsample4	5	37	12	15	42	35	29	7	17	12	9	9	7	1	0

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zone	Mytilus					Tetraclita					Total Count 25 Plots
plot #	816	817	818	819	820	821	822	823	824	825	total
Lepidochitona spp.						1				3	8
Nuttalina spp.			3	5	5	2	3	1	2	10	37
Fissurella volcano		2	1		2						5
Pachygrapsus crassipes		2		3		3				3	18
Pagurus spp.											0
Limpets	29	60	27	92	19	34	164	9	18	11	852
subsample1				4			11				36
subsample2				6			8				36
subsample3				5			5				23
subsample4				8			17				56
Siphonaira spp.	1										1
S. purpuratus		2									2
Amphissa versicolor	2		2		1						6
Nucella emarginata			3								3
Acanthina spp.								3	1	1	17
Tegula funebris											1
Tegula gallina											1
Ocenebra circumtexta	1	12	3	4	3	8	5	2	8	6	57
Lottia gigantea		2	2					2	1		7
Pisaster ochraceus											0
Epitonium spp.		2									2
Littorina spp.		1				48	116		92	32	4473
subsample1						4	7		10	3	284
subsample2						2	7		12	5	227
subsample3						6	15		1	0	379
subsample4						0	0		0	0	237

Anacapa Island, South Frenchy's Cove

March 20, 2001 (Database event #2001-B)

PERSONNEL: David Kushner, Marine Biologist, Channel Islands National Park
Derek Lerma, Biological Technician, Channel Islands National Park

PROCEDURE: we arrived at West Anacapa Island about 1000 hrs. via NPS Ocean Ranger. Motored ashore with David utilizing the Pacific Rangers skiff allowing for easy drop off and pick up. The tide was still fairly high with only the barnacle and *Endocladia sp.* plots workable. Skies were mostly foggy with some sun breaking through at times. Significant sand erosion around the site was obvious as well as cobble deposition in several areas. Small patches of tar were observed throughout much of the site. Derek photographed plots while David began scoring. Motile invertebrate counts were performed in tandem with some sub-sampling done for littorine snails. David conducted a 30-minute search of abalone and seastars with no individuals of either species found. Two IPCO groups came ashore in the afternoon number about 120 people. All sampling was completed including plot repairs and temperature downloading.

RESULTS: Barnacle cover within barnacle plots was consistent and appeared unchanged from the previous visit, although some recruitment was evident. *Endocladia muricata* was abundant, widespread and healthy. Rockweed, mostly *Silvetia compressa*, was healthy and dense over the entire site but noticeably variable within rockweed plots. Mussel plot 201 remains dominated by

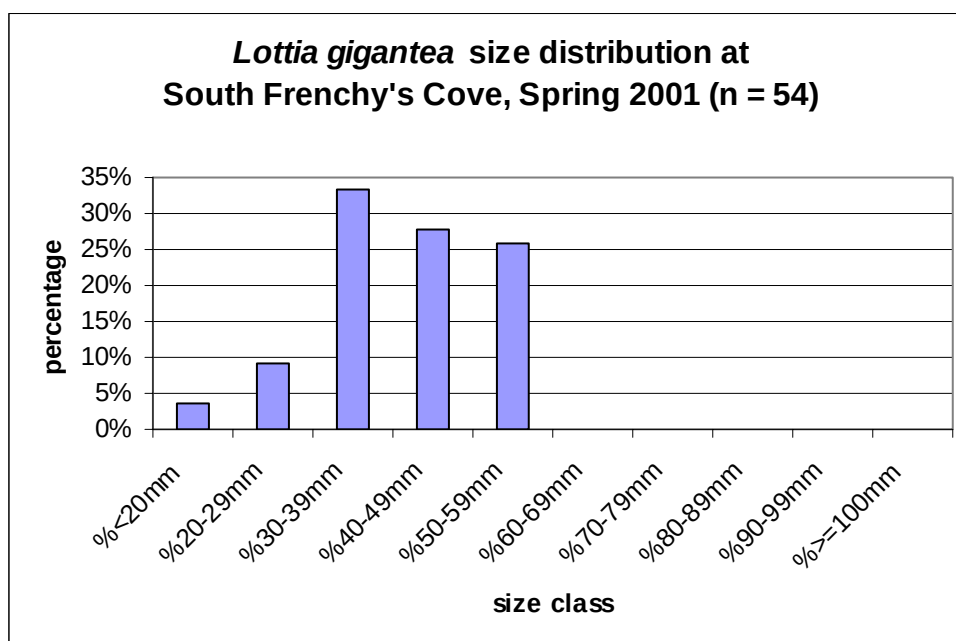
miscellaneous algae with all other mussel plots near or above 50% mussel cover. Limpet plots contained few small (<25mm) individuals and L3 was mostly covered by cobble, thus reducing suitable habitat within the plot by approximately 50%. Overall the site appeared healthy and robust with some sand in the upper intertidal areas and evidence of cobble disturbance in some mid tidal areas. *Sargassum sp.*, *Ulva sp.* and *Cladophora sp.* were common as were red mites and gammarid amphipods.

Photoplot summary – mean percent cover by zone at South Frenchy's Cove, Anacapa Island, Spring 2001 (5 plots/zone)

Zone	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal	Tar
Barnacle	50.0	30.2	14.8	0.2	0.0	3.4	0.4	1.0
Endocladia	15.0	1.8	62.0	17.2	0.0	3.8	0.0	0.2
Rockweed	16.0	5.8	3.8	60.8	0.2	12.8	0.6	0.0
Mussels	4.0	3.2	0.0	0.0	48.6	42.0	2.2	0.0

Owl Limpet *Lottia gigantea* plot summary at South Frenchy's Cove, Anacapa Island, Spring 2001

Plot	Count	Area	Density	Count Size	Mean Size	StDev	MinSize	MaxSize	%<20 mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%>60 mm
1	19	3.14	6.049	19	43.84	10.69	23	59	0.00%	5.26%	26.32%	21.05%	47.37%	0.00%
2	25	3.14	7.959	25	38.32	9.89	18	57	4.00%	12.00%	40.00%	32.00%	12.00%	0.00%
3	10	3.14	3.184	10	39.50	12.59	16	55	10.00%	10.00%	30.00%	30.00%	20.00%	0.00%



Motile invertebrate counts, South Frenchy's Cove, Anacapa Island, Spring 2001

zone	Barnacle					Endocladia					Silvetia				
plot #	249	250	251	252	253	154	155	256	257	258	259	260	261	262	263
Lepidochitona spp.							1						1	1	
Nuttalina spp.						1									
Fissurella volcano															1
Pachygrapsus									3	1		2			
Pagurus spp.															
limpets		1	8	3	4	7	0	2	4	6	6	8	7	7	15
S. purpuratus															
Amphissa versicolor															
Nucella emarginata															
Acanthina spp.				1	1						3		6		
Tegula funebris															
Ceratostoma nuttali															
Ocenebra circumtexta															
Lottia gigantea												1		1	
Littorina spp.	624	400	576	440	904			35	33	12	9	19	4		2
subsample 1	97	67	22	10	118	27	41							14	
subsample 2	59	33	49	54	108	12	3							27	
subsample 3			43	29		14	0							6	
subsample 4			30	17		6	5							39	

zone	Mytilus					Total Count- 20 plots
plot #	201	202	264	265	266	
Lepidochitona spp.						3
Nuttalina spp.	3	3	1	2	2	12
Fissurella volcano			1			2
Pachygrapsus					1	7
Pagurus spp.						0
limpets	8	8	16	16	16	142
S. purpuratus						0
Amphissa versicolor						0
Nucella emarginata	1		1	3	2	7
Acanthina spp.	1	7	2			21
Tegula funebris						0
Ceratostoma nuttali						0
Ocenebra circumtexta						0
Lottia gigantea				1		3
Littorina spp.	0	0	0	0	0	3058
subsample 1						396
subsample 2						345
subsample 3						
subsample 4						

Santa Cruz Island, Orizaba Cove

March 21, 2001 (Database event #2001-C)

PERSONNEL: David Kushner, Marine Biologist, Channel Islands National Park
Derek Lerma, Biological Technician, Channel Islands National Park

PROCEDURE: Traveled to Orizaba Cove via the Ocean Ranger on the regular Santa Rosa Island transportation day. Arrived 1030 landing in the cove via skiff. Hiked to the cave above the cove to observe pictographs done by Chumash Native Americans. Pig disturbance was obvious and extensive with nearly all oaks and lemonade berry bush disturbed or completely uprooted. Started work at 1100 on an outgoing tide. Derek photographed plots while David began scoring. Limited time was available for sampling due to the transportation schedule and no motile invertebrate counts or in-depth species censuses were performed. Departed 1230.

RESULTS: *Endocladia muricata* was healthy and widespread in the *Hesperophycus* zone. *Hesperophycus californicus* was common within that zone with most plants small and showing new growth. Barnacle plots had seemingly high cover and both new recruits and large individuals were common. In area R3 rockweeds had fairly low cover and new growth was obvious. *Tetraclita rubescens* were abundant and typically large in size throughout the site. Mussel plots appeared healthy and cover near 90% at all mussel zone plots but one. One black abalone shell approximately 40 mm was found. Four *Pisaster ochraceus* were counted at R3 and two at R2. *Ulva* sp. and *Endarachne* sp. were common in area R3.

Photoplot summary – mean percent cover by zone at Orizaba Cove, Santa Cruz Island, Spring 2001 (5 plots/zone)

Zone	Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal	Tar
Barnacle	36.8	57.6	0.0	0.0	0.2	5.2	0.2	0.0
Rockweed	39.8	22.0	2.4	8.6	6.0	19.6	1.6	0.0
Mussels	4.8	1.6	0.0	0.0	83.8	6.0	3.8	0.0
Tetraclita	27.6	42.0	1.0	0.0	10.4	13.0	6.0	0.0
Hesperophycus	24.4	12.4	51.2	7.8	0.6	3.4	0.0	0.2

Santa Cruz Island, Prisoner's Harbor

April 2, 2001 (Database event #2001-D)

PURPOSE: To monitor Prisoner's Harbor rocky intertidal site at Santa Cruz Island.

PERSONNEL: Derek Lerma, Biological Technician, Channel Islands National Park

PROCEDURE: Arrived via the NPS vessel Ocean Ranger serving as second captain. Skiffed several people ashore before landing to begin photographing plots. Limited time was available therefore only photoplots were photographed and general notes of the site taken. Left sampling site at 1245 to begin back loading personnel.

RESULTS: Barnacle plots were mostly covered with *Ulva* sp., *Porphyra perforata*, and other algae. Endocladia plots had fairly high cover (> 60%) of *Endocladia muricata* with obvious barnacle recruitment evident. The majority of the barnacle recruitment may have been from what was first noted in the fall 2000 sampling. Silvetia plots contained dense stands of *Silvetia compressa* with the majority of plants large and healthy. Hesperophycus plots had low cover (< 25 %) of *Hesperophycus californicus* in all but one plot and little new growth was noted. Mussel plots appeared healthy though disturbance from winter storms was obvious and widespread, typical for this site. Extensive mussel recruitment, individuals 1-2 cm, was noted. No abalone and four seastars, all *Pisaster ochraceus*, were observed during a quick overview of the site.

Photoplot summary – mean percent cover by zone at Prisoner's Harbor, Santa Cruz Island, Spring 2001 (5 plots/zone)

Zone Name	Bare Rock	Barnacle	Endocladia	Rockweed	Mussels	Misc Algae	Misc Animal
Barnacle	39.8	12.0	14.6	9.2	0.0	24.0	0.4
Endocladia	11.4	12.2	67.0	7.4	0.0	1.8	0.2
Rockweed	2.4	0.0	0.0	87.0	0.2	10.4	0.0
Mussels	5.8	0.8	0.0	0.0	83.2	5.2	5.0
Hesperophycus	36.6	18.4	22.0	19.8	0.0	2.6	0.6

San Miguel Island

April 3-7, 2001 (Database event #2001-E)

PURPOSE: To monitor rocky intertidal sites at San Miguel Island.

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
David Kushner, Marine Biologist, Channel Islands National Park
Derek Lerma, Biological Technician, Channel Islands National Park
Kelly O'Reilly, Marine Biologist, California Dept. of Fish and Game

PROCEDURE: Arrived via the CIA Islander with Susan Coppelli (fox technician). We hiked to each of the monitoring sites over the four days and conducted monitoring of the intertidal sites photographing each of the photoplots and areas, scoring the plots in the field, counting and measuring abalone and owl limpet in plots, counting sea stars by site, creating general species lists, counting shorebirds and pinnipeds, and repairing plots as needed. In addition, we installed one-meter radius owl limpet plots at Harris Point and Otter Harbor. Motile invertebrate counts were not done. Notes were made as to where the boundaries should be for each site to delineate the site for abalone, sea star and species list searches.

David took over fox feeding duties the last two evenings after Susan went home sick on Friday. David also gave a walk to island visitors from the VISION on Friday. The visitors turned out to be the CINMS staff on a team-building trip.

We flew back to Camarillo via CIA late Saturday after delays caused by rain and a soft runway on SRI (SMI was fine).

RESULTS:

Harris Point, 3 April 2001. Low tide –0.6 ft at 1345 hrs, wind NW 20-25 mph, partly cloudy and cool. Surge light with 3-ft. wind waves in cove. On site 1330-1645 hrs. There were six harbor seals present when we arrived and two Black Oystercatchers.

Endocladia muricata was quite dense and lush in most of the Endocladia zone plots. *Hesperophycus californicus* was fairly thick in plots 421-423 though it was all quite short here, of the form resembling *Pelvetiopsis limitata*. *Mytilus californianus* seemed sparse in most of the mussel zone plots. There are some dense patches in more exposed areas around the site, especially on the walls of surge channels. The reef flats had a thin cover of mussels, almost all were large individuals. Numerous mussel shells were gaping with most of the meat gone- either oystercatchers or sea stars are probably responsible. *Balanus glandula* dominate in only one of the barnacle plots (#440), the others are primarily dominated by *Tetraclita rubescens*. Plot 438 is in the Tetraclita zone but was primarily algae (*Mastocarpus papillata* and *Mazzaella affinis*). Consideration should be given to establishing one more Tetraclita plot and four more Balanus plots. Potential Tetraclita zone plots can be found

near plots 436 and 437 with potential *Balanus* zone plots common on the higher rocks. *Balanus glandula* was abundant and very dense in patches.

Dan looked around briefly for the species list but was not able to complete a very exhaustive at this site. There were some substantial patches of *Ulva* sp. around the site. Purple urchins were common in the lower abalone plots. A few diseased purple sea urchins were observed. *Tegula funebris* were quite common. Some larger, older individuals of *T. gallina* were found but were rare and they almost look like hybrids between the two species. *Pachygrapsus crassipes* were uncommon. There were only four black abalone in the plots. In the crevice transect, four black abalone (part of 30-minute search) were found along with two *Pisaster Ochraceus* and one *Asterina miniata*. No general seastar count was made. Kelly found 17 black abalone in the initial 30-minute search and measured 15 of them. She continued to search past 30 minutes over the rest of the reef at the site and found 19 more black abalone. Of the 19 black abalone measured, the mean size was 108 mm (SD=25). The size range was 75-164mm.

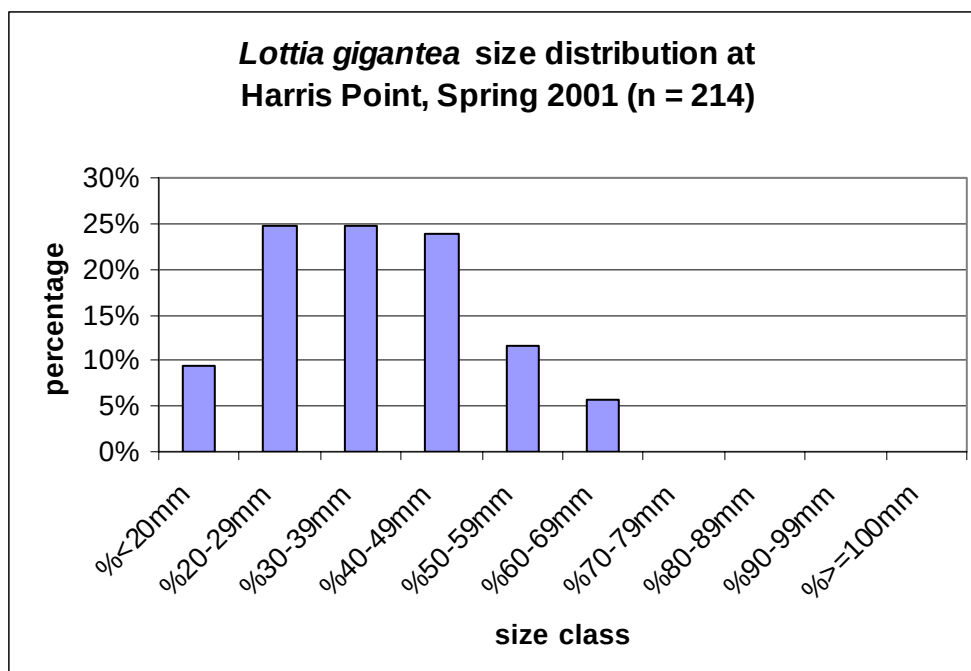
We installed five new owl limpet plots among the boulders and rocks west of abalone plot 445. A single stainless steel bolt marks each plot and we used a one-meter radius, measuring all *Lottia gigantea* that fell within the circle. We also installed two reference bolts, one at the west edge of the site, just past L5, on a tall rock. That bolt and the tall boulder seaward of it mark the western edge for abalone counts etc. A second bolt was placed at the head of the surge channel near plot 434 on a high point.

Photoplot summary - mean percent cover by zone in fixed photoplots at Harris Point, San Miguel Island, Spring 2001

Zone	BareRock	Barnacle	Tetraclita	Endocladia	Hespero phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle	29.0	12.8	11.0	4.6	0.0	0.0	9.2	0.0	32.2	1.2	0.0
Endocladia	15.6	9.0	0.8	55.2	11.0	0.0	1.0	0.0	7.2	0.2	0.0
Rockweed	30.0	4.4	0.0	31.0	29.8	0.0	0.0	0.0	4.6	0.2	0.0
Mussels	28.4	2.4	3.0	3.8	0.0	0.0	41.0	1.2	18.6	1.6	0.0

Owl limpet *Lottia gigantea* plot summary at Harris Point, San Miguel Island, Spring 2001

Plot	Count	MeanSize	StDev	MinSize	MaxSize	%<20m m	%20- 29mm	%30- 39mm	%40- 49mm	%50- 59mm	%60- 69mm	%>=79 mm	Area	Density
1	31	37.45	11.80	15	62	3.23%	22.58%	35.48%	22.58%	9.68%	6.45%	0.00%	3.14	9.869
2	27	48.22	8.84	30	64	0.00%	0.00%	14.81%	40.74%	33.33%	11.11%	0.00%	3.14	8.596
3	30	32.10	11.11	17	60	10.00%	40.00%	30.00%	13.33%	3.33%	3.33%	0.00%	3.14	9.551
4	65	27.60	8.36	15	47	21.54%	40.00%	30.77%	7.69%	0.00%	0.00%	0.00%	3.14	20.694
5	61	43.89	12.68	16	69	3.28%	13.11%	14.75%	39.34%	19.67%	9.84%	0.00%	3.14	19.421



Black abalone *Haliotis cracherodii* density within plots at Harris Point, San Miguel Island, Spring 2001

Count	Density	Area	Density
4		26.500	.151

Black abalone *Haliotis cracherodii* size distribution for Harris Point, San Miguel Island, Spring 2001

Site	Density	Count Size	Mean Size	St Dev	Min Size	Max Size	%<45 mm	%45-126mm	%127-145mm	%>145mm
HP	.151	19	107.95	25.42	75	164	-	78.95%	15.79%	5.26%

Otter Harbor 4 April 2001. Low tide –0.8 ft at 1427 hrs, air 13.5° C, water 13°C, wind NW 15 mph, partly cloudy and cold, Surge light with 2-4 waves. On site from 1200-1630 hrs. When we arrived there were 11 harbor seals plus one dead pup; two elephant seals were on the small beach adjacent to the reef and over 50 elephant seals were present on the beach to the east. Shorebirds included four Black Oystercatchers, 21 Willets, and various numbers of western gulls mostly interested in the seal carcass.

There were a lot of wild flowers on the hike over. We pulled at least 20 fireweed plants near the trail on the way. The work went well, we had no problems finding plots and we were able to make a few corner repairs.

Acorn barnacles were quite common and very dense in areas. *Endocladia muricata* were dense and extensive throughout the site, mixing in with rockweeds and mussels. Both *Silvetia compressa* and *Hesperophycus californicus* were fairly abundant and growing well. Mussels are never particularly dense at this site and ranged from 48%-72% cover. There were three black abalone in plot 369 and none in the others. Derek counted 46 black abalone in a 30-minute search with 24 more found

covering the rest of the site. I counted sea stars over the entire site, finding 16 *Pisaster ochraceus* and 2 *P. giganteus*.

We may want to consider adding more rockweed plots to adequately represent both *Silvetia* and *Hesperophycus* zones. Plots 358 and 359 are in the *Hesperophycus* zone though currently both have low coverage of rockweeds.

Five owl limpet plots were established using the standard center stainless-steel bolt with a one-meter radius circle. Two reference bolts were installed to provide photo points and mark the ends of the site. For abalone and seastar searches, the standard site will be from the edge of the rocks on the eastern side, not including the offshore rocks on the eastern point to reference bolt 2 which is above the western end of the pool below abalone plot 365.

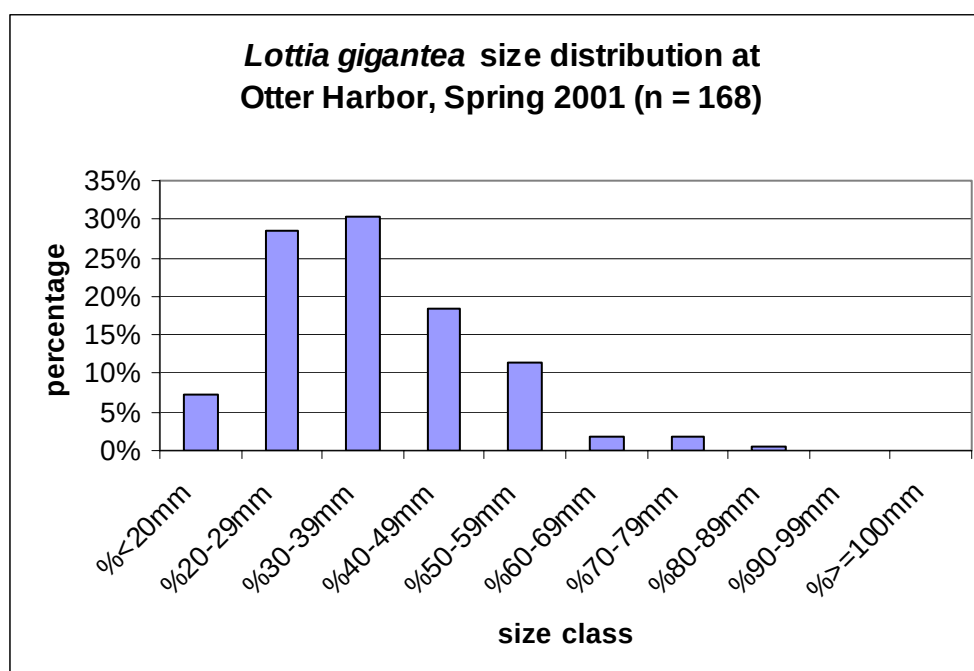
Tegula funebris were common as were *Nucella emarginata*, *Acanthina* sp. and *Ocenebra circumtexta*. The copepods *Tigriopus californica* were common in the high pools. The high pools were interesting for the variation between pools- one might have mostly cyanobacteria, the next diatom chains and the next would be light green from phytoplankton or spores. *Pachygrapsus crassipes* were not common. Purple sea urchins were common in the lower intertidal, mostly tucked into holes in the rock. *Phyllospadix* seemed less common and the area around the highest sea urchin densities was barren or bleached encrusting coralline algae and rock. Signs of sea urchin wasting disease (balding) were observed.

Photoplot summary-mean percent cover by zone in fixed photoplots at Otter Harbor, San Miguel Island, Spring 2001

Zone	Bare Rock	Barnacle	Tetraclita	Endocladia	Hespero-phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle	26.8	20.6	0.0	0.2	0.0	0.0	0.0	0.0	28.8	20.8	2.8
Endocladia	9.2	4.2	0.0	56.0	0.0	11.8	1.0	0.6	17.2	0.0	0.0
Rockweed	20.8	10.6	0.2	24.0	1.2	28.0	0.0	0.0	13.8	0.6	0.8
Mussels	10.4	0.2	0.8	0.2	0.0	0.0	57.2	7.8	23.0	0.4	0.0

Owl limpet *Lottia gigantea* plot summary at Otter Harbor, San Miguel Island, Spring 2001

Plot	Count	Mean Size	StDev	Min Size	Max Size	%<20mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%>=99mm	Area	Density
1	38	36.34	14.00	15	62	10.53%	26.32%	26.32%	13.16%	18.42%	5.26%	0.00%	0.00%	0.00%	3.14	12.098
2	40	39.23	12.81	15	72	7.50%	15.00%	32.50%	22.50%	17.50%	2.50%	2.50%	0.00%	0.00%	3.14	12.735
3	35	37.26	11.43	20	74	0.00%	34.29%	22.86%	34.29%	5.71%	0.00%	2.86%	0.00%	0.00%	3.14	11.143
4	28	36.18	15.88	15	84	10.71%	25.00%	39.29%	7.14%	10.71%	0.00%	3.57%	3.57%	0.00%	3.14	8.914
5	27	29.22	7.95	15	49	7.41%	48.15%	33.33%	11.11%	0.00%	0.00%	0.00%	0.00%	0.00%	3.14	8.596



Black abalone *Haliotis cracherodii* density within plots at Otter Harbor, San Miguel Island, Spring 2001

Plot	Count	Area	Density
	Density		
369	3	20.600	.146

Black abalone *Haliotis cracherodii* size distribution for Otter Harbor, San Miguel Island, Spring 2001

Count Size	Mean Size	StDev	Min Size	Max Size	%<45 mm	%45-126mm	%127-145mm	%>145 mm
49	84.47	24.99	39	127	4.08%	93.88%	2.04%	-

Crook Point 5 April 2001. Low tide –0.8 ft at 1506 hrs, air 17°C, water 13°C wind W 15 mph, breezy but nice weather, surge moderate with 4-5 ft surf and 2-3 ft waves. We were on site from 1200-1615 hrs. There were six elephant seals at the site, and three harbor seals and 21 elephant seals on the beach adjacent to the site. When we arrived there were 12 Pelagic Cormorants and four black oystercatchers at the site. One elephant seal had a yellow tag V919 on the left flipper.

Acorn barnacles did not seem very abundant and there did not seem to be any recruitment. *Endocladia muricata* was less common overall than the barnacles. *Silvetia compressa* was present in most plots in that zone but was in terrible condition with most of the frond tips broken off. Mussels were dense within the plots on the inner reef. Mussels also dominated some of the rockweed zone plots. Only one black abalone was found in the five abalone plots. Kelly found 15 more within a 30-minute search and continuing the search longer found a total of 35 black abalone. *Pisaster ochraceus* were abundant with 119 counted in the reef area. We decided on boundaries for the site for consistent counts on the reef.

Ulva sp. and *Porphyra perforata* covered much of the mussel shells and rock in the middle zones on both the inner and outer reefs. The green turf algae *Cladophora columbiana* and *Chaetomorpha linum* were both common. *Bryopsis corticulans* was commonly found. The lower zones on the reef were very dense with various species of algae. *Laminaria setchellii* and *Cystoseira osmundacea* (not *Halidrys*) were common even in some of the higher tidepools. *Analipus japonica* was present throughout the lower part of the east end of the outer reef. *Nucella emarginata* and *Littorina* spp. were the only common gastropods. *Petrolisthes* sp. were found when some of the *Phragmatopoma californica* sand tubes broke away. *Pachygrapsus crassipes* were not very common.

Photoplot summary-mean percent cover by zone in fixed photoplots at Crook Point, San Miguel Island, Spring 2001

Zone	Bare Rock	Barnacle	Tetraclita	Endocladia	Hespero phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle	58.0	35.6	0.0	2.0	0.0	0.0	0.8	0.0	2.0	1.6	0.0
Endocladia	36.2	20.6	0.4	15.4	0.2	0.6	8.4	0.2	16.0	2.0	0.0
Rockweed	32.4	15.6	0.6	4.2	0.0	1.2	23.0	1.2	20.4	1.4	0.0
Mussels	7.0	3.6	0.6	0.0	0.0	0.0	74.2	3.2	10.2	1.2	0.0

Black abalone *Haliotis cracherodii* Density within plots at Crook Point, San Miguel Island, Spring 2001

Count Density	Area	Density
1	11.100	.090

Black abalone *Haliotis cracherodii* size distribution for Crook Point, San Miguel Island, Spring 2001

Count Size	Mean Size	StDev	Min Size	Max Size	%<45 mm	%45-126mm	%127-145mm	%>145 mm
16	87.19	19.73	40	113	6.25%	93.75%	-	-

Cuyler Harbor, 6 April 2001. Low tide –0.6 ft at 1542 hrs, air 17°C, water 13°C, wind NW 10 mph, nice weather with decreasing wind and increasing clouds in afternoon, Surge light with 3-4 ft surf. Shorebirds included one Black Turnstone and one Black Oystercatcher on the site. We counted 23 Willets and 10 Whimbrels on the beach; they seemed to be feeding on sand crabs. There were numerous elephant seal pups on the Cuyler Harbor beach but no count was done.

The beach was clean of debris. We had to wade across the surge channel in front of the middle rocks. The rocks had an abundance of algal cover, mostly *Ulva* sp. and *Chaetomorpha linum*. *Gracilaria* sp. was abundant and *Ahnfeltia* sp. was common. *Nucella emarginata* and acorn barnacles were abundant there as well. On the site *Balanus glandula* was abundant with high densities in most plots. *Chthamalus* sp. was also fairly abundant. *Tetraclita rubescens* was common in the lower zones. *Endocladia muricata* was dense but only in a narrow band within the site. *Silvetia compressa* was dense within the narrow band of its zone. Two plants of *Hesperophycus californicus* were present above plot 410. The fronds of *H. californicus* were much longer and broader than the form at Harris Point. Mussels were particularly dense on the beach side of the sites. Near the large rock where the mussel plots are located though the mussels are less dense. Plots 404 and 405 (the highest) had few mussels, though they still covered 31% and 22% of the plots. There was an enormous mussel in the center of the plot 402 that may be worth analyzing to see if we can track it through time in the photos.

Phragmatopoma californica was abundant, though not as much as at other times. Shorecrabs, *Pachygrapsus crassipes* were strikingly more abundant than at other sites this week. Shorecrabs of all sizes were observed, especially on the outer rocks. We searched the entire site and the outer rocks and found no black abalone. One fresh abalone shell was found with chips on the end consistent with crab predation. Ten *Pisaster ochraceus* were counted within the site boundaries. Many ochre stars and some bat stars, *Asterina miniata*, were seen among the outer rocks. *Spheciospongia confoederata* and other sponges were present among the outer rocks. Purple sea urchins were common among the outer rocks but less common on the site.

Photoplot summary-mean percent cover by zone in fixed photoplots at Cuyler Harbor, San Miguel Island, Spring 2001

Zone	Bare Rock	Barnacle	Tetraclita	Endocladia	Hespero-phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle	58.6	32.2	0.0	7.8	0.0	0.0	0.0	0.0	0.4	0.8	0.2
Endocladia	34.4	6.4	0.2	39.8	0.0	7.4	5.0	0.0	5.2	1.6	0.0
Rockweed	16.8	0.0	0.6	0.0	0.0	66.0	0.2	0.0	10.6	5.8	0.0
Mussels	24.0	0.4	5.4	0.0	0.0	0.0	53.8	1.4	4.2	10.8	0.0

Santa Rosa Island

April 25-May 2, 2001 (Database event #2001-F)

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
 Derek Lerma, Biological Technician, Channel Islands National Park
 Sean Hastings, Channel Islands National Marine Sanctuary
 Megan Johnson, California Coastal Commission
 Julie Goodson, Channel Islands National Marine Sanctuary

PROCEDURE: Arrived via the OCEAN RANGER on 4/25. Because of the morning tides we explored some of the canyons in the afternoons pulling noxious weeds as they were found. Standard protocols for monitoring were conducted at all the sites following the monitoring handbook. Additionally we counted motile invertebrates within photoplots. Details are described below. We returned to Ventura via the OCEAN RANGER on 5/2.

RESULTS:

Ford Point, 26 April 2001. Low tide –0.4 ft at 0638 hrs, air 13.5° C, water 13°C, wind W 5-8 mph, foggy and cool. Surge moderate to light with occasional 4 ft surf and calm seas. We observed two black oystercatchers on site and six sanderlings chased by a peregrine falcon. One harbor seal was offshore. On site 0700-1000 hrs. An immature golden eagle was observed near Johnson's Lee about mid-day.

A mixture of both *Balanus glandula* and *Chthamalus fissus/dalli* occupied the barnacle zone with a fair cover. Small limpets mostly *Lottia digitalis* were abundant. There were many tiny *Littorina* (both species) throughout the upper intertidal zone. *Endocladia muricata* was common and all appeared healthy. *Mytilus californianus* abundance appeared normal but juveniles were not noted. Owl limpet, *Lottia gigantea*, densities in the plots seemed normal. The size range was 17-92 mm with small limpets being uncommon. *Ulva* sp. was common in the higher limpet plots. *Porphyra perforata* was present but not very common. A 20-minute search was made for black abalone. None were found though the tide was higher than preferred for the search. *Pisaster ochraceus* were present, though not counted. Megalopa stage *Pachygrapsus crassipes* were common. *Nucella emarginata* seemed common. *Ocenebra circumtexta* was present, and *Acanthina* sp. was rare.

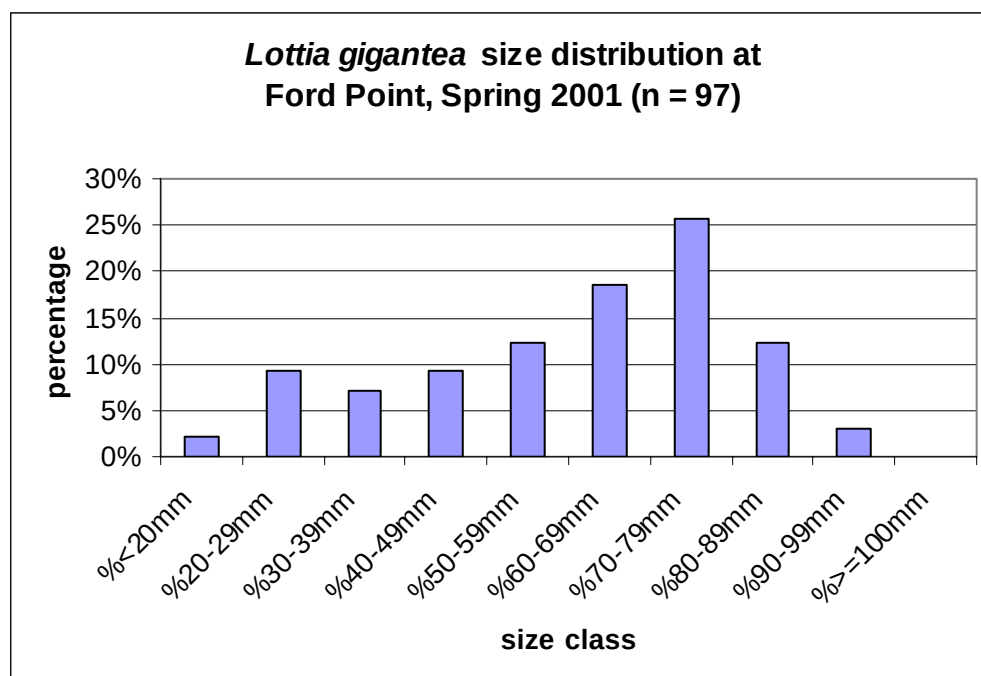
Panoramas of the site were photographed from a flat concretion near plot 524, and from the top of the rock above plot 525. Later in the day we hiked up Jolla Vieja canyon. The water flow was impressive and the water clear. Insects and tadpoles were common. There was some green alga in the stream. *Ruppia* was present in some pools. We visited Carrington Point later and collected some *Mastocarpus* sp. that was larger than the normal *M. papillatus* and closer in appearance to *M. jardinii*. There was some *Cumogloia andersonii* present. *Porphyra perforata* was common. Both *Hesperophycus californicus* and *Silvetia compressa* were present and large.

Photoplot summary – mean percent cover by zone at Ford Point, Santa Rosa Island, Spring 2001 (5 plots/zone)

Zone	Rock	Barnacle	Tetraclita	Endocladia	Hesperophycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal
Barnacle	61.4	26.8	0.0	7.8	0.0	0.0	0.0	0.0	1.6	2.4
Endocladia	33.0	2.6	0.2	48.8	0.0	0.0	4.2	0.0	9.0	2.2
Mussels	22.4	0.4	0.0	0.2	0.0	0.0	48.2	0.2	23.2	5.4

Owl Limpet *Lottia gigantea* plot summary at Ford Point, Santa Rosa Island, Spring 2001

Plot	Count	Mean Size	St Dev	Min Size	Max Size	%<20 mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	%>=100 mm	Area	Density
600	15	66.80	11.62	40	82	0.00%	0.00%	0.00%	6.67%	20.00%	20.00%	46.67%	6.67%	0.00%	0.00%	3.14	4.78
601	12	65.75	10.45	40	81	0.00%	0.00%	0.00%	8.33%	8.33%	50.00%	25.00%	8.33%	0.00%	0.00%	3.14	3.82
602	20	73.25	11.68	49	92	0.00%	0.00%	0.00%	5.00%	10.00%	15.00%	40.00%	20.00%	10.00%	0.00%	3.14	6.37
603	19	66.21	19.39	26	90	0.00%	5.26%	5.26%	10.53%	10.53%	10.53%	31.58%	21.05%	5.26%	0.00%	3.14	6.05
604	31	43.03	18.59	17	81	6.45%	25.81%	19.35%	12.90%	12.90%	12.90%	3.23%	6.45%	0.00%	0.00%	3.14	9.87



Motile invertebrate counts at Ford Point, Santa Rosa Island, Spring 2001

Zone	Barnacle					Endocladia					Mussel					Total Count 15 plots
plot #	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	
Lepidochitona spp.		3						1								4
Nuttalina spp.						2	1	3		6	4		2		9	27
Fissurella volcano												3	3		1	7
Pachygrapsus				3		2		2	2	1			2			12
Pagurus spp.																0
Limpets	324	84	69	188	44	49	125	19	28	34	42	28	13	10	15	1072
subsample 1	18	5		24												47
subsample 2	14	6		9												29
subsample 3	15	4		1												20
subsample 4	34	6		13												53
Nucella emarginata		1		3			3	1	1	3	1	8	16	19	5	61
Acanthina spp.															1	1
Tegula funebris									1	2				9	1	13
Strongylocentrotus purpuratus									1			1	2		1	5
Ocenebra circumtexta		1							1							2
Lottia gigantea	2							3	5	3	2	3		2	4	24
Littorina spp.	1148	1200	1744	776	880	65	432	240	95	57	0	0	0	6	0	6643
subsample 1	111	28	115	38	36		35	9								372
subsample 2	120	87	95	31	58		0	14								405
subsample 3	25	68	122	27	66		32	28								368
subsample 4	31	117	104	98	60		41	9								460

Fossil Reef, 27 April 2001. Low tide –0.4 ft at 0733 hrs, air 15.5° C, water 13°C, wind W 5-10 mph, foggy and windy, surge light with 2-3 ft surf calm seas. There were numerous elephant seals on the beach to the west and in the water in front of the site. There were six harbor seals, one pelagic cormorant, four western gulls and 13 black oystercatchers at the site. On site 0740-1300 hrs.

We started with the mussel plots and seastar counts. The entire 30 x 6 m seastar transect was counted but the 15 m segments were counted separately for comparability with the times when only the short transect was done. On the high side of the transect we counted 11 *Pisaster ochraceus* outside and two inside. On the low side, there were seven *P. ochraceus* and 3 *Haliotis cracherodii* outside and 17 *P. ochraceus* and two *H. cracherodii* on the inside reef. There were no black abalone in the abalone plots and no other search was made for them. Owl limpets were common in the plots, though the densities varied considerably between plots. Sizes ranged from 23-96 mm.

Silvetia compressa was present though there were almost no plants in the rockweed zone plots. Most of the plants were large and ends of the fronds were often broken off. A few young plants were present around the site, however. *Endocladia muricata* was sparse throughout the site. The sand castle worm, *Phragmatopoma californica*, and various algae dominated the mussel plots. Though the worms were common, the tubes were often short and small. A general species list was not made. *Porphyra perforata* was common but not abundant. Motile invertebrates were common in all the plots. *Nuttalina californica* were abundant in the mussel plots but not present in plots on the inner reef. *Nucella emarginata*, *Acanthina* sp. and *Ocenebra circumtexta* were all present. *Tegula funebris* were common in many of the plots. *Littorina* spp. (mostly *L. keenae*) were abundant in all plots except the mussel plots. Small limpets were also common throughout the site.

Stainless steel bolts were placed in both upper corners of each of the mussel plots to assist us in finding these plots in the future. Two brass reference bolts were also installed for photos and general

orientation. One was placed on the bluff slope at the access point in the center of the site. The other was placed on top of the reef above plot 620. Panoramic photos were taken at each of the reference bolts.

There were *Arundo donax* stalks washed up on the cobble beach, none were observed sprouting. There were no abalone shells on the cobble beach. There was a fair bit of fresh tar at the site. A peregrine falcon was seen flying by the site.

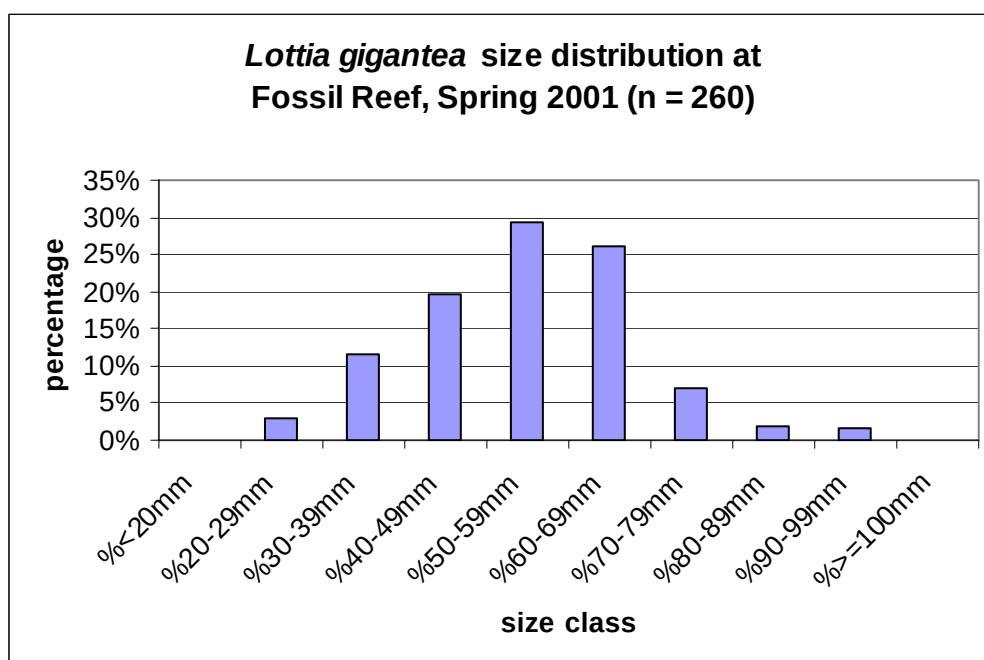
We visited Arlington Beach in the afternoon to see where the archeologists were working. On the beach there was a common dolphin carcass in pretty good shape near the east end of the beach. There were about 30 wire lobster traps washed up on the beach. A mature golden eagle was observed at Arlington, above the bluffs behind the beach.

Photoplot summary – mean percent cover by zone at Fossil Reef, Santa Rosa Island, Spring 2001 (5 plots/zone)

Zone	Rock	Barnacle	Tetraclita	Endocladia	Hesperophycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal
Barnacle	64.4	33.0	0.0	0.2	0.0	0.0	0.0	0.0	1.6	0.2
Endocladia	50.4	17.0	0.0	7.6	0.0	22.2	0.0	0.0	1.2	1.6
Rockweed	73.2	4.6	0.0	6.2	0.0	4.2	0.2	0.0	9.8	1.8
Mussels	16.8	0.4	9.8	0.2	0.0	0.0	24.0	1.6	20.2	27.0

Owl Limpet *Lottia gigantea* plot summary at Fossil Reef, Santa Rosa Island, Spring 2001

Plot	Count	MeanSize	StDev	Min Size	Max Size	%<20 mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	Area	Density
1	24	51.17	14.50	29	76	0.00%	8.33%	20.83%	16.67%	20.83%	25.00%	8.33%	0.00%	0.00%	3.14	7.64
2	26	52.27	9.66	34	73	0.00%	0.00%	11.54%	26.92%	42.31%	15.38%	3.85%	0.00%	0.00%	3.14	8.28
3	48	64.13	15.70	37	96	0.00%	0.00%	4.17%	12.50%	25.00%	25.00%	16.67%	8.33%	8.33%	3.14	15.28
4	81	55.51	11.47	23	81	0.00%	2.47%	8.64%	14.81%	33.33%	33.33%	6.17%	1.23%	0.00%	3.14	25.79
5	81	50.21	11.57	27	72	0.00%	4.94%	16.05%	27.16%	25.93%	23.46%	2.47%	0.00%	0.00%	3.14	25.79



Motile invertebrate counts at Fossil Reef, Santa Rosa Island, Spring 2001

Zone	Barnacle					Endocladia					Mytilus				
plot #	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619
Lepidochitona spp.						3		5	1	8					
Nuttalina spp.															
Fissurella volcano															
Pachygrapsus															
Pagurus spp.															
Limpets	43	4	19	2	28	68	50	172	164	68	6	87	31	180	192
subsample 1						8		22	5					12	12
subsample 2						4		4	11					3	16
subsample 3						3		14	13					22	12
subsample 4						2		3	12					8	8
Nucella emarginata															
Acanthina spp.							2	7	7	14	2	2	1	4	
Tegula funebris		1				7		34	4	73	2	25	3	18	
S. purpuratus															
Ocenebra circumtexta														2	
Lottia gigantea															
Littorina spp.	556	948	1032	948	952	229	272	88	664	22	808	260	304	3	716
subsample 1	18	44	29	65	58		16	12	63		84	38	32		15
subsample 2	46	64	46	43	87		43	1	14		52	3	4		85
subsample 3	50	51	65	31	34		5	9	48		66	54	40		65
subsample 4	25	78	118	98	59		4	0	41		0	0	0		14

zone	Silvetia					Total Count 20 plots
plot #	620	621	622	623	624	
Lepidochitona spp.	1			1	2	21
Nuttalina spp.	84	98	63	52	27	324
Fissurella volcano						0
Pachygrapsus		1	6	7		14
Pagurus spp.						0
Limpets	26	67	62	49	15	1333
subsample 1						59
subsample 2						38
subsample 3						64
subsample 4						33
Nucella emarginata	3	7	8	9		27
Acanthina spp.						39
Tegula funebris						167
S. purpuratus	80	6	9	6	23	124
Ocenebra circumtexta	1					3
Lottia gigantea		1	9	13		23
Littorina spp.		2				7804
subsample 1						474
subsample 2						488
subsample 3						518
subsample 4						437

East Point, 28 April 2001. Low tide –0.2 ft at 0841 hrs, air 19.5°C, water 13°C, wind NW 5-10 mph, partly cloudy, surge light with 2-4 ft surf and calm seas. There were four black oystercatchers, 2 black turnstones and four pelagic cormorants at the site. Approximately 100 harbor seals were on the reef at Abalone Rocks. On site 0800-1100 hrs.

We hiked from the lagoon because of the wet road there. The TRUTH and a sport boat were in the area this morning. After working the site we met the CIA plane and Megan and Sean flew in, Julie Goodson came out.

Rockweeds were abundant and the Silvetia plots had very high cover. *Hesperophycus californicus* looked healthy with very broad leaves, the comparison in morphology with some of the other sites is striking. Mussel plots all had high cover of *Mytilus californicus* in a mix of sizes. The mussels of photopoint 3 were still small and dense. This plot was established to follow the growth of what appeared to be a recent settlement when the site was established. *Endocladia muricata* had the highest density we had seen all week. Barnacle cover was fairly high in some plots. *Chthamalus fissus/dalli* dominates plots 575,578 and 579 with 11-21% cover. Plot 576 had large *Hesperophycus* and *Endocladia*. Plot 577 is dominated with 40% *Balanus glandula*. There were many tiny *Littorina keenae* in the higher plots. *Tegula funebris* were common in the rockweed plots. *Acanthina* sp. and *Nucella emarginata* were common.

The East Point site could be expanded by adding *Hesperophycus* zone plots and surfgrass transects.

Photoplot summary – mean percent cover by zone at East Point, Santa Rosa Island, Spring 2001 (5 plots/zone)

Zone	Rock	Barnacle	Tetraclita	Endocladia	Hespero- phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal
Barnacle	58.2	20.6	0.0	13.2	6.2	0.6	0.0	0.0	1.0	0.2
Endocladia	14.6	0.6	0.0	64.8	16.8	2.6	0.2	0.0	0.4	0.0
Rockweed	8.8	0.0	0.0	1.0	0.0	78.8	0.0	0.0	10.6	0.8
Mussels	7.8	0.0	0.0	0.0	0.0	0.0	72.0	0.0	11.6	8.6

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Motile invertebrate counts at East Point, Santa Rosa Island, Spring 2001

zone	Barnacle					Endocladia					Silvetia				
plot #	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589
Lepidochitona spp.		7	1								4	2	10	8	13
Nuttalina spp.			1			1									
Fissurella volcano															
Pachygrapsus						5			2	2	2	1	6	3	4
Pagurus spp.															
Limpets	68	4	56			15	24	33	28	2	19	23	14	18	15
subsample 1	2	1	3												
subsample 2	15	0	1												
subsample 3	0	0	3												
subsample 4	0	0	7												
Nucella emarginata		6								1		1			
Acanthina spp.		2				7	3	11	6	3	6	8	15	9	11
Tegula funebris		5						1	2	1	31	51	40	2	16
Strongylocentrotus purpuratus															
Ocenebra circumtexta							1					1		1	
Lottia gigantea															
Epitonium spp.		1													
Amphissa versicolor						1							3		
Littorina spp.	668	1440	696	1412	1296	260	284	160	240	472		5			16
subsample 1	29	110	58	68	58	6	9	7	20	12					
subsample 2	50	105	40	76	93	5	32	12	19	27					
subsample 3	34	110	42	89	62	42	4	8	18	22					
subsample 4	54	35	34	120	111	12	26	13	3	57					

zone	Mytilus					Total Count 20 plots
plot #	590	591	592	593	594	
Lepidochitona spp.	2	2				49
Nuttalina spp.	2	7	8	9	8	36
Fissurella volcano	4	5	6	3	2	20
Pachygrapsus	12	4	10	13	3	67
Pagurus spp.						0
Limpets	44	75	86	126	96	746
subsample 1						6
subsample 2						16
subsample 3						3
subsample 4						7
Nucella emarginata	23	20	16	32	30	129
Acanthina spp.			1			82
Tegula funebris	1	1				151
Strongylocentrotus purpuratus			1	1	2	4
Ocenebra circumtexta						3
Lottia gigantea			4	5	4	13
Epitonium spp.	1					2
Amphissa versicolor			2			6
Littorina spp.	12	37	43	8	2	7051
subsample 1						377

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subsample 2					459
subsample 3					431
subsample 4					465

Johnson's Lee 29 April 2001. Low tide –0.2 ft at 1000 hrs, air 24°C, water 13.5°C, wind W 3-5 mph, nice weather –warm and clear, surge moderate with 2-5 ft surf. Four black oystercatchers were observed on the site. On site 0830-1215 hrs.

Barnacles, especially *Balanus glandula*, were numerous. *Endocladia muricata* was lush and fairly abundant in all the plots. Plot 504 looked more like a barnacle plot again after several years of being dominated by limpets. The lower shelf (plots 510,511) was still dominated by *Phragmatopoma californica* and *Anthopleura sola*. *Pisaster ochraceus* seemed a little less numerous there than recent years. Plot 514 at about the same level and was mostly *Phragmatopoma californicus* and *Chondracanthus canaliculatus* with other algae. Mussels on the upper reef were fairly dense but the sandstone was pitted and the cover was irregular. *Pollicipes polymerus* were present but not very abundant.

Owl limpets were still in quite low densities in plots 595 and 597, however owl limpets were present around the plots and small owl limpets were present in some of the plots. Sizes ranged from 15-92 mm. No timed search was made for abalone other than looking during the seastar counts. Only one black abalone was found (no measure). *Nucella emarginata* was common but not in high numbers. *Tegula funebris* was present only in a few plots. *Littorina* spp. were common, with many juveniles present. Many small limpets only one or two millimeters long were found in the plots. Sea stars were counted in three zones but two were recounted on 1 May with slightly different boundary lines and those values were used. A total of 212 *Pisaster ochraceus* were counted in the three zones. The usual 10 x 2 m transect on the outer reef had 32 *Pisaster ochraceus*.

Northwest Talcott, 30 April 2001. Low tide –0.2 at 1115 hrs, wind NW 2-5 mph, beautiful conditions, clear sky, surge light with 2-4 ft surf, calm seas. Four harbor seals and three black oystercatchers were at the site. An additional two black oystercatchers and five black turnstones were observed to the west. Double-crested cormorants were nesting on the bluffs west of the site near transplant area 2. An elephant seal pup was on the beach near the access point. On site 1000-1330 hrs.

We had to climb down near the end of the peninsula as the bluff we had been using collapsed when the arch below it collapsed. The site was quite lush. *Phyllospadix* seemed to be everywhere. *Neorhodomela larix* with its epiphyte *Soranthra ulvoidia*, was common. Both *Balanus glandula* and *Chthamalus* sp. were abundant, the later dominant in the barnacle plots except 564. Barnacle plot 563 had a high cover of *Silvetia compressa*. *Endocladia muricata* was doing fine in spots but most of the plots in that zone had only sparse cover. Plot 558 looked more like an *Endocladia* plot than it had in some time though. *Silvetia compressa* was lush and was a long form at this site. No *Hesperophycus* was observed anywhere here. *Mytilus californianus* was common and there were no noticeable bare patches. Plot 553 however still had some open patches where a rock broke and 6 *Lottia gigantea* were keeping the space open. *Phragmatopoma californica* was present but not particularly common. There were many small limpets present. *Littorina* spp. were only common in the barnacle plots. Both juvenile and adult *Pachygrapsus crassipes* were common.

Tegula funebris were abundant on the flats. Owl limpets were quite common with a size range of 15-98 mm. *Porphyra perforata* was common, growing on the shells of owl limpets or on any rock projections in the owl limpet plots.

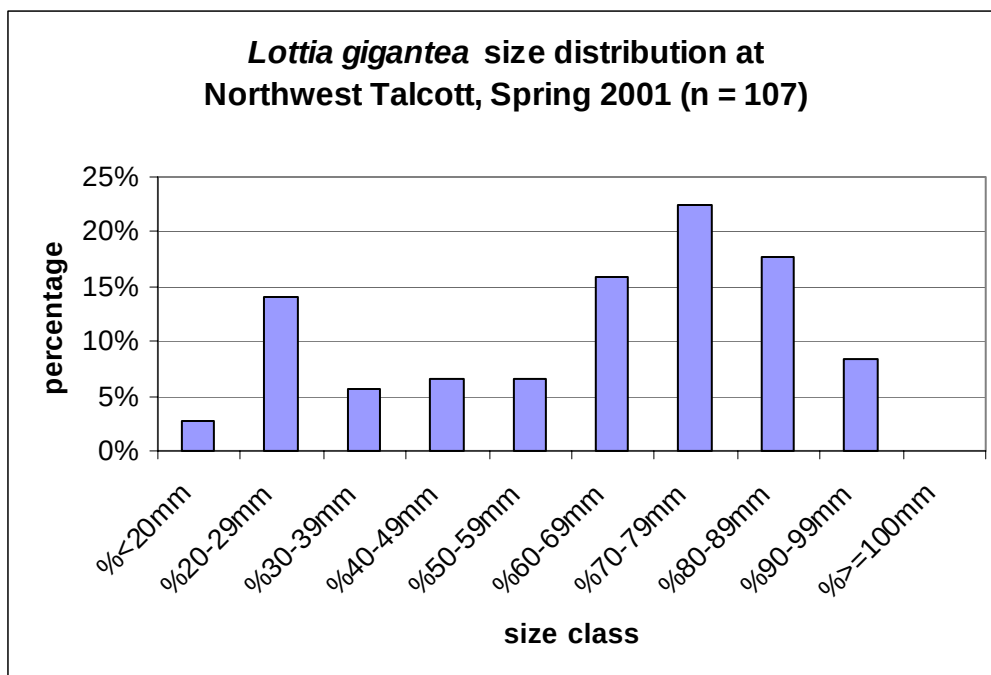
This site has potential surfgrass transect areas. Panorama photos were shot from the rock above limpet plot 701.

Photoplot summary – mean percent cover by zone at Northwest Talcott, Santa Rosa Island, Spring 2001 (5 plots/zone)

Zone	Rock	Barnacle	Tetraclita	Endocladia	Hespero-phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal
Barnacle	50.0	37.4	0.0	1.4	0.0	7.8	0.0	0.0	1.0	1.6
Endocladia	45.8	7.4	0.0	14.8	0.0	14.4	0.2	0.0	15.2	2.2
Rockweed	34.0	0.4	0.0	7.2	0.0	52.6	0.0	0.0	4.4	1.4
Mussels	24.2	0.2	1.4	0.0	0.0	0.0	56.6	5.0	7.0	5.6

Owl Limpet *Lottia gigantea* plot summary at Northwest Talcott, Santa Rosa Island, Spring 2001

Plot	Count	Mean Size	StDev	Min Size	Max Size	%<20mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	Area	Density
701	24	79.00	17.40	31	98	0.00%	0.00%	4.17%	8.33%	0.00%	8.33%	12.50%	37.50%	29.17%	3.14	7.64
702	20	71.80	17.53	25	95	0.00%	5.00%	5.00%	0.00%	0.00%	20.00%	35.00%	25.00%	10.00%	3.14	6.37
703	31	47.52	23.23	16	83	6.45%	32.26%	6.45%	6.45%	12.90%	9.68%	16.13%	9.68%	0.00%	3.14	9.87
704	18	56.33	20.30	21	82	0.00%	16.67%	5.56%	11.11%	11.11%	16.67%	27.78%	11.11%	0.00%	3.14	5.73
705	14	56.50	17.99	15	74	7.14%	7.14%	7.14%	7.14%	7.14%	35.71%	28.57%	0.00%	0.00%	3.14	4.46



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Motile invertebrate counts at Northwest Talcott, Santa Rosa Island, Spring 2001

Zone	Barnacle					Endocladia					Silvetia				
plot #	560	561	562	563	564	555	556	557	558	559	565	566	567	568	569
Lepidochitona spp.				1				2	3		3	3	2	1	
Nuttalina spp.									3	3			1		
Fissurella volcano									1						
Pachygrapsus		2		1		2		1	1		3	1	3	4	1
Pagurus spp.															
Limpets	8	76	156	32	95	40	102	52	119	43	21	16	37	17	15
subsample 1		6	15		17										
subsample 2		1	5		21										
subsample 3		12	6		24										
subsample 4		0	13		33										
S. purpuratus															
Nucella emarginata										3					
Acanthina spp.									3			2	1	1	
Tegula funebris		1		16				14			5	7	17	1	
Ocenebra circumtexta									2	1					
Lottia gigantea			1							7				1	1
Idotea spp.														1	
Littorina spp.	1436	173	176	23	172	3	9	1	18	7	46	16	6	12	
subsample 1	88		5		4										
subsample 2	108		6		12										
subsample 3	107		14		9										
subsample 4	56		19		18										

zone	Mytilus					Total Count 20 plots
plot #	550	551	552	553	554	
Lepidochitona spp.	2		1			18
Nuttalina spp.	1	6	6	12	11	43
Fissurella volcano	2	4			1	8
Pachygrapsus	9	9	5	2	6	50
Pagurus spp.						0
Limpets	82	56	128	54	52	1201
subsample 1						38
subsample 2						27
subsample 3						42
subsample 4						46
S. purpuratus		3		1	1	5
Nucella emarginata	23	19	8	5	5	63
Acanthina spp.						7
Tegula funebris						61
Ocenebra circumtexta						
Lottia gigantea			1			
Idotea spp.						
Littorina spp.	1436	173	176	23	172	3
subsample 1	88		5		4	
subsample 2	108		6		12	
subsample 3	107		14		9	
subsample 4	56		19		18	

Johnson's Lee, 1 May /2001. Low tide -0.3 ft at 1218 hrs, wind NW 2-5 mph, foggy morning clearing to nice day, surge light with 2-4 ft surf and calm seas. Five black oystercatchers and one western gull were observed. On site 1200-1330 hrs.

Julie Goodson flew back on the camper flight today. We returned to shoot the photo plots and recount the seastars. We also photographed the three zone areas. We added a third bolt to each of plots 510 and 511 for ease in finding them. The upper left bolt of plot 510 was marked with one notch and the upper left bolt of 511 has two notches. The upper left bolt of plot 514 now has 5 notches consistent with the Santa Cruz Island system of marking. We noted that the lower right bolt of plot 514 was about 10 cm inside the corner along the bottom edge of the frame. A bronze bolt was placed as a reference bolt (R1-1 notch) next to plot 500 and a panorama of the site was shot from there. A second reference marker (epoxy with R2) was placed on top of reef between 595 and 505. We suggest a reference point (R3) at the east end of the reef in front of plot 599, however we did not install a bolt or otherwise mark it. Panoramas of the tidepool area were shot from R2 and a panorama of the east end of the reef was shot from the east end of the reef.

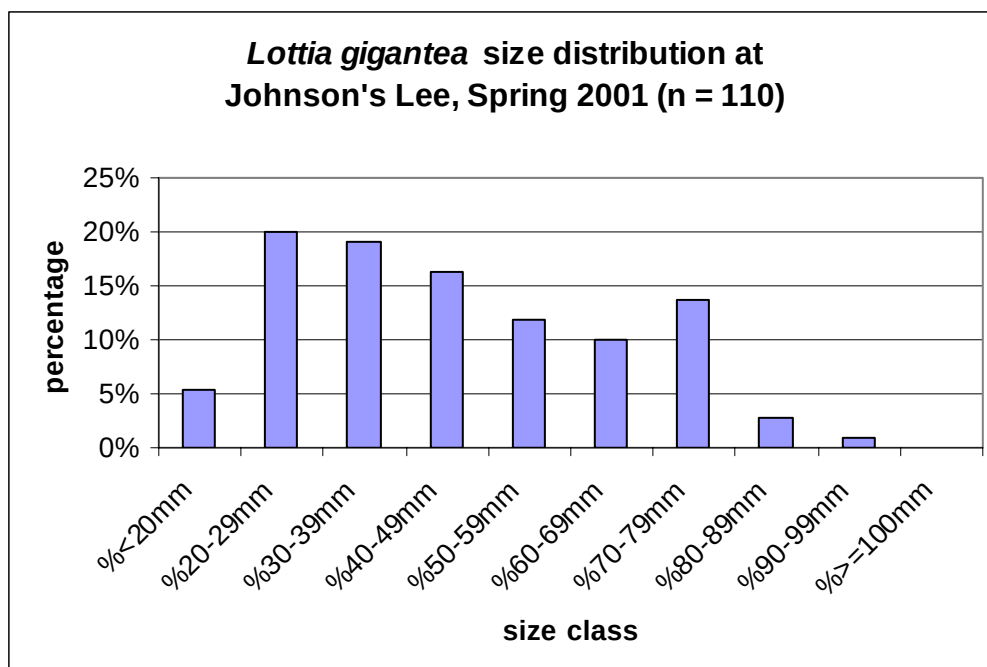
For seastar and black abalone counts we divided the area into three zones. Zone 1 includes the front reef at the west end of the site, not including the offshore rock. Zone 1 starts at R1/510 east to the end of the reef at plot 518, extending back only to the high ridge of the reef. Zone 2 includes the entire surge channel and behind the ridge of the zone 1 reef including the tidepool area to a line through 597/514 on the east side. Zone three is the area from the 597/514 line east to a line through 509/599. The counts we obtained were 57 *P. ochraceus* in zone 1, 110 *P. ochraceus* in zone 2 and 81 *P. ochraceus* in zone 3. The seaward side of all the zones is the mean low tide level along the main reef.

Photoplot summary – mean percent cover by zone at Johnson's Lee, Santa Rosa Island, Spring 2001 (5 plots/zone)

Zone	Rock	Barnacle	Tetraclita	Endocladia	Hesperophycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal
Barnacle	55.0	33.0	0.2	9.6	0.0	0.0	0.2	0.0	0.2	1.8
Endocladia	33.2	2.4	0.4	50.2	0.0	0.0	11.2	0.4	1.4	0.8
Mussels	12.4	0.8	0.6	0.6	0.0	0.0	16.8	1.4	30.6	36.8

Owl Limpet *Lottia gigantea* plot summary at Johnson's Lee, Santa Rosa Island, Spring 2001

Plot	Count	Mean	StDev	Min Size	Max Size	%<20 mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	Area	Density
595	9	39.78	13.99	15	57	11.11%	22.22%	0.00%	44.44%	22.22%	0.00%	0.00%	0.00%	0.00%	3.14	2.87
596	17	69.18	14.50	24	84	0.00%	5.88%	0.00%	5.88%	5.88%	11.76%	58.82%	11.76%	0.00%	3.14	5.41
597	6	45.00	20.35	20	72	0.00%	33.33%	16.67%	0.00%	16.67%	16.67%	16.67%	0.00%	0.00%	3.14	1.91
598	37	44.05	19.60	20	92	0.00%	18.92%	32.43%	16.22%	13.51%	2.70%	10.81%	2.70%	2.70%	3.14	11.78
599	41	37.78	17.34	16	69	12.20%	24.39%	19.51%	17.07%	9.76%	17.07%	0.00%	0.00%	0.00%	3.14	13.05



Motile invertebrate counts at Johnson's Lee, Santa Rosa Island, Spring 2001

zone	Barnacle					Endocladia					Mussel					Total Count 15 plots
plot #	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	
Lepidochitona spp.									1				8			9
Nuttalina spp.							1	2	3	2	3		1	7	1	20
Fissurella volcano				1					1	3	1				4	10
Pachygrapsus							3	3					3	5	2	16
Pagurus spp.																0
Limpets	26	168	152	200	888	45	89	61	94	216	30	15	53	41		2078
subsample 1		11	1	20	62					10						104
subsample 2		8	7	4	54					11						84
subsample 3		23	14	14	56					15						122
subsample 4		0	16	12	50					18						96
S. purpuratus															1	1
Amphissa versicolor																0
Nucella emarginata				3	2	2	2	3	4	6			7	3	1	33
Acanthina spp.														3		3
Tegula funebris											1		1	9		11
Ocenebra circumtexta																0
Leptasterias hexactis													1			1
Lottia gigantea						5	1	4	5	1	1		2			19
Pisaster ochraceus											1					1
Littorina spp.	1244	624	1052	916	260	33	70	24	31	84		2	35	11		4386
subsample 1	109	43	32	90	4					1						279
subsample 2	75	82	47	14	26					7						251
subsample 3	67	29	24	39	24					3						186
subsample 4	60	2	160	86	11					10						329

Santa Cruz Island

May 25-29, 2001 (Database event 2001-G)

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
Anne Walton, Channel Islands National Marine Sanctuary
Jessie Altstatt, Biologist, Channel Keepers
Jessie Swanhuysen, Environmental Defense

PROCEDURE: We arrived 1230 at Prisoners via the Pacific Ranger. We met J. Altstatt, who came out on IPCO with a high school class, at the research station and organized ourselves before driving out to the west end trailer, arriving there at 1800 hrs. We worked the two west end sites the next two mornings. Saturday afternoon was spent digging *Arundo donax* at Christy beach. The beach was littered with *Arundo* washed ashore during the winter storms. We found quite a few that had sprouted, mostly in the creek. Sunday afternoon we moved to the research station. Monday morning we worked the Willows Anchorage site. On Tuesday, the Surf Ranger picked us up at 1200 hrs and we proceeded back to Ventura.

Standard monitoring procedures were followed with photoplots being photographed and scored in the field. Motile invertebrates were counted in the photoplots usually by both Dan and Jessie each taking half a plot. Littorines and limpets were usually sub-sampled in the four corners of the plots totaling $\frac{1}{4}$ of the plot. Owl limpets were counted and measured within one-meter radius circle plots. Abalone and seastars were searched for over the entire reef at each site and surfgrass transects were sampled every 10 cm at all transects. Weather and tide conditions were excellent all week. Photo plots were shot with an SLR held over the frame. No strobes were used, but all the photos came out well.

RESULTS:

Trailers, 26 May 2001. Low tide –0.8 ft at 0719 hrs. Heavy overcast and fog but the temperature was comfortable, wind and waves were calm, surge was light and surf was less than one foot. Three harbor seals were just offshore when we arrived but no pinnipeds were ashore. Shore birds observed included one Black Turnstone, one Surfbird, two Black Oystercatchers and one American/Black hybrid Oystercatcher. We were on site from 0630-1200 hrs.

Barnacle plots appeared to have higher cover than what was recorded (18-67%). *Chthamalus* sp. were dominant, though *Balanus glandula* were common. Mussel plots looked normal with good coverage. Juvenile *Mytilus californianus* were found. *Silvetia compressa* cover was high (72-97%) in the *Silvetia* zone plots. *Hesperophycus* zone plots were more open with 20-60% rockweed cover though *Silvetia* was more abundant in two of the plots. *Endocladia muricata* was also fairly common in the *Hesperophycus* plots. Owl limpets numbers were nearly the same as the January sample, though the numbers within individual plots went up and down. *Phyllospadix* sp. dominated the transects in the surfgrass zone with 89% *Phyllospadix* in transect 1, 83% *Phyllospadix* in transect 2 and 76% *Phyllospadix* in transect 3. Various species of red algae covered most of the other points. Jessie Altstatt searched for seastars and abalone on the main reef, finding 22 *Pisaster ochraceus* (17 purple, 5 orange), four *Asterina miniata*, and 18 black abalone. The abalone ranged in size from 60-157 mm and 8 were found under one rock.

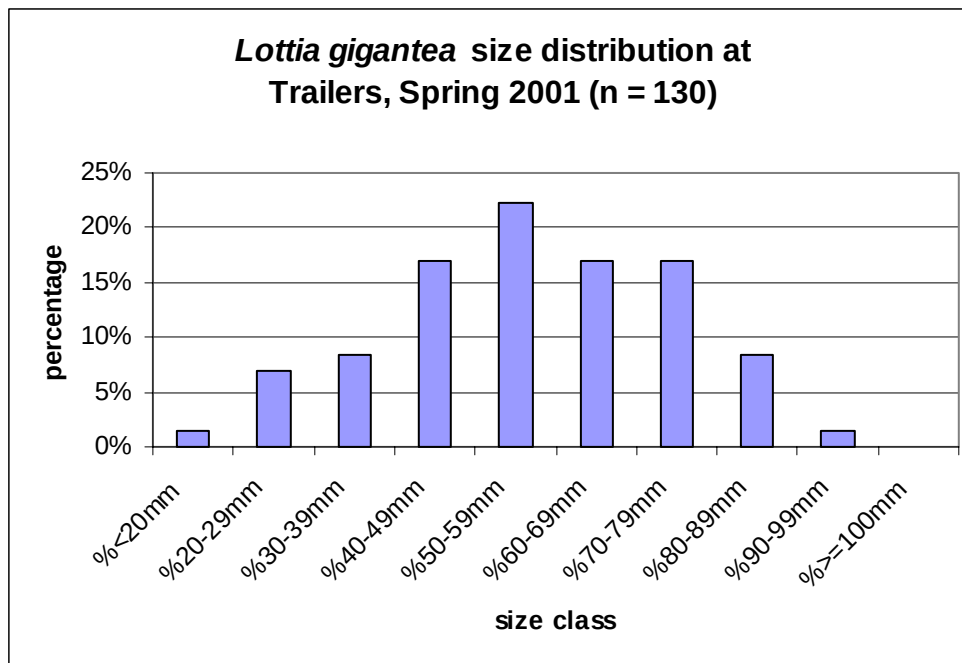
A variety of snails and chitons were found in the motile invertebrate counts. High numbers of *Nucella emarginata* were present in the mussel plots. *Tegula funebris* were abundant and *T. gallina* was present, making up about 8% of the total. A few *Leptasterias hexactis* were found. Many tiny *Littorina* spp. in the plots, though some large individuals were also present. Small limpets (*Lottia scabra*, *Lottia digitalis*, *L. strigatella*) were common in all plots. *Lottia pelta* was common in the rockweed plots. *Lottia asmi* was present on *Tegula* shells. *Lottia limatula* were present but uncommon. *Ligia occidentalis* and *Pachygrapsus crassipes* were noted as abundant at the site.

Photoplot summary – mean percent cover by zone at Trailers, Santa Cruz Island, Spring 2001 (5 plots/zone)

ZoneName	Rock	Barnacle	Tetraclita	Endocladia	Hesperophycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal
Barnacle	54.0	40.6	0.0	3.2	0.0	0.0	0.0	0.0	2.2	0.0
Rockweed	11.2	0.8	0.0	0.8	0.0	86.0	0.0	0.0	1.2	0.0
Mussels	14.4	1.2	1.6	0.4	0.0	0.0	68.6	2.2	6.2	5.4
Hesperophycus	48.0	3.6	0.0	14.0	14.0	19.2	0.0	0.0	1.2	0.0

Owl Limpet *Lottia gigantea* plot summary at Trailers, Santa Cruz Island, Spring 2001

Plot	Count	Mean	StDev	MinSize	MaxSize	Area	Density	%< 20mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	%>= 100 mm
1	25	70.72	16.60	21	90	3.14	7.959	0.00%	4.00%	0.00%	8.00%	8.00%	8.00%	36.00%	32.00%	4.00%	0.00%
2	21	69.48	11.85	40	90	3.14	6.686	0.00%	0.00%	0.00%	4.76%	14.29%	28.57%	38.10%	9.52%	4.76%	0.00%
3	20	53.20	18.09	18	85	3.14	6.367	5.00%	10.00%	10.00%	15.00%	15.00%	25.00%	15.00%	5.00%	0.00%	0.00%
4	47	49.45	11.37	21	71	3.14	14.963	0.00%	8.51%	8.51%	23.40%	40.43%	17.02%	2.13%	0.00%	0.00%	0.00%
5	17	40.47	15.92	16	73	3.14	5.412	5.88%	11.76%	29.41%	29.41%	11.76%	5.88%	5.88%	0.00%	0.00%	0.00%

**Black abalone *Haliotis cracherodii* size distribution for Trailers, Santa Cruz Island, Spring 2001**

Count Size	Mean Size	StDev	Min Size	Max Size	%<45mm	%45-126mm	%127-145mm	%>145mm
18	103.06	28.81	60	157	-	72.22%	22.22%	5.56%

Surfgrass transects at Trailers, Santa Cruz Island, Spring 2001 (additional taxa removed when not represented)**Location:** Trailers **Site Code:** SCTR**Date:** 5-26-2001**Recorder:** Dan Richards

	Transect	Transect	Transect
	1	2	3
Surf Grass Taxa	1	2	3
Egregia menziesii	3		
Erect coralline	2	5	2
Chondracanthus			
canaliculatus	4	5	9
Chondracanthus spinosus	3	2	
Porphyra perforata			2
Prionitis spp.		2	1
Mazzaella affinis			4
Mastocarpus sp.			1
other red algae			2
Gelidium sp.			1
Phyllospadix sp.	86	83	76
Mytilus californianus	2	1	1
Tetraclita rubescens		2	1
total	100	100	100

Motile invertebrate counts for Trailers, Santa Cruz Island, Spring 2001

zone	Barnacle					Hesperophycus					Mytilus				
plot #	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925
Lepidochitona spp.								2			4	1	1	3	1
Nuttalina spp.										1	21	23	11	10	9
Fissurella volcano												3		2	2
Pachygrapsus			1					2	1	1	7	5	4	2	2
Pagurus spp.															
Limpets	120	108	84	44	344	20	5	14	4	108	264	208	128	172	244
subsample1	18	8	1	3	33					7	26	15	9	10	13
subsample2	4	13	15	6	22					9	26	9	8	11	11
subsample3	4	3	4	2	5					10	14	17	7	15	24
subsample4	4	3	1	0	26					1	0	11	8	7	13
S. purpuratus													3	1	
Pisaster ochraceus															
Nucella emarginata											8	19	17	11	15
Acanthina spp.							2	1		3	2	1		1	
Tegula gallina							9								
Tegula funebris						1	15	1	3	10					
Ocenebra circumtexta											1	1			
Lottia gigantea											2		1	2	
Leptasterias hexactis					1										1
Littorina spp.	268	480	504	508	220	37	35	14	40	300	56			3	1
subsample1	24	13	21	42	8					16	11				
subsample2	6	48	30	19	18					8	2				
subsample3	8	37	38	57	6					3	1				
subsample4	29	22	37	9	23					48	0				
red mite	1														

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zone	Silvetia					Total Count 20 plots
plot #	926	927	928	929	930	
Lepidochitona spp.	4	6	4	14	7	47
Nuttalina spp.						75
Fissurella volcano						7
Pachygrapsus		1		1		27
Pagurus spp.				16	17	33
Limpets	9	16	23	12	10	1937
subsample1						143
subsample2						134
subsample3						105
subsample4						74
S. purpuratus						4
Pisaster ochraceus						0
Nucella emarginata			1		1	72
Acanthina spp.	2	1		5	1	19
Tegula gallina	2	8		4	7	30
Tegula funebris	41	43	12	19	99	244
Ocenebra circumtexta						2
Lottia gigantea						5
Leptasterias hexactis						2
Littorina spp.	1	1	5		2	2475
subsample1						135
subsample2						131
subsample3						150
subsample4						168
red mite						1

Fraser Cove, 27 May 2001. Low tide –0.7ft at 0820, heavy fog and drizzle but pleasant temperature, wind NW at 2 mph, waves calm, surge light with surf 1-2 ft. no pinnipeds were observed, shorebirds observed were three Black Oystercatchers and one American/Black Oystercatcher. On site 0700-1430 hrs.

We completed all the monitoring on the Fraser Cove side then moved to the Forney's side where the rockweed plots are located. The plots were photographed and invertebrates were counted but the plots were not field scored because of the rising tide.

Porphyra perforata was abundant over much of the reef especially in some barnacle plots where it obscured the barnacle cover. Barnacles were actually fairly dense under the *Porphyra*. *Porphyra* also dominated two of the Endocladia zone plots, though *Endocladia muricata* was quite dense in most plots. Mussel and leaf barnacle zone plots looked normal except for plot Po3 where another researcher apparently cleared part of the plot and installed some bolts in the rock. Small *Mytilus californianus* recruits were common. *Septifer/Brachydontes* were uncommon. Anne searched for abalone and seastars over the entire reef and found 2 *Pisaster ochraceus* (orange) and 2 black abalone (74 and 110 mm). *Phyllospadix* sp. only covered 36% of transect 1, 59% of transect 2 and 72% of transect 3. Owl limpet counts actually increased by four with a total of 79 in the five plots ranging from 15-74 mm. Jessie Altstatt measured limpets having to search through dense *Porphyra* to find them. *Littorina* sp. were abundant in the barnacle and Endocladia zone plots. *Littorina* were the only motile invertebrates found in the tar plots. *Nucella emarginata* were fairly abundant in the mussel

and leaf barnacle zone plots. *Tegula* sp. were not as common overall as at Trailer and only two *T. gallina* were found.

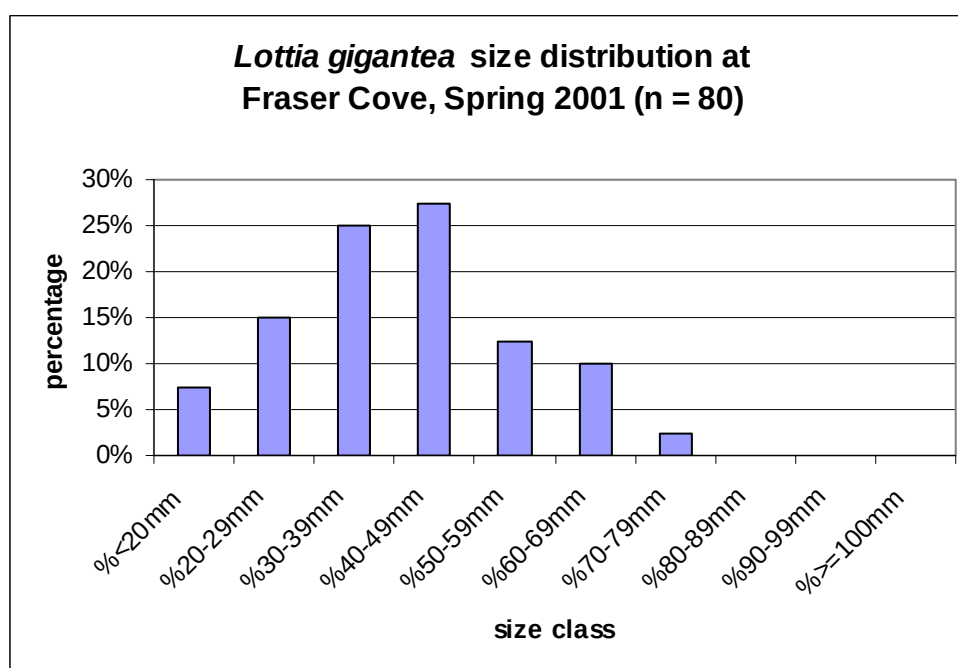
A small plainfin midshipman (*Porichthys notatus*) was found in a tidepool, alive but unable to swim as its swimbladder was inflated. *Ligia occidentalis* were present. *Pachygrapsus crassipes* were common but not as abundant as at the Trailer site. Crab megalopa were present.

Photoplot summary – mean percent cover by zone at Fraser Cove, Santa Cruz Island, Spring 2001 (5 plots/zone)

ZoneName	Rock	Barnacle	Tetraclita	Endocladia	Hespero phycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal	Tar
Barnacle	21.0	22.4	0.0	7.2	0.0	0.0	0.0	0.0	48.0	0.0	1.4
Endocladia	7.6	1.6	0.0	56.0	1.8	0.0	0.2	0.0	32.6	0.2	0.0
Rockweed	6.4	0.8	0.0	2.2	12.0	70.0	0.0	0.0	8.4	0.2	0.0
Mussels	12.4	1.2	0.4	0.0	0.0	0.0	66.4	1.6	4.2	13.8	0.0
Pollicipes	12.2	3.2	2.6	6.2	0.0	0.0	34.2	15.2	9.0	17.4	0.0
Tar	19.8	16.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	0.0	55.2
Hesperophycus	43.8	8.8	0.0	8.4	24.0	4.4	0.0	0.0	10.6	0.0	0.0

Owl Limpet *Lottia gigantea* plot summary at Fraser Cove, Santa Cruz Island, Spring 2001

Plot	Count	Mean	StDev	MinSize	MaxSize	Area	Density	%< 20mm	%20- 29mm	%30- 39mm	%40- 49mm	%50- 59mm	%60- 69mm	%70- 79mm	%80- 89mm	%90- 99mm	%>= 100 mm
1	11	49.73	13.33	30	67	3.14	3.502	0.00%	0.00%	27.27%	27.27%	9.09%	36.36%	0.00%	0.00%	0.00%	0.00%
2	10	44.80	22.62	15	74	3.14	3.184	20.00%	20.00%	0.00%	0.00%	20.00%	30.00%	10.00%	0.00%	0.00%	0.00%
3	21	36.52	16.06	16	71	3.14	6.686	14.29%	23.81%	14.29%	28.57%	9.52%	4.76%	4.76%	0.00%	0.00%	0.00%
4	22	34.45	8.12	20	51	3.14	7.004	0.00%	18.18%	50.00%	27.27%	4.55%	0.00%	0.00%	0.00%	0.00%	0.00%
5	16	42.19	11.23	17	58	3.14	5.094	6.25%	6.25%	18.75%	43.75%	25.00%	0.00%	0.00%	0.00%	0.00%	0.00%



Surfgrass transects at Fraser Cove, Santa Cruz Island, Spring 2001 (additional taxa removed when not represented)**Location:** Fraser Cove **Site Code:** SCFC**Date:** 27-May-01**Recorder:** Jessie Altstatt

	Transect	Transect	Transect
Surf Grass Taxa	1	2	3
Rock	2	2	1
Sand			1
Egria menziesii	1	11	
Endocladia muricata	2	1	1
Corallina vancouveriensis	29	4	3
Erect coralline			2
Encrusting coralline	2		1
Chondracanthus			
canaliculatus	6	8	8
Chondracanthus spinosus		1	
Porphyra perforata	1	1	2
Prionitis spp.		2	2
Mazzaella affinis			
Mastocarpus sp.		1	
other red algae	2	5	4
Phyllospadix sp.	36	59	72
Mytilus californianus	4	3	
Anthopleura spp.	6	1	
Phragmatopoma californica	7		
total	98	99	97

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Motile invertebrate counts at Fraser Cove, Santa Cruz Island, Spring 2001

zone	Barnacle					Endocladia					Hesperophycus				
plot #	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890
Lepidochitona spp.															
Nuttalina spp.									1						
Fissurella volcano															
Pachygrapsus	3			1	7	2	1	2	6	2					
Pagurus spp.	1														
Limpets	32	20	4	20	16	44	36	68	68	8	136	40	45	35	31
subsample1	1	0	0	4	1	1	3	5	3	0	4				
subsample2	3	3	0	0	3	4	3	5	2	0	15				
subsample3	3	0	1	0	0	2	1	0	3	2	11				
subsample4	1	2	0	1	0	4	2	7	9	0	4				
S. purpuratus															
Pisaster ochraceus															
Nucella emarginata	1					2	5		1						
Acanthina spp.	18	2					1	3		1	2	2		5	6
Tegula gallina															
Tegula funebris												14	1	1	8
Ocenebra circumtexta															
Lottia gigantea															
Littorina spp.	148	164	1284	608	72	232	228	252	84	288	336	45	532	72	30
subsample1	9	7	98	26	14	3	9	16	3	9	12		35		
subsample2	1	8	81	36	1	17	20	6	5	37	19		39		
subsample3	17	15	76	31	3	12	17	32	5	17	41		22		
subsample4	10	11	66	59	0	26	11	9	8	9	12		37		

zone	Silvetia					Mussel					Pollicipes				
plot #	896	897	898	899	900	891	892	893	894	895	901	902	903	904	905
Lepidochitona spp.	3		6		4										
Nuttalina spp.		1	1	1		6			1			1	1	4	5
Fissurella volcano									1						1
Pachygrapsus	1		2			2	6	3	6	6	5	5	5	3	12
Pagurus spp.	3	1													
Limpets	28	20	20	26	34	76	79	79	67	107	86	52	105	156	104
subsample1															
subsample2															
subsample3															
subsample4															
S. purpuratus															
Pisaster ochraceus															
Nucella emarginata						3	5	16	15	23	31	1	9	11	10
Acanthina spp.	1		2	4	3				1			1			
Tegula gallina				1	1										
Tegula funebris	1	6	4	28	1	1	1	1							
Ocenebra circumtexta					1							1			
Lottia gigantea						1	5		1	2	5	2		1	
Littorina spp.		3		2	13	1	2		2		19	11		1	
subsample1															
subsample2															

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subsample3															
subsample4															

zone	Tar					Total Count 35 plots
plot #	906	907	908	909	910	
Lepidochitona spp.						13
Nuttalina spp.						22
Fissurella volcano						2
Pachygrapsus						80
Pagurus spp.						5
Limpets						1642
subsample1						22
subsample2						38
subsample3						23
subsample4						30
S. purpuratus						0
Pisaster ochraceus						0
Nucella emarginata						133
Acanthina spp.						52
Tegula gallina						2
Tegula funebris						67
Ocenebra circumtexta						2
Lottia gigantea						17
Littorina spp.	124	76	131	39		4799
subsample1	20					261
subsample2	0					270
subsample3	6					294
subsample4	5					263

Willow's Anchorage, 28 May 2001. Low tide –0.4 ft at 0924, clear and calm though some white caps could be seen offshore. Waves were calm; surge was moderate with occasional surges washing over the plots as we worked. No shorebirds or pinnipeds were observed.

Hesperophycus californicus and *Silvetia compressa* both seemed to be doing well though the first plot in each zone was bare except for some *Endocladia muricata*. There were some young *Silvetia* plants in the plots. *Endocladia muricata* was common in most plots and was very lush on the slope next to Pe5. The low flat area below that (south of the rockweed plots) was quite scoured with numerous purple urchins and abundant *Lottia limatula* on the rocks there. The *Endocladia* zone plots on the outer reef had only fair cover, though the algae were not as bleached looking as sometimes. The mussel plots had good cover with many small *M. californianus* recruits found. *Pollicipes polymerus* were common within the mussel beds and form some nice patches near the owl limpet plots should we ever want to add photoplots in that zone. *Tetraclita rubescens* was dense below the *Endocladia* zone and photoplots could potentially be added to that zone. The surge should be a consideration here before new plots are added to this site though.

The same number (113) of owl limpets was found as in January with a size range of 15-65 mm. There were more small owl limpets at this site compared to the others. One abalone (80 mm) was found west of the last *Lottia* plot. A total of 165 *Pisaster ochraceus* (49 ochre and 116 purple) and two *Asterina miniata* were counted over the entire site. *Nucella emarginata* were common in the mussel zone plots. *Acanthina* sp. were common in the *Hesperophycus* zone plots. Only one *Tegula gallina* and no *T. funebris* were found in the plots. Littorine snails and small limpets were abundant.

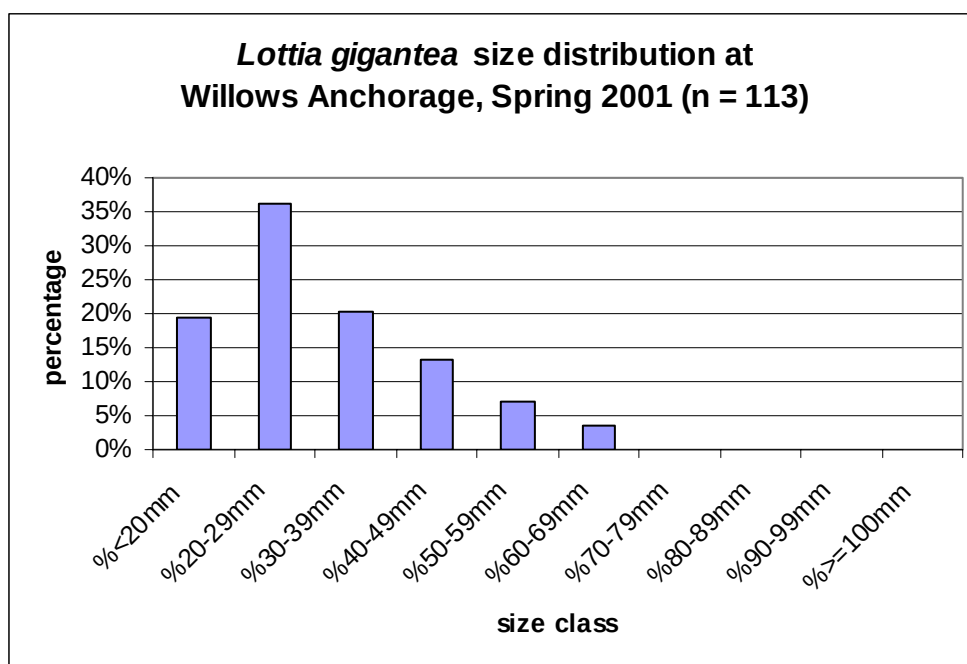
Pachygrapsus crassipes were abundant around the site with high numbers of small individuals and megalopa in the plots.

Photoplot summary – mean percent cover by zone at Willows Anchorage, Santa Cruz Island, Spring 2001 (5 plots/zone)

ZoneName	Rock	Barnacle	Tetraclita	Endocladia	Hesperophycus	Silvetia	Mussels	Leaf Barnacle	Misc Algae	Misc Animal
Endocladia	46.0	0.2	0.6	52.2	0.0	0.0	0.0	0.0	1.0	0.0
Rockweed	45.2	0.0	0.0	14.2	0.0	30.4	0.0	0.0	8.2	2.0
Mussels	13.0	0.0	5.6	0.0	0.0	0.0	46.2	9.0	20.2	6.0
Hesperophycus	72.6	1.4	0.0	2.8	7.8	7.4	0.0	0.0	7.6	0.4

Owl Limpet *Lottia gigantea* plot summary at Willows Anchorage, Santa Cruz Island, Spring 2001

Plot	Count	Mean	St Dev	Min Size	Max Size	Area	Density	%<20 mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	%>=100 mm
1	18	30.72	12.10	17	61	3.14	5.731	16.67%	38.89%	22.22%	16.67%	0.00%	5.56%	0.00%	0.00%	0.00%	0.00%
2	13	28.38	8.57	16	46	3.14	4.139	15.38%	46.15%	30.77%	7.69%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
3	38	32.00	11.48	15	56	3.14	12.098	15.79%	34.21%	23.68%	18.42%	7.89%	0.00%	0.00%	0.00%	0.00%	0.00%
4	30	29.30	13.81	15	61	3.14	9.551	23.33%	40.00%	13.33%	6.67%	13.33%	3.33%	0.00%	0.00%	0.00%	0.00%
5	14	34.57	18.04	15	65	3.14	4.457	28.57%	21.43%	14.29%	14.29%	7.14%	14.29%	0.00%	0.00%	0.00%	0.00%



Motile invertebrate counts at Willows Anchorage, Santa Cruz Island, Spring 2001

zone	Endocladia					Hesperophycus					Mytilus				
plot #	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945
Lepidochitona spp.	1				4	1	2		7	5					
Nuttalina spp.				1	7		1				30	6	10	14	15
Fissurella volcano												2	1	6	2
Pachygrapsus	5	2	3	3	2		1		1		6	3	6	5	4
Pagurus spp.									8	16					
Limpets	76	136	64	136	124	76	128	160	116	100	67	75	98	116	88
subsample1	1	8	4	9	9	6	6	12	8	9					
subsample2	5	8	1	5	7	0	6	11	10	6					
subsample3	4	9	6	8	11	9	14	8	3	3					
subsample4	9	9	5	12	4	4	6	9	8	6					
S. purpuratus			1							1	4	20	15	17	1
Nucella emarginata		2	2	2	9						16	13	7	8	6
Acanthina spp.							10	1	10	13					
Tegula gallina										1					
Tegula funebris															
Ocenebra circumtexta															
Lottia gigantea											7	2	2	2	
Leptasterias hexactis											1	1	1	1	4
Littorina spp.	660	1364	588	276	464	724	328	648	48	76					
subsample1	29	86	28	11	39	85	24	45	1	3					
subsample2	83	113	45	34	21	49	26	41	6	5					
subsample3	20	80	36	14	17	9	15	49	1	2					
subsample4	33	62	38	10	39	38	17	27	4	9					

zone	Silvetia					Total Count 20 plots
plot #	946	947	948	949	950	
Lepidochitona spp.	2	3	22	9	9	65
Nuttalina spp.	2	2	3		4	95
Fissurella volcano						11
Pachygrapsus	2	1	4	4		52
Pagurus spp.			17		5	46
Limpets	116	328	52	21	272	2349
subsample1	17	23	1		18	131
subsample2	2	22	2		16	101
subsample3	6	21	8		17	127
subsample4	4	16	2		17	111
S. purpuratus						59
Nucella emarginata	3	1	1			70
Acanthina spp.	2		5		2	43
Tegula gallina						1
Tegula funebris						0
Ocenebra circumtexta						0
Lottia gigantea						13
Leptasterias hexactis						8
Littorina spp.	232	72	20	1	12	5513
subsample1	15	10	3		1	380

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subsample2	16	2	1		0	442
subsample3	4	3	1		0	251
subsample4	23	3	0		2	305

Fall 2001 Rocky Intertidal Monitoring Trip Reports

Anacapa Island

October 16-18, 2001 (Database event 2001-H)

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
Derek Lerma, Biological Technician, Channel Islands National Park
Erin Maloney, SWAT team, UC Santa Cruz
Kristin Kusic, SWAT team, UC Santa Cruz
Megan Williams, SWAT team, UC Santa Cruz
Allison Kendall, SWAT team, UC Santa Cruz
Lydia Bergen, SWAT team, UC Santa Cruz
Jenny Raum, VIP, UCSC
Shawna Resewitz, VIP, UCSC
Jeff Hinke, VIP, UCSC

General notes and PROCEDURE: With Derek as Captain of the Pacific Ranger, we used the boat as a base for operations all week. On Wednesday and Thursday mornings we picked up Stacy ___ from East Island to look for rat midden sites to carry on Diana Stellar's study of rat predation on intertidal organisms. Each day, after skiffing ashore we began working the highest areas as the tide started going out. Derek scored plots (using the expanded species list), Dan shot the photographs and measured owl limpets, after these tasks we helped with the comprehensive surveys. For the comprehensive survey, a 30 m baseline transect was laid parallel to shore along the splash zone and fixed anchor bolts installed. Every three meters, a vertical transect was run down to about the zero tide level. Point intercepts were conducted at each line at a spacing determined by the transect length divided by 100. Along each transect, seastars were counted within one meter of each side and mobile invertebrates were counted within three 0.25 m² plots (in the high middle and low portions of each line). Tidal heights of each transect line were surveyed with a laser survey. We did not have the optic shuttle to download the temperature logger. Because motile invertebrates were counted as part of the comprehensive surveys, we did not count motile invertebrates in the photoplots.

RESULTS:

South Frenchy's Cove, 16 October 2001. Low tide –0.2 ft at 1613 hrs. Sky mostly overcast with high clouds. Air temp. 23.5°C water temp. 18.6°C Wind 10 kts NW offshore but calm at site. Surf was running 4-5 ft with a strong south component and heavy surge. There were no visitors or marine mammals in the area. The only shore birds observed were two wandering tattlers. We were on site from 1300-1900 hrs.

All activities were completed just in time to skiff off the beach with a little light. The survey transects were about 20 m long and somewhat difficult with the surge channels. Nothing unusual was noted. *Endocladia muricata* was doing well and was common in the barnacle plots. Tiny *Littorina keenea* were abundant in the upper plots as usual. *Silvetia* (*Silvetia*) *compressa* was common in the rockweed plots. Some *Hesperophycus californica* was present along the higher edges of the reef. Mussels at this site are mixed with barnacles and algae and tend to remain small. *Chaetomorpha* and *Ulva* were both present. *Chondracanthus canaliculatus* and *C. leptorhyncus* were common in the surge channels and both were common in the owl limpet plots. *Phyllospadix torreyi* was common in the surge channel and appeared healthy, some seeds were present. *Sargassum muticum* was present in small amounts in the tidepools. The most abundant taxonomic quandary was a *Laurencia* type algae.

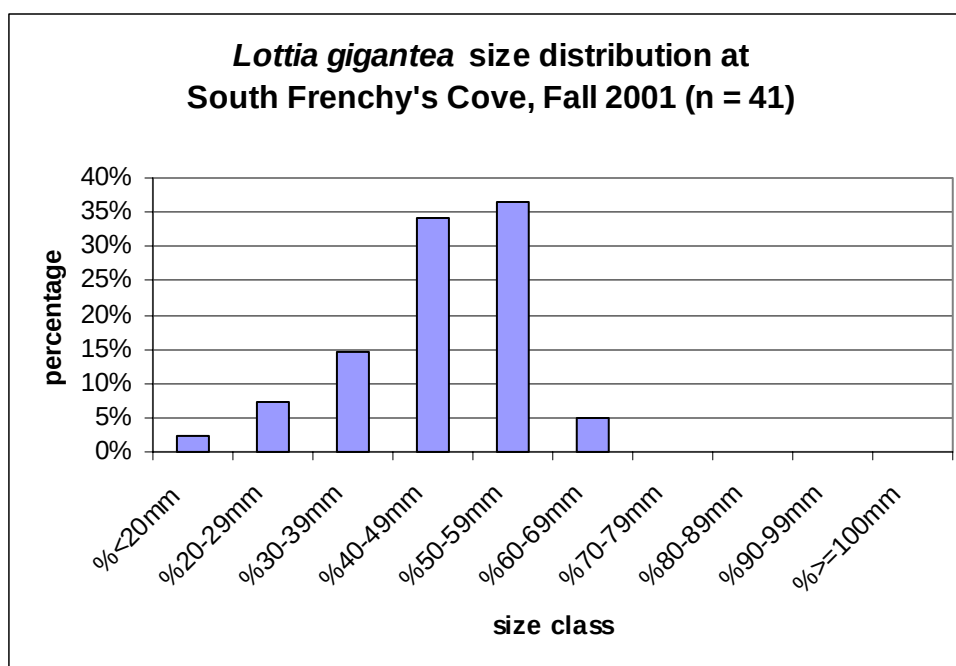
A total of 41 owl limpets were found in the three plots ranging from 18-62 mm in length. The total count was down from 54 last spring. One *Pisaster ochraceus* was found at the site. Weathered tar was present at the site but no fresh tar was found.

Photoplot summary – mean percent cover by zone at South Frenchy's Cove, Anacapa Island, Fall 2001 (5 plots/zone)

ZoneName	Rock	Barn	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussel	Leaf Barn	Misc Algae	Misc Animal	Tar
Barnacle	41.4	30.8	0.0	19.2	0.6	0.0	0.0	0.0	5.8	1.6	0.6
Endocladia	6.8	2.0	0.0	63.0	2.2	13.6	0.0	0.0	11.4	0.8	0.2
Rockweed	12.4	1.6	0.0	5.8	2.0	70.8	0.0	0.0	6.6	0.8	0.0
Mussels	1.8	0.6	0.2	0.0	0.0	0.0	54.0	0.2	43.0	0.2	0.0

Owl Limpet *Lottia gigantea* plot summary at South Frenchy's Cove, Anacapa Island, Fall 2001

Plot	Count	Area	Density	Mean Size	StDev	Min Size	Max Size	%<20 mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	%>=100 mm
1	13	3.14	4.139	48.54	11.79	18	60	7.69%	0.00%	7.69%	15.38%	61.54%	7.69%	0.00%	0.00%	0.00%	0.00%
2	18	3.14	5.731	40.33	8.90	24	56	0.00%	16.67%	22.22%	44.44%	16.67%	0.00%	0.00%	0.00%	0.00%	0.00%
3	10	3.14	3.184	48.40	7.86	38	62	0.00%	0.00%	10.00%	40.00%	40.00%	10.00%	0.00%	0.00%	0.00%	0.00%



North Middle Anacapa, 17 October 2001. Low tide –0.4 ft at 1659 hrs, we had a pleasant day with few clouds and calm conditions until about 1500 hrs. Wind (after 1500 hrs) 15 kts NW, seas 1-2 ft, surge light. Air temp 19°C, water temp. 18°C. There were no visitors or marine mammals in the area. The only birds present were two Black Oystercatchers and a young Rock Wren. We were on site from 1230-1730 hrs.

Derek and I started work on the East site shooting and scoring the 12 plots there. Conditions were the best we have had at this site in a while so corner epoxy and tag repairs were made to most of the plots. About 1430 we joined the others at the West site. The baseline transect was laid from the one-time survey transect bolt on the west end of the reef. A new bolt was placed at 30 m. The surveys went much quicker here as the transects were shorter and flatter.

Endocladia muricata was doing very well here and a nice dark color, very little beaching was noticed. The mussel beds were very dense and young *Mytilus californianus* were present. Both rockweed

species were healthy looking. This site has potential for establishing *Hesperophycus* plots if we decide to expand the monitoring here. *Tetraclita rubescens* was abundant and there is potential for a series of plots in that zone. *Chthamalus* sp. was the dominant acorn barnacle. There were also abundant *Lottia gigantea* in the upper mussel zone for potential owl limpet plots, though the micro relief of the rocks and other organisms will make the searching difficult here. *Egorgia menziesii* was all long and mature here, no young plants were noticed. There were no apparent bare patches in the mussel zone or elsewhere.

A total of 40 *Pisaster ochraceus* were counted in the transects and all were present in the low mussel zone and fairly hidden. Some drift *Zostera marina* was found on the reef. A small amount of weathered tar was present on the rocks. We did not check the abalone plots at Harbor Seal Arch.

Photoplot summary – mean percent cover by zone at Middle East, Anacapa Island, Fall 2001 (3 plots/zone)

Zone Name	Rock	Barn	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal
Barnacle	54.3	10.7	10.7	16.0	0.0	0.0	1.3	0.3	6.0	0.7
Endocladia	23.0	0.7	4.0	37.3	7.3	5.0	2.3	0.0	20.3	0.0
Rockweed	4.3	0.0	0.3	3.3	0.3	72.7	3.7	0.0	15.3	0.0
Mussels	3.3	0.0	4.0	0.0	0.0	0.0	63.3	0.0	28.7	0.7

Photoplot summary – mean percent cover by zone at Middle West, Anacapa Island, Fall 2001 (5 plots/zone)

ZoneName	Rock	Barn	Tet	Endo	Hespero-phycus	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal
Barnacle	41.4	10.0	0.0	18.8	2.2	0.0	1.4	0.0	25.8	0.4
Endocladia	45.0	2.2	0.4	21.4	2.2	0.0	3.2	0.2	23.4	2.0
Rockweed	10.2	0.6	2.6	2.0	0.0	65.4	4.8	0.4	12.4	1.6
Mussels	14.8	0.0	3.2	0.0	0.0	0.0	51.2	1.0	29.0	0.8

Cat Rock, 18 October 2001. Low tide –0.4 ft at 1746 hrs. We had a clear sky and calm, warm conditions on site. Offshore the wind was 15 kts NW, air temp. 21°C, water temp. 17°C. The south swell had died down some but occasional sets of 4-5 ft came in and the surge was generally heavy. No other people were ashore, no birds or mammals were ashore, however there were two harbor seals in the water watching us and a Black Oystercatcher flew over. We were on site between 1330 and 1830 hrs.

Because of the size and shape of the reef, the comprehensive transect baseline was established with a bend in it. The first 13 m of the baseline was on the east side with transects extending out over the barnacle plot reef to abalone plots 307 and 308. The other half of the transect extended out across *Lottia* plot L2 to the mussel plot reef. Though we began landing about 1330 hrs, it was 1430 hrs before we could really access most of the plots. Everything was completed except the point transects on the west side of the baseline.

Rockweeds were quite lush with dense patches of both *Hesperophycus* and *Silvetia*. *Chondracanthus canaliculatus* and *C. leptorhynchus* were both abundant. *Endarachne*, *Chondracanthus spinosus*, *Pterocladia*, *Egorgia* and *Halidrys* were all noted as being common to abundant. *Laurencia snyderiae*, more common at Catalina, was found here. There was some bleaching of some of the red algae such as *C. canaliculatus*, *Mazzaella affinis*, *Mastocarpus* and *Gastroclonium*.

Tetraclita rubescens was abundant on the outer reefs. *Chthamalus* were common on the reef in the barnacle plots despite the dense rockweed. Mussel densities looked about normal for here, fairly low density mixed with barnacles and coralline algae. *Petalochonchus montereyensis* was present throughout the site. Small *Ligia occidentalis* seemed fairly abundant.

No seastars were discovered on the transect lines or around the site. The abalone plots were checked and no abalone were found. All of the abalone plots are overgrown with algae. Dan measured owl limpets in the three plots. Plots L1 and L2 had good densities of 47 and 29 while plot L3 had only 7 owl limpets. Sizes ranged from 15-63 mm. This was down from a total of 90 one year ago.

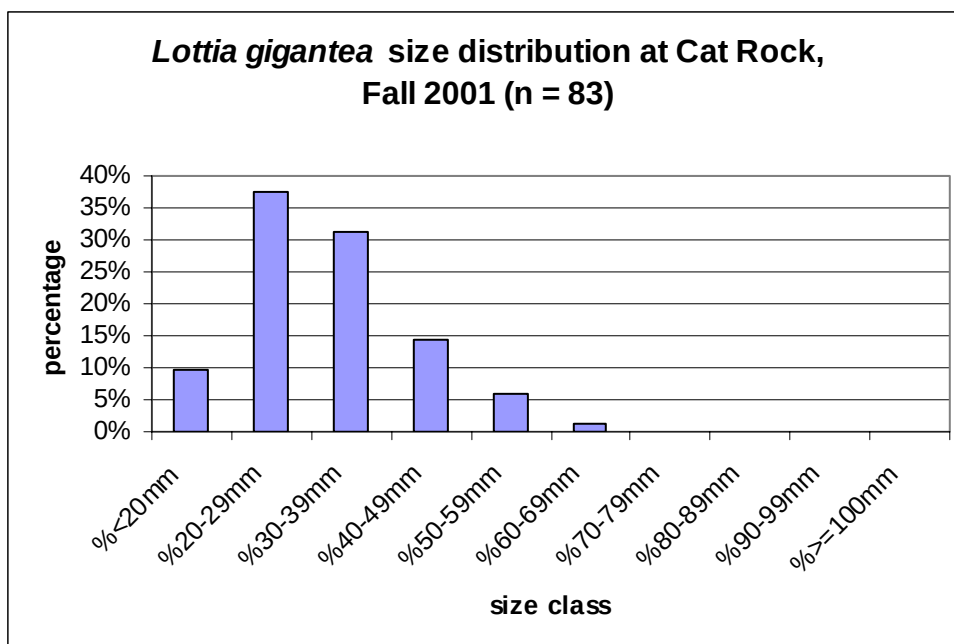
There were a number of missing corners on the photo plots however there was no time to make repairs. If we change plots at the site at all, we might consider moving plots 51 and 52, both plots are supposed to be in the Endocladia zone though other algae, particularly *C. canaliculatus*, *M. affinis* and coralline algae equal or dominate. The quadrat placing has never converted well to the rectangular frame either.

Photoplot summary – mean percent cover by zone at Cat Rock, Anacapa Island, fall 2001 (9 plots/zone)

ZoneName	Rock	Barn	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal
Barnacle	21.8	11.6	0.0	9.1	51.8	1.8	0.0	0.0	3.3	0.7
Endocladia	13.8	3.6	9.0	31.4	5.6	3.4	1.3	0.0	29.1	2.8
Rockweed	8.9	4.7	2.8	8.2	27.9	39.8	0.6	0.0	6.3	0.9
Mussels	13.8	1.4	18.8	1.1	0.0	0.0	32.0	1.0	28.1	3.8

Owl Limpet *Lottia gigantea* plot summary at Cat Rock, Anacapa Island, fall 2001

Plot	Count	Area	Density	Mean Size	StDev	MinSize	MaxSize	%<20 mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	%>=100 mm
1	47	3.14	14.963	28.83	8.03	17	45	12.77%	46.81%	27.66%	12.77%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2	29	3.14	9.233	34.52	8.70	17	51	3.45%	31.03%	34.48%	20.69%	10.34%	0.00%	0.00%	0.00%	0.00%	0.00%
3	7	3.14	2.229	43.00	16.71	15	63	14.29%	0.00%	42.86%	0.00%	28.57%	14.29%	0.00%	0.00%	0.00%	0.00%



San Miguel Island

November 13-17, 2001 (Database event 2001-I)

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
 Derek Lerma, Biological Technician, Channel Islands National Park
 Erin Maloney, SWAT team, UC Santa Cruz
 Kristin Kusic, SWAT team, UC Santa Cruz
 Megan Williams, SWAT team, UC Santa Cruz
 Allison Kendall, SWAT team, UC Santa Cruz

General notes and PROCEDURE: Dan flew out to San Miguel Island on the first flight with the SWAT team and we went directly down to the Cuyler Harbor site. Derek came on the second flight shared with the ranger and fox crew, bringing all the food for the week. We delayed the flights somewhat to allow the airstrip to dry from the rains of the previous days. Nearly an inch (0.86 in) of rain fell in the weekend storm. A large swell was running with crashing waves occasionally spraying the site and washing over the lower bench. We had large waves, though relatively low energy for the size, all week. A baseline transect was established over the Cuyler Harbor monitoring site for the comprehensive surveys, running from above (inshore from) plot 413 to the pool near plot 416. The comprehensive surveys include point intercept transects along 11 vertical transects from the splash zone to mean low tide, mobile invertebrate quadrats, seastar swath-transects, and tidal height mapping of the transect lines. Standard NPS monitoring was done at each site including photoplot pictures, photoplot field scoring (except Cuyler Harbor), shorebird and pinniped counts, abalone, owl limpet, and sea star counts (see details below). On 11/14 we all went to Crook Point together and began the comprehensive surveys there. On 11/15, Derek and Dan conducted the monitoring at Otter Harbor while the SWAT team returned to finish at Crook Point. On 11/16, Derek and Dan conducted the monitoring at Harris Point and the SWAT team completed the surveys at Cuyler Harbor. We had two flights to get us all back to Ventura on 11/17. The island was greening up after two rain events now, though few flowers were blooming. A few elephant seals were observed though the beaches were mostly empty. Recent fox scat was observed in the cross-island trail, presumably from the lone female still roaming the island. Two humpback whales were observed repeatedly breaching outside Cuyler Harbor one morning. We observed about 10 pacific slender salamanders in the trail on the

evening of 11/14. No unusual birds were noted. Kristin and Allison observed a sea otter in Cuyler Harbor on 11/16.

RESULTS:

Cuyler Harbor, 13 November 2001. Low tide –0.4 ft at 1433 hrs, clear sky, wind 15 mph NW, surf 6-8 ft with heavy surge and spray. Two black oystercatchers were on the site, approximately 20 whimbrels were on the center of the beach and surf scoters were off shore. One dead sea lion pup was on the beach near the site. We were on site from 1330 to 1800 hrs.

The general appearance was about the same as last spring. *Balanus glandula* were abundant with high densities especially around plots 412 and 418. *Endocladia muricata* was especially dense around plots 414 and 415, but patchy with generally sparse cover otherwise. *Silvetia compressa* tips were somewhat abraded but cover in the narrow zone was generally high. There was a small area of *Hesperophycus californicus* near the middle of the site. *Lottia pelta* and *Lepidochitona hartwegii* were common under the rockweed. Juvenile *Mytilus californianus* were present. The plots did not appear to have any changes. *Phragmatopoma californica* was present throughout the site but not as abundant as it has been at times. *Tegula funebris* were common. *Nucella emarginata*, *Ocenebra circumtexta*, and *Acanthina* sp. were all readily found. *Cylindrocarpus rugosum* seemed to be especially common. *Nemalion helminthoides*, *Cladophora columbiana*, *Egria menziesii*, *Prionitis lanceolata*, *P. lyalli*, and *Chondracanthus spinosus* were noted as common. Three bolts were installed to mark corners of the baseline transects. A total of 24 *Pisaster ochraceus* were counted on 11/16 (within one meter, either side of each vertical transect).

Photoplot summary-mean percent cover by zone in fixed photoplots at Cuyler Harbor, San Miguel Island, fall 2001 (5 plots/zone)

Zone	Rock	Barn	Tetraclita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal
Barnacle	52.2	42.4	0.0	4.6	0.0	0.0	0.0	0.0	0.6	0.2
Endocladia	41.0	9.4	0.2	28.0	0.0	8.6	4.6	0.0	4.8	3.4
Rockweed	9.6	0.0	0.0	0.0	0.0	78.2	0.0	0.0	9.0	3.2
Mussels	18.0	0.4	3.4	0.2	0.0	0.0	60.8	0.8	10.8	5.6

Crook Point 14 November 2001. Low tide-0.7 ft at 1516 hrs, clear sky- generally pleasant day, wind 15 mph NW, waves 6 ft max, surge heavy and occasionally washing over the reef. Approximately 30 cormorants left the site as we approached. Five black oystercatchers were seen along with one black turnstone and one western gull. A rock wren was working just above the site. There were no pinnipeds in the immediate area, one large bull and two younger animals were on the beach to the east. We were on site from 1130 to 1800 hrs.

Both *Chthamalus* and *Balanus glandula* were common though the later formed the densest patches. *Endocladia muricata* cover was generally light over the site and several *Endocladia* plots had a number of juvenile *Silvetia compressa* plants and relatively high cover of barnacles. *Silvetia compressa* was sparsely distributed overall and older plants had degraded frond tips. *Mytilus californianus* were generally very dense with many small mussels present. *Ulva* sp. was very common as an epiphyte on the mussels. *Porphyra perforata* was much less common. Overall red algae were abundant and diverse over the site. *Codium fragile* was abundant in some of the tidepools. *Nucella emarginata* seemed plentiful among the mussels. *Lottia gigantea* seemed common among the mussels. Sipunculids (peanut worms) were abundant among the mussels on the inner reef. Mussels there have obscured the corners of plot 382 and we were unable to locate the plot. The area

all around was very uniform in mussel cover however and a photo of the approximate area was taken and scored. Mussels obscured most of the corners of plot 397 also, however they were eventually located. Corner repairs were made to a number of plots. New bolts were placed to mark the baseline transect corners. The baseline transect was placed on the outer reef to the west of the established plots for safety and practicality reasons.

Photoplot summary-mean percent cover by zone in fixed photoplots at Crook Point, San Miguel Island, fall 2001 (5 plots/zone)

Zone	Rock	Barn	Tetraclita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal
Barnacle	50.4	42.0	0.0	2.0	0.0	0.0	0.6	0.0	0.2	4.8
Endocladi a	26.0	14.6	0.6	25.0	0.0	3.0	9.2	0.6	18.8	2.2
Rockweed	32.4	12.0	0.6	7.6	0.0	1.8	24.2	1.4	17.8	2.2
Mussels	7.2	2.6	0.2	0.0	0.0	0.0	74.2	3.8	11.8	0.2

Otter Harbor 15 November 2001. Low tide –0.8 ft. at 1559 hrs, air temperature 17°C water temperature 16.5°C, mostly fair, turning foggy in the evening, wind 10 mph NW, surf 6 ft with heavy surge. There were 12 harbor seals, four black oystercatchers, about 10 black turnstones, 16 willets and one western gull on the site and two elephant seals and 2 song sparrows on the small beach immediately adjacent to the reef. We were on site from 1245-1730 hrs.

Several pieces of rock, usually small ledges or promontories, have been broken off in recent months, most notably on the ridge above abalone plot 367 (within the old limpet transect 496) and within abalone plot 369. The piece from plot 369 changes the amount of available habitat for abalone, although no abalone have been found on that particular rock since the population collapse. There was a wooden pallet and several logs or tree branches in the high intertidal that may have been a factor in the broken rocks. Weathered tar was common (as usual) at the site and there were several fresh globs on the rocks. Plots 370, 379, and 375 need some corner repairs but we did not have time.

Both *Chthamalus* sp. and *Balanus glandula* were abundant. *Balanus glandula* densely covered most of plot 359, a rockweed zone plot. *Endocladia muricata* was abundant throughout the site. *Silvetia compressa* was patchy on the eastern side of the site, scattered among the *E. muricata*. More *S. compressa* and *Hesperophycus californicus* were found to the west with dense cover in the rockweed zone plots there. Much of the *S. compressa* fronds were pretty battered looking. Most of the *H. californicus* was small appearing more like the typical plants at Harris Point. *Mytilus californianus* were dense in the mussel zone plots with goose barnacles, *Pollicipes polymerus*, being common. *Mazzaella affinis* and *Gelidium coulteri* were common epiphytes in the mussel zone.

Tegula funebris were common. *Lottia limatula* were abundant. *Pachygrapsus crassipes* were common in the upper pools. *Littorina* (mostly *L. keenae*) were in very high numbers in the higher zones. Many small *Lottia scabra* were present. There was no sign of the sea urchin disease that was so noticeable last spring and *Strongylocentrotus purpuratus* were abundant. Only a small amount of *Sargassum muticum* was found, all in an outer pool below reference bolt R2.

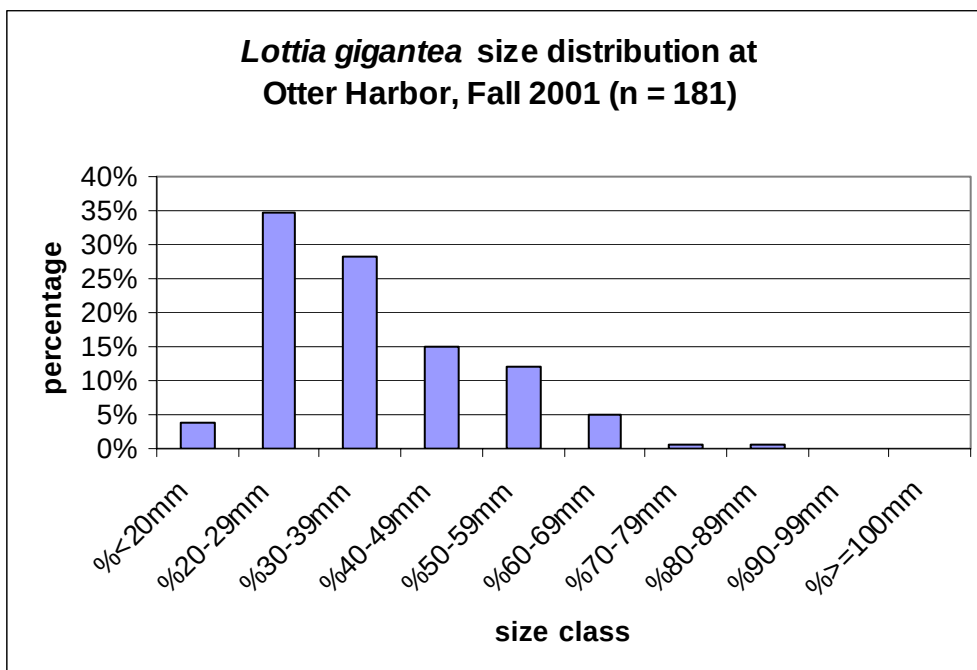
Both of us searched for abalone and seastars covering the site between R1 and R2 in about 80 minutes total time. We found three *Pisaster giganteus*, 24 *P. ochraceus*, and two *Asterina miniata*. A total of 84 *Haliotis cracherodii* were found, ranging in size from 40 to 148 mm. Most abalone were in groups (15 groups), defined as within a half meter of each other, with 2-9 individuals per group. Only one abalone (88mm) was found in plot 369, the only one in the five abalone plots. Owl limpets, *Lottia gigantea*, were measured in all five one-meter radius plots with size ranges of 16-82 mm. Owl limpet densities were similar to last spring's sample except for an increase in plot 5 where there were a large number of small animals (<35 mm).

Photoplot summary-mean percent cover by zone in fixed photoplots at Otter Harbor, San Miguel Island, Fall 2001 (5 plots/zone)

Zone	Rock	Barn	Tetraclita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal	Tar
Barnacle	41.0	33.8	0.0	0.0	0.0	0.0	0.0	0.0	20.8	1.2	3.2
Endocladia	10.8	5.0	0.8	49.6	0.0	7.8	0.6	0.2	24.6	0.6	0.0
Rockweed	16.2	13.0	0.2	15.0	3.2	31.4	0.0	0.0	18.0	2.0	1.0
Mussels	4.0	0.0	0.6	0.0	0.0	0.0	53.4	6.2	35.8	0.0	0.0

Owl limpet *Lottia gigantea* plot summary at Otter Harbor, San Miguel Island, Fall 2001

Plot	Count	Area	Density	Mean Size	StDev	Min Size	Max Size	%<20mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%>90mm
1	36	3.14	11.461	38.81	14.47	16	62	8.33%	19.44%	33.33%	8.33%	22.22%	8.33%	0.00%	0.00%	0.00%
2	36	3.14	11.461	38.22	13.33	17	74	5.56%	25.00%	22.22%	25.00%	19.44%	0.00%	2.78%	0.00%	0.00%
3	38	3.14	12.098	37.26	12.33	23	68	0.00%	34.21%	34.21%	13.16%	7.89%	10.53%	0.00%	0.00%	0.00%
4	31	3.14	9.869	36.45	15.11	20	82	0.00%	41.94%	22.58%	12.90%	12.90%	6.45%	0.00%	3.23%	0.00%
5	40	3.14	12.735	29.20	7.64	19	46	5.00%	52.50%	27.50%	15.00%	0.00%	0.00%	0.00%	0.00%	0.00%



Abalone Density within plots at Otter Harbor, San Miguel Island, Fall 2001

Count Density	Area	Density
1	20.600	.049

Abalone size distribution for Otter Harbor, San Miguel Island, Fall 2001

Count Size	Mean Size	StDev	Min Size	Max Size	%<45 mm	%45-126mm	%127-145mm	%>145 mm
84	89.86	22.21	40	148	1.19%	94.05%	3.57%	1.19%

Harris Point 16 November 2001. Low tide –0.8 ft at 1648 hrs, air 17°C, water 15.5°C, overcast all day, wind 10 mph NW, waves 8-10 ft with heavy surge but there was not as much energy in the waves as seen other times and the site was quite workable. Two harbor seals were present and there were many western gulls on the offshore rock. We were on site from 1100-1745 hrs though unable to work the plots before 1400 hrs.

No plot repairs were necessary. The usual weathered tar was everywhere but we did not notice any fresh tar. There were some fresh rock breaks, in particular was a broken piece next to abalone plot 444. A black abalone (115 mm) was on the new rock face.

Balanus glandula were dense in some areas but three of the barnacle plots are in the *Tetraclita rubescens* zone and *T. rubescens* were generally not very abundant. Plot 438 had only one *T. rubescens* inside. *Endocladia muricata* was common but not particularly dense anywhere and was usually mixed with *Hesperophycus californicus* which was common and relatively large for this site. No recruitment of *H. californicus* was apparent and there were no apparent recent recruits of *Mytilus californianus*. Large *Lottia limatula* were common throughout the site particularly in some of the abalone plots. Turfy red algae (*Mazzaella affinis*, *Chondracanthus canaliculatus*, and *Mastocarpus papillatus*) occupied much of the space in abalone plots. Large *Mopalia muscosa* and abundant *Tegula funebris* occupied the crevices of ab plot 445. *Tegula gallina* were surprisingly common. Unusually large *Nuttalina californica* were noted. There was a high diversity of limpets in the area. *Nucella emarginata* were common in some of the limpet plots. *Petalochonchus montereyensis* were present in limpet plot 3.

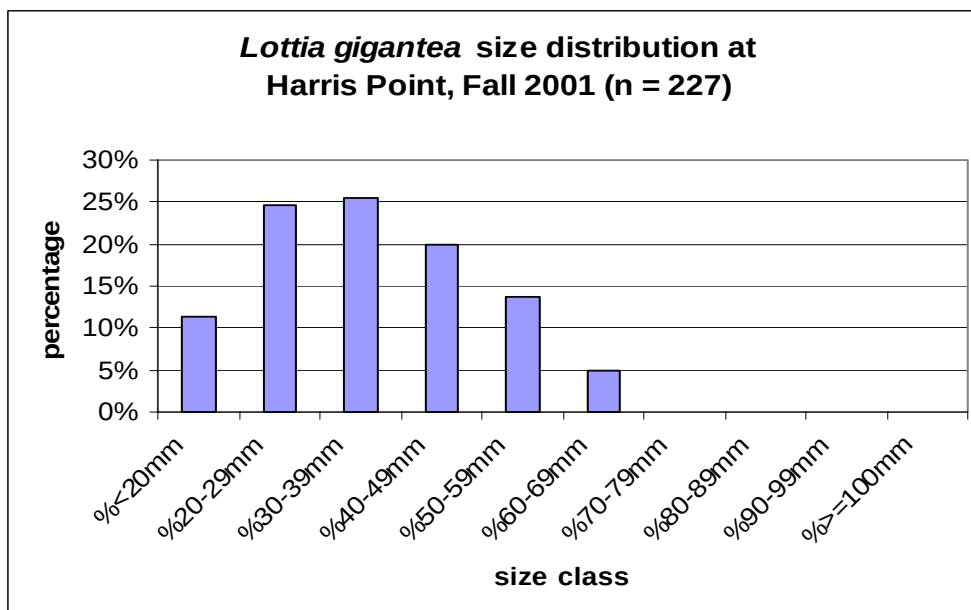
Three *Haliotis cracherodii* were present in plot 443 and one was in 444, the other three plots had no abalone. Sizes ranged from 75-108 mm. No general search was made of the site for abalone or seastars because of time. *Lottia gigantea* were measured in the five one-meter radius plots established last spring. Sizes ranged from 10 to 68 mm. Individual Plot densities varied from last spring but the overall number increased only slightly.

Photoplot summary-mean percent cover by zone in fixed photoplots at Harris Point, San Miguel Island, Fall 2001 (5 plots/zone)

Zone	Rock	Barn	Tetraclita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal
Barnacle	13.4	15.2	8.4	6.2	0.0	0.0	8.8	0.6	45.2	2.2
Endocladia	23.2	15.8	0.2	29.8	15.0	0.0	1.8	0.0	12.2	2.0
Rockweed	24.8	1.2	0.0	15.8	48.8	0.0	0.0	0.0	8.2	1.2
Mussels	22.2	0.8	2.0	2.2	0.4	0.0	39.8	0.2	28.4	4.0

Owl limpet *Lottia gigantea* plot summary at Harris Point, San Miguel Island, Fall 2001

Plot	Count	Area	Density	Mean Size	StDev	Min Size	Max Size	%<20 Mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%>70mm	%80-89mm	%90-99mm	%>=100 mm
1	22	3.14	7.004	39.68	11.74	19	64	4.55%	13.64%	27.27%	40.91%	9.09%	4.55%	0.00%	0.00%	0.00%	0.00%
2	36	3.14	11.461	43.50	11.64	20	64	0.00%	11.11%	25.00%	30.56%	22.22%	11.11%	0.00%	0.00%	0.00%	0.00%
3	41	3.14	13.053	30.15	11.41	16	60	19.51%	36.59%	24.39%	12.20%	4.88%	2.44%	0.00%	0.00%	0.00%	0.00%
4	75	3.14	23.878	26.64	7.62	15	47	21.33%	45.33%	28.00%	5.33%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
5	53	3.14	16.874	46.58	11.01	16	68	1.89%	0.00%	22.64%	30.19%	35.85%	9.43%	0.00%	0.00%	0.00%	0.00%

**Abalone Density within plots at Harris Point, San Miguel Island, Fall 2001**

Count	Density	Area	Density
4		26.500	.151

Abalone size distribution for Harris Point, San Miguel Island, Fall 2001

Count Size	Mean Size	StDev	Min Size	Max Size	%<45 mm	%45-126mm	%127-145mm	%>145 mm
4	99.00	16.02	75	108	-	100.00%	-	-

Santa Barbara Island

November 30-December 4, 2001 (Database event #2001-J)

PURPOSE: To monitor rocky intertidal sites at Santa Barbara Island and download temperature logger and to conduct Comprehensive Surveys at each site.

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
 Allison Kendall, UC Santa Cruz/PISCO SWAT team
 Kristin Kusic, UC Santa Cruz/PISCO SWAT team
 John Kovach, UC Santa Barbara/PISCO
 Erin Maloney, UC Santa Cruz/PISCO SWAT team
 Megan Williams, UCSC/PISCO SWAT team
 Alex Wyndham, UCSB/PISCO

PROCEDURE: We attempted to boat to the island on 11/29 but turned back because of heavy seas. The seas were associated with rain that dropped about 0.7 inches on Santa Barbara Island over the previous few days. On 11/30 we made it out on the OCEAN RANGER arriving about 1100 hrs. We worked the Landing Cove site that afternoon, setting up the comprehensive survey transects over the south area and continuing on to the reef below the wharf. The transect lengths were about 8-10 m. Normal sampling was conducted as per the handbook by Dan, with photos taken of the plots and field scoring and mobile invertebrate counts started. We went to the Sea Lion Rookery site on 12/1 repeating the process there finishing all the standard sampling and the comprehensive transects. We returned to Landing Cove on 12/2 to finish the sampling and transects. Rain fell Sunday (12/2) night and the swell picked up. An I-Button temperature logger was placed at each site. Monday was unworkable because of the large westerly swell wrapping around the island. We returned to Ventura on 12/4 aboard the SEA RANGER II.

RESULTS:

Landing Cove 28 November 2001. Low tide –0.6 ft at 1514 hrs. sky clear, wind 5 mph NW, surge heavy. There were approximately 30 California sea lions above the north area photoplots.

The SWAT team set up the transect lines over the barnacle plots and on the bench next to the wharf. Bolts were placed at the ends of the upper and lower baselines. Alex and John scored upper mobile invertebrate plots. The others began the point contact transects. Dan shot the photoplots, scored 13 plots and counted motile invertebrates in 10 plots. There was a fairly heavy surge making it difficult to work the lower parts of the reef.

The north site showed impacts from the sea lion presence in the thick *Ulva* in the upper zone. They have created a large bare area above the site that has grown somewhat over the years. Sea lion scat was common on the site. The red algal turf plots were mostly *Chondracanthus canaliculatus* with both *Pterocladia capilacea* and erect corallines common. *Phragmatopoma californica* was prevalent and probably covered many of the plots with the algae growing over or through it. Plots 322 and 323 were dominated by *Phyllospadix torreyi*, about 85% and 70% respectively. *Silvetia compressa* was not common and barely occurred in the rockweed zone plots. *Ulva* was the dominant cover in all the rockweed plots with 30-56% cover there. Barnacles were not very prevalent. No *Balanus glandula* were observed and *Chthamalus* sp were small and not common. *Tetraclita rubescens* was more common than *Chthamalus* sp. but were also generally small. *Endocladia muricata* was mixed with *Endarachne binghamiae* in the barnacle zone plots, the later quite common on both rocks and epiphytic on *Tetraclita* and *Mytilus*. *Mytilus californianus* was abundant and showed signs of good steady recruitment to this site. However there were several large patches where mussels had been cleared and only bare rock with byssal threads and worm tubes remained.

Photoplot summary-mean percent cover by zone in fixed photoplots at Landing Cove, Santa Barbara Island, Fall 2001 (5 plots/zone)

Zone	Rock	Barn	Tetraclita	Endo	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal	Phyllospadix
Barnacle	36.8	5.4	13.0	4.4	0.0	7.0	0.2	32.0	1.2	0.0
Rockweed	24.2	3.4	0.4	0.0	0.2	1.6	0.0	70.2	0.0	0.0
Mussels	20.6	0.0	1.6	0.0	0.0	58.6	1.6	10.4	7.2	0.0
Red Algal Turf	1.8	0.0	0.0	0.0	0.0	0.0	0.0	61.4	5.8	31.0

Motile invertebrate counts at Landing Cove, Santa Barbara Island, Fall 2001.

zone	Red algal turf					Silvetia					Barnacle				
plot #	335	336	337	338	339	330	331	332	333	334	345	346	347	348	349
Lepidochitona spp.			1			3		1	3	1					
Nuttalina spp.	2		9	2		9	1			3					
Fissurella volcano						1		1	3	1					
Pachygrapsus						4				1					
Pagurus spp.								16	10	33					
S. purpuratus															
Amphissa versicolor															
Nucella emarginata															
Acanthina spp.						3		3	3	2			1		
Tegula funebris															
Ceratostoma nuttali															
Ocenebra circumtexta			1			5	1		1						
Lottia gigantea			2			2	2		2		2				
Littorina spp.	6	324	136	16	26		2	1	11	3	263	400	572		452
Limpet	51	6	66	5	1	78	61	26	27	30	9		1		

zone	Mytilus					Total Count 20 plots
plot #	350	351	352	353	354	
Lepidochitona spp.						4
Nuttalina spp.						38
Fissurella volcano	9	2	5	5	1	17
Pachygrapsus	6	5	2		5	11
Pagurus spp.						0
S. purpuratus					2	23
Amphissa versicolor		1				0
Nucella emarginata						0
Acanthina spp.		1				15
Tegula funebris						0
Ceratostoma nuttali	1	3	2			1
Ocenebra circumtexta	2	8	2	1	5	85
Lottia gigantea		2			2	16
Littorina spp.						118
Limpet	46	26	40	23	19	759

Sea Lion Rookery 1 December 2001. Low tide –0.7 ft at 1554 hrs, mostly cloudy skies but pleasant temperature, air temp 72°, sea conditions calm with only a light surge. We had excellent working conditions. About 200 sea lions were on the slope above the site. Three Black Oystercatchers were observed and many Western Gulls were present. We worked the site between 1200 and 1830 hrs.

The SWAT team set up the comprehensive survey transects over the southern portion of the site between plot 334 and about 336. All of the sampling was completed including tidal heights, point transects, mobile invertebrate quadrats, and sea star swath transects. Carriage bolts were installed at the ends of the upper and lower baseline transects. Dan completed all of the photos, plot scoring and mobile invertebrate counts though plot 448 seemed to have been skipped. All of the sampling was completed after dark. No abalone were observed though the abalone plots were not closely checked. A general sea star count was not made. Several *Pisaster ochraceus* were observed over the site but only two were recorded in the swath transects.

There was a lot of sea lion scat on the higher rocks and the pools were all muddy and worse. The upper rocks are mostly bare or covered with short (1 cm tall) *Ulva* sp. Few invertebrates were observed in the upper pools. Some *Tegula gallina* were found in some of the surge channels but never in large numbers nor were they widespread. The lower reef flat area looked healthy though with abundant *Mytilus californianus*, coralline algae, various small foliose algae, and a variety of small invertebrates including *Tegula aureotincta* and *Norrisia norrisi*. In contrast, there were very few mobile invertebrates in the upper zones with small littorine snails being most abundant.

Most of the mussel bed was dense with all sizes of mussels, however as with the Landing Cove there were extensive areas where the mussels had all been torn out and only byssal threads and *Spirobranchus spinosus* or a few *Phragmatopoma californica* remained. *Pollicipes polymerus* were common among the mussels but were also missing from the clearings. Many nemertean worms (white with black stripes) were found in the cleared mussel areas. Small *Pachygrapsus crassipes* were common there also. *Silvetia compressa* appeared to be doing fine in the rockweed plots. Many juvenile plants were present. Plot 330 is a high rock in the reef flat (as opposed to the sides of the rocks above the flat) and the plot had no algae, just *Mytilus californianus*, *Tetraclita rubescens*, and *Anthopleura elegantissima*. We might want to consider looking for another rockweed plot as this one has always been marginal. *Endocladia muricata* were all small and mixed in with *Ulva* sp. *Balanus glandula* were rare and *Chthamalus* sp. was uncommon in the barnacle zone plots. *Tetraclita rubescens* were common even in some of the higher zone plots. *Ulva* dominated most of the barnacle plots.

After sunset the deer mice were numerous in the high intertidal. Whether they were eating *Ulva* or catching invertebrates we could not tell. There is potential here for establishing *Tetraclita rubescens* plots, should we want to expand the monitoring. I noticed some *Lottia gigantea* but did not have time to survey the relative density. We have measured them in the past here and it seems there would be adequate numbers for plots if the densities are still similar.

Photoplot summary-mean percent cover by zone in fixed photoplots at SE Sea Lion Rookery, Santa Barbara Island, fall 2001 (5 plots/zone)

Zone	Rock	Barn	Tetracrita	Endo-cladia	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal
Barnacle	34.0	8.0	1.6	0.8	0.0	0.2	0.2	54.8	0.4
Endocladia	23.4	2.6	6.8	8.2	0.0	2.6	2.0	54.0	0.4
Rockweed	24.4	0.2	3.2	0.8	27.2	13.0	0.6	29.4	1.2
Mussels	26.0	0.0	0.8	0.0	0.0	27.6	1.8	4.0	39.8

Motile invertebrate counts at SE Sea Lion Rookery, Santa Barbara Island, Fall 2001

zone	Endocladia					Silvetia					Barnacle				
plot #	320	321	322	323	324	310	311	312	313	314	315	316	317	318	319
Lepidochitona spp.													1	1	
Nuttalina spp.								2		2			4	8	
Fissurella volcano					1				1						
Pachygrapsus													2	4	1
Pagurus spp.															
S. purpuratus															
Amphissa versicolor															
Nucella emarginata															
Acanthina spp.						3		1	2	2			1	1	
Tegula funebris															
Ceratostoma nuttali															
Ocenebra circumtexta											1	4	4	12	2
Lottia gigantea										1			2	5	1
Littorina spp.						2	5	1	3	11	32	5	15	27	16
Limpet		1			1	11	25	36	13	45	7	20	61	77	55

Zone	Mytilus					Total Count 20 plots
plot #	325	326	327	328	329	
Lepidochitona spp.	1	1				9
Nuttalina spp.	6	3	4	3	6	26
Fissurella volcano		4	6	1	4	28
Pachygrapsus			1	3		23
Pagurus spp.						59
S. purpuratus		14	3	3	3	2
Amphissa versicolor						1
Nucella emarginata						0
Acanthina spp.	1			4		13
Tegula funebris						0
Ceratostoma nuttali		1				6
Ocenebra circumtexta	22	5	11	5	19	26
Lottia gigantea	7					14
Littorina spp.	1					2212
Limpet	149	46	39	86	87	515

Landing Cove 2 December 2001.. Low tide -0.7 at 1638 hrs. dense clouds and some drizzle (rain later in evening) air temp 63°, wind calm, surge heavy. There were about 30 sea lions again and two Black Oystercatchers and six Black Turnstones in the intertidal today.

The SWAT team finished the comprehensive surveys, though a couple of transects they would have liked to be longer. A couple of the folks almost got washed off the rocks however in the swell. Dan finished scoring the barnacle and mussel plots and counted motile invertebrates in those plots. There were 14 *Pisaster ochraceus* in the transect and 117 overall on the southern area reef down to the *Eisenia arborea* zone. I took advantage of the SWAT team's drill and placed two bolts in the upper corners of both plot 328 and 329. All mussel plots here now have bolts marking them. I was able to find the lower right corner of plot 329 in a mussel clearing, a corner not found in a while.

A large swell prevented us from returning to the intertidal on December 3. Time for writing up notes.

Santa Rosa Island

December 11-17, 2001 (Database event #2001-K)

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
Derek Lerma, Biological Technician, Channel Islands National Park
Erin Maloney, SWAT team, UC Santa Cruz
Kristin Kusic, SWAT team, UC Santa Cruz
Megan Williams, SWAT team, UC Santa Cruz
Allison Kendall, SWAT team, UC Santa Cruz
Carol Blanchette, PISCO, UC Santa Barbara
Alex Wyndham, PISCO, UC Santa Barbara
John Kovach, PISCO, UC Santa Barbara
Clara Svedlund, PISCO, UC Santa Barbara
Kara Cox, PISCO, UC Santa Barbara
Jonna Engel, UC Santa Cruz

PROCEDURE: The majority of the group arrived at Santa Rosa Island via Channel Islands Aviation on December 11th. Dan had arrived earlier on the 9th to assist with deer and elk counts. Upon arrival Clara Svedlund was drive tested and supplies moved to the housing area. We immediately proceeded to East Point to begin monitoring and set up the comprehensive survey. Clara was left behind to provide transportation and direction to the remainder of the field crew. Carol and Kara arrived on Thursday Dec 13th via park boat transportation and Dan departed. Overall the island had only light precipitation prior to our arrival and roads were in excellent condition. Comprehensive surveys were performed at all five permanent monitoring locations and were completed within one tide cycle. Standard monitoring protocols were completed at all sites, including photographing photoplots, field scoring photoplots, limpet plots, abalone and seastar searches. Jonna Engle, PhD candidate from UCSC, collected mussels *Mytilus californianus* from two sites for genetics testing with regards to her dissertation.

RESULTS:

East Point 11 December 2001. Low tide –0.2 ft at 1349 hrs, wind NW 20 mph, clear and cool. Surge moderate to light with occasional 2-3ft surf and moderate seas. We observed one Black Oystercatcher, two California Brown Pelicans and 30 cormorants on site. Two harbor seals were observed offshore. On site 1200-1800 hrs.

All zones appeared lush and cover high within their respective zones. The *Balanus/Chthamalus* zone showed the greatest variability and lowest overall percent cover compared to other selected zones. *Silvetia compressa* plots were at or above 80% cover in nearly all plots. *Endocladia muricata* plots ranged from 30 to 55 % cover and contained a substantial percentage of *Hesperophycus californicus*. Some *H. californicus* was noticeably desiccated in several areas. *Ulva* sp. was common in the upper mussel zone and *Cladophora columbiana* present in several locations. *Phragmatopoma californica* appeared less abundant compared to previous years especially in the surge channels seen in photo points 2 and 3. *Balanus/Chthamalus* recruitment was evident in and around the *Endocladia muricata* plots. A 30-minute survey for seastars was performed and 27 *Pisaster ochraceus* were observed. One black abalone, *Haliotis cracherodii*, was observed and measured (113 mm).

The PISCO SWAT team as recommended by our protocol review (Lafferty 2001) performed a comprehensive survey. The upper base line of the comprehensive survey originated near photo plot 579 and laid north beyond plot 583, crossing the sand channel to the north of the monitoring site. The temperature unit was downloaded at 1330.

Photoplot summary – mean percent cover by zone at East Point, Santa Rosa Island, Fall 2001 (5 plots/zone)

Zone Name	Rock	Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal	Tar
Barnacle	53.8	26.2	0.0	6.8	9.4	1.0	0.0	0.0	1.0	1.8	0.0
Endocladia	24.6	3.0	0.0	42.4	19.2	3.2	0.0	0.0	6.2	1.4	0.0
Rockweed	4.8	0.0	0.0	0.6	16.6	64.4	0.0	0.0	12.8	0.8	0.0
Mussels	2.2	0.2	0.4	0.0	0.0	0.0	72.8	0.0	20.4	4.0	0.0

Northwest Talcott 12 December 2001. Low tide –0.7 ft at 1432 hrs, wind NW 5 mph, clear. Surge was light with occasional 2-3 ft surf and light seas. No birds were observed. On site 1200-1630 hrs.

Density of *Balanus/Chthamalus* within the high zone was somewhat variable with three of the five plots at or above 50% cover and the others much lower. *Endocladia muricata* was evenly distributed throughout the site and moderate in occurrence overall. *Silvetia compressa* was healthy, expansive, and well represented within plots. *Mytilus californianus* had low to moderate cover with areas of noticeable disturbance within the low zone. *Tegula funebris* were common but densities appeared down from the previous visit. *Phyllospadix* sp. was very healthy and wide ranging covering areas previously absent of plants. Sand levels near plots 565, 566, and 561 have dropped since last year back to more typical levels, still 2-4 inches of sand was present. Limpet plots were monitored and appeared healthy. One large bedrock breakout was evident near limpet plot 701. A 30-minute search for abalone/seastars was performed finding two *Pisaster giganteus*, one *Asterina miniata*, and one black abalone (149 mm). A juvenile octopus was found that appeared to be a giant octopus, *Octopus dofleini*, based on the lack of eyespots and webbing between arms. Digital photographs were taken but have not yet been seen by experts.

Three surfgrass transects were installed and read at the site, and marked with stainless carriage bolts on each end of 10 meter transects. Two of the transects were placed on the reef flat east of photoplots 555 and 556. Both run primarily east west. The third transect runs southwest from the reef just west of photoplot 569. Distance and bearing measures were made to nearby plots. Refer to site location maps for relative locations.

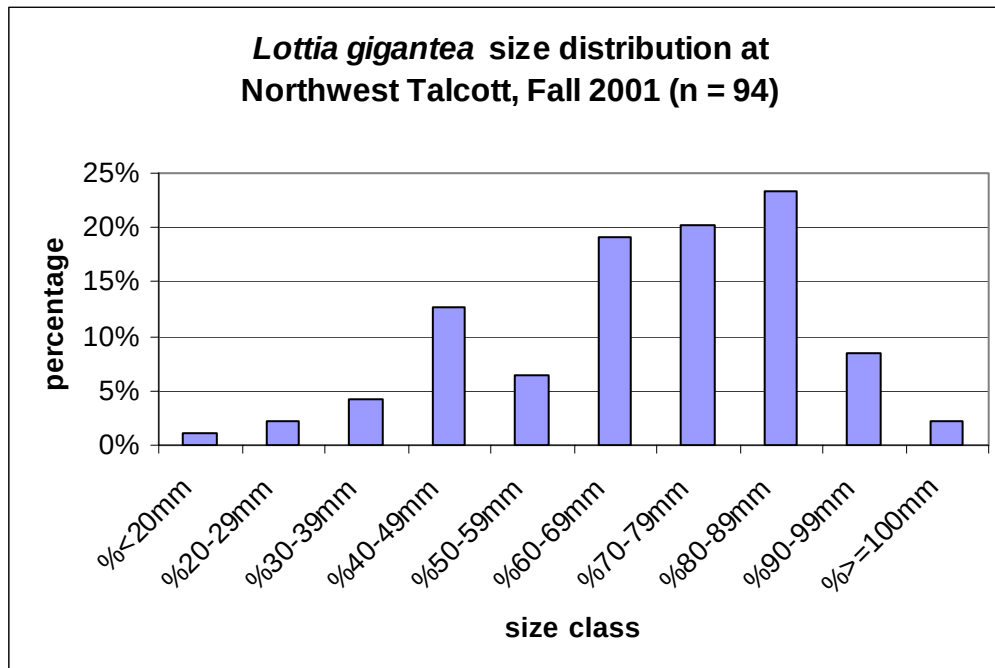
A comprehensive survey was performed east of the sampling site near the access point to the beach. The reef near the access point was chosen for ease of set up and presence of most of the representative zones in a small area

Photoplot summary – mean percent cover by zone at Northwest Talcott, Santa Rosa Island, Fall 2001 (5 plots/zone)

Zone Name	Rock	Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal	Tar
Barnacle	43.8	36.6	0.0	1.0	0.0	15.4	0.0	0.0	1.0	1.6	0.6
Endocladia	42.8	3.0	0.0	15.0	0.0	19.8	0.0	0.0	19.0	0.4	0.0
Rockweed	25.2	0.0	0.0	4.8	0.0	66.2	0.0	0.0	3.0	0.8	0.0
Mussels	21.2	0.0	1.4	0.0	0.0	0.0	51.6	9.2	11.2	5.4	0.0

Owl Limpet *Lottia gigantea* plot summary at Northwest Talcott, Santa Rosa Island, Fall 2001

Plot	Count	Mean Size	StDev	Min Size	Max Size	Area	Density	%<20 mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	%>=100 mm
701	19	83.68	13.92	41	101	3.14	6.05	0.00%	0.00%	0.00%	5.26%	0.00%	5.26%	5.26%	52.63%	26.32%	5.26%
702	23	72.22	16.83	34	91	3.14	7.32	0.00%	0.00%	8.70%	8.70%	0.00%	13.04%	26.09%	30.43%	13.04%	0.00%
703	20	61.75	19.79	27	102	3.14	6.37	0.00%	5.00%	5.00%	30.00%	5.00%	15.00%	20.00%	15.00%	0.00%	5.00%
704	16	65.81	12.22	42	83	3.14	5.09	0.00%	0.00%	0.00%	12.50%	18.75%	31.25%	25.00%	12.50%	0.00%	0.00%
705	16	57.00	18.42	15	76	3.14	5.09	6.25%	6.25%	6.25%	6.25%	12.50%	37.50%	25.00%	0.00%	0.00%	0.00%



Surfgrass transects at Northwest Talcott, Santa Rosa Island, Fall 2001 (additional taxa removed when not represented)

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

Date: 12-Dec-01

Recorders: Derek Lerma, Dan Richards

	Transect	Transect	Transect
	1	2	3
Surf Grass Taxa	1	2	3
Rock			2
Sand			2
Cystoseira/Halidrys		1	
Corallina			
vancouveriensis	1		1
Erect coralline			1
Chondracanthus canaliculatus			5
Neorhodomela larix			1
Polysiphonia sp.			
Phyllospadix sp.	99	99	87
Phragmatopoma californica			1
total	100	100	100

Fossil Reef 13 December 2001. Low tide –0.9 ft at 1514 hrs, wind ESE < 5 mph, cloud cover 20%. Surge light with 1-2 ft surf and light seas. Six Black Oystercatchers, nine Western Gulls, and 22 cormorants were observed. Two northern elephant seals were observed at the cove just north of the site. On site 1000-1700 hrs.

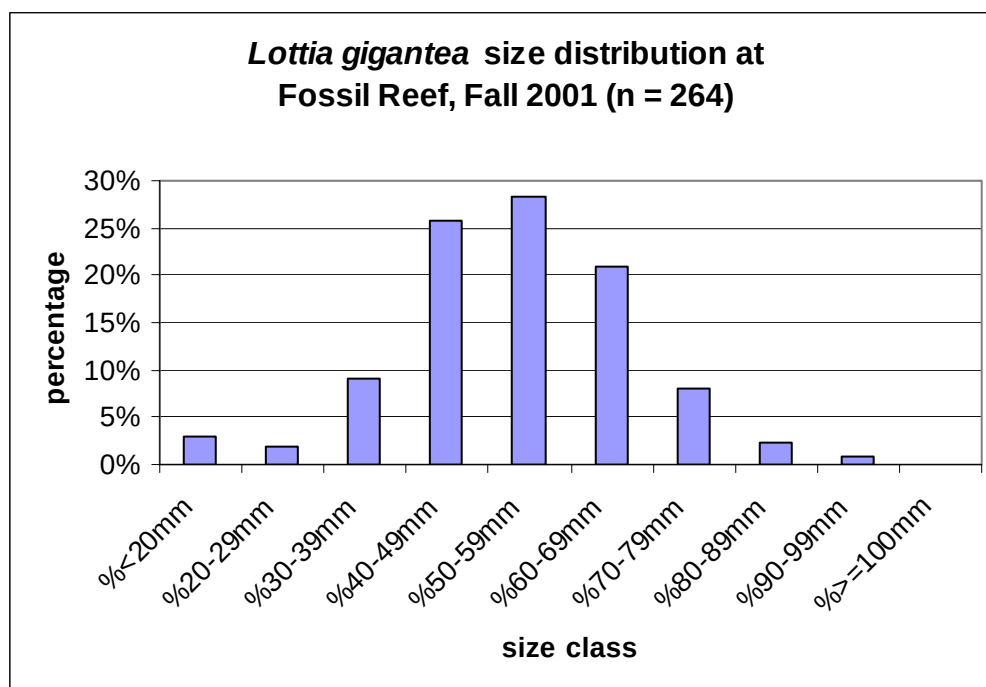
Typical for this site, the major zone assemblages were patchy and not always well represented in the photoplots. *Silvetia compressa* plots did not well represent the cover of the site with three of the plots exhibiting very low cover. Overall *S. compressa* was abundant and lush. Barnacles, *Balanus/Chthamalus*, were common throughout the site and cover was consistent at 20-40% within associate plots. *Endocladia muricata* was common but patchy. *Mytilus californianus* were abundant and healthy with no noticeable recruitment evident. *Phyllospadix sp.* cover was extremely low compared to previous years with bleaching widespread and extensive. *Ulva sp.* was common throughout the site and especially in the mussel zone. Algal bleaching was prevalent over much of the site and was noted in *Chondracanthus canaliculatus*, *Mazzaella affinis*, and *Ulva spp.* Limpet plots were sampled and plots appeared unchanged from previous visits. Two seastar transects were performed on the outer reef with the first 15m containing 15 *Pisaster ochraceus* and three black abalone. The second 15 m (15-30 m mark) containing 34 *Pisaster ochraceus*, one *Asterina miniata*, one *Pisaster giganteus*, and two black abalone. A 30-minute survey for black abalone was performed locating 12 individuals. A comprehensive survey was performed on the reef just north of the site due to available zones and adequate representation. Sixty black abalone were counted within one crevice within the comprehensive survey area.

Photoplot summary – mean percent cover by zone at Fossil Reef, Santa Rosa Island, Fall 2001 (5 plots/zone)

Zone Name	Rock	Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal	Tar
Barnacle	57.4	34.0	0.0	0.6	0.0	0.0	0.0	0.0	5.0	1.8	1.2
Endocladia	45.0	17.4	0.0	9.8	0.0	21.0	0.0	0.0	4.4	2.0	0.4
Rockweed	67.8	4.2	0.2	9.0	0.0	4.8	0.0	0.0	11.0	3.0	0.0
Mussels	12.8	0.4	7.4	0.0	0.0	0.0	26.4	2.2	37.2	13.6	0.0

Owl Limpet *Lottia gigantea* plot summary at Fossil Reef, Santa Rosa Island, Fall 2001

Plot	Count	Mean Size	StDev	Min Size	Max Size	Area	Density	%<20 mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	%≥100 mm
1	14	47.43	8.65	35	64	3.14	4.46	0.00%	0.00%	14.29%	57.14%	21.43%	7.14%	0.00%	0.00%	0.00%	0.00%
2	29	50.93	10.63	29	73	3.14	9.23	0.00%	3.45%	3.45%	41.38%	31.03%	13.79%	6.90%	0.00%	0.00%	0.00%
3	44	65.70	14.75	30	94	3.14	14.01	0.00%	0.00%	2.27%	11.36%	18.18%	22.73%	29.55%	11.36%	4.55%	0.00%
4	91	53.34	13.69	16	81	3.14	28.97	4.40%	2.20%	6.59%	20.88%	32.97%	27.47%	4.40%	1.10%	0.00%	0.00%
5	86	48.37	13.30	15	73	3.14	27.38	4.65%	2.33%	16.28%	27.91%	29.07%	17.44%	2.33%	0.00%	0.00%	0.00%

**Abalone size distribution for Fossil Reef, Santa Rosa Island, Fall 2001**

Count Size	Mean Size	StDev	Min Size	Max Size	%<45 mm	%45-126mm	%127-145mm	%>145 mm
12	114.83	18.77	66	134	-	75.00%	25.00%	-

Johnson's Lee 14 December 2001. Low tide –1.0 ft at 1554 hrs, wind NW 25-35 mph, light rain in am. Surge light with occasional 1-2ft surf and moderate seas. Two Western Gulls were observed on site and one Harbor seal offshore. On site 1300-1730 hrs.

Light rain fell overnight and roads were marginal. We stopped about 0.5 miles from the site, near Officers beach and hiked the remainder of the way along the road.

Balanus/Chthamalus was moderate to high both within plots and throughout the site with no

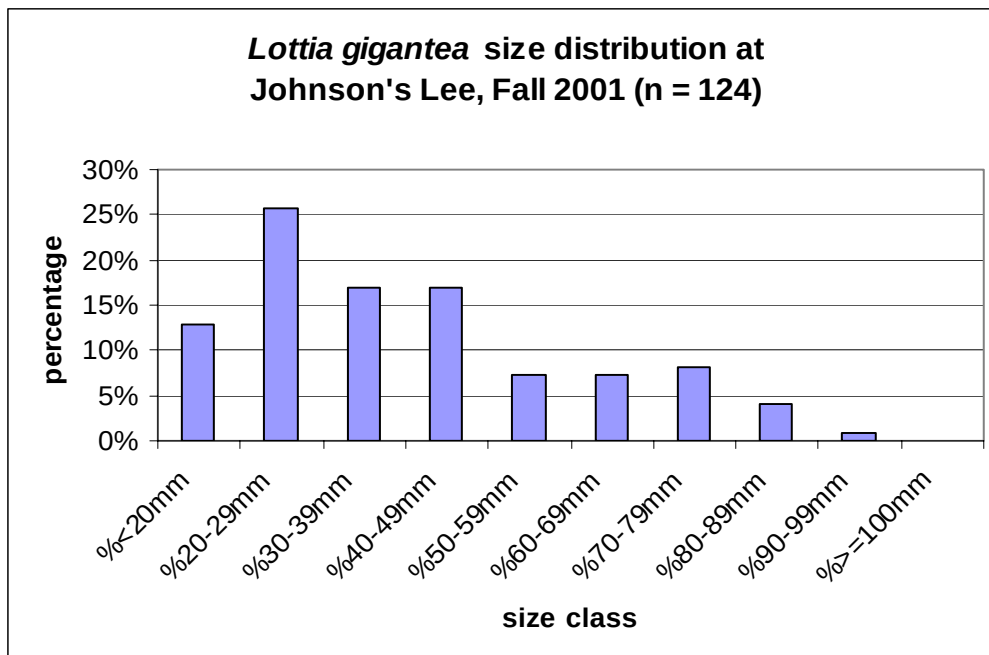
obvious recruitment noted. *Endocladia muricata* was common but patchy and low lying. Mussel, *Mytilus californianus*, plots were not representative of the majority of the site except for plot 512. Most of the mussel plots were dominated by *Phragmatopoma californica*, which was abundant in the low mussel zone. *Tetracita rubescens* was common and most individuals were relatively large. *Ulva* spp., *Pollicipes polymerus*, and *Anthopleura elegantissima* were all moderately abundant. Limpet plots were monitored and a 10 m seastar transect was performed, with 15 *Pisaster ochraceus* found. No black abalone were observed anywhere within the site. Algal bleaching was common and was noticeable on a variety of algae. The temperature unit was downloaded at 1624 hrs. A comprehensive survey was performed on site approximately 3m inside of reference bolt R1 and 15m either side. Sand levels were mostly low except for inshore of R2 behind the large tidepool where sand was moderately high.

Photoplot summary – mean percent cover by zone at Johnson's Lee, Santa Rosa Island, Fall 2001 (5 plots/zone)

Zone Name	Rock	Barnacle	Tetracita	Endocladia	Hesperophycus	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal	Tar
Barnacle	55.6	33.2	0.0	4.2	0.0	0.0	0.0	0.0	1.6	5.4	0.0
Endocladia	45.6	6.2	0.2	23.4	0.0	0.0	11.0	0.8	9.0	3.8	0.0
Mussels	15.0	0.2	0.8	0.0	0.0	0.0	10.2	1.6	34.6	37.6	0.0

Owl Limpet *Lottia gigantea* size distribution within plots at Johnson's Lee, Santa Rosa Island, Fall 2001

Plot	Count	Mean Size	StDev	Min Size	Max Size	Area	Density	%<20 mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	%>=100 mm
595	4	41.50	7.90	32	48	3.14	1.27	0.00%	0.00%	50.00%	50.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
596	43	39.86	25.46	16	90	3.14	13.69	25.58%	32.56%	4.65%	4.65%	2.33%	4.65%	16.28%	6.98%	2.33%	0.00%
597	13	31.69	14.92	17	61	3.14	4.14	23.08%	38.46%	0.00%	23.08%	7.69%	7.69%	0.00%	0.00%	0.00%	0.00%
598	33	43.21	17.87	19	84	3.14	10.51	3.03%	15.15%	33.33%	21.21%	6.06%	9.09%	6.06%	6.06%	0.00%	0.00%
599	31	42.00	15.10	19	70	3.14	9.87	3.23%	25.81%	19.35%	22.58%	16.13%	9.68%	3.23%	0.00%	0.00%	0.00%



Ford Point 15 December 2001. Low tide –1.0 ft at 1634 hrs, wind NW 10-15 mph, low clouds. Surge light with occasional 1-3 ft surf and moderate seas. No birds were observed on site and one gray whale was seen just offshore heading south. On site 1300-1700 hrs.

Balanus/Chthamalus cover was moderate within plots and throughout the site with some light recruitment noted. *Endocladia muricata* was common but patchy. Mussel cover, *Mytilus californianus*, was moderate to high compared to previous visits. Several green algal species were common at the site including *Ulva spp.*, *Enteromorpha sp.*, *Chaetomorpha linum* and *Cladophora columbiana*. Recruitment of barnacles *Balanus/Chthamalus* was light. *Mytilus californianus* recruitment was also evident at a moderate to light level. Limpet plots were monitored but no seastar or abalone searches were performed due to lack of time and the late hour of the tide. A comprehensive survey was performed on the site just east of plot 526 to near limpet plot 601.

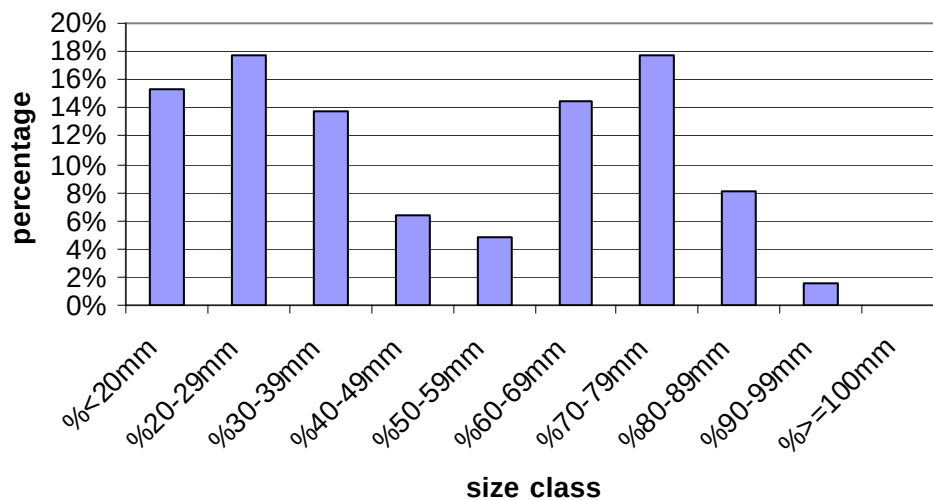
Photoplot summary – mean percent cover by zone at Ford Point, Santa Rosa Island, Fall 2001 (5 plots/zone)

Zone Name	Rock	Barnacle	Tetracita	Endocladia	Hesperophycus	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal	Tar
Barnacle	66.8	22.6	0.0	2.6	0.0	0.0	0.0	0.0	3.2	4.8	0.0
Endocladia	32.6	1.8	0.0	27.0	0.0	0.0	6.2	0.4	30.0	2.0	0.0
Mussels	31.2	2.4	0.0	0.0	0.0	0.0	48.8	0.2	14.8	2.6	0.0

Owl Limpet *Lottia gigantea* plot summary at Ford Point, Santa Rosa Island, Fall 2001

Plot	Count	Mean Size	StDev	Min Size	Max Size	Area	Density	%<20 mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	%>=100 mm
600	34	46.53	23.48	15	83	3.14	10.82	11.76%	26.47%	11.76%	5.88%	5.88%	8.82%	26.47%	2.94%	0.00%	0.00%
601	11	66.82	9.58	46	82	3.14	3.50	0.00%	0.00%	0.00%	9.09%	9.09%	45.45%	27.27%	9.09%	0.00%	0.00%
602	11	73.73	14.92	35	90	3.14	3.50	0.00%	0.00%	9.09%	0.00%	0.00%	18.18%	36.36%	27.27%	9.09%	0.00%
603	25	51.60	28.54	16	90	3.14	7.96	24.00%	12.00%	8.00%	0.00%	8.00%	12.00%	16.00%	16.00%	4.00%	0.00%
604	43	36.30	18.22	15	80	3.14	13.69	20.93%	23.26%	23.26%	11.63%	2.33%	11.63%	4.65%	2.33%	0.00%	0.00%

***Lottia gigantea* size distribution at Ford Point, Fall 2001 (n = 124)**



Santa Cruz Island

January 8-14, 2002 (Database event 2001-L)

PURPOSE: To biannual monitoring at rocky intertidal sites at Santa Cruz Island, and conduct comprehensive surveys at the monitoring sites.

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
Derek Lerma, Biological Technician, Channel Islands National Park
Erin Maloney, SWAT team, UC Santa Cruz
Kristin Kusic, SWAT team, UC Santa Cruz
Megan Williams, SWAT team, UC Santa Cruz
Allison Kendall, SWAT team, UC Santa Cruz
Carol Blanchette, PISCO, UC Santa Barbara
Alex Wyndham, PISCO, UC Santa Barbara
John Kovach, PISCO, UC Santa Barbara
Mikael ?, VIP, UC Santa Barbara
Sherri, PISCO, Oregon State University
Maria, PISCO, Oregon State University
Melissa, PISCO, Oregon State University

General notes and PROCEDURE: We departed Ventura on the Sea Ranger II at 0830, dropping off personnel at Anacapa Island. Four female orcas were swimming in pairs off the east end of Santa Cruz Island. NPS maintenance workers were actively removing the pier pilings in anticipation of the new pier construction this winter/spring. There was a large westerly swell generated from a storm up north. The roads on the island were somewhat wet from recent rains but there were no problems driving. We all stayed at the UC research station three nights, and camped at Christy Ranch two nights while we worked the sites on the west end.

The Oregon State crew conducted biodiversity surveys (percent cover was estimated and invertebrates were counted in random quadrats placed along 50 m transects in the high, mid, and low intertidal zones on three benches) at Trailer, Blue Gum, and Fraser Cove. The UCSC and UCSB crews conducted the Comprehensive Surveys at each of our sites including Forney's Cove and at the PISCO site at Valley Anchorage. Baseline transects were installed, usually such that most photoplots were included in the transect area. The comprehensive surveys included point intercept transects along 11 vertical transects from the splash zone to mean low tide, mobile invertebrate quadrats, seastar swath-transects, and tidal height mapping of the transect lines.

The UCSB crew replaced the larval recruitment collectors and downloaded temperature loggers at each site then helped with the comprehensive surveys. NPS monitoring included photos of the plots and site overview, field scoring plots, owl limpet measurements within limpet plots and point transects at the two sites with surfgrass transects. Shorebirds and pinnipeds were counted at each site, and when time and conditions permitted area searches for seastars and abalone were made. We also took advantage of the survey equipment being present to measure tidal heights of all the plots.

The three crew from Oregon flew off the island on Jan. 12 to go work sites on the mainland. The rest of us returned on Jan. 14 aboard the Sea Ranger.

RESULTS:

Prisoner's Harbor, 8 January 2002. Low tide 0.1 ft at 1250 hrs, high clouds, pleasant conditions, wind 2 mph NW, surf 2-3 ft with moderate surge. No shorebirds or marine mammals were present. We were on site from 1200 to 1600 hrs.

The surveys went quickly with the assistance of the Oregon people helping. The tide was not very low however and there were occasional swells breaking on the outer reef tip. The lowest mobile invertebrate plots and lower transect portions were not completed. Some repairs needed on the NPS plots were not made.

Both rockweed species were doing well. There was new growth of *Silvetia compressa* near some of the photoplots. *Endocladia muricata* was growing well above and mixed in with the *Hesperophycus californica*. *Mytilus californianus* was dense along the east slope of the bench but there were several patches of mostly bare rock among the mussel plots. Diatoms and some small *Ulva* sp. dominated those clearings. There were some dense patches of *Endarachne binghamiae* and *Scytosiphon lomentaria*. Some *Sargassum muticum* was present. *Phyllospadix torreyi* was present, just showing with the tide level. *Tegula funebris* was present. There were some *Nucella emarginata* and both *Acanthina* sp. and *Ocenebra circumtexta* were common.

Two small black abalone (58, 87 mm) were together on the reef and 36 *Pisaster ochraceus* and one *P. giganteus* were found in search of the area. We need new corners apparently, in plot M4 where only one bolt was found [later found overgrown]. Plot B1 also has only one bolt. We should consider moving plot B1 since it is usually covered by cobblestones and has only micro algae for biologic cover.

The comprehensive surveys were run along the east-facing slope through the *Hesperophycus* and *Endocladia* plots. Three carriage bolts were placed for the upper baseline only. We did not measure tide heights of the photoplots at this site.

Photoplot summary-mean percent cover by zone in fixed photoplots at Prisoner's Harbor, Santa Cruz Island, Fall 2001 (5 plots/zone)

Zone	Rock	Barnacle	Tetracrita	Endocladia	Hesperophycus	Silvetia	Mussels	Leaf Barn	Misc. Algae	Misc. Animal	Tar
Barnacle	34.6	12.0	0.2	5.6	0.0	5.8	0.0	0.0	41.0	0.8	0.0
Endocladia	13.2	15.8	0.0	48.6	11.8	0.0	0.0	0.0	9.6	1.0	0.0
Rockweed	2.0	0.0	0.0	0.0	0.0	90.4	0.2	0.0	7.4	0.0	0.0
Mussels	9.0	0.2	0.4	0.0	0.0	0.0	54.8	0.0	35.4	0.2	0.0
Hesperophycus	23.8	16.2	0.0	15.2	36.2	0.4	0.0	0.0	7.2	1.0	0.0

Forney's Cove, 9 January 2002. Low tide -0.4 ft at 1400 hrs, mostly clear sky, pleasant conditions, wind 15 mph W, surf 3-4 ft with moderate surge though quite workable. No shorebirds on the site though pelicans, cormorants and Royal Terns were present on the large rock to the south. A harbor seal was swimming just offshore while we worked. There was one lobster boat in Forney's Cove. We were on site from 1100 to 1600 hrs.

We only had the rockweed plots to sample here so we were able to help with the comprehensive transects. Both *Hesperophycus* and *Silvetia* were doing well with dense

cover through the area. A small amount of *Sargassum muticum* was present. *Phragmatopoma californica* was fairly common. In some of the pools we found *Lithothrix aspergillum*, *Laminaria farlowii*, *Prionitis lanceolata*, and *Dictyota flabellata* were present in pools. *Lottia gigantea* were quite common around the mussels on some of the higher rocks. There was a moderate amount of bleaching in the *Phyllospadix* sp. blades which were heavily epiphytized by *Melobesia mediocris* and less so by *Smithora naiadum*. Only one *Pisaster giganteus* was found during a 30-minute search. No abalone were found.

The comprehensive survey baseline went across the high rocks bisecting the photoplots. Five carriage bolts were installed for both the upper and lower baselines.

Trailers, 10 January 2002. Low tide -0.7 ft at 1423 hrs, clear sky, pleasant conditions, wind 5 mph NW, surf 2-4 ft with moderate surge though quite workable. There were one Black Oystercatchers and six Black Turnstones in the area. Two harbor seals were swimming just offshore. We were on site from 1100 to 1600 hrs.

Ligia occidentalis were common on the upper rocks especially in the shadows. *Tegula funebris* was fairly abundant in the rockweed zone. Approximately 1% of the *Tegula* were *T. gallina*. *Codium fragile*, *Halidrys dioica*, and *Egregia menziesii* were noted as present. Some *Eisenia arborea* and *Macrocystis (integrifolia?)* were present in tidepools, though wave damaged. Purple urchins were common in pools. A few purple sea urchins were found with short spines or bald patches but it seemed more like abrasion than disease.

Both *Silvetia compressa* and *Hesperophycus californica* were in good shape and were fairly dense. The mussel beds looked fine. *Chthamalus* sp. was abundant over much of the area. *Balanus glandula* was abundant in smaller patches. Both *Phyllospadix* species were present and common. Transects ranged from 59-91% surfgrass cover. *Phyllospadix scouleri* was highest and graded into *P. torreyii*. *Phragmatopoma californica* was common under the surfgrass. Large *Lottia gigantea* were present throughout the site. Sizes ranged from 13-91 mm. The highest mussel cover occurred in limpet plots 3 and 5, which also had the lowest numbers of owl limpets. Six *Pisaster giganteus* and one *P. ochraceus* and one *Asterina miniata* were found in a 30-minute search of the site. More *P. giganteus* and several large *P. ochraceus* were observed south of the site area. Two black abalone (122, 141 mm) were found at the site both appeared healthy. Another (70 mm) was found south of the site.

The comprehensive survey transect was split with part running out on the reef from plot He4 to M5 with the sample transects running south. The other part of the baseline runs south from plot B2 past SG1, with transects running west. Eight carriage bolts were installed. Four eyebolts were installed for the biodiversity transects here.

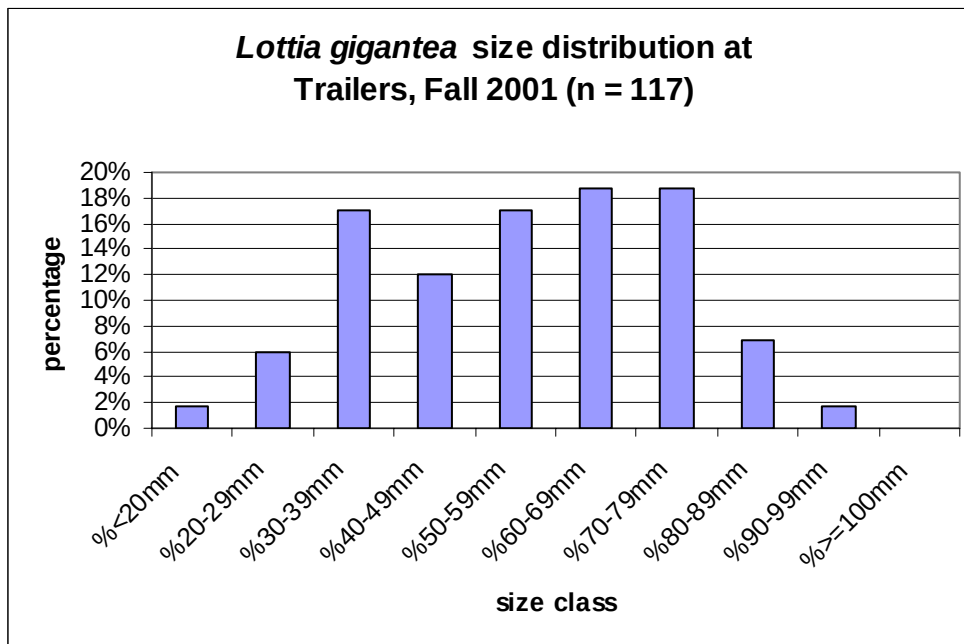
Many of the mussel plot bolts were bent at this site and epoxy was missing from around the base of some though they appeared to still be solid. There was not enough time to make repairs.

Photoplot summary-mean percent cover by zone in fixed photoplots at Trailers, Santa Cruz Island, Fall 2001 (5 plots/zone)

Zone	Rock	Barnacle	Tetracrita	Endocladia	Hesperophycus	Silvetia	Mussels	Leaf Barn	Misc. Algae	Misc. Animal	Tar
Barnacle	52.6	38.2	0.0	4.4	0.0	0.0	0.4	0.0	0.6	3.8	0.0
Rockweed	11.0	1.2	0.0	0.4	0.0	81.8	0.0	0.0	5.2	0.4	0.0
Mussels	16.8	0.8	0.6	0.0	0.0	0.0	62.4	0.4	13.6	5.4	0.0
Hesperophycus	43.8	3.2	0.0	15.2	11.8	23.8	0.0	0.0	1.8	0.4	0.0

Owl limpet *Lottia gigantea* plot summary at Trailers, Santa Cruz Island, Fall 2001

Plot	Count	Area	Density	MeanSize	StDev	MinSize	MaxSize	%<20 mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	%>=100 mm
1	29	3.14	9.233	63.69	18.72	29	91	0.00%	3.45%	13.79%	10.34%	10.34%	3.45%	37.93%	17.24%	3.45%	0.00%
2	20	3.14	6.367	66.30	16.17	29	90	0.00%	5.00%	0.00%	15.00%	10.00%	15.00%	40.00%	10.00%	5.00%	0.00%
3	17	3.14	5.412	51.24	18.15	13	83	5.88%	5.88%	23.53%	0.00%	17.65%	41.18%	0.00%	5.88%	0.00%	0.00%
4	34	3.14	10.825	50.65	14.73	18	71	2.94%	8.82%	8.82%	17.65%	26.47%	29.41%	5.88%	0.00%	0.00%	0.00%
5	17	3.14	5.412	42.71	12.92	28	72	0.00%	5.88%	52.94%	11.76%	17.65%	5.88%	5.88%	0.00%	0.00%	0.00%



Surfgrass transects at Trailers, Santa Cruz Island, Fall 2001 (additional taxa removed when not represented)**Location:** Trailer **Site Code:** SCTR**Date:** 10-Jan-02**Recorders:** Dan Richards

	Transect	Transect	Transect
Surf Grass Taxa	1	2	3
Rock	2	2	
Corallina vancouveriensis	4		
Erect coralline	8	13	2
Chondracanthus canaliculatus	13	6	1
Chondracanthus spinosus	2	1	2
Prionitis spp.	5		
Mazzaella affinis	3		
Phyllospadix sp.	59	70	91
Mytilus californianus		2	3
Phragmatopoma californica	4	2	1
Chthamalus/Balanus		1	
Phyllospadix/Prionitis		3	
	100	100	100

Fraser Cove, 11 January 2002. Low tide -0.9 ft at 1503 hrs, mostly clear, pleasant conditions, wind 5 mph NW, surf 8-12 ft with heavy surge though quite workable once the tide dropped. There were eight Black Oystercatchers and one hybrid American/Black Oystercatcher in the area. An Osprey was seen earlier flying over the cove. There was one lobster boat in Forney's Cove. We could work on the site from 1145 to 1630 hrs.

We waited almost two hours from when we expected to be able to start working to when we could access the site because of the waves, even though the swell was down considerably from three days ago. The Oregon crew did biodiversity transects over the site. The comprehensive survey baseline ran roughly from near plot M1 to Po1. Tide heights were measured for all plots.

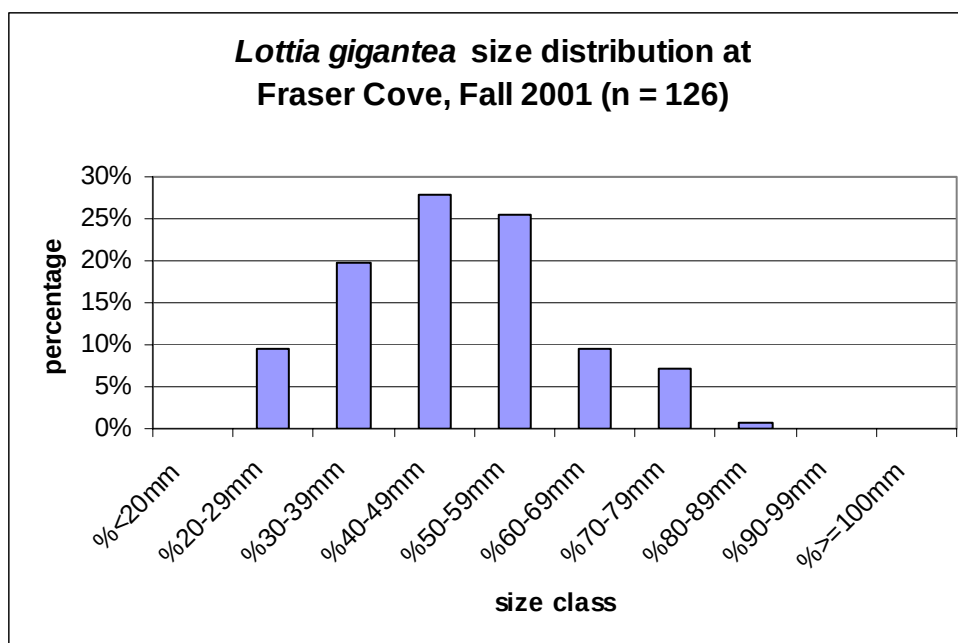
The barnacle plots actually looked like barnacle plots for a change with much of the algal overgrowth cleared off them. Still, *Endocladia muricata* was fairly abundant at 30-89% cover in the Endocladia plots. Little *Porphyra perforata* was present which accounted for much of the change in appearance. There was some *Hesperophycus californicus* present especially in plot E3(883). *Phyllospadix* was dominant in all the surfgrass transects with 50-61% cover. *Corallina* sp. was present throughout, however, and often formed a layer under the surfgrass. *Lottia gigantea* numbers were low in all the plots so owl limpets were counted in both 1 m and 1.5 m radius at each plot. Sizes ranged from 21-83 mm. The plots were much easier to measure without the *Porphyra* present. Because of the wave surge and short time, no seastar or abalone search was made. Only one *Pisaster ochraceus* was found in the seastar swaths of the comprehensive survey.

Photoplot summary-mean percent cover by zone in fixed photoplots at Fraser Cove, Santa Cruz Island, Fall 2001 (5 plots/zone)

Zone	Rock	Barnacle	Tetracita	Endocladia	Hesperophycus	Silvetia	Mussels	Leaf Barn	Misc. Algae	Misc. Animal	Tar
Barnacle	36.6	39.0	0.0	18.0	0.0	0.0	0.8	0.2	3.6	0.8	1.0
Endocladia	22.6	5.8	0.0	60.6	3.8	0.0	1.2	0.0	5.6	0.4	0.0
Silvetia	9.4	0.8	0.0	2.0	6.4	74.8	0.0	0.0	6.2	0.4	0.0
Mussels	14.4	1.0	0.4	0.2	0.0	0.0	65.0	1.8	6.6	10.6	0.0
Pollicipes	12.4	4.0	2.4	4.6	0.0	0.0	39.0	13.2	5.2	19.2	0.0
Tar	25.8	17.2	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	56.2
Hesperophycus	39.8	6.8	0.0	11.4	31.2	6.2	0.0	0.4	4.0	0.2	0.0

Owl limpet *Lottia gigantea* plot summary at Fraser Cove, Santa Cruz Island, Fall 2001

Plot	Count	Area	Density	MeanSize	StDev	MinSize	MaxSize	%<20mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	%>=100mm
1	23	3.14	7.323	51.52	15.18	21	78	0.00%	8.70%	8.70%	26.09%	21.74%	26.09%	8.70%	0.00%	0.00%	0.00%
2	23	3.14	7.323	57.48	14.07	27	83	0.00%	8.70%	0.00%	13.04%	34.78%	17.39%	21.74%	4.35%	0.00%	0.00%
3	25	3.14	7.959	47.40	13.38	25	75	0.00%	8.00%	20.00%	28.00%	32.00%	4.00%	8.00%	0.00%	0.00%	0.00%
4	33	3.14	10.506	37.09	6.64	24	51	0.00%	18.18%	45.45%	33.33%	3.03%	0.00%	0.00%	0.00%	0.00%	0.00%
5	22	3.14	7.004	48.14	6.74	36	62	0.00%	0.00%	13.64%	36.36%	45.45%	4.55%	0.00%	0.00%	0.00%	0.00%



Surfgrass transects at Fraser Cove, Santa Cruz Island, fall 2001 (additional taxa removed when not represented)

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

Date: 11-Jan-02

Recorders: Dan Richards, Derek Lerma

	Transect	Transect	Transect
Surf Grass Taxa	1	2	3
Rock	3	3	
Ulva			1
Endocladia muricata			1
Corallina vancouveriensis	27	5	16
Erect coralline		1	
Encrusting coralline		2	4
Non-coralline crust			2
Chondracanthus canaliculatus	7	13	2
Chondracanthus spinosus		1	
Prionitis spp.		6	5
Mazzaella affinis	1		1
other red algae			2
Gelidium sp.	3	1	1
Gastroclonium sp.		1	
Phyllospadix sp.	50	61	60
Mytilus californianus	2	3	
Anthopleura spp.	4		
Phragmatopoma californica	3	3	4
Chthamalus/Balanus			1
total	100	100	100

Willows Anchorage, 12 January 2002. Low tide -0.9 ft at 1539 hrs, high clouds were present, though the sky was mostly clear and the day was very nice, wind calm, surf – occasional 2-3 ft though there were no waves and the surge was very light. Two Black Oystercatchers were in the area and a sea lion was swimming in the cove. One private boat was in the anchorage and left shortly after our arrival. They had had their dog on the beach. We were on site from 1230 to 1700 hrs

There was little or no *Silvetia compressa* in plots Pe1 and Pe2, however *Endocladia muricata* cover was high and some young *Silvetia* blades were beginning to appear. *Silvetia compressa* cover was high in the other plots. Plot He 1 was still mostly bare, however some *E. muricata* was present. *Endocladia*, *Hesperophycus*, and *Silvetia* were mixed in the others. *Endocladia* was the most luxuriant we have seen here in some time. The outer reef appeared unchanged with abundant *Mytilus californianus*, *Pollicipes polymerus*, *Tetraclita rubescens*, and *Phragmatopoma californica*. The *Halidrys dioica* zone was exposed this day. *Pisaster ochraceus* were abundant and were apparently responsible for opening patches in the mussel bed.

Many spirobids were observed in pools near plot Pe5. Purple sea urchins were abundant, especially on the lower parts of the inner reef. Small *Aplysia californica* were also abundant there. *Pachygrapsus crassipes* were noticeably common (relatively high numbers of them were seen at most of the sites this week). Much of the lower shelf of the inner reef was very

scoured with many of the *Phragmatopoma* mats broken off. Low *Phragmatopoma* tubes and coralline algae dominated. *Psuedolithoderma nigra* was abundant. *Nuttalina californica* and *Lepidochitona* sp. were common in the mussel plots. *Nucella emarginata* were common with *Acanthina* sp. and *Ocenebra circumtexta* present. *Codium fragile* and *Bryopsis corticulans* were noted. *Ulva* sp. was uncommon.

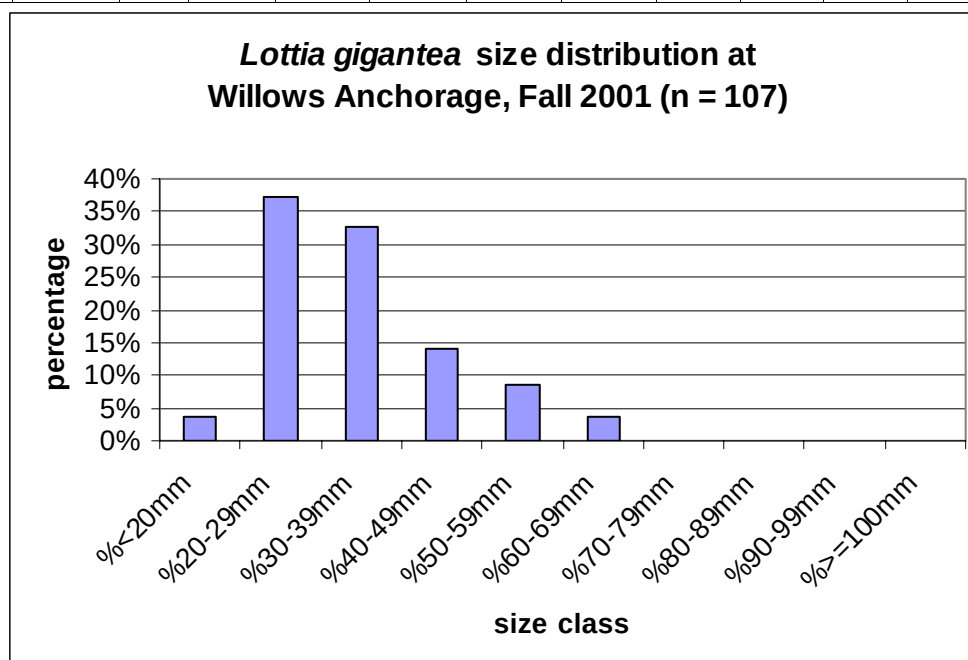
No abalone were found in a search of the site. Seastars were so common that a general count was not made. Seastars were counted in the swath transects as part of the comprehensive survey. *Lottia gigantea* were fairly common in the plots and ranged from 18 to 68 mm in length.

Photoplot summary-mean percent cover by zone in fixed photoplots Willows Anchorage, Santa Cruz Island, Fall 2001 (5 plots/zone)

Zone	Rock	Barnacle	Tetracrita	Endocladia	Hesperophycus	Silvetia	Mussels	Leaf Barn	Misc. Algae	Misc. Animal	Tar
Endocladia	23.6	0.2	0.8	72.0	0.0	0.0	0.0	0.0	2.8	0.6	0.0
Rockweed	17.4	0.0	0.0	23.0	0.0	37.4	0.0	0.0	20.4	1.8	0.0
Mussels	6.6	0.0	5.6	0.0	0.0	0.0	47.4	9.4	22.4	8.6	0.0
Hesperophycus	48.6	3.2	0.0	5.4	7.6	15.2	0.0	0.0	18.4	1.6	0.0

Owl limpet *Lottia gigantea* plot summary at Willows Anchorage, Santa Cruz Island, Fall 2001

Plot	Count	Area	Density	MeanSize	StDev	MinSize	MaxSize	%<20 mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	%>=100 mm
1	16	3.14	5.094	35.13	10.92	20	66	0.00%	31.25%	43.75%	18.75%	0.00%	6.25%	0.00%	0.00%	0.00%	0.00%
2	21	3.14	6.686	31.38	8.29	21	52	0.00%	47.62%	33.33%	14.29%	4.76%	0.00%	0.00%	0.00%	0.00%	0.00%
3	38	3.14	12.098	33.05	10.47	19	58	2.63%	36.84%	39.47%	7.89%	13.16%	0.00%	0.00%	0.00%	0.00%	0.00%
4	27	3.14	8.596	33.74	12.68	18	61	11.11%	37.04%	22.22%	14.81%	11.11%	3.70%	0.00%	0.00%	0.00%	0.00%
5	5	3.14	1.592	50.40	17.26	27	68	0.00%	20.00%	0.00%	40.00%	0.00%	40.00%	0.00%	0.00%	0.00%	0.00%



Valley Anchorage, 13 January 2002. Low tide -0.9 ft at 1623 hrs, clear sky, very nice day, warm afternoon, wind calm, surf calm with almost no surge. No shorebirds were present. We were on site from 1200 to 1700 hrs.

Valley Anchorage is not one of our regular sites so we helped with the comprehensive surveys. Larval recruitment samplers and temperature loggers were collected and replaced. The calm conditions and large experienced crew enabled us to quickly finish the site.

Santa Cruz Island

January 28, 2002 (Database event #2001-M)

PERSONNEL: Derek Lerma, Biological Technician, Channel Islands National Park
David Kushner, Marine Biologist, Channel Islands National Park

PROCEDURE: Departed park headquarters at 0830 via the Sea Ranger II and arrived Santa Cruz Island, Scorpion Anchorage at 1000. David and I hiked to the housing area to observe the new housing units and speak with the Ranger on current issues. We kayaked to the monitoring site from the Scorpion Pier at 1130 with conditions clear and calm. We arrived on site at 1200 hrs. with the tide just low enough to begin working the rockweed plots at area B. Photographed and field scored the five plots at area B and quickly moved to area A. Time was limited but all plots were photographed, seastars counted, and 15 or 25 plots field scored. Sea Ranger II arrived at 1430 for pick up. We kayaked out to the boat to speed operations. Returned to park headquarters at 1545 hrs.

RESULTS:

Scorpion Rock, 28 January 2002. Low tide -1.4 @ 1631, light rain in the am, Wind 5 mph ESE, waves 1-2 ft. NW, surge moderate, cloud cover 40%. No seabirds and one Harbor seal were observed on site. Overall both areas appeared healthy and undisturbed with little evidence of winter storm activity. Area B had moderate to high sand levels between the boulders near the *Hesperophycus californianus* plots. Rockweeds *H. californianus* and *Silvetia compressa* were high in cover, very long and widespread at area B. *Endocladia muricata* was high in cover and healthy. Barnacles, *Tetraclita rubescens* and *Balanus/Chthamalus* were moderately abundant and well represented in plots. Mussels, *Mytilus californianus* were high in cover with some areas of disturbance noted. *Strongylocentrotus purpuratus* densities were notably low compared to previous visits. Individuals present were both small (<40mm) and healthy. No observed recruitment of any kind was observed for zone defining species. *Chondracanthus canaliculatus* and *Mazzaella affinis* was observed at the recruitment stage. Light bleaching of *Mazzaella affinis* was noted. A complete search of area A produced a count of 28 seastars, all *Pisaster ochraceus*. One black abalone was found in area A measuring 83 mm. No searches were performed at area B but no stars or abalone were obvious. Limited time due to transportation limited our ability to score all photoplots in the field.

Photoplot summary – mean percent cover by zone at Scorpion Rock, Santa Cruz Island, Fall 2001 (5 plots/zone)

Zone	Rock	Barn	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Leaf Barn	Misc Algae	Misc Animal
Barnacle	47.0	16.8	10.2	25.0	0.0	0.0	0.0	0.0	0.0	1.0
Endocladia	21.6	4.2	1.4	50.2	0.0	0.0	0.4	1.0	20.6	0.6
Mussels	10.8	0.0	6.0	0.4	0.0	0.0	71.6	2.2	8.6	0.4
Tetraclita	54.0	2.0	9.2	1.0	0.0	0.0	20.4	4.6	7.6	1.2
Hesperophycus	8.4	0.4	0.0	16.6	55.2	8.6	0.0	0.0	10.4	0.4

