



Rocky Intertidal Community Monitoring at Channel Islands National Park

2008 Annual Report

Natural Resource Data Series NPS/CHIS/NRDS—2012/401



ON THE COVER

Chiton, *Nuttallina* sp., and an anemone, *Anthopleura* sp., with tentacles retracted at Northwest-Talcott, Santa Rosa Island

Photograph by: Dan Richards

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

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Executive Summary

Channel Islands National Park includes the five northern islands off the coast of southern California and the surrounding waters out one nautical mile. Approximately 176 miles of coastline surround the islands; 80% of which is composed of rock. The diversity and undisturbed nature of the tidepools of this rocky coastline was recognized as a special feature of the islands in the enabling legislation. To conserve these communities unimpaired for future generations, the NPS has been monitoring the rocky intertidal communities at the islands since 1982. Sites were established between 1982 and 1994. Site selection considered visitation, accessibility, presence of representative organisms, wildlife disturbance, and safety. This report summarizes the 2008 sampling year efforts (from March 2008 to January 2009) and findings of the Channel Islands National Park (CINP) Rocky Intertidal Monitoring Program.

Specific monitoring objectives are: 1) to determine the long-term trends in percent cover of key sessile organisms in the rocky intertidal ecosystem (Table 1), and 2) to determine population dynamics of *Haliotis cracherodii*, *Lottia gigantea*, and *Pisaster ochraceus*. Objectives were met by monitoring percent cover of core species in target intertidal zones using photo-plots and transects, monitoring species composition and abundance of motile invertebrates using photo-plots, and measuring size frequency and abundance of black abalone, owl limpets, and sea stars using fixed plots or timed searches.

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

All study sites were sampled in both spring and fall except the two sites at Santa Barbara Island which were only monitored in fall to avoid disturbing nesting California brown pelicans. Weather conditions were satisfactory during most monitoring sessions, but high wind coupled with strong swell and surge limited some of the abalone and sea star searches.

Most key species or assemblages targeted in the photo-plots were highly variable among sites but remained fairly comparable between sampling seasons in 2008. Compared with previous years, the mean percent cover of mussels, *Mytilus californianus*, and both rockweeds, *Silvetia compressa* and *Hesperophycus californicus* decreased substantially at most sites. Barnacle, *Chthamalus dalli/fissus* and *Balanus glandula*, cover remained stable during both seasons at approximately 45% of sampled sites while *Pollicipes polymerus* declined to the lowest recorded abundance at Fraser Cove. *Tetraclita rubescens* also occurred in low to moderate abundances

compared to past-year abundances at all three sites where it is monitored. Mean *Endocladia muricata* cover at approximately one-third of all sites increased above, remained equivalent to, or decreased below the long-term mean of past years.

Black abalone, *Haliotis cracherodii*, population levels at the islands remained less than one percent of 1985 population levels. Only two individuals were seen in fixed plots; one at Crook Point and one at Harris Point in spring. Two *H. cracherodii* were seen in plots at Crook Point, Otter Harbor, and Ford Point in fall. As in previous years following the population crash, the majority of sites had fewer than 10 black abalone located during timed or site-wide searches. Small *H. cracherodii* (< 50 mm) were only found at a few locations indicating low recruitment overall.

Ochre sea stars, *Pisaster ochraceus*, were abundant in 2008 at most sites around the islands. Five sites had more than 500 *P. ochraceus* counted during 30-minute searches in fall. At three locations, East Point, Anacapa Middle West and Sealion Rookery on Santa Rosa, Anacapa and Santa Barbara Islands, respectively, more than 700 ochre sea stars were counted in half an hour. The mode of *P. ochraceus* at most sites measured 80-130 mm, but was equal to 50 mm at Ford Point and 30 mm at Willows Anchorage in spring.

Giant owl limpets, *Lottia gigantea*, ranged in density from a mean of 4.2 m⁻² at Santa Cruz Island to 8.7 m⁻² at Anacapa. Compared with density measurements from previous years, 2008 mean densities were low for *L. gigantea* at Santa Cruz, San Miguel, and particularly Santa Rosa Islands. At Anacapa, owl limpet densities were comparable to the highest recorded densities in 2003. Mean sizes ranged from 34 mm at Anacapa to 56 mm at Santa Rosa. As in previous years, the largest *L. gigantea* was measured at Northwest-Talcott (106 mm).

Surfgrasses, *Phyllospadix* spp., were monitored in fixed transects at four sites. Mean *Phyllospadix* cover at the Santa Rosa sites, East Point and Northwest-Talcott, was greater than 90%, and was approximately 54% at Fraser Cove on Santa Cruz. Surfgrass cover ranged between 62% and 72% at Trailer. Overall, abundances have remained relatively stable at all four sites over time.

Black oystercatchers were the most ubiquitous shorebird seen at all sites. American oystercatchers were present at four sites, and black turnstones were observed at six sites throughout 2008. Greater than 20 western gulls were counted at Willows Anchorage and Fraser Cove. Forty brown pelicans and 20 cormorants were seen at East Point and Crook Point, respectively.

Harbor seals, *Phoca vitulina*, were seen at all but six sites during spring, but were only present at five sites in fall. *P. vitulina* were most abundant (n=30) at Otter Harbor in fall. Elephant seals, *Mirounga angustirostris*, were seen at more than half the Santa Rosa and San Miguel sites in spring. Only four sites had elephant seals present during the fall sampling. The greatest abundance (n=12) of *M. angustirostris* was observed at Otter Harbor in spring. Sea lions, *Zalophus californianus*, were only seen at the Santa Barbara sites. Up to 34 and 150 individuals were counted at Landing Cove and Sea Lion Rookery, respectively.

Visitation to all but two intertidal sites, South Frenchy's Cove on Anacapa and Prisoner's Harbor at Santa Cruz, is low. However, Frenchy's Cove particularly receives moderate usage due to its close proximity to the mainland and relative ease of access. In 2008, Island Packers Company conducted 23 trips to Frenchy's Cove to allow visitors access to the tidepools. Total visitation was 1,760 passengers. Most visitations (79%) occurred during February through April with March being the busiest month (806 visitors).

Acknowledgments

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

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

In 2008 we received funding from the National Marine Fisheries Service Endangered Species Program to hire an intern and conduct additional sampling for black abalone. Jacob Elliott was hired as a Student Conservation Association (SCA) intern in November 2008 for the intertidal monitoring program. His assistance in the field along with digital file management and GIS map work was greatly appreciated.

Special thanks to the Channel Islands National Marine Sanctuary (CINMS) for providing boat time and staff assistance with the monitoring. This work was performed in part at the University of California Natural Reserve System, Santa Cruz Island Reserve on property owned and managed by The Nature Conservancy. Thanks to Dr. Lyndal Laughrin and staff at the UC reserve field station for their assistance. Thanks also to Carol Blanchette and others from the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO) Marine Science Institute, University of California, Santa Barbara (UCSB) and UC Santa Cruz (UCSC) for their collaboration.

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List of Acronyms

<i>Acronym</i>	<i>Description</i>
ANI	Anacapa Island
CDFG	California Department of Fish and Game
CINP	Channel Islands National Park
CINMS	Channel Islands National Marine Sanctuary
ENSO	El Niño Southern Oscillation
GIS	Geographic Information System
MARINe	Multi-Agency Rocky Intertidal Network
MLLW	Mean Lower Low Water
NMFS	National Marine Fisheries Service
NOAA	National Oceanographic and Atmospheric Administration
NPS	National Park Service
PISCO	Partnership for Interdisciplinary Studies of Coastal Oceans
PIT	Passive Integrated Transponder
SCA	Student Conservation Association
SBI	Santa Barbara Island
SCI	Santa Cruz Island
SMCA	State Marine Conservation Area
SMI	San Miguel Island
SMR	State Marine Reserve
SRI	Santa Rosa Island
TNC	The Nature Conservancy
UCLA	University of California Los Angeles
UCSB	University of California Santa Barbara
UCSC	University of California Santa Cruz
WS	Withering Syndrome

Introduction

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

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

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

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

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

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

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

This report summarizes the 2008 sampling year efforts (from March 2008 to January 2009) and documents activities and observations of the CINP Rocky Intertidal Monitoring Program.

Monitoring results were previously reported in Richards 1986, 1988, 1998, Richards and Lerma 2000, 2002 2005a, 2005b, Richards et al. 2010, and Richards and Rich 2009, 2010. Additional black abalone monitoring results have been presented in Haaker et al. 1992, Davis et al. 1992, and Richards and Davis 1993.

Methods

Study Area

The California Channel Islands are comprised of eight islands in the Southern California Bight, five of which are within the Channel Islands National Park. The five park islands have about 323 kilometers (176 miles) of coastline, the majority of which is rocky shore (approximately 80%). Rock types vary from hard weathered volcanic basalt or breccias to easily eroded Monterey shale and sandstone. Sites were originally established to include the various exposures and rock types of each of the islands, though broad rocky benches were targeted.

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

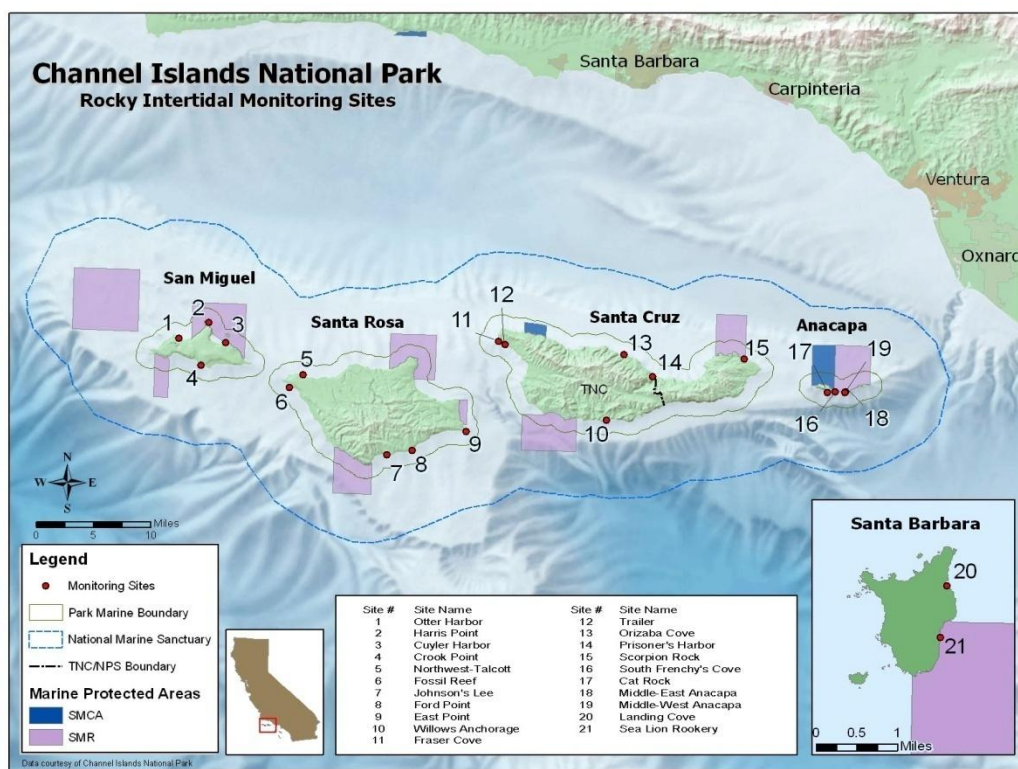


Figure 1. Rocky Intertidal Community Monitoring Site Locations in Channel Islands National Park. Note: TNC= The Nature Conservancy, SMCA= State Marine Conservation Area, SMR= State Marine Reserve, Sites 18 and 19 are on adjacent reefs.

Table 1. Core species, higher taxa, and substrata scored in photo-plots, point intercept transects, circular plots, abalone/seastars, and motile invertebrate counts at all CINP sites in 2008.

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

Table 1 (continued). Core Species, Higher Taxa, and Substrata Scored in Photo-plots, Point Intercept Transects, Circular Plots, Abalone/Sea stars, and Mobile Invertebrate Counts at all CINP Sites in 2008 (continued).

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

Monitoring

The CINP Rocky Intertidal Monitoring Program has 21 sites on the five park islands (Figure 1) that were established between 1982 and 1994. Sites generally consist of an array of 15-35 photoplots, 3-5 irregular and circular plots used to monitor black abalone and owl limpet densities, respectively, and *P. ochraceus* transects. Four sites have three surfgrass transects. Site selection considered visitation, accessibility, presence of representative organisms, wildlife disturbance, and safety. Sampling is usually conducted twice each year, once in spring and fall. In 2008, monitoring occurred at 19 sites in spring (March-May) and 21 sites in fall (October - January 2009). Monitoring protocols detailed in Richards and Davis (1988) and Engle *et al.* (1998) were followed. Updated protocol summaries can be found in Richards and Lerma (2000), Richards *et al.* (2010), and Engle (2008). See Appendix A for additional notes about the 2009 program.

Data are maintained in Microsoft Access databases and Excel files in the Channel Islands National Park network and MARINE. The annual reports are available on the internet at <http://science.nature.nps.gov/im/units/medn/>.

Thirteen core species or assemblages are targeted for monitoring in fixed photoplots to determine percent cover (Table 1). These target species and assemblages are often common and generally used to define a band or zone within the intertidal zone. Target species and assemblages include thatched and acorn barnacles (*Tetraclita rubescens*, *Balanus glandula*/*Chthamalus* spp.), mussels (*Mytilus californianus*), rockweeds (*Silvetia compressa*, and *Hesperophycus californicus*), turfweed (*Endocladia muricata*), red algal turf (*Pterocladia* spp. and *Gelidium* spp.), goose (or leaf) barnacles (*Pollicipes polymerus*), and tar which occurs naturally from oil seeps in the channel and can form a thick persistent cover over substrata. An additional 32 taxa or substrata are also monitored when present (see Table 1 for list of taxa¹). Fixed plots (50 x 75 cm) are photographed on each visit. In most cases, there are five replicate plots in each zone, initially established over high densities of the target species. Not all core species (zones) are represented at each site. Four new *M. californianus* plots were established in the *Mytilus* zone at Johnson's Lee in fall 2008 to replace plots that have been devoid of mussels for over 15 years. New plots were established in accordance to standard protocols (Engle 2008).

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

¹ Taxa are defined as species or groups of similar species that may not be easily separated in the field. Core taxa are those identified by MARINE as species to be searched for and counted by all groups (Engle 2008).



Figure 2. Dan Richards scoring photo-plots at Fossil Reef, Santa Rosa Island.

Relative abundance and size structure was collected for three species. *Haliotis cracherodii*, black abalone, were counted and measured in fixed irregular plots ranging in size (0.5m^2 - 11.2m^2) (5 plots per site) at eleven sites where plots have been established. At each site, a search of a defined area of the reef or defined period of time 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) (Figure 3). *Pisaster ochraceus*, ochre seastars, were counted along with other species of seastars (*Pisaster giganteus*, *Patiria miniata*, *Pycnopodia helianthoides*, and *Leptasterias hexactis*) in a general search of the reef (for 30-minutes). When possible, 50-100 *P. ochraceus* were measured (center of disk to tip of longest ray) for size distribution. At three sites (Johnson's Lee, Fossil Reef, and Landing Cove) where *P. ochraceus* were abundant, fixed transects ($2\text{m} \times \sim 8\text{m}$) were used as a rough measure of density within that area.



Figure 3. Dan Richards measuring *Lottia gigantea* in a fixed-circular plot.

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

Surfgrass, (*Phyllospadix* spp.), cover was measured on fixed point-intercept transects (10 m long, 100 points) (three transects per site) at four sites (Trailer, Fraser Cove, East Point, Northwest Talcott) (Figure 4). Special circumstances and general conditions that may have affected sampling were described on daily logs, and reported in the trip reports (Appendix C). Surfgrass transect scoring methods follow the MARINe protocol.



Figure 4. Surfgrass transect #2 at Northwest-Talcott, Santa Rosa Island.

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

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

Temperature loggers were placed at a number of sites in a cooperative study with PISCO (UCSB). Optic Stowaway temperature loggers from Onset Computer Corporation were placed in PVC (Polyvinyl Chloride) pipe housings strapped to rocks near the mean tide line. Units were downloaded in the field to an Optic Shuttle device and processed with Onset's Boxcar software. Data were analyzed by PISCO and are not presented here.

Taxonomy and nomenclature follow Smith and Carlton (1975), Carlton (2007), Abbott and Hollenberg (1976), McLean (1978), Morris et al. (1980), and <http://ucjeps.berkeley.edu/californiaseaweeds.html>.

Data Analysis

The purpose of this report is to present data collected in 2008. Advanced statistical analysis of the data has not been performed. Any trends presented are simple summary statistics and should be viewed as preliminary. Basic trends of percent cover, averaged by zone, were graphed for key species in photo-plots (acorn barnacles, thatched barnacles, mussels, rockweeds [*Silvetia* and *Hesperophycus*], leaf barnacles, red algal turf, and tar) using stock charts in Microsoft Excel. These charts provide a quick view of the cover by season compared to the overall range and mean of values through time for each taxon at each site. To minimize variability, photo-plot target types were not pooled from different zones for analysis. For example, the percent cover of mussels in only mussel zone plots was considered. Descriptive statistics (density, average size, minimum and maximum size), averaged by site, were determined for all fixed owl limpet plots and the trend through time was graphed by sampling event. Readers are cautioned that although densities are provided for comparative purposes, plots were chosen within high density areas and should not be considered as representative of a larger area. Surfgrass trends were plotted for temporal reference.

Photoplots, circular plots, and line transects were all “fixed” or measured in the same location every season. It is not possible to extrapolate trends in the plots to entire sites without using additional information specific to the area (Murray *et al.* 2006). Therefore, results from photoplots, transects, and circular plots should be interpreted with care.

Results and Discussion

Photo-plots

Photo-plot data are summarized in figures 5-7 for each target zone and season. Mean percent cover is pooled for all replicate plots per zone by site and season, and is compared to the range and mean cover across all years. Percent cover values of core taxa in each plot are presented in Appendix B. Summary tables (by zone) for each site can be found in the trip reports (Appendix C).

The mean percent cover of most targeted species in 2008 was highly variable among sites but remained fairly comparable between sampling seasons (Figures. 5-7). Compared with previous years, the mean percent cover of mussels, *Mytilus californianus*, declined at approximately 75% of sites during both seasons. The rockweeds, *Silvetia compressa* and *Hesperophycus californicus*, also decreased substantially. In fact, *S. compressa* mean percent cover decreased markedly below the long-term mean at all sites in spring and at all but one site in fall. Barnacle cover remained stable at approximately 45% of sites sampled in both spring and fall. *Endocladia muricata* cover increased at nearly one-third of sites and decreased at the same percentage of sites. Other core species such as *Pollicipes polymerus* and *Tetraclita rubescens* either decreased markedly below or remained within one standard error of the long-term mean cover for each taxon.

M. californianus abundances appeared to have decreased at predominantly north-facing sites in the eastern Santa Barbara Channel beginning in 2007. Exceptions were Middle West (only during spring) and Fraser Cove (both seasons) which both had comparable percentages (within one standard error) of mussel cover in 2008 to the long-term means (Figures. 5-7). Still, the geographical pattern was not distinct as more than half the south-facing sites also had below average *M. californianus* cover. At Johnson's Lee, a south-facing site, mean mussel cover has remained below 25% for over 15 years. In fall 2008, four new plots were established in the *Mytilus* zone at Johnson's which together had 79% mean mussel cover indicating that mussel cover was still high outside of the original *Mytilus* plots. We believe the mussel cover loss was due to seastar predation based on the large number of *Pisaster ochraceus* observed at the site and the fact that loss only occurred at the lower intertidal levels where seastars persist.

We observed gaping *M. californica* and many empty shells at Middle Anacapa in spring (March) 2008. It was a hot day when we sampled and the gaping shells were not considered that unusual for the heat. Warm periods in which low tides occur during clear and calm days can result in extreme stress for mussels (Deirdre et al. 1997). Some of the open patches at that time may have also resulted from the previous week's large swell event. We noted high levels of mussel recruitment at Middle Anacapa in spring and fall, but overall the mussel bed was in poor condition. Both Middle Anacapa (Middle East and Middle West) sites declined from levels equivalent to the long-term averages at each site to very low levels between March and November 2008. At Prisoners Harbor, we observed open patches in the mussel bed in spring and noted that there were many dead *Balanus glandula*. Carol Blanchette (pers. com.) mentioned to us that she had seen many gaping mussels at Prisoners Harbor in May. Most of the *M. californianus* were missing from the site when we visited in July 2008. We noted that *Pseudochama exogyra* were also gaping at that site. Gaping mussels were also observed at Otter

Harbor in January 2009. That sampling followed a period of warm, calm weather in late December and January.

Silvetia compressa declined markedly at all sites in spring and nearly all sites in fall compared to previous years (Figures 5-7). Fossil Reef on Santa Rosa was the only site which did not experience pronounced decreases of rockweed in fall. *S. compressa* cover measured below 15% at Prisoner's Harbor, Crook Point and Otter Harbor during both seasons and at Willows Anchorage in fall. The cause of these declines is unknown but may be an artifact of heat stress resulting from acute climatic events or may be related to unknown long-term factors that have contributed to the overall decline of rockweed we have observed during recent years at most sites.

Hesperophycus californicus decreased in cover at five out of eight sites sampled in spring and all but one site (Harris Point) in fall (Figures 5-7). During spring, *H. californicus* cover increased above the long-term mean at Harris Point and remained stable at Orizaba Cove and Willows Anchorage. Less than 15% cover was measured at East Point (both spring and fall), Fraser Cove (fall) and Orizaba Cove (fall). *H. californicus* cover at Prisoner's Harbor, Willows Anchorage and Trailer fell below 5% during one or both sampling seasons.

Endocladia muricata cover remained equivalent to previous years at six sites in both spring and fall (Figures 5-7). Nearly equal numbers of sites were above as below the long-term means in 2008. *E. muricata* abundances remained similar at most sites between seasons with the exception of Prisoner's Harbor which decreased from 47% in spring to 18% in fall. Fraser Cove, Willows Anchorage and East Point all had more than 70% *E. muricata* cover during at least one sampling season. Anacapa Middle East and Sea Lion Rookery both had less than 10% *E. muricata* cover in fall.

Barnacle, *Chthamalus dalli/fissus* and *Balanus glandula*, abundances remained stable in 2008 during both seasons at approximately 45% of sampled sites (Figures 5-7). In spring, seven out of 18 sites had higher *Chthamalus/Balanus* cover than previous years and only three sites had below average cover. The opposite trend occurred in fall whereby three sites experienced increased *Chthamalus/Balanus* abundances and eight sites had decreased barnacle cover. There was little variation in barnacle abundance (<10%) from spring to fall at most sites. Alternatively, Fraser Cove, Cuyler Harbor and Orizaba Cove had 16-27% difference in mean *Chthamalus/Balanus* cover between the two sampling seasons. Cat Rock was the only site that remained above average during both seasons while Anacapa Middle East, Fraser Cove and Scorpion Rock had consistently lower than average barnacle cover.

Red algal turf, composed of *Gelidium* sp., *Pterocladia* sp. and *Chondracanthus canaliculatus*, is only monitored at Landing Cove (Figures 5-7). The algal assemblage is typically very stable and usually dominates the lower intertidal zone at most sites. At Landing Cove, it is conspicuous in three out of five plots, yet the surfgrass, *Phyllospadix torreyi*, has increasingly become more established in two of the plots over the past several years. In 2008, red algal turf abundance fell markedly below the long-term mean, and was replaced primarily by surfgrass.

Pollicipes polymerus zone plots have only been established at Fraser Cove. There, leaf barnacle cover has declined slowly over time from a high in 1996 of approximately 25% to a low of 4.2% in fall 2008 (Figures. 5-7).

Tetraclita rubescens is monitored at three sites. Below average cover was measured at Orizaba Cove both seasons (Figures 5-7). At Harris Point and Scorpion Rock, *T. rubescens* cover was comparable to the long-term mean in spring and fall. *T. rubescens* abundances varied little between monitoring seasons at all three sites.

Tar is monitored at Fraser Cove where it is naturally deposited from seeps in the Santa Barbara Channel onto extensive substrata in the upper intertidal. Tar cover was slightly lower in spring than previous years, but rose to levels comparable to the long-term mean in fall (Figures 5-7).

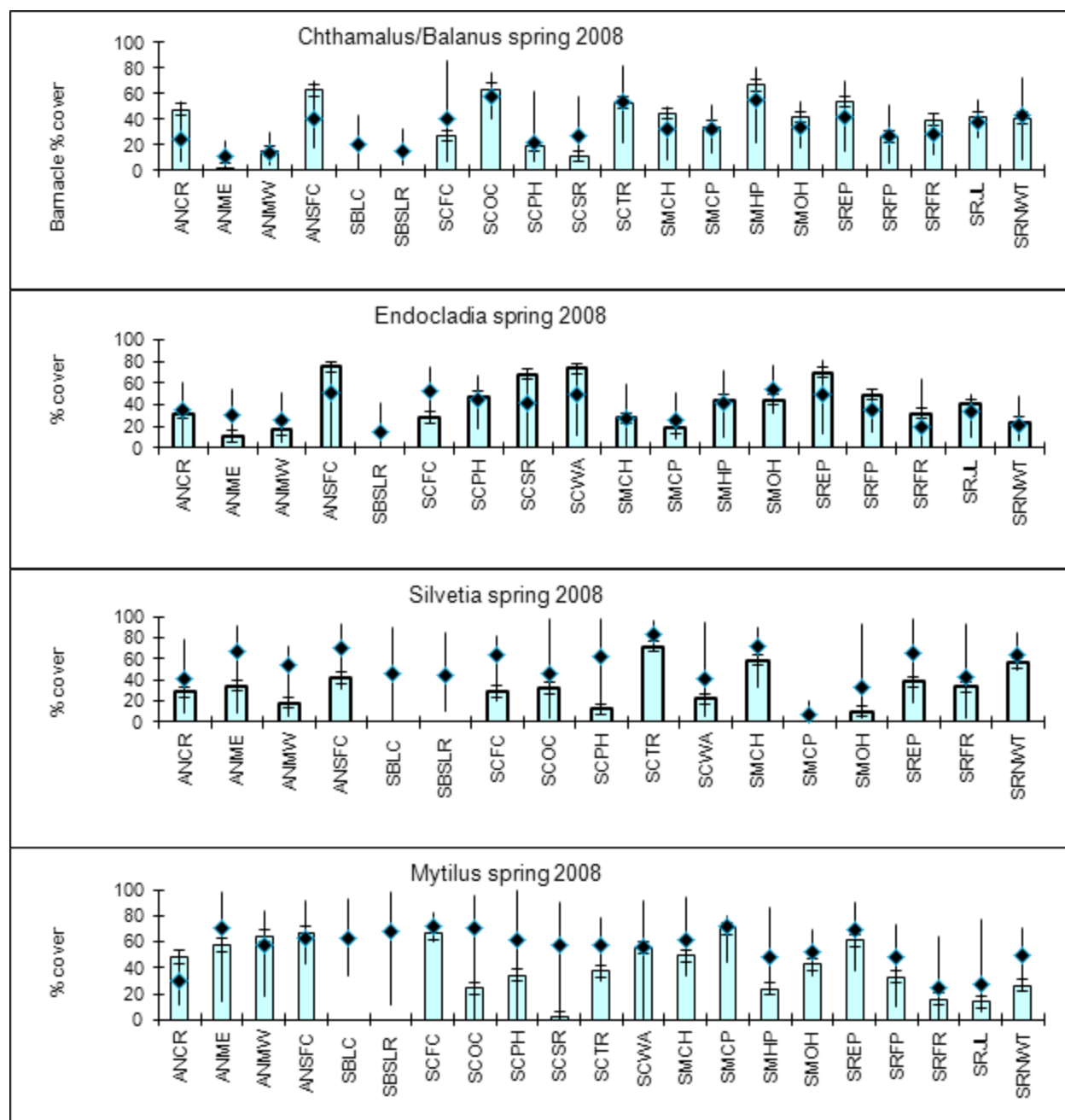


Figure 5. Percent cover of target species (*Chthamalus/Balanus*, *Endocladia muricata*, *Silvetia compressa*, and *Mytilus californianus*) in fixed plots by zone in spring 2009. Bars represent the seasonal mean percent cover from five plots within that zone; error bars represent ± 1 standard error of the plot abundances at that site. Vertical lines represent the range of means since monitoring began at that site. Diamonds represent the overall mean for all years at that site. See Table 2 for site codes. Note that Santa Barbara Island sites were not sampled in spring.

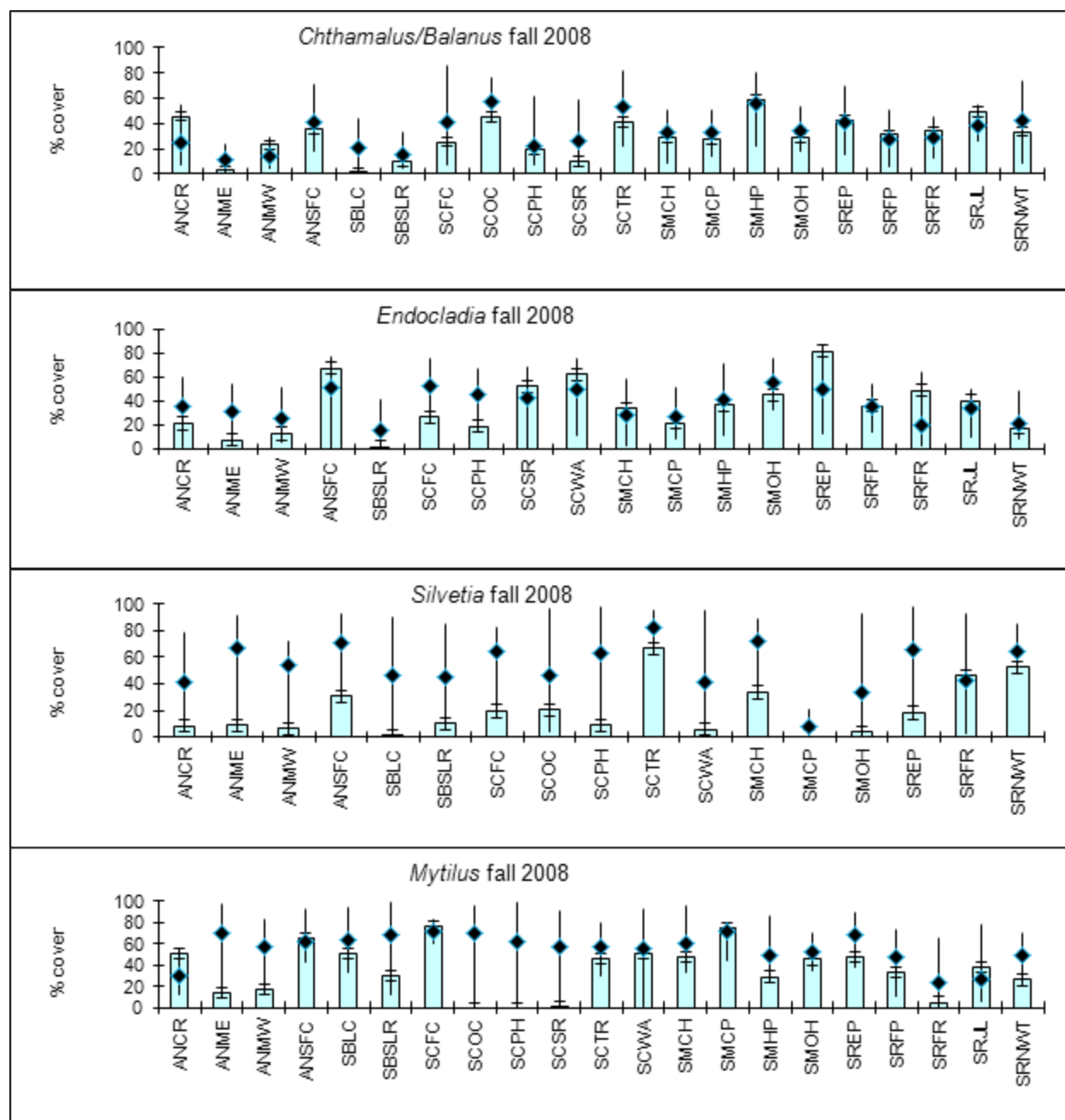


Figure 6. Percent cover of target species (*Chthamalus/Balanus*, *Endocladia muricata*, *Silvetia compressa*, and *Mytilus californianus*) in fixed plots by zone in fall 2008. Bars represent the seasonal mean percent cover from five plots within that zone; error bars represent ± 1 standard error of the plot abundances at that site. Vertical lines represent the range of means since monitoring began at that site. Diamonds represent the overall mean for all years at that site. See table 2 for site codes.

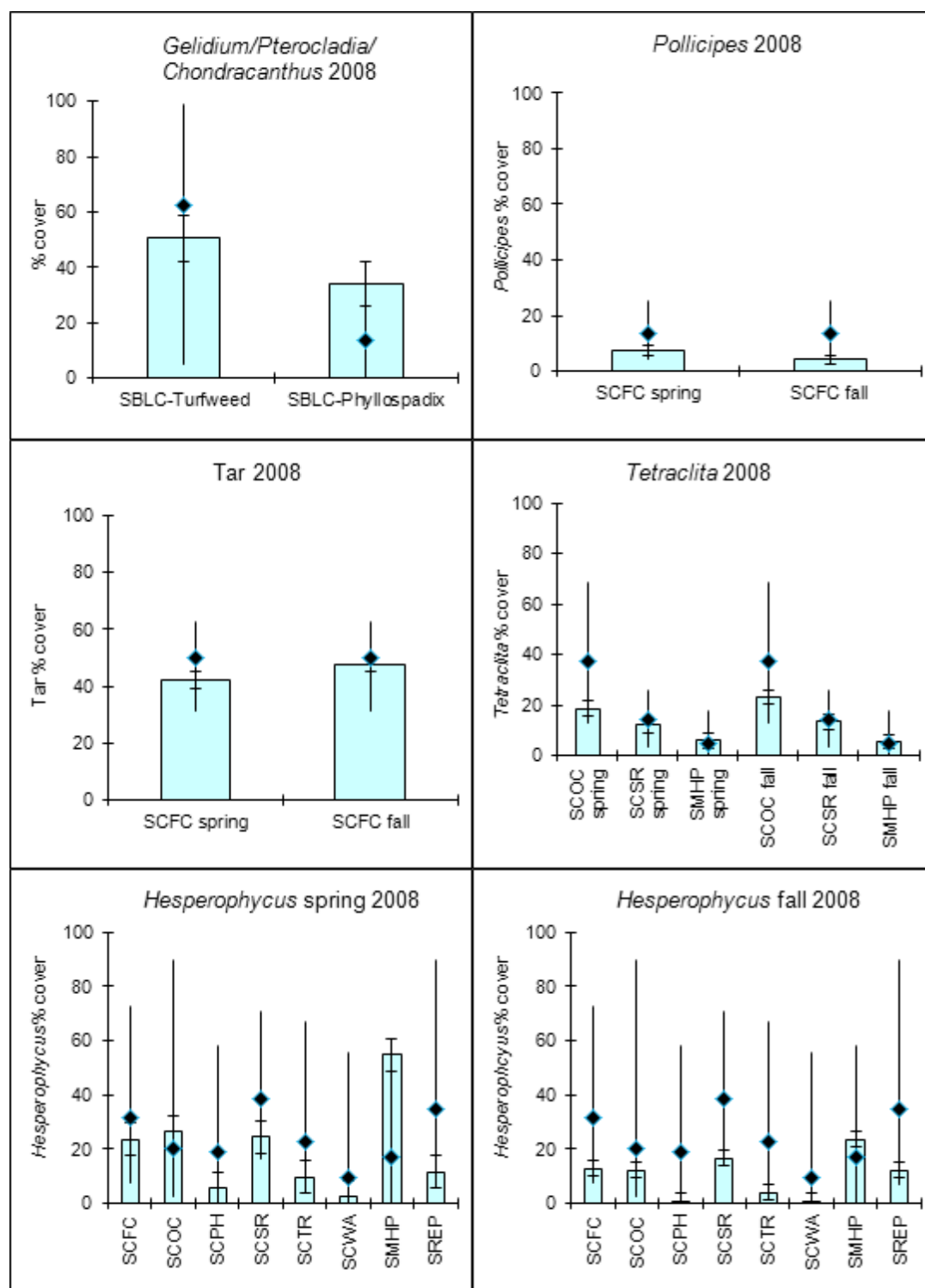


Figure 7. Percent cover of target taxa (Red algal turf, Tar, *Tetraclita rubescens*, *Pollicipes polymerus*, and *Hesperophycus californicus*) in fixed plots by zone in 2008. Bars represent the seasonal mean percent cover from five plots within that zone; error bars represent ± 1 standard error of the plot abundances at that site. Vertical lines represent the range of means since monitoring began at that site. Diamonds represent the overall mean for all years at that site. See table 2 for site codes.

Motile Invertebrates

The densities of motile invertebrate species have been sampled since 2000 at most sites. Over time, the abundances of most species have varied markedly. In 2008, abundances were again highly variable among species and sites (Figure 8). Exceptionally high or low densities were measured at many sites for nearly all species.

More medium-sized (5-15 mm) limpets (all species) were counted at five sites in 2008 than during any previous year; four of the sites are located on Santa Cruz Island (Figure 8). Periwinkle snail (*Littorina* spp.), chiton (*Lepidochitona* spp.) and purple urchin (*Strongylocentrotus purpuratus*) densities were also highest on record in 2008 at three sites. At Otter Harbor, nearly four times as many *Lepidochitona* spp. were counted in plots than before. Twice as many *Littorina* spp. occurred at Cuyler Harbor than is usually counted at the site. Additionally, volcano limpets (*Fissurella volcano*), chitons (*Nuttallina* spp.) and ochre sea stars (*Pisaster ochraceus*) were each more abundant at two sites than previous years. The greatest number of giant owl limpets (*Lottia gigantea*) for Crook Point since 1999 was counted in spring 2008.

The predatory dogwinkle, *Nucella emarginata*, decreased more in 2008 than any other year at 40% of sites; lowest abundances on record occurred at five of these sites. Lowest abundances were also observed in 2008 for shore crabs (*Pachygrapsus crassipes*) at three sites, angled unicorn snails (*Acanthina* spp.) at two sites, and *Nuttallina* spp. at one site. At Fossil Reef, *Nuttallina* spp. decreased in abundance to less than half the long-term mean.

The speckled turban snail, *Chlorostoma gallina*, a species that typically occurs in greater abundance in warmer-water regions than the northern Channel Islands, was abundantly present at Fraser Cove and Trailer site on Santa Cruz. *C. gallina* densities more than doubled at Fraser Cove and were three times greater at Trailer in 2008 than those of any previous year on record.

Size distribution data collected for motile invertebrates in 2008 appear to be similar to measurements recorded in previous years (see Appendix D). However, further analysis is needed to draw any inferences among sites.

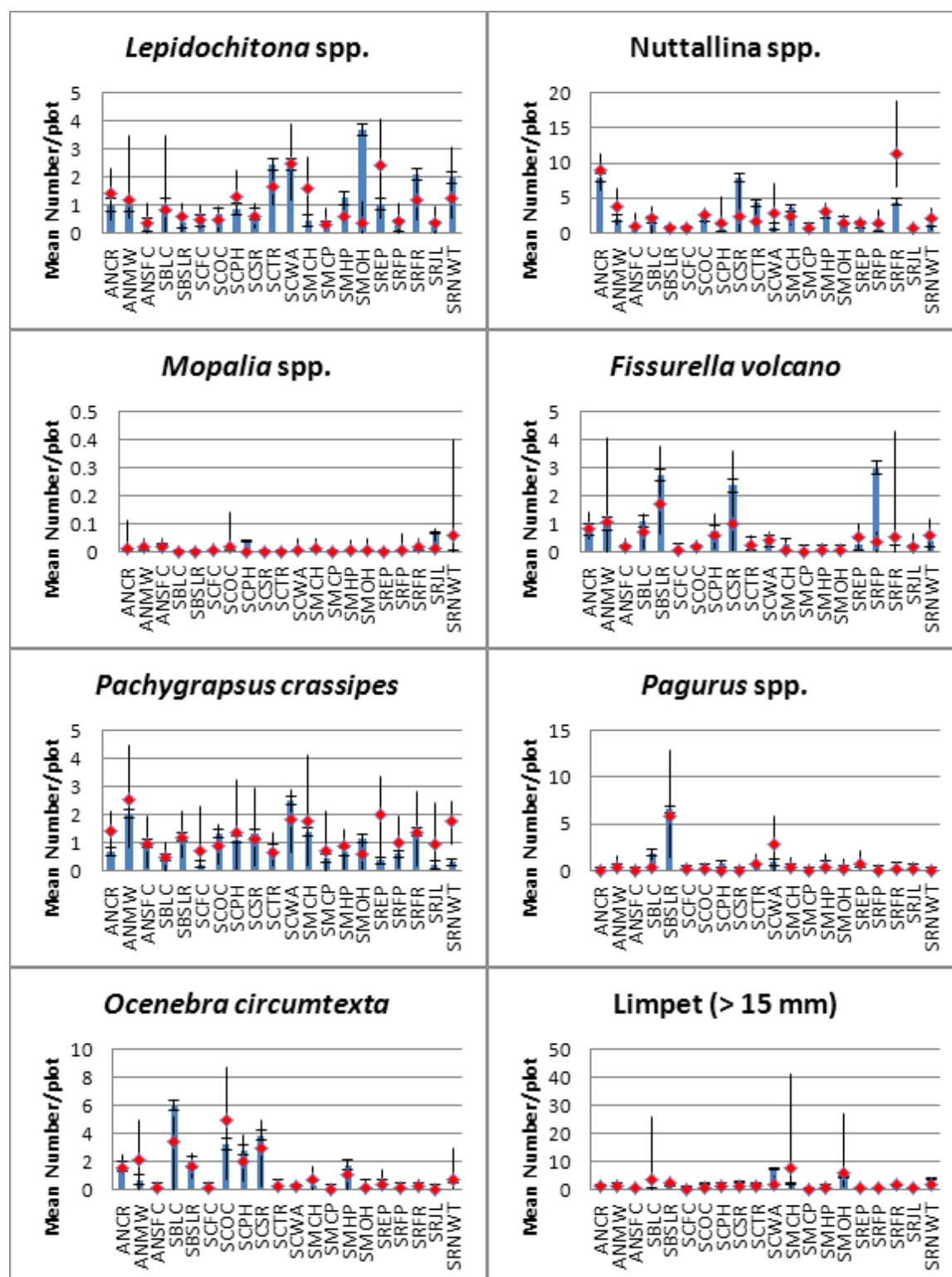


Figure 8. Motile invertebrate species mean abundances for 2008 at each site. Bars represent the mean abundance for 2008. Lines indicate the maximum and minimum distribution of mean abundances from combined previous years. Diamonds display overall mean for combined years. Note that y-axes vary by graph.

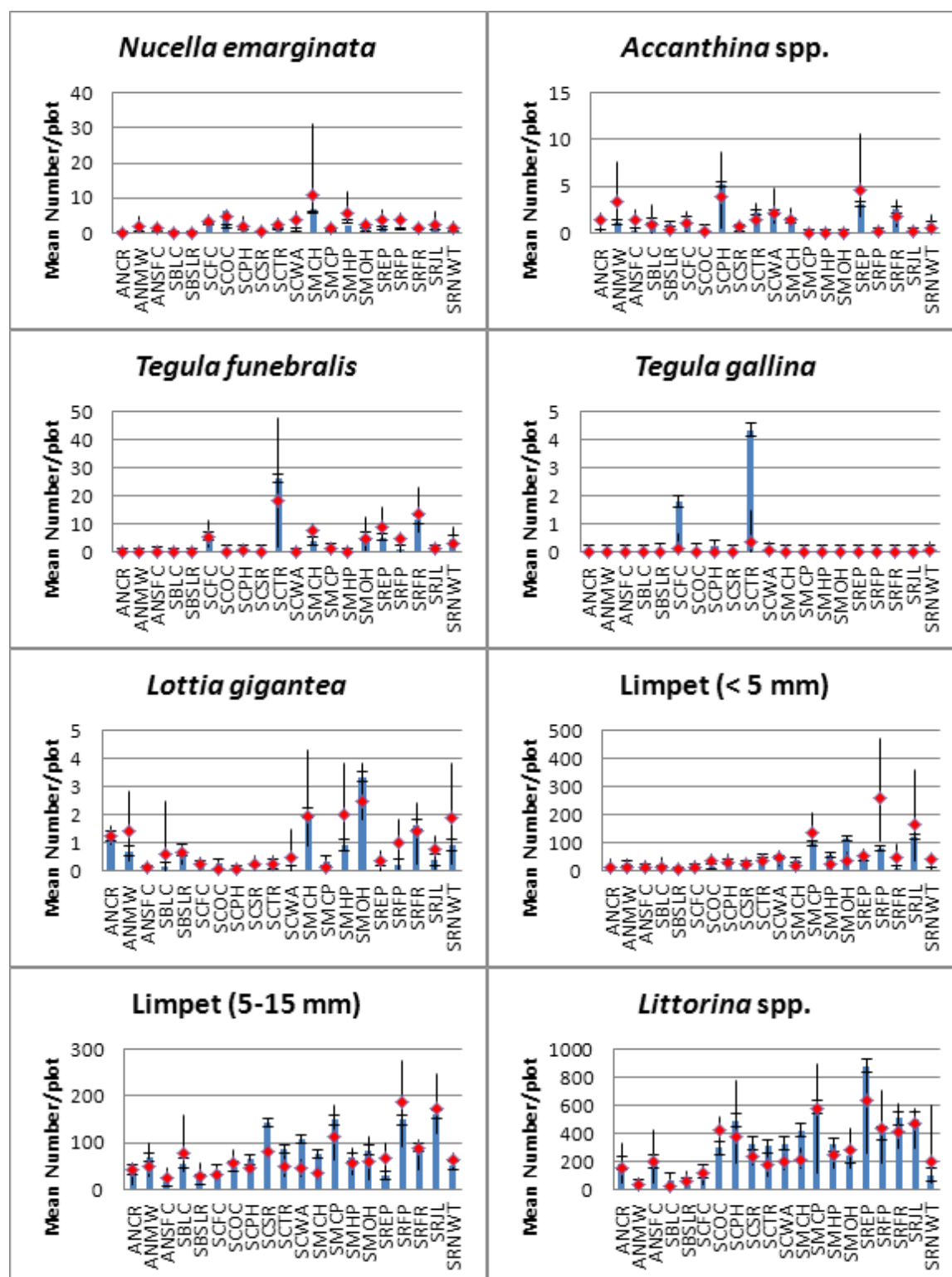


Figure 8 (continued). Motile invertebrate species mean abundances for 2008 at each site. Bars represent the mean abundance for 2008. Lines indicate the maximum and minimum distribution of mean abundances from combined previous years. Diamonds display overall mean for combined years. Note that y-axes vary by graph.

Haliotis cracherodii

One black abalone, *Haliotis cracherodii*, was found in a fixed monitoring plot at Crook Point and Harris Point, San Miguel Island in spring (Table 2). In fall, two *H. cracherodii* were seen in plots at Crook Point and Ford Point and one individual was in a plot at Harris Point. Abalone were not found inside any other fixed plots during spring or fall. Less than half the monitored sites had greater than 10 *H. cracherodii* found during 30-minute searches. No abalone were found at Cuyler Harbor, Northwest-Talcott, Prisoner's Harbor, South Frenchy's Cove, and Sea Lion Rookery during one or both monitoring seasons.

Small *H. cracherodii* (< 50 mm) were uncommon at most sites and mean sizes were greater than 80 mm at all islands except Anacapa and Santa Cruz indicating low recruitment overall (Table 2). Size distribution data from all sites in spring and fall are presented in Figures 9 and 10, respectively. Note that most juveniles were found at Willows Anchorage and Middle Anacapa. The largest individual (183 mm) was measured at Johnson's Lee in spring (Table 2).

The greatest number of *H. cracherodii* was found at Otter Harbor. We counted 175 and 194 in spring and fall, respectively during extended searches of the entire site (Tables 3 and 4). Willows Anchorage had the second greatest number of abalone with 184 counted in fall during an extended (3 hr.) count (Table 5). The spring count (n=56) was only for 30 minutes and we only covered the eastern portion of the site (Table 4). In 2008, almost as many black abalone were observed at Willows as were counted at Otter Harbor. (Note that different levels of effort may be applied at different sites or seasons depending on conditions. Timed counts should be viewed more as an index than actual numbers, however efforts are made to cover comparable areas of reef each visit. Overall reef area may vary between sites though.). At Willows Anchorage, abalone numbers have been increasing during the last several years (Figure 12). Figure 11 is included here to show the changes we have been seeing at each of the islands since black abalone monitoring began. Prior to the early 1990s abalone were only counted in fixed plots. Site-wide surveys or timed counts were initiated during different years at many sites. For example, the NPS began monitoring abalone at Santa Cruz Island sites in 1998.

No abalone were found exhibiting symptoms of Withering Syndrome in 2008.

Table 2. *Haliotis cracherodii*, black abalone, counts from 2008 sampling. Data from sites are combined by island. CountRandom is the number of abalone from 30-minute search, CountInPlot is the number of abalone found in fixed plots (not all sites were monitored each season, thus area size is different). AN=Anacapa, SB=Santa Barbara, SC=Santa Cruz, SM=San Miguel, SR=Santa Rosa.

Island Code	Year	Season	Count Random	Count InPlots	Count Sized	Mean Size	StDev	Min Size	Max Size
AN	2008	spring	28	0	18	70.22	25.46	37	131
AN	2008	fall	74	0	74	63.19	24.51	22	170
SB	2008	fall	1	0	1	83.00		83	83
SC	2008	spring	84	0	82	71.16	29.59	28	158
SC	2008	summer	122	0	112	74.24	61.28	40	165
SC	2008	fall	272	0	272	54.21	44.59	19	130
SM	2008	spring	215	2	217	101.83	23.07	30	162
SM	2008	fall	215	3	218	99.35	30.71	49	163
SM	2008	winter	57	0	57	107.98	21.20	65	150
SR	2008	spring	23	0	23	126.57	32.94	55	183
SR	2008	fall	38	2	39	111.03	41.20	25	176

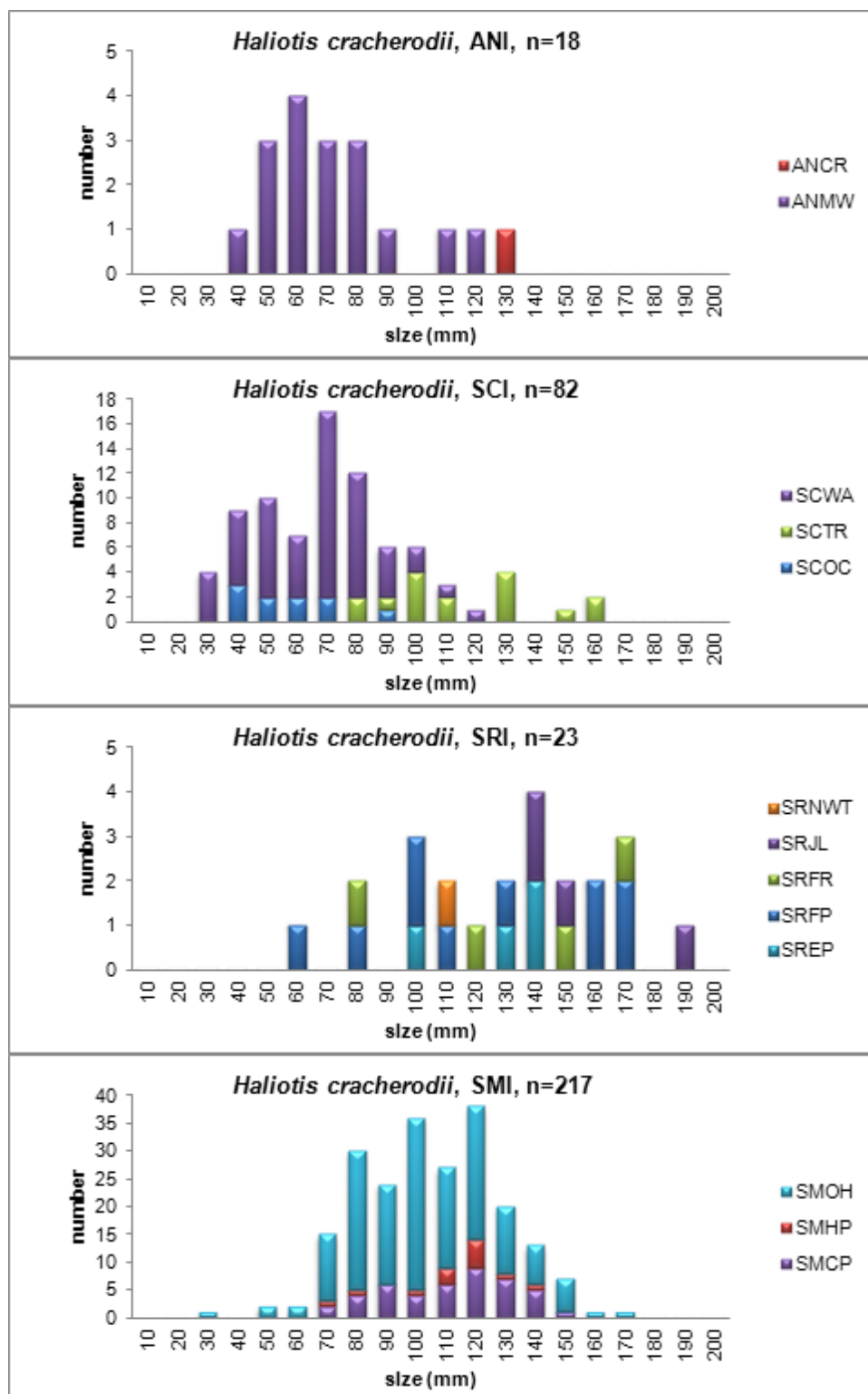


Figure 9. *Haliotis cracherodii* size distributions in spring 2009. All sampled sites were combined by island in each histogram. Note differences in scale of y-axes. See Table 2 for site codes.

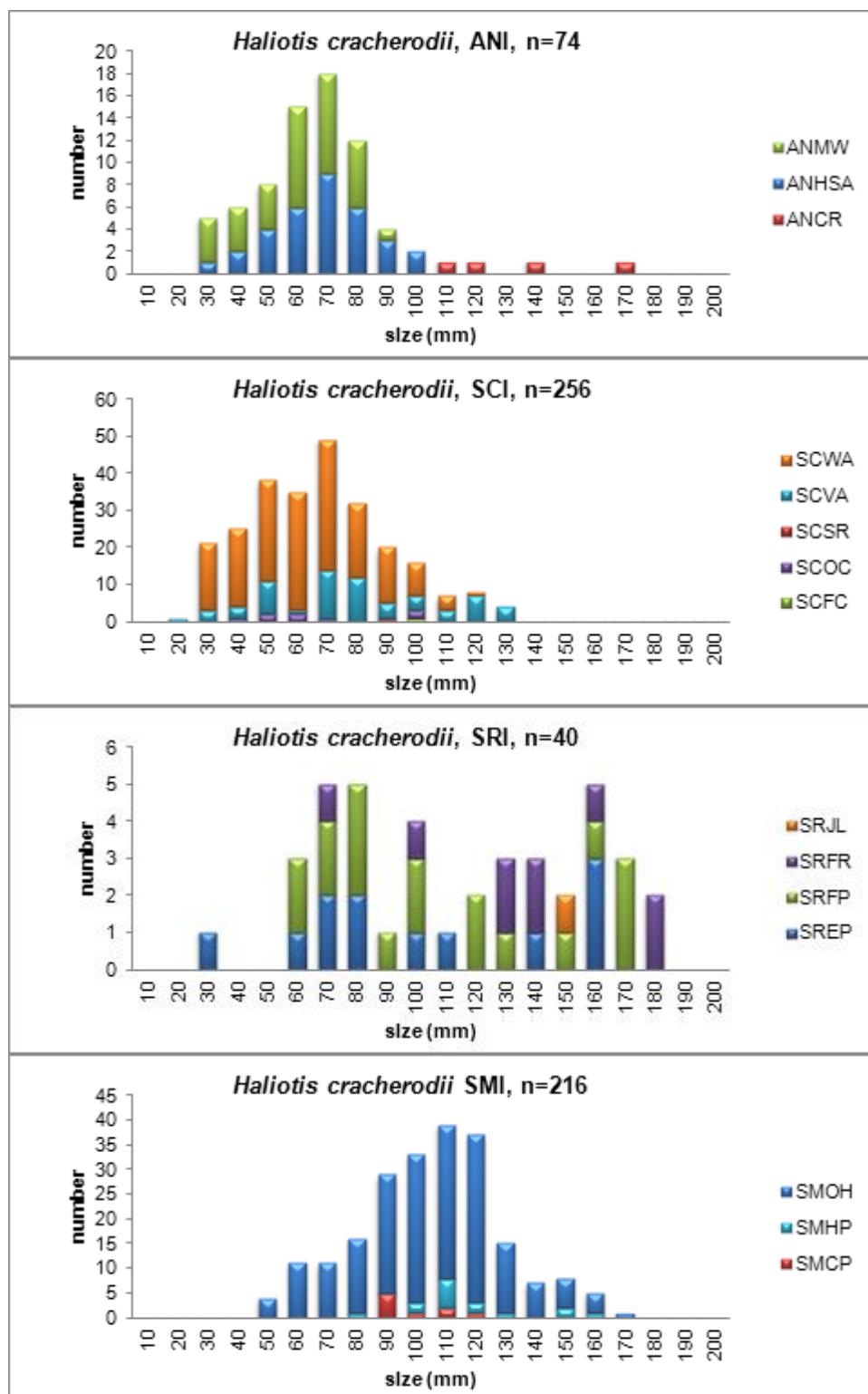


Figure 10. *Haliotis cracherodii* size distributions in fall 2008. All sampled sites were combined by island in each histogram. Note differences in scale of y-axes. See Table 2 for site codes.

Table 3. Sea star and black abalone searches in spring 2008 (x indicates no plot or transect, nc indicates no count performed, P.o.= *Pisaster ochraceus*, P.g.=*P. giganteus*, P.b.= *P. brevispinous*, P.m.= *Patiria miniata*).

* = Middle Anacapa-West combined with Harbor Seal Arch.

Site	Sampling Date	Seastars in 30 min	Seastars in transects	Abalone in plots	Abalone search
Cuyler Harbor, SMI	5/7/08	190 P.o.	x	x	0
Crook Point, SMI	5/9/08	83 P.o.	x	1	43
Otter Harbor, SMI	5/10/08	76 P.o., 10 P.g., 2 P.m.	x	0	175
Harris Point, SMI	5/8/08	13 P.o., 3 P.m.	x	1	13
Fossil Reef, SRI	4/13/08	242 P.o., 2 P.g.	62 (30x6)	0	4, 2 red
Johnson's Lee, SRI	4/9/08	189 P.o.	15 (10x2)	0	4
Ford Point, SRI	4/12/08	299 P.o.	x	0	10
Northwest-Talcott, SRI	4/11/08	0 P.o., 8 P.g., 2 P.m.	x	0	1
East Point, SRI	4/10/08	357 P.o., 1 P.b.	x	x	4
Fraser Cove, SCI	3/20/08	66	x	x	0
Trailer, SCI	3/19/08	134	x	x	16
Willows Anchorage, SCI	3/18/08	360	x	x	56
Scorpion Rock, SCI	3/6/08	207 P.o., 1 P.g., 3 P.m.	x	x	0
Prisoner's Harbor, SCI	3/17/08	154 P.o.	x	x	2
Orizaba Cove, SCI	3/7/08	nc	x	x	10
Cat Rock, ANI	3/5/08	15 P.o.	x	0	3
South Frenchy's Cove, ANI	3/3/08	5 P.o.	x	x	0
Middle Anacapa-West	3/4/08	616 P.o.	x	0	25*

Table 4. Sea star and black abalone searches in fall 2008. (x indicates no plot or transect, nc indicates no count performed, P.o.= *Pisaster ochraceus*, P.g.=*P. giganteus*, P.m.= *Patiria miniata*).

Site	Sampling Date	Sea stars in 30 min	Sea stars in transects	Abalone in plots	Abalone search
Cuyler Harbor, SMI	1/20/09	162 P.o.	x	x	0
Crook Point, SMI	1/21/09	47 P.o.	x	2	9
Otter Harbor, SMI	1/22/09	344 P.o., 18 P.g., 1 P.m.	x	0	194 extended search)
Harris Point, SMI	1/23/09	25 P.o., 1 P.g., 3 P.m. 1 P.h.	3	1	17(+1 red)
Fossil Reef, SRI	1/9/09	312 P.o., 3 P.m., 3 P.h.	70 P.o.	0	8
Johnson's Lee, SRI	1/11/09	417 P.o.	18 P.o.	0	1
Ford Point, SRI	1/10/09	512 P.o.	x	2	18
Northwest-Talcott, SRI	1/8/09	2 P.o., 6 P.g., 3 P.m.	x	0	0
East Point, SRI	1/7/09	840 P.o.	x	x	6 (12 in 1 hr.)
Fraser Cove, SCI	12/11/08	371 P.o.	x	x	1
Trailer, SCI	12/11/08	195 P.o., 1 P.m.	x	x	13
Willows Anchorage, SCI	12/10/09	434 P.o.	x	x	184 (extended search)
Scorpion Rock, SCI	11/25/08	169 P.o., 1 P.g., 1 P.m.	x	x	1
Prisoner's Harbor, SCI	12/9/09	94 P.o.	x	x	0
Orizaba Cove, SCI	11/26/08	541 P.o.	x	x	8
Cat Rock, ANI	11/11/08	5	x	0	4
South Frenchy's Cove, ANI	11/11/08	33	x	x	0
Middle Anacapa-West	11/12/08	733	x	0	33 HSA, 37 MW
Sea Lion Rookery, SBI	10/16/08	758	x	0	0
Landing Cove, SBI	10/18/08	224	31	x	1

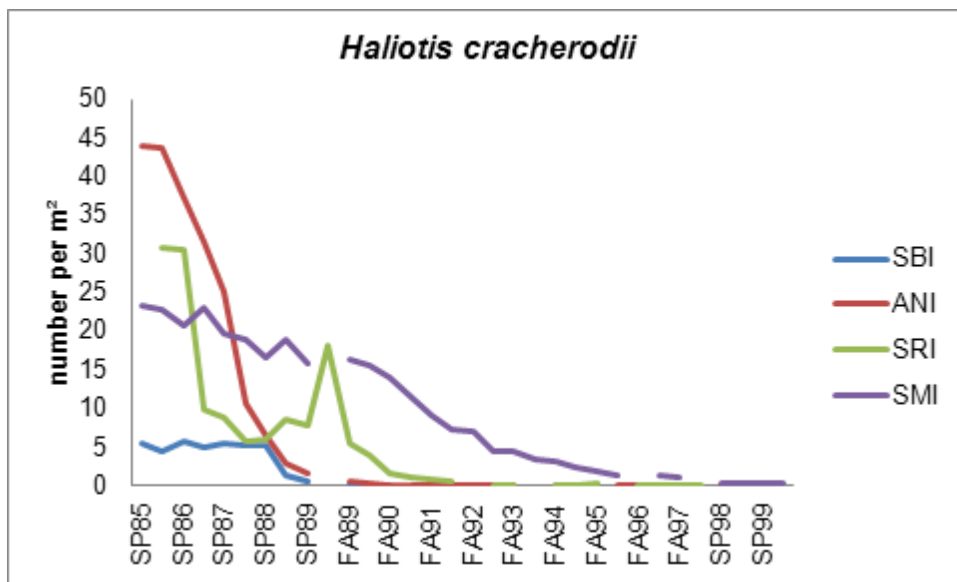


Figure 11. *Haliotis cracherodii* density estimates at all islands except Santa Cruz from 1985-1999. Note that Santa Cruz Island was not sampled for black abalone until 1998.

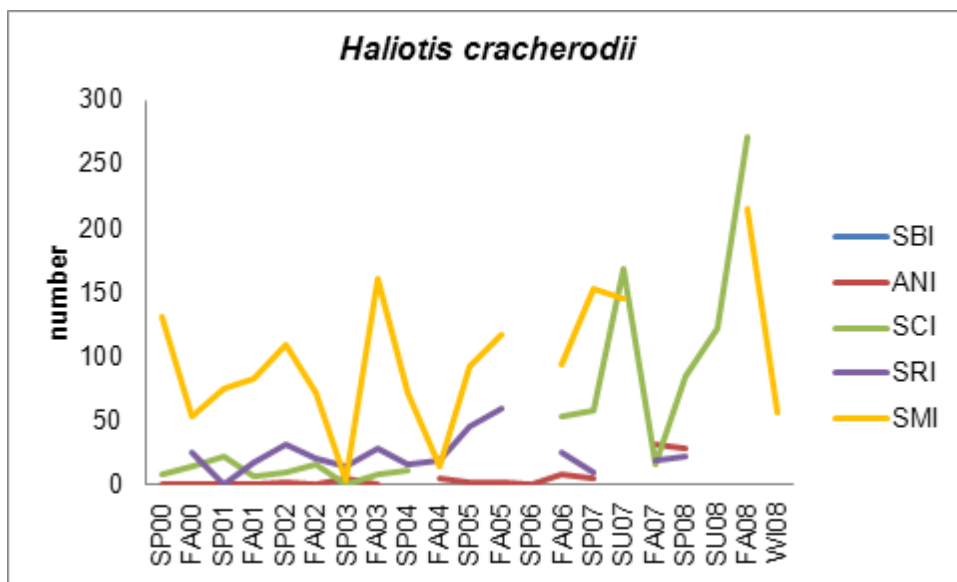


Figure 12. *Haliotis cracherodii* counts at all islands from 2000-2008. Count data are derived from site-wide and timed-searches and are meant as a general index of abundance (see text for cautions about site comparison).

Lottia gigantea

Lottia gigantea are usually only sampled in fall, alternating with motile invertebrate counts in spring. However, because of good conditions in 2008, we sampled most sites (four sites on Santa Rosa and three sites on both Anacapa and Santa Cruz Islands) during both seasons. With the exceptions of Fraser Cove, Ford Point, Trailer, and Johnson's Lee, *Lottia gigantea* densities in 2008 were comparable to initial densities (Figures 13-16). In the case of the four aforementioned sites, particularly Johnson's Lee, densities have decreased markedly over time. At Willows Anchorage and Otter Harbor, densities have fluctuated throughout the course of the monitoring program, but have been gradually increasing since 2007. Fossil Reef had the highest density (16.4 m^{-2}) of owl limpets averaged across all plots and Ford Point had the lowest (1.3 m^{-2}).

Mean shell length of *L. gigantea* in 2008 varied greatly among islands, sites, and plots (Table 5, Figures 17-18). The smallest owl limpets were measured at Cat Rock (mean = 30.8 mm) and largest were observed at Northwest-Talcott (mean = 73.0 mm).

At San Miguel Island, the mean sizes of owl limpets have remained relatively stable over time and continue to be comparable at both monitoring sites (Figures 17-18). In 2008, both populations of owl limpets were slightly skewed towards larger individuals. The mode at Harris Point (25%) was 30-39 mm and at Otter Harbor (32%) was 20-29 mm (fall trip report – Appendix C).

Santa Rosa Island sites had the largest limpets in 2008 compared with pooled sites from other islands (Figures 17-18). However, the high variability among sites resulted in only one site (Northwest-Talcott) having above average mean shell lengths for *L. gigantea*. Owl limpets at Fossil Reef, Northwest-Talcott and to a lesser degree, Johnson's Lee, followed a normal size distribution. *L. gigantea* at Johnson's Lee were skewed towards larger individuals (spring mode=20-39 mm, fall mode=20-29 mm). The mode at Fossil Reef in spring (29%) and fall (23%) was 50-59 mm. The most abundant (28%) size class of owl limpets at Northwest-Talcott measured 70-79 mm in spring and 23% were 80-89 mm in fall. At Ford Point, *L. gigantea* followed an odd size distribution during both seasons. In spring, one peak occurred at 50-59 mm (29%) and another at 80-89 mm (24%). In fall, the mode (42%) of Ford Point owl limpets was <20 mm indicating strong recruitment. Data for individual sites can be found in the field logs in Appendix C.

Two Santa Cruz Island *L. gigantea* populations (Willows Anchorage and Fraser Cove) had similar size distributions in spring (mode=30-39 mm) (Figures 17-18). In fall, the mode (27%) of owl limpets at Willows was 20-29 mm and 28% at Fraser were 30-39 mm. Nearly 50% of *L. gigantea* at Trailer were included in the mode (60-89 mm) in spring and 73% were 50-99 mm in fall (mode=70-79 mm).

L. gigantea at Anacapa Island displayed similar size structure at two sites (Cat Rock and Anacapa Middle West) in spring and fall with modes at 30-39 mm (Figures 17-18). The mode of owl limpets at South Frenchy's Cove was also 30-39 mm in spring, but size distribution was less uniform as there were many more large individuals. In fall, a bimodal distribution was followed (30-39 mm and 50-59 mm).

We do not have fixed plots for sampling owl limpets at Santa Barbara Island; however, we did randomly collect size frequency measurements at Sea Lion Rookery (Figure 18). Mean shell lengths were intermediate in size compared with other islands, and size classes were normally distributed with most (88%) measuring 30-59 mm.

Table 5. *Lottia gigantea* plot count and size information. All sites poled by island (Santa Rosa spring sample was only two sites). AN=Anacapa, SB= Santa Barbara, SC=Santa Cruz, SM= San Miguel, SR=Santa Rosa.

Island Code	Year	Season	Count Sized	Area	Density	Mean Size	StDev	Min Size	Max Size
AN	2008	spring	194	18.85	4.563	39.27	9.01	18	73
SC	2008	spring	155	43.97	3.525	46.56	19.63	11	96
SR	2008	spring	347	59.68	5.814	55.91	18.50	16	106
AN	2008	fall	245	28.27	8.668	33.72	11.23	14	72
SB	2008	fall	100		.000	44.31	10.03	14	70
SC	2008	fall	173	40.83	4.237	44.15	19.69	15	95
SM	2008	fall	250	31.41	7.959	37.96	15.02	12	79
SR	2008	fall	490	59.68	8.211	45.76	22.34	10	105

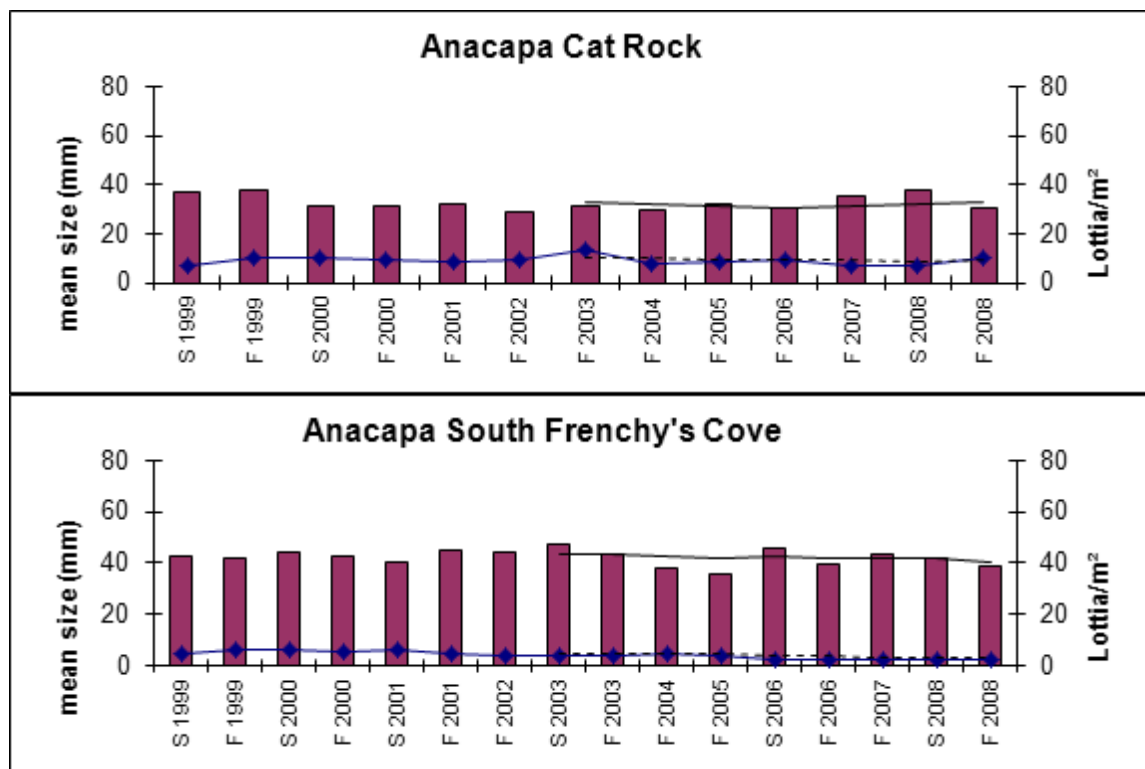


Figure 13. *Lottia gigantea* at Anacapa Island 1999-2008. Bars represent mean size (mm), blue diamonds and corresponding lines represent mean density from three fixed plots, black lines indicate five-sample moving trend for mean size and dashed lines indicate five-sample moving trend for mean density. S=spring samples, F=fall samples.

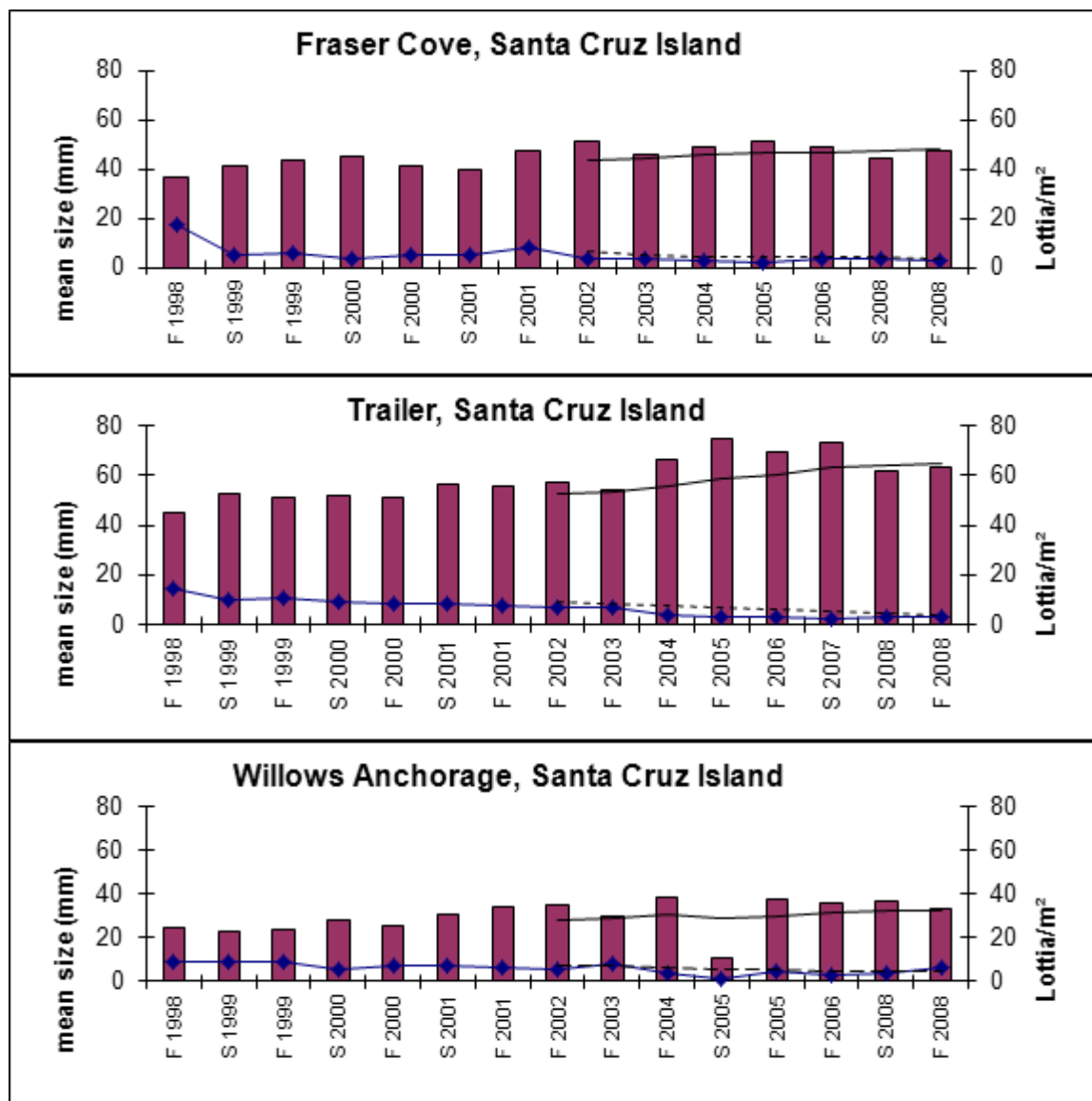


Figure 14. *Lottia gigantea* at Santa Cruz Island 1998-2008. Bars represent mean size (mm), blue diamonds and corresponding lines represent mean density from five fixed plots, black lines indicate five-sample moving trend for mean size and dashed lines indicate five-sample moving trend for mean density. S=spring samples, F=fall samples.

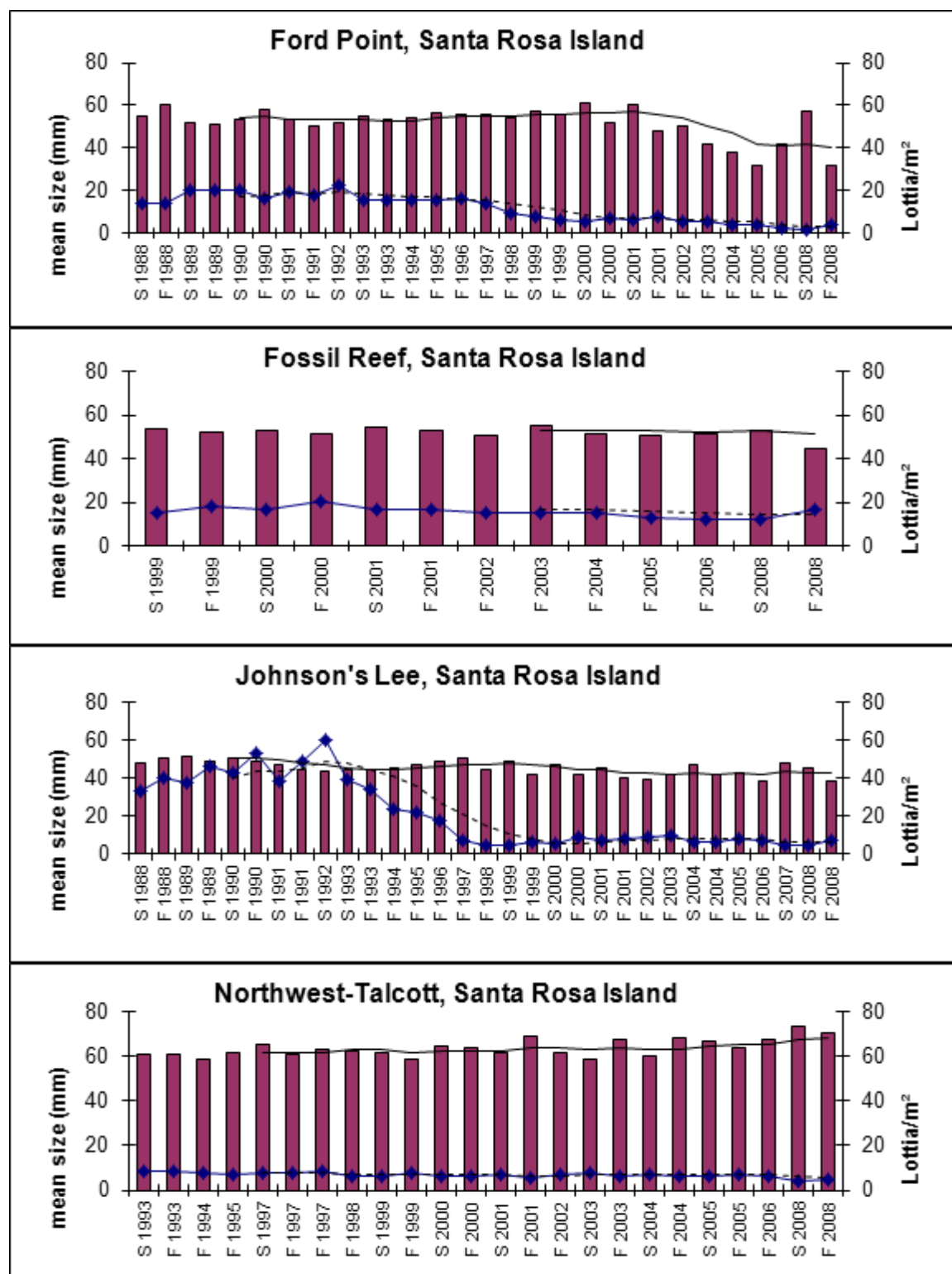


Figure 15. *Lottia gigantea* at Santa Rosa Island 1988-2008. Bars represent mean size (mm), blue diamonds and corresponding lines represent mean density from five fixed plots, black lines indicate five-sample moving trend for mean size and dashed lines indicate five-sample moving trend for mean density. S=spring samples, F=fall samples.

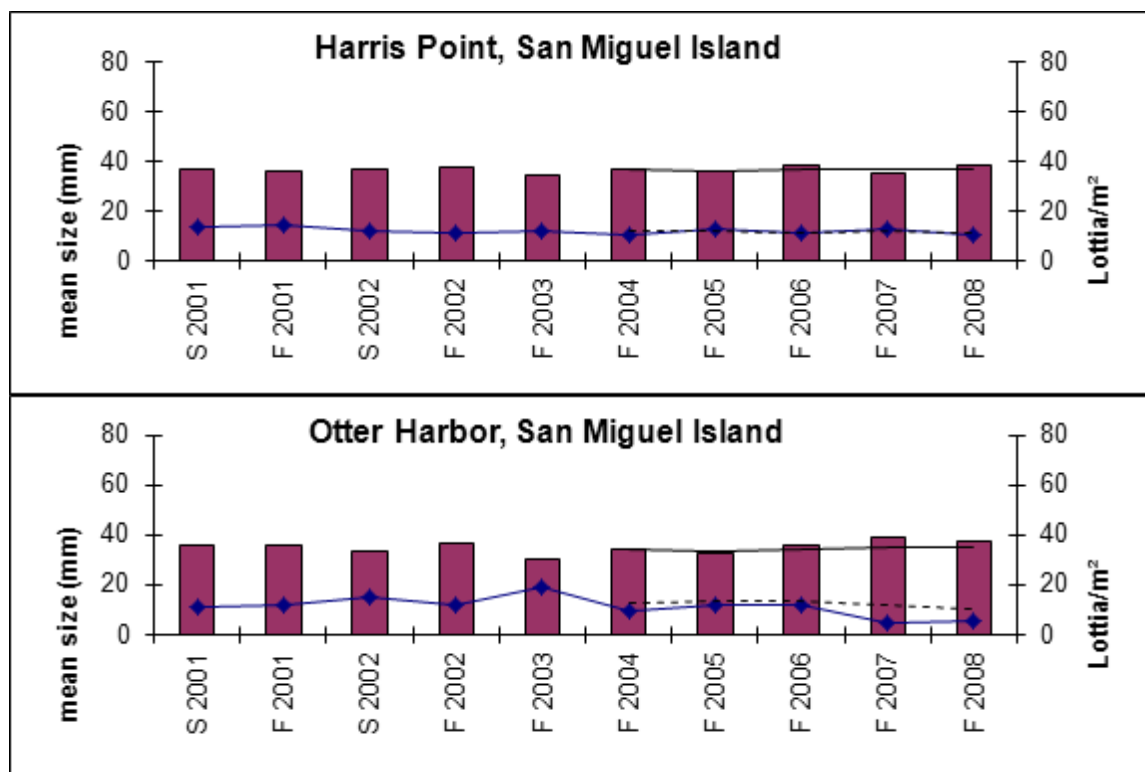


Figure 16. *Lottia gigantea* at San Miguel Island 1988-2008. Bars represent mean size (mm), blue diamonds and corresponding lines represent mean density from five fixed plots, black lines indicate five-sample moving trend for mean size and dashed lines indicate five-sample moving trend for mean density. S=spring samples, F=fall samples.

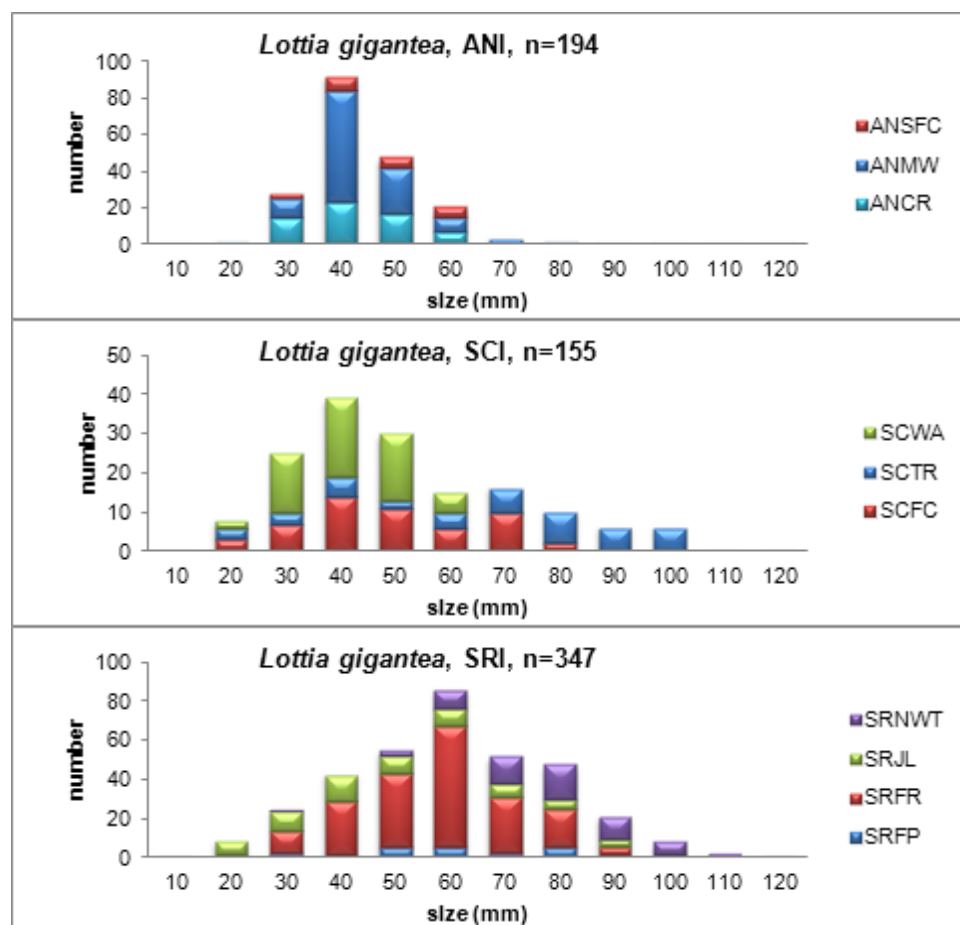


Figure 17. *Lottia gigantea* size distributions in spring 2008. All sampled sites were combined by island in each histogram. Note differences in scale of y-axes.

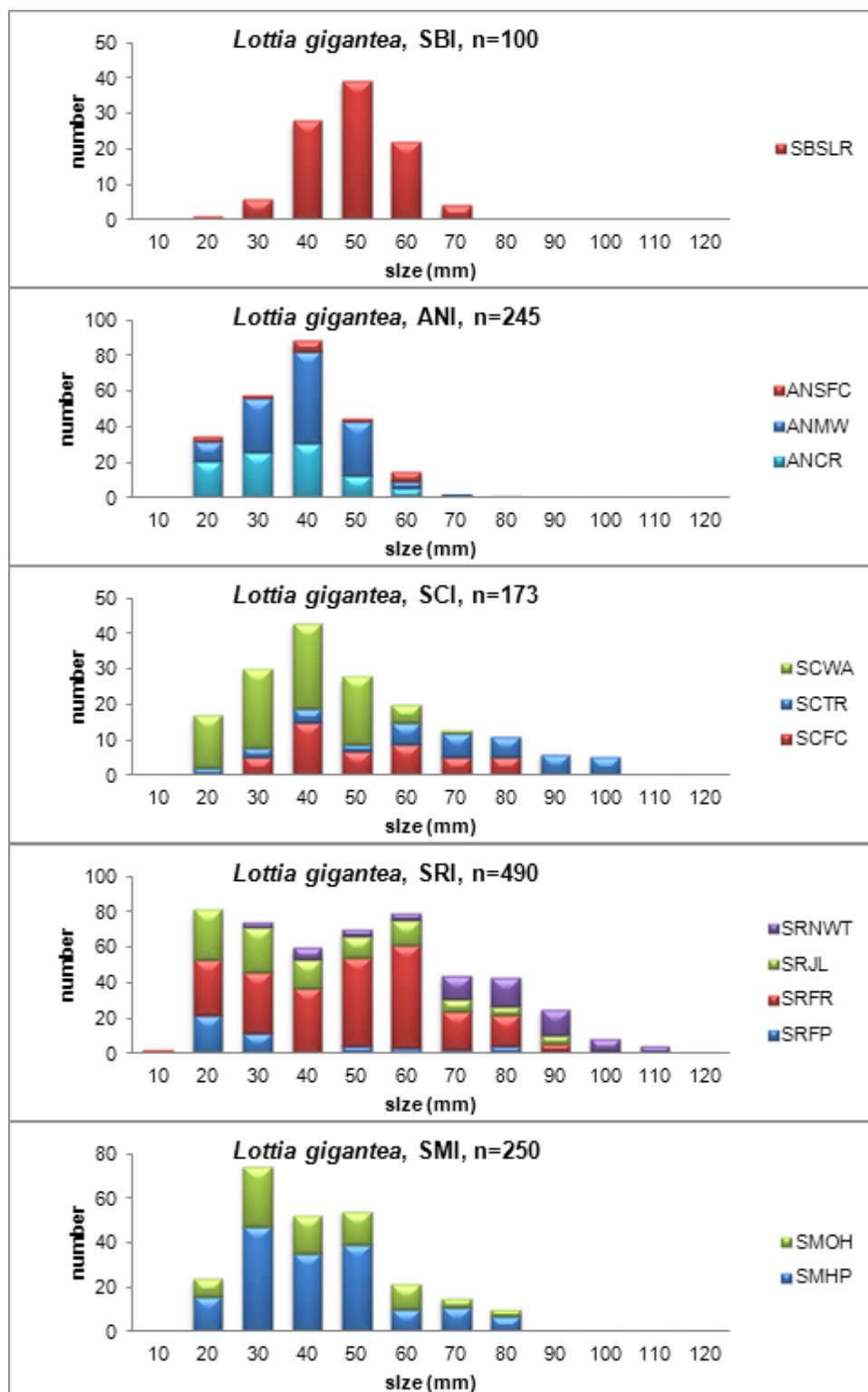


Figure 18. *Lottia gigantea* size distributions in fall 2008. All sampled sites were combined by island in each histogram. Note differences in scale of y-axes.

Pisaster ochraceus

Over time, the abundances of *P. ochraceus* have fluctuated markedly at most sites, with the exceptions of Cat Rock, Harris Point, Northwest-Talcott and South Frenchy's Cove (Figure 19). Moving trends indicate that *P. ochraceus* increased at most sites (Sea Lion rookery, Landing Cove, Anacapa Middle West, South Frenchy's Cove, Orizaba Cove, Fraser Cove, Trailer, East Point, Fossil Reef, Ford Point and Johnson's Lee) in 2008 relative to previous years. Seastar abundances remained comparable to past year counts at Cat Rock, Scorpion Rock, Prisoner's Harbor and Northwest Talcott and decreased at Cuyler Harbor and Crook Point.

More than 500 *P. ochraceus* were observed in 30 minute timed-counts at Ford Point, East Point, Orizaba Cove, Anacapa Middle West and Sea Lion Rookery in fall (Tables 3 and 4). At most other sites, more than 100 stars were located during timed counts. Less than 10 *P. ochraceus* were observed at Northwest-Talcott during both monitoring seasons and South Frenchy's Cove and Cat Rock during spring and fall, respectively; these sites typically support low abundances of *P. ochraceus*.

Size-frequency measurements were collected at most sites in spring and all sites in fall (Figures 20 and 21 and Appendix C). The size-distribution of *P. ochraceus* populations at most sites varied little (10-20 mm) between seasons with the exception of Willows Anchorage which had a mode of 30 mm in spring followed by a much larger mode (110 mm) in fall. Most sites followed a normally-distributed size-frequency though *P. ochraceus* at Scorpion Rock had a bimodal distribution during both seasons with nearly equivalent peaks at 80 mm and 120-150 mm. The modes of sea star populations at most other sites were typically between 80 mm and 130 mm. The population with the highest proportion of large *P. ochraceus* was Harris Point (modes=140 mm in spring and 130 mm in fall).

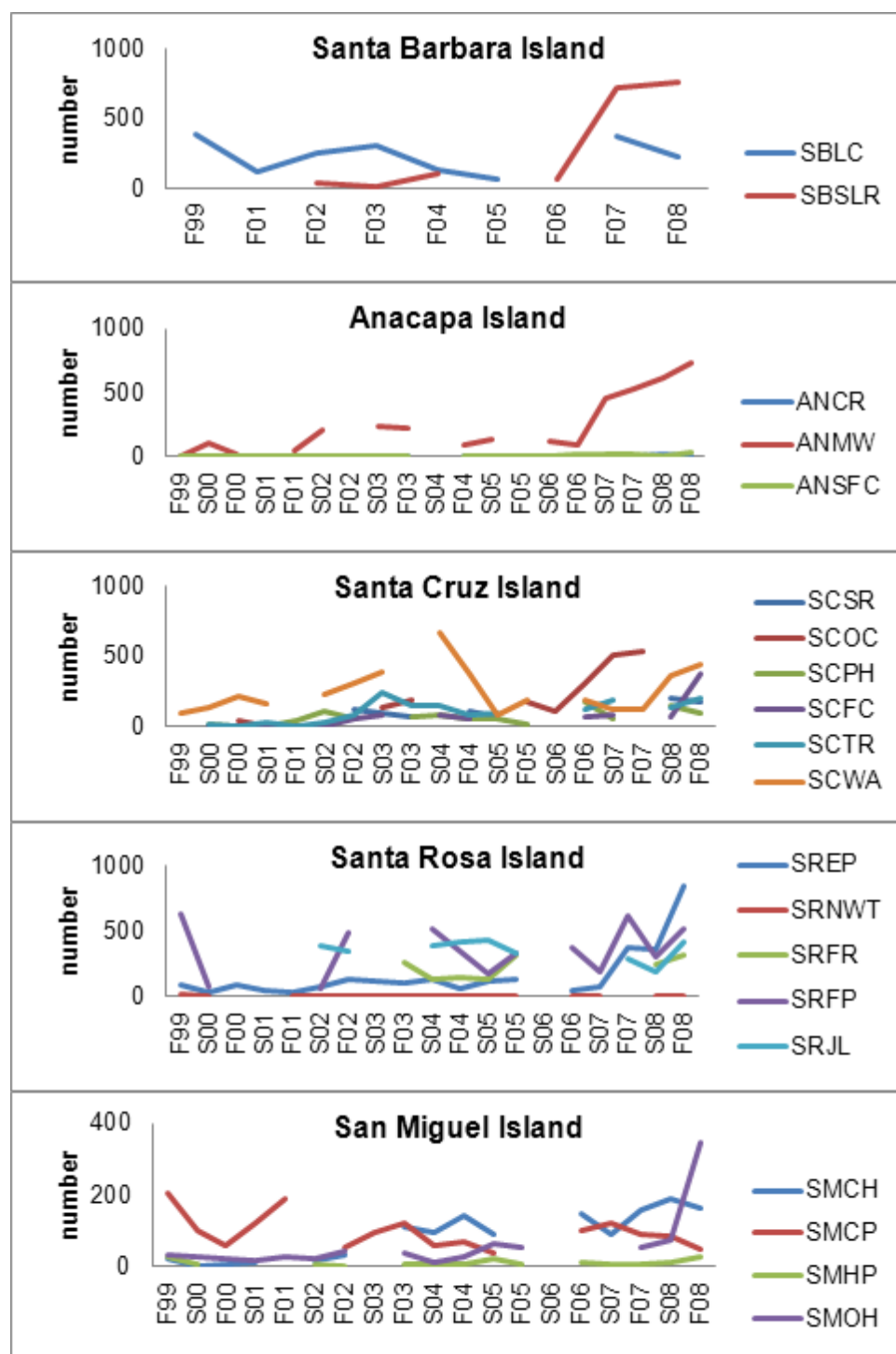


Figure 19. *Pisaster ochraceus* counts at each site from 1999-2008. Count data are derived from site-wide and timed searches. Note that y-axes vary by graph.

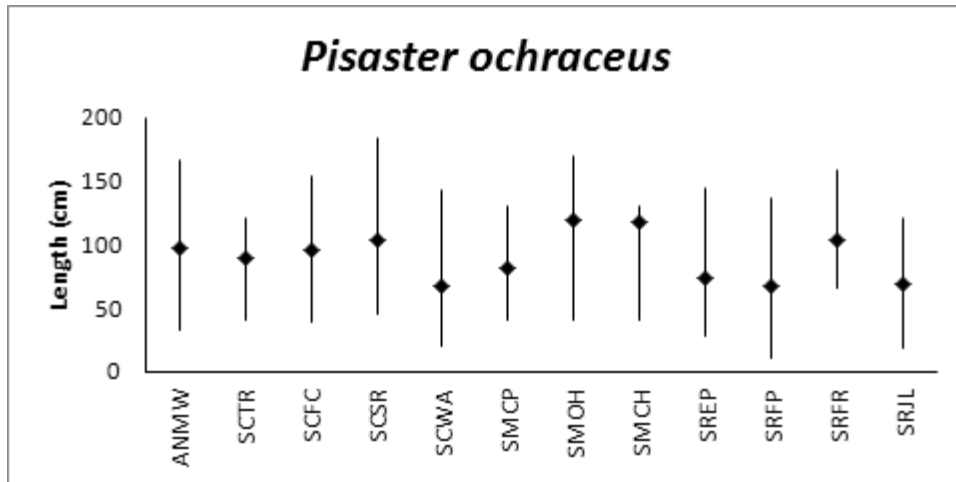


Figure 20. *Pisaster ochraceus* sampled in spring 2008. Diamonds represent the mean length (measured as longest ray), and vertical lines represent the range of lengths. N>60 *P. ochraceus* were measured at each site. See table 2 for site codes.

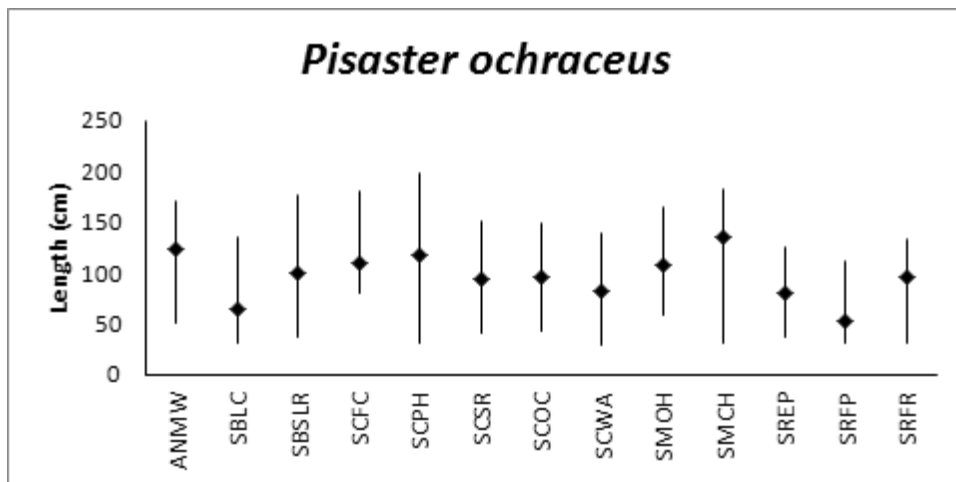


Figure 21. *Pisaster ochraceus* sampled in fall 2008. Diamonds represent the mean length (measured as longest ray), and vertical lines represent the range of lengths. N>60 *P. ochraceus* were measured at each site. See table 2 for site codes.

***Phyllospadix* spp.**

Phyllospadix spp., surfgrass cover has been monitored at two sites on Santa Cruz Island since fall 1998, and at two sites on Santa Rosa Island since spring 2002 (Figures 22 and 23 and Appendix C). The four sites were chosen for study based on the relatively high density of surfgrass habitat present. *Phyllospadix torreyi* has been the dominant species in most transects but some *P. scouleri* has also been present.

Strong seasonal patterns have been observed over the years at Fraser Cove and Trailer whereby surfgrass overstory cover has routinely declined in spring and increased in fall. The same trends only occurred in 2008 on Transect-1 and Transect-3 at Fraser. Transect-2 at Fraser along with all three transects at Trailer experienced decreases in *Phyllospadix* spp. abundances throughout the year. Surfgrass abundances at all six transects on Santa Cruz were comparable to previous years.

Santa Rosa Island sites, East Point and Northwest-Talcott, typically have not displayed a strong seasonal pattern in *Phyllospadix* spp. abundances. Instead, surfgrass on all three transects at East Point and two at Northwest-Talcott has remained relatively stable over time. Transect-3 surfgrass at the latter site has fluctuated markedly over the monitoring period declining rapidly several times by as much as 40% followed by gradual increases in cover. In 2008, Transect-1 and Transect-3 at Northwest-Talcott displayed a decreasing trend in surfgrass abundance throughout the year. All three transects at East Point and Transect-2 at Northwest-Talcott displayed slightly positive growth trends in *Phyllospadix* spp. overstory cover.

Phyllospadix spp. blades were typically bleached and/or abraded along all transects, particularly those at Northwest-Talcott and East Point. However surfgrass occurring in the lowest intertidal zones appeared healthy at all four sites. Epiphytic cover (composed of *Smithora naiadum* and *Melobesia mediocris*) was high on the surfgrass at Trailer.

Red algae, composed primarily of *Chondracanthus canaliculatus*, *Prionitis lanceolata*, and *Mazzaella affinis*, was common on the three transects at both Fraser Cove and Trailer in 2008. Mean abundances of red algae at the two sites ranged 18% to 21% across all transects and seasons. Articulated corallines and feather boa kelp, *Egregia menziesii*, were commonly observed in low abundances on most transects at all four sites.

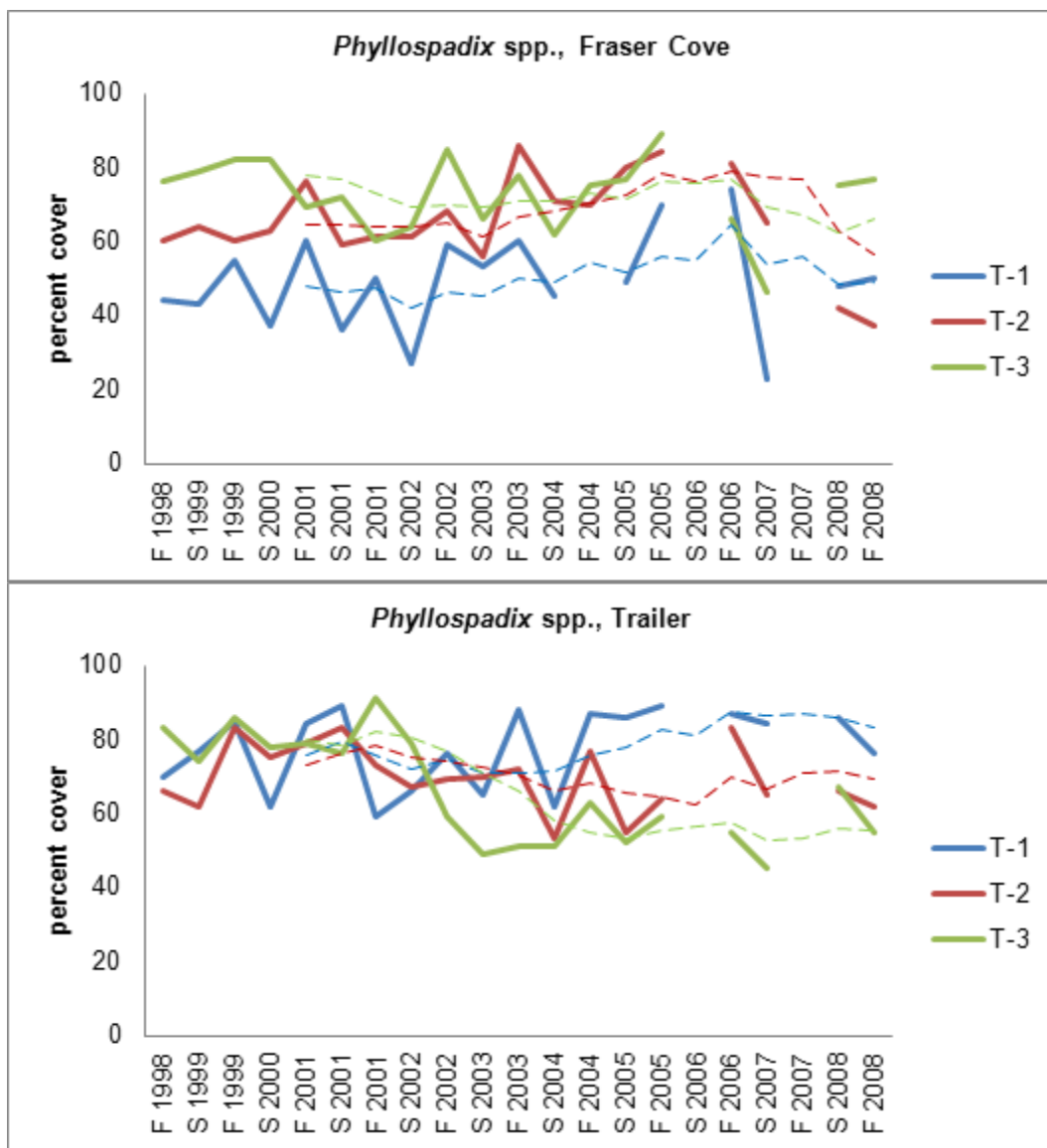


Figure 22. *Phyllospadix* spp. cover trends on 10m point-intercept transects at Fraser Cove and Trailer, Santa Cruz Island. S=spring samples, F=fall samples. Dashed lines indicate five-sample moving trends for percent cover of *Phyllospadix* spp. cover on each transect.

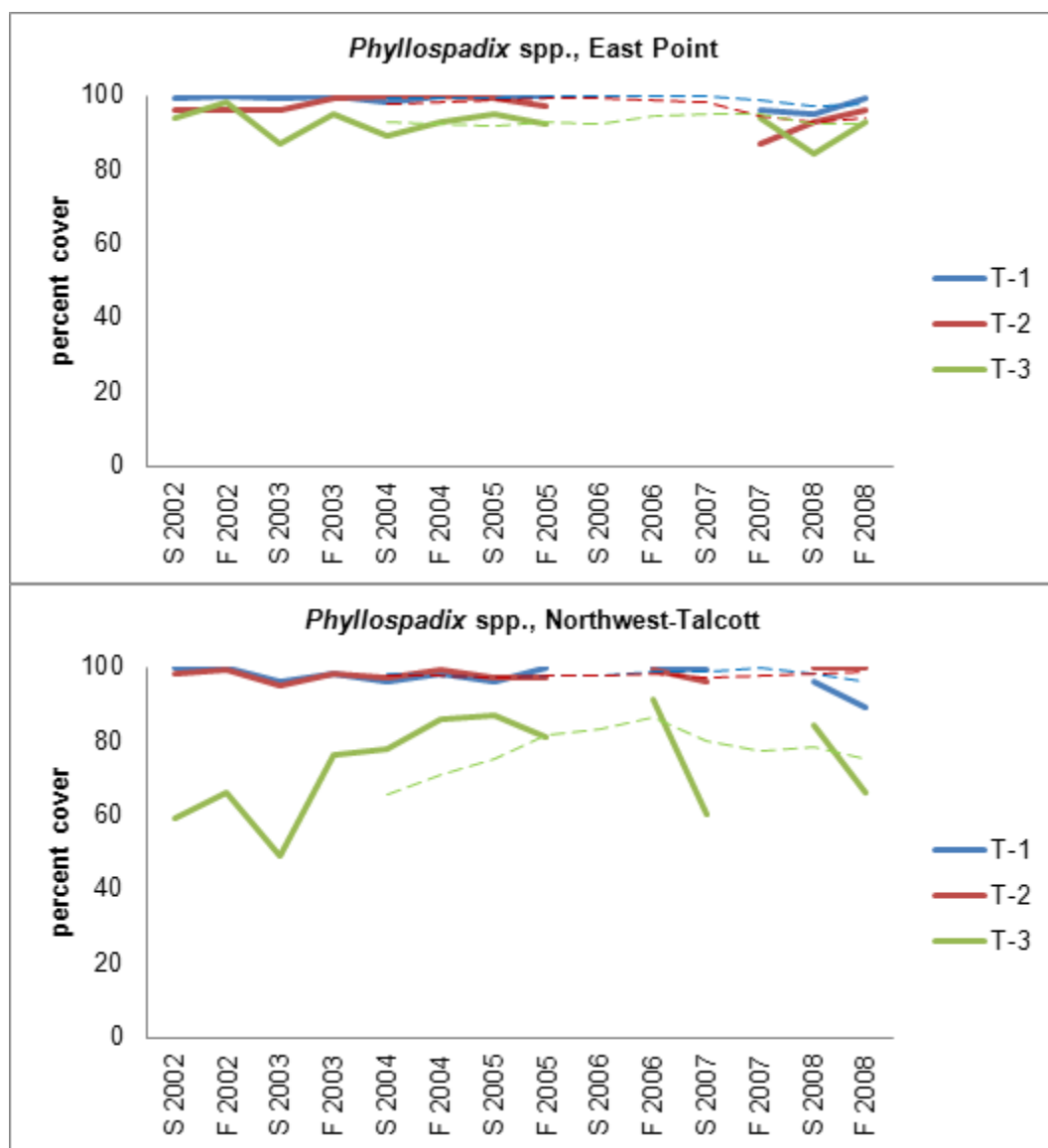


Figure 23. Surfgrass, *Phyllospadix* spp., cover trends on 10m point-intercept transects at East Point and Northwest-Talcott, Santa Rosa Island. S=spring samples, F=fall samples. Dashed lines indicate five-sample moving trends for percent cover of *Phyllospadix* spp. cover on each transect.

Shorebirds and Pinnipeds

The maximum number of shorebirds and pinnipeds observed at any one time during a visit to the sites in 2008 is summarized in Tables 6 and 7. One American oystercatcher was sighted at Cat Rock and Otter Harbor in both spring and fall. In spring, two American oystercatchers were observed at Scorpion Rock and one was seen at Fraser Cove in fall. Sightings of these birds have increased in recent years. In the early years of monitoring we only rarely saw American oystercatchers that appeared to be hybridized with black oystercatchers.

Black oystercatchers are the most ubiquitous shorebird on our rocky shorelines, and were seen at all of the monitoring sites in 2008. Black oystercatchers are also a common sight on beaches, especially on San Miguel Island, where they have been observed feeding by probing the sand for sand crabs, *Emerita analoga*. One black turnstone was seen at Ford Point and Johnson's Lee in spring along with three individuals at Fossil Reef. In fall, two black turnstones were observed at both sites on Santa Barbara Island and six at Crook Point.

Black turnstones are increasingly becoming less common over the years. Typically, only small groups are observed, and these are only seen at a few sites. Flocks of dozens were occasionally seen in the 1980s. Ruddy turnstones, a species that has typically been rare since monitoring began, are occasionally seen mixed with the flocks of black turnstones (Figure 24). We rarely see ruddy turnstones at the islands anymore.



Figure 24. Black and ruddy turnstones. Photo from San Miguel Island 1988.

Other less common birds observed at various sites during both monitoring seasons included seven wandering tattlers, six black-bellied plovers, three bald eagles, two western sandpipers and song sparrows, and an individual great egret, black phoebe, and osprey. The eagles and osprey were observed flying only.

Seabirds such as pelicans and cormorants were frequently observed using rocky points (e.g. East Point and Fossil Reef) and islets (e.g. Scorpion Rock and Orizaba Cove) as roosting areas. Western gulls were often seen foraging among mussel beds and adjacent beaches.

Harbor seals, *Phoca vitulina*, were observed within the immediate vicinity of 12 sites in spring and 5 sites in fall, 2008. Typically only 1-2 individuals were seen per site, but 12-16 harbor seals were found at Cat Rock, Northwest-Talcott and Otter Harbor in spring, and in fall, six were seen at Harris Point and 30 at Otter Harbor (Figure 25).

Northern elephant seals, *Mirounga angustirostris*, were most common in spring whereby 8-12 weaned pups and adults were seen at Fossil Reef, Otter Harbor and Crook Point. Additionally, four seals were seen at Cuyler Harbor and one at Northwest-Talcott. In fall, only one or two individuals were observed at all sites on San Miguel Island except Crook Point as well as Fossil Reef on Santa Rosa. Some of these sightings were seals that were in the water just off shore or on a beach adjacent to the site.

California sea lions, *Zalophus californianus*, were abundant at both Santa Barbara Island sites (Figure 26). As in previous years, sea lions were not seen at other sites in 2008. At Landing Cove, up to 34 individuals were observed in the vicinity, and approximately 150 were seen at Sea Lion Rookery.



Figure 25. Harbor seal, *Phoca vitulina*, at Otter Harbor, San Miguel Island.



Figure 26. California sea lions, *Zalophus californianus* at Sea Lion Rookery, Santa Barbara Island.

Table 6. Shorebirds and pinnipeds at monitoring sites in spring 2008 (maximum seen at any one time).
 (*= nearby but not on monitoring reef).

Spring 2008						
Site	Black Oystercatcher/ (American)	Black Turnstone	Other birds	<i>Phoca vitulina</i>	<i>Mirounga Angustirostris</i>	<i>Zalophus californianus</i>
ANCR	1/(1)	0	2 western gulls	12	0	0
ANMW	7	0	12 western gulls	1	0	0
ANSFC	2	0	1 western gulls	1	0	0
SCFC (Fraser)	5	0	0	1	0	0
SCTR	4	0	0	0	0	0
SCWA	2	0	30 western gulls, 2 cormorants	0	0	0
SCSR	2 /(2)	0	0	2	0	0
SCPH	2	0	1 wandering tattler	0	0	0
SCOC	3	0	brown pelicans*, cormorants*, western gulls*	0	0	0
SREP	5	0	1 western sandpiper	1	0	0
SRFP	6	1	0	1	0	0
SRFR	4	3	8 western gulls	2	8	0
SRJL	2	1	4 western gulls	0	0	0
SRNWT	7	0	2 western gulls	15	1	0
SMCH	11	0	1 western gull, 1 wandering tattler	0	4	0
SMCP	7	0	1 cormorant, 11 western gulls, 2 wandering tattlers	0	8	0
SMHP	4	0	0	1	0	0
SMOH	5 /(1)	0	0	16	12	0

Table 7. Shorebirds and pinnipeds at monitoring sites in fall 2008 (maximum seen at any one time).
 (*= nearby but not on monitoring reef, SBLC = highest count over three days).

Fall 2008						
Site	Black Oystercatcher/ (American)	Black Turnstone	other birds	<i>Phoca vitulina</i>	<i>Mirounga Angustirostris</i>	<i>Zalophus californianus</i>
SBLC	2	2	2 wandering tattlers, 2 western gulls	0	0	34*
SBSLR	3	2	western gulls*	0	0	150
ANCR	2/(1)	0	1 western gull	0	0	0
ANSFC	1	0	1 western gull	0	0	0
Middle -all	0	0	1 western sandpiper	0	0	0
SCFC	7/(1)	0	20 western gulls	1	0	0
SCTR	3	0	0	0	0	0
SCPH	1	0	1 wandering tattler, 1 osprey,	0	0	0
SCWA	2	0	1 cormorant	0	0	0
SCSR	2	0	1 cormorant	0	0	0
SCOC	3	0	3 bald eagles	0	0	0
SREP	2	0	1 western gull, 30 Brandt's cormorants, 40 brown pelicans, 1 great egret	0	0	0
SRFP	1	0	0	1	0	0
SRFR	4	0	1 brown pelican, 4 Brandt's cormorant, 7 western gulls	0	1	0
SRJL	2	0	6 black-bellied plovers	1	0	0
SRNWT	4	0	0	0	0	0
SMCH	2	0	2 song sparrows, 1 black phoebe	0	1	0
SMCP	6	6	20 cormorants	0	0	0
SMHP	5	0	6 western gulls	6	2	0
SMOH	7/(1)	0	6 western gulls	30	1	0

Visitation

In 2008, as in previous years, most visitors accessed the rocky intertidal in the Channel Islands National Park at Frenchy's Cove, Anacapa Island. Island Packers Company (IPCO) and Truth Aquatics transported school groups and other visitors (1,760 passengers) to Frenchy's primarily to conduct classroom programs at the site and adjacent reefs in winter and spring months (Table 8, Figure 27). Total visitation in 2008 was 35% higher than in 2007 and 25% more than the number of passengers in 2006 (Figure 28). March was once again the top month for visitation with 806 passengers on 9 trips. Seventy-nine percent of the visitation occurred from February to April. There was no visitation during the months May, June, and August through October.

Some visitors also explored on their own at East Point and Prisoner's Harbor tidepools on Santa Rosa and Santa Cruz Islands, respectively. However, no records are available for the number of private boaters going ashore and visitors utilizing these sites.

Table 8. Visitors to South Frenchy's Cove, Anacapa Island via Island Packers in 2008.

MONTH	#Passengers	#TRIPS	Average No Passengers/trip
January	84	1	84
February	202	3	67
March	806	9	90
April	389	5	78
May	0	0	0
June	0	0	0
July	32	1	32
August	0	0	0
September	0	0	0
October	0	0	0
November	170	3	57
December	77	1	77
Total	1760	23	77

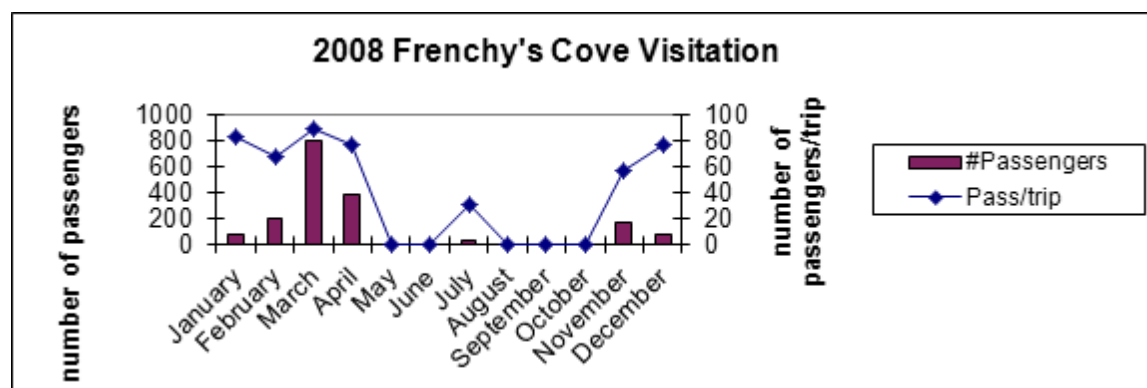


Figure 27. Visitation at Frenchy's Cove, Anacapa (Island Packers visitors).

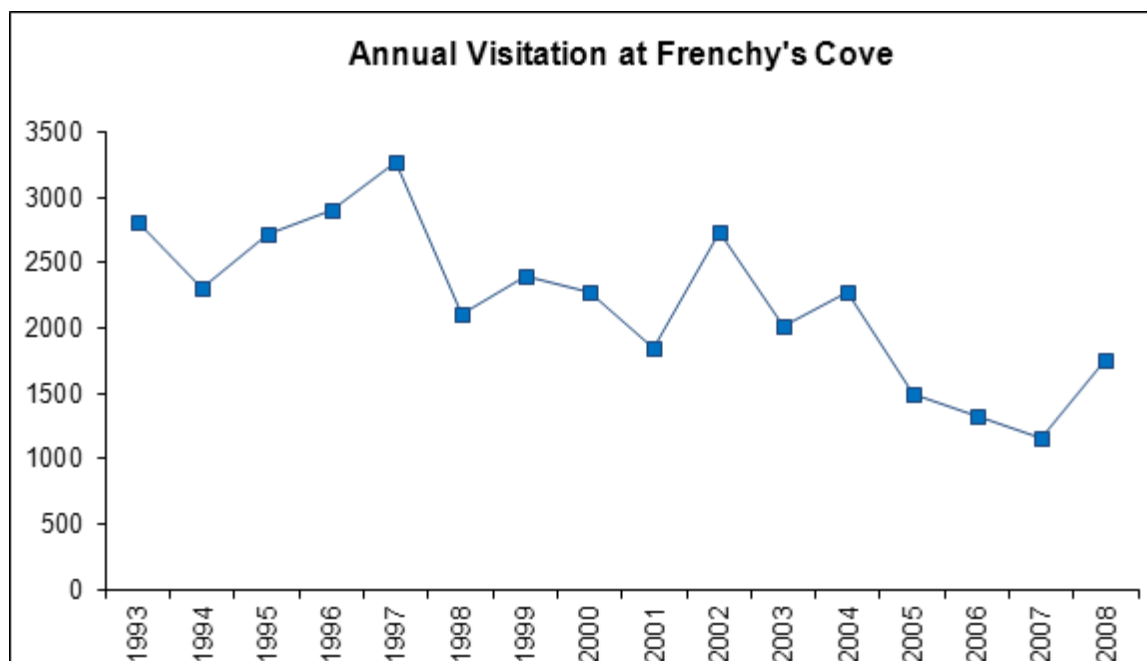


Figure 28. Annual commercial visitation at Frenchy's Cove, Anacapa (Island Packers visitors) 1993-2008.

Trip Reports

Trip reports were written by Dan Richards. Summaries of work performed, data collected, weather conditions, and natural history observations for each sampling event are presented in the individual trip reports in Appendix C. Explanations for missing or incomplete data are usually included in the trip reports. Summary tables and figures in the trip reports present additional information on species monitored. For simplicity, non-core species are reported in photo-plot data tables as miscellaneous algae, miscellaneous animals, or other. More detailed results of sea star, surfgrass, and motile invertebrate sampling are presented in the daily trip reports.

Trip reports contain information on beach surveys or other work done at the islands. Beach-walk surveys were conducted on the same trips as the rocky intertidal monitoring at San Miguel and Santa Rosa Islands in spring and fall. The purpose of those surveys was primarily to collect information on live and dead seabirds and marine mammals. Beach-walk data will be reported separately.

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Appendix A: Program Notes

2008 Sampling Events

We sampled most sites in spring and all sites in fall of the 2008 season (Table 9). The two sites at Santa Barbara Island were not sampled in spring because of difficulties with access due to nesting California brown pelicans.

Excellent working conditions were experienced at Anacapa and Santa Cruz Islands throughout most of March with only a couple days affected by moderate-sized swell/surge. The weather remained mostly calm in April when we sampled sites at Santa Rosa Island with the exception of a couple high-wind days. The trip to San Miguel in early May was accompanied by excellent conditions for all but one windy day that included heavy surf. Sampling at Santa Barbara Island was done in October during a period of good weather and working conditions hindered only by a moderate-sized swell. In November and December, the weather and swell were fully cooperative allowing for excellent sampling conditions at Anacapa and Santa Cruz. Weather remained pleasant during the first week in January 2009 when we visited the Santa Rosa study sites. A heavy south swell coupled with light rain had a slight negative effect on working conditions during the last week in January at San Miguel, but the weather was otherwise pleasant as skies were cloudy and wind remained calm.

We assisted with two genetics studies in 2008. Luis Hurtado from Texas A&M was collecting *Ligia occidentalis* for a biogeography study (Hurtado *et al.* 2010). We were able to collect *L. occidentalis* specimens from every island except Santa Barbara, where they were rare and very hard to catch. They found two distinct clades at the northern islands with specimens from Otter harbor, Harris Point, Northwest Talcott, Fossil Reef, China Point, and Orizaba Cove clustered with *Ligia* from Central California. *Ligia* from Anacapa, and the rest of Santa Cruz and Santa Rosa Islands clustered with specimens from San Diego and Ensenada. Specimens from Santa Catalina Island clustered with the southern California mainland samples. The central California group was divergent enough from the others that they suggest it may be different cryptic species.

Mike Dawson from University of California at Merced was the principle investigator on a multi-campus project to look at genetics from a suite of organisms from both the mainland and islands as part of a Coastal Environmental Quality Initiative (CEQI) grant titled Community Genetics and Marine Protected Areas of the California and Baja California Mainland and Island Array. Specimens of *Nucella* spp. *Lottia digitalis*, *L. scabra*, *Silvetia compressa*, *Mastocarpus papillatus*, *Chondracanthus canaliculatus*, *Pollicipes polymerus* and *Tetraclita rubescens* were collected for genetic analysis from each of the islands. Kristin Kusic-Heady assisted with the collections at some islands. The work is still in progress.

Kyle Walter and Haven Livingston (University of California, Santa Cruz, PISCO) accompanied us on many trips to remeasure the tidal heights of bolts marking the Biodiversity Transects at the islands. In addition they assisted with many of the park protocols and with collections of specimens for the CEQI grant project. All sites with biodiversity transects now have very accurate 3-D GPS information for the transect bolts that we can reference.

In 2008, we installed several Tidbit temperature loggers in housings in the mid-intertidal zone, usually in or near areas where *Haliotis cracherodii* had been found previously, often within fixed abalone plots. The purpose of these loggers is to record the temperature regime *H. cracherodii* experience during the course of the year. The housing is an enclosed cup made from Poly-Vinyl Chloride (PVC) end caps with a stainless steel bolt and epoxy holding it to the rock. The housings were placed in semi-protected locations. The caps allow some water exchange but were not drilled to allow constant water exchange. Our experience with drilled caps was that they filled with sand or sediment. In 2008, housings were installed at East Point, Northwest Talcott, Fossil Reef, Crook Point, and Otter Harbor. Two housings were installed at Otter Harbor to test fully exposed and semi-shaded exposure. The original housing at Johnson's Lee was lost before the fall sample and replaced at that time. The unit at East Point was lost before the spring 2009 survey and no data were recovered there.

Three owl limpet plots were established at Middle West, Anacapa. Size frequencies of *Lottia gigantea* have been monitored by random measurements in the past. We determined that there were sufficient densities to establish three fixed plots but not enough were present for five plots. Each of these consists of the standard single stainless steel bolt epoxied into a hole drilled into the rock. A one meter string is attached at one end to the bolt to scribe a circle and all *L. gigantea* within the circle are counted and measured.

Because of the lack of *Mytilus californianus* in four mussel zone plots at Johnson's Lee and what seems like the unlikely recovery of mussels in those plots (Figure 29), we installed four new plots on slightly higher terraces at the site. The new plots have high cover of *M. californica* and are apparently above the *Pisaster ochraceus* limit for desiccation. All nine mussel zone plots will be monitored in the future. The new plots will, however, provide better information about trends in *M. californianus*. One of the original plots (512) was established on the higher shelf and did not lose its mussel cover. The other four original plots have been mostly dominated by *Phragmatopoma californica* over the years. Plot 514 is placed fairly low next to a tidal pool and is often difficult to locate due to growth of *P. californica* and *Anthopleura sola*.



Figure 29. Johnson's Lee, Santa Rosa Island. Note absence of *M. californianus* in the lower intertidal zone where original mussel plots are located. Four new plots were installed in December 2008 to monitor remaining mussel community on higher terraces.

Table 9. 2008 Sampling dates for Rocky Intertidal Monitoring sites

Site	Site Codes	Spring	Fall
Cuyler Harbor, SMI	SMCH	5/7/08	1/20/09
Crook Point, SMI	SMCP	5/9/08	1/21/09
Otter Harbor, SMI	SMOH	5/10/08	1/22/09
Harris Point, SMI	SMHP	5/8/08	1/23/09
Fossil Reef, SRI	SRFR	4/13/08	1/9/09
Johnson's Lee, SRI	SRJL	4/9/08	1/11/09
Ford Point, SRI	SRFP	4/12/08	1/10/09
Northwest-Talcott, SRI	SRNWT	4/11/08	1/8/09
East Point, SRI	SREP	4/10/08	1/7/09
Fraser Cove/Forney Cove, SCI	SCFC	3/20/08	12/11/08
Trailer, SCI	SCTR	3/19/08	12/11/08
Willows Anchorage, SCI	SCWA	3/18/08	12/10/08
Scorpion Rock, SCI	SCSR	3/6/08	11/25/08
Prisoner's Harbor, SCI	SCPH	3/17, 3/21	12/9/08
Orizaba Cove, SCI	SCOC	3/7/08	11/26/08
Cat Rock, ANI	ANCR	3/5/08	11/11/08
South Frenchy's Cove, ANI	ANSFC	3/3/08	11/11/08
Middle Anacapa-West	ANMW	3/4/08	11/12/08
Middle Anacapa-East	ANME	3/4/08	11/12/08
Landing Cove, SBI	SBLC	--	10/15, 10/17
Sea Lion Rookery, SBI	SBSLR	--	10/16/08

--no spring sample because of nesting pelicans

* no sampling due to logistical problems

Appendix B. Photoquadrat Data Tables

Percent cover of selected taxa in fixed 50 x 75 cm photoquadrats are based on 100 points per plot. Target taxa are presented in the tables for each site and each sampling season (spring and fall). Acorn barnacle taxa include *Balanus glandula* and *Chthamalus fissus/dalli*. *Pollicipes polymerus* is listed as leaf barnacle. Turf-weed taxa are only used at Landing Cove Santa Barbara Island and include *Chondracanthus (Gigartina) canaliculatus*, *Gelidium* sp. and *Pterocladia capillacea*. The mussel taxa are *Mytilus* spp. with *Mytilus californianus* dominating at all sites. In 2008, horse mussels, *Septifer bifurcates* or *Brachydontes adamsianus* were scored as their own category, but are included in miscellaneous invertebrates in the tables. Misc. Algae and Misc. Animals include a variety of different species. Since 2001, we have identified most organisms to the species level and have added them to the database; however, because most are rare and to facilitate comparisons with past data, most species are lumped for convenience. Bare Rock is just that, however we had no way to detect the presence of Cyanobacteria. The *Other* category is a “catch-all” category including unidentified points.

Percent Cover of Index Species

Cat Rock, Anacapa Island - Spring 2008 (3/5/08)

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	38	49	0	6	5	0	0	0	0	2	0	0	0	100
	32	40	51	0	8	1	0	0	0	0	0	0	0	0	100
	33	33	21	0	15	29	1	0	0	0	0	0	0	1	100
	35	40	49	0	7	4	0	0	0	0	0	0	0	0	100
	36	38	37	0	10	13	0	0	0	0	2	0	0	0	100
	37	34	37	0	8	20	0	0	0	0	1	0	0	0	100
	38	47	47	1	5	0	0	0	0	0	0	0	0	0	100
	39	21	78	0	0	0	0	0	0	0	1	0	0	0	100
	135	37	61	0	1	0	0	0	0	0	0	1	0	0	100
	Mean	36.44	47.78	.11	6.67	8.00	.11	.00	.00	.00	.67	.11	.00	.11	100.00
	StDev	7.06	16.01	.33	4.53	10.46	.33	.00	.00	.00	.87	.33	.00	.33	.00
Endocladia	13	43	2	6	37	0	0	8	0	0	3	1	0	0	100
	14	44	3	7	25	0	0	13	0	0	8	0	0	0	100
	19	36	1	0	47	4	6	0	1	0	3	2	0	0	100
	51	12	0	7	9	0	0	0	3	0	67	2	0	0	100
	52	35	0	8	25	0	0	13	0	0	19	0	0	0	100
	54	27	2	10	21	0	0	7	14	0	17	1	0	1	100
	212	11	3	3	58	0	0	19	2	0	0	0	0	4	100
	467	28	0	11	29	0	0	26	0	0	5	1	0	0	100
	492	33	0	12	34	0	4	3	0	0	12	2	0	0	100
	Mean	29.89	1.22	7.11	31.67	.44	1.11	9.89	2.22	.00	14.89	1.00	.00	.56	100.00
	StDev	11.90	1.30	3.82	14.52	1.33	2.26	8.78	4.55	.00	20.60	.87	.00	1.33	.00
Silvetia (Rockweed)	2	15	19	0	26	28	7	1	0	0	4	0	0	0	100
	3	27	39	0	13	8	0	0	0	0	13	0	0	0	100
	4	29	28	0	11	5	22	2	0	0	3	0	0	0	100
	5	38	15	6	15	0	4	7	0	0	14	1	0	0	100
	6	10	4	0	14	17	53	0	2	0	0	0	0	0	100
	8	23	3	0	6	4	63	0	0	0	1	0	0	0	100
	9	8	0	0	4	10	77	0	1	0	0	0	0	0	100
	10	22	23	0	14	2	33	0	3	0	3	0	0	0	100
	55	24	21	5	12	15	0	8	0	0	14	0	0	1	100
	Mean	21.78	16.89	1.22	12.78	9.89	28.78	2.00	.67	.00	5.78	.11	.00	.11	100.00
	StDev	9.51	12.84	2.44	6.22	8.85	29.35	3.20	1.12	.00	6.08	.33	.00	.33	.00

Percent Cover of Index Species
Cat Rock, Anacapa Island - Spring 2008 (3/5/08)(continued)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	<i>Silvetia</i>	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Mussels	56	29	0	23	0	0	0	35	1	0	11	1	0	0	100
	164	18	0	11	4	0	0	48	0	0	18	1	0	0	100
	203	23	2	7	0	0	0	50	0	0	16	2	0	0	100
	204	10	0	12	0	0	0	74	0	0	2	1	0	1	100
	468	16	0	12	0	0	0	39	0	0	33	0	0	0	100
	470	39	0	12	6	0	0	35	0	0	6	2	0	0	100
	471	19	0	14	9	0	0	40	0	0	16	2	0	0	100
	472	6	0	9	0	0	0	79	1	0	5	0	0	0	100
	473	32	0	8	5	0	0	36	0	0	17	2	0	0	100
	Mean	21.33	.22	12.00	2.67	.00	.00	48.44	.22	.00	13.78	1.22	.00	.11	100.00
	StDev	10.58	.67	4.69	3.43	.00	.00	16.83	.44	.00	9.30	.83	.00	.33	.00

Percent Cover of Index Species Middle-East, Anacapa Island - Spring 2008 (3/4/08)

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	58	2	26	0	0	0	3	0	0	10	1	0	0	100
	244	65	3	3	19	0	0	1	0	0	9	0	0	0	100
	245	75	0	9	2	0	0	8	0	0	5	1	0	0	100
	Mean	66.00	1.67	12.67	7.00	.00	.00	4.00	.00	.00	8.00	.67	.00	.00	100.00
	StDev	8.54	1.53	11.93	10.44	.00	.00	3.61	.00	.00	2.65	.58	.00	.00	.00
Endocladia	240	47	0	1	17	0	7	0	0	0	28	0	0	0	100
	241	51	0	20	5	0	0	13	0	0	11	0	0	0	100
	242	51	5	4	10	0	0	1	0	0	29	0	0	0	100
	Mean	49.67	1.67	8.33	10.67	.00	2.33	4.67	.00	.00	22.67	.00	.00	.00	100.00
	StDev	2.31	2.89	10.21	6.03	.00	4.04	7.23	.00	.00	10.12	.00	.00	.00	.00
Silvetia (Rockweed)	53	32	0	8	1	0	1	34	8	0	16	0	0	0	100
	237	5	2	0	3	0	69	0	0	0	21	0	0	0	100
	469	8	0	7	3	0	33	2	0	0	47	0	0	0	100
	Mean	15.00	.67	5.00	2.33	.00	34.33	12.00	2.67	.00	28.00	.00	.00	.00	100.00
	StDev	14.80	1.15	4.36	1.15	.00	34.02	19.08	4.62	.00	16.64	.00	.00	.00	.00
Mussels	476	3	0	2	0	0	0	70	0	0	25	0	0	0	100
	477	2	0	9	0	0	0	35	0	0	52	0	0	2	100
	478	2	0	3	0	0	0	68	0	0	22	5	0	0	100
	Mean	2.33	.00	4.67	.00	.00	.00	57.67	.00	.00	33.00	1.67	.00	.67	100.00
	StDev	.58	.00	3.79	.00	.00	.00	19.66	.00	.00	16.52	2.89	.00	1.15	.00

Percent Cover of Index Species

Middle-West, Anacapa Island - Spring 2008 (3/4/08)

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	50	50	0	0	0	0	0	0	0	0	0	0	0	100
	448	59	1	0	17	0	0	5	0	0	17	1	0	0	100
	449	68	4	0	1	0	0	0	0	0	25	1	0	1	100
	450	38	19	0	17	0	0	2	0	0	24	0	0	0	100
	451	42	3	0	43	0	0	1	0	0	11	0	0	0	100
	Mean	51.40	15.40	.00	15.60	.00	.00	1.60	.00	.00	15.40	.40	.00	.20	100.00
	StDev	12.28	20.62	.00	17.40	.00	.00	2.07	.00	.00	10.31	.55	.00	.45	.00
Endocladia	457	28	0	0	20	0	0	43	0	0	9	0	0	0	100
	458	47	1	2	25	0	0	17	0	0	7	1	0	0	100
	459	59	1	0	10	0	0	10	0	0	20	0	0	0	100
	460	72	9	0	17	0	0	0	0	0	2	0	0	0	100
	461	71	5	0	15	0	0	0	0	0	9	0	0	0	100
	Mean	55.40	3.20	.40	17.40	.00	.00	14.00	.00	.00	9.40	.20	.00	.00	100.00
	StDev	18.39	3.77	.89	5.59	.00	.00	17.73	.00	.00	6.58	.45	.00	.00	.00
Silvetia (Rockweed)	452	46	5	3	0	0	46	0	0	0	0	0	0	0	100
	453	59	2	1	0	0	32	4	0	0	2	0	0	0	100
	454	28	0	1	14	0	0	4	2	0	50	1	0	0	100
	455	40	0	1	10	0	12	24	1	0	11	1	0	0	100
	456	60	0	2	2	0	2	26	0	0	6	2	0	0	100
	Mean	46.60	1.40	1.60	5.20	.00	18.40	11.60	.60	.00	13.80	.80	.00	.00	100.00
	StDev	13.45	2.19	.89	6.42	.00	19.97	12.36	.89	.00	20.67	.84	.00	.00	.00
Mussels	462	36	0	1	0	0	0	47	0	1	15	0	0	0	100
	463	28	0	4	1	0	0	33	3	0	30	1	0	0	100
	464	21	0	0	0	0	0	59	0	0	20	0	0	0	100
	465	14	0	0	0	0	0	84	0	0	2	0	0	0	100
	466	1	0	0	0	0	0	99	0	0	0	0	0	0	100
	Mean	20.00	.00	1.00	.20	.00	.00	64.40	.60	.20	13.40	.20	.00	.00	100.00
	StDev	13.40	.00	1.73	.45	.00	.00	26.92	1.34	.45	12.56	.45	.00	.00	.00

Percent Cover of Index Species

S. Frenchy's Cove, Anacapa Island - Spring 2008 (3/3/08)

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	35	65	0	0	0	0	0	0	0	0	0	0	0	100
	250	19	62	0	19	0	0	0	0	0	0	0	0	0	100
	251	31	69	0	0	0	0	0	0	0	0	0	0	0	100
	252	35	51	0	1	0	0	0	0	0	11	0	2	0	100
	253	7	67	0	18	8	0	0	0	0	0	0	0	0	100
	Mean	25.40	62.80	.00	7.60	1.60	.00	.00	.00	.00	2.20	.00	.40	.00	100.00
	StDev	12.20	7.09	.00	9.96	3.58	.00	.00	.00	.00	4.92	.00	.89	.00	.00
Endocladia	154	13	1	0	85	0	1	0	0	0	0	0	0	0	100
	155	4	0	0	72	0	17	0	0	0	3	0	0	4	100
	256	8	0	0	75	3	4	0	0	0	10	0	0	0	100
	257	9	0	0	89	0	0	0	0	0	2	0	0	0	100
	258	15	0	0	54	0	30	0	0	0	1	0	0	0	100
	Mean	9.80	.20	.00	75.00	.60	10.40	.00	.00	.00	3.20	.00	.00	.80	100.00
	StDev	4.32	.45	.00	13.66	1.34	12.90	.00	.00	.00	3.96	.00	.00	1.79	.00
Silvetia (Rockweed)	259	10	7	0	0	0	32	0	0	0	51	0	0	0	100
	260	19	4	0	5	0	59	0	0	0	13	0	0	0	100
	261	10	2	0	0	0	32	0	0	0	56	0	0	0	100
	262	37	5	0	39	0	14	1	0	0	4	0	0	0	100
	263	19	0	0	0	0	72	0	0	0	9	0	0	0	100
	Mean	19.00	3.60	.00	8.80	.00	41.80	.20	.00	.00	26.60	.00	.00	.00	100.00
	StDev	11.02	2.70	.00	17.02	.00	23.31	.45	.00	.00	24.83	.00	.00	.00	.00
Mussels	201	2	0	0	0	0	0	51	20	0	27	0	0	0	100
	202	8	0	0	0	0	0	76	14	0	2	0	0	0	100
	264	10	0	0	0	0	0	72	16	0	2	0	0	0	100
	265	8	0	0	0	0	0	75	3	0	14	0	0	0	100
	266	7	0	0	0	0	0	62	7	0	24	0	0	0	100
	Mean	7.00	.00	.00	.00	.00	.00	67.20	12.00	.00	13.80	.00	.00	.00	100.00
	StDev	3.00	.00	.00	.00	.00	.00	10.62	6.89	.00	11.80	.00	.00	.00	.00

Percent Cover of Index Species

Crook Point, San Miguel Island - Spring 2008 (5/9/08)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	137	72	28	0	0	0	0	0	0	0	0	0	0	0	100
	147	61	39	0	0	0	0	0	0	0	0	0	0	0	100
	148	50	50	0	0	0	0	0	0	0	0	0	0	0	100
	149	76	10	0	10	0	0	3	0	0	0	1	0	0	100
	495	51	44	0	5	0	0	0	0	0	0	0	0	0	100
	Mean	62.00	34.20	.00	3.00	.00	.00	.60	.00	.00	.00	.20	.00	.00	100.00
	StDev	11.85	15.75	.00	4.47	.00	.00	1.34	.00	.00	.00	.45	.00	.00	.00
Endocladia	386	73	3	0	19	0	0	2	0	0	1	2	0	0	100
	387	49	3	0	35	0	0	0	0	0	12	1	0	0	100
	388	22	8	0	9	1	0	0	0	0	60	0	0	0	100
	389	36	1	1	17	3	0	36	0	0	5	1	0	0	100
	390	60	8	0	10	0	0	11	0	2	8	1	0	0	100
	Mean	48.00	4.60	.20	18.00	.80	.00	9.80	.00	.40	17.20	1.00	.00	.00	100.00
	StDev	19.94	3.21	.45	10.44	1.30	.00	15.34	.00	.89	24.26	.71	.00	.00	.00
Silvetia (Rockweed)	396	45	8	0	25	2	0	16	0	1	3	0	0	0	100
	397	1	0	0	0	0	0	98	0	0	1	0	0	0	100
	398	45	4	0	10	0	0	26	0	4	10	1	0	0	100
	399	37	0	0	47	9	0	4	0	0	3	0	0	0	100
	400	43	1	1	0	0	0	0	6	0	49	0	0	0	100
	Mean	34.20	2.60	.20	16.40	2.20	.00	28.80	1.20	1.00	13.20	.20	.00	.00	100.00
	StDev	18.85	3.44	.45	19.93	3.90	.00	40.01	2.68	1.73	20.30	.45	.00	.00	.00
Mussels	381	40	3	0	0	0	0	50	0	2	4	1	0	0	100
	382	12	0	0	0	0	0	84	2	0	2	0	0	0	100
	383	12	0	0	0	0	0	78	0	0	10	0	0	0	100
	384	19	0	1	0	0	0	76	0	2	2	0	0	0	100
	385	23	0	0	0	0	0	63	0	5	8	1	0	0	100
	Mean	21.20	.60	.20	.00	.00	.00	70.20	.40	1.80	5.20	.40	.00	.00	100.00
	StDev	11.52	1.34	.45	.00	.00	.00	13.65	.89	2.05	3.63	.55	.00	.00	.00

Percent Cover of Index Species

Cuyler Harbor, San Miguel Island - Spring 2008 (5/7/08)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	416	27	73	0	0	0	0	0	0	0	0	0	0	0	100
	417	36	39	0	25	0	0	0	0	0	0	0	0	0	100
	418	14	78	0	7	0	0	1	0	0	0	0	0	0	100
	419	28	29	0	38	0	5	0	0	0	0	0	0	0	100
	420	22	4	0	74	0	0	0	0	0	0	0	0	0	100
	Mean	25.40	44.60	.00	28.80	.00	1.00	.20	.00	.00	.00	.00	.00	.00	100.00
	StDev	8.11	31.00	.00	29.35	.00	2.24	.45	.00	.00	.00	.00	.00	.00	.00
Endocladia	411	56	1	0	22	0	0	14	0	1	4	2	0	0	100
	412	15	32	0	19	0	0	34	0	0	0	0	0	0	100
	413	36	0	0	15	0	42	0	0	0	7	0	0	0	100
	414	54	0	1	26	0	0	0	0	0	19	0	0	0	100
	415	29	0	0	56	0	2	0	0	0	13	0	0	0	100
	Mean	38.00	6.60	.20	27.60	.00	8.80	9.60	.00	.20	8.60	.40	.00	.00	100.00
	StDev	17.28	14.21	.45	16.38	.00	18.58	14.93	.00	.45	7.50	.89	.00	.00	.00
Silvetia (Rockweed)	406	24	0	0	8	0	43	3	0	0	10	12	0	0	100
	407	17	0	0	1	0	67	0	0	0	12	3	0	0	100
	408	17	1	2	1	0	70	0	0	0	9	0	0	0	100
	409	12	0	0	2	0	65	0	0	0	11	10	0	0	100
	410	28	1	6	0	0	46	0	0	0	7	12	0	0	100
	Mean	19.60	.40	1.60	2.40	.00	58.20	.60	.00	.00	9.80	7.40	.00	.00	100.00
	StDev	6.35	.55	2.61	3.21	.00	12.68	1.34	.00	.00	1.92	5.55	.00	.00	.00
Mussels	401	38	13	5	0	0	0	14	5	4	13	8	0	0	100
	402	6	0	0	0	0	0	71	2	0	6	15	0	0	100
	403	12	0	0	0	0	0	76	0	1	3	8	0	0	100
	404	30	2	13	0	0	0	35	1	0	3	16	0	0	100
	405	31	1	9	0	0	0	51	0	1	2	5	0	0	100
	Mean	23.40	3.20	5.40	.00	.00	.00	49.40	1.60	1.20	5.40	10.40	.00	.00	100.00
	StDev	13.67	5.54	5.68	.00	.00	.00	25.68	2.07	1.64	4.51	4.83	.00	.00	.00

Percent Cover of Index Species

Harris Point, San Miguel Island - Spring 2008 (5/8/08)

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
60	Chthamalus/Balanus	440	27	64	0	7	2	0	0	0	0	0	0	0	100
		441	24	74	0	2	0	0	0	0	0	0	0	0	100
		442	24	75	0	1	0	0	0	0	0	0	0	0	100
		443	33	62	0	0	0	0	0	0	0	0	5	0	100
		444	38	59	0	3	0	0	0	0	0	0	0	0	100
	Mean	29.20	66.80	.00	2.60	.40	.00	.00	.00	.00	.00	.00	1.00	.00	100.00
	StDev	6.14	7.26	.00	2.70	.89	.00	.00	.00	.00	.00	.00	2.24	.00	.00
	Endocladia	431	31	21	1	34	0	4	0	0	9	0	0	0	100
		432	21	11	0	46	10	3	0	0	8	0	0	0	99
		433	12	7	0	68	13	0	0	0	0	0	0	0	100
		434	9	0	0	44	46	0	0	0	1	0	0	0	100
		435	20	0	0	31	36	0	0	0	13	0	0	0	100
	Mean	18.60	7.80	.20	44.60	21.00	.00	1.40	.00	.00	6.20	.00	.00	.00	99.80
	StDev	8.62	8.76	.45	14.55	19.21	.00	1.95	.00	.00	5.54	.00	.00	.00	.45
	Mussels	426	27	0	2	6	0	37	0	2	26	0	0	0	100
		427	53	2	2	15	2	0	3	0	23	0	0	0	100
		428	79	1	0	4	1	0	0	0	15	0	0	0	100
		429	35	10	2	1	0	33	0	1	18	0	0	0	100
		430	10	11	1	0	0	49	2	1	26	0	0	0	100
	Mean	40.80	4.80	1.40	5.20	.60	.00	23.80	1.00	.80	21.60	.00	.00	.00	100.00
	StDev	26.37	5.26	.89	5.97	.89	.00	22.51	1.41	.84	4.93	.00	.00	.00	.00
	Tetraclita	436	24	14	7	0	0	35	0	0	16	4	0	0	100
		437	34	3	10	0	0	20	0	0	31	2	0	0	100
		438	15	0	1	7	0	0	21	0	56	0	0	0	100
		439	19	6	1	4	0	0	18	0	52	0	0	0	100
		445	45	3	10	1	0	15	10	0	11	5	0	0	100
	Mean	27.40	5.20	5.80	2.40	.00	.00	14.00	9.80	.00	33.20	2.20	.00	.00	100.00
	StDev	12.14	5.36	4.55	3.05	.00	.00	14.75	9.81	.00	20.41	2.28	.00	.00	.00
	Hesperophycus	421	24	1	0	19	56	0	0	0	0	0	0	0	100
		422	10	0	0	11	64	0	0	0	13	1	0	1	100
		423	60	0	0	15	22	0	0	0	3	0	0	0	100
		424	10	0	0	10	79	0	0	0	1	0	0	0	100
		425	36	0	0	6	53	0	0	0	5	0	0	0	100
	Mean	28.00	.20	.00	12.20	54.80	.00	.00	.00	.00	4.40	.20	.00	.20	100.00
	StDev	20.93	.45	.00	4.97	20.92	.00	.00	.00	.00	5.18	.45	.00	.45	.00

Percent Cover of Index Species

Otter Harbor, San Miguel Island - Spring 2008 (5/10/08)

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	81	19	0	0	0	0	0	0	0	0	0	0	0	100
	371	8	88	0	0	0	0	0	0	0	0	0	4	0	100
	372	51	47	0	0	0	0	0	0	0	2	0	0	0	100
	373	44	54	0	0	0	0	0	0	0	1	0	1	0	100
	374	5	0	0	0	0	0	0	27	0	68	0	0	0	100
	Mean	37.80	41.60	.00	.00	.00	.00	.00	5.40	.00	14.20	.00	1.00	.00	100.00
	StDev	31.79	33.83	.00	.00	.00	.00	.00	12.07	.00	30.09	.00	1.73	.00	.00
Endocladia	360	42	12	1	24	0	10	1	0	0	9	1	0	0	100
	361	57	4	0	38	0	0	0	0	0	1	0	0	0	100
	362	5	0	0	59	0	2	0	2	1	31	0	0	0	100
	363	22	2	0	41	0	5	0	0	0	30	0	0	0	100
	364	20	0	0	61	0	17	0	0	0	2	0	0	0	100
	Mean	29.20	3.60	.20	44.60	.00	6.80	.20	.40	.20	14.60	.20	.00	.00	100.00
	StDev	20.36	4.98	.45	15.47	.00	6.83	.45	.89	.45	14.84	.45	.00	.00	.00
Silvetia (Rockweed)	355	50	13	0	0	0	0	0	0	0	36	1	0	0	100
	356	11	0	0	38	0	36	0	0	2	12	1	0	0	100
	357	14	0	0	48	0	12	0	0	0	26	0	0	0	100
	358	29	46	0	22	0	0	0	0	0	3	0	0	0	100
	359	35	56	0	4	0	1	0	0	0	2	0	2	0	100
	Mean	27.80	23.00	.00	22.40	.00	9.80	.00	.00	.40	15.80	.40	.40	.00	100.00
	StDev	15.96	26.34	.00	20.85	.00	15.50	.00	.00	.89	14.84	.55	.89	.00	.00
Mussels	375	25	8	0	0	0	0	51	0	3	9	4	0	0	100
	376	38	7	1	1	0	0	43	0	0	10	0	0	0	100
	378	25	2	1	0	0	0	50	0	11	10	1	0	0	100
	379	41	11	1	0	0	0	27	2	2	15	1	0	0	100
	380	34	1	0	0	0	0	44	0	3	16	2	0	0	100
	Mean	32.60	5.80	.60	.20	.00	.00	43.00	.40	3.80	12.00	1.60	.00	.00	100.00
	StDev	7.37	4.21	.55	.45	.00	.00	9.62	.89	4.21	3.24	1.52	.00	.00	.00

Percent Cover of Index Species

Fraser Cove, Santa Cruz Island - Spring 2008 (3/20/08)

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
62	Chthamalus/Balanus	876	49	8	1	0	0	4	0	0	38	0	0	0	100
		877	21	2	0	0	0	4	0	0	73	0	0	0	100
		878	25	69	0	0	0	0	0	0	2	0	4	0	100
		879	8	27	0	1	0	0	0	0	59	1	4	0	100
		880	10	29	0	0	0	0	0	0	61	0	0	0	100
		Mean	22.60	27.00	.20	.20	.00	1.60	.00	.00	46.60	.20	1.60	.00	100.00
		StDev	16.41	26.24	.45	.45	.00	2.19	.00	.00	27.93	.45	2.19	.00	.00
	Endocladia	881	41	0	0	25	0	15	0	0	19	0	0	0	100
		882	78	1	0	12	0	4	0	0	5	0	0	0	100
		883	72	1	0	16	0	2	0	0	9	0	0	0	100
		884	45	8	0	46	0	0	0	0	1	0	0	0	100
		885	17	5	0	41	0	0	0	0	36	0	1	0	100
		Mean	50.60	3.00	.00	28.00	.00	4.20	.00	.00	14.00	.00	.20	.00	100.00
		StDev	24.81	3.39	.00	15.02	.00	6.26	.00	.00	14.00	.00	.45	.00	.00
	Silvetia (Rockweed)	896	45	11	0	18	4	18	0	0	3	0	0	0	100
		897	33	6	0	9	6	26	0	0	16	2	0	2	100
		898	52	3	0	5	0	34	0	0	5	0	0	1	100
		899	44	11	0	12	1	24	0	0	8	0	0	0	100
		900	19	17	0	4	14	43	0	0	3	0	0	0	100
		Mean	38.60	9.60	.00	9.60	5.00	29.00	.20	.00	7.00	.40	.00	.60	100.00
		StDev	12.90	5.37	.00	5.68	5.57	9.70	.45	.00	5.43	.89	.00	.89	.00
	Mussels	891	12	0	0	0	0	53	0	0	12	23	0	0	100
		892	24	0	0	0	0	58	0	0	8	10	0	0	100
		893	20	0	0	0	0	71	0	0	0	9	0	0	100
		894	21	2	0	0	0	71	0	1	3	2	0	0	100
		895	15	0	0	0	0	79	0	2	2	2	0	0	100
		Mean	18.40	.40	.00	.00	.00	66.40	.00	.60	5.00	9.20	.00	.00	100.00
		StDev	4.83	.89	.00	.00	.00	10.62	.00	.89	4.90	8.58	.00	.00	.00
	Pollicipes	901	32	1	4	0	0	55	0	5	3	0	0	0	100
		902	42	0	3	13	0	21	0	2	5	14	0	0	100
		903	20	3	0	0	0	49	0	13	3	12	0	0	100
		904	22	3	0	0	0	49	0	6	10	10	0	0	100
		905	19	5	0	0	0	45	0	11	5	15	0	0	100
		Mean	27.00	2.40	1.40	2.60	.00	43.80	.00	7.40	5.20	10.20	.00	.00	100.00
		StDev	9.85	1.95	1.95	5.81	.00	13.24	.00	4.51	2.86	6.02	.00	.00	.00

Percent Cover of Index Species

Fraser Cove, Santa Cruz Island - Spring 2008 (3/20/08)

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	30	33	0	0	0	0	0	0	0	3	0	36	0	102
	907	23	31	0	0	0	0	0	0	0	8	0	38	0	100
	908	16	36	0	0	0	0	0	0	0	6	0	42	0	100
	909	21	37	0	0	0	0	0	0	0	9	0	33	0	100
	910	15	23	0	0	0	0	0	0	0	0	0	62	0	100
	Mean	21.00	32.00	.00	.00	.00	.00	.00	.00	.00	5.20	.00	42.20	.00	100.40
	StDev	6.04	5.57	.00	.00	.00	.00	.00	.00	.00	3.70	.00	11.54	.00	.89
Hesperophycus	886	35	3	0	14	48	0	0	0	0	0	0	0	0	100
	887	67	2	0	11	15	0	0	0	0	5	0	0	0	100
	888	23	13	0	45	18	0	0	0	0	1	0	0	0	100
	889	55	6	0	12	20	4	0	0	0	3	0	0	0	100
	890	18	10	0	29	17	26	0	0	0	0	0	0	0	100
	Mean	39.60	6.80	.00	22.20	23.60	6.00	.00	.00	.00	1.80	.00	.00	.00	100.00
	StDev	20.92	4.66	.00	14.69	13.76	11.31	.00	.00	.00	2.17	.00	.00	.00	.00

Percent Cover of Index Species
Orizaba Cove, Santa Cruz Island - Spring 2008 (3/7/08)

	Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	<i>Silvetia</i>	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
64	<i>Chthamalus/Balanus</i>	851	33	47	10	0	0	0	9	0	0	1	0	0	0	100
		852	20	79	0	0	0	0	1	0	0	0	0	0	0	100
		853	31	68	0	0	0	0	1	0	0	0	0	0	0	100
		854	32	52	7	0	0	0	5	0	0	4	0	0	0	100
		855	16	72	0	0	0	0	2	0	0	10	0	0	0	100
		Mean	26.40	63.60	3.40	.00	.00	.00	3.60	.00	.00	3.00	.00	.00	.00	100.00
		StDev	7.83	13.58	4.77	.00	.00	.00	3.44	.00	.00	4.24	.00	.00	.00	.00
	<i>Silvetia</i> (Rockweed)	866	19	0	16	0	2	3	50	0	0	10	0	0	0	100
		867	9	0	2	10	13	41	1	0	0	24	0	0	0	100
		868	12	0	3	9	2	27	23	0	0	23	0	0	1	100
		869	14	0	0	15	2	59	1	0	0	9	0	0	0	100
		870	12	0	3	17	24	31	0	0	0	13	0	0	0	100
		Mean	13.20	.00	4.80	10.20	8.60	32.20	15.00	.00	.00	15.80	.00	.00	.20	100.00
		StDev	3.70	.00	6.38	6.61	9.84	20.47	21.83	.00	.00	7.19	.00	.00	.45	.00
	Mussels	861	2	0	1	0	0	0	93	0	0	4	0	0	0	100
		862	29	0	7	0	0	0	17	1	0	27	19	0	0	100
		863	28	0	0	0	0	0	10	1	0	56	4	0	1	100
		864	13	0	0	0	0	0	2	0	0	82	2	0	1	100
		865	12	0	0	0	0	0	0	0	0	88	0	0	0	100
		Mean	16.80	.00	1.60	.00	.00	.00	24.40	.40	.00	51.40	5.00	.00	.40	100.00
		StDev	11.52	.00	3.05	.00	.00	.00	38.94	.55	.00	35.84	8.00	.00	.55	.00
	Tetraclita	871	0	3	6	0	0	0	91	0	0	0	0	0	0	100
		872	2	0	7	0	0	0	91	0	0	0	0	0	0	100
		873	14	0	39	0	0	0	37	0	0	8	2	0	0	100
		874	12	0	24	0	0	0	57	0	0	7	0	0	0	100
		875	19	0	17	0	0	0	59	0	0	5	0	0	0	100
		Mean	9.40	.60	18.60	.00	.00	.00	67.00	.00	.00	4.00	.40	.00	.00	100.00
		StDev	8.11	1.34	13.61	.00	.00	.00	23.54	.00	.00	3.81	.89	.00	.00	.00
	<i>Hesperophycus</i>	856	3	16	0	63	1	0	9	0	0	7	1	0	0	100
		857	8	5	2	23	18	6	28	0	0	9	1	0	0	100
		858	7	0	0	8	51	18	0	0	0	16	0	0	0	100
		859	6	30	0	18	2	0	44	0	0	0	0	0	0	100
		860	19	0	0	17	59	0	0	0	0	5	0	0	0	100
		Mean	8.60	10.20	.40	25.80	26.20	4.80	16.20	.00	.00	7.40	.40	.00	.00	100.00
		StDev	6.11	12.85	.89	21.49	27.29	7.82	19.29	.00	.00	5.86	.55	.00	.00	.00

Percent Cover of Index Species

Prisoner's Harbor, Santa Cruz Island - Spring 2008 (3/17/08)

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
65	Chthamalus/Balanus	826	100	0	0	0	0	0	0	0	0	0	0	0	100
		827	5	65	0	26	0	0	0	0	4	0	0	0	100
		828	1	27	0	72	0	0	0	0	0	0	0	0	100
		829	34	4	0	59	0	1	0	0	2	0	0	0	100
		830	22	0	0	74	1	0	1	0	2	0	0	0	100
	Mean	32.40	19.20	.00	46.20	.20	.00	.40	.00	.00	1.60	.00	.00	.00	100.00
	StDev	40.05	27.96	.00	32.19	.45	.00	.55	.00	.00	1.67	.00	.00	.00	.00
	Endocladia	831	55	2	1	38	0	0	0	0	3	1	0	0	100
		832	43	1	0	49	5	2	0	0	0	0	0	0	100
		833	37	12	0	50	0	1	0	0	0	0	0	0	100
		834	45	2	0	50	0	0	0	0	0	3	0	0	100
		835	30	0	0	50	11	4	0	0	5	0	0	0	100
	Mean	42.00	3.40	.20	47.40	3.20	.00	1.40	.00	.00	1.60	.80	.00	.00	100.00
	StDev	9.33	4.88	.45	5.27	4.87	.00	1.67	.00	.00	2.30	1.30	.00	.00	.00
	Silvetia (Rockweed)	846	37	8	0	44	0	3	0	0	8	0	0	0	100
		847	51	21	4	14	0	1	0	0	8	1	0	0	100
		848	66	1	6	0	0	1	0	0	23	0	0	0	100
		849	21	0	5	2	0	5	0	0	39	0	0	0	100
		850	10	0	2	1	0	32	0	0	52	0	0	0	100
	Mean	37.00	6.00	3.40	12.20	.00	12.60	2.60	.00	.00	26.00	.20	.00	.00	100.00
	StDev	22.48	9.03	2.41	18.66	.00	15.99	1.67	.00	.00	19.38	.45	.00	.00	.00
	Mussels	841	35	0	0	0	0	57	5	0	3	0	0	0	100
		842	10	9	0	0	0	54	0	0	13	14	0	0	100
		843	24	13	0	0	0	32	8	0	20	1	0	2	100
		844	45	0	0	0	0	18	0	0	35	1	0	1	100
		845	31	3	2	0	0	9	0	0	55	0	0	0	100
	Mean	29.00	5.00	.40	.00	.00	.00	34.00	2.60	.00	25.20	3.20	.00	.60	100.00
	StDev	13.06	5.79	.89	.00	.00	.00	21.30	3.71	.00	20.33	6.06	.00	.89	.00
	Hesperophycus	836	55	1	0	35	2	5	0	0	2	0	0	0	100
		837	60	1	0	26	11	2	0	0	0	0	0	0	100
		838	72	8	0	11	1	2	0	0	5	0	0	1	100
		839	60	14	0	16	8	1	0	0	0	0	0	0	100
		840	58	4	0	29	6	2	0	0	0	0	0	0	100
	Mean	61.00	5.60	.00	23.40	5.60	.40	2.40	.00	.00	1.40	.00	.00	.20	100.00
	StDev	6.48	5.50	.00	9.76	4.16	.55	1.52	.00	.00	2.19	.00	.00	.45	.00

Percent Cover of Index Species

Scorpion Rock, Santa Cruz Island - Spring 2008 (3/6/08)

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
66	Chthamalus/Balanus	801	51	3	1	41	0	0	4	0	0	0	0	0	100
		802	36	12	3	48	0	0	0	0	1	0	0	0	100
		803	62	0	0	35	0	0	1	0	2	0	0	0	100
		804	52	5	0	42	0	0	0	0	1	0	0	0	100
		805	59	37	0	4	0	0	0	0	0	0	0	0	100
		Mean	52.00	11.40	.80	34.00	.00	.00	1.00	.00	.40	.40	.00	.00	100.00
		StDev	10.07	14.98	1.30	17.39	.00	.00	1.73	.00	.89	.55	.00	.00	.00
	Endocladia	806	12	0	0	74	0	2	0	0	11	0	0	1	100
		807	7	0	0	64	0	7	0	0	21	0	0	1	100
		808	21	0	1	53	0	20	0	1	4	0	0	0	100
		809	14	0	0	83	0	2	0	0	1	0	0	0	100
		810	18	0	0	67	0	2	0	0	13	0	0	0	100
		Mean	14.40	.00	.20	68.20	.00	6.60	.00	.20	10.00	.00	.00	.40	100.00
		StDev	5.41	.00	.45	11.21	.00	7.80	.00	.45	7.87	.00	.00	.55	.00
	Mussels	816	40	0	29	1	0	0	1	0	27	2	0	0	100
		817	29	0	29	0	0	0	17	0	22	3	0	0	100
		818	34	0	48	0	0	9	0	0	7	2	0	0	100
		819	36	0	46	0	0	1	0	2	15	0	0	0	100
		820	16	0	23	0	0	0	4	0	56	0	0	1	100
		Mean	31.00	.00	35.00	.20	.00	2.00	4.40	.40	25.40	1.40	.00	.20	100.00
		StDev	9.27	.00	11.25	.45	.00	3.94	7.23	.89	18.69	1.34	.00	.45	.00
	Tetraclita	821	48	0	22	11	0	6	0	2	11	0	0	0	100
		822	67	0	7	0	0	22	0	0	4	0	0	0	100
		823	0	0	0	0	0	0	0	0	0	0	0	0	0
		824	80	0	14	0	0	0	0	0	3	3	0	0	100
		825	76	0	17	0	0	0	0	0	6	0	0	1	100
		Mean	54.20	.00	12.00	2.20	.00	5.60	.00	.40	4.80	.60	.00	.20	80.00
		StDev	32.71	.00	8.63	4.92	.00	9.53	.00	.89	4.09	1.34	.00	.45	44.72
	Hesperophycus	811	46	0	0	17	36	0	0	1	0	0	0	0	100
		812	22	0	0	35	30	3	4	0	6	0	0	0	100
		813	18	0	0	22	24	34	0	0	2	0	0	0	100
		814	74	0	0	19	4	0	0	0	2	1	0	0	100
		815	20	0	0	30	28	20	0	0	2	0	0	0	100
		Mean	36.00	.00	.00	24.60	24.40	11.40	.80	.00	2.40	.20	.00	.00	100.00
		StDev	24.08	.00	.00	7.64	12.20	15.13	1.79	.00	.45	.45	.00	.00	.00

Percent Cover of Index Species

Trailer, Santa Cruz Island - Spring 2008 (3/19/08)

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	89	0	0	11	0	0	0	0	0	0	0	0	0	100
	912	28	72	0	0	0	0	0	0	0	0	0	0	0	100
	913	45	32	0	20	0	0	1	0	0	1	1	0	0	100
	914	11	89	0	0	0	0	0	0	0	0	0	0	0	100
	915	26	73	0	0	0	0	0	0	0	0	1	0	0	100
	Mean	39.80	53.20	.00	6.20	.00	.00	.20	.00	.00	.20	.40	.00	.00	100.00
	StDev	30.03	36.42	.00	9.07	.00	.00	.45	.00	.00	.45	.55	.00	.00	.00
Silvetia (Rockweed)	926	7	1	0	0	0	87	0	0	0	5	0	0	0	100
	927	31	12	0	1	0	53	0	0	0	3	0	0	0	100
	928	24	2	0	10	0	55	0	0	0	9	0	0	0	100
	929	3	1	0	0	0	93	0	0	0	3	0	0	0	100
	930	25	2	0	0	0	71	0	0	0	2	0	0	0	100
	Mean	18.00	3.60	.00	2.20	.00	71.80	.00	.00	.00	4.40	.00	.00	.00	100.00
	StDev	12.25	4.72	.00	4.38	.00	18.14	.00	.00	.00	2.79	.00	.00	.00	.00
Mussels	921	28	1	1	0	0	0	1	1	0	17	51	0	0	100
	922	15	1	0	0	0	0	16	1	1	44	22	0	0	100
	923	6	0	0	0	0	0	61	0	0	16	17	0	0	100
	924	22	1	1	0	0	0	57	0	0	8	11	0	0	100
	925	33	0	0	0	0	0	53	0	0	4	10	0	0	100
	Mean	20.80	.60	.40	.00	.00	.00	37.60	.40	.20	17.80	22.20	.00	.00	100.00
	StDev	10.66	.55	.55	.00	.00	.00	27.24	.55	.45	15.63	16.81	.00	.00	.00
Hesperophycus	916	20	5	0	16	16	41	0	0	0	2	0	0	0	100
	917	6	6	0	17	5	65	0	0	0	0	0	1	0	100
	918	7	0	0	10	7	74	0	0	0	0	0	2	0	100
	919	53	37	0	10	0	0	0	0	0	0	0	0	0	100
	920	35	5	0	26	15	16	0	0	0	3	0	0	0	100
	951	44	13	0	26	15	0	0	0	0	0	0	0	2	100
	Mean	27.50	11.00	.00	17.50	9.67	32.67	.00	.00	.00	.83	.00	.50	.33	100.00
	StDev	19.58	13.40	.00	7.20	6.62	32.36	.00	.00	.00	1.33	.00	.84	.82	.00

Percent Cover of Index Species

Willows Anchorage, Santa Cruz Island - Spring 2008 (3/18/08)

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
68	<i>Endocladia</i>	931	16	0	0	84	0	0	0	0	0	0	0	0	100
		932	18	0	0	82	0	0	0	0	0	0	0	0	100
		933	39	0	0	61	0	0	0	0	0	0	0	0	100
		934	22	0	0	78	0	0	0	0	0	0	0	0	100
		935	33	0	2	62	0	0	0	0	3	0	0	0	100
	Mean	25.60	.00	.40	73.40	.00	.00	.00	.00	.00	.60	.00	.00	.00	100.00
	StDev	9.96	.00	.89	11.08	.00	.00	.00	.00	.00	1.34	.00	.00	.00	.00
	<i>Silvetia</i> (Rockweed)	946	74	0	0	14	0	0	0	0	12	0	0	0	100
		947	57	8	0	14	0	0	0	0	20	1	0	0	100
		948	35	17	0	1	0	30	0	0	16	1	0	0	100
69		949	3	2	0	0	0	80	0	0	15	0	0	0	100
		950	67	0	0	10	0	0	0	0	23	0	0	0	100
	Mean	47.20	5.40	.00	7.80	.00	22.00	.00	.00	.00	17.20	.40	.00	.00	100.00
	StDev	28.76	7.27	.00	6.87	.00	34.93	.00	.00	.00	4.32	.55	.00	.00	.00
	Mussels	941	12	3	5	0	0	71	0	0	8	0	0	1	100
		942	21	0	0	0	0	61	8	0	3	7	0	0	100
		943	20	2	0	0	0	40	3	0	33	1	0	1	100
		944	27	1	0	0	0	66	2	0	4	0	0	0	100
		945	9	0	0	0	0	39	0	0	52	0	0	0	100
	Mean	17.80	1.20	1.00	.00	.00	.00	55.40	2.60	.00	20.00	1.60	.00	.40	100.00
70	StDev	7.26	1.30	2.24	.00	.00	.00	14.94	3.29	.00	21.69	3.05	.00	.55	.00
	<i>Hesperophycus</i>	936	30	0	0	66	0	0	0	0	4	0	0	0	100
		937	34	47	0	0	0	0	0	0	19	0	0	0	100
		938	45	31	0	3	0	0	0	0	21	0	0	0	100
		939	55	7	0	0	0	20	0	0	16	2	0	0	100
		940	23	29	0	3	11	18	0	0	16	0	0	0	100
	Mean	37.40	22.80	.00	14.40	2.20	7.60	.00	.00	.00	15.20	.40	.00	.00	100.00
	StDev	12.66	19.11	.00	28.88	4.92	10.43	.00	.00	.00	6.61	.89	.00	.00	.00

Percent Cover of Index Species

East Point, Santa Rosa Island - Spring 2008 (4/10/08)

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	45	55	0	0	0	0	0	0	0	0	0	0	0	100
	576	28	44	0	20	7	0	0	0	0	0	1	0	0	100
	577	26	21	0	29	18	5	0	0	0	0	1	0	0	100
	578	37	63	0	0	0	0	0	0	0	0	0	0	0	100
	579	12	87	0	1	0	0	0	0	0	0	0	0	0	100
	Mean	29.60	54.00	.00	10.00	5.00	1.00	.00	.00	.00	.00	.40	.00	.00	100.00
	StDev	12.42	24.29	.00	13.62	7.87	2.24	.00	.00	.00	.00	.55	.00	.00	.00
Endocladia	580	16	0	0	79	5	0	0	0	0	0	0	0	0	100
	581	28	0	0	70	2	0	0	0	0	0	0	0	0	100
	582	14	0	0	81	5	0	0	0	0	0	0	0	0	100
	583	44	0	0	56	0	0	0	0	0	0	0	0	0	100
	584	16	9	0	62	13	0	0	0	0	0	0	0	0	100
	Mean	23.60	1.80	.00	69.60	5.00	.00	.00	.00	.00	.00	.00	.00	.00	100.00
	StDev	12.68	4.02	.00	10.74	4.95	.00	.00	.00	.00	.00	.00	.00	.00	.00
Silvetia (Rockweed)	585	53	0	0	21	9	12	0	0	0	5	0	0	0	100
	586	49	0	0	22	0	26	1	0	0	2	0	0	0	100
	587	67	0	0	5	0	24	0	0	0	4	0	0	0	100
	588	5	0	0	1	0	79	0	0	0	15	0	0	0	100
	589	34	0	0	0	0	50	1	0	0	15	0	0	0	100
	Mean	41.60	.00	.00	9.80	1.80	38.20	.40	.00	.00	8.20	.00	.00	.00	100.00
	StDev	23.60	.00	.00	10.85	4.02	26.65	.55	.00	.00	6.30	.00	.00	.00	.00
Mussels	590	11	0	0	0	0	0	43	8	0	38	0	0	0	100
	591	39	3	0	0	0	0	28	5	0	23	2	0	0	100
	592	9	0	0	0	0	0	75	1	0	12	3	0	0	100
	593	0	0	0	0	0	0	85	0	0	14	1	0	0	100
	594	12	1	0	0	0	0	76	4	0	7	0	0	0	100
	Mean	14.20	.80	.00	.00	.00	.00	61.40	3.60	.00	18.80	1.20	.00	.00	100.00
	StDev	14.65	1.30	.00	.00	.00	.00	24.54	3.21	.00	12.19	1.30	.00	.00	.00
Hesperophycus	570	17	0	0	77	6	0	0	0	0	0	0	0	0	100
	571	35	9	0	43	13	0	0	0	0	0	0	0	0	100
	572	29	8	0	38	22	1	0	0	0	1	1	0	0	100
	573	24	24	0	46	5	0	0	0	0	1	0	0	0	100
	574	29	12	0	46	11	1	0	0	0	1	0	0	0	100
	Mean	26.80	10.60	.00	50.00	11.40	.40	.00	.00	.00	.60	.20	.00	.00	100.00
	StDev	6.72	8.71	.00	15.44	6.80	.55	.00	.00	.00	.55	.45	.00	.00	.00

Percent Cover of Index Species

Ford Point, Santa Rosa Island - Spring 2008 (4/12/08)

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	81	13	0	0	0	0	0	0	0	0	6	0	0	100
	521	69	29	0	0	0	0	1	0	0	0	1	0	0	100
	522	69	30	0	0	0	0	0	0	0	0	1	0	0	100
	523	40	2	0	58	0	0	0	0	0	0	0	0	0	100
	524	41	58	0	0	0	0	0	0	0	0	1	0	0	100
	Mean	60.00	26.40	.00	11.60	.00	.00	.20	.00	.00	.00	1.80	.00	.00	100.00
	StDev	18.47	21.17	.00	25.94	.00	.00	.45	.00	.00	.00	2.39	.00	.00	.00
Endocladia	525	23	0	0	63	0	0	10	0	0	4	0	0	0	100
	526	38	6	0	47	0	0	6	0	0	3	0	0	0	100
	527	50	0	0	37	0	0	3	1	0	9	0	0	0	100
	528	29	3	0	52	0	0	0	1	0	15	0	0	0	100
	529	48	0	1	46	0	0	0	0	0	5	0	0	0	100
	Mean	37.60	1.80	.20	49.00	.00	.00	3.80	.40	.00	7.20	.00	.00	.00	100.00
	StDev	11.72	2.68	.45	9.51	.00	.00	4.27	.55	.00	4.92	.00	.00	.00	.00
Mussels	530	70	1	0	2	0	0	23	0	0	0	4	0	0	100
	531	19	0	0	0	0	0	76	0	0	5	0	0	0	100
	532	6	5	0	0	0	0	3	5	0	69	10	0	2	100
	533	32	0	0	0	0	0	64	0	0	4	0	0	0	100
	534	10	13	0	0	0	0	0	41	0	11	25	0	0	100
	Mean	27.40	3.80	.00	.40	.00	.00	33.20	9.20	.00	17.80	7.80	.00	.40	100.00
	StDev	25.82	5.54	.00	.89	.00	.00	35.00	17.91	.00	28.89	10.45	.00	.89	.00

Percent Cover of Index Species

Fossil Reef, Santa Rosa Island - Spring 2008 (4/13/08)

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	43	51	0	2	0	0	0	0	0	0	4	0	0	100
	606	53	44	0	0	0	0	0	0	0	0	0	3	0	100
	607	37	53	0	10	0	0	0	0	0	0	0	0	0	100
	608	77	23	0	0	0	0	0	0	0	0	0	0	0	100
	609	71	28	0	0	0	0	0	1	0	0	0	0	0	100
	Mean	56.20	39.80	.00	2.40	.00	.00	.00	.20	.00	.00	.80	.60	.00	100.00
	StDev	17.36	13.59	.00	4.34	.00	.00	.00	.45	.00	.00	1.79	1.34	.00	.00
Endocladia	610	26	41	0	32	0	0	0	0	0	1	0	0	0	100
	611	14	25	0	54	0	6	0	0	0	0	1	0	0	100
	612	29	46	0	24	0	0	0	0	0	1	0	0	0	100
	613	53	18	0	24	0	4	0	0	0	0	1	0	0	100
	614	49	22	0	25	0	0	0	0	0	3	1	0	0	100
	Mean	34.20	30.40	.00	31.80	.00	2.00	.00	.00	.00	1.00	.60	.00	.00	100.00
	StDev	16.39	12.34	.00	12.85	.00	2.83	.00	.00	.00	1.22	.55	.00	.00	.00
Silvetia (Rockweed)	615	28	43	0	28	0	1	0	0	0	0	0	0	0	100
	616	48	3	0	41	0	1	0	3	0	3	1	0	0	100
	617	42	12	0	19	0	26	0	0	0	0	1	0	0	100
	618	19	2	0	8	0	63	0	0	0	6	2	0	0	100
	619	16	2	0	4	0	77	0	0	0	1	0	0	0	100
	Mean	30.60	12.40	.00	20.00	.00	33.60	.00	.60	.00	2.00	.80	.00	.00	100.00
	StDev	14.03	17.62	.00	15.05	.00	35.11	.00	1.34	.00	2.55	.84	.00	.00	.00
Mussels	620	11	0	0	0	0	0	2	6	0	62	19	0	0	100
	621	29	0	3	1	0	0	1	1	1	59	5	0	0	100
	622	37	2	10	0	0	0	34	0	1	12	4	0	0	100
	623	24	0	3	0	0	0	42	0	3	24	4	0	0	100
	624	1	0	0	0	0	0	0	13	0	14	72	0	0	100
	Mean	20.40	.40	3.20	.20	.00	.00	15.80	4.00	1.00	34.20	20.80	.00	.00	100.00
	StDev	14.38	.89	4.09	.45	.00	.00	20.47	5.61	1.22	24.46	29.32	.00	.00	.00

Percent Cover of Index Species

Johnson's Lee, Santa Rosa Island - Spring 2008 (4/9/08)

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	40	60	0	0	0	0	0	0	0	0	0	0	0	100
	501	53	47	0	0	0	0	0	0	0	0	0	0	0	100
	502	63	36	0	0	0	0	0	0	0	0	1	0	0	100
	503	48	44	0	8	0	0	0	0	0	0	0	0	0	100
	504	62	22	0	2	0	0	2	0	0	9	3	0	0	100
	Mean	53.20	41.80	.00	2.00	.00	.00	.40	.00	.00	1.80	.80	.00	.00	100.00
	StDev	9.68	14.04	.00	3.46	.00	.00	.89	.00	.00	4.02	1.30	.00	.00	.00
Endocladia	505	39	1	0	40	0	0	16	0	0	3	1	0	0	100
	506	61	0	0	38	0	0	1	0	0	0	0	0	0	100
	507	47	0	0	35	0	0	15	0	0	3	0	0	0	100
	508	34	3	1	34	0	0	27	0	1	0	0	0	0	100
	509	46	0	0	54	0	0	0	0	0	0	0	0	0	100
	Mean	45.40	.80	.20	40.20	.00	.00	11.80	.00	.20	1.20	.20	.00	.00	100.00
	StDev	10.21	1.30	.45	8.07	.00	.00	11.34	.00	.45	1.64	.45	.00	.00	.00
Mussels	510	6	14	0	0	0	0	1	7	0	2	70	0	0	100
	511	6	2	1	0	0	0	1	3	2	3	82	0	0	100
	512	26	0	3	0	0	0	68	0	1	1	1	0	0	100
	513	48	3	0	0	0	0	0	15	0	22	12	0	0	100
	514	7	0	0	0	0	0	0	22	0	47	21	0	3	100
	515	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	516	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	517	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	518	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Mean	10.33	2.11	.44	.00	.00	.00	7.78	5.22	.33	8.33	20.67	.00	.33	55.56
	StDev	16.36	4.59	1.01	.00	.00	.00	22.59	8.07	.71	16.13	32.34	.00	1.00	52.70

Percent Cover of Index Species

Northwest-Talcott, Santa Rosa Island - Spring 2008 (4/11/09)

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	53	46	0	0	0	0	0	0	0	0	0	1	0	100
	561	42	47	0	1	0	9	0	0	0	0	0	1	0	100
	562	3	90	0	1	0	2	0	0	0	4	0	0	0	100
	563	11	8	0	4	0	76	0	0	0	1	0	0	0	100
	564	80	13	0	0	0	7	0	0	0	0	0	0	0	100
	Mean	37.80	40.80	.00	1.20	.00	18.80	.00	.00	.00	1.00	.00	.40	.00	100.00
	StDev	31.46	32.92	.00	1.64	.00	32.18	.00	.00	.00	1.73	.00	.55	.00	.00
Endocladia	555	51	0	0	16	0	33	0	0	0	0	0	0	0	100
	556	51	0	0	34	0	15	0	0	0	0	0	0	0	100
	557	41	0	0	23	0	33	0	0	0	3	0	0	0	100
	558	46	0	1	39	0	4	0	0	0	9	1	0	0	100
	559	76	0	0	7	0	0	0	0	0	16	1	0	0	100
	Mean	53.00	.00	.20	23.80	.00	17.00	.00	.00	.00	5.60	.40	.00	.00	100.00
	StDev	13.51	.00	.45	13.03	.00	15.60	.00	.00	.00	6.88	.55	.00	.00	.00
Silvetia (Rockweed)	565	12	0	0	0	0	87	0	0	0	1	0	0	0	100
	566	38	0	0	0	0	62	0	0	0	0	0	0	0	100
	567	49	0	0	0	0	46	0	1	0	4	0	0	0	100
	568	11	0	0	4	0	85	0	0	0	0	0	0	0	100
	569	78	0	0	19	0	1	0	0	0	2	0	0	0	100
	Mean	37.60	.00	.00	4.60	.00	56.20	.00	.20	.00	1.40	.00	.00	.00	100.00
	StDev	27.95	.00	.00	8.23	.00	35.22	.00	.45	.00	1.67	.00	.00	.00	.00
Mussels	550	34	0	0	0	0	0	7	10	2	40	7	0	0	100
	551	21	0	0	0	0	0	51	9	0	18	1	0	0	100
	552	20	0	0	0	0	0	30	7	4	32	7	0	0	100
	553	33	0	1	0	0	0	25	9	5	25	2	0	0	100
	554	28	0	0	0	0	0	20	5	1	45	1	0	0	100
	Mean	27.20	.00	.20	.00	.00	.00	26.60	8.00	2.40	32.00	3.60	.00	.00	100.00
	StDev	6.53	.00	.45	.00	.00	.00	16.10	2.00	2.07	10.93	3.13	.00	.00	.00

Percent Cover of Index Species

Cat Rock, Anacapa Island - Fall 2008 (11/11/08)

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	49	48	0	3	0	0	0	0	0	0	0	0	0	100
	32	62	33	0	5	0	0	0	0	0	0	0	0	0	100
	33	53	35	0	12	0	0	0	0	0	0	0	0	0	100
	35	48	51	0	1	0	0	0	0	0	0	0	0	0	100
	36	54	41	0	5	0	0	0	0	0	0	0	0	0	100
	37	39	49	0	10	0	0	0	0	0	2	0	0	0	100
	38	79	21	0	0	0	0	0	0	0	0	0	0	0	100
	39	36	64	0	0	0	0	0	0	0	0	0	0	0	100
	135	32	68	0	0	0	0	0	0	0	0	0	0	0	100
	Mean	50.22	45.56	.00	4.00	.00	.00	.00	.00	.00	.22	.00	.00	.00	100.00
	StDev	14.39	14.93	.00	4.47	.00	.00	.00	.00	.00	.67	.00	.00	.00	.00
Endocladia	13	53	2	9	28	0	0	4	0	0	2	2	0	0	100
	14	47	2	24	9	0	0	12	0	0	6	0	0	0	100
	19	69	1	0	25	0	2	0	0	0	3	0	0	0	100
	51	26	0	5	10	0	0	0	6	0	51	2	0	0	100
	52	13	0	20	27	0	0	15	2	0	21	2	0	0	100
	54	23	1	11	28	0	0	4	6	0	27	0	0	0	100
	212	46	1	8	27	0	0	8	0	0	8	0	0	2	100
	467	38	0	14	17	0	0	24	0	0	7	0	0	0	100
	492	48	3	8	19	0	3	2	0	0	17	0	0	0	100
	Mean	40.33	1.11	11.00	21.11	.00	.56	7.67	1.56	.00	15.78	.67	.00	.22	100.00
	StDev	17.23	1.05	7.40	7.67	.00	1.13	8.03	2.60	.00	15.74	1.00	.00	.67	.00
Silvetia (Rockweed)	2	35	34	0	22	4	0	0	0	0	4	1	0	0	100
	3	54	43	0	1	2	0	0	0	0	0	0	0	0	100
	4	59	29	0	9	1	1	0	0	0	1	0	0	0	100
	5	56	7	2	9	1	4	4	0	0	16	1	0	0	100
	6	30	5	0	11	8	21	0	0	0	25	0	0	0	100
	8	57	10	0	3	0	13	0	0	0	17	0	0	0	100
	9	29	7	0	5	0	37	0	0	0	21	1	0	0	100
	10	70	16	0	12	0	0	0	0	0	2	0	0	0	100
	55	27	20	4	18	7	0	3	0	0	20	1	0	0	100
	Mean	46.33	19.00	.67	10.00	2.56	8.44	.78	.00	.00	11.78	.44	.00	.00	100.00
	StDev	16.03	13.58	1.41	6.80	3.09	13.01	1.56	.00	.00	9.90	.53	.00	.00	.00

Percent Cover of Index Species
Cat Rock, Anacapa Island - Fall 2008 (11/11/08)(continued)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra- clita	Endo- cladia	Hespero- phycus	<i>Silvetia</i>	Mussels	Turf- weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Mussels	56	11	0	12	0	0	0	53	0	0	24	0	0	0	100
	164	8	0	10	1	0	0	51	0	0	29	1	0	0	100
	203	23	0	8	0	0	0	40	2	0	27	0	0	0	100
	204	6	0	3	0	0	0	89	0	0	2	0	0	0	100
	468	5	1	8	0	0	0	43	1	0	41	1	0	0	100
	470	41	0	8	1	0	0	30	1	1	17	1	0	0	100
	471	23	0	11	9	0	0	33	0	0	24	0	0	0	100
	472	2	0	2	0	0	0	78	0	0	18	0	0	0	100
	473	30	1	9	0	0	0	37	2	0	21	0	0	0	100
	Mean	16.56	.22	7.89	1.22	.00	.00	50.44	.67	.11	22.56	.33	.00	.00	100.00
	StDev	13.33	.44	3.37	2.95	.00	.00	20.37	.87	.33	10.50	.50	.00	.00	.00

Percent Cover of Index Species Middle-East, Anacapa Island - Fall 2008 (11/12/08)

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	64	3	23	0	0	0	0	0	0	10	0	0	0	100
	244	77	3	0	14	0	0	2	0	0	4	0	0	0	100
	245	70	2	13	4	0	0	6	0	0	4	1	0	0	100
	Mean	70.33	2.67	12.00	6.00	.00	.00	2.67	.00	.00	6.00	.33	.00	.00	100.00
	StDev	6.51	.58	11.53	7.21	.00	.00	3.06	.00	.00	3.46	.58	.00	.00	.00
Endocladia	240	80	1	1	3	0	0	0	0	0	15	0	0	0	100
	241	55	1	15	4	0	0	7	0	0	17	1	0	0	100
	242	74	4	7	15	0	0	0	0	0	0	0	0	0	100
	Mean	69.67	2.00	7.67	7.33	.00	.00	2.33	.00	.00	10.67	.33	.00	.00	100.00
	StDev	13.05	1.73	7.02	6.66	.00	.00	4.04	.00	.00	9.29	.58	.00	.00	.00
Silvetia (Rockweed)	53	46	0	5	1	0	0	14	8	0	26	0	0	0	100
	237	38	3	2	3	0	26	0	13	0	15	0	0	0	100
	469	57	0	9	0	0	0	2	0	0	31	1	0	0	100
	Mean	47.00	1.00	5.33	1.33	.00	8.67	5.33	7.00	.00	24.00	.33	.00	.00	100.00
	StDev	9.54	1.73	3.51	1.53	.00	15.01	7.57	6.56	.00	8.19	.58	.00	.00	.00
Mussels	476	24	0	3	0	0	0	23	0	0	42	8	0	0	100
	477	15	0	18	0	0	0	0	0	0	67	0	0	0	100
	478	7	0	3	0	0	0	18	2	0	54	16	0	0	100
	Mean	15.33	.00	8.00	.00	.00	.00	13.67	.67	.00	54.33	8.00	.00	.00	100.00
	StDev	8.50	.00	8.66	.00	.00	.00	12.10	1.15	.00	12.50	8.00	.00	.00	.00

Percent Cover of Index Species Middle-West, Anacapa Island - Fall 2008 (11/12/08)

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	41	56	0	0	0	0	0	0	0	2	1	0	0	100
	448	46	5	1	7	0	0	3	0	0	37	1	0	0	100
	449	49	19	0	0	0	0	0	0	0	31	1	0	0	100
	450	50	24	0	3	0	0	0	1	0	21	1	0	0	100
	451	57	12	1	19	0	0	0	0	0	7	4	0	0	100
	Mean	48.60	23.20	.40	5.80	.00	.00	.60	.20	.00	19.60	1.60	.00	.00	100.00
	StDev	5.86	19.69	.55	7.92	.00	.00	1.34	.45	.00	15.03	1.34	.00	.00	.00
Endocladia	457	21	1	0	22	0	0	19	0	0	35	2	0	0	100
	458	54	2	6	16	0	0	4	0	0	16	2	0	0	100
	459	57	7	0	8	0	0	2	0	0	25	1	0	0	100
	460	58	26	0	11	0	0	0	0	0	4	1	0	0	100
	461	71	19	0	5	0	0	0	0	0	5	0	0	0	100
	Mean	52.20	11.00	1.20	12.40	.00	.00	5.00	.00	.00	17.00	1.20	.00	.00	100.00
	StDev	18.62	11.02	2.68	6.73	.00	.00	8.00	.00	.00	13.25	.84	.00	.00	.00
Silvetia (Rockweed)	452	53	9	4	0	0	0	28	0	0	6	0	0	0	100
	453	52	4	2	0	0	28	0	0	0	13	1	0	0	100
	454	19	0	0	10	0	0	0	8	0	62	1	0	0	100
	455	54	0	0	5	0	3	0	1	0	34	3	0	0	100
	456	69	0	0	1	0	0	0	0	0	24	6	0	0	100
	Mean	49.40	2.60	1.20	3.20	.00	6.20	5.60	1.80	.00	27.80	2.20	.00	.00	100.00
	StDev	18.37	3.97	1.79	4.32	.00	12.26	12.52	3.49	.00	21.89	2.39	.00	.00	.00
Mussels	462	30	0	0	3	0	0	24	5	2	36	0	0	0	100
	463	33	3	2	0	0	0	11	5	0	43	3	0	0	100
	464	21	0	0	0	0	0	24	9	0	46	0	0	0	100
	465	35	1	2	0	0	0	2	2	0	54	4	0	0	100
	466	5	0	0	0	0	0	26	0	0	67	2	0	0	100
	Mean	24.80	.80	.80	.60	.00	.00	17.40	4.20	.40	49.20	1.80	.00	.00	100.00
	StDev	12.30	1.30	1.10	1.34	.00	.00	10.48	3.42	.89	11.86	1.79	.00	.00	.00

Percent Cover of Index Species
S. Frenchy's Cove, Anacapa Island - Fall 2008 (11/11/08)

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	55	32	0	13	0	0	0	0	0	0	0	0	0	100
	250	46	42	0	12	0	0	0	0	0	0	0	0	0	100
	251	52	42	0	6	0	0	0	0	0	0	0	0	0	100
	252	72	15	0	12	0	0	0	0	0	0	0	1	0	100
	253	42	47	0	11	0	0	0	0	0	0	0	0	0	100
	Mean	53.40	35.60	.00	10.80	.00	.00	.00	.00	.00	.00	.00	.20	.00	100.00
	StDev	11.57	12.74	.00	2.77	.00	.00	.00	.00	.00	.00	.00	.45	.00	.00
Endocladia	154	16	1	0	81	0	2	0	0	0	0	0	0	0	100
	155	12	0	0	68	0	17	0	0	0	2	0	0	1	100
	256	25	0	0	66	4	3	0	0	0	2	0	0	0	100
	257	31	0	0	66	0	0	0	0	0	3	0	0	0	100
	258	27	0	0	55	0	18	0	0	0	0	0	0	0	100
	Mean	22.20	.20	.00	67.20	.80	8.00	.00	.00	.00	1.40	.00	.00	.20	100.00
	StDev	7.92	.45	.00	9.26	1.79	8.75	.00	.00	.00	1.34	.00	.00	.45	.00
Silvetia (Rockweed)	259	55	9	0	1	0	16	0	0	0	19	0	0	0	100
	260	44	1	0	8	0	43	0	0	0	4	0	0	0	100
	261	28	1	0	0	1	16	0	0	0	54	0	0	0	100
	262	51	2	0	33	0	8	0	4	0	2	0	0	0	100
	263	24	0	0	0	0	70	0	0	0	6	0	0	0	100
	Mean	40.40	2.60	.00	8.40	.20	30.60	.00	.80	.00	17.00	.00	.00	.00	100.00
	StDev	13.79	3.65	.00	14.15	.45	25.71	.00	1.79	.00	21.73	.00	.00	.00	.00
Mussels	201	0	0	0	0	0	0	61	12	0	26	0	0	1	100
	202	11	0	1	0	0	0	66	11	0	11	0	0	0	100
	264	5	0	0	0	0	0	68	14	0	13	0	0	0	100
	265	8	0	0	0	0	0	75	8	0	9	0	0	0	100
	266	5	0	0	0	0	0	56	9	0	30	0	0	0	100
	Mean	5.80	.00	.20	.00	.00	.00	65.20	10.80	.00	17.80	.00	.00	.20	100.00
	StDev	4.09	.00	.45	.00	.00	.00	7.19	2.39	.00	9.52	.00	.00	.45	.00

Percent Cover of Index Species

Crook Point, San Miguel Island - Fall 2008 (1/21/09)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	137	78	22	0	0	0	0	0	0	0	0	0	0	0	100
	147	80	20	0	0	0	0	0	0	0	0	0	0	0	100
	148	67	33	0	0	0	0	0	0	0	0	0	0	0	100
	149	66	14	0	13	0	0	3	0	0	0	4	0	0	100
	495	47	48	0	4	0	0	0	0	0	1	0	0	0	100
	Mean	67.60	27.40	.00	3.40	.00	.00	.60	.00	.00	.20	.80	.00	.00	100.00
	StDev	13.13	13.41	.00	5.64	.00	.00	1.34	.00	.00	.45	1.79	.00	.00	.00
Endocladia	386	67	4	0	27	0	0	1	0	0	0	1	0	0	100
	387	55	4	0	23	0	0	0	0	0	17	1	0	0	100
	388	69	14	0	11	0	0	0	2	0	0	4	0	0	100
	389	27	1	1	31	4	0	31	0	3	1	0	0	0	99
	390	53	6	0	16	0	0	12	0	0	13	0	0	0	100
	Mean	54.20	5.80	.20	21.60	.80	.00	8.80	.40	.60	6.20	1.20	.00	.00	99.80
	StDev	16.77	4.92	.45	8.11	1.79	.00	13.41	.89	1.34	8.17	1.64	.00	.00	.45
Silvetia (Rockweed)	396	38	3	0	41	0	0	15	0	0	3	0	0	0	100
	397	4	0	0	0	0	0	95	0	0	1	0	0	0	100
	398	68	2	0	10	0	0	14	0	2	3	1	0	0	100
	399	57	4	0	0	0	0	0	8	0	29	2	0	0	100
	400	41	1	0	51	5	0	1	0	0	1	0	0	0	100
	Mean	41.60	2.00	.00	20.40	1.00	.00	25.00	1.60	.40	7.40	.60	.00	.00	100.00
	StDev	24.30	1.58	.00	23.99	2.24	.00	39.76	3.58	.89	12.12	.89	.00	.00	.00
Mussels	381	30	2	0	1	0	0	57	0	3	5	2	0	0	100
	382	5	0	0	0	0	0	91	0	0	4	0	0	0	100
	383	6	0	0	0	0	0	86	0	0	8	0	0	0	100
	384	18	0	1	0	0	0	73	0	0	8	0	0	0	100
	385	23	0	0	0	0	0	67	0	1	9	0	0	0	100
	Mean	16.40	.40	.20	.20	.00	.00	74.80	.00	.80	6.80	.40	.00	.00	100.00
	StDev	10.83	.89	.45	.45	.00	.00	13.86	.00	1.30	2.17	.89	.00	.00	.00

Percent Cover of Index Species

Cuyler Harbor, San Miguel Island - Fall 2008 (1/20/09)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	416	35	65	0	0	0	0	0	0	0	0	0	0	0	100
	417	62	15	0	23	0	0	0	0	0	0	0	0	0	100
	418	43	47	0	10	0	0	0	0	0	0	0	0	0	100
	419	36	10	0	54	0	0	0	0	0	0	0	0	0	100
	420	31	4	0	65	0	0	0	0	0	0	0	0	0	100
	Mean	41.40	28.20	.00	30.40	.00	.00	.00	.00	.00	.00	.00	.00	.00	100.00
	StDev	12.30	26.45	.00	28.06	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Endocladia	411	62	0	4	13	0	0	10	0	0	10	1	0	0	100
	412	29	22	0	26	0	0	18	4	1	0	0	0	0	100
	413	54	0	0	23	0	19	0	0	0	4	0	0	0	100
	414	55	0	0	37	0	0	2	1	0	4	1	0	0	100
	415	27	0	0	68	0	0	0	2	0	3	0	0	0	100
	Mean	45.40	4.40	.80	33.40	.00	3.80	6.00	1.40	.20	4.20	.40	.00	.00	100.00
	StDev	16.20	9.84	1.79	21.15	.00	8.50	7.87	1.67	.45	3.63	.55	.00	.00	.00
Silvetia (Rockweed)	406	23	0	0	15	0	32	0	0	0	16	14	0	0	100
	407	16	0	0	0	0	73	0	0	0	9	2	0	0	100
	408	37	0	8	4	0	32	1	0	1	15	2	0	0	100
	409	53	0	0	3	0	18	0	0	0	18	8	0	0	100
	410	63	0	5	1	0	13	0	0	1	11	6	0	0	100
	Mean	38.40	.00	2.60	4.60	.00	33.60	.20	.00	.40	13.80	6.40	.00	.00	100.00
	StDev	19.74	.00	3.71	6.02	.00	23.59	.45	.00	.55	3.70	4.98	.00	.00	.00
Mussels	401	27	12	16	0	0	0	4	8	4	7	22	0	0	100
	402	7	0	2	0	0	0	68	2	0	6	15	0	0	100
	403	7	0	3	0	0	0	72	5	5	0	8	0	0	100
	404	27	0	11	0	0	0	36	2	0	2	22	0	0	100
	405	25	0	7	0	0	0	57	1	4	0	6	0	0	100
	Mean	18.60	2.40	7.80	.00	.00	.00	47.40	3.60	2.60	3.00	14.60	.00	.00	100.00
	StDev	10.62	5.37	5.81	.00	.00	.00	28.00	2.88	2.41	3.32	7.54	.00	.00	.00

Percent Cover of Index Species

Harris Point, San Miguel Island - Fall 2008 (1/23/09)

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
81	Chthamalus/Balanus	440	27	64	0	4	0	0	0	0	5	0	0	0	100
		441	39	61	0	0	0	0	0	0	0	0	0	0	100
		442	41	56	0	2	0	0	0	0	0	1	0	0	100
		443	44	51	0	0	0	0	0	0	0	0	5	0	100
		444	36	63	0	0	0	0	0	0	0	1	0	0	100
		Mean	37.40	59.00	.00	1.20	.00	.00	.00	.00	1.00	.40	1.00	.00	100.00
		StDev	6.50	5.43	.00	1.79	.00	.00	.00	.00	2.24	.55	2.24	.00	.00
	Endocladia	431	43	24	1	17	0	3	1	0	9	2	0	0	100
		432	29	7	0	44	5	0	1	0	14	0	0	0	100
		433	38	7	0	44	7	0	0	0	4	0	0	0	100
		434	46	2	0	41	7	0	0	0	4	0	0	0	100
		435	22	0	0	36	24	0	0	0	18	0	0	0	100
		Mean	35.60	8.00	.20	36.40	8.60	.60	.40	.00	9.80	.40	.00	.00	100.00
		StDev	9.96	9.46	.45	11.33	9.07	1.34	.55	.00	6.18	.89	.00	.00	.00
	Mussels	426	33	0	0	4	0	52	0	2	8	1	0	0	100
82		427	58	0	0	8	5	0	0	0	24	5	0	0	100
		428	68	2	0	7	3	1	0	0	14	5	0	0	100
		429	47	11	2	0	0	29	0	0	11	0	0	0	100
		430	15	0	4	0	0	64	0	1	16	0	0	0	100
		Mean	44.20	2.60	1.20	3.80	1.60	29.20	.00	.60	14.60	2.20	.00	.00	100.00
		StDev	20.87	4.77	1.79	3.77	2.30	29.06	.00	.89	6.07	2.59	.00	.00	.00
	Tetraclita	436	27	18	7	0	0	34	0	0	13	1	0	0	100
		437	44	6	13	0	0	15	0	1	17	4	0	0	100
		438	19	0	0	6	0	0	26	0	47	2	0	0	100
		439	57	2	2	1	0	4	1	0	27	6	0	0	100
		445	66	1	5	1	0	13	0	0	7	7	0	0	100
		Mean	42.60	5.40	5.40	1.60	.00	13.20	5.40	.20	22.20	4.00	.00	.00	100.00
		StDev	19.73	7.40	5.03	2.51	.00	13.18	11.52	.45	15.66	2.55	.00	.00	.00
	Hesperophycus	421	36	0	0	26	37	0	0	0	1	0	0	0	100
83		422	26	0	0	13	48	0	0	0	12	0	1	0	100
		423	22	0	0	51	22	0	0	0	5	0	0	0	100
		424	80	0	0	16	3	0	0	0	0	0	1	0	100
		425	82	0	0	6	8	0	0	0	4	0	0	0	100
		Mean	49.20	.00	.00	22.40	23.60	.00	.00	.00	4.40	.00	.40	.00	100.00
		StDev	29.48	.00	.00	17.53	19.01	.00	.00	.00	4.72	.00	.55	.00	.00

Percent Cover of Index Species

Otter Harbor, San Miguel Island - Fall 2008 (1/22/09)

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	96	4	0	0	0	0	0	0	0	0	0	0	0	100
	371	53	46	0	0	0	0	0	0	0	0	1	0	0	100
	372	59	38	0	0	0	0	0	0	0	1	2	0	0	100
	373	47	53	0	0	0	0	0	0	0	0	0	0	0	100
	374	10	0	0	0	0	0	0	32	0	58	0	0	0	100
	Mean	53.00	28.20	.00	.00	.00	.00	.00	6.40	.00	11.80	.60	.00	.00	100.00
	StDev	30.70	24.54	.00	.00	.00	.00	.00	14.31	.00	25.83	.89	.00	.00	.00
Endocladia	360	24	30	1	31	0	7	3	0	0	4	0	0	0	100
	361	58	10	0	29	0	0	0	0	0	3	0	0	0	100
	362	6	0	0	78	0	0	0	0	1	15	0	0	0	100
	363	36	2	0	30	0	0	0	0	0	31	1	0	0	100
	364	19	0	0	55	0	4	0	0	0	22	0	0	0	100
	Mean	28.60	8.40	.20	44.60	.00	2.20	.60	.00	.20	15.00	.20	.00	.00	100.00
	StDev	19.64	12.76	.45	21.59	.00	3.19	1.34	.00	.45	11.94	.45	.00	.00	.00
Silvetia (Rockweed)	355	69	27	0	0	0	0	0	0	0	0	2	2	0	100
	356	14	0	1	49	0	14	0	4	1	17	0	0	0	100
	357	7	1	0	67	0	4	0	0	0	21	0	0	0	100
	358	27	44	0	26	0	0	0	0	0	2	0	1	0	100
	359	38	47	0	9	0	0	0	0	0	2	2	2	0	100
	Mean	31.00	23.80	.20	30.20	.00	3.60	.00	.80	.20	8.40	.80	1.00	.00	100.00
	StDev	24.36	22.60	.45	27.78	.00	6.07	.00	1.79	.45	9.81	1.10	1.00	.00	.00
Mussels	375	14	4	4	0	0	0	48	0	4	26	0	0	0	100
	376	18	6	0	0	0	0	46	0	4	26	0	0	0	100
	378	3	2	0	1	0	0	60	0	11	21	2	0	0	100
	379	14	8	0	2	0	0	19	0	3	53	1	0	0	100
	380	5	2	3	0	0	0	55	0	1	32	2	0	0	100
	Mean	10.80	4.40	1.40	.60	.00	.00	45.60	.00	4.60	31.60	1.00	.00	.00	100.00
	StDev	6.46	2.61	1.95	.89	.00	.00	15.88	.00	3.78	12.58	1.00	.00	.00	.00

Percent Cover of Index Species

Landing Cove, Santa Barbara Island - Fall 2008 (10/15/08)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	<i>Silvetia</i>	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Phyllo-spadiX	Total
Chthamalus/Balanus	315	79	3	3	2	0	0	2	3	0	7	1	0	0	100
	316	37	1	0	1	0	0	0	5	0	56	0	0	0	100
	317	28	0	1	0	0	0	6	22	0	43	0	0	0	100
	318	25	0	22	0	0	0	45	2	0	5	1	0	0	100
	319	62	1	5	4	0	0	2	3	0	23	0	0	0	100
	Mean	46.20	1.00	6.20	1.40	.00	.00	11.00	7.00	.00	26.80	.40	.00	.00	100.00
	StDev	23.40	1.22	9.04	1.67	.00	.00	19.13	8.46	.00	22.34	.55	.00	.00	.00
<i>Silvetia</i> (Rockweed)	310	48	2	0	0	0	0	1	2	0	47	0	0	0	100
	311	44	0	0	0	0	0	0	0	0	55	1	0	0	100
	312	37	0	0	0	0	0	1	6	0	56	0	0	0	100
	313	38	0	0	0	0	0	0	3	0	59	0	0	0	100
	314	44	0	0	0	0	3	0	12	0	41	0	0	0	100
	Mean	42.20	.40	.00	.00	.00	.60	.40	4.60	.00	51.60	.20	.00	.00	100.00
	StDev	4.60	.89	.00	.00	.00	1.34	.55	4.67	.00	7.40	.45	.00	.00	.00
Mussels	325	16	0	1	0	0	0	60	0	0	22	1	0	0	100
	326	1	1	0	0	0	0	92	0	0	5	1	0	0	100
	327	2	0	0	0	0	0	47	0	1	49	1	0	0	100
	328	11	0	4	0	0	0	57	0	0	27	1	0	0	100
	329	37	0	18	0	0	0	1	0	0	44	0	0	0	100
	Mean	13.40	.20	4.60	.00	.00	.00	51.40	.00	.20	29.40	.80	.00	.00	100.00
	StDev	14.60	.45	7.67	.00	.00	.00	32.84	.00	.45	17.70	.45	.00	.00	.00
Red Algal Turf	320	2	0	0	0	0	0	0	96	0	2	0	0	0	100
	321	0	0	0	0	0	0	0	83	0	17	0	0	0	100
	322	0	0	0	0	0	0	14	3	0	6	1	0	76	100
	323	0	0	0	0	0	0	0	5	0	0	0	0	95	100
	324	1	0	0	0	0	0	0	66	0	33	0	0	0	100
	Mean	.60	.00	.00	.00	.00	.00	2.80	50.60	.00	11.60	.20	.00	34.20	100.00
	StDev	.89	.00	.00	.00	.00	.00	6.26	43.86	.00	13.65	.45	.00	47.31	.00

Percent Cover of Index Species

Sea Lion Rookery, Santa Barbara Island - Fall 2008 (10/16/08)

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
84	Chthamalus/Balanus	345	43	5	1	3	0	0	5	3	0	40	0	0	100
		346	71	9	0	1	0	0	0	0	19	0	0	0	100
		347	40	18	0	0	0	0	0	0	42	0	0	0	100
		348	17	2	1	0	0	0	0	0	80	0	0	0	100
		349	46	12	0	0	0	1	0	0	41	0	0	0	100
	Mean	43.40	9.20	.40	.80	.00	.00	1.20	.60	.00	44.40	.00	.00	.00	100.00
	StDev	19.22	6.22	.55	1.30	.00	.00	2.17	1.34	.00	22.07	.00	.00	.00	.00
	Endocladia	335	25	0	3	2	0	0	0	1	68	1	0	0	100
		336	23	0	1	0	0	0	0	0	76	0	0	0	100
		337	8	0	2	0	0	14	1	1	74	0	0	0	100
84		338	18	1	2	2	0	2	0	0	75	0	0	0	100
		339	17	0	9	3	0	2	0	0	69	0	0	0	100
	Mean	18.20	.20	3.40	1.40	.00	.00	3.60	.20	.40	72.40	.20	.00	.00	100.00
	StDev	6.61	.45	3.21	1.34	.00	.00	5.90	.45	.55	3.65	.45	.00	.00	.00
	Silvetia (Rockweed)	330	33	0	6	0	0	15	6	0	33	7	0	0	100
		331	28	0	1	2	0	26	3	0	31	0	0	1	100
		332	13	0	0	2	0	1	3	0	72	1	0	0	100
		333	11	0	0	0	0	9	1	25	54	0	0	0	100
		334	19	0	1	2	0	13	0	4	61	0	0	0	100
	Mean	20.80	.00	1.60	1.20	.00	9.80	4.40	10.20	.00	50.20	1.60	.00	.20	100.00
84	StDev	9.50	.00	2.51	1.10	.00	10.57	6.07	8.44	.00	17.82	3.05	.00	.45	.00
	Mussels	350	33	0	0	0	0	19	0	0	42	6	0	0	100
		351	19	0	2	0	0	48	0	0	29	2	0	0	100
		352	21	0	2	0	0	42	1	0	28	6	0	0	100
		353	23	0	0	0	0	28	0	0	39	10	0	0	100
		354	14	0	2	0	0	12	0	1	66	5	0	0	100
	Mean	22.00	.00	1.20	.00	.00	.00	29.80	.20	.20	40.80	5.80	.00	.00	100.00
	StDev	7.00	.00	1.10	.00	.00	.00	15.14	.45	.45	15.35	2.86	.00	.00	.00

Percent Cover of Index Species

Fraser Cove, Santa Cruz Island - Fall 2008 (12/11/08)(continued)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
85	Chthamalus/Balanus	876	67	28	0	0	0	4	0	0	0	1	0	0	100
		877	78	18	0	2	0	2	0	0	0	0	0	0	100
		878	54	43	0	0	0	0	0	0	0	0	3	0	100
		879	76	22	0	0	0	0	0	0	1	0	1	0	100
		880	81	16	0	1	0	0	0	0	2	0	0	0	100
		Mean	71.20	25.40	.00	.60	.00	1.20	.00	.00	.60	.20	.80	.00	100.00
		StDev	10.94	10.85	.00	.89	.00	1.79	.00	.00	.89	.45	1.30	.00	.00
	Endocladia	881	50	6	0	22	0	18	0	0	4	0	0	0	100
		882	83	4	0	3	0	6	0	0	4	0	0	0	100
		883	87	1	0	11	0	1	0	0	0	0	0	0	100
		884	24	7	0	65	0	0	0	0	3	1	0	0	100
		885	35	17	0	31	0	0	0	0	16	1	0	0	100
		Mean	55.80	7.00	.00	26.40	.00	5.00	.00	.00	5.40	.40	.00	.00	100.00
		StDev	28.24	6.04	.00	24.06	.00	7.68	.00	.00	6.15	.55	.00	.00	.00
	Silvetia (Rockweed)	896	62	7	0	18	8	5	0	0	0	0	0	0	100
		897	44	3	0	16	6	15	0	0	12	0	0	4	100
		898	37	0	0	8	0	47	0	0	8	0	0	0	100
		899	54	12	0	10	0	19	0	0	4	1	0	0	100
		900	33	7	0	27	19	11	0	0	3	0	0	0	100
		Mean	46.00	5.80	.00	15.80	6.60	19.40	.00	.00	5.40	.20	.00	.80	100.00
		StDev	11.98	4.55	.00	7.50	7.80	16.27	.00	.00	4.67	.45	.00	1.79	.00
	Mussels	891	3	0	0	0	0	84	0	0	2	11	0	0	100
		892	28	1	0	0	0	66	0	0	4	1	0	0	100
		893	7	0	0	0	0	89	0	0	0	4	0	0	100
		894	12	7	0	0	0	77	0	0	0	4	0	0	100
		895	20	0	0	0	0	69	1	0	9	1	0	0	100
		Mean	14.00	1.60	.00	.00	.00	77.00	.20	.00	3.00	4.20	.00	.00	100.00
		StDev	10.07	3.05	.00	.00	.00	9.72	.45	.00	3.74	4.09	.00	.00	.00
	Pollicipes	901	28	7	1	0	0	60	0	2	2	0	0	0	100
		902	59	12	1	10	0	5	0	0	5	6	0	2	100
		903	14	1	0	0	0	69	0	8	2	6	0	0	100
		904	23	0	0	0	0	64	0	1	11	1	0	0	100
		905	20	0	1	0	0	61	1	10	3	4	0	0	100
		Mean	28.80	4.00	.60	2.00	.00	51.80	.20	4.20	4.60	3.40	.00	.40	100.00
		StDev	17.63	5.34	.55	4.47	.00	26.40	.45	4.49	3.78	2.79	.00	.89	.00

Percent Cover of Index Species Fraser Cove, Santa Cruz Island - Fall 2008 (12/11/08)

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	45	17	0	0	0	0	0	0	0	0	0	38	0	100
	907	24	14	0	0	0	0	0	0	0	0	0	62	0	100
	908	51	1	0	0	0	0	0	0	0	0	0	48	0	100
	909	59	5	0	0	0	0	0	0	0	0	0	36	0	100
	910	42	3	0	0	0	0	0	0	0	0	0	55	0	100
	Mean	44.20	8.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	47.80	.00	100.00
	StDev	13.03	7.07	.00	.00	.00	.00	.00	.00	.00	.00	.00	11.05	.00	.00
Hesperophycus	886	59	0	0	28	13	0	0	0	0	0	0	0	0	100
	887	69	2	0	18	8	0	0	0	0	3	0	0	0	100
	888	39	7	0	41	13	0	0	0	0	0	0	0	0	100
	889	73	2	0	16	2	2	0	0	0	5	0	0	0	100
	890	7	10	0	0	28	55	0	0	0	0	0	0	0	100
	Mean	49.40	4.20	.00	20.60	12.80	11.40	.00	.00	.00	1.60	.00	.00	.00	100.00
	StDev	27.11	4.15	.00	15.19	9.63	24.39	.00	.00	.00	2.30	.00	.00	.00	.00

Percent Cover of Index Species

Orizaba Cove, Santa Cruz Island - Fall 2008 (11/26/08)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	851	43	46	7	0	0	0	0	0	0	4	0	0	0	100
	852	17	79	0	0	0	0	2	0	0	2	0	0	0	100
	853	56	43	1	0	0	0	0	0	0	0	0	0	0	100
	854	46	37	5	0	0	0	5	0	0	7	0	0	0	100
	855	74	21	0	0	0	0	0	0	0	5	0	0	0	100
	Mean	47.20	45.20	2.60	.00	.00	.00	1.40	.00	.00	3.60	.00	.00	.00	100.00
	StDev	20.78	21.22	3.21	.00	.00	.00	2.19	.00	.00	2.70	.00	.00	.00	.00
Silvetia (Rockweed)	866	36	0	13	0	0	0	21	0	0	29	1	0	0	100
	867	49	0	1	1	0	10	0	0	0	39	0	0	0	100
	868	33	0	5	3	0	17	1	0	0	40	0	0	0	99
	869	20	1	5	7	1	52	0	0	0	14	0	0	0	100
	870	42	2	3	8	0	22	0	0	0	21	2	0	0	100
	Mean	36.00	.60	5.40	3.80	.20	20.20	4.40	.00	.00	28.60	.60	.00	.00	99.80
	StDev	10.84	.89	4.56	3.56	.45	19.60	9.29	.00	.00	11.28	.89	.00	.00	.45
Mussels	861	7	0	9	0	0	0	0	0	0	83	1	0	0	100
	862	16	0	3	0	0	0	0	0	0	80	1	0	0	100
	863	15	2	0	0	0	0	0	0	0	80	3	0	0	100
	864	9	0	0	0	0	0	0	0	0	91	0	0	0	100
	865	10	0	0	0	0	0	0	0	0	90	0	0	0	100
	Mean	11.40	.40	2.40	.00	.00	.00	.00	.00	.00	84.80	1.00	.00	.00	100.00
	StDev	3.91	.89	3.91	.00	.00	.00	.00	.00	.00	5.36	1.22	.00	.00	.00
Tetraclita	871	43	1	26	0	0	0	29	0	0	1	0	0	0	100
	872	35	0	13	0	0	0	13	1	0	24	14	0	0	100
	873	46	0	42	0	0	0	2	0	0	6	2	0	0	98
	874	35	0	27	0	0	0	9	0	1	26	2	0	0	100
	875	34	0	8	0	0	0	36	0	1	18	3	0	0	100
	Mean	38.60	.20	23.20	.00	.00	.00	17.80	.20	.40	15.00	4.20	.00	.00	99.60
	StDev	5.50	.45	13.33	.00	.00	.00	14.20	.45	.55	11.05	5.59	.00	.00	.89
Hesperophycus	856	30	15	1	42	3	0	0	0	0	9	0	0	0	100
	857	30	2	3	18	15	2	15	0	0	12	2	0	0	99
	858	29	0	0	13	30	6	0	0	0	22	0	0	0	100
	859	65	13	0	12	0	0	8	0	0	0	2	0	0	100
	860	60	0	0	25	13	0	0	0	0	2	0	0	0	100
	Mean	42.80	6.00	.80	22.00	12.20	1.60	4.60	.00	.00	9.00	.80	.00	.00	99.80
	StDev	18.07	7.38	1.30	12.31	11.82	2.61	6.77	.00	.00	8.77	1.10	.00	.00	.45

Percent Cover of Index Species

Prisoner's Harbor, Santa Cruz Island - Fall 2008 (12/9/08)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	826	68	8	0	0	0	0	0	0	0	16	1	0	7	100
	827	30	42	0	0	0	0	0	7	0	19	2	0	0	100
	828	31	16	0	4	0	0	0	5	0	33	11	0	0	100
	829	53	20	1	2	0	0	0	1	0	12	11	0	0	100
	830	53	8	0	16	0	1	0	0	0	15	7	0	0	100
	Mean	47.00	18.80	.20	4.40	.00	.20	.00	2.60	.00	19.00	6.40	.00	1.40	100.00
	StDev	16.26	13.97	.45	6.69	.00	.45	.00	3.21	.00	8.22	4.77	.00	3.13	.00
Endocladia	831	74	4	0	10	0	0	0	0	0	11	0	0	1	100
	832	64	12	0	22	2	0	0	0	0	0	0	0	0	100
	833	67	22	0	10	0	0	0	0	0	0	1	0	0	100
	834	76	1	0	23	0	0	0	0	0	0	0	0	0	100
	835	66	1	0	27	2	0	0	0	0	1	3	0	0	100
	Mean	69.40	8.00	.00	18.40	.80	.00	.00	.00	.00	2.40	.80	.00	.20	100.00
	StDev	5.27	9.03	.00	7.89	1.10	.00	.00	.00	.00	4.83	1.30	.00	.45	.00
Silvetia (Rockweed)	846	28	37	1	0	2	0	0	1	0	30	1	0	0	100
	847	26	59	1	0	0	0	0	0	0	13	1	0	0	100
	848	40	28	3	0	0	0	0	0	0	28	1	0	0	100
	849	21	0	4	1	0	22	0	0	0	52	0	0	0	100
	850	6	1	5	0	0	21	0	0	0	67	0	0	0	100
	Mean	24.20	25.00	2.80	.20	.40	8.60	.00	.20	.00	38.00	.60	.00	.00	100.00
	StDev	12.34	25.05	1.79	.45	.89	11.78	.00	.45	.00	21.37	.55	.00	.00	.00
Mussels	841	20	2	0	0	0	0	0	0	0	77	1	0	0	100
	842	6	7	1	0	0	0	0	1	0	80	5	0	0	100
	843	23	18	4	0	0	0	0	0	0	42	13	0	0	100
	844	4	0	0	0	0	0	0	0	0	83	13	0	0	100
	845	17	10	9	0	0	0	0	0	0	59	5	0	0	100
	Mean	14.00	7.40	2.80	.00	.00	.00	.00	.20	.00	68.20	7.40	.00	.00	100.00
	StDev	8.51	7.13	3.83	.00	.00	.00	.00	.45	.00	17.37	5.37	.00	.00	.00
Hesperophycus	836	92	3	0	4	0	0	0	0	0	0	1	0	0	100
	837	96	0	0	0	3	0	0	0	0	0	1	0	0	100
	838	96	0	0	1	0	1	0	0	0	1	1	0	0	100
	839	96	3	0	1	0	0	0	0	0	0	0	0	0	100
	840	75	13	0	8	0	2	0	0	0	0	2	0	0	100
	Mean	91.00	3.80	.00	2.80	.60	.60	.00	.00	.00	.20	1.00	.00	.00	100.00
	StDev	9.11	5.36	.00	3.27	1.34	.89	.00	.00	.00	.45	.71	.00	.00	.00

Percent Cover of Index Species

Scorpion Rock, Santa Cruz Island - Fall 2008 (11/25/08)

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
89	Chthamalus/Balanus	801	56	7	5	32	0	0	0	0	0	0	0	0	100
		802	60	9	1	27	0	0	0	0	3	0	0	0	100
		803	72	0	0	28	0	0	0	0	0	0	0	0	100
		804	69	4	0	27	0	0	0	0	0	0	0	0	100
		805	70	29	0	1	0	0	0	0	0	0	0	0	100
		Mean	65.40	9.80	1.20	23.00	.00	.00	.00	.00	.60	.00	.00	.00	100.00
		StDev	6.99	11.26	2.17	12.47	.00	.00	.00	.00	1.34	.00	.00	.00	.00
	Endocladia	806	15	0	1	69	0	5	0	0	10	0	0	0	100
		807	13	5	2	45	0	6	0	0	29	0	0	0	100
		808	26	0	2	37	0	1	0	0	33	1	0	0	100
		809	46	4	0	47	0	0	0	0	3	0	0	0	100
		810	29	0	1	63	0	1	0	0	6	0	0	0	100
		Mean	25.80	1.80	1.20	52.20	.00	2.60	.00	.00	16.20	.20	.00	.00	100.00
		StDev	13.22	2.49	.84	13.31	.00	2.70	.00	.00	13.81	.45	.00	.00	.00
	Mussels	816	32	0	32	0	0	1	5	0	28	2	0	0	100
		817	38	0	24	0	0	1	3	0	31	3	0	0	100
		818	33	0	53	0	0	0	0	0	10	4	0	0	100
		819	75	0	2	0	0	0	1	0	18	4	0	0	100
		820	45	0	3	0	0	0	1	0	50	1	0	0	100
		Mean	44.60	.00	22.80	.00	.00	.40	2.00	.00	27.40	2.80	.00	.00	100.00
		StDev	17.76	.00	21.35	.00	.00	.55	2.00	.00	15.13	1.30	.00	.00	.00
	Tetraclita	821	74	0	15	2	0	0	0	0	9	0	0	0	100
		822	83	0	6	0	0	0	0	0	11	0	0	0	100
		823	89	0	8	0	0	0	0	0	3	0	0	0	100
		824	74	0	21	0	0	0	0	0	4	1	0	0	100
		825	82	0	17	1	0	0	0	0	0	0	0	0	100
		Mean	80.40	.00	13.40	.60	.00	.00	.00	.00	5.40	.20	.00	.00	100.00
		StDev	6.43	.00	6.27	.89	.00	.00	.00	.00	4.51	.45	.00	.00	.00
	Hesperophycus	811	54	0	0	18	28	0	0	0	0	0	0	0	100
		812	38	0	0	39	19	3	0	0	1	0	0	0	100
		813	38	0	0	40	19	3	0	0	0	0	0	0	100
		814	77	0	0	14	4	0	0	0	2	2	0	0	100
		815	43	0	0	17	12	26	0	0	2	0	0	0	100
		Mean	50.00	.00	.00	25.60	16.40	1.20	.00	.00	1.00	.40	.00	.00	100.00
		StDev	16.45	.00	.00	12.78	8.96	1.64	.00	.00	1.00	.89	.00	.00	.00

Percent Cover of Index Species

Trailer, Santa Cruz Island - Fall 2008 (12/11/08)

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	98	2	0	0	0	0	0	0	0	0	0	0	0	100
	912	24	76	0	0	0	0	0	0	0	0	0	0	0	100
	913	58	22	0	16	0	0	3	0	0	1	0	0	0	100
	914	10	90	0	0	0	0	0	0	0	0	0	0	0	100
	915	83	15	0	0	0	0	0	0	0	0	2	0	0	100
	Mean	54.60	41.00	.00	3.20	.00	.00	.60	.00	.00	.20	.40	.00	.00	100.00
	StDev	37.51	39.32	.00	7.16	.00	.00	1.34	.00	.00	.45	.89	.00	.00	.00
Silvetia (Rockweed)	926	6	0	0	0	0	87	0	0	0	7	0	0	0	100
	927	60	6	0	1	0	21	0	0	0	12	0	0	0	100
	928	32	0	0	6	0	53	0	0	0	8	1	0	0	100
	929	3	2	0	0	0	94	0	0	0	1	0	0	0	100
	930	15	5	0	0	0	77	0	0	0	3	0	0	0	100
	Mean	23.20	2.60	.00	1.40	.00	66.40	.00	.00	.00	6.20	.20	.00	.00	100.00
	StDev	23.47	2.79	.00	2.61	.00	29.75	.00	.00	.00	4.32	.45	.00	.00	.00
Mussels	921	37	11	0	0	0	0	0	1	0	26	25	0	0	100
	922	13	4	0	0	0	0	1	0	0	47	35	0	0	100
	923	6	0	0	0	0	0	83	0	0	1	10	0	0	100
	924	14	5	0	0	0	0	72	0	0	2	7	0	0	100
	925	19	4	0	0	0	0	75	0	0	1	1	0	0	100
	Mean	17.80	4.80	.00	.00	.00	.00	46.20	.20	.00	15.40	15.60	.00	.00	100.00
	StDev	11.69	3.96	.00	.00	.00	.00	41.91	.45	.00	20.65	13.99	.00	.00	.00
Hesperophycus	916	26	2	0	14	7	48	0	0	0	3	0	0	0	100
	917	22	7	0	22	1	40	0	0	0	8	0	0	0	100
	918	22	0	0	9	4	63	0	0	0	1	1	0	0	100
	919	53	45	0	2	0	0	0	0	0	0	0	0	0	100
	920	43	8	0	14	10	23	0	0	0	2	0	0	0	100
	951	76	12	0	10	1	0	0	0	0	0	1	0	0	100
	Mean	40.33	12.33	.00	11.83	3.83	29.00	.00	.00	.00	2.33	.33	.00	.00	100.00
	StDev	21.53	16.57	.00	6.65	3.97	25.91	.00	.00	.00	3.01	.52	.00	.00	.00

Percent Cover of Index Species

Willows Anchorage, Santa Cruz Island - Fall 2008 (12/11/08)

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
91	<i>Endocladia</i>	931	53	0	0	45	0	0	0	0	2	0	0	0	100
		932	35	0	0	58	0	0	0	0	7	0	0	0	100
		933	27	0	0	69	0	0	0	0	4	0	0	0	100
		934	9	0	0	86	0	0	0	0	5	0	0	0	100
		935	24	0	3	51	0	0	0	0	22	0	0	0	100
		Mean	29.60	.00	.60	61.80	.00	.00	.00	.00	8.00	.00	.00	.00	100.00
		StDev	16.12	.00	1.34	16.21	.00	.00	.00	.00	8.03	.00	.00	.00	.00
	<i>Silvetia</i> (Rockweed)	946	58	0	0	27	0	0	0	0	15	0	0	0	100
		947	59	0	0	15	0	0	0	0	24	1	0	1	100
		948	69	2	0	0	0	0	1	0	24	4	0	0	100
92		949	42	1	0	0	0	29	0	0	20	8	0	0	100
		950	50	0	0	9	0	0	0	0	41	0	0	0	100
		Mean	55.60	.60	.00	10.20	.00	5.80	.20	.00	24.80	2.60	.00	.20	100.00
		StDev	10.16	.89	.00	11.34	.00	12.97	.45	.00	9.78	3.44	.00	.45	.00
	Mussels	941	10	0	6	0	0	67	0	0	16	1	0	0	100
		942	25	0	0	0	0	33	3	0	31	7	0	1	100
		943	10	1	0	0	0	46	5	0	38	0	0	0	100
		944	13	0	0	0	0	47	8	0	32	0	0	0	100
		945	2	0	1	0	0	61	0	0	35	1	0	0	100
		Mean	12.00	.20	1.40	.00	.00	50.80	3.20	.00	30.40	1.80	.00	.20	100.00
93		StDev	8.34	.45	2.61	.00	.00	13.42	3.42	.00	8.50	2.95	.00	.45	.00
	<i>Hesperophycus</i>	936	29	0	0	68	0	0	0	0	3	0	0	0	100
		937	59	21	0	0	0	0	0	0	20	0	0	0	100
		938	70	9	0	3	0	0	0	0	18	0	0	0	100
		939	68	5	0	0	0	1	0	0	26	0	0	0	100
		940	44	6	0	10	4	5	0	0	31	0	0	0	100
		Mean	54.00	8.20	.00	16.20	.80	1.20	.00	.00	19.60	.00	.00	.00	100.00
		StDev	17.33	7.85	.00	29.24	1.79	2.17	.00	.00	10.60	.00	.00	.00	.00

Percent Cover of Index Species

East Point, Santa Rosa Island - Fall 2008 (1/7/09)

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
92	Chthamalus/Balanus	575	63	35	0	0	0	0	1	0	0	1	0	0	100
		576	29	48	0	17	3	0	0	0	0	3	0	0	100
		577	18	14	0	39	29	0	0	0	0	0	0	0	100
		578	61	38	0	0	0	0	0	0	0	0	1	0	100
		579	21	78	0	1	0	0	0	0	0	0	0	0	100
	Mean	38.40	42.60	.00	11.40	6.40	.00	.00	.20	.00	.00	.80	.20	.00	100.00
	StDev	21.93	23.34	.00	17.04	12.70	.00	.00	.45	.00	.00	1.30	.45	.00	.00
	Endocladia	580	13	0	0	82	5	0	0	0	0	0	0	0	100
		581	6	0	0	92	2	0	0	0	0	0	0	0	100
		582	16	0	0	83	1	0	0	0	0	0	0	0	100
		583	33	0	0	65	2	0	0	0	0	0	0	0	100
		584	8	5	0	85	2	0	0	0	0	0	0	0	100
	Mean	15.20	1.00	.00	81.40	2.40	.00	.00	.00	.00	.00	.00	.00	.00	100.00
	StDev	10.71	2.24	.00	9.96	1.52	.00	.00	.00	.00	.00	.00	.00	.00	.00
	Silvetia (Rockweed)	585	59	0	0	25	1	2	0	0	13	0	0	0	100
		586	54	0	0	35	1	3	0	0	7	0	0	0	100
		587	73	0	0	7	0	11	0	4	5	0	0	0	100
		588	23	0	0	2	0	59	0	1	15	0	0	0	100
		589	40	0	0	1	0	15	0	0	39	4	0	0	99
	Mean	49.80	.00	.00	14.00	.40	18.00	.00	1.00	.00	15.80	.80	.00	.00	99.80
	StDev	19.07	.00	.00	15.20	.55	23.56	.00	1.73	.00	13.61	1.79	.00	.00	.45
	Mussels	590	19	0	0	0	0	7	13	0	45	16	0	0	100
		591	15	0	3	0	0	0	23	0	58	1	0	0	100
		592	19	0	0	0	0	58	3	0	19	1	0	0	100
		593	4	0	0	0	0	89	1	0	6	0	0	0	100
		594	6	0	1	0	0	84	1	0	6	2	0	0	100
	Mean	12.60	.00	.80	.00	.00	.00	47.60	8.20	.00	26.80	4.00	.00	.00	100.00
	StDev	7.16	.00	1.30	.00	.00	.00	42.02	9.65	.00	23.62	6.75	.00	.00	.00
	Hesperophycus	570	13	0	0	74	12	0	0	0	1	0	0	0	100
		571	31	2	0	49	18	0	0	0	0	0	0	0	100
		572	28	2	0	55	13	0	0	0	2	0	0	0	100
		573	17	11	0	61	10	0	0	0	1	0	0	0	100
		574	12	5	0	71	8	1	0	0	3	0	0	0	100
	Mean	20.20	4.00	.00	62.00	12.20	.20	.00	.00	.00	1.40	.00	.00	.00	100.00
	StDev	8.76	4.30	.00	10.54	3.77	.45	.00	.00	.00	1.14	.00	.00	.00	.00

Percent Cover of Index Species

Ford Point, Santa Rosa Island - Fall 2008 (1/10/09)

Zone	Plot	Bare Rock	Acorn Barnacle	Tetra-clita	Endo-cladia	Hespero-phycus	Silvetia	Mussels	Turf-weed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other	Total
Chthamalus/Balanus	520	71	25	0	0	0	0	0	0	0	0	4	0	0	100
	521	54	39	0	0	0	0	3	0	0	1	3	0	0	100
	522	59	35	0	0	0	0	0	0	0	0	6	0	0	100
	523	36	6	0	58	0	0	0	0	0	0	0	0	0	100
	524	46	51	0	2	0	0	0	0	0	0	1	0	0	100
	Mean	53.20	31.20	.00	12.00	.00	.00	.60	.00	.00	.20	2.80	.00	.00	100.00
	StDev	13.22	16.89	.00	25.73	.00	.00	1.34	.00	.00	.45	2.39	.00	.00	.00
Endocladia	525	44	2	0	44	0	0	5	0	0	4	1	0	0	100
	526	46	7	0	34	0	0	5	0	0	5	3	0	0	100
	527	50	5	0	20	0	0	6	3	0	16	0	0	0	100
	528	34	6	0	47	0	0	0	0	0	13	0	0	0	100
	529	56	1	1	34	0	0	0	1	0	7	0	0	0	100
	Mean	46.00	4.20	.20	35.80	.00	.00	3.20	.80	.00	9.00	.80	.00	.00	100.00
	StDev	8.12	2.59	.45	10.59	.00	.00	2.95	1.30	.00	5.24	1.30	.00	.00	.00
Mussels	530	58	6	0	0	0	0	27	2	0	0	7	0	0	100
	531	17	0	0	0	0	0	81	0	0	0	2	0	0	100
	532	21	0	0	0	0	0	0	9	0	29	41	0	0	100
	533	38	1	0	0	0	0	58	0	0	2	1	0	0	100
	534	21	0	0	0	0	0	0	52	0	5	22	0	0	100
	Mean	31.00	1.40	.00	.00	.00	.00	33.20	12.60	.00	7.20	14.60	.00	.00	100.00
	StDev	17.13	2.61	.00	.00	.00	.00	35.86	22.33	.00	12.36	16.98	.00	.00	.00

Percent Cover of Index Species

Fossil Reef, Santa Rosa Island - Fall 2008 (1/9/09)

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
94	Chthamalus/Balanus	605	55	44	0	1	0	0	0	0	0	0	0	0	100
		606	57	38	0	0	0	0	0	0	0	0	5	0	100
		607	45	39	0	16	0	0	0	0	0	0	0	0	100
		608	72	27	0	0	0	0	0	0	0	0	0	1	100
		609	79	21	0	0	0	0	0	0	0	0	0	0	100
	Mean	61.60	33.80	.00	3.40	.00	.00	.00	.00	.00	.00	.00	1.00	.20	100.00
	StDev	13.70	9.47	.00	7.06	.00	.00	.00	.00	.00	.00	.00	2.24	.45	.00
	Endocladia	610	34	31	0	34	0	0	0	0	0	0	0	1	100
		611	13	6	0	48	0	33	0	0	0	0	0	0	100
		612	24	19	0	53	0	0	0	0	3	1	0	0	100
94		613	44	11	0	43	0	1	0	0	1	0	0	0	100
		614	28	1	0	66	0	0	0	0	5	0	0	0	100
	Mean	28.60	13.60	.00	48.80	.00	6.80	.00	.00	.00	1.80	.20	.00	.20	100.00
	StDev	11.52	11.78	.00	11.90	.00	14.65	.00	.00	.00	2.17	.45	.00	.45	.00
	Silvetia (Rockweed)	615	22	24	0	47	0	5	0	0	2	0	0	0	100
		616	37	0	0	45	0	12	0	0	6	0	0	0	100
		617	41	3	0	18	0	38	0	0	0	0	0	0	100
		618	9	0	0	8	0	77	0	0	6	0	0	0	100
		619	0	0	0	3	0	97	0	0	0	0	0	0	100
	Mean	21.80	5.40	.00	24.20	.00	45.80	.00	.00	.00	2.80	.00	.00	.00	100.00
94	StDev	17.60	10.48	.00	20.63	.00	40.20	.00	.00	.00	3.03	.00	.00	.00	.00
	Mussels	620	20	0	0	0	0	0	6	0	60	14	0	0	100
		621	31	0	5	1	0	0	0	0	61	2	0	0	100
		622	49	0	7	0	0	4	1	0	37	2	0	0	100
		623	44	0	4	0	0	21	0	2	23	6	0	0	100
		624	4	0	0	0	0	0	4	0	14	78	0	0	100
	Mean	29.60	.00	3.20	.20	.00	.00	5.00	2.20	.40	39.00	20.40	.00	.00	100.00
	StDev	18.26	.00	3.11	.45	.00	.00	9.11	2.68	.89	21.27	32.57	.00	.00	.00

Percent Cover of Index Species

Johnson's Lee, Santa Rosa Island - Fall 2008 (1/11/09)

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	38	60	0	1	0	0	0	0	0	0	1	0	0	100
	501	50	50	0	0	0	0	0	0	0	0	0	0	0	100
	502	56	44	0	0	0	0	0	0	0	0	0	0	0	100
	503	32	45	0	22	0	0	0	0	0	0	1	0	0	100
	504	39	47	2	0	0	0	0	3	0	0	9	0	0	100
	Mean	43.00	49.20	.40	4.60	.00	.00	.00	.60	.00	.00	2.20	.00	.00	100.00
	StDev	9.75	6.46	.89	9.74	.00	.00	.00	1.34	.00	.00	3.83	.00	.00	.00
Endocladia	505	79	3	0	0	0	0	14	0	0	0	4	0	0	100
	506	47	5	0	47	0	0	0	0	0	0	1	0	0	100
	507	39	0	0	47	0	0	12	0	1	0	1	0	0	100
	508	25	6	0	46	0	0	22	0	1	0	0	0	0	100
	509	30	11	0	59	0	0	0	0	0	0	0	0	0	100
	Mean	44.00	5.00	.00	39.80	.00	.00	9.60	.00	.40	.00	1.20	.00	.00	100.00
	StDev	21.31	4.06	.00	22.88	.00	.00	9.53	.00	.55	.00	1.64	.00	.00	.00
Mussels	510	10	0	1	0	0	0	0	14	0	3	72	0	0	100
	511	2	0	1	0	0	0	3	4	0	1	89	0	0	100
	512	35	0	0	0	0	0	54	0	4	1	6	0	0	100
	513	36	1	0	0	0	0	0	10	0	5	48	0	0	100
	514	22	0	0	0	0	0	0	8	0	3	67	0	0	100
	515	11	0	0	0	0	0	86	0	1	0	2	0	0	100
	516	15	0	0	0	0	0	79	0	5	0	1	0	0	100
	517	26	0	1	0	0	0	69	0	0	0	4	0	0	100
	518	16	0	0	0	0	0	82	0	0	0	2	0	0	100
	Mean	19.22	.11	.33	.00	.00	.00	41.44	4.00	1.11	1.44	32.33	.00	.00	100.00
	StDev	11.52	.33	.50	.00	.00	.00	39.67	5.39	1.96	1.81	36.31	.00	.00	.00

Percent Cover of Index Species

Northwest-Talcott, Santa Rosa Island - Fall 2008 (1/8/09)

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	55	40	0	2	0	0	0	0	0	1	0	2	0	100
	561	60	38	0	1	0	0	0	0	0	0	0	1	0	100
	562	8	73	0	0	0	14	0	0	0	5	0	0	0	100
	563	19	9	0	7	0	48	0	0	0	17	0	0	0	100
	564	61	6	0	0	0	12	0	0	0	21	0	0	0	100
	Mean	40.60	33.20	.00	2.00	.00	14.80	.00	.00	.00	8.80	.00	.60	.00	100.00
	StDev	25.15	27.29	.00	2.92	.00	19.68	.00	.00	.00	9.60	.00	.89	.00	.00
Endocladia	555	51	0	0	13	0	35	0	0	0	1	0	0	0	100
	556	59	0	0	23	0	17	0	0	0	1	0	0	0	100
	557	46	0	0	17	0	25	0	0	0	12	0	0	0	100
	558	50	1	0	28	0	0	0	0	0	21	0	0	0	100
	559	63	0	0	6	0	0	0	0	0	31	0	0	0	100
	Mean	53.80	.20	.00	17.40	.00	15.40	.00	.00	.00	13.20	.00	.00	.00	100.00
	StDev	6.98	.45	.00	8.56	.00	15.44	.00	.00	.00	13.01	.00	.00	.00	.00
Silvetia (Rockweed)	565	9	0	0	0	0	91	0	0	0	0	0	0	0	100
	566	50	5	0	0	0	43	0	0	0	2	0	0	0	100
	567	47	0	0	0	0	47	0	0	0	6	0	0	0	100
	568	16	0	0	3	0	81	0	0	0	0	0	0	0	100
	569	81	0	0	17	0	0	0	0	0	2	0	0	0	100
	Mean	40.60	1.00	.00	4.00	.00	52.40	.00	.00	.00	2.00	.00	.00	.00	100.00
	StDev	29.01	2.24	.00	7.38	.00	35.96	.00	.00	.00	2.45	.00	.00	.00	.00
Mussels	550	32	0	0	0	0	0	15	6	4	38	5	0	0	100
	551	17	0	0	0	0	0	49	7	0	27	0	0	0	100
	552	22	0	0	0	0	0	26	4	4	41	2	0	1	100
	553	23	1	2	0	0	0	24	0	7	40	3	0	0	100
	554	27	0	0	0	0	0	17	4	0	50	2	0	0	100
	Mean	24.20	.20	.40	.00	.00	.00	26.20	4.20	3.00	39.20	2.40	.00	.20	100.00
	StDev	5.63	.45	.89	.00	.00	.00	13.55	2.68	3.00	8.23	1.82	.00	.45	.00

Appendix C. Trip Reports

The following are trip reports from the Rocky Intertidal Monitoring 2008 field season (March 2008 through January 2009). Reports were prepared by Dan Richards. The reports summarize the work done during each monitoring event, provide a quick summary of the data collected, include many of the data tables and site-specific graphs, and serve as metadata for the information collected.

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Spring 2008 Rocky Intertidal Monitoring Trip Reports

Anacapa and Santa Cruz Islands March 3-8, 2008 (Database event #2008-B)

Personnel: Dan Richards, Marine Biologist, Channel Islands National Park
Kelly Moore, biotech, Channel Islands National Park
Danielle Lipski, Channel Islands National Marine Sanctuary
Laura Francis, Channel Islands National Marine Sanctuary
Clair Fackler, Channel Islands National Marine Sanctuary
Luis Hurtado, Texas A&M University
Connie Jenkins, volunteer
Steve Francis, CINMS volunteer
Terrance Shinn, CINMS
Charlie Lara, CINMS

Procedure and General Notes:

The *R/V Shearwater* provided transportation to the island. Standard procedures were followed for photographing and counting motile invertebrates in fixed plots. Percent cover was determined from the digital images. Black abalone, *Haliotis cracherodii*, and seastars were counted in 30-minute searches and measured for size distribution. Owl limpets, *Lottia gigantea*, were measured in fixed one-meter radius plots. The highest number of shorebirds and pinnipeds seen was recorded. Luis collected *Ligia occidentalis* (rock louse) for genetic analysis.

Results (Daily and Site Description)

March 3, South Frenchy's Cove, Anacapa Island. Low tide -0.3 ft. at 1347 hrs. Clear sky, northeast wind, some south swell. Most of the sand had been stripped from the beach on the south side. One harbor seal was spying on us from the water. Two black oystercatchers were seen flying back and forth. We worked the site from 1130-1600 hrs.

Common dolphins and large flocks of feeding gulls were seen on the way to the island. Black-legged kittiwakes, rhinoceros auklets, and Cassin's auklets were seen. We dropped off Laurie Harvey, Robb Hamilton, Peter Gaede, and Richard Erickson to look for rufous-crowned sparrows. They ran into nesting brown pelicans on the climb but were able to get to a point to confirm the presence of four sparrows. A CINMS film crew came with Island Packers and filmed at Frenchy's while we were there. About 90 school kids came out but mostly worked to the west of us.

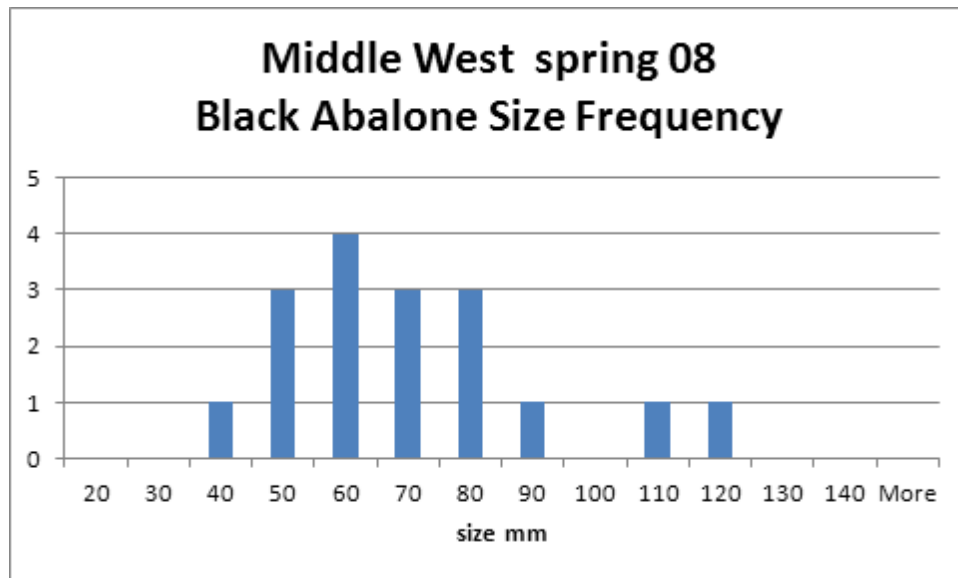
There were no problems finding plots, the only plot needing repair was plot 250 and a new upper left corner was installed. The tide was starting to come in by the time the seastar search was started at 1525, but Kelly was able to find five *Pisaster ochraceus*. No abalone were found. A total of 23 *Lottia gigantea* were found in the three plots ranging in size from 27-58 mm. *Endocladia muricata* was very abundant within the zone and held a lot of sand in the matrix of the thalli.

Motile invertebrate numbers seemed generally low. *Littorina* spp. were common in the barnacle plots. *Nucella emarginata* were common in four of the five mussel zone plots. Only a few *Ocenebra circumtexta* and *Acanthina* sp. were found. *Tegula funebris* were present in two *Silvetia* zone plots. Especially in the *Mytilus* zone, there were a lot of tube snails (*Petalochonchus montereyensis* probably). My impression was of tidepools further south (San Diego and Baja California) because of the general lack of algae except corallines and the dominance of tube snails and barnacles. The temperature logger I put out in December was ruined, apparently by sand or rocks breaking the cover. At least at this site it will require some kind of housing to protect it apparently.

March 4, Middle Anacapa Island. Low tide -0.5 ft. at 1413 hrs. Clear sky, calm wind and seas, warm and pleasant conditions. Water temperature 14° C. One harbor seal was seen in the water. There were seven black oystercatchers in the area. Gulls were abundant in the upper intertidal and on the bluffs above. Brown pelicans were nesting on Middle Anacapa including up slope of the monitoring site. One bald eagle was seen flying over. Photo plots at both East and West sites were photographed and an abalone search was performed at Harbor Seal Arch. We were on site from 1130-1700 hrs.

There were several open patches in the mussel beds probably from the large swell events of a week or two ago. The afternoon heat while we were there was apparently hard on the mussels as we saw numerous gaping mussels among the plots. Empty mussel shells were not uncommon, but there has been good recruitment and most of the beds were dense, and small mussels were common. *Endocladia muricata* was sparse overall, as was *Silvetia compressa*. The *Silvetia* present seemed to be in good shape. *Hesperophycus californica* was not seen at Middle West but some was seen at Harbor Seal Arch area. Overall, the algal cover seemed low. Even *Ulva* sp. was not common. This may also be a result of the recent swells.

Kelly shot photos and measured *Lottia gigantea* for 30-minutes in the general area (size range 24-73 mm, 110 measured). I counted motile invertebrates at Middle West only. Snails, chitons and large limpets were much more common than at Frenchy's. *Littorina* were not common even in the barnacle plots. Laura Francis counted then measured *Pisaster ochraceus*. She found 616 *Pisaster* in 30-minutes then measured 102 ranging from 33-167 mm radius. Laura also collected mussels for the NOAA mussel watch program. Luis searched for but did not find any *Ligia*. Kelly and Connie found 10 black abalone total in a 30-minute search. I found seven more afterwards. With all of us searching at Harbor Seal Arch, we found a total of eight there. I suspect that large swells may drive the abalone either deeper into crevices or possibly deeper into the subtidal. *Caulacanthus ustulatus* does not seem to be spreading and may have even been reduced in area. It was still present but the plants did not have bright colors and did not appear to be growing at this time.



March 5, Cat Rock Anacapa. Low tide -0.6 ft. at 1438 hrs. Clear and warm with heavy south swell coming in sets. There were about 12 harbor seals on the cobble beach when we went ashore. There was one black oystercatcher and one hybrid American/black oystercatcher. The latter had white on the belly only, none on the breast and only muddy white bands its wings when it flew. The CINMS film crew and several kids were out with us and worked at Cat Rock proper. We were ashore from 1115-1700 hrs.

Tube snails, probably *Petalochonchus montereyensis*, were common again as at Frenchy's. The small worm *Spirorbis* was present also. Large *Lottia scabra* and *L. limatula* were common especially in the area around *Lottia* plot 3. *Lottia digitalis* was present in some of the *Lottia* plots in fair numbers. As at most of the sites this week, *Egorgia menziesii* recruitment was fairly high. There was some recruitment of *Mytilus californianus* and the beds were doing pretty good overall. *Ocenebra circumtexta* and *Lottia gigantea* were both common among the mussel plots. *Nuttallina* sp. was abundant in several mussel plots.

Kelly searched for *Pisaster* finding a total of 15 *P. ochraceus* in the 30-minute search. A total of three black abalone were found in the crevices either side of plot 55. Laura Francis searched at Cat Rock (east of the site) and found two black abalone in a 30-minute search. Laura and Steve measured inter-plot distance and bearings, something that was never done at Cat Rock.

March 6, Scorpion Rock, Santa Cruz Island. Low tide -0.6 ft. at 1504 hrs. Partly cloudy with light winds from the northwest. Calm seas. Water temperature 16°C. There were two harbor seals in the cove watching us from the water. No boats were present at Little Scorpion. Two black oystercatchers and two American oystercatchers were present in the area. Josh Adams and David Mazurkowitz came out to check auklet boxes on Scorpion Rock. I helped them set up grids for clearing and restoration treatments. We were on Scorpion rock from about 0930-1130 hrs. Kelly, Dani, and I then kayaked from Scorpion Anchorage to our site while the Shearwater ran Josh and David to Prince Island. Luis collected some *Ligia occidentalis* from Scorpion then

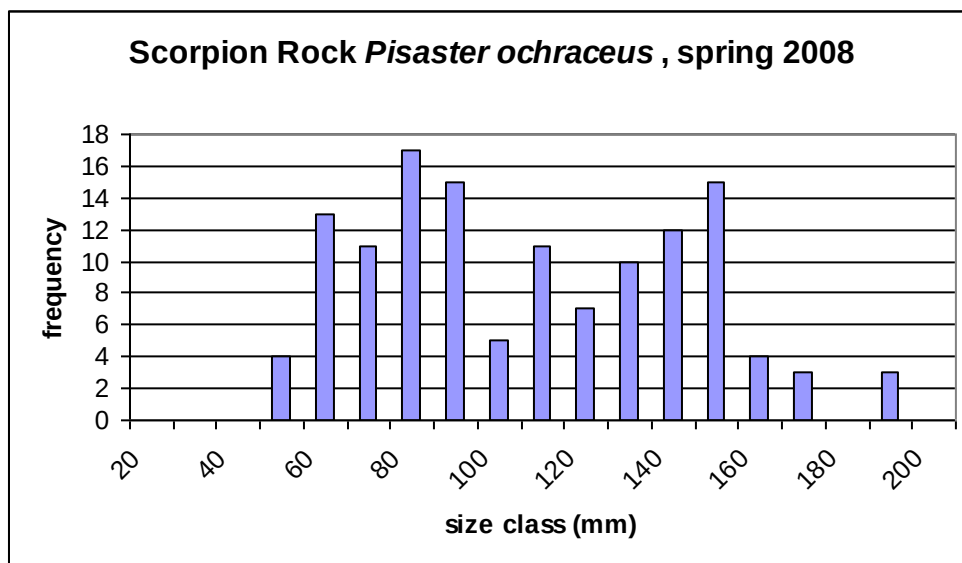
walked over to Smugglers Cove to collect there. We worked the intertidal sites from 1200-1700 hrs.

Kelly shot the photos and counted seastars. She found 207 *Pisaster ochraceus*, one *P. giganteus*, and three *Patiria miniata* in 30-minutes on the rock at site A. No abalone were found. I counted motile invertebrates with Dani recording. *Serpulorbis* and *Petalochonchus* were common among the mussel plots. There were large areas of the mussel beds devoid of mussels. Large *Tetraclita rubescens* were abundant. *Hesperophycus californica* was doing well at site B.

Motile invertebrates were common throughout the site. *Ocenebra* sp. was the only predatory snail in the mussel plots. Only two *Nucella emarginata* were found. *Acanthina* sp. was a little more common. *Nuttallina* sp. was abundant in most of the mussel zone plots. Large limpets were common in the *Hesperophycus* plots.

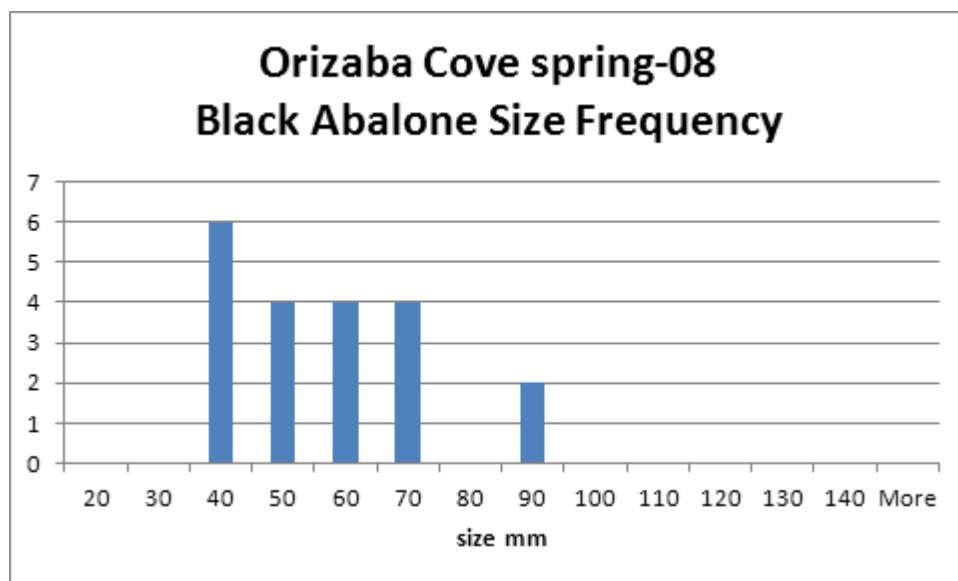
Pisaster ochraceus at Willows Anchorage, spring 2008

30 min count	207
measured	130
min	46
max	184
mean	103.11
stdv	35.60



March 7, Orizaba Cove. Low tide -0.4 ft. at 1531 hrs. Partly cloudy sky, light northwest wind, light surge. There were three harbor seals in the cove. Three black oystercatchers were seen in the area mostly on Orizaba Rock. Coreopsis was blooming on Orizaba Rock. After getting dropped off, the *Shearwater* ran up to Prince Island to pick up Josh and David. We were ashore from 1140-1645 hrs.

Luis collected about 15 *Ligia occidentalis* from across the cove. Dani and I shot the photos then counted motile invertebrates. Dani counted abalone while I finished the last motile counts. A total of 10 *Haliotis cracherodii* were found ranging from 40-82 mm. They seemed to be deeper in cracks than they were in December. There was no time for a seastar count, but *Pisaster ochraceus* were abundant. Both *Balanus glandula* and *Tetraclita rubescens* were very abundant with large individuals practically test-to-test in those zones. *Mytilus californianus* were abundant and there were signs of good recruitment but there were also some large patches of the bed missing including plots 3, 4, and 5. Young *Egregia menziesii* were common in these patches. Snails were particularly abundant in the *Tetraclita* and *Silvetia* zones. In the *Mytilus* plots, the mussels were either very dense or recently cleared so the counts were low. *Nucella emarginata* were particularly common. *Tetraclita* plot five had 60 *N. emarginata*.



Lottia gigantea abundance from plots or timed counts at Anacapa Island, spring 2008.

SiteCode	Plot	Timed count	Plot count	Density	MeanSize	StDev	MinSize	MaxSize
CR	1	0	20	6.367	34.80	7.57	22	55
CR	2	0	38	12.098	37.76	9.27	18	56
CR	3	0	5	1.592	46.80	12.52	25	56
MW	6	108	0	.000	39.69	8.62	24	73
SFC	1	0	13	4.139	39.69	7.78	28	55
SFC	2	0	4	1.273	38.50	3.87	34	43
SFC	3	0	6	1.910	49.50	11.24	27	58

Lottia gigantea size distribution at Anacapa Island, spring 2008.

SiteCode	Plot	%<20mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	%>=100mm
CR	1	0.00%	25.00%	55.00%	15.00%	5.00%	0.00%	0.00%	0.00%	0.00%	0.00%
CR	2	2.63%	18.42%	34.21%	34.21%	10.53%	0.00%	0.00%	0.00%	0.00%	0.00%
CR	3	0.00%	20.00%	0.00%	20.00%	60.00%	0.00%	0.00%	0.00%	0.00%	0.00%
MW	6	0.00%	4.63%	56.48%	26.85%	8.33%	2.78%	0.93%	0.00%	0.00%	0.00%
SFC	1	0.00%	7.69%	46.15%	38.46%	7.69%	0.00%	0.00%	0.00%	0.00%	0.00%
SFC	2	0.00%	0.00%	50.00%	50.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
SFC	3	0.00%	16.67%	0.00%	0.00%	83.33%	0.00%	0.00%	0.00%	0.00%	0.00%

Haliotis cracherodii counts and size distribution at Anacapa Island, spring 2008.

Site Code	Timed count	Mean Size	StDev	Min Size	Max Size	%<45mm	%45-126mm	%127-145mm	%>145mm
CR	3	131.00		131	131	-	-	100.00%	-
HSA	8					-	-	-	-
MW	17	66.65	21.07	37	116	5.88%	94.12%	-	-
SFC	0					-	-	-	-

Haliotis cracherodii counts and size distribution at Orizaba Cove, Santa Cruz Island, spring 2008.

Site Code	Timed count	Mean Size	StDev	Min Size	Max Size	%<45mm	%45-126mm	%127-145mm	%>145mm
OC	20	54.10	14.06	40	82	30.00%	70.00%	-	-

Photoplot summary – mean percent cover by zone at Anacapa and Santa Cruz Islands, spring 2008 (5 plots/zone except ANME with 3 plots/zone, and ANCR with 9 plots/zone).

<i>Island</i>	<i>Site</i>	<i>ZoneName</i>	<i>Bare Rock</i>	<i>Barnacle</i>	<i>Tetraclita</i>	<i>Endocladia</i>	<i>Hespero- phycus</i>	<i>Silvetia</i>	<i>Mussels</i>	<i>Turfweed</i>	<i>Leaf Barnacle</i>	<i>Misc Algae</i>	<i>Misc Animal</i>	<i>Tar</i>	<i>Other</i>
AN	CR	Chthamalus/Balanus	36.4	47.8	0.1	6.7	8.0	0.1	0.0	0.0	0.0	0.7	0.1	0.0	0.1
AN	CR	<i>Endocladia</i>	29.9	1.2	7.1	31.7	0.4	1.1	9.9	2.2	0.0	14.9	1.0	0.0	0.6
AN	CR	<i>Silvetia</i> (Rockweed)	21.8	16.9	1.2	12.8	9.9	28.8	2.0	0.7	0.0	5.8	0.1	0.0	0.1
AN	CR	Mussels	21.3	0.2	12.0	2.7	0.0	0.0	48.4	0.2	0.0	13.8	1.2	0.0	0.1
AN	ME	Chthamalus/Balanus	66.0	1.7	12.7	7.0	0.0	0.0	4.0	0.0	0.0	8.0	0.7	0.0	0.0
AN	ME	<i>Endocladia</i>	49.7	1.7	8.3	10.7	0.0	2.3	4.7	0.0	0.0	22.7	0.0	0.0	0.0
AN	ME	<i>Silvetia</i> (Rockweed)	15.0	0.7	5.0	2.3	0.0	34.3	12.0	2.7	0.0	28.0	0.0	0.0	0.0
AN	ME	Mussels	2.3	0.0	4.7	0.0	0.0	0.0	57.7	0.0	0.0	33.0	1.7	0.0	0.7
AN	MW	Chthamalus/Balanus	51.4	15.4	0.0	15.6	0.0	0.0	1.6	0.0	0.0	15.4	0.4	0.0	0.2
AN	MW	<i>Endocladia</i>	55.4	3.2	0.4	17.4	0.0	0.0	14.0	0.0	0.0	9.4	0.2	0.0	0.0
AN	MW	<i>Silvetia</i> (Rockweed)	46.6	1.4	1.6	5.2	0.0	18.4	11.6	0.6	0.0	13.8	0.8	0.0	0.0
AN	MW	Mussels	20.0	0.0	1.0	0.2	0.0	0.0	64.4	0.6	0.2	13.4	0.2	0.0	0.0
AN	SFC	Chthamalus/Balanus	25.4	62.8	0.0	7.6	1.6	0.0	0.0	0.0	0.0	2.2	0.0	0.4	0.0
AN	SFC	<i>Endocladia</i>	9.8	0.2	0.0	75.0	0.6	10.4	0.0	0.0	0.0	3.2	0.0	0.0	0.8
AN	SFC	<i>Silvetia</i> (Rockweed)	19.0	3.6	0.0	8.8	0.0	41.8	0.2	0.0	0.0	26.6	0.0	0.0	0.0
AN	SFC	Mussels	7.0	0.0	0.0	0.0	0.0	0.0	67.2	12.0	0.0	13.8	0.0	0.0	0.0
SC	OC	Chthamalus/Balanus	26.4	63.6	3.4	0.0	0.0	0.0	3.6	0.0	0.0	3.0	0.0	0.0	0.0
SC	OC	<i>Silvetia</i> (Rockweed)	13.2	0.0	4.8	10.2	8.6	32.2	15.0	0.0	0.0	15.8	0.0	0.0	0.2
SC	OC	Mussels	16.8	0.0	1.6	0.0	0.0	0.0	24.4	0.4	0.0	51.4	5.0	0.0	0.4
SC	OC	<i>Tetraclita</i>	9.4	0.6	18.6	0.0	0.0	0.0	67.0	0.0	0.0	4.0	0.4	0.0	0.0
SC	OC	<i>Hesperophycus</i>	8.6	10.2	0.4	25.8	26.2	4.8	16.2	0.0	0.0	7.4	0.4	0.0	0.0

Santa Cruz Island March 17-21, 2008
(Database event #2008-C)

Personnel: Dan Richards, Marine Biologist, Channel Islands National Park
Josh Sprague, Biological Technician, Channel Islands National Park
Kristen Kusic-Heady, UC Santa Cruz
Connie Jenkins, volunteer

Procedure and General Notes:

Transportation to and from Santa Cruz Island was via Island Packers boats. We stayed at the UC NRS field station and rented a UC land cruiser. We camped two nights at Christy Ranch. Standard procedures were used for monitoring the rocky intertidal sites. All plots and site overviews were photographed with an Olympus 5050 digital camera mounted on a PVC quadrapod. Scoring was performed in the field for select plots at Fraser and Trailer. Motile invertebrates were counted in all the photoplots. Sub-sampling of motile invertebrates was performed for littorines and small limpets, using three 20x20 cm, or 10x10 cm, subplots as noted. Sea stars and abalone were counted and measured at all sites using a timed-search (generally 30-minutes) method. Surfgrass was scored in fixed transects (10 meters, 100 points) at Fraser cove and Trailer. The maximum number of shorebirds and pinnipeds seen at any one time was recorded. Specimens of *Nucella* spp. *Lottia digitalis*, *L. scabra*, *Tetraclita rubescens*, *Pollicipes polymerus*, *Chondracanthus canaliculatus*, *Mazzaella affinis*, *Mastocarpus papillatus*, and *Ligia occidentalis* were collected for genetic samples at Willows Anchorage and Fraser Cove. I also collected *Tylos/Alloniscus* sp. from Christy Beach for genetic samples. The *Ligia* and *Tylos* were for Luis Hurtado of Texas A&M, the others are for a consortium of UC researchers working on a CEQI grant.

Results (Daily and Site Description):

17 March 2008, Prisoners Harbor: Low tide 0.0 ft. at 1122 hrs. Conditions were excellent. The wind and seas were calm, the morning fog lightened up at mid-day. The skeleton of a common dolphin was present on the beach. The beach was steep and covered with cobbles. There were two black oystercatchers, one wandering tattler, and one common raven on or around the reef. We were on site from about 1530-1800 hrs.

Kristin counted motile invertebrates with Connie recording. Josh helped me shoot photos. I then did field notes while Josh counted sea stars. Note that the sea star count was started about two hours after low tide so we did not do size frequency measurements. He found 154 *Pisaster ochraceus*, and two *Haliotis cracherodii*. I then counted motile invertebrates in the *Hesperophycus* zone. Kristin was only able to complete *Mytilus* and *Silvetia* zone plots before we needed to leave. Plot B1 is missing all its bolts however the holes were evident. That plot gets pounded by the cobble stones at this site and generally has bare rock with in the plot. There wasn't time for repairs. We might consider an alternate location.

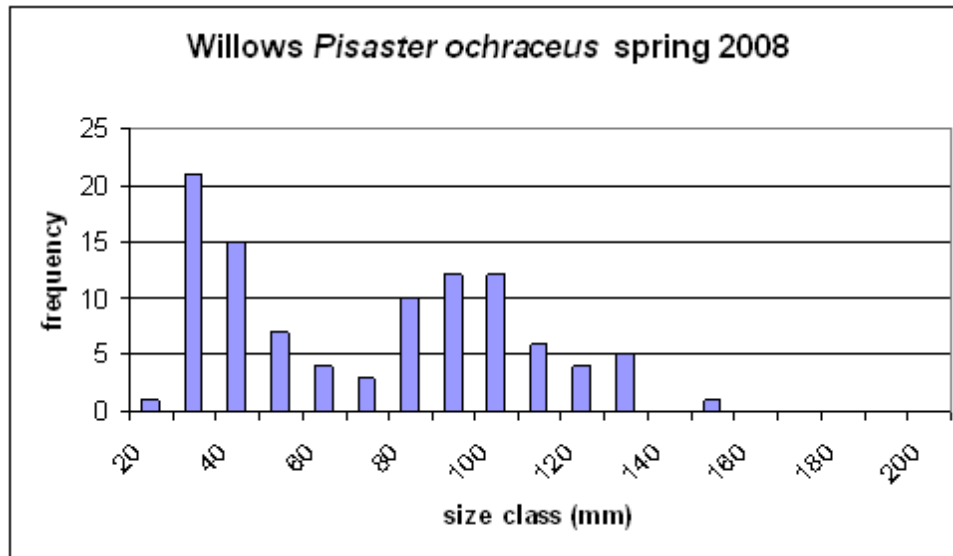
There were several good-sized bare patches in the mussel zone where all the mussels had been torn out, presumably by the large swells this winter. There was good *M. californianus* recruitment in some of the older clearings. *Acanthina* sp. and *Nucella emarginata* were abundant and their eggs were common as well. *Silvetia* and *Hesperophycus* both appeared healthy but neither was very common and plants were sparsely scattered. *Endocladia muricata* plants were robust but again not very dense. *Chthamalus* were abundant but most of the *Balanus* I looked at seemed to be dead. *Tetraclita rubescens* were common. Juvenile *Pachygrapsus crassipes* were more common than adult crabs.

Our original schedule was to go out March 16 but the trip was cancelled due to high winds. The boat on the 17th departed Ventura at noon so we did not get to the site until after 1500 hrs. The Canada del Puerto road was closed so we left for the field station with plenty of time to drive up the Navy Road to go around.

18 March, Willows Anchorage. Low tide -0.7 ft. at 1500 hrs. Conditions were excellent. There was almost no swell. The creek was flowing well all the way across the beach. There had been some rock fall off the cliff and there were some small rocks in and around some plots. Two black oystercatchers and two common ravens were present. There were about 30 western gulls on the beach by the creek. We were on site from 1015-1745 hrs. Josh measured the water temperature at 57° F with his watch as our thermometer was broken. A boat anchored in the cove and two men paddled ashore in a kayak in the late afternoon.

Josh helped Kristen collect genetic samples then she counted motile invertebrates. Josh counted 360 *P. ochraceus*, and measured 102. I counted 56 black abalone in a 30-minute search. A few more were found later during a more extensive search for tagged abalone. We only found three tagged abalone out of 75. I tagged 15 new abalone using both PIT tags and yellow number tags. I measured an additional 45 and we found at least 10 more that could not be measured. We found two juvenile abalone that appeared to be reds (*H. rufescens*). Most of the abalone were in familiar crevices. Some of the usual spaces did not have abalone or lower numbers. No shells were found so hopefully the recent swells have driven many of the abalone deeper into crevices where we could not see them.

Lottia gigantea were measured in plots and numbers were low in all but plot 1. Only 69 were found in the five plots. Most plots had about 50% mussel cover. Plot 5 which only had one limpet was covered by coralline algae and *Endocladia muricata*. *Chthamalus* was abundant as was *Tetraclita* and *Endocladia*. *Mytilus* was abundant but there were holes in the mussel beds where mussels were torn out. Overall the bed was mostly just one layer deep. All plot bolts were found, something we have had trouble with in recent visits. Both *Silvetia* and *Hesperophycus* were sparse though individual plants seemed healthy.



Pisaster ochraceus at Willows Anchorage,
spring 2008

30 min count	360
measured	101
min	20
max	142
mean	66.67
stdv	32.53

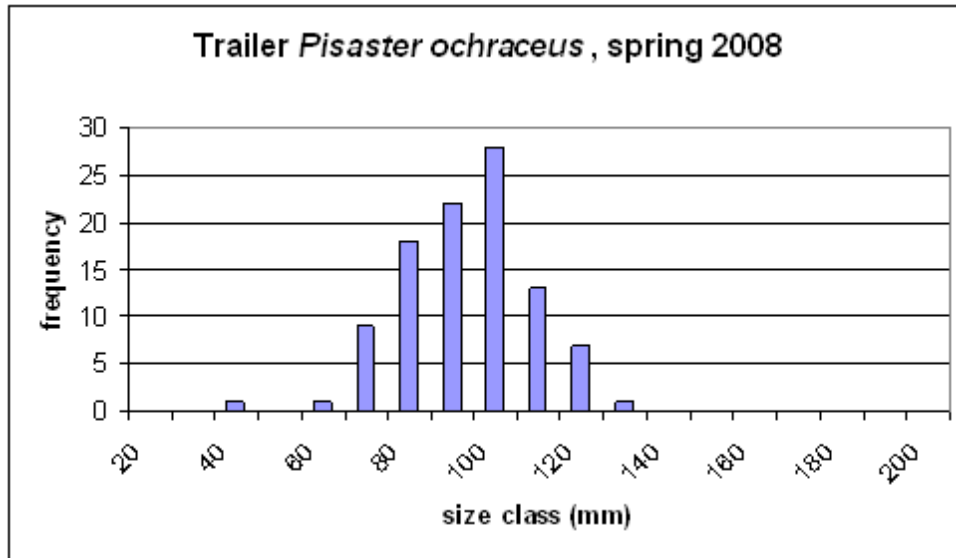
19 March, Trailer. Low tide -0.5 at 1530 hrs. Conditions were generally very good though we had a few sets of swell. Four black oystercatchers were in the area. After finishing at Trailer we went to Forney Cove to sample the rockweed plots there. We were on site at Trailer from 1200 to 1700 hrs. At Forney we were onsite from 1730-1900 hrs. We were the first full sized vehicle to drive to the west end this spring but we found the roads not too troublesome. We parked the trailer with our gear at Christy Ranch where we would spend the night before heading onto Trailer site.

Josh shot photos and counted 134 *Pisaster ochraceus* in a 30-minute search. I scored surfgrass transects, measured *Lottia* in plots, and counted black abalone. Only 42 *Lottia gigantea* were found in the plots. Sizes ranged from 11-96 mm. Plot 5 had no limpets and was covered by *Tetraclita* and *Corallina* sp. Plot 3 was overgrown with *Chondracanthus canaliculatus* and other algae. During a 30-minute count I found 16 black abalone ranging from 74-158 mm. An additional eight abalone were found among boulders south of the site after 30-minutes, and seven more were located on the reef facing south beyond the boulders. Kristen counted motile invertebrates in all the plots. I scored plots in the mussel and barnacle zones because of small barnacles and mix of various algae present.

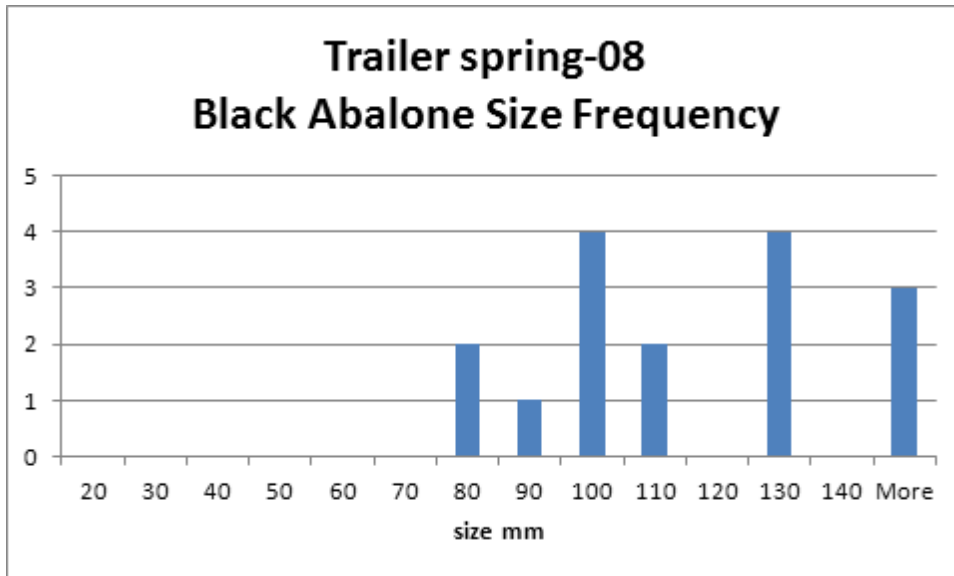
Both *Hesperophycus* and *Silvetia* were doing well. *Chthamalus* were abundant but *Balanus* were not. *Mytilus* were not common and mussel cover ran from 1-61% in the

plots. *Tegula gallina* were common in the upper pools but turban snails in the lower areas among the *Silvetia* plots were almost all *T. funebris*. Kristin was not distinguishing between the two *Tegula* species when counting motile invertebrates but all appeared to be *T. funebris* on spot checks. The overall ratio of *T. funebris* to *T. gallina* was 94:25.

We were able to photograph and count motile invertebrates in all *Silvetia* and *Hesperophycus* zone plots. Coverage was good in all the plots and plants were healthy.



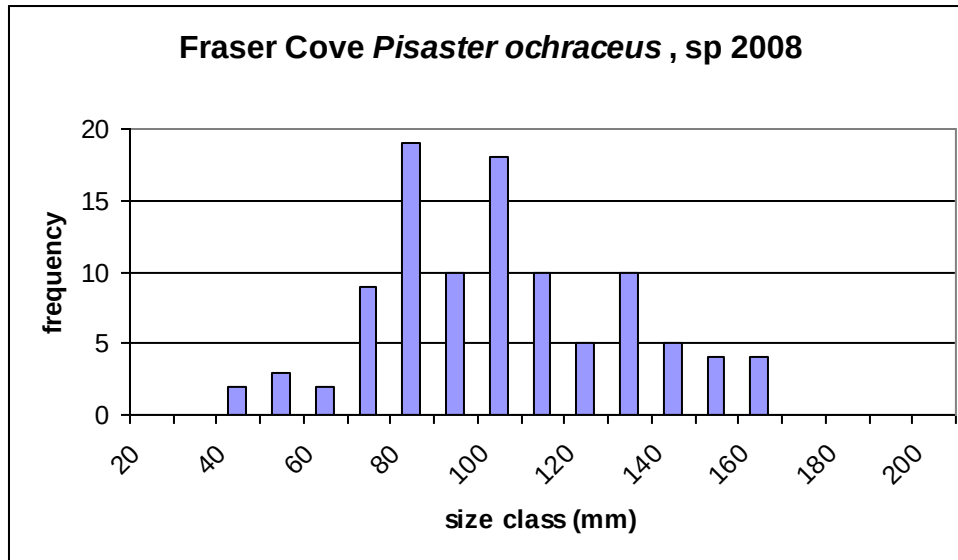
<i>Pisaster ochraceus</i> at Trailer, spring 2008	
30 min count	134
Measured (n)	100
min	40
max	121
mean	89.01
stdv	14.49



20 March, Fraser Cove. Low tide -0.2 ft. at 1556 hrs. The swell was 4-6 ft. which combined with the marginal tide made the lower zones tough. Five black oystercatchers were on the reef and one harbor seal was swimming in the cove. There were a few rocks in the intertidal that had fallen from the bluffs. We were on site from 1215-1900 hrs.

Kristin and Josh collected specimens for the genetics. I scored plots in all but the *Endocladia* zone. Kristin and I both counted motile invertebrates completing all the plots. I counted and measured *Lottia* in plots finding a total of 52 ranging in size from 14-72 mm. Josh counted and measured sea stars finding 66 *P. ochraceus* in 30-minutes but found 102 to measure. He found no abalone. The surfgrass transects 1 and 2 had less than 50% cover of surfgrass with red algae (mostly *Chondracanthus canaliculatus*) and *Egregia menziesii* being the other dominants.

Endocladia was fairly common. While some barnacle plots had low barnacle cover, *Chthamalus* were abundant and *Balanus* were present. There were some clearings among the mussels and there were many small *Mytilus californianus*. *Modiolus capax* were seen at several sites this week. *Pollicipes polymerus* were recorded as present and were only low cover in plots. *Nucella*, *Acanthina* and *Tegula* were common in plots. The ratio of *Tegula funebris* to *T. gallina* was 128:4.



Pisaster ochraceus at Fraser Cove, spring 2008

30 min count	66
Measured (n)	101
min	39
max	154
mean	96.08
stdv	27.53

21 March, Prisoners Harbor. Low tide +0.1 ft. at 1621 hrs. Conditions were calm and the upper plots were easily accessible. We drove back to the field station from Christy Ranch this morning then cleaned and packed the rest of our gear. Kristin fixed and packed her specimens. We only had motile invertebrate counts left in the *Endocladia* and Barnacle zones so Kristin and I were able to knock those out before the Island Packers boat arrived. We were on site from 1330-1445 hrs. We departed on the boat at 1515 and saw both humpback and gray whales on the ride in.

Surfgrass transects at Fraser Cove, Santa Cruz Island, spring 2008 (additional taxa removed when not represented)

Location: Fraser Cove	Site Code: SCFC		
Date	20-Mar-2008 spring 08		
recorders	Dan Richards		
Surf Grass Taxa	Transect 1	Transect 2	Transect 3
Phyllospadix sp. overstory	47	37	74
Phyllospadix sp. understory	1	5	1
Egregia menziesii		19	
Encrusting coralline	4	2	
Non-coralline crust			
Erect coralline	22	6	6
other red algae	13	31	16
Other green algae			1
Anthopleura spp.	2		
Phragmatopoma californica	1	2	
Mytilus californianus	2		
Rock	9	3	3
total	101	105	101

Surfgrass transects at Trailer, Santa Cruz Island, spring 2008 (additional taxa removed when not represented)

Location: Trailer	Site Code: SCTR		
Date	19-Mar-2008 spring -08		
recorders	Dan Richards		
Surf Grass Taxa	Transect 1	Transect 2	Transect 3
Phyllospadix sp. overstory	85	65	67
Phyllospadix sp. understory	1	1	
Egregia menziesii			1
Encrusting coralline	1		
Non-coralline crust		1	
Erect coralline	3	5	8
other red algae	8	24	21
Phragmatopoma californica	1	1	
barnacles	1		
Rock	1	4	3
total	101	101	100

Haliotis cracherodii counts and size distribution at Santa Cruz Island, spring 2008.

Site Code	Timed count	Mean Size	StDev	Min Size	Max Size	%<45mm	%45-126mm	%127-145mm	%>145mm
FC	0					-	-	-	-
PH	2					-	-	-	-
TR	16	113.56	25.86	74	158	-	62.50%	25.00%	12.50%
VA	26	75.88	14.37	45	96	-	100.00%	-	-
WA	56	62.09	20.32	28	120	23.21%	76.79%	-	-

Lottia gigantea abundance from plots at Santa Cruz Island, spring 2008.

SiteCode	Plot	Plot count	Area	Density	MeanSize	StDev	MinSize	MaxSize
FC	1	13	3.14	4.139	50.15	17.48	20	72
FC	2	5	3.14	1.592	50.40	13.15	39	71
FC	3	11	3.14	3.502	40.91	17.97	18	66
FC	4	13	3.14	4.139	35.15	10.49	14	54
FC	5	11	3.14	3.502	49.91	11.26	38	70
TR	1	17	3.14	5.412	69.18	26.69	11	96
TR	2	14	3.14	4.457	65.29	21.12	24	84
TR	3	2	3.14	.637	41.00	33.94	17	65
TR	4	10	3.14	3.184	50.20	20.94	18	83
WA	1	28	3.14	8.914	38.14	9.23	21	59
WA	2	11	3.14	3.502	33.18	7.90	19	45
WA	3	14	3.14	4.457	35.36	10.10	18	52
WA	4	5	3.14	1.592	41.80	12.03	27	59
WA	5	1	3.14	.318	46.00		46	46

Lottia gigantea size distribution at Santa Cruz Island, spring 2008.

Site Code	Plot	%<20mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	%>=100mm
FC	1	0.00%	7.69%	23.08%	23.08%	0.00%	23.08%	23.08%	0.00%	0.00%	0.00%
FC	2	0.00%	0.00%	40.00%	0.00%	40.00%	0.00%	20.00%	0.00%	0.00%	0.00%
FC	3	9.09%	27.27%	18.18%	9.09%	9.09%	27.27%	0.00%	0.00%	0.00%	0.00%
FC	4	7.69%	23.08%	30.77%	30.77%	7.69%	0.00%	0.00%	0.00%	0.00%	0.00%
FC	5	0.00%	0.00%	27.27%	18.18%	36.36%	9.09%	9.09%	0.00%	0.00%	0.00%
TR	1	5.88%	5.88%	0.00%	11.76%	11.76%	11.76%	5.88%	11.76%	35.29%	0.00%
TR	2	0.00%	14.29%	7.14%	0.00%	7.14%	7.14%	35.71%	28.57%	0.00%	0.00%
TR	3	50.00%	0.00%	0.00%	0.00%	0.00%	50.00%	0.00%	0.00%	0.00%	0.00%
TR	4	10.00%	0.00%	30.00%	10.00%	0.00%	30.00%	10.00%	10.00%	0.00%	0.00%
WA	1	0.00%	17.86%	39.29%	28.57%	14.29%	0.00%	0.00%	0.00%	0.00%	0.00%
WA	2	9.09%	18.18%	45.45%	27.27%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
WA	3	7.14%	28.57%	28.57%	28.57%	7.14%	0.00%	0.00%	0.00%	0.00%	0.00%
WA	4	0.00%	20.00%	20.00%	40.00%	20.00%	0.00%	0.00%	0.00%	0.00%	0.00%
WA	5	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Photoplot summary – mean percent cover by zone at Santa Cruz Island, spring 2008 (5 plots/zone).

Site	ZoneName	Bare Rock	Barnacle	Tetraclita	Endocladia	Hespero- phycus	Silvetia	Mussels	Turfweed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other
FC	Chthamalus/Balanus	22.6	27.0	0.2	0.2	0.0	0.0	1.6	0.0	0.0	46.6	0.2	1.6	0.0
FC	Endocladia	50.6	3.0	0.0	28.0	0.0	0.0	4.2	0.0	0.0	14.0	0.0	0.2	0.0
FC	Silvetia (Rockweed)	38.6	9.6	0.0	9.6	5.0	29.0	0.2	0.0	0.0	7.0	0.4	0.0	0.6
FC	Mussels	18.4	0.4	0.0	0.0	0.0	0.0	66.4	0.0	0.6	5.0	9.2	0.0	0.0
FC	Pollicipes	27.0	2.4	1.4	2.6	0.0	0.0	43.8	0.0	7.4	5.2	10.2	0.0	0.0
FC	Tar	21.0	32.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2	0.0	42.2	0.0
FC	Hesperophycus	39.6	6.8	0.0	22.2	23.6	6.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0
PH	Chthamalus/Balanus	32.4	19.2	0.0	46.2	0.2	0.0	0.4	0.0	0.0	1.6	0.0	0.0	0.0
PH	Endocladia	42.0	3.4	0.2	47.4	3.2	0.0	1.4	0.0	0.0	1.6	0.8	0.0	0.0
PH	Silvetia (Rockweed)	37.0	6.0	3.4	12.2	0.0	12.6	2.6	0.0	0.0	26.0	0.2	0.0	0.0
PH	Mussels	29.0	5.0	0.4	0.0	0.0	0.0	34.0	2.6	0.0	25.2	3.2	0.0	0.6
PH	Hesperophycus	61.0	5.6	0.0	23.4	5.6	0.4	2.4	0.0	0.0	1.4	0.0	0.0	0.2
TR	Chthamalus/Balanus	39.8	53.2	0.0	6.2	0.0	0.0	0.2	0.0	0.0	0.2	0.4	0.0	0.0
TR	Silvetia (Rockweed)	18.0	3.6	0.0	2.2	0.0	71.8	0.0	0.0	0.0	4.4	0.0	0.0	0.0
TR	Mussels	20.8	0.6	0.4	0.0	0.0	0.0	37.6	0.4	0.2	17.8	22.2	0.0	0.0
TR	Hesperophycus	27.5	11.0	0.0	17.5	9.7	32.7	0.0	0.0	0.0	0.8	0.0	0.5	0.3
WA	Endocladia	25.6	0.0	0.4	73.4	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0
WA	Silvetia (Rockweed)	47.2	5.4	0.0	7.8	0.0	22.0	0.0	0.0	0.0	17.2	0.4	0.0	0.0
WA	Mussels	17.8	1.2	1.0	0.0	0.0	0.0	55.4	2.6	0.0	20.0	1.6	0.0	0.4
WA	Hesperophycus	37.4	22.8	0.0	14.4	2.2	7.6	0.0	0.0	0.0	15.2	0.4	0.0	0.0

Santa Rosa Island April 8-15, 2008

(Database event #2008-D)

Personnel: Dan Richards, Marine Biologist, Channel Islands National Park
Mike Moss, Bio-tech, Channel Islands National Park
Benjamin Pister, Marine Biologist, Cabrillo National Monument

Procedure and General Notes:

Transportation to and from Santa Rosa Island was via the *Ocean Ranger* on the regular park run. We had very rough seas going out and windy conditions (gusting to 50 mph) at the island. Standard procedures were used for monitoring the rocky intertidal sites. All plots and site overviews were photographed with an Olympus 5050 digital camera mounted on a PVC quadrapod. Plots generally were not scored in the field and will be scored later from computer images. Motile invertebrates were counted in all the photoplots. Sub-sampling of motile invertebrates was performed for littorine snails and small limpets, using three 20x20 cm, or 10x10 cm subplots as noted. Sea stars and abalone were counted and measured at all sites using a timed-search method (generally two people searching for 15-minutes on different areas of the reef). Surfgrass was scored in fixed point intercept transects (10 meters, 100 points) at East Point and Northwest Talcott. The maximum number of shorebirds and pinnipeds seen at any one time was recorded. Luis collected *Ligia occidentalis* and *Tylos punctatus* for genetic analysis.

Results (Daily and Site Description)

9 April, Johnson's Lee: Low tide -0.8 ft. at 0718 hrs. Conditions were sunny but windy. The wind was cold and unpleasant and the rising tide did add difficulty to the last few *Lottia* plots and stopped me from field scoring additional plots. There were two black oystercatchers, one black turnstone and four western gulls at the site. We were on site from 0745-1200 hrs. We then checked the beach at Jolla Vieja and collected another sample of *Tylos*. Elephant seal pups were all over the beach at Jolla Vieja. There were a few immature female seals on some of the beaches molting.

The sand level seemed drastically different than last year as it was back to "normal" and well below the owl limpet plots. The large tidepool and most of the boulders in back of the site were exposed. Luis had a productive day finding plenty of huge *Ligia* as well as a full sample of *Tylos*. He also collected an isopod that looks to be *Porcellio laevis*.

Motile invertebrate counts were typically low, though *Littorina* were quite abundant. *Nucella emarginata* were common and there were a few *Acanthina* sp. *Lottia gigantea* were not present in plot 1 (595) and were scarce in plots 2 and 3. Over all there were 64 *Lottia* in the plots. Four black abalone were found including the large one still in the same crevice at the east end. Abalone ranged from 137-183 mm. The total seastar count was 189, much lower than past years. There were some juvenile *P. ochraceus* on the reef and sizes ranged from 19-121 mm. There were 15 *P. ochraceus* in the 10x2 m transect on the outer reef.

10 April East Point: Low tide -0.5 ft. at 0829 hrs. Conditions were clear with moderate wind and light swell. It was cold but otherwise an excellent day. There were five cormorants at the site when we arrived and five black oystercatchers and one western sandpiper were seen. One harbor seal was on the reef across the western surge channel. We were on site from 0725-1320 hrs. We placed *Drosophila* traps in cactus patches and collected isopods from Old Ranch House beach on the return trip.

Mike found four black abalone (96-137 mm). A total of 480 *Pisaster ochraceus* in the 30-minute search (Mike and Ben each searching 15 min.) sizes ranged from 28-131 mm. At least one *Leptasterias hexactis* and a small, diseased *Pisaster brevispinus* were found.

11 April, Northwest-Talcott: Low tide -0.4 ft. at 0953 hrs. Clear and calm conditions. There was no wind and almost no swell. There were 15 harbor seals in the area between the point and the site. An elephant seal pup was lying with the harbor seals at the site. There were seven black oystercatchers in the area, and at least two western gulls. We were on site from 0900- 1400 hrs. After lunch we met Sarah Chaney at Sandy Point and helped her put up an enclosure for *Dudleya*. Luis collected *Ligia* and *Tylos* at NWT and found some *Tylos* and *Excirolana* at Sandy Point. Four mallard ducks were seen at the Mud Tank Pond.

The sampling went well. Few seastars (8 *Pisaster giganteus*, 2 *Patiria miniata*) were found as usual and only one black abalone (105 mm) was found. The surfgrass transects all had high cover (83-100%) of *Phyllospadix torreyi* along the transects. There was a high degree of bleaching but it was easy to see why, as the surfgrass flat was exposed from the time we got there in the morning until we left at 1400 hrs. There was also a high cover of *Enteromorpha* epiphytes. *Smithora naiadum* cover was moderate on some of the wetter surfgrass. Swarms of flies and beetles were flying along the base of the cliffs. *Ligia occidentalis* and some Staphylinid beetles were common at the base of the cliffs. Luis pointed out an interesting creature that must have been a centipede but was very long and sinuous, hunting among the rocks below the cliff.

There were a total of 67 owl limpets in the *Lottia* plots ranging from 28-106 mm, with most being greater than 60 mm. Motile invertebrates were moderately common in the photoplots. *Acanthina* were the most common predatory snail and several were fairly large (over 20 mm). Only a few *Nucella emarginata* were present in the plots though eggs were seen in several places. *Ocenebra circumtexta* were present at the site. *Tegula funebris* were common but were much less so than they have been at the site in the past when they formed huge masses on the inner flats. Some of the *Tegula* were quite large.

Overall *Mytilus californianus* were present only at the end of the reef around the mussel plots. When compared with other areas the number of mussels at this site is very low. *Pollicipes polymerus* and *Tetraclita rubescens* were fairly common among the mussel beds and *Lottia gigantea* and other large limpets (>15 mm) were common in the plots. I did not see any *Hesperophycus* at this site. *Silvetia* was common and doing very well overall.

12 April, Ford Point: low tide -0.3 ft. at 1116 hrs. Clear and calm. It was very hot in the sun. Moderate swell when we arrived but it had calmed down by noon. There was a large kelp bed offshore. There were six black oystercatchers and one black turnstone in the area. One harbor

seal watched us offshore. There were many young elephant seals and several harbor seals on the main Ford Point beach. We were on site from 0830-1245 hrs.

I did some corner repairs including adding bolts to the lower corners of plot 534, so now it has three bolts and should be easy to find in the future. Luis found plenty of *Ligia* but they were tough to catch among the boulders. Mike and Ben found 299 *Pisaster ochraceus* with each searching 15 minutes. There were a lot under 40 mm radius. The largest was 136 mm. The reef did not appear to have that many sea stars because most were small and there was a lot of *Phragmatopoma californica* and algae on the lower shelf that typically has the large aggregations. There were a few aggregations of *Pisaster* however unlike Johnson's Lee that had few stars in the open. Purple sea urchins were very abundant in pools on the lower shelf.

We found 10 black abalone ranging from 55-167 mm. No abalone were in the plots. None of them were in groups; the closest pair was over 1.5 m apart. There were only 21 owl limpets in the five plots. I counted the old plot 600 as plot 6 where there were four more owl limpets. The old plot 600 was on a rock that broke and shifted so we set up a new plot, but where the old plot finally settled isn't much lower in elevation and still apparently good habitat.

Motile invertebrate counts in the plots were pretty low. There was a good diversity of organisms but the counts were not high. Both *Chthamalus* and *Balanus* were common. The former was especially dense on the upper shelf. *Endocladia* was fairly dense and common all along the site. *Mytilus* was common though not especially dense anywhere. Plot 530 still has low cover possibly influenced by the owl limpets nearby. Plot 534 had no mussels and was mostly covered by *Chondracanthus canaliculatus* and *Phragmatopoma*. Plot 532 was mostly *Corallina* sp. with a number of purple sea urchins present.

13 April, Fossil Reef: Low tide -0.3 ft. at 1223 hrs. Clear and mostly calm with a light breeze in the afternoon. The swell was light and conditions overall were excellent. There were four black oystercatchers, 3 black turnstones, and 8 western gulls at the site. Eight elephant seals and two harbor seals were playing in the channel at the site. There were many elephant seals and several harbor seals on the beaches to the west. We were on site from 0900-1500 hrs.

Sampling went well, and I even scored the cover in all the plots. Two of the owl limpet plots had low numbers but the other three made up for it with high densities. Motile invertebrates were common and the sampling went fairly slowly. Only four black abalone were found on the site ranging from 77-162 mm. We also found two red abalone, *Haliotis rufescens*, in the open in shallow pools. These may have been pushed in by high seas, both were over 200 mm. *Pisaster ochraceus* were fairly common with 242 of them found in the 30-minute search. The majority were quite large with sizes ranging from 66-158 mm and a mean of 104 mm.

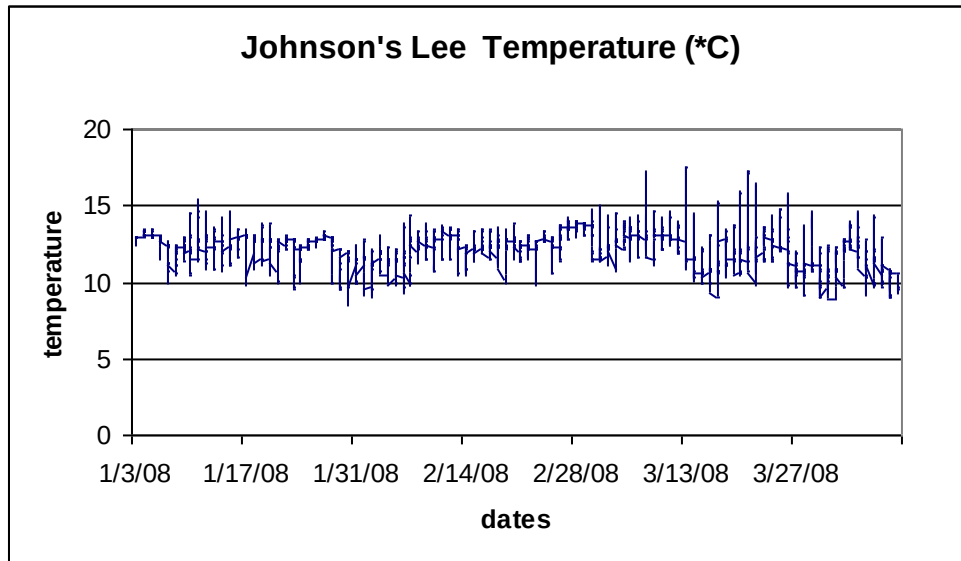
After completing the sampling at Fossil Reef we went to China Camp to collect *Ligia* and *Tylos*. There were several hundred elephant seals on the main beach.

14 April, East Point and Johnson's Lee. The wind returned with a vengeance and it was cold. The sky was clear after the morning fog lifted. Luis and I collected the *Drosophila* traps and

collected more *Ligia* and *Tylos* for live specimens to attempt rearing in the lab. A few of the *Drosophila* traps had one or two individual flies and the trap on Black Mountain had about a half-dozen, so at least we know they are here and Luis will be able to learn more about them.

We collected *Ligia* from the East Point area and collected both *Ligia* and *Tylos* from the cobble area behind the Johnson's Lee site.

Temperature data from logger at Johnson's Lee inside abalone plot 518.



Haliotis cracherodii at Santa Rosa Island, spring 2008

Site Code	Count Random	Mean Size	StDev	Min Size	Max Size	%<45 mm	%45-126mm	%127-145mm	%>145 mm
EP	4	124.0 0	18.96	96	137	-	25.00%	75.00%	-
FP	10	120.8 0	39.75	55	167	-	60.00%	-	40.00%
FR	4	125.2 5	36.66	77	162	-	50.00%	25.00%	25.00%
JL	4	150.2 5	22.08	137	183	-	-	75.00%	25.00%
NWT	1	105.0 0		105	105	-	100.00 %	-	-

Surfgrass transects at East Point, Santa Rosa Island, spring 2008 (additional taxa removed when not represented)

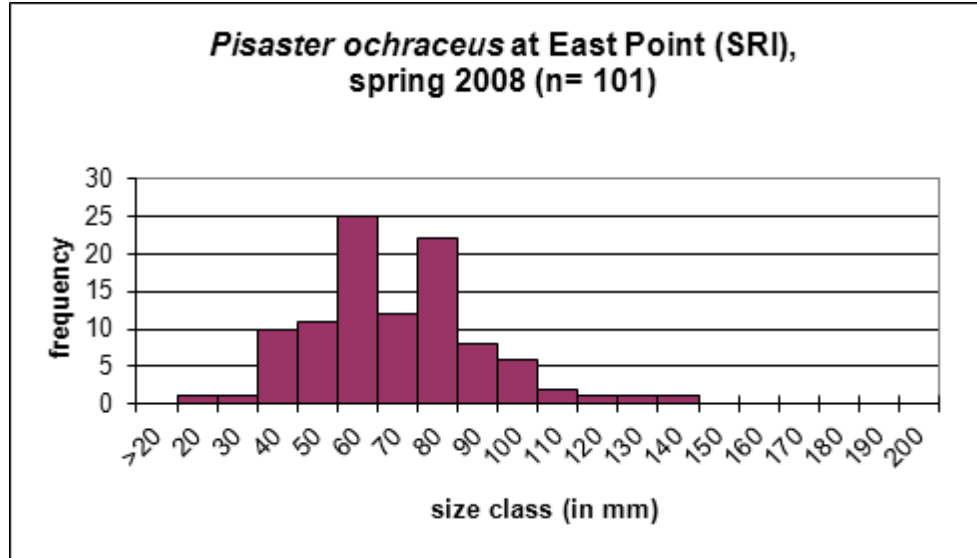
Location: East Point Site Code: SREP
Date: 10 April 2008 recorders: Dan Richards

Surf Grass Taxa	Transect 1	Transect 2	Transect 3
<i>Phyllospadix</i> spp. overstory	95	93	84
other red algae	4	3	6
other green algae	1	3	2
<i>Phragmatopoma californica</i>	1		
Sand		1	7
total	100	100	100

Surfgrass transects at Northwest-Talcott, Santa Rosa Island, spring 2008 (additional taxa removed when not represented)

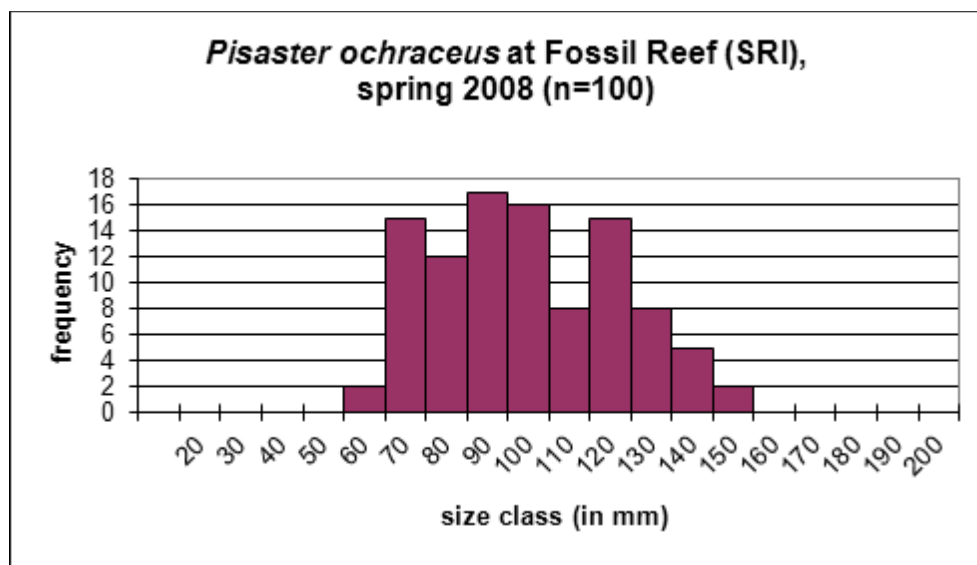
Location: Northwest Talcott Site Code: SRNWT
Date: 11-Apr-08 recorders: Dan Richards

Surf Grass Taxa	Transect 1	Transect 2	Transect 3
<i>Phyllospadix</i> spp. overstory	96	100	83
<i>Phyllospadix</i> spp. understory			1
other red algae			10
other brown algae			2
other green algae			5
Rock	4		
total	100	100	101

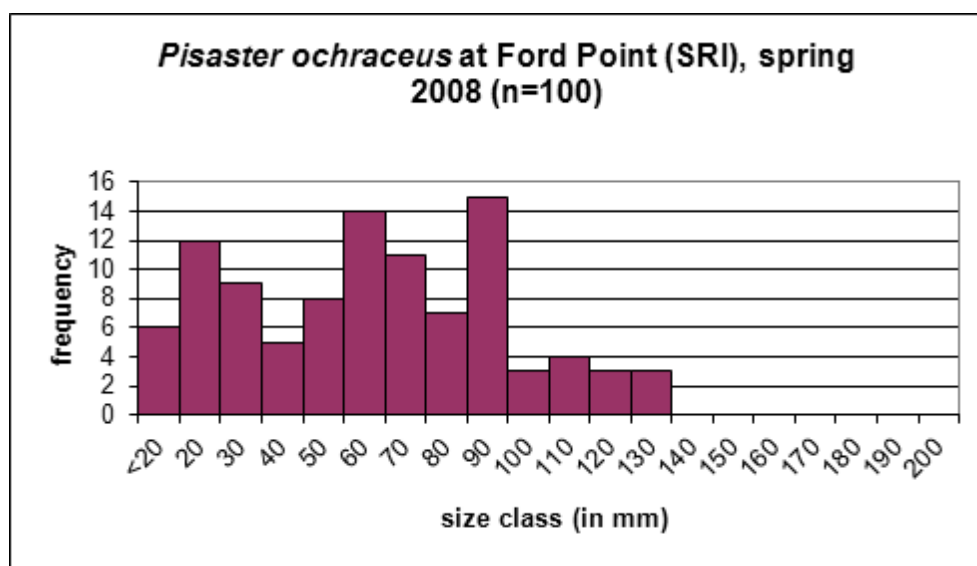


Pisaster at SREP, sp08

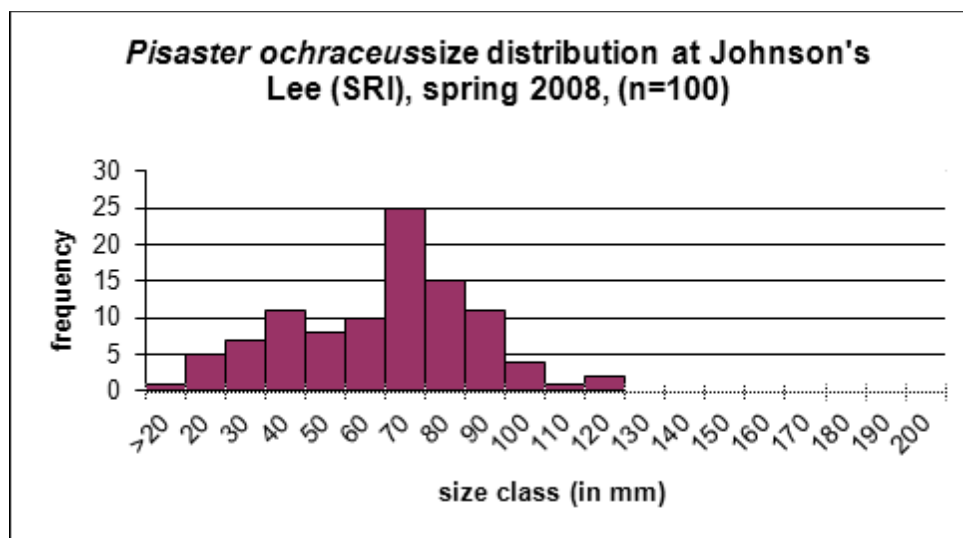
count	101
min size	28
max size	145
mean size	73.67
StDev	20.62



<i>Pisaster at SRFR, sp08</i>	
count	99
min size	66
max size	158
mean size	103.79
StDev	22.29



<i>Pisaster at SRFP, sp08</i>	
count	100
min size	11
max size	136
mean size	66.51
StDev	31.89



***Pisaster* at SRJL, sp08**

count	99
min size	19
max size	121
mean size	69.40
StDev	22.74

***Lottia gigantea* abundance from plots or timed counts at Santa Rosa Island, spring 2008.**

Site Code	Plot	Plot count	Area	Density	Mean Size	StDev	Min Size	Max Size
FR	1	2	3.14	.637	57.00	7.07	52	62
FR	2	3	3.14	.955	53.67	5.69	49	60
FR	3	46	3.14	14.645	65.09	17.21	19	94
FR	4	65	3.14	20.694	50.11	9.94	27	69
FR	5	79	3.14	25.151	48.91	13.22	23	80
JL	595	0	3.14					
JL	596	6	3.14	1.910	64.17	17.74	42	87
JL	597	3	3.14	.955	41.33	10.41	33	53
JL	598	27	3.14	8.596	44.00	21.87	20	87
JL	599	28	3.14	8.914	43.39	19.21	16	73
NWT	701	15	3.14	4.776	85.80	15.71	44	106
NWT	702	14	3.14	4.457	74.14	9.86	54	88
NWT	703	16	3.14	5.094	67.88	11.44	47	85
NWT	704	12	3.14	3.820	71.33	18.97	28	96
NWT	705	10	3.14	3.184	62.50	10.72	49	80
FP	600	3	3.14	.955	48.00	4.36	45	53
FP	601	1	3.14	.318	80.00		80	80
FP	602	8	3.14	2.547	62.38	14.86	45	80
FP	603	3	3.14	.955	73.00	19.47	51	88
FP	604	6	3.14	1.910	44.00	14.99	28	63

Lottia gigantea size distribution at Santa Rosa Island, spring 2008.

Site Code	Plot	%<20mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	%≥100mm
FR	1	0.00%	0.00%	0.00%	0.00%	50.00%	50.00%	0.00%	0.00%	0.00%	0.00%
FR	2	0.00%	0.00%	0.00%	33.33%	33.33%	33.33%	0.00%	0.00%	0.00%	0.00%
FR	3	2.17%	2.17%	4.35%	10.87%	8.70%	15.22%	41.30%	13.04%	2.17%	0.00%
FR	4	0.00%	4.62%	9.23%	29.23%	41.54%	15.38%	0.00%	0.00%	0.00%	0.00%
FR	5	0.00%	7.59%	20.25%	21.52%	29.11%	18.99%	1.27%	1.27%	0.00%	0.00%
JL	595										
JL	596	0.00%	0.00%	0.00%	16.67%	33.33%	16.67%	0.00%	33.33%	0.00%	0.00%
JL	597	0.00%	0.00%	66.67%	0.00%	33.33%	0.00%	0.00%	0.00%	0.00%	0.00%
JL	598	0.00%	29.63%	29.63%	7.41%	7.41%	7.41%	7.41%	11.11%	0.00%	0.00%
JL	599	14.29%	17.86%	10.71%	10.71%	25.00%	14.29%	7.14%	0.00%	0.00%	0.00%
NWT	701	0.00%	0.00%	0.00%	6.67%	0.00%	6.67%	13.33%	26.67%	26.67%	20.00%
NWT	702	0.00%	0.00%	0.00%	0.00%	14.29%	7.14%	50.00%	28.57%	0.00%	0.00%
NWT	703	0.00%	0.00%	0.00%	6.25%	18.75%	25.00%	31.25%	18.75%	0.00%	0.00%
NWT	704	0.00%	8.33%	0.00%	0.00%	16.67%	16.67%	25.00%	16.67%	16.67%	0.00%
NWT	705	0.00%	0.00%	0.00%	10.00%	30.00%	30.00%	20.00%	10.00%	0.00%	0.00%
FP	600	0.00%	0.00%	0.00%	66.67%	33.33%	0.00%	0.00%	0.00%	0.00%	0.00%
FP	601	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.0%	0.00%	0.00%
FP	602	0.00%	0.00%	0.00%	25.00%	25.00%	12.50%	12.50%	25.00%	0.00%	0.00%
FP	603	0.00%	0.00%	0.00%	0.00%	33.33%	0.00%	0.00%	66.67%	0.00%	0.00%
FP	604	0.00%	33.33%	16.67%	0.00%	33.33%	16.67%	0.00%	0.00%	0.00%	0.00%

Photoplot summary – mean percent cover by zone at Santa Rosa Island, spring 2008 (5 plots/zone).

Site	ZoneName	Bare Rock	Barnacle	Tetraclita	Endocladia	Hespero- phycus	Silvetia	Mussels	Turfweed	Leaf Barnacle	Misc Algae	Misc Animal	Tar
EP	Chthamalus/Balanus	29.6	54.0	0.0	10.0	5.0	1.0	0.0	0.0	0.0	0.0	0.4	0.0
EP	Endocladia	23.6	1.8	0.0	69.6	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EP	Silvetia (Rockweed)	41.6	0.0	0.0	9.8	1.8	38.2	0.4	0.0	0.0	8.2	0.0	0.0
EP	Mussels	14.2	0.8	0.0	0.0	0.0	0.0	61.4	3.6	0.0	18.8	1.2	0.0
EP	Hesperophycus	26.8	10.6	0.0	50.0	11.4	0.4	0.0	0.0	0.0	0.6	0.2	0.0
FP	Chthamalus/Balanus	60.0	26.4	0.0	11.6	0.0	0.0	0.2	0.0	0.0	0.0	1.8	0.0
FP	Endocladia	37.6	1.8	0.2	49.0	0.0	0.0	3.8	0.4	0.0	7.2	0.0	0.0
FP	Mussels	27.4	3.8	0.0	0.4	0.0	0.0	33.2	9.2	0.0	17.8	7.8	0.0
FR	Chthamalus/Balanus	56.2	39.8	0.0	2.4	0.0	0.0	0.0	0.2	0.0	0.0	0.8	0.6
FR	Endocladia	34.2	30.4	0.0	31.8	0.0	2.0	0.0	0.0	0.0	1.0	0.6	0.0
FR	Silvetia (Rockweed)	30.6	12.4	0.0	20.0	0.0	33.6	0.0	0.6	0.0	2.0	0.8	0.0
FR	Mussels	20.4	0.4	3.2	0.2	0.0	0.0	15.8	4.0	1.0	34.2	20.8	0.0
123 JL	Chthamalus/Balanus	53.2	41.8	0.0	2.0	0.0	0.0	0.4	0.0	0.0	1.8	0.8	0.0
JL	Endocladia	45.4	0.8	0.2	40.2	0.0	0.0	11.8	0.0	0.2	1.2	0.2	0.0
JL	Mussels	10.3	2.1	0.4	0.0	0.0	0.0	7.8	5.2	0.3	8.3	20.7	0.0
NWT	Chthamalus/Balanus	37.8	40.8	0.0	1.2	0.0	18.8	0.0	0.0	0.0	1.0	0.0	0.4
NWT	Endocladia	53.0	0.0	0.2	23.8	0.0	17.0	0.0	0.0	0.0	5.6	0.4	0.0
NWT	Silvetia (Rockweed)	37.6	0.0	0.0	4.6	0.0	56.2	0.0	0.2	0.0	1.4	0.0	0.0
NWT	Mussels	27.2	0.0	0.2	0.0	0.0	0.0	26.6	8.0	2.4	32.0	3.6	0.0

San Miguel Island May 6-11, 2008

(Database event #2008-E)

Personnel: Dan Richards, Marine Biologist, Channel Islands National Park
Kristin Kusic, UC Santa Cruz
Jessie Altstatt, Santa Barbara Channel Keepers
Natalie Senyk, Channel Islands National Marine Sanctuary

Procedure and General Notes:

Transportation to and from San Miguel Island was via Channel Islands Aviation. We were delayed a few hours on the outbound leg because of fog on the island. Our return flight was delayed a day because of fog. All plots and site overviews were photographed with an Olympus 5050 digital camera mounted on a PVC quadrapod. Scoring was performed in the field for select plots at Crook Point and Harris Point. Motile invertebrates were counted in all the photoplots. Sub-sampling of motile invertebrates was performed for littorines and small limpets, using three 20x20 cm, or 10x10 cm, subplots as noted. Sea stars and abalone were counted and measured at all sites using a timed-search (generally 30-minutes) method. The maximum number of shorebirds and pinnipeds seen at any one time was recorded. Specimens of *Nucella* spp. *Lottia digitalis*, *L. scabra*, *Tetraclita rubescens*, *Pollicipes polymerus*, *Chondracanthus canaliculatus*, *Mazzaella affinis*, and *Mastocarpus papillatus* were collected as part of a CEQI grant genetic samples at Cuyler Harbor and Crook Point. We also collected *Tylos* sp. and *Ligia occidentalis* collected for Luis Hurtado of Texas A&M.

Results (Daily and Site Description)

7 May 2008, Cuyler Harbor: Low tide -1.5 ft. at 0615 hrs. Conditions were excellent. The wind and seas started out light but increased through the morning. We had a marine layer so shading was not required for the photos. There were 11 black oystercatchers and one wandering tattler around the reef. Four elephant seals were playing at the base of the surge channel on the east side of the reef. Five whimbrels were seen on the beach as we left the site. We were on site from about 0645-1130 hrs.

Kristin collected genetic samples and after recording for me photographing the photoplots, Natalie helped Kristin with the collection. Jessie counted seastars finding 190 *Pisaster ochraceus* on the reef, 50 were orange, 140 were purple. I counted motile invertebrates with Jessie recording. Kristin helped out counting motile invertebrates in the barnacle plots. *Nucella* were common especially in the mussel plots. *Tegula funebris* were common in *Silvetia* and some *Endocladia* plots. Small and medium sized *Lottia gigantea* were common among the mussels. *Acanthina* were present only in a few *Endocladia* plots. *Littorina* spp. were common. There was heavy barnacle growth in the upper intertidal. *Endocladia muricata* and *Silvetia compressa* were both common with lush plants. *Mytilus californianus* were common with a wide range in sizes. Algae in the lower zones seemed particularly abundant, especially *Chondracanthus canaliculatus*, *C. spinosus*, *Laminaria setchelli*, and *Mazzaella* spp. *Hesperophycus californica* (with wide blades) formed a small patch with about 15-20 plants. *Pseudolithoderma nigra* was also common. We could not find any *Ligia* at Cuyler Harbor.

8 May, Harris Point: low tide -1.3 ft. at 0713 hrs. We had high wind and heavy surf. The marine layer was thick so the shade was not needed for the photos. Four black oystercatchers and one harbor seal were present at the site during the day. Pelagic cormorants may have been nesting on the ridge to the east but we could not see nests from the site and did not investigate. One peregrine falcon was heard and seen over the island. We were on site from 0740-1200 hrs.

Jessie counted seastars finding 13 *Pisaster ochraceus* and three *Patiria miniata*. *Pisaster* sizes were 70-170 mm with nearly all well over 100 mm. She spent about 50 minutes searching over the site area to find 13 black abalone. Their sizes ranged from 70-138 mm. 10 were within 10-50 cm from their nearest neighbor. The others were over 5 m away. There was one abalone inside the plots (presumably the same one in plot 343 that has been there). Kristin and Natalie counted motile invertebrates in plots. There were many *Tegula funebris* around the site but few within the photoplots. *Nucella* and *Ocenebra* were fairly common within mussel and *Tetraclita* plots. *Littorina* were the only common motile invertebrate in the barnacle plots. Motile invertebrate numbers were low in *Endocladia* and *Hesperophycus* zone plots.

Mastocarpus papillatus and *Mazzaella affinis* were very abundant among the low rocks in the center of the site. There was some fresh tar around the site and no noticeable change in the tar here. There was more rock breakage of the large rock chosen for reference point 2 (R2) and the marker was lost. So far, *Lottia* plot 5 which is next to R2 doesn't appear to be affected.

I scored most of the photoplots, leaving the *Hesperophycus* plots to score in the office. The rock type at this site makes scoring barnacles difficult and the mix of red algae and staining on the rocks makes scoring other plots difficult. Because of the heavy seas we were limited on time and I helped out with counting motile invertebrates in the barnacle plots.

We collected *Ligia* from the site area finding them particularly abundant among the cobbles inshore from the *Lottia* plots. In the afternoon we surveyed Simonton Beach and collected *Tylos* from the west end of the beach. There were three elephant seal carcasses and five different bird carcasses. Most were fairly decomposed and or heavily predated. The blubber and two vertebrae of the blue whale stranded in late November were still visible. The blubber still appeared much as it did back in January. There was an abundance of driftwood and *Arundo donax* sticks, mostly partly buried. The beach was quite wide and the berm was cut fairly deep.

9 May, Crook Point: low tide -1.0 ft. at 0816 hrs. Conditions were generally good. The wind mostly stayed offshore and the surf was light. It was partly cloudy but I was able to avoid needing the photo shade. There were seven black oystercatchers and two wandering tattlers, as well as 11 western gulls and one cormorant. There were eight elephant seals at the site mostly in the surge channel. The sand level in the channel was high. There were about another dozen on the small beach to the east. We were on site from 0730-1330.

Jessie counted sea stars for 30 minutes finding 83 ranging from 40-130 mm (16 orange, 27 purple). She spent an hour searching for abalone along the outer reef and found 43 ranging from 70-145 mm. A fresh, broken, black abalone shell (26 mm) was found.

Kristen and Natalie collected genetic samples then took over the motile invertebrate counts from me. I was able to score all the photoplots. Mussels on the inner reef were abundant and dominated the top of that reef. While common on the outer reef, *Mytilus californianus* were more scattered and in general were larger. Plot corners for plots 382 and 397 were obscured by the dense *Mytilus*. Many other plots need attention to lost corners.

Algal diversity was high and *Gracilaria* sp. and other reds were particularly common in the channel. *Analipus japonica*, a northern species was common on the outer reef. Mussel recruitment was very good overall. Sipunculids were very common among the mussels on the inner reef. In general, motile invertebrates were not very common. The short form of *Hesperophycus* was more common than *Silvetia*, but was still uncommon. A couple of *Silvetia* plants on the inner reef had the black frond tips seen last year at some locations indicating some disease, possibly fungal according to Steve Murray.

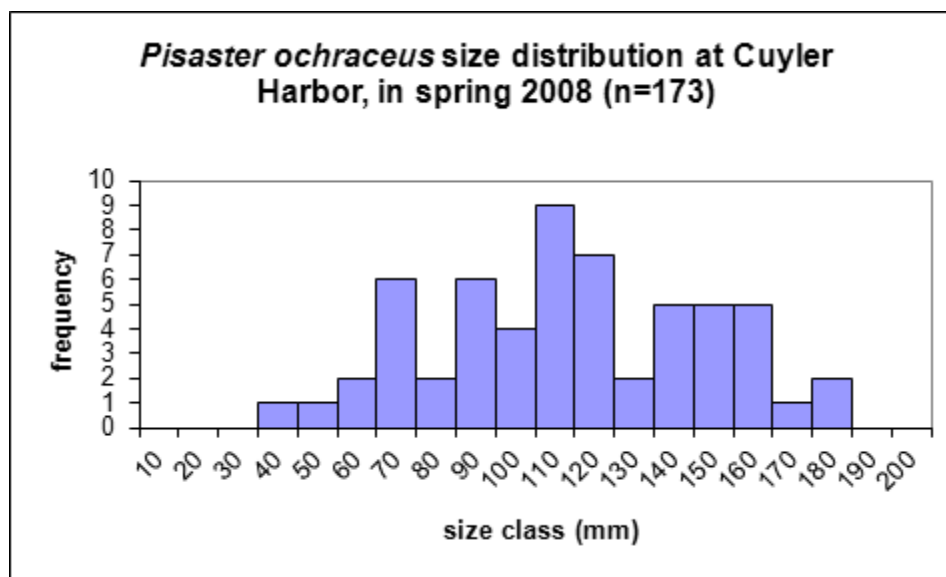
10 May, Otter Harbor: low tide -0.6 ft. at 0924. Wind and seas were light and the marine layer burned off about mid-day. There were five black oystercatchers and one American or Hybrid black/American oystercatcher present. The American oystercatcher was presumably the same one seen in January. There were 16 harbor seals and 12 elephant seals either on the rocks or in the surge channel. We were on site from 0815-1430 hrs.

Jessie spent about one hour measuring and counting sea stars finding a total of 76 (28 orange, 48 purple) *Pisaster ochraceus*, and sizes ranged from 40-170 mm. She also found 10 *P. giganteus* (30-180 mm) and 2 *Patiria miniata*. Kristin and Natalie counted motile invertebrates in the photoplots. *Lepidochitona* spp. were common in some plots. Large limpets (>15 mm) were common in the mussel plots especially. Mussel plots also had abundant *Nucella emarginata* and *Lottia gigantea*. *Tegula funebris* were abundant in plot 374, a barnacle plot now dominated by red algae, particularly *Mazzaella affinis*. That plot was the only plot field scored.

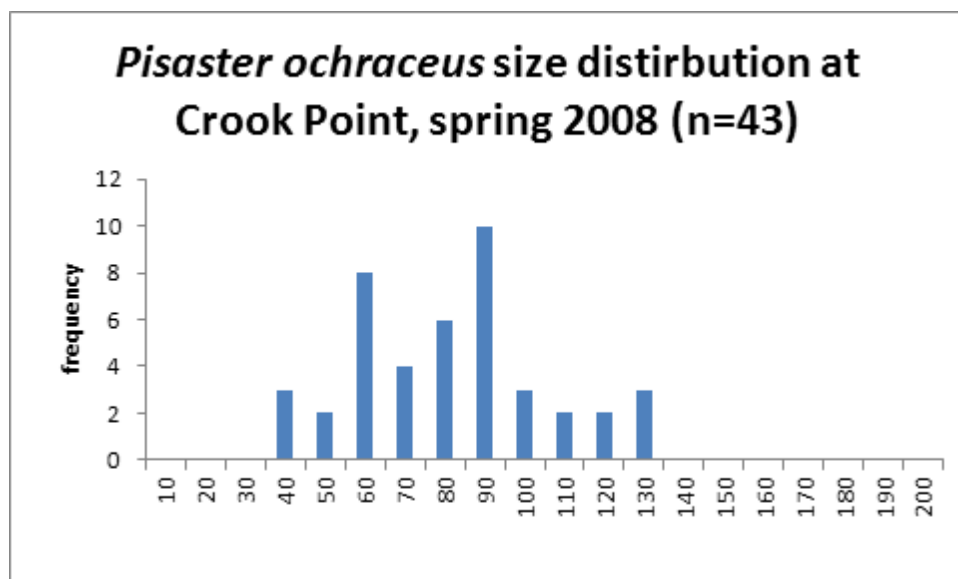
Jessie and I spent about three hours measuring black abalone across the site. I found 36 tags; though of those, only 24 tags could be read, the others were mostly broken though a few may have just been too deep in crevices. In all, we found 175 abalone. There was one dead abalone that did not appear to be shrunken or otherwise obviously diseased though there were several gouges in the foot that were consistent with gull pecks. One tagged shell was found. The shell was not collected.

Haliotis cracherodii at San Miguel Island, spring 2008.

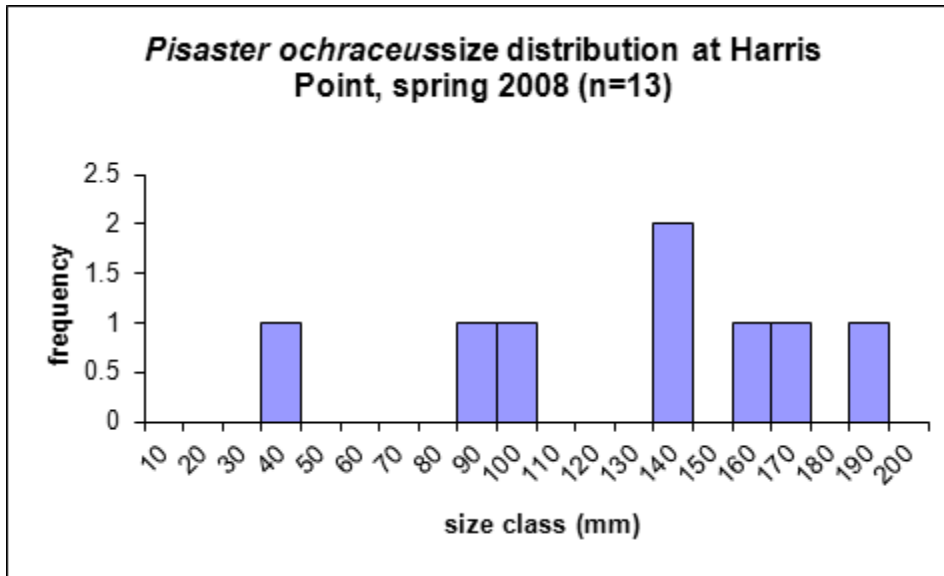
Site Code	Timed count	Plot count	Mean Size	StDev	Min Size	Max Size	%<45mm	%45-126mm	%127-145mm	%>145mm
CH	0	0					-	-	-	-
CP	43	1	108.70	20.82	70	145	-	77.27%	22.73%	-
HP	12	1	108.77	17.51	70	138	-	92.31%	7.69%	-
OH	175	0					-	-	-	-



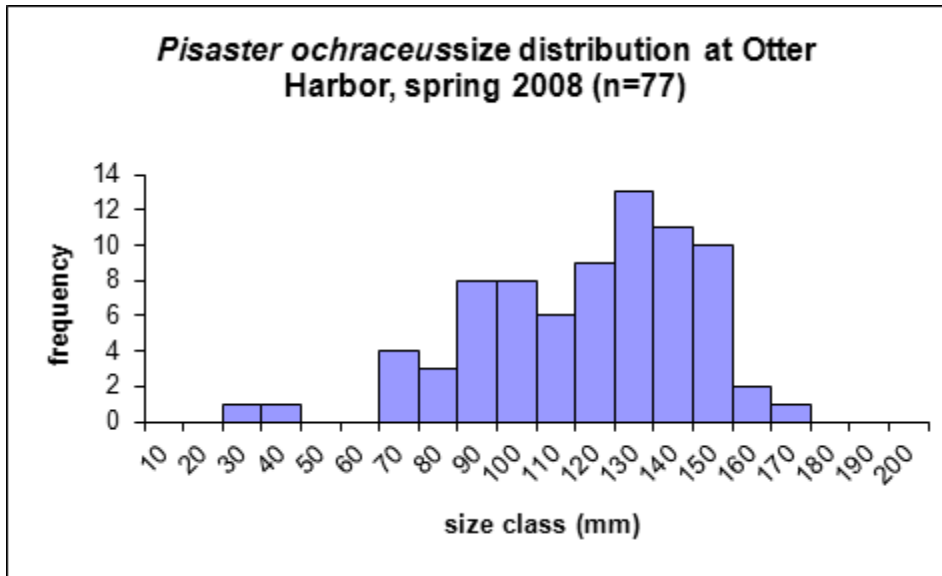
	<i>Total Pisaster</i>	<i>Orange</i>	<i>Purple</i>
count	173	38	135
min size	40	50	40
max size	130	150	180
mean size	118.38	116.32	118.96
StDev	25.92	22.50	26.18.



<i>Total Pisaster</i>		<i>Orange</i>		<i>Purple</i>	
count	43	count	16	count	27
min size	40	min size	60	min size	40
max	130	max	130	max	130
size		size		size	
mean	81.98	mean	90.94	mean	76.67
size		size		size	
StDev	24.11	StDev	17.91	StDev	25.98



<i>Total Pisaster</i>		<i>Orange</i>		<i>Purple</i>	
count	11	count	4	count	7
min size	70	min size	150	min size	70
max	170	max	170	max	160
size		size		size	
mean	142.73	mean	157.5	mean	134.29
size		size		size	
StDev	27.60	StDev	9.57	StDev	31.55



<i>Total</i>		<i>Orange</i>		<i>Purple</i>		<i>P. giganteus</i>	
count	76	count	28	count	48	count	10
min size	40	min size	80	min size	40	min size	30
max size	170	max size	170	max size	160	max size	180
mean	119.14	mean	121.07	mean	118.03	mean	106
size		size		size		size	
StDev	26.34	StDev	24.36	StDev	27.619	StDev	47.89

Photoplot summary – mean percent cover by zone at San Miguel Island, spring 2008 (5 plots/zone).

Site	ZoneName	Bare Rock	Barnacle	Tetraclita	Endocladia	Hespero- phycus	Silvetia	Mussels	Turfweed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other
CH	Chthamalus/Balanus	25.4	44.6	0.0	28.8	0.0	1.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
CH	Endocladia	38.0	6.6	0.2	27.6	0.0	8.8	9.6	0.0	0.2	8.6	0.4	0.0	0.0
CH	Silvetia (Rockweed)	19.6	0.4	1.6	2.4	0.0	58.2	0.6	0.0	0.0	9.8	7.4	0.0	0.0
CH	Mussels	23.4	3.2	5.4	0.0	0.0	0.0	49.4	1.6	1.2	5.4	10.4	0.0	0.0
CP	Chthamalus/Balanus	62.0	34.2	0.0	3.0	0.0	0.0	0.6	0.0	0.0	0.0	0.2	0.0	0.0
CP	Endocladia	48.0	4.6	0.2	18.0	0.8	0.0	9.8	0.0	0.4	17.2	1.0	0.0	0.0
CP	Silvetia (Rockweed)	34.2	2.6	0.2	16.4	2.2	0.0	28.8	1.2	1.0	13.2	0.2	0.0	0.0
CP	Mussels	21.2	0.6	0.2	0.0	0.0	0.0	70.2	0.4	1.8	5.2	0.4	0.0	0.0
HP	Chthamalus/Balanus	29.2	66.8	0.0	2.6	0.4	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0
HP	Endocladia	18.6	7.8	0.2	44.6	21.0	0.0	1.4	0.0	0.0	6.2	0.0	0.0	0.0
HP	Mussels	40.8	4.8	1.4	5.2	0.6	0.0	23.8	1.0	0.8	21.6	0.0	0.0	0.0
HP	Tetraclita	27.4	5.2	5.8	2.4	0.0	0.0	14.0	9.8	0.0	33.2	2.2	0.0	0.0
HP	Hesperophycus	28.0	0.2	0.0	12.2	54.8	0.0	0.0	0.0	0.0	4.4	0.2	0.0	0.2
OH	Chthamalus/Balanus	37.8	41.6	0.0	0.0	0.0	0.0	0.0	5.4	0.0	14.2	0.0	1.0	0.0
OH	Endocladia	29.2	3.6	0.2	44.6	0.0	6.8	0.2	0.4	0.2	14.6	0.2	0.0	0.0
OH	Silvetia (Rockweed)	27.8	23.0	0.0	22.4	0.0	9.8	0.0	0.0	0.4	15.8	0.4	0.4	0.0
OH	Mussels	32.6	5.8	0.6	0.2	0.0	0.0	43.0	0.4	3.8	12.0	1.6	0.0	0.0

Santa Cruz Island July 18-21, 2008

(Database event #2008-F)

Personnel: Dan Richards, Marine Biologist, Channel Islands National Park
Carol Blanchette, UCSB/ PISCO
Tal Ben-Horin, UCSB graduate student

Procedure and General Notes:

Transportation to and from Santa Cruz Island was via Island Packers boats. We stayed at the UC NRS field station and rented a UC land cruiser. We camped one night at Trailer. I searched for black abalone and recorded maximum lengths and distance to nearest neighbor, and at Willows I recorded the tag numbers when possible. I made plot repairs at Prisoner's Harbor. Carol replaced barnacle settling plates and tuffies (mussel recruitment) and conducted 30-minute seastar counts. Tal was trying to mark abalone locations with a GPS as a trial for part of his graduate work. He also installed a temperature logger in silicon under black abalone shells at Willows and Trailer.

Results (Daily and Site Description): 19 July 2008-Willows Anchorage. Foggy but pleasant morning. Low tide at -0.5 ft. at 0530 hrs. Air and water temperatures were both 18 C. There was a moderate south swell. Two black oystercatchers were seen on the reef. Carol replaced barnacle settling plates and tuffies (mussel recruitment) and counted 532 *Pisaster ochraceus* in a 30-minute search on the outer reef. Tal was trying to mark abalone locations with a GPS as a trial for part of his graduate work. He also installed a temperature logger in silicon within a black abalone shell, epoxied to rock below plot He1.

I measured black abalone finding a total of 57. Sizes ranged from approximately 40 mm to 127 mm. Only six were 100 mm or larger. Most of the usual places were occupied by abalone, though some of the groupings had fewer abalone than in the past. The tide was coming up fairly fast so some of the lower places were not searched and waves were washing over the outer reef by the time I got out there so the search was cursory there. I did not get to the western reef. The largest grouping was in the crevice with the overhang on the inshore side of the reef (near plot Pe2).

Eight tagged abalone were found but only five of the PIT tags responded to the reader. One of the non-functional tags was double tagged and we were able to get the number off it. Only two of 15 tagged in March 2008 were found. Tags found this time and their history are below in the table.

Pisaster ochraceus were numerous and most were small. Many under 40 mm arm length were found under boulders. Algal growth was lush, especially the *Chondracanthus canaliculatus* and *Mazzaella affinis*. Rockweed plots looked pretty barren overall but the *Silvetia* that were there (especially around Pe 4) looked healthy with some new growth. *Tegula* were quite common: *T. gallina* seemed to be most numerous. Juvenile sculpins were quite common in pools. *Nemalion helminthoides* plants were common and very

long. *Phragmatopoma californica* was common to abundant with what seemed like new growth and small tubes.



Willows Anchorage black abalone July 2008 (not all 57 were measured)

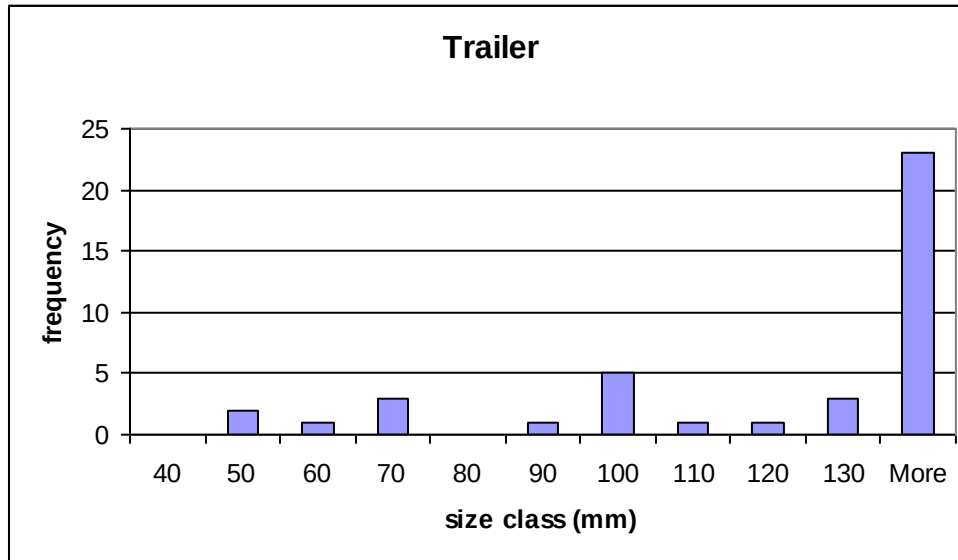
n	57
mean	70.6
min	40
max	127

20 July, Trailer. Foggy and pleasant again, very calm. Low tide -0.4 ft. at 0558. We camped on the bluff last night so it was easy to be on the reef at daylight. There were 2 black oystercatchers and one great blue heron seen this morning. Activities were a repeat of Willows. Carol went to Fraser also to work but Tal and I concentrated on Trailer. Tal put out another logger on the mussel reef near M5.

A total of 41 black abalone were found. Six were within the site boundary. Most were in the boulders just south of the site. I continued to the gravel beach around the south point. Only three were 60 mm or less, six total less than 70 mm. There were several over 160 mm. Many more solitary abalone than at Willows. Most were in crevices with northern exposures though a few were more or less in the open.

Some bleaching was seen with *Endocladia*. Some of the *Hesperophycus* appeared beat up, though other looked fine. Overall the individual plants were mostly in good shape but a lot of bare rock was showing in the bed. *Balanus* and *Chthamalus* were both very common especially south of the point. *Tegula funebris* was very common. I counted the *Tegula* around the point getting a 95:5 ratio of *T. funebris* to *T. gallina*. *Pachygrapsus crassipes* were large and common. *Ligia occidentalis* were fairly common and some individuals were huge (5-6 cm). I counted 210 *Pisaster ochraceus*, 1 *P. giganteus* and 4 *Patiria miniata* in a 30 minute search of the whole site. Carol just did her standard area of

the mussel reef and adjacent cobble area and found 110 *P. ochraceus*. Looked like *Pisaster* were eating barnacles on the outer reef. *Phyllospadix* spp. The surfgrass was abundant and looked healthy. There was fairly heavy *Smithora* growth. Lush red algae were common on the lower reef with dense large *Mastocarpus*, *Mazzaella*, *Gelidium coulteri*, and *Chondracanthus* being most common. *Porphyra perforata* was abundant on some of the high rocks. Juvenile sculpins were common in pools here too.



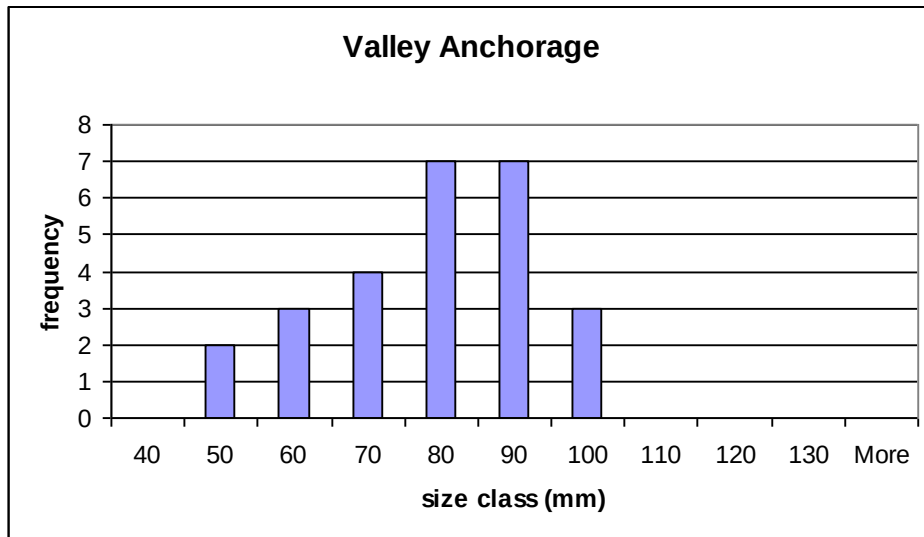
Trailer black abalone July 2008

n	40
mean	121.8
min	50
max	165

21 July 21, 2008; Valley Anchorage and Prisoner's Harbor. Low tide -0.1 ft. at 0625. I measured abalone at Valley for 30 minutes finding 26 black abalone all under 100 mm. They were hard to see and measure under the boulders so I did not get very far along the beach. I worked the inner part of the reef and about a third of the boulder beach.

At Prisoners, I made repairs to missing plot corners replacing all of B1 and lower left of M1. I also repaired corners at He4 and He 5 though the rock was so hard I only got one bolt partially in there. All other corner bolts of *Mytilus* plots and all the others I checked were present. There was one black abalone in the middle area between the *Endocladia* plots and *Hesperophycus* plots out in the open. Most of the mussels from the site are gone. There are a few small clusters of mussels and some byssal threads and broken shells. Mussels on the point were okay mostly. Carol said when she was here in May the water was very silty and many of the mussels and *Psuedochama* were gaping. *Ulva* dominates the lower reef by the mussel plots now, which is different from the diatom film we typically see on bare rock in the winter time. Both rockweed species were in very low abundance on the reef as well. *Pisaster* did not seem to be very common but it was past low tide when we got there. The other algae (*Chondracanthus canaliculatus*, *Mazzaella*

affinis and *Mastocarpus papillatus* seemed to be doing very well as we saw at the other sites. *Pachygrapsus crassipes* were common in the early morning at Valley. They are obviously more active before daylight.



Valley Anchorage black abalone July 2008

n	26
mean	75.9
min	45
max	96

Tags found at Willows July 22, 2008 with history

date	location	tag number	tagged size (mm)	comment	dist to nearest neighbor*
19-Jul-08	SCWA	985161000980654	61	Non-functional Pit tag	10-50 cm
18-Mar-08	SCWA	985161000980654	61	new	<10cm
19-Jul-08	SCWA	985161000979302	73		
27-Sep-07	SCWA	985161000979302	56		1-4 m
29-Mar-07	SCWA	985161000979302	45	new tag--	1-4 m
19-Jul-08	SCWA	985161000977073	61		touching
18-Jun-07	SCWA	985161000977073	45	new	10-50 cm
19-Jul-08	SCWA	985161000972199	61		touching
18-Mar-08	SCWA	985161000972199	56	new	touching
19-Jul-08	SCWA	985161000973395	65		touching
29-Mar-07	SCWA	985161000973395	51	new tag--	
19-Jul-08	SCWA	985161000974717	108		10-50 cm
18-Mar-08	SCWA	985161000974717	101		>5 m
27-Sep-07	SCWA	985161000974717	103	in crevice below Pe2	<10 cm
18-Jun-07	SCWA	985161000974717	86		<10 cm
31-Jan-07	SCWA	985161000974717			
21-Dec-06	SCWA	985161000974717	93		

Fall 2008 Rocky Intertidal Monitoring Trip Reports

Santa Barbara Island October 15-20, 2008

(Database event #2008g)

PURPOSE: To monitor rocky intertidal sites, measure tidal heights with GPS, pelican nest count, vegetation photo points and greenhouse work.

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
Haven Livingston, UCSC PISCO
Kyle Walters, UCSC PISCO
Laurie Harvey, Seabird Ecologist, Channel Islands National Park
Lianne Koczur, SCA seabird intern

PROCEDURE and general observations: Standard procedures were followed to photograph, field score and count motile invertebrates in fixed plots. All plots and site overviews were photographed with an Olympus 5050 digital camera mounted on a PVC quadrapod. Scoring was performed in the field for all plots. Sub-sampling of motile invertebrates was performed for littorines and small limpets, using three 20x20 cm, or 10x10 cm, subplots as noted. Sea stars and abalone were counted and measured at both sites using a 30-minute timed-search. The maximum number of shorebirds and pinnipeds seen at any one time was recorded.

We had calm conditions with only occasional swells over 2 ft. There was no wind early in the week and air temperatures were around 80°F. Water temperature was 18°C.

October 15, Landing Cove. Low tide -0.5 ft. at 1632 hrs. Good conditions with moderate swell being the only issue. The sky was clear with just a little smoke from the fires over the last several days. The wind was barely a breath. There were 34 young California sea lions in the cove. One black turnstone, and two black oystercatchers were present in the cove. At least two western gulls were present, but I will admit to not paying a lot of attention to counting them.

Kyle set up the GPS to get the measurements on the transect ends and Haven collected limpets for genetic analysis. We only worked the south (east) half of the site. I was able to find all the plots without trouble. Haven and Kyle did the mobile invertebrate counts in the mussel and one barnacle plot before darkness overtook us. I scored all 10 plots. *Ocenebra circumtexta* was common in the mussel plots and in two of the barnacle plots that also had *Mytilus*. *Littorina* were common in barnacle plots and a fair number of limpets were found. Note that *Siphonaria* were counted as limpets as they have been in previous years. A couple of snails were found in mussel plots that Haven identified as *Ocenebra subangulata*. These resemble small *Ceratostoma nuttalli*.

October 16, Sea Lion Rookery. Low tide -0.6 ft. at 1721 hrs. Excellent conditions. There were more than 150 California sea lions in the area, many on the plots. Three black turnstones and two black oystercatchers were present. No gulls were directly on our site. A dozen or so western gulls were on the reef further up coast.

Kyle and Haven set up the GPS and collected some genetic specimens; Lianne helped me with the photos and recorded for scoring and motile invertebrate counts. I was able to find all the plots, including at least two corners of each of the mussel plots. Last year all five mussel plots were overgrown. I made corner repairs to several plots outside the mussel zone and made detailed maps of the mussel and rockweed plots.

Kyle counted *Pisaster ochraceus* in a 30-minute search finding a total of 758, divided as 315 orange colored and 643 other colors. After the timed search he measured 100 *Pisaster*. Kyle and Haven did a general size frequency of *Lottia gigantea* measuring about 100.

Haven and Kyle counted motile invertebrates in plots finding generally very low numbers in the barnacle and *Endocladia* zones. Even *Littorina* spp. numbers were very low. In the *Silvetia* zone Limpets and *Acanthina* sp. were fairly common and hermit crabs were fairly abundant in several of the plots. *Fissurella volcano* and *Ocenebra circumtexta* were common in the mussel plots. Several of the mussel plots had *Pisaster ochraceus* and small *Strongylocentrotus purpuratus*.

Ulva sp. dominated in all zones except the mussels. *Chthamalus* was present in all the barnacle plots but 18% was the highest cover in any plot. *Silvetia compressa* was present but in fairly low cover in that zone. All the plants were young, but all appeared healthy. *Mazzaella affinis* and *Gelidium/Pterocladia* spp. were both common in *Silvetia* plots. *Mytilus californianus* cover ranged from 12-48% in the plots. Bare rock was common at 14-33%. *Egregia menziesii* was present in 4 of the 5 plots. Fronds of *Egregia* originating outside the plot were removed from the plot before scoring to expose the *Mytilus* below.

October 17, Landing Cove. Low tide -0.5 ft. at 1817 hrs. Excellent conditions, though there was an occasional swell. Only about 10 sea lions were in the cove and there were two black oystercatchers and two black turnstones present.

Kyle and Haven completed tidal height measurements. I used the kayak to access the north site and shot photos and scored plots. I counted motile invertebrates in the *Silvetia* plots only. I was unable to locate any corners for plot 321 so placed the plot in the best approximation based on triangulation from previous measures.

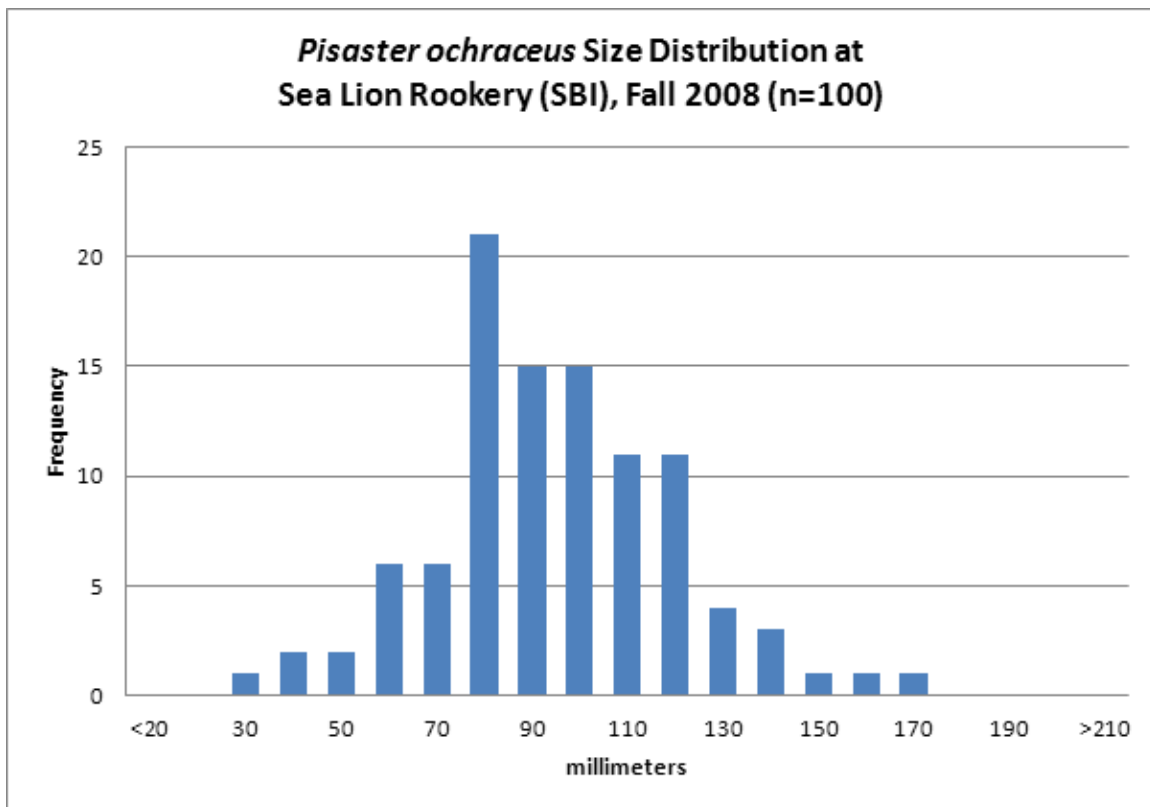
Ulva sp. dominated the *Silvetia* plots with 19-46% cover. Only a few *Silvetia compressa* plants were present in the plot areas and *Silvetia* was recorded in only one plot at 3%. Bare rock was the highest cover. *Mazzaella affinis* was common. *Gelidium/Pterocladia* cover was 85% in plot 320 but *Chondracanthus canaliculatus* was slightly more dominant in two other plots. Surfgrass *Phyllospadix* sp. dominated plots 322 and 323. *Mytilus californianus* was common in plot 322.

Acanthina sp. was the most common motile invertebrate in the *Silvetia* plots but small hermit crabs were also common in most plots.

I counted a total of 31 *Pisaster* in the 18 x 2 m transect and Kyle and Haven measured 100 *Pisaster* with a range of 32-136 mm, mean of 65 mm and mode of 50 mm.

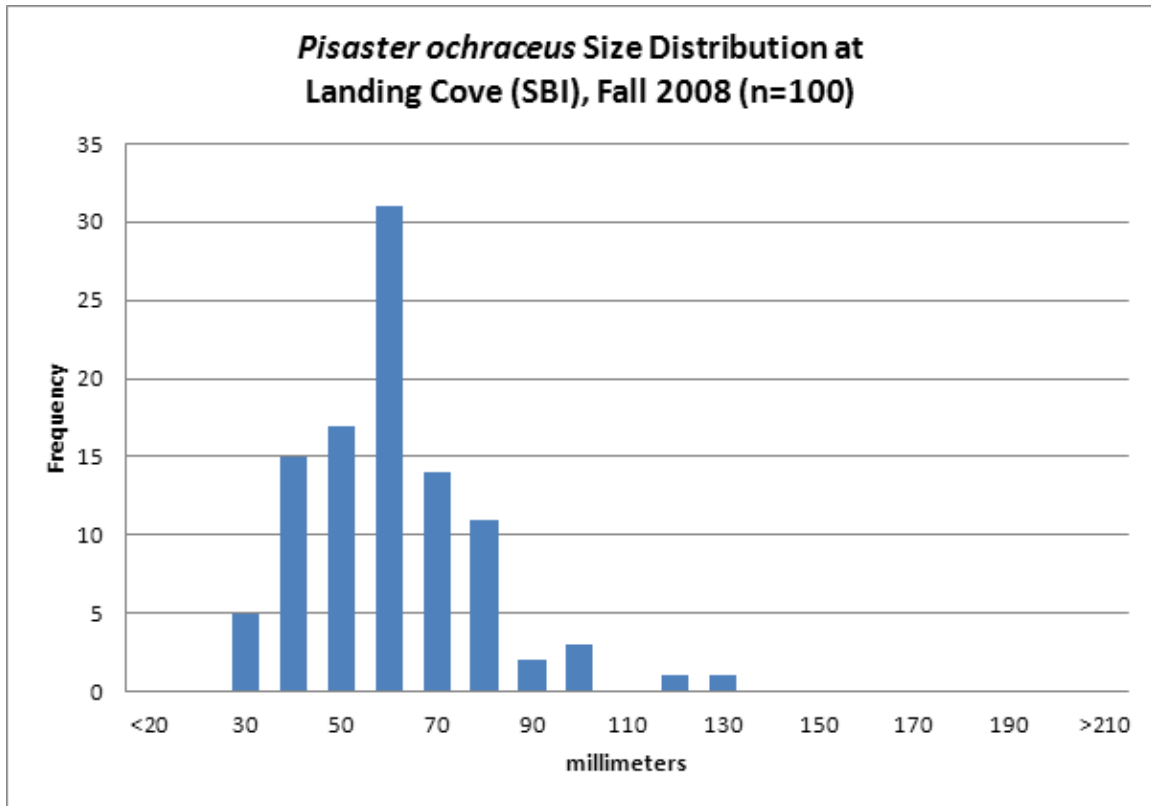
October 18, Landing Cove. Low tide -0.3 ft. at 1924 hrs. Excellent conditions. There were 10 young sea lions in the cove along with 2 black turnstones, 2 black oystercatchers, and 2 wandering tattlers.

I searched for *Ligia occidentalis* for Luis Hurtado, but I only saw five and was only able to catch one. I did a 30 minute search for abalone and sea stars. I counted 224 *Pisaster ochraceus* down from 379 last year. Only one black abalone was found, approximately 83 mm.



Pisaster ochraceus size distribution at SBSLR

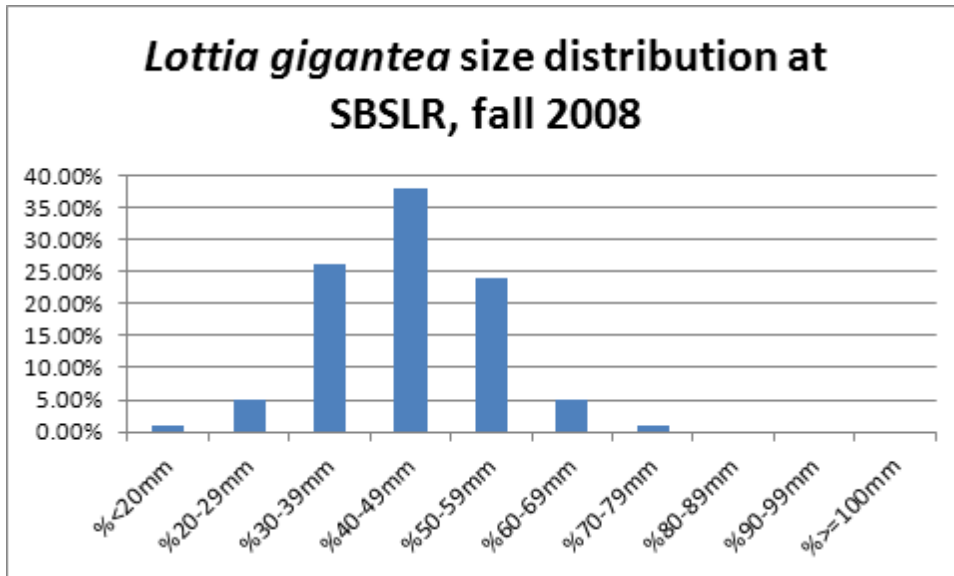
count	100
min size	37
max size	176
mean size	99.23
StDev	25.25



Pisaster ochraceus size distribution at SBLC

N	100
max	136
min	32
mean	64.71
mode	50

SiteCode	CountRandom	MeanSize	StDev	MinSize	MaxSize
SLR	100	44.31	10.03	14	70



Haliotis cracherodii at Santa Barbara Island, fall 2008.

SiteCode	Year	CountRandom	MeanSize
LC	2008	1	83
SLR	2008	0	

General bird list for the week

Brown Pelican	Brown-headed Cowbird
Western Gull	Horned Lark
Brandt's Cormorant	Western Meadowlark
Royal Tern	Rock Wren
Black Oystercatcher	Say's Phoebe
Black Turnstone	Black Phoebe
Wandering Tattler	Lapwing Longspur
Northern Harrier	Lesser Goldfinch
Peregrine falcon	White -crowned Sparrow
American Kestrel	Spotted Towhee
Burrowing Owl	

Photoplots at Santa Barbara Island, fall 2008 (five plots/zone).

Site	ZoneName	Bare Rock	Barnacle	Tetraclita	Endocladia	Hespero-phycus	Silvetia	Mussels	Turfweed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other
LC	Chthamalus/Balanus (Barnacle)	46.2	1.0	6.2	1.4	0.0	0.0	11.0	7.0	0.0	26.8	0.4	0.0	0.0
LC	<i>Silvetia</i> (Rockweed)	42.2	0.4	0.0	0.0	0.0	0.6	0.4	4.6	0.0	51.6	0.2	0.0	0.0
LC	Mussels	13.4	0.2	4.6	0.0	0.0	0.0	51.4	0.0	0.2	29.4	0.8	0.0	0.0
LC	Red Algal Turf/ Gelidium- Pterocladia	0.8	0.0	0.0	0.0	0.0	0.0	3.5	62.0	0.0	14.5	0.3	0.0	19.0
LC	Red Algal Turf/ Gelidium- Pterocladia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	95.0
SLR	Chthamalus/Balanus (Barnacle)	43.4	9.2	0.4	0.8	0.0	0.0	1.2	0.6	0.0	44.4	0.0	0.0	0.0
SLR	<i>Endocladia</i>	18.2	0.2	3.4	1.4	0.0	0.0	3.6	0.2	0.4	72.4	0.2	0.0	0.0
SLR	<i>Silvetia</i> (Rockweed)	20.8	0.0	1.6	1.2	0.0	9.8	4.4	10.2	0.0	50.2	1.6	0.0	0.2
SLR	Mussels	22.0	0.0	1.2	0.0	0.0	0.0	29.8	0.2	0.2	40.8	5.8	0.0	0.0

Anacapa/Santa Cruz Island November 11-12, 2008

(Database event #2008-H)

Personnel: Dan Richards, Marine Biologist, Channel Islands National Park
Mike Moss, biotech, Channel Islands National Park
Jacob Elliott, SCA intern, Channel Islands National Park
Haven Livingston, UCSC/PISCO
Kyle Walters, UCSC/PISCO
Danielle Lipski, CINMS
Charlie Lara, CINMS
Reg Greenwood, CINMS

Procedure and General Notes:

The *R/V Shearwater* provided transportation to the island. We did day trips from Ventura. Standard procedures were followed for photographing and counting motile invertebrates in fixed plots. Percent cover of photo plots was determined from the digital images except at Middle West where plots were field-scored. Black abalone, *Haliotis cracherodii*, and seastars were counted in 30-minute searches and measured for size distribution. Owl limpets, *Lottia gigantea*, were measured in fixed one-meter radius plots. The highest number of shorebirds and pinnipeds seen was recorded. PISCO biologists also mapped transect heights with GPS.

Results (Daily and Site Description)

November 11, South Frenchy's Cove, Anacapa Island. Low tide -0.5 ft. at 1419 hrs.

Clear sky, light wind and swell, excellent conditions. Unlike last spring the sand was built up high on the shore. There was a steep, high berm of gravel on the north shore at Frenchy's, possibly a result of last week's high winds. One western Gull and one black oystercatcher were in the area. Common murres and black-vented shearwaters were seen in fair numbers mid-channel on the way to the island. We worked the site from 1045-1545 hrs.

There were no problems finding plots, and most corners were in good shape. We need to consider placing bolts in some of the mussel plots though.

Mike counted motile invertebrates, and like last spring, numbers were generally low, including *Littorina* spp. *Nucella emarginata* were common in the mussel zone plots. Only a few *Acanthina* sp. were found. *Tegula funebris* were present in one *Silvetia* zone plot. Especially in the *Mytilus* zone, there were a lot of tube snails (*Petalochonchus montereyensis*). *Anthopleura elegantissima* normally common along the outer wall of the inshore reef were very sparse, possibly a result of scour from the high sand.

Island Packers landed with approximately 80 college students. They spent most of their time around the blowhole area but did stop to ask questions. Mike counted motile invertebrates and searched for sea stars and abalone. No abalone were found, but he did find 33 *Pisaster ochraceus*. The rest of us walked to Cat Rock to monitor there after shooting photos at Frenchy's. Mike measured owl limpets when we returned.

November 11, Cat Rock. Because of limited boat time this week, we sampled both west Anacapa sites in one day. Some of us went to Cat Rock from approximately 1315-1500 hrs. There were two black oystercatchers, one American oystercatcher, and one western gull at the site. The visitors to Frenchy's were near the blowhole when we passed by and they had found a large cabezon in a tidepool.

Haven helped with the seastar and abalone searches as well as owl limpet measurements while Jacob and I shot photos and filled out the field log. Four *Haliotis cracherodii* were found in the same crevices we have been seeing them in for several seasons. No abalone were found in the fixed plots. Four *P. ochraceus* and one *P. giganteus* were found. There was no time to do motile invertebrate counts or plot field-scoring. A couple of corner repairs were made.

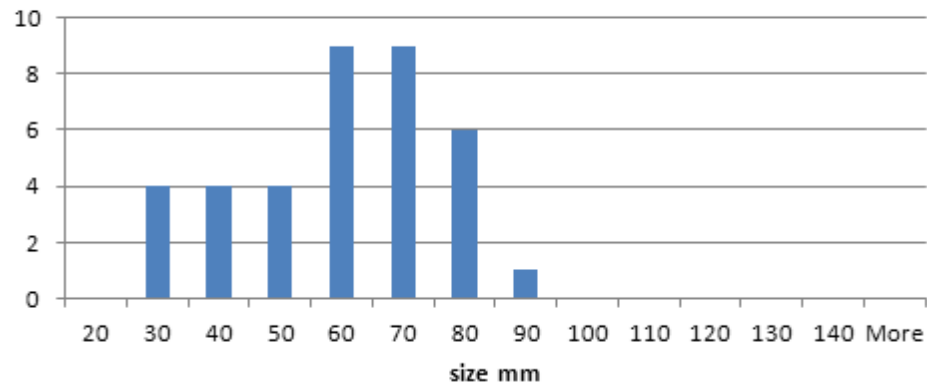
November 12, Middle Anacapa Island. Low tide -0.9 ft. at 1503 hrs. Clear sky, calm wind and seas, warm and pleasant conditions. We visited all three areas- Middle West, Middle East, and Harbor Seal Arch. The only shorebird seen was one sandpiper at Harbor Seal Arch. There were no pinnipeds seen.

Overall abundance of *Mytilus californianus* was depressed and large dense groups of *Pisaster ochraceus* were common. Haven counted 733 *P. ochraceus*. Some small stars were present but most were well over 100 mm radius. There were several patches of dense mussel recruitment across the reef. *Silvetia compressa* were quite restricted in distribution and did not show much new growth.

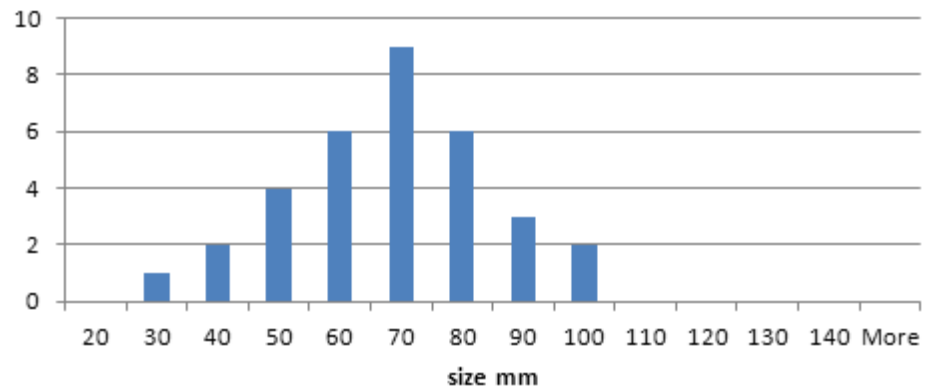
Mike counted motile invertebrates and Kyle and Dan split the field scoring of the photo plots at Middle West. Motile invertebrate numbers were relatively low in all plots but there was a fair diversity of snails in all the plots with *Nucella emarginata*, *Acanthina* sp. and *Ocenebra circumtexta* present. Dan and Jacob shot photos of both Middle West and Middle East. We were able to cross above the surge channel to get to Middle East. *Pisaster ochraceus* were common on the reef at Middle East. The *Caulacanthus ustulatus* appeared unchanged since last spring and does not appear to have spread. I did not look specifically for it at Middle West where we have seen it, but it was not obvious if it was present.

We installed three new *Lottia gigantea* monitoring plots by installing single bolts for each then measuring limpets within a one-meter radius (with the line following the rock contours). We have measured size frequency of owl limpets there before and took advantage of the time and conditions to install the fixed plots. Mike and Haven did most of the abalone measuring but we all helped with the search and spent longer than 30-minutes searching the entire Middle West reef. We found 37 *Haliotis cracherodii* there, ranging from 22-90 mm. We all spent about 20 minutes at Harbor seal Arch area where no abalone were present in the fixed plots, but we did find 33 ranging from 36-100 mm.

Middle-West fa-08
Black Abalone Size Frequency



Harbor Seal Arch fa-08
Black Abalone Size Frequency



Santa Cruz Island November 25-26, 2008

(Database event #2008-I)

Personnel: Dan Richards, Marine Biologist, Channel Islands National Park
Mike Moss, biotech, Channel Islands National Park
Jacob Elliott, SCA intern, Channel Islands National Park
Jessie Altstatt, Santa Barbara ChannelKeeper
Danielle Lipski, CINMS
Charlie Lara, CINMS
Reg Greenwood, CINMS

Procedure and General Notes:

The *R/V Shearwater* provided transportation to the island. Standard procedures were followed for photographing fixed plots. Percent cover was determined from the digital images at Scorpion rock and field-scored at Orizaba Cove. Black abalone, *Haliotis cracherodii*, and seastars were counted in 30-minute searches and measured for size distribution. The highest number of shorebirds and pinnipeds seen was recorded.

Results (Daily and Site Description) November 25, Scorpion Rock. Low tide -0.3 ft. at 1441 hrs. We had excellent working conditions with almost no wind or swell in the cove area. The sky was mostly cloudy and we had some drizzle by the end of the day. We dropped off Christine Hand to water the restoration plants on Scorpion Rock while we worked our site. We stopped first at the *Hesperophycus* plots then moved to the main site. Two black oystercatchers were in the area and one common raven. Numerous brown pelicans were roosting on the east side of Scorpion Rock. We worked the site from 1130-1400 hrs.

Jessie and I did a dive on the mooring buoys at Scorpion anchorage to photograph and evaluate the sub-surface floats and assess the eelgrass condition.

I shot photos and replaced missing bolts in two mussel plots. Jessie and Jacob counted and measured seastars and abalone. One black abalone (85 mm) and 169 *Pisaster ochraceus* were found. Several *Megathura crenulata* were present on the reef. *Tetraclita rubescens* were abundant and large. *Mytilus californianus* were rare on the reef. *Hesperophycus californicus* and *Silvetia compressa* seemed to be doing well and *Endocladia muricata* was fairly lush in areas.

Black abalone at Scorpion Rock

<i>IslandCode</i>	<i>SiteCode</i>	<i>Year</i>	<i>Season</i>	<i>Count</i>	<i>CountSized</i>	<i>MeanSize</i>
SC	SCSR	2008	fall	1	1	85.00

November 26, Orizaba Cove. Low tide -0.4 ft. at 1514 hrs. Wind and swell were very light, working conditions were good. The sky was mostly cloudy and it rained heavily just before we went ashore. There was about 0.75 inches of rain overnight. The only shorebirds were three

black oystercatchers on Orizaba Rock. There were also three bald eagles perched on top of Orizaba Rock. There were no seals in the area. We were on site from about 1200 to 1500 hrs.

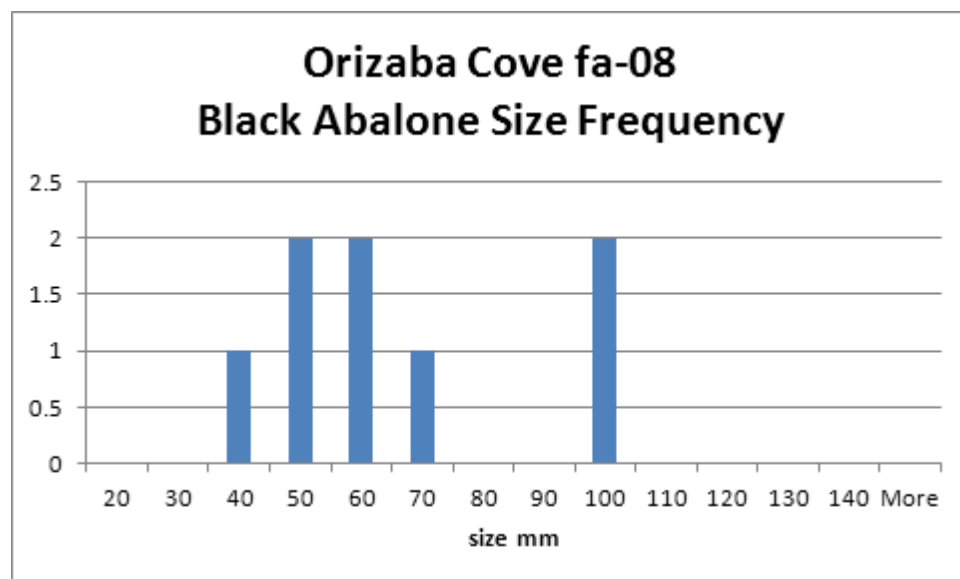
Mike and Jacob shot the photos while Dani and I scored the plots. *Pisaster ochraceus* were common on the reef and Jacob counted 541 *P. ochraceus* in a 30-minute search. Measurements were done after the search. Only 8 black abalone were found in a 30-minute search. There were almost no *Mytilus californianus* on the reef. *Egorgia menziesii* was growing in several mussel plots. *Tetraclita rubescens* were abundant and quite large but there was a high degree of empty tests. *Balanus glandula* was abundant and large also, and the majority of the tests were empty. It is not uncommon to see so many empty tests especially in the presence of so many *Pisaster*.

Black abalone at Orizaba Cove.

IslandCode	SiteCode	Year	Season	Count	CountSized	MeanSize	StDev	MinSize	MaxSize
SC	SCOC	2008	fall	8	8	62.63	21.10	33	93

Black abalone size distribution at Orizaba Cove

%<45mm	%45-126mm	%127-145mm	%>145mm
12.50%	87.50%	-	-



Santa Cruz Island December 9-12, 2008

(Database event #2008-J)

PURPOSE: To monitor rocky intertidal sites at Santa Cruz Island, excepting sites at Orizaba Cove and Scorpion Rock.

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
Jacob Elliott, SCA Intern, CINP
Josh Sprague, KF Biological Technician, Channel Islands National Park

PROCEDURE and general observations: The *Sea Ranger II* delivered us to Prisoners Harbor about 1030 on Dec 9. We stayed at the UC Field Station. Standard procedures were used for monitoring rocky intertidal sites. All plots and site overviews were photographed with an Olympus 5050-Z digital camera. Owl limpets were measured within 1-m radius circular plots. Surfgrass transects were read at Trailers and Fraser Cove. Seastars and black abalone were counted at all sites. The maximum number of shorebirds and pinnipeds seen at any one time was recorded. We returned to Ventura on Dec. 12, departing Santa Cruz Island at 1500 hrs on Island Packers.

RESULTS

9 December, Prisoners Harbor. Low tide -0.3 ft. at 1328 hrs. Conditions were good overall. The sky was clear and the temperature was pleasant. Winds were Northeast at about 20 kts. Waves were 2-3 ft. onto the shore but the wind abruptly stopped about 1500 hrs. One black oystercatcher and one wandering tattler were seen on site and an osprey was flying over. Numerous western gulls were on the water in the harbor and common ravens were flying above the bluff. We were onsite from 1230-1545 hrs.

Photoplots were all photographed and 15 plots were field-scored. The diffuser screen was used to shade the plots for even photographs. Pans from each of the reference bolts and other area photos were taken. Josh counted 94 *Pisaster ochraceus* over the reef and Jacob measured 66 for size distribution (32-191mm). *Pisaster* were on top of the reef and *Mytilus californianus* were mostly gone from the reef, with rows of mussels only along the ridge of the reef. Diatoms or filamentous algae and tufts of *Osmundia (Laurencia) pacifica* and *Chondracanthus canaliculatus* were dominant in most of the mussel plots. *Endarachne binghamiae* and *Scytosiphon dotyii* were common. *Silvetia compressa* and *Hesperophycus californica* were not common though there was new growth on some of the *Silvetia* holdfasts. Jacob found one black abalone (approximately 50 mm) on the reef west of the site.

Snails were common. *Tegula funebris*, *Nucella emarginata*, and *Acanthina* spp. were noted. *Psuedochama exogyra* and *Septifer bifurcatus* were both common on the reef. Several small *Aplysia californica* were present. *Tetraclita rubescens* were common on the upper reef. No repairs were needed as all corner bolts were found.

Black abalone

SiteCode	Year	Season	CountRandom
SCPH	2008	fall	0

10 December, Willows Anchorage. Low tide -0.9 ft. at 1413 hrs. Conditions were excellent with a clear sky and calm seas and wind. There were 2 black oystercatchers and one common raven in the area. We were on site from approximately 1100- 1700 hrs.

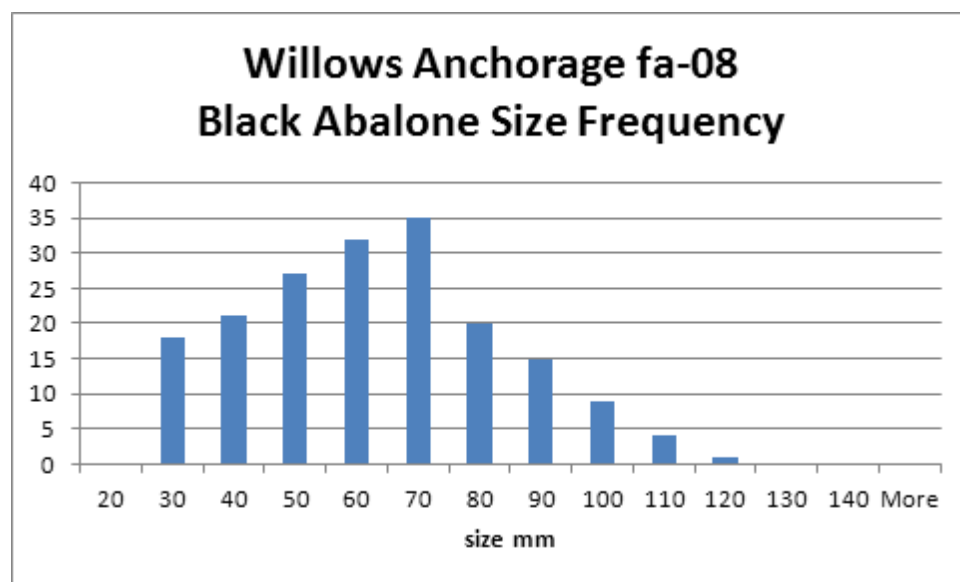
Small *Aplysia californica* were common on the site. Several keyhole limpets, *Megathura crenulata* were in the intertidal zone and purple sea urchins, *Strongylocentrotus purpuratus*, were abundant. *Pisaster ochraceus* were abundant. Jacob counted 434 ochre stars during a 30-minute count but may have undercounted the juveniles which were common in crevices of the reef. *Pisaster* sizes ranged from 30-140 mm. I found 184 *Haliotis cracherodii* ranging from 25-116 mm. I covered the entire reef in about a 2 hour search.

We all did the *Lottia gigantea* plots together. Sizes ranged from 16-64 mm. No plots were scored in the field. No repairs were needed. All bolts were found except M1-LL which may have been grown over by mussels. Zip-ties were put on the *Lottia* plot bolts and the upper-left bolts of the mussel plots. Only 11 tagged abalone were found. Nine empty shells (20-71 mm) were found.

Black abalone

SiteCode	Year	Season	Count	CountSized	MeanSize	StDev	MinSize	MaxSize
SCWA	2008	fall	183	182	59.32	20.24	25	116

%<45mm	%45-126mm	%127-145mm	%>145mm
26.37%	73.63%	-	-



11 December, Fraser Cove. Low tide -1.4 ft. at 1459 hrs. Conditions were excellent with calm seas and wind and only thin high clouds. There were 7 black oystercatchers and 1 American oystercatcher at the Fraser Cove site and 20 western gulls and one great egret at the Forney Cove area. One harbor seal was in the surf off Fraser Cove. We were onsite from 1045-1445 hrs.

One abalone and 371 *Pisaster ochraceus* were found in a 30-minute search of the site. We all measured *Lottia gigantea* in the 1-meter plots. Counts were low in all plots. Surfgrass transects were the easiest I remember thanks to the calm seas and low tide. *Phyllospadix* cover was relatively low, only 36-77%. There was a high degree of abraded blades and moderate bleaching/brown blades. There was a high degree of bleaching of *Chondracanthus canaliculatus* and *Mazzaella affinis*. *Mytilus californianus* were common and the bed looked good. Barnacles were abundant and most were alive. Both rockweed species looked healthy at Forney's. All three *Anthopleura* species were common.

I did plot repairs on several plots. Many of the stainless steel bolts were bent and corner bolts were missing from E3 and M3.

Black abalone

SiteCode	Year	Season	Count	CountSized	MeanSize
SCFC	2008	fall	1	1	100.00

Surfgrass Transects

Location: Fraser Cove Site Code: SCFC

Date: 12/11/08- fall 2008 Recorder: Dan Richards

Taxa	Transect 1	Transect 2	Transect 3
<i>Phyllospadix</i> sp. overstory	50	36	77
<i>Phyllospadix</i> sp. understory		1	
<i>Egregia menziesii</i>		18	
Encrusting coralline	1	3	
Erect coralline	16	3	5
other red algae	21	30	13
Other green algae		1	
<i>Anthopleura</i> spp.	1	1	
<i>Phragmatopoma californica</i>		3	1
<i>Mytilus californianus</i>	1		
Barnacles		2	
Rock	7	3	4
Sand	3		
total	100	101	100

11 December, Trailer. Conditions were excellent. We did all sampling except measure seastars and abalone because of the impending darkness. Three black oystercatchers were in the area. We were on site from 1510-1700 hrs.

I counted 195 *Pisaster ochraceus*, one *Patiria miniata*, and 13 *Haliotis cracherodii* in a 30-minute search. We all worked on the *Lottia* plots finding low numbers in all plots. The surfgrass condition was about the same as at Fraser Cove but there were patches of healthy grass and the overall cover in the plots was higher.

There was a high degree of algal bleaching at the site with *Chondracanthus canaliculatus*, *Mazzaella affinis*, and *Corallina* sp. greatly affected. Both rockweeds appeared healthy and cover was high. *Mytilus californianus* were not abundant and cover was very low in the plots. Acorn barnacles were abundant and in good condition.

Black abalone

SiteCode	Year	Season	Count	CountSized
SCTR	2008	fall	13	0

Surfgrass Transects

Location: Trailer Site Code: SCTR

Date: 11-Dec-08 fall 2008 Recorder: Dan Richards

Surf Grass Taxa	Transect 1	Transect 2	Transect 3
<i>Phyllospadix</i> spp. overstory	71	62	54
<i>Phyllospadix</i> spp. understory	5		1
<i>Egregia menziesii</i>	7		4
Encrusting coralline			3
Erect coralline	3	2	10
other red algae	17	23	20
other brown algae			2
other green algae		1	
<i>Phragmatopoma californica</i>		4	1
barnacles	1	4	1
Rock	1	4	5
total	105	100	101

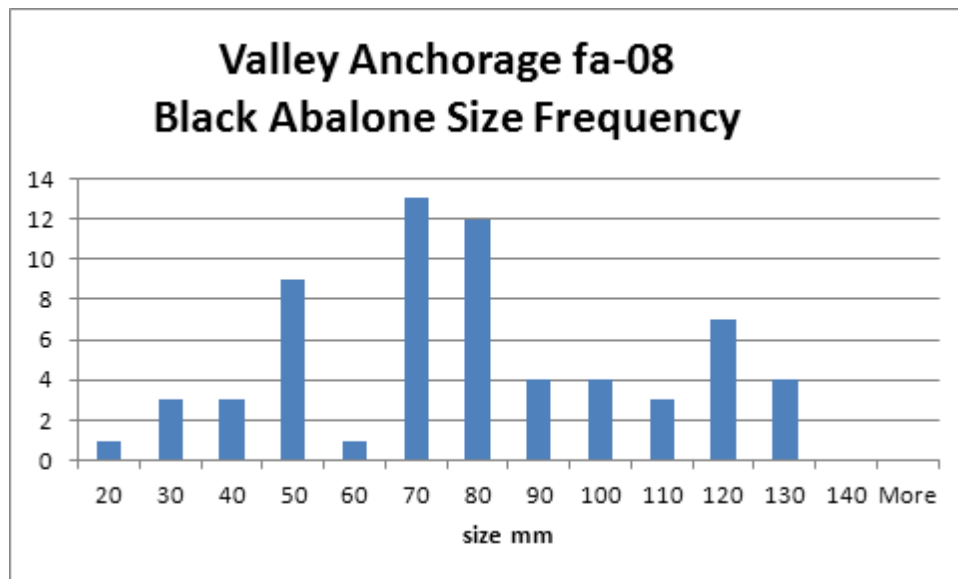
12 December, Valley Anchorage. Low tide -1.6 at 1546 hrs. Conditions were very good with clear and calm conditions.

We spent 50 minutes searching the reef and boulders for black abalone and found 66 ranging from 26-130 mm in length. Boulders to the north had more *Phragmatopoma californica* and *Chondracanthus canaliculatus* filling in gaps between rocks and fewer abalone were found among those boulders.

Black abalone

SiteCode	Year	Season	Count	CountSized	MeanSize	StDev	MinSize	MaxSize
SCVA	2008	fall	66	64	75.73	27.56	19	130

%<45mm	%45-126mm	%127-145mm	%>145mm
10.94%	85.94%	3.13%	-



Santa Rosa Island January 6-13, 2009

(Database event #2008-K))

PURPOSE: To monitor rocky intertidal sites at Santa Rosa Island, and count snowy plovers during the winter survey window.

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
Jacob Elliott, SCA Intern, CINP
Christy Hand, Seabird Biological Technician, Channel Islands National Park
Haven Livingston, UCSC, Biodiversity Survey
Kyle Walters, UCSC, Biodiversity Survey
Connie Jenkins, volunteer

PROCEDURE and general observations: Standard procedures were used for monitoring rocky intertidal sites. All plots and site overviews were photographed with an Olympus 5050-Z digital camera. Owl limpets were measured within 1m radius circular plots. Surfgrass transects were read at East Point and Northwest-Talcott. Sea stars and black abalone were counted and measured at all sites. The maximum number of shorebirds and pinnipeds observed at each site was recorded. Hobotemp Tidbit temperature loggers were installed inside PVC housings at East Point, Johnson's Lee, Northwest-Talcott and Fossil Reef in black abalone habitat. Four new mussel plots were installed at Johnson's Lee to monitor *Mytilus californianus* on a higher shelf since the lower plots have been dominated by *Phragmatopoma californica* since the return of sea stars in the early 1990's. Counts of snowy plovers were conducted on the beaches around the island.

January 6 and 13 were primarily taken up by transportation logistics. Kyle and Haven measured GPS heights and locations of each of the biodiversity transects that are labeled as OT#. Haven made a species list at each site.

7 January, East Point. Low tide -0.6 ft. at 1 hrs. Conditions were excellent. The sky was clear and the temperature was pleasant. Winds were calm. The surf was 2-3 ft. onto the shore but the surge was minimal. There were 2 black oystercatchers, about 30 Brandt's cormorants, 40 brown pelicans, 1 western gull, and one great egret at the point. An estimated 70 harbor seals were counted back at Abalone Rocks (approximately a half mile north of the East Point site). We were on site from 1300-1700 hrs.

Repairs were made to missing corners at plot 578 and new bolts were installed in the upper left corners of mussel plots 590, 591, and 594. We may still need to replace the bronze bolts installed several years ago that have eroded. The bolts will speed relocation of the plots in the future. We also installed the temperature logger in the crevice between mussel plots 591 and 592. It should be shaded from the south most of the time in this location.

Mytilus californianus were common but the bed was mostly just one layer thick. There was some recruitment but not exceptional. *Silvetia compressa* plants were not in the best shape and cover

was thin. *Hesperophycus californica* were present but plants were mostly small. *Endocladia muricata* was healthy with very dense cover. Individual *Chthamalus* sp. were small but the cover was generally high. *Phyllospadix* sp. cover was very high. There was moderate bleaching of the blades (about 20%) but the number of broken blades was low. Depths of the grass bed seemed thicker than last year.

The 30-minute sea star count was 840 *Pisaster ochraceus* with sizes ranging from 37-126 mm. Six *Haliotis cracherodii* were found in a 30-minute search but an extended search turned up a total of 12 ranging from 25-157 mm. All the photoplots were field scored.

Surfgrass transects

Location: East Point Site Code: SREP			
Date: 7-Jan-09 Recorders: Dan Richards			
Surf Grass Taxa	Transect 1	Transect 2	Transect 3
<i>Phyllospadix</i> sp. overstory	98	96	93
<i>Phyllospadix</i> sp. understory	1		
<i>Egredia menziesii</i>	2		
other red algae		4	6
other green algae			1
total	101	100	100

Skunk Point shorebird count. Angela Guglielmino (fox-tech) helped us set up the vehicle shuttle in the morning. We started at Southeast Anchorage at 0930 hrs; the weather was perfect-calm and clear. Fox and skunk tracks were present. 50 Sanderlings and one long-billed curlew were on the beach. Herrmann's gulls western gulls loons and surf scoters were offshore. The sand level was high and wrack quantity was light. One sealion carcass was present.

On the rocks and Skunk Point main beach, we saw 92 snowy plovers (band Pink/purple left, green/ blue). Also 2 black oystercatchers, 1 Brandt's cormorant, 8 western gull, 275 sanderling, 11 Herrmann's gull, 250 black-bellied plover 13 royal terns, 10+ California gulls. One fresh Brandt's cormorant carcass apparently predated, and one adult female sealion carcass.

Skunk Point south- 4 snowy plover, 69+ sanderling , 37 common raven, offshore 1 horned grebe, and on Oat Point- one brown pelican, 11 Brandt's cormorant and one black oystercatcher.

From Oat Point to Old Ranch Creek there were no plovers, one great blue heron, 1 willet, 14 mallards, and one coot. The overwash lagoon at oat point had water but it doesn't look like the dunes allow the ocean to wash over anymore because of their height. Old ranch house canyon beach had a fair amount of wrack. There was one female adult sea lion carcass. We didn't walk the final stretch of beach because we needed to get to East Point for the low tide, but we did not see any WSP with binoculars.

8 January, Northwest-Talcott. Low tide -1.2 ft. at 1417 hrs. Conditions were excellent. The sky was clear and the temperature was pleasant. Winds were calm. The surf was 2-3 ft. onto the shore but the surge was minimal. Four black oystercatchers were present in the area. Several cormorants and a few brown pelicans were near the point down-coast where we access the reef. We were onsite from 1430-1700 hrs.

I replaced rusting end bolts of surfgrass transects and installed a temperature logger along the north facing rock inside abalone plot 570. I was unable to download the temperature logger epoxied to the rock last spring as it sustained some damage.

No *Haliotis cracherodii* were found at the site. During a 30-minute search, only 2 *Pisaster ochraceus*, 6 *P. giganteus*, and 3 *Patiria miniata* were found. *Lottia gigantea* looked good overall. There were many large limpets, the largest was 105 mm, but there were also several in the 20-40 mm range.

Surfgrass Transects

Location: Northwest Talcott Site Code: SRNWT			
Date: 8-Jan-09 Recorders: Dan Richards			
Surf Grass Taxa	Transect 1	Transect 2	Transect 3
<i>Phyllospadix</i> sp. overstory	89	100	66
<i>Egregia menziesii</i>			1
Erect coralline			1
other red algae			9
other brown algae			4
other green algae	1		14
Rock	10		4
Sand			1
total	100	100	100

China Camp-Bee Rock Beaches shorebird count. Angela helped with the vehicle shuttle again. We started the beach surveys at 0930. China camp-43 Snowy plover (bands- left-Aqua/white:yellow/orange, and left-beige (possibly faded orange or yellow)/yellow: green/white). 175 western gull, 11 California gull, around 300 elephant seals. The only carcass was one elephant seal pup.

Cluster point beach – approximately 200 elephant seals, 80 common raven, 80 western gull, 5 Herrmann's gull, 20 California gull, 2 American pipit, 3 bald eagle (adult, imm. with orange tag, imm. with blue tag).

Whetstone Canyon – approx. 25 elephant seals, mostly males. American pipit, song sparrow. The bald eagles seen at Cluster Point were seen here moving west.

No Name Canyon- 2 bald eagles (2 adult with blue tags, 1 imm with blue tag) 8 black oystercatcher, about 60 gulls, mostly western with a few Herrmann's and California. One great blue heron and about 10 Brandt's cormorants on the rocky shore. One adult female sealion carcass.

Bee Rock beach east about 70 gulls mostly western

Bee Rock middle, 38 snowy plover (y/g:y/g left top was high, g/y?:r/w), 6 black oystercatcher, 140 western gull, 2 Herrmann's gull, 3 California gull and 4 common raven. Carcasses-immature elephant seal and 2 young pups.

Bee Rock west- 10 snowy plover (bands-yellow/ aqua: y/ faded red?) 56 western gull, 1 common raven 5 Herrmann's gull. One dead elephant seal pup.

9 January, Fossil Reef. Low tide -1.6 ft. at 1501 hrs. Conditions were excellent. The sky was clear and the temperature was pleasant. Winds were calm. The surf was 2 ft. on the outer reef but the surge was minimal. General conditions were excellent. There were 4 black oystercatchers, 1 brown pelican, 4 Brandt's cormorants, and 7 western gulls. One immature elephant seal was on the beach at the site. We were on site from 1200-1600 hrs.

I removed the two temperature loggers that were epoxied directly to the rock last May. They appeared to be in good shape but the epoxy will have to be removed to download them. A new housing and Tidbit logger were installed on the outer reef near plot 614 in the shadow of a low rock wall where abalone were once found.

Silvetia was doing well at the site and young plants were on the slope around plot 615. *Endocladia* was more dense and widespread than I recall ever seeing it. *Endocladia* was especially dense around the area of plots 615 and 616. *Mytilus californianus* was not very dense overall, confined mainly to the top ridge of the outer reef where *Pisaster* don't seem to be able to reach them. The mussel plots were dominated by *Phragmatopoma californica*. Because of the complexity of those plots, I scored them in the field. Other plots were not scored due to the lack of time.

Jacob conducted a 30-minute search and found 8 *Haliotis cracherodii*. All but one were large adults over 90 mm. The western reef, out of the count area had 15 adult abalone. In a 30-minute search Jacob found 312 *Pisaster ochraceus*, 3 *Pycnopodia helianthoides*, and 3 *Patiria miniata*. I searched the 30 x 6 m transect on the outer reef and found a total of 70 *P. ochraceus*. Haven found 257 *Lottia gigantea* in the plots.

Sandy Point, Mud Tank Shorebird count. 2 black turnstone, several western gulls, approximately 30 elephant seals with about 5 pups were at Sandy Point. The crescent beach on the south side had numerous elephant seals and 3 harbor seals. Christy checked Mud Tank Beach and found 7 snowy plovers there.

10 January, Ford Point. Low tide -1.8 ft. at 1543 hrs. Conditions were excellent. The sky was clear and the temperature was pleasant. Winds were calm. The surf was 2-3 ft. but the sea was calm and surge was minimal. One black oystercatcher and one harbor seal (offshore) were seen. We were on site from 1130- 1600 hrs.

Two *Haliotis cracherodii* were present in the abalone plots, one each in plots 1 and 2. Overall 18 black abalone were found. Haven searched the entire reef in a 50 minute search counting 512 *Pisaster ochraceus*. *Pisaster* did not seem that abundant but many small sea stars were found among the crevices of the reef. *Lottia gigantea* seemed fairly common, but the plot counts were low and only 48 were found. *Pisaster* seemed to be having a large impact on *Mytilus* and there were few mussels on the lower reef shelves. *Pollicipes polymerus* were doing well and were especially numerous on the lower lip of the shelf below plot 533. Because of the low tide,

Phyllospadix torreyi was very extensive. The surfgrass looked very good with little bleaching here. *Phragmatopoma californica* was dominant on the lower reef, especially at the eastern tip. *Phragmatopoma* covered much of the former abalone habitat. I was able to field-score all the photoplots.

Ford Point Beach shorebirds. No snowy plovers were seen. Christy counted 32 western gull, 3 California gull, 2 song sparrow, 4 black turnstone, 3 black-bellied plover and one common raven.

11 January, Johnson's Lee. Low tide -1.8 ft. at 1624 hrs. Conditions were excellent. The sky was clear and the temperature was pleasant. Winds were calm. The surf was 1-2 ft., generally calm and excellent conditions. There were 2 black oystercatchers and 6 black-bellied plovers in the area and one harbor seal in the surf line watching us. We were on site from 1230-1700 hrs.

The sand level which had been so high two years ago was fairly low, well below all the plots. Much of the cobble on the back beach was exposed. No elephant seals were present in January 2009. The site was very similar to Ford Point. *Phragmatopoma californica* was dominant on the lower reef and was the primary cover in four of the mussel plots. Because mussels have disappeared from those plots since the seastars became abundant in the early 1990s, we established four new plots on the shelf above the existing mussel plots. Three of the plots were established above plots 510 and 511, and one next to plot 512. All plots at the site, including the four new plots, were field scored. Distance and bearing measurements were taken for each of the new plots.

No abalone were present in plots and only one was found by Jacob and Kyle in searches of the reef, apparently the same large abalone (144 mm) we have seen for a number of years. A 30-minute sea star count found 417 *Pisaster ochraceus*. I laid out a 10 x 2 m transect that we have been doing on the outer reef and found a total of 18 *P. ochraceus*.

The Tidbit temperature logger attached to the reef last May was gone. A new housing was bolted to the rock inside plot 518 and a logger was deployed. *Lottia gigantea* seem to be doing better at this site. Haven found 112 in the five plots, up from 78 found in January 2007.

Endocladia muricata was abundant and lush. Both *Chthamalus* sp. and *Balanus glandula* were common, recruitment has been high, and they appeared to be doing well.

Officer's Beach shorebirds. No snowy plovers were observed. Elephant seals were numerous. We did not get to Jolla Veija beach for a count due to time, but Angela had been by that beach and hadn't seen any shorebirds. Christy counted 76 western gulls, 6 black turnstones, 6 Brandt's cormorants, 3 song sparrows, 1 Say's phoebe, 5 western meadow larks, 12 California gulls, 3 common raven.

Skunk Point snowy plovers. Christy and I went to Skunk Point early to try to read bands since the birds were so dispersed on 1/7 and we did not want to disrupt the count to look for bands then. We were on the beach from 0750-1030. The conditions were excellent being calm and clear. We saw 81 Western Snowy Plovers (WSP) early then followed them to a larger group

counting approximately 140 WSP. The majority was in one group but stragglers spread out making one count difficult. We used binoculars and a spotting scope to observe bands. Least Sandpipers, sanderlings, black-bellied plovers, royal terns, and western gulls were noted as present on the beach. On Southeast Anchorage beach there was a carcass of a Risso's dolphin *Grampus griseus*, which was quite decomposed.

12 January, Soledad, Arlington, Tecalote, Lobo Canyon. Low tide -0.6 ft. at 1 hrs. Conditions were excellent. The sky was clear and the temperature was pleasant. Winds were light from the east. The surf was 2-3 ft.

No snowy plovers were seen, but there was a semi-palmated plover at Arlington Beach. Five marbled godwits and one whimbrel were at Soledad Beach. Other birds included 1 American pipit, 2 song sparrow, 2 black phoebe, 1 say's phoebe, 10 western gull, 2 California gull and 2 common ravens. At Dry Canyon there were 5 black oystercatchers, 2 western gulls and 2 common ravens. At Tecalote Beach there were at least 120 Hermann's gulls and additional California, Mew and western gulls. There were about 80 mallard ducks and one spotted sandpiper at the lagoon.

At Lobo Canyon there was one black oystercatchers, 2 killdeer, one brown pelican and five black turnstones were seen near the mouth of Lobo Canyon.

13 January, return to Ventura on the *Ocean Ranger*. The osprey that has been at Santa Rosa Island for a couple years was sighted at the ranch bluff. Gray whales were common in the channel.

San Miguel Island. On a side note: Bob DeLong reported 18 snowy plovers at the west end of San Miguel Island; 5 in south cove and 13 on the flats. Jen Savage checked Simonton and found no other plovers there.

Haliotis cracherodii at Santa Rosa Island, fall 2008

Site Code	Timed count	Plot count	Mean Size	StDev	Min Size	Max Size	%<45mm	%45-126mm	%127-145mm	%>145mm
EP	12	0	99.42	44.22	25	157	8.33%	58.33%	8.33%	25.00%
FP	16	1	105.76	40.25	60	170	-	70.59%	-	29.41%
FR	9	0	132.78	34.70	68	176	-	33.33%	33.33%	33.33%
JL	1	0	144.00		144	144	-	-	100.00%	-
NWT	0	0					-	-	-	-

Lottia gigantea abundance from plots or timed counts at Santa Rosa Island, fall 2008

Site Code	Plot	Plot count	Area	Density	MeanSize	StDev	MinSize	MaxSize
FP	600	9	3.14	2.865	26.67	16.53	15	61
FP	602	13	3.14	4.139	43.38	27.54	14	83
FP	603	9	3.14	2.865	30.33	22.81	14	80
FP	604	17	3.14	5.412	25.35	14.54	14	64
FR	1	2	3.14	.637	57.50	3.54	55	60
FR	2	3	3.14	.955	54.33	6.03	48	60
FR	3	48	3.14	15.282	62.17	17.57	21	93
FR	4	87	3.14	27.698	41.68	15.04	10	66
FR	5	117	3.14	37.249	39.06	16.36	12	78
JL	595	3	3.14	.955	27.00	8.89	17	34
JL	596	18	3.14	5.731	38.28	23.65	14	90
JL	597	18	3.14	5.731	23.83	13.96	14	62
JL	598	33	3.14	10.506	43.03	22.61	14	88
JL	599	40	3.14	12.735	42.63	17.46	14	76
NWT	701	19	3.14	6.049	78.79	24.24	29	105
NWT	702	16	3.14	5.094	79.06	9.77	63	102
NWT	703	18	3.14	5.731	65.11	17.04	32	86
NWT	704	10	3.14	3.184	68.20	19.42	32	97
NWT	705	10	3.14	3.184	51.70	20.88	26	78

Lottia gigantea size distribution at Santa Rosa Island, fall 2008

Site Code	Plot	%<20mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	%>=100mm
FP	600	44.44%	33.33%	0.00%	11.11%	0.00%	11.11%	0.00%	0.00%	0.00%	0.00%
FP	602	30.77%	15.38%	0.00%	15.38%	7.69%	0.00%	15.38%	15.38%	0.00%	0.00%
FP	603	44.44%	33.33%	0.00%	0.00%	11.11%	0.00%	0.00%	11.11%	0.00%	0.00%
FP	604	47.06%	35.29%	0.00%	5.88%	5.88%	5.88%	0.00%	0.00%	0.00%	0.00%
FR	1	0.00%	0.00%	0.00%	0.00%	50.00%	50.00%	0.00%	0.00%	0.00%	0.00%
FR	2	0.00%	0.00%	0.00%	33.33%	33.33%	33.33%	0.00%	0.00%	0.00%	0.00%
FR	3	0.00%	4.17%	10.42%	10.42%	12.50%	18.75%	33.33%	8.33%	2.08%	0.00%
FR	4	13.79%	10.34%	9.20%	26.44%	32.18%	8.05%	0.00%	0.00%	0.00%	0.00%
FR	5	13.68%	19.66%	19.66%	15.38%	20.51%	9.40%	1.71%	0.00%	0.00%	0.00%
JL	595	33.33%	0.00%	66.67%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
JL	596	16.67%	38.89%	0.00%	16.67%	5.56%	11.11%	0.00%	5.56%	5.56%	0.00%
JL	597	55.56%	27.78%	5.56%	0.00%	5.56%	5.56%	0.00%	0.00%	0.00%	0.00%
JL	598	12.12%	27.27%	15.15%	12.12%	12.12%	0.00%	9.09%	12.12%	0.00%	0.00%
JL	599	7.50%	20.00%	17.50%	15.00%	17.50%	17.50%	5.00%	0.00%	0.00%	0.00%
NWT	701	0.00%	5.26%	5.26%	10.53%	0.00%	5.26%	10.53%	21.05%	26.32%	15.79%
NWT	702	0.00%	0.00%	0.00%	0.00%	0.00%	18.75%	25.00%	50.00%	0.00%	6.25%
NWT	703	0.00%	0.00%	11.11%	11.11%	5.56%	16.67%	33.33%	22.22%	0.00%	0.00%
NWT	704	0.00%	0.00%	10.00%	0.00%	20.00%	30.00%	10.00%	10.00%	20.00%	0.00%
NWT	705	0.00%	10.00%	30.00%	10.00%	0.00%	20.00%	30.00%	0.00%	0.00%	0.00%

Photoplot summary – mean percent cover by zone at Santa Rosa Island, fall 2008 (5 plots/zone).

Site	ZoneName	Bare Rock	Barnacle	Tetraclita	Endocladia	Hespero- phycus	Silvetia	Mussels	Turfweed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other
EP	Chthamalus/Balanus	38.4	42.6	0.0	11.4	6.4	0.0	0.0	0.2	0.0	0.0	0.8	0.2	0.0
EP	Endocladia	15.2	1.0	0.0	81.4	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EP	Silvetia (Rockweed)	49.8	0.0	0.0	14.0	0.4	18.0	0.0	1.0	0.0	15.8	0.8	0.0	0.0
EP	Mussels	12.6	0.0	0.8	0.0	0.0	0.0	47.6	8.2	0.0	26.8	4.0	0.0	0.0
EP	Hesperophycus	20.2	4.0	0.0	62.0	12.2	0.2	0.0	0.0	0.0	1.4	0.0	0.0	0.0
FP	Chthamalus/Balanus	53.2	31.2	0.0	12.0	0.0	0.0	0.6	0.0	0.0	0.2	2.8	0.0	0.0
FP	Endocladia	46.0	4.2	0.2	35.8	0.0	0.0	3.2	0.8	0.0	9.0	0.8	0.0	0.0
FP	Mussels	31.0	1.4	0.0	0.0	0.0	0.0	33.2	12.6	0.0	7.2	14.6	0.0	0.0
FR	Chthamalus/Balanus	61.6	33.8	0.0	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.2
FR	Endocladia	28.6	13.6	0.0	48.8	0.0	6.8	0.0	0.0	0.0	1.8	0.2	0.0	0.2
FR	Silvetia (Rockweed)	21.8	5.4	0.0	24.2	0.0	45.8	0.0	0.0	0.0	2.8	0.0	0.0	0.0
FR	Mussels	29.6	0.0	3.2	0.2	0.0	0.0	5.0	2.2	0.4	39.0	20.4	0.0	0.0
JL	Chthamalus/Balanus	43.0	49.2	0.4	4.6	0.0	0.0	0.0	0.6	0.0	0.0	2.2	0.0	0.0
JL	Endocladia	44.0	5.0	0.0	39.8	0.0	0.0	9.6	0.0	0.4	0.0	1.2	0.0	0.0
JL	Mussels	19.2	0.1	0.3	0.0	0.0	0.0	41.4	4.0	1.1	1.4	32.3	0.0	0.0
NWT	Chthamalus/Balanus	40.6	33.2	0.0	2.0	0.0	14.8	0.0	0.0	0.0	8.8	0.0	0.6	0.0
NWT	Endocladia	53.8	0.2	0.0	17.4	0.0	15.4	0.0	0.0	0.0	13.2	0.0	0.0	0.0
NWT	Silvetia (Rockweed)	40.6	1.0	0.0	4.0	0.0	52.4	0.0	0.0	0.0	2.0	0.0	0.0	0.0
NWT	Mussels	24.2	0.2	0.4	0.0	0.0	0.0	26.2	4.2	3.0	39.2	2.4	0.0	0.2

San Miguel Island January 20-24, 2009

(Database event #2008-L))

PERSONNEL: Dan Richards, Marine Biologist, Channel Islands National Park
Jacob Elliott, SCA Intern, CINP
Haven Livingston, UCSC, Biodiversity Survey
Kyle Walters, UCSC, Biodiversity Survey

PROCEDURE and general observations: Standard procedures were used for monitoring rocky intertidal sites. All plots and site overviews were photographed with an Olympus 5050-Z digital camera. Owl limpets were measured within 1m radius circular plots. Sea stars and black abalone were counted and measured at all sites. The maximum number of shorebirds and pinnipeds observed at each site was recorded. Hobotemp Tidbit temperature loggers were installed inside PVC housings at Crook Point, and Otter Harbor in black abalone habitat.

20 January, Cuyler Harbor. Low tide 0.2 ft. at 1321 hrs. Conditions were excellent. The sky was mostly clear and the temperature was warm. Winds were calm. The surf was 1-2 ft. There were 2 black oystercatchers, 2 song sparrows and one black phoebe. We were on site from 1050-1530 hrs.

Jacob made plot repairs after photographing the plots and measuring sea stars. I scored all the photoplots. Kyle did a 30-minute seastar search finding 162 *Pisaster ochraceus*. No black abalone were found.

Mytilus californianus were common. There were many very large individuals at this site but the bed was mostly just one layer thick. There was moderate *Mytilus* recruitment. *Silvetia compressa* individuals were in poor condition and scarce. Most of the plants on top of the reef (around plot 409) were torn up, but in another area of the reef (by plot 407) the plants looked fine. *Endocladia muricata* was healthy with very dense cover. *Chthamalus* sp. and *Balanus glandula* were dense in small areas but not very widespread over the reef.

21 January 2009, Crook Point, low tide -0.1 at 1400 hrs. Conditions were moderate with heavy south swell and light rain showers in the afternoon. There were about 20 cormorants, 1 western gull, 6 black oystercatchers and 6 black turnstones on the reef. We were on site from 1100- 1500 hrs.

I located the corners of plot 382 and installed bolts in the two left corners. I also installed a bolt in the upper-right of 378, and installed a temperature logger in a PVC housing in the lower part of abalone plot 391.

Chthamalus sp. and *Balanus glandula* were abundant though the patchiness resulted in relatively low cover within the barnacle plots. *Endocladia muricata* also had relatively low cover and really pales in comparison to the *Endocladia* at Santa Rosa Island a week before. Rockweeds, probably all *Hesperophycus* sp., were either extremely abraded or just small. *Mytilus*

californianus were doing well over most of the reef and there were pockets of high recruitment. There were patches of low *Analipus japonica* turf.

Pisaster ochraceus numbers continued the trend observed during the last several years and only 47 were found there. Most of the *P. ochraceus* were relatively small and cryptic. The surf on the front side of the reef was not a significant factor in the low count. The surf probably was a factor in the low black abalone count with only 9 found, compared to 43 in spring 2008.

22 January, Otter Harbor. Low tide -0.4 ft. at 1430 hrs. It rained 0.14 inches during the night but we only had one brief shower while at the site. Otherwise conditions were very good, with partly cloudy and calm conditions. There were 30 harbor seals, 7 black oystercatchers, 1 American oystercatcher, 7 black turnstones, and 6 western gulls. There was one elephant seal in the channel in front of the site all day and another hauled out on the beach next to the site. A male sea lion was on the adjacent reef. We were on site from 1100-1800 hrs. Haven and Kyle flew back to the mainland this morning.

Jacob and I worked together measuring owl limpets and shooting the photoplots. One harbor seal stayed put on the reef allowing us to work on plots close by. Most of the limpet plots had at least 50% *Mytilus* or *Endocladia* cover. There were a total of 85 *Lottia gigantea* ranging from 13-75 mm. File limpets, *Lottia limatula* were common and quite large here. Plot 4 especially had high numbers of *L. limatula*.

Jacob counted and measured seastars finding 344 *Pisaster ochraceus*, 18 *P. gigantea*, and 1 *Patiria miniata*. I measured black abalone across the site from 1330-1650 hrs. 192 *Haliotis cracherodii* were measured before stopping at the usual crevice at the west end of the site. Nearly 3.5 hours were spent measuring abalone. There were no abalone in any of the fixed plots, but the usual crevices looked the same as last year. All abalone looked healthy except one that may have been shrunken, yet it may have only appeared that way because it was moving and the shell was wedged. I found 34 tagged shells but I could only identify 22 of them (21 pit tags and one additional visual tag). One of the tagged abalone had died (#0042579).

I installed two temperature loggers in housings (#2012089, and #2012090) and collected the six loggers that were out (two attached directly to the rock in sun or shade and four under abalone shells (one shade one sun). One housing was placed in abalone plot 366 where it will be exposed to the sun most of the day. The other was placed under the ledge near *Lottia* plot 1. That was the location of the two “shade” loggers I just removed.

There were patches of considerable bleaching among algae including *Endocladia*, *Corallina*, and *Mazzaella*. *Egregia* looked abraded and possibly bleached. There were some gaping dead mussels around too. Considering the calm warm weather and low tides during the last few weeks, I'm surprised that there wasn't more bleaching or mussel death.

Siphonaria type limpets seemed particularly common at Otter Harbor but were also seen at other sites. These are small high peaked limpet with dark stripes. I did not have time to make a collection for identification.

23 January, Harris Point, Low tide -0.6 ft. at 1503 hrs. There was fog and drizzle in the morning but clearing mid-day for an hour or two. There was 0.09 inches of rain overnight. There was only a light breeze and light surge making general conditions excellent. At the site there were 5 black oystercatchers, 12 western gulls, 6 harbor seals and 2 elephant seals. We were on site from 1230-1715 hrs.

We walked Simonton Beach on the way to the site counting shorebirds and recording carcasses. There were 3 common ravens, 19 whimbrel, 1 black oystercatcher, 1 American oystercatcher, 15 western gulls, 5 Herrmann's gulls and 4 herring gulls. I counted 27 elephant seal pups but did not count adult seals. Fox tracks were seen on the beach. No plover tracks were observed. There was light oiling on the beach mostly in the form of moderate-sized pancakes. There were four California sea lion carcasses, all adult or immature females. One decayed adult brown pelican carcass and one rhinoceros auklet carcass that was missing the breast meat (I was unable to tell if it was predated or later scavenged) were also seen on the beach. The auklet carcass was heavily oiled which may have occurred post mortality.

Small *Lottia gigantea* were abundant in the plots. Even plot 1 which is dominated by algae and smaller species of limpets had 6 *L. gigantea*. Large *L. limatula* were common in or near several of the plots. One *Haliotis cracherodii* was found in abalone plot 463 and there was one in the crevice transect. A 30-minute search was not done, but Jacob measured 15 abalone and found two others he could not reach. Only 25 *Pisaster ochraceus* were found in a 30-minute search, 3 were in the crevice transect. Additionally one *Pycnopodia helianthoides* and three *Patiria miniata* were found.

I scored all 25 photoplots and Jacob repaired the corners of plot 429. There was some algal bleaching in the lower zones but not as much as at other sites.

Lottia gigantea abundance from plots at San Miguel Island, fall 2008

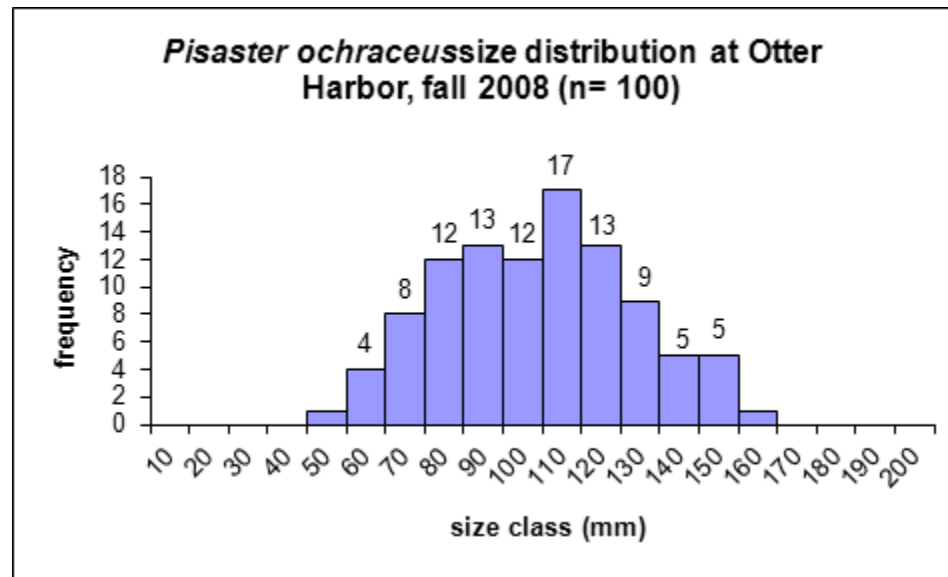
Site Code	Plot	Plot count	Area	Density	MeanSize	StDev	MinSize	MaxSize
HP	1	6	3.14	1.910	33.00	10.56	16	47
HP	2	22	3.14	7.004	47.95	19.28	17	79
HP	3	42	3.14	13.372	39.02	9.20	21	57
HP	4	69	3.14	21.968	29.04	8.78	13	52
HP	5	26	3.14	8.278	54.58	14.26	28	77
OH	1	17	3.14	5.412	41.24	12.51	21	60
OH	2	19	3.14	6.049	41.00	14.42	23	72
OH	3	18	3.14	5.731	31.06	13.94	12	62
OH	4	19	3.14	6.049	35.05	15.63	13	74
OH	5	12	3.14	3.820	39.25	18.16	14	75

Lottia gigantea abundance from plots at San Miguel Island, fall 2008

Site Code	Plot	%<20mm	%20-29mm	%30-39mm	%40-49mm	%50-59mm	%60-69mm	%70-79mm	%80-89mm	%90-99mm	%>=100mm
HP	1	16.67%	0.00%	50.00%	33.33%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
HP	2	4.55%	18.18%	9.09%	31.82%	0.00%	18.18%	18.18%	0.00%	0.00%	0.00%
HP	3	0.00%	21.43%	26.19%	40.48%	11.90%	0.00%	0.00%	0.00%	0.00%	0.00%
HP	4	17.39%	33.33%	34.78%	13.04%	1.45%	0.00%	0.00%	0.00%	0.00%	0.00%
HP	5	0.00%	7.69%	7.69%	23.08%	19.23%	23.08%	19.23%	0.00%	0.00%	0.00%
OH	1	0.00%	23.53%	17.65%	29.41%	23.53%	5.88%	0.00%	0.00%	0.00%	0.00%
OH	2	0.00%	26.32%	26.32%	21.05%	10.53%	10.53%	5.26%	0.00%	0.00%	0.00%
OH	3	16.67%	44.44%	11.11%	22.22%	0.00%	5.56%	0.00%	0.00%	0.00%	0.00%
OH	4	5.26%	42.11%	21.05%	10.53%	10.53%	5.26%	5.26%	0.00%	0.00%	0.00%
OH	5	16.67%	16.67%	8.33%	33.33%	16.67%	0.00%	8.33%	0.00%	0.00%	0.00%

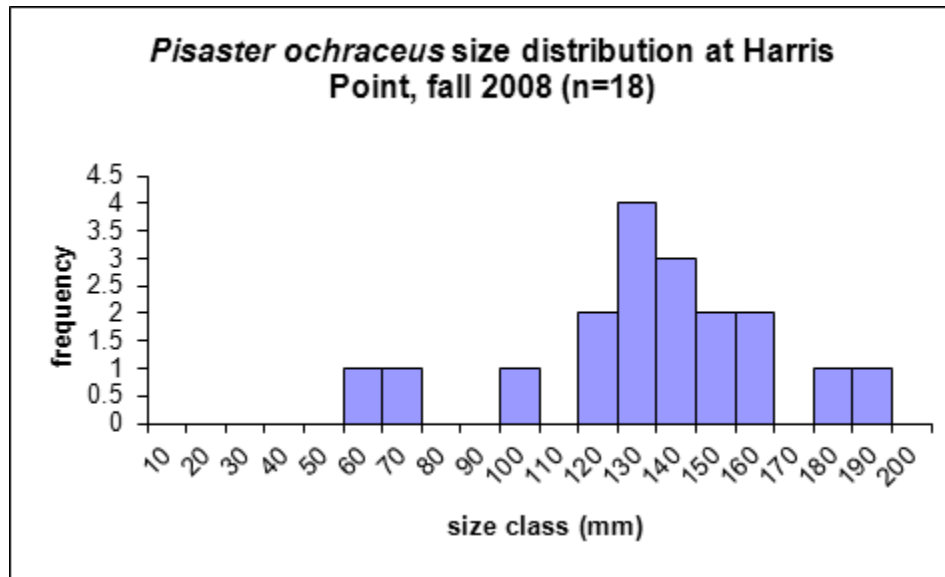
Haliotis cracherodii at San Miguel Island, fall 2008

Site Code	Timed count	Plot count	Mean Size	StDev	Min Size	Max Size	%<45mm	%45-126mm	%127-145mm	%>145mm
CH	0	0					-	-	-	-
CP	7	2	94.67	11.68	83	115	-	100.00%	-	-
HP	16	1	113.47	20.49	74	155	-	80.00%	13.33%	6.67%
OH	192	0					-	-	-	-



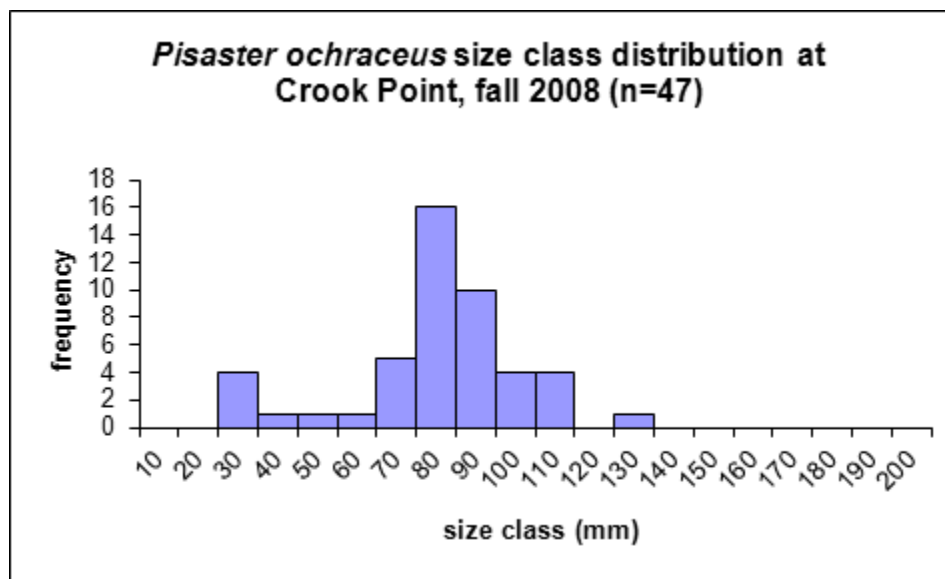
Pisaster at SMOH fall 2008

count	100
min size	59
max size	165
mean size	108.14
StDev	24.22

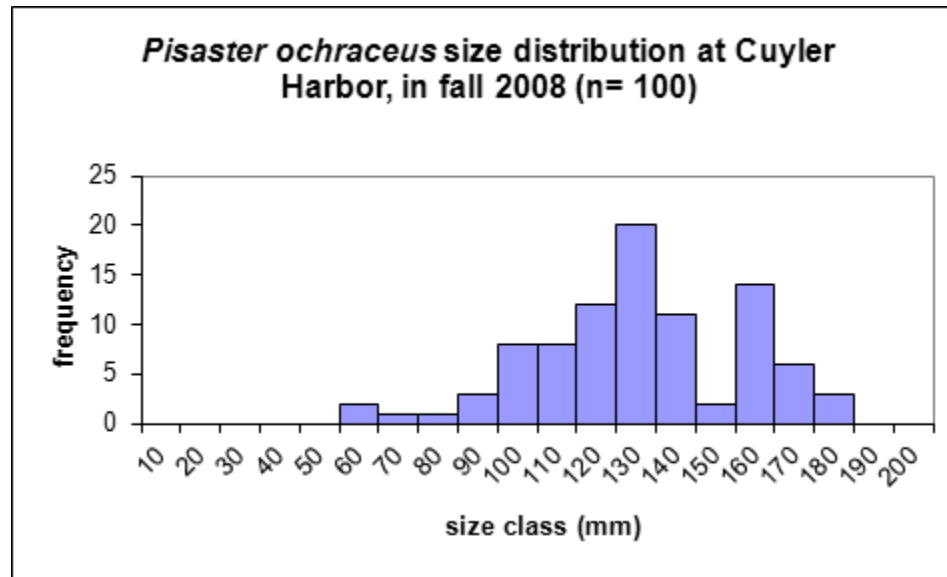


Pisaster at SMHP fall 2008

count	18
min size	62
max size	192
mean size	136.56
StDev	32.18



Pisaster at SMCP, fall 2008	
count	47
min size	33
max size	136
mean size	82.68085
StDev	21.64246



Pisaster at SMCH, fall 2008	
count	100
min size	31
max size	183
mean size	134.48
StDev	26.74628

Photoplot summary – mean percent cover by zone at San Miguel Island, fall 2008 (5 plots/zone).

Site	ZoneName	Bare Rock	Barnacle	Tetraclita	Endocladia	Hespero- phycus	Silvetia	Mussels	Turfweed	Leaf Barnacle	Misc Algae	Misc Animal	Tar	Other
CH	Chthamalus/Balanus	41.4	28.2	0.0	30.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CH	Endocladia	45.4	4.4	0.8	33.4	0.0	3.8	6.0	1.4	0.2	4.2	0.4	0.0	0.0
CH	Silvetia (Rockweed)	38.4	0.0	2.6	4.6	0.0	33.6	0.2	0.0	0.4	13.8	6.4	0.0	0.0
CH	Mussels	18.6	2.4	7.8	0.0	0.0	0.0	47.4	3.6	2.6	3.0	14.6	0.0	0.0
CP	Chthamalus/Balanus	67.6	27.4	0.0	3.4	0.0	0.0	0.6	0.0	0.0	0.2	0.8	0.0	0.0
CP	Endocladia	54.2	5.8	0.2	21.6	0.8	0.0	8.8	0.4	0.6	6.2	1.2	0.0	0.0
CP	Silvetia (Rockweed)	41.6	2.0	0.0	20.4	1.0	0.0	25.0	1.6	0.4	7.4	0.6	0.0	0.0
CP	Mussels	16.4	0.4	0.2	0.2	0.0	0.0	74.8	0.0	0.8	6.8	0.4	0.0	0.0
HP	Chthamalus/Balanus	37.4	59.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	1.0	0.4	1.0	0.0
HP	Endocladia	35.6	8.0	0.2	36.4	8.6	0.0	0.6	0.4	0.0	9.8	0.4	0.0	0.0
HP	Mussels	44.2	2.6	1.2	3.8	1.6	0.0	29.2	0.0	0.6	14.6	2.2	0.0	0.0
HP	Tetraclita	42.6	5.4	5.4	1.6	0.0	0.0	13.2	5.4	0.2	22.2	4.0	0.0	0.0
HP	Hesperophycus	49.2	0.0	0.0	22.4	23.6	0.0	0.0	0.0	0.0	4.4	0.0	0.4	0.0
OH	Chthamalus/Balanus	53.0	28.2	0.0	0.0	0.0	0.0	0.0	6.4	0.0	11.8	0.6	0.0	0.0
OH	Endocladia	28.6	8.4	0.2	44.6	0.0	2.2	0.6	0.0	0.2	15.0	0.2	0.0	0.0
OH	Silvetia (Rockweed)	31.0	23.8	0.2	30.2	0.0	3.6	0.0	0.8	0.2	8.4	0.8	1.0	0.0
OH	Mussels	10.8	4.4	1.4	0.6	0.0	0.0	45.6	0.0	4.6	31.6	1.0	0.0	0.0

Appendix D. Motile Invertebrate Data Tables and Figures

Motile invertebrate species sampled in fixed photoquadrats are listed in Table D-1. Included are species and group codes along with corresponding species and group names. Site identification codes and corresponding site names are also included.

Mean and standard error values are presented in Table D-2 for select motile invertebrate species in each sampling zone at all sites and both sampling seasons (spring and fall). All species were sampled within the entire area (50 x 75 cm) of photoquadrats except for LSMALL, LMDALL and *Littorina* spp. which were subsampled in three locations within photoquadrats each measuring either 10 x 10 cm or 20 x 20 cm (subsampled count data are extrapolated to the full 50 x 75 cm photoplot area). The three limpet categories (LIMPLG, LMDALL, and LSMALL) included all species of limpets, except *Lottia gigantea* which were recorded separately.

Figures D-1 through D-5 represent size distributions for dominant motile invertebrate species. Maximum of 10 individuals from each genera were collected for sizing. Refer to Table D-1 for site codenames. Figure D-6 includes graphs of species mean abundances for 2008 at each site along with the overall, maximum, and minimum means of combined previous years.

Table D1. Site, Species, and Group Codes with Definitions

Site ID	Island	Site	Species/ Group Code	Scientific Name/ Description
SMOH	San Miguel	Otter Harbor	LEPSPP	Lepidochitona spp.
SMCH	San Miguel	Cuyler Harbor	NUTSPP	Nuttallina spp.
SMCP	San Miguel	Crook Point	FISVOL	Fissurella volcano
SRFR	Santa Rosa	Fossil Reef	PACCRA	Pachygrapsus crassipes
SRNWT	Santa Rosa	NW-Talcott	PAGSPP	Pagurus spp.
SREP	Santa Rosa	East Point	OCESPP	Ocenebra spp.
SRFP	Santa Rosa	Ford Point	LIMPLG	limpets over 15 mm in size on any substrate/organism
SRJL	Santa Rosa	Johnson's Lee	NUCEMA	Nucella emarginata/ostrina
SCTR	Santa Cruz	Trailer	TEGFUN	Tegula funebris
SCFC	Santa Cruz	Fraser Cove	TEGGAL	Tegula gallina
SCOC	Santa Cruz	Orizaba Cove	LOTGIG	Lottia gigantea
SCPH	Santa Cruz	Prisoner's Harbor	LSMALL	limpets under 5 mm in size on all substrate
SCSR	Santa Cruz	Scorpion Rock	LMDALL	limpets 5-15 mm in size on all substrate
SCWA	Santa Cruz	Willows Anchorage	LITSPP	Littorina spp.
ANCR	Anacapa	Cat Rock	PISOCH	Pisaster ochraceus
ANMW	Anacapa	Middle-West	STRPUR	Strongylocentrotus purpuratus
ANME	Anacapa	Middle-East		
ANSFC	Anacapa	S Frenchy's Cove		
SBLC	Santa Barbara	Landing Cove		
SBSLR	Santa Barbara	Sea Lion Rookery		

Table D2. Mean and Standard Error Values for Select Motile Invertebrate Species and Groups

Site ID	Sampling Season	Target Species	# of Plots Sampled	LEPSP	NUTSP	FISVOL	PACCRA	PAGSP	OCECIR	LIMPLG	NUCEMA	ACASPP	TEGFUN	TEGGAL	LOTGIG	LSMALL	LMDALL	LITSPP	PISOCH	STRPUR
SMOH	SP08	<i>Silvetia</i>	5	1.8	0.0	0.0	0.6	0.0	0.0	5.8	0.4	0.0	0.2	0.0	0.4	98.8	61.9	474.5	0.0	0.0
SMOH	SP08	<i>Endocladia</i>	5	11.2	0.4	0.0	1.6	0.0	0.6	2.8	1.0	0.0	0.8	0.0	1.6	136.3	123.8	73.1	0.0	0.0
SMOH	SP08	<i>Chthamalus/Balanus</i>	5	0.2	0.0	0.0	0.0	0.4	0.2	1.2	0.0	0.0	19.4	0.0	0.0	11.2	12.7	400.5	0.0	0.0
SMOH	SP08	<i>Mytilus</i>	5	1.6	6.6	0.2	2.4	0.2	0.4	7.2	9.0	0.0	1.4	0.0	11.4	216.3	138.1	1.9	0.0	0.0
Average				3.7	1.8	0.1	1.2	0.2	0.3	4.3	2.6	0.0	5.5	0.0	3.4	115.6	84.1	237.5	0.0	0.0
StError				1.1	0.7	0.0	0.2	0.0	0.1	0.6	1.0	0.0	2.1	0.0	1.2	19.0	13.0	52.5	0.0	0.0
SMHP	SP08	<i>Hesperophycus</i>	5	0.2	0.0	0.0	0.4	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	1.3	51.9	325.0	0.0	0.0
SMHP	SP08	<i>Mytilus</i>	5	1.8	1.4	0.0	2.0	0.8	0.8	1.2	8.4	0.0	0.0	0.0	1.4	125.6	73.1	73.8	0.0	2.2
SMHP	SP08	<i>Endocladia</i>	5	0.0	0.0	0.0	0.4	0.0	0.8	1.2	0.4	0.0	0.0	0.0	0.0	3.1	55.0	195.8	0.0	0.0
SMHP	SP08	<i>Tetraclita</i>	5	4.2	11.8	0.0	0.6	2.2	7.0	3.2	2.8	0.0	0.2	0.0	3.2	162.5	123.8	23.1	0.0	0.0
SMHP	SP08	<i>Chthamalus/Balanus</i>	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	45.0	995.0	0.0	0.0
Average				1.2	2.6	0.0	0.7	0.7	1.8	1.1	2.3	0.0	0.0	0.0	0.9	58.5	69.8	322.5	0.0	0.4
StError				0.4	1.0	0.0	0.2	0.2	0.6	0.3	0.7	0.0	0.0	0.0	0.3	15.8	6.4	78.7	0.0	0.2
SMCH	SP08	<i>Mytilus</i>	5	0.2	12.0	1.0	3.8	0.0	0.0	0.2	21.4	0.0	0.0	0.0	7.0	126.3	166.9	0.6	0.0	0.4
SMCH	SP08	<i>Silvetia</i>	5	0.6	2.0	0.0	1.6	1.4	0.4	3.2	3.0	1.4	7.6	0.0	0.8	6.3	58.8	87.5	0.0	0.0
SMCH	SP08	<i>Chthamalus/Balanus</i>	5	0.0	0.0	0.0	0.0	0.0	0.6	0.4	1.0	0.4	0.6	0.0	0.0	1.2	12.6	1245.0	0.0	0.0
SMCH	SP08	<i>Endocladia</i>	5	1.0	0.4	0.0	0.2	0.0	0.0	4.0	1.8	3.4	7.6	0.0	0.4	13.8	68.1	352.5	0.0	0.0
Average				0.5	3.6	0.3	1.4	0.4	0.3	2.0	6.8	1.3	4.0	0.0	2.1	36.9	76.6	421.4	0.0	0.1
StError				0.1	1.3	0.1	0.4	0.2	0.1	0.4	2.2	0.3	0.9	0.0	0.7	13.4	14.5	127.3	0.0	0.0
SMCP	SP08	<i>Chthamalus/Balanus</i>	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1	36.9	1412.5	0.0	0.0
SMCP	SP08	<i>Mytilus</i>	5	0.6	3.4	0.0	1.6	0.0	0.0	0.6	3.4	0.0	5.8	0.0	1.4	130.0	146.9	28.8	0.0	1.0
SMCP	SP08	<i>Endocladia</i>	5	0.0	0.2	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.2	0.0	0.0	115.6	265.0	596.9	0.0	0.0
SMCP	SP08	<i>Silvetia</i>	5	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	140.6	148.1	332.5	0.0	0.0
Average				0.2	0.9	0.0	0.5	0.0	0.0	0.2	1.3	0.0	1.5	0.0	0.4	97.3	149.2	592.7	0.0	0.3
StError				0.1	0.4	0.0	0.2	0.0	0.0	0.1	0.4	0.0	0.6	0.0	0.2	14.2	20.8	132.8	0.0	0.1

Site ID	Sampling Season	Target Species	# of Plots Sampled	LEPSP	NUTSP	FISVOL	PACCRA	PAGSP	OCECIR	LIMPLG	NUCEMA	ACASPP	TEGFUN	TEGGAL	LOTGIG	LSMALL	LMDALL	LITSP	PISOCH	STRPUR
SRFR	SP08	<i>Chthamalus/Balanus</i>	5	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.4	0.0	0.0	0.0	5.0	72.5	1010.0	0.0	0.0
SRFR	SP08	<i>Endocladia</i>	5	0.4	0.0	0.0	1.6	0.4	0.0	1.4	0.0	5.6	14.2	0.0	0.0	0.6	87.5	675.0	0.0	0.0
SRFR	SP08	<i>Mytilus</i>	5	0.4	16.8	0.2	2.2	0.6	0.2	1.6	1.2	0.0	0.0	0.0	6.6	27.5	106.9	1.9	0.0	16.8
SRFR	SP08	<i>Silvetia</i>	5	7.6	1.0	0.0	1.8	1.0	0.4	3.0	0.0	4.0	32.4	0.0	0.0	2.5	96.3	352.5	0.0	0.4
Average				2.1	4.5	0.1	1.4	0.5	0.2	1.6	0.3	2.5	11.7	0.0	1.7	8.9	90.8	509.8	0.0	4.3
StError				0.8	1.8	0.0	0.2	0.1	0.0	0.3	0.1	0.6	3.4	0.0	0.7	2.8	3.3	96.6	0.0	1.9
SRNWT	SP08	<i>Mytilus</i>	5	0.4	4.6	1.2	0.2	0.0	0.0	5.4	0.6	0.0	0.0	0.0	2.6	6.3	60.0	0.0	0.0	0.0
SRNWT	SP08	<i>Endocladia</i>	5	0.8	0.4	0.2	0.2	0.0	0.0	4.4	0.0	2.4	0.2	0.0	1.0	1.3	61.3	5.6	0.0	0.0
SRNWT	SP08	<i>Chthamalus/Balanus</i>	5	2.8	0.0	0.2	0.2	0.0	0.0	3.4	0.0	0.8	10.2	0.0	0.0	3.1	65.0	401.9	0.0	0.0
SRNWT	SP08	<i>Silvetia</i>	5	3.8	0.4	0.0	0.6	0.0	0.4	1.8	0.0	0.4	7.0	0.0	0.0	1.3	18.1	11.3	0.0	0.0
Average				2.0	1.4	0.4	0.3	0.0	0.1	3.8	0.2	0.9	4.4	0.0	0.9	3.0	51.1	104.7	0.0	0.0
StError				0.4	0.5	0.1	0.0	0.0	0.0	0.3	0.1	0.2	1.1	0.0	0.3	0.5	4.9	44.3	0.0	0.0
SREP	SP08	<i>Hesperophycus</i>	5	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	1.8	0.6	0.0	0.0	9.4	7.5	1202.5	0.0	0.0
SREP	SP08	<i>Chthamalus/Balanus</i>	5	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.6	0.0	0.0	9.4	15.6	1947.5	0.0	0.0
SREP	SP08	<i>Endocladia</i>	5	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.8	0.2	0.0	0.0	18.1	19.4	951.3	0.0	0.0
SREP	SP08	<i>Silvetia</i>	5	4.0	0.0	0.0	1.2	0.4	0.4	1.2	0.8	10.6	22.4	0.0	0.0	82.5	30.0	221.3	0.0	0.0
SREP	SP08	<i>Mytilus</i>	5	0.2	6.2	1.2	0.2	0.2	1.2	0.2	6.8	0.0	0.4	0.0	0.0	96.3	80.6	80.6	0.4	0.0
Average				1.0	1.2	0.3	0.4	0.1	0.3	0.3	1.5	3.0	5.2	0.0	0.0	43.1	30.6	880.6	0.1	0.0
StError				0.3	0.6	0.1	0.1	0.0	0.1	0.1	0.6	0.9	1.9	0.0	0.0	8.5	5.8	152.4	0.0	0.0
SRFP	SP08	<i>Chthamalus/Balanus</i>	5	0.0	0.0	0.0	0.4	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	49.4	205.0	1107.5	0.0	0.0
SRFP	SP08	<i>Endocladia</i>	5	0.6	0.6	4.2	1.0	0.6	0.2	0.2	0.4	0.6	2.2	0.0	0.0	128.8	145.6	78.8	0.0	0.2
SRFP	SP08	<i>Mytilus</i>	5	0.2	1.4	4.8	0.4	0.0	0.2	0.0	0.4	0.0	0.6	0.0	0.6	65.0	95.0	20.6	0.0	5.6
Average				0.3	0.7	3.0	0.6	0.2	0.1	0.1	0.3	0.2	1.0	0.0	0.2	81.0	148.5	402.3	0.0	1.9
StError				0.1	0.2	0.7	0.1	0.1	0.0	0.0	0.1	0.1	0.3	0.0	0.1	10.9	14.2	157.9	0.0	0.8

Site ID	Sampling Season	Target Species	# of Plots Sampled	LEPSPP	NUTSPP	FISVOL	PACCRA	PAGSPP	OCECIR	LIMPLG	NUCEMA	ACASPP	TEGFUN	TEGGAL	LOTGIG	LSMALL	LMDALL	LITSPP	PISOCH	STRPUR
SRJL	SP08	<i>Chthamalus/Balanus</i>	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	67.5	102.5	1402.5	0.0	0.0
SRJL	SP08	<i>Endocladia</i>	5	0.2	0.0	0.0	0.0	0.0	0.0	0.4	2.6	0.0	0.0	0.0	0.8	47.5	215.0	95.0	0.0	0.0
SRJL	SP08	<i>Mytilus</i>	5	0.4	0.4	0.0	0.6	1.2	0.0	0.2	4.6	0.6	2.2	0.0	0.4	241.3	163.1	12.5	0.0	1.8
Average				0.2	0.1	0.0	0.2	0.4	0.0	0.2	2.5	0.2	0.7	0.0	0.4	118.8	160.2	503.3	0.0	0.6
StError				0.1	0.1	0.0	0.1	0.2	0.0	0.1	0.6	0.1	0.3	0.0	0.1	27.5	14.5	201.3	0.0	0.3
SCTR	SP08	<i>Chthamalus/Balanus</i>	5	0.2	0.0	0.0	0.0	0.0	0.0	1.4	0.2	0.0	0.0	0.0	0.0	30.0	193.1	962.5	0.0	0.0
SCTR	SP08	<i>Hesperophycus</i>	5	2.3	0.0	0.0	0.3	0.0	0.0	0.7	0.3	1.3	10.0	0.0	0.0	21.9	52.6	274.0	0.0	0.0
SCTR	SP08	<i>Mytilus</i>	5	0.6	16.8	1.2	1.6	0.0	1.0	1.6	8.2	0.0	0.0	0.0	1.0	142.5	55.6	1.9	0.0	0.6
SCTR	SP08	<i>Silvetia</i>	5	6.6	0.2	0.0	1.2	1.6	0.2	4.6	0.4	7.4	94.6	17.4	0.0	18.1	43.1	9.4	0.0	0.0
Average				2.4	4.3	0.3	0.8	0.4	0.3	2.1	2.3	2.2	26.2	4.4	0.3	53.1	86.1	311.9	0.0	0.2
StError				0.7	1.9	0.1	0.2	0.2	0.1	0.4	0.9	0.8	10.3	2.0	0.1	13.4	16.0	101.0	0.0	0.1
SCFC	SP08	<i>Chthamalus/Balanus</i>	5	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.2	0.4	0.0	0.0	0.0	3.8	355.6	0.0	0.0
SCFC	SP08	<i>Endocladia</i>	5	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.2	0.0	0.8	0.0	0.0	12.5	55.6	51.3	0.0	0.0
SCFC	SP08	<i>Hesperophycus</i>	5	0.6	0.0	0.0	0.4	1.0	0.0	2.0	0.2	2.8	8.0	12.6	0.0	7.5	46.3	171.9	0.0	0.0
SCFC	SP08	<i>Mytilus</i>	5	0.4	0.6	0.4	1.2	0.2	0.0	1.0	5.2	0.6	0.4	0.0	0.2	19.4	63.1	4.4	0.0	0.0
SCFC	SP08	<i>Silvetia</i>	5	2.0	0.0	0.0	0.0	0.6	0.4	2.0	1.0	6.4	30.4	0.0	0.0	21.9	55.0	32.5	0.0	0.0
SCFC	SP08	<i>Pollicipes</i>	5	0.2	1.8	0.4	0.0	0.0	0.0	1.2	8.2	0.0	0.0	0.0	0.8	40.6	68.8	0.0	0.0	0.0
SCFC	SP08	Tar	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	330.0	0.0	0.0
Average				0.5	0.3	0.1	0.2	0.3	0.1	1.0	2.1	1.4	5.7	1.8	0.1	14.6	41.8	135.1	0.0	0.0
StError				0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.6	0.4	1.9	0.8	0.1	2.4	4.8	25.9	0.0	0.0

Site ID	Sampling Season	Target Species	# of Plots Sampled	LESPPP	NUTSPP	FISVOL	PACCRA	PAGSPP	OCECIR	LIMPLG	NUCEMA	ACASPP	TEGFUN	TEGGAL	LOTGIG	LSMALL	LMDALL	LITSPP	PISOCH	STRPUR
SCOC	SP08	<i>Chthamalus/Balanus</i>	5	0.2	0.0	0.0	0.2	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.0	4.4	53.1	1177.5	0.0	0.0
SCOC	SP08	<i>Hesperophycus</i>	5	1.2	0.0	0.0	1.0	0.0	3.0	9.0	5.2	0.0	0.8	0.0	0.0	3.1	18.1	232.5	0.0	0.0
SCOC	SP08	<i>Mytilus</i>	5	0.0	2.2	0.0	1.2	1.0	1.2	0.2	0.6	0.0	0.0	0.0	0.0	41.9	33.8	0.0	4.2	0.0
SCOC	SP08	<i>Silvetia</i>	5	1.4	1.4	0.0	1.8	0.6	3.4	2.0	3.4	2.4	3.8	0.4	0.0	9.4	33.8	50.0	0.0	0.0
SCOC	SP08	<i>Tetraclita</i>	5	0.6	7.4	0.0	2.4	0.4	8.4	0.2	22.6	0.2	0.4	0.0	1.2	16.3	108.8	13.8	0.0	0.0
Average				0.7	2.2	0.0	1.3	0.4	3.2	2.3	6.4	0.5	1.0	0.1	0.2	15.0	49.5	294.8	0.8	0.0
StError				0.1	0.6	0.0	0.2	0.1	0.6	0.8	1.9	0.2	0.3	0.0	0.1	3.2	7.1	100.4	0.4	0.0
SCPH	SP08	<i>Chthamalus/Balanus</i>	5	0.2	0.0	0.0	0.8	0.0	0.0	0.8	0.8	0.0	0.4	0.0	0.0	10.0	30.0	477.5	0.0	0.0
SCPH	SP08	<i>Endocladia</i>	5	1.0	0.2	0.0	1.8	0.0	0.6	2.8	1.2	9.0	2.4	0.0	0.0	15.6	50.0	530.0	0.0	0.0
SCPH	SP08	<i>Hesperophycus</i>	5	0.4	0.2	0.0	0.2	0.0	0.0	2.6	0.2	6.8	1.6	0.6	0.0	17.5	57.5	1120.0	0.0	0.0
SCPH	SP08	<i>Mytilus</i>	5	0.4	2.8	3.6	1.8	3.6	11.8	0.0	7.6	6.8	0.0	0.0	0.0	37.5	42.5	0.0	0.0	0.0
SCPH	SP08	<i>Silvetia</i>	5	2.4	0.2	0.0	1.0	0.0	1.6	2.4	4.4	3.4	0.8	0.4	0.0	76.3	141.9	320.6	0.0	0.0
Average				0.9	0.7	0.7	1.1	0.7	2.8	1.7	2.8	5.2	1.0	0.2	0.0	31.4	64.4	489.6	0.0	0.0
StError				0.2	0.2	0.3	0.1	0.3	1.0	0.3	0.6	0.7	0.2	0.1	0.0	5.4	8.9	81.7	0.0	0.0
SCSR	SP08	<i>Endocladia</i>	5	0.4	1.4	0.0	1.0	0.0	2.0	1.4	0.2	1.2	0.0	0.0	0.0	26.3	62.5	360.0	0.0	0.0
SCSR	SP08	<i>Hesperophycus</i>	5	0.2	0.0	0.0	0.6	0.0	0.0	4.4	0.2	0.8	5.6	0.0	0.0	1.3	25.6	119.4	0.0	0.0
SCSR	SP08	<i>Mytilus</i>	5	2.0	27.2	11.8	2.4	0.0	17.0	0.2	0.0	0.0	0.0	0.0	0.0	43.8	234.4	8.1	1.8	1.6
SCSR	SP08	<i>Tetraclita</i>	5	0.8	10.4	0.0	1.6	0.0	0.4	6.2	0.2	0.0	0.0	0.0	0.0	48.1	348.8	91.9	0.0	0.0
Average				0.7	7.9	2.4	1.3	0.0	3.9	2.8	0.1	0.5	1.1	0.0	0.0	27.0	143.8	324.6	0.4	0.3
StError				0.2	2.3	1.1	0.1	0.0	1.5	0.5	0.0	0.1	0.5	0.0	0.0	3.9	28.3	84.6	0.2	0.1
SCWA	SP08	<i>Endocladia</i>	5	1.4	0.2	0.0	1.8	0.0	0.0	0.4	0.4	0.0	0.0	0.0	0.0	9.4	30.6	430.0	0.0	0.0
SCWA	SP08	<i>Hesperophycus</i>	5	3.2	0.2	0.0	0.0	0.8	0.0	15.6	0.2	1.6	0.0	0.2	0.0	17.5	81.3	733.1	0.0	0.0
SCWA	SP08	<i>Silvetia</i>	5	5.0	2.4	0.0	1.4	2.8	0.0	6.8	0.6	7.4	0.0	0.0	0.0	146.9	285.6	137.5	0.0	0.0
SCWA	SP08	<i>Mytilus</i>	4	0.3	0.8	1.5	6.8	0.0	0.0	6.3	1.0	0.0	0.0	0.0	0.0	14.4	31.9	0.0	4.8	4.8
Average				2.5	0.9	0.4	2.5	0.9	0.0	7.3	0.6	2.3	0.0	0.1	0.0	47.0	107.3	325.2	1.2	1.2

StError				0.5	0.2	0.2	0.7	0.3	0.0	1.4	0.1	0.8	0.0	0.0	0.0	15.3	27.8	74.7	0.5	0.5
Site ID	Sampling Season	Target Species	# of Plots Sampled	LESPPP	NUTSPP	FISVOL	PACCRA	PAGSPP	OCECIR	LIMPLG	NUCEMA	ACASPP	TEGFUN	TEGGAL	LOTGIG	LSMALL	LMDALL	LITSPP	PISOCH	STRPUR
ANCR	SP08	<i>Silvetia</i>	9	0.7	1.3	0.0	0.9	0.0	0.6	1.2	0.0	0.4	0.0	0.0	0.0	1.0	33.7	146.2	0.0	0.0
ANCR	SP08	<i>Endocladia</i>	9	2.1	14.0	2.7	1.1	0.0	0.9	3.4	0.0	0.0	0.0	0.0	0.8	2.1	54.2	37.2	0.0	0.0
ANCR	SP08	<i>Chthamalus/Balanus</i>	9	0.1	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	9.7	520.8	0.0	0.0
ANCR	SP08	<i>Mytilus</i>	9	1.1	16.1	0.4	0.7	0.0	5.0	0.3	0.0	0.0	0.0	0.0	4.2	1.4	74.7	38.9	0.0	0.0
Average				1.0	7.9	0.8	0.7	0.0	1.6	1.5	0.0	0.1	0.0	0.0	1.3	1.1	43.1	185.8	0.0	0.0
StError				0.1	1.4	0.2	0.1	0.0	0.4	0.2	0.0	0.0	0.0	0.0	0.3	0.1	4.6	38.2	0.0	0.0
ANMW	SP08	<i>Chthamalus/Balanus</i>	5	1.6	1.2	0.0	1.8	0.0	0.4	0.6	1.2	0.2	0.0	0.0	0.4	1.9	62.5	45.6	0.0	0.0
ANMW	SP08	<i>Silvetia</i>	5	1.4	5.0	4.0	0.6	0.0	0.8	2.4	1.4	0.8	0.0	0.0	0.8	6.9	54.4	9.4	0.0	1.4
ANMW	SP08	<i>Endocladia</i>	5	0.4	2.8	0.4	2.0	0.4	0.6	4.4	2.0	2.6	0.0	0.0	0.8	3.1	65.6	18.8	0.0	0.0
ANMW	SP08	<i>Mytilus</i>	5	1.2	4.0	3.4	0.4	0.4	1.6	3.8	7.6	1.0	0.0	0.0	2.4	5.6	128.8	1.9	0.2	0.0
Average				1.2	3.3	2.0	1.2	0.2	0.9	2.8	3.1	1.2	0.0	0.0	1.1	4.4	77.8	18.9	0.1	0.4
StError				0.1	0.4	0.5	0.2	0.1	0.1	0.4	0.7	0.2	0.0	0.0	0.2	0.5	7.7	4.3	0.0	0.2
ANSFC	SP08	<i>Chthamalus/Balanus</i>	5	0.6	0.0	0.0	0.4	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	3.1	5.6	1417.5	0.0	0.0
ANSFC	SP08	<i>Endocladia</i>	5	0.2	0.0	0.0	0.8	0.0	0.0	0.0	0.4	0.2	0.2	0.0	0.0	1.9	3.1	31.0	0.0	0.0
ANSFC	SP08	<i>Silvetia</i>	5	0.2	0.2	0.0	0.6	0.0	0.0	3.8	0.0	0.6	1.4	0.0	0.0	0.0	13.9	47.7	0.0	0.0
ANSFC	SP08	<i>Mytilus</i>	5	1.0	2.2	0.0	2.0	0.0	0.8	0.0	6.0	0.4	0.0	0.0	0.0	5.0	80.0	0.0	0.0	0.0
Average				0.5	0.6	0.0	1.0	0.0	0.2	1.0	1.7	0.3	0.4	0.0	0.0	2.5	25.7	374.0	0.0	0.0
StError				0.1	0.2	0.0	0.2	0.0	0.1	0.4	0.6	0.1	0.2	0.0	0.0	0.5	8.2	155.6	0.0	0.0
SBLC	FA08	<i>Silvetia</i>	5	0.4	0.0	0.0	0.2	5.6	0.0	0.0	0.0	4.0	0.0	0.0	0.2	2.5	30.0	0.6	0.0	0.0
SBLC	FA08	<i>Chthamalus/Balanus</i>	5	1.4	2.4	0.0	0.6	0.0	4.6	0.2	0.0	0.0	0.0	0.0	0.0	18.8	37.5	202.5	0.0	0.0
SBLC	FA08	<i>Mytilus</i>	5	1.2	3.2	3.2	0.6	0.2	13.4	0.0	0.0	0.0	0.0	0.0	0.2	9.4	101.3	1.3	0.4	3.6
Average				1.0	1.9	1.1	0.5	1.9	6.0	0.1	0.0	1.3	0.0	0.0	0.1	10.2	56.3	68.1	0.1	1.2
StError				0.1	0.4	0.5	0.1	0.8	1.8	0.0	0.0	0.6	0.0	0.0	0.0	2.1	10.1	30.0	0.1	0.5

Site ID	Sampling Season	Target Species	# of Plots Sampled	LESPPP	NUTSPP	FISVOL	PACCRA	PAGSPP	OCECIR	LIMPLG	NUCEMA	ACASPP	TEGFUN	TEGGAL	LOTGIG	LSMALL	LMDALL	LITSPP	PISOCH	STRPUR
SBSLR	FA08	<i>Silvetia</i>	5	1.2	0.8	0.0	1.6	23.6	1.0	5.6	0.0	2.8	0.0	0.0	2.6	4.4	22.5	0.6	0.0	0.0
SBSLR	FA08	<i>Endocladia</i>	5	0.0	0.6	0.0	0.4	2.4	0.2	0.4	0.0	0.6	0.0	0.0	0.2	1.3	3.1	5.6	0.0	0.0
SBSLR	FA08	<i>Chthamalus/Balanus</i>	5	0.0	0.0	0.0	0.2	0.2	0.0	0.2	0.0	0.4	0.0	0.2	0.0	1.3	1.3	132.5	0.0	0.0
SBSLR	FA08	<i>Mytilus</i>	5	0.4	0.8	11.0	2.6	0.2	6.6	0.2	0.0	0.0	0.0	0.0	0.2	1.9	61.9	0.0	1.0	16.4
Average				0.4	0.6	2.8	1.2	6.6	2.0	1.6	0.0	1.0	0.0	0.1	0.8	2.2	22.2	34.7	0.3	4.1
StError				0.1	0.1	1.2	0.3	2.5	0.7	0.6	0.0	0.3	0.0	0.0	0.3	0.3	6.3	14.6	0.1	1.8
ANMW	FA08	<i>Chthamalus/Balanus</i>	5	1.2	0.4	0.0	2.8	0.4	0.2	0.4	0.6	1.8	0.0	0.0	0.0	75.0	18.1	43.1	0.0	0.0
ANMW	FA08	<i>Silvetia</i>	5	0.8	0.4	0.0	3.2	0.4	0.8	0.8	0.8	0.4	0.0	0.0	0.4	50.6	73.8	3.8	0.0	2.2
ANMW	FA08	<i>Endocladia</i>	5	0.2	1.6	0.0	2.4	0.8	0.0	1.2	0.2	2.0	0.0	0.0	0.0	33.8	56.3	62.5	0.0	0.2
ANMW	FA08	<i>Mytilus</i>	5	0.8	1.2	0.2	3.0	0.2	1.0	0.2	0.8	0.4	0.0	0.0	0.8	20.0	91.9	0.6	0.0	1.2
Average				0.8	0.9	0.1	2.9	0.5	0.5	0.7	0.6	1.2	0.0	0.0	0.3	44.8	60.0	27.5	0.0	0.9
StError				0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.0	0.0	0.1	5.3	7.0	6.8	0.0	0.2
ANSFC	FA08	<i>Chthamalus/Balanus</i>	5	0.0	0.2	0.0	0.6	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	12.5	0.6	120.0	0.0	0.0
ANSFC	FA08	<i>Endocladia</i>	5	0.2	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	11.3	1.3	10.6	0.0	0.0
ANSFC	FA08	<i>Silvetia</i>	5	0.2	0.4	0.0	1.0	0.0	0.0	0.0	0.2	1.0	0.6	0.0	0.0	30.0	6.3	8.8	0.0	0.0
ANSFC	FA08	<i>Mytilus</i>	5	0.0	0.6	0.0	1.8	0.0	0.0	0.0	4.6	0.4	0.0	0.0	0.0	49.4	23.1	6.9	0.0	0.0
Average				0.1	0.3	0.0	1.0	0.0	0.0	0.0	1.5	0.4	0.3	0.0	0.0	25.8	7.8	36.6	0.0	0.0
StError				0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.5	0.1	0.1	0.0	0.0	4.0	2.4	12.4	0.0	0.0
SMOH	SP08	<i>Silvetia</i>	5	1.8	0.0	0.0	0.6	0.0	0.0	5.8	0.4	0.0	0.2	0.0	0.4	98.8	61.9	474.5	0.0	0.0
SMOH	SP08	<i>Endocladia</i>	5	11.2	0.4	0.0	1.6	0.0	0.6	2.8	1.0	0.0	0.8	0.0	1.6	136.3	123.3	73.1	0.0	0.0
SMOH	SP08	<i>Chthamalus/Balanus</i>	5	0.2	0.0	0.0	0.0	0.4	0.2	1.2	0.0	0.0	19.4	0.0	0.0	11.3	12.7	400.5	0.0	0.0
SMOH	SP08	<i>Mytilus</i>	5	1.6	6.6	0.2	2.4	0.2	0.4	7.2	9.0	0.0	1.4	0.0	11.4	216.3	138.2	1.9	0.0	0.0
Average				3.7	1.8	0.1	1.2	0.2	0.3	4.3	2.6	0.0	5.5	0.0	3.4	115.7	84.1	237.5	0.0	0.0
StError				1.1	0.7	0.0	0.2	0.0	0.1	0.6	1.0	0.0	2.1	0.0	1.2	19.0	13.0	52.5	0.0	0.0

Site ID	Sampling Season	Target Species	# of Plots Sampled	LEPSPP	NUTSPP	FISVOL	PACCRA	PAGSPP	OCECIR	LIMPLG	NUCEMA	ACASPP	TEGFUN	TEGGAL	LOTGIG	LSMALL	LMDALL	LITSPP	PISCH	STRPUR
SMHP	SP08	<i>Hesperophycus</i>	5	0.2	0.0	0.0	0.4	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	1.3	51.9	325.0	0.0	0.0
SMHP	SP08	<i>Mytilus</i>	5	1.8	1.4	0.0	2.0	0.8	0.8	1.2	8.4	0.0	0.0	0.0	1.4	125.6	73.1	73.8	0.0	2.2
SMHP	SP08	<i>Endocladia</i>	5	0.0	0.0	0.0	0.4	0.0	0.8	1.2	0.4	0.0	0.0	0.0	0.0	3.1	55.0	195.8	0.0	0.0
SMHP	SP08	<i>Tetraclita</i>	5	4.2	11.8	0.0	0.6	2.2	7.0	3.2	2.8	0.0	0.2	0.0	3.2	162.5	123.8	23.1	0.0	0.0
SMHP	SP08	<i>Chthamalus/Balanus</i>	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	45.0	995.0	0.0	0.0
Average				1.2	2.6	0.0	0.7	0.7	1.8	1.1	2.3	0.0	0.0	0.0	0.9	58.5	69.8	322.5	0.0	0.4
StError				0.4	1.0	0.0	0.2	0.2	0.6	0.3	0.7	0.0	0.0	0.0	0.3	15.8	6.4	78.7	0.0	0.2
SMCH	SP08	<i>Mytilus</i>	5	0.2	12.0	1.0	3.8	0.0	0.0	0.2	21.4	0.0	0.0	0.0	7.0	126.3	166.9	0.6	0.0	0.4
SMCH	SP08	<i>Silvetia</i>	5	0.6	2.0	0.0	1.6	1.4	0.4	3.2	3.0	1.4	7.6	0.0	0.8	6.3	58.8	87.5	0.0	0.0
SMCH	SP08	<i>Chthamalus/Balanus</i>	5	0.0	0.0	0.0	0.0	0.0	0.6	0.4	1.0	0.4	0.6	0.0	0.0	1.2	12.6	1245.0	0.0	0.0
SMCH	SP08	<i>Endocladia</i>	5	1.0	0.4	0.0	0.2	0.0	0.0	4.0	1.8	3.4	7.6	0.0	0.4	13.8	68.1	352.5	0.0	0.0
Average				0.5	3.6	0.3	1.4	0.4	0.3	2.0	6.8	1.3	4.0	0.0	2.1	36.9	76.6	421.4	0.0	0.1
StError				0.1	1.3	0.1	0.4	0.2	0.1	0.4	2.2	0.3	0.9	0.0	0.7	13.4	14.5	127.3	0.0	0.0
SMCP	SP08	<i>Mytilus</i>	5	0.6	3.4	0.0	1.6	0.0	0.0	0.6	3.4	0.0	5.8	0.0	1.4	130.0	146.9	28.8	0.0	1.0
SMCP	SP08	<i>Chthamalus/Balanus</i>	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1	36.9	1413.0	0.0	0.0
SMCP	SP08	<i>Endocladia</i>	5	0.0	0.2	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.2	0.0	0.0	115.6	265.0	596.9	0.0	0.0
SMCP	SP08	<i>Silvetia</i>	5	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	140.6	148.1	332.5	0.0	0.0
Average				0.2	0.9	0.0	0.5	0.0	0.0	0.2	1.3	0.0	1.5	0.0	0.4	97.3	149.2	592.7	0.0	0.3
StError				0.1	0.4	0.0	0.2	0.0	0.0	0.1	0.4	0.0	0.6	0.0	0.2	14.2	20.8	132.8	0.0	0.1
SRFR	SP08	<i>Chthamalus/Balanus</i>	5	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.4	0.0	0.0	0.0	5.0	72.5	1010.0	0.0	0.0
SRFR	SP08	<i>Endocladia</i>	5	0.4	0.0	0.0	1.6	0.4	0.0	1.4	0.0	5.6	14.2	0.0	0.0	0.6	87.5	675.0	0.0	0.0
SRFR	SP08	<i>Mytilus</i>	5	0.4	16.8	0.2	2.2	0.6	0.2	1.6	1.2	0.0	0.0	0.0	6.6	27.5	106.9	1.9	0.0	16.8
SRFR	SP08	<i>Silvetia</i>	5	7.6	1.0	0.0	1.8	1.0	0.4	3.0	0.0	4.0	32.4	0.0	0.0	2.5	96.3	352.5	0.0	0.4
Average				2.1	4.5	0.1	1.4	0.5	0.2	1.6	0.3	2.5	11.7	0.0	1.7	8.9	90.8	509.8	0.0	4.3
StError				0.8	1.8	0.0	0.2	0.1	0.0	0.3	0.1	0.6	3.4	0.0	0.7	2.8	3.3	96.6	0.0	1.9

Site ID	Sampling Season	Target Species	# of Plots Sampled	LEPSPP	NUTSPP	FISVOL	PACCRA	PAGSPP	OCECIR	LIMPLG	NUCEMA	ACASPP	TEGFUN	TEGGAL	LOTGIG	LSMALL	LMDALL	LITSPP	PISCH	STRPUR
SRNWT	SP08	<i>Mytilus</i>	5	0.4	4.6	1.2	0.2	0.0	0.0	5.4	0.6	0.0	0.0	0.0	2.6	6.3	60.0	0.0	0.0	0.0
SRNWT	SP08	<i>Endocladia</i>	5	0.8	0.4	0.2	0.2	0.0	0.0	4.4	0.0	2.4	0.2	0.0	1.0	1.3	61.3	5.6	0.0	0.0
SRNWT	SP08	<i>Chthamalus/Balanus</i>	5	2.8	0.0	0.2	0.2	0.0	0.0	3.4	0.0	0.8	10.2	0.0	0.0	3.1	65.0	401.9	0.0	0.0
SRNWT	SP08	<i>Silvetia</i>	5	3.8	0.4	0.0	0.6	0.0	0.4	1.8	0.0	0.4	7.0	0.0	0.0	1.3	18.1	11.3	0.0	0.0
Average				2.0	1.4	0.4	0.3	0.0	0.1	3.8	0.2	0.9	4.4	0.0	0.9	3.0	51.1	104.7	0.0	0.0
StError				0.4	0.5	0.1	0.0	0.0	0.0	0.3	0.1	0.2	1.1	0.0	0.3	0.5	4.9	44.3	0.0	0.0
SREP	SP08	<i>Hesperophycus</i>	5	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	1.8	0.6	0.0	0.0	9.4	7.5	1203.0	0.0	0.0
SREP	SP08	<i>Chthamalus/Balanus</i>	5	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.6	0.0	0.0	9.4	15.6	1948.0	0.0	0.0
SREP	SP08	<i>Endocladia</i>	5	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.8	0.2	0.0	0.0	18.1	19.4	951.3	0.0	0.0
SREP	SP08	<i>Silvetia</i>	5	4.0	0.0	0.0	1.2	0.4	0.4	1.2	0.8	10.6	22.4	0.0	0.0	82.5	30.0	221.3	0.0	0.0
SREP	SP08	<i>Mytilus</i>	5	0.2	6.2	1.2	0.2	0.2	1.2	0.2	6.8	0.0	0.4	0.0	0.0	96.3	80.6	80.6	0.4	0.0
Average				1.0	1.2	0.3	0.4	0.1	0.3	0.3	1.5	3.0	5.2	0.0	0.0	43.1	30.6	880.6	0.1	0.0
StError				0.3	0.6	0.1	0.1	0.0	0.1	0.1	0.6	0.9	1.9	0.0	0.0	8.5	5.8	152.4	0.0	0.0
SRFP	SP08	<i>Chthamalus/Balanus</i>	5	0.0	0.0	0.0	0.4	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	49.4	205.0	1107.5	0.0	0.0
SRFP	SP08	<i>Endocladia</i>	5	0.6	0.6	4.2	1.0	0.6	0.2	0.2	0.4	0.6	2.2	0.0	0.0	128.8	145.6	78.8	0.0	0.2
SRFP	SP08	<i>Mytilus</i>	5	0.2	1.4	4.8	0.4	0.0	0.2	0.0	0.4	0.0	0.6	0.0	0.6	65.0	95.0	20.6	0.0	5.6
Average				0.3	0.7	3.0	0.6	0.2	0.1	0.1	0.3	0.2	1.0	0.0	0.2	81.0	148.5	402.3	0.0	1.9
StError				0.1	0.2	0.7	0.1	0.1	0.0	0.0	0.1	0.1	0.3	0.0	0.1	10.9	14.2	157.9	0.0	0.8
SRJL	SP08	<i>Chthamalus/Balanus</i>	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	67.5	102.5	1402.5	0.0	0.0
SRJL	SP08	<i>Endocladia</i>	5	0.2	0.0	0.0	0.0	0.0	0.0	0.4	2.6	0.0	0.0	0.0	0.8	47.5	215.0	95.0	0.0	0.0
SRJL	SP08	<i>Mytilus</i>	5	0.4	0.4	0.0	0.6	1.2	0.0	0.2	4.6	0.6	2.2	0.0	0.4	241.3	163.1	12.5	0.0	1.8
Average				0.2	0.1	0.0	0.2	0.4	0.0	0.2	2.5	0.2	0.7	0.0	0.4	118.8	160.2	503.3	0.0	0.6
StError				0.1	0.1	0.0	0.1	0.2	0.0	0.1	0.6	0.1	0.3	0.0	0.1	27.5	14.5	201.3	0.0	0.3

Site ID	Sampling Season	Target Species	# of Plots Sampled	LEPSPP	NUTSPP	FISVOL	PACCRA	PAGSPP	OCECIR	LIMPLG	NUCEMA	ACASPP	TEGFUN	TEGGAL	LOTGIG	LSMALL	LMDALL	LITSPP	PISOCH	STRPUR
SCTR	SP08	<i>Chthamalus/Balanus</i>	5	0.2	0.0	0.0	0.0	0.0	0.0	1.4	0.2	0.0	0.0	0.0	0.0	30.0	193.1	962.5	0.0	0.0
SCTR	SP08	<i>Hesperophycus</i>	5	2.3	0.0	0.0	0.3	0.0	0.0	0.7	0.3	1.3	10.0	0.0	0.0	21.9	52.6	274.0	0.0	0.0
SCTR	SP08	<i>Mytilus</i>	5	0.6	16.8	1.2	1.6	0.0	1.0	1.6	8.2	0.0	0.0	0.0	1.0	142.5	55.6	1.9	0.0	0.6
SCTR	SP08	<i>Silvetia</i>	5	6.6	0.2	0.0	1.2	1.6	0.2	4.6	0.4	7.4	94.6	17.4	0.0	18.1	43.1	9.4	0.0	0.0
Average				2.4	4.3	0.3	0.8	0.4	0.3	2.1	2.3	2.2	26.2	4.4	0.3	53.1	86.1	311.9	0.0	0.2
StError				0.7	1.9	0.1	0.2	0.2	0.1	0.4	0.9	0.8	10.3	2.0	0.1	13.4	16.0	101.0	0.0	0.1
SCFC	SP08	<i>Chthamalus/Balanus</i>	5	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.2	0.4	0.0	0.0	0.0	3.8	355.6	0.0	0.0
SCFC	SP08	<i>Endocladia</i>	5	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.2	0.0	0.8	0.0	0.0	12.5	55.6	51.3	0.0	0.0
SCFC	SP08	<i>Hesperophycus</i>	5	0.6	0.0	0.0	0.4	1.0	0.0	2.0	0.2	2.8	8.0	12.6	0.0	7.5	46.3	171.9	0.0	0.0
SCFC	SP08	<i>Mytilus</i>	5	0.4	0.6	0.4	1.2	0.2	0.0	1.0	5.2	0.6	0.4	0.0	0.2	19.4	63.1	4.4	0.0	0.0
SCFC	SP08	<i>Silvetia</i>	5	2.0	0.0	0.0	0.0	0.6	0.4	2.0	1.0	6.4	30.4	0.0	0.0	21.9	55.0	32.5	0.0	0.0
SCFC	SP08	<i>Pollicipes</i>	5	0.2	1.8	0.4	0.0	0.0	0.0	1.2	8.2	0.0	0.0	0.0	0.8	40.6	68.8	0.0	0.0	0.0
SCFC	SP08	Tar	5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	330.0	0.0	0.0
Average				0.5	0.3	0.1	0.2	0.3	0.1	1.0	2.1	1.4	5.7	1.8	0.1	14.6	41.8	135.1	0.0	0.0
StError				0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.6	0.4	1.9	0.8	0.1	2.4	4.8	25.9	0.0	0.0
SCOC	SP08	<i>Chthamalus/Balanus</i>	5	0.2	0.0	0.0	0.2	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.0	4.4	53.1	1177.5	0.0	0.0
SCOC	SP08	<i>Hesperophycus</i>	5	1.2	0.0	0.0	1.0	0.0	3.0	9.0	5.2	0.0	0.8	0.0	0.0	3.1	18.1	232.5	0.0	0.0
SCOC	SP08	<i>Mytilus</i>	5	0.0	2.2	0.0	1.2	1.0	1.2	0.2	0.6	0.0	0.0	0.0	0.0	41.9	33.8	0.0	4.2	0.0
SCOC	SP08	<i>Silvetia</i>	5	1.4	1.4	0.0	1.8	0.6	3.4	2.0	3.4	2.4	3.8	0.4	0.0	9.4	33.8	50.0	0.0	0.0
SCOC	SP08	<i>Tetraclita</i>	5	0.6	7.4	0.0	2.4	0.4	8.4	0.2	22.6	0.2	0.4	0.0	1.2	16.3	108.8	13.8	0.0	0.0
Average				0.7	2.2	0.0	1.3	0.4	3.2	2.3	6.4	0.5	1.0	0.1	0.2	15.0	49.5	294.8	0.8	0.0
StError				0.1	0.6	0.0	0.2	0.1	0.6	0.8	1.9	0.2	0.3	0.0	0.1	3.2	7.1	100.4	0.4	0.0

Site ID	Sampling Season	Target Species	# of Plots Sampled	LEPSPP	NUTSPP	FISVOL	PACCRA	PAGSPP	OCECIR	LIMPLG	NUCEMA	ACASPP	TEGFUN	TEGGAL	LOTGIG	LSMALL	LMDALL	LITSPP	PISCH	STRPUR
SCPH	SP08	<i>Chthamalus/Balanus</i>	5	0.2	0.0	0.0	0.8	0.0	0.0	0.8	0.8	0.0	0.4	0.0	0.0	10.0	30.0	477.5	0.0	0.0
SCPH	SP08	<i>Endocladia</i>	5	1.0	0.2	0.0	1.8	0.0	0.6	2.8	1.2	9.0	2.4	0.0	0.0	15.6	50.0	530.0	0.0	0.0
SCPH	SP08	<i>Hesperophycus</i>	5	0.4	0.2	0.0	0.2	0.0	0.0	2.6	0.2	6.8	1.6	0.6	0.0	17.5	57.5	1120.0	0.0	0.0
SCPH	SP08	<i>Mytilus</i>	5	0.4	2.8	3.6	1.8	3.6	11.8	0.0	7.6	6.8	0.0	0.0	0.0	37.5	42.5	0.0	0.0	0.0
SCPH	SP08	<i>Silvetia</i>	5	2.4	0.2	0.0	1.0	0.0	1.6	2.4	4.4	3.4	0.8	0.4	0.0	76.3	141.9	320.6	0.0	0.0
Average				0.9	0.7	0.7	1.1	0.7	2.8	1.7	2.8	5.2	1.0	0.2	0.0	31.4	64.4	489.6	0.0	0.0
StError				0.2	0.2	0.3	0.1	0.3	1.0	0.3	0.6	0.7	0.2	0.1	0.0	5.4	8.9	81.7	0.0	0.0
SCSR	SP08	<i>Chthamalus/Balanus</i>	5	0.0	0.4	0.0	1.0	0.0	0.0	1.8	0.0	0.6	0.0	0.0	0.0	15.6	47.5	1043.8	0.0	0.0
SCSR	SP08	<i>Endocladia</i>	5	0.4	1.4	0.0	1.0	0.0	2.0	1.4	0.2	1.2	0.0	0.0	0.0	26.3	62.5	360.0	0.0	0.0
SCSR	SP08	<i>Hesperophycus</i>	5	0.2	0.0	0.0	0.6	0.0	0.0	4.4	0.2	0.8	5.6	0.0	0.0	1.3	25.6	119.4	0.0	0.0
SCSR	SP08	<i>Mytilus</i>	5	2.0	27.2	11.8	2.4	0.0	17.0	0.2	0.0	0.0	0.0	0.0	0.0	43.8	234.4	8.1	1.8	1.6
SCSR	SP08	<i>Tetraclita</i>	5	0.8	10.4	0.0	1.6	0.0	0.4	6.2	0.2	0.0	0.0	0.0	0.0	48.1	348.8	91.9	0.0	0.0
Average				0.7	7.9	2.4	1.3	0.0	3.9	2.8	0.1	0.5	1.1	0.0	0.0	27.0	143.8	324.6	0.4	0.3
StError				0.2	2.3	1.1	0.1	0.0	1.5	0.5	0.0	0.1	0.5	0.0	0.0	3.9	28.3	84.6	0.2	0.1
SCWA	SP08	<i>Endocladia</i>	5	1.4	0.2	0.0	1.8	0.0	0.0	0.4	0.4	0.0	0.0	0.0	0.0	9.4	30.6	430.0	0.0	0.0
SCWA	SP08	<i>Hesperophycus</i>	5	3.2	0.2	0.0	0.0	0.8	0.0	15.6	0.2	1.6	0.0	0.2	0.0	17.5	81.3	733.1	0.0	0.0
SCWA	SP08	<i>Silvetia</i>	5	5.0	2.4	0.0	1.4	2.8	0.0	6.8	0.6	7.4	0.0	0.0	0.0	146.9	285.6	137.5	0.0	0.0
SCWA	SP08	<i>Mytilus</i>	4	0.3	0.8	1.5	6.8	0.0	0.0	6.3	1.0	0.0	0.0	0.0	0.0	14.4	31.9	0.0	4.8	4.8
Average				2.5	0.9	0.4	2.5	0.9	0.0	7.3	0.6	2.3	0.0	0.1	0.0	47.0	107.3	325.2	1.2	1.2
StError				0.5	0.2	0.2	0.7	0.3	0.0	1.4	0.1	0.8	0.0	0.0	0.0	15.3	27.8	74.7	0.5	0.5

Site ID	Sampling Season	Target Species	# of Plots Sampled	LEPSP	NUTSP	FISVOL	PACCRA	PAGSPP	OCECIR	LIMPLG	NUCEMA	ACASPP	TEGFUN	TEGGAL	LOTGIG	LSMALL	LMDALL	LITSP	PISCH	STRPUR
ANCR	SP08	<i>Silvetia</i>	9	0.7	1.3	0.0	0.9	0.0	0.6	1.2	0.0	0.4	0.0	0.0	0.0	1.0	33.7	146.2	0.0	0.0
ANCR	SP08	<i>Endocladia</i>	9	2.1	14.0	2.7	1.1	0.0	0.9	3.4	0.0	0.0	0.0	0.0	0.8	2.1	54.2	37.2	0.0	0.0
ANCR	SP08	<i>Chthamalus/Balanus</i>	9	0.1	0.0	0.0	0.0	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	9.7	520.8	0.0	0.0
ANCR	SP08	<i>Mytilus</i>	9	1.1	16.1	0.4	0.7	0.0	5.0	0.3	0.0	0.0	0.0	0.0	4.2	1.4	74.7	38.9	0.0	0.0
Average				1.0	7.9	0.8	0.7	0.0	1.6	1.5	0.0	0.1	0.0	0.0	1.3	1.1	43.1	185.8	0.0	0.0
StError				0.1	1.4	0.2	0.1	0.0	0.4	0.2	0.0	0.0	0.0	0.0	0.3	0.1	4.6	38.2	0.0	0.0
ANMW	SP08	<i>Chthamalus/Balanus</i>	5	1.6	1.2	0.0	1.8	0.0	0.4	0.6	1.2	0.2	0.0	0.0	0.4	1.9	62.5	45.6	0.0	0.0
ANMW	SP08	<i>Silvetia</i>	5	1.4	5.0	4.0	0.6	0.0	0.8	2.4	1.4	0.8	0.0	0.0	0.8	6.9	54.4	9.4	0.0	1.4
ANMW	SP08	<i>Endocladia</i>	5	0.4	2.8	0.4	2.0	0.4	0.6	4.4	2.0	2.6	0.0	0.0	0.8	3.1	65.6	18.8	0.0	0.0
ANMW	SP08	<i>Mytilus</i>	5	1.2	4.0	3.4	0.4	0.4	1.6	3.8	7.6	1.0	0.0	0.0	2.4	5.6	128.8	1.9	0.2	0.0
Average				1.2	3.3	2.0	1.2	0.2	0.9	2.8	3.1	1.2	0.0	0.0	1.1	4.4	77.8	18.9	0.1	0.4
StError				0.1	0.4	0.5	0.2	0.1	0.1	0.4	0.7	0.2	0.0	0.0	0.2	0.5	7.7	4.3	0.0	0.2
ANSFC	SP08	<i>Chthamalus/Balanus</i>	5	0.6	0.0	0.0	0.4	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	3.1	5.6	1417.5	0.0	0.0
ANSFC	SP08	<i>Endocladia</i>	5	0.2	0.0	0.0	0.8	0.0	0.0	0.0	0.4	0.2	0.2	0.0	0.0	1.9	3.1	31.0	0.0	0.0
ANSFC	SP08	<i>Silvetia</i>	5	0.2	0.2	0.0	0.6	0.0	0.0	3.8	0.0	0.6	1.4	0.0	0.0	0.0	13.9	47.7	0.0	0.0
ANSFC	SP08	<i>Mytilus</i>	5	1.0	2.2	0.0	2.0	0.0	0.8	0.0	6.0	0.4	0.0	0.0	0.0	5.0	80.0	0.0	0.0	0.0
Average				0.5	0.6	0.0	1.0	0.0	0.2	1.0	1.7	0.3	0.4	0.0	0.0	2.5	25.7	374.0	0.0	0.0
StError				0.1	0.2	0.0	0.2	0.0	0.1	0.4	0.6	0.1	0.2	0.0	0.0	0.5	8.2	155.6	0.0	0.0
SBLC	FA08	<i>Silvetia</i>	5	0.4	0.0	0.0	0.2	5.6	0.0	0.0	0.0	4.0	0.0	0.0	0.2	2.5	30.0	0.6	0.0	0.0
SBLC	FA08	<i>Chthamalus/Balanus</i>	5	1.4	2.4	0.0	0.6	0.0	4.6	0.2	0.0	0.0	0.0	0.0	0.0	18.8	37.5	202.5	0.0	0.0
SBLC	FA08	<i>Mytilus</i>	5	1.2	3.2	3.2	0.6	0.2	13.4	0.0	0.0	0.0	0.0	0.0	0.2	9.4	101.3	1.3	0.4	3.6
Average				1.0	1.9	1.1	0.5	1.9	6.0	0.1	0.0	1.3	0.0	0.0	0.1	10.2	56.3	68.1	0.1	1.2
StError				0.1	0.4	0.5	0.1	0.8	1.8	0.0	0.0	0.6	0.0	0.0	0.0	2.1	10.1	30.0	0.1	0.5

Site ID	Sampling Season	Target Species	# of Plots Sampled	LEPSP	NUTSP	FISVOL	PACCRA	PAGSP	OCECIR	LIMPLG	NUCEMA	ACASPP	TEGFUN	TEGGAL	LOTGIG	LSMALL	LMDALL	LITSP	PISOCH	STRPUR
SBSLR	FA08	<i>Silvetia</i>	5	1.2	0.8	0.0	1.6	23.6	1.0	5.6	0.0	2.8	0.0	0.0	2.6	4.4	22.5	0.6	0.0	0.0
SBSLR	FA08	<i>Endocladia</i>	5	0.0	0.6	0.0	0.4	2.4	0.2	0.4	0.0	0.6	0.0	0.0	0.2	1.3	3.1	5.6	0.0	0.0
SBSLR	FA08	<i>Chthamalus/Balanus</i>	5	0.0	0.0	0.0	0.2	0.2	0.0	0.2	0.0	0.4	0.0	0.2	0.0	1.3	1.3	132.5	0.0	0.0
SBSLR	FA08	<i>Mytilus</i>	5	0.4	0.8	11.0	2.6	0.2	6.6	0.2	0.0	0.0	0.0	0.0	0.2	1.9	61.9	0.0	1.0	16.4
Average				0.4	0.6	2.8	1.2	6.6	2.0	1.6	0.0	1.0	0.0	0.1	0.8	2.2	22.2	34.7	0.3	4.1
StError				0.1	0.1	1.2	0.3	2.5	0.7	0.6	0.0	0.3	0.0	0.0	0.3	0.3	6.3	14.6	0.1	1.8
ANMW	FA08	<i>Chthamalus/Balanus</i>	5	1.2	0.4	0.0	2.8	0.4	0.2	0.4	0.6	1.8	0.0	0.0	0.0	75.0	18.1	43.1	0.0	0.0
ANMW	FA08	<i>Silvetia</i>	5	0.8	0.4	0.0	3.2	0.4	0.8	0.8	0.8	0.4	0.0	0.0	0.4	50.6	73.8	3.8	0.0	2.2
ANMW	FA08	<i>Endocladia</i>	5	0.2	1.6	0.0	2.4	0.8	0.0	1.2	0.2	2.0	0.0	0.0	0.0	33.8	56.3	62.5	0.0	0.2
ANMW	FA08	<i>Mytilus</i>	5	0.8	1.2	0.2	3.0	0.2	1.0	0.2	0.8	0.4	0.0	0.0	0.8	20.0	91.9	0.6	0.0	1.2
Average				0.8	0.9	0.1	2.9	0.5	0.5	0.7	0.6	1.2	0.0	0.0	0.3	44.8	60.0	27.5	0.0	0.9
StError				0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.0	0.0	0.1	5.3	7.0	6.8	0.0	0.2
ANSFC	FA08	<i>Chthamalus/Balanus</i>	5	0.0	0.2	0.0	0.6	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	12.5	0.6	120.0	0.0	0.0
ANSFC	FA08	<i>Endocladia</i>	5	0.2	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	11.3	1.3	10.6	0.0	0.0
ANSFC	FA08	<i>Silvetia</i>	5	0.2	0.4	0.0	1.0	0.0	0.0	0.0	0.2	1.0	0.6	0.0	0.0	30.0	6.3	8.8	0.0	0.0
ANSFC	FA08	<i>Mytilus</i>	5	0.0	0.6	0.0	1.8	0.0	0.0	0.0	4.6	0.4	0.0	0.0	0.0	49.4	23.1	6.9	0.0	0.0
Average				0.1	0.3	0.0	1.0	0.0	0.0	0.0	1.5	0.4	0.3	0.0	0.0	25.8	7.8	36.6	0.0	0.0
StError				0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.5	0.1	0.1	0.0	0.0	4.0	2.4	12.4	0.0	0.0

* Refer to Table D1 for definitions of site, species and group codes. SP=spring, FA=fall.

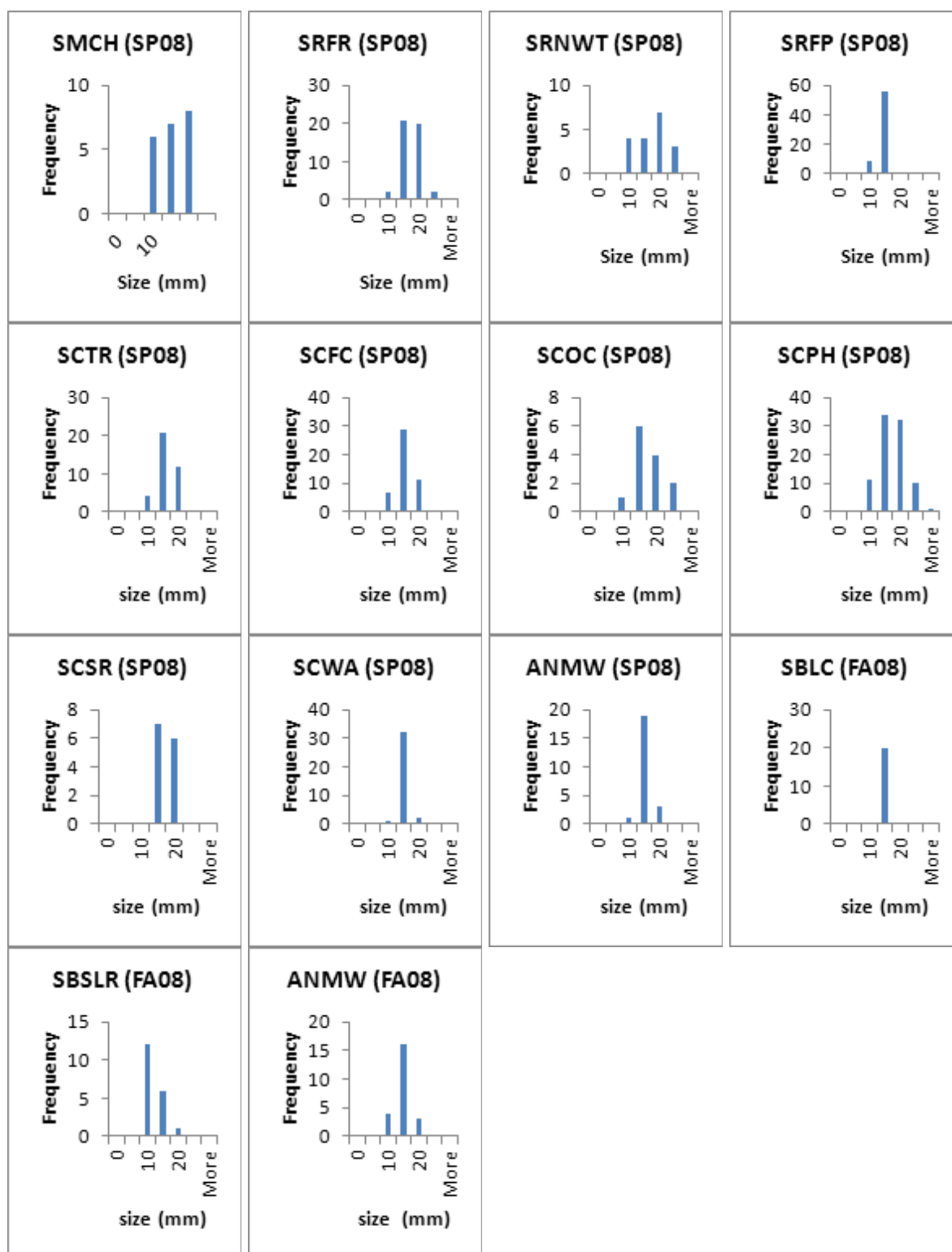


Figure D-1. *Acanthina* spp. size distributions in all plots. Figures show proportion of total (note that y-axes vary by graph) and do not reflect overall abundance. Some sites are not shown due to insufficient abundances of *Acanthina*.

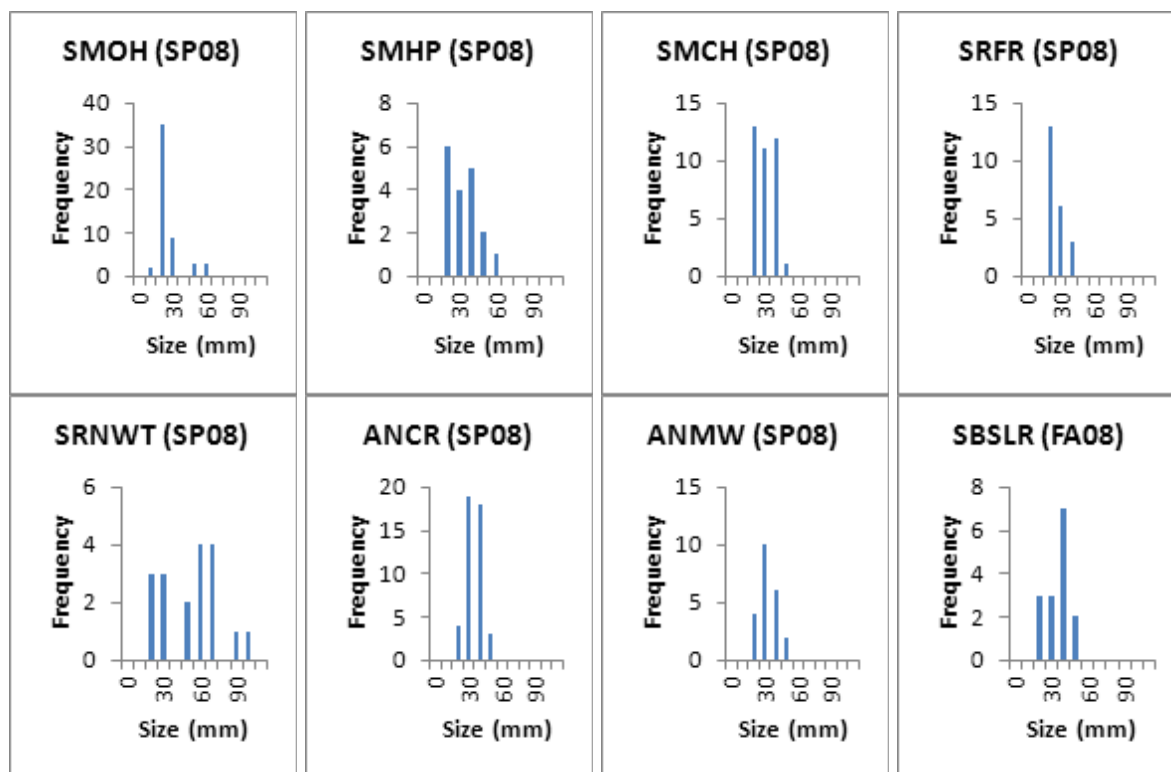


Figure D-2. *Lottia gigantea* size distributions in all plots. Figures show proportion of total (note that y-axes vary by graph) and do not reflect overall abundance. Some sites are not shown due to insufficient abundances of *Lottia gigantea*.

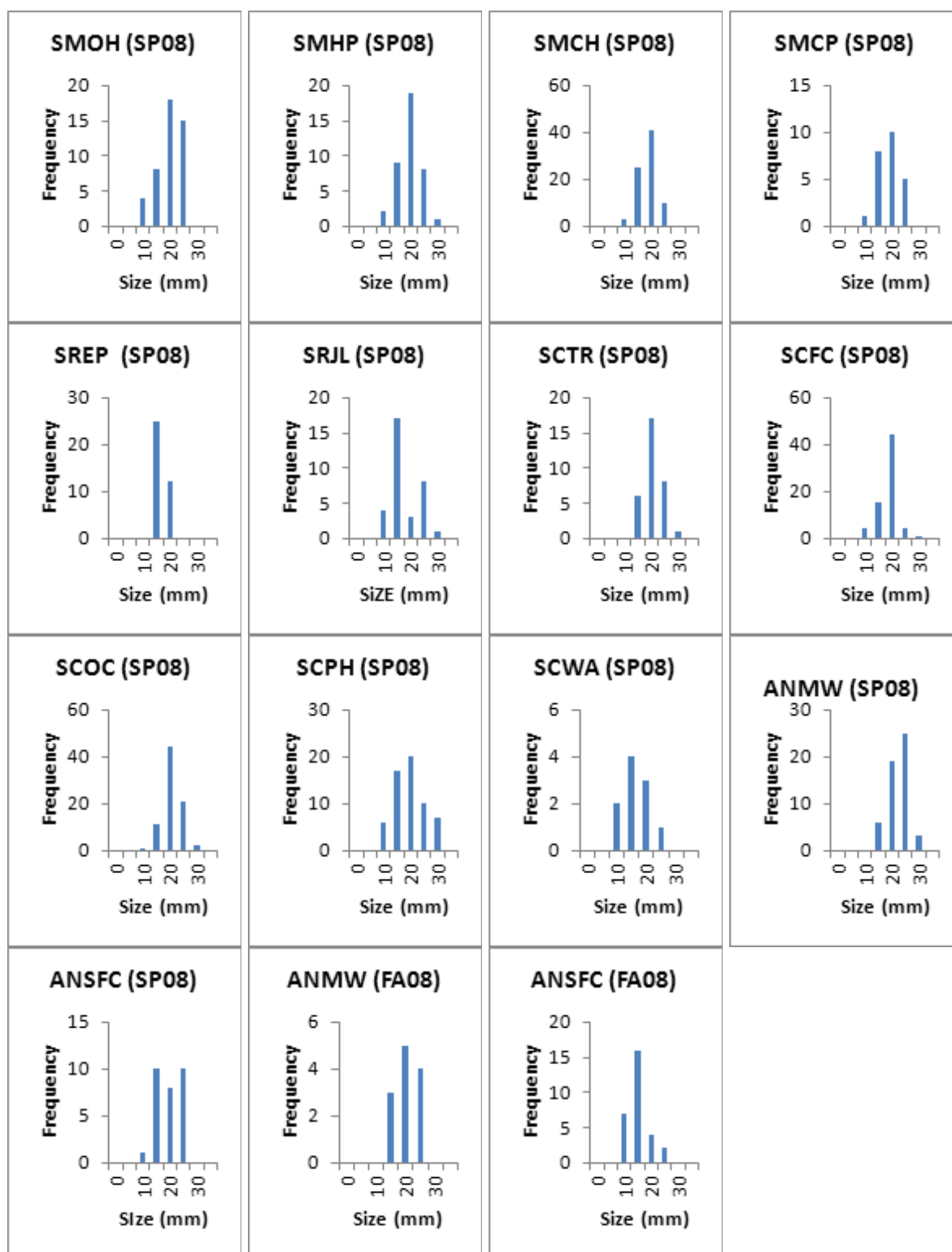


Figure D-3. *Nucella emarginata/ostrina* size distributions in all plots. Figures show proportion of total (note that y-axes vary by graph) and do not reflect overall abundance. Some sites are not shown due to insufficient abundances of *Nucella*.

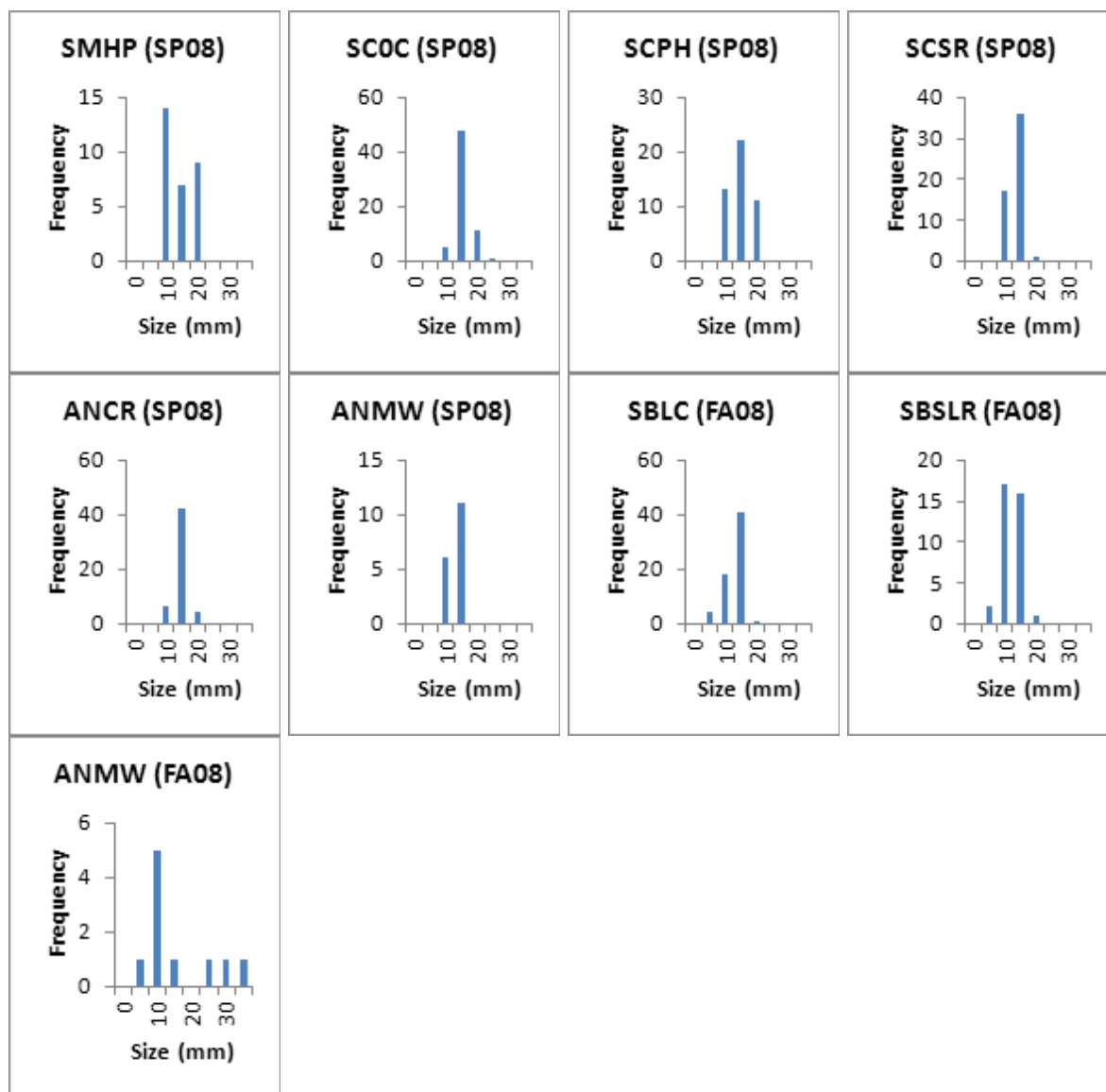


Figure D-4. *Ocenebra circumtexta* size distributions in all plots. Figures show proportion of total (note that y-axes vary by graph) and do not reflect overall abundance. Some sites are not shown due to insufficient abundances of *Ocenebra*.

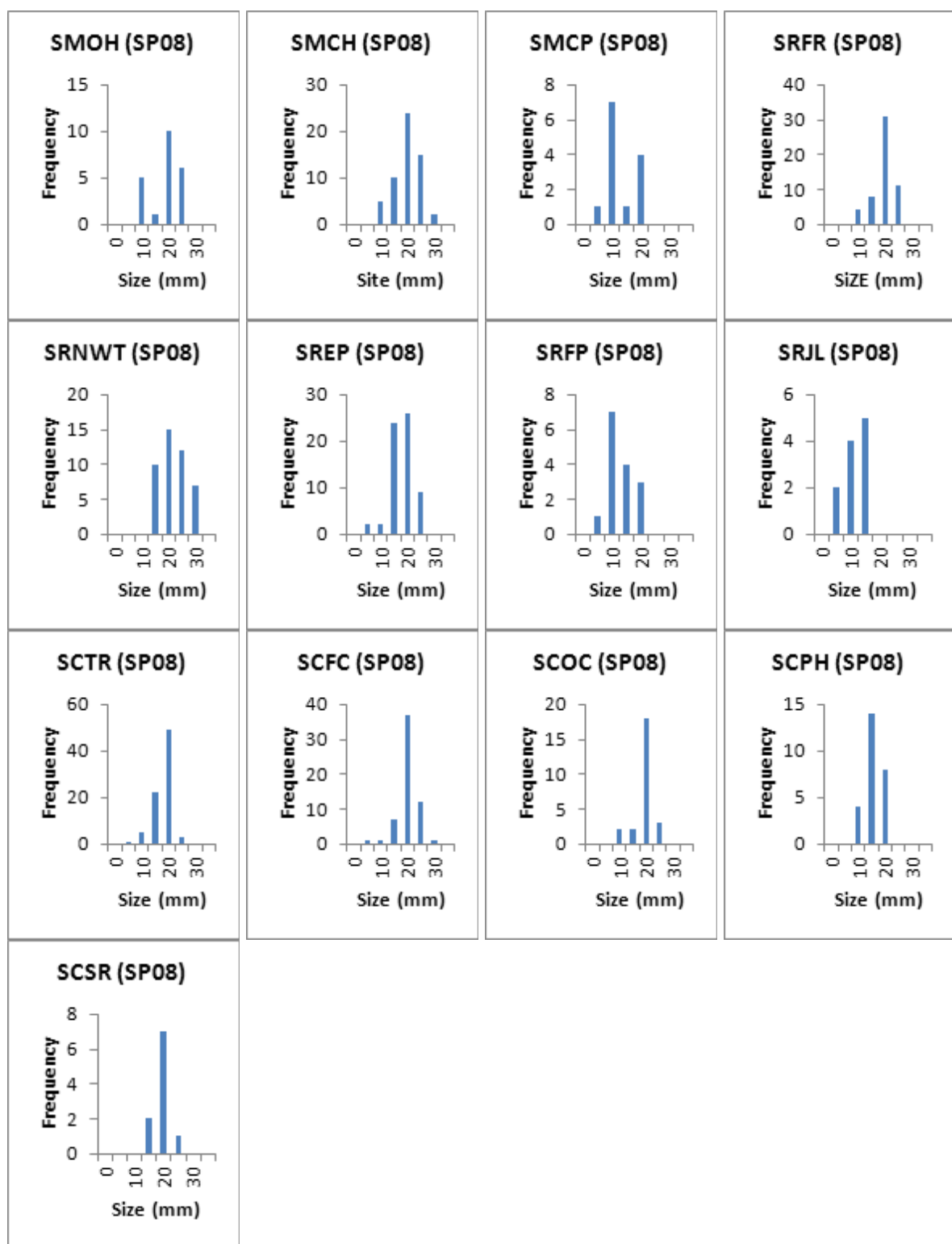


Figure D-5. *Tegula funebris* size distributions in all plots. Figures show proportion of total (note that y-axes vary by graph) and do not reflect overall abundance. Some sites are not shown due to insufficient abundances of *Tegula*.

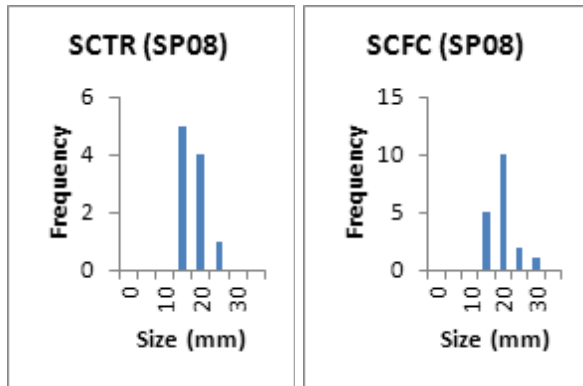


Figure D-5. *Tegula gallina* size distributions in all plots. Figures show proportion of total (note that y-axes vary by graph) and do not reflect overall abundance. Some sites are not shown due to insufficient abundances of *Tegula*.