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KELP FOREST MONITORING
1992 Annual Report

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ABSTRACT

The 1992 results of the Channel Islands National Park Kelp Forest Monitoring Project are described in this report. Population dynamics of 68 taxa or categories of algae, fish, and invertebrates were measured at 16 permanent sites around the five islands within the park. Survey techniques utilized SCUBA and surface-supplied-air, and included quadrats, band transects, random point contacts, fish and video transects, photogrammetric plots, size frequency measurements, artificial recruitment habitats, and species list surveys. Some batheothermograph data was collected. In 1992, nine sites had healthy kelp forests while seven were mostly barren. The seven barren sites consisted of one that was dominated by the aggregated red sea cucumber, *Pachythyone rubra*, one was barren with high sedimentation, one was dominated by red sea urchins, *Strongylocentrotus franciscanus*, and four sites were dominated by purple sea urchins, *Strongylocentrotus purpuratus*, three of which had signs of a developing kelp forest. Wasting disease was observed in sea stars and a wasting syndrome was observed in sea urchins. Fish recruitment appeared to be late this year. Size frequency measurements were taken from artificial recruitment modules (previously named "abalone recruitment modules") at six of the sites.

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EXECUTIVE SUMMARY

The Channel Islands kelp forests are an important part of southern California's marine ecosystem and economy. Channel Islands National Park has conducted long-term ecological monitoring of the kelp forests around Santa Barbara, Anacapa, Santa Cruz, Santa Rosa and San Miguel Islands since 1982. Permanent transects were established at 16 stations between 1981 and 1986 (Table 2). The stations were monitored during seven five-day and three one-day cruises between June and October. Survey techniques utilizing SCUBA or surface-supply air include; quadrat counts, band transect counts, random point contact quadrats, fish transect counts, video transects, photogrammetric plots, size frequency measurements, artificial recruitment modules, and species list surveys (Table 3). The 1992 kelp forest monitoring was completed by 34 National Park Service (NPS) and volunteer divers making over 736 dives (Table 5).

In 1992, nine of the 16 transects had healthy kelp forests (Table 4). These included all three Anacapa Island sites, Yellow Banks, and Gull Island on the south side of Santa Cruz Island, all three Santa Rosa Island sites, and Wyckoff Ledge on the south side of San Miguel Island. Cat Canyon, Southeast Sea Lion and Arch Point on Santa Barbara Island had some giant kelp, *Macrocystis pyrifera*, along their transects, but were still purple sea urchin barrens. Scorpion Anchorage on Santa Cruz Island, remains a complete barren with little algae, high densities of purple sea urchins, *S. purpuratus*, and high sedimentation. Hare Rock on San Miguel Island was still dominated by red sea urchins, *S. franciscanus*, but there was a small kelp forest southeast of the transect that appears to be expanding. Some giant kelp, *M. pyrifera*, was growing along the transect at Pelican Bay on Santa Cruz Island; however, this site was mostly bare with some brown algae. Fry's Harbor on Santa Cruz Island had some understory brown algae, but continued to be dominated by small aggregated red sea cucumbers, *Pachythyone rubra*.

During 1992, El Niño conditions were present around the Channel Islands. Anomalously warm ocean sea surface temperatures and several indicator species were observed. These species included the small pelagic red crab, *Pleuroncodes planipes*, frequent sightings of California barracuda, *Sphyraena argentea*, and the sighting of a spotted porcupinefish, *Diodon hystrix* at Arch Point, Santa Barbara Island. The brown alga, *Hydroclathrus clathratus*, was found at Fry's Harbor, this species is usually not found this far north. Sea star wasting disease was observed at nine sites on Santa Cruz, Anacapa, and Santa Barbara Islands. From our observations, this

disease is often associated with warm water. Sea surface temperatures recorded by NOAA were often several degrees warmer than normal.

Sea urchin wasting was observed at six locations on Santa Barbara, Anacapa and Santa Cruz Islands. This is the first time this sea urchin wasting has been observed since monitoring began in 1982. The symptoms of sea urchin wasting are spine loss and/or the presence of lesions on the test. These symptoms were observed in white, *Lytechinus anamesus*, purple, *S. purpuratus* and red sea urchins, *S. franciscanus*. Of the islands that we monitor, sea urchin wasting appeared to be more widely distributed on Santa Barbara Island, and affected mostly purple sea urchins. Sea urchin density counts were gathered twice this year at Cat Canyon and it appears that this wasting syndrome may be causing high mortality among purple sea urchins, *S. purpuratus*.

Fish recruitment appeared to have occurred later than usual this year. Blacksmith, *Chromis punctipinnis*, juveniles were first observed on July 31, at Fry's Harbor, Santa Cruz Island, this is about one month later than usual.

Artificial recruitment modules (ARMs) were placed at Scorpion Anchorage, and Fry's Harbor, Santa Cruz Island and Johnson's Lee South, Santa Rosa Island. A total of 21 ARMs were deployed this year, seven at each of these sites. This was a cooperative volunteer effort with the National Park Service, Channel Islands Council of Divers, California Department of Fish and Game, and Southern California Edison. Abalone recruitment seemed to be low this year. Very few abalone were found in the recruitment modules and in their natural habitat.

In 1992, size frequency determinations were made for bat stars, *Patiria miniata*, giant-spined sea stars, *Pisaster giganteus*, sunflower stars, *Pycnopodia helianthoides*, purple sea urchins, *Strongylocentrotus purpuratus*, red sea urchins, *S. franciscanus*, white sea urchins, *L. anamesus*, chestnut cowries, *Cypraea spadicea*, wavy turban snails, *Astraea undosa*, rock scallops, *Hinnites giganteus* and abalone, *Haliotis spp.*, in the Artificial Recruitment Modules at six locations where the modules have been for a year or longer. Overall, the animals measured in the ARMs were smaller than the ones measured in the natural habitat. We recommend that additional ARMs be placed at the other seven stations for monitoring juvenile cohorts and recruitment events.

INTRODUCTION

The waters of Channel Islands National Park and Channel Islands National Marine Sanctuary

harbor one-third of southern California's kelp forests (Davies, 1968). The giant kelp, *Macrocystis pyrifera,* is the primary constituent of these kelp forests and over 1,000 species of macro flora and fauna can be found here (Woodhouse 1981, J. M. Engle pers. comm.). Many other species, while not residents of the kelp forest community, are dependent upon the existence and productivity of kelp forests. The kelp forest serves as food, shelter, substrate, and nursery to both migratory and resident species. Kelp forest detrital flux provides an important source of nutrients to nearby rocky shore, sandy beach and estuary communities. The kelp forests are essential to our commercial and sport fisheries as well as to recreation and the associated tourist industry.

Channel Islands National Park consists of five of the eight California Channel Islands (San Miguel, Santa Rosa, Santa Cruz, Anacapa, and Santa Barbara) and the submerged lands and waters within one nautical mile of each of the islands. The Channel Islands National Marine Sanctuary overlaps the subtidal portions of the park, and its boundary extends six miles seaward from the park islands. Channel Islands National Park also bears the designation of International Biosphere Reserve and State of California Areas of Special Biological Significance. The State of California maintains jurisdiction over the park's marine resources and manages them through the Department of Fish and Game.

The federal law which established Channel Islands National Park (16-USC-410) directed development of inventories and monitoring of natural resources in the park. Kelp forest monitoring is part of the long-term ecological monitoring at the park designed to measure the health of the ecosystems. By determining the limits of normal variation and diagnosing abnormal conditions we hope to prescribe remedial action through management recommendations.

Following a five year design study begun in 1982, the kelp forest monitoring was implemented in 1987 by the park resource management division, using the protocol established during the design phase. Monitoring design rationale is discussed in Davis and Halvorson (1988). Preliminary results and specific design considerations can be found in reports written by Davis (1985, 1986). Richards, Gramlich, and Davis (in prep), describe monitoring efforts and results for 1982-1989. Richards, Avery, and Kushner (1993) and Richards, Kushner, and Avery (1993) describe the 1990 and 1991 monitoring efforts and results respectively.

This report summarizes the monitoring efforts and results from 1992, our eleventh year of monitoring.

It is hoped that these reports will provide some insight into kelp forest dynamics and stimulate further research into the long-term trends and changes in the nearshore ecosystem. We have highlighted some of the most important observations, and tried to provide a characterization for each site. Organisms are referred to by their scientific names; however, Table 1 lists common names for all of the monitored species.

METHODS

Population dynamics of 68 taxa or categories of algae, fish, and invertebrates (Table 1) were measured at 16 permanent sites (Table 2) around the five park islands (Fig. 1). Site and species selection criteria are provided in the Kelp Forest Monitoring Handbook (Davis, 1988). Sites were monitored between June and October of 1992.

Each site is marked by a 100 m-long transect permanently affixed to the seabed. The sampling techniques employed to gather population dynamics information are summarized in Table 3. Complete protocol for each sampling technique are described in Davis (1988). At each station, 20 randomly placed 1 m x 2 m quadrats and 12 randomly placed 3 m x 20 m band transects were used to determine densities and distribution of discrete benthic organisms; 1000 random points spread over 25 quadrats (random point contacts - RPC's) were used to determine percent cover of encrusting invertebrates, algae, and substrate composition; 2 m x 3 m x 100 m fixed transects were used to determine fish abundance; video taped transects and video taped 20 m^2 photogrammetric plots provide a record of the site appearance; and size frequency measurements were collected to determine age structure, population recruitment, and growth rates. Random numbers for each technique were chosen along the entire 100 m transect avoiding adjacent samples. A general species list was made for each station, noting presence/absence and relative abundance for all recognizable species. Artificial habitat structures, referred to as ARMs (Artificial Recruitment Modules) were used at six of the sites to measure recruitment and population structure. ARMs were placed at three additional sites in 1992, but not monitored. The video camera was used for monitoring photoplots in 1992, eliminating the use of still photos. Photoplots were not video taped at Hare Rock, Yellow Banks, and Cat Canyon because the marker-stakes could not be found, and at Johnson's Lee North, Gull Island South, Admiral's Reef and Arch Point due to unfavorable water conditions or camera failure.

In addition to the standard size frequency measurements that were taken, we collected size frequency measurements in the artificial recruitment modules (ARMs). These ARMs are rock cribs, consisting of 20 half-sized concrete blocks (40 cm L X 20 cm W X 10 cm H) stacked five high and enclosed in a wire mesh frame. The wire cage dimensions are 60 cm L X 60 cm W X 50 cm H and the mesh size is 5 cm X 10 cm. The ARMs provided a standardized surface area of about 24 m^2. The ARMs are sampled by opening up the cage, and removing each brick while looking for animals. Measurements of *Patiria miniata*, *Pisaster giganteus*, *Pycnopodia helianthoides*, *Strongylocentrotus purpuratus*, *S. franciscanus*, *Lytechinus anamesus*, *Cypraea spadicea*, *Astraea undosa*, *Hinnites giganteus*, and *Haliotis spp.* were taken. Due to time constraints underwater, once a sample size was greater than 200 for a particular species, that species was no longer measured in the remaining ARMs at the site. Measurements were taken underwater, or the animals were brought to the surface to be measured then replaced into the ARM they were removed from.

Sea Data temperature-depth recorders were in place during the last half of the year at Arch Point, Santa Barbara Island, Hare Rock, San Miguel Island, Gull Island, Santa Cruz Island. These data will be reduced and presented in a later report.

STATION RESULTS AND DISCUSSION

Sampling was completed at all 16 monitoring sites by 36 divers (Table 5) during seven five-day and three day trips. A total of 736 dives with 556.4 hours of bottom time were completed.

A brief description of each site is included with the station results below. Means for quadrats, band transects, random point contacts, fish transects and size frequency tables for each location are in Appendix A. Size frequency measurements from the artificial recruitment modules were kept separate from the other size measurements. Video transects for all locations except SRIRR were completed. Videoplots were completed at SMIWL, SRIJLNO, SRIJLSO, SCIGI, SCIFH, SCIPB, SCISA, ANICC, ANILC, SBISESL, and SBIAP. Species lists for all locations are in Appendix B. A summary of the 1992 status of each site is presented in Table 4.

In addition to the regular monitoring sites, we occasionally survey other areas to give the permanent sites a frame of reference to the surrounding areas. Surveys generally consisted of one dive, with all divers fanning out and noting

general characteristics of the site. General species lists were sometimes filled out for the area. Descriptions here include noteworthy observations and a short description of the dive site.

Location: Wyckoff Ledge, San Miguel Island
Site #1 SMIWL

1992 sampling dates: September 16, September 17

1992 status: dense kelp forest

There was a very dense kelp canopy over the site. *Macrocystis pyrifera* plants were mostly large and mature, and the fronds were heavily covered with bryozoans. *M. pyrifera* densities and percent cover of *M. pyrifera*, *Pterygophora californica*, and *Eisenia arborea* remained relatively constant over the past five years. Red algae, mostly *Botryoglossum farlowianum*, covered much of the bottom (53%), and *Gigartina spp.* was common at 6%. Articulate coralline algae was abundant at 15%. Crustose coralline appears to have increased over the past two years and is now at 32% coverage. Bare substrate was recorded at its highest level ever, 25%.

The worm, *Pista elongata* was the most common miscellaneous invertebrate on RPC's. *Diopatra ornata* were common in the sandy areas, covering 10% of the bottom. Bryozoans were abundant covering 16% of the substrate.

Mysids were very abundant in both the canopy and near the bottom where they were so dense they obscured visibility. Rock crabs, mostly *Cancer antennarius*, were common. Small kelp crabs, *Pugettia richii*, were present, but were not as abundant as last year. Kelp crabs, *Pugettia producta*, were common in the kelp canopy.

Haliotis rufescens were commonly found, three of which were measured to be commercially legal (>= 19.4 cm). A commercial abalone diver was observed diving at the site on September 17. *Kelletia kelletii* were abundant and were counted on both the band transects and quadrats, their respective densities were 0.25/m^2 and 0.88/m^2.

Both *Patiria miniata* and *Pisaster giganteus* were common and no sign of wasting disease was observed. Recently settled *P. giganteus* were abundant on the kelp blades. *Pycnopodia helianthoides* were uncommon and most were small with a mean size of 77 mm. They were recorded on band transects at 0.0069/m^2, down from their high in 1991 (0.049/m^2). Both *Strongylocentrotus purpuratus* and *S. franciscanus* were uncommon and at their lowest densities since 1984. *S. purpuratus* were absent

in quadrat counts while *S. franciscanus* densities were 0.58/m^2.

Rockfish were abundant at the west end of the transect; however, the east end had few fish. Lingcod, *Ophiodon elongata,* and cabezon, *Scorpaenichthys marmoratus* were observed. Kelp greenlings, *Hexagrammos decagrammus*, were common, this is the southern end of their range. Tubesnouts, *Aulorhyncus flavidus*, small schools of jack mackerel, *Trachurus symmetricus*, and a large white sea bass, *Atractoscion nobilis*, were also seen. An uncommon sighting of a mosshead warbonnet, *Chirolophis nugator*.

Location: Hare Rock, San Miguel Island
Site #2 SMIHR
1992 sampling dates: July 14, July 15, September 17
1992 status: red sea urchin barren

Overall the site looked similar to the way it was in 1991. The few kelp plants from last year along the outside of the transect, especially to the northeast, have grown into a small forest about ten meters in diameter. The kelp looked healthy and dark. Red algae and sea lettuce, *Ulva sp.*, were abundant under the kelp plants and in two large patches right along the transect. Green algae (mostly sea lettuce) coverage was patchy and increased to 14%, similar to 1990 levels. Crustose coralline algae was abundant covering 52% of the substrate.

Terebellid worms were very abundant and were the most common miscellaneous invertebrates on RPC's. Large rock crabs, *Cancer spp.*, and the coon shrimp, *Pandalus danae,* were common.

Aplysia californica were common at a density of 0.065/m^2. Juvenile *Navanax inermis* (a sea slug) were very abundant on our September 17 visit.

Strongylocentrotus franciscanus were abundant at 9.5/m^2. *S. franciscanus* densities have not changed since 1987. *S. purpuratus* were relatively rare and fell to their lowest density (0.3/m^2) since sampling began in 1982. Earlier this year a fisherman reported that many *S. purpuratus* were dying near Hare Rock. We noticed many fresh *S. purpuratus* tests on July 14. *Pisaster giganteus* (0.68/m^2), *Patiria miniata* (1.4/m^2), and *Pycnopodia helianthoides* (0.04/m^2) were all relatively common.

Some juvenile *Haliotis rufescens* were found on or near the transect and some adult *H. rufescens* and *H. cracherodii* were found and measured in the shallows around Hare Rock. Shells of both *H.*

rufescens and *H. cracherodii* were collected and measured.

Young-of-year rockfish, *Oxyjulis californica*, and *Heterostichus rostratus* were seen. *Aulorhyncus flavidus*, *Sebastes atrovirens* and *S. serranoides* were common in the kelp forest. A large *Opiodon elongata* was seen.

Location: Tyler Bight, San Miguel Island
Date: September 16

A survey dive was made here in this commonly used anchorage. We dove on the outside edge of the kelp bed. There was an abundance of large *Haliotis rufescens* and rock crabs, *Cancer spp.*, on the small rocky reefs jutting out of the sand. The fish fauna was much like Wyckoff Ledge, but the algae was different in that *Eisenia arborea* was very abundant here and was missing entirely from the monitoring site. Acid weed, *Desmarestia viridis* was common on the sand.

Location: Johnson's Lee North, Santa Rosa Island
Site #3 SRIJLNO
1992 sampling dates: July 15, July 16, September 15
1992 status: thick mature kelp forest

The transect was covered by a thick canopy and kelp plants were dense below with a coverage of 55% for *Macrocystis pyrifera*, *Pterygophora californica* and *Eisenia arborea* combined. The color and condition of the kelp looked healthy. A dense understory of *Cystoseira spp.* and *P. californica* was present over much of the transect area. *Cystoseira spp.* and *Gelidium spp.* were at their highest level ever at this site, 15% and 5% respectively. *Desmarestia spp.* was very abundant in 1991, but this year it was almost completely absent from the transect. Miscellaneous red algae was at its highest coverage since 1982 (42%).

Sponges, tunicates, and bryozoans were diverse and abundant. Encrusting sponges and bryozoans increased to their highest levels ever at this site, 11% and 43% respectively. Tunicate cover decreased from their 1991 high of 19% to a more typical coverage of 4.3%. The divers who collected this data were questioned about their identification of the encrusting tunicates and sponges, as they can be easily confused, but they were sure of their identifications. The sand castle worm increased in coverage from last year to 10%. Amphipod tube mats were abundant and were the most common miscellaneous invertebrate on the RPC's.

Sea urchins were present under ledges but few were found in the open. Both *Strongylocentrotus franciscanus* and *S. purpuratus* continued to have low densities, 0.2 and 0.18/m^2 respectively. *Pisaster giganteus* and *Patiria miniata* seemed abundant. *P. giganteus* abundance has gradually decreased from it's high in 1989 of 1.2/m^2, to 0.13/m^2 this year.

Adult *Haliotis rufescens* were easily found along the transect, we found 41 for size frequency measurements. Though adult abalone were common, juveniles were scarce. We checked under many rocks and only found a few, the smallest being 50 mm. On a dive inshore from the transect, we observed a *H. rufescens*, approximately 150 mm long, that was very weak and flaccid, though only slightly shrunken. On that dive we also observed a healthy *H. rufescens* approximately 230 mm long. Both abalone were at depth of 30 ft.

Juvenile and adult *Chromis punctipinnis* and juvenile surfperch were common. Juvenile rockfish were uncommon. The *Hypsypops rubicundus* nest near the 70 m mark on the transect was active and had eggs. This is the only *H. rubicundus* nest in the area, and it has been interesting to follow through the years.

There are three groups of five ARMs at this site. All were heavily overgrown with encrusting invertebrates. On September 15, all 15 ARMs were monitored, and all sea stars and abalone were measured. Sea urchins, *Hinnites giganteus* and cowries were also measured in 10 of the ARMs. Octopus nests were found in two ARMs. A total of 31 *Haliotis rufescens* were found inside the ARMs, 14 were thought to be introduced hatchery abalone that were placed here over two years ago. Because of fouling growth on the shells and the light colored shells of many of the native abalone here, it is often difficult to positively identify the hatchery abalone. Sizes ranged from 16 mm to 165 mm. Several introduced abalone in the 120 mm size class were found in the rocks around the middle group of ARMs. Pacific falsejingles, *Pododesmus cepio*, were abundant in the ARMs.

Location: Johnson's Lee South, Santa Rosa Island

Site #4 SRIJLSO

1992 sampling dates: July 27, July 28, July 29, September 14, September 15

1992 status: mature kelp forest

Kelp canopy cover was thick and at slack current it covered about 90% of the transect. *Macrocystis pyrifera* density was slightly lower

this year than last, with fewer juveniles and more adults, reflecting a maturation of the forest. On the bottom, the percent coverage for *Macrocystis pyrifera*, *Pterygophora californica* and *Eisenia arborea* combined was 36%. This category has been increasing since 1990. *Laminaria farlowii*, *Cystoseira spp.*, and articulated coralline algae all increased to their highest coverage ever at this site, 6.9%, 3.1%, and 12% respectively. However, *Laminaria farlowii* densities did not increase on quadrats. *Gigartina spp.* coverage increased to 7.4%, its highest level since 1983. On RPC's the percent cover of rocks was the highest ever at this site, and may have been a factor in some of the changes observed such as the increase in algae.

In general, densities from quadrat and band transect counts were very similar to last year's. Amphipod tube mats, hydroids, and brittle stars in the kelp holdfasts accounted for most of the miscellaneous invertebrate category on RPC's. *Diopatra ornata* decreased in coverage to 5.7%. This decrease is proportional to the decrease in sand substrate, its most common habitat.

Strongylocentrotus franciscanus and *S. purpuratus* densities were 0.23/m^2 and 2/m^2 respectively. The decrease in sea urchin densities we saw in 1991 seems to hold, as densities changed little this year. *Pycnopodia helianthoides* and *Patiria miniata* were common (0.11/m^2 and 2/m^2 respectively), while *Pisaster giganteus* was rare (0.05/m^2).

Adult and juvenile *Oxyjulis californica* were common. Adult *Sebastes mystinus* and *S. atrovirens* were common as were adult *Embiotica lateralis* and *E. jacksonii*.

Haliotis rufescens were present on band transects (0.014/m^2). Twenty nine *H. rufescens* were measured for size frequency information. One *H. corrugata* was observed.

Seven ARMs were placed at the site on July 28, 1992. They were located between 56-63 m on the transect, and about 5-10 m east of the line.

Location: Rodes Reef, Santa Rosa Island
Site #5 SRIRR
1992 sampling dates: July 13, July 14, October 22
1992 status: open kelp forest

The kelp forest was much more open than it has been in the previous two years. Most of the *Macrocystis pyrifera* did not reach the surface, many of the plants were pale in color and the tips of many blades were tattered. Bottom coverage for *M. pyrifera*, *Pterygophora californica* and

Eisenia arborea combined cover 8% of the substrate, little change since 1990. There were no signs of amphipod or isopod infestations on the kelp as were seen in 1991. Red algae was abundant and diverse covering 42% of the bottom. The red alga, *Acrosorium uncinatum* was abundant. This alga was abundant in large mats here in the mid-1980's. Temperatures ranged from 15°C on the bottom to 17°C at the surface.

Diopatra ornata were common, covering 10% of the bottom. *Phragmatopoma californica* were abundant within the kelp holdfasts. Bryozoans were abundant, covering 14% of the bottom, their highest coverage ever; however, *Diaperoecia californica* decreased in coverage from 4.8% in 1991 to 0.3% this year. The miscellaneous invertebrates on RPC's were mostly hydroides, barnacles, anemones and the polychaete *Pista elogata*.

Both *Strongylocentrotus franciscanus* and *S. purpuratus* were common on the west end of the transect with overall means of 3.1 and 0.78/m^2 respectively. *Patiria miniata* were abundant at 2.4/m^2. *Pycnopodia helianthoides* and *Pisaster giganteus* were common, although *P. helianthoides* densities continued to decline from their high in 1989. On October 22, some *S. purpuratus* were found that were losing spines, and two were found with deformities.

Rockfish and *Semicossyphus pulcher*, including several males, were abundant. *Sebastes mystinus* and *Chromis punctipinnis* were common.

Location: South Point, Santa Rosa Island
Date: July 29

This area had a very thick kelp canopy and very little understory algae. Barnacles, bryozoans, and sponges were abundant. *Balanophyllia elegans* was abundant, and in some areas it contrasted with the cobalt sponge, *Hymenamphiastra cyanocrypta*, which was also abundant. Nudibranchs were common and fairly diverse. Except for the lack of understory algae, the species composition was very similar to Johnson's Lee South. Sea urchins were uncommon over most of the area. The urchins found were all in crevices. There were areas of rock with the round pock marks that typically have *Strongylocentrotus purpuratus*, though the depressions were all overgrown by encrusting invertebrates and no urchins were present. A couple of small *Haliotis rufescens* were seen. One of the divers thought he saw some *Patiria miniata* with the wasting disease.

Location: Gull Island South, Santa Cruz Island

Site #6 SCIGI

1992 sampling dates: August 18,August 19,October 22

1992 status: mature kelp forest

On August 18 we recorded the water temperature at 19°C at a depth of 50 ft, this was unusually warm. This site changed from a dense young kelp forest in 1991 to a mature kelp forest having few widely spaced large plants with a dense canopy. On RPC's, bottom coverage for *Macrocystis pyrifera*, *Pterygophora californica* and *Eisenia arborea* combined decreased from 25% in 1991 to 9.6% this year. In quadrats adult and juvenile *M. pyrifera* combined decreased from 3.6/m^2 in 1991 to 0.23/m^2. Over the past three years (1990-1992) the mean number of stipes (7, 10, and 19) and mean holdfast diameters (14, 26, and 41) increased. The RPC, quadrat, and size frequency data combined over the past three years show the progression of a kelp forest, from recruitment to maturity. The *M. pyrifera* appeared healthy; however, many of the older blades had epiphytes growing on them. Didemnid tunicates seemed to be the most common epiphyte. Crustose coralline algae continued to dominate much of the substrate covering 53%. *Corynactis californica* percent cover continued to decrease to its lowest level of 2.7%. Sponges were common. *Diopatra ornata* was common in sandy areas. Miscellaneous invertebrates, most commonly *Pista elongata*, hydroids, anenomes and barnacles, increased to 24%.

On October 22, it was noticed that several *Allopora californica* colonies were completely or partially overgrown by crustose coralline algae. This was the first time this phenomenon was noticed. This could be a normal occurrence as sometimes seen with *Balanophyllia elegans*. Usually it means that the polyps have withdrawn allowing the algae to progress up the base of the colony. With cup corals, constant disturbance from something such as foliose algae can keep the polyps retracted (Coyer et al. 1993). The colony could also be sick or possibly just old. Further surveys to other areas where *A. californica* occurs are warranted to see if this phenomena exists elsewhere.

On August 18, along with warm water (20° C surface), sea stars were all observed with symptoms of wasting disease. Enumeration of diseased stars was not attempted, but at least twelve sea stars along the transect were seen in

various states of decay. On an adjacent shallow reef at less than 30 feet, almost every sea star observed was diseased. On October 22, we found fewer sea stars showing signs of wasting disease than in August, and there were a few that seemed to be recovering (ie. they had healed over patches). A few *Strongylocentrotus purpuratus* were found with wasting syndrome, indicated by loss of spines and/or lesions.

Strongylocentrotus purpuratus were still abundant (12/m^2), but densities continued to decline as they have for the past 4 years. *S. franciscanus* were common at 1.6/m^2. *Pycnopodia helianthoides* and *Pisaster giganteus* were relatively uncommon; however, *Patiria miniata* were abundant at 2.3/m^2.

Juvenile *Sebastes atrovirens* were very abundant in the kelp canopy, and were recorded at their highest abundance at this site (13/transect). Other rockfish juveniles, probably gopher rockfish, were seen on the bottom. *Sebastes mystinus* juveniles were not as abundant as usual at this site. Juvenile *Heterostichous rostratus* were seen schooling in the canopy. A few juvenile *Oxyjulis californica* were seen, and *Chromis punctipinnis* were common on October 22.

There are three groups of five ARMs at this site. In four of them, sea urchins, sea stars, cowries, scallops and abalone were measured. The remaining 11 ARMs were monitored for abalone only. Only one (14 mm) native *Haliotis rufescens* was found. A 3 mm abalone was found on encrusting coralline algae growing on a *Kelletia kelletii* shell found along the transect.

Location: Fry's Harbor, Santa Cruz Island
Site #7 SCIFH
1992 sampling dates: July 30, August 31, October 7
1992 status: barrens

There was very little change in general appearance from 1991. The site had no kelp and little macro algae. The brown alga, *Hydroclathrus clathratus* was found here. This species has a southern distribution and is not normally found this far north.

Astrangia lajollaensis was a dominant encrusting invertebrate, covering 20% of the bottom. Miscellaneous invertebrates covered 20% of the bottom, the most common ones being the brittle star *Ophiactis simplex*, octocoral *Clavularia* sp., and the christmas-tree worm, *Spirobranchus spinosa*. *Megathura crenulata*, *Parastichopus parvamensis* and *Lophogorgia chilensis* were abundant at this site. A small group of about 10

purple gorgonians, *Eugorgia rubens*, were found down slope from the 58 m point on the transect. Aggregating red sea cucumbers, *Pachythyone rubra*, were very abundant, particularly at the north end of the transect. This small sea cucumber covered 17% of the substrate which was approximately the same as it has been the last four years. *Lytechinus anamesus* density increased to 5/m^2, double the means of the past three years. *Strongylocentrotus franciscanus* and *S. purpuratus* densities were low and had decreased from previous years. Both *Patiria miniata* and *Pisaster giganteus* were common. On our August 31 visit, many of the sea stars appeared to have wasting disease. On October 7, we found no sign of wasting disease in sea stars or sea urchins. Also at this later sampling date, *P. miniata* were uncommon above a depth of 50 ft.

Lythrypnus dalli seemed abundant; however, their densities on quadrats decreased from last year. Smooth ronquils, *Rathbunella hypoplecta*, were common. A large school of sardines, *Sardinops sagax* was observed and *Chromis punctipinnis* were very common. A small school of juvenile *C. punctipinnis* was seen on July 30, this was our first sighting of juveniles in 1992. One month later on August 31, juvenile *C. punctipinnis* were very abundant. Many of the *C. punctipinnis* had white spots (indicative of a bacterial infection) that formed lesions of various sizes, generally around the dorsal fin. We have seen this infection before, during warm water years. On October 7, a school of barracuda, *Sphyraena argentea*, was seen.

Seven ARMs were placed here by the Channel Islands Council of Divers on July 17, 1992. The ARMs are located inshore of the transect between 65 and 80 meters.

Location: Pelican Bay, Santa Cruz Island
Site #8 SCIPB
1992 sampling dates: July 30, August 31, October 7
1992 status: barrens

The small kelp forest present last year, expanded closer to the transect. Adult *Macrocystis pyrifera* were recorded in quadrats for the first time since 1984. On RPC's, kelp was recorded at 7.1% cover. There was still no canopy in the immediate area. On July 30 a filamentous brown alga covered everything, and was recorded at 66% cover on RPC's. We saw a similar phenomenon in 1984 when a 23% cover of miscellaneous brown algae was recorded. Miscellaneous green algae has been common for the past three years, but this year covered only 0.4% of the substrate. Crustose coralline algae covered 33% of the bottom.

The site looked very different on August 31 than it did during the first visit, July 30. The filamentous brown algae that covered everything in July was completely gone. On October 7 mature *Sargassum muticum* appeared to be much more abundant than on our earlier visits.

Astrangia lajollaensis was common, covering 10% of the bottom. The most common miscellaneous invertebrates on RPC's was a brittle star (*Ophiactis simplex*), this category covered 22% of the bottom. The brown alga, *Hydroclathrus clathratus*, was observed here.

Astraea undosa densities (0.28/m^2) continued to decrease for their fifth consecutive year. The mean number of *Aplysia californica* on band transects increased this year to 0.093/m^2, this increase may be related to the abundance of filamentous brown algae.

Both *Strongylocentrotus franciscanus* and *S. purpuratus* were common with densities of 1.6 and 4.0/m^2 respectively. In general sea stars are not abundant at this site. *Patiria miniata*, *Pisaster giganteus*, and the sand star, *Astropectin armatus*, were observed with wasting disease on August 31. *Parastichopus parvamensis* densities continued at low levels (0.3/m^2) after being common between 1984 and 1990 with densities between 0.98 - 1.9/m^2. Juvenile *P. parvamensis* were found under rocks.

Adult and juvenile *Chromis punctipinnis* were common. Young-of-year *Semicossyphus pulcher*, and *Paralabrax clathratus* were seen. Juvenile *Oxyjulis californica* were recorded at this site for the first time on fish transects. Zebra gobies *Lythrypnus zebra*, *Embiotica jacksonii*, and *Damalichthys vacca* were common. *Lythrypnus dalli* density decreased from 2.5/m^2 in 1991 to 0.48/m^2 this year. *Coryphopterus nicholsii* also decreased, from 7.1/m^2 in 1991 to 2/m^2 this year. A school of *Sardinops sagax* was observed.

Location: Scorpion Anchorage, Santa Cruz Island
Site #9 SCISA
1992 sampling dates: July 17, October 7
1992 status: purple sea urchin barrens

This site persisted as a *Strongylocentrotus purpuratus* barren, and showed no sign of changing. Miscellaneous green algal coverage increased to 9.3%. Most of this green algae consisted of a green filamentous type on the silty bottom. Crustose coralline algae dominated the substrate covering 49%; however, it was patchy and not particularly healthy looking.

Miscellaneous invertebrates, mostly *Spirobranchus spinosa* covered 26% of the bottom, their highest level ever. *Serpulorbis squamigerus* was common, covering 7.8% of the substrate.

Strongylocentrotus purpuratus (43/m^2) dominated the site. *S. franciscanus* were uncommon at 0.9/m^2, and were small. On October 7, several individuals of both *S. purpuratus* and *Lytechinus anamesus*, and one *Patiria miniata* were observed with wasting disease. *Astraea undosa* were common (0.73/m^2), but densities have decreased on quadrats for the past four years. *Parastichopus parvamensis* was common at a density of 0.78/m^2.

In general, fish were not very common. *Chromis punctipinnis* were the most common fish, but juveniles did not appear until our later transects on October 7. *Lythrypnus zebra* were very common. *Semicossyphus pulcher* and *Paralabrax clathratus* were uncommon.

ARMs were deployed on March 15, 1992 by the Channel Islands Council of Divers. The ARMs are located approximately 70 meters north of the west end of the transect and will be moved closer to the transect.

Location: Yellow Banks, Santa Cruz Island
Site #10 SCIYB
1992 sampling dates: August 17, September 4, October 19, October 20
1992 status: mature kelp forest

Macrocystis pyrifera formed a thin canopy. The kelp blades were clean but very pale colored. All types of brown algae were more common this year than in 1991. *Pterygophora californica* was very common having a density of 1/m^2. *M. pyrifera*, *P. californica* and *Eisenia arborea* together covered 25% of the bottom. *Cystoseira spp.*, articulated and crustose coralline algae were at their highest levels recorded on RPC's (40%, 32% and 62% respectively). Articulated coralline algae steadily increased over the last five years. *Laminaria farlowii* was common with a density of 0.43/m^2, covering 16% of the bottom.

Diopatra ornata were common in the sandy area covering 0.9% of the bottom. *Lophogorgia chilensis* were common. *Astraea undosa* were at their lowest density on quadrats(0.025/m^2) at this site.

Patiria miniata were uncommon, and a few appeared to be recovering from wasting disease. Several large *Pycnopodia helianthoides* were observed. *Strongylocentrotus franciscanus*,

S.purpuratus, and *Lytechinus anamesus* all decreased in density. *S.purpuratus* were at their lowest densities since sampling began at this site (4.4/m^2). *Lytechinus anamesus* were absent from band transects, hard to find, and were generally small (under 1 cm) in diameter.

In general fish were not very abundant. *Oxyjulis californica* were common and juveniles were present on the fish transects for the first time since monitoring began at this site. *Semicossyphus pulcher* were common.

In six of the twenty ARMs at this site, sea urchins, sea stars, abalone, *Hinnites giganteus* and *Cypraea spadicea* were also measured. In the other twelve ARMs only abalone, *Hinnites giganteus*, and sea stars were measured. Nothing was counted or measured in the remaining two modules.

Location: Offshore Yellowbanks, Santa Cruz Island
33°59.15'N 119°31.91'W
Date: August 17

We conducted white abalone, *Haliotis sorensoni*, transects with four pairs of divers heading north, south, east, and west from the anchor. The site was chosen using depth and the indication of a reef on a depth finder. The depth ranged from 92 to 96 feet over a rocky reef with low relief. Each buddy pair covered approximately 10 m x 30 m, reeling out a meter tape and searching about 5 m on each side. No live abalone were found. All intact abalone shells were collected and measured. This shell sample consisted of ten *H. rufescens* and six *H. sorensoni* shells. No shells were fresh. The reef was beautiful and was covered with coralline algae, *Pelagophycus porra*, *Agarum fimbriatum*, *Macrocystis pyrifera*, and both *Eisenia arborea* and *Pterygophora californica*. *Strongylocentrotus franciscanus* were scarce but very large. *Lytechinus anamesus* were rare. Sea stars were present in low numbers. *Astraea gibberosa*, a snail unusual south of Santa Rosa Island, was common here. Several *Maripelta rotata*, were found. This red alga generally occurs in deeper water and is rarely encountered. Shells of the deep water scallop, *Pectin sandiegensis,* were found and a yellowtail, *Seriola lalandi*, was seen. Water temperature ranged from 19°C at the surface to 16°C on the bottom with the thermocline below 50 ft. Visibility was near 80 feet.

Location: Smugglers Cove (north end), Santa Cruz Island
Date: August 19

We made a late afternoon dive here followed by a night dive. The primary objective was to search for eel grass, of which we found only drift. The sand star, *Astropectin armatus,* was seen with symptoms of wasting disease. *Kelletia kelletii*, large *Astraea undosa*, and *Lytechinus anamesus* were common. Angel shark, *Squatina californica*, and thornback rays, *Platyrhinoidis triseriata*, were seen over the sand. A large male *Semicossyphus pulcher* was seen on the night dive. Several sarcastic fringehead, *Neoclinus blanchardi*, were found living in *Astrea undosa* shells. Several sea spiders, identified by Jay Carroll as *Pycnogonida unida*, were found on the sand. Other species seen included sea pens *Stylatula elongata*, sea pansy *Renilla kollikeri*, octopus *Octopus bimaculatus/bimaculoides*, rose anemone *Telia columbiana*, phoronid worm *Phoronopsis californica*, a brittle star *Ampiodia occidentalis*, lobster *Panulirus interruptus*, and crabs *Randallia ornata*, and *Heterocrypta occidentalis*. A juvenile *Medialuna californiensis* was found on the night dive, something we do not see often.

Location: Scorpion Rock (southeast), Santa Cruz Island

Date: October 22

A night dive was made in the anchorage to the east of Scorpion Rock. The area was interesting with a steep rocky wall dropping to a flat sandy plain about 45 feet deep. Fewer *Panulirus interruptus* were encountered than we expected to see. Large swell sharks, *Cephaloscyllium ventriosum*, were seen. An octopus was observed eating an *Aplysia californica*. Schools of anchovies, *Engraulis mordax* were abundant and made for a wonderful display of bioluminescence. Pelicans were observed feeding at night on the glowing balls of fish.

Location: Admiral's Reef, Anacapa Island Site #11 ANIAR

1992 sampling dates: August 21, September 18, October 21, October 23

1992 status: Mature kelp forest

Macrocystis pyrifera was abundant covering the entire length of the transect and was generally in good condition; however, some kelp blades were pale and had rotting edges. Both adult and juvenile *M. pyrifera* densities increased on quadrats this year. On RPC's, *M. pyrifera*, *Pterygophora californica* and *Eisenia arborea* combined covered 35% of the bottom. Miscellaneous brown algae increased to 50% from 8% in 1991. In 1983, we saw a similar increase in brown algae. The brown alga, *Agarum*

fimbriatum, was common on the lower part of the reef and the sand flat. *Laminaria farlowii*, *Cystoseira spp.*, *P. californica* and *E. arborea* were common on the sand flat. *L. farlowii* and *Cystoseira spp.* were at their highest levels covering 8.2% and 19% of the bottom respectively. Correspondingly, *L. farlowii* increased in density on quadrats to 1.1/m^2. Red algal cover decreased from last year. Crustose coralline algae was abundant covering 57% of the bottom. The abundant understory algae this year may be competitive with the large gorgonians and cup corals.

On RPC's, miscellaneous invertebrates (most commonly *Spirobranchus spinosa*) covered 37% of the bottom. Sponges and tunicates were common. Both *Balanophyllia elegans* and *Astrangia lajollaensis* decreased in their coverage this year.

On August 21, sea star wasting disease was present in *Henricia leviuscula*, *Patiria miniata*, and *Pisaster giganteus*. *Lytechinus anamesus*, *Strongylocentrotus franciscanus*, and *S. purpuratus* were observed with wasting syndrome in August and September. An estimated 5% of the *L. anamesus* were observed to be losing their spines and some were found with lesions or deformed tests. Whole *L. anamesus* tests were common. On October 21, only *L. anamesus* were observed with wasting syndrome and no sea star wasting disease was observed. *L. anamesus* densities (counted on band transects) continued to decline and were the lowest since 1986 (1.6/m^2). From 1986 - 1990 *L. anamesus* were counted in quadrats because of their high densities. *L. anamesus* no longer dominate the east end of the transect, and algae is recovering there. *S. franciscanus* and *S. purpuratus* densities were moderate at 6.3 and 4.3/m^2. *Patiria miniata* were uncommon and had their lowest densities on quadrats since 1985 (0.05/m^2). *Parastichopus parvamensis* decreased from last year, but was still common in quadrats at 0.85/m^2.

Aplysia californica were common at 0.049/m^2 on band transects. *Haliotis corrugata* were common and several were found to be weak and flaccid, but most appeared to be only slightly shrunken.

Schools of barracuda were seen on October 21. Adult and juvenile *Chromis punctipinnis* were abundant. Adult and juvenile *Oxyjulis californica* were common. Large schools of *Girella nigricans* were observed nearby. *Coryphopterous nicholsii* densities decreased to their lowest levels since 1986 (0.28/m^2). We observed a bat ray eating a large *Haliotis corrugata*, crunching the shell into fragments.

ARMs were placed at this site on April 21, 1991. In six of the seven ARMs located at this site, all sea urchins, *Cypraea spadicea*, sea stars, *Hinnites giganteus*, and abalone were measured. In the other ARM, only *Hinnites giganteus*, abalone, and sea stars were measured. One small (24 mm) *Haliotis corrugata* was found in the ARMs. Small scallops were found in abundance in the ARMs.

Location: Cathedral Cove, Anacapa Island Site #12 ANICC

1992 sampling dates: August 20, October 23

1992 status: kelp forest

Macrocystis pyrifera formed a canopy over the entire length of the transect, and was very dense over the inner half. *M. pyrifera* extended farther up the slope on the inside of the transect than it has since the early 1980's. On quadrats, adult *M. pyrifera* density increased to 1.2/m^2, its highest density since 1983. Juvenile *M. pyrifera* was also abundant at 1.1/m^2. On RPC's, *M. pyrifera*, *Pterygophora californica* and *Eisenia arborea* covered 33% of the bottom, their highest level ever. Although *M. pyrifera* was abundant, it did not appear healthy and much of it was pale in color with degrading blades. *M. pyrifera* was present on the sandy bottom north of the transect, anchored to *Chaetopterous variopedatus* tubes. *Laminaria farlowii* was at its highest percent cover (4.6%) since 1984. *Cystoseira spp.* was at its highest coverage ever at this site (21%). Crustose and articulated coralline algae were abundant covering 50% and 24% of the bottom respectively.

The most common miscellaneous invertebrates on RPC's were *Spirobranchus spinosa*. *Serpulorbis squamigerus* and *Spirobranchus spinosa* were still the dominant competitors for space on the large cobble area inshore of the line.

Adult *Patiria miniata* and *Pisaster giganteus* were uncommon. *Strongylocentrotus franciscanus* were abundant at 4.3/m^2, while *S. purpuratus* were less abundant at 1.3/m^2. Juvenile *P. miniata*, sea cucumbers, and sea urchins were common under rocks.

Astraea undosa were common at 1.3/m^2; however, they seem to be continuing to decline as they have for the past four years. *Megathura crenulata* were common (0.029/m^2) and seemed to have slowly increased in density over the past 5 years. *Hinnites giganteus* were abundant at 0.20/m^2, but were very patchy on rock wall faces. *Haliotis corrugata* and *Panulirus interruptus* were found in abundance. Large numbers of lobster molts were found in the cove on August 20 and

October 23. Rocks were turned during the search for abalone for size frequency measurements.

Adult and juvenile *Chromis punctipinnis* were very common. *Sebastes atrovirens* were more abundant than usual at this site. Adult and juvenile *Embiotica jacksonii*, *Hypsypops rubicundus*, and *Paralabrax clathratus* were all common. Adult rock wrasse, *Halichoeres semicinctus*, were very common. Juveniles of *Heterostichous rostratus*, *Semicossyphus pulcher*, and *Alloclinus holderi* were seen. *A. holderi* were at their highest densities since 1985, 0.48/m^2. A fishing lure was found in the cove, very suspicious in a closed area.

Seven ARMs were deployed at this site on June 6, 1991. In four of the seven ARMs, sea urchins, sea stars, *Cypraea spadicea*, *Hinnites giganteus*, and abalone were measured. In the other three ARMs, only *H. giganteus* and abalone were measured. One native *Haliotis corrugata* was found in the seven ARMs. No living transplanted abalone were found here (approximately 200 were outplanted by volunteer divers last year). Empty shells were collected and saved for later analysis.

Location: Landing Cove, Anacapa Island
Site #13 ANILC

1992 sampling dates: July 31, September 1
1992 status: Open kelp forest

This site has been remarkably stable over the years. It is characterized by an open kelp forest with little canopy, probably due to boat traffic in the cove. Overall the *Macrocystis pyrifera* was healthy, with little epiphytic growth, but some of the blades were starting to degrade. On quadrats, adult and juvenile *M. pyrifera* density were at their lowest level (0.28/m^2 and 0.33/m^2 respectively) since sampling began in 1982. However, the *M. pyrifera*, *Pterygophora californica* and *Eisenia arborea* coverage on RPC's changed little. Miscellaneous red algae coverage decreased to 0.6%, while agar weed, *Gelidium* spp., increased to 11%; their lowest and highest levels since sampling began in 1982, respectively. Articulated and crustose coralline algae were abundant covering 30% and 57% respectively. The understory algae, *E. arborea* (1.1/m^2), and *Laminaria farlowii* (3.7/m^2) were abundant.

The most common miscellaneous invertebrate on RPC's was *Spirobranchus spinosa*. Sponges were abundant covering 8.4% of the bottom.

Sea stars were uncommon, though this was not unusual for this site. On September 1, only one *Pisaster giganteus* was seen and it had wasting disease. *Strongylocentrotus franciscanus* and *S.*

purpuratus had densities of 1.1 and 2.2/m^2 respectively. *Lytechinus anamesus* appeared here for the first time on band transects (0.042/m^2). *Parastichopus parvamensis* was common at 0.45/m^2 and several juveniles were found.

Haliotis corrugata and *Panulirus interruptus* were common on band transects. *Hinnites giganteus* were very abundant (0.93/m^2). The opistobranch, *Tylodina fungina*, was common. *Megathura crenulata* densities continued to decline (0.011/m^2 this year), as it has during the past 6 years.

Adult and juvenile *Chromis punctipinnis*, *Hypsypops rubicundus*, and *Oxyjulis californica* were common. Juvenile *C. punctipinnis* were seen in large numbers on our second visit on September 1. Adult *Paralabrax clathratus* and *Girella nigricans* were common. Adult and juvenile *Embiotica jacksonii* were present in small numbers.

Seven ARMs were placed on September 30, 1991. Sea urchins, sea stars, *Cypraea spadicea*, *Hinnites giganteus*, and abalone were measured in each of the seven ARMs. One juvenile *Haliotis corrugata* and one adult *H. fulgens* were found in the ARMs.

Location: Seabass Reef (NE of Landing Cove), Anacapa Island

Date: July 31

We conducted a brief survey dive here. This area is within the Anacapa Ecological reserve. *Panulirus interruptus* and *Hinnites giganteus* were abundant in the shallow areas. *Haliotis corrugata* and large *Strongylocentrotus franciscanus* were abundant. One area had high concentrations of *S. purpuratus* and very little kelp.

Location: Southeast Sea Lion, Santa Barbara Island

Site #14 SBISESL

1992 sampling dates: June 23, June 24, September 2

1992 status: Sea urchin barren/developing kelp forest

Adult and juvenile *Macrocystis pyrifera* plants were growing along the south and north ends of the transect. Many juvenile *M. pyrifera* plants were growing epiphytically on gorgonians as we had observed in 1991. Estimated canopy over the transect was about 10%. On RPC's, the *M. pyrifera*, *Pterygophora californica* and *Eisenia*

arborea coverage increased to 3.5%, its highest level since the 1983 El Niño. Correspondingly, on quadrats, *M. pyrifera* was also recorded at its highest density since 1982 (0.6/m^2). Miscellaneous brown algae increased to 11%. *Cystoseira spp.* was common, covering 2% of the bottom. The green alga, *Codium setchellii*, seemed to be as abundant as it was in 1991. Miscellaneous red algae was common covering 8.1% of the bottom. Crustose coralline algae was abundant covering 47% of the bottom.

Corynactis californica, *Balanophyllia elegans*, and *Astrangia lajollaensis* coverage on RPC's appears to have decreased over the past three years. Encrusting sponges and tunicates were common. The miscellaneous invertebrate category on RPC's was not dominated by any particular group and included: anenomes, barnacles, amphipod tube mats, hydroids, and *Spirobranchus spinosa*. *Lophogorgia chilensis* were abundant at 0.22/m^2.

On June 23, both *Patiria miniata* and *Pisaster giganteus* were common, and there were no signs of sea star wasting disease. Recently settled *P. giganteus* were fairly abundant on the *Macrocystis pyrifera* fronds. On September 2, most *P. miniata* and *Pisaster giganteus* were severely afflicted with wasting disease. One *Parastichopus parvamensis* was seen with symptoms of wasting disease. No sea urchins were observed with wasting syndrome. *Strongylocentrotus franciscanus* densities remained about the same over the past five years (1.8/m^2 this year), while *S. purpuratus* densities decreased. *S. purpuratus* densities were 40/m^2, their lowest since 1985. *Lytechinus anamesus* densities decreased to 5.5/m^2. *L. anamesus* were observed with wasting syndrome in December.

Oxyjulis californica were common with juveniles schooling around the *Macrocystis pyrifera* plants. Juveniles of *Heterostichous rostratus* and *Paralabrax clathratus* were also observed in the kelp near the canopy. Juvenile *Chromis punctipinnis* and *O. californica* were abundant in September. Juvenile and adult female *Semicossyphus pulcher* were common. Adult and juvenile *Hypsypops rubicundus*, and adult *Sebastes atrovirens* were present. *Halichores semicinctus* were not seen here. A huge school of thousands of *Trachurus symmetricus* was seen.

Location: Arch Point, Santa Barbara Island Site #15 SBIAP

1992 sampling dates: June 22, June 24, June 26, September 3
1992 status: Sea urchin barren/developing kelp forest

Although densities of *Macrocystis pyrifera* and percent bottom cover of *M. pyrifera*, *Pterygophora californica* and *Eisenia arborea* combined decreased, overall the kelp forest appeared to have increased in area and canopy cover since 1991. The north end of the transect still had little kelp on the line. There was a thin strip of *M. pyrifera* and *Cystoseira spp.* growing along the offshore edge of the transect. Green algae was not as abundant as in previous years. *Cystoseira spp.* cover increased, but was very patchy. On September 3, a diatom film and a fine filamentous red algae were very abundant on the rocks. Crustose coralline algae was abundant covering 53% of the bottom. Bare substrate was at its lowest coverage (18%) since 1985.

Bryozoans and tunicates were common covering 5.4% and 3.0% of the bottom respectively. Miscellaneous invertebrates on RPC's covered 11% of the bottom and consisted mainly of *Spirobranchus spinosa* and *Dodecaceria fewkesi*.

Strongylocentrotus franciscanus and *S. purpuratus* densities did not change much from last year. *S. purpuratus* were abundant (59/m^2), and many juveniles were found. No *Lytechinus anamesus* were found. On September 3, we estimated 50% of the *S. purpuratus* had wasting syndrome. The sick urchins still appeared to be actively feeding even though most had lost their spines. *S. purpuratus* that were in shallower water, close to shore did not appear to be as widely affected by the syndrome. *S. franciscanus* did not seem to be affected. *Astraea undosa* densities declined here for the sixth consecutive year. *Aplysia californica* were very common. One juvenile *Haliotis fulgens* was found during species list surveys.

Hypsypops rubicundus were very abundant, averaging 12/fish transect. Three tagged *H. rubicundus* were observed, these were probably tagged in 1985. Adult and juvenile *Chromis punctipinnis* and *Oxyjulis californica* were present. Adult *Paralabrax clathratus*, *Girella nigricans*, and *Semicossyphus pulcher* were common. Juveniles of *S. pulcher*, *Sebastes atrovirens*, and *Halichores semicinctus* were present. A huge school of *G. nigricans* were on the site feeding on red filamentous algae. On September 3, we found a spotted porcupinefish, *Diodon hystrix*. Previous sightings for puffers in California only include San Diego and Newport Harbor. The fish was captured by a diver, photographed, measured, and released.

We resampled band transects on September 3 because of concerns that the heavy surge in June may have adversely affected our ability to find organisms in crevices at that time. There was very little difference between the two counts, but we used the latter.

Location: Cat Canyon, Santa Barbara Island Site #16 SBICC

1992 sampling dates: June 25, September 2, October 13, December 1

1992 status: Sea urchin barren/developing kelp forest

Overall this site was mostly a *Strongylocentrotus purpuratus* barrens, but there was a small dense patch of *Macrocystis pyrifera* between 70 and 80 meters on the transect. There were also patches of *M. pyrifera* off the east end, to the west and south of the transect. Juvenile *M. pyrifera* densities in quadrats were lower this year than last; however, adult *M. pyrifera* densities were their highest (0.43/m^2) since 1988. *Cystoseira spp.* was common, but very patchy. Crustose coralline algae was abundant covering 39% of the bottom. On our second visit on September 2, a diatom film covered everything at the site. Red filamentous algae that was covered with diatoms covered most of the rocks. On October 13 most of the diatom film was gone, and the macroalgae looked healthy.

Spirobranchus spinosa was the most common miscellaneous invertebrate on RPC's. *Serpulorbis squamigerus* continued its fourth year of decline, recorded this year as covering 0.3% of the bottom. Macroinvertebrates in general were lacking at this site.

Parastichopus parvamensis were common at 0.45/m^2. Sea stars were uncommon. On June 25, *Strongylocentrotus franciscanus* were common (2.2/m^2), and *S. purpuratus* were abundant at 35/m^2. There was no sign of echinoderm wasting disease in June. On our September 2 visit, *S. purpuratus* appeared have wasting syndrome. Nearly all of them had lost their spines, but they were still active, holding on to the rocks and feeding. *S. purpuratus* tests were accumulating in ripple channels, an indication of recent mortality. Several of the sea urchins were dissected, and appeared to have normal gonads and their guts contained food. *S. purpuratus* that were in close proximity of patches of *Macrocystis pyrifera* looked healthier than those in the barren areas. We expected to see high mortality of the *S. purpuratus* as they are very susceptible to fish predation even if they survive the syndrome. *S. franciscanus* did not appear to be affected by this syndrome. Most

Patiria miniata and *Pisaster giganteus* found on this date had wasting disease.

On October 13, *S. purpuratus* with wasting syndrome were still present. Most of the *S. purpuratus* had short spines (about 7 mm.), and many of them had black/dark green spots/lesions. It was observed that their spines and epidermis could be easily rubbed off. Juvenile *S. purpuratus* appeared to be healthy. Some *S. franciscanus* were observed with short spines, that appeared to be broken.

Quadrat counts to measure changes in *S. purpuratus* densities were conducted on December 1. Densities decreased to 25/m^2, a 29% decrease from their June 25th densities (35/m^2). Densities of *S. franciscanus* and most other organisms changed little. Most of the *S. purpuratus* appeared to be sick, having few spines and some had lesions as described previously. Seven *S. purpuratus* with no or few spines from an area devoid of *Macrocystis pyrifera*, and five healthy *S. purpuratus* from a kelp forest were dissected and checked for gonad condition. None of the sick sea urchins had gonads, while four of the five healthy sea urchins had large gonads.

Astraea undosa densities continued to decline for their fourth year. Small *Aplysia californica* were very abundant. *Chromis punctipinnis* were not very common. *Oxyjulis californica*, *Paralabrax clathratus*, *Semicossyphus pulcher* and *Hypsypops rubicundus* were all common. *Girella nigricans* were abundant.

Location: Sutil Island, Santa Barbara Island
Date: June 25

Survey dives were made about 150 m south of Sutil Rock, where there is a vertical wall from about 40' to over 100' deep. The area on top of the reef was a healthy kelp forest with a lush understory of *Eisenia arborea* palm kelp and articulated coralline algae, much like Cat Canyon used to look like. Fish were common, including *Brachyistius frenatus*, *Sebastes mystinus*, *S. serranoides*, *S. carnatus*, and *S. serriceps* which were not seen at the other Santa Barbara Island sites. The fleshy sea pen, *Ptilosarcus gurneyi*, was seen by Kristine Barsky. Southern California is listed as the southern extension of its range and it is an unusual sighting at the islands. Small sponges were common on the reef, 13 species of nudibranchs were found, in addition to *Navanax inermis* and *Tylodina fungina*. The nudibranch, *Dirona picta* was abundant on various substrates. The same species was noted as abundant in June 1991. One *Haliotis corrugata* of

about legal size was found. Amphipod tube mats were very abundant on the reef tops.

GENERAL DISCUSSION

According to NOAA's Coast Watch bulletin, sea surface temperatures off the west coast of the U.S. were anomalously warm (0-6°F above normal) during 1992. In 1992, we observed several biological anomalies often associated with warm water caused by an El Niño. We frequently observed sea star wasting disease (Table 6). Pelagic red crabs, *Pleuroncodes planipes*, were observed in May off Santa Cruz Island, and a spotted porcupinefish, *Diodon hystrix*, was observed off Santa Barbara Island, which is a northern range extension for this species. Some sea birds such as the California Brown Pelican had poor recruitment success (Ingram and Jory, in prep.), and fish recruitment appeared to be later than usual this year.

There were no major changes in the last three years at the permanent sites with healthy kelp forests (Richards *et al.* 1990 and 1991). Table 4 summarizes the 1992 status of the 16 permanent sites. All three Santa Barbara Island sites appeared to be recovering, returning to kelp forests, but all still had high densities of *Strongylocentrotus purpuratus* which appeared to be hindering that recovery. Scorpion Anchorage on Santa Cruz Island showed no sign of recovery towards a kelp forest. High densities of *S. purpuratus* continued to persist, and very little macro algae could be found in the area. The kelp forest at Pelican Bay on Santa Cruz Island seemed like it would return in 1992. Sea urchin densities there were low, having declined since at least 1990. Kelp was present nearby. Siltation seems like the most probable reason for the low kelp recruitment, though others factors may be important as well. Similarly, kelp at Fry's Harbor, also on the north side of Santa Cruz Island, had not recovered despite low sea urchin densities there. Some understory algae, primarily *Eisenia arborea* was present; however, the site was still dominated by *Pachythyone rubra* whose effects on kelp recruitment are unknown. *S. franciscanus* that dominated Hare Rock on San Miguel Island showed no sign of declining in density, though a small kelp forest southeast of the transect was well established and appeared to be expanding.

Sea star wasting disease was observed at nine locations on Santa Barbara, Anacapa, and Santa Cruz Islands (Table 6). When the disease was present, its prevalence ranged from a few to almost all of the sea stars being affected. *Patiria miniata*, *Pisaster giganteus*, *Pycnopodia helianthoides*, *Henricia leviuscula,* and

Astropectin armatus were observed with the disease. This disease, in which the infected animals appear to be rotting is possibly caused by a bacterial infection (Schroeter and Dixon, 1988).

This year we observed *Lytechinus anamesus*, *Strongylocentrotus franciscanus*, and *S. purpuratus* with symptoms of a wasting syndrome. Afflicted sea urchins exhibited partial or complete loss of spines, easily eroded epidermis, and sometimes dark green or black blotches on the test. These blotches were usually associated with lesions in the test. Our first observation of sea urchins showing these symptoms was on August 21 (Table 6), at Admiral's Reef, Anacapa Island. There we observed *Lytechinus anamesus* that had various degrees of spine loss, ranging from no spine loss (healthy) to complete spine loss. Unbroken *L. anamesus* sea urchin tests were common at Admiral's Reef. A large number of *L. anamesus* sea urchin tests were observed at Yellowbanks, on east Santa Cruz Island in fall 1991, and had virtually disappeared by 1992. We did not observe any symptoms in 1991, though they could have been overlooked. *L. anamesus* densities at Southeast Sea Lion Rookery decreased by nearly 60% between 1991 and 1992 but moribund urchins were not seen there until late fall. The symptoms seem similar to the sea star wasting disease and may be related (caused by the same or similar bacteria). Without knowing the cause, we have referred to the symptoms as sea urchin wasting syndrome.

Sea urchin wasting syndrome was observed at six locations on Santa Barbara, Anacapa and Santa Cruz Islands (Table 6). This syndrome was also observed at Santa Catalina Island (J. Engle, pers. comm.), and at San Nicholas Island (D. Kushner, pers. obs.). Of the islands that we monitor, the wasting syndrome appeared to be more widely distributed on Santa Barbara Island, and affected mostly *S. purpuratus*. *L. anamesus* may have also been heavily affected. From the quadrat data taken at Cat Canyon, it appears that this syndrome may be causing high mortality. The syndrome was still present in March 1993, and it will be interesting to follow the course of the syndrome and its affects. Studies into the causes and affects of this syndrome are urgently needed.

Subtidal abalone populations have continuously declined for years (Parker et al. 1992). Abalone continues to be a heavily exploited resource in the National Park making it an important resource to monitor and manage. Abalone densities at our 16 monitoring locations are currently too small to detect significant decreases in density. We recommend establishing several permanent

transects in areas of high abalone density so that changes in abalone populations can be monitored.

We observed several *Haliotis corrugata* at Admiral's Reef on the south side of West Anacapa Island that were weak and had what appeared to be a slightly shrunken foot. We have heard a few anecdotal reports of withered *H. corrugata* from sport divers around Anacapa and Santa Cruz Islands. Symptoms were similar to those seen in *H. cracherodii* over the last few years (Richards and Davis, 1993). The condition of abalone at all sites needs to be carefully watched and documented, even if the cause is unknown. We also need to carefully observe other subtidal gastropods for similar symptoms.

Abalone recruitment appeared to be low this year. We found very few juvenile abalone in the Artificial Recruitment Modules or in their natural habitat. Low abalone recruitment may be expected among abalone populations that are depressed. To further our knowledge of abalone recruitment, additional ARMs were placed at Scorpion Anchorage and Fry's Harbor, Santa Cruz Island and Johnson's Lee South, Santa Rosa Island, making a total of nine sites with ARMs (Table 7).

The artificial recruitment modules also worked well in attracting other animals. Each ARM has approximately 24 m^2 of interstitial space providing good habitat for small animals; however, the spaces are small enough to prevent larger animals from entering. In 1992, we measured sea urchins, sea stars, and cowries inside the modules at the six sites with ARMs. Although no statistical analysis has been done, it appears that the animal "populations" in the ARMs had a smaller size structure than in the natural habitat. Conducting size frequency measurements in these ARMs may enable us to detect recruitment events sooner than our natural habitat measurements because of the presence of smaller animals. We recommend that the ARMs be used to monitor size frequency distributions of these animals in the future. Natural habitat monitoring should continue for a full representation of the adult population, especially with harvested species. Nine sites now have ARMs, and we recommend placement of ARMs at the other seven sites. Maintenance of the ARMs includes replacing broken concrete blocks and occasionally reorienting them after heavy storms.

As stated in the Kelp Forest Monitoring Handbook, the purpose of the photogrammetric plots is to "To determine abundance (density) of selected invertebrates and algae.

Photogrammetry is also an excellent source of visual documentation for algae, invertebrates, and substratum in order to determine any temporal changes on a long-term basis". Logistically it has been very difficult to acquire consistent photographs that would enable us to collect accurate density data. Meanwhile, we feel our other sampling methods have been adequate in collecting this information. We still believe that photographic documentation is very important in documenting long-term temporal changes and recommend that in 1993 a new, more efficient method be used for photographic documentation of the sites. New methods should include still camera photos of the transect areas and "roving" video documentation. Slides of the sites would be useful in presentations about the monitoring and could be standardized with wide angle photos from each end of the transect looking down the line and in the middle looking each direction. These would serve as photopoints which could be duplicated and used to show changes along the transect. The video documentation should give a broader impression of the site with wide angle shots as well as close ups of some of the representative or unusual features that may be important. Voice over by the diver describing the scene is possible and the necessary equipment should be obtained to do this.

This year, data management changes were updated in the Kelp Forest Monitoring Handbook. In late 1992, we acquired several HOBO-TEMP^{tm} temperature recorders. Their low cost and ease of operation seem very promising. We will field test some units in early 1993 and install them at all the permanent sites during the 1993 field season. Methods for use, maintenance, and data management will need to be developed and added to the handbook.

We recommend that the combined category of *Macrocystis pyrifera*, *Eisenia arborea* and *Pterygophora californica* on RPC's be separated into three categories, one for each species. This will enable us to more accurately describe the changes in algal abundance. We also recommend that the rock wrasse, *Halichoeres semicinctus*, be added to the fish transects.

In 1992, project divers assisted with sea urchin recruitment and growth studies conducted by Steve Schroeter and John Dixon (San Diego State University). This study is using brushes to collect urchin larvae to determine recruitment timing and abundance. *Strongylocentrotus franciscanus* growth will be measured in urchins with the aid of a Tetracycline marker. We provided assistance to divers from the University of California at Santa Barbara and the Tatman Foundation's Channel Island Research Program with the Santa Barbara

County Shoreline Resources Inventory. These inventories of the subtidal and rocky intertidal will provide baseline information in the event of an oil spill and will be a good comparison of the Channel Islands and mainland biota. Data from the Kelp Forest Monitoring Project was used by Dr. Sally Holbrook at the University of California at Santa Barbara for comparative work on surfperch recruitment.

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We are grateful to the many volunteer divers from the Channel Islands Council of Divers who built and placed the Artificial Recruitment Modules around Santa Cruz and Anacapa Islands during the last two years. In particular, we appreciate the efforts of Paul Doose for organizing the trips and keeping us informed with his observations.

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Table 1. Regularly monitored species by taxonomic grouping, common name, scientific name, and

TAXA/COMMON NAME	SCIENTIFIC NAME	TECHNIQUE		
ALGAE				
Miscellaneous Green Algae			R	
Miscellaneous Red Algae			R	
Articulated Coralline Algae			R	
Crustose Coralline Algae			R	
Agar weed	*Gelidium spp.*		R	
Sea tongue	*Gigartina spp*.		R	
Miscellaneous Brown Algae			R	
Acid weed	*Desmarestia spp*.		R	
Oar weed	*Laminaria farlowii*		R,Q	
Bladder chain kelp	*Cystoseira spp*.		R	
Giant kelp	*Macrocystis pyrifera*		R,Q	
California sea palm	*Pterygophora californica*		R,Q	
Southern sea palm	*Eisenia arborea*		R,Q	
Miscellaneous plants			R	
INVERTEBRATES				
Miscellaneous Sponges			R	
Orange puffball sponge	*Tethya aurantia*		B,S	
Southern staghorn bryozoan	*Diaperoecia californica*		R	
Miscellaneous Bryozoans			R	
California hydrocoral	*Allopora californica*	B,S		
White-spotted rose anemone	*Tealia lofotensis*			B
Red gorgonian	*Lophogorgia chilensis*		B,S	
Brown gorgonian	*Muricea fruticosa*		B,S	
California golden gorgonian	*Muricea californica*		B,S	
Strawberry anemone	*Corynactis californica*		R	
Orange cup coral	*Balanophyllia elegans*		R	
La Jolla cup coral	*Astrangia lajollaensis*		R	
Hydroids			R	
Ornate tube worm	*Diopatra ornata*		R	
Colonial sand-tube worm	*Phragmatopoma californica*		R	
Chestnut cowrie	*Cypraea spadicea*		Q	
Wavy turban snail	*Astraea undosa*		Q,S	
Red turban snail	*Astraea gibberosa*		Q,S	
Bat star	*Patiria miniata*		Q,S	
Giant-spined sea star	*Pisaster giganteus*		Q,S	
Sunflower star	*Pycnopodia helianthoides*		B,S	
White sea urchin	*Lytechinus anamesus*		B,S	
Red sea urchin	*Strongylocentrotus franciscanus*	Q,S		

Table 1. continued.

TAXA/COMMON NAME	SCIENTIFIC NAME	TECHNIQUE
Purple sea urchin	*Strongylocentrotus purpuratus*	Q,S
Warty sea cucumber	*Parastichopus parvimensis*	Q
Aggregated red sea cucumber	*Pachythyone rubra*	R
Red abalone	*Haliotis rufescens*	B,S
Pink abalone	*Haliotis corrugata*	B,S
Green abalone	*Haliotis fulgens*	B,S
Kellet's whelk	*Kelletia kelletii*	B,S
Giant keyhole limpet	*Megathura crenulata*	B,S
California brown sea hare	*Aplysia californica*	B
Scaled tube snail	*Serpulorbis squamigerus*	R
Rock scallop	*Hinnites giganteus*	B,S
California spiny lobster	*Panulirus interruptus*	B
Tunicates		R
Stalked tunicate	*Styela montereyensis*	Q
Miscellaneous Invertebrates		R
SUBSTRATE		
Bare Substrate		R
Substrates: Rock		R
Cobble		R
Sand		R
FISH		
Bluebanded goby	*Lythrypnus dalli*	Q
Blackeye goby	*Coryphopterus nicholsii*	Q
Island kelpfish	*Alloclinus holderi*	Q
Blacksmith	*Chromis punctipinnis*	V
Señorita	*Oxyjulis californica*	V
Blue rockfish	*Sebastes mystinus*	V
Olive rockfish	*Sebastes serranoides*	V
Kelp rockfish	*Sebastes atrovirens*	V
Kelp bass	*Paralabrax clathratus s*	V
Sheephead	*Semicossyphus pulcher*	V
Black surfperch	*Embiotoca jacksoni*	V
Striped surfperch	*Embiotoca lateralis*	V
Pile perch	*Damalichthys vacca*	V
Garibaldi	*Hypsypops rubicundus*	V
Opaleye	*Girella nigricans*	V

B= Band Transect
Q= Quadrat Count
R= Random Point Contact

S= Size Frequency Measurement
V= Visual Transect

Table 2. Station information.

SITE NUMBER	ISLAND	LOCATION	ABBREVIATION	DEPTH (FEET)	YEAR EST.	# of Artificial Recruitment Modules in 1992
1	San Miguel	Wyckoff Ledge	SMIWL	43-49	1981	0
2	San Miguel	Hare Rock	SMIHR	20-30	1981	0
3	Santa Rosa	Johnson's Lee North	SRIJLNO	31-36	1981	15
4	Santa Rosa	Johnson's Lee South	SRIJLSO	46-52	1981	7
5	Santa Rosa	Rodes Reef	SRIRR	43-49	1983	0
6	Santa Cruz	Gull Island South	SCIGI	45-54	1981	15
7	Santa Cruz	Fry's Harbor	SCIFH	39-42	1981	7
8	Santa Cruz	Pelican Bay	SCIPB	21-27	1981	0
9	Santa Cruz	Scorpion Anchorage	SCISA	15-20	1981	7
10	Santa Cruz	Yellowbanks	SCIYB	48-51	1986	20
11	Anacapa	Admiral's Reef	ANIAR	42-49	1981	7
12	Anacapa	Cathedral Cove	ANICC	20-35	1981	7
13	Anacapa	Landing Cove	ANILC	15-40	1981	7
14	Santa Barbara	SE Sea Lion Rookery	SBISESL	40-46	1981	0
15	Santa Barbara	Arch Point	SBIAP	22-27	1981	0
16	Santa Barbara	Cat Canyon	SBICC	22-30	1986	0

Table 3. Summary of sampling techniques used to monitor population dynamics of selected kelp forest organisms.

TECHNIQUE	SAMPLE SIZE	NUMBER OF REPLICATES
Quadrat count	1 m X 2 m	20 / site
Band Transect count	3 m X 20 m	12 / site
Random Point contact (RPC)	40 points/(0.5 x 3 m)	25 / site
Visual Fish transect	2(w) X 3(h) X 100(l) m /5 minutes	8 / site
Video transects	5 minutes/100 m	4 / site
Size frequency	30 to 100 / species	1 / site
Photogrammetric plots	20 m^2 (80-0.5 x 0.5 m)	1 / site
Species checklist	30 - 90 minutes	1 / site

Table 4. Kelp forest monitoring site status 1992.

<u>San Miguel Island</u>	
Wyckoff Ledge	Mature kelp forest with dense canopy and abundant understory red algae.
Hare Rock	Sea urchin barren, high density of *Strongylocentrotus franciscanus*, *Corynactis californica*. Small developing kelp forest near the transect.
<u>Santa Rosa Island</u>	
Johnson's Lee North	Mature kelp forest with a dense canopy and a high density of *Macrocystis pyrifera*.
Johnson's Lee South	Mature kelp forest with a dense canopy.
Rodes Reef	Open mature kelp forest with little canopy and abundant understory of red algae.
<u>Santa Cruz Island</u>	
Gull Island South	Mature kelp forest with a dense canopy.
Fry's Harbor	Barrens dominated by *Pachythyone rubra* and *Astrangia lajollaensis*.
Pelican Bay	Barrens with some brown algae.
Scorpion Anchorage	Sea urchin barren with high density of *Strongylocentrotus purpuratus* and low diversity.
Yellowbanks	Mature kelp forest with a moderate understory of brown algae.
<u>Anacapa Island</u>	
Admiral's Reef	Mature kelp forest with a rich understory of brown algae and a diverse assemblage of fish and invertebrates.
Cathedral Cove	Mature kelp forest with a dense canopy and a high density of *Macrocystis pyrifera*
Landing Cove	Open kelp forest with a diverse assemblage of fish and invertebrates.
<u>Santa Barbara Island</u>	
SE Sea Lion Rookery	*Strongylocentrotus purpuratus* barren with a developing kelp forest.
Arch Point	*Strongylocentrotus purpuratus* barren with a developing kelp forest.
Cat Canyon	*Strongylocentrotus purpuratus* barren with some remnant and recovering kelp patches.

Table 5. 1992 kelp forest monitoring program participant and cruise list.

PARTICIPANTS	AFFILIATION	CRUISES PARTICIPATED
Bill Avery	Utah State University	2
Kristine Barsky	Calif. Dept. of Fish and Game	1
Steve Barsky	Marine Marketing & Consulting	1
Cliff Beaver	Channel Islands National Park	2
Randy Bidwell	Channel Islands National Park	7
Jay Carroll	TENERA Corp.	4
John Conti	Truth Aquatics	3,9
Ken Cox	Lake Mead National Rec. Area	3
Gary Davis	Channel Island National Park	1
Doug Defirmian	Channel Island National Park	1,3,4,6,8
Frank DiCrisi	Univ. of Calif. Los Angeles	8
Jack Engle	Tatman Foundation	8
Peter Haaker	Calif. Dept. of Fish and Game	5
Scott Harris	Calif. Dept. of Fish and Game	3
Kelly Kiefer	Moss Landing Marine Lab	4
David Kushner	Channel Island National Park	1,2,3,4,5,6,7,9,10
Bud Laurent	San Luis Obispo Cnty. Supervisor	6
Bob Lea	Calif. Dept. of Fish and Game	5
Laura Martin	Univ. of Calif. Los Angeles	6
Carolyn Meyer	Redwood National Park	9
Dave Meyer	Bell Intermediate School	3
Natalie McMillan	Univ. of Calif. Los Angeles	6
Karen Press	Moss Landing Marine Lab	1
John Provo	Channel Island National Park	2,3,4,5,6,
Stephen Pryor	Channel Island National Park	1,2,3,4,5,6,7,8,9
Dan Richards	Channel Island National Park	1,2,3,4,5,6,7,8,9,10
Diane Richardson	Channel Island National Park	1,2,5,9,
Dana Smith	Channel Island National Park	6
Julie Smith	Orange County Marine Institute	5
David Steichen	Univ. of Calif. Santa Barbara	5
Ian Taniguchi	Calif. Dept. of Fish and Game	2
John Tarpley	Calif. Dept. of Fish and Game	2
Matt Timney	Calif. State Univ. Long Beach	4
Bob Todd	Redwood National Park	9
Ronald Walder	Channel Island National Park	1,2,3,4,5,6,7,9,10
Dwight Willey	Channel Island National Park	8,10
Ian Williams	Channel Island National Park	9

Table 5. Continued

	Cruise Dates
CRUISE # 1	June 22-26, 1992
CRUISE # 2	July 13-17, 1992
CRUISE # 3	July 27-31, 1992
CRUISE # 4	August 17-21, 1992
CRUISE # 5	August 31 - September 4, 1992
CRUISE # 6	September 14-18, 1992
CRUISE # 7	October 7, 1992
CRUISE # 8	October 19-23, 1992
CRUISE # 9	October 13, 1992
CRUISE # 10	December 1, 1992

Table 6. 1992 echinoderm wasting disease/syndrome observations.

none = not noticed at the site during our visits.
date = dates disease/syndrome was observed.

	Sea Star wasting disease	Sea Urchin wasting syndrome
	species//dates observed	species//dates observed
San Miguel Island		
Wyckoff Ledge	none	none
Hare Rock	none	6?//?*
Santa Rosa Island		
Johnson's Lee North	none	none
Johnson's Lee South	none	none
Rodes Reef	none	6// Oct.22
Santa Cruz Island		
Gull Island South	1,2,3//Aug.19, Oct.22	6// Oct.22
Fry's Harbor	1,2// Aug.31	none
Pelican Bay	1,2,4// Aug.31	none
Scorpion Anchorage	1// Oct.7	6,8// Oct.7
Yellowbanks	none	8?// Oct. 1991**
Anacapa Island		
Admiral's Reef	1,2,5// Aug., Sep, Oct.	6,7,8// Aug.21
Cathedral Cove	none	none
Landing Cove	2// Sep.1	none
Santa Barbara Island		
SE Sea Lion Rookery	1,2// Sep.2	none
Arch Point	none	6// Sep.3
Cat Canyon	1,2// Sep.2	6// Sep.2, Oct.13, Dec.1

Species legend:

1 = *Patiria miniata*
2 = *Pisaster giganteu*
3 = *Pycnopodia helianthoides*
4 = *Astropectin armatus*
5 = *Henricia leviuscula*
6 = *Strongylocentrotus purpuratus s*
7 = *Strongylocentrotus franciscanus*
8 = *Lytechinus anamesus*

*= Dead and dying sea urchins reported during the winter of 91-92.
**= sea urchin tests observed, but the cause of mortality was unknown- see text.

Table 7. Deployment dates of artificial recruitment modules (ARMs)

Location	Date of deployment	# of modules
SRIJLNO	9/12/89	15
SRIJLSO	7/28/92	7
SCIGI	10/2/89	15
SCIFH	7/17/92	7
SCISA	3/15/92	7
SCIYB	10/11/89	20
ANILC	7/28/91	4
ANILC	9/30/91	3
ANICC	6/6/91	7
ANIAR	4/21/91	7

Appendix A. 1992 Station Data - All Sampling Methods

Introduction

Following are data gathered in 1992 for all kelp forest monitoring program sampling methods. Means, standard deviations and total number of samples (cases) are given for QUADRATS, BAND TRANSECTS, RANDOM POINT CONTACTS, and FISH TRANSECTS. SIZE FREQUENCY data are presented as percentiles falling within indicated size classes. (Readers should be aware that the number of significant digits is an artifact of the database program and does not imply this level of precision.)

Notes on methods:

QUADRATS. Means represent average counts obtained from 20 random 1 m X 2 m quadrats, each the sum of two individual divers' counts in 1 m X 1 m quadrats.

BAND TRANSECTS. Means represent average counts obtained from 12 random 3 m X 20 m transects, each the sum of two individual divers' counts on 3 m X 10 m transects.

RANDOM POINT CONTACTS. Means represent average percent cover for a given organism, or substrate, at 25 random locations along the transect line. Forty points from each quadrat (1,000 points total) are used to determine percent cover of selected organisms and substrate within one meter of the bottom. Percent cover may total more than 100% because of layering.

FISH TRANSECTS. Means represent the average of counts obtained on each pass by divers swimming the entire 100 m transect line and observing fishes passing within a 2 m X 3 m "window" centered on the line. Cases listed refer to the total number of passes made during fish surveys for the year, or day. Counts of adults and juveniles for each transect pass for each date are available as raw data, as are time and horizontal Secchi measurements. All counts were conducted between 0900 and 1500 hours.

SIZE FREQUENCY MEASUREMENTS. Cases (N) represent the number of organisms measured. Data are presented as percentiles within size classes. Specific dimensions: *Tethya*- diameter in mm; *Hinnites*- maximum shell diameter in mm; *Haliotis*, and *Kelletia*- maximum shell length in mm; *Astraea*- maximum diameter of shell at base in mm; *Megathura*- shell length, not including mantle, in mm; Sea stars- maximum radius in mm; Sea urchins- test diameter in mm; *Macrocystis*- number of stipes (counted 1 m above the substrate) and maximum holdfast-base diameters in cm. Gorgonians and *Allopora*- maximum width and height in cm. Raw data will allow correlation between stipe number and holdfast diameter for individual kelp plants and between width and height for individual gorgonians. Size frequencies taken from animals found in the artificial recruitment modules (ARMs) are titled appropriately.

LOCATION 1 SAN MIGUEL ISLAND - WYCKOFF LEDGE

1992 QUADRAT DATA: MEAN NUMBER PER M^2

Species	Mean	Std Dev	Cases
Macrocystis pyrifera adult	0.5500	0.5596	20
Eisenia arborea	0.0000	0.0000	20
Pterygophora californica	0.0750	0.1832	20
Laminaria farlowii	0.0000	0.0000	20
Macrocystis pyrifera juvenile	0.4250	0.8926	20
Macrocystis pyrifera all	0.9750	1.2615	20
Cypraea spadicea	0.0000	0.0000	20
Kelletia kelletii	0.8750	0.7232	20
Astraea undosa	0.0000	0.0000	20
Astraea gibberosa	0.2250	0.3796	20
Patiria miniata	2.2750	1.5768	20
Pisaster giganteus	0.1750	0.4064	20
Strongylocentrotus franciscanus	0.5750	1.7035	20
Strongylocentrotus purpuratus	0.0000	0.0000	20
Parastichopus parvamensis	0.1750	0.3726	20
Styela montereyensis	0.0750	0.1832	20
Lythrypnus dalli	0.0000	0.0000	20
Coryphopterus nicholsii	0.2250	0.4128	20
Alloclinus holderi	0.0000	0.0000	20

1992 BAND TRANSECT DATA: MEAN NUMBER PER M^2

Tethya aurantia	0.0986	0.0597	12
Allopora californica	0.0000	0.0000	12
Tealia lofotensis	0.2583	0.1211	12
Lophogorgia chilensis	0.0000	0.0000	12
Muricea fruticosa	0.0014	0.0048	12
Muricea californica	0.0000	0.0000	12
Panulirus interruptus	0.0000	0.0000	12
Haliotis rufescens	0.0319	0.0423	12
Haliotis corrugata	0.0000	0.0000	12
Haliotis fulgens	0.0000	0.0000	12
Kelletia kelletii	0.2472	0.2172	12
Megathura crenulata	0.0000	0.0000	12
Hinnites giganteus	0.0125	0.0203	12
Aplysia californica	0.0000	0.0000	12
Pycnopodia helianthoides	0.0069	0.0132	12
Lytechinus anamesus	0.0000	0.0000	12

LOCATION 1 SAN MIGUEL ISLAND - WYCKOFF LEDGE

1992 RANDOM POINT CONTACT DATA: MEAN PERCENT COVER

Species	Mean	Std Dev	Cases
Green algae	0.0000	0.0000	25
Miscellaneous brown algae	1.0000	2.0412	25
Desmarestia spp.	1.5000	3.8864	25
Laminaria farlowii	0.0000	0.0000	25
Cystoseira spp.	4.7000	5.3677	25
Macrocystis,Eisenia,Pterygophora	19.7000	15.9151	25
Miscellaneous red algae	53.2000	20.6599	25
Articulated coralline algae	14.5000	15.5624	25
Crustose coralline algae	31.7000	17.3614	25
Gelidium spp.	0.0000	0.0000	25
Gigartina spp.	6.0000	6.9597	25
Miscellaneous plants	0.0000	0.0000	25
Sponges	1.5000	2.6021	25
Corynactis californica	0.2000	1.0000	25
Balanophyllia elegans	1.5000	2.3936	25
Astrangia lajollaensis	1.3000	2.7119	25
Diopatra ornata	9.9000	11.4900	25
Phragmatopoma californica	0.1000	0.5000	25
Serpulorbis squamigerus	0.2000	0.6922	25
Bryozoans	15.5000	11.4109	25
Diaperoecia californica	0.0000	0.0000	25
Tunicates	0.9000	2.8759	25
Miscellaneous invertebrates	12.4000	11.3761	25
Bare substrate	25.2000	23.4845	25
Rock	71.7000	27.9389	25
Cobble	4.1000	5.0456	25
Sand	24.2000	27.4215	25

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Total Fish Abundance	2.0208	3.8839	48
Chromis punctipinnis	0.0000	0.0000	4
Oxyjulis californica	5.2500	10.5000	4
Sebastes mystinus	8.5000	2.3805	4
Sebastes serranoides	0.0000	0.0000	4
Sebastes atrovirens	3.0000	0.8165	4
Paralabrax clathratus	0.0000	0.0000	4
Semicossyphus pulcher	2.5000	1.2910	4
Embiotoca jacksoni	0.2500	0.5000	4
Embiotoca lateralis	1.5000	1.2910	4
Damalichthys vacca	3.2500	3.3040	4
Hypsypops rubicundus	0.0000	0.0000	4
Girella nigricans	0.0000	0.0000	4

LOCATION 1 SAN MIGUEL ISLAND - WYCKOFF LEDGE

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Species	Date (year/month/day)	Mean	Std Dev	Cases
Chromis punctipinnis adult		0.0000	0.0000	4
	920916	0.0000	0.0000	4
Chromis punctipinnis juvenile		0.0000	0.0000	4
	920916	0.0000	0.0000	4
Oxyjulis californica adult		5.0000	10.0000	4
	920916	5.0000	10.0000	4
Oxyjulis californica juvenile		0.2500	0.5000	4
	920916	0.2500	0.5000	4
Sebastes mystinus adult		8.5000	2.3805	4
	920916	8.5000	2.3805	4
Sebastes mystinus juvenile		0.0000	0.0000	4
	920916	0.0000	0.0000	4
Sebastes serranoides adult		0.0000	0.0000	4
	920916	0.0000	0.0000	4
Sebastes serranoides juvenile		0.0000	0.0000	4
	920916	0.0000	0.0000	4
Sebastes atrovirens adult		3.0000	0.8165	4
	920916	3.0000	0.8165	4
Sebastes atrovirens juvenile		0.0000	0.0000	4

	920916	0.0000	0.0000
4			
Paralabrax clathratus adult		0.0000	0.0000
4			
	920916	0.0000	0.0000
4			
Paralabrax clathratus juvenile		0.0000	0.0000
4			
	920916	0.0000	0.0000
4			
Semicossyphus pulcher male		0.2500	0.5000
4			
	920916	0.2500	0.5000
4			
Semicossyphus pulcher female		2.2500	1.2583
4			
	920916	2.2500	1.2583
4			

LOCATION 1 SAN MIGUEL ISLAND - WYCKOFF LEDGE

Embiotoca jacksoni adult		0.2500	0.5000
4			
	920916	0.2500	0.5000
4			
Embiotoca jacksoni juvenile		0.0000	0.0000
4			
	920916	0.0000	0.0000
4			
Embiotoca lateralis adult		1.5000	1.2910
4			
	920916	1.5000	1.2910
4			
Embiotoca lateralis juvenile		0.0000	0.0000
4			
	920916	0.0000	0.0000
4			
Damalichthys vacca adult		0.5000	0.5774
4			
	920916	0.5000	0.5774
4			
Damalichthys vacca juvenile		2.7500	3.7749
4			
	920916	2.7500	3.7749
4			
Hypsypops rubicundus adult		0.0000	0.0000
4			
	920916	0.0000	0.0000
4			
Hypsypops rubicundus juvenile		0.0000	0.0000
4			
	920916	0.0000	0.0000
4			
Girella nigricans adult		0.0000	0.0000
4			
	920916	0.0000	0.0000
4			
Girella nigricans juvenile		0.0000	0.0000
4			
	920916	0.0000	0.0000
4			

LOCATION 1 SAN MIGUEL ISLAND - WYCKOFF LEDGE

1992 NATURAL HABITAT SIZE FREQUENCY DISTRIBUTIONS

Tethya aurantia

(cases) N=	30
< 10	0.0
10 - 19	3.3%
20 - 29	10.0%
30 - 39	10.0%
40 - 49	3.3%
50 - 59	13.3%
60 - 69	10.0%
70 - 79	10.0%
80 - 89	16.7%
90 - 99	10.0%
> 99	13.3%
min size (mm)	18
max size (mm)	127
mean	67
mode	52

Astraea gibberosa

(cases) N=	35
< 10	0.0
10 - 19	2.9%
20 - 29	0.0
30 - 39	14.3%
40 - 49	14.3%
50 - 59	31.4%
60 - 69	34.3%
70 - 79	2.9%
80 - 89	0.0
90 - 99	0.0
100 - 109	0.0
110 - 119	0.0
> 119	0.0
min size (mm)	15
max size (mm)	72
mean	53
mode	46

Kelletia kelletii

(cases) N=	97
< 40	0.0
40 - 49	0.0
50 - 59	0.0
60 - 69	8.2%
70 - 79	14.4%
80 - 89	36.1%
90 - 99	25.8%
100 - 109	11.3%
110 - 119	4.1%
120 - 129	0.0
130 - 139	0.0
140 - 149	0.0
> 149	0.0
min size (mm)	61
max size (mm)	119
mean	88
mode	85

Patiria miniata

(cases) N=	140
< 10	0.0
10 - 19	1.4%
20 - 29	.7%
30 - 39	2.9%
40 - 49	4.3%
50 - 59	16.4%
60 - 69	50.7%
70 - 79	18.6%
80 - 89	5.0%
90 - 99	0.0
> 99	0.0
min size (mm)	16
max size (mm)	87
mean	63
mode	61

LOCATION 1 SAN MIGUEL ISLAND - WYCKOFF LEDGE

Haliotis rufescens

(cases) N=	21
< 25	0.0
25 - 29	0.0
30 - 34	0.0
35 - 39	0.0
40 - 44	4.8%
45 - 49	0.0
50 - 54	0.0
55 - 59	0.0
60 - 64	0.0
65 - 69	0.0
70 - 74	0.0
75 - 79	0.0
80 - 84	0.0
85 - 90	0.0
90 - 94	0.0
95 - 99	0.0
100 - 104	0.0
105 - 109	0.0
110 - 114	0.0
115 - 119	4.8%
120 - 124	4.8%
125 - 129	0.0
130 - 134	9.5%
135 - 139	0.0
140 - 144	0.0
145 - 149	14.3%
150 - 154	14.3%
155 - 159	9.5%
160 - 164	0.0
165 - 169	4.8%
170 - 174	4.8%
175 - 179	9.5%
180 - 184	4.8%
185 - 189	4.8%
190 - 194	4.8%
195 - 199	0.0
> 199	4.8%
min size (mm)	42
max size (mm)	216
mean	153
mode	146

Strongylocentrotus franciscanus

(cases) N=	138
< 5	0.0
5 - 9	0.0
10 - 14	3.6%
15 - 19	9.4%
20 - 24	4.3%
25 - 29	4.3%
30 - 34	1.4%
35 - 39	2.9%
40 - 44	4.3%
45 - 49	1.4%
50 - 54	1.4%
55 - 59	1.4%
60 - 64	3.6%
65 - 69	4.3%
70 - 74	2.9%
75 - 79	8.0%
80 - 84	6.5%
85 - 90	7.2%
90 - 94	10.9%
95 - 99	10.9%
100 - 104	7.2%
105 - 109	0.7%
> 109	1.4%
min size (mm)	10
max size (mm)	118
mean	67
mode	96

LOCATION 1 SAN MIGUEL ISLAND - WYCKOFF LEDGE

Pisaster giganteus

(cases) N=	43
< 20	0.0
20 - 39	0.0
40 - 59	34.9%
60 - 79	39.5%
80 - 99	14.0%
100 - 119	2.3%
120 - 139	4.7%
140 - 159	2.3%
160 - 179	0.0
180 - 199	2.3%
200 - 219	0.0
220 - 239	0.0
240 - 259	0.0
260 - 279	0.0
280 - 299	0.0
> 299	0.0
min size (mm)	45
max size (mm)	190
mean	73
mode	61

Pycnopodia helianthoides

(cases) N=	11
< 20	18.2%
20 - 39	9.1%
40 - 59	18.2%
60 - 79	18.2%
80 - 99	18.2%
100 - 119	0.0
120 - 139	0.0
140 - 159	9.1%
160 - 179	0.0
180 - 199	0.0
200 - 219	0.0
220 - 239	9.1%
240 - 259	0.0
260 - 279	0.0
280 - 299	0.0
> 299	0.0
min size (mm)	4
max size (mm)	230
mean	77
mode	4

Macrocystis pyrifera numbers of stipes

(cases) N=	104
< 3	5.8%
3 - 5	16.3%
6 - 8	7.7%
9 - 11	8.7%
12 - 14	3.8%
15 - 17	11.5%
18 - 20	8.7%
21 - 23	10.6%
24 - 26	5.8%
27 - 29	3.8%
30 - 32	3.8%
33 - 35	5.8%
36 - 38	1.0%
39 - 41	3.8%
42 - 44	0.0
>44	1.9%
min number	1
max number	77
mean	18
mode	4

Macrocystis pyrifera holdfast diameters

(cases) N=	104
< 6	2.9%
6 - 11	8.7%
12 - 17	10.6%
18 - 23	5.8%
24 - 29	11.5%
30 - 35	10.6%
36 - 41	12.5%
42 - 47	13.5%
48 - 53	12.5%
54 - 59	4.8%
60 - 65	3.8%
66 - 71	2.9%
72 - 77	0.0
78 - 83	0.0
84 - 89	0.0
>89	0.0
min width (cm)	2
max width (cm)	68
mean	34
mode	24

LOCATION 2 SAN MIGUEL ISLAND - HARE ROCK

1992 QUADRAT DATA: MEAN NUMBER PER M^2

Species	Mean	Std Dev	Cases
Macrocystis pyrifera adult	0.0000	0.0000	20
Eisenia arborea	0.0000	0.0000	20
Pterygophora californica	0.0000	0.0000	20
Laminaria farlowii	0.0000	0.0000	20
Macrocystis pyrifera juvenile	0.0000	0.0000	20
Macrocystis pyrifera all	0.0000	0.0000	20
Cypraea spadicea	0.3250	0.5200	20
Astraea undosa	0.0000	0.0000	20
Astraea gibberosa	0.0250	0.1118	20
Patiria miniata	1.4000	1.2418	20
Pisaster giganteus	0.6750	0.7304	20
Strongylocentrotus franciscanus	9.5000	5.1093	20
Strongylocentrotus purpuratus	0.3000	0.5712	20
Parastichopus parvamensis	0.0750	0.1832	20
Styela montereyensis	0.0000	0.0000	20
Lythrypnus dalli	0.0000	0.0000	20
Coryphopterus nicholsii	0.9500	0.8721	20
Alloclinus holderi	0.0500	0.2236	20

1992 BAND TRANSECT DATA: MEAN NUMBER PER M^2

Tethya aurantia	0.0069	0.0111	12
Allopora californica	0.0000	0.0000	12
Tealia lofotensis	0.0208	0.0327	12
Lophogorgia chilensis	0.0000	0.0000	12
Muricea fruticosa	0.0000	0.0000	12
Muricea californica	0.0000	0.0000	12
Panulirus interruptus	0.0000	0.0000	12
Haliotis rufescens	0.0000	0.0000	12
Haliotis corrugata	0.0000	0.0000	12
Haliotis fulgens	0.0000	0.0000	12
Kelletia kelletii	0.0000	0.0000	12
Megathura crenulata	0.0000	0.0000	12
Hinnites giganteus	0.0181	0.0329	12
Aplysia californica	0.0653	0.0524	12
Pycnopodia helianthoides	0.0444	0.0304	12
Lytechinus anamesus	0.0000	0.0000	12

LOCATION 2 SAN MIGUEL ISLAND - HARE ROCK

1992 RANDOM POINT CONTACT DATA: MEAN PERCENT COVER

Species	Mean	Std Dev	Cases
Green algae	14.0000	19.4454	25
Miscellaneous brown algae	0.0000	0.0000	25
Desmarestia spp.	0.0000	0.0000	25
Laminaria farlowii	0.0000	0.0000	25
Cystoseira spp.	0.0000	0.0000	25
Macrocystis,Eisenia,Pterygophora	0.0000	0.0000	25
Miscellaneous red algae	6.1000	9.5492	25
Articulated coralline algae	0.4000	0.9354	25
Crustose coralline algae	52.1000	19.1850	25
Gelidium spp.	0.0000	0.0000	25
Gigartina spp.	0.0000	0.0000	25
Miscellaneous plants	0.0000	0.0000	25
Sponges	0.0000	0.0000	25
Corynactis californica	12.6000	10.8848	25
Balanophyllia elegans	2.1000	3.0345	25
Astrangia lajollaensis	1.2000	2.1794	25
Diopatra ornata	0.0000	0.0000	25
Phragmatopoma californica	0.2000	1.0000	25
Serpulorbis squamigerus	0.1000	0.5000	25
Bryozoans	0.0000	0.0000	25
Diaperoecia californica	0.0000	0.0000	25
Tunicates	0.0000	0.0000	25
Miscellaneous invertebrates	9.5000	9.0139	25
Bare substrate	24.6000	15.9863	25
Rock	75.3000	25.3036	25
Cobble	23.5000	25.4337	25
Sand	1.2000	2.7119	25

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Total Fish Abundance	3.0417	6.8224	96
Chromis punctipinnis	17.6250	14.5105	8
Oxyjulis californica	0.1250	0.3536	8
Sebastes mystinus	10.8750	5.4363	8
Sebastes serranoides	1.0000	0.9258	8
Sebastes atrovirens	2.2500	2.7124	8
Paralabrax clathratus	0.0000	0.0000	8
Semicossyphus pulcher	1.2500	0.7071	8
Embiotoca jacksoni	1.5000	1.6036	8
Embiotoca lateralis	1.3750	1.5980	8
Damalichthys vacca	0.5000	0.7559	8
Hypsypops rubicundus	0.0000	0.0000	8
Girella nigricans	0.0000	0.0000	8

LOCATION 2 SAN MIGUEL ISLAND - HARE ROCK

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Species	Date (year/month/day)	Mean	Std Dev	Cases
Chromis punctipinnis adult		17.3750	14.5988	8
	920715	25.7500	16.7804	4
	920917	9.0000	5.3541	4
Chromis punctipinnis juvenile		0.2500	0.7071	8
	920715	0.5000	1.0000	4
	920917	0.0000	0.0000	4
Oxyjulis californica adult		0.1250	0.3536	8
	920715	0.2500	0.5000	4
	920917	0.0000	0.0000	4
Oxyjulis californica juvenile		0.0000	0.0000	8
	920715	0.0000	0.0000	4
	920917	0.0000	0.0000	4
Sebastes mystinus adult		10.8750	5.4363	8
	920715	11.5000	6.6081	4
	920917	10.2500	4.9244	4
Sebastes mystinus juvenile		0.0000	0.0000	8
	920715	0.0000	0.0000	4
	920917	0.0000	0.0000	4
Sebastes serranoides adult		1.0000	0.9258	8
	920715	1.5000	1.0000	4
	920917	0.5000	0.5774	4

Sebastes serranoides juvenile		0.0000	0.0000
8			
	920715	0.0000	0.0000
4			
	920917	0.0000	0.0000
4			
Sebastes atrovirens adult		0.8750	0.8345
8			
	920715	0.2500	0.5000
4			
	920917	1.5000	0.5774
4			
Sebastes atrovirens juvenile		1.3750	2.1998
8			
	920715	0.0000	0.0000
4			
	920917	2.7500	2.5000
4			
Paralabrax clathratus adult		0.0000	0.0000
8			
	920715	0.0000	0.0000
4			
	920917	0.0000	0.0000
4			
Paralabrax clathratus juvenile		0.0000	0.0000
8			
	920715	0.0000	0.0000
4			
	920917	0.0000	0.0000
4			

LOCATION 2 SAN MIGUEL ISLAND - HARE ROCK

Semicossyphus pulcher male		0.5000	0.5345
8			
	920715	0.0000	0.0000
4			
	920917	1.0000	0.0000
4			
Semicossyphus pulcher female		0.7500	0.8864
8			
	920715	1.2500	0.9574
4			
	920917	0.2500	0.5000
4			
Embiotoca jacksoni adult		1.5000	1.6036
8			
	920715	0.7500	0.5000
4			
	920917	2.2500	2.0616
4			
Embiotoca jacksoni juvenile		0.0000	0.0000
8			
	920715	0.0000	0.0000
4			
	920917	0.0000	0.0000
4			
Embiotoca lateralis adult		1.3750	1.5980
8			
	920715	2.7500	0.9574
4			
	920917	0.0000	0.0000
4			
Embiotoca lateralis juvenile		0.0000	0.0000
8			
	920715	0.0000	0.0000
4			
	920917	0.0000	0.0000
4			
Damalichthys vacca adult		0.5000	0.7559
8			
	920715	0.5000	1.0000
4			
	920917	0.5000	0.5774
4			
Damalichthys vacca juvenile		0.0000	0.0000
8			
	920715	0.0000	0.0000
4			

	920917	0.0000	0.0000
4			
Hypsypops rubicundus adult		0.0000	0.0000
8			
	920715	0.0000	0.0000
4			
	920917	0.0000	0.0000
4			
Hypsypops rubicundus juvenile		0.0000	0.0000
8			
	920715	0.0000	0.0000
4			
	920917	0.0000	0.0000
4			
Girella nigricans adult		0.0000	0.0000
8			
	920715	0.0000	0.0000
4			
	920917	0.0000	0.0000
4			
Girella nigricans juvenile		0.0000	0.0000
8			
	920715	0.0000	0.0000
4			
	920917	0.0000	0.0000
4			

LOCATION 2 SAN MIGUEL ISLAND - HARE ROCK

1992 NATURAL HABITAT SIZE FREQUENCY DISTRIBUTIONS

Tethya aurantia

(cases) N=	46
< 10	0.0
10 - 19	2.2%
20 - 29	4.3%
30 - 39	13.0%
40 - 49	17.4%
50 - 59	21.7%
60 - 69	19.6%
70 - 79	17.4%
80 - 89	4.3%
90 - 99	0.0
> 99	0.0
min size (mm)	19
max size (mm)	83
mean	55
mode	47

Pycnopodia helianthoides

(cases) N=	40
< 20	0.0
20 - 39	2.5%
40 - 59	7.5%
60 - 79	0.0
80 - 99	10.0%
100 - 119	15.0%
120 - 139	7.5%
140 - 159	2.5%
160 - 179	10.0%
180 - 199	12.5%
200 - 219	15.0%
220 - 239	2.5%
240 - 259	2.5%
260 - 279	7.5%
280 - 299	2.5%
> 299	2.5%
min size (mm)	34
max size (mm)	311
mean	165
mode	116

Kelletia kelletii

(cases) N=	16
< 40	43.8%
40 - 49	25.0%
50 - 59	12.5%
60 - 69	0.0
70 - 79	0.0
80 - 89	0.0
90 - 99	6.3%
100 - 109	6.3%
110 - 119	0.0
120 - 129	6.3%
130 - 139	0.0
140 - 149	0.0
> 149	0.0
min size (mm)	27
max size (mm)	120
mean	53
mode	34

Pisaster giganteus

(cases) N=	68
< 20	1.5%
20 - 39	0.0
40 - 59	16.2%
60 - 79	47.1%
80 - 99	20.6%
100 - 119	11.8%
120 - 139	1.5%
140 - 159	1.5%
160 - 179	0.0
180 - 199	0.0
200 - 219	0.0
220 - 239	0.0
240 - 259	0.0
260 - 279	0.0
280 - 299	0.0
> 299	0.0
min size (mm)	16
max size (mm)	149
mean	76
mode	60

LOCATION 2 SAN MIGUEL ISLAND - HARE ROCK

Strongylocentrotus franciscanus

(cases) N=	195
< 5	0.0
5 - 9	0.0
10 - 14	0.0
15 - 19	2.1%
20 - 24	3.6%
25 - 29	6.2%
30 - 34	1.5%
35 - 39	2.6%
40 - 44	3.1%
45 - 49	6.2%
50 - 54	6.7%
55 - 59	12.8%
60 - 64	16.4%
65 - 69	19.0%
70 - 74	10.8%
75 - 79	6.2%
80 - 84	2.1%
85 - 90	1.0%
90 - 94	0.0
95 - 99	0.0
>100	0.0
min size (mm)	18
max size (mm)	89
mean	57
mode	65

Strongylocentrotus purpuratus

(cases) N=	101
< 5	0.0
5 - 9	1.0%
10 - 14	13.9%
15 - 19	23.8%
20 - 24	22.8%
25 - 29	15.8%
30 - 34	14.9%
35 - 39	4.0%
40 - 44	2.0%
45 - 49	2.0%
50 - 54	0.0
55 - 59	0.0
> 60	0.0
min size (mm)	9
max size (mm)	45
mean	23
mode	22

Haliotis rufescens

(cases) N=	28
< 25	32.1%
25 - 29	3.6%
30 - 34	0.0
35 - 39	3.6%
40 - 44	7.1%
45 - 49	3.6%
50 - 54	0.0
55 - 59	0.0
60 - 64	0.0
65 - 69	0.0
70 - 74	0.0
75 - 79	0.0
80 - 84	0.0
85 - 90	0.0
90 - 94	0.0
95 - 99	0.0
100 - 104	0.0
105 - 109	0.0
110 - 114	0.0
115 - 119	0.0
120 - 124	0.0
125 - 129	0.0
130 - 134	0.0
135 - 139	3.6%
140 - 144	3.6%
145 - 149	0.0
150 - 154	3.6%
155 - 159	0.0
160 - 164	17.9%
165 - 169	7.1%
170 - 174	3.6%
175 - 179	3.6%
180 - 184	0.0
185 - 189	7.1%
190 - 194	0.0
195 - 199	0.0
> 199	0.0
min size (mm)	11
max size (mm)	188
mean	95
mode	17

LOCATION 2 SAN MIGUEL ISLAND - HARE ROCK

Patiria miniata

(cases) N=	103
< 10	1.0%
10 - 19	4.9%
20 - 29	3.9%
30 - 39	11.7%
40 - 49	13.6%
50 - 59	39.8%
60 - 69	21.4%
70 - 79	3.9%
80 - 89	0.0
90 - 99	0.0
> 99	0.0
min size (mm)	6
max size (mm)	77
mean	50
mode	53

Macrocystis pyrifera numbers of stipes

(cases) N=	104
< 3	29.8%
3 - 5	30.8%
6 - 8	19.2%
9 - 11	0.5%
12 - 14	4.8%
15 - 17	0.0
18 - 20	1.9%
21 - 23	1.9%
24 - 26	0.0
27 - 29	0.0
30 - 32	0.0
33 - 35	0.0
36 - 38	0.0
39 - 41	0.0
42 - 44	0.0
>44	0.0
min number	1
max number	23
mean	6
mode	4

Macrocystis pyrifera holdfast diameters

(cases) N=	104
< 6	8.7%
6 - 11	34.6%
12 - 17	35.6%
18 - 23	13.5%
24 - 29	4.8%
30 - 35	1.0%
36 - 41	1.9%
42 - 47	0.0
48 - 53	0.0
54 - 59	0.0
60 - 65	0.0
66 - 71	0.0
72 - 77	0.0
78 - 83	0.0
84 - 89	0.0
>89	0.0
min width (cm)	2
max width (cm)	36
mean	14
mode	10

LOCATION 3 SANTA ROSA ISLAND - JOHNSON'S LEE NORTH

1992 QUADRAT DATA: MEAN NUMBER PER M^2

Species	Mean	Std Dev	Cases
Macrocystis pyrifera adult	1.0000	0.8885	20
Eisenia arborea	0.0000	0.0000	20
Pterygophora californica	0.7250	0.6382	20
Laminaria farlowii	0.1500	0.2856	20
Macrocystis pyrifera juvenile	0.6500	1.2365	20
Macrocystis pyrifera all	1.6500	1.2886	20
Cypraea spadicea	0.3000	0.5231	20
Astraea undosa	0.0250	0.1118	20
Patiria miniata	0.2750	0.4435	20
Pisaster giganteus	0.1250	0.2751	20
Strongylocentrotus franciscanus	0.2000	0.4104	20
Strongylocentrotus purpuratus	0.1750	0.3354	20
Parastichopus parvamensis	0.4750	0.5955	20
Styela montereyensis	1.9250	1.0422	20
Lythrypnus dalli	0.0000	0.0000	20
Coryphopterus nicholsii	0.0000	0.0000	20
Alloclinus holderi	0.0250	0.1118	20

1992 BAND TRANSECT DATA: MEAN NUMBER PER M^2

Tethya aurantia	0.0514	0.0351	12
Allopora californica	0.0000	0.0000	12
Tealia lofotensis	0.0069	0.0111	12
Lophogorgia chilensis	0.0028	0.0065	12
Muricea fruticosa	0.0000	0.0000	12
Muricea californica	0.0000	0.0000	12
Panulirus interruptus	0.0000	0.0000	12
Haliotis rufescens	0.0097	0.0337	12
Haliotis corrugata	0.0000	0.0000	12
Haliotis fulgens	0.0000	0.0000	12
Kelletia kelletii	0.0028	0.0096	12
Megathura crenulata	0.0167	0.0123	12
Hinnites giganteus	0.0056	0.0148	12
Aplysia californica	0.0000	0.0000	12
Pycnopodia helianthoides	0.0500	0.0341	12
Lytechinus anamesus	0.0000	0.0000	12

LOCATION 3 SANTA ROSA ISLAND - JOHNSON'S LEE NORTH

1992 RANDOM POINT CONTACT DATA: MEAN PERCENT COVER

Species	Mean	Std Dev	Cases
Green algae	0.0000	0.0000	25
Miscellaneous brown algae	1.5000	5.5434	25
Desmarestia spp.	0.0000	0.0000	25
Laminaria farlowii	3.1000	5.8754	25
Cystoseira spp.	15.0000	15.1038	25
Macrocystis,Eisenia,Pterygophora	54.6000	29.8318	25
Miscellaneous red algae	41.6000	16.4234	25
Articulated coralline algae	11.7000	7.1705	25
Crustose coralline algae	16.3000	9.2736	25
Gelidium spp.	0.4000	1.5612	25
Gigartina spp.	5.0000	5.5902	25
Miscellaneous plants	0.0000	0.0000	25
Sponges	11.4000	9.6036	25
Corynactis californica	2.5000	4.4488	25
Balanophyllia elegans	4.3000	2.3408	25
Astrangia lajollaensis	0.8000	1.8708	25
Diopatra ornata	0.5000	1.2500	25
Phragmatopoma californica	10.4000	8.4681	25
Serpulorbis squamigerus	0.1000	0.5000	25
Bryozoans	43.1000	16.5404	25
Diaperoecia californica	0.0000	0.0000	25
Tunicates	4.3000	4.5369	25
Miscellaneous invertebrates	14.1000	17.3187	25
Bare substrate	1.7000	2.3629	25
Rock	98.8000	2.6141	25
Cobble	1.2000	2.6141	25
Sand	0.0000	0.0000	25

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Total Fish Abundance	3.1250	4.9953	96
Chromis punctipinnis	16.3750	4.2067	8
Oxyjulis californica	4.7500	4.2678	8
Sebastes mystinus	0.5000	0.5345	8
Sebastes serranoides	0.6250	0.7440	8
Sebastes atrovirens	1.7500	1.1650	8
Paralabrax clathratus	0.0000	0.0000	8
Semicossyphus pulcher	1.7500	1.4880	8
Embiotoca jacksoni	6.5000	4.4401	8
Embiotoca lateralis	2.8750	3.1820	8
Damalichthys vacca	0.7500	0.7071	8
Hypsypops rubicundus	1.2500	1.0351	8
Girella nigricans	0.3750	0.7440	8

LOCATION 3 SANTA ROSA ISLAND - JOHNSON'S LEE NORTH

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Species	Date (year/month/day)	Mean	Std Dev	Cases
Chromis punctipinnis adult		11.8750	6.8752	8
	920718	7.7500	5.9090	4
	920915	16.0000	5.4772	4
Chromis punctipinnis juvenile		4.5000	6.6332	8
	920718	9.0000	6.9761	4
	920915	0.0000	0.0000	4
Oxyjulis californica adult		3.5000	3.5857	8
	920718	0.5000	0.5774	4
	920915	6.5000	2.3805	4
Oxyjulis californica juvenile		1.2500	3.5355	8
	920718	2.5000	5.0000	4
	920915	0.0000	0.0000	4
Sebastes mystinus adult		0.2500	0.4629	8
	920718	0.5000	0.5774	4
	920915	0.0000	0.0000	4
Sebastes mystinus juvenile		0.2500	0.4629	8
	920718	0.2500	0.5000	4
	920915	0.2500	0.5000	4
Sebastes serranoides adult		0.3750	0.5175	8
	920718	0.2500	0.5000	4
	920915	0.5000	0.5774	4

Sebastes serranoides juvenile		0.2500	0.4629
8			
	920718	0.5000	0.5774
4			
	920915	0.0000	0.0000
4			
Sebastes atrovirens adult		1.7500	1.1650
8			
	920718	1.0000	0.0000
4			
	920915	2.5000	1.2910
4			
Sebastes atrovirens juvenile		0.0000	0.0000
8			
	920718	0.0000	0.0000
4			
	920915	0.0000	0.0000
4			
Paralabrax clathratus adult		0.0000	0.0000
8			
	920718	0.0000	0.0000
4			
	920915	0.0000	0.0000
4			
Paralabrax clathratus juvenile		0.0000	0.0000
8			
	920718	0.0000	0.0000
4			
	920915	0.0000	0.0000
4			

LOCATION 3 SANTA ROSA ISLAND - JOHNSON'S LEE NORTH

Semicossyphus pulcher male		0.0000	0.0000
8			
	920718	0.0000	0.0000
4			
	920915	0.0000	0.0000
4			
Semicossyphus pulcher female		1.7500	1.4880
8			
	920718	1.5000	0.5774
4			
	920915	2.0000	2.1602
4			
Embiotoca jacksoni adult		5.0000	3.5051
8			
	920718	2.0000	1.1547
4			
	920915	8.0000	1.8257
4			
Embiotoca jacksoni juvenile		1.5000	1.1952
8			
	920718	0.7500	0.9574
4			
	920915	2.2500	0.9574
4			
Embiotoca lateralis adult		2.7500	3.2404
8			
	920718	0.7500	0.9574
4			
	920915	4.7500	3.5940
4			
Embiotoca lateralis juvenile		0.1250	0.3536
8			
	920718	0.2500	0.5000
4			
	920915	0.0000	0.0000
4			
Damalichthys vacca adult		0.7500	0.7071
8			
	920718	0.7500	0.9574
4			
	920915	0.7500	0.5000
4			
Damalichthys vacca juvenile		0.0000	0.0000
8			
	920718	0.0000	0.0000
4			

	920915	0.0000	0.0000
4			
Hypsypops rubicundus	adult	1.2500	1.0351
8			
	920718	2.0000	0.8165
4			
	920915	0.5000	0.5774
4			
Hypsypops rubicundus	juvenile	0.0000	0.0000
8			
	920718	0.0000	0.0000
4			
	920915	0.0000	0.0000
4			
Girella nigricans	adult	0.3750	0.7440
8			
	920718	0.7500	0.9574
4			
	920915	0.0000	0.0000
4			
Girella nigricans	juvenile	0.0000	0.0000
8			
	920718	0.0000	0.0000
4			
	920915	0.0000	0.0000
4			

LOCATION 3 SANTA ROSA ISLAND - JOHNSON'S LEE NORTH

1992 NATURAL HABITAT SIZE FREQUENCY DISTRIBUTIONS

Tethya aurantia

(cases) N=	38
< 10	0.0
10 - 19	0.0
20 - 29	18.4%
30 - 39	21.1%
40 - 49	21.1%
50 - 59	5.3%
60 - 69	7.9%
70 - 79	5.3%
80 - 89	2.6%
90 - 99	5.3%
> 99	13.2%
min size (mm)	20
max size (mm)	120
mean	55
mode	38

Hinnites giganteus

(cases) N=	16
< 10	0.0
10 - 19	0.0
20 - 29	6.3%
30 - 39	25.0%
40 - 49	18.8%
50 - 59	31.3%
60 - 69	0.0
70 - 79	0.0
80 - 89	0.0
90 - 99	0.0
100 - 109	6.3%
110 - 119	0.0
120 - 129	12.5%
130 - 139	0.0
140 - 149	0.0
> 149	0.0
min size (mm)	29
max size (mm)	123
mean	57
mode	52

Haliotis rufescens

(cases) N=	41
< 25	0.0
25 - 29	0.0
30 - 34	0.0
35 - 39	0.0
40 - 44	0.0
45 - 49	0.0
50 - 54	2.4%
55 - 59	2.4%
60 - 64	0.0
65 - 69	4.9%
70 - 74	2.4%
75 - 79	2.4%
80 - 84	2.4%
85 - 90	0.0
90 - 94	2.4%
95 - 99	2.4%
100 - 104	4.9%
105 - 109	0.0
110 - 114	7.3%
115 - 119	7.3%
120 - 124	12.2%
125 - 129	9.8%
130 - 134	12.2%
135 - 139	2.4%
140 - 144	0.0
145 - 149	0.0
150 - 154	4.9%
155 - 159	4.9%
160 - 164	2.4%
165 - 169	0.0
170 - 174	2.4%
175 - 179	0.0
180 - 184	2.4%
185 - 189	2.4%
190 - 194	2.4%
195 - 199	0.0
> 199	0.0
min size (mm)	50
max size (mm)	190
mean	121
mode	120

LOCATION 3 SANTA ROSA ISLAND - JOHNSON'S LEE NORTH

Strongylocentrotus franciscanus

(cases) N=	84
< 5	0.0
5 - 9	0.0
10 - 14	0.0
15 - 19	1.2%
20 - 24	2.4%
25 - 29	1.2%
30 - 34	1.2%
35 - 39	1.2%
40 - 44	1.2%
45 - 49	1.2%
50 - 54	3.6%
55 - 59	2.4%
60 - 64	2.4%
65 - 69	4.8%
70 - 74	13.1%
75 - 79	8.3%
80 - 84	20.2%
85 - 90	8.3%
90 - 94	13.1%
95 - 99	7.1%
100 - 104	4.8%
105 - 109	2.4%
> 109	0.0
min size (mm)	18
max size (mm)	108
mean	77
mode	80

Strongylocentrotus purpuratus

(cases) N=	19
< 5	0.0
5 - 9	0.0
10 - 14	0.0
15 - 19	0.0
20 - 24	5.3%
25 - 29	10.5%
30 - 34	26.3%
35 - 39	15.8%
40 - 44	5.3%
45 - 49	21.1%
50 - 54	15.8%
55 - 59	0.0
60 - 64	0.0
65 - 69	0.0
70 - 74	0.0
75 - 79	0.0
80 - 84	0.0
85 - 90	0.0
90 - 94	0.0
95 - 99	0.0
100 - 104	0.0
105 - 109	0.0
> 109	0.0
min size (mm)	22
max size (mm)	53
mean	38
mode	29

Patiria miniata

(cases) N=	54
< 10	1.9%
10 - 19	7.4%
20 - 29	3.7%
30 - 39	0.0
40 - 49	3.7%
50 - 59	11.1%
60 - 69	35.2%
70 - 79	22.2%
80 - 89	14.8%
90 - 99	0.0
> 99	0.0
min size (mm)	5
max size (mm)	85
mean	61
mode	60

Pisaster giganteus

(cases) N=	57
< 20	3.5%
20 - 39	1.8%
40 - 59	19.3%
60 - 79	49.1%
80 - 99	17.5%
100 - 119	5.3%
120 - 139	3.5%
140 - 159	0.0
160 - 179	0.0
180 - 199	0.0
200 - 219	0.0
220 - 239	0.0
240 - 259	0.0
260 - 279	0.0
280 - 299	0.0
> 299	0.0
min size (mm)	15
max size (mm)	126
mean	72
mode	76

LOCATION 3 SANTA ROSA ISLAND - JOHNSON'S LEE NORTH

Pycnopodia helianthoides

(cases) N=	35
< 20	0.0
20 - 39	2.9%
40 - 59	5.7%
60 - 79	8.6%
80 - 99	20.0%
100 - 119	17.1%
120 - 139	14.3%
140 - 159	5.7%
160 - 179	11.4%
180 - 199	5.7%
200 - 219	2.9%
220 - 239	2.9%
240 - 259	2.9%
260 - 279	0.0
280 - 299	0.0
> 299	0.0
min size (mm)	27
max size (mm)	252
mean	125
mode	86

Megathura crenulata

(cases) N=	6
< 10	0.0
10 - 19	0.0
20 - 29	0.0
30 - 39	0.0
40 - 49	0.0
50 - 59	0.0
60 - 69	0.0
70 - 79	0.0
80 - 89	16.7%
90 - 99	16.7%
100 - 109	0.0
110 - 119	16.7%
> 119	50.0%
min size (mm)	80
max size (mm)	135
mean	114
mode	80

Macrocystis pyrifera numbers of stipes

(cases) N=	101
< 3	10.9%
3 - 5	21.8%
6 - 8	16.8%
9 - 11	16.8%
12 - 14	13.9%
15 - 17	12.9%
18 - 20	2.0%
21 - 23	2.0%
24 - 26	2.0%
27 - 29	0.0
30 - 32	0.0
33 - 35	0.0
36 - 38	1.0%
39 - 41	0.0
42 - 44	0.0
>44	0.0
min number	1
max number	37
mean	9
mode	5

Macrocystis pyrifera holdfast diameters

(cases) N=	101
< 6	3.0%
6 - 11	6.9%
12 - 17	2.0%
18 - 23	14.9%
24 - 29	11.9%
30 - 35	20.8%
36 - 41	7.9%
42 - 47	14.9%
48 - 53	9.9%
54 - 59	4.0%
60 - 65	4.0%
66 - 71	0.0
72 - 77	0.0
78 - 83	0.0
84 - 89	0.0
>89	0.0
min width (cm)	5
max width (cm)	62
mean	33
mode	30

LOCATION 3 SANTA ROSA ISLAND - JOHNSON'S LEE NORTH

1992 ARTIFICIAL RECRUITMENT MODULE SIZE FREQUENCY DISTRIBUTIONS

Haliotis rufescens FROM 15 ARMs

(cases) N=	31
< 25	3.2%
25 - 29	0.0
30 - 34	0.0
35 - 39	3.2%
40 - 44	0.0
45 - 49	0.0
50 - 54	0.0
55 - 59	3.2%
60 - 64	0.0
65 - 69	0.0
70 - 74	3.2%
75 - 79	0.0
80 - 84	0.0
85 - 90	3.2%
90 - 94	0.0
95 - 99	0.0
100 - 104	0.0
105 - 109	12.9%
110 - 114	6.5%
115 - 119	0.0
120 - 124	9.7%
125 - 129	9.7%
130 - 134	16.1%
135 - 139	9.7%
140 - 144	3.2%
145 - 149	0.0
150 - 154	3.2%
155 - 159	6.5%
160 - 164	3.2%
165 - 169	3.2%
170 - 174	0.0
> 175	0.0
min size (mm)	16
max size (mm)	165
mean	118
mode	125

Cypraea spadicea FROM 10 ARMs

(cases) N=	34
< 30	0.0
30 - 34	0.0
35 - 39	5.9%
40 - 44	20.6%
45 - 49	55.9%
50 - 54	17.6%
55 - 59	0.0
> 59	0.0
min size (mm)	38
max size (mm)	53
mean	46
mode	45

Patiria miniata FROM 15 ARMs

(cases) N=	29
< 10	0.0
10 - 19	3.4%
20 - 29	17.2%
30 - 39	20.7%
40 - 49	13.8%
50 - 59	17.2%
60 - 69	27.6%
70 - 79	0.0
80 - 89	0.0
90 - 99	0.0
> 99	0.0
min size (mm)	13
max size (mm)	68
mean	45
mode	23

LOCATION 3 SANTA ROSA ISLAND - JOHNSON'S LEE NORTH

1992 ARTIFICIAL RECRUITMENT MODULE SIZE FREQUENCY DISTRIBUTIONS

Pisaster giganteus FROM 15 ARMs

(cases) N=	44
< 20	0.0
20 - 39	54.5%
40 - 59	40.9%
60 - 79	4.5%
80 - 99	0.0
> 100	0.0
min size (mm)	21
max size (mm)	71
mean	40
mode	32

Pycnopodia helianthoides FROM 15 ARMs

(cases) N=	33
< 20	0.0
20 - 39	3.0%
40 - 59	21.2%
60 - 79	36.4%
80 - 99	24.2%
100 - 119	9.1%
120 - 139	6.1%
140 - 159	0.0
> 160	0.0
min size (mm)	25
max size (mm)	130
mean	76
mode	56

Strongylocentrotus franciscanus FROM 10 ARMs

(cases) N=	56
< 5	0.0
5 - 9	0.0
10 - 14	0.0
15 - 19	1.8%
20 - 24	1.8%
25 - 29	3.6%
30 - 34	7.1%
35 - 39	3.6%
40 - 44	5.4%
45 - 49	5.4%
50 - 54	8.9%
55 - 59	7.1%
60 - 64	10.7%
65 - 69	17.9%
70 - 74	17.9%
75 - 79	5.4%
80 - 84	1.8%
85 - 90	1.8%
> 90	0.0
min size (mm)	15
max size (mm)	87
mean	57
mode	31

Strongylocentrotus purpuratus FROM 10 ARMs

(cases) N=	2
< 5	0.0
5 - 9	0.0
10 - 14	0.0
15 - 19	0.0
20 - 24	0.0
25 - 29	50.0%
30 - 34	0.0
35 - 39	0.0
40 - 44	0.0
45 - 49	0.0
50 - 54	0.0
55 - 59	0.0
60 - 64	0.0
65 - 69	0.0
70 - 74	50.0%
> 75	0.0
min size (mm)	25
max size (mm)	70
mean	48
mode	25

LOCATION 4 SANTA ROSA ISLAND - JOHNSON'S LEE SOUTH

1992 QUADRAT DATA: MEAN NUMBER PER M^2

Species	Mean	Std Dev	Cases
Macrocystis pyrifera adult	0.7750	0.8656	20
Eisenia arborea	0.0250	0.1118	20
Pterygophora californica	0.3000	0.5231	20
Laminaria farlowii	0.4250	0.4064	20
Macrocystis pyrifera juvenile	0.9000	1.1539	20
Macrocystis pyrifera all	1.6750	1.7341	20
Cypraea spadicea	0.0750	0.2447	20
Astraea undosa	0.0000	0.0000	20
Patiria miniata	2.0000	1.3079	20
Pisaster giganteus	0.0500	0.1539	20
Strongylocentrotus franciscanus	0.2250	0.3796	20
Strongylocentrotus purpuratus	2.0500	3.5685	20
Parastichopus parvamensis	0.1500	0.3663	20
Styela montereyensis	0.5250	0.6973	20
Lythrypnus dalli	0.0000	0.0000	20
Coryphopterus nicholsii	0.1000	0.3479	20
Alloclinus holderi	0.0000	0.0000	20

1992 BAND TRANSECT DATA: MEAN NUMBER PER M^2

Tethya aurantia	0.1278	0.0763	12
Allopora californica	0.0000	0.0000	12
Tealia lofotensis	0.1139	0.0635	12
Lophogorgia chilensis	0.2056	0.1192	12
Muricea fruticosa	0.0028	0.0096	12
Muricea californica	0.0014	0.0048	12
Panulirus interruptus	0.0000	0.0000	12
Haliotis rufescens	0.0139	0.0156	12
Haliotis corrugata	0.0014	0.0048	12
Haliotis fulgens	0.0000	0.0000	12
Kelletia kelletii	0.0083	0.0151	12
Megathura crenulata	0.0083	0.0112	12
Hinnites giganteus	0.0389	0.0391	12
Aplysia californica	0.0000	0.0000	12
Pycnopodia helianthoides	0.1056	0.0570	12
Lytechinus anamesus	0.0000	0.0000	12

LOCATION 4 SANTA ROSA ISLAND - JOHNSON'S LEE SOUTH

1992 RANDOM POINT CONTACT DATA: MEAN PERCENT COVER

Species	Mean	Std Dev	Cases
Green algae	0.0000	0.0000	25
Miscellaneous brown algae	0.0000	0.0000	25
Desmarestia spp.	0.1000	0.5000	25
Laminaria farlowii	6.9000	7.7150	25
Cystoseira spp.	3.1000	4.6926	25
Macrocystis,Eisenia,Pterygophora	36.3000	28.1006	25
Miscellaneous red algae	26.0000	9.3819	25
Articulated coralline algae	11.5000	7.8395	25
Crustose coralline algae	21.4000	9.6577	25
Gelidium spp.	0.1000	0.5000	25
Gigartina spp.	7.4000	8.7643	25
Miscellaneous plants	0.0000	0.0000	25
Sponges	5.4000	5.1881	25
Corynactis californica	2.0000	4.7871	25
Balanophyllia elegans	7.1000	5.2381	25
Astrangia lajollaensis	0.6000	1.4930	25
Diopatra ornata	5.7000	6.1033	25
Phragmatopoma californica	1.6000	3.2178	25
Serpulorbis squamigerus	0.0000	0.0000	25
Bryozoans	23.9000	11.5036	25
Diaperoecia californica	1.0000	2.2822	25
Tunicates	2.3000	3.3789	25
Miscellaneous invertebrates	20.4000	10.0437	25
Bare substrate	12.3000	8.9536	25
Rock	88.0000	12.3744	25
Cobble	1.7000	4.0000	25
Sand	10.3000	11.0472	25

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Total Fish Abundance	2.8194	6.0887	144
Chromis punctipinnis	1.4167	3.4499	12
Oxyjulis californica	19.0833	11.2529	12
Sebastes mystinus	2.6667	2.4246	12
Sebastes serranoides	0.7500	1.0553	12
Sebastes atrovirens	2.0833	1.2401	12
Paralabrax clathratus	0.0000	0.0000	12
Semicossyphus pulcher	1.2500	1.0553	12
Embiotoca jacksoni	2.7500	1.8647	12
Embiotoca lateralis	2.6667	1.3707	12
Damalichthys vacca	0.7500	0.9653	12
Hypsypops rubicundus	0.0000	0.0000	12
Girella nigricans	0.4167	0.6686	12

LOCATION 4 SANTA ROSA ISLAND - JOHNSON'S LEE SOUTH

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Species	Date (year/month/day)	Mean	Std Dev	Cases
Chromis punctipinnis adult		0.4167	0.6686	12
	920729	0.1250	0.3536	8
	920915	1.0000	0.8165	4
Chromis punctipinnis juvenile		1.0000	2.8920	12
	920729	0.0000	0.0000	8
	920915	3.0000	4.7610	4
Oxyjulis californica adult		2.4167	1.5050	12
	920729	1.6250	0.7440	8
	920915	4.0000	1.4142	4
Oxyjulis californica juvenile		16.6667	11.6098	12
	920729	17.1250	10.4940	8
	920915	15.7500	15.3487	4
Sebastes mystinus adult		2.6667	2.4246	12
	920729	3.0000	2.6186	8
	920915	2.0000	2.1602	4
Sebastes mystinus juvenile		0.0000	0.0000	12
	920729	0.0000	0.0000	8
	920915	0.0000	0.0000	4
Sebastes serranoides adult		0.7500	1.0553	12
	920729	1.1250	1.1260	8
	920915	0.0000	0.0000	4

Sebastes serranoides juvenile		0.0000	0.0000
12			
	920729	0.0000	0.0000
8			
	920915	0.0000	0.0000
4			
Sebastes atrovirens adult		2.0833	1.2401
12			
	920729	2.2500	1.2817
8			
	920915	1.7500	1.2583
4			
Sebastes atrovirens juvenile		0.0000	0.0000
12			
	920729	0.0000	0.0000
8			
	920915	0.0000	0.0000
4			
Paralabrax clathratus adult		0.0000	0.0000
12			
	920729	0.0000	0.0000
8			
	920915	0.0000	0.0000
4			
Paralabrax clathratus juvenile		0.0000	0.0000
12			
	920729	0.0000	0.0000
8			
	920915	0.0000	0.0000
4			

LOCATION 4 SANTA ROSA ISLAND - JOHNSON'S LEE SOUTH

Semicossyphus pulcher male		0.0000	0.0000
12			
	920729	0.0000	0.0000
8			
	920915	0.0000	0.0000
4			
Semicossyphus pulcher female		1.2500	1.0553
12			
	920729	0.7500	0.8864
8			
	920915	2.2500	0.5000
4			
Embiotoca jacksoni adult		2.6667	1.9695
12			
	920729	2.6250	2.2638
8			
	920915	2.7500	1.5000
4			
Embiotoca jacksoni juvenile		0.0833	0.2887
12			
	920729	0.1250	0.3536
8			
	920915	0.0000	0.0000
4			
Embiotoca lateralis adult		2.4167	1.1645
12			
	920729	2.3750	0.9161
8			
	920915	2.5000	1.7321
4			
Embiotoca lateralis juvenile		0.2500	0.4523
12			
	920729	0.0000	0.0000
8			
	920915	0.7500	0.5000
4			
Damalichthys vacca adult		0.6667	0.9847
12			
	920729	1.0000	1.0690
8			
	920915	0.0000	0.0000
4			
Damalichthys vacca juvenile		0.0833	0.2887
12			
	920729	0.0000	0.0000
8			

	920915	0.2500	0.5000
4			
Hypsypops rubicundus adult		0.0000	0.0000
12			
	920729	0.0000	0.0000
8			
	920915	0.0000	0.0000
4			
Hypsypops rubicundus juvenile		0.0000	0.0000
12			
	920729	0.0000	0.0000
8			
	920915	0.0000	0.0000
4			
Girella nigricans adult		0.4167	0.6686
12			
	920729	0.2500	0.4629
8			
	920915	0.7500	0.9574
4			
Girella nigricans juvenile		0.0000	0.0000
12			
	920729	0.0000	0.0000
8			
	920915	0.0000	0.0000
4			

LOCATION 4 SANTA ROSA ISLAND - JOHNSON'S LEE SOUTH

1992 NATURAL HABITAT SIZE FREQUENCY DISTRIBUTIONS

Tethya aurantia

(cases) N=	70
< 10	0.0
10 - 19	1.4%
20 - 29	5.7%
30 - 39	15.7%
40 - 49	4.3%
50 - 59	11.4%
60 - 69	14.3%
70 - 79	10.0%
80 - 89	18.6%
90 - 99	8.6%
> 99	10.0%
min size (mm)	19
max size (mm)	133
mean	68
mode	36

Hinnites giganteus

(cases) N=	29
< 10	0.0
10 - 19	0.0
20 - 29	3.4%
30 - 39	6.9%
40 - 49	6.9%
50 - 59	31.0%
60 - 69	17.2%
70 - 79	13.8%
80 - 89	0.0
90 - 99	17.2%
100 - 109	0.0
110 - 119	3.4%
120 - 129	0.0
130 - 139	0.0
140 - 149	0.0
> 149	0.0
min size (mm)	21
max size (mm)	118
mean	65
mode	52

Haliotis rufescens

(cases) N=	29
< 25	0.0
25 - 29	0.0
30 - 34	0.0
35 - 39	0.0
40 - 44	3.4%
45 - 49	0.0
50 - 54	0.0
55 - 59	0.0
60 - 64	0.0
65 - 69	0.0
70 - 74	3.4%
75 - 79	6.9%
80 - 84	0.0
85 - 90	3.4%
90 - 94	3.4%
95 - 99	0.0
100 - 104	3.4%
105 - 109	6.9%
110 - 114	0.0
115 - 119	3.4%
120 - 124	3.4%
125 - 129	0.0
130 - 134	0.0
135 - 139	3.4%
140 - 144	6.9%
145 - 149	3.4%
150 - 154	0.0
155 - 159	6.9%
160 - 164	6.9%
165 - 169	10.3%
170 - 174	3.4%
175 - 179	6.9%
180 - 184	0.0
185 - 189	0.0
190 - 194	0.0
195 - 199	6.9%
> 199	6.9%
min size (mm)	41
max size (mm)	203
mean	139
mode	167

LOCATION 4 SANTA ROSA ISLAND - JOHNSON'S LEE SOUTH

Strongylocentrotus franciscanus

(cases) N=	64
< 5	0.0
5 - 9	0.0
10 - 14	3.1%
15 - 19	4.7%
20 - 24	12.5%
25 - 29	6.3%
30 - 34	9.4%
35 - 39	4.7%
40 - 44	1.6%
45 - 49	1.6%
50 - 54	1.6%
55 - 59	0.0
60 - 64	1.6%
65 - 69	1.6%
70 - 74	9.4%
75 - 79	6.3%
80 - 84	3.1%
85 - 90	12.5%
90 - 94	6.3%
95 - 99	1.6%
100 - 104	6.3%
105 - 109	1.6%
> 109	3.1%
min size (mm)	11
max size (mm)	128
mean	60
mode	32

Strongylocentrotus purpuratus

(cases) N=	111
< 5	0.0
5 - 9	1.8%
10 - 14	2.7%
15 - 19	4.5%
20 - 24	12.6%
25 - 29	9.0%
30 - 34	9.0%
35 - 39	11.7%
40 - 44	15.3%
45 - 49	7.2%
50 - 54	12.6%
55 - 59	6.3%
60 - 64	1.8%
65 - 69	3.6%
70 - 74	1.8%
75 - 79	0.0
80 - 84	0.0
85 - 90	0.0
90 - 94	0.0
95 - 99	0.0
100 - 104	0.0
105 - 109	0.0
> 109	0.0
min size (mm)	8
max size (mm)	70
mean	38
mode	32

Patiria miniata

(cases) N=	54
< 10	0.0
10 - 19	0.0
20 - 29	1.9%
30 - 39	5.6%
40 - 49	9.3%
50 - 59	9.3%
60 - 69	18.5%
70 - 79	29.6%
80 - 89	20.4%
90 - 99	3.7%
> 99	1.9%
min size (mm)	23
max size (mm)	105
mean	68
mode	68

Pisaster giganteus

(cases) N=	21
< 20	0.0
20 - 39	4.8%
40 - 59	9.5%
60 - 79	52.4%
80 - 99	14.3%
100 - 119	4.8%
120 - 139	4.8%
140 - 159	0.0
160 - 179	4.8%
180 - 199	4.8%
200 - 219	0.0
220 - 239	0.0
240 - 259	0.0
260 - 279	0.0
280 - 299	0.0
> 299	0.0
min size (mm)	38
max size (mm)	185
mean	84
mode	65

LOCATION 4 SANTA ROSA ISLAND - JOHNSON'S LEE SOUTH

Pycnopodia helianthoides

(cases) N=	41
< 20	0.0
20 - 39	0.0
40 - 59	0.0
60 - 79	4.9%
80 - 99	2.4%
100 - 119	19.5%
120 - 139	7.3%
140 - 159	19.5%
160 - 179	19.5%
180 - 199	17.1%
200 - 219	4.9%
220 - 239	2.4%
240 - 259	2.4%
260 - 279	0.0
280 - 299	0.0
> 299	0.0
min size (mm)	70
max size (mm)	250
mean	152
mode	105

Macrocystis pyrifera numbers of stipes

(cases) N=	81
< 3	7.4%
3 - 5	11.1%
6 - 8	16.0%
9 - 11	24.7%
12 - 14	19.8%
15 - 17	13.6%
18 - 20	3.7%
21 - 23	2.5%
24 - 26	1.2%
27 - 29	0.0
30 - 32	0.0
33 - 35	0.0
36 - 38	0.0
39 - 41	0.0
42 - 44	0.0
>44	0.0
min number	1
max number	24
mean	10
mode	11

Macrocystis pyrifera holdfast diameters

(cases) N=	81
< 6	1.2%
6 - 11	14.8%
12 - 17	27.2%
18 - 23	14.8%
24 - 29	18.5%
30 - 35	13.6%
36 - 41	6.2%
42 - 47	1.2%
48 - 53	1.2%
54 - 59	1.2%
60 - 65	0.0
66 - 71	0.0
72 - 77	0.0
78 - 83	0.0
84 - 89	0.0
>89	0.0
min width (cm)	5
max width (cm)	56
mean	22
mode	14

LOCATION 5 SANTA ROSA ISLAND - RODES REEF

1992 QUADRAT DATA: MEAN NUMBER PER M^2

Species	Mean	Std Dev	Cases
Macrocystis pyrifera adult	0.2000	0.2991	20
Eisenia arborea	0.0000	0.0000	20
Pterygophora californica	0.0000	0.0000	20
Laminaria farlowii	0.0000	0.0000	20
Macrocystis pyrifera juvenile	0.1750	0.4064	20
Macrocystis pyrifera all	0.3750	0.4253	20
Cypraea spadicea	0.0000	0.0000	20
Astraea undosa	0.0000	0.0000	20
Patiria miniata	2.3750	1.3943	20
Pisaster giganteus	0.4250	0.8472	20
Strongylocentrotus franciscanus	3.1000	6.2209	20
Strongylocentrotus purpuratus	0.7750	1.8530	20
Parastichopus parvamensis	0.0000	0.0000	20
Styela montereyensis	0.7250	0.6973	20
Lythrypnus dalli	0.0000	0.0000	20
Coryphopterus nicholsii	0.1250	0.2221	20
Alloclinus holderi	0.0000	0.0000	20

1992 BAND TRANSECT DATA: MEAN NUMBER PER M^2

Tethya aurantia	0.1417	0.0723	12
Allopora californica	0.0000	0.0000	12
Tealia lofotensis	0.0639	0.0627	12
Lophogorgia chilensis	0.0000	0.0000	12
Muricea fruticosa	0.0014	0.0048	12
Muricea californica	0.0000	0.0000	12
Panulirus interruptus	0.0000	0.0000	12
Haliotis rufescens	0.0000	0.0000	12
Haliotis corrugata	0.0000	0.0000	12
Haliotis fulgens	0.0000	0.0000	12
Kelletia kelletii	0.0111	0.0148	12
Megathura crenulata	0.0236	0.0329	12
Hinnites giganteus	0.0014	0.0048	12
Aplysia californica	0.0028	0.0096	12
Pycnopodia helianthoides	0.0278	0.0278	12
Lytechinus anamesus	0.0000	0.0000	12

LOCATION 5 SANTA ROSA ISLAND - RODES REEF

1992 RANDOM POINT CONTACT DATA: MEAN PERCENT COVER

Species	Mean	Std Dev	Cases
Green algae	0.0000	0.0000	25
Miscellaneous brown algae	0.0000	0.0000	25
Desmarestia spp.	0.0000	0.0000	25
Laminaria farlowii	0.3000	1.0992	25
Cystoseira spp.	0.2000	1.0000	25
Macrocystis,Eisenia,Pterygophora	8.0000	11.7260	25
Miscellaneous red algae	41.9000	22.5495	25
Articulated coralline algae	2.3000	2.7876	25
Crustose coralline algae	26.4000	10.0799	25
Gelidium spp.	0.6000	1.6583	25
Gigartina spp.	1.5000	2.3936	25
Miscellaneous plants	0.0000	0.0000	25
Sponges	1.7000	2.1311	25
Corynactis californica	0.6000	1.4930	25
Balanophyllia elegans	5.2000	3.8810	25
Astrangia lajollaensis	6.2000	8.9884	25
Diopatra ornata	10.3000	11.0236	25
Phragmatopoma californica	1.1000	2.8940	25
Serpulorbis squamigerus	0.0000	0.0000	25
Bryozoans	14.1000	10.9659	25
Diaperoecia californica	0.3000	0.8292	25
Tunicates	1.7000	1.8708	25
Miscellaneous invertebrates	12.2000	8.6398	25
Bare substrate	4.0000	4.2696	25
Rock	80.3000	16.1426	25
Cobble	10.8000	9.3184	25
Sand	8.9000	10.5840	25

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Total Fish Abundance	1.3889	5.0799	144
Chromis punctipinnis	8.0833	15.9057	12
Oxyjulis californica	0.0000	0.0000	12
Sebastes mystinus	2.2500	3.4411	12
Sebastes serranoides	0.8333	1.0299	12
Sebastes atrovirens	0.8333	1.2673	12
Paralabrax clathratus	0.5833	0.9962	12
Semicossyphus pulcher	2.8333	0.8348	12
Embiotoca jacksoni	0.5000	1.1677	12
Embiotoca lateralis	0.7500	1.3568	12
Damalichthys vacca	0.0000	0.0000	12
Hypsypops rubicundus	0.0000	0.0000	12
Girella nigricans	0.0000	0.0000	12

LOCATION 5 SANTA ROSA ISLAND - RODES REEF

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Species	Date (year/month/day)	Mean	Std Dev	Cases
Chromis punctipinnis	adult	8.0833	15.9057	12
	920714	24.0000	20.5102	4
	921022	0.1250	0.3536	8
Chromis punctipinnis	juvenile	0.0000	0.0000	12
	920714	0.0000	0.0000	4
	921022	0.0000	0.0000	8
Oxyjulis californica	adult	0.0000	0.0000	12
	920714	0.0000	0.0000	4
	921022	0.0000	0.0000	8
Oxyjulis californica	juvenile	0.0000	0.0000	12
	920714	0.0000	0.0000	4
	921022	0.0000	0.0000	8
Sebastes mystinus	adult	2.2500	3.4411	12
	920714	6.2500	3.3040	4
	921022	0.2500	0.4629	8
Sebastes mystinus	juvenile	0.0000	0.0000	12
	920714	0.0000	0.0000	4
	921022	0.0000	0.0000	8
Sebastes serranoides	adult	0.7500	0.8660	12
	920714	1.2500	0.9574	4
	921022	0.5000	0.7559	8

Sebastes serranoides juvenile		0.0833	0.2887
12			
	920714	0.2500	0.5000
4			
	921022	0.0000	0.0000
8			
Sebastes atrovirens adult		0.8333	1.2673
12			
	920714	2.5000	0.5774
4			
	921022	0.0000	0.0000
8			
Sebastes atrovirens juvenile		0.0000	0.0000
12			
	920714	0.0000	0.0000
4			
	921022	0.0000	0.0000
8			
Paralabrax clathratus adult		0.5833	0.9962
12			
	920714	1.7500	0.9574
4			
	921022	0.0000	0.0000
8			
Paralabrax clathratus juvenile		0.0000	0.0000
12			
	920714	0.0000	0.0000
4			
	921022	0.0000	0.0000
8			

LOCATION 5 SANTA ROSA ISLAND - RODES REEF

Semicossyphus pulcher male		0.3333	0.8876
12			
	920714	1.0000	1.4142
4			
	921022	0.0000	0.0000
8			
Semicossyphus pulcher female		2.5000	0.9045
12			
	920714	2.0000	0.8165
4			
	921022	2.7500	0.8864
8			
Embiotoca jacksoni adult		0.5000	1.1677
12			
	920714	1.0000	2.0000
4			
	921022	0.2500	0.4629
8			
Embiotoca jacksoni juvenile		0.0000	0.0000
12			
	920714	0.0000	0.0000
4			
	921022	0.0000	0.0000
8			
Embiotoca lateralis adult		0.7500	1.3568
12			
	920714	2.2500	1.5000
4			
	921022	0.0000	0.0000
8			
Embiotoca lateralis juvenile		0.0000	0.0000
12			
	920714	0.0000	0.0000
4			
	921022	0.0000	0.0000
8			
Damalichthys vacca adult		0.0000	0.0000
12			
	920714	0.0000	0.0000
4			
	921022	0.0000	0.0000
8			
Damalichthys vacca juvenile		0.0000	0.0000
12			
	920714	0.0000	0.0000
4			

	921022	0.0000	0.0000
8			
Hypsypops rubicundus adult		0.0000	0.0000
12			
	920714	0.0000	0.0000
4			
	921022	0.0000	0.0000
8			
Hypsypops rubicundus juvenile		0.0000	0.0000
12			
	920714	0.0000	0.0000
4			
	921022	0.0000	0.0000
8			
Girella nigricans adult		0.0000	0.0000
12			
	920714	0.0000	0.0000
4			
	921022	0.0000	0.0000
8			
Girella nigricans juvenile		0.0000	0.0000
12			
	920714	0.0000	0.0000
4			
	921022	0.0000	0.0000
8			

LOCATION 5 SANTA ROSA ISLAND - RODES REEF

1992 NATURAL HABITAT SIZE FREQUENCY DISTRIBUTIONS

Tethya aurantia

(cases) N=	58
< 10	1.7%
10 - 19	3.4%
20 - 29	1.7%
30 - 39	8.6%
40 - 49	8.6%
50 - 59	13.8%
60 - 69	19.0%
70 - 79	17.2%
80 - 89	15.5%
90 - 99	6.9%
> 99	3.4%
min size (mm)	7
max size (mm)	123
mean	64
mode	60

Patiria miniata

(cases) N=	100
< 10	0.0
10 - 19	0.0
20 - 29	3.0%
30 - 39	9.0%
40 - 49	20.0%
50 - 59	21.0%
60 - 69	35.0%
70 - 79	8.0%
80 - 89	4.0%
90 - 99	0.0
> 99	0.0
min size (mm)	22
max size (mm)	85
mean	56
mode	64

Pisaster giganteus

(cases) N=	65
< 20	0.0
20 - 39	3.1%
40 - 59	35.4%
60 - 79	33.8%
80 - 99	13.8%
100 - 119	12.3%
120 - 139	1.5%
140 - 159	0.0
160 - 179	0.0
180 - 199	0.0
200 - 219	0.0
220 - 239	0.0
240 - 259	0.0
260 - 279	0.0
280 - 299	0.0
> 299	0.0
min size (mm)	36
max size (mm)	126
mean	70
mode	50

Strongylocentrotus franciscanus

(cases) N=	174
< 5	0.0
5 - 9	0.0
10 - 14	3.4%
15 - 19	9.2%
20 - 24	8.0%
25 - 29	1.1%
30 - 34	1.1%
35 - 39	2.9%
40 - 44	1.7%
45 - 49	2.3%
50 - 54	3.4%
55 - 59	5.2%
60 - 64	5.2%
65 - 69	5.2%
70 - 74	6.3%
75 - 79	10.9%
80 - 84	10.9%
85 - 90	8.6%
90 - 94	7.5%
95 - 99	3.4%
100 - 104	0.6%
105 - 109	1.7%
> 109	1.1%
min size (mm)	11
max size (mm)	122
mean	62
mode	19

LOCATION 5 SANTA ROSA ISLAND - RODES REEF

Strongylocentrotus purpuratus

(cases) N=	173
< 5	0.0
5 - 9	0.6%
10 - 14	2.3%
15 - 19	4.6%
20 - 24	4.0%
25 - 29	5.2%
30 - 34	8.7%
35 - 39	10.4%
40 - 44	19.1%
45 - 49	18.5%
50 - 54	17.3%
55 - 59	7.5%
60 - 64	1.7%
65 - 69	0.0
70 - 74	0.0
75 - 79	0.0
80 - 84	0.0
85 - 90	0.0
90 - 94	0.0
95 - 99	0.0
100 - 104	0.0
105 - 109	0.0
> 109	0.0
min size (mm)	8
max size (mm)	63
mean	41
mode	51

Macrocystis pyrifera numbers of stipes

(cases) N=	81
< 3	12.3%
3 - 5	8.6%
6 - 8	3.7%
9 - 11	2.5%
12 - 14	3.7%
15 - 17	4.9%
18 - 20	4.9%
21 - 23	9.9%
24 - 26	11.1%
27 - 29	11.1%
30 - 32	4.9%
33 - 35	4.9%
36 - 38	7.4%
39 - 41	4.9%
42 - 44	2.5%
>44	2.5%
min number	1
max number	53
mean	22
mode	26

Macrocystis pyrifera holdfast diameters

(cases) N=	81
< 6	9.9%
6 - 11	17.3%
12 - 17	23.5%
18 - 23	3.7%
24 - 29	3.7%
30 - 35	8.6%
36 - 41	8.6%
42 - 47	7.4%
48 - 53	7.4%
54 - 59	4.9%
60 - 65	4.9%
66 - 71	0.0
72 - 77	0.0
78 - 83	0.0
84 - 89	0.0
>89	0.0
min width (cm)	1
max width (cm)	65
mean	26
mode	1

LOCATION 6 SANTA CRUZ ISLAND - GULL ISLAND SOUTH

1992 QUADRAT DATA: MEAN NUMBER PER M^2

Species	Mean	Std Dev	Cases
Macrocystis pyrifera adult	0.2000	0.2513	20
Eisenia arborea	0.1000	0.3078	20
Pterygophora californica	0.0250	0.1118	20
Laminaria farlowii	0.0000	0.0000	20
Macrocystis pyrifera juvenile	0.0250	0.1118	20
Macrocystis pyrifera all	0.2250	0.2552	20
Cypraea spadicea	0.5500	0.6048	20
Astraea undosa	0.0000	0.0000	20
Patiria miniata	2.2750	1.8171	20
Pisaster giganteus	0.2250	0.4723	20
Strongylocentrotus franciscanus	1.6000	1.8396	20
Strongylocentrotus purpuratus	12.0000	9.2110	20
Parastichopus parvamensis	0.7750	0.6382	20
Styela montereyensis	0.0000	0.0000	20
Lythrypnus dalli	0.0000	0.0000	20
Coryphopterus nicholsii	0.5000	0.8429	20
Alloclinus holderi	0.1250	0.2751	20

1992 BAND TRANSECT DATA: MEAN NUMBER PER M^2

Tethya aurantia	0.0167	0.0201	12
Allopora californica	0.0625	0.0628	12
Tealia lofotensis	0.0000	0.0000	12
Lophogorgia chilensis	0.0806	0.0741	12
Muricea fruticosa	0.0194	0.0308	12
Muricea californica	0.0000	0.0000	12
Panulirus interruptus	0.0000	0.0000	12
Haliotis rufescens	0.0000	0.0000	12
Haliotis corrugata	0.0000	0.0000	12
Haliotis fulgens	0.0000	0.0000	12
Kelletia kelletii	0.0319	0.0305	12
Megathura crenulata	0.0528	0.0395	12
Hinnites giganteus	0.0347	0.0379	12
Aplysia californica	0.0000	0.0000	12
Pycnopodia helianthoides	0.0194	0.0199	12
Lytechinus anamesus	0.0722	0.1184	12

LOCATION 6 SANTA CRUZ ISLAND - GULL ISLAND SOUTH

1992 RANDOM POINT CONTACT DATA: MEAN PERCENT COVER

Species	Mean	Std Dev	Cases
Green algae	0.2000	0.6922	25
Miscellaneous brown algae	0.1000	0.5000	25
Desmarestia spp.	0.0000	0.0000	25
Laminaria farlowii	0.0000	0.0000	25
Cystoseira spp.	1.1000	2.1747	25
Macrocystis,Eisenia,Pterygophora	9.6000	13.4761	25
Miscellaneous red algae	13.9000	10.8032	25
Articulated coralline algae	2.9000	4.3708	25
Crustose coralline algae	52.7000	15.7275	25
Gelidium spp.	0.0000	0.0000	25
Gigartina spp.	0.0000	0.0000	25
Miscellaneous plants	0.0000	0.0000	25
Sponges	2.1000	2.6693	25
Corynactis californica	2.7000	3.5296	25
Balanophyllia elegans	4.0000	4.2696	25
Astrangia lajollaensis	4.4000	4.2254	25
Diopatra ornata	2.4000	8.2437	25
Phragmatopoma californica	0.0000	0.0000	25
Serpulorbis squamigerus	0.0000	0.0000	25
Bryozoans	14.6000	9.0335	25
Diaperoecia californica	2.9000	2.9475	25
Tunicates	0.5000	1.2500	25
Miscellaneous invertebrates	23.5000	8.0039	25
Bare substrate	2.5000	3.6084	25
Rock	95.0000	10.1036	25
Cobble	1.3000	1.7854	25
Sand	3.7000	9.8721	25

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Total Fish Abundance	8.1319	27.7593	144
Chromis punctipinnis	79.7500	60.6782	12
Oxyjulis californica	1.1667	1.0299	12
Sebastes mystinus	1.1667	1.1146	12
Sebastes serranoides	0.0833	0.2887	12
Sebastes atrovirens	11.7500	9.7991	12
Paralabrax clathratus	0.0833	0.2887	12
Semicossyphus pulcher	2.5833	1.5643	12
Embiotoca jacksoni	0.5000	0.6742	12
Embiotoca lateralis	0.0000	0.0000	12
Damalichthys vacca	0.2500	0.4523	12
Hypsypops rubicundus	0.0833	0.2887	12
Girella nigricans	0.1667	0.3892	12

LOCATION 6 SANTA CRUZ ISLAND - GULL ISLAND SOUTH

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Species	Date (year/month/day)	Mean	Std Dev	Cases
Chromis punctipinnis	adult	8.1667	8.1891	12
	920818	16.7500	3.8622	4
	921022	3.8750	5.9866	8
Chromis punctipinnis	juvenile	71.5833	66.1506	12
	920818	0.7500	1.5000	4
	921022	107.0000	50.7431	8
Oxyjulis californica	adult	1.0000	0.8528	12
	920818	1.2500	1.2583	4
	921022	0.8750	0.6409	8
Oxyjulis californica	juvenile	0.1667	0.5774	12
	920818	0.0000	0.0000	4
	921022	0.2500	0.7071	8
Sebastes mystinus	adult	1.0000	1.0445	12
	920818	0.2500	0.5000	4
	921022	1.3750	1.0607	8
Sebastes mystinus	juvenile	0.1667	0.3892	12
	920818	0.0000	0.0000	4
	921022	0.2500	0.4629	8
Sebastes serranoides	adult	0.0833	0.2887	12
	920818	0.0000	0.0000	4
	921022	0.1250	0.3536	8

Sebastes serranoides juvenile		0.0000	0.0000
12			
	920818	0.0000	0.0000
4			
	921022	0.0000	0.0000
8			
Sebastes atrovirens adult		2.8333	1.8990
12			
	920818	2.7500	2.0616
4			
	921022	2.8750	1.9594
8			
Sebastes atrovirens juvenile		8.9167	9.5770
12			
	920818	0.7500	0.5000
4			
	921022	13.0000	9.3197
8			
Paralabrax clathratus adult		0.0833	0.2887
12			
	920818	0.0000	0.0000
4			
	921022	0.1250	0.3536
8			
Paralabrax clathratus juvenile		0.0000	0.0000
12			
	920818	0.0000	0.0000
4			
	921022	0.0000	0.0000
8			

LOCATION 6 SANTA CRUZ ISLAND - GULL ISLAND SOUTH

Semicossyphus pulcher male		0.2500	0.4523
12			
	920818	0.2500	0.5000
4			
	921022	0.2500	0.4629
8			
Semicossyphus pulcher female		2.3333	1.3027
12			
	920818	2.2500	2.2174
4			
	921022	2.3750	0.7440
8			
Embiotoca jacksoni adult		0.5000	0.6742
12			
	920818	1.0000	0.8165
4			
	921022	0.2500	0.4629
8			
Embiotoca jacksoni juvenile		0.0000	0.0000
12			
	920818	0.0000	0.0000
4			
	921022	0.0000	0.0000
8			
Embiotoca lateralis adult		0.0000	0.0000
12			
	920818	0.0000	0.0000
4			
	921022	0.0000	0.0000
8			
Embiotoca lateralis juvenile		0.0000	0.0000
12			
	920818	0.0000	0.0000
4			
	921022	0.0000	0.0000
8			
Damalichthys vacca adult		0.2500	0.4523
12			
	920818	0.5000	0.5774
4			
	921022	0.1250	0.3536
8			
Damalichthys vacca juvenile		0.0000	0.0000
12			
	920818	0.0000	0.0000
4			

	921022	0.0000	0.0000
8			
Hypsypops rubicundus adult		0.0833	0.2887
12			
	920818	0.0000	0.0000
4			
	921022	0.1250	0.3536
8			
Hypsypops rubicundus juvenile		0.0000	0.0000
12			
	920818	0.0000	0.0000
4			
	921022	0.0000	0.0000
8			
Girella nigricans adult		0.1667	0.3892
12			
	920818	0.0000	0.0000
4			
	921022	0.2500	0.4629
8			
Girella nigricans juvenile		0.0000	0.0000
12			
	920818	0.0000	0.0000
4			
	921022	0.0000	0.0000
8			

LOCATION 6 SANTA CRUZ ISLAND - GULL ISLAND SOUTH

1992 NATURAL HABITAT SIZE FREQUENCY DISTRIBUTIONS

Kelletia kelletii

(cases) N=	25
< 40	0.0
40 - 49	0.0
50 - 59	0.0
60 - 69	0.0
70 - 79	0.0
80 - 89	16.0%
90 - 99	32.0%
100 - 109	44.0%
110 - 119	8.0%
120 - 129	0.0
130 - 139	0.0
140 - 149	0.0
> 149	0.0
min size (mm)	86
max size (mm)	112
mean	99
mode	102

Megathura crenulata

(cases) N=	32
< 10	0.0
10 - 19	0.0
20 - 29	0.0
30 - 39	3.1%
40 - 49	0.0
50 - 59	6.3%
60 - 69	65.6%
70 - 79	25.0%
80 - 89	0.0
90 - 99	0.0
100 - 109	0.0
110 - 119	0.0
> 119	0.0
min size (mm)	31
max size (mm)	73
mean	66
mode	65

Hinnites giganteus

(cases) N=	22
< 10	0.0
10 - 19	0.0
20 - 29	4.5%
30 - 39	22.7%
40 - 49	27.3%
50 - 59	4.5%
60 - 69	13.6%
70 - 79	0.0
80 - 89	0.0
90 - 99	4.5%
100 - 109	9.1%
110 - 119	4.5%
120 - 129	4.5%
130 - 139	4.5%
140 - 149	0.0
> 149	0.0
min size (mm)	26
max size (mm)	137
mean	63
mode	30

Patiria miniata

(cases) N=	60
< 10	0.0
10 - 19	0.0
20 - 29	5.0%
30 - 39	10.0%
40 - 49	16.7%
50 - 59	28.3%
60 - 69	26.7%
70 - 79	13.3%
80 - 89	0.0
90 - 99	0.0
> 99	0.0
min size (mm)	23
max size (mm)	79
mean	54
mode	52

LOCATION 6 SANTA CRUZ ISLAND - GULL ISLAND SOUTH

Pisaster giganteus

(cases) N=	91
< 20	0.0
20 - 39	0.0
40 - 59	14.3%
60 - 79	49.5%
80 - 99	29.7%
100 - 119	4.4%
120 - 139	1.1%
140 - 159	0.0
160 - 179	1.1%
180 - 199	0.0
200 - 219	0.0
220 - 239	0.0
240 - 259	0.0
260 - 279	0.0
280 - 299	0.0
> 299	0.0
min size (mm)	47
max size (mm)	171
mean	76
mode	81

Pycnopodia helianthoides

(cases) N=	11
< 20	0.0
20 - 39	0.0
40 - 59	0.0
60 - 79	0.0
80 - 99	0.0
100 - 119	0.0
120 - 139	0.0
140 - 159	0.0
160 - 179	9.1%
180 - 199	18.2%
200 - 219	18.2%
220 - 239	18.2%
240 - 259	0.0
260 - 279	9.1%
280 - 299	18.2%
> 299	9.1%
min size (mm)	168
max size (mm)	310
mean	233
mode	168

Lytechinus anamesus

(cases) N=	133
< 5	0.0
5 - 9	2.3%
10 - 14	31.6%
15 - 19	45.1%
20 - 24	19.5%
25 - 29	1.5%
30 - 34	0.0
35 - 39	0.0
40 - 44	0.0
45 - 49	0.0
> 49	0.0
min size (mm)	5
max size (mm)	26
mean	16
mode	15

Strongylocentrotus franciscanus

(cases) N=	173
< 5	0.0
5 - 9	0.0
10 - 14	1.7%
15 - 19	5.2%
20 - 24	14.5%
25 - 29	11.6%
30 - 34	11.6%
35 - 39	5.2%
40 - 44	2.9%
45 - 49	4.6%
50 - 54	3.5%
55 - 59	1.7%
60 - 64	3.5%
65 - 69	5.2%
70 - 74	4.6%
75 - 79	6.9%
80 - 84	9.2%
85 - 90	4.0%
90 - 94	0.6%
95 - 99	2.3%
100 - 104	0.6%
105 - 109	0.6%
> 109	0.0
min size (mm)	14
max size (mm)	106
mean	49
mode	23

LOCATION 6 SANTA CRUZ ISLAND - GULL ISLAND SOUTH

Strongylocentrotus purpuratus

(cases) N=	145
< 5	0.0
5 - 9	0.7%
10 - 14	8.3%
15 - 19	17.9%
20 - 24	19.3%
25 - 29	9.7%
30 - 34	10.3%
35 - 39	13.1%
40 - 44	9.0%
45 - 49	6.2%
50 - 54	3.4%
55 - 59	1.4%
60 - 64	0.7%
65 - 69	0.0
70 - 74	0.0
75 - 79	0.0
80 - 84	0.0
85 - 90	0.0
90 - 94	0.0
95 - 99	0.0
100 - 104	0.0
105 - 109	0.0
> 109	0.0
min size (mm)	9
max size (mm)	61
mean	29
mode	19

Macrocystis pyrifera numbers of stipes

(cases) N=	102
< 3	0.0
3 - 5	2.9%
6 - 8	3.9%
9 - 11	9.8%
12 - 14	13.7%
15 - 17	17.6%
18 - 20	16.7%
21 - 23	10.8%
24 - 26	7.8%
27 - 29	8.8%
30 - 32	3.9%
33 - 35	2.9%
36 - 38	0.0
39 - 41	0.0
42 - 44	0.0
>44	1.0%
min number	3
max number	49
mean	19
mode	16

Macrocystis pyrifera holdfast diameters

(cases) N=	102
< 6	0.0
6 - 11	0.0
12 - 17	0.0
18 - 23	0.0
24 - 29	4.9%
30 - 35	23.5%
36 - 41	30.4%
42 - 47	15.7%
48 - 53	17.6%
54 - 59	3.9%
60 - 65	2.0%
66 - 71	0.0
72 - 77	2.0%
78 - 83	0.0
84 - 89	0.0
>89	0.0
min width (cm)	24
max width (cm)	77
mean	41
mode	40

LOCATION 6 SANTA CRUZ ISLAND - GULL ISLAND SOUTH

Lophogorgia chilensis widths

(cases) N=	80
< 5	0.0
5 - 8	3.8%
9 - 12	7.5%
13 - 16	10.0%
17 - 20	17.5%
21 - 24	12.5%
25 - 28	10.0%
29 - 32	8.8%
33 - 36	2.5%
37 - 40	7.5%
41 - 44	6.3%
45 - 48	2.5%
49 - 52	2.5%
53 - 56	2.5%
57 - 60	1.3%
61 - 64	2.5%
65 - 68	1.3%
69 - 72	0.0
73 - 76	0.0
77 - 80	0.0
81 - 84	0.0
85 - 88	1.3%
89 - 92	0.0
93 - 96	0.0
97 - 100	0.0
>100	0.0
min width (cm)	5
max width (cm)	85
mean	29
mode	20

Lophogorgia chilensis heights

(cases) N=	80
< 5	0.0
5 - 8	0.0
9 - 12	2.5%
13 - 16	2.5%
17 - 20	0.0
21 - 24	7.5%
25 - 28	10.0%
29 - 32	17.5%
33 - 36	11.3%
37 - 40	13.8%
41 - 44	7.5%
45 - 48	10.0%
49 - 52	1.3%
53 - 56	3.8%
57 - 60	3.8%
61 - 64	1.3%
65 - 68	1.3%
69 - 72	0.0
73 - 76	3.8%
77 - 80	1.3%
81 - 84	1.3%
85 - 88	0.0
89 - 92	0.0
93 - 96	0.0
97 - 100	0.0
>100	0.0
min height (cm)	9
max height (cm)	82
mean	39
mode	30

Allopora californica widths

(cases) N=	42
< 3	4.8%
3 - 4	9.5%
5 - 6	7.1%
7 - 8	7.1%
9 - 10	4.8%
11 - 12	9.5%
13 - 14	7.1%
15 - 16	4.8%
17 - 18	4.8%
19 - 20	4.8%
21 - 22	16.7%
23 - 24	4.8%
25 - 26	7.1%
27 - 28	4.8%
29 - 30	0.0
>30	2.4%
min width (cm)	2
max width (cm)	32
mean	15
mode	22

Allopora californica heights

(cases) N=	42
< 3	21.4%
3 - 4	11.9%
5 - 6	16.7%
7 - 8	14.3%
9 - 10	21.4%
11 - 12	4.8%
13 - 14	4.8%
15 - 16	0.0
17 - 18	4.8%
19 - 20	0.0
21 - 22	0.0
23 - 24	0.0
25 - 26	0.0
27 - 28	0.0
29 - 30	0.0
>30	0.0
min height (cm)	1
max height (cm)	17
mean	7
mode	9

LOCATION 6 SANTA CRUZ ISLAND - GULL ISLAND SOUTH

1992 ARTIFICIAL RECRUITMENT MODULE SIZE FREQUENCY DISTRIBUTIONS

Cypraea spadicea FROM 4 ARMs

(cases) N=	68
< 30	0.0
30 - 34	2.9%
35 - 39	30.9%
40 - 44	39.7%
45 - 49	22.1%
50 - 54	4.4%
55 - 59	0.0
> 59	0.0
min size (mm)	33
max size (mm)	50
mean	42
mode	44

Strongylocentrotus purpuratus FROM 4 ARMs

(cases) N=	210
< 5	0.5%
5 - 9	2.4%
10 - 14	5.2%
15 - 19	4.3%
20 - 24	7.1%
25 - 29	1.9%
30 - 34	6.7%
35 - 39	11.0%
40 - 44	12.9%
45 - 49	21.9%
50 - 54	15.7%
55 - 59	9.0%
60 - 64	1.4%
65 - 69	0.0
70 - 74	0.0
> 75	0.0
min size (mm)	2
max size (mm)	62
mean	40
mode	49

Lytechinus anamesus FROM 4 ARMs

(cases) N=	1
< 5	100.0%
5 - 9	0.0
> 10	0.0
min size (mm)	3
max size (mm)	3
mean	3
mode	3

Strongylocentrotus franciscanus FROM 4 ARMs

(cases) N=	175
< 5	0.0
5 - 9	0.0
10 - 14	4.0%
15 - 19	8.0%
20 - 24	12.0%
25 - 29	13.7%
30 - 34	16.6%
35 - 39	6.3%
40 - 44	4.0%
45 - 49	6.3%
50 - 54	5.7%
55 - 59	6.9%
60 - 64	6.9%
65 - 69	5.1%
70 - 74	4.0%
75 - 79	0.6%
80 - 84	0.0
> 85	0.0
min size (mm)	10
max size (mm)	76
mean	38
mode	30

Haliotis rufescens FROM 15 ARMs

(cases) N=	1
< 25	100.0%
25 - 29	0.0
30 - 34	0.0
> 35	0.0
min size (mm)	14
max size (mm)	14
mean	14
mode	14

Pisaster giganteus FROM 4 ARMs

(cases) N=	8
< 20	12.5%
20 - 39	87.5%
40 - 59	0.0
> 60	0.0
min size (mm)	18
max size (mm)	32
mean	24
mode	23

LOCATION 7 SANTA CRUZ ISLAND - FRY'S HARBOR

1992 QUADRAT DATA: MEAN NUMBER PER M^2

Species	Mean	Std Dev	Cases
Macrocystis pyrifera adult	0.0000	0.0000	20
Eisenia arborea	0.0750	0.1832	20
Pterygophora californica	0.0250	0.1118	20
Laminaria farlowii	0.1000	0.4472	20
Macrocystis pyrifera juvenile	0.0000	0.0000	20
Macrocystis pyrifera all	0.0000	0.0000	20
Cypraea spadicea	0.0750	0.1832	20
Astraea undosa	0.0000	0.0000	20
Patiria miniata	0.7000	0.7678	20
Pisaster giganteus	0.2750	0.4435	20
Strongylocentrotus franciscanus	0.5500	0.5104	20
Strongylocentrotus purpuratus	1.1500	1.8432	20
Parastichopus parvamensis	2.2500	1.3717	20
Styela montereyensis	0.0000	0.0000	20
Lythrypnus dalli	0.6000	0.5982	20
Coryphopterus nicholsii	0.6750	0.7826	20
Alloclinus holderi	0.2750	0.3432	20

1992 BAND TRANSECT DATA: MEAN NUMBER PER M^2

Tethya aurantia	0.0236	0.0429	12
Allopora californica	0.0000	0.0000	12
Tealia lofotensis	0.0097	0.0241	12
Lophogorgia chilensis	0.0875	0.0722	12
Muricea fruticosa	0.0000	0.0000	12
Muricea californica	0.0000	0.0000	12
Panulirus interruptus	0.0014	0.0048	12
Haliotis rufescens	0.0000	0.0000	12
Haliotis corrugata	0.0000	0.0000	12
Haliotis fulgens	0.0000	0.0000	12
Kelletia kelletii	0.0208	0.0226	12
Megathura crenulata	0.1319	0.0723	12
Hinnites giganteus	0.0125	0.0215	12
Aplysia californica	0.0125	0.0161	12
Pycnopodia helianthoides	0.0000	0.0000	12
Lytechinus anamesus	5.0153	4.2764	12

LOCATION 7 SANTA CRUZ ISLAND - FRY'S HARBOR

1992 RANDOM POINT CONTACT DATA: MEAN PERCENT COVER

Species	Mean	Std Dev	Cases
Green algae	2.5000	2.6021	25
Miscellaneous brown algae	0.2000	0.6922	25
Desmarestia spp.	0.0000	0.0000	25
Laminaria farlowii	0.0000	0.0000	25
Cystoseira spp.	0.0000	0.0000	25
Macrocystis,Eisenia,Pterygophora	0.9000	2.5900	25
Miscellaneous red algae	12.8000	9.3908	25
Articulated coralline algae	1.4000	2.6101	25
Crustose coralline algae	33.2000	16.7008	25
Gelidium spp.	0.0000	0.0000	25
Gigartina spp.	0.0000	0.0000	25
Miscellaneous plants	0.3000	0.8292	25
Sponges	0.3000	1.0992	25
Corynactis californica	2.6000	3.9843	25
Balanophyllia elegans	0.6000	2.5290	25
Astrangia lajollaensis	19.8000	11.0378	25
Diopatra ornata	0.1000	0.5000	25
Phragmatopoma californica	0.0000	0.0000	25
Serpulorbis squamigerus	0.5000	1.2500	25
Bryozoans	2.5000	3.3850	25
Diaperoecia californica	1.5000	2.5000	25
Pachythyone rubra	16.9000	21.0317	25
Tunicates	0.5000	1.0206	25
Miscellaneous invertebrates	19.5000	12.0761	25
Bare substrate	12.5000	15.1726	25
Rock	81.8000	16.0000	25
Cobble	13.9815	12.2329	27
Sand	3.3696	8.7129	23

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Total Fish Abundance	58.0764	229.1574	144
Chromis punctipinnis	676.4167	477.0358	12
Oxyjulis californica	3.1667	2.9491	12
Sebastes mystinus	0.0000	0.0000	12
Sebastes serranoides	0.8333	1.1146	12
Sebastes atrovirens	0.6667	0.4924	12
Paralabrax clathratus	3.8333	2.3290	12
Semicossyphus pulcher	7.3333	1.9695	12
Embiotoca jacksoni	0.6667	0.9847	12
Embiotoca lateralis	0.0000	0.0000	12
Damalichthys vacca	0.9167	0.7930	12
Hypsypops rubicundus	0.7500	0.6216	12
Girella nigricans	2.3333	3.3394	12

LOCATION 7 SANTA CRUZ ISLAND - FRY'S HARBOR

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Species	Date (year/month/day)	Mean	Std Dev	Cases
Chromis punctipinnis	adult	258.3333	144.2588	12
	920730	328.1250	122.0052	8
	920831	118.7500	51.0514	4
Chromis punctipinnis	juvenile	418.0833	563.7532	12
	920730	40.8750	35.5626	8
	920831	1172.5000	155.2149	4
Oxyjulis californica	adult	3.0833	2.9683	12
	920730	2.2500	1.9086	8
	920831	4.7500	4.2720	4
Oxyjulis californica	juvenile	0.0833	0.2887	12
	920730	0.0000	0.0000	8
	920831	0.2500	0.5000	4
Sebastes mystinus	adult	0.0000	0.0000	12
	920730	0.0000	0.0000	8
	920831	0.0000	0.0000	4
Sebastes mystinus	juvenile	0.0000	0.0000	12
	920730	0.0000	0.0000	8
	920831	0.0000	0.0000	4
Sebastes serranoides	adult	0.8333	1.1146	12
	920730	1.2500	1.1650	8
	920831	0.0000	0.0000	4

Sebastes serranoides juvenile		0.0000	0.0000
12			
	920730	0.0000	0.0000
8			
	920831	0.0000	0.0000
4			
Sebastes atrovirens adult		0.6667	0.4924
12			
	920730	0.6250	0.5175
8			
	920831	0.7500	0.5000
4			
Sebastes atrovirens juvenile		0.0000	0.0000
12			
	920730	0.0000	0.0000
8			
	920831	0.0000	0.0000
4			
Paralabrax clathratus adult		3.7500	2.3404
12			
	920730	2.3750	0.9161
8			
	920831	6.5000	1.7321
4			
Paralabrax clathratus juvenile		0.0833	0.2887
12			
	920730	0.1250	0.3536
8			
	920831	0.0000	0.0000
4			

LOCATION 7 SANTA CRUZ ISLAND - FRY'S HARBOR

Semicossyphus pulcher male		0.4167	0.6686
12			
	920730	0.5000	0.7559
8			
	920831	0.2500	0.5000
4			
Semicossyphus pulcher female		6.9167	1.8320
12			
	920730	6.5000	1.9272
8			
	920831	7.7500	1.5000
4			
Embiotoca jacksoni adult		0.6667	0.9847
12			
	920730	0.2500	0.4629
8			
	920831	1.5000	1.2910
4			
Embiotoca jacksoni juvenile		0.0000	0.0000
12			
	920730	0.0000	0.0000
8			
	920831	0.0000	0.0000
4			
Embiotoca lateralis adult		0.0000	0.0000
12			
	920730	0.0000	0.0000
8			
	920831	0.0000	0.0000
4			
Embiotoca lateralis juvenile		0.0000	0.0000
12			
	920730	0.0000	0.0000
8			
	920831	0.0000	0.0000
4			
Damalichthys vacca adult		0.9167	0.7930
12			
	920730	1.1250	0.8345
8			
	920831	0.5000	0.5774
4			
Damalichthys vacca juvenile		0.0000	0.0000
12			
	920730	0.0000	0.0000
8			

	920831	0.0000	0.0000
4			
Hypsypops rubicundus adult		0.7500	0.6216
12			
	920730	0.7500	0.7071
8			
	920831	0.7500	0.5000
4			
Hypsypops rubicundus juvenile		0.0000	0.0000
12			
	920730	0.0000	0.0000
8			
	920831	0.0000	0.0000
4			
Girella nigricans adult		2.3333	3.3394
12			
	920730	0.2500	0.4629
8			
	920831	6.5000	2.3805
4			
Girella nigricans juvenile		0.0000	0.0000
12			
	920730	0.0000	0.0000
8			
	920831	0.0000	0.0000
4			

LOCATION 7 SANTA CRUZ ISLAND - FRY'S HARBOR

1992 NATURAL HABITAT SIZE FREQUENCY DISTRIBUTIONS

Megathura crenulata

(cases) N=	40
< 10	0.0
10 - 19	0.0
20 - 29	0.0
30 - 39	0.0
40 - 49	0.0
50 - 59	12.5%
60 - 69	35.0%
70 - 79	42.5%
80 - 89	10.0%
90 - 99	0.0
100 - 109	0.0
110 - 119	0.0
> 119	0.0
min size (mm)	53
max size (mm)	82
mean	69
mode	72

Hinnites giganteus

(cases) N=	31
< 10	0.0
10 - 19	0.0
20 - 29	6.5%
30 - 39	19.4%
40 - 49	16.1%
50 - 59	19.4%
60 - 69	6.5%
70 - 79	12.9%
80 - 89	9.7%
90 - 99	6.5%
100 - 109	0.0
110 - 119	0.0
120 - 129	0.0
130 - 139	0.0
140 - 149	3.2%
> 149	0.0
min size (mm)	25
max size (mm)	144
mean	59
mode	52

Patiria miniata

(cases) N=	57
< 10	0.0
10 - 19	0.0
20 - 29	1.8%
30 - 39	7.0%
40 - 49	10.5%
50 - 59	28.1%
60 - 69	28.1%
70 - 79	22.8%
80 - 89	1.8%
90 - 99	0.0
> 99	0.0
min size (mm)	27
max size (mm)	83
mean	59
mode	52

Pisaster giganteus

(cases) N=	53
< 20	0.0
20 - 39	0.0
40 - 59	0.0
60 - 79	0.0
80 - 99	18.9%
100 - 119	34.0%
120 - 139	26.4%
140 - 159	13.2%
160 - 179	1.9%
180 - 199	3.8%
200 - 219	1.9%
220 - 239	0.0
240 - 259	0.0
260 - 279	0.0
280 - 299	0.0
> 299	0.0
min size (mm)	82
max size (mm)	212
mean	121
mode	102

LOCATION 7 SANTA CRUZ ISLAND - FRY'S HARBOR

Lytechinus anamesus

(cases) N=	248
< 5	0.0
5 - 9	0.0
10 - 14	0.8%
15 - 19	33.9%
20 - 24	57.3%
25 - 29	8.1%
30 - 34	0.0
35 - 39	0.0
40 - 44	0.0
45 - 49	0.0
> 49	0.0
min size (mm)	11
max size (mm)	27
mean	20
mode	20

Strongylocentrotus franciscanus

(cases) N=	77
< 5	0.0
5 - 9	0.0
10 - 14	6.5%
15 - 19	11.7%
20 - 24	5.2%
25 - 29	6.5%
30 - 34	2.6%
35 - 39	9.1%
40 - 44	3.9%
45 - 49	5.2%
50 - 54	9.1%
55 - 59	6.5%
60 - 64	7.8%
65 - 69	9.1%
70 - 74	2.6%
75 - 79	2.6%
80 - 84	6.5%
85 - 90	2.6%
90 - 94	1.3%
95 - 99	0.0
100 - 104	1.3%
105 - 109	0.0
> 109	0.0
min size (mm)	10
max size (mm)	104
mean	47
mode	52

Strongylocentrotus purpuratus

(cases) N=	183
< 5	0.0
5 - 9	1.6%
10 - 14	14.2%
15 - 19	21.3%
20 - 24	21.9%
25 - 29	18.0%
30 - 34	14.2%
35 - 39	6.0%
40 - 44	2.7%
45 - 49	0.0
50 - 54	0.0
55 - 59	0.0
60 - 64	0.0
65 - 69	0.0
70 - 74	0.0
75 - 79	0.0
80 - 84	0.0
85 - 90	0.0
90 - 94	0.0
95 - 99	0.0
100 - 104	0.0
105 - 109	0.0
> 109	0.0
min size (mm)	8
max size (mm)	42
mean	23
mode	22

Astraea undosa

(cases) N=	4
< 10	0.0
10 - 19	0.0
20 - 29	0.0
30 - 39	0.0
40 - 49	25.0%
50 - 59	25.0%
60 - 69	25.0%
70 - 79	25.0%
80 - 89	0.0
90 - 99	0.0
100 - 109	0.0
110 - 119	0.0
> 119	0.0
min size (mm)	40
max size (mm)	73
mean	57
mode	40

LOCATION 7 SANTA CRUZ ISLAND - FRY'S HARBOR

Lophogorgia chilensis widths	
(cases) N=	52
< 5	0.0
5 - 8	1.9%
9 - 12	0.0
13 - 16	0.0
17 - 20	3.8%
21 - 24	5.8%
25 - 28	5.8%
29 - 32	9.6%
33 - 36	17.3%
37 - 40	5.8%
41 - 44	3.8%
45 - 48	3.8%
49 - 52	9.6%
53 - 56	5.8%
57 - 60	3.8%
61 - 64	1.9%
65 - 68	0.0
69 - 72	3.8%
73 - 76	0.0
77 - 80	9.6%
81 - 84	3.8%
85 - 88	0.0
89 - 92	0.0
93 - 96	3.8%
97 - 100	0.0
>100	0.0
min width (cm)	8
max width (cm)	96
mean	47
mode	34

Lophogorgia chilensis heights	
(cases) N=	52
< 5	0.0
5 - 8	0.0
9 - 12	0.0
13 - 16	0.0
17 - 20	0.0
21 - 24	1.9%
25 - 28	0.0
29 - 32	5.8%
33 - 36	11.5%
37 - 40	5.8%
41 - 44	13.5%
45 - 48	7.7%
49 - 52	7.7%
53 - 56	7.7%
57 - 60	17.3%
61 - 64	7.7%
65 - 68	3.8%
69 - 72	3.8%
73 - 76	0.0
77 - 80	1.9%
81 - 84	1.9%
85 - 88	1.9%
89 - 92	0.0
93 - 96	0.0
97 - 100	0.0
>100	0.0
min height (cm)	23
max height (cm)	85
mean	51
mode	59

LOCATION 8 SANTA CRUZ ISLAND - PELICAN BAY

1992 QUADRAT DATA: MEAN NUMBER M^2

Species	Mean	Std Dev	Cases
Macrocystis pyrifera adult	0.0500	0.1539	20
Eisenia arborea	0.0250	0.1118	20
Pterygophora californica	0.0000	0.0000	20
Laminaria farlowii	0.0000	0.0000	20
Macrocystis pyrifera juvenile	0.1500	0.3663	20
Macrocystis pyrifera all	0.2000	0.4104	20
Cypraea spadicea	0.0000	0.0000	20
Astraea undosa	0.2750	0.4435	20
Patiria miniata	0.1500	0.4617	20
Pisaster giganteus	0.0250	0.1118	20
Strongylocentrotus franciscanus	1.5750	2.2785	20
Strongylocentrotus purpuratus	4.0000	4.4189	20
Parastichopus parvamensis	0.3000	0.4104	20
Styela montereyensis	0.0000	0.0000	20
Lythrypnus dalli	0.4750	0.6172	20
Coryphopterus nicholsii	2.0250	1.2511	20
Alloclinus holderi	0.0250	0.1118	20

1992 BAND TRANSECT DATA: MEAN NUMBER PER M^2

Tethya aurantia	0.0000	0.0000	12
Allopora californica	0.0000	0.0000	12
Tealia lofotensis	0.0014	0.0048	12
Lophogorgia chilensis	0.0653	0.0712	12
Muricea fruticosa	0.0000	0.0000	12
Muricea californica	0.0000	0.0000	12
Panulirus interruptus	0.0000	0.0000	12
Haliotis rufescens	0.0000	0.0000	12
Haliotis corrugata	0.0000	0.0000	12
Haliotis fulgens	0.0000	0.0000	12
Kelletia kelletii	0.0111	0.0164	12
Megathura crenulata	0.0097	0.0150	12
Hinnites giganteus	0.0653	0.0505	12
Aplysia californica	0.0931	0.0562	12
Pycnopodia helianthoides	0.0000	0.0000	12
Lytechinus anamesus	0.2042	0.3868	12

LOCATION 8 SANTA CRUZ ISLAND - PELICAN BAY

1992 RANDOM POINT CONTACT DATA: MEAN PERCENT COVER

Species	Mean	Std Dev	Cases
Green algae	0.4000	0.9354	25
Miscellaneous brown algae	66.4000	17.6641	25
Desmarestia spp.	0.0000	0.0000	25
Laminaria farlowii	0.0000	0.0000	25
Cystoseira spp.	0.1000	0.5000	25
Macrocystis,Eisenia,Pterygophora	7.1000	15.3039	25
Miscellaneous red algae	2.5000	3.3072	25
Articulated coralline algae	2.3000	2.5941	25
Crustose coralline algae	33.1000	11.7544	25
Gelidium spp.	0.0000	0.0000	25
Gigartina spp.	0.0000	0.0000	25
Miscellaneous plants	0.0000	0.0000	25
Sponges	0.0000	0.0000	25
Corynactis californica	1.2000	2.5125	25
Balanophyllia elegans	0.0000	0.0000	25
Astrangia lajollaensis	10.3000	5.6051	25
Diopatra ornata	0.0000	0.0000	25
Phragmatopoma californica	0.0000	0.0000	25
Serpulorbis squamigerus	1.0000	1.7678	25
Bryozoans	1.2000	1.9257	25
Diaperoecia californica	0.3000	1.0992	25
Tunicates	0.3000	0.8292	25
Miscellaneous invertebrates	21.5000	8.2285	25
Bare substrate	37.8000	12.3600	25
Rock	62.5000	15.3603	25
Cobble	12.5000	8.9559	25
Sand	24.7000	13.7371	25

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Total Fish Abundance	22.8611	55.5758	144
Chromis punctipinnis	161.3333	89.3098	12
Oxyjulis californica	78.6667	58.6055	12
Sebastes mystinus	0.0000	0.0000	12
Sebastes serranoides	0.0000	0.0000	12
Sebastes atrovirens	0.4167	0.9003	12
Paralabrax clathratus	16.0833	3.7769	12
Semicossyphus pulcher	4.3333	2.9644	12
Embiotoca jacksoni	8.5833	2.6785	12
Embiotoca lateralis	0.0833	0.2887	12
Damalichthys vacca	2.1667	3.3800	12
Hypsypops rubicundus	2.0000	1.3484	12
Girella nigricans	0.6667	0.4924	12

LOCATION 8 SANTA CRUZ ISLAND - PELICAN BAY

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Species	Date (year/month/day)	Mean	Std Dev	Cases
Chromis punctipinnis	adult	22.1667	32.0846	12
	920730	62.5000	22.7669	4
	920831	2.0000	1.0690	8
Chromis punctipinnis	juvenile	139.1667	114.1338	12
	920730	0.0000	0.0000	4
	920831	208.7500	62.2065	8
Oxyjulis californica	adult	0.5000	1.0000	12
	920730	0.0000	0.0000	4
	920831	0.7500	1.1650	8
Oxyjulis californica	juvenile	78.1667	58.9836	12
	920730	148.0000	46.5403	4
	920831	43.2500	18.9416	8
Sebastes mystinus	adult	0.0000	0.0000	12
	920730	0.0000	0.0000	4
	920831	0.0000	0.0000	8
Sebastes mystinus	juvenile	0.0000	0.0000	12
	920730	0.0000	0.0000	4
	920831	0.0000	0.0000	8
Sebastes serranoides	adult	0.0000	0.0000	12
	920730	0.0000	0.0000	4
	920831	0.0000	0.0000	8

Sebastes serranoides juvenile		0.0000	0.0000
12			
	920730	0.0000	0.0000
4			
	920831	0.0000	0.0000
8			
Sebastes atrovirens adult		0.4167	0.9003
12			
	920730	1.2500	1.2583
4			
	920831	0.0000	0.0000
8			
Sebastes atrovirens juvenile		0.0000	0.0000
12			
	920730	0.0000	0.0000
4			
	920831	0.0000	0.0000
8			
Paralabrax clathratus adult		15.4167	3.4761
12			
	920730	15.7500	3.9476
4			
	920831	15.2500	3.4949
8			
Paralabrax clathratus juvenile		0.6667	0.8876
12			
	920730	0.7500	0.9574
4			
	920831	0.6250	0.9161
8			

LOCATION 8 SANTA CRUZ ISLAND - PELICAN BAY

Semicossyphus pulcher male		0.0000	0.0000
12			
	920730	0.0000	0.0000
4			
	920831	0.0000	0.0000
8			
Semicossyphus pulcher female		4.3333	2.9644
12			
	920730	3.7500	3.5940
4			
	920831	4.6250	2.8253
8			
Embiotoca jacksoni adult		8.5833	2.6785
12			
	920730	10.0000	2.4495
4			
	920831	7.8750	2.6424
8			
Embiotoca jacksoni juvenile		0.0000	0.0000
12			
	920730	0.0000	0.0000
4			
	920831	0.0000	0.0000
8			
Embiotoca lateralis adult		0.0833	0.2887
12			
	920730	0.2500	0.5000
4			
	920831	0.0000	0.0000
8			
Embiotoca lateralis juvenile		0.0000	0.0000
12			
	920730	0.0000	0.0000
4			
	920831	0.0000	0.0000
8			
Damalichthys vacca adult		2.1667	3.3800
12			
	920730	5.2500	4.5735
4			
	920831	0.6250	0.9161
8			
Damalichthys vacca juvenile		0.0000	0.0000
12			
	920730	0.0000	0.0000
4			

	920831	0.0000	0.0000
8			
Hypsypops rubicundus adult		2.0000	1.3484
12			
	920730	3.2500	0.9574
4			
	920831	1.3750	1.0607
8			
Hypsypops rubicundus juvenile		0.0000	0.0000
12			
	920730	0.0000	0.0000
4			
	920831	0.0000	0.0000
8			
Girella nigricans adult		0.6667	0.4924
12			
	920730	0.7500	0.5000
4			
	920831	0.6250	0.5175
8			
Girella nigricans juvenile		0.0000	0.0000
12			
	920730	0.0000	0.0000
4			
	920831	0.0000	0.0000
8			

LOCATION 8 SANTA CRUZ ISLAND - PELICAN BAY

1992 NATURAL HABITAT SIZE FREQUENCY DISTRIBUTIONS

Astraea undosa

(cases) N=	106
< 10	0.0
10 - 19	0.0
20 - 29	0.0
30 - 39	0.0
40 - 49	0.9%
50 - 59	3.8%
60 - 69	0.9%
70 - 79	26.4%
80 - 89	60.4%
90 - 99	7.5%
100 - 109	0.0
110 - 119	0.0
> 119	0.0
min size (mm)	48
max size (mm)	96
mean	81
mode	83

Hinnites giganteus

(cases) N=	49
< 10	0.0
10 - 19	0.0
20 - 29	2.0%
30 - 39	10.2%
40 - 49	22.4%
50 - 59	14.3%
60 - 69	22.4%
70 - 79	12.2%
80 - 89	6.1%
90 - 99	4.1%
100 - 109	4.1%
110 - 119	0.0
120 - 129	0.0
130 - 139	0.0
140 - 149	0.0
> 149	2.0%
min size (mm)	28
max size (mm)	159
mean	62
mode	66

Strongylocentrotus franciscanus

(cases) N=	62
< 5	0.0
5 - 9	0.0
10 - 14	3.2%
15 - 19	8.1%
20 - 24	8.1%
25 - 29	8.1%
30 - 34	8.1%
35 - 39	6.5%
40 - 44	9.7%
45 - 49	1.6%
50 - 54	19.4%
55 - 59	6.5%
60 - 64	3.2%
65 - 69	1.6%
70 - 74	1.6%
75 - 79	4.8%
80 - 84	4.8%
85 - 90	0.0
90 - 94	3.2%
95 - 99	0.0
100 - 104	1.6%
105 - 109	0.0
> 109	0.0
min size (mm)	13
max size (mm)	102
mean	46
mode	52

LOCATION 8 SANTA CRUZ ISLAND - PELICAN BAY

Strongylocentrotus purpuratus

(cases) N=	183
< 5	0.0
5 - 9	0.5%
10 - 14	4.9%
15 - 19	8.2%
20 - 24	12.6%
25 - 29	24.6%
30 - 34	29.5%
35 - 39	15.8%
40 - 44	3.8%
45 - 49	0.0
50 - 54	0.0
55 - 59	0.0
> 60	0.0
min size (mm)	6
max size (mm)	41
mean	28
mode	32

Lytechinus anamesus

(cases) N=	293
< 5	0.3%
5 - 9	2.4%
10 - 14	4.1%
15 - 19	31.7%
20 - 24	58.7%
25 - 29	2.7%
30 - 34	0.0
35 - 39	0.0
40 - 44	0.0
45 - 49	0.0
> 49	0.0
min size (mm)	3
max size (mm)	27
mean	20
mode	21

Lophogorgia chilensis widths

(cases) N=	76
< 5	1.3%
5 - 8	3.9%
9 - 12	3.9%
13 - 16	6.6%
17 - 20	5.3%
21 - 24	15.8%
25 - 28	14.5%
29 - 32	17.1%
33 - 36	14.5%
37 - 40	6.6%
41 - 44	6.6%
45 - 48	2.6%
49 - 52	1.3%
53 - 56	0.0
57 - 60	0.0
>61	0.0
min width (cm)	3
max width (cm)	52
mean	27
mode	21

Lophogorgia chilensis heights

(cases) N=	76
< 5	0.0
5 - 8	1.3%
9 - 12	2.6%
13 - 16	2.6%
17 - 20	6.6%
21 - 24	9.2%
25 - 28	11.8%
29 - 32	19.7%
33 - 36	14.5%
37 - 40	15.8%
41 - 44	11.8%
45 - 48	2.6%
49 - 52	1.3%
53 - 56	0.0
57 - 60	0.0
>61	0.0
min height (cm)	8
max height (cm)	49
mean	31
mode	30

LOCATION 9 SANTA CRUZ ISLAND - SCORPION ANCHORAGE

1992 QUADRAT DATA: MEAN NUMBER PER M^2

Species	Mean	Std Dev	Cases
Macrocystis pyrifera adult	0.0000	0.0000	20
Eisenia arborea	0.0000	0.0000	20
Pterygophora californica	0.0000	0.0000	20
Laminaria farlowii	0.0000	0.0000	20
Macrocystis pyrifera juvenile	0.0000	0.0000	20
Macrocystis pyrifera all	0.0000	0.0000	20
Cypraea spadicea	0.0500	0.1539	20
Astraea undosa	0.7250	0.7860	20
Patiria miniata	0.2500	0.4136	20
Pisaster giganteus	0.0250	0.1118	20
Strongylocentrotus franciscanus	0.9000	0.8046	20
Strongylocentrotus purpuratus	42.9500	10.6942	20
Parastichopus parvamensis	0.7750	0.5495	20
Styela montereyensis	0.0000	0.0000	20
Lythrypnus dalli	0.0000	0.0000	20
Coryphopterus nicholsii	0.6500	0.4894	20
Alloclinus holderi	0.0500	0.1539	20

1992 BAND TRANSECT DATA: MEAN NUMBER PER M^2

Tethya aurantia	0.0139	0.0199	12
Allopora californica	0.0000	0.0000	12
Tealia lofotensis	0.0042	0.0075	12
Lophogorgia chilensis	0.0000	0.0000	12
Muricea fruticosa	0.0000	0.0000	12
Muricea californica	0.0000	0.0000	12
Panulirus interruptus	0.0000	0.0000	12
Haliotis rufescens	0.0000	0.0000	12
Haliotis corrugata	0.0000	0.0000	12
Haliotis fulgens	0.0000	0.0000	12
Kelletia kelletii	0.0000	0.0000	12
Megathura crenulata	0.0903	0.0435	12
Hinnites giganteus	0.0194	0.0223	12
Aplysia californica	0.0181	0.0111	12
Pycnopodia helianthoides	0.0000	0.0000	12
Lytechinus anamesus	0.0611	0.0914	12

LOCATION 9 SANTA CRUZ ISLAND - SCORPION ANCHORAGE

1992 RANDOM POINT CONTACT DATA: MEAN PERCENT COVER

Species	Mean	Std Dev	Cases
Green algae	9.3000	9.6964	25
Miscellaneous brown algae	0.0000	0.0000	25
Desmarestia spp.	0.0000	0.0000	25
Laminaria farlowii	0.0000	0.0000	25
Cystoseira spp.	0.0000	0.0000	25
Macrocystis,Eisenia,Pterygophora	0.0000	0.0000	25
Miscellaneous red algae	0.1000	0.5000	25
Articulated coralline algae	2.5000	2.6021	25
Crustose coralline algae	48.5000	16.9865	25
Gelidium spp.	0.0000	0.0000	25
Gigartina spp.	0.0000	0.0000	25
Miscellaneous plants	0.0000	0.0000	25
Sponges	0.4000	1.5612	25
Corynactis californica	0.1000	0.5000	25
Balanophyllia elegans	0.5000	1.0206	25
Astrangia lajollaensis	0.4000	0.9354	25
Diopatra ornata	0.0000	0.0000	25
Phragmatopoma californica	0.0000	0.0000	25
Serpulorbis squamigerus	7.8000	5.4639	25
Bryozoans	0.6000	1.3070	25
Diaperoecia californica	0.0000	0.0000	25
Tunicates	0.0000	0.0000	25
Miscellaneous invertebrates	25.6000	15.2459	25
Bare substrate	23.5000	9.6825	25
Rock	89.6000	11.8515	25
Cobble	0.4000	1.1815	25
Sand	10.0000	11.7482	25

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Total Fish Abundance	11.2396	42.3464	96
Chromis punctipinnis	123.6250	91.8865	8
Oxyjulis californica	8.0000	9.0396	8
Sebastes mystinus	0.0000	0.0000	8
Sebastes serranoides	0.1250	0.3536	8
Sebastes atrovirens	0.0000	0.0000	8
Paralabrax clathratus	0.5000	0.5345	8
Semicossyphus pulcher	0.8750	0.8345	8
Embiotoca jacksoni	0.5000	0.5345	8
Embiotoca lateralis	0.0000	0.0000	8
Damalichthys vacca	0.2500	0.4629	8
Hypsypops rubicundus	0.6250	0.7440	8
Girella nigricans	0.3750	0.5175	8

LOCATION 9 SANTA CRUZ ISLAND - SCORPION ANCHORAGE

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Species	Date (year/month/day)	Mean	Std Dev	Cases
Chromis punctipinnis adult		26.3750	23.8084	8
	920717	45.5000	17.7106	4
	921007	7.2500	5.7951	4
Chromis punctipinnis juvenile		97.2500	110.9694	8
	920717	0.0000	0.0000	4
	921007	194.5000	59.2706	4
Oxyjulis californica adult		5.2500	6.2048	8
	920717	1.7500	1.5000	4
	921007	8.7500	7.4106	4
Oxyjulis californica juvenile		2.7500	4.6214	8
	920717	0.0000	0.0000	4
	921007	5.5000	5.4467	4
Sebastes mystinus adult		0.0000	0.0000	8
	920717	0.0000	0.0000	4
	921007	0.0000	0.0000	4
Sebastes mystinus juvenile		0.0000	0.0000	8
	920717	0.0000	0.0000	4
	921007	0.0000	0.0000	4
Sebastes serranoides adult		0.1250	0.3536	8
	920717	0.2500	0.5000	4
	921007	0.0000	0.0000	4

Sebastes serranoides juvenile		0.0000	0.0000
8			
	920717	0.0000	0.0000
4			
	921007	0.0000	0.0000
4			
Sebastes atrovirens adult		0.0000	0.0000
8			
	920717	0.0000	0.0000
4			
	921007	0.0000	0.0000
4			
Sebastes atrovirens juvenile		0.0000	0.0000
8			
	920717	0.0000	0.0000
4			
	921007	0.0000	0.0000
4			
Paralabrax clathratus adult		0.5000	0.5345
8			
	920717	0.5000	0.5774
4			
	921007	0.5000	0.5774
4			
Paralabrax clathratus juvenile		0.0000	0.0000
8			
	920717	0.0000	0.0000
4			
	921007	0.0000	0.0000
4			

LOCATION 9 SANTA CRUZ ISLAND - SCORPION ANCHORAGE

Semicossyphus pulcher male		0.0000	0.0000
8			
	920717	0.0000	0.0000
4			
	921007	0.0000	0.0000
4			
Semicossyphus pulcher female		0.8750	0.8345
8			
	920717	0.7500	0.9574
4			
	921007	1.0000	0.8165
4			
Embiotoca jacksoni adult		0.5000	0.5345
8			
	920717	0.5000	0.5774
4			
	921007	0.5000	0.5774
4			
Embiotoca jacksoni juvenile		0.0000	0.0000
8			
	920717	0.0000	0.0000
4			
	921007	0.0000	0.0000
4			
Embiotoca lateralis adult		0.0000	0.0000
8			
	920717	0.0000	0.0000
4			
	921007	0.0000	0.0000
4			
Embiotoca lateralis juvenile		0.0000	0.0000
8			
	920717	0.0000	0.0000
4			
	921007	0.0000	0.0000
4			
Damalichthys vacca adult		0.2500	0.4629
8			
	920717	0.0000	0.0000
4			
	921007	0.5000	0.5774
4			
Damalichthys vacca juvenile		0.0000	0.0000
8			
	920717	0.0000	0.0000
4			

	921007	0.0000	0.0000
4			
Hypsypops rubicundus adult		0.5000	0.5345
8			
	920717	0.2500	0.5000
4			
	921007	0.7500	0.5000
4			
Hypsypops rubicundus juvenile		0.1250	0.3536
8			
	920717	0.0000	0.0000
4			
	921007	0.2500	0.5000
4			
Girella nigricans adult		0.3750	0.5175
8			
	920717	0.5000	0.5774
4			
	921007	0.2500	0.5000
4			
Girella nigricans juvenile		0.0000	0.0000
8			
	920717	0.0000	0.0000
4			
	921007	0.0000	0.0000
4			

LOCATION 9 SANTA CRUZ ISLAND - SCORPION ANCHORAGE

1992 NATURAL HABITAT SIZE FREQUENCY DISTRIBUTIONS

Astraea undosa

(cases) N=	136
< 10	0.0
10 - 19	0.0
20 - 29	0.0
30 - 39	1.5%
40 - 49	8.1%
50 - 59	8.1%
60 - 69	22.8%
70 - 79	52.9%
80 - 89	6.6%
90 - 99	0.0
100 - 109	0.0
110 - 119	0.0
> 119	0.0
min size (mm)	30
max size (mm)	82
mean	68
mode	73

Megathura crenulata

(cases) N=	53
< 10	0.0
10 - 19	0.0
20 - 29	0.0
30 - 39	1.9%
40 - 49	5.7%
50 - 59	20.8%
60 - 69	43.4%
70 - 79	26.4%
80 - 89	1.9%
90 - 99	0.0
100 - 109	0.0
110 - 119	0.0
> 119	0.0
min size (mm)	33
max size (mm)	80
mean	63
mode	66

Hinnites giganteus

(cases) N=	39
< 10	0.0
10 - 19	0.0
20 - 29	2.6%
30 - 39	17.9%
40 - 49	20.5%
50 - 59	15.4%
60 - 69	2.6%
70 - 79	12.8%
80 - 89	7.7%
90 - 99	7.7%
100 - 109	5.1%
110 - 119	5.1%
120 - 129	2.6%
130 - 139	0.0
140 - 149	0.0
> 149	0.0
min size (mm)	25
max size (mm)	123
mean	64
mode	37

Patiria miniata

(cases) N=	99
< 10	0.0
10 - 19	0.0
20 - 29	3.0%
30 - 39	14.1%
40 - 49	18.2%
50 - 59	22.2%
60 - 69	23.2%
70 - 79	12.1%
80 - 89	5.1%
90 - 99	2.0%
> 99	0.0
min size (mm)	22
max size (mm)	93
mean	56
mode	63

LOCATION 9 SANTA CRUZ ISLAND - SCORPION ANCHORAGE

Pisaster giganteus

(cases) N=	16
< 20	0.0
20 - 39	0.0
40 - 59	0.0
60 - 79	0.0
80 - 99	0.0
100 - 119	18.8%
120 - 139	0.0
140 - 159	6.3%
160 - 179	6.3%
180 - 199	37.5%
200 - 219	25.0%
220 - 239	6.3%
240 - 259	0.0
260 - 279	0.0
280 - 299	0.0
> 299	0.0
min size (mm)	103
max size (mm)	235
mean	180
mode	1

Lytechinus anamesus

(cases) N=	87
< 5	0.0
5 - 9	0.0
10 - 14	2.3%
15 - 19	8.0%
20 - 24	63.2%
25 - 29	25.3%
30 - 34	1.1%
35 - 39	0.0
40 - 44	0.0
45 - 49	0.0
> 49	0.0
min size (mm)	13
max size (mm)	30
mean	23
mode	21

Strongylocentrotus franciscanus

(cases) N=	158
< 5	0.0
5 - 9	0.0
10 - 14	0.0
15 - 19	0.0
20 - 24	0.6%
25 - 29	6.3%
30 - 34	48.7%
35 - 39	32.3%
40 - 44	5.7%
45 - 49	3.8%
50 - 54	0.6%
55 - 59	0.0
60 - 64	0.6%
65 - 69	0.0
70 - 74	0.6%
75 - 79	0.6%
80 - 84	0.0
85 - 90	0.0
90 - 94	0.0
95 - 99	0.0
100 - 104	0.0
105 - 109	0.0
> 109	0.0
min size (mm)	24
max size (mm)	76
mean	35
mode	33

Strongylocentrotus purpuratus

(cases) N=	300
< 5	0.0
5 - 9	0.3%
10 - 14	0.0
15 - 19	0.3%
20 - 24	13.3%
25 - 29	73.3%
30 - 34	12.0%
35 - 39	0.7%
40 - 44	0.0
45 - 49	0.0
>50	0.0
min size (mm)	7
max size (mm)	35
mean	27
mode	27

LOCATION 10 SANTA CRUZ ISLAND - YELLOWBANKS

1992 QUADRAT DATA: MEAN NUMBER PER M^2

Species	Mean	Std Dev	Cases
Macrocystis pyrifera adult	0.1250	0.3582	20
Eisenia arborea	0.1500	0.2856	20
Pterygophora californica	1.0000	1.2140	20
Laminaria farlowii	0.4250	0.4940	20
Macrocystis pyrifera juvenile	0.4750	1.0192	20
Macrocystis pyrifera all	0.6000	1.0588	20
Cypraea spadicea	0.0000	0.0000	20
Astraea undosa	0.0250	0.1118	20
Patiria miniata	0.0500	0.1539	20
Pisaster giganteus	0.0250	0.1118	20
Strongylocentrotus franciscanus	0.2500	0.5000	20
Strongylocentrotus purpuratus	4.4000	5.9573	20
Parastichopus parvamensis	0.4000	0.5026	20
Styela montereyensis	0.0000	0.0000	20
Lythrypnus dalli	0.0000	0.0000	20
Coryphopterus nicholsii	0.7500	1.1062	20
Alloclinus holderi	0.0250	0.1118	20

1992 BAND TRANSECT DATA: MEAN NUMBER PER M^2

Tethya aurantia	0.0375	0.0513	12
Allopora californica	0.0000	0.0000	12
Tealia lofotensis	0.0042	0.0104	12
Lophogorgia chilensis	0.0847	0.0770	12
Muricea fruticosa	0.0014	0.0048	12
Muricea californica	0.0014	0.0048	12
Panulirus interruptus	0.0000	0.0000	12
Haliotis rufescens	0.0000	0.0000	12
Haliotis corrugata	0.0083	0.0151	12
Haliotis fulgens	0.0000	0.0000	12
Kelletia kelletii	0.0236	0.0194	12
Megathura crenulata	0.0028	0.0065	12
Hinnites giganteus	0.0097	0.0132	12
Aplysia californica	0.0000	0.0000	12
Pycnopodia helianthoides	0.0014	0.0048	12
Lytechinus anamesus	0.0000	0.0000	12

LOCATION 10 SANTA CRUZ ISLAND - YELLOWBANKS

1992 RANDOM POINT CONTACT DATA: MEAN PERCENT COVER

Species	Mean	Std Dev	Cases
Green algae	0.1000	0.5000	25
Miscellaneous brown algae	5.9000	7.6335	25
Desmarestia spp.	0.0000	0.0000	25
Laminaria farlowii	15.5000	15.5958	25
Cystoseira spp.	39.9000	17.2524	25
Macrocystis,Eisenia,Pterygophora	24.9000	24.5212	25
Miscellaneous red algae	5.6000	10.0073	25
Articulated coralline algae	32.4000	15.9993	25
Crustose coralline algae	61.9000	10.8321	25
Gelidium spp.	0.0000	0.0000	25
Gigartina spp.	0.0000	0.0000	25
Miscellaneous plants	0.0000	0.0000	25
Sponges	3.2000	5.6605	25
Corynactis californica	0.1000	0.5000	25
Balanophyllia elegans	0.2000	0.6922	25
Astrangia lajollaensis	0.8000	1.3919	25
Diopatra ornata	0.9000	2.4875	25
Phragmatopoma californica	0.0000	0.0000	25
Serpulorbis squamigerus	0.0000	0.0000	25
Bryozoans	8.2000	10.3461	25
Diaperoecia californica	2.5000	3.8188	25
Tunicates	0.7000	1.8428	25
Miscellaneous invertebrates	8.4000	8.5355	25
Bare substrate	17.3000	12.6639	25
Rock	75.6000	24.8147	25
Cobble	17.0000	16.5044	25
Sand	7.3000	10.6781	25

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Total Fish Abundance	3.8681	14.4378	144
Chromis punctipinnis	7.5833	14.6502	12
Oxyjulis californica	34.1667	36.6403	12
Sebastes mystinus	0.0000	0.0000	12
Sebastes serranoides	0.0000	0.0000	12
Sebastes atrovirens	0.6667	0.8876	12
Paralabrax clathratus	1.1667	1.3371	12
Semicossyphus pulcher	2.2500	1.2881	12
Embiotoca jacksoni	0.4167	0.5149	12
Embiotoca lateralis	0.0000	0.0000	12
Damalichthys vacca	0.0000	0.0000	12
Hypsypops rubicundus	0.0833	0.2887	12
Girella nigricans	0.0833	0.2887	12

LOCATION 10 SANTA CRUZ ISLAND - YELLOWBANKS

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Species	Date (year/month/day)	Mean	Std Dev	Cases
Chromis punctipinnis	adult	0.0833	0.2887	12
	920904	0.0000	0.0000	4
	921020	0.1250	0.3536	8
Chromis punctipinnis	juvenile	7.5000	14.6938	12
	920904	1.2500	2.5000	4
	921020	10.6250	17.4105	8
Oxyjulis californica	adult	0.8333	1.5859	12
	920904	2.0000	2.4495	4
	921020	0.2500	0.4629	8
Oxyjulis californica	juvenile	33.3333	36.4550	12
	920904	16.2500	27.9568	4
	921020	41.8750	38.7720	8
Sebastes mystinus	adult	0.0000	0.0000	12
	920904	0.0000	0.0000	4
	921020	0.0000	0.0000	8
Sebastes mystinus	juvenile	0.0000	0.0000	12
	920904	0.0000	0.0000	4
	921020	0.0000	0.0000	8
Sebastes serranoides	adult	0.0000	0.0000	12
	920904	0.0000	0.0000	4
	921020	0.0000	0.0000	8

Sebastes serranoides juvenile	0.0000	0.0000
12		
920904	0.0000	0.0000
4		
921020	0.0000	0.0000
8		
Sebastes atrovirens adult	0.5000	0.6742
12		
920904	0.0000	0.0000
4		
921020	0.7500	0.7071
8		
Sebastes atrovirens juvenile	0.1667	0.3892
12		
920904	0.0000	0.0000
4		
921020	0.2500	0.4629
8		
Paralabrax clathratus adult	1.0833	1.3790
12		
920904	1.7500	0.9574
4		
921020	0.7500	1.4880
8		
Paralabrax clathratus juvenile	0.0833	0.2887
12		
920904	0.0000	0.0000
4		
921020	0.1250	0.3536
8		

LOCATION 10 SANTA CRUZ ISLAND - YELLOWBANKS

Semicossyphus pulcher male		0.0833	0.2887
12			
	920904	0.2500	0.5000
4			
	921020	0.0000	0.0000
8			
Semicossyphus pulcher female		2.1667	1.3371
12			
	920904	2.0000	1.4142
4			
	921020	2.2500	1.3887
8			
Embiotoca jacksoni adult		0.4167	0.5149
12			
	920904	0.5000	0.5774
4			
	921020	0.3750	0.5175
8			
Embiotoca jacksoni juvenile		0.0000	0.0000
12			
	920904	0.0000	0.0000
4			
	921020	0.0000	0.0000
8			
Embiotoca lateralis adult		0.0000	0.0000
12			
	920904	0.0000	0.0000
4			
	921020	0.0000	0.0000
8			
Embiotoca lateralis juvenile		0.0000	0.0000
12			
	920904	0.0000	0.0000
4			
	921020	0.0000	0.0000
8			
Damalichthys vacca adult		0.0000	0.0000
12			
	920904	0.0000	0.0000
4			
	921020	0.0000	0.0000
8			
Damalichthys vacca juvenile		0.0000	0.0000
12			
	920904	0.0000	0.0000
4			
	921020	0.0000	0.0000

8				
Hypsypops rubicundus adult			0.0833	0.2887
12				
	920904		0.2500	0.5000
4				
	921020		0.0000	0.0000
8				
Hypsypops rubicundus juvenile			0.0000	0.0000
12				
	920904		0.0000	0.0000
4				
	921020		0.0000	0.0000
8				
Girella nigricans adult			0.0833	0.2887
12				
	920904		0.2500	0.5000
4				
	921020		0.0000	0.0000
8				
Girella nigricans juvenile			0.0000	0.0000
12				
	920904		0.0000	0.0000
4				
	921020		0.0000	0.0000
8				

LOCATION 10 SANTA CRUZ ISLAND - YELLOWBANKS

1992 NATURAL HABITAT SIZE FREQUENCY DISTRIBUTIONS

Tethya aurantia

(cases) N=	21
< 10	4.8%
10 - 19	4.8%
20 - 29	14.3%
30 - 39	9.5%
40 - 49	14.3%
50 - 59	19.0%
60 - 69	19.0%
70 - 79	14.3%
80 - 89	0.0
90 - 99	0.0
> 99	0.0
min size (mm)	9
max size (mm)	79
mean	49
mode	29

Kelletia kelletii

(cases) N=	25
< 40	0.0
40 - 49	4.0%
50 - 59	4.0%
60 - 69	4.0%
70 - 79	8.0%
80 - 89	12.0%
90 - 99	32.0%
100 - 109	32.0%
110 - 119	0.0
120 - 129	4.0%
130 - 139	0.0
140 - 149	0.0
> 149	0.0
min size (mm)	43
max size (mm)	120
mean	91
mode	

Astraea undosa

(cases) N=	45
< 10	0.0
10 - 19	0.0
20 - 29	0.0
30 - 39	2.2%
40 - 49	4.4%
50 - 59	2.2%
60 - 69	4.4%
70 - 79	6.7%
80 - 89	8.9%
90 - 99	20.0%
100 - 109	40.0%
110 - 119	11.1%
> 119	0.0
min size (mm)	39
max size (mm)	111
mean	
mode	91

Megathura crenulata

(cases) N=	10
< 10	0.0
10 - 19	0.0
20 - 29	0.0
30 - 39	0.0
40 - 49	0.0
50 - 59	30.0%
60 - 69	0.0
70 - 79	60.0%
80 - 89	10.0%
90 - 99	0.0
100 - 109	0.0
110 - 119	0.0
> 119	0.0
min size (mm)	54
max size (mm)	82
mean	70
mode	54

LOCATION 10 SANTA CRUZ ISLAND - YELLOWBANKS

Haliotis corrugata

(cases) N=	15
< 25	6.7%
25 - 29	0.0
30 - 34	6.7%
35 - 39	0.0
40 - 44	0.0
45 - 49	0.0
50 - 54	0.0
55 - 59	0.0
60 - 64	0.0
65 - 69	0.0
70 - 74	0.0
75 - 79	0.0
80 - 84	0.0
85 - 90	0.0
90 - 94	0.0
95 - 99	0.0
100 - 104	0.0
105 - 109	0.0
110 - 114	0.0
115 - 119	6.7%
120 - 124	0.0
125 - 129	0.0
130 - 134	0.0
135 - 139	26.7%
140 - 144	6.7%
145 - 149	13.3%
150 - 154	13.3%
155 - 159	20.0%
160 - 164	0.0
165 - 169	0.0
170 - 174	0.0
175 - 179	0.0
> 180	0.0
min size (mm)	15
max size (mm)	159
mean	128
mode	15

Patiria miniata

(cases) N=	31
< 10	0.0
10 - 19	3.2%
20 - 29	0.0
30 - 39	12.9%
40 - 49	19.4%
50 - 59	12.9%
60 - 69	25.8%
70 - 79	12.9%
80 - 89	6.5%
90 - 99	6.5%
> 99	0.0
min size (mm)	13
max size (mm)	97
mean	58
mode	67

Pisaster giganteus

(cases) N=	12
< 20	8.3%
20 - 39	0.0
40 - 59	58.3%
60 - 79	16.7%
80 - 99	8.3%
100 - 119	0.0
120 - 139	0.0
140 - 159	0.0
160 - 179	0.0
180 - 199	0.0
200 - 219	0.0
220 - 239	0.0
240 - 259	8.3%
260 - 279	0.0
280 - 299	0.0
> 299	0.0
min size (mm)	13
max size (mm)	250
mean	70
mode	54

Strongylocentrotus franciscanus

(cases) N=	84
< 5	0.0
5 - 9	1.2%
10 - 14	6.0%
15 - 19	7.1%
20 - 24	7.1%
25 - 29	2.4%
30 - 34	2.4%
35 - 39	0.0
40 - 44	2.4%
45 - 49	1.2%
50 - 54	2.4%
55 - 59	1.2%
60 - 64	0.0
65 - 69	6.0%
70 - 74	14.3%
75 - 79	6.0%
80 - 84	14.3%
85 - 90	6.0%
90 - 94	10.7%
95 - 99	2.4%
100 - 104	3.6%
105 - 109	1.2%
> 109	2.4%
min size (mm)	7
max size (mm)	116
mean	64
mode	74

LOCATION 10 SANTA CRUZ ISLAND - YELLOWBANKS

Strongylocentrotus purpuratus	
(cases) N=	109
< 5	0.0
5 - 9	0.9%
10 - 14	2.8%
15 - 19	7.3%
20 - 24	12.8%
25 - 29	17.4%
30 - 34	21.1%
35 - 39	9.2%
40 - 44	13.8%
45 - 49	3.7%
50 - 54	4.6%
55 - 59	4.6%
60 - 64	0.0
65 - 69	0.9%
70 - 74	0.9%
75 - 79	0.0
80 - 84	0.0
85 - 90	0.0
90 - 94	0.0
95 - 99	0.0
100 - 104	0.0
105 - 109	0.0
> 109	0.0
min size (mm)	8
max size (mm)	72
mean	33
mode	32

Pycnopodia helianthoides	
(cases) N=	4
< 140	0.0
160 - 179	0.0
180 - 199	0.0
200 - 219	25.0%
220 - 239	25.0%
240 - 259	25.0%
260 - 279	25.0%
280 - 299	0.0
> 299	0.0
min size (mm)	210
max size (mm)	270
mean	240
mode	210

LOCATION 10 SANTA CRUZ ISLAND - YELLOWBANKS

Macrocystis pyrifera numbers of stipes

(cases) N=	91
< 3	3.3%
3 - 5	8.8%
6 - 8	3.3%
9 - 11	12.1%
12 - 14	13.2%
15 - 17	12.1%
18 - 20	13.2%
21 - 23	7.7%
24 - 26	11.0%
27 - 29	1.1%
30 - 32	7.7%
33 - 35	1.1%
36 - 38	2.2%
39 - 41	3.3%
42 - 44	0.0
>44	0.0
min number	2
max number	41
mean	18
mode	9

Macrocystis pyrifera holdfast diameters

(cases) N=	91
< 6	3.3%
6 - 11	3.3%
12 - 17	4.4%
18 - 23	9.9%
24 - 29	12.1%
30 - 35	18.7%
36 - 41	13.2%
42 - 47	11.0%
48 - 53	14.3%
54 - 59	6.6%
60 - 65	2.2%
66 - 71	0.0
72 - 77	1.1%
78 - 83	0.0
84 - 89	0.0
>89	0.0
min width (cm)	3
max width (cm)	72
mean	35
mode	25

Lophogorgia chilensis widths

(cases) N=	75
< 5	0.0
5 - 8	2.7%
9 - 12	13.3%
13 - 16	17.3%
17 - 20	14.7%
21 - 24	20.0%
25 - 28	8.0%
29 - 32	10.7%
33 - 36	6.7%
37 - 40	4.0%
41 - 44	1.3%
45 - 48	1.3%
49 - 52	0.0
53 - 56	0.0
57 - 60	0.0
>61	0.0
min width (cm)	5
max width (cm)	48
mean	22
mode	21

Lophogorgia chilensis heights

(cases) N=	75
< 5	0.0
5 - 8	1.3%
9 - 12	1.3%
13 - 16	10.7%
17 - 20	6.7%
21 - 24	14.7%
25 - 28	20.0%
29 - 32	14.7%
33 - 36	12.0%
37 - 40	8.0%
41 - 44	9.3%
45 - 48	0.0
49 - 52	0.0
53 - 56	1.3%
57 - 60	0.0
>61	0.0
min height (cm)	8
max height (cm)	54
mean	28
mode	26

LOCATION 10 SANTA CRUZ ISLAND - YELLOW BANKS

1992 ARTIFICIAL RECRUITMENT MODULE SIZE FREQUENCY DISTRIBUTIONS

Haliotis corrugata FROM 18 ARMs

(cases) N=	2
< 25	50.0%
25 - 29	0.0
30 - 34	0.0
35 - 39	50.0%
40 - 44	0.0
45 - 49	0.0
> 50	0.0
min size (mm)	14
max size (mm)	39
mean	27
mode	14

Cypraea spadicea FROM 6 ARMs

(cases) N=	72
< 30	2.8%
30 - 34	8.3%
35 - 39	47.2%
40 - 44	33.3%
45 - 49	5.6%
50 - 54	2.8%
55 - 59	0.0
> 59	0.0
min size (mm)	20
max size (mm)	50
mean	39
mode	39

Patiria miniata FROM 18 ARMs

(cases) N=	33
< 10	3.0%
10 - 19	48.5%
20 - 29	18.2%
30 - 39	12.1%
40 - 49	15.2%
50 - 59	0.0
60 - 69	3.0%
70 - 79	0.0
80 - 89	0.0
90 - 99	0.0
> 99	0.0
min size (mm)	8
max size (mm)	68
mean	25
mode	17

Pisaster giganteus FROM 18 ARMs

(cases) N=	81
< 20	21.0%
20 - 39	60.5%
40 - 59	16.0%
60 - 79	2.5%
80 - 99	0.0
> 100	0.0
min size (mm)	12
max size (mm)	77
mean	29
mode	21

LOCATION 10 SANTA CRUZ ISLAND - YELLOW BANKS

1992 ARTIFICIAL RECRUITMENT MODULE SIZE FREQUENCY DISTRIBUTIONS

Strongylocentrotus franciscanus FROM 6 ARMs

(cases) N=	143
< 5	0.0
5 - 9	7.7%
10 - 14	4.9%
15 - 19	7.7%
20 - 24	10.5%
25 - 29	11.2%
30 - 34	7.7%
35 - 39	9.8%
40 - 44	2.8%
45 - 49	6.3%
50 - 54	3.5%
55 - 59	3.5%
60 - 64	7.0%
65 - 69	7.7%
70 - 74	8.4%
75 - 79	0.0
80 - 84	1.4%
85 - 90	0.0
> 90	0.0
min size (mm)	5
max size (mm)	82
mean	38
mode	28

Hinnites giganteus FROM 18 ARMs

(cases) N=	8
< 10	12.5%
10 - 19	37.5%
20 - 29	0.0
30 - 39	0.0
40 - 49	25.0%
50 - 59	25.0%
60 - 69	0.0
70 - 79	0.0
80 - 89	0.0
90 - 99	0.0
> 100	0.0
min size (mm)	9
max size (mm)	54
mean	32
mode	15

Strongylocentrotus purpuratus FROM 6 ARMs

(cases) N=	549
< 5	0.4%
5 - 9	1.8%
10 - 14	2.6%
15 - 19	3.5%
20 - 24	3.8%
25 - 29	5.6%
30 - 34	9.1%
35 - 39	13.1%
40 - 44	18.0%
45 - 49	19.3%
50 - 54	15.8%
55 - 59	5.6%
60 - 64	1.3%
65 - 69	0.0
70 - 74	0.0
75 - 79	0.0
80 - 84	0.0
85 - 90	0.0
90 - 94	0.0
95 - 99	0.0
100 - 104	0.0
105 - 109	0.0
> 109	0.0
min size (mm)	4
max size (mm)	63
mean	40
mode	47

LOCATION 11 ANACAPA ISLAND - ADMIRAL'S REEF

1992 QUADRAT DATA: MEAN NUMBER PER M^2

Species	Mean	Std Dev	Cases
Macrocystis pyrifera adult	0.5250	0.5955	20
Eisenia arborea	0.5000	0.7609	20
Pterygophora californica	0.1750	0.4064	20
Laminaria farlowii	1.0500	1.6694	20
Macrocystis pyrifera juvenile	0.4500	0.5596	20
Macrocystis pyrifera all	0.9750	0.8025	20
Cypraea spadicea	0.1250	0.2751	20
Astraea undosa	0.0000	0.0000	20
Patiria miniata	0.0500	0.1539	20
Pisaster giganteus	0.0000	0.0000	20
Strongylocentrotus franciscanus	6.2500	5.0013	20
Strongylocentrotus purpuratus	4.3250	3.4841	20
Parastichopus parvamensis	0.8500	0.8127	20
Styela montereyensis	0.0000	0.0000	20
Lythrypnus dalli	0.0000	0.0000	20
Coryphopterus nicholsii	0.2750	0.4993	20
Alloclinus holderi	0.1000	0.2052	20

1992 BAND TRANSECT DATA: MEAN NUMBER PER M^2

Tethya aurantia	0.0014	0.0048	12
Allopora californica	0.0000	0.0000	12
Tealia lofotensis	0.0014	0.0048	12
Lophogorgia chilensis	0.0806	0.0308	12
Muricea fruticosa	0.0139	0.0199	12
Muricea californica	0.0319	0.0279	12
Panulirus interruptus	0.0000	0.0000	12
Haliotis rufescens	0.0014	0.0048	12
Haliotis corrugata	0.0097	0.0194	12
Haliotis fulgens	0.0000	0.0000	12
Kelletia kelletii	0.0153	0.0344	12
Megathura crenulata	0.0014	0.0048	12
Hinnites giganteus	0.1333	0.0873	12
Aplysia californica	0.0486	0.0557	12
Pycnopodia helianthoides	0.0000	0.0000	12
Lytechinus anamesus	1.6056	2.1388	12

LOCATION 11 ANACAPA ISLAND - ADMIRAL'S REEF

1992 RANDOM POINT CONTACT DATA: MEAN PERCENT COVER

Species	Mean	Std Dev	Cases
Green algae	4.5000	5.1031	25
Miscellaneous brown algae	50.4000	20.2160	25
Desmarestia spp.	0.0000	0.0000	25
Laminaria farlowii	8.2000	20.4573	25
Cystoseira spp.	18.8000	26.5569	25
Macrocystis,Eisenia,Pterygophora	35.4000	20.9623	25
Miscellaneous red algae	12.7000	13.0886	25
Articulated coralline algae	4.7000	5.4160	25
Crustose coralline algae	56.6000	18.4966	25
Gelidium spp.	1.0000	3.3072	25
Gigartina spp.	0.0000	0.0000	25
Miscellaneous plants	0.0000	0.0000	25
Sponges	6.8000	8.2449	25
Corynactis californica	2.0000	3.8864	25
Balanophyllia elegans	0.7000	1.5343	25
Astrangia lajollaensis	1.4000	2.0514	25
Diopatra ornata	0.5000	2.0412	25
Phragmatopoma californica	0.0000	0.0000	25
Serpulorbis squamigerus	1.5000	2.6021	25
Bryozoans	9.9000	9.9079	25
Diaperoecia californica	0.1000	0.5000	25
Tunicates	1.0000	2.0412	25
Miscellaneous invertebrates	36.9000	14.1841	25
Bare substrate	12.7000	12.3094	25
Rock	89.4000	15.1259	25
Cobble	3.5000	5.1539	25
Sand	7.1000	11.7854	25

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Total Fish Abundance	28.3438	89.1960	96
Chromis punctipinnis	312.8750	77.2425	8
Oxyjulis californica	22.0000	24.1720	8
Sebastes mystinus	0.0000	0.0000	8
Sebastes serranoides	0.0000	0.0000	8
Sebastes atrovirens	0.2500	0.4629	8
Paralabrax clathratus	0.8750	0.9910	8
Semicossyphus pulcher	1.2500	1.0351	8
Embiotoca jacksoni	0.2500	0.7071	8
Embiotoca lateralis	0.0000	0.0000	8
Damalichthys vacca	0.3750	0.7440	8
Hypsypops rubicundus	1.2500	0.8864	8
Girella nigricans	1.0000	1.4142	8

LOCATION 11 ANACAPA ISLAND - ADMIRAL'S REEF

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Species	Date (year/month/day)	Mean	Std Dev	Cases
Chromis punctipinnis	adult	50.3750	51.6442	8
	920821	95.7500	27.0601	4
	921021	5.0000	0.8165	4
Chromis punctipinnis	juvenile	262.5000	63.1325	8
	920821	247.5000	74.4424	4
	921021	277.5000	56.1991	4
Oxyjulis californica	adult	7.8750	7.0799	8
	920821	3.7500	5.6789	4
	921021	12.0000	6.2716	4
Oxyjulis californica	juvenile	14.1250	18.7802	8
	920821	1.2500	2.5000	4
	921021	27.0000	19.3563	4
Sebastes mystinus	adult	0.0000	0.0000	8
	920821	0.0000	0.0000	4
	921021	0.0000	0.0000	4
Sebastes mystinus	juvenile	0.0000	0.0000	8
	920821	0.0000	0.0000	4
	921021	0.0000	0.0000	4
Sebastes serranoides	adult	0.0000	0.0000	8
	920821	0.0000	0.0000	4
	921021	0.0000	0.0000	4

Sebastes serranoides juvenile	0.0000	0.0000
8		
920821	0.0000	0.0000
4		
921021	0.0000	0.0000
4		
Sebastes atrovirens adult	0.2500	0.4629
8		
920821	0.2500	0.5000
4		
921021	0.2500	0.5000
4		
Sebastes atrovirens juvenile	0.0000	0.0000
8		
920821	0.0000	0.0000
4		
921021	0.0000	0.0000
4		
Paralabrax clathratus adult	0.7500	1.0351
8		
920821	0.5000	0.5774
4		
921021	1.0000	1.4142
4		
Paralabrax clathratus juvenile	0.1250	0.3536
8		
920821	0.0000	0.0000
4		
921021	0.2500	0.5000
4		

LOCATION 11 ANACAPA ISLAND - ADMIRAL'S REEF

Semicossyphus pulcher male		0.1250	0.3536
8			
	920821	0.0000	0.0000
4			
	921021	0.2500	0.5000
4			
Semicossyphus pulcher female		1.1250	1.1260
8			
	920821	0.7500	0.9574
4			
	921021	1.5000	1.2910
4			
Embiotoca jacksoni adult		0.2500	0.7071
8			
	920821	0.0000	0.0000
4			
	921021	0.5000	1.0000
4			
Embiotoca jacksoni juvenile		0.0000	0.0000
8			
	920821	0.0000	0.0000
4			
	921021	0.0000	0.0000
4			
Embiotoca lateralis adult		0.0000	0.0000
8			
	920821	0.0000	0.0000
4			
	921021	0.0000	0.0000
4			
Embiotoca lateralis juvenile		0.0000	0.0000
8			
	920821	0.0000	0.0000
4			
	921021	0.0000	0.0000
4			
Damalichthys vacca adult		0.3750	0.7440
8			
	920821	0.0000	0.0000
4			
	921021	0.7500	0.9574
4			
Damalichthys vacca juvenile		0.0000	0.0000
8			
	920821	0.0000	0.0000
4			

	921021	0.0000	0.0000
4			
Hypsypops rubicundus adult		1.2500	0.8864
8			
	920821	1.0000	0.0000
4			
	921021	1.5000	1.2910
4			
Hypsypops rubicundus juvenile		0.0000	0.0000
8			
	920821	0.0000	0.0000
4			
	921021	0.0000	0.0000
4			
Girella nigricans adult		1.0000	1.4142
8			
	920821	1.2500	1.8930
4			
	921021	0.7500	0.9574
4			
Girella nigricans juvenile		0.0000	0.0000
8			
	920821	0.0000	0.0000
4			
	921021	0.0000	0.0000
4			

LOCATION 11 ANACAPA ISLAND - ADMIRAL'S REEF

1992 NATURAL HABITAT SIZE FREQUENCY DISTRIBUTIONS

Haliotis corrugata

(cases) N=	43
< 25	0.0
25 - 29	0.0
30 - 34	0.0
35 - 39	0.0
40 - 44	0.0
45 - 49	2.3%
50 - 54	0.0
55 - 59	0.0
60 - 64	0.0
65 - 69	2.3%
70 - 74	0.0
75 - 79	0.0
80 - 84	0.0
85 - 90	0.0
90 - 94	7.0%
95 - 99	4.7%
100 - 104	2.3%
105 - 109	4.7%
110 - 114	14.0%
115 - 119	7.0%
120 - 124	9.3%
125 - 129	9.3%
130 - 134	11.6%
135 - 139	9.3%
140 - 144	9.3%
145 - 149	2.3%
150 - 154	2.3%
155 - 159	0.0
160 - 164	2.3%
165 - 169	0.0
170 - 174	0.0
175 - 179	0.0
180 - 184	0.0
185 - 189	0.0
190 - 194	0.0
195 - 199	0.0
> 199	0.0
min size (mm)	46
max size (mm)	162
mean	120
mode	130

Hinnites giganteus

(cases) N=	66
< 10	0.0
10 - 19	1.5%
20 - 29	4.5%
30 - 39	18.2%
40 - 49	18.2%
50 - 59	13.6%
60 - 69	15.2%
70 - 79	13.6%
80 - 89	7.6%
90 - 99	4.5%
100 - 109	1.5%
110 - 119	0.0
120 - 129	0.0
130 - 139	1.5%
140 - 149	0.0
> 149	0.0
min size (mm)	14
max size (mm)	130
mean	57
mode	71

Patiria miniata

(cases) N=	25
< 10	0.0
10 - 19	0.0
20 - 29	0.0
30 - 39	0.0
40 - 49	4.0%
50 - 59	32.0%
60 - 69	44.0%
70 - 79	8.0%
80 - 89	12.0%
90 - 99	0.0
> 99	0.0
min size (mm)	45
max size (mm)	89
mean	64
mode	58

LOCATION 11 ANACAPA ISLAND - ADMIRAL'S REEF

Pisaster giganteus

(cases) N=	10
< 20	0.0
20 - 39	0.0
40 - 59	0.0
60 - 79	0.0
80 - 99	0.0
100 - 119	20.0%
120 - 139	10.0%
140 - 159	30.0%
160 - 179	40.0%
180 - 199	0.0
200 - 219	0.0
220 - 239	0.0
240 - 259	0.0
260 - 279	0.0
280 - 299	0.0
> 299	0.0
min size (mm)	105
max size (mm)	178
mean	147
mode	105

Lytechinus anamesus

(cases) N=	137
< 5	0.0
5 - 9	0.0
10 - 14	0.0
15 - 19	0.0
20 - 24	0.0
25 - 29	19.7%
30 - 34	56.9%
35 - 39	22.6%
40 - 44	0.7%
45 - 49	0.0
> 49	0.0
min size (mm)	25
max size (mm)	42
mean	32
mode	34

Strongylocentrotus franciscanus

(cases) N=	134
< 5	0.0
5 - 9	0.0
10 - 14	0.7%
15 - 19	0.7%
20 - 24	1.5%
25 - 29	0.7%
30 - 34	1.5%
35 - 39	8.2%
40 - 44	2.2%
45 - 49	6.7%
50 - 54	5.2%
55 - 59	11.2%
60 - 64	9.7%
65 - 69	13.4%
70 - 74	9.0%
75 - 79	11.9%
80 - 84	8.2%
85 - 90	1.5%
90 - 94	3.0%
95 - 99	0.7%
100 - 104	0.7%
105 - 109	0.0
> 109	3.0%
min size (mm)	14
max size (mm)	132
mean	64
mode	77

Strongylocentrotus purpuratus

(cases) N=	191
< 5	0.0
5 - 9	2.1%
10 - 14	2.1%
15 - 19	6.3%
20 - 24	8.9%
25 - 29	11.0%
30 - 34	13.6%
35 - 39	14.7%
40 - 44	11.5%
45 - 49	8.9%
50 - 54	13.6%
55 - 59	4.2%
60 - 64	2.1%
65 - 69	1.0%
70 - 74	0.0
75 - 79	0.0
80 - 84	0.0
85 - 90	0.0
>90	0.0
min size (mm)	5
max size (mm)	66
mean	37
mode	39

LOCATION 11 ANACAPA ISLAND - ADMIRAL'S REEF

Macrocystis pyrifera numbers of stipes

(cases) N=	100
< 3	42.0%
3 - 5	28.0%
6 - 8	11.0%
9 - 11	4.0%
12 - 14	3.0%
15 - 17	2.0%
18 - 20	1.0%
21 - 23	2.0%
24 - 26	2.0%
27 - 29	1.0%
30 - 32	0.0
33 - 35	1.0%
36 - 38	0.0
39 - 41	0.0
42 - 44	2.0%
>44	1.0%
min number	1
max number	49
mean	7
mode	2

Macrocystis pyrifera holdfast diameters

(cases) N=	100
< 6	37.0%
6 - 11	34.0%
12 - 17	6.0%
18 - 23	0.0
24 - 29	3.0%
30 - 35	2.0%
36 - 41	8.0%
42 - 47	3.0%
48 - 53	3.0%
54 - 59	0.0
60 - 65	2.0%
66 - 71	1.0%
72 - 77	1.0%
78 - 83	0.0
84 - 89	0.0
>89	0.0
min width (cm)	1
max width (cm)	74
mean	15
mode	4

Lophogorgia chilensis widths

(cases) N=	33
< 5	0.0
5 - 8	3.0%
9 - 12	6.1%
13 - 16	6.1%
17 - 20	6.1%
21 - 24	9.1%
25 - 28	12.1%
29 - 32	6.1%
33 - 36	15.2%
37 - 40	9.1%
41 - 44	0.0
45 - 48	3.0%
49 - 52	9.1%
53 - 56	0.0
57 - 60	6.1%
61 - 64	3.0%
>65	6.1%
min width (cm)	8
max width (cm)	74
mean	35
mode	26

Lophogorgia chilensis heights

(cases) N=	33
< 5	0.0
5 - 8	0.0
9 - 12	3.0%
13 - 16	0.0
17 - 20	9.1%
21 - 24	9.1%
25 - 28	21.2%
29 - 32	6.1%
33 - 36	0.0
37 - 40	12.1%
41 - 44	9.1%
45 - 48	6.1%
49 - 52	6.1%
53 - 56	3.0%
57 - 60	6.1%
61 - 64	6.1%
65 - 68	3.0%
>69	0.0
min height (cm)	12
max height (cm)	65
mean	37
mode	27

LOCATION 11 ANACAPA ISLAND - ADMIRAL'S REEF

Muricea fruticosa widths

(cases) N=	21
< 5	0.0
5 - 8	0.0
9 - 12	0.0
13 - 16	0.0
17 - 20	4.8%
21 - 24	14.3%
25 - 28	9.5%
29 - 32	23.8%
33 - 36	28.6%
37 - 40	4.8%
41 - 44	14.3%
45 - 48	0.0
49 - 52	0.0
53 - 56	0.0
57 - 60	0.0
>60	0.0
min width (cm)	19
max width (cm)	43
mean	32
mode	36

Muricea fruticosa heights

(cases) N=	21
< 5	0.0
5 - 8	4.8%
9 - 12	4.8%
13 - 16	4.8%
17 - 20	23.8%
21 - 24	23.8%
25 - 28	23.8%
29 - 32	14.3%
33 - 36	0.0
37 - 40	0.0
41 - 44	0.0
45 - 48	0.0
49 - 52	0.0
53 - 56	0.0
57 - 60	0.0
>60	0.0
min height (cm)	8
max height (cm)	31
mean	22
mode	23

Muricea californica widths

(cases) N=	50
< 5	0.0
5 - 8	0.0
9 - 12	0.0
13 - 16	0.0
17 - 20	2.0%
21 - 24	2.0%
25 - 28	2.0%
29 - 32	0.0
33 - 36	2.0%
37 - 40	4.0%
41 - 44	6.0%
45 - 48	6.0%
49 - 52	6.0%
53 - 56	6.0%
57 - 60	2.0%
61 - 64	4.0%
65 - 68	6.0%
69 - 72	4.0%
73 - 76	4.0%
77 - 80	10.0%
81 - 84	6.0%
85 - 88	2.0%
89 - 92	12.0%
93 - 96	4.0%
97 - 100	0.0
>100	8.0%
min width (cm)	20
max width (cm)	123
mean	69
mode	90

Muricea californica heights

(cases) N=	50
< 5	0.0
5 - 8	0.0
9 - 12	0.0
13 - 16	0.0
17 - 20	0.0
21 - 24	4.0%
25 - 28	8.0%
29 - 32	6.0%
33 - 36	6.0%
37 - 40	8.0%
41 - 44	6.0%
45 - 48	10.0%
49 - 52	8.0%
53 - 56	0.0
57 - 60	8.0%
61 - 64	10.0%
65 - 68	8.0%
69 - 72	6.0%
73 - 76	6.0%
77 - 80	2.0%
81 - 84	4.0%
85 - 88	0.0
89 - 92	0.0
93 - 96	0.0
97 - 100	0.0
>100	0.0
min height (cm)	22
max height (cm)	81
mean	51
mode	28

LOCATION 11 ANACAPA ISLAND - ADMIRAL'S REEF

1992 ARTIFICIAL RECRUITMENT MODULE SIZE FREQUENCY DISTRIBUTIONS

Haliotis corrugata FROM 7 ARMs

(cases) N=	1
< 25	100.0%
25 - 29	0.0
30 - 34	0.0
35 - 39	0.0
40 - 44	0.0
45 - 49	0.0
> 50	0.0
min size (mm)	24
max size (mm)	24
mean	24
mode	24

Cypraea spadicea FROM 6 ARMs

(cases) N=	14
< 30	0.0
30 - 34	0.0
35 - 39	0.0
40 - 44	28.6%
45 - 49	35.7%
50 - 54	35.7%
55 - 59	0.0
> 59	0.0
min size (mm)	40
max size (mm)	54
mean	47
mode	45

Lytechinus anamesus FROM 6 ARMs

(cases) N=	13
< 5	0.0
5 - 9	0.0
10 - 14	7.7%
15 - 19	7.7%
20 - 24	7.7%
25 - 29	38.5%
30 - 34	30.8%
35 - 39	7.7%
40 - 44	0.0
45 - 49	0.0
> 49	0.0
min size (mm)	12
max size (mm)	36
mean	27
mode	29

Hinnites *giganteus* FROM 7 ARMs

(cases) N=	62
< 10	33.9%
10 - 19	46.8%
20 - 29	8.1%
30 - 39	1.6%
40 - 49	4.8%
50 - 59	4.8%
60 - 69	0.0
> 70	0.0
min size (mm)	3
max size (mm)	57
mean	15
mode	10

Patiria miniata FROM 7 ARMs

(cases) N=	36
< 10	8.3%
10 - 19	19.4%
20 - 29	13.9%
30 - 39	11.1%
40 - 49	16.7%
50 - 59	8.3%
60 - 69	16.7%
70 - 79	2.8%
80 - 89	2.8%
90 - 99	0.0
> 99	0.0
min size (mm)	6
max size (mm)	86
mean	37
mode	7

LOCATION 11 ANACAPA ISLAND - ADMIRAL'S REEF

1992 ARTIFICIAL RECRUITMENT MODULE SIZE FREQUENCY DISTRIBUTIONS

Strongylocentrotus franciscanus FROM 6 ARMs

(cases) N=	62
< 5	0.0
5 - 9	6.5%
10 - 14	16.1%
15 - 19	11.3%
20 - 24	16.1%
25 - 29	3.2%
30 - 34	9.7%
35 - 39	9.7%
40 - 44	9.7%
45 - 49	4.8%
50 - 54	3.2%
55 - 59	1.6%
60 - 64	3.2%
65 - 69	0.0
70 - 74	1.6%
75 - 79	3.2%
80 - 84	0.0
85 - 90	0.0
> 90	0.0
min size (mm)	6
max size (mm)	76
mean	30
mode	20

Megathura crenulata FROM 6 ARMs

(cases) N=	1
< 10	0.0
10 - 19	0.0
20 - 29	0.0
30 - 39	100.0%
40 - 49	0.0
50 - 59	0.0
> 60	0.0
min size (mm)	35
max size (mm)	35
mean	35
mode	35

Strongylocentrotus purpuratus FROM 6 ARMs

(cases) N=	140
< 5	1.4%
5 - 9	7.9%
10 - 14	16.4%
15 - 19	12.9%
20 - 24	23.6%
25 - 29	10.7%
30 - 34	15.0%
35 - 39	6.4%
40 - 44	2.9%
45 - 49	0.7%
50 - 54	2.1%
55 - 59	0.0
> 60	0.0
min size (mm)	4
max size (mm)	53
mean	23
mode	20

Pisaster giganteus FROM 7 ARMs

(cases) N=	5
< 20	60.0%
20 - 39	0.0
40 - 59	40.0%
60 - 79	0.0
80 - 99	0.0
> 100	0.0
min size (mm)	3
max size (mm)	43
mean	20
mode	3

LOCATION 12 ANACAPA ISLAND - CATHEDRAL COVE

1992 QUADRAT DATA: MEAN NUMBER PER M^2

Species	Mean	Std Dev	Cases
Macrocystis pyrifera adult	1.2000	2.0926	20
Eisenia arborea	0.0000	0.0000	20
Pterygophora californica	0.0000	0.0000	20
Laminaria farlowii	0.6500	0.7452	20
Macrocystis pyrifera juvenile	1.0750	1.0295	20
Macrocystis pyrifera all	2.2750	2.7790	20
Cypraea spadicea	0.1500	0.4617	20
Astraea undosa	1.3250	1.2489	20
Patiria miniata	0.0000	0.0000	20
Pisaster giganteus	0.0000	0.0000	20
Strongylocentrotus franciscanus	4.3250	3.2252	20
Strongylocentrotus purpuratus	1.3750	2.6302	20
Parastichopus parvamensis	0.4750	0.4435	20
Styela montereyensis	0.0000	0.0000	20
Lythrypnus dalli	0.0250	0.1118	20
Coryphopterus nicholsii	0.2750	0.3432	20
Alloclinus holderi	0.4750	0.5250	20

1992 BAND TRANSECT DATA: MEAN NUMBER PER M^2

Tethya aurantia	0.0000	0.0000	12
Allopora californica	0.0000	0.0000	12
Tealia lofotensis	0.0000	0.0000	12
Lophogorgia chilensis	0.0014	0.0048	12
Muricea fruticosa	0.0000	0.0000	12
Muricea californica	0.0000	0.0000	12
Panulirus interruptus	0.0222	0.0462	12
Haliotis rufescens	0.0000	0.0000	12
Haliotis corrugata	0.0028	0.0096	12
Haliotis fulgens	0.0000	0.0000	12
Kelletia kelletii	0.0000	0.0000	12
Megathura crenulata	0.0292	0.0711	12
Hinnites giganteus	0.2014	0.2837	12
Aplysia californica	0.0153	0.0261	12
Pycnopodia helianthoides	0.0000	0.0000	12
Lytechinus anamesus	0.0000	0.0000	12

LOCATION 12 ANACAPA ISLAND - CATHEDRAL COVE

1992 RANDOM POINT CONTACT DATA: MEAN PERCENT COVER

Species	Mean	Std Dev	Cases
Green algae	1.1000	3.0687	25
Miscellaneous brown algae	6.0000	6.9597	25
Desmarestia spp.	0.1000	0.5000	25
Laminaria farlowii	4.6000	9.6469	25
Cystoseira spp.	21.3000	16.5536	25
Macrocystis,Eisenia,Pterygophora	33.1000	22.7564	25
Miscellaneous red algae	6.3000	5.9126	25
Articulated coralline algae	24.1000	10.3552	25
Crustose coralline algae	50.4000	22.4499	25
Gelidium spp.	0.0000	0.0000	25
Gigartina spp.	0.0000	0.0000	25
Miscellaneous plants	0.0000	0.0000	25
Sponges	0.5000	1.0206	25
Corynactis californica	0.0000	0.0000	25
Balanophyllia elegans	0.0000	0.0000	25
Astrangia lajollaensis	1.5000	2.0412	25
Diopatra ornata	1.3000	3.3942	25
Phragmatopoma californica	0.0000	0.0000	25
Serpulorbis squamigerus	3.2000	3.3479	25
Bryozoans	2.4000	3.4970	25
Diaperoecia californica	1.9000	5.6032	25
Tunicates	2.3000	2.9686	25
Miscellaneous invertebrates	16.5000	10.4831	25
Bare substrate	25.4000	18.0376	25
Rock	70.1000	20.0193	25
Cobble	9.4000	10.3401	25
Sand	20.5000	15.9263	25

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Total Fish Abundance	18.3125	59.0817	144
Chromis punctipinnis	199.4167	79.1701	12
Oxyjulis californica	2.0000	1.7056	12
Sebastes mystinus	0.0000	0.0000	12
Sebastes serranoides	0.2500	0.4523	12
Sebastes atrovirens	1.7500	1.7645	12
Paralabrax clathratus	5.4167	2.7455	12
Semicossyphus pulcher	2.3333	2.3868	12
Embiotoca jacksoni	3.1667	3.1861	12
Embiotoca lateralis	0.0000	0.0000	12
Damalichthys vacca	0.0833	0.2887	12
Hypsypops rubicundus	4.5000	2.8123	12
Girella nigricans	0.8333	1.1146	12

LOCATION 12 ANACAPA ISLAND - CATHEDRAL COVE

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Species	Date (year/month/day)	Mean	Std Dev	Cases
Chromis punctipinnis	adult	18.0833	23.4345	12
	920820	4.0000	3.9158	4
	921023	25.1250	26.1994	8
Chromis punctipinnis	juvenile	181.3333	76.1701	12
	920820	112.7500	66.7601	4
	921023	215.6250	56.3508	8
Oxyjulis californica	adult	1.4167	1.1645	12
	920820	1.7500	0.9574	4
	921023	1.2500	1.2817	8
Oxyjulis californica	juvenile	0.5833	1.1645	12
	920820	1.5000	1.7321	4
	921023	0.1250	0.3536	8
Sebastes mystinus	adult	0.0000	0.0000	12
	920820	0.0000	0.0000	4
	921023	0.0000	0.0000	8
Sebastes mystinus	juvenile	0.0000	0.0000	12
	920820	0.0000	0.0000	4
	921023	0.0000	0.0000	8
Sebastes serranoides	adult	0.2500	0.4523	12
	920820	0.2500	0.5000	4
	921023	0.2500	0.4629	8

Sebastes serranoides juvenile		0.0000	0.0000
12			
	920820	0.0000	0.0000
4			
	921023	0.0000	0.0000
8			
Sebastes atrovirens adult		1.7500	1.7645
12			
	920820	0.0000	0.0000
4			
	921023	2.6250	1.5059
8			
Sebastes atrovirens juvenile		0.0000	0.0000
12			
	920820	0.0000	0.0000
4			
	921023	0.0000	0.0000
8			
Paralabrax clathratus adult		4.1667	2.0817
12			
	920820	3.0000	1.4142
4			
	921023	4.7500	2.1876
8			
Paralabrax clathratus juvenile		1.2500	1.2154
12			
	920820	0.5000	0.5774
4			
	921023	1.6250	1.3025
8			

LOCATION 12 ANACAPA ISLAND - CATHEDRAL COVE

Semicossyphus pulcher male		0.0833	0.2887
12			
	920820	0.2500	0.5000
4			
	921023	0.0000	0.0000
8			
Semicossyphus pulcher female		2.2500	2.2208
12			
	920820	3.7500	2.6300
4			
	921023	1.5000	1.6903
8			
Embiotoca jacksoni adult		2.5000	3.2051
12			
	920820	5.7500	3.8622
4			
	921023	0.8750	0.8345
8			
Embiotoca jacksoni juvenile		0.6667	0.7785
12			
	920820	1.0000	0.8165
4			
	921023	0.5000	0.7559
8			
Embiotoca lateralis adult		0.0000	0.0000
12			
	920820	0.0000	0.0000
4			
	921023	0.0000	0.0000
8			
Embiotoca lateralis juvenile		0.0000	0.0000
12			
	920820	0.0000	0.0000
4			
	921023	0.0000	0.0000
8			
Damalichthys vacca adult		0.0833	0.2887
12			
	920820	0.0000	0.0000
4			
	921023	0.1250	0.3536
8			
Damalichthys vacca juvenile		0.0000	0.0000
12			
	920820	0.0000	0.0000
4			

	921023	0.0000	0.0000
8			
Hypsypops rubicundus adult		3.9167	2.8110
12			
	920820	3.5000	1.2910
4			
	921023	4.1250	3.3991
8			
Hypsypops rubicundus juvenile		0.5833	0.9962
12			
	920820	0.0000	0.0000
4			
	921023	0.8750	1.1260
8			
Girella nigricans adult		0.8333	1.1146
12			
	920820	1.2500	0.9574
4			
	921023	0.6250	1.1877
8			
Girella nigricans juvenile		0.0000	0.0000
12			
	920820	0.0000	0.0000
4			
	921023	0.0000	0.0000
8			

LOCATION 12 ANACAPA ISLAND - CATHEDRAL COVE

1992 NATURAL HABITAT SIZE FREQUENCY DISTRIBUTIONS

Haliotis corrugata

(cases) N=	23
< 25	43.5%
25 - 29	0.0
30 - 34	8.7%
35 - 39	0.0
40 - 44	0.0
45 - 49	0.0
50 - 54	0.0
55 - 59	0.0
60 - 64	0.0
65 - 69	0.0
70 - 74	0.0
75 - 79	0.0
80 - 84	0.0
85 - 90	0.0
90 - 94	0.0
95 - 99	0.0
100 - 104	0.0
105 - 109	0.0
110 - 114	0.0
115 - 119	0.0
120 - 124	4.3%
125 - 129	4.3%
130 - 134	4.3%
135 - 139	8.7%
140 - 144	8.7%
145 - 149	8.7%
150 - 154	0.0
155 - 159	4.3%
160 - 164	4.3%
165 - 169	0.0
170 - 174	0.0
175 - 179	0.0
180 - 184	0.0
185 - 189	0.0
190 - 194	0.0
195 - 199	0.0
> 199	0.0
min size (mm)	6
max size (mm)	163
mean	77
mode	19

Astraea undosa

(cases) N=	99
< 10	1.0%
10 - 19	0.0
20 - 29	3.0%
30 - 39	2.0%
40 - 49	9.1%
50 - 59	4.0%
60 - 69	11.1%
70 - 79	21.2%
80 - 89	28.3%
90 - 99	15.2%
100 - 109	4.0%
110 - 119	1.0%
> 119	0.0
min size (mm)	8
max size (mm)	114
mean	74
mode	82

Hinnites giganteus

(cases) N=	57
< 10	0.0
10 - 19	0.0
20 - 29	0.0
30 - 39	1.8%
40 - 49	10.5%
50 - 59	22.8%
60 - 69	15.8%
70 - 79	10.5%
80 - 89	14.0%
90 - 99	10.5%
100 - 109	5.3%
110 - 119	3.5%
120 - 129	5.3%
130 - 139	0.0
140 - 149	0.0
> 149	0.0
min size (mm)	31
max size (mm)	128
mean	74
mode	52

LOCATION 12 ANACAPA ISLAND - CATHEDRAL COVE

Strongylocentrotus franciscanus

(cases) N=	126
< 5	0.8%
5 - 9	4.8%
10 - 14	9.5%
15 - 19	11.1%
20 - 24	11.1%
25 - 29	1.6%
30 - 34	1.6%
35 - 39	1.6%
40 - 44	2.4%
45 - 49	2.4%
50 - 54	1.6%
55 - 59	0.8%
60 - 64	3.2%
65 - 69	3.2%
70 - 74	7.1%
75 - 79	11.1%
80 - 84	9.5%
85 - 90	4.0%
90 - 94	4.8%
95 - 99	3.2%
100 - 104	2.4%
105 - 109	2.4%
> 109	0.0
min size (mm)	2
max size (mm)	108
mean	52
mode	10

Strongylocentrotus purpuratus

(cases) N=	114
< 5	1.8%
5 - 9	10.5%
10 - 14	19.3%
15 - 19	13.2%
20 - 24	9.6%
25 - 29	4.4%
30 - 34	6.1%
35 - 39	5.3%
40 - 44	9.6%
45 - 49	13.2%
50 - 54	6.1%
55 - 59	0.9%
60 - 64	0.0
65 - 69	0.0
70 - 74	0.0
75 - 79	0.0
80 - 84	0.0
85 - 90	0.0
90 - 94	0.0
95 - 99	0.0
100 - 104	0.0
105 - 109	0.0
> 109	0.0
min size (mm)	4
max size (mm)	59
mean	27
mode	11

Patiria miniata

(cases) N=	59
< 10	33.9%
10 - 19	39.0%
20 - 29	13.6%
30 - 39	10.2%
40 - 49	1.7%
50 - 59	1.7%
60 - 69	0.0
70 - 79	0.0
80 - 89	0.0
90 - 99	0.0
> 99	0.0
min size (mm)	4
max size (mm)	53
mean	16
mode	8

Megathura crenulata

(cases) N=	6
< 10	16.7%
10 - 19	0.0
20 - 29	16.7%
30 - 39	0.0
40 - 49	0.0
50 - 59	16.7%
60 - 69	33.3%
70 - 79	16.7%
80 - 89	0.0
90 - 99	0.0
100 - 109	0.0
110 - 119	0.0
> 119	0.0
min size (mm)	0
max size (mm)	75
mean	48
mode	68

LOCATION 12 ANACAPA ISLAND - CATHEDRAL COVE

Macrocystis pyrifera numbers of stipes	
(cases) N=	138
< 3	34.1%
3 - 5	21.7%
6 - 8	13.0%
9 - 11	5.1%
12 - 14	6.5%
15 - 17	2.9%
18 - 20	3.6%
21 - 23	0.7%
24 - 26	5.8%
27 - 29	2.2%
30 - 32	2.2%
33 - 35	1.4%
36 - 38	0.0
39 - 41	0.0
42 - 44	0.0
>44	0.7%
min number	1
max number	46
mean	8
mode	2

Macrocystis pyrifera holdfast diameters	
(cases) N=	138
< 6	12.3%
6 - 11	23.9%
12 - 17	28.3%
18 - 23	8.0%
24 - 29	8.7%
30 - 35	9.4%
36 - 41	8.0%
42 - 47	0.7%
48 - 53	0.7%
54 - 59	0.0
60 - 65	0.0
66 - 71	0.0
72 - 77	0.0
78 - 83	0.0
84 - 89	0.0
>89	0.0
min width (cm)	2
max width (cm)	51
mean	17
mode	15

LOCATION 12 ANACAPA ISLAND - CATHEDRAL COVE

1992 ARTIFICIAL RECRUITMENT MODULE SIZE FREQUENCY DISTRIBUTIONS

Haliotis corrugata FROM 7 ARMs

(cases) N=	1
< 25	100.0%
25 - 29	0.0
30 - 34	0.0
35 - 39	0.0
> 40	0.0
min size (mm)	22
max size (mm)	22
mean	22
mode	22

Cypraea spadicea FROM 4 ARMs

(cases) N=	27
< 30	0.0
30 - 34	7.4%
35 - 39	44.4%
40 - 44	29.6%
45 - 49	14.8%
50 - 54	3.7%
55 - 59	0.0
> 59	0.0
min size (mm)	32
max size (mm)	50
mean	40
mode	38

Pisaster giganteus FROM 4 ARMs

(cases) N=	2
< 20	0.0
20 - 39	100.0%
40 - 59	0.0
60 - 79	0.0
> 80	0.0
min size (mm)	26
max size (mm)	34
mean	30
mode	26

Hinnites giganteus FROM 7 ARMs

(cases) N=	23
< 10	39.1%
10 - 19	26.1%
20 - 29	0.0
30 - 39	21.7%
40 - 49	13.0%
50 - 59	0.0
> 60	0.0
min size (mm)	5
max size (mm)	44
mean	19
mode	6

Patiria miniata FROM 4 ARMs

(cases) N=	21
< 10	0.0
10 - 19	38.1%
20 - 29	9.5%
30 - 39	14.3%
40 - 49	9.5%
50 - 59	14.3%
60 - 69	14.3%
70 - 79	0.0
80 - 89	0.0
90 - 99	0.0
> 99	0.0
min size (mm)	10
max size (mm)	67
mean	33
mode	12

LOCATION 12 ANACAPA ISLAND - CATHEDRAL COVE

1992 ARTIFICIAL RECRUITMENT MODULE SIZE FREQUENCY DISTRIBUTIONS

Strongylocentrotus franciscanus FROM 4 ARMs

(cases) N=	73
< 5	4.1%
5 - 9	23.3%
10 - 14	8.2%
15 - 19	5.5%
20 - 24	12.3%
25 - 29	12.3%
30 - 34	8.2%
35 - 39	4.1%
40 - 44	12.3%
45 - 49	1.4%
50 - 54	1.4%
55 - 59	1.4%
60 - 64	0.0
65 - 69	2.7%
70 - 74	1.4%
75 - 79	1.4%
80 - 84	0.0
85 - 90	0.0
> 90	0.0
min size (mm)	4
max size (mm)	75
mean	25
mode	7

Strongylocentrotus purpuratus FROM 4 ARMs

(cases) N=	136
< 5	2.9%
5 - 9	18.4%
10 - 14	13.2%
15 - 19	10.3%
20 - 24	17.6%
25 - 29	11.0%
30 - 34	6.6%
35 - 39	5.9%
40 - 44	5.1%
45 - 49	1.5%
50 - 54	5.1%
55 - 59	2.2%
60 - 64	0.0
65 - 69	0.0
> 70	0.0
min size (mm)	3
max size (mm)	59
mean	22
mode	20

LOCATION 13 ANACAPA ISLAND - LANDING COVE

1992 QUADRAT DATA: MEAN NUMBER PER M^2

Species	Mean	Std Dev	Cases
Macrocystis pyrifera adult	0.2750	0.3796	20
Eisenia arborea	1.0750	1.7265	20
Pterygophora californica	0.3250	0.5684	20
Laminaria farlowii	3.6750	2.9748	20
Macrocystis pyrifera juvenile	0.3250	0.4375	20
Macrocystis pyrifera all	0.6000	0.6996	20
Cypraea spadicea	0.0500	0.2236	20
Astraea undosa	0.6500	0.8900	20
Patiria miniata	0.0000	0.0000	20
Pisaster giganteus	0.0000	0.0000	20
Strongylocentrotus franciscanus	1.0750	1.5241	20
Strongylocentrotus purpuratus	2.1500	3.2971	20
Parastichopus parvamensis	0.4500	0.5826	20
Styela montereyensis	0.0000	0.0000	20
Lythrypnus dalli	0.0250	0.1118	20
Coryphopterus nicholsii	0.2750	0.5250	20
Alloclinus holderi	0.2750	0.4435	20

1992 BAND TRANSECT DATA: MEAN NUMBER PER M^2

Tethya aurantia	0.0028	0.0065	12
Allopora californica	0.0000	0.0000	12
Tealia lofotensis	0.0014	0.0048	12
Lophogorgia chilensis	0.0083	0.0167	12
Muricea fruticosa	0.0000	0.0000	12
Muricea californica	0.0000	0.0000	12
Panulirus interruptus	0.0222	0.0543	12
Haliotis rufescens	0.0000	0.0000	12
Haliotis corrugata	0.0431	0.0815	12
Haliotis fulgens	0.0000	0.0000	12
Kelletia kelletii	0.0000	0.0000	12
Megathura crenulata	0.0111	0.0205	12
Hinnites giganteus	0.9292	0.7166	12
Aplysia californica	0.0083	0.0241	12
Pycnopodia helianthoides	0.0000	0.0000	12
Lytechinus anamesus	0.0417	0.0740	12

LOCATION 13 ANACAPA ISLAND - LANDING COVE

1992 BAND TRANSECT DATA: MEAN PERCENT COVER

Species	Mean	Std Dev	Cases
Green algae	0.0000	0.0000	25
Miscellaneous brown algae	6.9000	9.2218	25
Desmarestia spp.	0.0000	0.0000	25
Laminaria farlowii	26.8000	29.3108	25
Cystoseira spp.	11.4000	15.9602	25
Macrocystis,Eisenia,Pterygophora	42.9000	38.6738	25
Miscellaneous red algae	0.6000	2.0767	25
Articulated coralline algae	29.8000	16.6132	25
Crustose coralline algae	57.0000	24.9896	25
Gelidium spp.	27.9000	40.8036	25
Gigartina spp.	0.1000	0.5000	25
Miscellaneous plants	0.0000	0.0000	25
Sponges	8.4000	11.7898	25
Corynactis californica	2.5000	3.8188	25
Balanophyllia elegans	0.1000	0.5000	25
Astrangia lajollaensis	0.7000	1.5343	25
Diopatra ornata	0.2000	0.6922	25
Phragmatopoma californica	0.6000	1.3070	25
Serpulorbis squamigerus	1.8000	3.6458	25
Bryozoans	5.0000	8.8093	25
Diaperoecia californica	2.7000	4.6165	25
Tunicates	0.1000	0.5000	25
Miscellaneous invertebrates	13.4000	13.8421	25
Bare substrate	15.8000	22.9891	25
Rock	77.4000	26.7656	25
Cobble	10.6000	13.4102	25
Sand	12.0000	21.6627	25

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Total Fish Abundance	21.5833	82.5590	96
Chromis punctipinnis	236.5000	185.9777	8
Oxyjulis californica	11.5000	13.9181	8
Sebastes mystinus	0.0000	0.0000	8
Sebastes serranoides	0.1250	0.3536	8
Sebastes atrovirens	0.7500	0.4629	8
Paralabrax clathratus	2.2500	1.0351	8
Semicossyphus pulcher	1.2500	1.0351	8
Embiotoca jacksoni	1.2500	1.1650	8
Embiotoca lateralis	0.0000	0.0000	8
Damalichthys vacca	0.0000	0.0000	8
Hypsypops rubicundus	3.2500	1.6690	8
Girella nigricans	2.1250	1.5526	8

LOCATION 13 ANACAPA ISLAND - LANDING COVE

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Species	Date (year/month/day)	Mean	Std Dev	Cases
Chromis punctipinnis	adult	36.2500	33.3970	8
	920731	64.0000	21.5252	4
	920901	8.5000	9.2556	4
Chromis punctipinnis	juvenile	200.2500	215.3149	8
	920731	0.0000	0.0000	4
	920901	400.5000	35.2278	4
Oxyjulis californica	adult	2.8750	1.7269	8
	920731	3.7500	2.0616	4
	920901	2.0000	0.8165	4
Oxyjulis californica	juvenile	8.6250	13.2551	8
	920731	12.0000	18.8326	4
	920901	5.2500	4.9917	4
Sebastes mystinus	adult	0.0000	0.0000	8
	920731	0.0000	0.0000	4
	920901	0.0000	0.0000	4
Sebastes mystinus	juvenile	0.0000	0.0000	8
	920731	0.0000	0.0000	4
	920901	0.0000	0.0000	4
Sebastes serranoides	adult	0.1250	0.3536	8
	920731	0.0000	0.0000	4
	920901	0.2500	0.5000	4

Sebastes serranoides juvenile		0.0000	0.0000
8			
	920731	0.0000	0.0000
4			
	920901	0.0000	0.0000
4			
Sebastes atrovirens adult		0.7500	0.4629
8			
	920731	1.0000	0.0000
4			
	920901	0.5000	0.5774
4			
Sebastes atrovirens juvenile		0.0000	0.0000
8			
	920731	0.0000	0.0000
4			
	920901	0.0000	0.0000
4			
Paralabrax clathratus adult		2.2500	1.0351
8			
	920731	2.5000	1.2910
4			
	920901	2.0000	0.8165
4			
Paralabrax clathratus juvenile		0.0000	0.0000
8			
	920731	0.0000	0.0000
4			
	920901	0.0000	0.0000
4			

LOCATION 13 ANACAPA ISLAND - LANDING COVE

Semicossyphus pulcher male		0.1250	0.3536
8			
	920731	0.2500	0.5000
4			
	920901	0.0000	0.0000
4			
Semicossyphus pulcher female		1.1250	0.8345
8			
	920731	1.2500	0.9574
4			
	920901	1.0000	0.8165
4			
Embiotoca jacksoni adult		0.8750	0.8345
8			
	920731	0.2500	0.5000
4			
	920901	1.5000	0.5774
4			
Embiotoca jacksoni juvenile		0.3750	0.5175
8			
	920731	0.0000	0.0000
4			
	920901	0.7500	0.5000
4			
Embiotoca lateralis adult		0.0000	0.0000
8			
	920731	0.0000	0.0000
4			
	920901	0.0000	0.0000
4			
Embiotoca lateralis juvenile		0.0000	0.0000
8			
	920731	0.0000	0.0000
4			
	920901	0.0000	0.0000
4			
Damalichthys vacca adult		0.0000	0.0000
8			
	920731	0.0000	0.0000
4			
	920901	0.0000	0.0000
4			
Damalichthys vacca juvenile		0.0000	0.0000
8			
	920731	0.0000	0.0000
4			

	920901	0.0000	0.0000
4			
Hypsypops rubicundus adult		2.7500	1.4880
8			
	920731	3.2500	1.7078
4			
	920901	2.2500	1.2583
4			
Hypsypops rubicundus juvenile		0.5000	0.5345
8			
	920731	0.2500	0.5000
4			
	920901	0.7500	0.5000
4			
Girella nigricans adult		2.1250	1.5526
8			
	920731	2.5000	1.9149
4			
	920901	1.7500	1.2583
4			
Girella nigricans juvenile		0.0000	0.0000
8			
	920731	0.0000	0.0000
4			
	920901	0.0000	0.0000
4			

LOCATION 13 ANACAPA ISLAND - LANDING COVE

1992 NATURAL HABITAT SIZE FREQUENCY DISTRIBUTIONS

Haliotis corrugata

(cases) N=	51
< 25	0.0
25 - 29	0.0
30 - 34	0.0
35 - 39	0.0
40 - 44	0.0
45 - 49	0.0
50 - 54	0.0
55 - 59	0.0
60 - 64	0.0
65 - 69	0.0
70 - 74	0.0
75 - 79	0.0
80 - 84	0.0
85 - 90	0.0
90 - 94	2.0%
95 - 99	0.0
100 - 104	0.0
105 - 109	0.0
110 - 114	2.0%
115 - 119	5.9%
120 - 124	2.0%
125 - 129	3.9%
130 - 134	13.7%
135 - 139	15.7%
140 - 144	9.8%
145 - 149	9.8%
150 - 154	15.7%
155 - 159	5.9%
160 - 164	7.8%
165 - 169	2.0%
170 - 174	2.0%
175 - 179	2.0%
180 - 184	0.0
185 - 189	0.0
190 - 194	0.0
195 - 199	0.0
> 199	0.0
min size (mm)	91
max size (mm)	175
mean	142
mode	132

Haliotis fulgens

(cases) N=	3
<135	0.0
140 - 144	0.0
145 - 149	0.0
150 - 154	33.3%
155 - 159	33.3%
160 - 164	0.0
165 - 169	33.3%
170 - 174	0.0
175 - 179	0.0
180 - 184	0.0
185 - 189	0.0
190 - 194	0.0
195 - 199	0.0
> 199	0.0
min size (mm)	153
max size (mm)	169
mean	160
mode	153

Astraea undosa

(cases) N=	78
< 10	0.0
10 - 19	0.0
20 - 29	2.6%
30 - 39	19.2%
40 - 49	29.5%
50 - 59	16.7%
60 - 69	19.2%
70 - 79	7.7%
80 - 89	5.1%
90 - 99	0.0
100 - 109	0.0
110 - 119	0.0
> 119	0.0
min size (mm)	23
max size (mm)	89
mean	52
mode	48

LOCATION 13 ANACAPA ISLAND - LANDING COVE

Hinnites giganteus

(cases) N=	68
<19	0.0
20 - 29	2.9%
30 - 39	5.9%
40 - 49	17.6%
50 - 59	22.1%
60 - 69	17.6%
70 - 79	13.2%
80 - 89	14.7%
90 - 99	2.9%
100 - 109	0.0
110 - 119	2.9%
>120	0.0
min size (mm)	20
max size (mm)	118
mean	62
mode	46

Strongylocentrotus franciscanus

(cases) N=	195
< 5	0.0
5 - 9	1.5%
10 - 14	2.6%
15 - 19	5.1%
20 - 24	2.6%
25 - 29	1.0%
30 - 34	0.0
35 - 39	1.0%
40 - 44	2.6%
45 - 49	0.5%
50 - 54	0.5%
55 - 59	0.0
60 - 64	0.5%
65 - 69	1.5%
70 - 74	2.1%
75 - 79	4.1%
80 - 84	2.6%
85 - 90	7.2%
90 - 94	10.8%
95 - 99	14.4%
100 - 104	11.8%
105 - 109	11.8%
> 109	13.8%
min size (mm)	7
max size (mm)	129
mean	85
mode	99

Strongylocentrotus purpuratus

(cases) N=	136
< 5	0.0
5 - 9	5.1%
10 - 14	11.0%
15 - 19	5.1%
20 - 24	0.0
25 - 29	3.7%
30 - 34	3.7%
35 - 39	8.8%
40 - 44	9.6%
45 - 49	13.2%
50 - 54	16.9%
55 - 59	10.3%
60 - 64	9.6%
65 - 69	2.9%
70 - 74	0.0
75 - 79	0.0
80 - 84	0.0
85 - 90	0.0
90 - 94	0.0
95 - 99	0.0
100 - 104	0.0
105 - 109	0.0
> 109	0.0
min size (mm)	5
max size (mm)	66
mean	41
mode	46

LOCATION 13 ANACAPA ISLAND - LANDING COVE

Macrocystis pyrifera numbers of stipes	
(cases) N=	117
< 3	62.4%
3 - 5	12.8%
6 - 8	5.1%
9 - 11	4.3%
12 - 14	5.1%
15 - 17	0.9%
18 - 20	0.9%
21 - 23	3.4%
24 - 26	0.9%
27 - 29	1.7%
30 - 32	0.9%
33 - 35	0.0
36 - 38	0.9%
39 - 41	0.9%
42 - 44	0.0
>44	0.0
min number	1
max number	40
mean	6
mode	2

Macrocystis pyrifera holdfast diameters	
(cases) N=	117
< 6	19.7%
6 - 11	38.5%
12 - 17	8.5%
18 - 23	8.5%
24 - 29	8.5%
30 - 35	4.3%
36 - 41	4.3%
42 - 47	3.4%
48 - 53	0.9%
54 - 59	0.9%
60 - 65	1.7%
66 - 71	0.0
72 - 77	0.0
78 - 83	0.0
84 - 89	0.9%
>89	0.0
min width (cm)	2
max width (cm)	89
mean	17
mode	5

LOCATION 13 ANACAPA ISLAND - LANDING COVE

1992 ARTIFICIAL RECRUITMENT MODULE SIZE FREQUENCY DISTRIBUTIONS

Haliotis corrugata FROM 7 ARMs

(cases) N=	1
< 25	0.0
25 - 29	0.0
30 - 34	0.0
35 - 39	100.0%
40 - 44	0.0
45 - 49	0.0
> 50	0.0
min size (mm)	36
max size (mm)	36
mean	36
mode	36

Haliotis fulgens FROM 7 ARMs

(cases) N=	1
< 130	0.0
130 - 134	0.0
135 - 139	0.0
140 - 144	0.0
145 - 149	0.0
150 - 154	100.0%
155 - 159	0.0
160 - 164	0.0
> 145	0.0
min size (mm)	154
max size (mm)	154
mean	154
mode	154

Cypraea spadicea FROM 7 ARMs

(cases) N=	14
< 30	0.0
30 - 34	21.4%
35 - 39	35.7%
40 - 44	14.3%
45 - 49	28.6%
50 - 54	0.0
55 - 59	0.0
> 59	0.0
min size (mm)	32
max size (mm)	49
mean	40
mode	38

Astraea undosa FROM 7 ARMs

(cases) N=	30
< 10	0.0
10 - 19	10.0%
20 - 29	6.7%
30 - 39	23.3%
40 - 49	23.3%
50 - 59	16.7%
60 - 69	10.0%
70 - 79	6.7%
80 - 89	3.3%
90 - 99	0.0
100 - 109	0.0
110 - 119	0.0
> 119	0.0
min size (mm)	10
max size (mm)	81
mean	45
mode	42

LOCATION 13 ANACAPA ISLAND - LANDING COVE

1992 ARTIFICIAL RECRUITMENT MODULE SIZE FREQUENCY DISTRIBUTIONS

Pisaster giganteus FROM 7 ARMs

(cases) N=	12
< 20	16.7%
20 - 39	75.0%
40 - 59	8.3%
60 - 79	0.0
80 - 99	0.0
> 100	0.0
min size (mm)	18
max size (mm)	44
mean	28
mode	21

Strongylocentrotus franciscanus FROM 7 ARMs

(cases) N=	18
< 5	0.0
5 - 9	5.6%
10 - 14	22.2%
15 - 19	22.2%
20 - 24	22.2%
25 - 29	5.6%
30 - 34	5.6%
35 - 39	5.6%
40 - 44	0.0
45 - 49	5.6%
50 - 54	0.0
55 - 59	0.0
60 - 64	0.0
65 - 69	5.6%
70 - 74	0.0
> 75	0.0
min size (mm)	9
max size (mm)	65
mean	23
mode	20

Hinnites giganteus FROM 7 ARM's

(cases) N=	5
< 10	20.0%
10 - 19	60.0%
20 - 29	20.0%
30 - 39	0.0
40 - 49	0.0
> 50	0.0
min size (mm)	7
max size (mm)	25
mean	14
mode	11

Strongylocentrotus purpuratus FROM 7 ARMs

(cases) N=	98
< 5	1.0%
5 - 9	2.0%
10 - 14	16.3%
15 - 19	23.5%
20 - 24	23.5%
25 - 29	20.4%
30 - 34	11.2%
35 - 39	2.0%
40 - 44	0.0
45 - 49	0.0
> 50	0.0
min size (mm)	3
max size (mm)	35
mean	21
mode	23

Megathura crenulata FROM 7 ARMs

(cases) N=	1
< 10	0.0
10 - 19	0.0
20 - 29	0.0
30 - 39	0.0
40 - 49	100.0%
50 - 59	0.0
60 - 69	0.0
> 70	0.0
min size (mm)	43
max size (mm)	43
mean	43
mode	43

LOCATION 14 SANTA BARBARA ISLAND - SOUTHEAST SEA LION ROOKERY

1992 QUADRAT DATA: MEAN NUMBER PER M^2

Species	Mean	Std Dev	Cases
Macrocystis pyrifera adult	0.2750	0.5250	20
Eisenia arborea	0.0000	0.0000	20
Pterygophora californica	0.0000	0.0000	20
Laminaria farlowii	0.0000	0.0000	20
Macrocystis pyrifera juvenile	0.3250	0.7122	20
Macrocystis pyrifera all	0.6000	0.8522	20
Cypraea spadicea	0.0250	0.1118	20
Astraea undosa	0.1750	0.3354	20
Patiria miniata	0.2000	0.2991	20
Pisaster giganteus	0.1500	0.2856	20
Strongylocentrotus franciscanus	1.8250	2.3129	20
Strongylocentrotus purpuratus	38.9750	32.6728	20
Parastichopus parvamensis	1.0750	0.8626	20
Styela montereyensis	0.0000	0.0000	20
Lythrypnus dalli	0.0000	0.0000	20
Coryphopterus nicholsii	0.3250	0.4667	20
Alloclinus holderi	0.0750	0.2447	20

1992 BAND TRANSECT DATA: MEAN NUMBER PER M^2

Tethya aurantia	0.0764	0.0417	12
Allopora californica	0.0000	0.0000	12
Tealia lofotensis	0.0028	0.0065	12
Lophogorgia chilensis	0.2236	0.0733	12
Muricea fruticosa	0.0125	0.0104	12
Muricea californica	0.0278	0.0365	12
Panulirus interruptus	0.0014	0.0048	12
Haliotis rufescens	0.0000	0.0000	12
Haliotis corrugata	0.0000	0.0000	12
Haliotis fulgens	0.0000	0.0000	12
Kelletia kelletii	0.0000	0.0000	12
Megathura crenulata	0.0000	0.0000	12
Hinnites giganteus	0.0014	0.0048	12
Aplysia californica	0.0361	0.0186	12
Pycnopodia helianthoides	0.0000	0.0000	12
Lytechinus anamesus	5.5319	2.6524	12

LOCATION 14 SANTA BARBARA ISLAND - SOUTHEAST SEA LION ROOKERY

1992 RANDOM POINT CONTACT DATA: MEAN PERCENT COVER

Species	Mean	Std Dev	Cases
Green algae	1.7000	3.0380	25
Miscellaneous brown algae	10.9000	15.9079	25
Desmarestia spp.	0.9000	2.6887	25
Laminaria farlowii	0.0000	0.0000	25
Cystoseira spp.	2.0000	5.6366	25
Macrocystis,Eisenia,Pterygophora	3.5000	5.9948	25
Miscellaneous red algae	8.1000	7.0074	25
Articulated coralline algae	1.1000	1.7795	25
Crustose coralline algae	47.2000	8.6096	25
Gelidium spp.	0.0000	0.0000	25
Gigartina spp.	0.0000	0.0000	25
Miscellaneous plants	1.4000	2.6101	25
Sponges	3.0000	4.1458	25
Corynactis californica	0.7000	1.5343	25
Balanophyllia elegans	1.8000	2.6536	25
Astrangia lajollaensis	2.0000	2.7003	25
Diopatra ornata	0.0000	0.0000	25
Phragmatopoma californica	0.0000	0.0000	25
Serpulorbis squamigerus	0.0000	0.0000	25
Bryozoans	4.4000	5.0662	25
Diaperoecia californica	0.0000	0.0000	25
Tunicates	2.0000	2.1651	25
Miscellaneous invertebrates	11.2000	7.4694	25
Bare substrate	25.1000	13.4722	25
Rock	83.0000	17.8682	25
Cobble	7.7000	7.4624	25
Sand	9.3000	15.4872	25

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Total Fish Abundance	32.1319	130.2434	144
Chromis punctipinnis	225.5833	330.5806	12
Oxyjulis californica	155.6667	206.8646	12
Sebastes mystinus	0.0000	0.0000	12
Sebastes serranoides	0.0000	0.0000	12
Sebastes atrovirens	0.0833	0.2887	12
Paralabrax clathratus	0.5833	0.7930	12
Semicossyphus pulcher	2.2500	2.0944	12
Embiotoca jacksoni	0.0000	0.0000	12
Embiotoca lateralis	0.0000	0.0000	12
Damalichthys vacca	0.0833	0.2887	12
Hypsypops rubicundus	1.0833	0.9003	12
Girella nigricans	0.2500	0.6216	12

LOCATION 14 SANTA BARBARA ISLAND - SOUTHEAST SEA LION ROOKERY

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Species	Date (year/month/day)	Mean	Std Dev	Cases
Chromis punctipinnis	adult	2.9167	7.4157	12
	920624	4.3750	8.8952	8
	920902	0.0000	0.0000	4
Chromis punctipinnis	juvenile	222.6667	332.6200	12
	920624	5.2500	10.9642	8
	920902	657.5000	165.0000	4
Oxyjulis californica	adult	17.9167	16.1778	12
	920624	25.1250	15.0754	8
	920902	3.5000	3.6968	4
Oxyjulis californica	juvenile	137.7500	215.9323	12
	920624	6.6250	5.9025	8
	920902	400.0000	182.5742	4
Sebastes mystinus	adult	0.0000	0.0000	12
	920624	0.0000	0.0000	8
	920902	0.0000	0.0000	4
Sebastes mystinus	juvenile	0.0000	0.0000	12
	920624	0.0000	0.0000	8
	920902	0.0000	0.0000	4
Sebastes serranoides	adult	0.0000	0.0000	12
	920624	0.0000	0.0000	8
	920902	0.0000	0.0000	4

Sebastes serranoides juvenile		0.0000	0.0000
12			
	920624	0.0000	0.0000
8			
	920902	0.0000	0.0000
4			
Sebastes atrovirens adult		0.0833	0.2887
12			
	920624	0.1250	0.3536
8			
	920902	0.0000	0.0000
4			
Sebastes atrovirens juvenile		0.0000	0.0000
12			
	920624	0.0000	0.0000
8			
	920902	0.0000	0.0000
4			
Paralabrax clathratus adult		0.5833	0.7930
12			
	920624	0.3750	0.7440
8			
	920902	1.0000	0.8165
4			
Paralabrax clathratus juvenile		0.0000	0.0000
12			
	920624	0.0000	0.0000
8			
	920902	0.0000	0.0000
4			

LOCATION 14 SANTA BARBARA ISLAND - SOUTHEAST SEA LION ROOKERY

Semicossyphus pulcher male		0.0000	0.0000
12			
	920624	0.0000	0.0000
8			
	920902	0.0000	0.0000
4			
Semicossyphus pulcher female		2.2500	2.0944
12			
	920624	3.1250	1.9594
8			
	920902	0.5000	1.0000
4			
Embiotoca jacksoni adult		0.0000	0.0000
12			
	920624	0.0000	0.0000
8			
	920902	0.0000	0.0000
4			
Embiotoca jacksoni juvenile		0.0000	0.0000
12			
	920624	0.0000	0.0000
8			
	920902	0.0000	0.0000
4			
Embiotoca lateralis adult		0.0000	0.0000
12			
	920624	0.0000	0.0000
8			
	920902	0.0000	0.0000
4			
Embiotoca lateralis juvenile		0.0000	0.0000
12			
	920624	0.0000	0.0000
8			
	920902	0.0000	0.0000
4			
Damalichthys vacca adult		0.0833	0.2887
12			
	920624	0.0000	0.0000
8			
	920902	0.2500	0.5000
4			
Damalichthys vacca juvenile		0.0000	0.0000
12			
	920624	0.0000	0.0000
8			

	920902	0.0000	0.0000
4			
Hypsypops rubicundus adult		0.6667	0.6513
12			
	920624	0.6250	0.7440
8			
	920902	0.7500	0.5000
4			
Hypsypops rubicundus juvenile		0.4167	0.6686
12			
	920624	0.0000	0.0000
8			
	920902	1.2500	0.5000
4			
Girella nigricans adult		0.2500	0.6216
12			
	920624	0.3750	0.7440
8			
	920902	0.0000	0.0000
4			
Girella nigricans juvenile		0.0000	0.0000
12			
	920624	0.0000	0.0000
8			
	920902	0.0000	0.0000
4			

LOCATION 14 SANTA BARBARA ISLAND - SOUTHEAST SEA LION ROOKERY

1992 NATURAL HABITAT SIZE FREQUENCY DISTRIBUTIONS

Tethya aurantia

(cases) N=	56
< 10	0.0
10 - 19	1.8%
20 - 29	8.9%
30 - 39	17.9%
40 - 49	17.9%
50 - 59	17.9%
60 - 69	19.6%
70 - 79	16.1%
80 - 89	0.0
90 - 99	0.0
> 99	0.0
min size (mm)	19
max size (mm)	79
mean	51
mode	29

Patiria miniata

(cases) N=	63
< 10	0.0
10 - 19	0.0
20 - 29	3.2%
30 - 39	7.9%
40 - 49	9.5%
50 - 59	23.8%
60 - 69	25.4%
70 - 79	15.9%
80 - 89	12.7%
90 - 99	1.6%
> 99	0.0
min size (mm)	28
max size (mm)	
mean	62
mode	52

Astraea undosa

(cases) N=	29
< 10	0.0
10 - 19	3.4%
20 - 29	6.9%
30 - 39	3.4%
40 - 49	34.5%
50 - 59	17.2%
60 - 69	20.7%
70 - 79	6.9%
80 - 89	6.9%
90 - 99	0.0
100 - 109	0.0
110 - 119	0.0
> 119	0.0
min size (mm)	17
max size (mm)	86
mean	52
mode	44

Pisaster giganteus

(cases) N=	50
< 20	2.0%
20 - 39	0.0
40 - 59	16.0%
60 - 79	52.0%
80 - 99	18.0%
100 - 119	12.0%
120 - 139	0.0
140 - 159	0.0
160 - 179	0.0
180 - 199	0.0
200 - 219	0.0
220 - 239	0.0
240 - 259	0.0
260 - 279	0.0
280 - 299	0.0
> 299	0.0
min size (mm)	5
max size (mm)	111
mean	74
mode	66

LOCATION 14 SANTA BARBARA ISLAND - SOUTHEAST SEA LION ROOKERY

Lytechinus anamesus

(cases) N=	239
< 5	0.4%
5 - 9	2.5%
10 - 14	8.4%
15 - 19	48.1%
20 - 24	38.9%
25 - 29	1.7%
30 - 34	0.0
35 - 39	0.0
40 - 44	0.0
45 - 49	0.0
> 49	0.0
min size (mm)	3
max size (mm)	26
mean	19
mode	19

Strongylocentrotus franciscanus

(cases) N=	129
< 5	0.0
5 - 9	2.3%
10 - 14	6.2%
15 - 19	7.8%
20 - 24	9.3%
25 - 29	8.5%
30 - 34	3.9%
35 - 39	6.2%
40 - 44	8.5%
45 - 49	3.1%
50 - 54	5.4%
55 - 59	6.2%
60 - 64	6.2%
65 - 69	4.7%
70 - 74	6.2%
75 - 79	3.9%
80 - 84	1.6%
85 - 90	2.3%
90 - 94	3.1%
95 - 99	0.8%
100 - 104	1.6%
105 - 109	0.8%
> 109	0.8%
min size (mm)	6
max size (mm)	112
mean	47
mode	12

Strongylocentrotus purpuratus

(cases) N=	267
< 5	0.4%
5 - 9	6.0%
10 - 14	13.1%
15 - 19	17.6%
20 - 24	40.8%
25 - 29	18.7%
30 - 34	3.4%
35 - 39	0.0
40 - 44	0.0
45 - 49	0.0
50 - 54	0.0
55 - 59	0.0
60 - 64	0.0
65 - 69	0.0
70 - 74	0.0
75 - 79	0.0
80 - 84	0.0
85 - 90	0.0
90 - 94	0.0
95 - 99	0.0
100 - 104	0.0
105 - 109	0.0
> 109	0.0
min size (mm)	4
max size (mm)	32
mean	20
mode	20

LOCATION 14 SANTA BARBARA ISLAND - SOUTHEAST SEA LION ROOKERY

Macrocystis pyrifera numbers of stipes

(cases) N=	88
< 3	44.3%
3 - 5	28.4%
6 - 8	10.2%
9 - 11	3.4%
12 - 14	5.7%
15 - 17	3.4%
18 - 20	3.4%
21 - 23	1.1%
24 - 26	0.0
27 - 29	0.0
30 - 32	0.0
33 - 35	0.0
36 - 38	0.0
39 - 41	0.0
42 - 44	0.0
>44	0.0
min number	1
max number	21
mean	5
mode	2

Macrocystis pyrifera holdfast diameters

(cases) N=	88
< 6	22.7%
6 - 11	51.1%
12 - 17	9.1%
18 - 23	12.5%
24 - 29	2.3%
30 - 35	2.3%
36 - 41	0.0
42 - 47	0.0
48 - 53	0.0
54 - 59	0.0
60 - 65	0.0
66 - 71	0.0
72 - 77	0.0
78 - 83	0.0
84 - 89	0.0
>89	0.0
min width (cm)	1
max width (cm)	34
mean	10
mode	4

Lophogorgia chilensis widths

(cases) N=	74
< 5	0.0
5 - 8	2.7%
9 - 12	6.8%
13 - 16	4.1%
17 - 20	6.8%
21 - 24	8.1%
25 - 28	16.2%
29 - 32	23.0%
33 - 36	8.1%
37 - 40	8.1%
41 - 44	4.1%
45 - 48	5.4%
49 - 52	2.7%
53 - 56	1.4%
57 - 60	0.0
61 - 64	1.4%
65 - 68	1.4%
>69	0.0
min width (cm)	6
max width (cm)	65
mean	30
mode	30

Lophogorgia chilensis heights

(cases) N=	74
< 5	2.7%
5 - 8	9.5%
9 - 12	4.1%
13 - 16	5.4%
17 - 20	23.0%
21 - 24	16.2%
25 - 28	12.2%
29 - 32	10.8%
33 - 36	5.4%
37 - 40	5.4%
41 - 44	4.1%
45 - 48	0.0
49 - 52	1.4%
53 - 56	0.0
57 - 60	0.0
61 - 64	0.0
>65	0.0
min height (cm)	2
max height (cm)	50
mean	23
mode	20

LOCATION 15 SANTA BARBARA ISLAND - ARCH POINT

1992 QUADRAT DATA: MEAN NUMBER PER M^2

Species	Mean	Std Dev	Cases
Macrocystis pyrifera adult	0.0250	0.1118	20
Eisenia arborea	0.0000	0.0000	20
Pterygophora californica	0.0000	0.0000	20
Laminaria farlowii	0.0000	0.0000	20
Macrocystis pyrifera juvenile	0.0500	0.1539	20
Macrocystis pyrifera all	0.0750	0.2447	20
Cypraea spadicea	0.0250	0.1118	20
Astraea undosa	0.1500	0.2856	20
Patiria miniata	0.1000	0.3479	20
Pisaster giganteus	0.1500	0.2856	20
Strongylocentrotus franciscanus	3.1000	2.5058	20
Strongylocentrotus purpuratus	58.8500	23.6104	20
Parastichopus parvamensis	0.4750	0.4435	20
Styela montereyensis	0.0000	0.0000	20
Lythrypnus dalli	0.0000	0.0000	20
Coryphopterus nicholsii	0.0000	0.0000	20
Alloclinus holderi	0.2000	0.3403	20

1992 BAND TRANSECT DATA: MEAN NUMBER PER M^2

Tethya aurantia	0.0000	0.0000	12
Allopora californica	0.0000	0.0000	12
Tealia lofotensis	0.0000	0.0000	12
Lophogorgia chilensis	0.0000	0.0000	12
Muricea fruticosa	0.0028	0.0065	12
Muricea californica	0.0014	0.0048	12
Panulirus interruptus	0.0083	0.0133	12
Haliotis rufescens	0.0000	0.0000	12
Haliotis corrugata	0.0000	0.0000	12
Haliotis fulgens	0.0000	0.0000	12
Kelletia kelletii	0.0000	0.0000	12
Megathura crenulata	0.0000	0.0000	12
Hinnites giganteus	0.0139	0.0292	12
Aplysia californica	0.0889	0.0773	12
Pycnopodia helianthoides	0.0000	0.0000	12
Lytechinus anamesus	0.0000	0.0000	12

LOCATION 15 SANTA BARBARA ISLAND - ARCH POINT

1992 RANDOM POINT CONTACT DATA: MEAN PERCENT COVER

Species	Mean	Std Dev	Cases
Green algae	0.5000	1.2500	25
Miscellaneous brown algae	1.2000	2.8976	25
Desmarestia spp.	0.0000	0.0000	25
Laminaria farlowii	0.0000	0.0000	25
Cystoseira spp.	1.5000	6.5352	25
Macrocystis,Eisenia,Pterygophora	4.0000	11.5244	25
Miscellaneous red algae	6.2000	5.6421	25
Articulated coralline algae	10.4000	13.3596	25
Crustose coralline algae	53.3000	14.3018	25
Gelidium spp.	1.8000	4.7059	25
Gigartina spp.	0.0000	0.0000	25
Miscellaneous plants	1.5000	2.1651	25
Sponges	0.7000	1.3540	25
Corynactis californica	3.0000	4.0825	25
Balanophyllia elegans	0.1000	0.5000	25
Astrangia lajollaensis	2.5000	3.6799	25
Diopatra ornata	0.0000	0.0000	25
Phragmatopoma californica	0.0000	0.0000	25
Serpulorbis squamigerus	0.0000	0.0000	25
Bryozoans	5.4000	9.5110	25
Diaperoecia californica	0.1000	0.5000	25
Tunicates	3.0000	3.3850	25
Miscellaneous invertebrates	11.1000	8.0065	25
Bare substrate	17.7000	10.5801	25
Rock	84.1000	11.8559	25
Cobble	11.0000	9.5470	25
Sand	4.9000	8.9116	25

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Total Fish Abundance	9.9861	41.1766	144
Chromis punctipinnis	89.1667	119.2376	12
Oxyjulis californica	11.7500	9.5072	12
Sebastes mystinus	0.0000	0.0000	12
Sebastes serranoides	0.0000	0.0000	12
Sebastes atrovirens	0.0000	0.0000	12
Paralabrax clathratus	1.5000	1.5667	12
Semicossyphus pulcher	1.4167	1.0836	12
Embiotoca jacksoni	0.4167	0.9003	12
Embiotoca lateralis	0.0833	0.2887	12
Damalichthys vacca	0.0000	0.0000	12
Hypsypops rubicundus	12.5000	3.7779	12
Girella nigricans	3.0000	3.3303	12

LOCATION 15 SANTA BARBARA ISLAND - ARCH POINT

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Species	Date (year/month/day)	Mean	Std Dev	Cases
Chromis punctipinnis	adult	17.5000	12.3840	12
	920624	11.5000	10.6503	8
	920903	29.5000	3.1091	4
Chromis punctipinnis	juvenile	71.6667	110.3575	12
	920624	0.0000	0.0000	8
	920903	215.0000	59.7216	4
Oxyjulis californica	adult	9.5833	4.3996	12
	920624	10.7500	5.0639	8
	920903	7.2500	0.5000	4
Oxyjulis californica	juvenile	2.1667	5.8750	12
	920624	3.2500	7.0862	8
	920903	0.0000	0.0000	4
Sebastes mystinus	adult	0.0000	0.0000	12
	920624	0.0000	0.0000	8
	920903	0.0000	0.0000	4
Sebastes mystinus	juvenile	0.0000	0.0000	12
	920624	0.0000	0.0000	8
	920903	0.0000	0.0000	4
Sebastes serranoides	adult	0.0000	0.0000	12
	920624	0.0000	0.0000	8
	920903	0.0000	0.0000	4

Sebastes serranoides juvenile		0.0000	0.0000
12			
	920624	0.0000	0.0000
8			
	920903	0.0000	0.0000
4			
Sebastes atrovirens adult		0.0000	0.0000
12			
	920624	0.0000	0.0000
8			
	920903	0.0000	0.0000
4			
Sebastes atrovirens juvenile		0.0000	0.0000
12			
	920624	0.0000	0.0000
8			
	920903	0.0000	0.0000
4			
Paralabrax clathratus adult		1.3333	1.4975
12			
	920624	0.5000	0.5345
8			
	920903	3.0000	1.4142
4			
Paralabrax clathratus juvenile		0.1667	0.5774
12			
	920624	0.2500	0.7071
8			
	920903	0.0000	0.0000
4			

LOCATION 15 SANTA BARBARA ISLAND - ARCH POINT

Semicossyphus pulcher male		0.1667	0.3892
12			
	920624	0.1250	0.3536
8			
	920903	0.2500	0.5000
4			
Semicossyphus pulcher female		1.2500	0.8660
12			
	920624	1.2500	1.0351
8			
	920903	1.2500	0.5000
4			
Embiotoca jacksoni adult		0.2500	0.6216
12			
	920624	0.0000	0.0000
8			
	920903	0.7500	0.9574
4			
Embiotoca jacksoni juvenile		0.1667	0.3892
12			
	920624	0.0000	0.0000
8			
	920903	0.5000	0.5774
4			
Embiotoca lateralis adult		0.0833	0.2887
12			
	920624	0.1250	0.3536
8			
	920903	0.0000	0.0000
4			
Embiotoca lateralis juvenile		0.0000	0.0000
12			
	920624	0.0000	0.0000
8			
	920903	0.0000	0.0000
4			
Damalichthys vacca adult		0.0000	0.0000
12			
	920624	0.0000	0.0000
8			
	920903	0.0000	0.0000
4			
Damalichthys vacca juvenile		0.0000	0.0000
12			
	920624	0.0000	0.0000
8			

	920903	0.0000	0.0000
4			
Hypsypops rubicundus adult		11.8333	3.6139
12			
	920624	9.7500	1.3887
8			
	920903	16.0000	2.9439
4			
Hypsypops rubicundus juvenile		0.6667	0.6513
12			
	920624	0.6250	0.7440
8			
	920903	0.7500	0.5000
4			
Girella nigricans adult		3.0000	3.3303
12			
	920624	1.1250	1.4577
8			
	920903	6.7500	2.7538
4			
Girella nigricans juvenile		0.0000	0.0000
12			
	920624	0.0000	0.0000
8			
	920903	0.0000	0.0000
4			

LOCATION 15 SANTA BARBARA ISLAND - ARCH POINT

1992 NATURAL HABITAT SIZE FREQUENCY DISTRIBUTIONS

Astraea undosa

(cases) N=	47
< 10	0.0
10 - 19	0.0
20 - 29	8.5%
30 - 39	6.4%
40 - 49	10.6%
50 - 59	42.6%
60 - 69	17.0%
70 - 79	4.3%
80 - 89	4.3%
90 - 99	4.3%
100 - 109	2.1%
110 - 119	0.0
> 119	0.0
min size (mm)	21
max size (mm)	105
mean	56
mode	55

Patiria miniata

(cases) N=	11
< 10	0.0
10 - 19	0.0
20 - 29	0.0
30 - 39	9.1%
40 - 49	54.5%
50 - 59	36.4%
60 - 69	0.0
70 - 79	0.0
80 - 89	0.0
90 - 99	0.0
> 99	0.0
min size (mm)	33
max size (mm)	59
mean	49
mode	47

Pisaster giganteus

(cases) N=	34
< 20	0.0
20 - 39	0.0
40 - 59	0.0
60 - 79	11.8%
80 - 99	29.4%
100 - 119	29.4%
120 - 139	11.8%
140 - 159	11.8%
160 - 179	2.9%
180 - 199	2.9%
>200	0.0
min size (mm)	70
max size (mm)	1
mean	110
mode	88

Strongylocentrotus franciscanus

(cases) N=	191
< 5	0.0
5 - 9	3.1%
10 - 14	20.4%
15 - 19	7.9%
20 - 24	4.7%
25 - 29	2.1%
30 - 34	1.0%
35 - 39	3.1%
40 - 44	4.2%
45 - 49	4.2%
50 - 54	5.2%
55 - 59	5.2%
60 - 64	8.9%
65 - 69	7.9%
70 - 74	11.0%
75 - 79	4.7%
80 - 84	2.6%
85 - 90	3.7%
90 - 94	0.0
95 - 99	0.0
100 - 104	0.0
105 - 109	0.0
> 109	0.0
min size (mm)	5
max size (mm)	89
mean	44
mode	14

LOCATION 15 SANTA BARBARA ISLAND - ARCH POINT

Strongylocentrotus purpuratus

(cases) N=	264
< 5	0.0
5 - 9	8.7%
10 - 14	31.1%
15 - 19	7.6%
20 - 24	9.1%
25 - 29	12.1%
30 - 34	15.9%
35 - 39	10.2%
40 - 44	4.5%
45 - 49	0.0
50 - 54	0.8%
55 - 59	0.0
60 - 64	0.0
65 - 69	0.0
70 - 74	0.0
75 - 79	0.0
80 - 84	0.0
85 - 90	0.0
90 - 94	0.0
95 - 99	0.0
100 - 104	0.0
105 - 109	0.0
> 109	0.0
min size (mm)	5
max size (mm)	50
mean	22
mode	12

Macrocystis pyrifera numbers of stipes

(cases) N=	75
< 3	33.3%
3 - 5	20.0%
6 - 8	13.3%
9 - 11	2.7%
12 - 14	6.7%
15 - 17	6.7%
18 - 20	4.0%
21 - 23	1.3%
24 - 26	2.7%
27 - 29	1.3%
30 - 32	5.3%
33 - 35	0.0
36 - 38	0.0
39 - 41	1.3%
42 - 44	1.3%
>44	0.0
min number	1
max number	44
mean	9
mode	2

Macrocystis pyrifera holdfast diameters

(cases) N=	75
< 6	29.3%
6 - 11	37.3%
12 - 17	6.7%
18 - 23	6.7%
24 - 29	6.7%
30 - 35	12.0%
36 - 41	1.3%
42 - 47	0.0
48 - 53	0.0
54 - 59	0.0
60 - 65	0.0
66 - 71	0.0
72 - 77	0.0
78 - 83	0.0
84 - 89	0.0
>89	0.0
min width (cm)	2
max width (cm)	36
mean	12
mode	4

LOCATION 16 SANTA BARBARA ISLAND - CAT CANYON

1992 QUADRAT DATA: MEAN NUMBER PER M^2

Note: Quadrat data for this location was taken two times.

Sampling date: 6/25/92

Species	Mean	Std Dev	Cases
Macrocystis pyrifera adult	0.4250	0.8315	20
Eisenia arborea	0.0000	0.0000	20
Pterygophora californica	0.0000	0.0000	20
Laminaria farlowii	0.0000	0.0000	20
Macrocystis pyrifera juvenile	0.2750	0.7860	20
Macrocystis pyrifera all	0.7000	1.1743	20
Cypraea spadicea	0.0000	0.0000	20
Astraea undosa	0.1750	0.3726	20
Patiria miniata	0.0000	0.0000	20
Pisaster giganteus	0.0750	0.2447	20
Strongylocentrotus franciscanus	2.2250	3.0369	20
Strongylocentrotus purpuratus	35.1250	24.2530	20
Parastichopus parvamensis	0.4500	0.4840	20
Styela montereyensis	0.0000	0.0000	20
Lythrypnus dalli	0.0000	0.0000	20
Coryphopterus nicholsii	0.0250	0.1118	20
Alloclinus holderi	0.0250	0.1118	20

Sampling date: 12/1/92

Species	Mean	Std Dev	Cases
Macrocystis pyrifera adult	0.5000	0.8584	20
Eisenia arborea	0.0000	0.0000	20
Pterygophora californica	0.0000	0.0000	20
Laminaria farlowii	0.0000	0.0000	20
Macrocystis pyrifera juvenile	0.3000	0.6156	20
Macrocystis pyrifera all	0.8000	1.3611	20
Cypraea spadicea	0.0500	0.2236	20
Astraea undosa	0.0500	0.1539	20
Patiria miniata	0.0000	0.0000	20
Pisaster giganteus	0.0000	0.0000	20
Strongylocentrotus franciscanus	2.5000	3.5615	20
Strongylocentrotus purpuratus	24.9000	21.2173	20
Parastichopus parvamensis	0.1250	0.2751	20
Styela montereyensis	0.0000	0.0000	20
Lythrypnus dalli	0.0000	0.0000	20
Coryphopterus nicholsii	0.0500	0.1539	20
Alloclinus holderi	0.0250	0.1118	20

LOCATION 16 SANTA BARBARA ISLAND - CAT CANYON

1992 BAND TRANSECT DATA: MEAN NUMBER PER M^2

Species	Mean	Std Dev	Cases
Tethya aurantia	0.0014	0.0048	12
Allopora californica	0.0000	0.0000	12
Tealia lofotensis	0.0000	0.0000	12
Lophogorgia chilensis	0.0000	0.0000	12
Muricea fruticosa	0.0000	0.0000	12
Muricea californica	0.0000	0.0000	12
Panulirus interruptus	0.0153	0.0288	12
Haliotis rufescens	0.0000	0.0000	12
Haliotis corrugata	0.0000	0.0000	12
Haliotis fulgens	0.0000	0.0000	12
Kelletia kelletii	0.0014	0.0048	12
Megathura crenulata	0.0014	0.0048	12
Hinnites giganteus	0.0000	0.0000	12
Aplysia californica	0.0764	0.0366	12
Pycnopodia helianthoides	0.0000	0.0000	12
Lytechinus anamesus	0.0000	0.0000	12

1992 RANDOM POINT CONTACT DATA: MEAN PERCENT COVER

Green algae	0.3000	0.8292	25
Miscellaneous brown algae	3.9000	8.5720	25
Desmarestia spp.	0.3000	1.5000	25
Laminaria farlowii	0.0000	0.0000	25
Cystoseira spp.	7.0000	12.8898	25
Macrocystis,Eisenia,Pterygophora	7.2000	13.6801	25
Miscellaneous red algae	2.6000	3.7832	25
Articulated coralline algae	8.0000	9.6014	25
Crustose coralline algae	39.1000	15.4933	25
Gelidium spp.	0.1000	0.5000	25
Gigartina spp.	0.0000	0.0000	25
Miscellaneous plants	3.9000	5.1579	25
Sponges	0.6000	1.0897	25
Corynactis californica	0.1000	0.5000	25
Balanophyllia elegans	1.0000	1.9094	25
Astrangia lajollaensis	1.0000	1.4434	25
Diopatra ornata	0.0000	0.0000	25
Phragmatopoma californica	0.4000	0.9354	25
Serpulorbis squamigerus	0.3000	1.0992	25
Bryozoans	2.5000	4.0825	25
Diaperoecia californica	0.1000	0.5000	25
Tunicates	3.2000	5.3774	25
Miscellaneous invertebrates	22.9000	17.2101	25
Bare substrate	33.1000	15.1259	25
Rock	85.6000	19.0022	25
Cobble	1.4000	3.3135	25
Sand	13.0000	18.8884	25

LOCATION 16 SANTA BARBARA ISLAND - CAT CANYON

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Total Fish Abundance	3.0972	6.5220	144
Species	Mean	Std Dev	Cases
Chromis punctipinnis	9.6667	10.1025	12
Oxyjulis californica	16.6667	8.5422	12
Sebastes mystinus	0.0000	0.0000	12
Sebastes serranoides	0.0000	0.0000	12
Sebastes atrovirens	0.0000	0.0000	12
Paralabrax clathratus	1.3333	1.5570	12
Semicossyphus pulcher	1.0833	0.9962	12
Embiotoca jacksoni	0.3333	0.4924	12
Embiotoca lateralis	0.0000	0.0000	12
Damalichthys vacca	0.0000	0.0000	12
Hypsypops rubicundus	3.4167	1.7816	12
Girella nigricans	4.6667	7.2027	12

LOCATION 16 SANTA BARBARA ISLAND - CAT CANYON

1992 FISH TRANSECT DATA: MEAN NUMBER PER TRANSECT

Species	Date (year/month/day)	Mean	Std Dev	Cases
Chromis punctipinnis adult		5.2500	6.0019	12
	920625	7.6250	6.0695	8
	920902	0.5000	1.0000	4
Chromis punctipinnis juvenile		4.4167	5.8692	12
	920625	4.0000	6.0945	8
	920902	5.2500	6.1847	4
Oxyjulis californica adult		15.8333	7.9639	12
	920625	13.1250	5.1391	8
	920902	21.2500	10.5948	4
Oxyjulis californica juvenile		0.8333	0.8348	12
	920625	0.3750	0.5175	8
	920902	1.7500	0.5000	4
Sebastes mystinus adult		0.0000	0.0000	12
	920625	0.0000	0.0000	8
	920902	0.0000	0.0000	4
Sebastes mystinus juvenile		0.0000	0.0000	12
	920625	0.0000	0.0000	8
	920902	0.0000	0.0000	4
Sebastes serranoides adult		0.0000	0.0000	12
	920625	0.0000	0.0000	8
	920902	0.0000	0.0000	4

Sebastes serranoides juvenile		0.0000	0.0000
12			
	920625	0.0000	0.0000
8			
	920902	0.0000	0.0000
4			
Sebastes atrovirens adult		0.0000	0.0000
12			
	920625	0.0000	0.0000
8			
	920902	0.0000	0.0000
4			
Sebastes atrovirens juvenile		0.0000	0.0000
12			
	920625	0.0000	0.0000
8			
	920902	0.0000	0.0000
4			
Paralabrax clathratus adult		1.2500	1.6026
12			
	920625	0.3750	0.7440
8			
	920902	3.0000	1.4142
4			
Paralabrax clathratus juvenile		0.0833	0.2887
12			
	920625	0.1250	0.3536
8			
	920902	0.0000	0.0000
4			

LOCATION 16 SANTA BARBARA ISLAND - CAT CANYON

Semicossyphus pulcher male		0.0000	0.0000
12			
	920625	0.0000	0.0000
8			
	920902	0.0000	0.0000
4			
Semicossyphus pulcher female		1.0833	0.9962
12			
	920625	0.7500	0.8864
8			
	920902	1.7500	0.9574
4			
Embiotoca jacksoni adult		0.3333	0.4924
12			
	920625	0.5000	0.5345
8			
	920902	0.0000	0.0000
4			
Embiotoca jacksoni juvenile		0.0000	0.0000
12			
	920625	0.0000	0.0000
8			
	920902	0.0000	0.0000
4			
Embiotoca lateralis adult		0.0000	0.0000
12			
	920625	0.0000	0.0000
8			
	920902	0.0000	0.0000
4			
Embiotoca lateralis juvenile		0.0000	0.0000
12			
	920625	0.0000	0.0000
8			
	920902	0.0000	0.0000
4			
Damalichthys vacca adult		0.0000	0.0000
12			
	920625	0.0000	0.0000
8			
	920902	0.0000	0.0000
4			
Damalichthys vacca juvenile		0.0000	0.0000
12			
	920625	0.0000	0.0000
8			

	920902	0.0000	0.0000
4			
Hypsypops rubicundus adult		3.0000	1.6514
12			
	920625	2.3750	0.9161
8			
	920902	4.2500	2.2174
4			
Hypsypops rubicundus juvenile		0.4167	0.5149
12			
	920625	0.2500	0.4629
8			
	920902	0.7500	0.5000
4			
Girella nigricans adult		4.6667	7.2027
12			
	920625	0.0000	0.0000
8			
	920902	14.0000	4.0000
4			
Girella nigricans juvenile		0.0000	0.0000
12			
	920625	0.0000	0.0000
8			
	920902	0.0000	0.0000
4			

LOCATION 16 SANTA BARBARA ISLAND - CAT CANYON

1992 NATURAL HABITAT SIZE FREQUENCY DISTRIBUTIONS

Haliotis corrugata

(cases) N=	3
< 25	0.0
25 - 29	0.0
30 - 34	66.7%
35 - 39	0.0
40 - 44	0.0
45 - 49	0.0
50 - 54	0.0
55 - 59	0.0
60 - 64	0.0
65 - 69	0.0
70 - 74	0.0
75 - 79	0.0
80 - 84	0.0
85 - 90	0.0
90 - 94	0.0
95 - 99	0.0
100 - 104	0.0
105 - 109	0.0
110 - 114	0.0
115 - 119	0.0
120 - 124	0.0
125 - 129	0.0
130 - 134	0.0
135 - 139	0.0
140 - 144	0.0
145 - 149	33.3%
150 - 154	0.0
155 - 159	0.0
160 - 164	0.0
165 - 169	0.0
170 - 174	0.0
175 - 179	0.0
180 - 184	0.0
185 - 189	0.0
190 - 194	0.0
195 - 199	0.0
> 199	0.0
min size (mm)	31
max size (mm)	147
mean	70
mode	31

Astraea undosa

(cases) N=	40
< 10	0.0
10 - 19	0.0
20 - 29	2.5%
30 - 39	0.0
40 - 49	0.0
50 - 59	5.0%
60 - 69	22.5%
70 - 79	42.5%
80 - 89	22.5%
90 - 99	2.5%
100 - 109	2.5%
110 - 119	0.0
> 119	0.0
min size (mm)	27
max size (mm)	101
mean	73
mode	73

Strongylocentrotus purpuratus

(cases) N=	237
< 5	0.0
5 - 9	1.3%
10 - 14	1.3%
15 - 19	0.4%
20 - 24	0.4%
25 - 29	0.4%
30 - 34	3.8%
35 - 39	23.2%
40 - 44	44.3%
45 - 49	18.6%
50 - 54	5.5%
55 - 59	0.8%
60 - 64	0.0
65 - 69	0.0
70 - 74	0.0
75 - 79	0.0
80 - 84	0.0
85 - 90	0.0
90 - 94	0.0
95 - 99	0.0
>100	0.0
min size (mm)	5
max size (mm)	57
mean	41
mode	43

LOCATION 16 SANTA BARBARA ISLAND - CAT CANYON

Strongylocentrotus franciscanus

(cases) N=	52
< 5	0.0
5 - 9	0.0
10 - 14	3.8%
15 - 19	3.8%
20 - 24	9.6%
25 - 29	1.9%
30 - 34	1.9%
35 - 39	3.8%
40 - 44	3.8%
45 - 49	1.9%
50 - 54	1.9%
55 - 59	11.5%
60 - 64	3.8%
65 - 69	11.5%
70 - 74	5.8%
75 - 79	11.5%
80 - 84	13.5%
85 - 90	7.7%
90 - 94	0.0
95 - 99	0.0
100 - 104	1.9%
105 - 109	0.0
> 109	0.0
min size (mm)	11
max size (mm)	102
mean	59
mode	82

Macrocystis pyrifera numbers of stipes

(cases) N=	59
< 3	54.2%
3 - 5	18.6%
6 - 8	3.4%
9 - 11	3.4%
12 - 14	8.5%
15 - 17	3.4%
18 - 20	0.0
21 - 23	3.4%
24 - 26	0.0
27 - 29	0.0
30 - 32	1.7%
33 - 35	0.0
36 - 38	0.0
39 - 41	0.0
42 - 44	1.7%
>44	1.7%
min number	1
max number	50
mean	7
mode	2

Macrocystis pyrifera holdfast diameters

(cases) N=	59
< 6	3.4%
6 - 11	50.8%
12 - 17	18.6%
18 - 23	10.2%
24 - 29	1.7%
30 - 35	8.5%
36 - 41	5.1%
42 - 47	0.0
48 - 53	1.7%
54 - 59	0.0
60 - 65	0.0
66 - 71	0.0
72 - 77	0.0
78 - 83	0.0
84 - 89	0.0
>89	0.0
min width (cm)	4
max width (cm)	48
mean	15
mode	10

Appendix B. 1992 Species List for all Channel Islands National Park Kelp Forest Monitoring Stations.

Introduction

The species list contains presence/absence and relative abundance data for all species that could be found during the site visits between June and October. Generally at least one dive is made by an experienced biologist strictly for species list observations. The overall effort varies from station to station with the water conditions and available time. Relative abundance values are subjective, and generally based on opinions of several divers viewing the overall site. Species identifications are based on field characteristics. Some species assemblages are more difficult to identify than others and may be lumped into general categories. Organisms were generally not collected for additional taxonomic work. When identification was tentative, we either omitted it or placed a question mark on the list. Some categories, (eg. sponges or tunicates) may be much more diverse than it would appear from the list because of the difficulty in identifying individual species.

Abundance Ratings

X - present, no relative abundance rating given
4 - abundant, organism present in higher than normal densities
3 - common, organism found over most of site or in high density patches
2 - present, organism found in moderate numbers
1 - rare, few organisms found
0 - noticeably absent, an effort was made to look for an organism that was not found

Notes

e - eggs
j or jvs - juvenile
s - shell only
int - intertidal
d - drift
PM or night - seen only on night dive
JX - juveniles present and adults present

J#/# - (e.g. J3/2 - juvenile abundance 3, adult abundance 2)

nests - Hypsypops nest turf

dis - diseased

(Station names are listed in Table 2 of the text.)