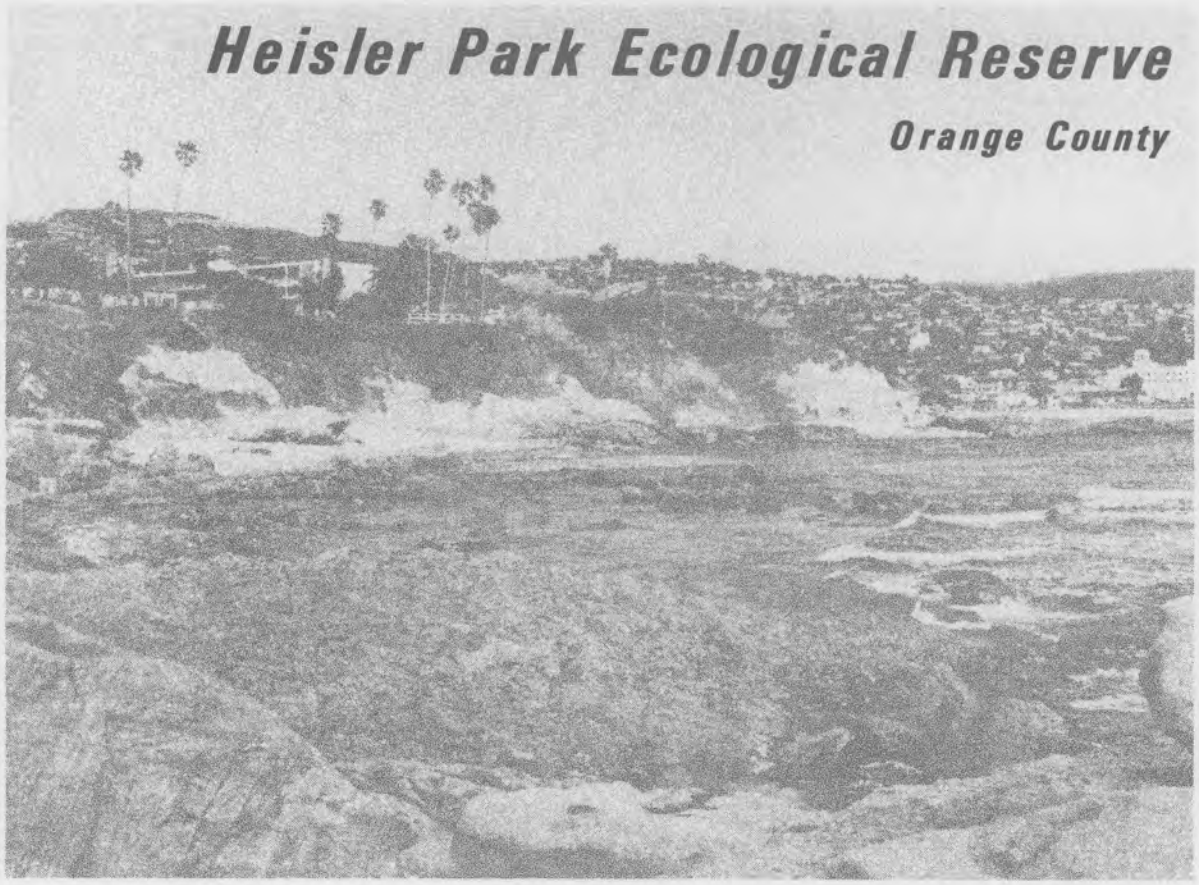
California Marine Waters
Areas of Special Biological Significance
Reconnaissance Survey Report



CALIFORNIA STATE WATER RESOURCES CONTROL BOARD
DIVISION OF PLANNING AND RESEARCH
SURVEILLANCE AND MONITORING SECTION

March 1979

WATER QUALITY MONITORING REPORT NO. 79-2

Cover Photograph: Heisler Park
Ecological Reserve Area of
Special Biological Significance

CALIFORNIA MARINE WATERS
AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE

RECONNAISSANCE SURVEY REPORT

HEISLER PARK ECOLOGICAL RESERVE
ORANGE COUNTY

STATE WATER RESOURCES CONTROL BOARD

DIVISION OF PLANNING AND RESEARCH

SURVEILLANCE AND MONITORING SECTION

March, 1979

WATER QUALITY MONITORING REPORT 79-2

ACKNOWLEDGEMENT

This State Water Resources Control Board Report is based on a reconnaissance survey report submitted by Richard C. Brusca and Mary K. Wicksten of the University of Southern California in June, 1978. The latter report was prepared in fulfillment of an agreement with the California Department of Fish and Game, which has coordinated the preparation of a series of Area of Special Biological Significance Survey Reports for the Board under an Interagency Agreement.

Heisler Park Ecological Reserve Area of
Special Biological Significance

ABSTRACT

The Heisler Park Ecological Reserve Area of Special Biological Significance (ASBS) is located near the town of Laguna Beach, in Orange County, within the approximate coordinates 33° 32' 25" - 45" N LAT and 117° 47' 15" - 55" W LONG. The area extends about 0.6 mi along the coast and encompasses 2.4 sq. mi. Adjoining land consists largely of sandstone bluffs which meet the ocean in a series of pitted, fractured larger rocks with interspersed stretches of cobble.

Nearshore waters vary widely in clarity and degree of surge and wave action. Surface water temperatures ranged from 60 to 68° F during the fall through early spring months.

The intertidal zone is generally composed of either sedimentary rock or sand. The rocky upper intertidal zone contains a fauna dominated by limpets, barnacles, and turban snails. In the middle intertidal zone, beds of boa kelp, cobble, and tidepools support large populations of tube mollusks and many other plants and animals. The kelp Eisenia arborea coralline algae, patches of surfgrass, and many fishes and invertebrates live in the lower intertidal zone. Numerous outcroppings of surf-swept rocks support large mussel beds. The coarse sand beaches are devoid of obvious macroscopic marine life, even at subsurface depths, due to heavy human use.

In the subtidal zone, to a water depth of about 20 m kelp beds and rocky reefs containing many suspension feeding invertebrates and fishes are found. From the 20 m isobath to the boundaries of the Reserve, the bottom is sandy and supports large populations of ghost shrimp, sea anemones, and flat fishes.

Potential water quality threats to the area include storm drains that empty onto the rocky shore and onto the heavily used sandy beach at the end of Laguna Canyon Road. Anoxic conditions observed presumably result from an overabundance of organic matter in some localized shallow habitats resulting in pockets of hydrogen sulfide in surface sediments.

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENT	2
ABSTRACT	3
FINDINGS AND CONCLUSIONS	5
INTRODUCTION	6
ORGANIZATION OF SURVEY	8
PHYSICAL DESCRIPTION	9
Location and Size	9
Nearshore Waters	9
Geophysical Characteristics	11
BIOLOGICAL DESCRIPTION	12
Subtidal Biota	12
Intertidal Biota	13
Landside Biota	14
LAND AND WATER USE DESCRIPTIONS	15
ACTUAL OR POTENTIAL POLLUTION THREATS	17
ANNOTATED BIBLIOGRAPHY	19
APPENDIX 1. SPECIES LIST	22
FIGURE 1. LOCATION OF HEISLER PARK ASBS	10

FINDINGS AND CONCLUSIONS

FINDINGS

1. Discrete beds of sand dollars, sea pansies, and heart urchins, so common to similar habitats throughout Southern California, are absent from Heisler Park ASBS.

2. The subtidal and intertidal zones of the ASBS are heavily used by recreationists.

3. The sandy beaches do not support the normal complement of biota, such as sand crabs, amphipods and isopods.

4. Localized zones of hydrogen sulfide staining were observed on intertidal and shallow subtidal surface sediments.

5. Healthy stands of giant kelp and large brown algae were observed in subtidal rocky areas.

CONCLUSIONS

1. Subtidal areas exhibit little observable impact from SCUBA diving usage; however, intertidal zone biota suffer from careless use or possibly abuse by visitors to the area.

2. Heavy human disturbance of sandy beach areas and storm drain discharges may account for the absence of a typical sandy beach fauna.

3. Absence of sandy beach fauna (detritivores) limits the area's ability to assimilate organic material and contributes to hydrogen sulfide generation in localized pockets.

4. Any additional loading of organic material could increase existing conditions of anoxia and hydrogen sulfide generation.

5. The presence of healthy stands of large brown algae and giant kelp may be indicative of an improvement in water quality in the ASBS over recent years.

INTRODUCTION

The California State Water Resources Control Board, under its Resolution No. 74-28, designated certain Areas of Special Biological Significance (ASBS) in the adoption of water quality control plans for the control of wastes discharged to ocean waters. The ASBS are intended to afford special protection to marine life through prohibition of waste discharges within these areas. The concept of "special biological significance" recognizes that certain biological communities, because of their value or fragility, deserve very special protection that consists of preservation and maintenance of natural water quality conditions to practicable extents (from State Water Resources Control Board's and California Regional Water Quality Control Board's Administrative Procedures, September 24, 1970, Section XI. Miscellaneous--Revision 7, September 1, 1972).

Specifically, the following restrictions apply to ASBS in the implementation of this policy.

1. Discharge of elevated temperature wastes in a manner that would alter natural water quality conditions is prohibited.

2. Discharge of discrete point source sewage or industrial process wastes in a manner that would alter natural water quality conditions is prohibited.

3. Discharge of wastes from nonpoint sources, including but not limited to storm water runoff, silt and urban runoff, will be controlled to the extent practicable. In control programs for wastes from nonpoint sources, Regional Boards will give high priority to areas tributary to ASBS.

4. The Ocean Plan, and hence the designation of Areas of Special Biological Significance, is not applicable to vessel wastes, the control of dredging, or the disposal of dredging spoil.

In order for the State Water Resources Control Board to evaluate the status of protection of Heisler Park Ecological Reserve ASBS, a reconnaissance survey integrating existing information and additional field study was performed by Dr. Richard Brusca and Mary Wicksten of the University of Southern California. The survey report was one of a series prepared for the State Board under the direction of the California Department of Fish and Game and provided the information compiled in this document.

ORGANIZATION OF SURVEY

The Reserve was studied by both shore observations and numerous SCUBA diving operations between October, 1977 and June, 1978. During preliminary trips, divers familiarized themselves with the area, took underwater photographs of fishes, and made careful records of the organisms observed. Checks for staining by hydrogen sulfide were made from the shoreline to depths of 85 feet (26 m). On subsequent trips, one team of divers made horizontal transects through the water column at depths of 40, 60 and 85 feet, recording all the larger, obvious organisms seen during the dive period. The 85 foot isobath is the maximum depth encountered in this study. A second team of divers made benthic transects, collecting representative samples of plants and animals not identifiable by sight (e.g. hydroids, ascidians, sponges, etc.), for identification by specialists, and also took photographs of common organisms *in situ*. Temperature, surge, and visibility (measured with a secchi disk) were recorded during each dive.

The intertidal area south of Rocky Point was studied in detail, using 0.1 m^2 quadrats along a vertical transect line. Records of habitat types and all macroscopic animals and plants were made from the highest tide mark to the minus 1.2 foot tide level (along the old outfall pipe). The shoreline was investigated for access routes, erosion, coastal vegetation, and terrestrial wildlife. Bird species present were recorded. Photographs of the predominant habitats and their organisms were taken and are archived at the State Water Resources Control Board.

During all field work, observations were continuously made for poaching or fishing in the Reserve. Counts of divers and beach-goers were also made.

PHYSICAL DESCRIPTION

Location and Size

The Heisler Park Ecological Reserve Area of Special Biological Significance (ASBS) comprises the nearshore waters near the town of Laguna Beach, Orange County. The approximate map coordinates for the area's boundaries are 33° 32' 25" - 45" N LAT and 117° 47' 15" - 55" W LONG (Fig. 1). The Area extends about 0.6 mi (0.96 km) along the coast and encompasses 2.4 sq. mi. (622 ha). The official boundary description, as stated in the California State Water Resources Control Board publication Areas of Special Biological Significance (1976), is as follows:

> "Ocean waters within a line beginning at the intersection of the line of mean high tide with the westerly boundary line of Heisler Park, as described in a deed to the City of Laguna Beach, recorded in book 1666, page 144, Official Records Orange County, California; thence south 16° 21' west 800 feet more or less to the line of the Laguna Beach Marine Life Refuge, as per Division 7, Chapter 1, Article 2, Section 10904, State of California Fish and Game Code; thence along said marine life refuge line south 73° 39' east, 2,400 feet more or less to the easterly boundary of said refuge; thence along said easterly boundary north 14° 58' west, 700 feet more or less to the line of mean high tide in a westerly direction to the point of beginning."

Nearshore Waters

The clarity and degree of surge and wave action of the nearshore waters vary considerably from day to day. During the period of study, horizontal underwater visibility varied from 6.5 ft. to over 33 ft. When visibility was poor, the water column was typically full of suspended particulate matter. This material was not examined to determine whether it was silt or phytoplankton, but the color and light refraction properties

FIGURE 1

HEISLER PARK ECOLOGICAL RESERVE
AREA OF SPECIAL BIOLOGICAL SIGNIFICANCE
Ref. Map: USGS Laguna Beach, CA
Scale: 2.5 inches = 1 mile

suggested it was the former. Water temperature from the surface to 60 ft. ranged from 60-68° F through the period of this study. A thermocline existed at 66 ft. where temperature dropped to 56° F. In waters of less than 33 foot depth, hydrogen sulfide stains can be found on surface sediment under rocks.

Geophysical Characteristics

Bluffs of crumbly sandstone adjacent to the ASBS meet the ocean in a series of pitted, fractured larger rocks and stretches of cobble forming numerous pools at low tide. At Diver's Cove, a steep beach of coarse sand slopes to a water depth of about 33 feet before encountering rocky reefs. A beach of fine sand with some silt and hydrogen sulfide under the rocks is located at the north end of the Reserve. The subtidal reefs to water depth of about 20 m consist of many cracks, caves, and parallel fissures with interspersed regions of coarse sand and shell, ripple-marked sand, and pebbles. Beyond, the bottom consists of silty sand.

BIOLOGICAL DESCRIPTION

Subtidal Biota

In water areas deeper than 66 feet, a typical soft bottom community is found. Obvious animals include the sea anemone Tealia columbiana, tube anemones (Ceriantharia), starfishes Astropecten brasiliensis and Pisaster brevispinus, ghost shrimps Callianassa sp. and Upogebia sp. and sanddabs, Citharichthys sordidus. The bottom has been pitted by the burrowing of the ghost shrimps and the digging of rays (probably Myliobatus californica). Discrete beds of sand dollars, Dendraster excentricus, sea pansies, Renilla kollikeri, and heart urchins, Lovenia cordiformis, so common throughout most of this habitat type in Southern California, are lacking at the Heisler Park ASBS. The reason is not known. The soft bottom is not conducive to the establishment of attached plants.

At 33 to 66 foot water depths, rocky reefs occur and support forests of giant kelp, Macrocystis pyrifera, and an understory of brown alga Eisenia arborea. Smaller brown algae, branched red algae, and coralline red algae also grow on the rocks. The reefs are covered by large luxuriant growths of suspension feeding invertebrates, such as sponges Tethya aurantia, Spheciospongia confoederata and others, hydroids Plumularia sp., Sertularia sp., and others, bryozoans, Phidolopora pacifica, Hippodiplosia insculpta, Diaperoecia californica and others, jewel box shells, Chama pellucida, rock scallops, Hinnites multirugosus, and ascidians (many unidentified compound species).

The well-covered reefs provide food and shelter for invertebrate predators, such as knobby starfish, Pisaster giganteus, nudibranchs Flabellina iodinea and others, crabs Paraxanthias taylori and others, spiny lobsters, Panulirus interruptus, and octopuses Octopus bimaculatus. Fishes such as the convict fish, Oxylebius pictus, and the gopher rock-

fish, Sebastes carnatus, usually are found resting on the reefs while others such as kelp rockfish, Sebastes atrovirens, garibaldi, Hypsypops rubicundus, and rock wrasses Halichoeres semicinctus, feed and remain close to the rocks. The algae attached to the rocks are eaten by sea urchins Strongylocentrotus franciscanus and Centrostephanus coronatus, kelp crabs, Pugettia dalli, and opaleye, Girella nigricans.

In the shelter of the kelp blades and stipes lives the giant kelpfish, Heterostichus rostratus. The plants provide a habitat for bryozoans, small hydroids, serpulid polychaetes, grass shrimp Hippolyte clarki, and numerous small crustaceans, particularly isopods Idotea spp. and Cirolana sp., amphipods, and mysids.

Intertidal Biota

The steep, coarse sand beaches at Diver's Cove and the City access beach at Laguna Canyon Rd. support no noticeable larger organisms, although surf perch (family Embiotocidae) forage among drifting algae close to the beach. Surf-swept intertidal rocks support luxuriant mussel bed communities dominated by the California sea mussel, Mytilus californianus. There is a near absence of the goose barnacle, Pollicipes polymerus from the mussel bed communities. This is known to happen when the predatory sea star, Pisaster ochraceus, is absent from the habitat - a situation usually resulting from removal of the seastar by seashore visitors. Under such conditions, the mussel will outcompete the weaker goose barnacles. Low tidal pools contain brown alga Eisenia arborea, healthy stands of surf grass Phyllospadix sp., and many coralline algae along with many species of ophiuroids, molluscs, starfishes, crustaceans, and small polychaetes. The boa kelp, Egregia menziesii, occurs in the mid-intertidal zone along with masses of the tube mollusc Serpulorbis squamigerus. The upper intertidal zone contains limpets Collisella spp., barnacles Chthamalus fissus, and black turban snails, Tegula funebralis. The striped shore crab, Pachygrapsus crassipes, forages throughout the intertidal zone. The fauna as a whole is typical of a protected outer coast (Ricketts, Calvin, and Hedgpeth, 1969). A complete list of species observed during the study is given in Appendix 1.

Landside Biota

The top of the coastal bluffs has been landscaped with shrubs and grass to provide a public park. Some scattered native shrubs, such as lemonadeberry, Rhus integrifolia, suggest that the original vegetation was coastal sage scrub (Munz, 1974). Ground squirrels, Spermophilus beecheyi, dig burrows in the bluffs, encouraging erosion of about 3 meters per year in some areas (James Stauffer, Laguna Beach Lifeguards, personal comm.).

LAND AND WATER USE DESCRIPTIONS

Beyond the immediate coastal bluffs of the Reserve, a public park and a public beach access are located. The landward side beyond the park is fully developed with private residences and businesses.

Access on foot to the Reserve is provided by paved paths and steps, and signs announcing the Reserve are posted on all of these accesses.

The most popular activities at the Reserve are exploring tidepools, picnicking, sunbathing, and SCUBA diving (several large dive classes utilize the area nearly every weekend from February through November). Other activities observed included fishing from boats and snorkeling.

The impact of divers on any subtidal area is difficult to assess, except under the most extreme conditions. Invertebrate game animals, such as scallops and abalone, were present, but the individuals were very small. No legal-sized abalone were seen. Fishes around the reefs appear healthy and are relatively unafraid of divers.

Direct human impact on the intertidal region is easier to assess. Although lifeguards and local citizens try to prevent blatant poaching, visitors still kill many marine organisms by carelessly disturbing their habitat and taking animals out of their preferred environments. During one low tide period, children were observed disturbing the area by turning over rocks and leaving them upside down, a procedure that kills both the animals that live on top of the rocks and those underneath them. Others were observed picking up animals such as limpets and starfish to examine them and then returning the animals to less optimal habitats such as surge channels or warm upper intertidal pools.

No scientific studies, other than the present survey were known to have been carried out at Heisler Park during the period of this study, but research has been carried on in the area in the past. Laguna Beach is the type locality of seven species of algae (Abbott and Hollenberg, 1976). E. Yale Dawson studied the marine flora of this region several years ago (1959a, 1959b, 1965a, 1965b), for the then California State Water Pollution Control Board. More recently Widdowson (1971), Thom (1976), and Thom and Widdowson (1978) have studied algal species diversity at Laguna Beach. The goboid fishes have been investigated along this coastline by Wiley (1973, 1976).

ACTUAL AND POTENTIAL POLLUTION THREATS

Storm drains run from the residential and business districts above the Reserve to the beach. These drains carry not only fresh water runoff but may contain automobile and asphalt oils, captured air pollutants such as lead, pesticides, and various and sundry debris into the tidepools and onto the beaches. Dead algae tend to accumulate in drifts on the shore, particularly south of Rocky Point. This algae, and debris from other sources, contribute to the hydrogen sulfide generation in anoxic areas under rocks in the sandy tidepools in the Reserve. Sulfide stains also were observed under cobble in the subtidal zone at a water depth of 33 feet. The proximity of the Laguna Beach domestic outfall may contribute to the sulfide-stained patches noted in the Reserve, but this outfall is scheduled to be abandoned in 1979. The presence of these hydrogen sulfide regions suggests that any new large input of organic matter could worsen existing anoxic conditions.

It is probable that a combination of two factors, heavy public use and storm drain effluent, prevents a typical sandy beach fauna from developing at Heisler Park. No sand crabs, Emerita analoga, amphipods or isopods, which are common to sandy beach habitats, were recovered from the sandy littoral region during the course of this study.

Widdowson (1971) noted that marine algae were declining in both number of species and types of growth form along the coast of Southern California. His data suggest that foliose red and brown algae are becoming scarce while turf-forming coralline algae were becoming more abundant along much of the coast. He attributed this change to sewage, human use, and air pollution. Thom (1976) found the same trend toward turf-forming algae along most of the coast, but reported a rise in the number of species of algae at stations in Laguna Beach. This localized increase in species abundance may have been due to the closing of the old sewage outfall in Laguna Beach and the establishment of the Reserve.

Overall, Orange County coastal algal diversity has been declining over the past 20 years (Thom and Widdowson, 1978). Although turf-forming algae continue to be abundant in the intertidal zone at Heisler Park, healthy-looking stands of the brown alga Eisenia arborea and giant kelp, Macrocystis pyrifera, currently are present in the lower intertidal and subtidal zones. These plants, which provide food directly to grazers such as sea urchins and abalone, and which are a source of the detritus eaten by many smaller invertebrates, contribute extensively to the abundance and diversity of fish and invertebrates. The presence of the larger brown algae may be indicative of an improvement in water quality in the Reserve over recent years.

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APPENDIX 1

SPECIES LIST

Animals:	Depth of observation in feet
Phylum Porifera: sponges	
Cliona sp.	40
Hymenamphiastra cyanocrypta	40-50
? Leucetta sp.	40
Leucosolenia eleanor	20-40
Spheciospongia confoederata	40
Tethya aurantia	40
? Verongia sp.	40-50
Unidentified species	
Phylum Coelenterata: corals, sea pens, sea fans, and sea anemones	
Anthopleura elegantissima	0-20
Astrangia lajollaensis	20-60
Ceriantharia	40-60
Corynactis californica	20-40
Diplocheilus allmani	0-30
Epiactis prolifera	20
? Halcampa sp.	40
? Hydractinia sp.	40
Lophogorgia chilensis	40
Muricea californica	20-50
Muricea fructicosa	40-50
Obelia ? alternata	0-5
Paracyathus stearnsi	40
Parazoanthus lucificum	50
? Plumularia sp.	40
Stylatula elongata	40
Syncoryne ? mirabilis	0-30
Tealia columbiana	60

Tealia coriacea	40
Zoantharia	20
Phylum Platyhelminthes: flatworms	
Thysanozoon sp.	20-40
Unidentified species	Intertidal
Phylum Annelida: segmented worms	
? Arenicola sp.	40
Diopatra ornata	40
Eudistylia polymorpha	40
Phragmatopoma californica	0-20
Salmacina tribranchiata	20-40
Serpulidae	Intertidal
Spirobranchus sp.	40
Spirorbis sp.	Intertidal
Unidentified species	
Phylum Mollusca	
Class Gastropoda: snails, abalone, limpets, sea hares and nudibranchs	
Acanthodoris lutea	40
Amphissa versicolor	20
Aplysia californica	0-40
Archidoris montereyensis	40
Astraea undosa	60
Chelidonura inermis	20
Collisella digitalis	Intertidal
Collisella limatula	Intertidal
Collisella scabra	Intertidal
Cypraea spadicea	40
Fissurella volcano	Intertidal
Flabellina iodinea	40

Haliotis cracherodii	Intertidal
Haliotis corrugata	40
Kelletia kelletii	20-50
Littorina planaxis	Intertidal
Littorina scutulata	Intertidal
Homalopoma sp.	Intertidal
Lottia gigantea	Intertidal
Megathura crenulata	0-50
Mitrella carinata	20-40
Norrisia norrisi	40
Nucella emarginata	Intertidal
Petaloconchus montereyensis	Intertidal
Polycera atra	40
Opalia funiculata	Intertidal
Seila montereyensis	Intertidal
Serpulorbis squamigerus	Intertidal
Spurilla oliviae	Intertidal
Tegula funebralis	Intertidal
Tegula eiseni	Intertidal
Tegula gallina	Intertidal
Thordisa bimaculata	40

Class Pelecypoda: clams, mussels, and scallops

Chama pellucida	20-50
Hiatella arctica	20
Hinnites multirugosus	20-50
Mytilus californianus	Intertidal
Septifer bifurcatus	Intertidal

Class Amphineura: chitons

Cyanoplax hartwegii	Intertidal
Lepidozona pectinulata	Intertidal
Nuttallina fluxa	Intertidal

Class Cephalopoda: octopuses and squid	
Octopus bimaculatus	0-40
Phylum Arthropoda	
Class Arachnida: spiders and mites	
Acarina	Intertidal
Class Crustacea: barnacles, shrimp, crabs, lobsters, etc.	
Alpheus sp.	40
Balanus tintinnabulum	20-40
Balanus galeatus	40
? Callianassa sp.	60
Chthamalus fissus	Intertidal
Cirolana harfordi	Intertidal
Cirolana parva	Intertidal
Gammaridae	0-80
Heptacarpus pictus	Intertidal
Heptacarpus taylori	Intertidal
Hippolyte clarki	0-5
Idotea sp.	0-40
Lysmata californica	Intertidal
Mysidacea	20
Pachygrapsus crassipes	Intertidal
Paguristes parvus	20-40
Paguristes ulreyi	20
Pagurus samuelis	Intertidal
Panulirus interruptus	50
Paraxanthias taylori	40
Petrolisthes cabrilloa	Intertidal
Pollicipes polymerus	Intertidal
Pilumnus spinohirsutus	20
Pugettia dalli	0-40
Pylopagurus californiensis	20

Pyromaia tuberculata	30
Scyra acutifrons	40
Phylum Bryozoa: moss animals	
Bugula neritina	20-50
Diaperoecia californica	20-50
Hippodiplosia insculpta	40
Lichenopora sp.	20-40
Membranipora membranacea	0-5
Phidolopora pacifica	20-50
Unidentified species	
Phylum Echinodermata	
Class Asteroidea: sea stars	
Astrometis sertulifera	0-40
Astropecten brasiliensis	40-60
Linckia columbiae	40
Patiria miniata	40-60
Pisaster brevispinus	80
Pisaster giganteus	0-40
Pisaster ochraceus	0-20
Class Holothuroidea: sea cucumbers	
Cucumaria salmo	20
Parastichopus parvimensis	40-50
Class Echinoidea: sea urchins	
Centrostephanus coronatus	50
Lytechinus anamesus	60-80
Strongylocentrotus franciscanus	0-50
Strongylocentrotus purpuratus	Intertidal
Class Ophiuroidea: brittle stars	
? *Amphipholis* sp.	Intertidal

Ophioderma panamensis	20-40
Ophiactis simplex	40
Ophionereis annulata	Intertidal
Ophioplocus esmarki	Intertidal
Ophiopteris papillosa	40
Ophiothrix spiculata	40

Phylum Chordata

Class Ascidacea: tunicates

Clavelina huntsmani	50
Euherdmania claviformis	20
Metandrocarpa taylori	50
Pyura haustor	40
Styela montereyensis	20-40
Unidentified compound species	

Class Pisces: fishes

Atherinops affinis (topsmelt)	0-10
Brachyistius frenatus (kelp perch)	20
Chromis punctipinnis (blacksmith)	20-50
Citharichthys sordidus (Pacific sanddab)	60
Clinidae (Klipfish)	Intertidal
Clinocottus analis (Woolly sculpin)	Intertidal
Coryphopterus nicholsii (blackeye goby)	20-50
Cottidae (sculpins)	20-40
Damalichthys vacca (pile perch)	40
Embiotoca jacksoni (black perch)	20-50
Genyonemus lineatus (white croaker)	20
Gibbonsia sp. (klipfish)	0-20
Girella nigricans (opaleye)	0-20
Halichoeres semicinctus (rock wrasse)	20-50
Heterostichus rostratus (giant kelpfish)	20-50
Hysopsetta guttulata (diamond turbot)	40

Hypsurus caryi (rainbow perch)	20-40
Hypsypops rubicundus (garibaldi)	20-50
Leiocottus hirundo (lavendar sculpin)	40
Oxyjulis californica (senorita)	20-50
Oxylebius pictus (painted greenling)	20-40
Paralabrax clathratus (kelp bass)	20-50
Paralabrax nebulifer (sand bass)	20-50
Phanerodon furcatus (white perch)	20-40
Pimelemetopon pulchrum (sheepshead)	20-50
Scorpaena guttata (poison sculpin)	20-40
Scorpaenichthys marmoratus (cabezon)	50
Sebastes atrovirens (kelp rockfish)	40
Sebastes carnatus (gopher rockfish)	20-40
Sebastes serriceps (treefish)	40
Syngnathus californiensis (kelp pipefish)	40
Torpedo californica (electric ray)	40

Class Aves: birds

Black-bellied plover (Squatarola squatarola)
Bonaparte's gull (Larus philadelphia)
Brown pelican (Pelecanus occidentalis)
Cormorants
Heermann's gull (Larus heermanni)
Spotted sandpiper (Actitis macularia)
Western grebe (Aechmophorus occidentalis)
Western gull (Larus occidentalis)
Willet (Catoptrophorus semipalmatus)
White-crowned sparrow (Zonotrichia leucophrys)

Class Mammalia: mammals

Spermophilus beecheyi (California ground squirrel)

Plants:

Division Chlorophyta: green algae	
Cladophora sp.	Intertidal
Codium fragile	Intertidal
Ulva sp.	Intertidal
Division Phaeophyta: brown algae	
Colpomenia sinuosa	Intertidal
Cystoseira osmundacea	0-40
Dictyotales	0-40
Dictyopteris undulata	40
Dictyopteris zonarioides	50
Egregia menziesii	Intertidal
Eisenia arborea	0-40
Laminaria sp.	50
Macrocystis pyrifera	20-50
Sargassum sp.	0-50
Division Rhodophyta: red algae	
Acrosorium uncinatum	40
Bossiella spp.	0-50
Corallina officinalis chilensis	40
? Laurencia sp.	Intertidal
Leptofauchea pacifica	40
? Petalonia sp.	Intertidal
Platythamnion sp.	40
Pleonosporium vancouverianum	40
Pterosiphonia pennata	40
? Ralfsia sp.	Intertidal
Unidentified species	
Division	
Phyllospadix sp.	0-10

STATE WATER RESOURCES CONTROL BOARD

P. O. Box 100, Sacramento, CA 95801

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARDS

NORTH COAST REGION (1)
1000 Coddingtown Center
Santa Rosa, California 95401
(707) 545–2620

SAN FRANCISCO BAY REGION (2)
1111 Jackson Street, Room 6040
Oakland, California 94607
(415) 464–1255

CENTRAL COAST REGION (3)
1122–A Laurel Lane
San Luis Obispo, California 93401
(805) 549–3147

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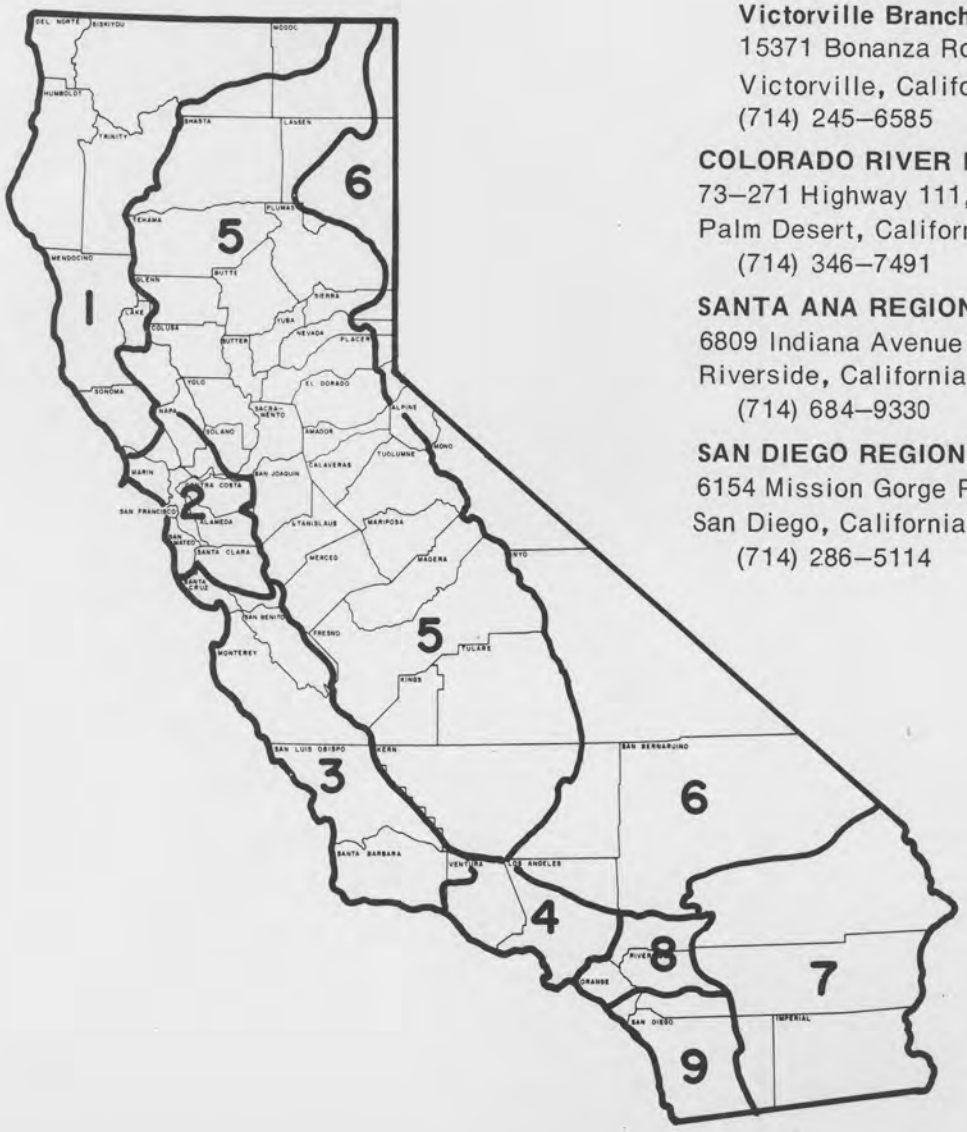
107 South Broadway, Room 4027
Los Angeles, California 90012
(213) 620–4460



CENTRAL VALLEY REGION (5)
3201 S Street
Sacramento, California 95816
(916) 445–0270

Fresno Branch Office
3374 East Shields Avenue
Fresno, California 93726
(209) 488–5116

Redding Branch Office
1815 Sacramento Street
Redding, California 96001
(916) 442–6376

LAHONTAN REGION (6)
2092 Lake Tahoe Boulevard
P. O. Box 14367
South Lake Tahoe, California 95702
(916) 544–3481

Victorville Branch Office
15371 Bonanza Road
Victorville, California 92392
(714) 245–6585

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73–271 Highway 111, Suite 21
Palm Desert, California 92260
(714) 346–7491

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6809 Indiana Avenue
Riverside, California 92506
(714) 684–9330

SAN DIEGO REGION (9)
6154 Mission Gorge Road, Suite 205
San Diego, California 92120
(714) 286–5114