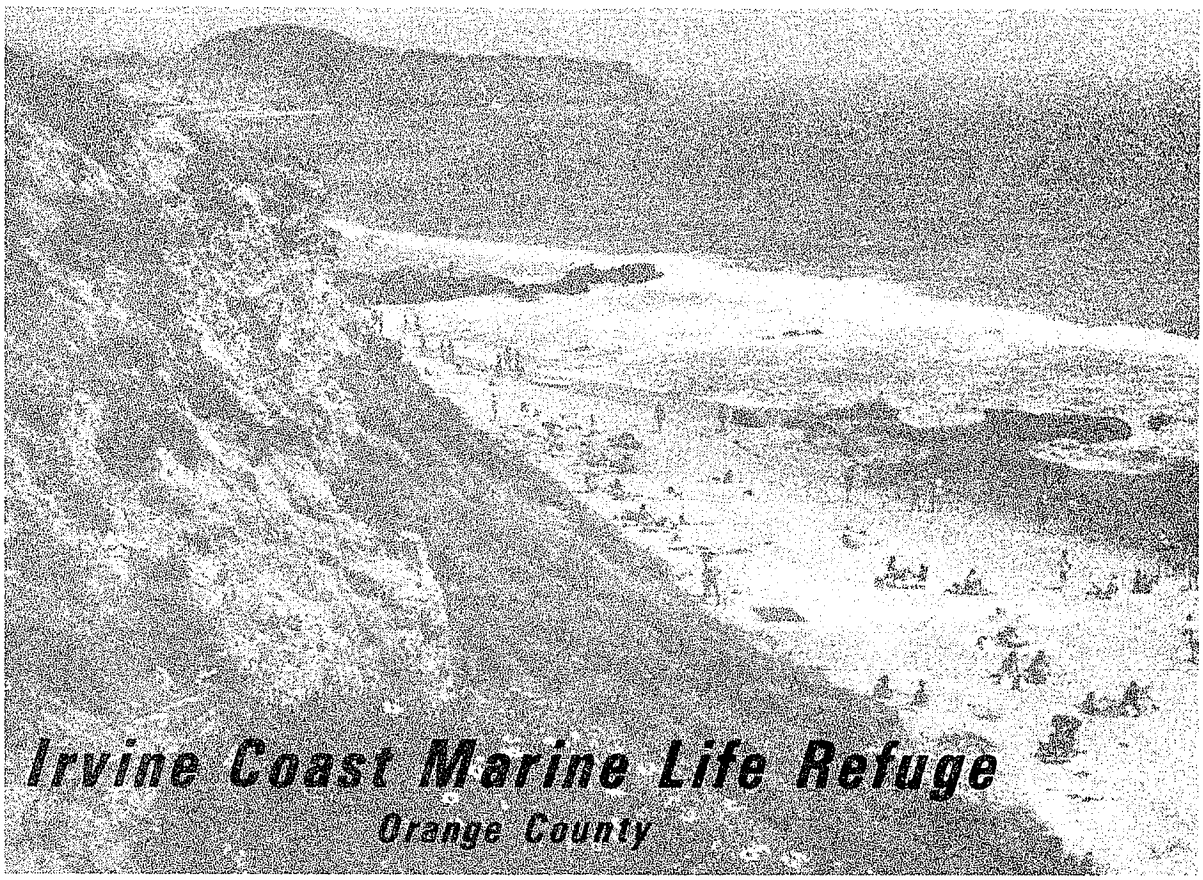
California Marine Waters
Areas of Special Biological Significance
Reconnaissance Survey Report



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

March 1979

WATER QUALITY MONITORING REPORT NO. 79-3

Irvine Coast Marine Life Refuge Area of
Special Biological Significance

CALIFORNIA MARINE WATERS
AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE

RECONNAISSANCE SURVEY REPORT

IRVINE COAST MARINE LIFE REFUGE
ORANGE COUNTY

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

MARCH, 1979

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ACKNOWLEDGEMENT

This State Water Resources Control Board Report is based on a Reconnaissance Survey Report submitted by Richard C. Brusca and Richard Zimmerman 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. The Department of Fish and Game coordinated the preparation of a series of Area of Special Biological Significance Survey Reports for the Board under an Interagency Agreement.

ABSTRACT

Irvine Coast Marine Life Refuge Area of Special Biological Significance (ASBS) includes the nearshore waters adjacent to approximately 3 miles of beach from southern Corona del Mar to Abalone Point, Orange County. The area is located within the approximate coordinates 33° 33' 20" to 33° 35' 05" N LAT and 117° 49' to 117° 51' 55" W LONG.

The long, clean sandy beach, interspersed with a few rocky outcroppings, is fronted by high coastal bluffs of sandstone, which are vegetated with native coastal sage scrub and a few introduced plant species.

The coastline is unprotected from the southwesterly swells that are at times quite heavy. A consistent surf of at least two to three feet makes water access difficult and sometimes hazardous. The water mass is well mixed with turbid conditions primarily dependent on surge and wave action. Water termperature varies seasonally, with the surf approaching 70° F in the summer and rarely dropping below 60° F in the winter. Offshore currents generally flow southeasterly during the winter and spring and northwesterly during summer and fall.

The intertidal substrate consists of coarse sand beaches and surf-washed rocks. Beach areas are inhabitated by sand crabs, isopods and talitrid amphipods. Shorebirds such as the marbled godwits and black bellied plovers forage the area. Rocky tidepool areas contain the typical fauna assemblages including: mussel, anemone, brown algae, starfish, polychaetes, urchins, surf grass, limpets, and the striped shore crab.

The subtidal substrate is fine silty sands in water depths greater than 30 feet (9 m) and coarse sands and shell fragments in shallower water. A wide variety of benthic organisms are found in this area. Small rocky reefs occur throughout the ASBS, some supporting small stands of giant kelp and a diverse assemblage of associated biota.

The greatest threats to the area are outflow from Newport Bay and land use and development of adjoining land areas. Tidal flushing of Newport Bay, coupled with longshore currents, carries outflow directly down the coast to Irvine ASBS. Although no deleterious effects were observed during the course of this study, the situation warrants monitoring. Land development will undoubtedly bring increased public use, storm runoff, and probable landslide erosion. At the present time, however, the Irvine Coast Marine Life Refuge ASBS must be considered as one of the most biologically healthy regions of the Southern California Coast.

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FINDINGS AND CONCLUSIONS

FINDINGS

1. The intertidal zone is predominately sandy beach with a few rocky outcroppings and supports rich and diverse plant and animal communities.

2. The subtidal area is sandy benthos with numerous small rocky reefs, also supporting rich and healthy biota.

3. A variety of recreational uses are made of the area; however, limited access restricts some public use.

CONCLUSIONS

1. Land use and development in the watershed adjoining the ASBS poses one potential water quality threat due to increased storm drain discharge and erosion.

2. Cycling of Newport Bay outflow downcoast into the ASBS constitutes a second potential water quality problem due to the uncertain quality of the bay's water.

3. Irvine Coast MLR must be considered as presently one of the most biologically healthy regions of the Southern California coast.

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 Boards' 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 Irvine Coast Marine Life Refuge ASBS, a reconnaissance survey integrating existing knowledge and additional field study information was performed by Richard C. Brusca and Richard Zimmerman of the University of Southern California. This survey report was one of a series prepared for the Board under the direction of the California Department of Fish and Game and provided the information for preparation of this document.

ORGANIZATION OF SURVEY

The area was studied by both shore observations and numerous SCUBA diving operations between January and June, 1978. Careful records of the organisms observed were maintained. Sandy subtidal regions were surveyed by a team of divers swimming transects from the 85 foot (26 m) isobath perpendicular to the beach to the 20 foot (6 m) isobath. Rocky subtidal areas were surveyed by teams of divers swimming over each reef, recording all common organisms observed, and collecting those not readily identifiable by sight for identification by specialists. Photographs were taken of general habitat types and common species assemblages. Temperature, surge and water clarity (secchi disk) were measured on each outing.

Intertidal regions were surveyed during periods of extreme low tide on 22 January, 20 February, and 13 May, 1978. Records of all organisms seen from the highest tide mark to the low water mark were made. Each habitat type was recorded. The shoreline was investigated for access routes, erosion, coastal vegetation, storm drainages 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 Refuge. Counts of divers and beach-goers were also made, as well as observations of use by SCUBA divers, horse-riders and off-road vehicles.

PHYSICAL DESCRIPTION

Location and Size

The Irvine Coast Marine Life Refuge ASBS encompasses the nearshore waters between the southern border of Corona del Mar and Abalone Point, Orange County (Fig. 1). These waters border approximately 3 mi (4.8 km) of coast and comprise about 1.6 sq. mi. (414 ha). Boundaries of the ASBS are contained within the approximate map coordinates 33° 33' 20" to 33° 35' 05" N LAT and 117° 49' to 117° 51' 55" W LONG. The official boundary description, as stated in the State Water Resources Control Board publication Areas of Special Biological Significance (1976), is as follows:

> "Ocean waters within that portion of California State tide and submerged lands adjoining the Newport Beach Marine Life Refuge bounded by a line beginning at the intersection of the southwesterly extension of Lot 141, Tract No. 3357, as shown on a map recorded in Book 107, Page 1 of Miscellaneous Maps on file in the office of the County Recorder, Orange County and the line of ordinary high tide; thence, southeasterly along the line of ordinary high tide approximately 20,000 feet to its intersection with the southwesterly extension of the northwesterly boundary line of the City of Laguna Beach; thence, southwesterly along such southwesterly extension 1,000 feet or to the 100-foot isobath, whichever distance from shore is greater; thence northwesterly along a line parallel to and 1,000 feet or to the 100-foot isobath, whichever distance from shore is greater southwesterly of the line of ordinary high tide to the southwesterly extension of said Lot 141; thence northeasterly along such southwesterly extension to the point of beginning."

Nearshore Waters

The entire coastline is unprotected from the southwesterly swells that are, at times, quite heavy. There is a consistent 2-3 foot surf that makes launching of boats and entry by divers difficult at best and extremely hazardous on days of very heavy surf.

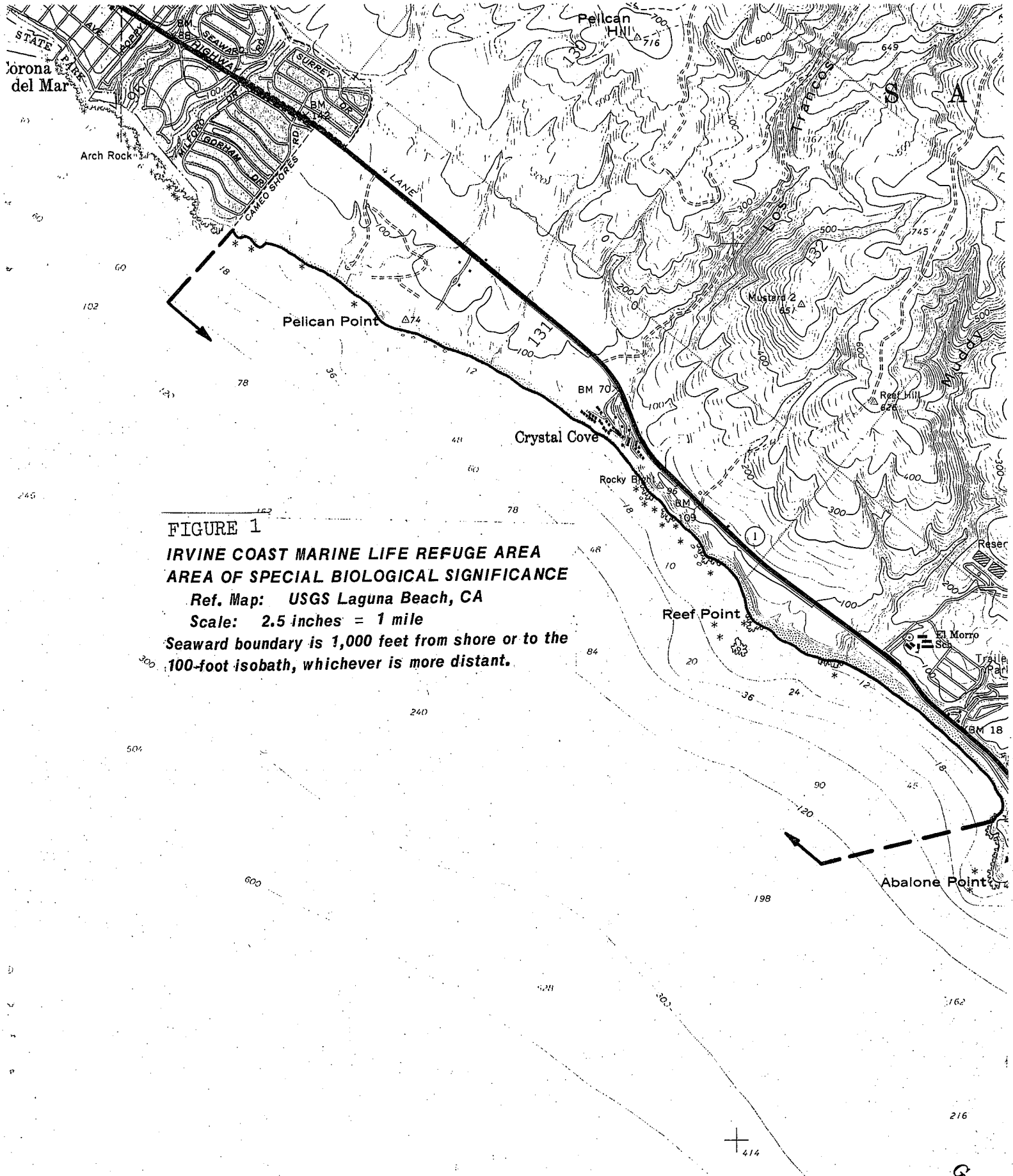

FIGURE 1

IRVINE COAST MARINE LIFE REFUGE AREA
AREA OF SPECIAL BIOLOGICAL SIGNIFICANCE

Ref. Map: ***USGS Laguna Beach, CA***

Scale: ***2.5 inches = 1 mile***

Seaward boundary is 1,000 feet from shore or to the 100-foot isobath, whichever is more distant.

The lack of hydrogen sulfide stains in this region indicates that the water mass is well mixed and well oxygenated. This is probably a result of the open exposure and chronic moderate to heavy surf conditions that prevail.

Turbidity of the water is primarily a function of surge and wave action, although it does follow a seasonal cycle, increasing in the winter and spring as a result of increased phytoplankton productivity (due in part to the upwelling of nutrient rich waters at this time of the year).

Water temperatures vary seasonally. In the summer, surf temperatures usually approach 70°F; winter temperatures rarely drop below 60°F. Subtidally, the water is generally several degrees colder, ranging from a low of 55°F in the winter to 65°F in summer and early autum. A shallow summer thermocline usually exists. The actual location of the thermocline in the water column is highly variable and is a function of (1) storm mixing, (2) turbidity, (3) convective stirring during cooling periods, and (4) convergence and divergence caused by wind patterns (Cairns and LaFond, 1966). The depth of the thermocline is generally less than 30 feet (9 m); it is usually abolished by October or mid-November. Table 1 indicates the variability in temperature and turbidity observed during the course of this study.

Studies of the current patterns by Jones (1971) indicate that a generally southeasterly flowing current occurs offshore during the winter and spring. This current often reverses itself during summer and autum months. Current velocities, on the order of 5-10 cm/sec, are highly variable. Nearshore current patterns have not been extensively studied and are complicated by wind and tidal factors. Jones concludes that "most studies of nearshore current patterns are too limited in time and synoptic observations of winds and currents to be useful in determining the various causes of nearshore circulation or in stating its general nature."

Table 1: Water Temperatures and Turbidity at Irvine Coast Marine Life Refuge

Date	Water Temp (^{o}F)	Extinction (Secchi Depth)
22 January	55-56	-
20 February	-	3 m
30 April	56-60	13 m
7 May	64-56	10 m
13 May	68	-

Geophysical Characteristics

The Abalone Point region is composed of a siltstone bench that is easily accessible from the adjacent beach only at times of low spring tides. The benchwork is part of a several hundred foot high cliff that also helps to limit access to the area. Just north of Abalone Point is a broad sand beach that stretches the entire length of the reserve. This sandy beach, over 3 miles long, is interrupted by small rocky outcroppings only twice, at Reef Point and at a small rocky bight just south of Crystal Cove. Sandstone bluffs line the entire beach. Erosion of these bluffs is particularly noticeable in the Scotchman's Cove region. The bluffs appear less eroded in the area around Pelican Point, where fossil-bearing rocks are found.

Subtidally, the Irvine Coast Marine Life Refuge is composed of fine silty sands in regions deeper than 30 feet (9 m). A coarser sand substrate is found in zones shallower than the 30 foot isobath, primarily because of the heavy surf conditions that prevail in this area. Subtidal reefs dot the region throughout the ASBS. They occur primarily in depths shallower than 40 feet (13 m). These subtidal reefs consist of vertical rock walls with many cracks, caves and parallel fissures. The substrate in sandy regions surrounding the reefs is composed of coarse shelly debris which has been imported to a large extent from the reef areas.

BIOLOGICAL DESCRIPTION

Subtidal Biota

A typical soft bottom community is found in areas deeper than 65 feet (20 m). Organisms observed in the area include sea pens Ptilosarcus and Stylatula, razor clams, Ensis myrae, sand stars Astropectin armatus, and moon sails Polinices sp. The bottom is smooth and shows little evidence of pitting or burrowing as a result of the activity by organisms such as ghost shrimps or rays. As one proceeds from the 20 m isobath into shallower regions, the sediment becomes a bit coarser and tube worms Diopatra sp. and olive shells, Olivella biplicata, become common. A few small sand dollars, Dendraster, were observed at the south end of the reserve, near Abalone Point, but there was no evidence of any extensive beds. No other live sand dollars were observed and there were no remnants or broken tests to indicate that there had been sizeable populations in the recent past.

Small rocky reefs are scattered throughout the reserve and range in depths from 50 feet (16 m) to the intertidal zone. Giant kelp, Macrocystis pyrifera, are present although they do not form large beds, due to the small size of the scattered reefs that they utilize as substrate. Smaller brown algae (Phaeophyta) and a branched and coralline red algae (Rhodophyta) are extremely common on the reefs, which are covered with luxuriant growths of invertebrates such as sponges, bryozoans, jewel box shells, Chama pellucida, rock scallops, Hinnites multirugosus, and ascidians. Abalone are present, although they are not extremely common. Most are smaller than the legal size limit. Sea urchins Strongylocentrotus purpuratus, S. franciscanus, and Centrostephanus coronatus are also present and are locally abundant on many rocky outcroppings. The reefs are also inhabited by such predatory invertebrates as the knobby starfish, Pisaster giganteus, nudibranchs, crabs, spiny lobsters

and octopuses. Fishes associated with the reefs include the 'convict-fish', Oxylebius pictus, rockfish Sebastes spp., rock wrasse Halichoeres semicinctus, opaleye, Girella nigricans, and the garibaldi, Hypsypops rubicundus. Kelp bass are not extremely abundant, and most individuals are quite small. The plants inhabiting these reefs provide a habitat for bryozoans, small hydroids, polychaetes, grass shrimp Hippolyte clarki and numerous small crustaceans, particularly isopods (Idotea, Cirolana, various Sphaeromatidae), amphipods and mysids.

Intertidal Biota

The coarse sand beaches are inhabited by sand crabs, Emerita analoga. Talitid amphipods and flies are present and form dense aggregations around drift algae that have been stranded by the tide. Broken shells of Donax gouldi, Tivela stultorum and Olivella biplicata have been cast up from deeper regions. Marbled godwits and black bellied plovers forage along the beach. A California sea lion was seen in the surf zone.

Surf swept intertidal rocks support a fauna typical of that described by Ricketts, et al. (1968) for protected outer coasts. Wide bands of mussel beds, composed primarily of the mussel, Mytilus californianus, dominate much of the rocky mid-intertidal region. Low tidepools contain the anemone Anthopleura elegantissima, brown alga Eisenia arborea and many corralline algae, primarily Corallina vancouveriensis, along with many species of ophiuroids, molluscs, starfishes, crustaceans and small polychaetes. The purple sea urchin, Strongylocentrotus purpuratus, is common in the low tide region around Abalone Point but is not present on the other intertidal reefs in the Refuge. Surf grass, Phyllospadix torreyi, is common in the low intertidal zone as are the brown algae Egregia menziesii and Cystoseira sp. The upper intertidal zone contains limpets Collisella spp., barnacles Chthamalus fissus, Balanus sp., Tetraclita squamosa, and black turban snails, Tegula funebralis. The striped shore crab, Pachygrapsus crassipes, forages throughout the rocky intertidal zone. A complete list of the species observed during this study is given in Appendix 2.

Landside Biota

The tops of the bluffs fronting the entire reserve are covered by the coastal sage scrub vegetation community described by Munz (1974). Common shrubs include lemonadeberry, Rhus integrifolia, a bladderpod, introduced sunflowers Helianthus, and native daisies Encelia sp. Ice plant and sea rocket, Cabile, grow near the edge of the bluffs in which starlings nest. Ground squirrels, hummingbirds and insects, especially locusts and butterflies, are very common. Although a number of introduced plants grow in this area, most of the flora is native to the Southern California coastal region, evincing the relatively undisturbed nature of the area.

LAND AND WATER USE DESCRIPTIONS

Harvesting of marine life in the ASBS is controlled by special regulations imposed as a result of its marine life refuge designation (Section 10644, Fish and Game Code) as well as other sport and commercial fishing regulations. Commercial fishing for spiny lobster in or near the ASBS was observed, as was sport hook and line fishing from shore and boats. Other recreation activities associated with the area include water-contact sports, horseback riding and beach sports.

Land adjoining the ASBS is largely undeveloped, except for a large equestrian center and several small developments. Future development of the area is anticipated.

No scientific studies, other than the present report, were carried out within the Irvine Coast Marine Life Refuge during the period of this study, although research has been carried out in the past. ZoBell (1971) studied drift algae on the beaches along this coastline. The goboid fishes have been investigated by Wiley (1973, 1976), and Pequegnat (1963, 1964, 1968) studied several subtidal reefs located within the boundaries of the reserve. Jones and Fauchald (1976) studied the soft bottom macrofaunal communities in the deeper waters adjacent to the reserve. Mearns, et al. (1973) reported on an otter trawl survey of the central Orange County coast by the Southern California Coastal Water Research Project. They captured 47 species of fishes and concluded that the inshore coastal fishes of this region are both abundant and diverse. Their data indicate, as did this survey, that this region is biologically healthy, relatively undisturbed and free of any gross or observable water pollution.

ACTUAL OR POTENTIAL POLLUTION THREATS

Fresh water runoff from the surrounding hills enters the ASBS at a number of points. A small stream enters near Abalone Point, and several smaller seeps are fed by rain runoff from the land directly behind the bluffs. Although too small to represent an actual pollution threat, the runoff might carry enough nutrients to cause small problems in isolated spots. This is particularly true of the runoff water originating in the area of the equestrian center.

Water quality in the ASBS may be directly affected by changes in the water quality of Newport Bay. Tidal flushings brings Newport Bay out-flow directly into the waters of the ASBS. The proximity to Newport Bay may be considered the greatest water quality threat to the Irvine Coast ASBS at the present time. Future land development east of Pacific Coast Highway will eventually result in storm drainage to the ASBS. When this development ensues, much of the pristine Irvine Refuge Area may be threatened unless control measures are implemented.

Although the area affords no direct access to motor vehicles, R/V and off-road vehicles commonly drive along the bluff overlooking the beach. Should easy beach access be provided, it is conceivable that these vehicles might become a problem by disturbing vegetative cover and bluff soils. The opportunity for erosion and associated water quality problems in the ASBS would be enhanced.

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Appendix 1

FAUNAL LIST

Animals	Depth of observation in feet
Phylum Porifera: sponges	
Xestospongia vanilla	shore
Cliona sp.	shore to 40
Euherdmania sp.	20-45
Hymenamphiastra cyanocrypta	40-50
Leucetta sp.	shore to 30
Leucosolenia eleanor	shore to 40
Spheciospongia confoederata	40
Tethya aurantia	30-40
Verongia sp.	40-50
Haliclona permollis	shore to 40
Phylum Coelenterata: corals, sea pens, sea fans, and sea anemones	
Tubularia sp.	shore to 40
Anthopleura elegantissima	shore to 15
Anthopleura xanthogrammica	shore
Astrangia lajollaensis	20-60
Ceriantharia	40-60
Corynactis californica	20-40
Diplocheilus allmani	shore to 40
Epiactis prolifera	20
? *Halcampa* sp.	40
Hydractinia sp.	40
Lophogorgia chilensis	40
Muricea californica	20-50
Muricea fructicosa	40-50
Obelia (*alternata* ?)	shore to 10
Paracyathus stearnsi	40

Parazoanthus lucificum	50
Plumularia sp.	shore to 40
Renilla kollikeri	20-40
Stylatula elongata	40
Syncoryne ? *mirabilis*	shore to 30
? *Tealia columbiana*	60
Tealia coriacea	40
Zoantharia	20
Eudendrium californicum	shore to 40
Aglaophenia sp.	shore
Phylum Platyhelminthes: flatworms	
Thysanozoon sp.	20-40
Unidentified species	Intertidal
Phylum Sipuncula: peanut worms	
Themiste pyroides	shore
Phylum Annelida: segmented worms	
? *Arenicola* sp.	40
Diopatra ornata	40
Eudistylia polymorpha	40
Chaetopterus variopedatus	15-30
Phragmatopoma californica	shore
Salmacina tribranchiata	20-40
Serpulidae	shore
Spirobranchus sp.	40
Spirorbis sp.	shore
Halosydna johnsoni	shore
Phylum Mollusca	
Class Gastropoda: snails, abalone, limpets, sea hares and nudibranchs	
Acmaea pelta	shore
Acanthodoris lutea	40
Aplysia californica	shore to 40

Astraea undosa	60
Chelidonura inermis	20
Collisella digitalis	shore
Collisella limatula	shore
Collisella scabra	shore
Conus californicus	10-40
Crassispira semiinflata	30-40
Crassispira sp.	60
Cypraea spadicea	40
Fissurella volcano	shore
Flabellina iodinea	40
Forreria belcheri	60
Haliotis corrugata	40
Kelletia kelletii	20-50
Littorina planaxis	shore
Littorina scutulata	shore
Megasurcula carpenteria	60
Homalopoma sp.	shore
Lottia gigantea	shore
Megathura crenulata	shore to 50
Mitra idae	40
Mitrella carinata	20-40
Nassarius spp.	10-30
Norrisia norrisi	40
Nucella emarginata	shore
Odostomia spp.	shore to 20
Olivella baetica	20-30
Olivella biplicata	10-20
Opalia funiculata	shore
Polinices sp.	60
Petaloconchus montereyensis	shore
Polycera atra	40
Seila montereyensis	shore

Serpulorbis squamigerus	shore
Spurilla oliviae	shore
Tegula funebralis	shore
Tegula eiseni	shore
Tegula gallina	shore
Thordisa bimaculata	40

Class Pelecypoda: clams, mussels, and scallops

Anomia peruviana	shore to 40
Chama pellucida	20-50
Ensis myrae	20-50
Hiatella arctica	20
Hinnites multirugosus	20-50
Leptopecten monotimeris	40
Lima hemphilli	30-40
Mytilus californianus	shore
Septifer bifurcatus	shore

Class Amphineura: chitons

Mopalia muscosa	shore
Cyanoplax hartwegii	shore
Lepidozona pectinulata	shore
Nuttallina fluxa	shore

Class Cephalopoda: octopuses and squid

Octopus bimaculatus	shore to 40

Phylum Arthropoda

Class Arachnida: spiders and mites

? Acarina	Intertidal

Class Crustacea: barnacles, shrimp, crabs, lobsters, etc.

Balanus tintinnabulum	20-40
Balanus glandula	shore
Balanus galeatus	40
Cancer productus	shore
Chthamalus fissus	shore

Cirolana harfordi	shore
Cirolana parva	shore
Emerita analoga	shore
Excirolana kincaidi	shore
Gammaridea	shore to 80
Heptacarpus pictus	shore
Heptacarpus taylori	shore
Heterosaccus californicus	(parasitic on crabs)
Hippolyte clarki	shore to 5
Idotea resecata	shore to 40
Idotea urotoma	shore to 40
Ligia occidentalis	shore
Lysmata californica	shore
Mysidacea	20
Orchestoidea corniculata	shore
Pachygrapsus crassipes	shore
Paguristes parvus	20-40
Paguristes ulreyi	20
Pagurus samuelis	shore
Panulirus interruptus	50
Paraxanthias taylori	40
Petrolisthes cabrilloa	shore
Pollicipes polymerus	shore
Pilumnus sphinohirsutus	shore to 20
Pugettia dalli	shore to 40
Pylopagurus californiensis	20
Pyromaia tuberculata	80
Scyra acutifrons	40
Phylum Bryozoa: moss animals	
Bugula neritina	20-50
Hippodiplosia insculpta	40
Lichenopora sp.	20-40
Membranipora membranacea	0-5

Phidolopora pacifica	shore to 40
Unidentified species	

Phylum Echinodermata

Class Asteroidea: starfish	
Astrometis sertulifera	20-50
Astropecten brasiliensis	40-60
Linckia columbiae	40
Patiria miniata	shore to 40
Pisaster brevispinus	40
Pisaster gigantea	shore to 40
Pisaster ochraceus	shore to 20
Class Holothuroidea: sea cucumbers	
Parastichopus parvimensis	40-50
Class Echinoidea: sea urchins	
Dendraster excentricus	?
Centrostephanus coronatus	50
Lytechinus anamesus	60-80
Strongylocentrotus franciscanus	0-50
Strongylocentrotus purpuratus	shore
Class Ophiuroidea: brittle stars	
? *Amphipholis* sp.	shore
Ophioderma panamensis	shore to 40
Ophiactis simplex	40
Ophionereis annulata	shore
Ophioplocus esmarki	shore
Ophiopteris papillosa	40
Ophiothrix spiculata	shore to 40

Phylum Chordata

Class Ascidacea: tunicates	
Ciona intestinalis	shore to 40
Clavelina huntsmani	40

Metandrocarpa taylori	40-50
Pyura haustor	40
Styela montereyensis	shore to 40
Unidentified compound species	
Class Pisces: fishes	
Atherinops affinis (topsmelt)	0-10
Brachyistius frenatus (kelp perch)	20
Chromis punctipinnis (blacksmith)	20-50
Clinidae (klipfish)	Intertidal
Clinocottus analis (wooly sculpin)	Intertidal
Coryphopterus nicholsii (blackeye goby)	20-50
Cottidae (sculpins)	20-40
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
Hypsurus caryi (rainbow perch)	20-40
Hypsypops rubicundus (garibaldi)	20-50
Leiocottus hirundo (lavender sculpin)	40
Oxyjulis californica (senorita)	20-50
Oxylebius pictus (painted greenling)	20-50
Paralabrax clathratus (kelp bass)	20-50
Paralabrax nebulifer (sand bass)	20-50
Phanerodon furcatus (white perch)	20-40
Pimelemetopon pulchrum (sheephead)	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)	20
Syngnathus californiensis (kelp pipefish)	40

Class Aves: birds

- Black-bellied plover (~~Squatarola~~ Pluvialis squatarola)
- Brown pelican (Pelecanus occidentalis)
- 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)
- Starling (Sturnus vulgaris)

Hummingbirds

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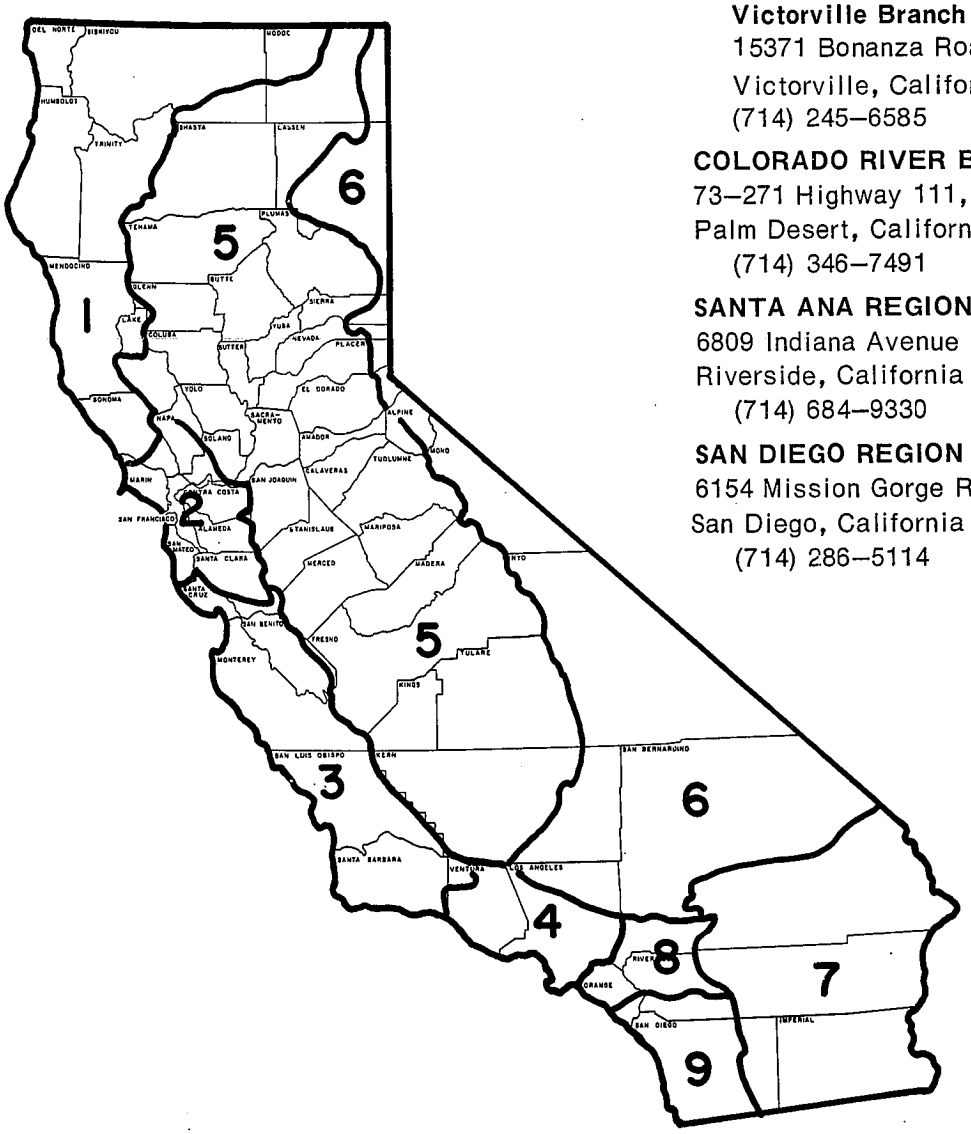

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