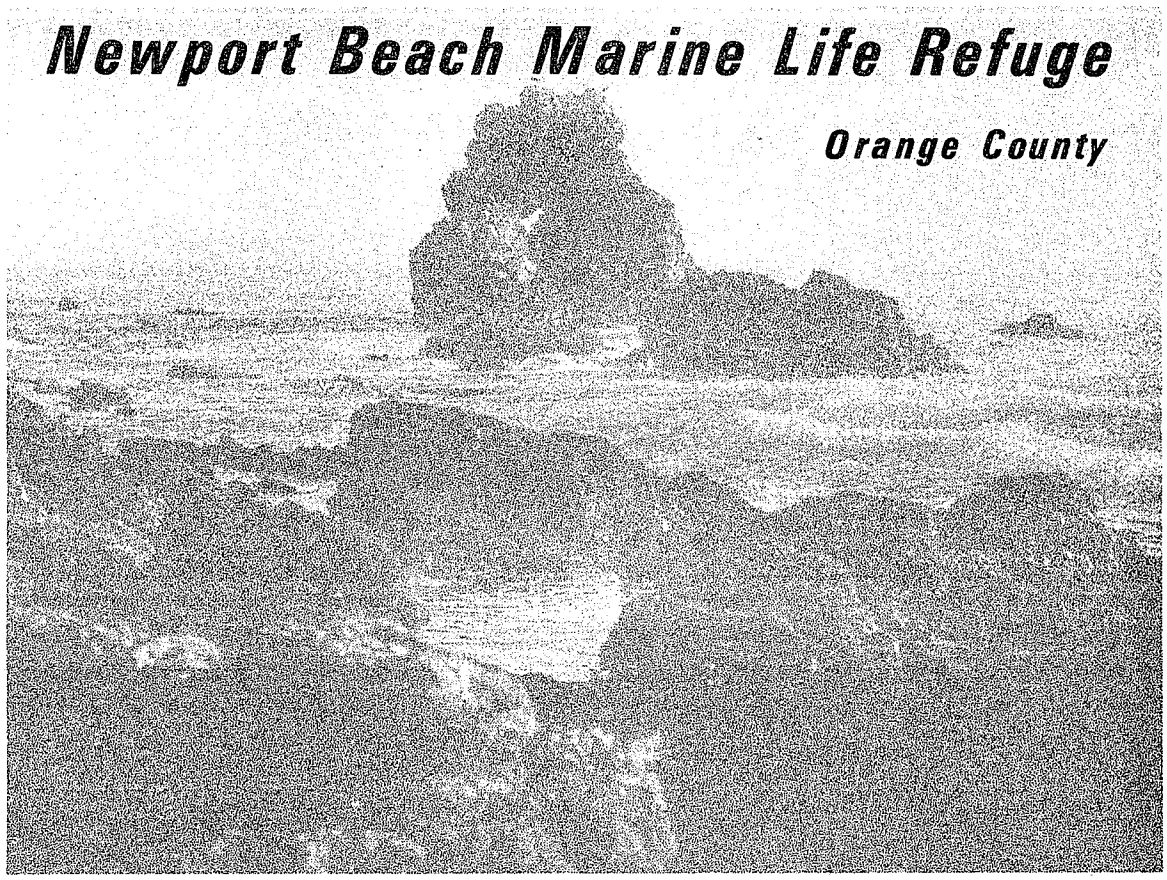
California Marine Waters
Areas of Special Biological Significance
Reconnaissance Survey Report

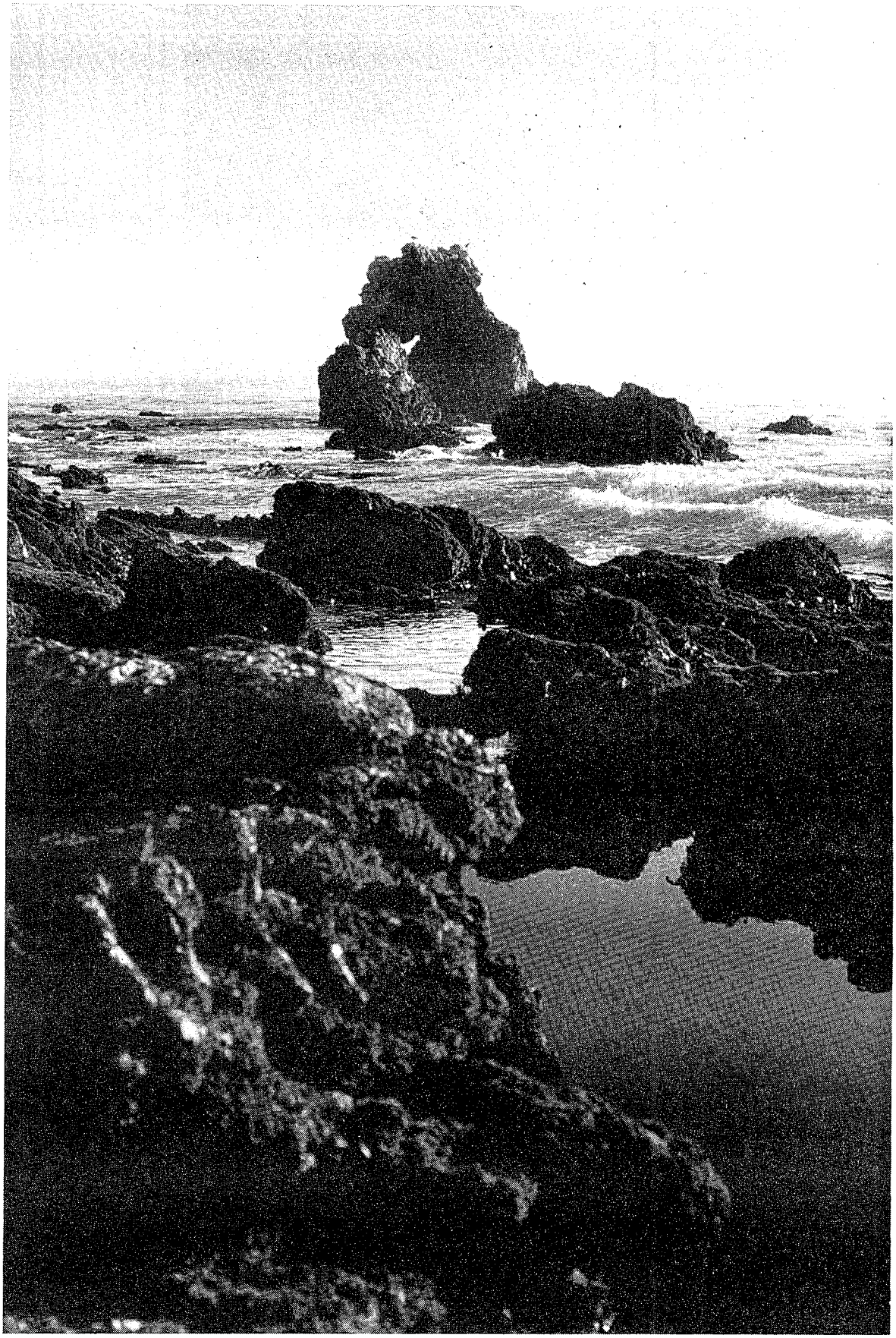


CALIFORNIA STATE WATER RESOURCES CONTROL BOARD
DIVISION OF PLANNING AND RESEARCH
SURVEILLANCE AND MONITORING SECTION

March 1979

WATER QUALITY MONITORING REPORT NO. 79-4

Cover Photograph: Newport Beach Marine Life Refuge Area of Special Biological Significance



Newport Beach Marine Life Refuge
Area of Special Biological Significance

CALIFORNIA MARINE WATERS
AREAS OF SPECIAL BIOLOGICAL SIGNIFICANCE

RECONNAISSANCE SURVEY REPORT

NEWPORT BEACH 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 N. Winn 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 coordinated the preparation of a series of Area of Special Biological Significance survey reports for the Board under an Interagency Agreement.

ABSTRACT

Newport Beach Marine Life Refuge Area of Special Biological Significance (ASBS) comprises the nearshore ocean waters near the town of Corona del Mar, Orange County, within the coordinates 33° 34'50" - 35'25" N LAT and 117° 51'10" - 52'30" W LONG.

The ASBS is 0.68 mi (1.1 km) long, extends 1,000 ft (304.8 m) seaward and comprises about 0.26 sq mi (67 ha).

The littoral region of the ASBS is comprised nearly equally of sandy beaches and interspersed rocky headlands, with conspicuous offshore rocks, stacks, and arches. The beach is fronted by a sandstone bluff with mixed native coastal scrub and introduced vegetation. The bluff is, in turn, nearly completely bordered by private residences. Two small creeks carry storm and street runoff onto the sandy beaches.

Generally, a southeasterly-flowing current occurs offshore of the ASBS during the summer and spring, although a north-flowing current, the Southern California eddy, generally exists in nearshore waters year-round. This eddy current is enhanced during winter and autumn months when the north-flowing Davidson Current is present.

The area is protected from northwest swells by the breakwater extending from Newport Bay but is exposed to southwesterly swells. Tidal surge and a consistent 2-3 foot surf make boat and diver entry from shore difficult throughout most of the year under even moderate conditions.

The generally high turbidity is largely due to surf and surge, which constantly churn the shallow areas. A seasonal cycle of winter and spring nutrient enrichment and resultant increased phytoplankton productivity also contribute to decreased water clarity. Surf temperatures approach 70° F in the summer, while winter temperatures rarely drop below 60° F. In the summer, a shallow thermocline usually develops.

The intertidal coarse sand beaches are inhabited by a somewhat diminished, but typical, algal wrack zone fauna, including talitrid amphipods, isopods, and flies. Marbled plovers, black-bellied plovers,

western gulls, and cormorants can be seen along the beach, as well. The surf swept intertidal rocks and some offshore outcroppings provide habitat for a typical protected outer coast fauna. In terms of species diversity, the rocky littoral regions are quite sparse and show obvious signs of human disturbance. The severe drop in diversity of organisms in comparison to areas of similar structural composition (such as the rocky shore areas of the Irvine coast) is quite apparent.

The subtidal region between the smaller submerged rocky reefs and at most depths greater than 30 feet (9 m) is composed of fine silty sands. Coarse sand substrate and shell fragments are found in water depths less than 30 feet. Numerous subtidal rocky reefs, some supporting giant kelp, extend from the headlands offshore approximately 1400 feet (440 m) to depths of about 50 feet (16 m). Several reefs and conspicuous arch rocks and stacks are exposed continuously, while other smaller formations break the surface with only the lower tides. These subtidal reefs are highly rugose and consist of many cracks, parallel fissures, and small caves. This structural configuration affords protection for abalone and spiny lobster. In water depths greater than 15 feet (4.57 m), a typical soft bottom biotic assemblage is found. Rocky reefs interspersed through the subtidal zone support luxuriant growths of coralline red algae and small brown algae. Abundant invertebrates are also found and finfishes of many types, including the protected garibaldi, are prevalent.

The Newport Beach Marine Life Refuge ASBS sustains the greatest public use, per equivalent area, of any of the three Orange County Areas of Special Biological Significance (Newport Beach Marine Life Refuge, Irvi Coast Marine Life Refuge, and Heisler Park Ecological Reserve). This heavy public use has resulted in a diminished species diversity of the sandy shore and rocky intertidal areas.

Water quality threats to the area include storm and street runoff via the two drainages and tidal flushing flows from Newport Bay which are frequently carried to the ASBS by prevailing nearshore currents.

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FINDINGS AND CONCLUSIONS

FINDINGS

1. Newport Beach Marine Life Refuge ASBS is one of the most publicly utilized beaches in Orange County.

2. The intertidal biota of Newport Beach ASBS are depressed in numbers and diversity.

3. Numerous storm drains discharge across the beach into Newport ASBS.

4. Offshore reefs provide abundant habitat for a variety of attached algae, invertebrates, and fishes.

CONCLUSIONS

1. The depressed quantity of intertidal biota probably results largely from the heavy public use of the area and, possibly, to a much lesser degree, from storm drain discharges.

2. Offshore pelagic and benthic habitats appear healthy and diverse probably due to their relative inaccessibility and to the water quality in the area.

3. The greatest potential water quality threat to the ASBS may be the outflow from Newport Bay, which at times is carried downcoast by prevailing water currents.

INTRODUCTION

The California State Water Resources Control Board, under 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 Newport Beach Marine Life Refuge ASBS, a reconnaissance survey integrating existing knowledge and additional

field study information was performed by Richard C. Brusca and Richard N. Winn 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 ASBS was studied by both shore observations and numerous SCUBA diving operations, between October 1977 and June 1978. During each SCUBA reconnaissance, two teams of divers made horizontal transects, one through the water column at fixed depths, the other along the bottom, again maintaining fixed depths. Careful records were made of all organisms observed. Checks for hydrogen sulfide (anoxic) conditions were made on the substrate. The pelagic transects were at depths of 12, 20 and 25 m. The benthic transects were at 15, 20 and 25 m. Benthic organisms not identifiable by sight were collected for later identification by specialists. Photographs of common organisms and habitats were taken, in situ and are archived at the State Water Resources Control Board. Temperature, surge and visibility (measured with a secchi disc) were recorded at each dive period.

The intertidal area was studied by teams of biologists walking the entire stretch of the Refuge, recording their observations en route. Organisms not identifiable by sight were collected for later identification by specialists. No quantitative or discrete sampling was made, although each habitat and tidal level was examined by each team.

The shoreline was investigated for access routes, erosion, coastal vegetation, terrestrial wildlife, and sources of pollution. Storm drains were carefully examined. During all field work, observations were continuously made for poaching or fishing in the Refuge, and estimates of public use were made both on the beach itself and offshore.

PHYSICAL DESCRIPTION

Location and Size

The Newport Beach Marine Life Refuge ASBS encompasses approximately 0.26 sq mi (67 ha) of nearshore water extending along the coast for about 0.68 mi (1.1 km) south of Corona del Mar in Orange County. The Area is contained within the approximate map coordinates 33° 34'50" - 35'25" N LAT and 117° 51'10" - 52'30" W LONG (Fig. 1). The official boundary description, as contained in the State Water Resources Control Board publication Areas of Special Biological Significance (1976), is as follows:

> "Ocean waters within that portion of (Fish and Game) District 19 bounded by the line of mean high tide of the Pacific Ocean between the eastern boundary of the City of Newport Beach and Poppy Avenue in the City of Newport Beach, and extending into and including the state waters of the State of California for a distance of 1,000 feet into the Pacific Ocean or to the 100-foot isobath, whichever is the greater distance offshore, from the line of mean high tide."

Nearshore Waters

The ASBS is fairly well protected from northwest swells by the breakwater extending from Newport Bay. It is, however, exposed to southwesterly swells, with little protection except in some of the small coves surrounded by the large offshore rocks. Tidal surge and a consistent 2-3 foot surf make boat and diver entry from shore difficult throughout most of the year, under even moderate conditions.

Turbidity is generally high and is largely due to surf and surge, which constantly churn the shallow areas. Visibility ranged from a maximum of about 30 ft (9 m) to only a few inches, during the course of a recent 9-month study. A seasonal cycle of winter and spring nutrient enrichment and resultant increased phytoplankton productivity also

Figure 1

NEWPORT BEACH MARINE LIFE REFUGE
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

contribute to decreased water clarity. During the course of a recent survey, a winter (late February) diatom bloom occurred, drastically increasing turbidity. Also, the lack of hydrogen sulfide stains on surface sediments is a further indication of strong mixing and oxygenation of the entire water column.

Water temperatures in the vicinity vary seasonally. In the summer, surf temperatures approach 70° F; winter temperatures rarely drop below 60° F. Subtidally, the water is generally several degrees cooler, ranging from 55° F in the winter to 65° F in the summer and early autumn. In the summer, a shallow thermocline usually exists. Its actual location is variable and dependent upon storm mixings, turbidity, convective stirring during cooling periods, and convergence and divergence caused by wind patterns (Cairns and LaFond, 1966). The thermocline is usually eliminated by October to mid-November.

Studies of current patterns in Central and Southern California by Jones (1971) and Griggs (1974) indicate that a generally southeasterly-flowing current occurs offshore during the summer and spring, although a north-flowing current, the Southern California eddy, generally exists in nearshore waters year-round. This eddy current is enhanced during winter and autumn months when the north-flowing Davidson Current is present. Current velocities of 5-10 cm/second have been recorded and appear to be highly variable. Nearshore current patterns have not been extensively studied and are complicated by tidal factors and diurnal winds. Jones (1971) 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 and in stating its general nature."

Geophysical Characteristics

The ASBS is fronted by sandstone bluffs that slough to produce some rubble at their base. Several small drainages enter the beach zone in the northern portion of the ASBS forming marshy areas.

The intertidal zone consists of sandy beaches interspersed with rocky outcroppings and reaches of cobble and boulders. Tidepools are formed in the lower intertidal rocky areas.

The subtidal region between the smaller submerged rocky reefs and at most depths greater than 30 feet (9 m) is composed of fine silty sands. Coarse sand and shell fragments due to the heavy surf conditions are found on the gradually sloping shelf in water depths less than 30 feet. Numerous subtidal rocky reefs extend from the headlands offshore approximately 1400 ft (440 m), to depths of about 50 feet (16 m). Several reefs, including the conspicuous arch rocks and stacks, are exposed continuously, while other smaller formations break the surface only with the lower tides. These subtidal reefs are highly rugose and consist of many cracks, parallel fissures and small caves. This structural configuration affords protection and habitat for numerous marine organisms.

BIOLOGICAL DESCRIPTION

Subtidal Biota

A typical soft bottom assemblage is found in depths greater than 50 ft (15 m), comprised primarily of sea pens Ptilosarcus sp. and Stylatula elongata, sand stars Astropecten aramatus, moon snails Polinices sp., large conchs, Forreria belcheri, brittle stars Amphiodia sp., isopods Cirolana, Rocinela, Aega, gnathiidae, mysids, the sand goby, Lepidogobius, and sanddabs Citharichthys sp. Increasingly coarser sands grade into shallower areas where tube worms, Diopatra splendidissima, olive shells, Olivella biplicata, and terebellid worms are common. No sand dollars, Dendraster excentricus, or sea pansies, Renilla kollikeri, are present in the Refuge. The lack of Dendraster test fragments in the subtidal benthos and on the sandy beaches suggest it is unlikely any sizeable populations existed in the recent past.

Numerous small rocky reefs dot the entire Refuge, ranging in depths from 50 ft to the intertidal zone. Some clumps of adult giant kelp, Macrocystis pyrifera, and small sporophytes are present on these reefs. Macrocystis growth in the area is limited primarily to these small patches, although one fairly large offshore bed is present. Luxuriant growths of coralline red algae (Rhodophyta) and smaller brown algae (Phaeophyta) are also present on the reefs. Abundant invertebrates such as bryozoans, sponges, gorgonians, jewel box shells, Chama pellucida, rock scallops, Hinnites multirugosus, and ascidians are also present in this habitat. Within the crevices, rock walls and fissures of these areas, very large numbers of sea urchins exist Strongylocentrotus purpuratus, S. franciscanus, and Centrostephanus coronatus. Also present are many small spiny lobster, Panulirus interruptus, predatory knobby starfish, Pisaster giganteus, nudibranchs, and octopuses. Fishes associated with the rocky area include the common garibaldi, Hypsypops rubicundus, the "convict fish" or painted greenling, Oxylebius pictus, various rockfish, Sebastes spp., rock wrasse, Halichoeres semicinctus, opaleye, Girella

nigricans, moray eels, Gymnothorax mordax, and scorpion fish, Scorpaena guttata. Bryozoans, small hydroids, polychaetes, grass shrimp, Hippolyte clarki, and numerous small crustaceans, particularly isopods (Idotea, Cirolana, various Sphaeromatidae), amphipods and mysids also inhabit the reef floral turf. Appendix 1 presents a list of subtidal and intertidal biota occurring in this Area of Special Biological Significance.

Intertidal Biota

A somewhat diminished, but typical algal wrack zone fauna inhabits the upper reaches of the coarse sand beaches, including talitrid amphipods, isopods and flies. Birds, such as marbled plovers, black-bellied plovers, western gulls and cormorants, can be seen along the beach.

The surf swept intertidal rocks and some offshore outcroppings provide habitat for a typical protected outer coast fauna (see Ricketts, et al., 1968). In terms of species diversity, however, the rocky littoral regions are quite depressed and show obvious signs of disturbance (e.g. overturned rocks, almost no seastars, misplaced animals, etc.). Several California sea lions were observed resting among the offshore rocks. The upper and mid intertidal is inhabited by barnacles, Chthamalus fissus, Balanus spp., Tetraclita spp., black turban snails, Tegula funebralis, and limpets, Collisella spp. The striped shore crab, Pachygrapsus crassipes, is present but not abundant, throughout the intertidal zone. The California mussel, Mytilus californianus, is found in small clumps but does not dominate the mid intertidal zone as it does in many areas of the Southern California rocky environment. This conspicuous absence of mussels may be due to previous harvesting by the public for consumption and/or fishing bait. In addition, most of the intertidal rocks present have very jagged surfaces, which may not be conducive to formation of Mytilus beds. The intertidal rocks are covered with turf-forming coralline algae, feather boa kelp, Egregia menziesii, and "reef forming" worms, Phragmatopoma californica, all of which are known to prevent successful settlement of mussel larvae. In the tidal pools, an abundance of the purple sea urchin, Strongylocentrotus purpuratus, is present. Also present in these pools are a number of encrusting coralline algae (Bossiella and others) and fishes, such as opaleye, Girella nigricans. The severe drop in diversity of organisms in comparison to areas of similar structural

composition (such as the rocky shore areas of the Irvine coast) is quite apparent. The presence of these few species (most of which are generalists), and the lack of many common protected rocky coast species (such as the seastars, Pisaster ochraceous and Patiria miniata, and a number of species of brown algae) are indicative of an artificially disturbed habitat. Low intertidal tidepools contain a more diverse biota, including the anemone Anthopleura elegantissima, green algae Codium fragile, the brown alga Eisenia arborea and many coralline algae, along with several species of ophiuroids, molluscs, crustaceans and polychaete worms (Appendix 1). Phyllospadix, the surf grass, is common in the low intertidal zone, as are the brown algae Egregia spp. and Cystoseira spp.

Landside Biota

A small creek, produced by storm drain and street runoff forms a marsh-pond that drains onto and through the sandy beach in the northern portion of the ASBS. The marsh contains a typical assemblage of cattails, willows, reed, mayflies, stoneflies, mosquitoes, dragon and damsel flies, and frogs. A second, similar small creek drains onto the beach southeast of the Poppy Avenue beach but does not form a marsh.

The sandstone bluffs fronting the reserve are covered with a mixture of native coastal scrub and introduced vegetation. Common native plants include the lemonadeberry bush, Rhus integrifolia, bladderpod, and daisies Encelia sp. Ice plant and sea rocket, Cabile, grow near the edge of the bluffs.

LAND AND WATER USE DESCRIPTIONS

Commercial day cruise fishing boats (party boats) and private boats utilize the Newport Beach Refuge extensively. In addition, considerable shore fishing and spearfishing have been observed within the limits of the reserve. Several commercial lobster fishermen's buoys were noted through the course of the study. There is often heavy boat traffic traversing the reserve from the adjacent Newport Bay area, and on weekends the offshore area is often congested with sailboats.

The accessibility of the ASBS and its proximity to Newport Bay results in a considerable amount of activity within the reserve, particularly on weekends and holidays, including SCUBA diving, snorkeling, swimming, boating, fishing, water skiing, sunbathing and tidepool exploring. Many persons have been observed turning over rocks within the intertidal area, and removing organisms from the region, despite the numerous "protected area" signs posted along the beach. Additionally, it is impossible for anyone approaching from the sea to observe these notices. The large conspicuous offshore rocks and arches also are not too far removed from the activities of climbers and tidepool explorers.

The land immediately behind the coastal bluffs is nearly completely developed, and private homes line most of the cliff edge.

Public access to the Refuge is provided by a large, partially paved walkway at Poppy Avenue and by climbing over the rocks along shore from the north (from the Corona del Mar area).

No other scientific studies were carried out on the Newport Beach Marine Life Refuge during the period of this study. Research has been accomplished in the past, within the limits of the Refuge and in adjacent areas. ZoBell (1971) studied drift algae on the beaches along the coastline. The gobioid fishes have been investigated by Wiley (1973, 1976). Pequegnat (1963, 1964, 1968) studied several subtidal reefs within the Irvine Coast Marine Life Refuge. Jones and Fauchald (1975) studied the deeper, offshore, soft-bottom macrofauna in areas near the reserve.

ACTUAL OR POTENTIAL WATER POLLUTION THREATS

Runoff from the surrounding watershed and streets enters the Refuge at a number of points. At two locations the runoff forms semi-permanent streams that cut across the sandy beach to drain into the ASBS. One of these large runoffs, near Poppy Avenue, forms a small marsh in which green algae, Enteromorpha sp., various flying insects and rock lice, Ligia occidentalis, are found. While runoff to the area is causing no obvious water quality problems, it may carry a variety of pollutants that are difficult to assess, such as street oils, auto emissions, captured air pollutants, fecal material from pets, etc. The potential impact of these materials has not been adequately assessed.

Water quality in the Refuge may also be directly affected by changes in the water quality of Newport Bay. Tidal flushing brings effluents from the bay directly into the Newport Beach region. At the present time, however, the offshore area appears healthy and free of any obvious contamination, and faunal species diversity is high.

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Appendix 1

FAUNAL LIST

TAXON	INTERTIDAL	SUBTIDAL
Phylum Porifera		
Spheciospongia confoederata		X
Cliona sp.	X	X
Leucetta sp.		X
Tetilla arb		X
Haliclona permollis		X
Euherdmania sp.		X
Unidentified species		X
Phylum Cnidaria		
Stylatula elongata		X
Aglaophenia struthionides		X
Obelia sp.		X
Muricea californica		X
Anthopleura xanthogrammica	X	X
Tealia coriacea		X
Corynactis californica		X
Sertularia sp.	X	X
Cerianthus sp.		X
Phylum Platyhelminthes		
Thysanozoon californicum		X
Stylochoplana sp. (?)		X
Phylum Annelida		
Arenicola sp.		X
Halosydna johnsoni	X	X
Diopatra splendidissima		X
Phragmatopoma californica	X	X
Serpulidae	X	X
Spirorbis sp.	X	

Anaitides sp.	X	
Undetermined species	X	X
Phylum Mollusca		
Pholadidae		X
Haliotis cracherodii		X
Fissurella volcano	X	
Diodora aspera		X
Collisella sp.	X	
Norrisia norrisi		X
Tegula funebralis	X	
Astraea undosa		X
Crepidula onyx		X
Maxwellia gemma		X
Nassarius perpinguis		X
Olivella biplicata		X
Chione undatella (shell only)		X
Chama pellucida		X
Hinnites multirugosus		X
Mytilus californianus	X	
Megathura crenulata		X
Kelletia kelleti		X
Polinices sp.		X
Octopus bimaculatus		X
Phylum Arthropoda		
Class Insecta		
Mosquitoes	X	
Various dipterans	X	
Ephemeroptera	X	
Odonata	X	
Plecoptera	X	
Coleoptera	X	
Lepidoptera	X	

Class Crustacea		
Balanus tintinnabulum		X
Balanus glandula	X	
Chthamalus fissus	X	
Idotea resecata		X
Sphaeromatidae		X
Cirolana parva		X
Rocinela belliceps		X
Aega lecontii		X
Mysidacea		X
Gnathiidae		X
Ligia occidentalis	X	
Orchestoidea californiana	X	
Panulirus interruptus		X
Isocheles pilosus		X
Pagurus samuelis	X	
Pugettia producta	X	
Pugettia richii	X	
Cancer anthonyi		X
Pachygrapsus crassipes	X	
Pagurus spilocarpus		X
Phylum Ectoprocta		
Bugula neritina		X
Lichenopora sp.		X
Unidentified species		X
Phylum Echinodermata		
Cucumaria salmo		X
Pisaster ochraceus	X	
Astropecten armatus		X
Pisaster giganteus		X
Ophiothrix spiculata		X
Amphiodia sp.		X

Strongylocentrotus purpuratus	X	
Strongylocentrotus franciscanus	X	X
Centrostephanus coronatus		X
Astrometis sertulifera		X
Lytechinus anamesus		X
Phylum Chordata		
Class Ascidiacea		
Unidentified compound species		X

SPECIES	INTERTIDAL AND SHALLOW SUBTIDAL - to 4 meters	SUBTIDAL
Class Pisces (Fishes)		
Gibbonsia metzi (striped kelpfish)	X	
Syngnathus californiensis (kelp pipefish)		X
Girella nigricans (opaleye)	X	X
Hypsypops rubicundus (garibaldi)		X
Gymnothorax mordax		X
Urolophus halleri (round stingray)		X
Heterodontus francisci (California horn shark)		X
Atherinops affinis (topsmelt)		X
Brachyistius frenatus		X
Cottidae (sculpins)	X	X
Halichoeres semicinctus (rock wrasse)		X
Oxyjulis californica (senorita)		X
Rockfish		
Sebastes spp. (rockfishes)		X
Citharichthys spp. (sanddabs)		X
Neoclinus uninotatus (onespot fringehead)		X
Cymatogaster aggregata (shiner perch)		X
Embiotoca jacksoni (black perch)		X
Oxylebius pictus ("convict fish")		X