2.2 SPECIES AND ECOSYSTEMS

2.2.1 Terrestrial Biology

2.2.1.1 Species

On the basis of habitat requirements, the species of plants found on the property of the proposed facility and contiguous land were grouped into six vegetation categories. Two of these six groups are native plant communities (coastal strand and coastal salt marsh), one is cropland, and the remaining three are different aggregations of weed[1] species and volunteer native plants found on disturbed terrain. The distribution of each vegetation category is shown on Plate 2.2.1-1, and the species comprising each group are listed in Table 2.2.1-I. The species of animals which actually or potentially reside in and move between the various vegetation groups, segments of these groups, the ocean, and various habitats on land adjacent to the site are listed in Tables 2.2.1-II through 2.2.1-IV.

Commercial species of plants grown on the cropland of the site and contiguous land include vegetables (Lima beans, lettuce, cabbage) and commercial stock flowers. There are no faunal populations of commercial importance on the site or contiguous land.

There is little recreational hunting on the site. Rabbits (Blacktail hare and Audubon cottontail) and ducks (25 species are known to be in the vicinity; see Table 2.2.1-III) may be hunted occasionally (Table 2.2.1-V). Bullfrogs are of

---

[1]Species of plants which have been unintentionally introduced.

possible occurrence[2] in the freshwater portions of the coastal marsh and along the drainage course. Audubon Society records (Langton, 1973) indicate that irregular observations of native birds have been made in the area, including the site, for at least 15 years.

Extensive duck hunting occurs along the coast less than 2 miles to the southeast of the site, where duck ponds are maintained by a hunting club. Mugu Lagoon is situated south of the duck ponds and is a well-known natural area visited by professional biologists as well as wildlife and wildflower enthusiasts.

2.2.1.2 Communities and Associations

Factors Controlling Vegetation and Disturbance History of the Site

The primary factors which control the species composition and distribution of the six vegetation groups on the site and contiguous land include geologic substrate, microtopography, oceanic microclimate, and disturbance by man.

On the basis of a survey in 1933, Cooper (1967) described the coastal area between Point Hueneme and Point Mugu as a barrier ridge bearing a continuous foredune zone and bordering very low alluvial surfaces, salt marshes, and lagoons.

Comparison of soil survey maps issued in 1920 (Nelson, et al., 1920) and 1970 (Edwards, et al., 1970) indicates that the terrain and vegetation on the site and contiguous land have been significantly altered by man's activity over this 50-year period.

---

[2]The site lies within their geographic range (Stebbins, 1966) and suitable habitat is available.

extensive "intermittent lake" located along the east side of the road to the west of the site and on the northwest portion of the site was filled in, and industrial facilities were constructed on the fill. A natural drainage course leading into the lake from the northeast was channelized. Apparently this was open to natural tidal flow in 1920. Sometime after 1956, a diked slag pond was placed between one of the industrial facilities (on filled terrain at the end of the road) and the west boundary of the site. The slag filled in the remaining low terrain in the area and eliminated a pickleweed-salt-grass marsh. The drainage channel now extends through this area toward the sea (Plate 2.2.1-1).

In 1920, a second, much smaller "intermittent lake" existed on very low terrain behind the dunes on the southeast portion of the site (Nelson, et al., 1920). The low terrain on the south half of the site was classed as tidal marsh, and considered as high in salt content and vegetated by pickleweed. At present, the area behind the dunes occasionally floods during periods of high tide in winter and spring. The water is ponded until it evaporates (Hoover, 1973). The slightly higher northern portion of the site was classed as Yalo sandy clay loam in the 1920 survey (Nelson, et al., 1920). Although characterized by high water table and saltiness at depth, the Yalo soils are capable of producing high yields of shallow-rooted crops when managed properly. Land reclamation, through drainage of the soils on the northern portion of the site for farming purposes, was extended into the slightly lower tidal marsh on the

south. Much of this converted marshland has been subsequently abandoned as reclaimed agricultural land.

The beach and coastal dunes have been visited by increasing numbers of clammers, fishermen, surfers, and beach enthusiasts over the years. During the last 6 years, dune buggy enthusiasts have used Ormond Beach, including the dunes on the site (Hoover, 1973). The intensity of recreational use on the strand increases toward Port Hueneme, where a beach park is situated. Bulldozer activity along drainage channels at the onshore extent of the dunes and at the mouths of the drainage channels in the strand have disturbed the dunes to the west of the site to some extent (Dames & Moore, 1973).

Vegetation of the Site

Coastal Strand. The sands of the beach and dunes are vegetated by low-growing, succulent plants which tolerate the unstable, dry, infertile substrate, persistent wind, high light, evaporation, and sea salt aerosol characteristics of the shoreline. The flat portion of the beach is devoid of terrestrial plants. Landward, small scattered dunes formed by silver beachweed[3] and sea rocket grow to a more or less continuous dune system vegetated by all six strand species listed in Table 2.2.1-I.

Although dominant on many Southern California dunes, sand verbina (Abronia maritima) produces little plant cover in the Port Hueneme area and on the site. Another sand verbina,

---

[3]Common names of plants are in accordance with Munz and Keck (1959). Scientific name equivalents are found in Table 2.2.1-I.

Abronia umbellata, was not found on the survey. Both sand verbinas appear to be intolerant to trampling, and this may account for their paucity on the site. Sea rocket is an introduced species (presumably from ship ballast) which now represents a minor component of most Southern California strands. An important positive feature of these dunes is that they have not been significantly invaded by iceplant (Hottentot fig), an introduced species from South Africa. Only a few patches exist on the site. Species variety decreases and disturbance increases on the strand toward the northwest where recreational use increases. The species on the strand listed as primarily occurring in other vegetation groups (Table 2.2.1-I) are found on the sheltered, lee side of the dunes and in the low wet areas where the drainage courses terminate on the strand.

The composition of the coastal strand community on the site is typical of strand vegetation in the region as described in a review of Pacific Coast beach and saltmarsh vegetation by MacDonald and Barbour (in press). The distributions of the individual plants are similar to those at other locations in Southern California as described by Purer (1936) and Boyce (1972).

Pickleweed-Saltgrass Marsh. The low, seasonally inundated, alternately wet and dry, salty substrate behind the dunes is vegetated primarily by pickleweed, saltgrass, and alkali weed. This area extends from the coast in a northwest direction to the drainage course. The inland reaches of this area, especially the block of land behind the slag area (W_S in Plate 2.2.1-1), but off the site proper, are subject to fresh water ponding by drainage from adjacent land. Bullrushes

typically occur in such fresh water micro-habitats of coastal marshes and are found here. Small areas of sand in the marsh behind the dunes are vegetated by beach plants and volunteer weeds (Table 2.2.1-I). The distribution of many species in the salt marsh is associated with microtopography. Pickleweed is best developed in the lowest areas near the coast. Saltgrass also occurs in low areas but extends to slightly higher terrain. Frankenia grandifolia and various chenopods (Table 2.2.1-I) are found on slightly higher terrain.

The composition of the salt marsh on the site is typical of marshes with similar elevation and a seasonal flooding regime in the region as reviewed by MacDonald and Barbour (in press). The distribution of the individual plants is similar to those in other Southern California marshes, as described by Purer (1942) and Vogl (1966).

Cropland and Vegetation on Disturbed Terrain. Most of the drained land classed as Yalo sandy clay loam during the older soil survey (Nelson, et al, 1920) is still actively used in crop production. The abandoned, reclaimed, agricultural land between the currently cropped area and the pickleweed-saltgrass community is vegetated by Hordeum stebbinsii, other grasses, and weedy species, such as Chenopodium album (Table 2.2.1-I). Weedy chenopods are locally important in the northwest portion of the Hordeum grassland.

The more or less persistently wet portions of the drainage courses are vegetated by a characteristic assemblage of introduced weed species and volunteer native plants (Table 2.2.1-I). The dry upper sides of the drainage courses, the

rough terrain consisting of dredged soil adjacent to the drainage courses, the railroad tracks, the filled unlandscaped areas, and the edges of agricultural fields are vegetated by a heterogeneous group of weeds and volunteer native plants. The only trees on the site are a few small willows near the west boundary, west of the drainage course. The slag pond is devoid of vegetation.

Fauna of the Site

The on-site survey was carried out in September, 1973. The number of species of vertebrates which were observed by actual sighting of individuals or their signs included one amphibian, two reptiles, 62 birds, and 10 mammals (Tables 2.2.1-II through 2.2.1-IV). These tables also include unsighted species which could reasonably be expected to occur on the site because of a combination of overlapping geographic range, the presence of suitable habitat, and existing populations near enough to provide possible access to the site. These expanded lists include 11 species of amphibians, 24 reptiles, 81 birds, and 41 mammals. References are listed in the tables.

Trapping of small mammals indicated that the rodents on the site are low in species variety but probably sufficiently high in population numbers to provide a moderately productive base for upper level carnivores. Feral House mice[4] were trapped in numbers equal to harvest mice. House mice have taken well to the salt marsh environment, especially the less tidally influenced areas and surrounding weedy areas typical of this site.

---

[4]Common names of mammals are in accordance with Ingles (1965). See Table 2.2.1-IV for scientific name equivalents.

Populations of House mice have been established in many, if not all, salt marshes along the California coast. Although they contribute to the food source available to upper level carnivores, the extent to which these mice influence populations of native mice is not well established.

Present land uses limit the species variety of the site by separating the site, by ecological barriers, from source habitats for other species. Although weasel, raccoon, and skunk are known or expected on the site, other large mammals (e.g., deer), including many upper level carnivores (e.g., fox and Coyote), are unlikely to range onto the site from other areas. The site is also isolated from some actual or potential recruiting populations of small mammals and other animals, including harvest mice, shrews, and voles; and subspecies of all three species which presently inhabit the site and may be restricted to salt marsh habitats between Ventura and Orange Counties (von Bloeker, 1932; Dames & Moore, 1973).

The property is used as a feeding, resting, and nesting ground by many birds.[5] It is a feeding area for such groups as shorebirds, gulls, swallows, some blackbirds, some sparrows, and certain birds of prey. Breeding on the property in its current condition is limited, partly by the lack of trees. Some sparrows, wrens, meadowlarks, blackbirds, rails, killdeer, flycatchers, swallows, and perhaps a few other passerine birds are expected

---

[5]Common names of birds are in accordance with the American Ornithologists' Union Check List (1973). Scientific name equivalents are given in Table 2.2.1-III.

to breed regularly on or near the property, some utilizing artificial habitats such as utility poles and buildings. Such species as owls and hawks may breed locally but probably not on the property. As indicated by numerous tracks of various-sized individuals, the frequent presence of domestic dogs on the property probably discourages use of the area by birds. Some native mammalian carnivores may also discourage utilization of the site by birds. The lack of trees and shrubs on the property lowers species variety of all groups of animals, but especially the avifauna.

2.2.1.3 Habitats

In the course of their various activities, animals actually or potentially on the site may reside within, visit, and move between the various vegetation groups, specific portions of these groups, the ocean, and various habitats on land adjacent to the site. Therefore, these features are useful landmarks around which to base the detailed account of animal activity on the site.

Ocean

The Harbor seal and California sea lion are seen in the area on a more or less regular basis. California sea lions, in particular, probably feed in the offshore areas and haul up on the rocks of the jetty at the harbor mouth. Several oceanic birds (petrels and shearwaters) and such coastal species as cormorants and Brown pelicans utilize the ocean off the site for feeding. Some may, on occasion, use the jetty at the west end of the harbor site for resting. However, in general neither the

proposed berthing site nor the plant site would be important as a feeding or resting area for these birds.

Coastal Strand

Several species of lizards[6] actually or potentially occur in the dry, sandy habitat of the coastal strand (Table 2.2.1-II). Notable among these may be the California legless lizard which is generally restricted to this kind of habitat in coastal areas.

Among rodents, only House mice were trapped in high numbers on the strand. California voles and pocket gophers were trapped on the landward side of the dunes where the dune vegetation integrates with the pickleweed-saltgrass marsh. Although isolated populations of pocket mice may occur along the Ventura County coast, trapping by Hannum (1973) near McGrath Lake several miles north of the site, and near the duck ponds less than 2 miles to the south, yielded negative results. No pocket mice were trapped on the strand during the on-site survey.

As evidenced by their signs, the Audubon cottontail and Blacktail hare utilize this habitat. The Raccoon is a likely visitor.

The coastal strand is utilized by numerous bird species, especially gulls and certain shorebirds, which spend long hours resting and/or feeding on the sandy beaches. Although a suitable breeding habitat exists on the site for Snowy plovers and Least terns, they apparently do not breed there (Craig, unpublished).

---

[6]Common names of reptiles and amphibians are in accordance with Stebbins (1966). Scientific name equivalents are given in Table 2.2.1-II.

Pickleweed-Saltgrass Marsh

Although harvest mice were found in most of the naturally vegetated areas sampled, they showed a distinct preference for this habitat, especially for the areas with well-developed pickleweed. The California vole was most common in saltgrass areas and was absent from samples taken in pickleweed. One Ornate shrew was captured during sampling in the salt marsh, and it probably occurs in the inland fresh water area also. Blacktailed hares use the well-developed pickleweed areas for cover during the daytime.

Occasional use of this area by herons, egrets, and other bird groups can be expected. Usage by ducks is subject to the presence of sufficient standing water, which usually occurs in the winter and spring months. Shorebirds, gulls, and certain birds of prey can also use the area during wet periods for resting or feeding. Salt marshes offer cover to smaller shorebirds and passerines. The treeless nature of the habitat precludes extended resting by most raptors (except ground-perching forms), such as the Short-eared owl, although transmission lines and poles are used by some species.

Freshwater Portions of Salt Marsh and Water Courses

Species distributions and movement patterns of animals are oriented, at least to some extent, to the two fresh water sources on the site. These include the drainage course and the small area of fresh water habitat found in the inland portion of the salt marsh behind the slag pond just off the site. A few animals, including amphibians and some reptiles, possess a strict requirement for moist habitats and are restricted to such

places. Many animals merely visit the moist places to drink. Others visit or reside there to feed on other residents, visitors or plant life.

During the dry season survey, the California treefrog was very abundant. This frog may breed in the puddles which form during spring. Because of their fossorial (digging) behavior during the dry season, the California toad and California slender salamander were not expected to be observed and were not seen. These organisms probably reside here and probably could be found when weather conditions permit them to be active on the surface. The bullfrog and the California red-legged frog are known to exist near Oxnard. These frogs are possible residents on the site. Only the bullfrog is expected to occur; when the two are forced to compete, the Red-legged frog is usually eliminated.

Among reptiles, Western pond turtles, if present, would be largely restricted to these moist habitats. Several snakes (the two species of garter snakes for example) apparently require moist habitats for survival because they feed extensively on the resident amphibians. Although all snakes listed in Table 2.2.1-II are expected to occur in the marsh, most are not restricted to it. The surrounding area, including the Hordeum grassland and areas of disturbed vegetation, also provides sources of food and shelter.

The same three species of small mammals (harvest mouse, California vole, Ornate shrew) found in the salt marsh proper utilize the fresh water portion. Deer mice may also occur there. Evidence of recent utilization of the water course and fresh

water marsh by Muskrat was found during the field survey. These animals apparently use both areas when ponded water is available. (Muskrat is not native to Southern California but occurs here now.)

Among birds, the Marsh wren, song sparrow, and Savannah sparrows are largely restricted to the marsh vegetation where they nest and feed. Many blackbirds, Starlings, and other species with similar habitat preferences may use the marsh for feeding and resting, although the area may not be sufficiently extensive for breeding by these birds. Though rather restricted in area, the water course serves as a resting site for several bird species, especially ducks, shorebirds, and herons. A female Northern Shoveler, several Ruddy ducks, and a Pied-billed grebe were observed there during the on-site visit. Swallows may feed over the water, and the edges of the slough offer a limited feeding area for the aquatic and semiaquatic groups of the birds mentioned above.

Hordeum Grassland

The harvest mouse, California vole, and House mouse were trapped in this habitat. House mice were more abundant than the other two species in areas of lesser ground cover. Several species of amphibians could be expected in this zone. Toads are probably common but are mostly underground in the summer. Some toads and frogs from the moist areas occasionally move into this area for temporary feeding during rains but are certainly not permanent residents here.

Most of the snakes listed for the site are expected to use this area extensively for feeding and shelter. Though these

species are not restricted to this habitat, many individuals are probably permanent residents.

Small nonpasserine and passerine birds use this area for feeding and probably some nesting, though little evidence of nesting was obvious during the September 1973 survey.[7] A detailed analysis would require a spring breeding census.

Cropland and Vegetation on Disturbed Terrain

Although the agricultural land was not sampled, it is expected that the same species of mice present in the Hordeum grassland would be found there. The harvest mouse is likely to be the least abundant of the three. Beechey ground squirrels were seen only in the transition zones and disturbed areas bordering the road between the salt marsh, Hordeum grassland area and the cropped fields; they probably range into the vegetation for feeding.

As in the Hordeum grassland, most of the reptile species are expected to occur here occasionally, and some (gopher snake, California king snake, and Red racer) are expected to be permanent residents in or around the fields.

Bird use would primarily involve feeding in the area by pigeons and doves, blackbirds, Starlings, sparrows, Killdeer, and possibly gulls. Other species would not be inclined to utilize the area extensively.

---

[7]Many species of small, nonaquatic birds, including some living in adjacent habitats, utilize fresh water puddles in the marsh for bathing.

2.2.1.4 Unique and Other Biotic Resources

Unique Habitats

Although both salt marshes and fresh water marshes have become increasingly uncommon in Southern California, those on the site are not unique. The avifauna dependent upon such areas are in danger of being excluded from this region as a result of continued habitat destruction. The proposed project will not disturb the marsh areas. The freshwater marsh also provides suitable habitat for numerous amphibians and reptiles, many of which cannot survive in less moist situations.

Likewise, the sand dune area is a habitat which has been drastically reduced in recent years along the Southern California coastline. These dunes serve as essentially the only coastal habitat for such species as the California legless lizard and provide potential nesting sites for Snowy plovers.

Rare and Endangered Species

There are five endangered, two rare, and one fully protected species of birds which are potential or actual users of the site (See Table 2.2.1-III). Of these, only the White-tailed kite (fully protected) and the Clapper rail (endangered) are probably regular users of the site. Although they would not be expected in large numbers, the former was seen in the area during the survey of September 1973. The latter is uncommon in the area. The Brown pelican (endangered) may fly by and feed offshore.

None of the reptiles or amphibians known or likely to be present on the site are considered rare or endangered by governmental agencies. The Red-legged frog, which could

conceivably be present at the site but was not observed during the field survey, is fully protected by the California Department of Fish and Game (1973b).

No rare or endangered species of mammals are expected to occur on the site, although it is remotely possible that the Ringtail (fully protected by state law) might be on the site. The Harbor seal and California sea lion, which are likely to occur in the waters off the beach, are protected by federal law, as are all marine animals. The likelihood of Ringtail presence on the site is so small as to make it of little significance in any considerations.

2.2.1.5 Investigation Procedures and Applicable Standards

Botanical surveys of the site, contiguous land, and general area were conducted on August 24 and September 3, 1973. Vegetation categories were defined and mapped on the basis of known habitat preferences of the various species encountered. Taxonomic identifications were made from dead and flowerless material whenever possible to minimize destruction of healthy vegetation. Of the vegetation types involved, only a few weed species are expected to occur in other seasons of the year. Vouchers are stored in the Dames and Moore office, Santa Barbara.

On-site faunal surveys were conducted during a 2-day period in September 1973. During the survey, animal habitats were systematically explored, and all animals (or their signs) observed were identified. Small mammals were sampled during 425 trap-nights extending over 2 days with Museum-special traps arranged according to Calhoun-type trap lines (Calhoun, 1963). These lines were modified in order to sample the various

vegetation types on the site. (Cropped fields were not sampled.) When trapping was terminated, 81 individuals of three species had been sampled. On the basis of expected catch for similar habitats, this was considered to be a representative sample of trappable small mammals on the site at the time. Overcast, cool weather minimized surface activity among reptiles during the survey.

In addition to the on-site survey, the bird list is based upon data obtained from the Los Angeles and San Fernando Valley Chapters of the Audubon Society. These data were compiled by Langton (1973) and represent the results of observations made irregularly in the area, including the site itself, over a period of 15 years. Several bird species not on that list were either seen during the survey or known from personal experience to be likely occupants of the area. A few species not on the final list might occasionally be found there.

Analysis and interpretation of the plant communities and faunal populations on the site are based on the on-site surveys, the literature, faunal collections in the Los Angeles County Museum of Natural History, data from Langton (1973), and discussions with Hannum (1973).

BIBLIOGRAPHY 2.2.1

(References cited denoted by asterisks)

Alexander, W.B., 1963, Birds of the Ocean, Revised Edition.

*American Ornithologists' Union, 1957, Check-list of North American Birds, 5th Edition.

*American Ornithologists' Union, 1973, Thirty-Second Supplement to the American Ornithologists' Union, Check-List of North American Birds, Auk 90:411-419.

*Arbib, R., 1973, The Blue List for 1973, American Birds 26:6, pp. 932-933.

Barbour, Michael G., 1970a, Germination and Early Growth of the Strand Plant, Cakile maritima, Torrey Botanists Club Bulletin 97:13-22.

Barbour, Michael G., 1970b, Seedling Ecology of Cakile maritima Along the California Coast, Torrey Botanists Club Bulletin 97:280-289.

Barbour, M.G. and C.B. Davis, 1970, Salt Tolerance of Five California Salt Marsh Plants, The Americal Midland National 84, pp. 262-265.

*Boyce, Carol Lee, 1972, The Influence of People on the Dune Vegetation at Coal Oil Point Reserve, Santa Barbara County, California, University of California, Santa Barbara, M.A. thesis, p. 28.

*Calhoun, John B., 1963, The Social Use of Space, in Mayer, W.V. and R.G. Van Gelder (eds.), Physiological Mammalogy, Vol. I, Academic Press, New York.

California Department of Fish and Game, 1973a, California Hunting Regulations, Sacramento.

*California Department of Fish and Game, 1973b, California's Rare Fish and Wildlife, Sacramento.

California Department of Fish and Game, 1973c, California Sport Fishing Regulations, Article 4: Amphibians and Reptiles, Sacramento (issued as a separate).

California Department of Fish and Game, 1972, At the Crossroads, A Report on California's Endangered and Rare Fish and Wildlife, Sacramento.

*California Department of Fish and Game, 1971, Listing of California's Fully Protected, Endangered and Rare Fish and Wildlife, Sacramento.

Chapman, V.J., 1960, Salt Marshes and Salt Deserts of the World, Interscience, New York, p. 392.

Cooper, W.S., 1936, The Strand and Dune Flora of the Pacific Coast of North America: A Geographic Study, in T.H. Goodseed (ed.), Essays in Geobotany, UC Press-Berkeley, pp. 141-187.

*Cooper, William S., 1967, Coastal Dunes of California, The Geological Society of America, Inc. p. 117.

Coulombe, Harry N., 1970, The Role of Succulent Halophytes in the Water Balance of Salt Marsh Rodents, Oecologia 4:223-247.

*Craig, A.M. (unpublished), Survey of Least Tern Nesting Sites, unpublished manuscript, California Department of Fish and Game.

*Dames & Moore, 1973, Terrestrial Field Surveys of the Site, August 24, September 3 and 6-8, 1973.

*Edwards, R.E., D.F. Robey, and R.W. Kover, 1970, Soil Survey of the Ventura Area, California, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C., p. 148.

Grinnell, J. and A.H. Miller, 1944, The Distribution of the Birds of California, Cooper Ornithological Club, Berkeley, p. 608.

Hall, E. Raymond and Keith R. Kelsen, 1959, The Mammals of North America, 2 volumes.

*Hannum, R.G., 1973, letter dated October 1, 1973, personal communication.

*Hoover, H., 1973, letter dated October 2, 1973, personal communication.

*Ingles, Lloyd G., 1965, Mammals of the Pacific States.

International Union for the Conservation of Nature and Natural Resources, 1971, Survival Service Commission Red Data Book, Volumes 1 and 2, 1966-1971.

*Kozlik, F.M., 1970, Waterfowl of California, California Department of Fish and Game.

*Langton, A, 1973, letter and bird list dated August 29, 1973, personal communication.

Los Angeles County Regional Planning Commission, 1973, County General Plan Conservation Element Technical Report.

*MacDonald, K.B. and M.G. Barbour, in press, Beach and Salt Marsh Vegetation of the North America Pacific Coast, in Reimold and Queen (eds.), Physiological Ecology of Halophytes, Academic Press, New York.

*Mallete, R.D., (no date), Upland Game of California, California Department of Fish and Game.

Martin, Emmett V., and Frederic E. Clements, 1939, Adaption and Origin in the Plant World: 1. Factors and Functions in Coastal Dunes, Carnegie Institute Washington Publication 521, p. 107.

*Munz, P.A. and D.D. Keck, 1959, A California Flora, UC Press-Berkeley & Los Angeles, p. 1550.

National Audubon Society, American Birds (Audubon Field Notes), various dates, Los Angeles County Audubon Society.

*Nelson, J.W., et al., 1920, Soil Survey of the Ventura Area, California, U.S. Government Printing Office, Washington, D.C., p. 87.

Peterson, Roger T., 1961, A Field Guide to Western Birds.

Pierce, W. Dwight and Dorothy Pool, 1938, The Fauna and Flora of the El Segundo Sand Dunes: 1. General Ecology of the Dunes, Bulletin of Southern California Academy of Science 37:93-97.

*Purer, Edith A., 1936, Studies of Certain Coastal Sand Dune Plants of Southern California, Ecology Monograph 6:4-87.

*Purer, Edith A., 1942, Plant Ecology of the Coastal Salt Marshlands of San Diego County, California, Ecology Monogram 12, pp. 82-111.

Robbins, C.S., B. Bruun, and H.S. Zim, 1966, A Guide to Field Identification, Birds of North America, 1966.

*Starrett, A., 1973, California State University, Northridge, Department of Biology, personal communication.

Stebbins, R.C., 1954, Amphibians and Reptiles of Western North America, McGraw-Hill, New York.

*Stebbins, R.C., 1966, A Field Guide to Western Reptiles and Amphibians, Houghton Mifflin Company, Boston.

Tillett, Stephen S., 1967, The Maritime Species of Abronia (Nyctaginaceae), Brittonia 19:299-327.

*Vogl, Richard J., 1966, Salt-Marsh Vegetation of Upper Newport Bay, California, Ecology 47:80-87.

Bloeker, J.C., Jr., 1932, Three New Mammals from Salt-Marsh Areas in Southern California, Proceedings of the Biological Society of Washington 45:131-138.

Bloeker, J.C., Jr., 1942, Fauna and Flora of the El Segundo Sand Dunes. 13. Amphibians and Reptiles of the Dunes. Bulletin Southern California Academy of Science 41:29-38.

Bloeker, J.C., Jr., 1943, The Fauna and Flora of the El Segundo Sand Dunes. 14. & 15. Birds of El Segundo and Playa del Rey, Bulletin Southern California Academy of Science 42, pp. 1-30.

Wright, A.H. and A.A. Wright, 1949, Handbook of Frogs and Toads of the United States and Canada, Comstock Publishing Company, Ithaca, New York.

Wright, A.H. and A.A. Wright, 1957, Handbook of Snakes of the United States and Canada, Comstock Publishing Company, Ithaca, New York.

KEY

AG	GENERAL AGRICULTURE
C	COASTAL STRAND
SM_F	SALT MARSH (FRESH WATER PORTION)
SM_S	SALT MARSH (SALINE PORTION)
W	GENERAL DISTURBED AREA
W_D	DRAINAGE COURSE
W_H	HORDEUM GRASS
Ws	SLAG POOL

VEGETATION CATEGORIES

DAMES & MOORE

PLATE 2.2.1-1

DAMES & MOORE

PLATE 2.2.1-1

TABLE 2.2.1-I

VEGETATION OF THE PORT HUENEME SITE

Scientific Name	Common Name	Status		Association[1]					
		Native	Introduced	Coastal Strand	Pickleweed/ Saltgrass Marsh	Hordeum Grassland	Wet Courses	Waste Areas	Cropland
COASTAL STRAND									
Franseria Chamissonis	Silver Beach-weed[2]	X[A]		3	X[3]			X	
Oenothera cheiranthifolia var. suffruticosa	Beach Primrose	X		2	X[3]				
Cakile maritima	Sea Rocket		X	2	X[3]		X	X	
Convolvulus Soldanella	Beach Morning-glory	X		X					
Abronia maritima	Sand Verbena	X		X					
Atriplex leucophylla		X		X					
PICKLEWEED/SALTGRASS MARSH									
Salicornia virginica	Pickleweed	X		X	3		X	X	
Cressa truxillensis var. vallicola	Alkali Weed	X			2	X		X	
Distichlis spicata var. stolonifera	Saltgrass	X		X	2	X		X	
Frankenia grandifolia		X			X			X	
Scirpus californicus	California Bulrush	X			X	X			
S. robustus		X			X		X		
Cuscuta campestris	Dodder	X			X			X	
Baccharis Douglasii		X			X				
Haplopappus venetus ssp. vernonioides		X		X	X				
Rumex crispus	Curly Dock		X		X	X	X	X	
HORDEUM GRASSLAND									
Hordeum Stebbinsii			X	X	X	2		X	
Polygonum monspeliensis			X		X	X		X	
Phalaris sp.						X			
Bromus mollis	Soft Chess		X			X		X	
B. rigidus	Ripgut		X			X		X	
B. rubens	Foxtail Chess		X			X		X	
Beta vulgaris	Beet		X			X			
Malacothrix crystallinum			X			X		X	
Avena barbata			X			X		X	
H. leporinus ssp. Brewer		X				X		X	
A. patula ssp. hastata		X				X		X	
WET COURSES									
Nasturtium officinale	Watercress		X				X		
Spergularia marina		X					X		
Polygonum bistortoides		X					X		
Chenopodium murale			X				X	X	
Plantago major	Plaintain		X				X		
Veronica Anagallis-aquatica			X				X		
Apium graveolens	Celery		X				X		
Cotula coronopifolia	Brass Buttons		X				X		
Juncus carnosa		X					X		
Potamogeton ?pectinatus			X				X		
Paspalum dilatatum			X				X		

TABLE 2.2.1-I - continued

VEGETATION OF THE PORT HUENEME SITE

Scientific Name	Common Name	Status		Association[1]					
		Native	Introduced	Coastal Strand	Pickleweed/ Saltgrass Marsh	Hordeum Grassland	Wet Courses	Waste Areas	Cropland
WASTE AREAS									
Malva nicaeënsis			X		X	X		X	
M. sylvestris ssp. mauritiana			X					X	
Brassica nigra	Mustard Weed		X					X	
Mesembryanthemum edule	Hottentot Fig		X	X				X	
Polygonum aviculare	Knotweed		X					X	
Chenopodium album			X	X	X	X	X	X	X
Salsola kali var. tenuifolia	Russian Thistle		X					X	
Suaeda californica	Sea Blite	X						X	
S. californica var. taxifolia		X						X	
Amaranthus graecizans			X					X	
A. hybridus			X					X	
Heliotropium curassavicum var. oculatum			X		X	X	X	X	X
Nicotiana glauca			X					X	
Solanum Douglasii		X						X	
S. nodiflorum			X					X	X
Melilotus sp.			X			X			
M. albus			X					X	
M. indicus			X					X	
Salix spp.	Willows	X						X	
Urtica holosericea	Nettle	X						X	
Ambrosia artemisiifolia			X		X	X		X	
Artemisia Douglasiana	Mugwort		X					X	
Baccharis pilularis ssp. consanguinea		X		X				X	
Conyza canadesnis		X						X	
C. Coulteri		X						X	
Corethrogyne filaginifolia var. latifolia			X					X	
Gnaphalium ?microcephalum		X						X	
Heterotheca grandiflora		X						X	
Sonchus oleraceus			X	X	X	X	X	X	
Stephanomeria virgata		X						X	
Xanthium spinosum	Spiny Clotbur		X					X	
X. strumarium var. canadense	Cocklebur		X		X	X	X	X	
Cynodon Dactylon			X		X	X	X	X	X
Festuca megalura	Foxtail Fescue	X						X	
Oryzopsis miliacea	Ricegrass		X				X	X	
CROPLAND									
Brassica aleralea	Mustard Weed								3
Phaseolus limensis	Lima Beans								2
Centaurea repens			X					X	X

[1]Associations plotted on Plate 2.2.1-1.

[2]Common names in accordance with Munz and Keck (1959).

[3]Found only where sand occurs.

Reference: Dames & Moore (1973).

[A]Key:
X = present
2 = abundant
3 = dominant

TABLE 2.2.1-II

AMPHIBIANS AND REPTILES OF THE PORT HUENEME REGION

Common Name	HABITAT OCCUPIED AT SITE[1]							OCCURRENCE			
	Ocean	Coastal Strand	Salt Marsh	Fresh-Water Marsh	Hordeum Grassland	Wet Courses	Disturbed Area	Known or Expected	Possible or Unlikely	Use of Area	Observed
CLASS AMPHIBIA: AMPHIBIANS											
ORDER CAUDATA: SALAMANDERS											
FAMILY SALAMANDRIDAE: NEWTS											
Coast Range Newt**				X[2]		X			P	R	
FAMILY PLETHODONTIDAE: LUNGLESS SALAMANDERS											
Arboreal Salamander				X					P	R	
California Slender Salamander		X		X				L		R	
Ensatina				X	X				P	R	
ORDER ANURA: FROGS AND TOADS											
FAMILY PELOBATIDAE: SPADEFOOT TOADS											
Western Spadefoot Toad				X					P	R	
FAMILY BUFONIDAE: TRUE TOADS											
Western Toad		X		X	X		X	L		R	
Southwestern Toad		X		X					P	R	
FAMILY HYLIDAE: TREEFROGS											
California Treefrog				X	O	O	O	K		R	X
Pacific Treefrog				X	O	O	O	L		R	
FAMILY RANIDAE: TRUE FROGS											
Red-legged Frog				X		X			P	R	
Bullfrog				X		X			P	R	
CLASS REPTILIA: REPTILES											
ORDER CHELONIA: TURTLES AND TORTOISES											
FAMILY TESTUDINIDAE: WATER AND BOX TURTLES, TORTOISES											
SUBFAMILY EMYDINAE: WATER AND BOX TURTLES											
Western Pond Turtle		O		X		X			P	R	
ORDER SQUAMATA: SNAKES AND LIZARDS											
FAMILY GEKKONIDAE: GECKOS											
San Diego Banded Gecko		X							P	R	
FAMILY IGUANIDAE: IGUANIDS											
Coast Horned Lizard		X						L		R	
Great Basin Fence Lizard		X		O	O		O	K		R	X
California Side-blotched Lizard		X		O	O		O	K		R	X
FAMILY SCINCIDAE: SKINKS											
Western Skink		O		X	X			L		R	
FAMILY TEIIDAE: WHIPTAILS											
Coastal Whiptail					X		X		P	R	

DAMES & MOORE

TABLE 2.2.1-IIa

TABLE 2.2.1-II - continued

AMPHIBIANS AND REPTILES OF THE PORT HUENEME REGION

Scientific Name	Common Name	HABITAT OCCUPIED AT SITE[1]							OCCURRENCE	
		Ocean	Coastal Strand	Salt Marsh	Fresh-Water Marsh	Hordeum Grassland	Wet Courses	Disturbed Area	Known or Expected	Possible or Unlikely
FAMILY ANGUIDAE: ALLIGATOR LIZARDS										
Gerrhonotus multicarinatus	Southern Alligator Lizard		X			X			L	
FAMILY ANNIELLIDAE: CALIFORNIA LEGLESS LIZARDS										
Anniella pulchra	California Legless Lizard		X						L	
FAMILY LEPTOTYPHLOPIDAE: SLENDER BLIND SNAKES										
Leptotyphlops humilis	Western Blind Snake				O	O		O		P
FAMILY COLUBRIDAE: COLUBRIDS										
Coluber constrictor mormon	Western Yellow-Bellied Racer		O		X	X	O	X	L	
Diadophis punctatus	Ringneck Snake		X	O	X	X		O	L	
Hypsiglena torquata klauberi	San Diego Night Snake		O		O	O		O		P
Lampropeltis getulus californiae	California Kingsnake		X		X	X		X	L	
Masticophis flagellum piceus	Red Racer		O		O	X	O	X	L	
M. lateralis lateralis	California Striped Racer		X	O	X	X	X	X	L	
Pituophis melanoleucas annectans	San Diego Gopher Snake		X	O	X	X		X	L	
Rhinocheilus lecontei lecontei	Western Long-nosed Snake				O	X		O		P
Salvadora hexalepis virgultea	Coast Patch-nosed Snake					X		X		P
Tantilla plancipes eiseni	California Black-headed Snake					X		X		P
Thamnophis couchi hammondi	Two-striped Garter Snake				X		X		L	
T. sirtalis infernalis	California Red-sided Garter Snake				X	O	X	O	L	
Trimorphodon vandenburghi	California Lyre Snake		A							U
FAMILY VIPERIDAE: VIPERS SUBFAMILY CROTALINAE: PIT VIPERS										
Crotalus viridis helleri	Southern Pacific Rattlesnake		X		X	X			L	

[1]Associations plotted on Plate 2.2.1-1.

[2]Key:

^{A}Normally found in rocky areas; not likely in site area.

^{X}Presence known or expected in the area.

^{R}Resident.

^{L}Likely in the area.

^{O}Occasionally in the area in small numbers.

^{U}Unlikely.

^{P}Possibly present, but not unlikely.

^{K}Known to be in the area; observed animal or tracks on survey of the site, Sept. 6, 1973.

^{P}Fully protected species. Source: California Department of Fish and Game (1971).

**Common names in accordance with Stebbins.

All likelihood data for presence are based on geographic range, presence of suitable habitat, and availability of recruit populations.

Reference: Dames & Moore (1973), Stebbins (1966).

TABLE 2.2.1-III

BIRDS OF THE PORT HUENEME AREA

Scientific Name[1]	Common Name	Season					Frequency[3]				Habitat[4]						
		Summer	Winter	Spring	All Year	Observed[2]	Common	Fairly Common	Uncommon	Rare	Ocean	Coastal Strand	Salt Marsh	Fresh-water Marsh	Hordeum Grassland	Wet Courses	Disturbed Area
ORDER GAVIIFORMES: LOONS																	
FAMILY GAVIIDAE: LOONS																	
Gavia arctica	Artic Loon		X				X				X						
G. immer	Common Loon		X				X				X						
G. stellata	Red-Throated Loon		X				X				X						
ORDER PODICIPEDIFORMES: GREBES																	
FAMILY PODICEPIDIDAE: GREBES																	
*Aechmophorus occidentalis	Western Grebe		X				X				X						
Podiceps auritus	Horned Grebe		X				X				X						
P. nigricollis	Eared Grebe		X				X				X						
Podilimbus podiceps	Pied-billed Grebe				X	X	X							X		X	
ORDER PROCELLARIIFORMES: ALBATROSSES, SHEARWATERS, AND PETRELS																	
FAMILY DIOMEDEIDAE: ALBATROSSES																	
Diomedea nigripes	Black-footed Albatross				X				X		X						
FAMILY PROCELLARIIDAE: FULMARS, PETRELS, AND SHEARWATERS																	
Fulmarus glacialis	Northern Fulmer		X						X		X						
Puffinus creatopus	Pink-footed Shearwater		M						X		X						
P. griseus	Sooty Shearwater				X		X				X						
P. puffinus	Manx Shearwater		M		X		X										
FAMILY HYDROBATIDAE: STORM PETRELS																	
Oceanodroma homochroa	Ashy Petrel	X	M						X		X						
O. melania	Black Petrel				X			X			X						
ORDER PELICANIFORMES: PELICANS, FRIGATE BIRDS, AND ALLIES																	
FAMILY PELICANIDAE: PELICANS																	
*Pelecanus occidentalis	Brown Pelican				X	X					X						
FAMILY PHALACROCORACIDAE: CORMORANTS																	
*Phalacrocorax auritus	Double-crested Cormorant				X		X				X						
P. pelagicus	Pelagic Cormorant				X			X			X						
P. penicillatus	Brandt's Cormorant				X		X				X						
ORDER CICONIIFORMES: HERONS, STORKS, IBISES, AND ALLIES																	
FAMILY ARDEIDAE: HERONS AND BITTERNS																	
Ardea herodias	Great Blue Heron				X	X	X						X	X		X	
Butorides virescens	Green Heron				X			X					X	X		X	
Botaurus lentiginosus	American Bittern				X				X				X	X		X	
Bubulcus ibis	Cattle Egret				X				X				X	X	X		X
Casmerodius albus	Great Egret				X		X						X	X		X	X
Egretta thula	Snowy Egret				X	X	X						X	X		X	
Ixobrychus exilis	Least Bittern	X							X				X	X		X	
*Nycticorax nycticorax	Black-crowned Night Heron				X			X					X	X		X	
FAMILY CICONIIDAE: STORKS AND WOOD IBISES																	
Mycteria americana	Wood Stork	X								X			X	X		X	
ORDER ANSERIFORMES: SCREAMERS, SWANS, GEESE, AND DUCKS																	
FAMILY ANATIDAE: DUCKS, GEESE, AND SWANS																	
SUBFAMILY ANSERINAE: GEESE																	
Anser albifrons	White-fronted Goose		X							X							
Branta canadensis	Canada Goose		X					X								X	
B. nigricans	Black Brant			X			X				X				X		

BIRDS OF THE PORT HUENEME AREA

Scientific Name[1]	Common Name	Season: Summer	Winter	Spring	All Year	Observed[2]	Frequency[3]: Common	Fairly Common	Uncommon	Rare	Habitat[4]: Ocean	Coastal Strand	Salt Marsh	Fresh-water Marsh	Bordeum Grassland	Wet Courses	Disturbed Area
SUBFAMILY ANATINAE: SURFACE-FEEDING DUCKS																	
Anas acuta	Pintail		X				X									X	
A. americana	American Wigeon		X				X									X	
A. crecca carolinensis	Green-winged Teal		X			X	X									X	
A. cylpeata	Northern Shoveler		X			X	X									X	
A. cyanoptera	Cinnamon Teal				X		X									X	
A. discors	Blue-wing Teal		X						X							X	
A. platyrhynchos	Mallard		X				X									X	
A. strepera	Gadwall		X						X							X	
Aythya affinis	Lesser Scaup		X				X									X	
A. americana	Redhead		X					X			X					X	
A. collaris	Ring-necked Duck		X					X								X	
A. marila	Greater Scaup		X							X						X	
A. valisineria	Canvasback		X					X			X					X	
Bucephala albeola	Bufflehead		X					X								X	
B. islandica	Barrow's Goldeneye		X							X							
Clangula hyemalis	Oldsquaw		X							X	X						
Histrionicus histrionicus	Harlequin Duck		X						X							X	
SUBFAMILY ANTHYINAE: SEA DUCKS																	
Melanitta deglandi	White-winged Scoter		X					X			X						
M. perpicilata	Surf Scoter		X				X				X						
Oedimia nigra	Black Scoter		X							X	X						
SUBFAMILY MERGINAE: MERGANSERS																	
Laphodytes cucullatus	Hood merganser		X							X						X	
Mergus merganser	Common Merganser		X					X								X	
M. serrator	Red-breasted Merganser		X				X				X					X	
SUBFAMILY OXYURINAE: STIFF-TAILED DUCKS																	
Oxyura jamaicensis	Ruddy Duck	⊗				X	X									X	
ORDER FALCONIFORMES: DIURNAL BIRDS OF PREY																	
FAMILY CATHARTIDAE: AMERICAN VULTURES																	
Cathartes aura	Turkey Vulture				⊗		X					X	X	X		X	
FAMILY ACCIPITRIDAE: HAWKS, EAGLES, AND KITES																	
SUBFAMILY ELANINAE: KITES																	
P Elanus leucurus	White-tailed Kite				⊗	X		X				X	X	X		X	
SUBFAMILY ACCIPITINAE: ACCIPITERS																	
R Accipiter cooperii	Cooper's Hawk				⊗			X							X	X	
R A. striatus	Sharp-shinned Hawk				X			X							X	X	
SUBFAMILY BUTEONINAE: HAWKS AND EAGLES																	
Aguila chrysaetos	Golden Eagle				X				X					X	X		X
Buteo jamaicensis	Red-tailed Hawk				X		X					X	X	X		X	X
R B. lineatus	Red-shouldered Hawk				X				X			X	X	X		X	X
E Haliaeetus leucocephalus	Bald Eagle				X					X		X	X	X	X		X
SUBFAMILY CIRCINAE: HARRIERS																	
R Circus cyaneus	Marsh Hawk				X		X					X	X	X		X	X
P Falco peregrinus	Peregrine Falcon				⊗					X					X		X
FAMILY PANDIONIDAE: OSPREYS																	
R Pandion haliaetus	Osprey				⊗				X				X	X	X	X	X
FAMILY FALCONIDAE: FALCONS																	
R Falco columbarius	Merlin	X							X			X	X	X	X		X
R F. sparverius	American Kestrel				X		X					X	X	X	X		X
ORDER GALLIFORMES: FOWL-LIKE BIRDS																	
FAMILY PHASIANIDAE: QUAILS AND PHEASANTS																	
Lophortyx californicus	California Quail				⊗				X						X		

TABLE 2.2.1-III - continued
BIRDS OF THE PORT HUENEME AREA

Scientific Name[1]	Common Name	Season: Summer	Winter	Spring	All Year	Observed[2]	Frequency[3]: Common	Fairly Common	Uncommon	Rare	Habitat[4]: Ocean	Coastal Strand	Salt Marsh	Fresh-water Marsh	Hordeum Grassland	Wet Courses	Disturbed Area
ORDER GRUIFORMES: CRANES, RAILS, AND COOTS																	
FAMILY RALLIDAE: RAIL-LIKE BIRDS																	
Coturnicops noveboracensis	Yellow Rail		X							X			X	X			
Fulica americana	American Coot				⊗		X									X	
Gallinula chloropus	Common Gallinule				⊗	X			X					X		X	
[*]Laterallus jamaicensis	Black Rail				⊗					X			X	X			
Porzana carolina	Sora				⊗				X				X	X			
Rallus limicola	Virginia Rail				⊗				X				X				
[*]R. longirostris	Clapper Rail				⊗				X				X				
ORDER CHARADRIIFORMES: SHOREBIRDS																	
FAMILY CHARADRIIDAE: PLOVERS																	
[*]Charadrius alexandrinus	Snowy Plover		X				X					X					X
C. semipalmatus	Semipalmated Plover		⊗					X				X	X	X			X
C. vociferus	Killdeer				⊗	X	X					X	X	X	X		X
Squatarola squatarola	Black-bellied Plover		X			X	X					X	X	X			X
FAMILY SCOLOPACIDAE: SANDPIPERS																	
Actitis macularia	Spotted Sandpiper		X			X		X			X		X	X		X	
Aphriza virgata	Surfbird		X					X				X					
Arenaria interpres	Ruddy Turnstone		X				X					X	X				
A. melanocephala	Black Turnstone		X				X					X	X				
Calidris alba	Sanderling		X			X						X	X	X			
C. alpina	Dunlin		X				X					X	X	X		X	
C. bairdii	Baird's Sandpiper		M							X		X	X	X			X
C. canutus	Knot		M							X		X	X	X			
C. melanotus	Pectoral SandPiper		M							X		X	X	X		X	
C. minutilla	Leasd Sandpiper			X		X	X					X	X	X		X	
Gallinago gallinago	Common Snipe		X						X					X		X	
Catoptrophorus semipalmatus	Willet			X		X	X					X	X	X			
Heteroscelus incanum	Wandering Tattler		X						X			X					
Limnodromus griseus	Short-billed Dowitcher			X		X	X					X	X	X		X	
L. scolopaceus	Long-billed Dowitcher			X			X					X	X	X		X	
Limosa fedoa	Marbled Godwit		X			X	X					X	X	X		X	X
Numenius americanus	Long-billed Curlew		X			X	X						X	X			X
N. phaeopus	Whimbrel		X			X	X						X	X			X
Tringa flavipes	Lesser Yellowlegs		X						X				X	X			
T. melanoleuca	Greater Yellowlegs		X			X		X					X	X			
Tringa solitaria	Solitary Sandpiper		M							X		X					
FAMILY PHALAROPODIDAE: PHALAROPES																	
Lobipes lobatus	Northern Phalarope		M			X		X			X		X	X		X	
Phalaropus fulicarius	Red Phalarope		M			X		X			X					X	
Steganopus tricolor	Wilson's Phalarope		M			X			X				X	X		X	
FAMILY RECURVIROSTRIDAE: AVOCETS AND STILTS																	
Himantopus mexicanus	Black-necked Stilt			X			X						X	X		X	
Recurvirostra americana	American Avocet			X		X	X						X	X		X	
FAMILY STERCORARIIDAE: JAEGERS																	
Stercorarius parasiticus	Parasitic Jaeger		X						X		X						
FAMILY LARIDAE: GULLS AND TERNS																	
SUBFAMILY LARINAE: GULLS																	
Larus argentatus	Herring Gull		X					X			X	X	X	X		X	X
L. atricilla	Bonaparte's Gull		X				X				X	X	X	X		X	X
L. californicus	California Gull			X		X		X			X	X	X	X		X	X
L. canus	Mew Gull		X						X		X	X	X	X		X	X
L. delawarensis	Ring-billed Gull			X		X	X				X	X	X	X		X	X
L. glaucescens	Glaucous-winged Gull		X					X			X	X	X	X		X	X
L. heermanni	Heermann's Gull		X			X			X		X	X	X	X		X	
L. occidentalis	Western Gull		X			X			X		X	X	X	X		X	X
L. philadelphia	Franklin's Gull								X		X	X	X	X		X	X
Rissa tridactyla	Black-legged Kittiwake		X						X		X	X	X	X			
Xema sabini	Sabine's Gull								X		X						

BIRDS OF THE PORT HUENEME AREA

Scientific Name[1]	Common Name	Season: Summer	Winter	Spring	All Year	Observed[2]	Frequency[3]: Common	Fairly Common	Uncommon	Rare	Habitat[4]: Ocean	Coastal Strand	Salt Marsh	Fresh-water Marsh	Bordeum Grassland	Net Courses	Disturbed Area
SUBFAMILY STERNINAE: TERNS																	
Chlidonias niger	Black Tern			X					X			X	X	X			
Hydroprogne caspa	Caspian Tern		X					X			X	X	X	X		X	
Sterna albifrons	Least Tern	X								X	X	X				X	
S. forsteri	Forster's Tern				X	X	X				X	X	X	X			
S. hirundo	Common Tern		M					X			X	X	X	X		X	
S. paradisea	Arctic Tern		M							X	X	X				X	
Thalsseus elegans	Elegant Tern		X						X		X	X	X	X		X	
T. maximus	Royal Tern		X						X		X	X	X	X		X	
FAMILY ALCIDAE: AUKS																	
Uria aalge	Common Murre		X							X	X						
Cepphus columba	Pigeon Guillemot				X					X	X						
Brachyramphus marmoratum	Marbled Murrelet		X							X	X						
Endomychura hypoleuca	Xantus' Murrelet				⊗				X		X						
Synthliboramphus antiquum	Ancient Murrelet		X							X	X						
Ptychoramphus aleutica	Cassin's Auklet				X				X		X						
Cerorhinca monocerata	Rhinoceros Auklet		X						X		X						
ORDER COLUMBIFORMES: PIGEONS AND DOVES																	
FAMILY COLUMBIDAE: PIGEONS AND DOVES																	
Columba fasciata	Band-tailed Pigeon				⊗				X						X		X
C. livia	Domestic Pigeon				⊗	X	X										X
Streptopelia chinensis	Spotted Dove				⊗			X									X
Zenaida macroura	Mourning Dove				⊗	X	X								X		X
ORDER CUCULIFORMES: CUCKOOS AND ROADRUNNERS																	
P Coccyzus americanus	Yellow-billed Cuckoo	X								X				X			
Geococcyx californianus	Roadrunner				⊗				X						X		X
ORDER STRIGIFORMES: OWLS																	
FAMILY TYTONIDAE: BARN OWLS																	
R Tyto alba	Barn Owl				⊗				X			X	X	X	X		X
FAMILY STRIGIDAE: TYPICAL OWLS																	
Asia flammeus	Short-eared Owl				X				X				X	X			X
Bubo virginianus	Great-horned Owl				X			X				X	X	X	X		X
Otus asio	Screech Owl				⊗				X						X		X
Speotyto cunicularia	Burrowing Owl				⊗					X		X			X		
FAMILY CAPRIMULGIDAE: GOATSUCKERS																	
Chordeiles acutipennis	Lesser Nighthawk	⊗							X						X		X
ORDER APODIFORMES: SWIFTS AND HUMMINGBIRDS																	
FAMILY APODIDAE: SWIFTS																	
Aeronautes saxatalis	White-throated Swift				⊗			X				X	X	X	X		X
Chaetura pelagica	Vaux's Swift	X							X			X	X	X	X		X
FAMILY TROCHILIDAE: HUMMINGBIRDS																	
Archilochus alexandri	Black-chinned Hummingbird	⊗					X								X		X
Calypte anna	Anna's Hummingbird				⊗		X						X	X	X		X
C. costae	Costa's Hummingbird	X								X					X		X
Selasphorus rufus	Rufous Hummingbird			X					X						X		X
S. sasin	Allen's Hummingbird	X		⊗				X					X	X	X		
ORDER CORACIIFORMES: KINGFISHERS																	
FAMILY ALCEDINIDAE: KINGFISHERS																	
Megaceryle alcyon	Belted Kingfisher				⊗			X					X	X		X	

BIRDS OF THE PORT HUENEME AREA

Scientific Name[1]	Common Name	Season: Summer	Winter	Spring	All Year	Observed[2]	Frequency[3]: Common	Fairly Common	Uncommon	Rare	Habitat[4]: Ocean	Coastal Strand	Salt Marsh	Fresh-water Marsh	Hordeum Grassland	Wet Courses	Disturbed Area
ORDER PICIFORMES: WOODPECKERS AND FLICKERS																	
FAMILY PICIDAE: WOODPECKERS AND FLICKERS																	
Colaptes auratus	Common Flicker				⊗		X										X
Dendrocopus nuttalli	Nuttall's Woodpecker				⊗			X									X
D. pubescens	Downy Woodpecker				⊗			X									X
D. villosus	Hairy Woodpecker				⊗			X									X
Melanerpes formicivorus	Acorn Woodpecker				⊗		X										X
ORDER PASSERIFORMES: PERCHING BIRDS																	
SUBORDER TYRANNI: FLYCATCHERS																	
FAMILY TYRANNIDAE: TYRANT FLYCATCHERS																	
Contopus sordidulus	Western Wood Pewee	⊗							X								
Empidonax difficilis	Western Flycatcher	⊗								X				X			X
Myiarchus cinerascens	Ash-throated Flycatcher	⊗						X							X		X
Sayornis nigricans	Black Phoebe				⊗	X	X						X	X			X
S. saya	Say's Phoebe		X					X				X	X	X	X		X
Tyrannus verticalis	Western Kingbird	⊗						X							X		X
T. vociferans	Cassin's Kingbird			X					X						X		X
SUBORDER PASSERES: SONGBIRDS																	
FAMILY ALAUDIDAE: LARKS																	
Eremophila alpestris	Horned Lark				X			X							X		X
FAMILY HIRUNDINIDAE: SWALLOWS																	
Hirundo rustica	Barn Swallow	⊗				X		X				X	X	X		X	
Iridoprocne bicolor	Tree Swallow		M							X			X	X		X	
Petrochelidon pyrrhonta	Cliff Swallow	⊗				X		X				X	X	X		X	
Progne subis	Purple Martin		M							X			X	X		X	
Stelgidopteryx ruficollis	Rough-winged Swallow	⊗				X		X				X	X	X		X	
Riparia riparia	Bank Swallow	X							X				X	X		X	
Tachycineta thassalina	Violet-green Swallow	X						X					X	X		X	
FAMILY CORVIDAE: JAYS AND CROWS																	
Aphelocoma coerulescens	Scrub Jay				⊗		X							X			X
Corvus brachyrhynchos	Crow				⊗	X	X					X	X	X	X		X
C. corax	Common Raven				⊗			X				X	X	X	X		X
FAMILY SITTIDAE: NUTHATCHES																	
Sitta carolinensis	White-breasted Nuthatch				X			X									
FAMILY PARIDAE: TITMICE AND BUSHTITS																	
Parus inornatus	Plain Titmouse				⊗		X							X			X
Psaltriparus minimus	Bushtit				⊗		X										X
FAMILY CHAMAEIDAE: WRENTITS																	
Chamae fasciata	Wrentit				⊗		X										
FAMILY TROGLODYTIDAE: WRENS																	
Salpinctes obsoletus	Rock Wren				⊗					X		X					
Telmatodytes palustris	Marsh Wren				⊗		X						X	X			
Thryomanes bewicki	Bewick's Wren				⊗			X						X			X
Troglodytes aedon	House Wren				⊗			X						X	X		X
FAMILY MIMIDAE: MOCKINGBIRDS																	
Mimus polyglottus	Mockingbird				⊗	X	X								X		X
FAMILY TURDIDAE: THRUSHES AND BLUEBIRDS																	
Catharus guttata	Swainson's Thrush	X							X					X			
C. ustulina	Hermit Thrush		X					X									
Ixoreus naevius	Varied Thrush		X						X								
Sialia mexicana	Western Bluebird				⊗			X							X		X
Turdus migratorius	American Robin		X				X										X

BIRDS OF THE PORT HUENEME AREA

Scientific Name[1]	Common Name	Season: Summer	Winter	Spring	All Year	Observed[2]	Frequency[3]: Common	Fairly Common	Uncommon	Rare	Habitat[4]: Ocean	Coastal Strand	Salt Marsh	Fresh-water Marsh	Riparian Grassland	Mud Flat/Sea	Disturbed Area
FAMILY SYLVIIDAE: KINGLETS																	
Polioptila caerulea	Blue-grey Gnatcatcher				⊗				X								
Regulus calendula	Ruby-crowned Kinglet		X					X						X			
														X			
FAMILY MOTOCILLIDAE: PIPITS																	
Anthus spindetta	Water Pipit		X					X				X	X	X	X		X
FAMILY BOMBYCILLIDAE: WAXWINGS																	
Bombycylla cedrorum	Cedar Waxwing		X				X										X
FAMILY PTILOGONATIDAE: SILKY FLYCATCHERS																	
Phainopepla nitrens	Phainopepla	X						X							X		X
FAMILY LANIIDAE: SHRIKES																	
Lanius ludovicianus	Loggerhead Shrike				⊗	X	X					X	X	X	X		X
FAMILY STURNIDAE: STARLINGS																	
Sturnus vulgaris	Starling				⊗	X	X					X	X	X	X		X
FAMILY VIREONIDAE: VIREOS																	
Vireo bellii	Bell's Vireo	⊗								X				X			
V. gilvus	Warbling Vireo	⊗						X						X			
V. huttoni	Hutton's Vireo				⊗				X					X			
V. solitarius	Solitary Vireo		M							X				X			
V. vicinior	Gray Vireo	X							X								
FAMILY PARULIDAE: WARBLERS																	
Dendroica coronata	Yellow-rumped Warbler		X				X										
D. nigrescens	Black-throated Gray Warbler		M						X					X			
D. townsendi	Townsend's Warbler		M						X					X			
D. occidentalis	Hermit Warbler		M						X					X			
R D. petechia	Yellow Warbler	X		X			X		X					X			
R Geothlypis trichas	Yellowthroat Warbler				⊗		X		X				X	X			
Icteria virens	Yellow-breasted Chat	X								X				X			
Oporornis tolmiei	MacGillivary's Warbler	M							X					X			
Vermivora celata	Orange-crowned Warbler			X					X					X			
V. ruficapilla	Nashville Warbler	X							X					X			
V. virginiae	Virginia Warbler		M						X					X			
Wilsonia pusilla	Wilson's Warbler	⊗				X	X							X			
FAMILY PLACEIDAE: WEAVER FINCHES																	
Passer domesticus	House Sparrow				⊗	X	X					X	X	X	X		X
FAMILY ICTERIDAE: BLACKBIRDS																	
Agulius phoenicius	Red-winged Blackbird				X		X						X	X	X		X
A. tricolor	Tricolored Blackbird				X			X					X	X	X		X
Euphagus cyanocephalus	Brewer's Blackbird				X		X					X	X	X	X		
Icterus galbula	Northern Oriole	X						X									
I. cucullatus	Hooded Oriole	X						X									X
Molothrus ater	Cowbird				X		X					X	X	X	X		
Sturnella neglecta	Brown-headed Western Meadowlark				X	X	X						X	X	X		X
Xanthocephalus xanthocephalus	Yellow-headed Blackbird		M							X			X	X			
FAMILY THRAUPIDAE: TANAGERS																	
Piranga ludoviciana	Western Tanager	⊗							X								

TABLE 2.2.1-III - continued

BIRDS OF THE PORT HUENEME AREA

Scientific Name[1]	Common Name	Season					Frequency[3]				Habitat[4]						
		Summer	Winter	Spring	All Year	Observed[2]	Common	Fairly Common	Uncommon	Rare	Ocean	Coastal Strand	Salt Marsh	Fresh-water Marsh	Hordeum Grassland	Wet Courses	Disturbed Area
FAMILY FRINGILLIDAE:	GROSBEAKS, FINCHES, AND SPARROWS																
Aimophila ruficeps	Rufous-crowned Sparrow				⊗				X						X		
Ammodramus savannarum	Grasshopper Sparrow				X				X						X		
Amphispiza belli	Sage Sparrow		X						X								
Carpodacus mexicanus	Housefinch				⊗		X					X			X		X
C. purpureus	Purple Finch		X						X						X		
Chondestes grammacus	Lark Sparrow				⊗	X		X				X	X	X	X		X
Junco hyemalis	Dark-eyed Junco		X				X								X		X
Melospiza lincolni	Lincoln's Sparrow		X						X				X	X	X		X
M. melodia	Song Sparrow				X		X					X	X	X			X
Passerculus sandwichensis	Savannah Sparrow				⊗	X	X					X	X	X	X		X
Passerella iliaca	Fox Sparrow		⊗					X						X	X		X
Passerina amoena	Lazuli Bunting	⊗							X					X			
Pipilo fuscus	Brown Towhee				⊗		X					X					X
P. erythrophthalmus	Rufous-sided Towhee				⊗			X									X
Pheucticus melanocephalus	Black-headed Grosbeak	⊗						X									
Pooecetes gramineus	Vesper Sparrow		X							X					X		X
Spinus lawrencei	Lawrence's Goldfinch				⊗				X					X			
Spinus pinus	Pine Siskin		X						X								
S. psaltria	Lesser Goldfinch				⊗		X						X	X			X
S. tristis	American Goldfinch				⊗		X						X	X			X
Spizella passerina	Chipping Sparrow				⊗				X						X		X
Zonotrichia atricapilla	Golden-crowned Sparrow		X						X					X	X		X
Z. leucophrys	White-crowned Sparrow		X				X							X	X		X

[1]Scientific and common names in accordance with American Ornithologists Union (1957, 1973).

[2]Key:
E=Endangered, Arbib (1973); California Department of Fish and Game (1971, 1973b).
S=Suffering population dimunition, Arbib (1973).
W=Species to be watched, as they may be on the verge of becoming rare, Arbib (1973).
P=Fully protected species, Arbib (1973).
M=Migratory
⊗=Probably breeding in the area.

[3]Common: To be found 75% or more of the time. Reference: Langton (1973).
Fairly Common: To be found 25-75% of the time. Reference: Langton (1973).
Uncommon: To be found less than 25% of the time. Reference: Langton (1973).

[4]Associations plotted on Plate 2.2.1-1.
References: Dames & Moore (1973).

TABLE 2.2.1-IV

MAMMALS OF THE PORT HUENEME REGION

Scientific Name	Common Name	Habitat occupied at site: Ocean	Coastal Strand	Salt Marsh	Fresh Water Marsh	Wet Courses	Hordeum Grassland	Disturbed	Occurrence on site: Known(K) or Expected (L)	Possible(P) or Unlikely(N)	Expected Principal Utilization of Site	Status on Site (Year, etc.)
ORDER MARSUPIALIA: MARSUPIALS												
FAMILY DIDELPHIDAE: OPOSSUMS												
Didelphis marsupialis	Common Opossum[2]		X[3]	X	X		X	X		P	I	
ORDER INSECTIVORA: INSECTIVORES												
FAMILY SORICIDAE: SHREWS												
Sorex ornatus	Ornate Shrew			X	X				K		R	
FAMILY TALPIDAE: MOLES												
Scapanus latimanus	Broad-handed Shrew				X		X	X		N	R	
ORDER CHIROPTERA: BATS												
FAMILY VESPERTILIONIDAE: EVENING BATS												
Antrozous pallidus pacificus	Pallid Bat											
Eumops perotis californicus	Western Mastiff Bat											
Eptesicus fuscus bernardinus	Big Brown Bat											
Lasiurus borealis teliotis	Red Bat											
L. cinereus cinereus	Hoary Bat											
Myotis californicus californicus	California Myotis											
M. yumanensis sociabilis	Yuma Myotis											
Pipistrellus hesperus merriami	Western Pipistrelle											
Plecotus townsendii intermedius	Lump-nosed Bat											
FAMILY MOLOSSIDAE: FREE-TAILED BATS												
Tadarida brasiliensis mexicana	Brazilian Free-tailed Bat											
ORDER LAGOMORPHA: COTTONTAILS, HARES, AND RABBITS												
FAMILY LEPORIDAE: HARES AND RABBITS												
Lepus californicus bennetti	Black-tailed Hare		X	X	X		X	X	K		R	
Sylvilagus audubonii vallicola	Audubon Cottontail		X	X	X		X	X	K		R	
ORDER RODENTIA: RODENTS												
SUBORDER SCIUROMORPHA: SCIUROMORPH RODENTS												
FAMILY SCIURIDAE: SQUIRRELS AND MARMOTS												
Otospermophilus beecheyi beecheyi	Beechey Ground Squirrel		X	X	X		X	X	K		R	
FAMILY GEOMYIDAE: POCKET GOPHERS												
Thomomys bottae bottae	Botta Pocket Gopher		X	X	X		X	X	K		R	
FAMILY HETEROMYIDAE: POCKET MICE AND KANGAROO RATS												
Perognathus californicus dispar	California Pocket Mouse						X	X		N	IN	
P. fallax fallax	San Diego Pocket Mouse						X	X		N	I/V	
P. longimembris pacificus	Little Pocket Mouse		X				X	X		N	R	

Local distributions of bats are poorly known. These species are among the most likely, but it is doubtful whether more than two or three are seen in these habitats with any degree of regularity. Feeding and drinking along the slough and feeding over the marshes are the most likely major activities of bats in the area.

TABLE 2.2.1-IV - continued

MAMMALS OF THE PORT HUENEME REGION

Scientific Name	Common Name	Habitat occupied at site: Ocean	Coastal Strand	Salt Marsh	Fresh Water Marsh	Wet Courses	Hordeum Grassland	Disturbed	Occurrence on site: Known(K) or Expected (L)	Possible(P) or Unlikely(N)	Expected Principal Utilization of Site	Status on Site on Sept 6-8, 1973
SUBORDER MYOMORPHA: MYOMORPH RODENTS.												
FAMILY CRICETIDAE: RATS AND MICE												
Microtus californicus stephensi	California Meadow Mouse		X	X	X		X	X	K		R	Co
Neotoma fuscipes macrotis	Dusky-Footed Wood Rat			(X)[4]					(K)	N	I	
N. lepida intermedia	Desert Wood Rat						X	X		N	I	
Ondatra zibethicus	Muskrat				X	X			K		R	Ca[5]
Peromyscus boylii rowleyi	Brush Mouse				X		X	X		N	I	
P. californicus insignis	California Mouse						X	X		N	V	
P. crinitus fraterculus	Canyon Mouse							X		N	I	
P. maniculatus gambelli	Deer Mouse		X					X	L		R/V	
Reithrodontomys megalotis limicola	Western Harvest Mouse			X	X		X	X	K		R	A
FAMILY MURIDAE: OLD WORLD RATS AND MICE												
Mus musculus	House Mouse		X	X	X		X	X	K		R	A
Rattus norvegicus	Norway Rat			X	X	X		X	L		R	
R. rattus	Black Rat							X		P	R	
ORDER CARNIVORA: TERRESTRIAL CARNIVORES												
FAMILY CANIDAE: FOXES AND COYOTES												
Canis latrans ochropus	Coyote		X	X	X		X	X		P	I	
Urocyon cinereoargenteus californicus	Gray Fox		X	X	X		X	X		P	V	
FAMILY PROCYONIDAE: RACOONS												
Bassariscus astutus	Ringtailed Cat		X		X		X	X		N	I	
Procyon lotor pacra	Racoon		X	X	X	X	X	X	L		V/R	
FAMILY MUSTELIDAE: WEASELS, SKUNKS, AND BADGERS												
Mephitis mephitis holzneri	Striped Skunk		X	X	X		X	X	K		R/V	Co
Mustela frenata latirostra	Long-Tailed Weasel			X	X		X	X	L		R	
Spilogale putorius [illegible]	Spotted Skunk		X	X	X		X	X	L		V/R	
FAMILY FELIDAE: CATS												
Lynx rufus californicus	Bobcat		X	X	X		X	X		N	I	
ORDER ARTIODACTYLA: EVEN-TOED HOOFED MAMMALS												
FAMILY CERVIDAE: DEER												
Odocoileus hemionus californicus	Mule Deer		X	X	X		X	X		N	I	

[1] Associations plotted on Plate 2.2.1-1.
[2] Common and scientific names to species level in accordance with L.G. Ingles (1965).
[3] Subspecies names supplied by A. Starret (1973).
[4] Key:
X=Occurrence in habitat expected or known.
K=Known: determined by on-site survey.
L=Likely or expected, but not verified.
P=Possible, but not likely.
N=Unlikely, but possible.
R=Resident.
V=Regular visitor.
I=Irregular visitor.
F=Fully protected species.
References: California Dept. Fish & Game, 1973b.
Dames and Moore, 1973

A=Abundant.
Co=Common.
Ca=Casual; at time of survey.
(X)[4]=Based on one animal found dead. No suitable habitat. Possibly killed elsewhere and left in salt marsh.
Ca[5]=Evidence found of recent resident population, but current presence on site not verified. Possibly seasonal with relation to abundance of fresh water.

2.2.2 Marine Biology

2.2.2.1 Introduction

Information on biotic baseline conditions contained herein represents a compilation of information from published and unpublished sources. Generally speaking, when questions have arisen concerning the presence or absence of a particular species within the study area, a conservative attitude was maintained. If the species in question were known from similar localities at nearby sites, but not reported from the Port Hueneme area, it was included for the sake of thoroughness. Questions such as these arose most often with scarcer species, those which usually do not constitute an important fraction of the total biomass of an area.

Baseline monitoring studies conducted for the Ormond Beach and Mandalay Generating Stations (Marine Advisors, 1969; Intersea Research Corporation, 1972a-i, 1973a-c) and unpublished data obtained through the courtesy of the Southern California Coastal Water Research Project (SCCWRP: Mearns, et al., 1971, unpublished) provided the basic data matrix for this investigation. Additional data were obtained from the Oxnard Municipal Marine Floatation Monitoring System (City of Oxnard, 1973, 1964-72), the California Cooperative Oceanic Fisheries Investigations (CALCOFI: Ahlstrom, 1969; Berner, 1967; Brinton, 1967; Fleminger, 1967; Isaacs, et al., 1968; Kramer, 1970; McGowan, 1967: plankton data), and the California Department of Fish and Game (no date, unpublished computerized fish catch records). Other sources of information are cited in the text.

It is generally thought that the diversity of spec[illegible] present within a circumscribed area is functionally related [illegible] the variety of available habitats; the greater the number o[illegible] available habitats, the more diverse the associated fauna a[illegible] flora. Biological productivity, on the other hand, need not [illegible] so functionally related. A relatively homogeneous area may [illegible] as productive, from a biomass point of view, as a highly he[illegible]geneous area. These two basic biological concepts, diversi[illegible] and productivity, should not be confused with one another. [illegible] is important to note that the data to be presented are heavi[illegible] weighted in favor of describing biological diversity.

2.2.2.2 Habitats

The submarine topography immediately adjacent to [illegible] proposed site is composed of a gently sloping, sandy bottom extending seaward approximately 1.5 miles to the 10-fathom [illegible]. Moving progressively deeper, a greater percentage of mud i[illegible] encountered with some shell fragments. The dominant submarin[illegible] topographical feature of the area is Hueneme Canyon, a deep water area approaching to within several hundred yards of sh[illegible]. Except for this canyon, the nearshore submarine geology for several miles north and south of the site is very simil[illegible]ar i[illegible] topography and substrate to that previously described (see Section 2.1.2.3). The site region is thus rather homogeneous. The nearest inshore, natural rocky areas lie about 12 miles northwest and 11 miles southeast of the site along the shor[illegible] (Plate 2.2.2-1). These localities support kelp beds and associated biota not originally a part of the Port Hueneme

faunal and floral assemblage. The closest natural rocky area lies approximately 7 miles seaward in about 160 fathoms of water. Anacapa Island, the closest island of the Channel Islands chain, lies approximately 12 miles southwest of Port Hueneme. The importance of these rocky areas will become apparent in succeeding sections, particularly as they relate to sport- and commercial-fishing catch records.

The other important feature of this area is Port Hueneme itself, which was formerly an area of undisturbed wetlands supporting animal and plant associations distinct from nearshore and open water associations. Its conversion into a usable port necessitated construction of wharves, breakwaters, and other structures which changed not only the harbor itself, but also the coastal zone. Breakwaters now provide an artificial rocky habitat.

Other relevant, subtidal, man-made changes pertinent to this investigation include the addition of three municipal waste treatment outfalls (one of which is now inoperative) and two thermal outfalls from fossil-fueled power plants. The Port Hueneme Municipal Waste Treatment Plant's outfall discharges in about 35 feet of water, slightly south of the proposed protected berth. This outfall will be shut down in the near future, and the waste water will be transported to the Oxnard Municipal Waste Treatment Plant (Port Hueneme S.T.P., 1973). The Oxnard plant's outfall currently extends 6,000 feet from shore, with a 6,500-foot extension planned (Oxnard Municipal S.T.P., 1973). The new outfall terminus will be approximately 1.6 miles from the outer breakwater of the proposed LNG berthing facility. The

Ormond Beach Generating Station is slightly over 2 miles south of this facility; the Mandalay Generating Station is roughly 4 miles north. The net result of these outfalls and associated rip-rap is to increase the "rocky" habitat available for colonization by plants and animals.

The physical impact of man-made structures in the nearshore study area has been to increase habitat complexity. The expected biological impact of the proposed berthing facilities would be to increase species diversity. However, stress caused by municipal outfalls may have the opposite effect. Artificial nutrient enrichment from the waste treatment outfalls may also have increased the productivity of the area, although this point is not clearly documented.

The primary types of plant and animal habitats presently found within the study area include: a sandy beach surf zone, extending from the upper shore-washed beach to just seaward of the breaker line; a sandy muddy area beginning at the terminus of the surf zone, and gradually sloping into deeper water; the Hueneme Canyon, an area where primarily deepwater or northern species may be found relatively close to shore; the overlying water mass, supporting primarily pelagic organisms; the Port Hueneme Harbor itself; and all the artificial solid substrate including the breakwater, retaining walls, and outfalls. Each of these areas may support a different assemblage of organisms.

2.2.2.3 Fish

In excess of 550 species of marine fish have been recorded from California's coastal waters (Miller and Lea, 1972).

of this number, many are restricted to very deep waters, and others to Northern California. Others are so rare that they have been recorded only once. Elimination of these questionable species occurrences results in a list of 176 species, encompassing 55 families, which probably occur in the general vicinity of Port Hueneme (Table 2.2.2-I). Of this number, roughly half have actually been taken by the various capture techniques reviewed here.

Three independent otter trawl programs which have been completed in the recent past in the vicinity of the proposed site were reviewed. The first two studies gathered biological baseline information for the Mandalay Beach and Ormond Beach Generating Stations (Intersea Research Corporation, 1972a-i, 1973a-c). The relative positions of these facilities are shown on Plate 2.2.2-1 and the actual locations of the trawls on Plates 2.2.2-2 and -3. The third study was conducted by Mearns, et al. (1971, unpublished), for which the trawl locations are shown on Plate 2.2.2-4.

It should be mentioned at the outset that these trawl data cannot be directly compared, except within and between trawl stations of the same study. Variations in seasons and depths trawled, trawling gear used, distance covered, and the speed at which the trawls were towed precludes such a comparison. None of the trawl data are sufficiently consistent through time to examine seasonal fluctuations in species abundance and diversity.

All trawl data, converted into mean number of fish captured per trawl per station, are given in Table 2.2.2-II.

The data have been abstracted and will be discussed by locality and depth. Only the more common species, being defined as those species which are expected to be taken at least once in each trawl (an abundance of 1.0 in Table 2.2.2-II), are discussed. Less abundant species do not constitute a significant proportion of fish biomass, as measured by trawl catches. Fish diversity is discussed in Section 2.2.2.11, Species Diversity.

Surf and Bay Fishes

Dominant surf and bay fishes in Southern California are listed in Table 2.2.2-III. These data are from extensive beach seining collections made by the California Department of Fish and Game (Carlisle, et al., 1960). The most abundant fish are Northern anchovies,[1] the primary food fish for virtually all large piscivorous (fish eating) carnivores in Southern California (Frey, 1971). Northern anchovies are ubiquitous, locally forming large, dense schools. Deep body and Slough anchovies are also ubiquitous in their distribution, but not nearly as abundant as the Northern anchovy.

Silversides (California grunion, Jacksmelt, and Topsmelt) also figure prominently in the nearshore region. All are schooling fish, as are anchovies, and may be locally abundant. Silversides are forage fish for other species.

The most important[2] surf and bay fishes, at least from a sportsman's point of view, are the croakers and surfperches.

---

[1] Common names of fishes are in accordance with American Fisheries Society Special Publication No. 6 (1970); scientific name equivalents are given in Table 2.2.2-I.

[2] "Important" is used here to denote fish which are of sport or commercial interest or are of high abundance.

Barred and Walleye surf perch, California corbina, and Spotfin croaker are the dominant, and the most sought after, surf zone fishes (Carlisle, et al., 1960). All of these species spawn in relatively shallow water along the shore or in bays.

Shallow Water Fishes

The present trawl data are sufficient to establish fish species' dominance in shallow waters (from roughly 10 to 60 feet). Data presented in Table 2.2.2-IV suggest that surfperches are dominant in this zone, as they are in the surf zone. Drums are also important, although not as much as in the surf. The most important sportfishes are the Barred, Walleye and White surf perches, and White croaker (Carlisle, et al., 1960). Other species are not normally included in the fisherman's bag either because of small size or unpalatability.

Deepwater Fishes

Dominant deepwater (beyond 240 feet) fishes in the Port Hueneme area, as determined by Mearns, et al. (1971, unpublished), are listed in Table 2.2.2-V. By far the most abundant are Pacific and Speckled sanddabs, being roughly three times as abundant as all other species combined. The flat fishes are clearly the dominant group of fishes over sandy bottoms, followed in general by the ubiquitous rockfish, of which there are more than 50 species in California (Miller and Lea, 1972).

The most important sport and commercial species are also the rock and flatfishes. Both groups are actively sought by fishermen. However, the most productive rockfish-fishing areas in this region are located over a rocky bank near Anacapa

Island, at a distance of approximately 7 miles from the study site.

Mearns, et al. (1971, unpublished) performed a recurrent group analysis on his data to determine the depth and interspecific affinities of the fishes trawled. (Recurrent group analysis statistically groups data, yielding information on which species are most often found in association with one another.) This statistical procedure was applied to 448 otter trawl samples taken between Port Hueneme and Dana Point (Orange County, California). Seven basic recurrent groups are identified in Table 2.2.2-VI, five groups (1, 2, 3, 5, and 6) of which are applicable to the Port Hueneme region. Group affinities are probably based on biological interdependence and similar requirements of prey, depth, temperature, and substrate.

The distributions of recurrent groups 1, 2, and 3 are shown on Plate 2.2.2-5. Recurrent group 3 probably occurs all along this area of the shoreline and is not restricted to the western side of Port Hueneme (see Mandalay fish data), as shown by Mearns, et al. Recurrent groups 5 and 6 are shown on Plate 2.2.2-6. These groups may extend along the offshore areas west of Hueneme Canyon. Plate 2.2.2-7 details the distribution of Speckled and Pacific sanddabs and Plainfin midshipmen, three of the more abundant benthic fishes in the Port Hueneme region.

Oceanic Fishes

Quantitative data on dominant oceanic fishes (free swimming fishes which do not rest on the bottom) in the Port Hueneme region are lacking. From regional data, the most abundant teleostean resident species undoubtedly include

anchovies, Jacksmelt, and Topsmelt, in that order. Seasonally, Pacific bonito, California barracuda, chub, and Jack mackerel figure prominently. White sea-bass, especially as juveniles, may also be locally abundant. Yellowtail have not been abundant for many years. Blue sharks are dominant oceanic residents. Other species of sharks, such as Smooth hammerheads, Common threshers, and Bonito sharks are seasonal, but never abundant (Miller and Lea, 1972; Frey, 1971).

Sport and Commercial Fisheries Statistics

Sportfishing catch records for the California Department of Fish and Game Fish Block 683 are presented in Table 2.2.2-VII. (The area covered by this fish block is shown in Plate 2.2.2-1.) A fairly large variety of fishes are actively sought or incidentally taken while fishing for the more preferred species in this block. However, these data may not reflect the true areas in which some of these species were taken. Daily catch records are often treated rather casually by sportsmen, who frequently record the wrong catch blocks. For instance, primary fishing areas for the sea basses, Ocean white fish, mackerels, Halfmoon, wrasses, sculpins, and barracuda are around Anacapa Island, outside of Fish Block 683 and over 10 miles from the study site (Squires, 1964). Rockfishes, the dominant group of sport fishes, are primarily fished at the rocky bank lying just to the east of Anacapa Island (Squire, 1964), which is in Fish Block 683, but is about 10 miles from Port Hueneme. From habitat requirements, the only species likely to be taken in close proximity to Port Hueneme are Barred sand bass, White croaker, flatfishes, and salmon. Salmon are

infrequently caught in the area (1 out of every 2,000 fish in the 5 years reported and none in the last 3 years). Prime fishing areas for flatfishes are found between Anacapa and Santa Cruz Islands. Thus, fish taken here may have been incorrectly recorded as being caught in Fish Block 683. In summary, no important offshore sportfishing grounds are thought to exist around the site for a distance of at least 5 miles, and probably for 10 miles.

Shore and jetty fishing statistics are not included in Table 2.2.2-VII. No definitive data on the Port Hueneme area exist. There are, however, published data on shoreline fishing in Southern California in general (Pinkas, et al., 19[illegible]). These data are presented in Table 2.2.2-VIII and should be generally applicable to the Port Hueneme region. Note that two species constitute a significant proportion of both pier and jetty or open coast categories. Most of the fish species expected to occur around the proposed site area are included in this table.

Commercial fish records for Fish Block 683 are presented in Table 2.2.2-IX. Reporting errors are more evident in this table than Table 2.2.2-VII. Abalone, for instance, would only be taken around Anacapa Island, which is outside of Fish Block 683.

These catch records are dominated by Northern anchovy and Pacific bonito. Both species are taken offshore in open water using purse seines.

Rockfishes, which have the next largest yield among commercial fishes, are either taken with beam trawls or hook-and-line. Most of the rockfish are taken by hook-and-line either

or near the deepwater rocky area adjacent to Anacapa Island.

Flatfishes may likewise be taken in trawls or by hook-and-line, most probably by the former method. The most productive fishing areas lie well away from Port Hueneme (Squires, 1964). Most of the other species listed, except for shellfish, may have been taken incidentally in trawls or purse seines. In any event, primary commercial fishing areas are located some distance from Port Hueneme, with most around the Channel Islands.

2.2.2.4 Marine Mammals

Marine mammals expected to occur in the Port Hueneme region are listed in Table 2.2.2-X. This table was compiled from published distributional and abundance information (Ingles, 1965; Daugherty, 1964). Most species, with the exception of the Harbor seal,[3] are either oceanic or reach peak abundances around the Channel Islands. Harbor seals may be locally abundant along the Southern California coast wherever rocky outcrops exist. Whales, porpoises, and dolphins are not expected to occur in shallower coastal waters, although infrequent surf zone sightings have been reported.

The only marine mammal likely to sporadically breed around Port Hueneme is the Harbor seal. Pupping usually occurs on one of the Channel Islands (Daugherty, 1964).

---

[3]Common names are in accordance with Daugherty (1964); scientific name equivalents are given in Table 2.2.2-X.

2.2.2.5 Marine Birds

Marine birds are included in the master bird list, Table 2.2.1-III, found in Section 2.2.1, Terrestrial Biology.

Approximately 53 species of marine birds (birds normally resting or feeding at or on the edge of the sea) are expected to occur in the Port Hueneme region. Of this number, only the California brown pelican[4] is endangered. Individuals can be expected to spend some time feeding and resting within the area of the entire project. Anacapa Island is one of the few primary nesting areas for this species in California (Riseborough, et al., 1967).

2.2.2.6 Invertebrates

Intertidal Invertebrates

In their study of the Ormond Beach Generating Station, Marine Advisors (1969), and later Intersea Research Corporation (1972b,c,e,f,h; 1973a,b), established eight intertidal stations to sample the existing fauna of this sandy beach region (Plate 2.2.2-8). Although these stations are approximately 1.5 miles south of the study site, they are probably indicative of the beach fauna of this region in general. Similar beach stations were established for the Mandalay Generating Station studies (Intersea Research Corporation, 1972a). These station locations are shown on Plate 2.2.2-9.

Table 2.2.2-XI lists the intertidal invertebrates observed in these studies. Beach hoppers (Orchestoidea spp.), which are seasonally abundant, were noticeably absent from the

---

[4]Pelecanus occidentalis californicus

Ormond Beach list and may have been overlooked. They were recorded at Mandalay Beach.

Subtidal Invertebrates

Benthic samples collected by Intersea Research Corporation at Mandalay (Plate 2.2.2-9) and Ormond Beach Generating Stations (Plate 2.2.2-10) represent the only definitive studies conducted within the study area. Diver stations at depths of 10 to 40 feet were established along transect lines at Ormond Beach. Sample stations of 30 m^2 were established, and counts of the benthic organisms were obtained by divers. Mandalay benthic stations were sampled using a Campbell grab. Subsequent laboratory identification and counts were made. Diver sampling stations at Ormond Beach were supplemented with grab samples for a more thorough annelid (worm) analysis.

Table 2.2.2-XII lists the species of subtidal invertebrates observed at both locations, except species from sample transects A and B at Ormond Beach. These are defined in this report as "Site Stations," and are listed separately in Table 2.2.2-XIII.

The fauna is typical of nearshore sedimentary habitats in Southern California (see Jones, 1969, for comparison). The dominant fauna are spionid, capitellid, and onuphid worms, small clams, and microcrustacea (amphipods, ostracods, and cumaceans).

Only three species were reported from all benthic stations at least once during the two studies. These were a cumacean,[5] a snail,[6] and a clam.[7] No sponges (Phylum Porifera)

---

[5]Diastylopsis tenuis [6]Nassarius perpinguis [7]Tellina modesta

were collected at any of the stations, but were not expected as they are associated with solid substrates. All other major phyla were represented. Table 2.2.2-XIII indicates an abundance of the following organisms: caprellid amphipods, sand dollars, nematode worms, and polychaete worms, including Armandia bioculata, Diopatra ornata, and Prionospio pygmaeus. The most abundant species sampled at Ormond Beach was the sand dollar[8] (Table 2.2.2-XIV), over 112,000 of which were estimated from all surveys totaled. Table 2.2.2-XV lists the dominant subtidal invertebrates of Mandalay Beach, and Plates 2.2.2-11 through 2.2.2-15 show the geographic distribution of the dominant subtidal invertebrates. Diversity of invertebrates is discussed in Section 2.2.2.11.

2.2.2.7 Plankton

The most extensive plankton studies along the Californias are being conducted by the California Cooperative Oceanic Fisheries Investigations (CALCOFI). These continuing investigations have been conducted at approximately monthly intervals at pre-established stations since the late 1940's (Plate 2.2.2-16). CALCOFI data thus supply monthly and yearly plankton data on a significant portion of the eastern, temperate Pacific Ocean. Only two of the stations occupied by CALCOFI are at all near the study area (both between Port Hueneme and the Channel Islands), and they are well away from the proposed site.

Plankton volumes at any given locality along the Californias may vary by as much as an order of magnitude

---

[8] Dendraster excentricus

seasonally and from year to year (Thrailkill, 1969). A particular locality may support a large population of plankters one month, and a very light population a few months later, or during the same month a year later. For instance, between 1951 and 1956, plankton volumes were very large in southern CALCOFI areas, only to fall off drastically between 1958 and 1959, which were relatively warmer water years along the Pacific Coast. Plate 2.2.2-18 presents mean plankton volumes for 1960, which was considered by Thrailkill (1969) to represent an average distribution of plankton volumes for all years CALCOFI had made plankton studies. The greatest volumes of plankton from CALCOFI data were found around the Channel Islands in Southern California, and around Cedros Island and near Scammons Lagoon in Baja California. Plankton volumes for the continental shelf area, including the area offshore from the site, generally range between 100 and 300 cc of plankton per 1,000 m^3 of water strained. None of the large, highly productive water pockets are near the site. Studies which have included nearshore stations in the vicinity of Port Hueneme (State of California Water Quality Board, 1965; Straughan and Kolpack, 1971; Kolpack and Straughan, 1972) have been utilized to supplement the CALCOFI data. A table of the common inshore zooplankton of Southern California (after Barnett, 1973) has been presented for comparative purposes. Plate 2.2.2-17 shows the location of nearshore plankton stations.

Phytoplankton

Results of phytoplankton studies performed for the Water Quality Control Board are presented in Table 2.2.2-XVI.

Seven species and six higher taxonomic groupings of phytoplankters and four unsorted taxa of zooplankters were found in this study. Primary productivity data were not gathered as part of the study (but see Section 2.2.2.10).

Zooplankton

CALCOFI zooplankton records for the past 20 years were examined to ascertain the probable distribution of zooplankton in the Port Hueneme region. Relative abundances of fish larvae from the nearer CALCOFI stations are presented in Table 2.2.2-XVII. Total monthly zooplankton volumes for selected years from these stations are given in Table 2.2.2-XVIII. Abundances of copepods (Table 2.2.2-XIX) and other zooplankton for which CALCOFI data were available (Table 2.2.2-XX) have also been presented. Some more recent zooplankton data are available from stations which are nearer to the site than the CALCOFI stations. These data are presented in Table 2.2.2-XXI. Due to the general nature of these data they are not directly comparable with known inshore zooplankton data for the Southern California Region (Table 2.2.2-XXIX). Comparison with the offshore data of the CALCOFI reports yields the level of similarity expected for inshore-offshore discontinuities in Southern California.

For illustration, overall biomass information from a CALCOFI cruise is presented on Plate 2.2.2-19. Maximum biomass concentrations for that cruise were encountered west of Port Hueneme, roughly between Ventura and Santa Barbara. Biomass concentrations near the proposed site were between 257 and 1,024 grams per 1,000 m^3 filtered sea water. Maximum abundances for the pteropod Clio pyramidata (the most abundant

pteropod reported from the CALCOFI data) are presented on Plate 2.2.2-20. Estimated abundance ranges between 1 and 49 individuals per 1,000 m^3 of water. Calocalanus styliremis was reported as a dominant copepod along offshore coastal California by the CALCOFI reports (Plate 2.2.2-21), although it is not a dominant near-shore species. Maximum abundances for this species occurred in late 1958, when approximately 100 individuals per 1,000 m^3 water were encountered.

One of the most important fish forage items along our immediate coast is the euphausid shrimp, Euphausia pacifica, which often forms the mainstay of cetacenas' and larval fishes' diets (Daugherty, 1964). Maximum concentrations of this species were found in the summer of 1954 (Plate 2.2.2-22).

Larval fishes, particularly those in the lower part of food webs, often constitute a large fraction of the zooplankton. Some concern over the fate of these lower trophic-level fishes is warranted since without them many sport and commercial fisheries would collapse. Of primary interest to various regulatory agencies for several years has been the plight of the Pacific sardine, a species which underwent a serious population decline several years ago (Frey, 1971). Maximum egg abundances of less than one per 10 m^2 sea surface can be expected near the proposed site (Plate 2.2.2-23). Larval abundances, on the other hand, may be somewhat higher (Plate 2.2.2-24). Spawning normally occurs in deep water within 100 miles of shore (Frey, 1971). Pacific sardine egg and larval concentrations noted around Port Hueneme are apparently derived from deepwater offshore spawnings.

The Northern anchovy is the most abundant fish in the California Current system. This species, like the Pacific anchovy, generally spawns within 100 miles of the coast (Frey, 1971). Estimates of spawning population size of Northern anchovies for the Californias from CALCOFI data range between 5 and 6 million tons of fish (Frey, 1971). Maximum larval abundance measured offshore from the proposed site was between 11 and 100 individuals per 10 m^2 of sea surface (Plate 2.2.2-25). Primary spawning areas are well to sea from Port Hueneme (Isaacs et al., 1968).

Pacific hake are a presently under-utilized fish resource in California (Frey, 1971). Estimates of standing stocks have varied from a low of 610,000 tons by U.S. biologists to a high of 1,200,000 tons by Soviet biologists (Frey, 1971). Only 17 tons of Pacific hake were commercially utilized in California in 1971 (Oliphant, 1973). Adults are highly migratory, with spawning occurring during the winter months in Southern and Baja California. In Southern California adult fish schools occur at depths of between 600 and 1,320 feet (Frey, 1971). Thus, the distribution and abundance of Pacific hake larvae shown on Plate 2.2.2-26 are also the result of offshore spawnings. Currents carry the larvae to inshore waters. A summary of spawning characteristics for the more important forage, sport, and commercial fishes in the Port Hueneme Region is presented in Table 2.2.2-XXII. Most of the important[9] fish

[9] "Important" again is used to denote fish which are of sport or commercial interest or are of high abundance.

likely to be encountered in this area as adults or juveniles move to other areas to spawn. Based on known spawning habits and species distributions, only fry of silversides, surfperches, croakers, and possibly barred sand bass and California halibut may be expected in the Port Hueneme region in even moderate numbers.

2.2.2.8 Marine Macro-algae

With the exception of the breakwater and rocky areas mentioned in Section 2.2.2.2, the marine habitats of Port Hueneme are characterized by sedimentary substrates. Since most benthic algae require a solid substrate for permanent attachment, the majority of the algae likely to be encountered along the sandy beaches and sandy subtidal areas represent drift kelp derived from other localities.

Benthic algal studies conducted near the proposed site included an investigation for the State of California Water Quality Control Board (1965), a study by Kolpack and Straughan (1972), and a site reconnaissance by Dames & Moore biologists (1973)[10] along the outer Port Hueneme breakwater. Thirty-four taxa of marine algae are reported. Their immediate distributions are listed in Table 2.2.2-XXIII. The geographic distribution of the more common of these species are shown on Plate 2.2.2-27.

2.2.2.9 Coliform Bacteria

Marine coliform bacterial monitoring programs are designed to determine the distribution and abundance of coliforms[11]

---

[10] See Section 2.2.2.12.
[11] Bacteria associated with sanitary wastes.

eminating from domestic waste treatment outfalls. Coliform counts are taken in the interest of the public health. The coliforms themselves are not harmful; they are used as indicator organisms to detect the likelihood of the presence of pathogenic[12] organisms which are associated with coliforms.

Coliform monitoring stations for both the Oxnard and Port Hueneme sewage monitoring studies are shown on Plate 2.2.2-28. Fifteen shore and eight surface ocean monitoring stations are currently being utilized to study marine coliform distribution and abundances in the Port Hueneme region.

Recent coliform data in most-probable-number per 100 ml are given for the Oxnard outfall area in Table 2.2.2-XXIV and for the Port Hueneme outfall area in Table 2.2.2-XXV. Historical data for the Oxnard area outfall are presented in Table XXVI.

2.2.2.10 Primary Productivity

Measurements of primary productivity and standing crop (measured by chlorophyll a concentration) were reported by Straughan and Kolpack (1971) for two stations (#4 and #5) offshore of the site area (see Plate 2.2.2-1). The data are presented in Table 2.2.2-XXVII.

2.2.2-11 Species Diversity

Species diversity calculations were made for benthic invertebrates and fish as part of the studies at the Mandalay Beach Generating Station. Diversity is used here in its strictly defined sense, i.e., as the relationship between variety (the

---

[12]Disease producing.

number of species) and equitability (the distribution of numbers of individuals among species). Histograms of abundance against rank order of abundance show this relationship. Plates 2.2.2-29 through 2.2.2-32 are illustrative invertebrate and fish diversity graphs for the Hueneme area.

Lowest diversity occurs in communities with very few species, and essentially all the individuals are of one of those species, the few other species being represented by only a few individuals. With sensitive and scaled diversity indices,[13] these communities have calculated index values which approach zero. In medially diverse communities there are a few abundant species and many rare ones. Such communities are often found in coastal temperate areas and are illustrated on Plate 2.2.2-30. These communities yield diversity index values[13] near 0.5. Very diverse communities have a relatively equal distribution of individuals among a large number of species. These communities have diversity index values[13] approaching 1.0.

Both invertebrate and fish diversities are higher for 20-foot depths than for 40-foot depths in the Mandalay Beach data. For data collected in August 1972, for instance, the mean of the 20-foot station values was 0.641 compared to 0.456 for 40-foot stations.[14] Comparable values for trawl-collected fish from the same survey were 0.746 for 20 feet and 0.665 for 40 feet.

---

[13] Such as Shannon-Weiner or Number of Moves, but not Margalef.
[14] H(Shannon-Weiner) scaled values; see Fager (1972).

2.2.2.12 Results of Site Reconnaissance

In September 1973, a reconnaissance of the downcoast (southeast) jetty of the east Port Hueneme breakwater was undertaken with the use of SCUBA. The sandy bottom leading up to the seaward face of the jetty was littered with debris. Principal faunal elements were gaper clams,[15] sand dollars,[16] and tube-inhabiting bristle worms.[17]

The biota of the jetty was unusual only in that it contained elements which are usually found only in deeper water. Included in these were the corals[18] and the Blue and Olive rockfish.[19] The nearby location of the submarine canyon probably accounts for these shallower bathymetric distributions.

The remainder of the recorded biota is typical of similar habitats in Southern California. A list of observed species is presented in Table 2.2.2-XXVIII.

2.2.2.13 Unique Ecosystems

The uniqueness of an ecosystem may be assessed from several different levels ranging from local to global. An ecosystem, or a particular habitat for that matter, may be locally scarce yet regionally abundant. The level of initial assessment therefore greatly influences the way in which an individual perceives a given ecosystem. The Hueneme Canyon is an unusual feature, being one of only four large deepwater canyons in Southern California which impinge on the nearshore

---

[15] Tresus nuttalli.
[16] Dendraster excentricus.
[17] Diopatra spp.
[18] Astrandia lajollensis and Paracyathus stearnsi.
[19] Common names of fishes are in accordance with American Fisheries Society Special Publication #6, 1970.

[illegible]. The sandy beach and adjacent sand dunes south of Port [illegible] are of interest because they have not been extensively [illegible]ified.

The closest truly unique aquatic area is the Mugu [illegible]goon, located roughly 5 miles south of the study site. This [illegible] the largest and most biologically diverse estuarine area [illegible]maining in Southern California (Fay, et al., 1972).

The northern Channel Islands are one of Southern [illegible]alifornia's few remaining distinctly unique biological areas. [illegible]nacapa, Santa Cruz, Santa Rosa, and San Miguel Islands harbor [illegible]y endemic species of plants and animals. The closest island [illegible] the study site, Anacapa Island, is roughly 12 miles distant.

2.2.2.14 Rare and Endangered Marine Species

No rare or endangered marine invertebrates, plants, [illegible] fish exist in the Port Hueneme region (Tables 2.2.2-I, -[illegible], -XII, -XIII, and -XX). No rare or endangered marine mammals [illegible] thought to utilize the site. The Northern elephant seal, a [illegible]protected species in California, may infrequently utilize the [illegible]ite, although no positive sitings have been verified. All [illegible]rine mammals are protected by federal law (see Table 2.2.2-X).

The California brown pelican is the only endangered [illegible]rine animal known to utilize the proposed site. This species [illegible] wide-ranging and has been observed within the entire area [illegible] the project site. The Channel Islands are the main pelican [illegible]ting areas in California (Peterson, 1961). Feeding and [illegible]ting have been observed at the site. It is, however, highly [illegible]ikely that nesting occurs there.

BIBLIOGRAPHY 2.2.2

(References cited denoted by asterisks)

*Alvarino, A., 1965, Distribution Atlas of the Chaetognath in the California Current Region, CALCOFI Atlas #3, p. 291.

*Ahlstrom, E. H., 1969, Distribution of Fish Larvae of Jack Mackerel, Trachurus symmetricus and Pacific Hake, Mexluccius productus in the California Current, CALCOFI Atlas #11.

*American Fisheries Society, 1970, Special Publication #6, A List of Common and Scientific Names of Fishes from the United States and Canada.

Barnett, A., 1973, letter dated November 13, 1973, from Marine Ecological Consultants, personal communication.

*Berner, L.D., 1967, Distribution of Thaliacea Larvae in the California Current, CALCOFI Atlas #8.

*Brinton, E., 1967, Distribution of Euphausiacea in the California Current, CALCOFI Atlas #5.

*California Department of Fish and Game, (no date), Annual Sport and Commercial Fish Catch Data, August (unpublished computerized data).

*Carlisle, J.G., Jr., et al., 1964, Artificial Habitats in the Marine Environment, California Department of Fish and Game Bulletin #124.

*Carlisle, J.G., Jr., et al., 1960, The Barred Surfperch (Amphistichus argenteus, Agassiz) in Southern California. California Department of Fish and Game, Fish Bulletin #109.

*City of Oxnard File #52-61, 1973, Report #643 (Folder #2), Sewage Treatment Plant Monitoring System, L.A. Regional Water Quality Control Board (unpublished).

*City of Oxnard File #52-61, 1964-1972, Sewage Treatment Plant Monitoring System, L.A. Regional Water Quality Control Board (unpublished).

*Daugherty, A.E., 1964, Marine Mammals of California, California Department of Fish and Game.

*Dawson, E.Y., et al., 1960, Seaweeds Associated with Kelp Beds Along Southern California and Northwestern Mexico, Pacific Naturalist 1(14), pp. 1-81.

Hager, E.W., 1972, Diversity: A Sampling Study, American Naturalist, Vol. 106, pp. 293-310.

Hager, E.W., 1963, Communities of Organisms, in The Sea, Vol. 2, M.N. Hill (ed.), New York Interscience, pp. 115-137.

Hager, E.W., 1957, Determination and Analysis of Recurrent Groups, Ecology 38, pp. 586-595.

Hay, R.C., et al., 1972, Southern California's Deteriorating Marine Environment, Center for California Public Affairs, Claremont College.

Fleminger, A., 1967, Distribution of Calanoid Copepods in the California Current, CALCOFI Atlas #7.

Frey, H.W., (ed.), 1971, California's Living Marine Resources and Their Utilization, California Department of Fish and Game.

Hartman, O., 1968, Atlas of the Errantiate Polychaetous Annelids from California, Allan Hancock Foundation, University of Southern California.

Hartman, O., 1969, Atlas of the Sedentariate Polychaetous Annelids from California, Allan Hancock Foundation, University of Southern California.

Ingles, L.G., 1965, Mammals of the Pacific Status, Stanford University Press.

Intersea Research Corporation, 1972a, Thermal Effect Study for the Mandalay Steam Plant--Progress Report, February.

Intersea Research Corporation, 1972b, Thermal Effect Study for the Ormond Beach Generating Station--Progress Report, February.

Intersea Research Corporation, 1972c, Thermal Effect Study for the Ormond Beach Generating Station--Progress Report, May.

Intersea Research Corporation, 1972d, Thermal Effect Study for the Mandalay Steam Plant--Progress Report, May.

Intersea Research Corporation, 1972e, Thermal Effect Study for the Ormond Beach Generating Station--Progress Report, July.

Intersea Research Corporation, 1972f, Thermal Effect Study for the Ormond Beach Generating Station--Progress Report, August.

Intersea Research Corporation, 1972g, Thermal Effect Study for the Mandalay Steam Plant--Progress Report, August.

*Intersea Research Corporation, 1972h, Thermal Effect Study for the Ormond Beach Generating Station--Progress Report, November.

*Intersea Research Corporation, 1972i, Thermal Effect Study for the Mandalay Steam Plant--Progress Report, November.

*Intersea Research Corporation, 1973a, Thermal Effect Study for the Ormond Beach Generating Station--Progress Report, February.

*Intersea Research Corporation, 1973b, Thermal Effect Study for the Ormond Beach Generating Station--Progress Report, March.

*Intersea Research Corporation, 1973c, Thermal Effect Study for the Mandalay Steam Plant--Progress Report, February.

*Isaacs, J.D., A. Fleminger, and J.K. Miller, 1968, Distribution of the Northern Anchovy, Engraulis mordax, Larvae in the California Current, CALCOFI Atlas #9.

Issacs, J.D., et al., 1969, Distributional Atlas of Zooplankton Biomass in the California Current Region, Spring and Fall 1955-1959, CALCOFI Atlas #10, p. 239.

Jones, G.F., 1969, The Benthic Macrofauna of the Mainland Shelf of Southern California, Allan Hancock Monographs, in Marine Biology #4.

Kolpack, R.L. and D.M. Straughan, 1972, Biological, Geological and Oceanogaphical Study of the Hueneme Shelf, California, University of Southern California.

*Kramer, D., 1970, Distribution of the Larvae of the Pacific Sardine, Sardinops sagax, in the California Current (1951-1965), CALCOFI Atlas #12.

*Light, S.F. et al., 1970, Intertidal Invertebrates of the Central California Coast, University of California Berkeley Press.

*Marine Advisors, Incorporated, 1969, The Marine Environment Offshore from Ormond Beach, Ventura County, August Survey.

*Marine Advisors, Incorporated, 1970a, The Marine Environment Offshore from Ormond Beach, Ventura County, January-February Survey.

*Marine Advisors, Incorporated, 1970b, The Marine Environment Offshore from Ormond Beach, Ventura County, Addendum to January-February Survey.

*Marine Advisors, Incorporated, 1970c, The Marine Environment Offshore from Ormond Beach, Ventura County, July Survey.

*Marine Advisors, Incorporated, 1970d, The Marine Environment Offshore from Ormond Beach, Ventura County, Addendum to July Survey.

*Marine Advisors, Incorporated, 1971a, The Marine Environment Offshore from Ormond Beach, Ventura County, January Survey.

*Marine Advisors, Incorporated, 1971b, The Marine Environment Offshore from Ormond Beach, Ventura County, April Survey.

*McGowan, J.A., 1967, Distribution of Pelagic Molluscs in the California Current, CALCOFI Atlas #6.

*McLean, J.H., 1969, Marine Shells of Southern California, Los Angeles County Museum Science Series, Publication #24, Zoology #11.

*Mearns, A.J., et al., 1971, Results of a Demersal Fish Survey Conducted off Port Hueneme, Ventura County, December 1971 to February 1972, SCCWRP (unpublished).

*Miller, D.J. and R. N. Lea, 1972, Guide to the Coastal Marine Fishes of California, California Department of Fish and Game Bulletin #157.

*Oliphant, M.S., 1973, California Marine Fish Landings for 1971, California Department of Fish and Game, Fish Bulletin #159.

*Oxnard Municipal Sewage Treatment, 1973, Annual Summary Report.

*Peterson, R.T., 1961, A Field Guide to Western Birds, Houghton Mifflin Company.

*Pinkas, L., et al, 1968, Southern California Marine Sport Fishing Survey: Private Boats, 1964; Shoreline, 1965-66, California Department of Fish and Game, Fish Bulletin #143.

*Port Hueneme Sewage Treatment Plant, 1973, Annual Summary Report.

*Ricketts, E.F. and J. Calvin, 1966, Between Pacific Tides, Stanford University Press.

*Risebrough, R.W., et al., 1967, D.D.T. Residues in Pacific Sea Birds: A Persistant Insecticide in Marine Food Chains, Nature (London) 216, pp. 589-590.

*Schmitt, W. L., 1921, The Marine Decapod Crustaceans of California, University of California Publications, in Zoology 23, pp. 1-470.

*Smith, G.M., 1964, Marine Algae of the Monterey Penninsula, California, Stanford University Press.

Smith, R.E., 1971, Distributional Atlas of Zooplankton Volume in the California Current Region, 1951 through 1966, CALCOFI Atlas #13.

*Squires, J.L., Jr., 1964, Atlas of Eastern Pacific Marine Game Fishing, U.S. Fish and Wildlife Circular #174.

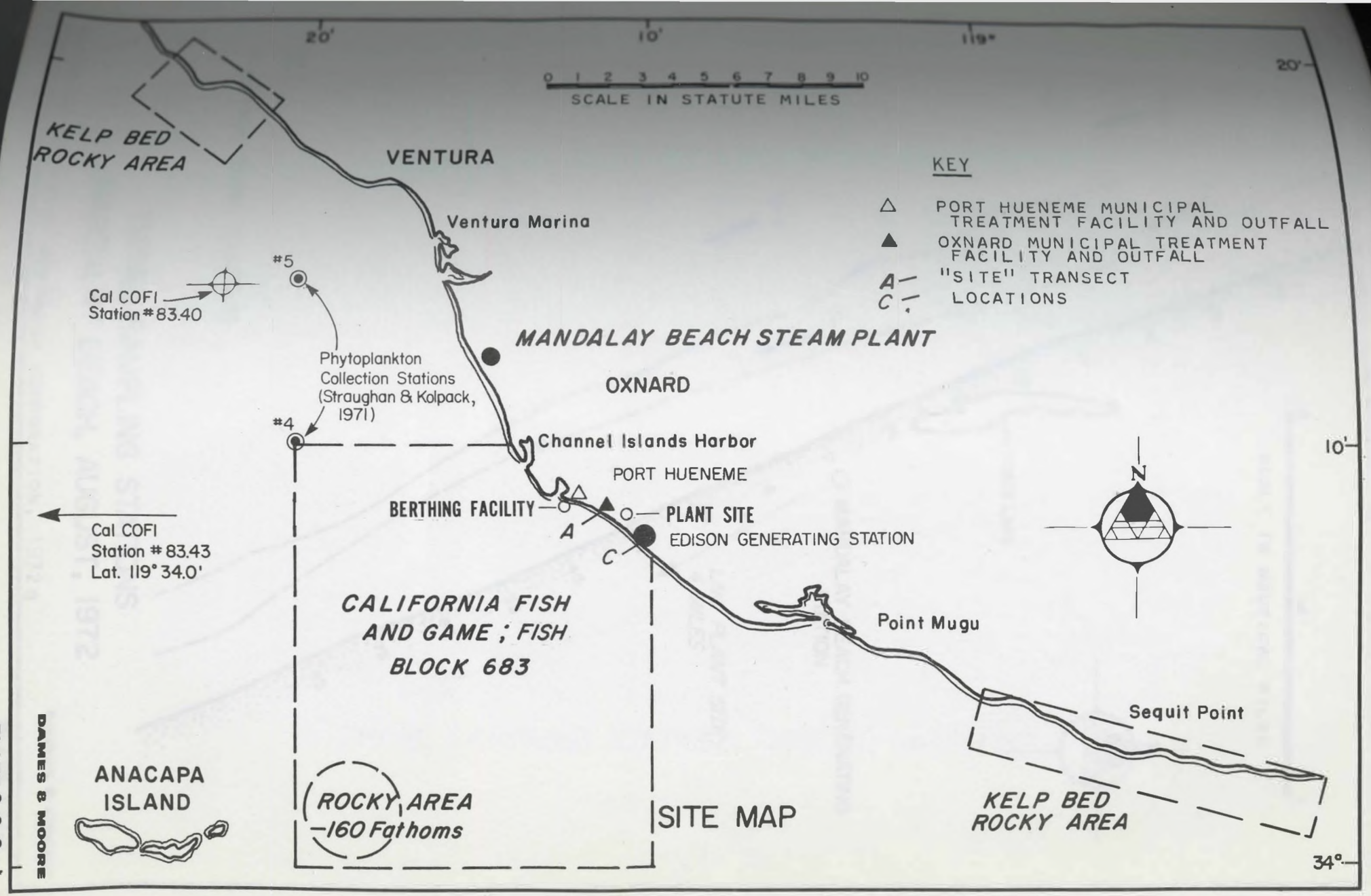
Staff of the South Pacific Fishery Investigations, 1955, Zooplankton Volumes off the Pacific Coast, 1954, U.S. Fisheries and Wildlife Special Scientific Report #161.

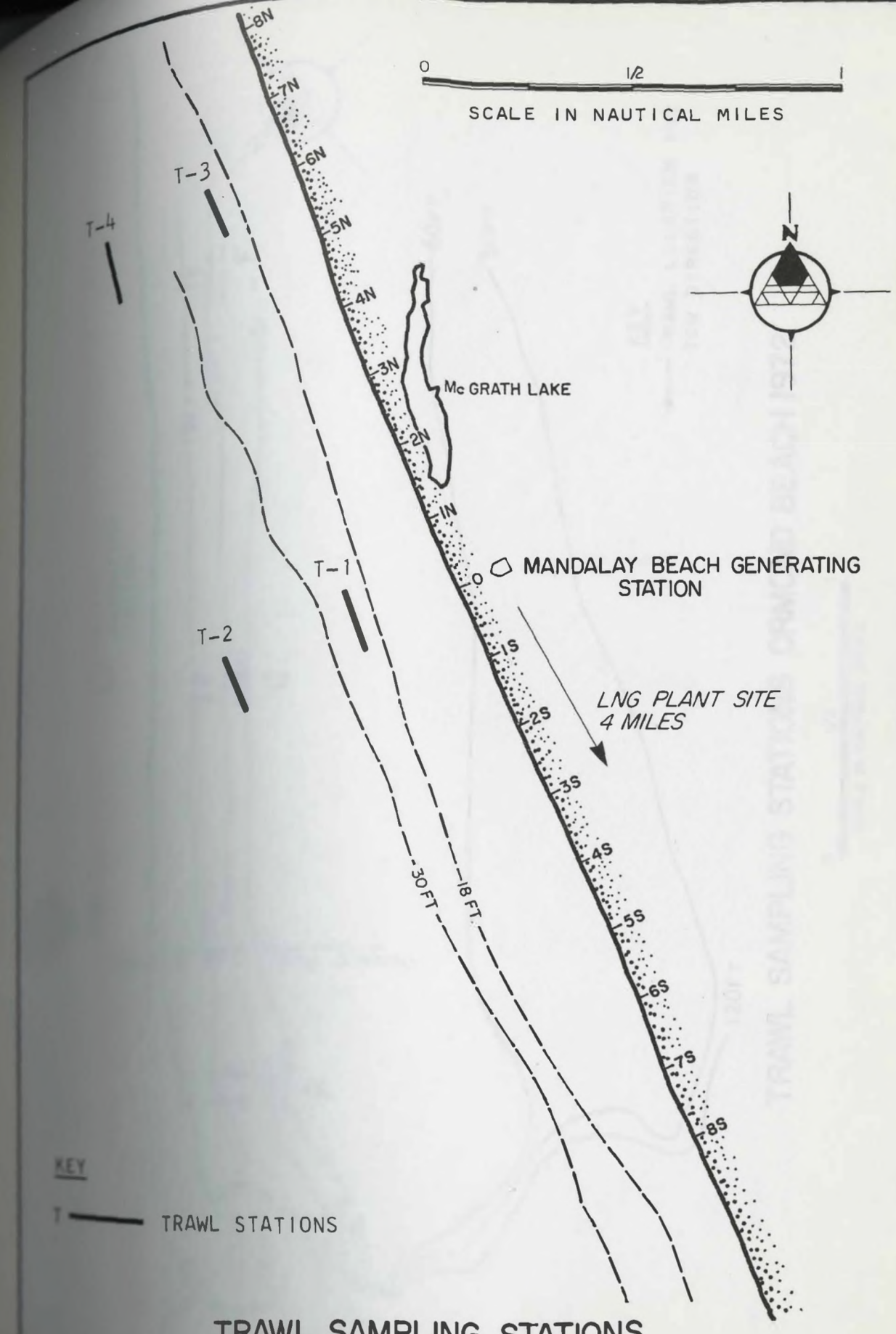
*State of California Water Quality Control Board (CWQCB), 1965, An Oceanographic and Biological Survey of the Southern California Mainland Shelf, CWQCB Publication #27 and Appendix.

*Straughan, D.M. and R.L. Kolpack, 1971, Biological and Oceanographical Survey of the Santa Barbara Channel Oil Spill, Allan Hancock Foundation, Sea Grant Publication #2.

*Thrailkill, J.R., 1969, Zooplankton Volumes off the Pacific Coast, 1960, U.S. Fish and Wildlife Special Scientific Report-Fisheries #581.

*U.S. Government, 1972, The Marine Mammal Act, Public Law 95-522.


20'
10'
119°
20'
0 1 2 3 4 5 6 7 8 9 10
SCALE IN STATUTE MILES
KELP BED
ROCKY AREA
VENTURA
Ventura Marina
KEY
PORT HUENEME MUNICIPAL TREATMENT FACILITY AND OUTFALL
OXNARD MUNICIPAL TREATMENT FACILITY AND OUTFALL
A— "SITE" TRANSECT
C— LOCATIONS
#5
Cal COFI
Station # 83.40
MANDALAY BEACH STEAM PLANT
Phytoplankton
Collection Stations
(Straughan & Kolpack,
1971)
OXNARD
#4
Channel Islands Harbor
PORT HUENEME
BERTHING FACILITY
A
C
PLANT SITE
EDISON GENERATING STATION
10'
N
Cal COFI
Station # 83.43
Lat. 119° 34.0'
CALIFORNIA FISH
AND GAME ; FISH
BLOCK 683
Point Mugu
Sequit Point
ANACAPA
ISLAND
ROCKY AREA
-160 Fathoms
SITE MAP
KELP BED
ROCKY AREA
34°
DAMES & MOORE
PLATE 2.2.2-1

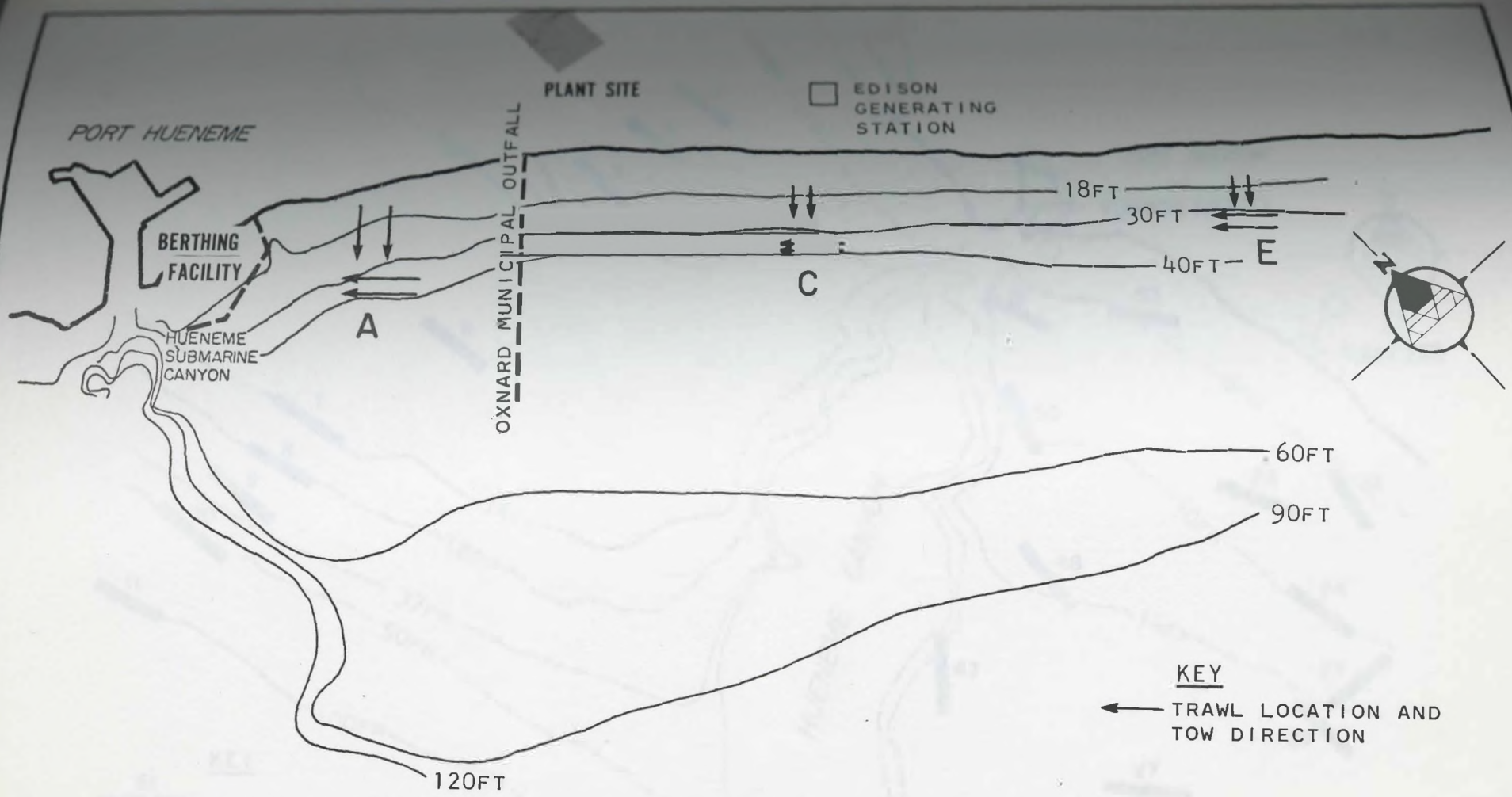


TRAWL SAMPLING STATIONS
MANDALAY BEACH, AUGUST, 1972

REFERENCE: INTERSEA RESEARCH CORPORATION, 1972g

DAMES & MOORE

PLATE 2.2.2-2



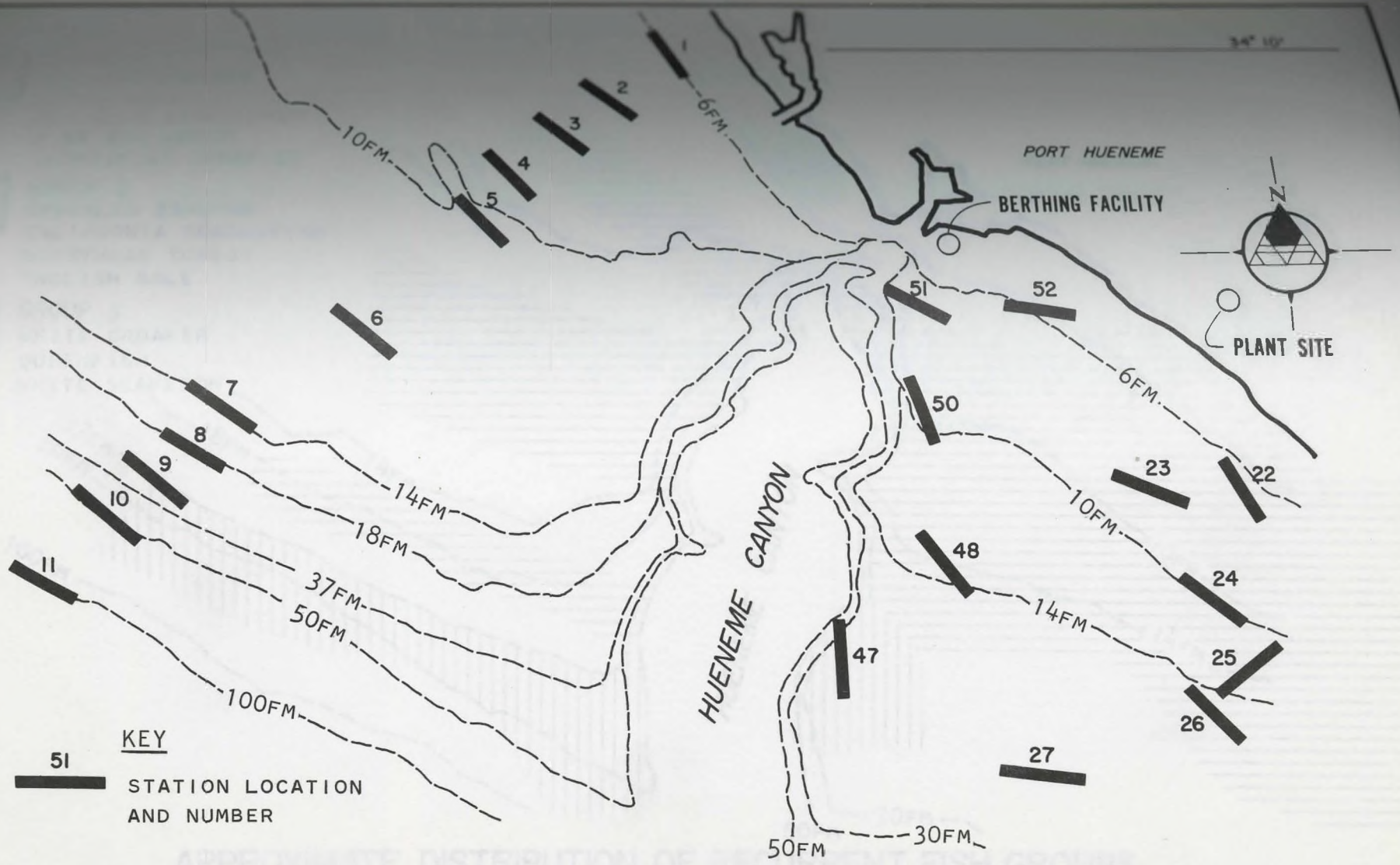
TRAWL SAMPLING STATIONS ORMOND BEACH 1972

0 1/2 1
SCALE IN NAUTICAL MILES

REFERENCE: INTERSEA RESEARCH CORPORATION (1972b)

DAMES & MOORE

PLATE 2.2.2-3



MEARNS OTTER TRAWL STATIONS

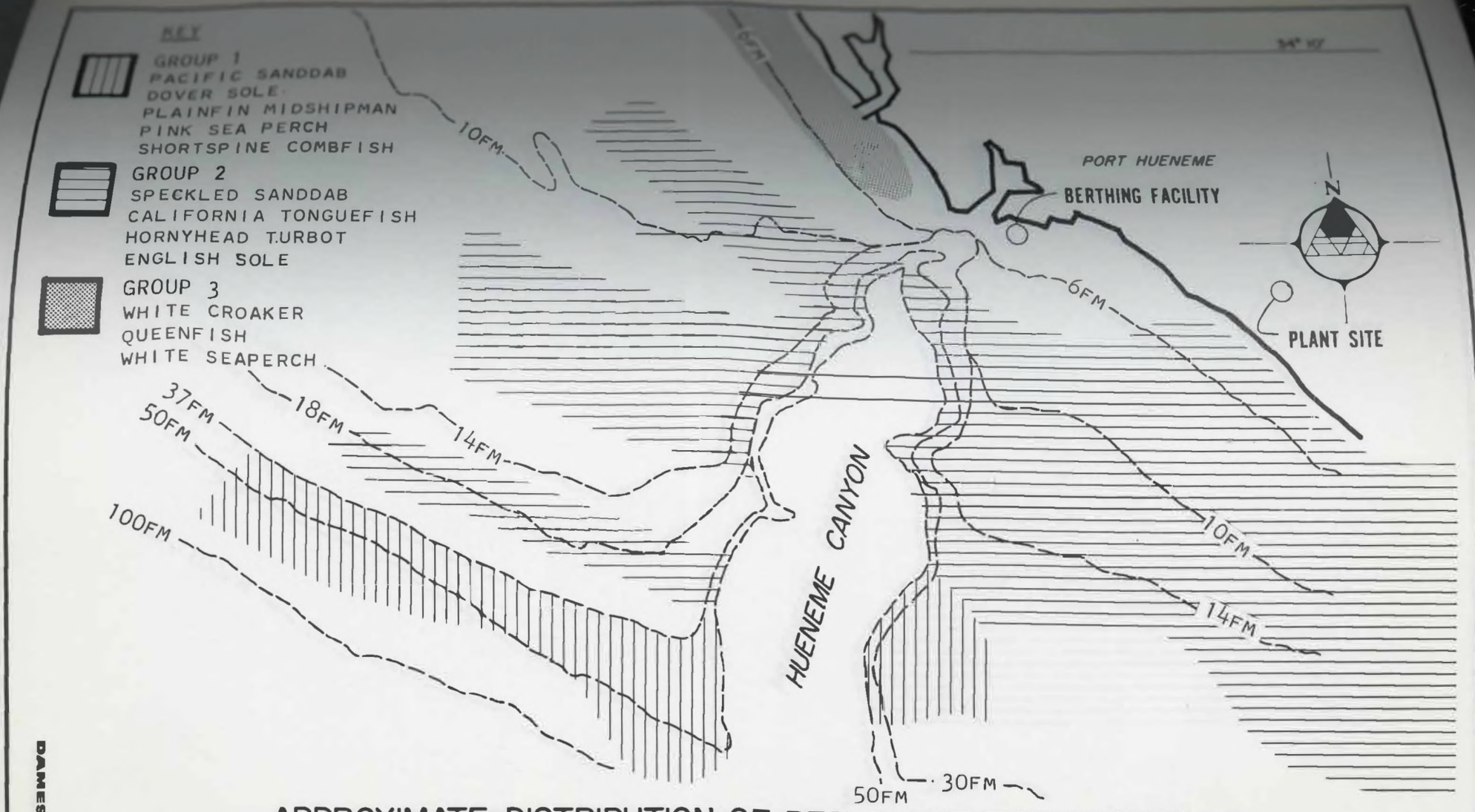
0 1 2

SCALE IN NAUTICAL MILES

REFERENCE: MEARNS, (1971, UNPUBL.)

DAMES & MOORE

PLATE 2.2.2-4



APPROXIMATE DISTRIBUTION OF RECURRENT FISH GROUPS DECEMBER 1971 AND FEBRUARY 1972

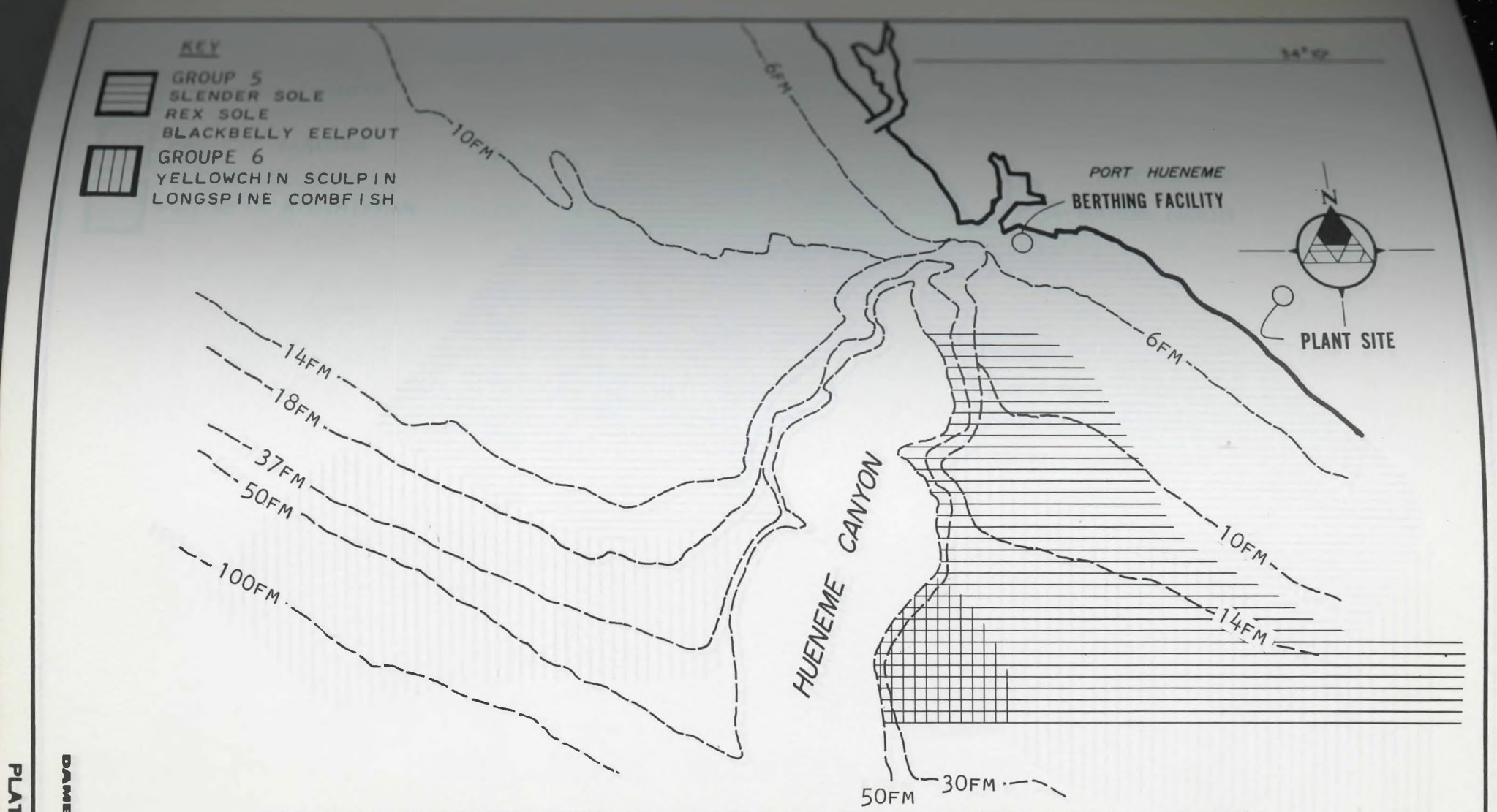
0 1 2

SCALE IN NAUTICAL MILES

REFERENCE: MEARNS, (1971, UNPUBL.)

DAMES & MOORE

PLATE 2.2.2-5



APPROXIMATE DISTRIBUTION OF RECURRENT FISH GROUPS DECEMBER 1971 AND FEBRUARY 1972

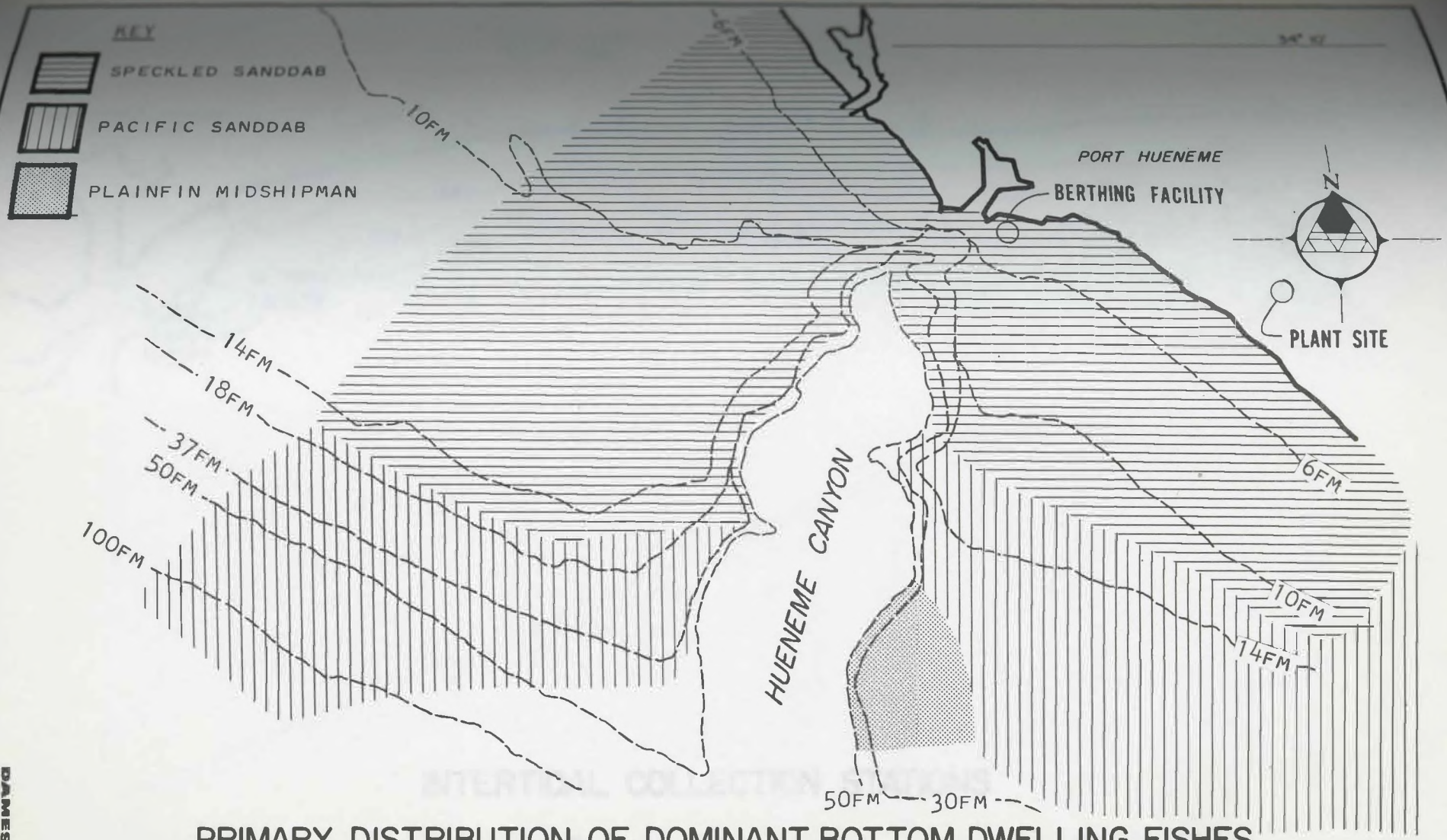
0 1 2

SCALE IN NAUTICAL MILES

REFERENCE: MEARNS, (1971, UNPUBL.)

DAMES & MOORE

PLATE 2.2.2-6



PRIMARY DISTRIBUTION OF DOMINANT BOTTOM DWELLING FISHES DECEMBER 1971 AND FEBRUARY 1972

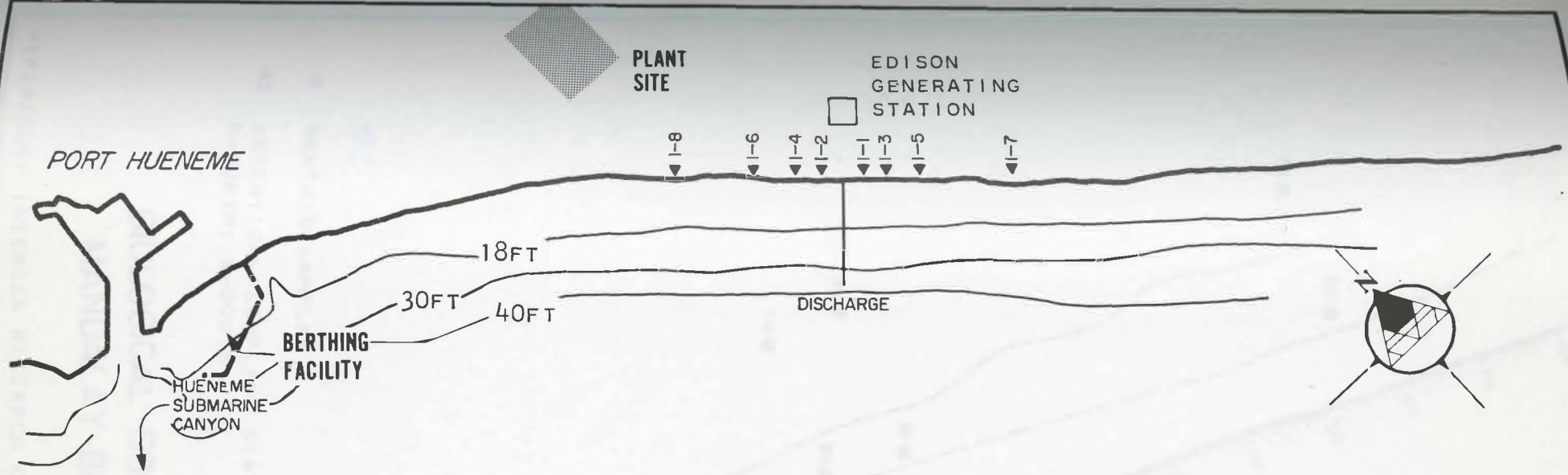
0 1 2

SCALE IN NAUTICAL MILES

REFERENCE: MEARNS, (1971, UNBUBL.)

DAMES & MOORE

PLATE 2.2.2-7



INTERTIDAL COLLECTION STATIONS

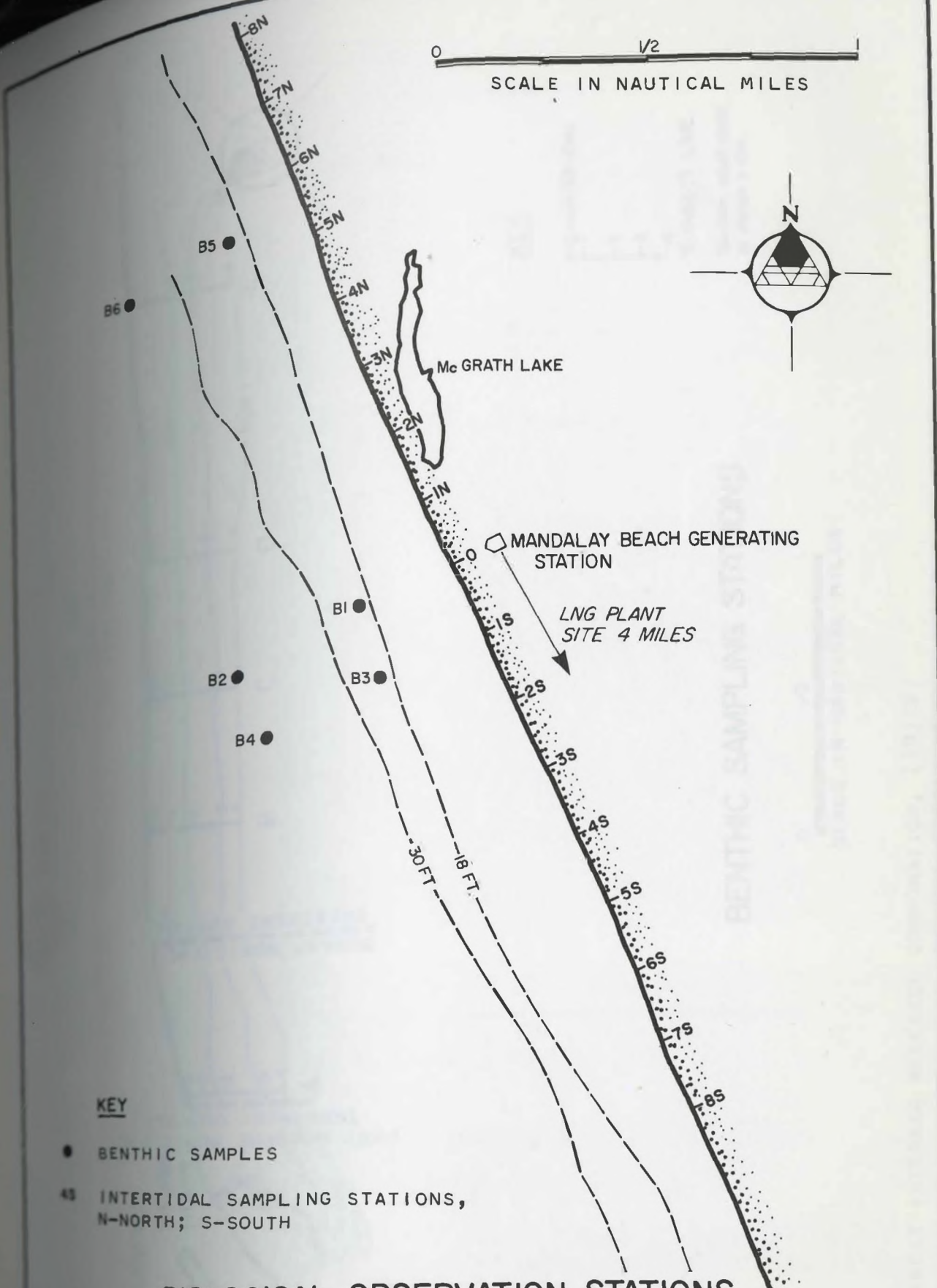
0 1/2 1

SCALE IN NAUTICAL MILES

REFERENCE: INTERSEA RESEARCH CORPORATION, (1972b)

DAMES & MOORE

PLATE 2.2.2-8

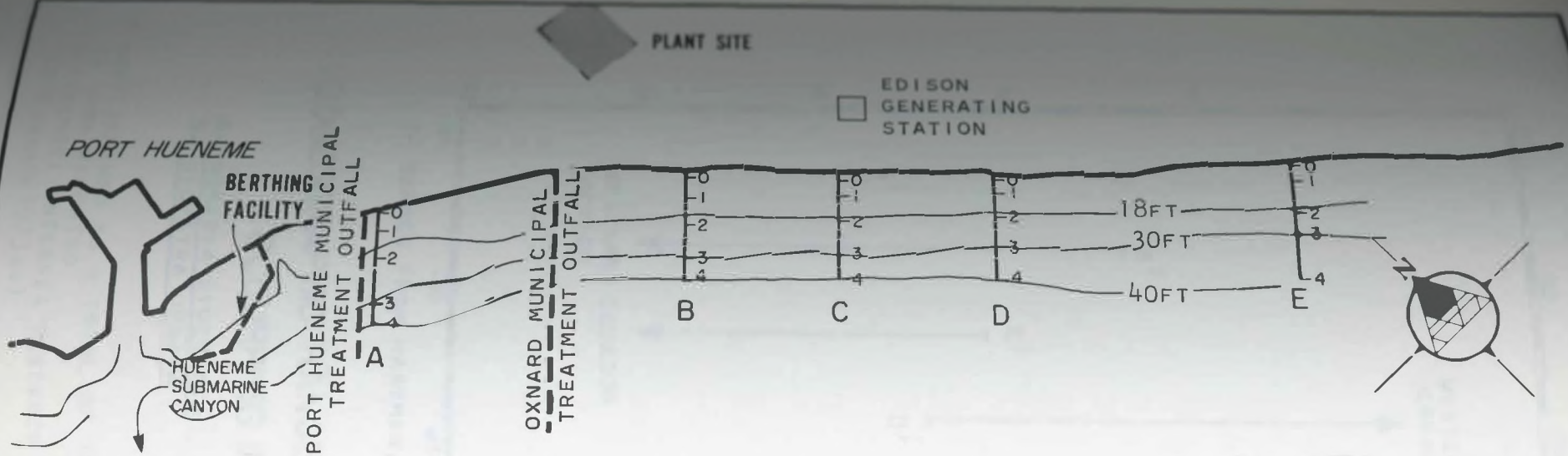


BIOLOGICAL OBSERVATION STATIONS MANDALAY BEACH, AUGUST, 1972

REFERENCE: INTERSEA RESEARCH CORPORATION, 1972g

DAMES & MOORE

PLATE 2.2.2-9



KEY

0 — INTERTIDAL
1
2
3
4

TRANSECT LINE

Numbers equal depth of station X 10ft.

BENTHIC SAMPLING STATIONS

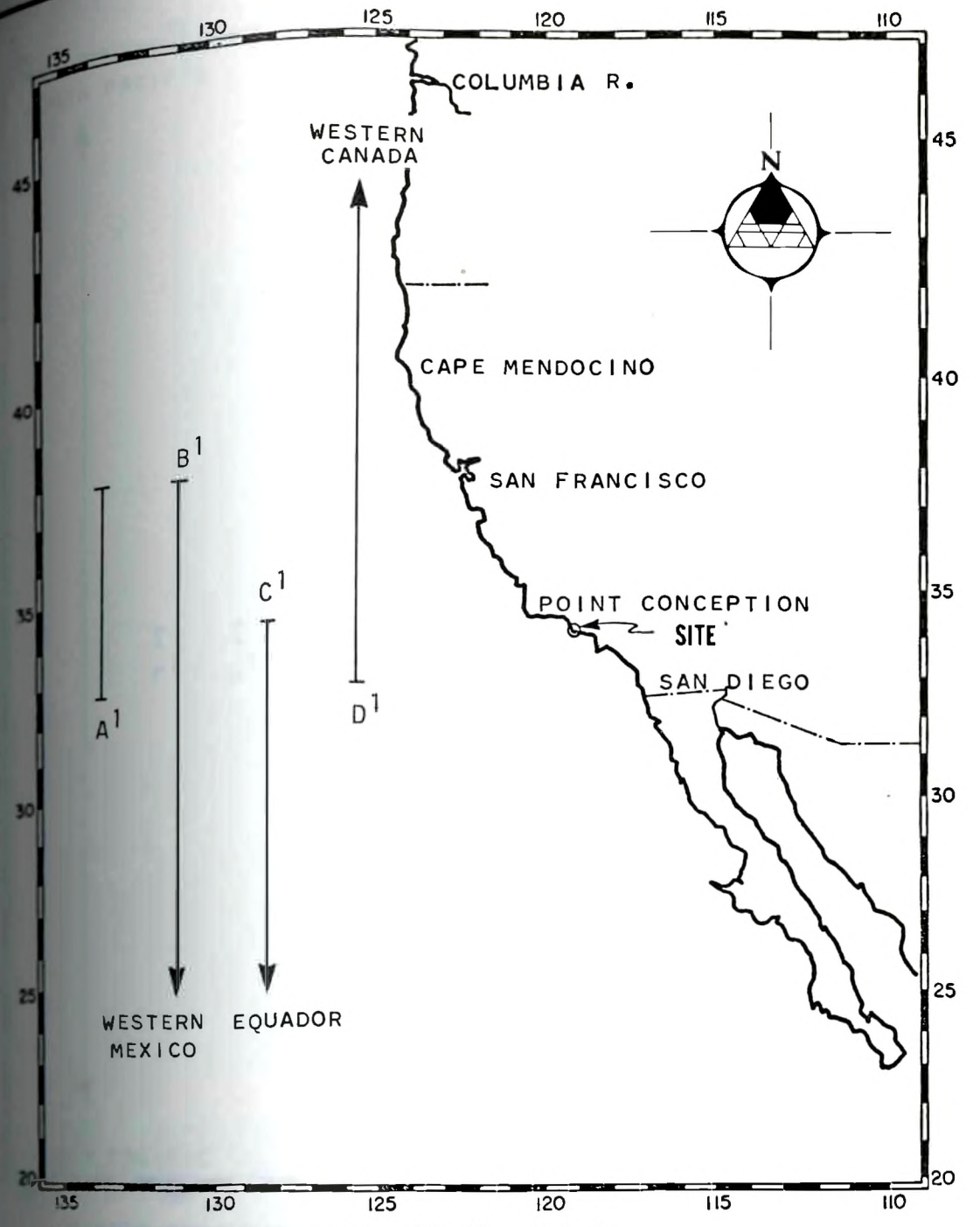
0 1/2 1

SCALE IN NAUTICAL MILES

REFERENCE: INTERSEA RESEARCH CORPORATION, (1972b)

DAMES & MOORE

PLATE 2.2.2-10



1- RANGES FROM HARTMAN, (1968, 1969)

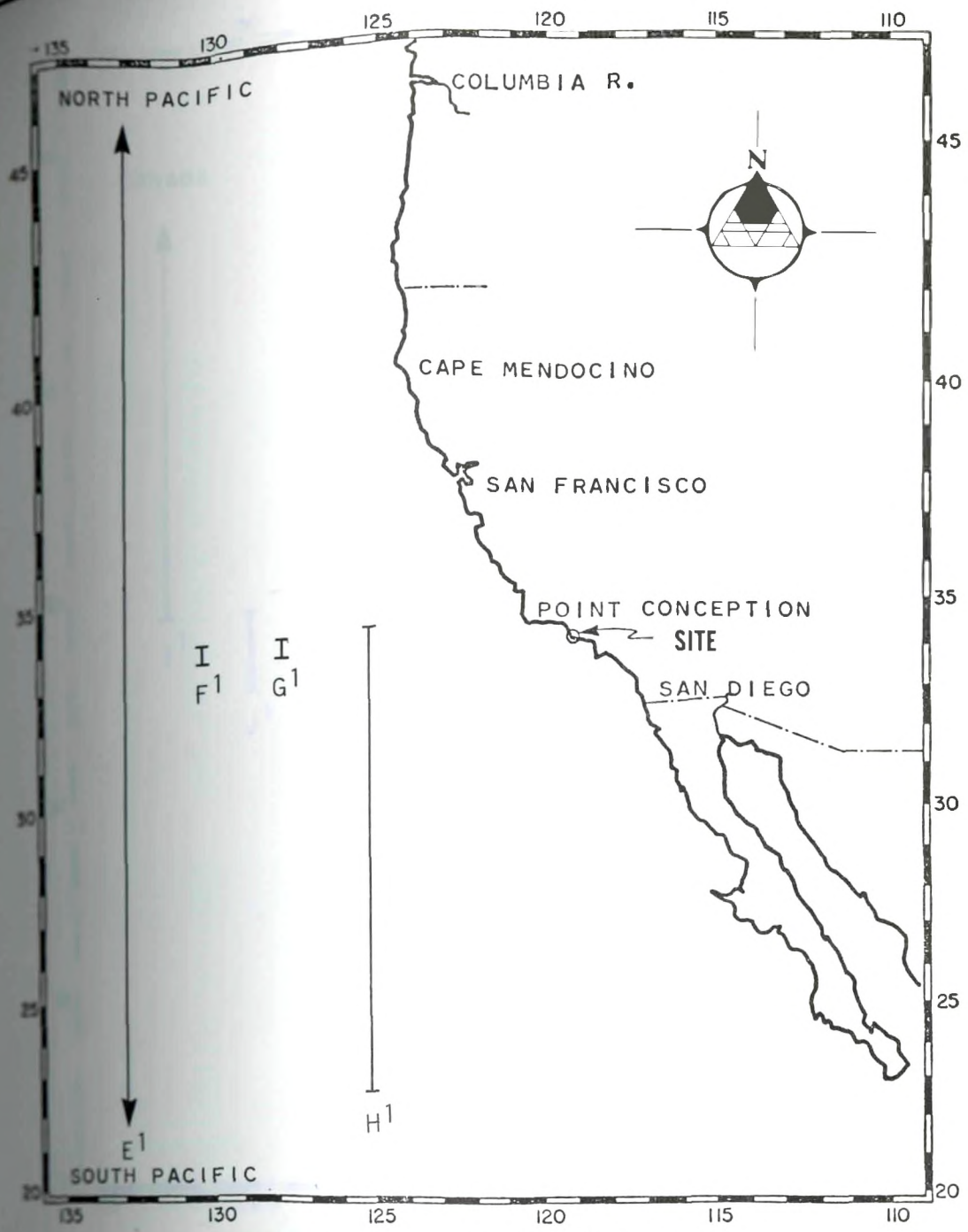
ZOOGEOGRAPHIC RANGES OF ABUNDANT* SPECIES OCCURRING IN THE SITE AREA

A- ARMADIA BIOCULATA
B- DIOPATRA ORNATA
C- DIOPATRA SPLENDIDISSIMA
D- NEPHTYS CORNUTA FRANCISCANA

* HERE DEFINED AS A TOTAL OF 100 INDIVIDUALS OR MORE REPORTED
REFERENCE: INTERSEA RESEARCH CORPORATION (1972 a,b,c,e,f,h; 1973 a,b)

DAMES & MOORE

PLATE 2.2.2-11



1- RANGES FROM HARTMAN, (1968, 1969)

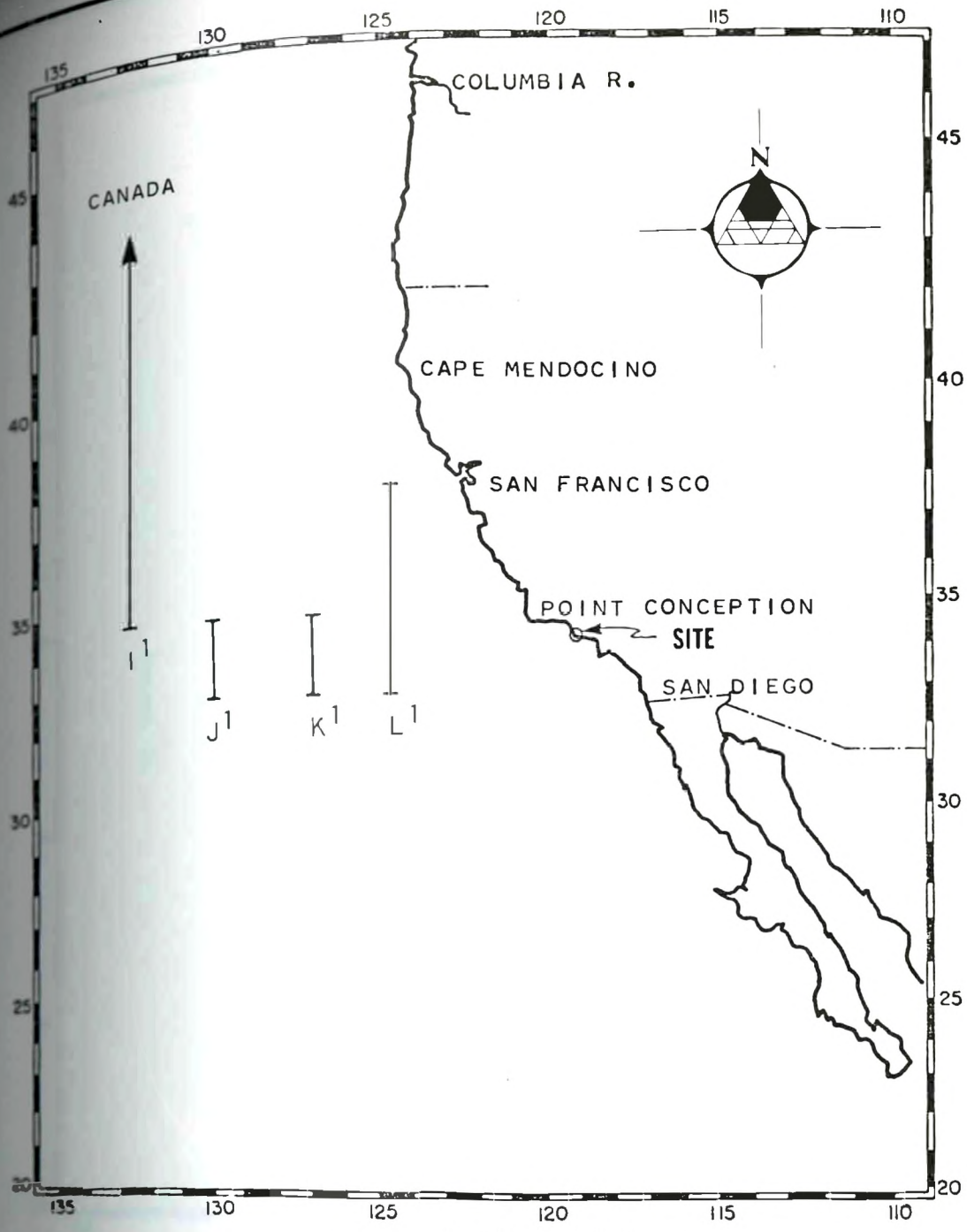
ZOOGEOGRAPHIC RANGES OF ABUNDANT* SPECIES OCCURRING IN THE SITE AREA

E- PLATYNEREIS BICANALICULATA
F- PRIONOSPIO PYGMAEUS
G- SPHAEROSYLLIS CALIFORIENSIS
H- CAPITIA AMBISETA

* HERE DEFINED AS A TOTAL OF 100 INDIVIDUALS OR MORE REPORTED
REFERENCE: INTERSEA RESEARCH CORPORATION (1972 a,b,c,e,f,h; 1973 a,b)

DAMES & MOORE

PLATE 2.2.2-12



1- RANGE SOURCE: HARTMAN, (1968, 1969)

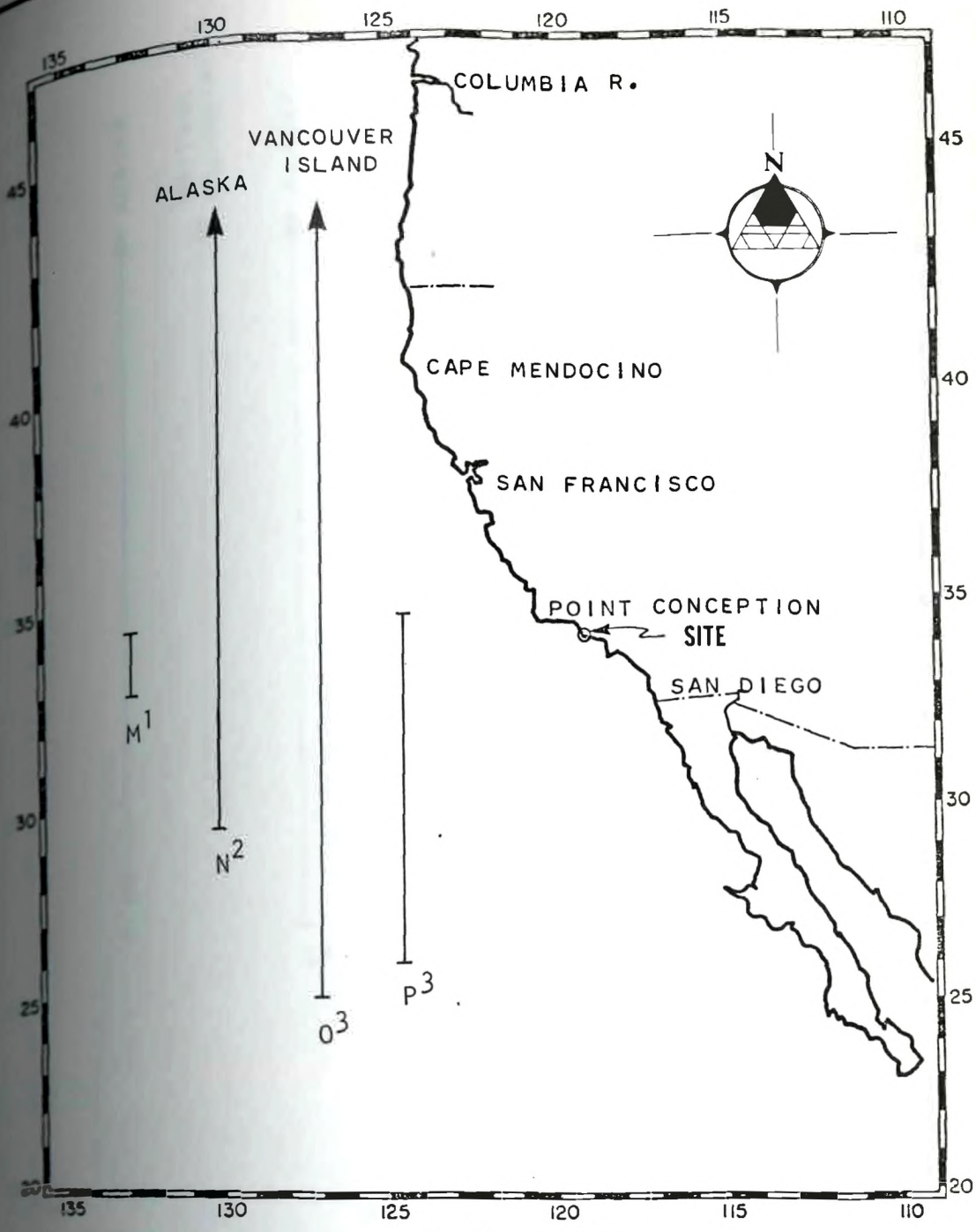
ZOOGEOGRAPHIC RANGES OF ABUNDANT* SPECIES OCCURRING IN THE SITE AREA

I- ETEONE PACIFICA
J- GONIADA LITTOREA
K- MAGELONA SACCULATA
L- PECTINARIA CALIFORIENSIS

* HERE DEFINED AS A TOTAL OF 100 INDIVIDUALS OR MORE REPORTED
REFERENCE: INTERSEA RESEARCH CORPORATION (1972 a,b,c,e,f,h, 1973 a,b)

DAMES & MOORE

PLATE 2.2.2-13



1 RANGE SOURCE: HARTMAN, (1968, 1969)
2 RANGE SOURCE: SCHMITT, (1921)
3 RANGE SOURCE: MCLEAN, (1969)

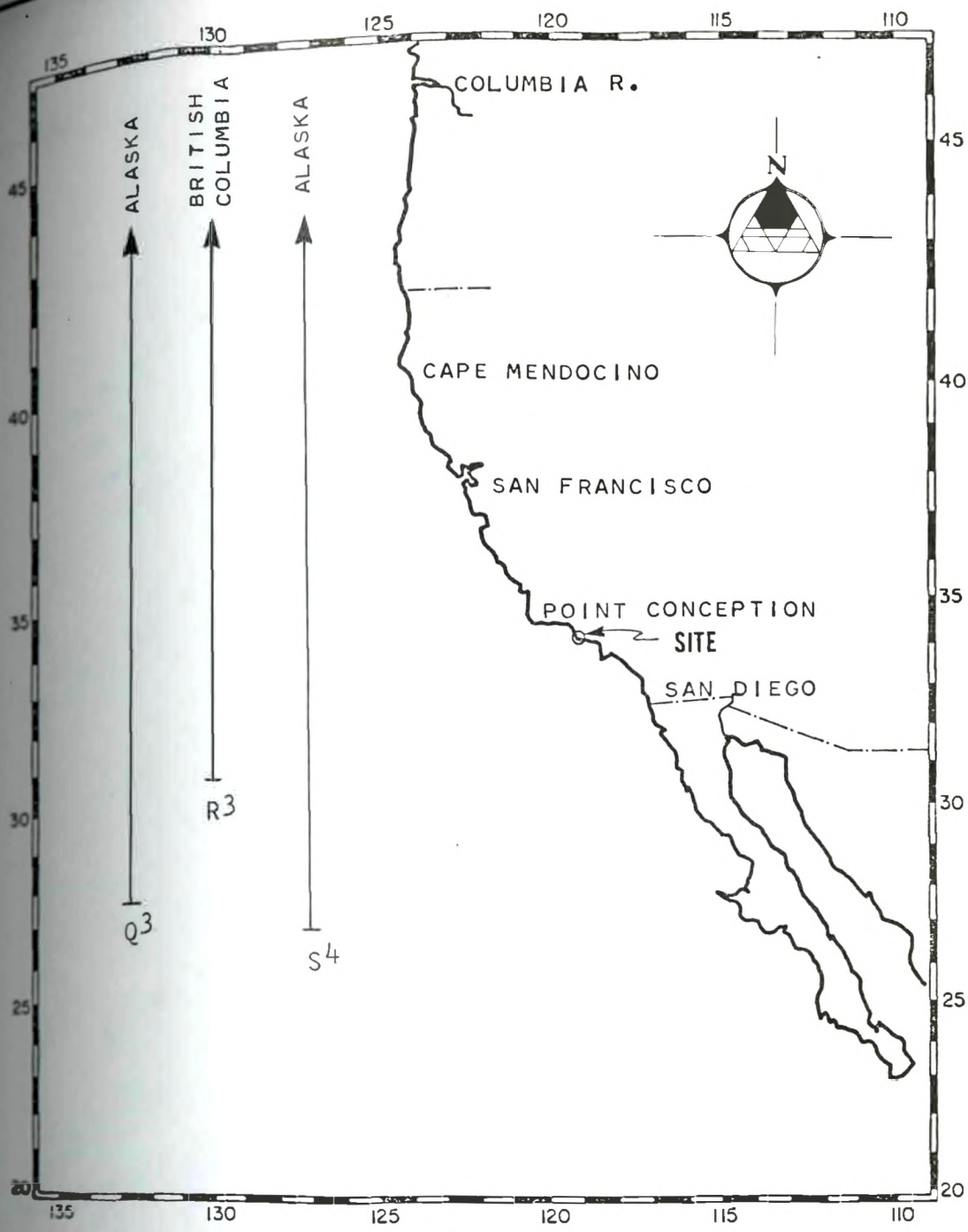
ZOOGEOGRAPHIC RANGES OF ABUNDANT* SPECIES OCCURRING IN THE SITE AREA

M- SPIOPHANES BOMBYX
N- CANCER GRACILIS
O- MACOMA SECTA
P- SPISULA HEMIPHILLI

* HERE DEFINED AS A TOTAL OF 100 INDIVIDUALS OR MORE REPORTED
REFERENCE: INTERSEA RESEARCH CORPORATION (1972 a,b,c,e,f,h; 1973 a,b)

DAMES & MOORE

PLATE 2.2.2-14



3- RANGE SOURCE: MCLEAN, (1969)
4- RANGE SOURCE: RICKETTS AND CALVIN (1966)

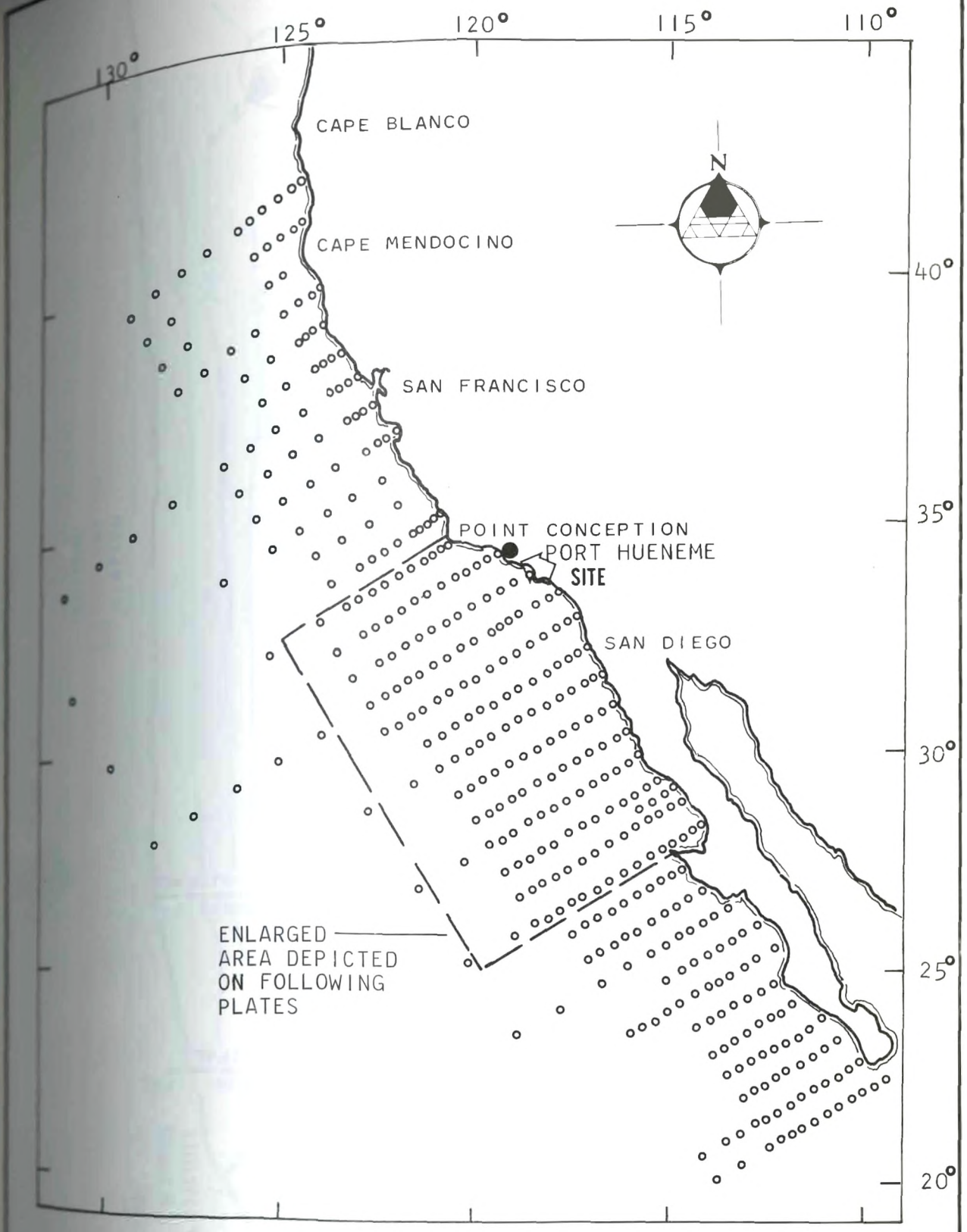
ZOOGEOGRAPHIC RANGES OF ABUNDANT* SPECIES OCCURRING IN THE SITE AREA

Q- TELLINA MODESTA
R- COOPERELLA SUBDIAPHANA
S- DENERASTER EXCENTRICUS

* HERE DEFINED AS A TOTAL OF 100 INDIVIDUALS OR MORE REPORTED
REFERENCE: INTERSEA RESEARCH CORPORATION (1972 a,b,c,e,f,h; 1973 a,b)

DAMES & MOORE

PLATE 2.2.2-15



1960 CALCOFI SAMPLING STATIONS

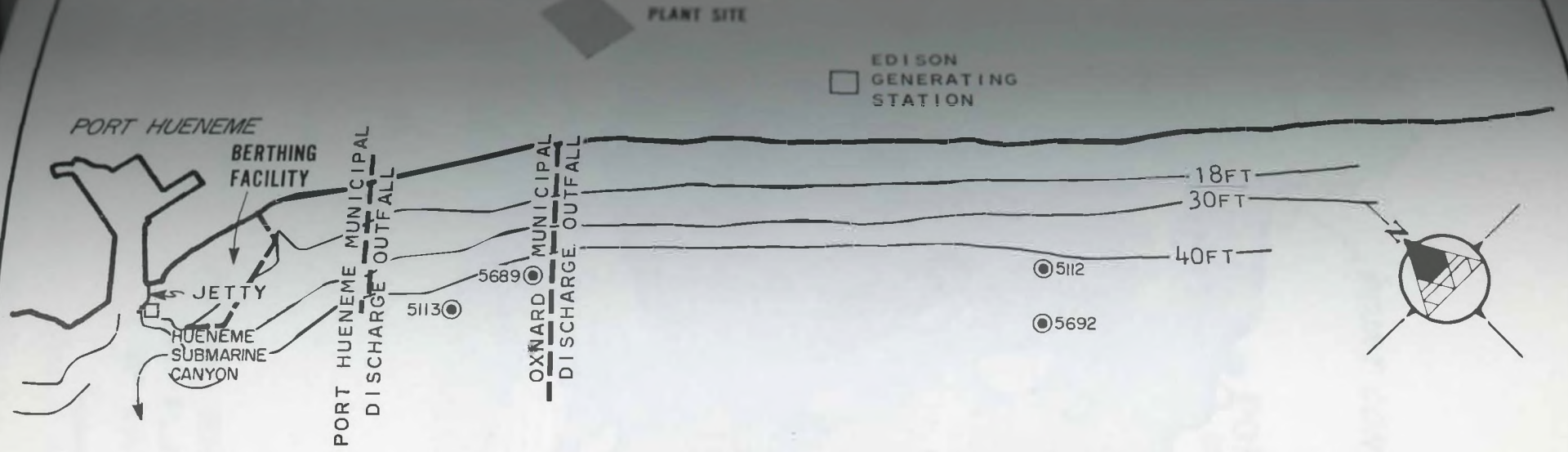
0 100 200 300 400 500

SCALE IN NAUTICAL MILES

REFERENCE: THRAILKILL, 1969

DAMES & MOORE

PLATE 2.2.2-16



KEY

- ◉ MICROPLANKTON STATIONS
- □ MARINE ALGAE STATIONS

MARINE ALGAE AND MICROPLANKTON COLLECTION STATIONS

0 1/2 1

SCALE IN NAUTICAL MILES

REFERENCE: STATE OF CALIFORNIA, 1965;
STRAUGHAN AND KOLPACK, 1971

DAMES & MOORE

PLATE 2.2.2-17

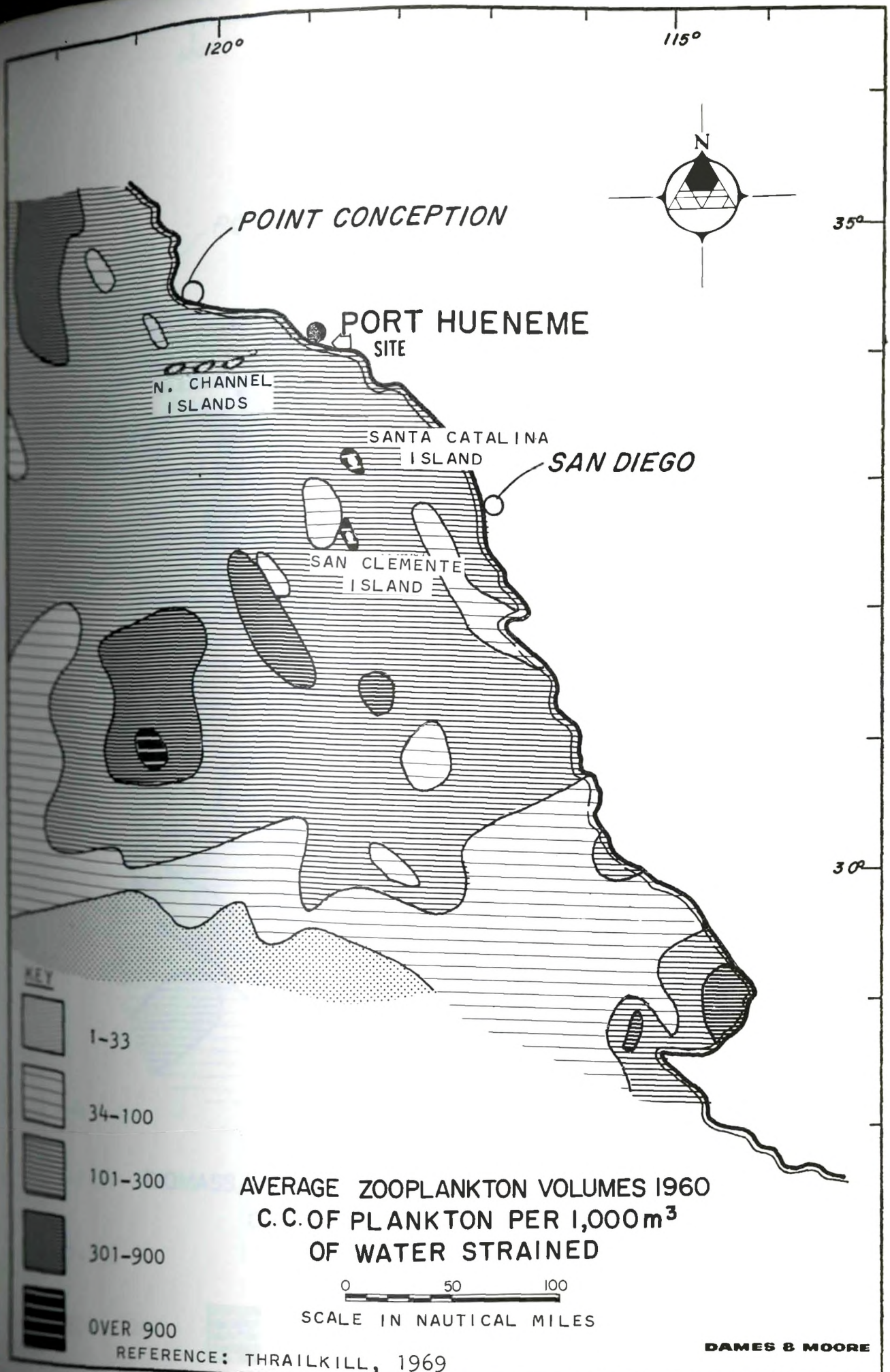

120°
115°
N
35°
POINT CONCEPTION
PORT HUENEME
SITE
N. CHANNEL
ISLANDS
SANTA CATALINA
ISLAND
SAN DIEGO
SAN CLEMENTE
ISLAND
30°
KEY
1-33
34-100
101-300
301-900
OVER 900
AVERAGE ZOOPLANKTON VOLUMES 1960
C.C. OF PLANKTON PER 1,000 m³
OF WATER STRAINED
0
50
100
SCALE IN NAUTICAL MILES
REFERENCE: THRAILKILL, 1969
DAMES & MOORE

PLATE 2.2.2-18

BIOMASS, ALL ZOOPLANKTON TAXA COMBINED

CALCOFI CRUISE 5904

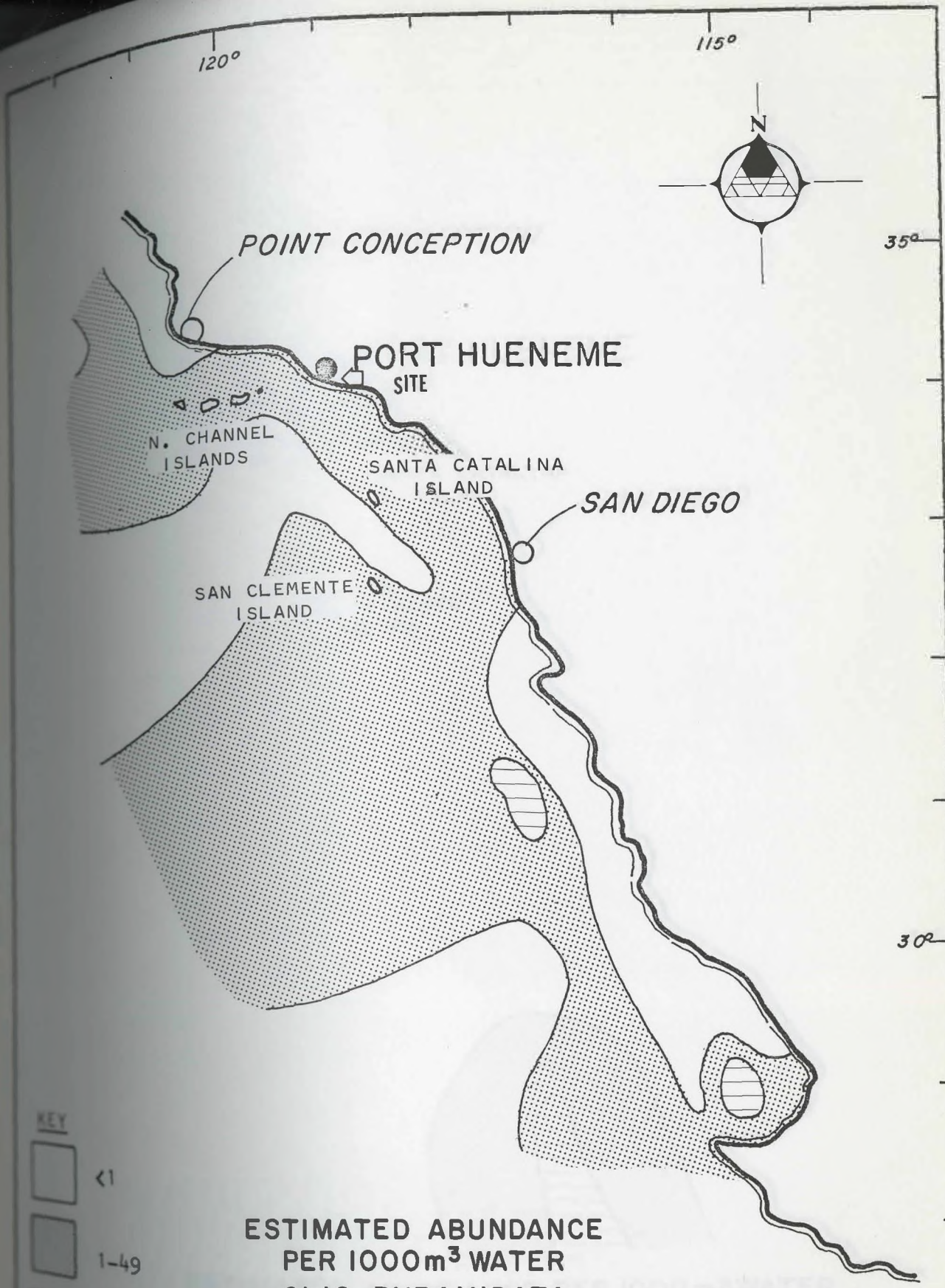
7-26 APRIL 1959

gm/1000 m³

REFERENCE: SMITH, 1971

DAMES & MOORE

PLATE 2.2.2-19



ESTIMATED ABUNDANCE PER 1000m³ WATER

CLIO PYRAMIDATA

CALCOFI CRUISE 5210
8-22 OCTOBER 1952

0 50 100

SCALE IN NAUTICAL MILES

REFERENCE: MCGOWAN, 1967

DAMES & MOORE

PLATE 2.2.2-20

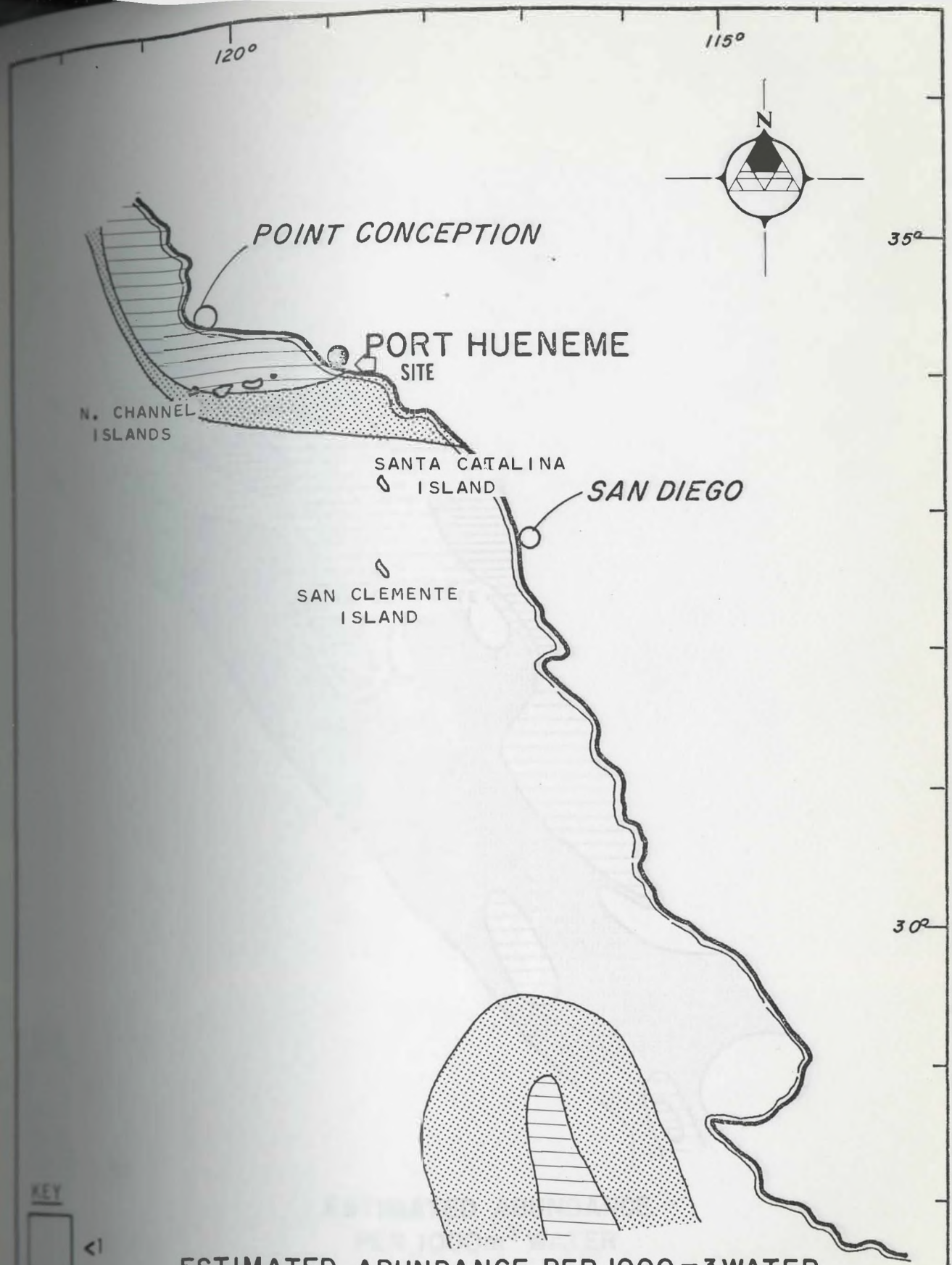

120°
115°
N
35°
POINT CONCEPTION
PORT HUENEME
SITE
N. CHANNEL
ISLANDS
SANTA CATALINA
ISLAND
SAN DIEGO
SAN CLEMENTE
ISLAND
30°
KEY
<1
1-49
50-499
ESTIMATED ABUNDANCE PER 1000 m³ WATER
CALOCALANUS STYLIREMIS
CALCOFI CRUISE 5810
8 OCTOBER-6 NOVEMBER 1958
0 50 100
SCALE IN NAUTICAL MILES
REFERENCE: FLEMINGER, 1967
DAMES & MOORE

PLATE 2.2.2-21

ESTIMATED ABUNDANCE PER 1000m³ WATER

EUPHAUSIA PACIFICA CALCOFI CRUISE 5408

18 AUGUST—10 SEPTEMBER 1954

0 50 100

SCALE IN NAUTICAL MILES

REFERENCE: BRINTON, 1967

DAMES & MOORE

PLATE 2.2.2-22

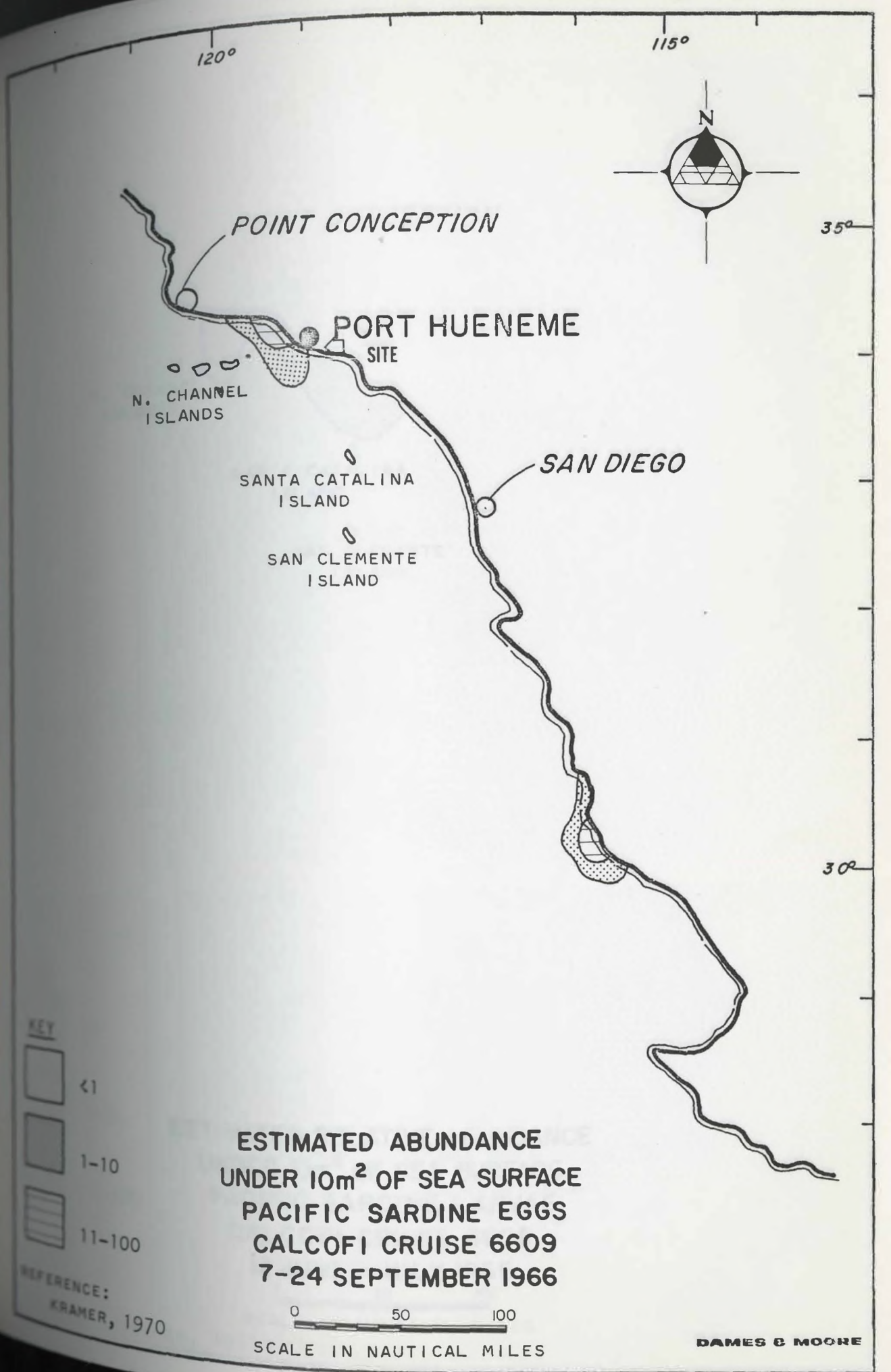

120°
115°
N
35°
30°
POINT CONCEPTION
PORT HUENEME
SITE
N. CHANNEL
ISLANDS
SANTA CATALINA
ISLAND
SAN CLEMENTE
ISLAND
SAN DIEGO
KEY
<1
1-10
11-100
REFERENCE:
KRAMER, 1970
ESTIMATED ABUNDANCE
UNDER 10m² OF SEA SURFACE
PACIFIC SARDINE EGGS
CALCOFI CRUISE 6609
7-24 SEPTEMBER 1966
0
50
100
SCALE IN NAUTICAL MILES
DAMES & MOORE

PLATE 2.2.2-23

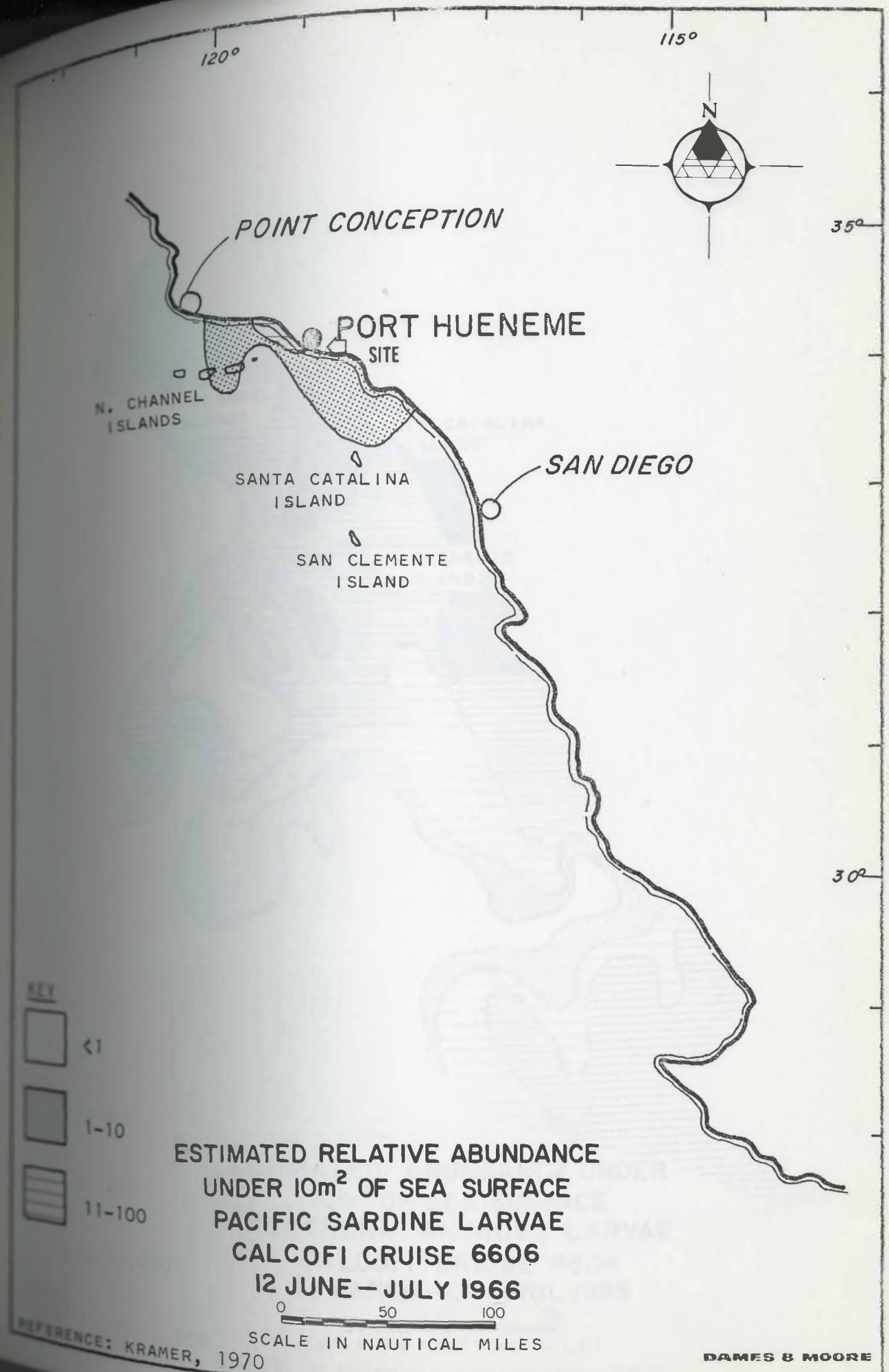
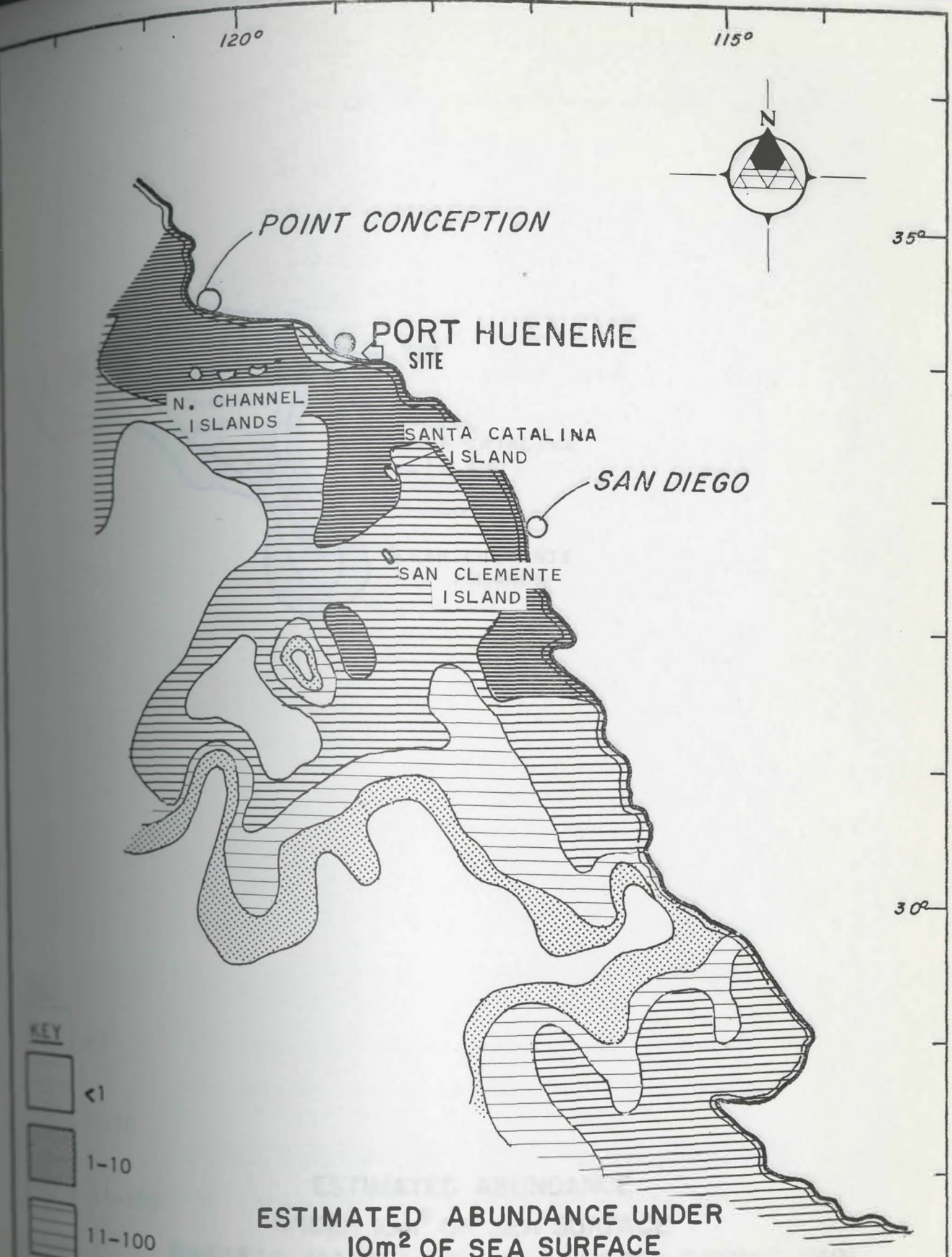

120°
115°
N
35°
POINT CONCEPTION
PORT HUENEME
SITE
N. CHANNEL
ISLANDS
SANTA CATALINA
ISLAND
SAN DIEGO
SAN CLEMENTE
ISLAND
30°
KEY
<1
1-10
11-100
ESTIMATED RELATIVE ABUNDANCE
UNDER 10m² OF SEA SURFACE
PACIFIC SARDINE LARVAE
CALCOFI CRUISE 6606
12 JUNE – JULY 1966
0
50
100
SCALE IN NAUTICAL MILES
REFERENCE: KRAMER, 1970
DAMES & MOORE

PLATE 2.2.2-24



ESTIMATED ABUNDANCE UNDER 10m² OF SEA SURFACE NORTHERN ANCHOVY LARVAE CALCOFI CRUISE 6504 31 MARCH – 24 APRIL 1965

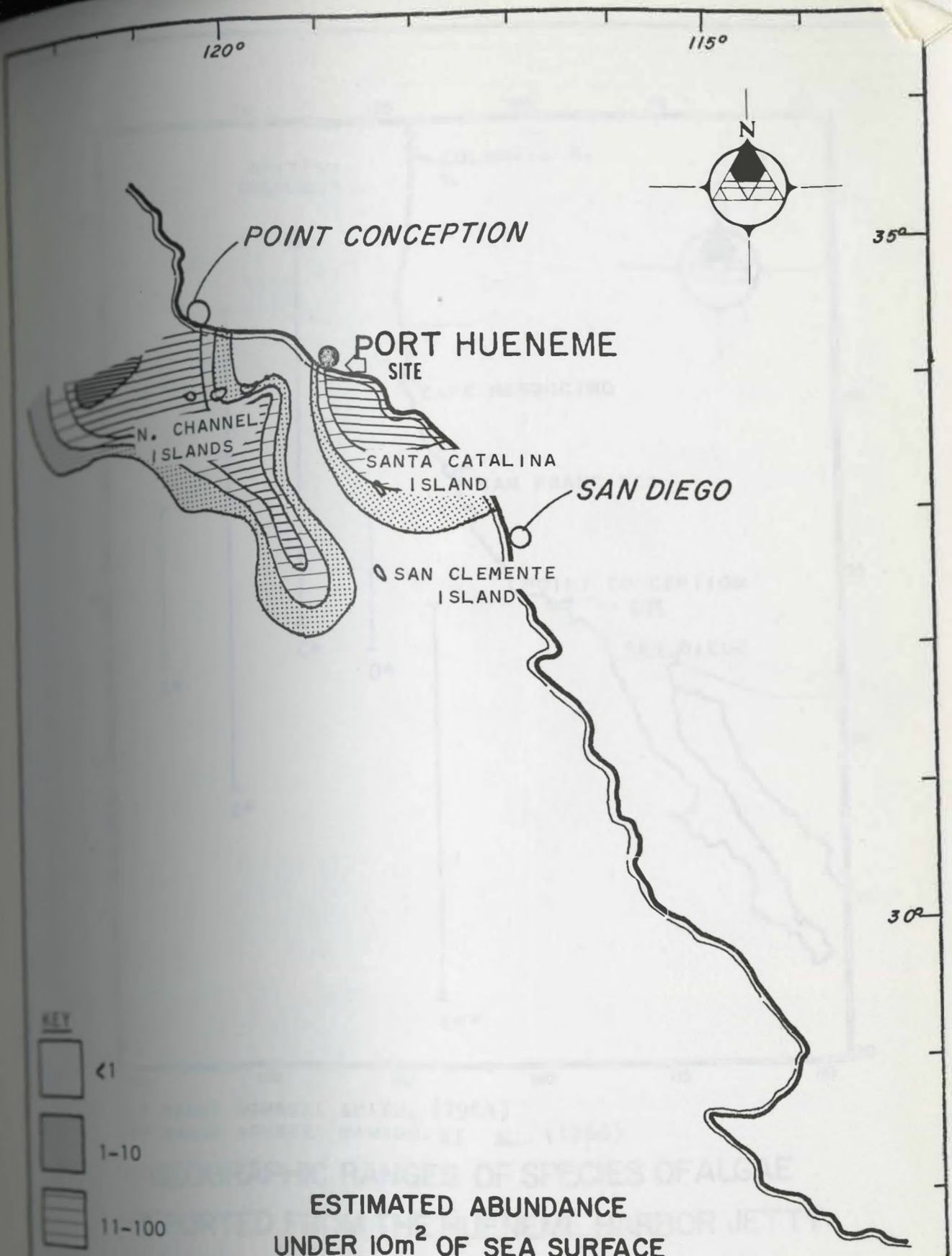
0 50 100

SCALE IN NAUTICAL MILES

REFERENCE: ISSACS, FLEMINGER, AND MILLER, 1968

DAMES & MOORE

PLATE 2.2.2-25



ESTIMATED ABUNDANCE UNDER 10m² OF SEA SURFACE PACIFIC HAKE LARVAE CALCOFI CRUISE 6601 12 JANUARY – 7 FEBRUARY 1966

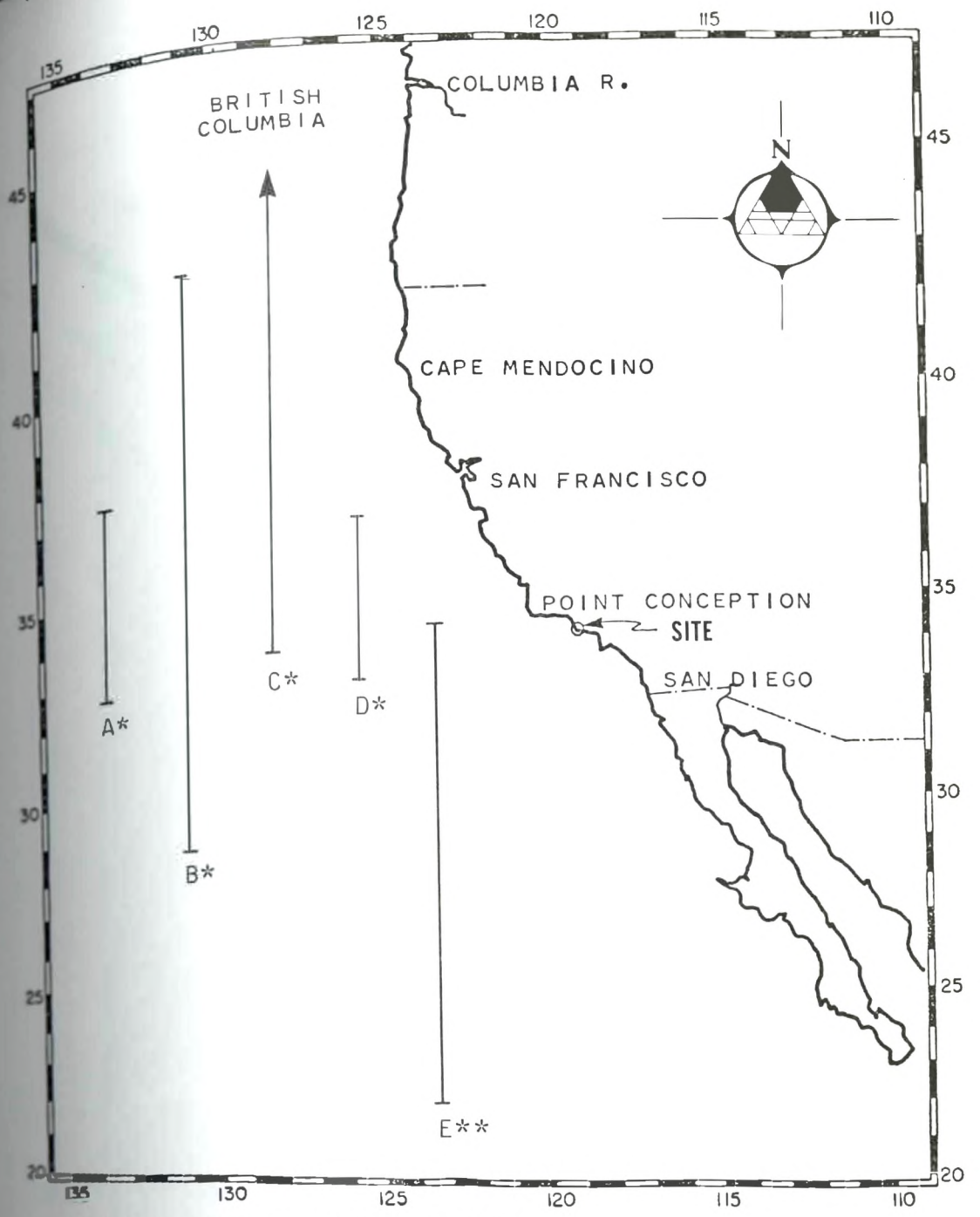
0 50 100

SCALE IN NAUTICAL MILES

REFERENCE: AHLSTROM, 1969

DAMES & MOORE

PLATE 2.2.2-26



* RANGE SOURCE: SMITH, (1964)
** RANGE SOURCE: DAWSON, ET AL. (1960)

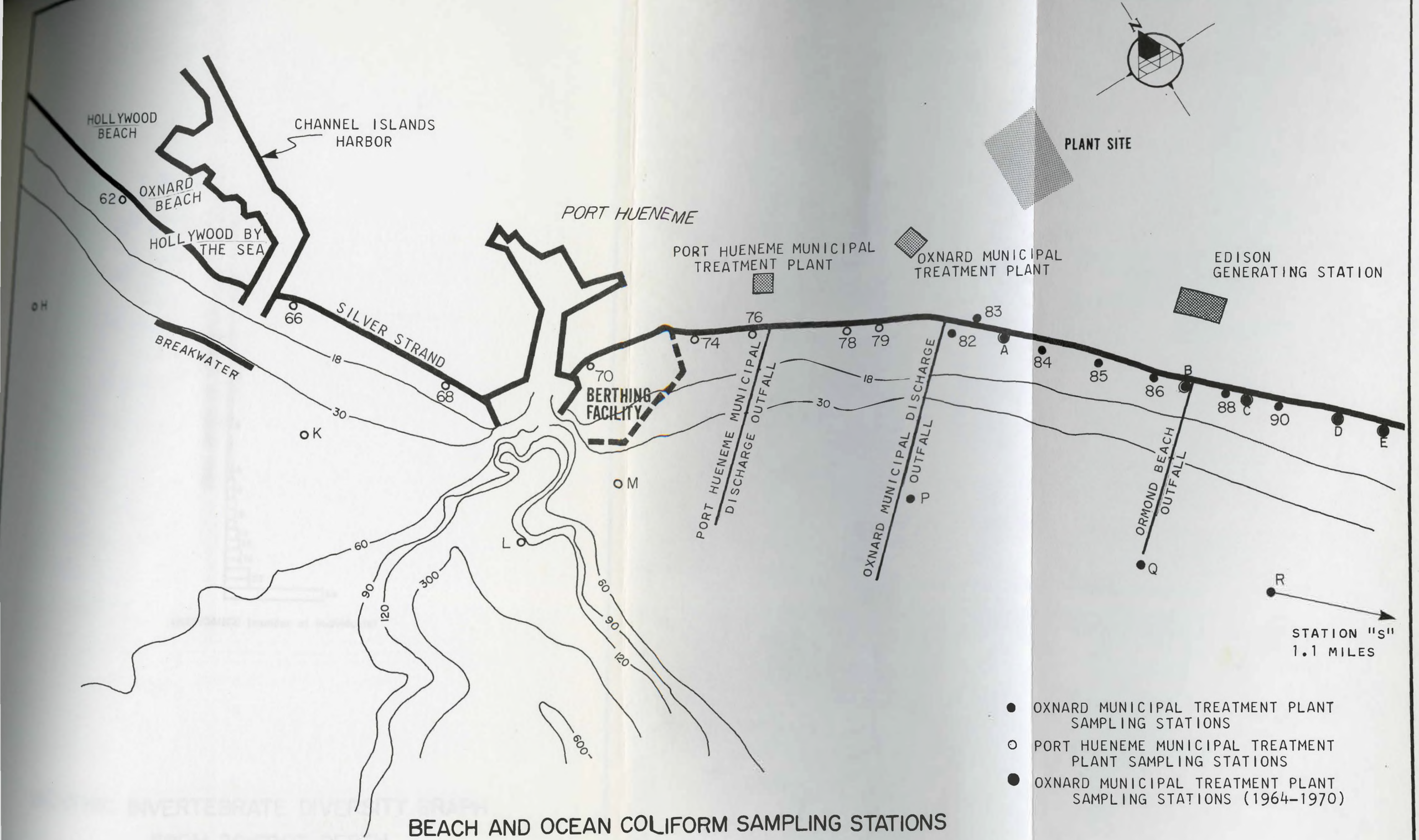
GEOGRAPHIC RANGES OF SPECIES OF ALGAE REPORTED FROM THE HUENEME HARBOR JETTY

A- GELIDIUM COULTERI
B- GIGARTINA CANALICULATA
C- PRIONITIS LANCEOLATA
D- RHODOGLOSSUM AFFINE
E- GIGARTINA EATONIANA

REFERENCE: STATE OF CALIFORNIA, 1965

DAMES & MOORE

PLATE 2.2.2-27



- ● OXNARD MUNICIPAL TREATMENT PLANT SAMPLING STATIONS
- ○ PORT HUENEME MUNICIPAL TREATMENT PLANT SAMPLING STATIONS
- ● OXNARD MUNICIPAL TREATMENT PLANT SAMPLING STATIONS (1964–1970)

BEACH AND OCEAN COLIFORM SAMPLING STATIONS

DEPTH IN FEET

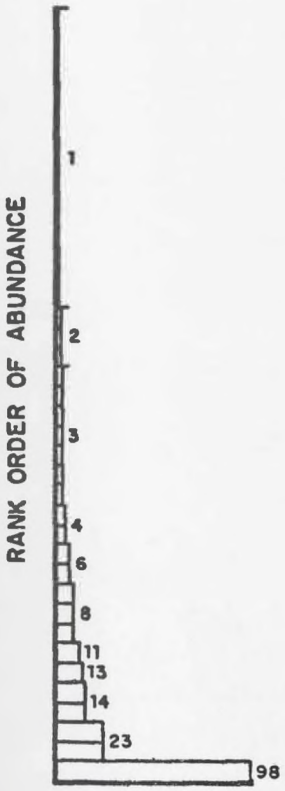
0 1/2 1

SCALE IN NAUTICAL MILES

REFERENCE: CITY OF OXNARD MUNICIPAL SEWAGE TREATMENT PLANT MONITORING SYSTEM (UNPUBL.)

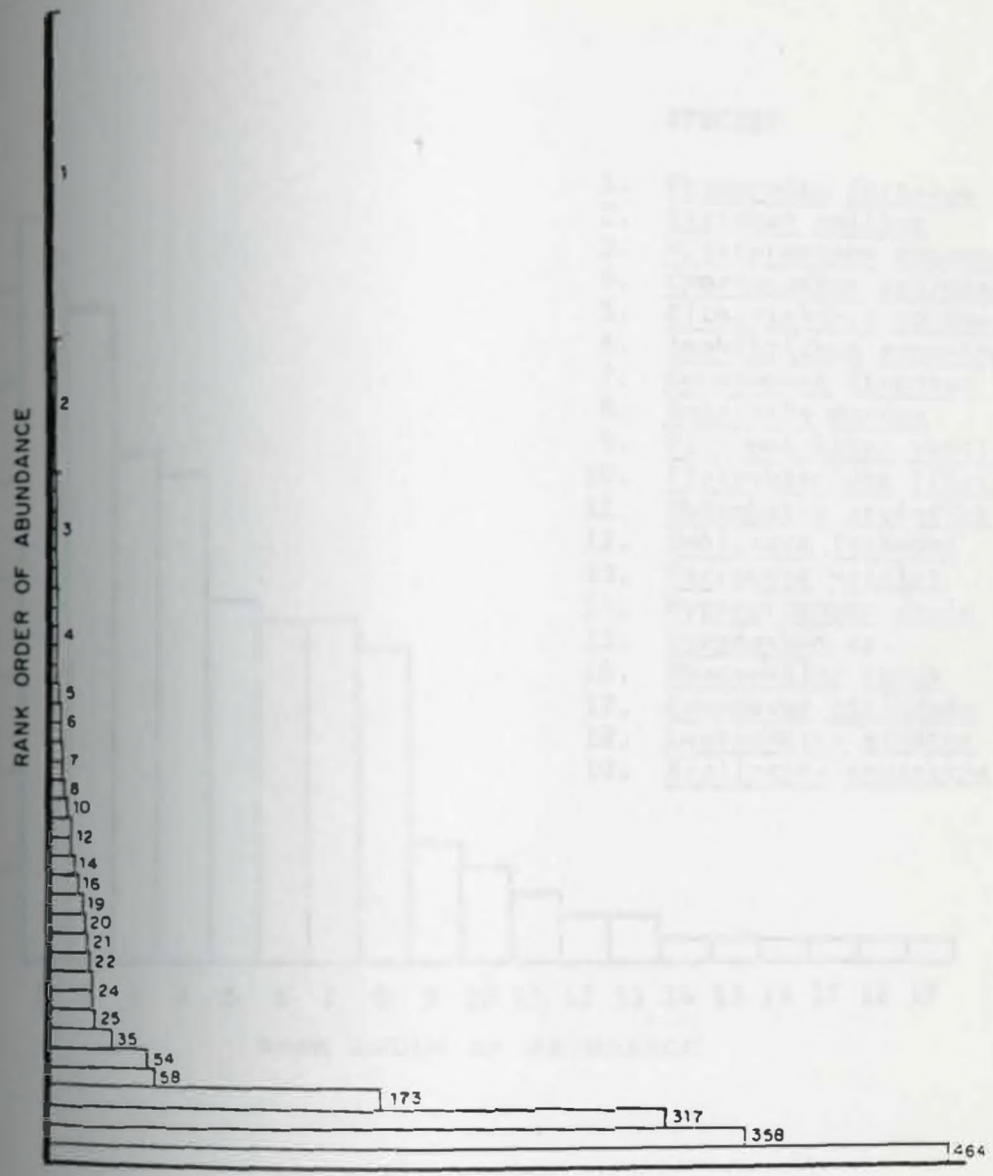
DAMES & MOORE

PLATE 2.2.2-28



BENTHIC INVERTEBRATE DIVERSITY GRAPH FROM 20-FOOT DEPTH

REFERENCE: INTERSEA RESEARCH, 1972

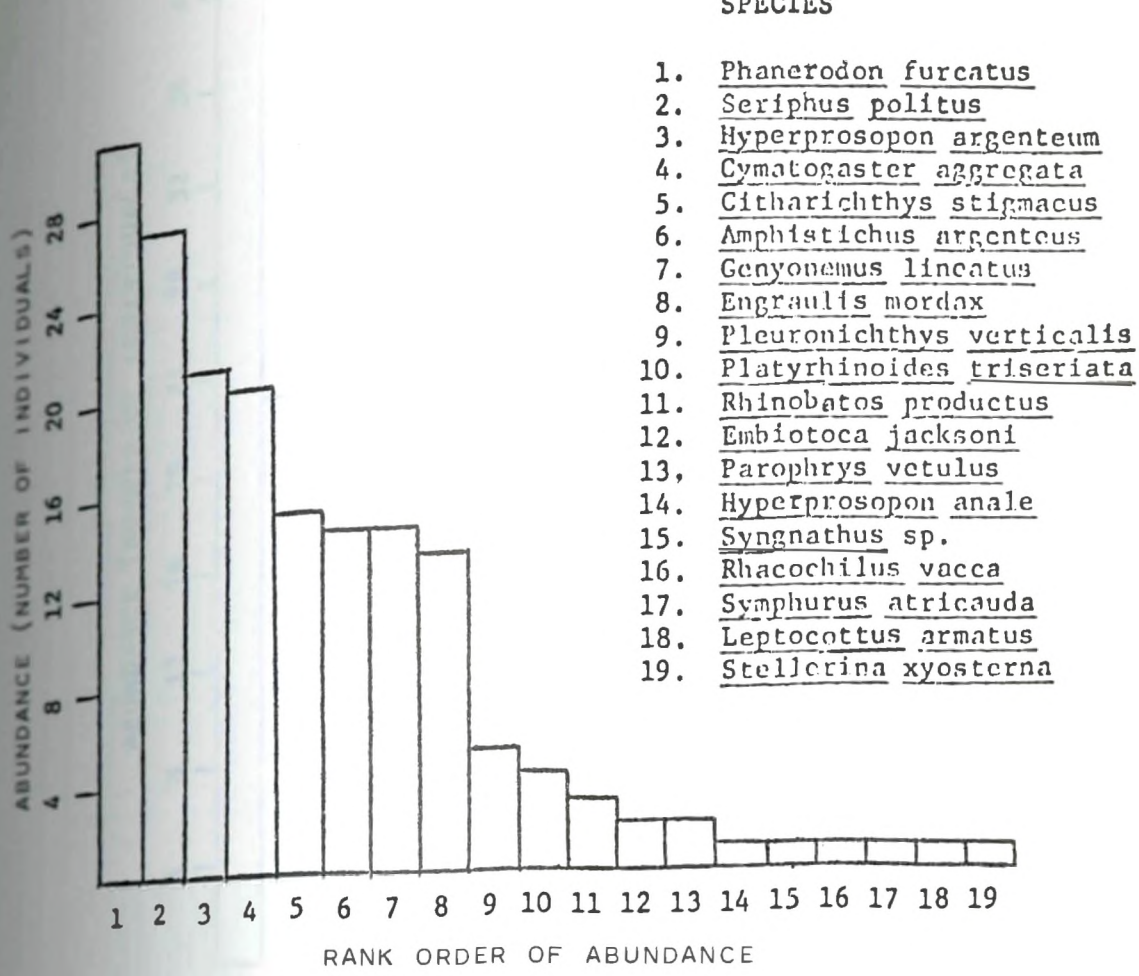


BENTHIC INVERTEBRATE DIVERSITY GRAPH FROM 40-FOOT DEPTH

REFERENCE: INTERSEA RESEARCH, 1972i

DAMES & MOORE

PLATE 2.2.2-30

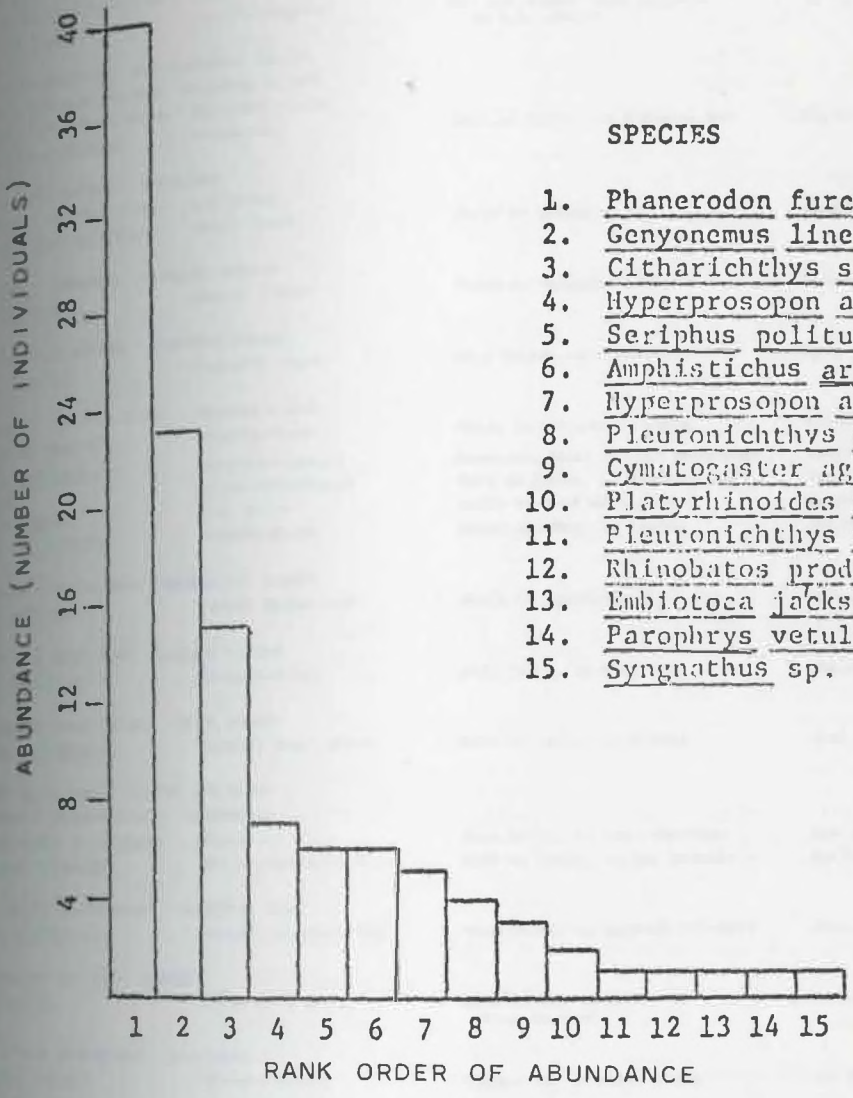


FISH DIVERSITY GRAPHS FROM COMBINED TRAWLS FROM 20-FOOT DEPTH

REFERENCE: INTERSEA RESEARCH, 1972

DAMES & MOORE

PLATE 2.2.2-31



SPECIES

1. Phanerodon furcatus
2. Genyonemus lineatus
3. Citharichthys stigmaeus
4. Hyperprosopon anale
5. Seriphus politus
6. Amphistichus argenteus
7. Hyperprosopon argenteum
8. Pleuronichthys decurrens
9. Cymatogaster aggregata
10. Platyrhinoides triseriata
11. Pleuronichthys verticalis
12. Rhinobatos productus
13. Embiotoca jacksoni
14. Parophrys vetulus
15. Syngnathus sp.

FISH DIVERSITY GRAPHS FROM COMBINED TRAWLS FROM 40-FOOT DEPTH

REFERENCE: INTERSEA RESEARCH, 1972

PROBABLE SHALLOW WATER MARINE FISHES OF THE PORT HUENEME REGION[1]

Scientific Name	Common Name	Geographic Range[2]	Depth (feet)
CLASS AGNATHA: JAWLESS FISHES			
ORDER MYXINIFORMES: HAGFISHES AND LAMPREYS			
FAMILY MYXINIDAE: HAGFISHES			
Eptatretus stouti	Pacific Hagfish[3]	Pt. San Pablo, Baja Calif., to S.E. Alaska	30 to 2,400
CLASS CHONDRICHTHYES: CARTILAGINOUS FISHES			
ORDER HETERODONTIFORMES: BULLHEAD SHARKS			
FAMILY HETERODONTIDAE: BULLHEAD SHARKS			
Heterodontus francisci	Hornshark	Gulf of Calif. to Monterey Bay	Shallow to 490
ORDER SQUALIFORMES: CATSHARKS			
FAMILY SCYLIORHINIDAE: CATSHARKS			
Cephaloscyllium ventriosum	Swell Shark	Chile to Monterey Bay	Shallow to 138
FAMILY LAMNIDAE: MACKEREL SHARKS			
Isurus oxyrinchus	Shortfin Mako	Chile to Columbia River	Epipelagic
FAMILY ALOPIIDAE: THRESHER SHARKS			
Alopias vulpinus	Thresher Shark	Baja Calif. to Washington	Epipelagic
FAMILY CARCHARHINIDAE: REQUIEM SHARKS			
Gmelorhinus zyopterus	Soupfin Shark	Chile to British Columbia	Epipelagic
Mustelus californicus	Grey Smoothhound	Mazatlan, Mex. to Cape Mendocino	Shallow, bays
M. henlei	Brown Smoothhound	Gulf of Calif. to Humboldt Bay	Shallow to 210
Prionace glauca	Blue Shark	Chile to Gulf of Alaska	Epipelagic
Triakis semifasciata	Leopard Shark	Mazatlan, Mex. to Oregon	Shallow, bays
FAMILY SPHYRNIDAE: HAMMERHEAD SHARKS			
Sphyrna zygaena	Smooth Hammerhead	Chile to Central Calif.	Epipelagic
FAMILY SQUALIDAE: DOGFISH SHARKS			
Squalus acanthias	Spiny Dogfish	Baja Calif. to Alaska	Shallow to 120
FAMILY SQUATINIDAE: ANGEL SHARKS			
Squatina californica	Pacific Angel Shark	Gulf of Calif. to Alaska	Shallow
ORDER RAJIFORMES: SKATES AND RAYS			
FAMILY RHINOBATIDAE: GUITARFISH			
Platyrhinoidis triseriata	Thornback Ray	Baja Calif. to San Francisco	Shallow to 150
Rhinobatus productus	Shovelnose Guitarfish	Gulf of Calif. to San Francisco	Surface to 50
FAMILY TORPEDINIDAE: ELECTRIC RAYS			
Torpedo californica	Pacific Electric Ray	Baja Calif. to British Columbia	Shallow to 640
FAMILY RAJIDAE: SKATES			
Raja inornata	California Skate	Baja Calif. to Strait of Juan de Fuca	60 to 2,200
FAMILY DASYATIDAE: STINGRAYS			
Urolophus halleri	Round Stingray	Panama Bay to Humbolt Bay	To 70
FAMILY MYLIOBATIDAE: EAGLE RAYS			
Myliobatis californica	Bat Stingray	Gulf of Calif. to Oregon	Bays to 150
ORDER CHIMAERIFORMES: RATFISHES			
FAMILY CHIMAERIDAE: CHIMAERAS			
Hydrolagus colliei	Ratfish	Baja Calif. to Alaska	Shallow to 1,200
CLASS OSTEICHTHYES: BONY FISHES			
ORDER ANGUILLIFORMES: EELS			
FAMILY MURAENIDAE: MORAYS			
Gymnothorax mordax	California Moray	Baja Calif. to Pt. Conception	Shallow
ORDER CLUPEIFORMES: CLUPEIFORM FISHES			
FAMILY CLUPEIDAE: SARDINES AND HERRINGS			
Clupea harengus pallasi	Pacific Herring	N. Baja Calif. to Alaska	Inshore
Sardinops sagax	Pacific Sardine	Mexico to Kamchatka Isl.	Epipelagic
FAMILY ENGRAULIDAE: ANCHOVIES			
Anchoa compressa	Deepbody Anchovy	Baja Calif. to Morro Bay	Pelagic
A. delicatissima	Slough Anchovy	Baja Calif. to Long Beach	Pelagic
Engraulis mordax	Northern Anchovy	Baja Calif. to British Columbia	Pelagic

PROBABLE SHALLOW WATER MARINE FISHES OF THE PORT HUENEME REGION[1]

Scientific Name	Common Name	Geographic Range[2]	Depth (feet)
ORDER SALMONIFORMES: SALMON, TROUT, WHITEFISHES			
FAMILY SALMONIDAE: TROUTS, WHITEFISHES, GRAYLINGS			
Oncorhynchus kisutch	Coho Salmon	Baja Calif. to Bering Sea	Pelagic
O. tshawytscha	Chinook Salmon	San Diego to Bering Sea	Pelagic
FAMILY ARGENTINIDAE: ARGENTINES			
Argentina sialis	Pacific Argentine	Baja Calif. to Oregon	36 to 900
ORDER MYCTOPHIFORMES: INIOMIOUS FISHES			
FAMILY SYNODONTIDAE: LIZARD FISHES			
Synodus lucioceps	California Lizardfish	Mexico to San Francisco	5 to 150
ORDER BATRACHOIDIFORMES: TOADFISHES			
FAMILY BATRACHOIDIDAE: TOADFISHES			
Porichthys myriaster	Specklefin Midshipman	Baja Calif. to Pt. Conception	Shallow to 414
P. notatus	Plainfin Midshipman	Baja Calif. to Sitka, Alaska	Surface to 1,000
ORDER GOBIESOCIFORMES: CLINGFISHES			
FAMILY GOBIESOCIDAE: CLINGFISHES			
Gobiesox rhessodon	California Clingfish	Baja Calif. to Santa Cruz Isl. and Gaviota	Surface to 25
Rimicola muscarum	Kelp Clingfish	Baja Calif. to British Columbia	Under kelp
ORDER GADIFORMES: CODFISHES			
FAMILY GADIDAE: CODFISHES			
Merluccius productus	Pacific Hake	Baja Calif. to Alaska	Surface to 300
FAMILY ZOARCIDAE: EELPOUTS			
Lycodopsis pacifica	Blackbelly Eelpout	Ensenada to Afognak Isl., Alaska	30 to 1,308
Lyconema barbatum	Bearded Eelpout[4]	Baja Calif. to Mack Arch., Ore.	270 to 1,224
FAMILY OPHIDIIDAE: CUSK-EELS AND BROTULAS			
Brosmophycis marginata	Red Brotula	Ensenada to Petersburg, Alaska	10 to 840
Otophidium scrippsae	Basketweave Cusk-eel	Guaymas, Mexico to Pt. Arguello	9 to 230
O. taylori	Spotted Cusk-eel	Baja Calif. to N. Oregon	4 to 800
ORDER GASTEROSTEIFORMES: STICKLEBACKS AND TUBENOSE FISHES			
FAMILY GASTEROSTEIDAE: STICKLEBACKS			
Gasterosteus aculeatus	Three-spine Stickleback	Baja Calif. to North of Monterey	Surface to 90
FAMILY SYNGNATHIDAE: PIPEFISHES AND SEAHORSES			
Syngnathus californiensis	Kelp Pipefish	Baja Calif. to San Francisco	Kelp beds
S. griseolineatus	Bay Pipefish	Baja Calif. to Alaska	Eelgrass (subtidal)
ORDER PERCIFORMES: PERCH-LIKE FISHES			
FAMILY SERRANIDAE: SEA BASSES			
Paralabrax clathratus	Kelp Bass	Baja Calif. to Columbia River	Surface to 150
P. maculatofasciatus	Spotted Sand Bass	Baja Calif. to Santa Cruz	Shallow to 200
P. nebulifer	Barred Sand Bass	Baja Calif. to Santa Cruz	Shallow to 600
FAMILY BRANCHIOSTEGIDAE: TILEFISHES			
Caulolatilus princeps	Ocean Whitefish	Peru to British Columbia	Surface to 300
FAMILY CARANGIDAE: JACKS AND POMPANOS			
Seriola dorsalis	Yellowtail	Chile to S. Washington	Surface to 80
Trachurus symmetricus	Jack Mackerel	Baja Calif. to S.E. Alaska	Surface to 150
FAMILY POMADASYIDAE: GRUNTS			
Anisotremus davidsoni	Sargo	Baja Calif. to Santa Cruz	Surface to 130
FAMILY LABRIDAE: WRASSES			
Halichoeres semicinctus	Rock Wrasse	Gulf of Calif. to Pt. Conception	Surface to 78
Oxyjulis californica	Senorita	Baja Calif. to Sausalito	Surface to 180
Pimelometopon pulchrum	California Sheephead	Baja Calif. to Monterey	Surface to 180
FAMILY SCIAENIDAE: DRUMS			
Cynoscion nobilis	White Sea Bass	Baja Calif. to Juneau, Alaska	Surface to 480
Genyonemus lineatus	White Croaker	Baja Calif. to Vancouver Isl.	Surface to 330
Menticirrhus undulatus	California Corbina	Gulf of Calif. to Pt. Conception	Surface to 45
Roncador stearnsi	Spotfin Croaker	Mexico to Pt. Conception	Surface to 50
Seriphus politus	Queenfish	Baja Calif. to Yaquina Bay, Oregon	Surface to 180
Umbrina roncador	Yellowfin Croaker	Gulf of Calif. to Pt. Conception	Surface to 150

PROBABLE SHALLOW WATER MARINE FISHES OF THE PORT HUENEME REGION[1]

Scientific Name	Common Name	Geographic Range[2]	Depth (feet)
FAMILY EMBIOTOCIDAE: SURFPERCHES			
Amphistichus argenteus	Barred Surfperch	Baja Calif. to Bodega Bay	Surface to 240
A. koelzi	Calico Surfperch	Baja Calif. to Washington	Surface to 30
Cymatogaster aggregata	Shiner Perch	Baja Calif. to Pt. Wrangell, Ala.	Surface to 480
Embiotoca jacksoni	Black Perch	Baja Calif. to Ft. Bragg	Surface to 130
Hyperprosopon anale	Spotfin Surfperch	Baja Calif. to Oregon	Surface to 210
H. argenteum	Walleye Surfperch	Baja Calif. to British Columbia	Surface to 60
Hypsurus caryi	Rainbow Seaperch	Baja Calif. to Cape Mendocino	Surface to 130
Micrometrus aurora	Reef Surfperch	Baja Calif. to Tamales Bay	Intertidal to 20
M. minimus	Dwarf Surfperch	Baja Calif. to Bodego Bay	To 30
Phanerodon atripes	Sharpnose Seaperch	Baja Calif. to Bodega Bay	To 750
P. furcatus	White Seaperch	Baja Calif. to Vancouver Isl.	Surface to 140
Rhacochilus toxotes	Rubberlip Seaperch	Baja Calif. to Mendocino Co.	Surface to 150
R. vacca	Pile Perch	Guadalupe Isl. to Pt. Wrangell, Alaska	Surface to 150
Zalembius rosaceus	Pink Seaperch	Baja Calif. to Drake's Bay, Ala.	30 to 300
FAMILY POMACENTRIDAE: DAMSELFISHES			
Chromis punctipinnis	Blacksmith	Baja Calif. to Monterey	Surface to 150
FAMILY KYPHOSIDAE: SEA CHUBS			
Girella nigricans	Opaleye	Baja Calif. to San Francisco	Intertidal to 95
Medialuna californiensis	Halfmoon	Gulf of Calif. to Klamath River	Surface to 130
FAMILY SCOMBRIDAE: MACKERELS AND TUNAS			
Sarda chiliensis	Pacific Bonito	Chile to Gulf of Alaska	Epipelagic
Scomber japonicus	Chub Mackerel	Chile to Gulf of Alaska	To 150
FAMILY GOBIIDAE: GOBIES			
Clevlandia ios	Arrow Goby	Gulf of Calif. to Vancouver Isl.	Shallow bays
Coryphopterus nicholsi	Blackeye Goby	Baja Calif. to British Columbia	5 to 80
Gillichthys mirabilis	Longjaw Mudsucker	Gulf of Calif. to Tomales Bay	Shallow bays
Lepidogobius lepidus	Bay Goby	Baja Calif. to Vancouver Isl.	Shallow to 200
Ilypnus gilberti	Cheekspot Goby	Gulf of California to Tamales Bay	Bays and mud flats
Lythrypnus dalli	Bluebanded Goby	Gulf of Calif. to Morro Bay	Inter. to 210
Quietula y-cauda	Shallow Goby	Gulf of Calif. to Morro Bay	Mudflats
FAMILY SCORPAENIDAE: SCORPION FISHES			
Scorpaena guttata	California Scorpionfish	Baja Calif. to Santa Cruz	Shallow to 600
Sebastes alutus	Pacific Ocean Perch[4]	La Jolla to Bering Sea	180 to 2,100
S. atrovirens	Kelp Rockfish	Pt. San Pablo; Baja Calif. to Sonoma Co.	Subtidal to 150
S. auriculatus	Brown Rockfish	Baja Calif. to S.E. Alaska	Shallow to 180
S. carnatus	Gopher Rockfish	Baja Calif. to Eureka	Subtidal to 180
S. chrysomelas	Black and Yellow Rockfish	Baja Calif. to Eureka	Inter. to 120
S. constellatus	Starry Rockfish	Baja Calif. to San Francisco	80 to 900
S. dalli	Calico Rockfish	Baja Calif. to San Francisco	60 to 840
S. elongatus	Greenstriped Rockfish[4]	Baja Calif. to Montague Isl., Ala.	200 to 1,320
S. flavidus	Yellowtail Rockfish	San Diego to Kodiak Isl.	Surface to 900
S. goodei	Chilipepper	Baja Calif. to Vancouver Isl.	Surface to 1,080
S. jordani	Shortbelly Rockfish	Baja Calif. to British Columbia	Surface to 930
S. levis	Cow Rockfish	Guadalupe Isl. to Mendocino Co.	68 to 1,200
S. melanops	Black Rockfish	Paradise Cove to Amchitka Isl., Alaska	Surface to 300
S. miniatus	Vermillion Rockfish	Baja Calif. to Vancouver Isl.	Shallow to 660
S. mystinus	Blue Rockfish	Baja Calif. to Bering Sea	Surface to 300
S. ovalis	Speckled Rockfish	Baja Calif. to San Francisco	100 to 1,200
S. paucispinis	Bocaccio	Baja Calif. to Kodiak Isl, Ala.	Surface to 1,050
S. pinniger	Canary Rockfish	Baja Calif. to Cape Bartolome, Alaska	Surface to 900
S. rastrelliger	Grass Rockfish	Baja Calif. to Yaquina Bay, Ore.	Inter. to 150
S. rosaceus	Rosy Rockfish	Baja Calif. to Puget Sound	50 to 420
S. rubrivinctus	Flag Rockfish	Baja Calif. to Aleutian Isls.(?)	100 to 600
S. saxicola	Stripetail Rockfish	Baja Calfi. to S.E. Alaska	192 to 1,320
S. semicintus	Halfbanded Rockfish[4]	Baja Calif. to Pt. Pinos	192 to 1,320
S. serranoides	Olive Rockfish	Baja Calif. to Del Norte Co.	Surface to 480
S. serriceps	Treefish	Baja Calif. to San Francisco	Shallow to 150
S. umbrosus	Honeycomb Rockfish	Baja Calif. to Pt. Pinos, Monterey Co.	90 to 250
S. vexillaris	Whitebelly Rockfish	San Benito Isls., Baja Calif. to Crescent City	Surface to 600
Sebastolobus alascanus	Shortspined Thornyhead	N. Baja Calif. to Bering Sea	84 to 5,000
S. altivelus	Longspine Thornyhead	Cape San Lucas to Aleutian Isl	1,090 to 5,000

PROBABLE SHALLOW WATER MARINE FISHES OF THE PORT HUENEME REGION[1]

Scientific Name	Common Name	Geographic Range[2]	Depth (feet)
FAMILY TRIGLIDAE: SEAROBINS			
Prionotus stephanophrys	Lumptail Searobin	Peru to Columbia River	48 to 360
FAMILY ANOPLOPOMATIDAE: SABLEFISHES			
Anoplopoma fimbria	Sablefish	Baja Calif. to Bering Sea	Surface to 5,000
FAMILY HEXAGRAMMIDAE: GREENLINGS			
Ophiodon elongatus	Lingcod	Baja Calif. to Gulf of Alaska	Surface to 1,400
Oxylebius pictus	Painted Greenling	Baja Calif. to British Columbia	Intertidal to 180
Zaniolepis frenata	Shortspine Combfish	Baja Calif. to Oregon	Shallow to 1,200
Z. latipinnus	Longspine Combfish	Baja Calif. to Vancouver Isl.	120 to 372
FAMILY COTTIDAE: SCULPINS			
Artedius corallinus	Coralline Sculpin	Baja Calif. to Orcas Isls., Washington	Intertidal to 70
A. notospilotus	Bonehead Sculpin	Baja Calif. to Puget Sound	Intertidal to 150
A. lateralis	Smoothhead Sculpin	Baja Calif. to Bering Isl., USSR	Intertidal to 25
Chitonotus pugetensis	Roughback Sculpin	Baja Calif. to British Columbia	Intertidal to 40
Clinocottus analis	Wooly Sculpin	Baja Calif. to Cape Mendocino	Inter. to 60
Icelinus filamentosus	Threadfin Sculpin	Cortez Bank to N. British Columbia	60 to 1,224
I. quadriseriatus	Yellowchin Sculpin	Baja Calif. to Russian River	20 to 330
I. tenuis	Spotfin Sculpin[4]	Baja Calif. to British Columbia	180 to 1,224
Leptocottus armatus	Pacific Staghorn Sculpin	Baja Calif. to Alaska	Intertidal to 300
FAMILY AGONIDAE: POACHERS			
Agonopsis emmelane	Northern Spearnose Poacher	Pt. Loma to S.E. Alaska	60 to 534
Odontopyxis trispinosa	Pygmy Poacher	Baja Calif. to S.E. Alaska	30 to 1,028
Stellerina xyosterna	Picklebreast Poacher	Baja Calif. to British Columbia	15 to 246
FAMILY RHAMPHOCOTTIDAE: GRUNT-SCULPINS			
Rhamphocottus richardsoni	Grunt-sculpin	Santa Monica Bay to Bering Sea	Intertidal to 540
FAMILY CYCLOPTERIDAE: SNAILFISHES AND LUMPFISHES			
Liparis mucosus	Slimy Snailfish	Baja Calif. to Vancouver Isl.	Intertidal to 50
FAMILY BATHYMASTERIDAE: RONQUILS			
Rathbunella hypoplecta	Smooth Ronquil	Northern Baja Calif. to Pacific N.W.	Intertidal
FAMILY URANOSCOPIDAE: STARGAZERS			
Kathetostoma averruncus	Smooth Stargazer	Peru to San Luis Obispo	42 to 1,260
FAMILY CLINIDAE: CLINIDS			
Gibbonsia elegans	Spotted Kelpfish	Baja Calif. to Pt. Piedras Blancas	Surface to 185
G. metzi	Striped Kelpfish	Baja Calif. to Vancouver Isl.	Surface to 30
Heterostichus rostratus	Giant Kelpfish	Baja Calif. to British Columbia	Surface to 132
Neoclinus blanchardi	Sarcastic Fringehead	Baja Calif. to San Francisco	10 to 200
N. uninotatus	Onespot Fringehead	San Diego Bay to Bodega Bay	10 to 90
FAMILY BLENNIIDAE: COMBTOOTH BLENNIES			
Hypsoblennius jenkinsi	Mussel Blenny	Mexico to Coal Oil Pt., Calif.	Intertidal to 70
H. gentilis	Bay Blenny	Gulf of Calif. to Monterey	Intertidal to 80
H. gilberti	Rockpool Blenny	Baja Calif. to Pt. Conception	Intertidal to 80
FAMILY STICHAEIDAE: PRICKLEBACKS			
Plectobranchus evides	Bluebarred Prickleback	San Diego to Central British Columbia	276 to 900
Poroclinus rothrocki	Whitebarred Blenny	San Diego to Bering Sea	150 to 240
FAMILY PHOLIDAE: GUNNELS			
Xererpes fucorum	Rockweed Gunnel	Baja Calif. to Vancouver Isl.	Intertidal to 30
FAMILY STROMATEIDAE: BUTTERFISHES			
Peprilus simillimus	Pacific Pompano	Baja Calif. to Fraser River, B.C.	30 to 300

TABLE 2.2.2-I - continued

PROBABLE SHALLOW WATER MARINE FISHES OF THE PORT HUENEME REGION[1]

Scientific Name	Common Name	Geographic Range[2]	Depth (feet)
FAMILY SPHYRAENIDAE: BARRACUDAS			
Sphyraena argentea	California Barracuda	Baja Calif. to Kodiak Isl, Ala.	Surface to 60
ORDER ATHERINIFORMES: SILVERSIDES			
FAMILY ATHERINIDAE: SILVERSIDES			
Atherinops affinis	Topsmelt	Gulf of Calif. to British Columbia	Surface
Atherinopsis californiensis	Jacksmelt	Baja Calif. to Oregon	Surface
Leuresthes tenuis	California Grunion	Baja Calif. to San Francisco	To 60
FAMILY EXOCOETIDAE: FLYINGFISHES AND HALFBEAKS			
Cypselurus californicus	California Flying Fish	Baja Calif. to Astoria, Oregon	Epipelagic
FAMILY CYPINODONTIDAE: KILLIFISHES			
Fundulus parvipinnis	California Killifish	Baja Calif. to Morro Bay	Bays of S. Cal.
ORDER PLEURONECTIFORMES: FLATFISHES			
FAMILY BOTHIDAE: LEFTEYE FLOUNDERS			
Citharichthys sordidus	Pacific Sanddab	Baja Calif. to Bering Sea	30 to 1,800
C. stigmaeus	Speckled Sanddab	Baja Calif. to Alaska	10 to 1,200
C. xanthostigma	Longfin Sanddab	Costa Rica to Monterey Bay	8 to 444
Hippoglossina stomata	Bigmouth Sole	Gulf of Calif. to Monterey	100 to 450
Paralichthys californicus	California Halibut	Baja Calif. to British Columbia	Surface to 300
Pleuronichthys liolepis	Fantail Sole	Gulf of Calif. to Monterey Bay	15 to 260
FAMILY PLEURONECTIDAE: RIGHTEYE FLOUNDERS			
Eopsetta jordani	Petrale Sole	Baja Calif. to N. Gulf of Alaska	60 to 1,500
Glyptocephalus zachirus	Rex Sole	San Diego to Bering Sea	60 to 2,100
Hypsopsetta guttulata	Diamond Turbot	Baja Calif. to Cape Mendocino	5 to 150
Lepidopsetta exilis	Slender Sole[4]	Baja Calif. to Alsek Canyon, Ala.	250 to 1,700
Microstomus pacificus	Dover Sole	Baja Calif. to Bering Sea	90 to 3,000
Parophrys vetulus	English Sole	Baja Calif. to N.W. Alaska	60 to 1,000
Pleuronichthys coenosus	C-O Turbot	Baja Calif. to S.E. Alaska	Shallow to 210
P. decurrens	Curlfin Turbot	Baja Calif. to N.W. Alaska	60 to 1,146
P. ritteri	Spotted Turbot	Baja Calif. to Pt. Conception	4 to 150
P. verticalis	Hornyhead Turbot	Baja Calif. to N.W. Alaska	30 to 612
FAMILY CYNOGLOSSIDAE: TONGUEFISHES			
Symphurus atricauda	California Tonguefish	Baja Calif. to Humboldt Co.	5 to 276
ORDER TETRAODONTIFORMES: PLECTOGNATHOUS FISHES			
FAMILY MOLIDAE: MOLAS			
Mola mola	Ocean Sunfish	To British Columbia	Epipelagic

[1]Fishes expected in 100 feet.

[2]Geographic range and depth in accordance with Miller and Lea (1972).

[3]Common and Scientific names in accordance with American Fisheries Society Special Publication #6 (1970).

[4]Collected by Mearns (1971).

TABLE 2.2.2-II

FISH OTTER TRAWL CATCH RECORDS

Expressed as mean number per trawl

	OTTER TRAWL STATIONS												
	Mandalay[1]					Ormond Beach[2]				Mearns[3]			
Common Name	3	4	1	2	Mean Number per Station per Trawl	A	C	E	Mean Number per Station per Trawl	Shallow Water	Midwater	Deepwater	Mean Number per Station per Trawl
REQUIEM SHARKS													
Leopard Shark								0.12	0.04				
Gray Smoothhound Shark										0.14			
DOGFISH SHARKS													
Spiny Dogfish							0.06	0.81	0.30				
ANGEL SHARKS													
Pacific Angel Shark												0.20	
GUITARFISH													
Shovelnose Guitarfish	0.16		0.71	0.14	0.25	0.75			0.25		0.07		
Thornback Rays	0.33	0.16	1.29	0.43	0.44	2.50	2.06	0.56	1.71	0.14			
ELECTRIC RAYS													
Pacific Electric Ray										0.14	0.07		
EAGLE RAYS													
Bat Stingray			0.14		0.04		0.12		0.04				
ANCHOVIES													
Northern Anchovy	3.67	10.67	2.00	18.86	8.80	1.50	14.13	3.31	6.31	3.00			
LIZARD FISHES													
California Lizard Fish										0.14	0.23		
PIPEFISHES AND SEAHORSES													
Kelp Pipefish											0.15		
Pipefish, sp.	0.17	0.50	0.14	0.71	0.38	0.25			0.08				
GRUNTS													
Sargo								0.06	0.02				
DRUMS													
Queenfish	2.83	3.33	1.29	10.00	4.37	1.75	11.81	0.63	4.73	3.71	0.15		
White Croaker	6.50	15.00	4.57	11.43	9.38	1.25	8.00	3.88	4.38	6.42	0.45	0.20	
SURFPERCHES													
Barred Surfperch	2.17	1.67	7.14	4.86	3.96	4.25	5.63	7.69	5.86	0.57			
Black Perch		0.17	0.57	0.43	0.68		0.06	0.12	0.06	0.28			
Pile Perch	0.17			0.14	0.08		0.12	0.12	0.08				
Pink Seaperch											1.30	28.00	
Rubberlip Seaperch							0.63	1.56	0.73				
Shiner Perch	0.67	1.33	0.14	3.14	1.32	3.50	7.56	9.63	6.90		1.61		
Spotfin Surfperch	0.67	2.50	1.29	0.43	1.25	2.75	40.19	28.88	23.94	5.42	2.61		
Walleye Surfperch	2.17	1.67	2.14	4.86	3.96	1.75	4.19	3.00	2.98	0.71			
White Seaperch	6.17	2.67	3.29	2.86	3.75	6.75	9.69	3.88	6.77	1.71	0.61		
ROCKFISHES													
Bocaccio											0.07		
Chilipepper											0.23	2.00	
Cow Rockfish												0.40	
Greenstripe Rockfish				0.14	0.04							0.20	
Olive Rockfish										0.14			
Shortbelly Rockfish												0.40	
Stripetailed Rockfish												15.80	
COMBFISHES													
Longspine Combfish										2.42	6.92	44.40	
Shortspine Combfish											0.07	5.40	
SCULPINS													
Bonehead Sculpin						1.25	0.50		0.58				
Pacific Staghorn Sculpin	0.17		0.71		0.22	2.00	0.75	0.25	1.00	0.14			
Red Irish Lord						0.25			0.08				
Roughback Sculpin											0.23		
Spotfin Sculpin												0.40	
Yellowchin Sculpin											7.84	12.60	

TABLE 2.2.2-II - continued

FISH OTTER TRAWL CATCH RECORDS

Expressed as mean number per trawl

	OTTER TRAWL STATIONS												
	Mandalay[1]					Ormond Beach[2]				Mearns[3]			
Common Name[4]	3	4	1	2	Mean Number per Station per Trawl	A	C	E	Mean Number per Station per Trawl	Shallow Water	Midwater	Deepwater	Mean Number per Station per Trawl
POACHERS													
Bluespot Poacher												1.00	0.33
Pricklebreast Poacher				0.14	0.04								
Pygmy Poacher										0.14	0.53	1.20	0.62
CLINIDS													
Sarcastic Fringehead										0.14			0.04
EELPOUTS													
Blackbelly Eelpout												2.20	0.73
CUSK-EELS													
Spotted Cusk-eel						0.25			0.08			0.20	0.07
BUTTERFISHES													
Pacific Pompano							0.56	0.19	0.25				
LEFT-EYED FLOUNDERS													
Bigmouth Sole							0.06		0.02	0.14	0.38	1.80	0.77
California Halibut							0.06		0.02	0.14	0.07		0.07
Dover Sole												25.20	8.40
Fantail Sole							0.06		0.02		0.23	0.20	0.14
Longfin Sanddab											0.07	0.07	0.04
Pacific Sanddab							0.06		0.02	3.28	76.69	210.40	96.79
Slender Sole												4.80	1.60
Speckled Sanddab	1.00	3.17	6.14	3.57	3.47	36.25	20.38	8.63	21.75	96.57	90.76	69.00	85.44
RIGHT-EYED FLOUNDERS													
C-O Turbot						3.25	0.19	0.06	1.33	2.57	0.38		0.98
Curlfin Turbot							1.25	1.38	0.88	9.14	10.53	3.00	7.55
Diamond Turbot							0.06		0.02	0.14	0.07		0.07
Dover Sole													
English Sole				0.29	0.08		0.75	0.88	0.54	0.57	3.23	12.40	5.40
Hornyhead Turbot			0.43		0.11	2.50	1.63	0.19	1.44	5.71	6.23	2.20	4.71
Rex Sole							0.06		0.02	3.28	76.69	210.40	96.79
TONGUEFISHES													
California Tonguefish						2.25	0.32		0.86	1.57	3.23	6.60	3.80
TOADFISHES													
Plainfin Midshipman				0.14	0.04			0.06	0.02		1.00	22.20	7.73
Specklefin Midshipman										0.28	0.38		0.22

[1] Mandalay Trawl Data based on six trawls for stations 3 & 4, and 7 trawls per station for stations 1 & 2: December 28, 1971; May 3, August 21-22, and November 13, 1972.

[2] Ormond Beach Trawl data based on 8 trawls per station: December 15, 1971; June 20, August 6, and November 6, 1972.

[3] Mearns data based on the following: Shallow water, stations 1, 2, 22, 23, 51, 52.
Midwater, stations 3-8, 24-26, 48, 50.
Deepwater, stations 9, 10, 11, 27, 47.

[4] Common names in accordance with American Fisheries Society Special Publication #6, 1970. See Table 2.2.2-I for scientific name equivalents.

Reference: Intersea Research Corporation (1972a-i, 1973a-c); Mearns (1971, unpublished).

TABLE 2.2.2-III

DOMINANT SURF AND BAY FISHES OF SOUTHERN CALIFORNIA[1]

Depth roughly 0-10 feet, rankings as indicated
(1 is most abundant)

SKATES AND RAYS

Shovelnose Guitarfish (17)

STINGRAYS

Round Stingray (15)

ANCHOVIES

Deepbody Anchovy (10)
Northern Anchovy (1)
Slough Anchovy (11)

PIPEFISHES AND SEAHORSES

Bay Pipefish (20)

DRUMS

California Corbina (9)
Queenfish (2)
Spotfin Croaker (18)
White Croaker (8)

SURFPERCHES

Barred Surfperch (3)
Dwarf Surfperch (19)
Shiner Perch (5)
Walleye Surfperch (4)
White Seaperch (13)

SCULPINS

Pacific Staghorn Sculpin (7)

SILVERSIDES

California Grunion (14)
Jacksmelt (12)
Topsmelt (6)

FLATFISHES

California Halibut (16)
Diamond Turbot (21)

[1]Data from Carlisle, et al. (1960), based on 451 beach seinings taken between February 1953 and September 1956. Seines were taken in 11 different localities between El Capitan State Beach (Santa Barbara County) and North Island (San Diego Bay, San Diego County). The over 128,000 fishes captured were taken from open coasts, bays, and estuaries. Common names in accordance with American Fisheries Society Special Publication #6 (1970). See Table 2.2.2-I for scientific name equivalents.

TABLE 2.2.2-IV

DOMINANT SHALLOW WATER BENTHIC FISHES OF THE PORT HUENEME REGION

Depth roughly 10-40 feet, rankings as indicated (1 is most abundant)

	Data Source		
	Mandalay[1]	Ormond Beach[2]	Mearns[3]
THORNBACK RAYS			
Thornback Ray[4]	-	10	-
ANCHOVIES			
Northern Anchovy	8	5	5
DRUMS			
Queenfish	4	7	4
White Croaker	2	8	2
SURFPERCHES			
Barred Surfperch	7	6	-
Shiner Perch	6	3	-
Spotfin Surfperch	9	1	3
Walleye Surfperch	3	9	-
White Surfperch	1	4	7
SCULPINS			
Pacific Staghorn Sculpin	-	13	-
FLATFISHES			
C-O Turbot	-	12	-
Curlfin Turbot	-	-	6
Hornyhead Turbot	-	11	-
Speckled Sanddab	5	2	1

[1]Data from Intersea Research Corporation (1972a,d,g,i; 1973c), trawl stations T_1 - T_4. Total trawls, 26. See Plate 2.2.2-2 for locations.

[2]Data from Intersea Research Corporation (1972b,c,e,f,h; 1973a,b), trawl stations A,C, and E. Total trawls, 24. See Plate 2.2.2-3 for locations.

[3]Data from Mearns (1971, unpublished), trawl stations 1, 2, 22, 23, 51, 52. Total trawls, 6. See Plate 2.2.2-4 for location.

[4]Common names in accordance with American Fisheries Society Publications #6 (1970). See Table 2.2.2-I for scientific name equivalents.

TABLE 2.2.2-V

DOMINANT DEEPWATER BENTHIC FISHES OF THE PORT HUENEME REGION[1]

Depth roughly 250-600 feet rankings as indicated (1 is most abundant)

SURFPERCHES
- Pink Seaperch (4)[2]

ROCKFISHES
- Chilipepper (13)
- Stripetail Rockfish (7)

COMBFISHES
- Longspine Combfish (4)

SCULPINS
- Yellowchin Sculpin (9)

FLATFISHES
- California Tonguefish (11)
- C-O Turbot (12)
- Curlfin Turbot (8)
- Dover Sole (6)
- Hornyhead Turbot (9)
- Pacific Sanddab (1)
- Speckled Sanddab (2)

TOADFISHES
- Plainfin Midshipman (3)

---

[1]Data from Mearns (1971, unpublished), Stations 9-11, 27, 47. Rankings based on 5 otter trawls. See Plate 2.2.2-4 for locations.

[2]Common name in accordance with American Fisheries Society Special Publication #6 (1970). See Table 2.2.2-I for scientific name equivalents.

TABLE 2.2.2-VI

RECURRENT GROUP ANALYSIS* OF FISHES TAKEN IN 448 OTTER TRAWLS IN SOUTHERN CALIFORNIA

Port Hueneme to Dana Point

(Statistical Index of Affinity = 0.50)

Recurrent Group 1

Dover Sole
Pacific Sanddab
Pink Seaperch
Plainfin Midshipman
Shortspine Combfish
Stripetail Rockfish
(Bigmouth Sole, 0.33)

Recurrent Group 2

California Tonguefish
English Sole
Hornyhead Turbot
Speckled Sanddab

Recurrent Group 3

Northern Anchovy
Queenfish
White Croaker
(Shiner Perch, 0.33)

Recurrent Group 4

California Rattail
Catalina Conger
Starry Skate

Recurrent Group 5

Blackbelly Eelpout
Rex Sole
Slender Sole
(Blacktip Poacher, 0.33)

Recurrent Group 6

Yellowchin Sculpin
Longspine Combfish

Recurrent Group 7

Walleye Surfperch
Black Perch

*See Fager (1957, 1963) for explanation of recurrent group analysis.

Reference: Mearns (1971, unpublished).

TABLE 2.2.2-VII

SPORTFISH CATCH OF THE PORT HUENEME REGION

FISH BLOCK #683

Species[1]	Year 1967	1968	1969	1970	1971	Total Number
SALMON						
King Salmon[2]	6					6
Silver Salmon	9					9
Unid. Salmon	1	72				73
SEA BASSES						
Kelp Bass	250	1,249			430	1,929
Rock Seabass	12,470	1,080	950	5,738	1,687	21,925
Barred Sand bass	105	499	15	1,235	37	1,854
OCEAN WHITEFISHES						
Ocean Whitefish	10	1	20			31
JACKS						
Jack Mackerel	3	2				5
DRUMS						
White Croaker	633	103		150		886
White Seabass	7		5	2	11	25
HALFMOONS						
Halfmoon					1,085	1,085
WRASSES						
California Sheephead	107	43		2	49	201
MACKERELS						
Pacific Bonito	1,480	162	49	441		2,132
Pacific Mackerel	28	21				49
ROCKFISHES						
Cow Rockfish	8	104	130	62	148	485
Lingcod	224	190	426	327	263	1,430
Saltwater Perch			2		28	30
Unid. Rockfish	28,395	47,326	20,829	26,260	21,564	144,374
SCULPINS						
Cabezon	30	18	7	6	3	64
Sculpin	662	214	8	6	112	1,002
FLATFISHES						
California Halibut	494	115	97	81	54	841
Flounders	195	421	81	81	86	864
Sanddabs	3			20		23
BARRACUDAS						
Pacific Barracuda	156	8				164
MISC. FISHES		12				12
TOTAL FISH	45,277	51,640	22,625	34,411	25,557	179,426
TOTAL NO. ANGLER HRS	301,396	20,679	8,806	15,412	10,975	357,268

[1]Some of these fish are caught in depths greater than 100 feet.
[2]Common names from California Fish and Game Species List (no date, unpublished).
Reference: California Fish and Game Sportfish Catch Records, Long Beach Facility.

TABLE 2.2.2-VIII

DOMINANT PIER, JETTY, AND OPEN COAST SPORTFISHES

	As Percentage of Each Class	
	Piers & Jetties	Open Coast
SHARKS		
Unspecified	-	1.0
ANCHOVIES		
Northern Anchovy*	1.6	-
SEA BASSES		
Kelp and Barred Sand Bass	2.5	1.0
GRUNTS		
Sargo	-	1.1
WRASSES		
Unidentified	-	1.0
DRUMS		
California Corbina	-	12.6
Queenfish	19.7	-
White Croaker	18.5	-
Yellowfin Croaker	-	1.8
SEA CHUBS		
Halfmoon	-	3.6
Opaleye	1.7	14.2
SURFPERCHES		
Barred Surfperch	36.4	1.3
Black Perch	3.5	10.8
Pile Perch	-	1.0
Shiner Perch	7.2	-
Walleye Surfperch	7.7	5.3
White Seaperch	1.0	1.4
MACKERELS AND TUNAS		
Pacific Bonito	15.3	-
Chub Mackerel	3.1	-

TABLE 2.2.2-VIII - continued

DOMINANT PIER, JETTY, AND OPEN COAST SPORTFISHES

	As Percentage of Each Class	
	Piers & Jetties	Open Coast
SCULPINS		
Cabezon	-	1.2
Pacific Staghorn Sculpin	-	1.0
BARRACUDAS		
California Barracuda	0.9	-
SILVERSIDES		
Jack & Topsmelt	3.9	-
FLATFISHES		
California Halibut	3.1	-
Miscellaneous entries	9.0	6.7
TOTALS	100.0	100.0

* Common name as per American Fisheries Society Special Publication #6 (1970). See Table 2.2.2-I for scientific name equivalents.

Reference: Pinkas, et al., 1968.

TABLE 2.2.2-IX

COMMERCIAL FISH LANDINGS OF THE PORT HUENEME REGION

FISH BLOCK #683

Species	Year 1967	1968	1969	1970	1971	Total Pounds
SHARKS						
		29				29
Leopard Shark[1]						46
Soupfin Shark	46				30	78
Thresher Shark	48			18	123	1,847
Unid. Sharks	1,576	130				
RAYS						
Shovelnose Guitarfish		112				112
ANCHOVIES						
Northern Anchovy	1,002,242	2,064,085	1,876,558	253,300	2,880,221	8,076,406
CROAKERS						
				1,200		2,025
Queenfish	825			800		2,015
White Croaker	1,115	100			52	2,531
White Seabass	2,479					
MACKERELS AND TUNAS						
Pacific Bonito	78,430	96,100	222,912	295	3,528	401,265
JACKS						
Jack Mackerel	22,500	76,745	35,130	43,100		177,475
ROCKFISHES						
Boccacio		54				54
Lingcod				450		450
Red Rockfish	3,737					3,737
Unid. Rockfish	131,044	33,684	46,240	19,790	34,280	265,038
SURFPERCHES						
California Sheephead	112					112
BUTTERFISHES						
California Butterfish	10	368	200	1,450		2,028
FLATFISHES						
California Halibut	6,848	2,520	668	139	3,060	13,285
Dover Sole	630	860				1,490
English Sole	4,615	1,955	4,155	495	23,730	34,950
Petrale Sole	3,620	3,345	720	1,440	2,360	11,485
Rex Sole	1,025	1,270	945	170	1,345	4,755
Sanddab (unid.)		90				90
Unid. Sole	64					64
Unid. Turbot		430		425		855
MISC. FISHES	48,901	24,610	4,980	2,065	29,680	110,236
Pink Abalone					102	102
Squid		2,785		22,000		24,785
Rock Crab		12			16	28
Spiny Lobster	1,960	75				2,035
TOTAL NUMBER	2,016,797	2,309,129	2,193,368	347,137	2,978,527	9,844,958

Reference: California Fish and Game Commercial Fish Landings, Long Beach Facility.
Common names from California Fish and Game Species List (unpublished).

TABLE 2.2.2-X

MARINE MAMMALS* EXPECTED IN THE PORT HUENEME REGION

Scientific Name	Common Name	Common	Uncommon	Rare	Migratory	Observed
ORDER CARNIVORA: MARINE CARNIVORES						
SUBORDER PINNIPEDIA: SEALS, SEALIONS, AND ELEPHANT SEALS						
FAMILY OTARIIDAE: EARED SEALS AND SEA LIONS						
Callorhinus ursinus	Northern Fur Seal			X		
Eumetopias jubata	Steller Sea Lion	X[1]				
Zalophus californianus	California Sea Lion	X[1]				
FAMILY PHOCIDAE: HAIR AND EARLESS SEALS						
[P]Mirounga angustirostris	Northern Elephant Seal	X[1]				
Phoca vitulina	Harbor Seal	X[2]				X[4]
ORDER CETACEA: WHALES, PORPOISES, AND DOLPHINS						
SUBORDER MYSTICETI: BALEEN WHALES						
FAMILY ESCHRICHTIDAE: GRAY WHALES						
[P]Eschrichtus gibbosus	California Gray Whale				X	
SUBORDER ODONTOCETI: TOOTHED WHALES AND PORPOISES						
FAMILY PHOCOENIDAE: PORPOISES						
Delphinus delphis bairdi	Common Dolphin	X[3]				
Tursiops truncatus gilli	Pacific Bottlenosed Dolphin		X			
FAMILY DELPHINIDAE: OCEAN DOLPHINS						
Lagenorhynchus obliguidens	White-sided Dolphin	X[3]				
Orcinus orca	Killer Whale		X			
Phocoena phocoena	Harbor Porpoise		X			

*All Marine mammals are fully protected; reference U.S. Government Public Law 95-522 (1972), Marine Mammal Act, 1972.
[1]On offshore islands.
[2]Possibly in protected harbors.
[3]Considered common in offshore waters.
[4]Observed one (1) harbor seal within Channel Islands Harbor, 19 September 1973.
P=Protected in California; California Fish and Game Code, Article 1, Sections 900-903; 3511; 4700; 5050; 5152.

TABLE 2.2.2-XI

INTERTIDAL INVERTEBRATES OF ORMOND AND MANDALAY BEACHES

Scientific Name	Common Name	Ormond Beach Collection Sites[1] I-1	I-2	I-3	I-4	I-5	I-6	I-7	I-8	Total
PHYLUM ANNELIDA: SEGMENTED WORMS										
CLASS POLYCHAETA: BRISTLE WORMS										
Glyceridae, unid.	Glycerid Worm		3[2]							3
Hemipodus borealis[3]	Glycerid Worm	1	2							3
Nephtys californiensis	Polychaete Worm			1	7	6		1		15
Nerinides acuta	Polychaete Worm		2							2
PHYLUM ARTHROPODA: JOINT LEGGED ANIMALS										
CLASS MALOCOSTRACA: MALOCOSTRACANS										
ORDER ISOPODA: PILLBUGS										
Excirolana chilton[3]	Pillbug									
Tylos punctatus[3]	Pillbug									
ORDER AMPHIPODA: BEACH HOPPERS										
Orchestoidea columbiana[3]	Beach Hopper									
O. minor[3]	Beach Hopper									
ORDER DECAPODA: CRABS AND SHRIMP										
Emerita analoga[3]	Sand Crab	2	8	23	13	64	8	15	4	137
Paguridae, unid.			1							1
PHYLUM MOLLUSCA: MOLLUSCS										
CLASS PELECYPODA: CLAMS										
Donax gouldii	Bean Clam			1	1		1		1	4
Tivela stultorum	Pismo Clam				1	2		1	1	5

[1]Collection made at water's edge and every 3 meters inland to a maximum of 11 meters, See Plate 2.2.2-8 for collection stations.

[2]Numbers indicate total per station per sample.

[3]Observed at Mandalay Beach; at various stations from the Mandalay outfall to 1,200 feet north and south of the outfall point.

Reference: Intersea Research Corporation: Ormond Beach & Mandalay Beach Studies (1972a-i), (1973a-c).

TABLE 2.2.2-XII

SUBTIDAL INVERTEBRATES NORTH[1] AND SOUTH[2] OF PROPOSED SITE

Scientific Name	Common Name	COLLECTION STATIONS[3] North 1	2	3	4	5	6	C 1	2	3	4	South D 1	2	3	4	1	2	3
PHYLUM PROTOZOA: FORAMS AND CILIATES																		
Ciliata, unident.											X							
Cornuspira, spp.	Foram										X							
Dentatatum sp.	Foram											X						
Elphidiella sp.	Foram								X		X							
Elphidium sp.	Foram								X		X	X						
Folliculina sp.	Foram								X		X		X	X	X	X		
Foraminifera, unident.								X	X	X	X	X	X	X	X	X		
Gromia oviformis	Testate Protozoan							X	X	X	X	X	X	X	X	X		
"Gromia"-like protozoan													X	X	X	X		
Haplophragmoides sp.	Foram										X							
Nonion sp.	Foram									X	X				X			
Nonionella sp.	Foram									X	X			X	X			
Quinqueloculina sp.	Protozoan										X							
Reophax sp.	Foram													X	X			
?Spiroloculina sp.	Foram												X					
testate protozoan, unident.								X			X				X			
Triloculina sp.	Foram												X		X	X		
Vorticellidae, unident.												X						
Zoothamnium? sp.	Ciliate Protozoan													X				
PHYLUM CNIDARIA: JELLYFISH, ANENONES, & HYDROIDS																		
Aglaophenia dispar	Hydroid																	
A. epizoica	Hydroid										X							
Aglaophenia sp.	Hydroid	D[4]									X		X	X	X			
Anthozoa, unident.												X	X			X		
Campanulariidae, unident.									X	X	X			X	X			
Campanulina sp.	Hydroid										X							
Clytia bakeri	Hydroid								X									
Corynidae, unident.										X								
Harenactis attenuata	Burrowing Anemone							X			X		X					
Hydrallmania distans	Onidarian									X				X				
Hydroid, thecate, unident.								X	X	X	X	X	X	X	X			
Hydromedusa, unident.									X					X				
Medusae, unident.									X									
Obelia commissuralis	Hydroid							X										
O. ?geniculata	Hydroid												X					
Obelia sp.	Hydroid										X		X		X			
Pelagia panopyra	Jellyfish											X						
Phialella quadrata	Hydroid							X						X				
Plumularia ?alicia	Hydroid														X			
Plumularidae, unident.													X					
Renilla kollikeri	Sea Pansy								X	X			X					
Stylatula elongata	Sea Pen								X	X					X			
Tubularia ?marina	Solitary Hydroid													X				
Zaolutus actius	Burrowing Anemone									X								
PHYLUM PLATYHELMINTHES: FLATWORMS																		
Platyhelminthes, unident.		X	X	X	X	X	X			X	X	X	X	X	X	X		
PHYLUM NEMERTEA: RIBBONWORMS																		
Nemertea, unident.		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
Cerebratulus californiensis	Ribbonworm	X		X		X								X				
Tubulanus ?pellucidus	Ribbonworm																	
PHYLUM NEMATODA: ROUNDWORMS																		
Nematoda, unident.			X	X	X	X	X		X	X	X	X	X	X	X	X		
PHYLUM ECTOPROCTA: MOSS ANIMALS																		
Alcyonidium mammillatum	Bryozoans														X			
Alcyonidium sp.		D					D								X			
Bugula neritina											X							
Bugula sp.									X									
Celleporella hyalina											X		X					
Fenestrulina sp.											X				X			
Filicrisia sp.		D				D			X									
Membranipora sp.										X	X							
Scrupocellaria sp.													X		X			
Victorella argilla											X							
PHYLUM BRACHIOPODA: LAMPSHELL CLAMS																		
Glottidia albida	Tongue Clam						X				X							

TABLE 2.2.2-XII - continued

SUBTIDAL INVERTEBRATES NORTH[1] AND SOUTH[2] OF PROPOSED SITE

Scientific Name	Common Name	COLLECTION STATIONS[3] North 1	North 2	North 3	North 4	North 5	North 6	South C 1	South C 2	South C 3	South C 4	South D 1	South D 2	South D 3	South D 4	South E 1	South E 2	South E 3	South E 4
PHYLUM PHORONIDIA; PHORONID WORMS																			
Phoronis sp.	Phoronid		X	X	X		X					X	X			X	X	X	X
PHYLUM ANNELIDA; WORMS	Polychaete Worms									X	X								X
Amaeana occidentalis			X		X		X				X								X
Amphicteis scaphobranchiata			X	X		X	X				X				X				X
Amphitrite williamsi										X	X				X				
Amphitritinae sp.											X								
Axiothella lopezi									X	X	X		X	X	X	X	X	X	X
Axiothella bioculata					X	X				X	X		X	X	X				X
Axiothella sp.									X		X								
Boccardia tricuspa																X			
Capitellidae, unident.		X	X	X	X	X	X	X			X			X	X	X		X	X
Capitella capitata								X	X							X			
Cirratulidae, unident.								X	X	X	X		X	X	X		X	X	X
Cistenides gouldi		X	X	X	X	X	X				X		X						
Clymenella sp.											X								X
Clymenidae, unident.											X								
Cossuridae, unident.									X	X	X		X	X	X		X	X	X
Dasybranchus caducus			X	X		X	X		X	X	X		X	X	X		X	X	X
Dasybranchus sp.			X					X		X									X
Diopatra ornata									X	X	X		X	X	X		X	X	X
E. splendidissima																			
Eteone sp.			X					X		X									X
Exogone dispar		X	X	X	X	X	X				X								
Exogone sp.										X	X				X			X	X
Galathowenia oculata																			X
G. vancouveri										X									
Glycera sp.											X			X	X		X		X
Goniada maculata											X								X
Goniada sp.										X									
Haploscoloplos crescentis										X									
Haploscoloplos sp.											X								X
Harmothoe imbricata											X								
H. uniformis											X								
Hesionidae sp.		X	X	X	X	X	X		X		X		X					X	
Hesperonoe armigera			X	X	X		X				X				X				X
Hesperonoe brunnea									X						X	X			X
H. listrocea		X	X	X	X	X	X		X	X	X				X		X	X	
Heteromastus brevisetosa															X			X	
H. lineatus											X		X		X				
Hyperoniciphoa elongatus		X	X	X	X	X	X		X	X	X	X	X	X	X		X	X	X
Hyperoniciphoa imbricata										X			X	X					
H. stigis			X	X	X		X				X		X	X	X	X		X	X
Hyperoniciphoa borealis																			
Leitoscoloplos heterochaeta														X					
Leitoscoloplos sp.																			
Lumbrineris minima														X	X				
Lumbrineris sp.																			
Magelona californica			X	X	X		X			X	X	X			X	X		X	X
M. rosacea											X	X			X	X		X	X
Magelona sp.										X		X		X	X	X			X
Maldanidae, unident.		X	X	X	X	X	X												X
Mediomastus ambiseta						X		X								X			
M. californiensis		X	X	X	X	X	X		X					X		X			X
Nephtys caecoides								X	X	X		X	X		X	X	X		X
Nephtys californiensis		X	X	X	X	X	X			X	X								
Nereis (Neanthes) virens											X			X	X			X	X
Nereidae, unident.		X	X	X	X	X	X				X								
Nereis latescens											X								
N. procera							X			X	X		X		X				X
Nicomache sp.										X	X								
Nicomache acuta											X		X		X				X
N. kinbergiana		X		X		X		X	X			X	X			X		X	X
Notomastus phosphorea			X		X		X				X				X				X
Onuphidae, unident.											X								
Onuphis iridescens											X				X				X
Ophelina acuminata											X								X
Orbiniidae, unident.			X							X	X		X	X	X			X	X
Owenia collaris											X			X	X	X			X
O. fusiformis		X	X	X	X	X	X				X								
Paraonella bellis										X	X								
Paraonella gracilis oculata									X	X	X			X	X			X	X
Paraonis sp.											X								
Pectinaria californiensis		X	X	X	X	X	X				X								X

SUBTIDAL INVERTEBRATES NORTH[1] AND SOUTH[2] OF PROPOSED SITE

Scientific Name	Common Name	COLLECTION STATIONS[3] North 1	2	3	4	5	6	South C 1	2	3	4	South D 1	2	3	4			
PHYLUM ANNELIDA: WORMS (continued)																		
Pherusa sp.	Polychaete Worms									X	X							
Phyllochaetopterus sp.													X		X			
Phyllodocid, juvenile										X	X				X			
Pionosyllis sp.													X	X	X			
Pista pacifica													X					
Pista sp.									X									
Platynereis bicanaliculata													X					
Polycirrus sp.																		
Polydora limicola		X				X							X		X			
Polydora sp.		X	X	X	X	X	X				X							
Polynoidae, unident.													X	X				
Polyophthalmus pictus			X	X	X		X											
Prionospio cirrifera													X					
P. pinnata			X			X	X											
P. pygmaeus		X	X	X	X	X	X		X									
Prionospio sp.									X									
Pseudopotamilla sp.															X			
Scionides sp.																		
Scolplos acmaceps																		
Scoloplos sp.		X	X	X	X	X	X	X	X	X	X		X	X	X			
Sigalionidae, unident.																		
Sphaerosyllis californiensis																		
Sphaerosyllis nr. californiensis																		
S. pirifera													X	X				
Spionidae, unident.														X				
Spiophanes bombyx		X	X	X	X	X	X			X								
S. missionensis																		
Spiophanes sp.							X	X	X									
Sthenelais verruculosa		X		X		X	X		X					X				
Sthenelais sp.											X							
Sthenolepis fimbriarum		X		X	X	X	X			X								
Syllidae, unident.											X			X				
Telepsavus costarum									X	X	X		X	X	X			
Terebellidae, unident.			X								X							
Thalenessa spinosa			X		X		X			X	X				X			
Tharyx parvus											X				X			
Travisia gigas								X										
Typosyllis cf. armillaris											X			X				
T. fasciata														X				
T. hyalina									X	X	X				X			
Typosyllis sp			X		X		X				X							
Hirudinea, unident.	Leeches										X							
PHYLUM SIPUNCULIDA: PEANUT WORMS																		
Sipunclulid, unident.								X	X	X	X		X	X	X	X		
?Siphonosoma sp.	Sipunculid														X			
PHYLUM ECHIUROIDA: ECHIUROID WORMS																		
Echiuroid, unident.											X							
PHYLUM ARTHROPODA: JOINT-LEGGED ANIMALS																		
Alteutha sp.	Copepod								X				X	X	X	X		
Ammothea sp.	Sea Spider										X							
Ampelisca sp.	Gammarid																	
Amphipoda, unident.								X	X	X	X		X	X	X	X		
Ampithoe sp.	Gammarid													X				
Anatanais normani	Tanaid													X				
Anchicolurus occidentalis	Cumacean							X	X		X		X		X	X		
Ancinus granulatus	Isopod							X										
Anoplodactylus erectus	Sea Spider	X																
Anthuroidea, unident.																		
Aoroides columbiae	Gammarid									X	X			X	X	X		
Balanus concavus pacificus	Barnacle								X	X	X		X	X	X	X		
B. tintinnabulum	Barnacle															X		
Balanus sp.	Barnacle								X		X		X	X	X	X		
Blepharipoda occidentalis	Spiny Sand Crab							X	X				X	X				
Bodotriidae, unident.													X					
Brachyura, unident., juvenile									X						X			
Callipallene palpida	Sea Spider													X				
Cancer anthonyi	Edible Crab						X		X	X			X					

DAMES & MOORE

TABLE 2.2.2-XIIc

TABLE 2.2.2-XII - continued

SUBTIDAL INVERTEBRATES NORTH[1] AND SOUTH[2] OF PROPOSED SITE

		COLLECTION STATIONS[3]																			
		North						South													
								C				D				E					
	Common Name	1	2	3	4	5	6	1	2	3	4	1	2	3	4	1	2	3	4		
[illegible]	ARTHROPODA, JOINT-LEGGED ANIMALS (continued)																				
[illegible]	Edible Crab									X											
[illegible]	Edible Crab							X	X	X			X	X	X			X	X	X	
[illegible]	Edible Crab									X				X					X	X	
[illegible]	Edible Crab									X											
[illegible]	Edible Crab										X										
[illegible]	Edible Crab							X		X	X			X	X	X					X
[illegible]	Caprellid Shrimp										X			X		X			X	X	
[illegible]	Caprellid Shrimp										X										
[illegible]	Caprellid Shrimp										X			X		X			X	X	
[illegible]	Caprellid Shrimp		X				X			X	X							X			X
[illegible]	Caprellid Shrimp									X	X			X		X			X		
[illegible]									X	X	X			X	X	X			X	X	
[illegible]									X												X
[illegible]															X						
[illegible]								X			X				X						
[illegible]									X	X	X			X	X	X				X	X
[illegible]								X	X	X	X	X	X	X	X	X	X	X	X	X	X
[illegible]	Black-tailed Shrimp								X	X			X	X	X	X		X			X
[illegible]	Shrimp																				X
[illegible]								X	X	X	X		X		X			X	X	X	
[illegible]	Cumacean Shrimp									X	X				X						X
[illegible]	Cumacean Shrimp							X	X				X	X	X		X	X			X
[illegible]	Cumacean Shrimp										X				X	X			X	X	
[illegible]	Cumacean Shrimp										X				X						
[illegible]	Cumacean Shrimp							X	X		X		X			X					X
[illegible]	Cumacean Shrimp														X						
[illegible]	Cumacean Shrimp														X						
[illegible]	Caprellid Shrimp									X	X			X	X	X			X		X
[illegible]															X						
[illegible]	Cumacean	X	X	X	X	X	X	X	X	X	X		X	X	X	X		X	X	X	X
[illegible]	Isopod		X		X	X	X	X		X	X					X			X		X
[illegible]	Gammarid	X	X	X		X									X				X	X	
[illegible]	Gammarid						X								X		X				
[illegible]	Gammarid						X				X				X				X		X
[illegible]	Gammarid										X		X								X
[illegible]	Isopod														X						X
[illegible]									X	X	X				X	X					
[illegible]	Cumacean										X				X						X
[illegible]	Crab									X					X						X
[illegible]	Spider Crab									X	X				X						
[illegible]	Gammarid									X			X	X							X
[illegible]	Gammarid									X	X		X	X					X	X	
[illegible]	Hermit Crab														X			X	X		
[illegible]											X							X			
[illegible]	Isopod								X		X		X	X	X			X			X
[illegible]	Copepod																		X		
[illegible]	Cumacean								X	X								X	X		
[illegible]	Cumacean									X	X		X	X	X		X		X		
[illegible]	Sand Crab					X															
[illegible]	Tanaid										X				X						X
[illegible]	Decorator Crab									X	X										X
[illegible]	Decorator Crab														X						
[illegible]	Decorator Crab										X										
[illegible]	Gammarid	X				X		X	X												
[illegible]	Gammarid		X	X		X	X			X									X		
[illegible]	Gammarid										X										
[illegible]	Gammarid										X										
[illegible]	Gammarid				X		X								X						
[illegible]	Isopod		X		X	X	X		X	X	X		X	X	X			X	X	X	
[illegible]										X	X		X	X				X			
[illegible]										X				X					X		
[illegible]	Sea Spider										X										
[illegible]	Sea Spider										X										X
[illegible]	Crab		X																		
[illegible]									X	X	X		X	X	X		X	X	X	X	
[illegible]	Cumacean									X											
[illegible]									X	X	X		X	X	X		X	X	X	X	
[illegible]	Hermit Crab									X					X		X	X			

DAMES & MOORE

TABLE 2.2.2-XIId

SUBTIDAL INVERTEBRATES NORTH[1] AND SOUTH[2] OF PROPOSED SITE

Scientific Name	Common Name	COLLECTION STATIONS[3] North 1	2	3	4	5	6	South C 1	2	3	4	D 1	2	3	4			
PHYLUM ARTHROPODA: JOINT-LEGGED ANIMALS (continued)																		
P. parvus	Hermit Crab								X									
Paguristes sp.	Hermit Crab																	
Pagurus beringanus	Hermit Crab									X				X			X	
Pagurus ?beringanus	Hermit Crab															X	X	
P. granosimanus	Hermit Crab									X	X	X		X				
P. ?granosimanus	Hermit Crab									X				X	X	X		
P. hirsutiusculus	Hermit Crab													X	X			
Pagurus sp.	Hermit Crab									X	X							
Paraphoxus abronius	Gammarid									X			X	X				
P. bicuspidatus	Gammarid												X	X				
P. epistomus	Gammarid							X		X			X	X	X			
P. nr spinosus	Gammarid												X	X	X			
Paraphoxus sp.	Gammarid	X	X	X	X	X	X	X		X			X	X	X			
Parapleustes pugettensis	Gammarid																	
Parapleustes sp.	Gammarid																	
Philomedes loame	Gammarid																	
Philomedes longiseta	Gammarid								X	X	X		X	X	X			
Philomedes sp.	Gammarid								X	X	X			X	X			
Photidae, unident.											X							
Photis bifurcata	Gammarid									X	X			X	X			
P. brevipes	Gammarid									X	X							
P. ?lacia	Gammarid										X							
Photis sp.	Gammarid	X	X	X	X	X	X	X		X	X		X	X	X			
Podocerus brasiliensis	Gammarid									X			X					
Pugettia richii	Spider Crab										X							
Pycnogonida, unident.										X	X							
Randallia ornata	Crab									X				X	X			
Sarcotretes sp.																		
Spirontocaris cristata	Broken-back Shrimp																	
Spirontocaris sp.	Broken-back Shrimp																	
Synchelidium sp.	Gammarid	X	X	X	X	X	X	X	X	X	X		X	X	X			
Tiron biocellata	Gammarid									X	X							
Tritella laevis	Caprellid										X							
T. pilimana	Caprellid								X	X	X			X	X			
Tritella sp.	Caprellid									X	X			X	X			
PHYLUM MOLLUSCA: SNAILS AND CLAMS																		
CLASS GASTROPODA: SNAILS																		
Acanthodoris rhodoceras	Nudibranch																	
Acteocina sp.	Mud Snail		X				X				X							
A. harpa	Mud Snail								X	X								
Acteon punctocaelatus	Barrel Snail		X		X		X				X							
Amphissa sp.	Amphissa Snail								X									
Balcis micans	Snail																	
B. oldroydi	Snail								X	X	X			X	X			
Balcis sp.	Snail								X	X	X				X			
Bulla sp.	Bubble Snail																	
Corambella sp.	Nudibranch																	
Crepidula coei	Slipper Shell Snail									X					X			
C. norrisiarum	Slipper Shell Snail									X								
Crepidula sp.	Slipper Shell Snail										X							
Dendronotus sp.	Nudibranch																	
Epitonium bellastriatum	Wentletrap Snail													X				
E. fallaciosum	Wentletrap Snail																	
Epitonium sp.	Wentletrap Snail					X	X				X				X			
Forreria belcheri	Belcher's Murex										X				X			
Hermissenda crassicornis	Nudibranch									X	X				X			
Mangelia sp.	Snail														X			
Mangelidae, unident.															X			
Megasurcula carpenteriana	Carpenter's Turrid														X			
Mitrella aurantiaca	Dove Snail												X					
M. carinata	Carinate Dove Snail									X	X		X	X				
M. gausapata	Dove Snail																	
Mitrella sp.	Dove Snail										X							
Moellerria sp.	Snail										X							
Nassarius fossatus	Mud Snail							X	X	X	X		X	X	X			
N. perpinguis	Mud Snail	X	X	X	X	X	X	X	X	X	X		X	X	X			
Nassarius sp.	Mud Snail								X	X	X				X			
Nudibranchiata, unident.										X	X							

TABLE 2.2.2-XII - continued

SUBTIDAL INVERTEBRATES NORTH[1] AND SOUTH[2] OF PROPOSED SITE

Scientific Name	Common Name	COLLECTION STATIONS[3] North 1	North 2	North 3	North 4	North 5	North 6	South C 1	South C 2	South C 3	South C 4	South D 1	South D 2	South D 3	South D 4	South E 1	South E 2	South E 3	South E 4
PHYLUM MOLLUSCA: SNAILS AND CLAMS	(continued)																		
	Rock Snail										X								
	Rock Snail													X					
	Rock Snail														X				
	Rock Snail											X							
	Snail		X		X	X	X		X	X	X				X				X
	Olive Snail	X	X	X	X	X	X		X	X	X		X	X	X			X	X
	Olive Snail			X				X	X	X			X	X			X	X	X
	Olive Snail												X		X		X	X	X
	Olive Snail								X	X	X			X	X	X	X	X	X
	Snail										X				X				X
	Tectibranch Snail														X				
	Moon Snail	X	X	X	X	X	X			X									
	Moon Snail		X				X			X	X								
	Moon Snail							X					X						
	Moon Snail								X					X					
	Festive Murex														X				
	Snail														X				
	Snail										X				X				X
													X		X	X	X		X
	San Pedro Augur	X								X	X				X			X	X
	Pheasant Snail										X				X				X
	Snail				X										X				X
	Snail	X	X										X						X
										X	X				X				
PHYLUM PELECYPODA: CLAMS																			
	Cockle	X	X	X											X				
	Cockle		X	X													X		
	Basket Cockle										X				X		X		X
	Clam	X	X	X	X	X	X												
	Bean Clam											X				X	X		X
	Bean Clam							X		X	X						X	X	X
	Bean Clam									X									
	Clam								X		X								X
	Clam									X	X				X		X	X	
	Scallop									X	X		X		X				
	Nuttall's Lucine																		
						X													
	White Sand Clam	X	X	X	X	X	X												
	Mussel									X	X			X	X				X
	Mussel									X	X		X	X	X				X
	Mussel								X		X				X				X
	Mussel										X								
	Mussel												X		X		X		X
	Mussel									X									
	Nut Clam	X	X	X	X		X				X								
											X								
	Clam										X				X				X
	Clam		X								X				X				
	Cockle		X								X				X				
	Razor Clam	X	X	X	X	X	X		X		X		X				X	X	
	Razor Clam									X	X		X	X					
	Tellen Clam				X														
	Tellen Clam	X	X	X	X	X	X	X	X	X	X		X	X	X		X	X	X
	Tellen Clam								X	X	X			X				X	
	Thracia Clam										X		X	X	X		X	X	X
	Pismo Clam									X									
	Spiny Cockle	X		X	X	X		X					X	X	X		X	X	
																		X	
											X								
		X	X		X	X	X	X	X	X	X		X	X	X	X		X	X	X
															X	X			
PHYLUM CEPHALOPODA: OCTOPUS AND SQUID																			
	Octopus														X				

TABLE 2.2.2-XII - continued

SUBTIDAL INVERTEBRATES NORTH[1] AND SOUTH[2] OF PROPOSED SITE

Scientific Name	Common Name	COLLECTION STATIONS[3] North 1	2	3	4	5	6	South C 1	2	3	4	D 1	2	3	4	1	2	3
CLASS SCAPHOPODA: TUSK SHELLS																		
Dentalium neohexagonum	Scaphopod									X								
Dentalium sp.	Scaphopod	X	X		X		X											
PHYLUM ECHINODERMATA: URCHINS, STARFISH & SEA CUCUMBERS																		
Amphiodia occidentalis	Brittle Star	X			X		X				X							
Astropecten brasiliensis armatus	Sand Star								X		X							
A. verrilli	Sand Star									X	X							
Dendraster excentricus	Sand Dollar			X	X	X		X	X	X	X	X	X	X	X			
Echinoidea, unident.											X							
Holothuroidea, unident.																		
Leptosynapta albicans	Sea Cucumber																	
Leptosynapta sp.	Sea Cucumber																	
Molpadia arenicola	Sweet Potato Cucumber														X			
Ophiuroidea, unident.														X				
Pisaster brevispinus	Pink Sea Star										X			X	X			
PHYLUM HEMICHORDATA: ACORN WORMS																		
Enteropneusta, unident.																		

[1]North: Data from Mandalay Beach Generating Station Study, Intersea Research Corporation (1972a,d,g,i; 1973c).
[2]South: Data from Ormond Beach Generating Station Study, Intersea Reseach Corporation (1972b,c,e,f,h; 1973a,b).
[3]See Plates 2.2.2-9, -10 for station locations.
[4]D=Drift.
X=Observed in Intersea Study.

TABLE 2.2.2-XIII

SUBTIDAL INVERTEBRATES OF ORMOND BEACH STATIONS A AND B

Scientific Name	Common Name	Depth (ft)	Number of Organisms[1] per 30 m^2 Station A[4] 10	20	30	40	Total	Station B[4] 10	20	30	40	Total
PHYLUM PROTOZOA: ONE-CELLED ORGANISMS												
CLASS CILIATA: CILIATES												
Tintinnina sp.	Testate Protozoan		P			S						
Nebela militaris (unid.)					P				P	P		
Arcellinida sp.	Testate Protozoan		P									
CLASS FORAMINIFERA: FORAMS												
Elphidium sp.	Foram				P	P						
Rotalia sp.	Foram			8	1	2	11					
Bolivina sp.	Foram				S							
Textularia sp.				P	S	1			P	4	P	
Foraminifera (unid.)	Testate Protozoan					S			S	S	S	
Arcella vulgaris	Testate Protozoan					1	1		5	2	2	9
Miliolina sp.	Foram					2	2					
Quinqueloculina sp.	Foram				P	2						
Miliolina sp.	Foram								1			1
PHYLUM CNIDARIA: JELLYFISH, ANEMONES, HYDROIDS												
CLASS HYDROZOA: HYDROIDS												
Aglaophenia sp.	Ostrich-plume Hydroid					P				P	P	
A. sphinx	Ostrich-plume Hydroid					P						
Calyptoblastea (unid.)	Hydroid										1	
Hydromedusae (unid.)					1				3	5	P	
Thecate hydroids (unid.)					P				P	P	P	
CLASS SCYPHOZOA: JELLYFISH												
Scyphomedusae (unid.)						1	1		1			1
CLASS ANTHOZOA : ANEMONES												
Renilla reniformis	Burrowing Anemone			2	2		4	2				2
Stylatula elongata	Sea Pen		2	11	1		14		P			
Renilla mullikeri	Sea Pen				2		2			9	1	10
Renilla reniformis	Burrowing Anemone			7	28	11	46[2]			4	3	7
Actiniaria (unid.)				2	1		3					
PHYLUM PLATYHELMINTHES: FLATWORMS												
Turbellaria (unid.)			4	2	1	23	30		1	1		2
PHYLUM NEMERTEA: RIBBONWORMS												
Nemertinea (unid.)			1	2	12	35	50	1	3	2	2	8
PHYLUM NEMATODA: ROUNDWORMS												
Nematoda (unid.)			1	2	29	70	102		30	33	44	107
PHYLUM BRACHIOPODA: LAMPSHELL CLAMS												
Glottidia albida	Tongue Clam					1	1				1	1
PHYLUM ECTOPROCTA												
Bugula neritina	Palmate Bryozoan			P								
Hippodiplosia insculpta	Bryozoan					P						
PHYLUM ANNELIDA: WORMS												
CLASS POLYCHAETA: BRISTLE WORMS												
Aphelochaeta sp.	Polychaete Worms					7	7				2	2
Spiophanes bombyx						8	8				1	1
Armandia brevis											1	1
Magelona sp.				94	67	47	208[2]			1	25	26
Nereis limbata						2	2			1	6	7
Capitella capitata											1	1
Diopatra sp.					1	4	5					
Glycinde solitaria			1		1		2					
Nephtys picta			2	3	10	15	30	5	3	8	7	23
E. ingens				51	89	385	525[2]			50	489	539
Prionospio heterobranchia				3	62	21	86		2	17	9	28

SUBTIDAL INVERTEBRATES OF ORMOND BEACH STATIONS A AND B

Scientific Name	Common Name	Depth (ft)	Number of Organisms[1] per 30 m^2 Station A* 10	20	30	40	Total	Station B* 10	20	30	40	Total
CLASS POLYCHAETA: BRISTLE WORMS (cont.)												
Eudistylia polymorpha					2		2					
Eumida sanguinea						2	2					
Exogone lourei			1			2	3					
Glycera capitata						3	3			5		
Glycinde armigera				1		1	2		1			
Goniada brunnea						1	1					
G. littorea				4	11	12	27					
Halosydna johnsoni					1		1		1	7		
Haploscoloplos elongatus				1		4	5					
Harmothoe imbricata					3	4	7		10	3		
Lumbrineris bifilaris					1	9	10			2		
L. erecta					1		1					
Magelona californica				1		5	6					
M. succulata				3			3					
Nephtys caecoides			1	1		2	4					
N. californiensis			6		1	1	8	8	1	4		
N. cornuta franciscana				1	2	9	12		1	2		
Nereis latescens					12	22	34			2		
Nerinides acuta			8	2			10	4		1		
N. maculata												
Owenia collaris					2	1	3					
O. fusiformis					2	44	46			3		
Paraonis gracilis oculata			4	1			5	3	1	6		
Pherusa sp.				3	9	14	26					
Pista pacifica				3			3					
Platynereis bicanaliculata					4	8	12					
Prionospio pinnata						1	1			2		
P. pygmaeus			1	56	65	32	194[2]	2	23	27		
Sphaerosyllis pirifera				3		65	68			2		
Spiophanes bombyx									1			
Sthenelais verruculosa									1			
Thalenessa spinosa						1	1					
Tharyx parvus					3		3					
Telepsavus costarum					2	2	4			2		
Typosyllis hyalina			1	1	5	7	14		1	2		
PHYLUM ARTHROPODA: JOINT-LEGGED ANIMALS												
CLASS PYCNOGONIDAE: SEA SPIDERS												
Anoplodactylus erectus					2		2					
Callipallene palpida					1		1			33		
Phoxichilidium compactum					2		2					
Pycnogonids (unid.)					1		1			1		
CLASS OSTRACODA: CLAM SHRIMP												
Ostracods (unid.)			2	27	21	21	71		71	9		
CLASS COPEPODA: COPEPODS												
Copepods (unid.)			2	48	4	30	86		1			
CLASS CIRRIPEDIA: BARNACLES												
Balanus sp.	Acorn Barnacle				P				P			
B. pacificus	Acorn Barnacle								P	12		
CLASS MALOCOSTRACA: AMPHIPODS, CUMACEANS, PILLBUGS												
ORDER MYSIDACEA: FAIRY SHRIMP												
Mysids (unid.)					2		2	2		P		
ORDER CUMACEA: CUMACEANS												
Anchicolurus occidentalis	Cumaceans		6		2		8	1	3			
Campylaspis sp.				2	4	9	15		5	5		
Cumella sp.					4		4			1		
Cyclaspis depressa			1	1			2	6		3	1	
Diastylopsis tenuis			1	83	77	25	186		8	19		
Lamprops sp.						2	2					
Oxyurostyllis pacific					1		1					
ORDER ISOPODA: PILLBUGS												
Ancinus granulatus	Pillbugs		3				3			8		
Edotea sublittoralis				2	19	5	26			5		
Jaeropsis dubia					6	10	16			1		
Munna sp.				1	1	1	3					
ORDER TANAIDACEA: TANAIDS												
Leptochella sp.												

SUBTIDAL INVERTEBRATES OF ORMOND BEACH STATIONS A AND B

Common Name	Depth (ft)	Number of Organisms[1] per 30 m^2 Station A[4] 10	20	30	40	Total	Station B[4] 10	20	30	40	Total
PHYLUM ARTHROPODA: AMPHIPODS											
Skeleton Shrimps				1	56	57			5	8	13
				1		1					
			11	16	60	87				5	5
			14		83	97				15	15
			12	15	85	112			43	101	144
			11	46	36	93	16	56	301	462	835
CLASS MALACOSTRACA: CRABS, SHRIMP, LOBSTERS											
Spiny Sandcrab		1				1	2	1		1	4
Cancer Crab			1	1	9	11				1	1
Cancer Crab		P	3	2	5			4	2	1	7
Black-tailed Shrimp		1		3	4	8	2			5	7
Spider Crab										1	1
Hermit Crab			4	4	6	14			4	1	5
Hermit Crab									1	4	5
Brokenback Shrimp					6	6				1	1
				3	5	8					
PHYLUM MOLLUSCA: SNAILS AND CLAMS											
CLASS GASTROPODA: SNAILS											
Barrel Snail			3	10	2	15[2]					
Snail			2	1		3		1			1
Nudibranch					1	1					
		2	1	4	4	11					
Dove Snail			2	11	7	20[2]		1	2		3
Channeled Welk		2	2	5	1	10[2]	1	7		3	11
Fat Welk			10					6			6
					3	3				2	2
Rock Snail					2	2					
Olive Snail					4	4	4				4
Olive Snail		1				1			3	2	5
Moon Snail							1		1	P	
CLASS PELECYPODA: CLAMS											
Clam				3	1	4			3		3
Scallop				8	10	18[2]			8	11	19
Clam				1		1					
Mussel				8	8	16				4	4
Mussel				6	2	8			5	10	15
Clam			1			1					
				10		10					
Jackknife Clam			1	11	33	45[2]		6	11	5	22
Clam			2	2		4					
Tellin Clam			1	26	15	43[2]	2	38	1	1	42
Pismo Clam							21	24			45
PHYLUM ECHINODERMATA: SEASTARS, URCHINS, SEA CUCUMBERS											
CLASS ASTEROIDEA: SEASTARS											
Sand Star				1		1				1	1
Sand Star					2	2		2	21	35	58
Sea Star			1			1					
CLASS ECHINOIDEA: URCHINS, SAND DOLLARS											
Sand Dollar[3]		26	500	1	4	531	10	150	6	8	174
CLASS HOLOTHUROIDEA: SEA CUCUMBERS											
Burrowing Sea Cucumber		98[2]				98		1	1		2
Sweet Potato Sea Cucumber		1				1					

P = Present: No estimate of numbers.
S = Sparse: Widely scattered throughout sample or station.

[1] Reference: Marine Advisors, Inc. (1970a-d). Numbers indicate number of individuals per liter benthic grab sample or number per 30 m^2 circular transect.
[2] Laboratory number per 30 m^2, estimated by diving survey, Marine Advisors, Inc. (1969, 1970a).
[3] Live estimate of number per m^2, Marine Advisors, Inc. (1970a).
[4] Stations A and B shown on Plate 2.2.2-10.

TABLE 2.2.2-XIV

DOMINANT SUBTIDAL INVERTEBRATES OF ORMOND BEACH

Scientific Name	Common Name	Rank Order (1=most abundant)	Total #* Recorded	Frequency (Total=)
PHYLUM ANNELIDA: SEGMENTED WORMS				
CLASS POLYCHAETA: BRISTLE WORMS				
Armandia bioculata	Polychaete Worms	7	516	16
Diopatra ornata		6	678	12
D. splendidissima		21	106	2
Nephtys cornuta franciscana		18	138	11
Platynereis bicanaliculata		17	147	5
Prionospio pygmaeus		9	353	16
Sphaerosyllis californiensis		14	223	4
PHYLUM ARTHROPODA: JOINT-LEGGED ANIMALS				
CLASS OSTACODA: OSTRACODS				
Philomedes longiseta	Ostracod	12	266	18
Philomedes sp.	Ostracod	2	1,702	19
CLASS CIRRIPEDIA: BARNACLES				
Balanus pacificus		15	207+	11
CLASS MALOCOSTRACA: AMPHIPODS, CUMACLANS				
ORDER CUMACEA: CUMACEAN SHRIMP				
Cyclaspis sp.	Cumacean	8	468	14
Diastylopsis tenuis	Cumacean	5	870	19
ORDER AMPHIPODA: AMPHIPODS				
Paraphoxus epistomus	Amphipod	10	345	14
Paraphoxus sp.	Amphipod	11	308	13
Photis spp.	Amphipod	13	234	18
Synchelidium sp.	Amphipod	3	1,125	24
PHYLUM MOLLUSCA: CLAMS AND SNAILS				
CLASS PELECYPODA: CLAMS				
Cooperella subdiaphana	Clam	16	186	7
Modiolus sp.	Clam	20	108	9
Tellina modesta	Tellin Clam	4	1,046	19
PHYLUM ECHINODERMATA: SPINY-SKINNED ANIMALS				
CLASS ASTEROIDEA: SEASTARS				
Astropecten verrilli	Sandstar	19	123	8
CLASS ECHINOIDEA: SEA URCHINS AND SAND DOLLARS				
Dendraster excentricus	Sand Dollar	1	112,000+	13
		N=21	1,222,196+	25

*Only taxa in which more than 100 individuals were observed are included in this table.

Reference: Intersea Research Corporation, (1972b,c,e,f,h; 1973a,b).

TABLE 2.2.2-XV

DOMINANT SUBTIDAL INVERTEBRATES OF MANDALAY BEACH

Scientific Name	Common Name	Rank Order (1 is most abundant)	Total # Recorded	Frequency (Total=36)
PHYLUM PROTOZOA: ONE-CELLED ORGANISMS				
CLASS SARCODINA: AMOEBOID PROTOZOANS				
ORDER FORAMINIFERA: FORAMS				
Cribroecion sandiegense	Foram	8	565	23
PHYLUM MOLLUSCA: CLAMS AND SNAILS				
CLASS PELECYPODA: CLAMS				
Macoma inconspicua	Bent-nose Clam[2]	2	2,890	18
M. secta	White Macoma	12	308	18
Tellina bodega	Clam	13	257	27
Tellina hemphilli	Hemphill Dish Clam	11	315	18
Tellina modesta	Tellin Clam	3	2,476	36
PHYLUM ANNELIDA: SEGMENTED WORMS				
CLASS POLYCHAETA: BRISTLE WORMS				
Capitata ambiseta	Polycheate Worms	4	2,223	25
[illegible] pacifica		19	114	21
Spiochaetopterus costarum		10	322	36
Magelona sacculata		18	120	19
Nephtys caecoides franciscana		9	561	32
Owenia californiensis		14	256	28
Prionospio steenstrupi		1	4,996	36
Thelepus crispus		16	132	25
PHYLUM ARTHROPODA: JOINT-LEGGED ANIMALS				
SUBPHYLUM CRUSTACEA: CRUSTACEANS				
CLASS OSTRACODA: OSTRACODS				
Philomedes sp.	Ostracod	5	1,655	18
SUBCLASS MALACOSTRACA: AMPHIPODS, CUMACEANS, AND PILLBUGS				
ORDER CUMACEA: CUMACEANS				
Diastylopsis californica	Cumacean Shrimp	7	568	32
ORDER AMPHIPODA: AMPHIPODS				
Rhepoxynius washingtonus	Amphipod	17	125	11
Synchelidium lucubrans	Amphipod	6	635	32
ORDER ISOPODA: PILLBUGS				
Exosphaeroma sublittoralis		15	225	28
	N =	19	18,743	36

[illegible] in which more than 100 individuals were observed.
[illegible] names in accordance with McLean (1969).

Reference: Intersea Research Corporation, 1973d

TABLE 2.2.2-XVI

MICROPLANKTON OF THE PORT HUENEME REGION[1]

Scientific Name	Common Name	Depth/feet	Station 5112 S[3]	5112 25[3]	5113 S	5113 25	5689 S	5689 25	5690 S	5690 25
KINGDOM PROTISTA: UNICELLULAR ORGANISMS										
CLASS BACILLARIACEA: DIATOMS										
Chaetocerus peruvianus	Diatoms									
Naviculoid forms			X	X	X	X			X	
Nitzchia closterium			X		X			X		
N. pugens var altanica			X							
Nitzchia sp.								X	X	
Unid. Diatoms							X	X		
Skeletonema cosatum[4]			X				X			
CLASS MASTIGOPHORA: FLAGELATES										
Ceratium tripos	Dinoflagellates				X					
Eutreptia lanowii									X	
Gymnodinium spp.				X		X			X	
Peridinium spp.				X		X				
Protocentrum micans			X							
Unid. Euglenids							X	X	X	
CLASS INFUSORIA: CILIATES										
Unid. Ciliates							X	X	X	
KINGDOM ANIMALIA: ANIMALS										
Nauplii larvae (unid)							X	X		
Unid. Eggs										
Codepods[4]								X		
		Total#/Liter	625	375	625	625	875	1,125	1,500	1,250

[1]Sampled March 1957-December 1959.

[2]For station locations see Plate 2.2.2-17.

[3]S=Surface, 25=feet.

[4]Observed in less than 5% of the samples.

Reference: State of California (1965).

TABLE 2.2.2-XVII

SELECTED LARVAL FISH ABUNDANCES OF THE PORT HUENEME REGION

	1951				1956				1961				1965				1966			
	I[1]	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Northern Anchovy[2]	3	2	2	2	2	2	1	3	-*	2	2	1	3	3	3	-	-	-	-	-
Jack Mackerel	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-	-	1	-
Pacific Hake	1	2	-	1	-	-	-	-	1	1	-	-	2	1	1	-	1	2	-	1
Pacific Sardine	-	1	-	-	-	-	-	-	1	-	-	-	-	-	1	-	-	2	-	-

[1] I=January-March, II=April-June, III=July-September, IV=October-December.
[2] Common names in accordance with American Fisheries Society, Special Publication #6, (1970) Scientific equivalents in Table 2.2.2-I.
[3] Key: Number of larvae (estimated) under 10m^2 sea surface.
1= 1-10
2= 11-100
3= 101-1,000
4= 1,001-10,000

*Indicates none collected in the sample.

Reference: Cal COFI Collection Stations shown on Plate 2.2.2-1

TABLE 2.2.2-XVIII

MONTHLY ZOOPLANKTON VOLUMES OF THE PORT HUENEME REGION

(1951, 1956, 1960, 1965, 1966)

	1951	1956	1960	1965	1966	Approximate Mean Volume/Month cc/1,000m^3
January	4[1]	4	3	5	4	160.5
February	5	4	3	5	4	256.5
March	2	4	3	5	4	112.5
April	4	5	4	3	4	160.5
May	4	4	3	3	4	112.5
June	5	4	3	4	5	256.5
July	4	5	3	4	5	256.5
August	3	1	3	4	5	64.5
September	3	1	1	4	5	34.4
October	3	5	5	4	5	544.5
November	4	4	5	4	1	112.5
December	4	3	1	1	4	28.3
Approximate Mean Volume/year cc/1,000m^3	130.5	119.7	50.1	140.1	237.3	

[1] Key: 1 = <4 cc/1,000m^3 of seawater.
2 = 4-16 " "
3 = 17-64 " "
4 = 65-256 " "
5 = 257-1024 " "

Reference: Smith (1971), Cal COFI Collection Stations shown on Plate 2.2.2-1.

TABLE 2.2.2-XIX

CALANOID COPEPOD ZOOPLANKTON ABUNDANCES
OF THE PORT HUENEME REGION
(1958-1959)*

Scientific Name	1958 I	II	III	IV	Mean/ Year[4]	1959 I
Acartia danae	1[3]			2	18.75	
A. tonsa	2	3	3		204.5	1
Aetideus armatus	1	2	2	1	149.8	1
Calanus gracilis						1
C. helgolandicus	4	3	3	3	8937	3
C. minor	1			1	12.5	
C. tenuicornis		2	3	3	274.5	2
Calocalanus styliremis				2	12.5	
Candacia aethiopica				1	6.25	
C. bipinnata	1	1		2	25	1
C. curta	2	1	1	3	212.1	2
Clausocalanus arcuicornis	1	1		2	25	
C. farrani	2	2		1	87.3	2
C. furcatus				1	6.25	
C. paululus	1				6.25	
C. pergens	2	2		3	212.1	2
Ctenocalanus vanus	2	2	3	3	1512	2
Euaetideus acutus		1			6.25	
E. bradyi			2		12.5	
Eucalanus bungii californicus	2	2	1	1	149.8	2
E. crassus		1	2		181.75	
E. longatus hyalinus		1		1	12.5	
Euchaeta acuta				1	6.25	
E. media		1		1	12.5	1
Euchirella pulchara		1			6.25	
Gaidius pungens						1
Haloptilus longicornis		1			6.25	
Heterorhabdus papilliger	1	1	2	2	149.8	2
Labidocera trispinosa	1	2	2	2	212.1	2
Lucicuta flavicornis	1			2	187.5	1
Mecynocera clausi	1			1	12.5	1
Metridia lucens	2			3	87.3	3
Paracalanus parvus	2	3	3	2	1512	1
Pleuronamma abdominalis	2	2	2	1	212.1	1
Pleuromamma abdominalis	3	2	3	3	2131	3
P. gracilis	2	2	2	2	274.5	2
P. viphias	1				6.25	1

TABLE 2.2.2-XIX - continued

CALANOID COPEPOD ZOOPLANKTON ABUNDANCES
OF THE PORT HUENEME REGION
(1958-1959)[1]

Scientific Name	1958 I[2]	1958 II	1958 III	1958 IV	Mean/ Year[4]	1959 I
Pontellopsis occidentalis	1[3]				6.25	1
Racovitzanus antarcticus	2				12.5	
Rhinoalanus nausotus	2	2	2	2	274.5	2
Scaphocalanus echinatus	1				6.25	2
Scolecithricella abyssalis	1				6.25	
S. dentata	1			2	18.75	2
S. ovata	1				6.25	1
Scolecithrix bradyi	1				6.25	1
S. danae	1				6.25	
Scottocalanus persecans	1				6.25	
Temora discaudata	1			2	18.75	2
Approximate Mean Number by Season/1,000m³	149.8	468.0	199.7	249.6		174.7
Frequency of Collection	31/48	16/48	24/48	30/48		30/48

[1]Cal COFI Collection Stations shown on Plate 2.2.2-1
[2]Seasonal Key: I=January-March, II=April-June, III= July- September, IV= October-December
[3]Abundance Key: 1= 1-49 /1,000m³ seawater
2= 50-499 " "
3= 500-4,999 " "
4=5,000-49,999 " "
[4]Computed by taking numerical means of the numbers per 1,000m³/4.
Reference: Fleminger, (1967)

TABLE 2.2.2-XX

SELECTED ZOOPLANKTON ABUNDANCE* OF THE PORT HUENEME REGION

	1949				1950				1951				1952				1953			
	I[1]	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
CLADOCERA[2]																				
EUPHAUSIDS[3]																				
Euphausia eximia																				
E. pacifica																				
Nematoscelis difficilis																				
Myctiphanes simplex																				
Stylocheiron affine																				
S. longicorne																				
Thysanoessa gregaria																				
T. spinifera																				
CHAETOGNATHS																				
Pterosagitta draco																				
Sagitta bierii																				
S. bipunctata																				
S. enflata																				
S. euneritica																				
S. hexaptera																				
S. minima																				
S. pseudoserratodentata																				
S. scrippsae																				
THALIACEANS																				
Cyclosalpa bakeri	0	0	1	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0
Dilioletta gegenbauri	1	0	0	0	1	2	1	0	1	0	2	0	2	2	0	0	1	0	1	0
Doliolina mulleri	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D. denticulatum	0	0	0	1	0	0	2	0	0	0	0	0	0	2	0	0	0	2	0	0
Pegea confoederata	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salpa fusiformis	1	1	0	0	0	2	0	0	0	0	2	0	0	1	0	0	0	0	0	0

NO SAMPLES TAKEN

	1954				1955				1956				1957				1958			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
CLADOCERA[2]	0	0	0	0	0	1	0	2	0	0	0	1	0	0	0	3	0	0	0	0
EUPHAUSIDS[3]																				
Euphausia eximia	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E. pacifica	0	0	2	0	0	2	0	0	0	0	0	0	0	4	0	0	3	0	1	2
Nematoscelis difficilis	0	0	2	0	0	2	0	0	0	0	0	0	0	3	0	0	2	1	2	2
Myctiphanes simplex	0	0	2	0	1	0	0	3	1	1	0	0	0	0	3	3	2	0	0	0
Stylocheiron affine	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
S. longicorne	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
Thysanoessa gregaria	0	0	2	0	0	0	2	2	0	2	0	0	0	0	0	0	0	0	0	0
T. spinifera	0	0	0	0	0	1	2	0	1	0	0	0	0	0	0	0	0	0	0	0
CHAETOGNATHS																				
Pterosagitta draco	0	0	0	0													1	0	0	0
Sagitta bierii	1	1	3	0													1	0	0	0
S. bipunctata	1	0	0	0													1	0	0	0
S. enflata	1	1	0	0													2	2	1	3
S. euneritica	4	4	3	4													2	4	4	3
S. hexaptera	0	0	0	0													0	0	1	0
S. minima	2	1	0	3													1	3	3	2
S. pseudoserratodentata	0	0	0	0													1	0	0	0
S. scrippsae	0	2	0	0																
THALIACEANS																				
Cyclosalpa bakeri	0	0	0	0																
Dilioletta gegenbauri	0	2	2	0																
Doliolina mulleri	0	0	0	0																
D. denticulatum	0	0	0	0																
Pegea confoederata	0	0	0	0																
Salpa fusiformis	0	0	0	0																

NO SAMPLES TAKEN

*Excluding fish larvae and copepods.
[1]Seasonal Key: I=January-March, II=April-June, III=July-September, IV=October-December.
[2]Measured in grams/1,000m³ (Cladocerans only)
1 = .062-.25
2 = .26-1.00
3 = 1.01-4.00
[3]Measured in number/1,000m³ water
1 = 1-49
2 = 50-499
3 = 500-4,999
4 = 5,000-49,999
References: Alvarino (1965), Berner (1967), Brinton (1967), Isaacs, et al. (1969).
Cal COFI Collection Stations shown on Plate 2.2.2-1.

TABLE 2.2.2-XXI

PERCENTAGES OF THE COMPOSITION OF ZOOPLANKTON OF THE PORT HUENEME REGION

MAY 1969-APRIL 1970, DECEMBER 1972

Species	Year	1969												1970										1971			
	Month	May		Jun		July		Sep		Nov		Dec		Jan		Feb		Mar		Apr		Dec			
	Station[3]	4	5	4	5	4	5	4	5	4	5	4	5	4	5	4	5	4	5	4	5	50	51	52	53
Unknown Eggs			4																		+[2]				
Fish Eggs			5	2	+	+	+	+	+		6		12	7	19	72	55						1		
LARVAE																									
Holothuroid																						+		+	
Echinoid																									
Ophiuroid																						+			
Asteroid																									
Crustacean[2]			+	+	+	+	4		3			+	19	+	+	+	3	6	+	+				+	
Euphausid			2	3	3	+	+	15	2		2		+	4	4		+	+	6	10	2					
Cirripede																						+			
Polychaete							+		+				+	+	+		+			+	+	+	+	2	
Gastropod				+	+																			+	
Pelecypod																								+	
Brachiopod											5								+						
Ectoproct			+									+											1		1
Phoronid					+																				
Larvacea (juveniles and adults)			2	+	+	+	15				13		+	10	10	20	9	39	6	10	17	35	17	29	32
Salps			+			+		+	+				+	+	5					+	+				
Doliolids			2				+	2	+		5		28	7	7	+	+	19	7	2	3				
Chaetognaths			+	+	+	13	2	2	5		5	+	3	+	+	+	2	+	7	5	3		+		
Isopods																									
Amphipods					+		+									+			+						
Euphausids							+		12			+	2								+				
Mysids					+																				
Copepods			88	86	93	73	65	68	15		56	5	32	66	46	7	28	25	63	77	70	58	78	64	65
Ostracods							+				4											+	+	+	
Cladocerans				7		9	5	12	55		+	94	+		4	+	+	5	+			4	1	4	
Annelids					+	+	+							+		+									2
Heteropods						+																			
Pteropods														+	+										
Squid					+																				
Ctenophores							+		+											+	+		+		
Cnidarians		+	+	+	+	+	+		+		+	+	+	2	+	+	2	2	+	+	+	+	+		
Total settled volume (ml)		12		70	345	200	60	15	15		85	10	25	190	290	40	30	50	80	780	250	170			

No Sample taken this Month

[1] Excluding euphausids and cirripedes.
[2] Present, comprising less than 1% of the total.
[3] Station locations shown on Plate 2.2.2-1.
[4] Blank spaces indicate none observed in sample.

References: Straughan and Kolpack (1971), Bolgano and Straughan (1972).

TABLE 2.2.2-XXII

SPAWNING CHARACTERISTICS OF IMPORTANT[1] BONY FISHES OF THE PORT HUENEME REGION

Species	Spawning Months	Spawning Areas
HERRINGS		
Pacific Sardine[2]	All Year	Open ocean, surface
ANCHOVIES		
Northern Anchovy	All Year	Open ocean; surface
HAKES		
Pacific Hake	Winter	Open ocean, midwater
SEA BASSES		
Kelp Bass	April-Sept	Nearshore, kelpbed areas
Barred Sand Bass	April-Sept	Nearshore, sandy-muddy bottom areas
JACKS, SCADS, POMPANOS		
Jack Mackerel	Jan-Nov	Open Ocean, surface
California Yellowtail	July-Oct	Primarily off Baja California
DRUMS		
Corbina	June-Sept	Offshore (?), bottom
Spotfin Croaker	June-Sept	Offshore (?), bottom
White Croaker	Early Spring	Offshore (?), bottom
White Seabass	April-Aug	Inshore, rocky bottom-kelp
Yellowfin Croaker	June-Sept	Offshore (?), bottom
SURFPERCHES		
Barred Surfperch	March-July	Inshore, sandy bottom
Walleye Surfperch	May-June	Inshore, sandy bottom
MACKERELS		
Pacific Bonito	Jan-May	Open ocean, surface
Pacific Mackerel	?	Open ocean, surface
SCORPION FISHES AND ROCKFISHES		
Bocaccio	Dec-April	Deepwater, offshore, bottom
Chilipepper	Nov-March	Deepwater, offshore, bottom
Sculpin	April-Aug	Shallow to intermediate depths, bottom
Vermillion Rockfish	Dec-April	Intermediate depths, offshore, bottom
SABLEFISHES		
Sablefish	Dec-April	Deepwater, offshore, bottom
SCULPINS		
Calezon	Oct-April	Rocky intertidal to 20 feet
BARRACUDAS		
California Barracuda	May-June	Open ocean, surface
SILVERSIDES		
Grunion	March-Aug	Buried in sand along upper intertidal zone
Jacksmelt	Oct-April	Bays, harbors, eggs deposited on algae
Topsmelt	May-June	Bays, harbors, eggs deposited on algae
FLATFISHES		
California Halibut	Feb-July	Sand bottom, 18-20 feet
Dover Sole	Fall	Deepwater, offshore, bottom
English Sole	Oct-May	Deepwater, offshore, bottom
Petrale Sole	Nov-March	Deepwater, offshore, bottom
Rex Sole	Feb-March	Deepwater, offshore, bottom

[1]Dominant trophic, sport, and commercial fishes.
[2]Common names according to American Fisheries Society Special Publication #6, 1970. See Table 2.2.2-I for scientific names.
Reference: Frey (1971).

TABLE 2.2.2-XXIII

INTERTIDAL AND SUBTIDAL[1] MARINE ALGAE OF THE PORT HUENEME BREAKWATER AND OUTFALL REGION

Scientific Name	Common Name	Location
DIVISION CYANOPHYTA: BLUE-GREEN ALGAE		
Pleotonema nostocorum		Protected[2] jetty rocks.
Symploca muscorum		Protected jetty rocks.
DIVISION CHLOROPHYTA: GREEN ALGAE		
Ulva sp.	Sea Lettuce	Protected jetty rocks.
DIVISION PHAEOPHYTA: BROWN ALGAE		
Cystoseira osmundacea		Exposed[3] and protected jetty rocks.
Egregia laevigata	Feather Bea Kelp	Exposed jetty rocks.
Egregia sp.		Exposed jetty rocks.
Laminaria farlowii		On stone in 55 feet of water.
Macrocystis pyrifera	Giant Kelp	Exposed and protected rocks; canopy forming kelp.
Macrocystis sp.		On protected jetty rocks.
DIVISION RHODOPHYTA: RED ALGAE		
Antithamnion sp.		As an epiphyte[4] on Egregia and Macrocystis.
Bossea sp.	Corallin Algae	Protected and exposed jetty rocks near outfall.
Bossiella sp.	Coralline Algae	Protected and exposed jetty rocks.
Calliarthron cheilosporioides		Exposed jetty rocks.
Corallina officinalis var. chilensis	Coralline Algae	Exposed and protected jetty rocks.
Gelidium coulteri	Agar Weed	Exposed jetty rocks.
Gelidium robustum		Protected jetty rocks.
Gigartina armata		Exposed and protected jetty rocks.
G. canaliculata	Turkish Towel Algae	Exposed jetty rocks.
G. catoniana		Protected jetty rocks near outfall.
G. spinosa		Protected and exposed jetty rocks.
Gracilaria sp.		Protected jetty rocks.
Gymnogongrus platyphyllus		Exposed jetty rocks.
Lithothamnion giganteum		Exposed jetty rocks.
Microcladia coulteri		Protected jetty rocks.
Nienburgia andersoniana		Protected and exposed jetty rocks.
Phyllophora sp.		Protected jetty rocks.
Pleonosporium sp.		As an epiphyte on protected rock species.
Prionitis cornea		Protected jetty rocks.
P. lanceolata	Glistening Red Algae	Protected jetty rocks near outfall.
Pterochondria woodi var. pygmaea		As an epiphyte on protected rock species.
Rhodoglossum affine	Red Tongue Algae	Exposed jetty rocks.
Rhodymenia californica		Exposed jetty rocks.
R. pacifica		Protected jetty rocks.
Spermathamnion snyderae		Exposed jetty rocks.

[1] In depths from surface to 25 feet.
[2] Protected. On inner portion of Hueneme jetty not exposed to directed wave action.
[3] Exposed. On outer portion of Hueneme jetty exposed to direct wave action.
[4] Epiphyte. Growing on other algae.
References: State of California Water Quality Control Board (1965). Kolpack and Straughan (1972). Collection station is shown on Plate 2.2.2-17.

TABLE 2.2.2-XXIV

COLIFORM MPN/100 ml FROM OXNARD MUNICIPAL SEWAGE OUTFALL (1973)

STATION[1]

Date	Ocean P	Ocean Q	Ocean R	Ocean S	Date	Beach 82	Beach 84	Beach 86	Beach 88	Beach 90
1-8-73	15	4	4	3	1-8-73	43	23	20	23	9
1-15-73	460	93	240	43	1-15-73	39	23	15	21	9
1-29-73	9	4	21	4	1-29-73	39	23	15	21	9
2-6-73	4	9	3	3	2-6-73	39		23	21	
2-12-73	460	3	3	3	2-12-73	93	40	460	240	
2-20-73	460	15	3	4	2-20-73	43	23	15	15	9
2-26-73	460	460	240	93	2-26-73	35	21	15	15	9
3-6-73					3-6-73	43	23	15	15	9
3-12-73					3-12-73	35	23	15	15	9
3-19-73					3-19-73	35	23	15	15	9
3-26-73					3-26-73	35	23	15	15	9
4-2-73					4-2-73	35	23	15	15	9
4-9-73					4-9-73	35	21	15	15	9
4-16-73					4-16-73	43	23	15	15	9
4-23-73					4-23-73	43	23	15	15	9
4-30-73					4-30-73	43	23	16	15	9
5-7-73					5-7-73	43	29	21	15	9
5-14-73					5-14-73	43	29	23	15	9
5-21-73					5-21-73	43	28	23	15	9
5-29-73					5-29-73	43	28	23	15	9
6-4-73					6-4-73	43	28	23	15	9
6-11-73					6-11-73	43	28	23	15	9
6-18-73					6-18-73	460	1100	43	4	4
6-25-73					6-25-73	240	240	16	3	4
7-2-73					7-2-73	75	29	23	15	9
7-9-73					7-9-73	75	28	23	15	9
7-16-73					7-16-73	75	28	21	11	9
7-23-73					7-23-73	75	28	21	11	9
7-31-73					7-31-73	43	23	26	9	9
8-6-73					8-6-73	93	23	21	11	9

[1]Collection stations shown on Plate 2.2.2-28.
Reference: City of Oxnard (1973).

TABLE 2.2.2-XXV

COLIFORM COUNTS IN MOST PROBABLE NUMBER (M.P.N.)/100 ml. FROM THE PORT HUENEME OUTFALL MONITORING SYSTEM, 1972

Date	STATION											
	Ocean*				Beach							
	H	K	L	M	62	66	68	70	74	76	78	79
January 1972	2	2	2	2	11	25	12	14	21	12	100	1300
February	3	7	3	3	20	10	15	3.5	4	5	12	1300
March	3	3	3	4	6	12	6	6	7	5	16	230
April	71	78	23	23	3	15	11	18	17	28	65	300
May	3	3	3	3	6	10	15	36	21	25	70	1600
June	3	3	3	7	3.5	3	3	11	8	19	24	200
July	3	3	3	3	3	5	3	4	8	22	17	150
August	3	3	3	7	5	4	6	5	14	25	21	200
September	230	230	950	60	45	70	100	1600	1600	3000	1000	1600
October	45	45	45	45	70	375	700	125	650	225	-	-
November	46	45	2400	620	50	166	375	650	850	1800	900	-
December	60	1300	620	7000	140	280	100	195	240	240	-	-

*Collection stations are shown on Plate 2.2.2-28.
References: Port Hueneme Outfall Monitoring Data (1973, unpublished).

TABLE 2.2.2-XXVI

MONTHLY COLIFORM MOST PROBABLE NUMBER PER 100 ml FOR OXNARD MUNICIPAL TREATMENT PLANT (1964-1972)

	SAMPLING STATIONS[1]									
	Ocean				Beach					
Date	P	W	R	S	82	83	84	85	86	88	90
December 1972	44	1,100	9	3	>2,400	-	1,100	-	290	93	9
November	240	4	4	3	150	-	240	-	93	15	29
October	<3	<3	<3	<3	3	-	21	-	43	9	4
September	23	43	21	23	3	-	<3	-	<3	4	4
August	44	210	240	150	240	-	240	-	36	93	93
July	460	460	>2,400	<3	23	-	15	-	240	43	43
June	<3	4	15	<3	150	-	93	-	93	9	9
May	<3	4	<3	<3	15	-	<3	-	<3	<3	<3
April	240	240	<3	<3	43	-	4	-	11	4	3
March					No Readings taken this month						
February	<3	4	<3	<3	21	-	11	-	20	93	460
January		No Readings			43	23	460	150	93	43	9
December 11971	4	9	3	9	39	43	15	15	7	3	28
November	3	3	4	3	15	4	15	43	7	43	9
October	4	4	9	3	15	9	9	21	21	28	7
September		No Readings			9	3	4	3	21	3	4
August	<3	<3	<3	<3	1,100	43	9	15	<3	<3	9
July	28	210	120	120	28	150	210	150	460	120	21
June	460	240	120	4	45	75	23	43	75	43	42
May	93	93	240	240	460	460	240	240	3	3	4
April	15	4	4	9	9	9	9	9	14	11	9
March	75	9	<3	23	240	240	43	23	23	240	<3
February		No Readings			>3	36	<30	91	150	30	110
January	<30	<30	<30	30	160	110	150	36	30	<30	110
December 1970		No Readings			240	240	110	240	460	240	21
September	23	<2	2	5	<2	15	7	7	7	11	4
June		No Readings			7	11	<2	5	13	<2	<2

Date	A[2]	B	C	E	F
February	2.	0	5	0	2
September 1969	230	230	60	620	230
June[3]	9.5	6.2	2.9	4	3.7
February	0.45	0.6	0.6	0.45	0.45
December	6.2	1.3	2.3	0.92	2.3
September	13	2.0	1.4	1.4	2.9
June	2.3	9.5	5.0	2.0	2.0
February	6.2	13	2.1	2.0	0.92
May 1964	70	70	21	13	2.8
February	70	70	24	13	6.2

Ocean Samples not Recorded Prior to September 1970

[1]Station locations indicated on Plate 2.2.2-28.
[2]Old (1964 to February 1970) Sampling Stations. See Plate 2.2.2-28 for locations.
[3]Indicates MPN per 10 ml sea water (February 1964 to June 1969).
Reference: City of Oxnard (1964-1972).

TABLE 2.2.2-XXVII

PRIMARY PRODUCTIVITY OF THE PORT HUENEME REGION

Station[1]	Date											
	1969						1970					
	May	June	July	Aug	Nov	Dec	Jan	Feb	Mar	May	June	Mean
#4												
P[2]	-	3.47	3.58	4.00	3.73	2.89	1.69	2.90	2.32	31.54	9.34	6.55
C	-	1.78	-	1.22	0.76	1.04	0.80	1.15	1.15	3.01	1.19	1.30
E	-	1.90	-	3.30	4.90	2.80	2.10	2.50	2.50	10.50	7.80	4.30
#5												
P	9.62	4.50	2.16	6.24	2.30	2.03	3.55	2.99	2.09	27.89	18.09	7.41
C	1.37	-	-	2.34	0.78	1.21	1.72	1.22	0.70	2.74	2.34	1.60
E	7.00	-	-	2.70	3.00	1.70	2.10	2.50	3.00	10.20	7.70	4.40

[1]Station location #4, 5.1 miles west of Port Hueneme, and #5, 7.5 miles

[2]P=Productivity expressed as milligrams of carbon fixed/hour/m^3 seawater.
C=Amount of chlorophyll "a" expressed in milligrams/m^3 seawater.
E=Productivity/chlorophyll "a".

Reference: Straughan and Kolpack (1971).

TABLE 2.2.2-XXVII

TABLE 2.2.2-XXVIII

FIELD OBSERVED BIOTA NEAR THE
PORT HUENEME BREAKWATER

CHLOROPHTA: Green Algae	
Ulva sp.	
PHAEOPHYTA: Brown Algae	
Dictyopteris zonaroides	
Egregia laevigata	
Pterygophora californica	
RHODOPHYTA: Red Algae	
Bossiella sp.	
Carallina officinalis	
Gelidium nudifrons	
Gigartina sp.	
Rhodymenia sp.	
CNIDARIA: Jellyfish, Anemones, and Hydroids	
Astrangia lajollensis	Coral
Corynactis californica	Colonial Anemone
Paracyathus stearnsi	Solitary Coral
ECTOPROCTA: Moss Animals	
Bugula neritina	
Membranipora tuberculata	
Scrupocellaria diegensis	
Thalamoporella sp.	
ANNELIDA: Segmented Worms	
Diopatra spp.	Bristle Worm

TABLE 2.2.2-XXVIII - continued

FIELD OBSERVED BIOTA NEAR THE PORT HUENEME BREAKWATER

MOLLUSCA: Snails and Clams	
Clinocardium nuttalli	Cockle
Saxidomus nuttalli	Gaper
ARTHROPODA: Joint-Legged Animals	
Loxorhynchus grandis	Sheep Crab
Echinodermata; Urchins, Starfish, and Sea Cucumbers	
Dendraster excentricus	Sand Dollar
Patiria miniata	Bat Star
Pisaster giganteus	Giant Seastar
Strongylocentrotus franciscanus	Red Urchin
CHORDATA; UROCHORDATA: Tunicates	
Styela montereyensis	Sea Squirt
CHORDATA; VERTEBRATA; PICES: Fishes	
Chromis punctipinnis	Blacksmith
Citharichtys stigmaeus	Speckled Sanddab
Coryphopterus nicholsi	Blackeye Goby
Embiotoca jacksoni	Black Perch
E. lateralis	Striped Seaperch
Girella nigricans	Opaleye
Oxylebius pictus	Painted Greenling
Paralabrax clathratus	Kelp Bass
Rhacochilus toxotes	Rubberlip Seaperch
R. vacca	Pile Perch
Sebastes mystinus	Blue Rockfish
S. serranoides	Olive Rockfish

Reference: Dames and Moore, 1973

TABLE 2.2.2-XXIX

DOMINANT SOUTHERN CALIFORNIA NEARSHORE MACRO-ZOOPLANKTON

COPEPODS

- Acartia tonsa
- Labidocera trispinosa
- Paracalanus parvus
- Corycaeus anglicus
- Oithona similis
- Clausocalanus spp.
- Euterpina acutifrons
- Oncaea spp.

CLADOCERA

- Evadne nordmanii
- E. tergestina
- E. spinifera
- Penilia avirostris

CHAETOGNATHA

- Sagitta euneritica

CTENOPHORA

- Pleurobrachia bachei

THALIACEA

- Oikopleura spp.

LARVAL FORMS

- barnacle nauplii
- decapod larvae
- cyphonautes
- mysid larvae
- furcalia (euphausiid larvae)

Note: An estimated 80% of the species of nearshore macro-zooplankton are included on this list.

Nearshore = within 3 Km of shore