MARINE BIOLOGICAL RESOURCES TECHNICAL APPENDIX
FOR THE
DANA POINT HARBOR MARINA IMPROVEMENT PROJECT
SUBSEQUENT ENVIRONMENTAL IMPACT REPORT
DANA POINT, ORANGE COUNTY, CALIFORNIA

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

1.1 PROJECT PURPOSE

The County of Orange proposes to make extensive waterside improvements to Dana Point Harbor as part of Dana Point Harbor Revitalization Plan. Consequently, Coastal Resources Management, Inc. (CRM) was retained by the firm of LSA Associates, Inc. to prepare a marine biological resources impact assessment for Waterside Improvement Draft Subsequent EIR. CRM conducted habitat and species surveys within Dana Point Harbor in February/March, October/November 2007, and June (Coastal Resources Management, Inc. 2010). The purposes of the investigation were to (1) determine if eelgrass (*Zostera marina*) or invasive algae (*Caulerpa taxifolia or Undaria pinnatifida*) were present in regions of the Harbor where proposed marina improvements are planned, (2) collect data on the presence/absence of other sensitive and non-sensitive species present in the Harbor on soft-bottom, piling, rip-rap and reef habitats that might be affected by marina improvements and (3) assess the potential environmental effects of construction and long-term operation of the marina on sensitive marine resources.

The results of the Coastal Resources Management, Inc. field surveys are contained in a separate project report (Coastal Resources Management, Inc., 2010) and integrated into this impact evaluation report. This document assesses the potential environmental effects of short-term construction and the long-term operation of Dana Point waterside development activity, including a federally-mandated Essential Fish Habitat (EFH) analysis on marine habitats and marine life within Dana Point Harbor.

1.2 PROJECT LOCATION

Dana Point Harbor ("the Harbor"), constructed between 1966 and 1970, is located in the City of Dana Point, Orange County, California about 40 miles south of Long Beach/Los Angeles Harbors (Figure 1). It lies in the lee (protected side) of Dana Point Headlands within Capistrano Bay and is also protected by a 1.7 mile long and 14 to 18 feet (ft) high breakwater. Harbor channel widths vary from 350 feet in the anchorage areas to 600 feet at the Harbor entrance (Wiegel, 1993) The Harbor is subject to in-filling of sands that migrate through the quarry stone-breakwater requiring periodic maintenance dredging to maintain safe water depths.

The marina within Dana Point Harbor is divided into two basins, the East Basin and West Basin (Figure 2). Each basin operates as a separate marina, with a total capacity of about 2,500 shallow-draft vessels. The boat launch ramp at the northeast corner of the Harbor is newly upgraded as of July 2007. Other facilities within the Harbor include the Dana Point Marine Institute, a dry boat storage hoist, fishing pier, shipyard, marine fuel dock, three yacht clubs, and a commercial sports fishing operation. Swimming is allowed at the west end of the Harbor, at Baby Beach. (http://www.ocparks.com/danapointharbor/).

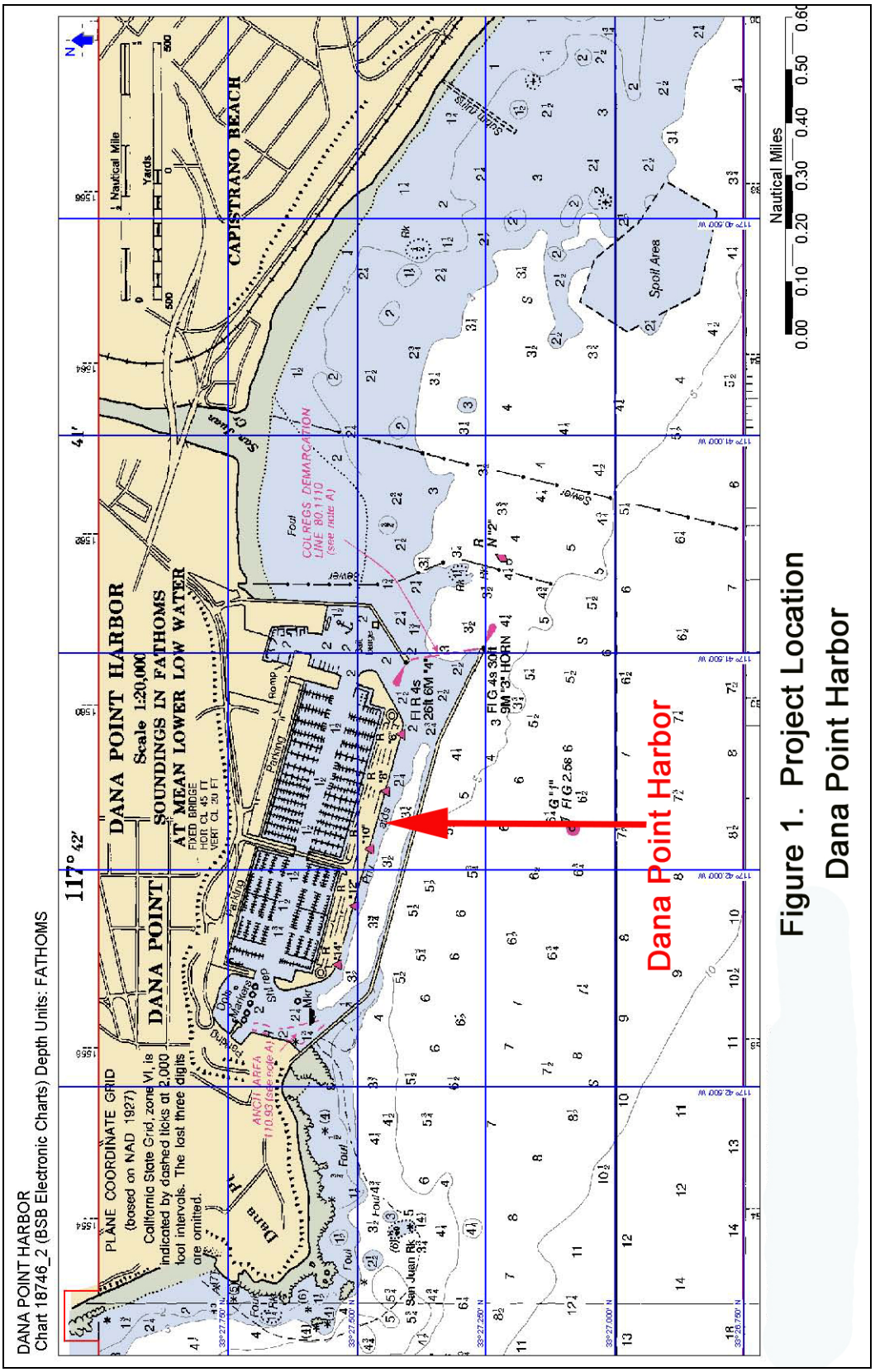

Figure 1. Project Location
Dana Point Harbor


FIGURE 2.
DANA POINT HARBOR STUDY LOCATIONS
COASTAL RESOURCES MANAGEMENT, INC.
BABY BEACH
YOUTH SAILING CENTER
WEST CHANNEL AND TURNING BASIN
COVE WEST MARINA
WEST BASIN
BRIDGE ABUTMENTS
COVE EAST MARINA
EAST BASIN
MAIN CHANNEL
WEST BREAKWATER
ENTRANCE CHANNEL
EAST BREAKWATER
EAST CHANNEL
HARBOR PATROL DOCKS
COMM DOCKS
SPORTFISHING DOCKS
MARINE SERVICES
DRY STACK STORAGE
Dana Point Harbor Dr
Puerto Pl
Street of Golden Lantern
Dana Dr
Santa Clara Ave
El Camino Capistrano
Old Golden Lantern
Green Lantern
Blue Lantern St
Cove Rd
Amber Lantern St
Violet Lantern St
Starboard Lantern
Shore Lantern
Cove Lantern
Castile Pl
East Lantern St
Lantern Bay
Pointer lat 33.460258° lon -117.698844° elev 0 ft
1508 ft
Streaming 100%
Eye alt 5218 ft
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1.3 PROPOSED PROJECT COMPONENTS

Table 1 and Figure 3 describe and illustrate the proposed marina improvements, respectively. Waterside upgrades include (1) the renovation and re-orientation of the East and West marina basin dock systems by replacing old and deteriorating docks, slips and gangways with new facilities; (2) dock redesign and improvements for the Youth Sailing Center, the Harbor Patrol facilities, Commercial Fishing Dock, the Sport Fishing dock, the Dry Stack facility, and the Shipyard docks; (3) the construction of for vessels that will be displaced during marina reconstruction.; (4) the addition of handicap access at locations where it currently is not available; (5) upgrading vessel pump out facilities; and (6) upgrading dock utilities.

The number of boat slips within the Harbor will decrease from 2,409 to 2,293 (a loss of 116 slips) although the average slip length will increase from 29.85 feet (ft) to a length not to exceed 32 ft. A total of 1,306 existing piles will be removed and 969 new piles will be emplaced. The total dock surface area will decrease from 492,530 square feet (sq ft) to 459,540 sq ft (a net decrease of 32,990 sq ft) One-thousand three hundred and six, 14-inch diameter pilings with a surface area of 1,396 sq ft will be replaced by 969 piles (851, 16-inch diameter piles and 118, 18-inch diameter piles) with a surface area of 1,395 sq ft.

Table 1. Proposed Project Components. Source: LSA Associates, Inc.

Element	Existing Conditions	Proposed Project Improvements
Floating Docks(East/West Marinas and Satellite Areas)	Floating docks supported by 1,306 concrete filled steel pipe piles	Remove existing piles and replace with 969 piles
	2,409 boat slips	2,293 boat slips (loss of 116 slips)
	Average slip length of 29.85 feet (ft). Majority of West Marina slips oriented west-east. East Marina slips oriented north-south	Average slip length not to exceed 32 ft West Marina slips to be reoriented to a north-south direction. East Marina slips to remain oriented north-south
	Approximately 492,530 square feet (sf) of area covered by floating docks	Approximately 459,540 sf[1] of area covered by floating docks
	1,306, 14-inch diameter piles (1,396 sq ft)	851, 14-inch diameter and 118, 18-inch diameter piles (1,395 sq ft)
Access	52 existing gangways	59 gangways plus 9 ADA gangways, for a total of 68 gangways
Boat Services	3 sewage pump outs	4 upgraded sewage pump outs
Utilities	electrical service, water service, telephone and cable service	Upgraded electrical service, water service, telephone and cable service
	Dock Boxes	New Dock Boxes
Embarcadero/Dry Stack Storage Staging Docks	766 linear feet (lf)	1,300 lf
Marine Services Docks	1,190 lf	896 lf
Sport Fishing Docks	1,350 lf	1,350 lf
Guest Slips	42 existing slips	46 proposed slips
Dinghy Dock	No existing dinghy dock	374 lf
Harbor Patrol Slips	8 existing slips plus 2 emergency side-ties	8 proposed slips plus 2 emergency side-ties
Commercial Fishing Slips	15 existing slips plus 1 end-tie for California Department of Fish and Game boat	15 proposed slips plus 1 end-tie for California Department of Fish and Game boat
OC Sailing and Events Center Docks	890 lf	893 lf
Temporary/Yacht Broker Docks	No existing temporary/yacht broker docks	1 dock located along the breakwater next to Doheny State Beach – approx. 2,590 lf

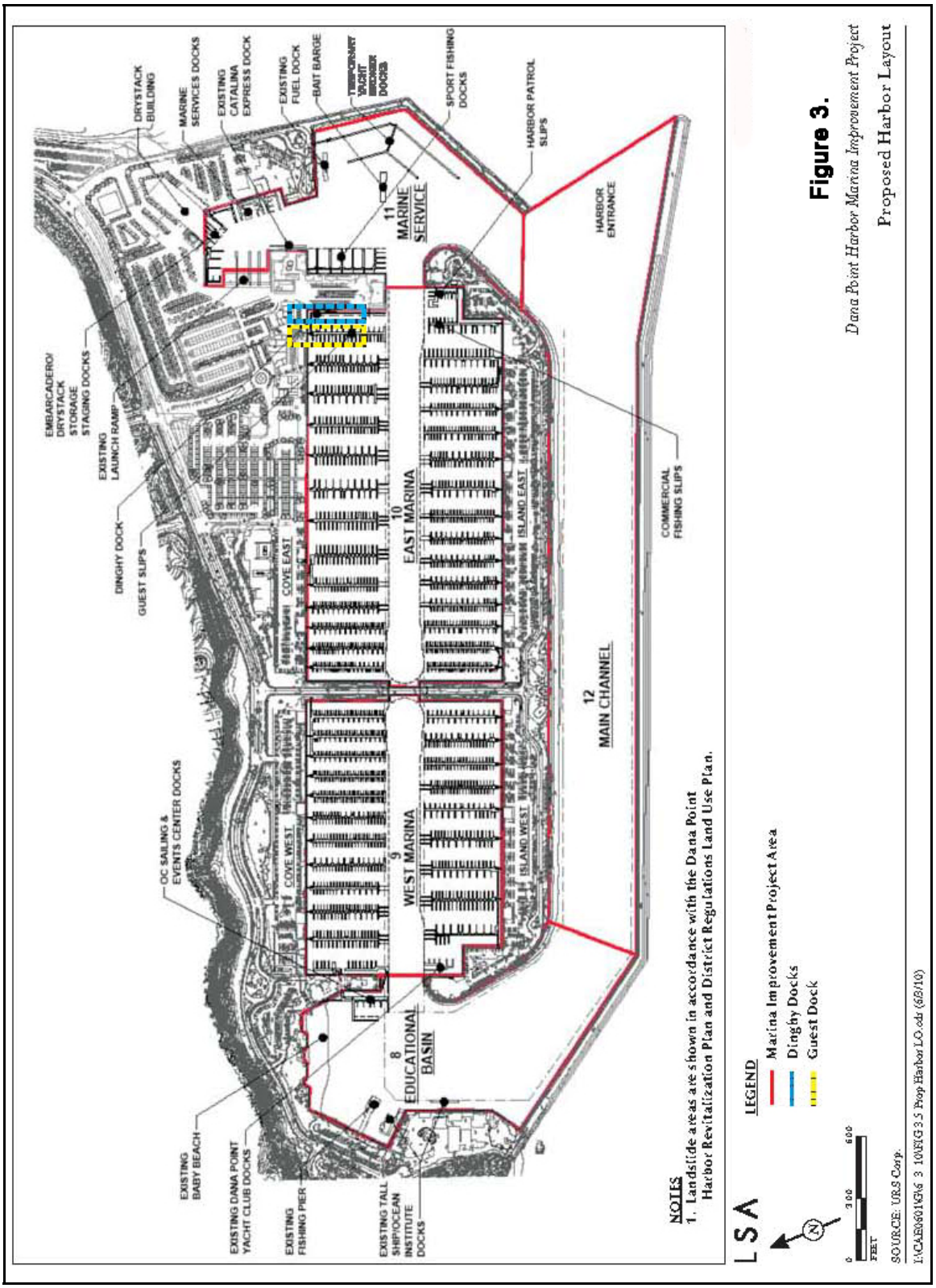

Figure 3.
Dana Point Harbor Marina Improvement Project
Proposed Harbor Layout

2.0 EXISTING CONDITIONS

The existing marine biological setting within Dana Point Harbor is based upon marine biological field surveys conducted by Coastal Resources Management [CRM], Inc. (2010) between February and October 2007; and June 2010; bird surveys conducted by Keane Biological Consulting (2007) conducted in March 2007, previous studies conducted within the Harbor by RBF and MBC Applied Environmental Sciences, 2003 and MBC Applied Environmental Sciences (2008 and 2009) for the Dana Point Harbor Revitalization EIR, and a literature review of other pertinent data sources.

The CRM surveys were conducted throughout Dana Point Harbor in February/March, 2007, Oct/Nov 2007, and June 2010 (Coastal Resources Management, Inc. 2010) in areas proposed for waterside improvements (Table 1 and Figure 4). Studies were conducted using diver-biologists and Remote Underwater Video (RUV) methods. Other observations were made of bulkhead habitats during low tides. Habitats that were surveyed included subtidal soft benthos (silt and sand sub-habitats), the hardscape of dock pilings, sloped cement bulkheads, small-to-large protective rip rap at the base of bulkheads, breakwater quarry stone, and low-to-moderate relief natural rocky reefs. A total of 329 variable-length underwater transects (15 meters [m] to 258 m in length) were swam using SCUBA. Fourteen dock piles in the Cove East and the Island East marina basins were also surveyed to determine the types and relative abundances of marine organisms that might be affected by marina construction. Underwater Remote Video surveys were also conducted due to the large area of harbor seafloor to be surveyed. Track lines covered 7,899 meters of harbor seafloor (4.91 miles).

Table 2. Areas Surveyed in Dana Point Harbor*

Location	Bottom Habitat Survey Area (Acres)	Area of Potential Biological Impact (Acres)	% Total Area Covered*	Depth Range (ft, MLLW
Baby Beach	1.40	0.75	186.7	-3 to -10
Bridge Abutment Slopes	0.06	0.08	75.3	+3 to -10
Commercial Fishing Docks	0.12	0.58	20.3	+3 to -15.9
Dry Stack/Shipyard Basins	0.30	0.36	83.5	-12.4
Harbor Patrol Basins	0.28	0.13	221.9	+3 to -15.9
Marina Basins	2.98	21.43	13.9	+3 to -11
Sport fishing Dock Basin (inner ½ to bulkhead) and immediately seaward of docks	0.35	0.36	97.6	+3 to -15.4
Temporary Dock Area, East Channel	0.88	2.04	43.0	+3 to -12
Youth Sailing Center	0.12	0.10	110.7	+3 to -12
Total	**6.28**	**25.28**	**24.7**	**+3 to -15.9**
Other Regions Surveyed				
West Jetty Channel Slope**	0.42	none**	**	-2 to -12
Main Channel**	1.9	none**	**	+3 to -20.4
*** Includes both biologist/diver and remote video survey coverage** **** Not in project area**				

The surveys covered 6.28 acres of harbor bottom habitat (Table 1 and Figure 4). Overall, the bottom area surveyed by both diving biologists and remote video averaged 24.7% of the total bottom habitat within the project survey limits, ranging from 13.9% in the East and West Marina basins to over 100% coverage in the at the Youth Sailing Center and the Harbor Patrol basin. Baby Beach areal cover (by divers and video in 2007 and 2010) encompassed 187% of the survey area, and reflected a survey effort concentrated in a region where there was a probability of locating eelgrass since a very small patch of eelgrass (three

turions) was located there in April 2005 (Chambers Group, Inc., 2005). The eelgrass survey area in 2010 was concentrated along the eastern one-third of Baby Beach from depths of -3 to -12 ft MLLW beginning immediately west of the existing Sailing Center Dock and all of the basins at the Embarcadero and Dry Stack/Staging Area north of the launch ramp (Figure 4).

2.1 PHYSICAL ENVIRONMENT

2.1.1 Water Depths

Dana Point Harbor depths vary between approximately 21 feet (ft) Mean Lower Low Water (MLLW) in the Entrance Channel and Main Channel to intertidal depths in the Turning Basin where Baby Beach provides sandy intertidal habitat (Coastal Resources Management, Inc. 2010). Depths within the marina basins are generally between -8 and -12 ft MLLW.

2.1.2 Substrate Types

Unconsolidated sediments. Surficial sediments within all the marina and harbor basins were fine sands to extremely fine silts although underlying sediments tend to be sandier (Geotechnical Inc., 2006). Unconsolidated sediments in the Turning Basin and the East Channel near the Youth Sailing Center were sandy silts but visually, increased in sand percentages closer to the Baby Beach shoreline. Sediments were coarsest near the Youth Sailing Center; and on the south side of the bait barge along the base of the East Breakwater (Temporary Dock area). In each of these areas, sediment sized decreased with depth. Significant amounts of trash and debris (cans, bottles, plastic bags, fishing lines, etc.) was also found on the bottom all along the base of the East Breakwater.

Hard substrate. Intertidal and subtidal rock quarry stone and smaller rip rap is present in many areas of Dana Point Harbor and serves as protection for bulkheads and shorelines. The breakwaters and the south side of the East and West Island marinas consist of larger quarry stone, whereas the rip rap that protects the bulkheads of the marinas in the vicinity of the Youth Sailing Center and the Sport Fishing Dock consist of small-to moderate-sized rip rap. Sloped, cement quay walls occur around the perimeter of the marina basins and at the bridge abutments. These cement slopes were covered by a light to moderate layer of fine sediments.

Pilings and docks are attachment surfaces for plants and invertebrates. This community of organisms is commonly referred to as the "biofouling community". These hard surfaces extend between the highest high tide line and the Harbor bottom depths, supporting both an intertidal and subtidal complex of organisms. This habitat type is common throughout the Harbor.

Exposed natural reef is present within many areas of the Harbor, a remnant of the extensive reef habitat that was present prior to the construction of the Harbor. Isolated rock habitat in the marina basin that was observed during the subtidal surveys included three, single rock outcrops in the Island West Basin and one moderate relief (1 meter high) rock outcrop in Cove West Basin. These outcrops were at depths between -8 and -10 ft MLLW. Other outcrops are likely present but not observed during the surveys. Outside of the marina basins, scattered low to medium relief (<1 to 2 meter high) reef outcrops and isolated boulders were located in the Turning Basin west of the Youth Sailing Center docks at depths between -3 and -8 ft MLLW; in the Main Channel and East Channel at depths between -8 and -20 ft MLLW; in the East Channel seaward of the Sport Fishing Docks; and in the Anchorage Area at the north end of the proposed temporary dock at depths of -12 ft MLLW.

2.1.3 Underwater Visibility and Water Temperature Conditions During The Surveys

Underwater visibility in the Harbor is highly variable, depending on factors such as plankton blooms, stormwater runoff into the Harbor, wind-generated waves and currents, tidal currents, vessel prop wash, and proximity to the entrance to the Harbor. During surveys conducted by CRM in Feb/March 07, underwater visibility ranged between 1 and 3 ft within the marina basins and 1 to 4 ft in the vicinity of Baby Beach and the Youth Sailing Center (Coastal Resources Management, In. 2010). During the October/November 2007 survey, underwater visibility was still limited within the marina and harbor basins, but was substantially better outside the marina basins where visibility approached 8 to 10 ft in the vicinity of the proposed in the West Channel and on the south side of the bait barge in the vicinity of the proposed temporary dock. In June 2010, underwater visibility was approximately 2-3 feet near Baby Beach, 5-10 ft in the West Main Channel, and 2 feet in the East Channel near the bait barge and the dry stack storage area.

Comparatively, underwater visibility averaged about 3 ft near the boat launch ramp in August 2006 (Chambers Group, Inc 2006) and 8 feet at depths of 0.0 to -10 ft MLLW at Baby Beach in April 2005 (Chambers Group, Inc., 2005).

2.2 MARINE BIOLOGICAL ENVIRONMENT

Dana Point Harbor intertidal habitats extend from the extreme low to extreme high water mark (-1.2 to +7.0 ft MLLW). The types of habitats in this zone include sandy intertidal, quarry stone (rip rap), dock piles, and sloping cement bulkheads. Portions of, or all of these shoreline types are exposed to both air and water during the tidal cycle. Habitats below the extreme low tide zone are "subtidal" and are never exposed. Project area subtidal habitats include unconsolidated, soft-bottom (sands and muds) which make up the majority of the Harbor's benthic (bottom) environment, portions of docks, pilings, bulkheads, isolated reef outcrops, and the water column. These habitats support marine plants, invertebrates, fishes, and birds.

2.2.1 Intertidal Sandy Beach

Sand beach habitat is found in the Turning Basin at Baby Beach. This sand beach is a low-energy environment that is affected primarily by wind waves and tidal action within the Harbor. It is in the lee of Dana Headlands and is exposed only to significant winds during easterly and southerly wind events. The sediments consist of a combination of fine-grain sediments mixed with coarse grained sand, imported to form and sustain the beach (Applied Ecological Research [AER], 2000). The high intertidal portion of the County-maintained public beach supports few if any marine organisms because of infrequent tidal exposure and periodic cleaning and grooming. This higher elevation however, provides resting habitat for seabirds (gulls and pelicans). The middle and low intertidal zones provide consistent tidal inundation and therefore support burrowing species of invertebrates (primarily clams, crustaceans, and polychaete worms). These organisms attract shorebirds to the beach that utilize the invertebrates as their food source (Quammen 1980). Core samples analyzed by AER included polychaete worms and snails; the algae *Enteromorpha* was found below the tide line along the beach.

2.2.2 Subtidal Environments

The benthic invertebrate community in the Harbor is made up of a complex of species that live on the sediment surface (epibenthic organisms) or in the soft-bottom sediments (infauna). Bottom-dwelling fish that either live in burrows (i.e., gobies), as well as species that are dependent on the bottom sediments for foraging (i.e. sting rays, sand bass, and halibut) are important members of the bottom community within bays and harbors.

Subtidal Soft-bottom Habitat. Invertebrates in Dana Point Harbor are found in a range of sediment regimes between fine silts to coarse sands/gravels, and are transitional in their affinities to offshore benthic communities and coastal embayments. While the majority of benthic invertebrates obtain their nutrition by consuming organic detritus, some graze on diatoms and algae or actively prey on other invertebrates. In turn, bottom feeding fishes and resident soft-bottom-dwelling fishes (gobies, juvenile flatfish, and sand bass) rely upon these benthic organisms as food sources (USACOE, 2000; MBC and SCCWRP, 1980).

Common types of benthic infaunal organisms that are associated with bay and harbor sediments include flat worms, amphipod crustaceans, crabs, snails, clams, polychaete worms (capitellids, spionids, cirratulids, and ophelliids), oligochaete worms and brittle stars. Sediment physical and chemical characteristics, water column properties, tidal circulation, proximity to storm water outfalls and other contaminant sources, and harbor configuration all play a role in the types of benthic organisms present in the Harbor as well as where these organisms live.

Benthic surveys in Dana Point Harbor indicate that the infaunal community is dominated by small polychaete annelid and arthropod species, with fewer numbers of clams and nemerteans (Robert Bein, William Frost Associates and MBC Applied Environmental Sciences, 2003). These studies also suggest that the infaunal community makeup and composition is similar to Newport Harbor (State Water Resources Control Board, 1998; Coastal Resources Management, 2003), Alamitos Bay (Coastal Resources Management, 1998), and Marina del Rey Harbor (ABC Laboratories, Inc., 2005).

During benthic surveys conducted in 1994 and 1998 by the State Water Resources Control Board, infaunal species composition and dominance was dominated by a similar group of species that included amphipods (*Grandidierella japonica* and *Corophium* sp.) and annelid worms (*Pseudopolydora paucibranchiata* and *Euchone limnicola*). High abundances at some stations of species tolerant of variable salinities, such as *P. paucibranchiata* and *G. japonica*, suggest that freshwater input from urban runoff may be considerable in some areas of the Harbor. These species are also dominant species within Newport Bay (State Water Resources Control Board 1998; Coastal Resources Management, 2003). Density of infaunal organisms in the Harbor in 1994 ranged from approximately 3,000 organisms per square meter (sq m) in sediments from the south side of the Harbor to almost 20,000 organisms per sq min near the storm drain at Baby Beach. During Southern California Bight Wide regional benthic surveys conducted in 1998, infaunal density in the Harbor ranged from approximately 1,250 to nearly 7,000 organisms per sq m, with the highest densities found in the Baby Beach area. As is typical in southern California harbors, species found during infauna sampling include both native and well-established introduced species.

Coastal Resources Management, Inc. (2010) observed eighty-eight (88) taxa of marine plants, invertebrates, and fishes during field surveys conducted between February 2007 and June 2010 (Table 3 and Appendix 2). Marine plants (algae and seagrass) contributed the highest number of taxa (34.1% of the total). Mollusks (octopus, snails and clams) contributed the second highest number (22.7 % of the total), followed by fish (11.4%), annelid worms (8.0) and arthropods (5.7%).

*Soft-Bottom Epi-Benthos***.** The soft-bottom epibenthic community in Dana Point Harbor during CRM field surveys was species poor (Coastal Resources Management, 2010). Eleven soft-bottom plant and macro-invertebrate taxa were observed in the marina basins and other soft-bottom habitats in Dana Point Harbor (Table 4). Sediments within the east and west basins as well as other areas within and outside the marina basins were lightly coated with a layer of diatoms, and secondarily, spotty cover of the algae *Chaetomorpha aerea* and *Ulva intestinalis*. This was typical in areas of lower tidal current flows. Small beds and patches of Eelgrass (*Zostera marina*) were observed in the shallow subtidal habitat offshore of Baby Beach encompassing 457 square feet of bottom habitat (See Section 2.3).

Table 3. Number of Marine Taxa Observed During the CRM Dive Surveys, Feb/Mar 07, Oct/Nov 07, and June 2010.

Taxonomic Group	Total Taxa	% Total
Algae	29	33.0
Seagrasses	1	1.1
Porifera	2	2.3
Cnidaria	6	6.8
Platyhelminthes	1	1.1
Annelida	7	8.0
Arthropoda	5	5.7
Mollusca	20	22.7
Bryozoa	3	3.4
Tunicata	4	4.5
Fish	10	11.4
Total	**88**	**100.0**

The most common occurring macro-invertebrate on soft sediments was the predatory snail *Navanax inermis*, which was ubiquitous throughout the Harbor soft-bottom habitats. The burrowing anemone *Pachycerianthus fimbriatus* was common within the West Marina although found in many areas of both marina basins and in the Main Channel. The tube-building polychaete *Diopatra ornata* the bubble snail *Haminoea vesicula* were observed where sediments were sandier in the East Channel near the southern section of the proposed temporary dock. Notably, no marine invertebrates or algae were observed on the soft substrates within the Dry Stack or the Ship Yard basins.

Rocky Intertidal and Subtidal Habitat (Pier Pilings, Rock Rip Rap, Cement Bulkheads, and Natural Reefs.

Most plants and invertebrates were associated with harbor artificial hardscape and natural reef (81 of 88 taxa). Of the various hard-bottom habitat types, 59 were associated with East and West marina hard substrate, and 68 were present on hard substrate in the Main Channel, West Channel, and East Channel on larger quarry stones and natural reefs (Table 4). The most productive areas were reefs and quarry stone in the Main Channel (49 taxa), the hardscape of the Youth Sailing Center reefs (40 taxa), marina pilings (36 taxa), the hardscape of the East Breakwater quarry stone and isolated reefs near the proposed temporary dock (25 taxa), and the hardscape of the Sport Fishing Dock bulkhead and rip rap (25 taxa).

Marina Basin Pilings. Thirty-six taxa were observed on 14 piles scattered throughout the East Marina (Table 4). While the cumulative number of taxa observed on pilings was 36 for all piles, the number of taxa on a single pile varied between five and 11. Species richness decreased with depth. The dominant organisms on the upper three feet of the pilings included a complex of green algae (*Ulva intestinalis*), a turf and filamentous red algae complex, brown algae (*Colpomenia perigrina*, *Dictyota flabellata*, and *Sargassum muticum),* hydroids (*Aglaophenia* sp.), serpulid polychaete worms, barnacles (*Balanus amphitrite* and *B. glandula*), and mussels *(Mytilus galloprovincialis*). The mid-depth piling community (-3 to -7 ft) was dominated by polychaete worms (serpulid worms and the calcareous tube-building *Dodecaceria fewksii*), mussels, solitary tunicates (*Styela plicata*), and ectoprocts (*Bugula neritina* and unid. encrusting ectoprocts). The bottom depth piling community (-7 to -10 ft MLLW) was dominated by tunicates, ectoprocts, and hydroids.

Table 4. Number of plants, invertebrate, and fish taxa in the Dana Point Harbor Survey Areas-Feb/Mar, Oct/Nov 2007, and June 2010

Region of Harbor	Total Number of Taxa
Island Way Bridge Abutment (north side)	12
Marina Pilings	36
Marina Quay Walls	18
Youth Sailing Center Rip Rap and Reefs, and Soft-benthos (epibiota)	42
All Areas Within East and West Marina Basins	**59**
Main Channel Reefs, Rip Rap, and Soft Epi- Benthos	49
Temporary Dock Area (Hard-bottom and Soft-bottom epi-benthos	28
Sport Fishing Docks (Hard-bottom)	25
All Soft-bottom Substrate in Survey Areas (epibiota)	11
All Hard Substrate in Survey Areas Outside West and East Marina Basins	68
All Hard Substrate in Survey Areas, Dana Point Harbor	81
All Soft and Hard Bottom Substrate in Survey Areas, Dana Point Harbor	**88**

Basin Quay Walls. The sloping, cement bulkhead around the perimeter of Cove East and West and Island East and West Basins (including the Harbor Patrol Basin) supported 18 species of algae and invertebrates. However, this habitat exhibited a low diversity of taxa and extremely low percent cover of marine life. The most conspicuous species was the calcareous, tube-building polychaete *Dodecaceria fewksii* that formed small colonies on most of the quay walls examined. Other common species included lined-shore crabs (*Pachygrapsus crassipes*), solitary ascidians, and scattered, juvenile mussels. A fine silt layer, approximately 1-2 cm deep, covered the substrate. Other than *Dodecaceria*, most of the flora and fauna were found in the depressions formed by the meeting of adjoining cement sections of quay wall.

Bridge Abutments, Island Way. Twelve taxa were represented on the north bridge abutment at depths between +3 to -10 ft MLLW (Table 4). This site consisted of a low-diversity assemblage of macrophytes and macroinvertebrates due to a lack of sunlight and a coating of sediment over the concrete slope. Four macrophytes were observed-*Corallina pinnatifolia*, *Dictyota binghamiae, Dictyopteris undulata,* and *Colpomenia sinuosa*. The dominant invertebrates included acorn barnacles (*Balanus glandula, Chthamalus fissus/dalli*), bay mussels (*Mytilus galloprovincialis*), tunicates (*Styela plicata*), sponges (*Leucosolenia* sp.), and hydroids (*Aglaophenia* sp); hydroids exhibited the highest cover.

Breakwater Quarry Stone and Natural Reef, Main Channel. This area is located outside of any harbor improvements. Substrata at depths between the intertidal to -7 ft MLLW was primarily quarry stone rip-

rap. Naturally occurring low-to moderate relief reefs were present throughout the area surveyed in the channel.

The most productive intertidal and subtidal habitats were those associated with large quarry stone and natural reef outcrops. These areas supported a diverse assemblage of macrophytes and invertebrates and fishes (49 taxa) characteristic of communities associated with a greater degree of wave exposure than protected marinas. The common red macrophytes include articulated corallines (*Corallina chilensis*, *C. pinnatifolia*, *Lithothrix aspergillum*, *Amphiroa zonata*, *Bossiella orbigniana*), coarsely branched red algae (*Gelidium purpurascens*), and crustose corallines (*Lithothamnion* spp.), while other less common red macrophytes included *Ceramium*/*Polysiphonia* spp., *Cryptopleura crispa*, and *Laurencia pacifica*. This habitat also supported a rich brown macrophyte community including Dictyotales (*Dictyota binghamiae, Dictyopteris undulata, Zonaria farlowii, Taonia lennebackerae*), the Fucales (*Sargassum muticum, Halidrys dioica*), and one member from both the Laminariales (*Eisenia arborea*) and the Scytosiphonales (*Colpomenia sinuosa*). Giant kelp (*Macrocystis pyrifera*) was also present, in very low abundances. Many of the plants observed had only a few number of thin stipes, and were in poor condition.

The most conspicuous lower-intertidal and subtidal invertebrates included limpets (*Lottia limatula, L. gigantea, L. scabra*), barnacles (*Balanus glandula, Chthamalus fissus/dalli*), scaly tube snail (*Serpulorbis squamigerus*), and trochid snails (*Tegula eiseni*). Larger, but less abundant invertebrates included lobsters (*Panulirus interruptus*), gorgonians (*Muricea californica*), warty sea cucumbers (*Parastichopus parvimensis*), rock scallops (*Crassedoma giganteum*), festive murex snails (*Pteropurpura festiva*), and tunicates (*Styela plicata*). No sensitive or listed species of plants, invertebrates, or fishes were documented from this site.

Breakwater Quarry Stone and Isolated Reefs, East Basin Temporary Dock, Similar to the area surveyed in the Main and West Channel, hardscape in the East Channel near the breakwater supported many plant and invertebrate form in response to adequate tidal exchange and tidal currents, and suitable substrate. The East Breakwater provided the most extensive hard-bottom habitat. Common red macrophytes present in the low intertidal and shallow subtidal zone included articulated corallines (*Corallina chilensis*, *C. pinnatifolia*, *Amphiroa zonata*), and crustose algae (*Lithothamnion* spp., *Peyssonneliaceae/Hildenbrandiaceae*) and secondarily, *Ceramium*/*Polysiphonia* spp. and *Laurencia pacifica*. Several species of brown macrophytes were also present-*Dictyota binghamiae, Dictyopteris undulata, Zonaria farlowii, Taonia lennebackerae*, *Sargassum muticum, Halidrys dioica, Eisenia arborea* and *Colpomenia sinuosa*.

A fauna similar to the West Channel quarry stone community was also found at this site and included limpets (*Lottia limatula, L. scabra, Crepidula onyx*), barnacles (*Balanus glandula, Chthamalus fissus/dalli*), and trochid snails (*Tegula eiseni*). The snails *Pteropurpura festiva* and *Acanthina spirata* were also present, but were not as common.

North of the bait barge, a few moderate relief (1.5-2 m high) rocky reefs were located in the general vicinity of the proposed Temporary Dock. These reefs supported fewer macrophytes and macroinvertebrates than the subtidal fauna on the East Breakwater and in the Main Channel. Species that were observed included the red algae complex *Ceramium*/*Polysiphonia* spp., and *Rhodymenia californica;* brown macrophytes (*Sargassum muticum*, *Dictyopteris undulata*); slipper limpets (*Crepidula onyx*); and gorgonians (*Muricea fructicosa*). These features exhibited a higher degree of sedimentation that reefs in the West and Main Channels.

A significant amount of trash was observed while surveying the East Breakwater biological communities. This debris was concentrated at the base of the breakwater lodged in the rocks as well as on the sediments at the base of the breakwater rocks.

Youth Sailing Center Reefs and Rip Rap. Rip rap behind the docks and low relief natural reef in the Turning Basin in front of the Youth Sailing Center docks supported a large number of species-40 taxa of plants and invertebrates similar in nature to those occurring in the marina piling community and the quarry stone/natural reef habitats in the West Channel and Main Channel. Dominants included the southern sea palm algae (*Eisenia arborea*) the brown seaweed *Sargassum muticum*, coralline turf algae, and invertebrates such as sponges, colonial polychaete worms, lobsters (*Panulirus interruptus)*, snails (*Kelletia kelletii*), limpets (*Lottia spp.*), slipper limpets (*Crepidula onyx*), and mussels (*Mytilus galloprovincialis*).

Rip rap lined the cement bulkhead on the south side of the Youth Sailing Center,. The most commonly red algal forms included articulated corallines (*Corallina pinnatifolia*, *Amphiroa zonata*), coarsely branched red algae (*Gelidium purpurascens*), and crustose corallines (*Lithothamnion* spp.). Small red turf algae (*Ceramium* and *Polysiphonia* spp.) was less common. The dominant brown macrophytes were *Dictyota binghamiae, Dictyopteris undulata*, and *Sargassum muticum*. Barnacles (*Balanus glandula, Chthamalus fissus/dalli*), lobsters (*Panulirus interruptus*), slipper limpets (*Crepidula onyx*), and tunicates (*Styela plicata*) were the most common-occurring invertebrates.

Sport Fishing Dock Rip Rap. The variable-sized rip rap in front of the Sport Fishing Docks supported a moderately-diverse community of intertidal and subtidal plants and invertebrates typical of both the inner marina and the outer channels of the Harbor. The most common types of plants were filamentous red algal taxa, coralline turf algae, and macrophytes, particularly *Sargassum muticum* and *Dictyota flabellata*. The most conspicuous *macroinvertebrates* were limpets (*Lottia* spp.), mussels (*Mytilus galloprovincialis*, sea fans (*Muricea californiensis* and *M. fructicosa*), lobsters (*Panulirus interruptus*), and colonies of the cup coral *Astrangia lajollensis*.

Comparative Studies. Coastal Resources Management, Inc. (2009) conducted dive surveys at the Dana Point Marine Institute in July 2009 for proposed dock and improvements. The area surveyed within the project area covered a total of 32,000 sq ft (0.73 acre) from the bulkhead out into the West Channel. Dominant reef algae included *Sargassum muticum*, *Dictyopteris undulata*, and *Corallina* spp. Less common species included individual giant kelp plants (*Macrocystis pyrifera*) on low relief reef, sea palms (*Eisenia arborea*) at the base of the rip rap and the dock, and the brown algae *Taonia lennebackerae* on the rip rap. *Pachycerianthus fimbriatus* (burrowing anemone) was the only epifaunal species observed on soft bottom habitat. Other species observed on bulkhead walls, pilings, and rip rap included sponges (*Haliclona* sp.) barnacles (*Chthamalus fissus/dalli* and *Balanus glandula*), shorecrabs (*Pachygrapsus crassipes*), mussels (*Mytilus galloprovincialis*) and limpets (*Lottia limatula and L. scabra*). Scattered colonies of gorgonians (*Muricea californica*) were also present in the rocky subtidal habitat. Fishes observed included unidentified flatfish, kelp bass (*Paralabrax clathratus*), barred sand bass (*P. nebulifer*), opaleye (*Girella nigricans*), and pile perch (*Damalichthys vacca).*

Lambert and Lambert (2003) studied the distribution and abundance of non-indigenous ascidians (tunicates) in southern California marinas between 1994 and 1998, including a site near the Orange County Marine Science Institute floats (Dana Point Marine Institute). As a consequence of low flushing rates in most of the Harbor which is nearly completely enclosed by breakwaters, few ascidians or other marine invertebrates were ever found at sites other than the site near the harbor entrance. The most common ascidian found was *Styela plicata*, which favors a preference for lower tidal flushing rates over *S. clava*. During the CRM field surveys in 2007, two specific types of tunicates were found in the marina basins-*Botrylloides* spp. and *Styela plicata*. *Botrylloides* commonly was found covering mussels and other biological substrate. *Styela* was common on the pilings as well as occasionally present on the quay walls.

MBC Applied Environmental Sciences conducted a brief reconnaissance survey near the Ocean Institute on 22 November 1999 to evaluate the intertidal community on the riprap (Robert Bein, William Frost Associates and MBC Applied Environmental Sciences, 2003). They concluded that in general, the community composition in Dana Point Harbor closely resembles those communities in other southern California harbors. The community was highly degraded with few species and low abundances. At the +3 ft level, only a few slipper shells and limpets were noted. In the high intertidal (+5 ft MLLW), abundance was low, with white acorn barnacle most abundant and bay mussels in crevices. Below that, brown acorn barnacle became more prominent, and overall coverage was greater. Below the +2 ft level, barnacles, limpets, and slipper shells were dominant. At the O-ft level, some low lying algae was present, and in the subtidal, the brown alga *Sargassum muticum* was noted.

The shallow subtidal riprap at Dana Point Harbor was also briefly surveyed by MBC (Robert Bein, William Frost Associates and MBC Applied Environmental Sciences, 2003). At two locations, approximately 50 meters apart, percent cover of dominant organisms was estimated. Results from that survey indicated that the epibiota of the riprap of the shallow subtidal was relatively depauparate compared with that seen in Long Beach Harbor. The probable cause is the decrease in tidal strength and increasing shallowness progressing into the inner portion of the basin, resulting in less water movement for filter feeders and increasing siltation which potentially smothers settling epibiota. The upper subtidal at the innermost site was dominated by *Mytilus* spp. and coralline algae, whereas at the other location, the upper subtidal was dominated by large brown algae, particularly *Sargassum muticum*.

In conclusion, studies of Dana Point Harbor intertidal and subtidal flora and fauna conducted between 1994 and 2010 indicate that the overall biodiversity of pilings, rocky intertidal, and subtidal hardscape varies greatly within different parts of the Harbor. Highest diversity occurs in the Main, West, and East Channel outside the marina basins on large breakwater quarry stone and isolated patch reefs. These areas support a greater diversity of macrophytes and invertebrates than the pilings, docks, quay walls, and bulkheads within the Marina Basins. Giant kelp may be found incidentally within the Main and West Channel although the dominant macrophytes are the sea palm (*Eisenia arborea*) and the invasive *Sargassum muticum*. Primary limiting factors for the varying distribution patterns of plants and invertebrates are related to reduced tidal flushing and water turnover within the Harbor basins and secondly, the accumulation of silts over the surfaces of the rocky habitats as a consequence of the Harbor being nearly completely enclosed by the breakwater. The flora and fauna components of Dana Point Harbor are composed of a mixture of species, both endemic and invasive, that are generally found within other bays and harbors within Southern California.

2.2.3 Plankton

Plankton consists of algae (phytoplankton) and animals (zooplankton) small enough to be suspended in the water column and drift through tidal and oceanic currents. Common types of phytoplankton in the Southern California Bight (SCB) include diatoms, dinoflagellates, euglenoids, coccolithophores, and ciliates (Hardy, 1993) while the zooplankton are those animals that spend part (meroplankton) or all (holoplankton) of their life cycle as plankton (Dawson and Pieper, 1993). Fish eggs and larvae (ichthyoplankton) are an important component of the zooplankton community. With the exception of a few fish species (e.g., the Embiotocidae or surf perches that bear live young), most fish that occur in southern California are present as larvae or eggs in the plankton community. Plankton abundances and distributions are directly tied to water temperature, nutrients, upwelling, and current movements, and for zooplankton, the amount of phytoplankton food resources. The planktonic community in Dana Point Harbor is expected to be composed of the same types of organisms common to the nearshore coastal environment offshore of Dana Point, since the plankton are drawn into the Harbor through tidal and wind-driven processes and there is not a significant estuarine influence in the Harbor.

2.2.4 Fishes

The types of fishes which commonly occur in protected marinas and harbors of southern California are a combination of species that are associated with both soft-bottom habitat and hardscape of pilings, docks, cement bulkheads, and breakwaters.

Soft-bottom (demersal) species include gobies (*Clevelandia ios*) and flatfish (California halibut, P*aralichthys californicus;* diamond turbot*, Hypsopsetta guttulata*). Water-column species include topsmelt (*Atherinops affinis*), northern anchovy (*Engraulis mordax*), black surfperch (*Embiotoca jacksoni*), shiner surfperch (*Cymatogaster aggregata*), walleye surfperch (*Hyperprosopon argenteum*), white croaker (*Genyonemus lineatus*), queenfish (*Seriphus politus*) and white surfperch (*Phanerodon furcatus*).

Marinas provide additional structure (pilings, docks, and breakwaters) that attract different groups of fish (Coastal Resources Management, 1993). Hard substrate in marinas offer cover, protection, or sources of food for pile perch (*Damalichthys vacca*), pipefish (*Sygnathus* spp.), kelpfish (*Heterostichus* spp.), and opaleye (*Girella nigricans*), while the breakwater riprap protecting the Harbor provides a habitat for barred sand bass (*Paralabrax nebulifer*), kelp bass (*P. clathratus*), sargo (*Anisotremus davidsoni*), halfmoon (*Medialuna californiensis*), and cryptic species (blennies and sculpins).

Water-column species such as topsmelt (*Atherinops affinis*), northern anchovy (*Engraulis mordax*), black surfperch (*Embiotoca jacksoni*), shiner surfperch (*Cymatogaster aggregata*), walleye surfperch (*Hyperprosopon argenteum*), white croaker (*Genyonemus lineatus*), queenfish (*Seriphus politus*) and white surfperch (*Phanerodon furcatus*) are also common within southern California marinas and may be expected to be present in Dana Point Harbor.

Fishes Observed during CRM Field Investigations

Soft-Bottom. Few fish were observed over sedimentary habitats, likely due to low visibility (CRM, 2010). Of the two species observed, only the round sting ray (*Urolophus halleri*) was common. Other unidentified flat fish were seen, but could not be identified. However, there are several other species of fish that occur in other bays and harbors in southern California that are likely to be present in Dana Point Harbor. These include gobies (*Clevelandia ios*), and flatfish (California halibut, *Paralichthys californicus;* diamond turbot*, Hypsopsetta guttulata*).

Hard-Bottom. Nine species of fish and one unidentified juvenile were observed in the vicinity of hard-bottom habitat during the dive and remote video surveys. The most common fishes observed included garibaldi (*Hypsypops rubicundus*), kelp bass (*Paralabrax clathratus*), opaleye (*Girella nigricans*), pile surfperch (*Damalichthys vacca*), blacksmith (*Chromis punctipinnis*), señorita (*Oxyjulis californica*), and kelpfish (*Heterostichus rostratus*). Most fish were seen in the vicinity of the Youth Sailing Center Docks, the Sport Fishing Docks, the West Channel, Main Channel, and East Channel.

Water Column. Water-column species such as topsmelt (*Atherinops affinis*), northern anchovy (*Engraulis mordax*), black surfperch (*Embiotoca jacksoni*), shiner surfperch (*Cymatogaster aggregata*), walleye surfperch (*Hyperprosopon argenteum*), white croaker (*Genyonemus lineatus*), queenfish (*Seriphus politus*) and white surfperch (*Phanerodon furcatus*) are also common within southern California marinas and are also expected to be present in Dana Point Harbor.

2.2.5 Marine Mammals

One of the most important areas of high concentrations of marine mammals in southern California is the waters within a 10-mile radius between San Clemente and Dana Point (Bonnell et al 1981). These waters are known for high seasonal concentrations of common dolphin (*Delphinus delphis*) and the nearshore migratory pathway of California gray whales (*Eschrichtius robustus*) which was delisted as an endangered species in June 1994.

Several species of marine mammals inhabit the local waters (Bonnell et al., 1981; Bonnell and Dailey, 1993; Dohl et al., 1981). These include two pinnipeds (California sea lions [*Zalophus californicus*] and harbor seals [*Phoca vitulina*]) and 12 species of cetaceans (whales and dolphins). Four of the whales are baleen (filter feeding) whales, and eight species are odontocetes (toothed whales). The California gray whale, bottlenose dolphin (*Tursiops truncatus*), common dolphin (*Delphinus delphis*), and Pacific white-sided dolphin (*Lagenorhynchus obliquidens*) are the most commonly occurring species in the waters offshore of Dana Point Harbor.

Whales and dolphins are uncommon visitors to Dana Point Harbor. Recently however, a young, emaciated, gray whale entangled in fishing gear swam into Dana Point Harbor and remained for a few days in mid-May 2010. The net was removed by a team of biologists, and the whale swam out of the harbor. It died offshore of Doheny Beach on May 14th, 2010 (Orange County Local News Network, 2010). California sea lions and harbor seals are more frequently observed within the Harbor waters, with sea lions also hauling out on the breakwater. The Harbor is not considered a breeding habitat for pinnipeds but it is a secondary foraging area.

2.2.6 Water-Associated Birds

Shorebirds, waterfowl, and seabirds occur along the shoreline throughout the year but concentrations are usually highest during the fall to spring period when seasonal migrants winter over along the southern California shoreline. Common shorebirds include willet (*Catoptrophorus semipalmatus*), whimbrel (*Numenius phaeopus*), marbled godwit (*Limosa fedoa*), and sanderling (*Calidris alba*). The western grebe (*Aechmophorus occidentalis*), various species of cormorants (*Phalacrocorax spp*.) and surf scoter (*Melanitta perspicillata*) are among the water fowl which occupy the nearshore waters of Dana Point Harbor. Sea birds and larger marsh birds such as California brown pelican (*Pelecanus occidentalis*), terns (*Sterna spp*), western and ring-billed gulls (*Larus occidentalis* and *L. delawarensis Larus spp),* great blue herons (*Ardea herodias)* black-crowned night herons (*Nycticorax nycticorax*), and snowy egrets (*Egretta thula)* are expected to either occur in the waters and on the shoreline in the immediate area of Dana Point, or potentially within Dana Point Harbor as foraging and/or resting habitat.

Bird surveys conducted in March 2007 (Keane Biological Consulting, 2007) and March 2003 (MBC Applied Environmental Sciences in: RBF and MBC Applied Environmental Sciences, 2003) indicated that approximately one-half of the species observed were marine water-associated birds. Herons, egrets, and gulls, and pelicans were the most common species observed during both surveys. Other common water-associated bird species present included surf scoter (*Melanitta perspicillata*) and cormorants (*Phalacrocorax* spp). Although not observed, dabbling and wading ducks can also be found in the Harbor. During spring and summer, California least terns *(Sterna antillarum browni),* Forster's terns (*Sterna forsteri*), elegant terns *(Sterna elegans*), Caspian terns (*Sterna caspia*) and black skimmer (*Rynchops niger*) may be seen in local harbors, including Dana Point Harbor.

Breeding and Nesting Species of Water Birds in Dana Point Harbor. Fourteen bird species were identified as confirmed breeders in the Dana Point Harbor area during the March 2007 bird survey and an additional eight species are expected to nest in the area (Keane Biological Consulting, 2007). Of these

species, one water bird (black-crowned night heron) was observed nesting. Both snowy egrets and great blue herons were determined to be likely nesters nearby the Harbor.

2.3 SENSITIVE SPECIES

2.3.1 Eelgrass (*Zostera marina*)

Importance of Eelgrass. Eelgrass (Figure 5) is a marine flowering plant that grows in soft sediments in coastal bays and estuaries, and occasionally offshore to depths of 50 feet (ft). Eelgrass canopy (consisting of shoots and leaves) enhances the abundance and the diversity of otherwise barren sediments. Many species of invertebrates (i.e., clams, crabs, and worms) live either on eelgrass or within the soft sediments that cover the root and rhizome mass system. Eelgrass is a nursery habitat for many juvenile fishes, including species of commercial and/or sports fish value (California halibut and barred sand bass). They are also foraging centers for seabirds such as the endangered California least tern that seek out juvenile topsmelt that are attracted to the eelgrass cover. Lastly, eelgrass is an important contributor to the detrital (decaying organic) food web of bays as the decaying plant material is consumed by many benthic invertebrates (such as polychaete worms) and reduced to primary nutrients by bacteria.

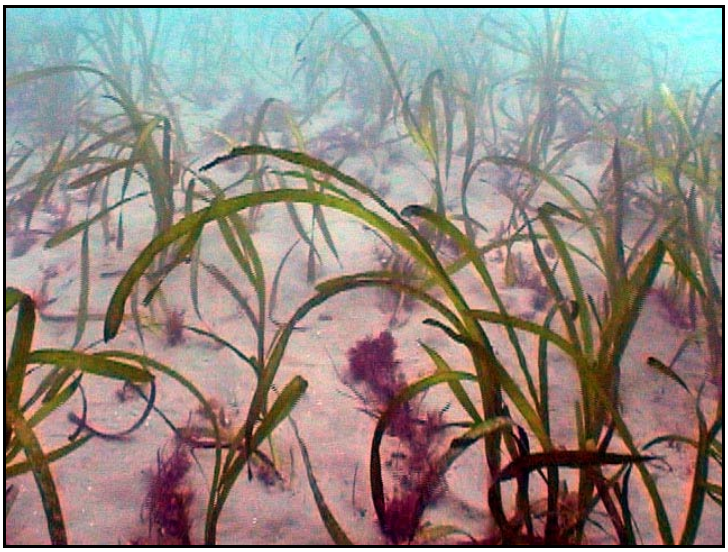

Figure 5. Eelgrass, *Zostera marina*. One "shoot" and the cluster of "blades" arising from the shoot is considered a "turion unit". (Photo: CRM)

Eelgrass in Dana Point Harbor. Studies conducted between 2005 and 2010 have documented the expansion of an eelgrass bed seaward of Baby Beach in the western section of Dana Point Harbor (Figure 6). Most recently, small-to-large patches of eelgrass were located 160 to 412 feet west of the existing bulkhead at the Youth Sailing Center (Figure 6) during surveys conducted by MBC Applied Environmental Sciences (2008 and 2009) and CRM (Coastal Resources Management, Inc. 2010). The results of eelgrass surveys conducted to date in Dana Point Harbor are discussed below.

Chambers Group, Inc. located a single, three-turion plant at the eastern end of Baby Beach in 2005 (Chambers Group, Inc (2005) for the Dana Point Harbor Maintenance Dredging Project. MBC Applied Environmental Sciences conducted eelgrass and invasive algae surveys for the Dana Point Harbor Maintenance Dredging and Pipeline Corridor Project in August 2008 (MBC Applied Environmental Sciences, Inc. 2008 and 2009). A total of 14.5 square meters of eelgrass was located seaward of Baby Beach in 2008, and 70 square meters of eelgrass were located seaward of Baby Beach in 2009. Eelgrass

turion density ranged between about 48 to 56 turions per square meter during the February 2009 survey. None of the eelgrass was impacted by the County dredging project.

Coastal Resources Management, Inc. (2010) did not located eelgrass within Dana Point Harbor during the February/March 2007 or the October/November 2007 reconnaissance surveys of Baby Beach. On June 8th, 2010, CRM updated the earlier Dana Point Harbor marine biological surveys in the vicinity of Baby Beach and the Sailing Center Docks along the eastern one-third of Baby Beach at depths between -3 and -12 ft MLLW (Figure 6). CRM reported the presence of 457.3 square feet (42.5 square meters) of eelgrass within the survey area at depths between -2.5 and -4.5 ft MLLW in a mixture of silt and scattered boulders (Figure 7). Eelgrass density was extremely low, ranging between 4 and 10 turions per square meter. None of this eelgrass was reported by MBC during the 2009 and 2009 surveys. In addition, turion density was extremely low. These observations suggest that eelgrass recently expanded during the 2009-2010 growing season and will likely continue to increase in areal cover, and increase in density to levels observed by MBC in 2008 and 2009.

CRM could not relocate the eelgrass patch that MBC located in the Dry Stack Storage area docks during the 2010 survey. This location appeared to be located underneath jet ski platforms at the time of the survey.

2.3.2 Surfgrass (*Phyllospadix spp*.)

Surfgrass is a sensitive marine resource that occurs in rocky shoreline and rocky subtidal habitats at depths to approximately 20 feet. Its sensitivity is related to its use by invertebrates and fishes as nursery habitat and its susceptibility to long-term damage because it is a very slow growing species. Revegetation occurs very slowly through initial seeding and eventually the spreading of roots and rhizomes over surfaces of rocks.

Surfgrass is considered to be Essential Fish Habitat by the National Marine Fisheries Service, and juvenile olive rockfish (*Sebastes serranoides*) which are a Fisheries Management Plan Groundfish species utilize surfgrass beds as nursery habitat. Surfgrass is also an extremely important nursery habitat for juvenile lobsters.

Surfgrass is a dominant feature of the Dana Point State Marine Park and Niguel State Marine Park intertidal and subtidal habitat (Applied Ecological Research 2001, Coastal Resources Management, 1998). Its presence on the inside of the Harbor's breakwater, or within the marina is likely limited because of the lack of wave action and other related requirements. No surfgrass was observed within the Harbor project area during the CRM 2007 field surveys (Coastal Resources Management, Inc., 2010).

2.3.3 Abalone

Abalone *(Haliotis sorensoni*). The white abalone is one of eight species of abalone that is known from California. Its listing as a federally endangered species in May 2001 is the result of a population reduction related to over fishing. It is unlikely to occur anywhere in Dana Point Harbor because of a lack of suitable rocky habitat and depth.

White abalones are found in open low and high relief rock or boulder habitat that is interspersed with sand channels. Sand channels may be important for the movement and concentration of drift macro-algae, such as Laminaria farlowii, *Agarum fimbriatum,* and a variety of red algae, upon which white abalone are known to feed (http://www.nmfs.noaa.gov/pr/species/invertebrates/whiteabalone.htm).

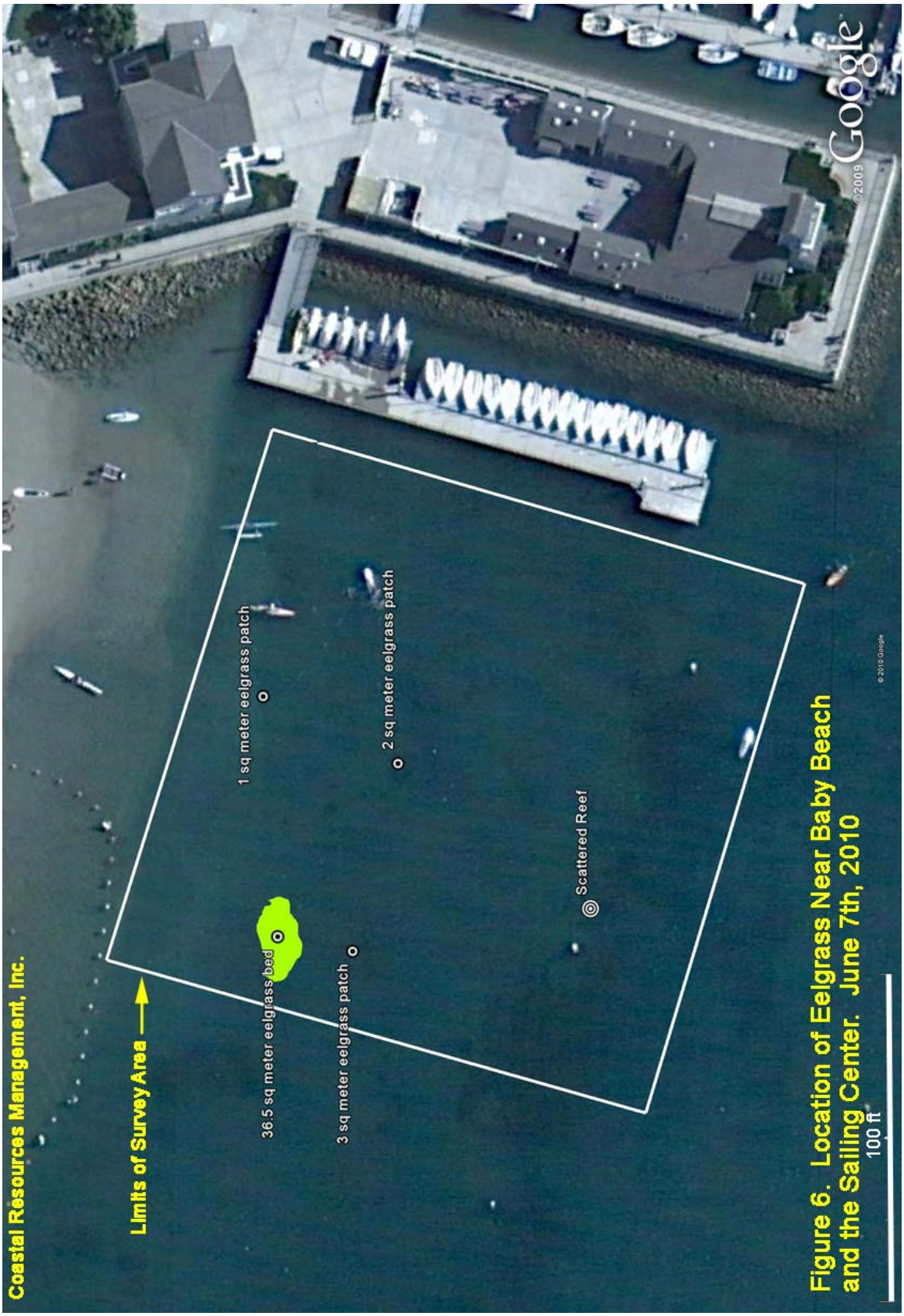

Figure 6. Location of Eelgrass Near Baby Beach and the Sailing Center. June 7th, 2010

White abalone is reported to be most abundant between 25-30 m (80-100 ft) depths, making them the deepest occurring abalone species in California (California Department of Fish and Game 2001). The white abalone depth range is generally believed to be between 60 to 200 ft deep (18 to 60 m) with most occurring at depths greater than 75 ft on reef in exposed areas (California Department of Fish and Game 2001). However, white abalones have been verified at depths as shallow as 28 ft (8.5 meters) in surveys conducted in April and March 2002 in the vicinity of El Capitan State Beach (R. Ware, pers. observation; R. de Wt pers. observation; verified by Ian Tanaguchi, California Dept of Fish and Game in: L.A. de Wit Consultant, 2002). A hybrid white and red abalone was also found at a depth of 22 ft in April 2001 in the same area (R. Ware, pers. observation 2001; L.A. de Wit Consultant, 2001). MBC Applied Environmental Sciences Inc. (2003) noted that "a listing of the white abalone as having previously occurred at Doheny Marine Life Refuge is probably in error. None of the marine life refuge's area is deeper than 6 to 8 m, which is well outside of the white abalones' habitat range". However, due to its confirmed presence at depths as shallow as 22 ft (8.5 m) in Santa Barbara County, there is a potential that this species occurrence in the Marine Life Refuge (State Marine Park) is a valid record, or alternatively, it could be a white/red abalone hybrid since one was observed at these depths along the Santa Barbara County coastline.

Black Abalone (*Haliotis cracherodii*). In 1998, the National Oceanographic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) added black abalone to the candidate species list for possible listing under the federal ESA, and on January 14th, 2009, NMFS listed black abalone as an endangered species (Federal Register / Vol. 74, No. 9 / Wednesday, January 14th, 2009 /Rules and Regulations). Black abalones usually inhabit surf-battered rocks and crevices from the intertidal zone to shallow subtidal zone down to 20 ft (6 m). It is a long-lived species, attaining an age of 25 years or more. Now a rare species, the black abalone was abundant in California until the mid-1980's. It once occurred in such high concentrations that individuals were observed stacked on top of one another. Density studies conducted at the Channel Islands indicate significant declines attributed to Withering Syndrome. According to NMFS, no effort has been made to assess effects of withering syndrome at Santa Catalina Island, though the Island historically supported black abalone populations (NMFS, 2008b). This species is potentially present within the Dana Point Marine Refuge and on the outer side of the Dana Point Harbor breakwater but in highly reduced numbers. It does not occur within Dana Point Harbor.

Red Abalone (*Haliotis rufescens*). Red abalone is listed as a species of special concern by the NMFS. In southern California, they are exclusively subtidal, restricted to areas of upwelling along the mainland and the northwestern Channel Islands. In central and southern California, red abalone had declined the least of all five species by the time the fishery was closed in 1997. A successful red abalone sport fishery continues in northern California, where SCUBA and commercial take have been prohibited. It does not occur within the Dana Point Harbor project area.

Green Abalone (***Haliotis fulgens***). Green abalone is listed as a species of special concern by the NMFS. It prefers shallow water from the low tide zone down to 25 feet (8 m). Green abalone may occupy a particular site, called a home site or scar, and abalone larger than one inch seldom leave their home scar to forage, relying solely on drift algae. Smaller individuals actively forage but return to their home scar in the day. Now rare, the green abalone was once a common species in southern California. It does not occur within the Dana Point Harbor project area.

Pink Abalone (*Haliotis corrugata*). This NMFS species of special concern occurs in a depth range from the lower intertidal zone to almost 200 feet (60 meters), but most are found from 20 to 80 feet (6 to

24 m). It has the broadest distribution of the southern California abalones. In the early 1950's, pink abalone comprised the largest segment of the abalone fishery, about 75 percent (California Department of Fish and Game, 2001). By the early 1980's, the commercial pink abalone fishery had expanded throughout its range and the landings dwindled to virtually nothing. Surveys at San Clemente, Santa Catalina, and Santa Barbara Islands in 1996 and 1997 indicated that there were few remaining abalone on these islands (California Department of Fish and Game, 2001).

2.3.4 Fishes

California Grunion (*Leuresthes tenuis*). This fish species is not a formally listed species but is considered sensitive because of its beach spawning activity and potential impacts from beach disturbances such as beach cleaning and beach nourishment. It uses the high intertidal sandy beach habitat of many southern California beaches as spawning habitat. Grunion lay their eggs in the wet beach sands during the highest spring tides between late February or early March to as late as early September (Walker 1952). Dana Strands beach is a grunion spawning habitat which has been used by grunion on a regular basis. Doheny (Capistrano Beach) is also a historical spawning grounds for this particular species (Walker 1952 and H. Helling, pers. comm.). It does not occur within the Dana Point marina project area.

Steelhead Trout (*Onchorynchus mykiss*). Steelhead are a unique form of rainbow trout. Like salmon, they spent most of their adult lives in the ocean, but spawn in freshwater streams and rivers. It lives approximately two to four years of its life (but this period varies greatly) in the open ocean prior to returning to the stream where it was spawned. It is dependent on small, clear-flowing but not rapid, streams with gravel beds to complete its spawning cycle. The area must also have protective cover and an adequate food source. Steelhead populations are declining because of impacts on habitat such as dams, turbidity, and other habitat incursions (RBF Engineering and MBC Applied Environmental Sciences, Inc. 2003).

Although steelhead probably once existed in most of the California rivers and creeks with outlets to the ocean, recent records of this species are few, until the mid-1990s. Historically, a few fish were known to enter most of the waterways south of the Los Angeles Basin; however, spawning success may have been sporadic. The last published data indicated that anglers caught large numbers of juvenile rainbow fish in coastal lagoons in the 1930s (RBF Engineering and MBC Applied Environmental Sciences, 2003).

Colonization events of steelhead were documented during 1996-2002 in Topanga and San Mateo Creeks. These colonization events were represented by a few spawning adults or the observation of a single individual, when some fry suspected to be juvenile steelhead were discovered in San Mateo Creek in 1999. http://ecos.fws.gov/docs/federal_register/fr3542.pdf.

Except for the colonization of the small population in San Mateo Creek in northern San Diego County, steelhead appear to have been completely extirpated from nearly all systems in the southern portion of the range of the Distinct Population Segment (DPS) from Malibu Creek to the Mexican border. http://www.nmfs.noaa.gov/pr/species.

A steelhead trout was caught in the Harbor as recently as December 30, 2002 (RBF Engineering and MBC Applied Environmental Sciences, 2003). However, it is unlikely that this species would naturally occur in the Harbor.

In 1994, the National Marine Fisheries Service (NMFS) received a petition to list steelhead throughout its range in California, Oregon, Washington, and Idaho under the Endangered Species Act (ESA). On January 5, 2006, NMFS listed nine Distinct Population Segments (DPSs) including the west coast steelhead as threatened and one as endangered. Some of them had been previously listed between 1996

and 1998, but, because of legal and other issues, all listings were reaffirmed and/or revised in 2006 (National Oceanographic and Atmospheric Administration, 2006).

Tidewater Goby (*Eucyclogobius newberryi*). The tidewater goby is a Federally-listed endangered species that has been expatriated from many southern California creek mouths (U.S. Fish and Wildlife Service, 2000; Swift et al., 1989). It is currently found in shallow marine areas and lower reaches of streams between San Diego northward to Humboldt County waters where salinity is less than 10 ppt. The population of Tidewater Goby is depleted due to reduced or eliminated flows in the lower reaches of coastal streams, pollution, and the filling in, channelization, and other physical alterations of their habitats. The population disappeared from about 74 percent of the coastal lagoons from Morro Bay southward to San Diego (U.S. Fish and Wildlife Service, 1995).

Historically, the tidewater goby inhabited San Juan Creek from the mouth to 2.5 miles inland of the ocean. A search of the California Department of Fish and Game Natural Diversity Data Base (indicated the tidewater goby is extirpated from the creek and was last observed in 1984. The U.S. Army Corps of Engineers (1997) reported that habitats at the mouth of both San Juan Creek and Aliso Creek were poor in habitat and water quality and unlikely to support populations of this endangered species. Habitat conducive to tidewater gobies is absent from Dana Point Harbor.

California Halibut (*Paralichthys californicus*). Although it does not have a formal special status, the California halibut is considered a sensitive species by resource agencies because of its commercial value and a continued region-wide reduction of its nursery habitat in bays and wetlands. California halibut spawn at sea and its larval stages are planktonic. After several months, larval fish settle to the bottom and migrate into shallow coastal waters. Young-of-the-Year fish (YOTY) prefer shallow waters between about -1.5 feet and -3.5 feet MLLW, whereas juveniles prefer deeper channel bottoms to a maximum depth of approximately -15 feet MLLW. After spending nearly nine months in coastal embayments, juveniles move out into the open coastal environment. The species uses inshore waters of bays, harbors, and estuaries as a nursery habitat. Halibut may occasionally be found particularly in the outer channels of Dana Point Harbor, but are much more common in the open coastal environment. Their occurrence within the marina basins is likely rare.

2.3.5 Reptiles

Sea Turtles. Several species of federally-listed threatened and endangered sea turtles could potentially occur in the nearshore open water habitats surrounding Dana Point Harbor. There are no known nesting beaches for these species in the United States, but they have been observed off the coast of southern California. These include the threatened population of green sea turtle (*Chelonia mydas*), the endangered leatherback sea turtle (*Dermochelys coriacea*), the threatened but federally-proposed endangered, North Pacific Distinct Population Segment loggerhead sea turtle (*Caretta caretta*), and the endangered olive ridley sea turtle *(Lepodochelys olivacea*). Sightings are extremely rare and it is unlikely that they would be affected by project activities.

The green sea turtle, Federally-listed as endangered have been sighted from Baja California to southern Alaska, but most commonly occur from San Diego south (http://www.nmfs.noaa.gov/pr/species/turtles/green.htm). Green sea turtles, have been sighted offshore of Dana Point Harbor (RBF Engineering and MBC Applied Environmental Sciences 2003) although the nearest place they are frequently seen is in and near the mouth of the San Gabriel River and Alamitos Bay (Fullerton 1985 in RBF Engineering and MBC Applied Environmental Sciences, 2003). A 21-inch juvenile green sea turtle (estimated to be between three to five years old) was found by fishermen casting lines in the channel at the intersection of Pacific Coast Highway and the San Gabriel River on 29 August, 2008 (Aquarium of the Pacific, 2008), stranded within the intake channel, and was reported to have been

harassed by several unknown individuals. It was removed and transferred to the Long Beach Aquarium for rehabilitation from minor injuries. This species would be considered uncommon to rare as it is more common in tropical and subtropical waters.

2.3.6 Marine Mammals

California Gray Whale (*Eschrichtius robustus*). Two distinct populations of gray whales occur in the North Pacific Ocean, a western and an eastern stock. The eastern stock occurs along the eastern Pacific coastline and is known as the California gray whale. In June 1994, the eastern pacific population was removed from the Federal Endangered Species List, due to recovery of population numbers to near the estimated sustainable population size.

The California gray whale migrates through the SCB twice each year, traveling between its feeding grounds in Alaska and its breeding grounds in Baja California. The southern migration through the SCB occurs from December through February, with pregnant females moving through the area first. The northward migration begins in February and lasts through May, peaking in March (Poole, 1984; Dailey and Bonnell, 1993). Solitary animals generally lead the northbound migration with cow-calf pairs following 1 to 2 months later (Poole, 1984). Gray whales migrate within 125 miles (200 km) of the shoreline and many are sighted within 9 miles (15 km) of shore (Dailey et al. Bonnell and Dailey, 1993). On the northbound migration, cow-calf pairs are believed to more closely follow the shoreline rather than the offshore route (Dailey and Bonnell, 1993). Gray whales are observed commonly in the nearshore waters of the project area, but rarely do individual whales enter Dana Point Harbor.

2.3.7 Water-Associated Bird Species

A bird survey focusing on nesting species was conducted by Keane Biological Consulting (2007). This section focuses on marine-associated sensitive species of birds, including observations from that survey, and a 2003 survey conducted by MBC Applied Environmental Sciences (2003).

California Gull (*Larus californicus*). The California Gull is a Species of Special Concern. It nests in alkali and freshwater laucustine habitats east of the Sierra Nevada, and not locally. It is abundant in the project area during its non-breeding season (August-March) (Zeiner at al., 1990). This species would roost on the breakwater and docks of Dana Point Harbor during the non-breeding season.

Double-Crested Cormorant. (*Phalacrocorax auritus*). A Species of Special Concern, this species is vulnerable to reduced nesting success from persistent pesticides in the water (Zeiner et al., 1990). This species is the most widespread of all cormorants in North America but in California, they are the least abundant of the various species of cormorants (Sowls et al., 1980) and uncommon in southern California. In California, they nest offshore on rocks and islands, on abandon wharves and power poles, and most of the breeding colony sites are in central to northern California. They can be found in nearshore waters and roost on the breakwater and docks of Dana Point Harbor. Cormorants are diving birds that forage on fish.

California brown pelican *(Pelicanus occidentalis californicus)*. The California brown pelican is federally- and state-listed as an endangered species. It is observed primarily in the open ocean and beaches but is also common in estuaries, tidal rivers, rocky coasts, breakwaters, and islands. Breeding locations along the west coast of California are limited to the Channel Islands. During the late 1960's and early 1970's, the brown pelican population suffered a widespread and dramatic decline linked to egg shell thinning due to DDT, first noted in 1962, which resulted in listing the subspecies as endangered. The population is now recovering well. Brown pelicans do not breed on the mainland but are frequent inhabitants of southern California estuaries and harbors.

The Dana Point harbor breakwater provides roosting habitat for pelicans, and the Dana Wharf region and bait barge attract large numbers of pelicans. However, no nesting habitat for pelicans is present on the California mainland.

California least tern *(Sterna antillarum browni.* The California least tern is federally- and state-listed as endangered. A migratory species, it nests from April through August along the coast of California from San Francisco south to Baja California. It presumably winters in Central America or northern South America, although the specific location of its wintering range is unknown. In 2006, the California least tern breeding population was estimated at over 7,000 pairs, more than a ten-fold increase from estimated numbers when it was listed in the early 1970's. Least terns breed on sparsely vegetated sandy beaches, salt flats, and dredge spoil in colonies of few to several hundred nesting pairs. This species relies on sight for foraging and usually requires relatively clear water to locate its preferred baitfish food sources, northern anchovy (*Engraulis mordax*), topsmelt (*Atherinops affinis*), and jacksmelt (*Atherinopsis californicus*). The majority of foraging occurs in open ocean (Atwood and Minsky 1983, Minsky 1984, Keane Biological Consulting, 2002). California least terns are expected to forage occasionally among the docks of the project site, particularly during years when offshore prey (small baitfish) are limited in availability.

There are no nesting sites in the immediate vicinity of Dana Point Harbor. The nearest nesting site to the south of Dana Point is Red Beach on the Pendleton Marine Corps Facility, approximately 20 miles south of Dana Point. In 2006, there were 27 least tern nest with 16 fledglings (Kathy Keane, per. com. with R. Ware, 3 July, 2007). The nearest breeding site to the north west of Dana Point is in Upper Newport Bay. In 2006, only 18 of 61 eggs (36 nests) hatched and only 2 of those chicks survived to fledging. In 2007 to date, there have been 35 nests built but hatching success appears to be much higher than in 2006, with a minimum of about of 20 fledglings (Kathy Keane, pers. com. with R. Ware, 3 July, 2007). Other nesting sites for this species are located at the Santa Ana River mouth, Bolsa Chica, and in the Port of Los Angeles.

Western Snowy Plover (*Charadrius alexandrinus nivosus*). The western snowy plover is a federally and state-listed threatened shorebird that nests on sand spits, dune-backed beaches, river/creek mouth beaches, and on salt pannes in lagoons and estuaries. Its current breeding range extends between southern Washington to Baja California. Breeding occurs from early March to late September. Individuals of the wintering population can be expected to be present along south Orange County beaches and forage along the shoreline between November and February.

Small numbers of migrant or wintering snowy plovers are occasionally reported from the nearby San Mateo Creek area, but no nesting has been documented at Dana Point Harbor (RBF Engineering and MBC Applied Environmental Sciences 2003). Population declines are attributed to human disturbance and raking of beaches. Their occurrence in the Harbor is limited by the small amount of available sandy beach and mudflat. Snowy plovers prefer the same type of nesting habitat as least terns, so little potential exists for them to nest at the beaches of Dana Point Harbor.

Great Blue Heron. The great blue heron has no listing status, and although it is a common wading bird in southern California estuaries its nesting sites in California are uncommon. It is one of the most widespread and adaptable wading birds in North America (Butler 1992). The range of the great blue heron extends from Southeast Alaska and north British Columbia to south Quebec and south to Florida, Texas, Baja California, and Central America, at least to Belize and Guatemala. Along the Pacific coast, its range extends from southeast Alaska to Mexico (Butler 1992), and they are known to be common in coastal California (Kathy Keane, Keane Biological Consulting, personal observation). They can be found in shallow estuary systems and fresh and saline emergent wetlands all year throughout most of the state. Great blue herons usually arrive on breeding grounds by early February (Butler 1992). Courtship and nest-building begin shortly thereafter, and eggs are laid in late February or March. They usually nest

in colonies, sometimes with five or more pairs, but often with fewer (Butler 1992). This species is sensitive to human disturbances and probably to pesticides and herbicides in nesting and foraging areas (Zeiner et al 1990).

Great blue herons are believed to nest nearby the Dana Point project vicinity (Keane Biological Consulting 2007).

2.4 REEFS AND KELP BEDS

Subtidal reefs are considered Essential Fish Habitat for groundfish species. Kelp forests associated with reefs provide protection and cover for many marine invertebrates and fishes (Foster and Schiel, 1985). Kelp (*Macrocystis pyrifera*) grows on rock and cobble habitat offshore of Dana Point northwest through Corona del Mar at depths between 20 and 45 feet. California Department of Fish and Game Kelp Bed #9 extends between Emerald Bay and Dana Point Harbor. Kelp canopy has historically persisted in two regions of Orange County; between Heisler Park and Cactus Point in Laguna Beach and between Mussel Cove (South Laguna) and Dana Point, including the waters offshore of Dana Strand and the Dana Headlands. Kelp beds located between the Dana Point Harbor breakwater and San Mateo Creek are located at distances between approximately 1,600 and 5,000 feet from shore and are identified as California Department of Fish and Game Kelp Bed #8.

Kelp grows on the breakwater of Dana Point Harbor, the hard substrate of the SERRA outfall downcoast of Dana Point Harbor at depths less than 40 ft, intermittently for about 1 mile south of the outfall on low relief cobble and boulder, and immediately downcoast of the Capistrano Beach County Park at distances between 600 and 1,500 feet offshore (ECOSCAN 1990). Inshore kelp beds are patchy, and not always present due to their shallow nature and greater susceptibility to damage from storms. Hard-Bottom features and kelp beds are more common farther offshore at depths between 40 and 55 ft between Doheny Beach Marine Life Refuge and San Mateo Point.

Inside Dana Point Harbor, giant kelp is very sparse. Individual giant kelp plants, in extremely low density and in poor condition were found on isolated rock outcrops and quarry stone in the vicinity of the in the Main Channel during Oct/Nov 2007 field surveys (Coastal Resources Management, Inc. 2010). However, there was no observable surface canopy.

2.5 PROTECTED MARINE AREAS

2.5.1 Current Marine Protected Areas in the Vicinity of Dana Point Harbor

Currently protected Marine Areas nearby Dana Point Harbor are listed in Table 5 and their locations are shown in Figures 6a-6d. Upcoast of Dana Point Harbor, intertidal and subtidal habitats receive local and state environmental protection status as part of the *Niguel Marine Park* and the *Dana Point Marine State Park* located at the base of the Headlands. The Niguel State Marine Park boundaries extend 1,200 feet offshore and 2.1 mi along the shoreline. It encompasses an area of 315.2 acres. Dana Strands Beach and the waters offshore of the beach are located within the boundaries of this State Marine Park. The Dana Point State Marine Park boundaries extend 0.7 mi offshore and 1,200 ft of shoreline between the headlands and Dana Point Harbor. This covers an area of 124.8 acres.

Downcoast of Dana Point Harbor, *Doheny Beach State Marine Conservation Area* is also an underwater park. This area overlaps with the *Doheny Beach State Marine Park*. The Marine Park extends 600 feet offshore, whereas the State Marine Conservation Area extends 1,500 ft offshore. Most of the shoreline is sandy habitat, although there is some rocky intertidal habitat at the northern edge of the Marine Park. Offshore, the seafloor is a mixture of both sand bottom and low-to-high relief reef. Lagoon wetland

habitat in located at the mouth of San Juan Creek. The County of Orange-maintained *Capistrano Beach County Park* is located at the southern end of Doheny State Marine Park.

Table 5. State Designated Marine Life Areas in the Vicinity of Dana Point

Name/Area[1]	*Approximate Boundaries*	*Overlapping Designation*	*Area Covered*	*Managing Agency (ies)*
Niguel State Marine Park	SE point of Mussel Cove to NW tip of Dana Point	None	2.1 mi of coastline and 1,200 ft offshore	CDF&G; County of Orange
Dana Point State Marine Park	NW tip of Dana Point Headland to Eastern tip of headland	None	0.7 mi of coastline and 1,200 ft offshore	CDF&G; County of Orange
Doheny Beach State Marine Conservation Area	Dana Point Harbor to Palisades Drive	County of Orange Capistrano County Park	1.2 mi of coastline and 1,500 ft offshore	California Department of Parks and Recreation; CDF&G; County of Orange
Doheny Beach State Marine Park	Dana Harbor south to Palisades Drive	Doheny State Marine Conservation Area	1.2 mi of coastline and 600 ft offshore	California Department of Fish and Game (CDF&G); County of Orange

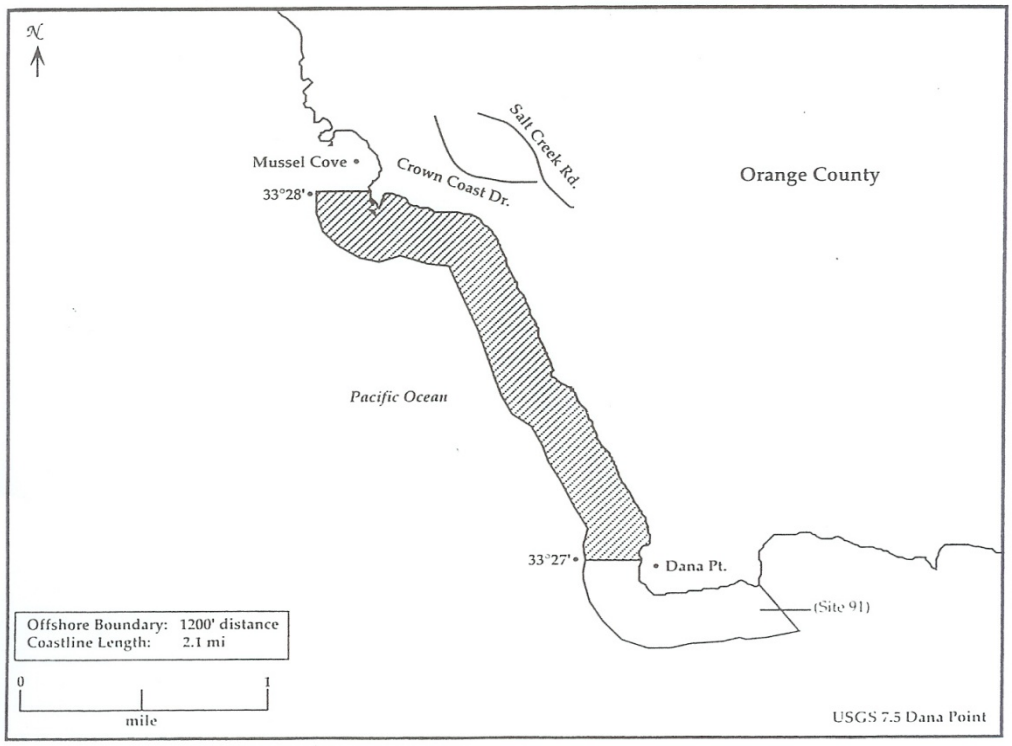

Figure 7a. Niguel State Marine Park

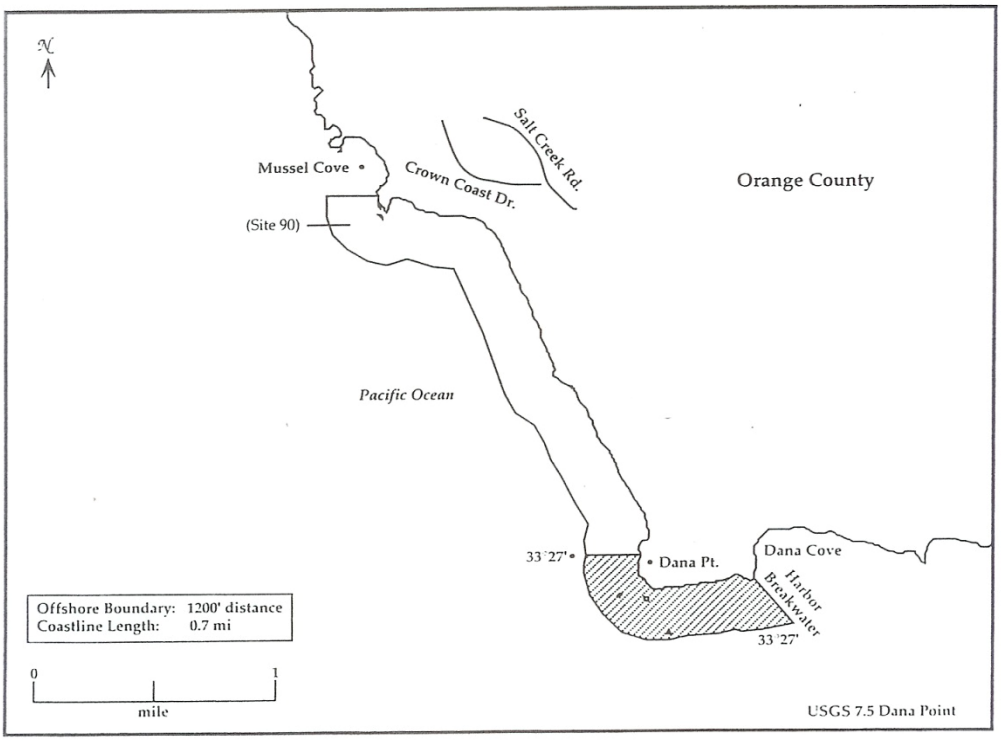

Figure 7b. Dana Point State Marine Park

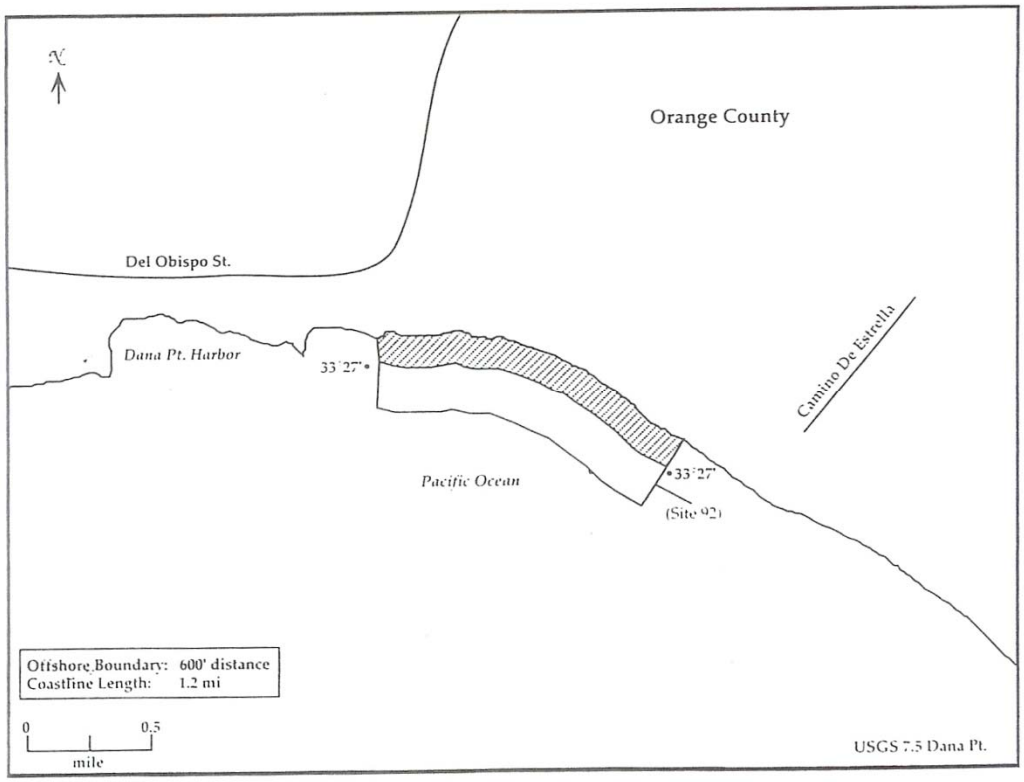

Figure 7c. Doheny Beach State Marine Park

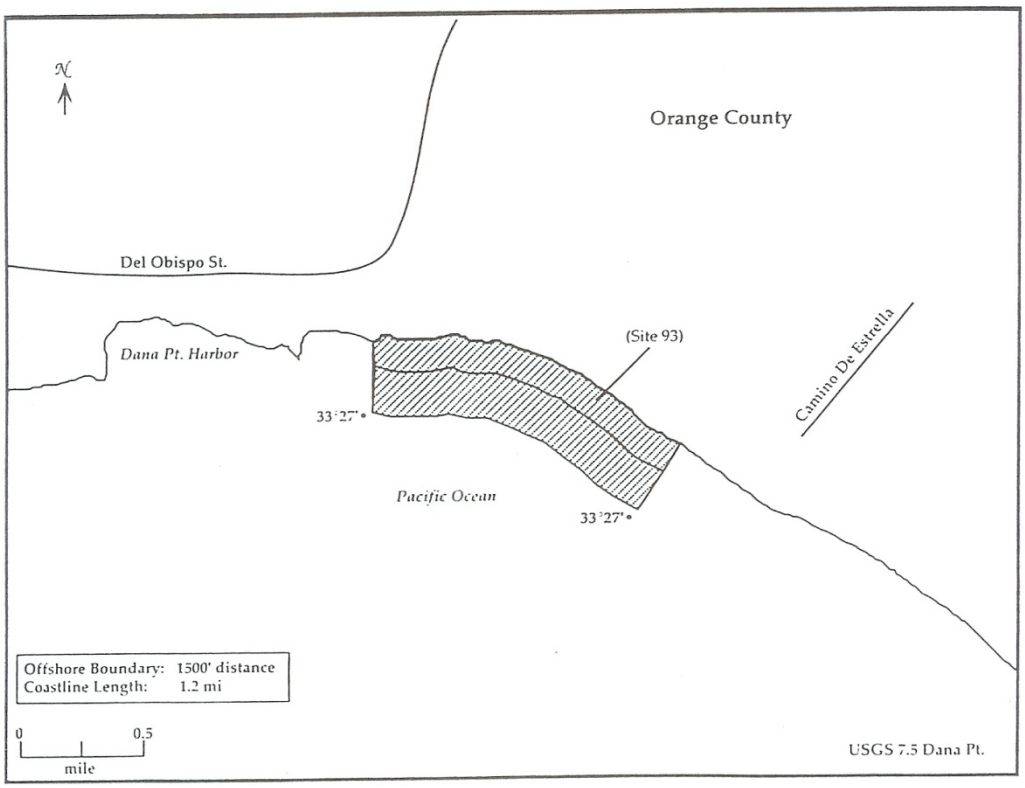

Figure 7d. Doheny Beach State Marine Conservation Area

2.5.2 Proposed Marine Protected Areas

The 1999 Marine Life Protection Act (MLPA) mandated that the State of California design and manage an improved network of marine protected areas to protect marine life and habitats, marine ecosystems, and marine natural heritage. Marine protected areas include marine reserves, marine parks and marine conservation areas. Intertidal and subtidal habitats that were previously listed as State of California Marine Ecological Reserves and Marine Life Refuge have been reclassified. This re-classification was the result of a state-wide simplification of existing state-protected areas into six classifications, and replaced 18 classifications that were previously used to categorize state Marine Managed Areas (MMAs). Marine Protected Areas (MPAs) are a subset of MMAs and include conservation areas, marine reserves, state marine parks, and state marine conservation areas. The MLPA requires that the Department of Fish and Game (Department) prepare and present to the Fish and Game Commission (Commission) a master plan that will guide the adoption and implementation of a Marine Life Protection Program, which includes a statewide network of marine protected areas (MPAs). Other recent related legislation includes the Marine Life Management Act of 1998 (MLMA; Stats. 1998, Chapter 1052), Marine Managed Areas Improvement Act of 2000 (MMAIA; Stats. 2000, Chapter 385), and California Ocean Protection Act of 2004 (COPA; Stats. 2004, Chapter 719).

In August 2004, the California Resources Agency, California Department of Fish and Game, and Resources Legacy Fund Foundation launched an effort to implement the MLPA, after two unsuccessful earlier attempts. On April 13, 2007, the California Fish and Game Commission adopted regulations to create a new suite of marine protected areas (MPAs) designed for the Central Coast of California, the first region considered for the State. This move effectively launched the state's Marine Life Protection Act (MLPA) Program. Southern California MPAs (Point Conception to the Mexican Border) and Northern California MPAs are currently undergoing reviews.

For Southern California, a marine protected area (MPA) proposal was unanimously adopted on November 10, 2009 by the MLPA Blue Ribbon Task Force (BRTF) as the MLPA South Coast Integrated Preferred Alternative (IPA) MPA Proposal to be recommended to the California Fish and Game Commission (CFGC). The IPA integrates elements from three MPA proposals developed by the MLPA South Coast Regional Stakeholder Group (SCSRG); the BRTF also adopted a motion to forward SCRSG MPA proposals 1, 2 and 3 to the CFGC for consideration. The IPA recommends 50 marine protected areas (MPAs) in state waters in the MLPA South Coast Study Region, which extends from Point Conception in Santa Barbara County to the California/Mexico border in San Diego County (http://www.dfg.ca.gov/mlpa/southcoastipa.asp).

The proposed Sub region 4 MPAs in the vicinity of Dana Point Harbor are shown in Figure 8. These include the Crystal Cove State Marine Conservation Area, the Laguna Marine Life Reserve, and the Dana Point State Marine Conservation Area. Local

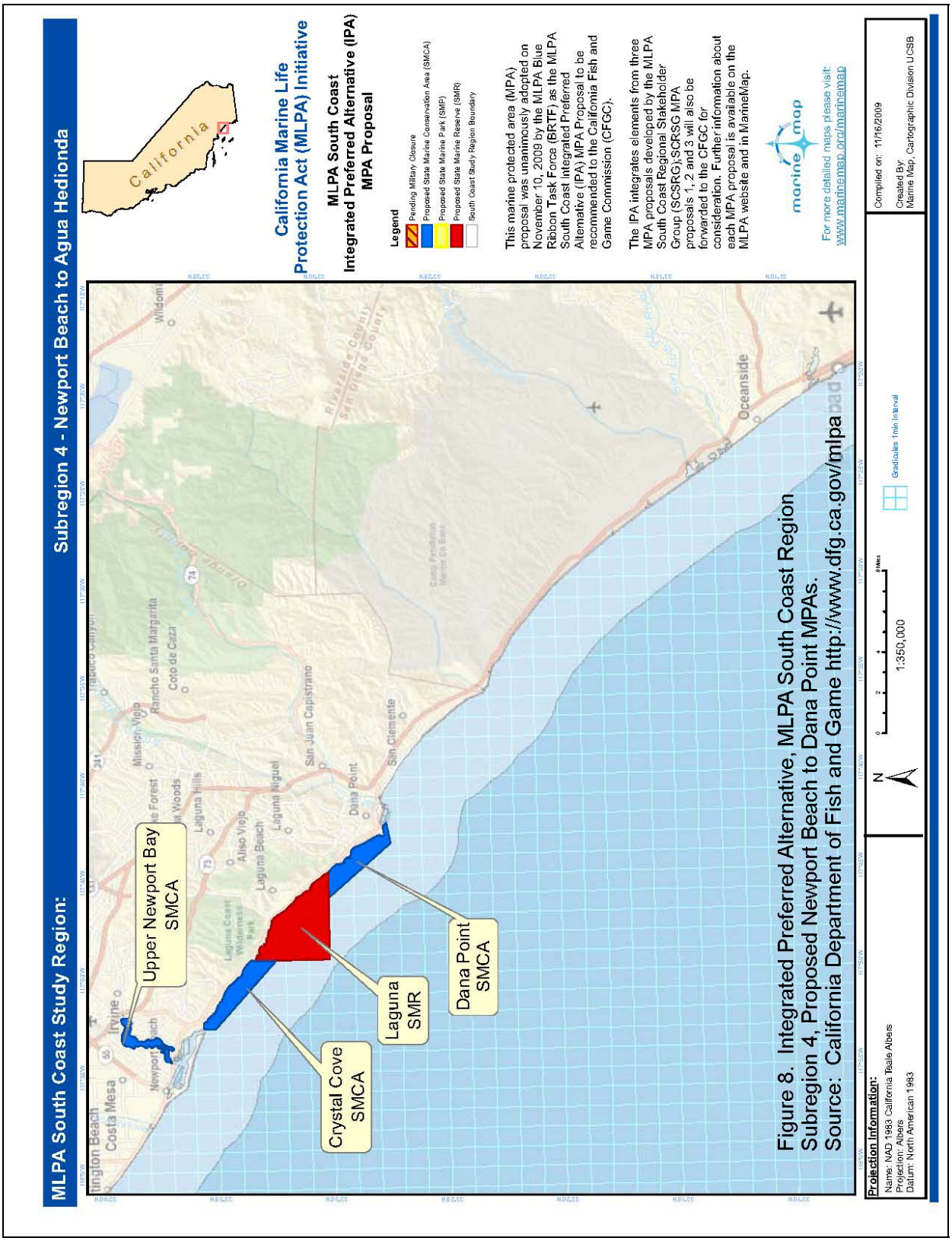

Figure 8. Integrated Preferred Alternative, MLPA South Coast Region Subregion 4, Proposed Newport Beach to Dana Point MPAs. Source: California Department of Fish and Game http://www.dfg.ca.gov/mlpa

2.6 FISH MANAGEMENT PLAN SPECIES

This assessment of Essential Fish Habitat (EFH) for the Dana Point Harbor Waterside Improvement Project is being provided in conformance with the 1996 amendments to the Magnuson-Stevens Fishery Management and Conservation Act (FR 62, 244, December 19, 1997). The 1996 amendments to the Magnuson-Stevens Act set forth a number of new mandates for the National Marine Fisheries Service, eight regional fishery management councils, and other federal agencies to identify and protect important marine and anadromous fish habitat. The councils, with the assistance from NMFS are required to delineate EFH for all managed species. Federal action agencies which fund, permit, or carry out activities that may adversely impact EFH are required to consult with NMFS regarding the potential effects of their actions on EFH, and respond in writing to the NMFS recommendations.

The Dana Point Harbor Waterside Improvement Project area is located in an area designated as EFH in the Coastal Pelagics Fisheries Management Plan (FMP) and the Pacific Groundfish FMP. The Coastal Pelagics FMP includes four finfish (Pacific sardine, chub mackerel, northern anchovy, and jack mackerel) as well as market squid (Pacific Fisheries Management Council, 1998). The Pacific Groundfish FMP includes 83 species, many of which are rockfish (Pacific Fisheries Management Council, 2008).

2.6.1 Coastal Pelagic FMP

Coastal Pelagic FMP Species that are likely to be present within and outside of Dana Point Harbor include northern anchovy and Pacific sardine. Outside the Harbor, jack mackerel and chub mackerel are known to occur; these however, would only be present within the Harbor, on rare occasions.

Of these species, the northern anchovy is the most likely species to be within the Dana Point Harbor Waterside Improvement Project Area.

Northern Anchovy-*Engraulis mordax:* The central subpopulation ranges from approximately San Francisco, California, to Punta Baja, Baja California. The bulk of the central subpopulation is located in the Southern California Bight, a 20,000-square-nautical-mile area bounded by Point Conception, California, in the north and Point Descanso, Mexico, (about 40 miles south of the U.S.-Mexico boarder) in the south. Northern anchovy in the central subpopulation are typically found in waters that range from 12° C to 21.5° C. All life stages are found in the surface waters of the EEZ. Eggs and larvae are found near the surface, generally at depths of less than 50 meters and in the same areas as spawning adults. Anchovy eggs are most abundant at about 14° C. Nearshore habitat areas «90 meters) between Pt. Conception, California and Pt. Banda, Baja California represented 23% of the available habitat for central stock juvenile northern anchovy (Pacific Fishery Management Council, 1998).

Northern anchovy comprise a significant portion of nearshore otter trawl catches and contribute moderately to the nearshore fish biomass of the nearshore area of San Pedro Bay (MBC Applied Environmental Sciences, 1997) and accounts for about 80% of all fishes caught within 3 km of the coast in the Southern California Bight (Cross and Allen 1993). Along the coast of northern Orange County and Long-Beach to LA Harbors, this species ranked highest in abundance during 6 of the 11 monitoring surveys between 1972 and 1997 offshore of the San Gabriel River and was never ranked lower than the 5th most abundant species. The northern anchovy is also the most abundant species in Los Angeles Harbor, representing over 80% of the fish caught (MEC Analytical Systems, 1988, 1999), and larvae of the species are also a common component of the ichthyoplankton (MEC Analytical Systems, 1988). In Los Angeles Harbor, Northern Anchovy appear to prefer deeper waters of the Harbor. There is a

commercial bait fishery for northern anchovy offshore of Dana Point Harbor, and a commercial bait barge is located within Dana Point Harbor. Larvae of northern anchovy are also part of the Dana Point ichthyofauna and icthyoplankton community.

2.6.2 Pacific Groundfish FMP

The Pacific Groundfish FMP species that are likely present within Dana Point Harbor or immediately outside Dana Point Harbor rocky habitats include the California scorpion fish (*Scorpaena guttata)* that is associated rocky habitats on the breakwaters, and potentially, juvenile Olive rockfish (*Sebastes serranoides*). While both may be associated with rocky habitats along the breakwaters and to a lesser extent the quarry stone lining the Island Marina shoreline in the outer section of the Harbor, populations of these species are expected to be low.

California scorpion fish -*Scorpaena guttata*. California scorpionfish are benthic and found intertidally as deep as 183 m. They are commonly found in both sandy and rocky areas, in association with rocky reefs, often lodged in crevices. Although it is commonly a solitary species, it aggregates near prominent features and can be associated with anthropogenic features including pipes and wrecks. Juveniles settle on rocky bottom. Very young scorpionfish live in shallow water hidden away in habitats with dense algae and bottom-encrusting organisms McCain (2003). The Dana Point breakwaters and the quarry stone protecting the marinas is likely habitat for this species.

Olive rockfish-*Sebastes serranoides*. Olive rockfish occur from surface/intertidal waters to 174 m deep but most commonly they occur in waters less than 30 m. Adult olive rockfish are a midwater fish, almost always lining over hard, high relief (such as reefs, wrecks, oil platforms or pipes), Young-of-the-year and adults are primarily found hovering off the bottom, Sometimes olive rockfish are observed well off the bottom, in or near kelp or over rocky reefs, Olive rockfish prefer clear-water areas of dense kelp and are rarely caught or seen over sandy substrate, Olive rockfish distribution is fairly even over all rocky substrata, although significant selection is exhibited toward low rock substratum, The larval stage of olive rockfish is planktonic, When young-of-the-year olive rockfish settle out of the plankton they are most commonly found in and around kelp beds, oil platforms, surfgrass, and other structures at depths as shallow as 3 m, Young olive rockfish also are found under drifting kelp mats McCain et al (2003). In Los Angeles Harbor, olive rockfish has been found largely as juveniles associated with the kelp growing along the inner edge of the federal breakwater (MEC Analytical Systems, 1988). One unidentified rockfish was observed nearby eelgrass patches and low-relief reef seaward of Baby Beach in June 2010 (CRM, Inc., 2010)

2.6.3 Habitats of Particular Concern

Eelgrass (*Zostera marina*) is identified as HAPC for ESH groundfish species. Eelgrass meadows form a basis of primary production that supports ecologically and economically important species. Eelgrass is an important habitat for invertebrates which use eelgrass beds as a source of food and attachment. Marine fishes seek the shelter of the beds for protection, and forage on invertebrates that colonize the eelgrass blades and sediments in and around eelgrass vegetation. The vegetation also serves a nursery function for many juvenile fishes, including species of commercial and/or sports fish value (California halibut and barred sand bass) and federal Fishery Management Plan (FMP) groundfish species (i.e., lingcod (*Ophiodon elongatus*), and Bocaccio rockfish *(Sebastes paucispinis).*

As discussed in Section 2.3.1, eelgrass is found in Dana Point Harbor, although it is not abundant and its density is low. Its distribution is primarily limited to the region near Baby Beach (Chambers Group, Inc. 2005; BC Applied Environmental Sciences 2008, 2009; Coastal Resources Management, Inc., 2010). A single patch was also located in the boat basin north of the launch ramp in 2009 (MBC Applied

Environmental Sciences, 2009) but it was not relocated in 2010 (Coastal Resources Management, Inc. 2010).

2.7 INVASIVE ALGAE

2.7.1 *Caulerpa taxifolia*

Caulerpa (Figure 9) has a potential to cause ecosystem-level impacts on California's bays and nearshore systems due to its extreme ability to out-compete other algae and seagrasses. *Caulerpa taxifolia* grows as a dense smothering blanket, covering and killing all native aquatic vegetation in its path when introduced in a non-native marine habitat. Fish, invertebrates, marine mammals, and sea birds that are dependent on native marine vegetation are displaced or die off from the areas where they once thrived. It is a tropical-subtropical species that is used in aquariums. It was introduced into southern California in 2000 (Agua Hedionda Lagoon and Huntington Harbour) by way of individuals likely dumping their aquaria waters into storm drains, or directly into the lagoons. While outbreaks have been contained, the Water Resources Board, through the National Marine Fisheries Service and the California Department of Fish and Game require that projects that have potential to spread this species through dredging, and bottom-disturbing activities conduct pre-construction surveys to determine if this species

Figure 9. The invasive algae, *Caulerpa taxifolia*. Source: NOAA/NMFS

is present using standard agency-approved protocols and by National Marine Fisheries Service/California Department of Fish and Game Certified Field Surveyors.

Focused Surveys for Invasive Algae

Caulerpa was not observed within the regions proposed for waterside improvements during surveys conducted for this project in Feb/March 2007, Oct/Nov 2007, and June, 2010 (Coastal Resources Management, Inc., 2010), or for the Dana Point Harbor Maintenance Dredging and Beach Nourishment Project (Chambers Group, Inc. 2005, 2006; MBC Applied Environmental Sciences, 2008). The CRM invasive algae survey covered 6.28 acres of harbor bottom habitat (Table 2 and Figure 4). Overall, the bottom area surveyed by both diving biologists and remote underwater video averaged 24.7% of the total

bottom habitat within the project survey limits, ranging from 13.9% in the East and West Marina basins to over 100% coverage in the at the Youth Sailing Center and the Harbor Patrol Basin. Baby Beach areal cover (by divers and video in 2007 and 2010) covered 100% of the survey area, and reflected a survey effort concentrated in a region where there was the highest probability of locating either *Caulerpa* algae or eelgrass.

2.7.2 *Undaria pinnatifida*

Undaria pinnatifida (Figure 10) is a golden-brown kelp native to the Japan Sea. It has been introduced in Australia, New Zealand, and Europe and has now spread to the California coastline. It has been found in Santa Barbara Harbor, Long Beach Harbor, Anaheim Bay, San Diego Bay, and offshore of Catalina Island.

In Japan it is known as wakame and is extensively cultivated as a fresh and dried food plant. However, it has the potential to become a major pest in our coastal waters. *Undaria* grows to between 3 to 7 feet (1 and 2 m) tall and is found in sheltered harbor waters on rocks, breakwaters, and marine debris from the low-tide mark to 50 feet (15 m). A mature plant has a distinctive, spiraled (frilly), spore-producing structure at its base. It also has an obvious central stem to 4 inches (10 cm) wide that extends for the length of the plant (Figure 7). The blade may be up to 3.1 feet (1 m) wide and extends from the tip of the plant for half the length of the plant.

Focused Survey for *Undaria*

Undaria was not observed during dive surveys or remote video surveys in Dana Point Harbor between February 2007 and June 2010 (Coastal Resources Management, Inc. 2010).

Figure 10. *Undaria pinnatifida*. Source Photo: CRM

2.7.3 *Zostera japonica*. Dwarf eelgrass is native to Asia and threatens to upset the natural balance of California's wetlands. It has been found in Humboldt Bay (http://www.dfg.ca.gov/invasives/dwarfeelgrass; Foss et al., 2007). It has not been found in Dana Point Harbor.

3.0 MARINE RESOURCES IMPACT ASSESSMENT

3.1 PROPOSED PROJECT

Proposed waterside upgrades to Dana Point Harbor include (1) the renovation and re-orientation of the East and West marina basin dock systems by replacing old and deteriorating docks, slips and gangways with new facilities; (2) dock redesign and improvements for the Youth Sailing Center, the Harbor Patrol facilities, Commercial Fishing Dock, the Sport Fishing Dock, the Dry Stack Docks, and the Embarcadero Docks; (3) the construction of a temporary dock facility for vessels that would be displaced during marina reconstruction.; (4) the addition of handicap access at locations where it currently is not available; (5) upgrading vessel pump out facilities; and (6) upgrading dock utilities.

The number of boat slips within the Harbor will decrease from 2,409 to 2,223 (a loss of 116 slips) although the average slip length will increase from 29.85 feet (ft) to a length not to exceed 32 ft. A total of 1,306 existing piles will be removed and 969 new piles will be emplaced. The total dock surface area will decrease from 492,530 square feet (sq ft) to 459,540 sq ft (a net decrease of 32,990 sq ft) One-thousand three hundred and six, 14-inch diameter pilings with a surface area of 1,396 sq ft will be replaced by 969 piles (851, 16-inch diameter piles and 118, 18-inch diameter piles) with a surface area of 1,395 sq ft.

In order to accommodate boaters during the dock and slip renovations, the project also includes a set of temporary docks along the breakwater adjacent to Doheny State Beach that will have a surface area of 2,590 square feet. Once renovations to all dock areas are completed, the temporary docks may become docks for some yacht brokers who currently have docks in the East and West Basins. An ADA gangway is included in the plans for the temporary/yacht broker docks. The relocation of some yacht broker slips to this new location will allow for more slips to be made available to the general public. The number of yacht broker slips is not being increased with the proposed project. The placement of these docks near the breakwater would require the nearby relocation of the existing bait barge.

3.2 PROPOSED CONSTRUCTION METHODS

Improvements are anticipated to occur over a period of about eight years. Within each area, the construction phases will include the removal of the existing dock and piles, and the installation of the new dock and piles. Piles will be removed by vibratory extraction equipment mounted to a crane operating from a barge. However, if piles break off at the mudline, they will be manually cut two to three feet below the mudline. The old piles and floating docks will be lifted from the water using a crane and then trucked off-site.

New floating docks systems will consist of prefabricated, lightweight aggregate concrete modules. No creosote treated wood products will be included in the new concrete dock system.

The last phase for each area would be the placement of the piles and prefabricated docks. It is anticipated that piles will be pre-drilled into rock. Pre-stressed concrete piles will then be set into these holes and then grouted with cement or sand. A Seaflex anchoring system for the temporary docks is currently being considered as an alternative to the standard dock and pile design. If a Seaflex system is used, anchors will still have to be anchored, to perhaps drilled-in piles, since the typical helix anchors would not be able to penetrate the rock substrate (Randy Mason, URS Corporation, pers. com with R. Ware 1/10/08). However, this analysis assumes that a Seaflex system will not be employed.

3.3 SHORT-TERM WATER QUALITY CONSTRUCTION IMPACTS

3.3.1 Pile Replacement and Dock Construction

Marina Basins, Dry Stack Dock, and Ship Yard Docks. New piles will be removed, cut off at the water-line, and new ones placed into pre-drilled holes in rock substrate. These activities could increase the levels of water turbidity as each phase of the project is being conducted. Higher turbidity is expected to be limited to the specific area of dock improvements and the turbidity plume would dissipate as a function of tidal exchange within the basins. While the impact is expected to be short-term and have a less-than-significant impact on water quality within each specific phase, the project will be conducted over a period of several years. Thus, site-specific turbidity levels have a potential to be above-ambient with a portion of the Harbor for an extended period. Best Management Practices and Mitigations Measures to limit the spread of the turbidity plume outside the work area are provided in Section 4, Mitigation Measures.

Pile replacement activities would also have a potential to release detectable levels of sediment-bound contaminants into the water column that would be redistributed through the tidally-induced movement of the turbidity plume. Organically enriched sediments resuspended into the water column during pile replacement would also cause a slight decrease in dissolved oxygen levels. Tidal currents would slowly dissipate the oxygen-poor water mass and replenish ambient oxygen levels within one-to-several tidal exchanges.

Sediment testing for the Dana Point Harbor Dredge Material Evaluation (Kinnetic Laboratories and Moffatt & Nichol, 2007) indicated that fine sediments in one particular zone near the 60 inch storm drain in the East Basin contain elevated levels of copper and total DDTs compared to other sites tested. Consequently, pile removal and replacement in the vicinity of this one zone may result in the resuspension of material that could degrade water quality. This has a potential to result in a short-term adverse, significant impact to water quality within the East Basin. Mitigation measures to reduce the level of impact to less-than-significant is provided in Section 4, Mitigation Measures.

Temporary Dock, Youth Sailing Center Docks, and Sport Fishing Docks. Turbidity associated with pile driving and/or boring activity in the vicinity of hard-bottom habitat and reefs will potentially result in a short-term reduction of light and an increase of suspended material. Bottom sediments may also be disturbed during the process that could increase turbidity in the vicinity of eelgrass near the proposed Sailing Center docks. Eelgrass surveys conducted in the vicinity of the proposed dock improvements (Coastal Resources Management, Inc. 2010) indicate that as of June 2010, one or two small patches of low-density eelgrass may be affected by turbidity generated from pile driving activity. However, there is a potential for more eelgrass expanding into the proposed dock footprint in the next several years.

Turbidity plumes would dissipate and disperse out of the area over the course of daily tidal changes. Some suspended sediment may settle on eelgrass blades. The loss or reduction of eelgrass areal cover and density as a result of increased turbidity would be a local but significant impact to the expanding eelgrass bed in the vicinity of Baby Beach. Pre-and-post dock construction eelgrass surveys will be required per the provisions of the Southern California Eelgrass Mitigation Policy (National Marine Fisheries Service, 1991 as amended). Based upon these surveys, a determination will be made if mitigation is required, and a mitigation plan to offset eelgrass habitat losses will be developed if eelgrass losses occur. Best Management Practices to reduce the potential for eelgrass habitat losses during construction are presented in Section 4.

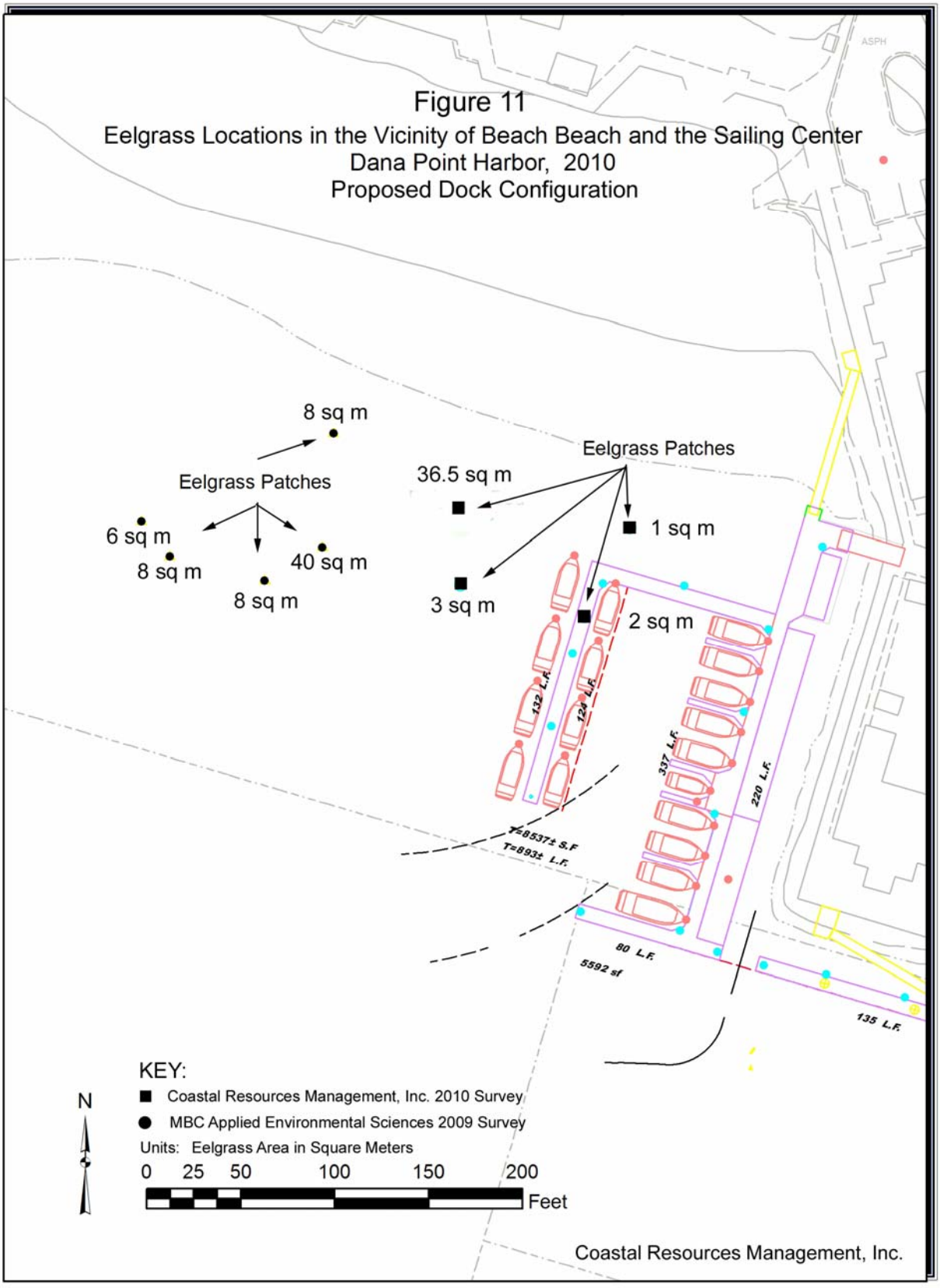
Figure 11
Eelgrass Locations in the Vicinity of Beach Beach and the Sailing Center
Dana Point Harbor, 2010
Proposed Dock Configuration
ASPH
8 sq m
Eelgrass Patches
6 sq m
8 sq m
8 sq m
40 sq m
Eelgrass Patches
36.5 sq m
1 sq m
3 sq m
2 sq m
132 L.F.
124 L.F.
337 L.F.
220 L.F.
T=8537± S.F
T=893± L.F.
80 L.F.
5592 sf
135 L.F.
KEY:
Coastal Resources Management, Inc. 2010 Survey
MBC Applied Environmental Sciences 2009 Survey
Units: Eelgrass Area in Square Meters
N
0 25 50 100 150 200
Feet
Coastal Resources Management, Inc.

3.3.2 Oil and Fuel Discharges. Accidental oil or fuel spills that could potentially occur during the Harbor renovation project could significantly affect water quality and marine biological resources within and nearby the Harbor. Such events are likely to be localized spills of lighter, refined diesel fuels, gasoline, and lubricating oils that are highly toxic to marine life. The potential for the occurrence of petroleum-product leaks or spills would be low-to-moderate but the potential for significant, long-term effect on marine resources would be moderate-to- high in the event of a spill. Best Management Measures (BMPs) to avoid oil spills, water quality degradation, and adverse impacts on fish and wildlife are provided in Section 4. With the inclusion of BMPs, the expected impact on fish and wildlife would be less-than-significant. The inclusion and implementation of a Marina Construction Management Plan for the project will assist in preventing accidental spills and provide the necessary guidelines to follow in case of an oil or fuel spill. Such an action will assist in reducing a potentially significant oiling event to less-than-significant.

3.4 SHORT-TERM CONSTRUCTION IMPACTS ON MARINE BIOLOGICAL RESOURCES

3.4.1 Soft and Hard-bottom Associated Benthic Communities

Dock and Pile Replacement. The removal of 1,306 piles and subsequent placement with 969 support piles for the new dock systems in Dana Point Harbor will result in minor disturbances to soft-bottom benthic invertebrates within a zone of disturbance around the piles to be removed related to sediment resuspension and sediment disturbances from machinery. This would constitute a less-than-significant impact on soft-bottom infauna. Once disturbances end, larvae will settle on the sediments and begin the process of recolonization. Long-term impacts of removal of soft bottom habitat and replacement with piles are discussed in Section 3.6.

Marina Basins. The removal of docks and dock pilings within the marina basins, the Youth Sailing Center, the Sport Fishing Dock, Dry Stack Dock, and the Ship Yard Dock will result in an initial loss of biofouling (pile-dwelling) associated flora and fauna on each of the 1,306 piles. Because the marina redevelopment will occur during several phases over an eight-year period, losses will be site-specific and will not occur throughout the Harbor at the same time. Some of the biofouling cover will be dislodged during the pile removal process, creating a zone of organic debris on the Harbor bottom in the immediate vicinity of the docks.

Most of the biofouling organisms would be removed and transported offsite to a proper disposal area eliminating a significant localized impact related to an accumulation of decaying organic material on the harbor seafloor. The removal of the pilings is unlikely to result in the release of a significant amount of contaminants; most contaminants present on the pilings would be bound up within the tissues of the organisms being removed. None of the species that would be removed are considered sensitive or unique.

Youth Sailing Docks, and Sport Fishing Docks-Hard Substrate Impacts

Construction of piling and dock systems for the Youth Sailing Center and the Sport Fishing Dock would potentially affect hard-bottom macroflora and fauna living on or among the subtidal hardscape within these areas. Losses would be associated with the direct effects of pile driving and secondary turbidity plumes. Mortality of individual plants and invertebrates might occur. These initial losses would be offset since additional pile substrata and surface area would be added. Plants and invertebrates would begin to colonize the new hard substrate upon completion of construction. Mobile *macroinvertebrate*s (i.e., octopus and lobsters) would likely move out of the impact zone. The losses of plants and invertebrates from pile driving would not result in any population level impacts to *macrobiota* within the surrounding region. Therefore, the construction of docks and the addition of the piles would have an unavoidable,

short-term less-than-significant, on hard-bottom associated plants and invertebrates within these areas of Dana Point Harbor.

Temporary Dock System. The majority of habitat potentially affected the construction of the proposed temporary dock system in the East Channel (and permanent broker docks) is sand to silty bottom in the lee of the East Breakwater. Remnants of low-reef outcrops may be present but these are mostly buried and exhibit low biological productivity. The loss of biomass would be offset by the addition of piles that would function as additional hard bottom habitat for invertebrates and algae.

Dumping of trash, debris, hazardous materials, and organic wastes from vessels or from visitors to the Temporary Dock area could degrade water quality, habitat values, and marine life. This would result is a potentially significant, localized impact on the quality of the bottom habitats. BMPs to reduce this impact to less-than-significant are discussed in Section 4.

3.4.2 Water Column Biota

Piling Replacement Activities. The project area water column habitat supports species of plankton and fish common to bays and harbors of southern California. These organisms live with constant sources of turbidity from runoff and other sources have acclimated to some degree to turbid conditions that might arise from pile removal and replacement. In addition, fishes have the ability to swim away from disturbances such as noise, vibrations, and excess turbidity, while plankton move with the currents and do not remain in one location for an extended period of time. These behavioral mechanisms help preclude construction impacts from occurring on water column organisms.

Construction activities would cause a temporary reduction in submarine light levels and a very localized, short-term reduction of plankton productivity due to increased turbidity. Because plankton drift with the currents there would be only be short-term, less-than-significant construction impacts to the plankton community.

There would be no direct loss of open water (schooling) fishes from pile removal and replacement. Water column fishes would avoid the immediate work area due to either increased turbidity, or a potential increase in underwater pressure and noise levels from work equipment. However, the removal of pilings may also attract some fish to biofouling debris that is removed from piles that settles on the harbor floor. No mortality of bottom-dwelling species such as gobies is anticipated due to the mobile nature of fishes.

Secondary impacts of increased water turbidity on fishes would be a short-term, less-than-significant construction impact. A greater-than ambient suspended sediment load related to higher turbidity may temporarily reduce the ability of both visual-foraging fishes to feed (i.e., surfperch and halibut) and planktivores (i.e., topsmelt, anchovy, juvenile surfperch, and juvenile sciaenids). Because the Harbor Waterside Improvement project would proceed incrementally over months-to-years, fish living within the marina basins would be able to move to nearby areas without any negative impacts to their habitat or food sources.

Water column dissolved oxygen concentrations may decrease due to the resuspension of organically-enriched sediments. The resuspension of potentially toxic levels of copper and DDT may also potentially increase, particularly in areas near storm drains. These impacts would physiologically stress the fish in the area; their response would be to swim to less-stressed areas of the harbor. Since fish would likely move away from the immediate zone of turbidity, their exposure to elevated levels of contaminants is expected to be minimal. Turbidity would return to ambient levels upon cessation of pile removal and replacement activities through tidal flushing, which would allow fish to return to the area. In summary, the potential

impacts arising from pile and dock removal and replacement in Dana Point Harbor would have potentially less-than-significant, localized, and temporary impacts to the plankton and fish community.

3.4.3 Seabirds (See Section 3.4.5)

3.4.4 Marine Mammals (See Section 3.4.5)

3.4.5 Sensitive Species

Eelgrass and Surfgrass. Pile driving will not result in the direct loss of eelgrass based upon the results of 2009 and 2010 field surveys (MBC Applied Environmental Sciences, 2009; Coastal Resources Management, Inc. 2010). Should eelgrass areal cover expand into areas where pile driving will occur, there is a potential for some direct losses of eelgrass. Potential impacts at present are related to secondary turbidity effects (See Section 3.2).

Pre-and-post construction eelgrass monitoring surveys will be conducted to determine if direct loss of eelgrass have occurred as a consequence of pile driving activity. Based upon these surveys, it will be determined if mitigation for eelgrass losses are required, under provisions of the Southern California Eelgrass Mitigation Policy (National Marine Fisheries Service, 1991 as amended). BMPs to reduce eelgrass habitat losses in the general area of Baby Beach are provided in Section 4.0.

Surfgrass does not occur within the confines of Dana Point Harbor Improvement Area. This sensitive marine resource would not be impacted by construction activities.

Abalone. White, red, green, and black abalones are not likely to be present within any of the Harbor Waterside Improvement project construction zones. Their distribution is limited to areas outside of the Harbor on the seaward side of the marina breakwaters and in offshore rocky habitats. Consequently, Harbor waterside improvement construction activities are not expected to impact these sensitive mollusks.

Tidewater Goby. Tidewater gobies are not known to occur within Dana Point Harbor; no construction-related impacts would occur on this species or its habitat.

Steelhead Trout. There are no known populations of this species in the Harbor, although there are rare occasions when individuals may be present. Therefore, construction-related impacts on Steelhead Trout are not expected to occur, nor would its nearest spawning habitat (San Mateo Creek) be affected.

California Halibut. Juvenile halibut can be found within Dana Point Harbor. During pile installation, individuals in the immediate area of construction would swim away from bottom disturbances within the construction zone. No mortality or short-term stress on this species is anticipated as a result of construction activities.

Sea Turtles. The green sea turtle, Federally-listed as endangered, has been sighted offshore of Dana Point Harbor (RBF Engineering and MBC Applied Environmental Sciences, 2003) but their occurrences would be considered rare. There are no warm water discharges which might attract them to the Harbor, nor is there available suitable seagrass habitat for foraging. Although an occasional green sea turtle may enter the Harbor at the time of waterside improvements, the potential for adverse impacts to an individual is low. If present, marina reconstruction, the construction and abandonment of the temporary dock systems, and vessel movements within the Harbor could induce behavioral modifications to individuals (i.e., changes in swimming behavior) to avoid excessive noise, turbidity, or vessel movements.

No green sea turtle mortality would be expected to occur as a result of the waterside construction activities nor would the project cause any decline in green sea turtle populations. If a sea turtle is present

in the project area during marina renovation the mitigation measures identified in Section 4 would reduce these potentially short-term construction impacts to a less- than- significant level.

Listed or Otherwise Sensitive Bird Species. The special-status marine birds most likely to occur in the vicinity of the project area include brown pelican, double-crested cormorant, western snowy plover, California gull, elegant tern, and occasionally, California least tern and common loon. All of these species feed on fish and may, on occasion, forage in Dana Point Harbor. No breeding colonies for any of the sensitive species of seabirds exist in the project area.

Pile driving activity could potentially result in less-than-significant impacts to sensitive bird species related to an increase in localized turbidity plumes and a reduction in foraging habitat. These species rely on sight foraging behavior to catch their prey. In addition, their fish and invertebrate prey base may move out of the turbidity plumes caused by construction activities. Because pile driving activities are within localized areas, other areas of the Harbor would be available as foraging habitat for these species. Exposure to contaminants that could cause acute toxicity or bioaccumulation to sea birds would also be avoided by the implementation of a Marina Construction and Management Plan which would assist in reducing impacts related to contamination to less-than-significant.

Seabirds roosting on docks and jetty areas near the bait barge in the vicinity of the proposed Temporary Dock may be affected by construction. Seabirds would respond by moving to other, nearby roosting habitat, which is available throughout the harbor. This modification of seabird behavior would not have any population level impacts on seabird. Therefore, the impacts are considered to be less-than-significant.

A decrease in the amount of open-water habitat in the vicinity of the Temporary Dock in the East Channel would have a less-than-significant impact on the ability of seabirds to forage in the outer harbor channels. Schooling fishes (including baitfish used by seabirds) would likely aggregate in other areas of the channel Therefore, foraging terns, gulls, and pelicans would follow their food sources. This modification of forage behaviors would not result in any significant, adverse impacts on seabirds.

Marine Mammals. All marine mammals are protected by the Federal Marine Mammal Protection Act of 1972 (MMPA). The MMPA prohibits the intentional taking, import, or export of marine mammals without a permit. Several of the species that occur within the SCB are also protected under the Federal Endangered Species Act of 1973 (ESA). A species that is listed as threatened or endangered under the ESA is categorized as depleted under the MMPA. Unintentional take of a depleted species is allowed by permit only if the activity is determined to have a negligible impact. Intentional take of a depleted species is only allowed under a scientific research permit.

Marine mammals are not anticipated to be in the immediate areas where pile removal and replacement would occur in the Harbor and would not suffer any direct mortality resulting from pile removal or pile replacement.

Vessel traffic coming in and going out of Dana Point Harbor (barges, tugs, work vessels) would be transiting to-and-from offshore waters where California sea lion, Pacific harbor seal, California gray whale, bottlenose dolphin, and other marine mammals are found. Transiting vessels have a low potential to collide with marine mammals, or exposure these resource groups to contaminants, or interfere with foraging activity. Marine mammals are generally capable of avoiding boat traffic (Richardson et al., 1983) especially at the speeds the vessels will likely be transiting at. Marine mammals in the local waters have also likely habituated to vessel traffic since large fishing vessels, excursion vessels, and work vessels commonly transit in-and-out of Dana Point Harbor. Vessel operators are also trained to recognize the presence of marine mammals which reduces the potential for adverse impacts. Therefore, impacts to

marine mammals should be less than significant. In the event a pinniped or cetacean is injured or killed as consequence of a collision, the impact would be a locally significant impact, but it would not result in a population-level impact. Should this occur, the vessel operator and the County of Orange will immediately notify the National Marine Fisheries Service (Southwest Division) and will submit a written, follow up report within 24 hours of the incident.

Marine mammals are not anticipated to be in the immediate areas where pile removal and replacement will occur in the marina and will not suffer any direct mortality resulting from pile removal or pile replacement.

Noise Production from Pile Extraction and Pile Driving. Marine mammals are capable of hearing over long distances, and even though they may not be in immediate vicinity, there is a low potential for marine mammals to be affected by pile driving activity. The duration of such noise would be intermittent and the work at each site would be in different locations and at different times.

One-thousand three hundred and six, 14-inch diameter pilings will be replaced by 969 piles (851, 16-inch diameter piles and 118, 18-inch diameter piles). The use of concrete piles is an environmentally superior method- acoustically speaking- to the use of steel piles since because it produces less noise from individual pile strikes (ICF Jones & Stokes and Illingworth and Rodkin, Inc. 2009). However, pile extraction and pile driving will still result in the production of some underwater noise and vibrations within Dana Point Harbor that marine mammals may be capable of sensing. Overall however, moving sound sources from vessels and aircraft seem to be more disturbing than stationary sources such as drilling rigs and drill ships (Richardson et al., 1983). The initiation of these pile driving could potentially result in a minor startle response from nearby marine mammals and they would be expected to either move away from, or avoid the immediate vicinity. A minor startled response by a marine mammal (most likely a sea lion) would include swimming away from the source of dredging, from either the physical presence of the dredge equipment or sound/vibration detected by the animal that was produced from dredge equipment. No deleterious impacts would result from a minor startled response. Over time, marine mammals would acclimate to the noise. Most pile driving would occur within the East and West Marina Basins, where marine mammals are least likely to be. and although they would likely able to "sense" pile driving noise, the magnitude and intensity of the source sounds are unlikely to result in any significant changes in behavior. Such types of sounds and their intensity levels are common throughout the range in which these marine mammals live.

Pile driving in the air and water could cause seal lions to temporarily move farther away from these activities, although the sea lions are anticipated to adapt to noise. Breeding would not be affected because sea lions do not breed in Dana Point Harbor (Bonnell and Dailey, 1993)

The following information is extracted the Port of Los Angeles (2008), Pacific L.A. Marine Terminal LLC Crude Oil Terminal Final SEIS/SEIR 3.3-23 and 3.3 24 in response to the National Marine Fisheries Service's comments regarding the effects of noise on pinnipeds relative to pile driving in L.A. Harbor.

"Pinnipeds appear to have greater tolerance to noise levels than cetaceans. Kastelein et al. (2006) demonstrated that captive seals avoid zones where the sound pressure levels were louder than 107 dBrms (re 1 µPa), but noted that it is possible that in the wild, seals may tolerate higher levels, in order to get food, escape predators, or stay with a pup. Finneran et al. (2003) found no measurable Temporary Threshold Shift (TTS) at sound pressure levels up to 178 to 183 dB (re 1 µPa) for California sea lions. a sea lion, harbor seal, and northern elephant seal at sound pressure levels over periods of 25 to 50 minutes. Increasing the exposure duration from 25 to 50 minutes had a greater effect on threshold shifts than increasing the exposure level from 80 dB original sound source level (SL) (137 to 159 dBrms re 1 µPa) to 95 dB SL (152 to 174 dBrms re 1 µPa); SELs resulting in TTS onset ranged from about 183 to 206 dB (re

1 μPa2 s). Kastak and Schusterman (1996) reported TTS in California sea lions exposed to airborne noise from nearby construction.

Pile driving produces noise levels of 175 to 205 dBrms 177 to 220 dB (re 1 μPa) at 33 ft (10 m) depending on the material and size of the piles (Caltrans 2007). Caltrans (2007) data indicate the sound level for the proposed steel piles could be as high as 195 dBrms at 33 ft (10m). In comparison, an underwater sound level of 180 190 dBrms (re 1 μPa) has been designated as the level A harassment level for pinnipeds (Federal Register 2005), representing a potential effect level for marine mammals occurring close to construction noise in the Outer Harbor.

Observations during pile driving for the San Francisco-Oakland Bay Bridge East Span seismic safety project showed minimal response in harbor seals while sea lions swam rapidly out of the area (Caltrans 2001). In water, sound transmission loss is between 3 and 6 dB per doubling of distance, with approximately 4.5 dB per doubling of distance in nearshore waters (Vagle 2003). However, at distances of less than about 330 feet (100 m), the transmission loss (rate of attenuation) can be less (Caltrans 2007). For this project, marine mammals such as pinnipeds could experience sound levels approaching Level A harassment levels at around 100 m (330 feet) from the pile driving. This estimate accounts for the size of the largest steel piles, the power of the hammer that would be required to drive them, the lower rate of attenuation close to the pile, and uncertainty in the sound propagation rate that depends on site-specific characteristics (Caltrans 2007). “

Few, if any, individual sea lions or marine mammals would be expected to be present with the Dana Point Harbor during dredging or pile extraction or cement pile driving activities. Any sea lions or other marine mammals present would not be harmed, because they would likely either move out of range of sound produced by pile driving, or they would adapt to expected sound intensities. The effect would be of short duration for each pile. The size of the piles to be driven for the project (average of 14 and 18 inch diameter pilings) are smaller in diameter than those typically used for commercial port shipping operations and the use (cement production piles) will produce less noise. Therefore, the sound intensity produced, and the potential level of impact for the Dana Point Harbor project will be less than that within the Port of Los Angeles for pile driving operations, and a less-than-significant project impact.

Based on the review of data for Los Angeles Harbor, and the fact that smaller concrete production piles will used for this project do not produce as intense sounds as steel piles, the expected level of impact to marine mammals for the project will be less-than-significant. Noise levels are expected to be below that identified as harassment during therefore an application to the NMFS for an Incidental Harassment Authorization, under Section 101 of the Marine Mammal Protection Act will not be necessary. In addition, the County of Orange will add a mitigation measure to the project that requires slowly ramping up pile-driving activities (referred to as a “soft start”) at the start of Dana Point Harbor pile-driving activities (at the beginning of the day and at restarting of construction after lunch breaks or other pile driving interruptions of longer than 15 minutes). See Section 4 for this mitigation measure.

Exposure to contaminants that could cause acute toxicity or bioaccumulation to marine mammals, sea turtles, and sea birds would be avoided by implementing a Marina Construction and Management Plan as part of the County’s marina management program. With the implementation of this BMP, impacts related to contamination would be less than significant. No mitigation would be required.

3.4.6 Sensitive Habitats

Reef Habitat. Scattered low-to-moderate relief rocky reef habitat is present within the confines of the protected Dana Point Harbor, remnant of the open coastal reefs present prior to the construction of the harbor. While biological diversity of these reefs is less compared to reefs outside the Harbor due to

sedimentation, less wave exposure, and exposure to higher levels of contaminants, Dana Point Harbor reef habitat still supports many types of plants, invertebrates, and fishes.

Within the limits of proposed harbor improvements, the scattered outcrops support characterized by low-diversity biological communities are found in the East and West marina basins; west of the Sailing Center; and in the East Channel in general proximity to the proposed Temporary Dock (Coastal Resources Management, Inc. 2010). Outside the project area (in the Main Channel and West Channel near the protective quarry stone slopes of the Island Marina), biological diversity is considerably higher.

Pile driving has a potential to damage isolated reef outcrops and associated macro-invertebrates and macro algae (i.e., gorgonians, snails, and urchins, and kelp). Because it is not generally known exactly where these reefs are with respect to pile locations, sidescan sonar surveys will be necessary prior to the construction of the temporary docks to pinpoint reef habitat and assess the amount and quality of reef habitat and associated biological resources. However, based upon the results of previous surveys, the reefs in the East Channel are highly impacted, very low relief, and covered in silt (Coastal Resources Management, Inc. 2010). Reefs in the West Channel are outside the footprint of the proposed Sailing Center Dock. If reef habitat is present, pile removal and installation may result in the disturbance of a small percentage of low-relief and associated organism. Based on existing information, is anticipated that the impacts from the construction of the temporary dock in the East Channel will result in less-than-significant on rocky subtidal habitat and biota. Best Management Practices (BMPs) to lessen the potential for adverse impacts to reefs in the vicinity of the temporary dock are provided to further reduce potential impacts on reefs (See Section 4).

Giant Kelp. Individual giant kelp *(Macrocystis pyrifera*) plants may be present on either remnant natural reef or quarry stone protecting the marinas, but outside of the proposed construction zones. Short-term turbidity increases from pile emplacement activities in the construction zone will not impact local giant kelp populations within the general Dana Point Harbor region. Consequently, the pile driving will have a not impact giant kelp populations.

3.4.7 Marine Protected Areas

No Marine Protected Areas occur in Dana Point Harbor precluding short-term construction related impacts to MPAs.

3.4.8 Fisheries Management Plan Species

Project activities that could potentially affect identified Coastal Pelagic FMP species (northern anchovy) and Pacific Groundfish FMP species (scorpion fish and juvenile Olive rockfish) include increased water turbidity caused by the demolition and replacement of docks and bulkheads, increased underwater pressure and noise due to pile driving and pile removal; and direct mortality from habitat destruction. These impacts could potentially result in (1) the movement of schooling anchovies away from the impact zones to more suitable offshore habitat (2) an increase in the suspended sediment load that could potentially introduce this species to harmful levels of contaminants and clog their gill apparatus, resulting in a reduced ability to breathe and/or feed. This is particularly true for northern anchovy, which is a filter feeder that uses their gill structures to filter plankton. Groundfish species are likely to be extremely rare in the project area. However, should they be present, the potential for direct mortality of juveniles, or adults of these species is minimal.

Based upon the life histories and the distribution of these species that favor most of the populations to be distributed in offshore areas rather than the confines of Dana Point Harbor, the potential for short-term

construction impacts on these FMP species is expected to be less-than-significant. There would not be any population-level impacts on Fisheries Management Plan species.

Eelgrass is a Habitat of Particular Concern (HAPC) for FMP groundfish species (rockfish) and is present near Baby Beach and the proposed dock at the Youth Sailing Center. See Section 3.3.1 and 3.4.5 for a discussion of water quality and construction-related impacts to eelgrass.

See Section 3.4.5 for a discussion of project construction impacts on green sea turtles.

3.4.9 Invasive Species

Caulerpa taxifolia. *Caulerpa* is not present within Dana Point Harbor which precludes the potential spread of this species during Harbor Waterside improvement construction activities. However, a *Caulerpa* algae survey will be conducted according to the National Marine Fisheries Service Control Protocol prior to construction (National Marine Fisheries Service, 2008). If this species is found, then protocols for the eradication of *Caulerpa* will be implemented to remove this species from the project area. (http://swr.ucsd.edu/hcd/*Caulerpa*ControlProtocol.htm).

Undaria pinnatifida. *Undaria pinnatifida* is not currently growing within Dana Point Harbor. Should it be found during pre-construction surveys, then it should be removed prior to marina modifications to prevent its spread during the pile and dock removal process. It should be noted that at this time, there are no defined eradication processes for this species by the National Marine Fisheries Service or the California Department of Fish and Game.

***Zostera japonica*.** This species of eelgrass does not grow in Dana Point Harbor and will not be impacted during Harbor Waterside improvement construction activities.

3.5 LONG-TERM OPERATIONAL IMPACTS ON WATER QUALITY

Marina Operations. Water quality within Dana Point Harbor will be governed by the practices of the tenants relative to their compliance with ordinances, laws, and guidelines related to discharges, vessel maintenance and marina maintenance. Periodic and/or uncontrolled discharges of various pollutants, oils, greases, and wastes would potentially create significant long-term, adverse effects on water quality with subsequent adverse impacts on local marine life. To prevent long-term impacts on local water quality, a Marina Management Plan should be implemented to provide tenants and boaters with reasonable BMPs, safety guidelines, information on pump out facility use, regulations and steps to take in response to trash and debris disposal, accidental spills, leakages, and fires to reduce the potential for water quality degradation. Implementation of a Marina Management Plan that covers these issues will assist in reducing potential long-term water quality impacts to less-than-significant (Section 4).

Temporary Dock Operations. Dumping of trash, debris, hazardous materials, and organic wastes from vessels or from visitors to the Temporary Dock area could degrade water quality, habitat values, and marine life in a region of the Harbor that supports many types of marine life. This would result is a significant, localized impact on the quality of the Main Channel and West Channel bottom habitats. Mitigation measures and BMPs to reduce this impact to less-than-significant are discussed in Section 4.

3.6 LONG-TERM OPERATIONAL IMPACTS ON MARINE BIOLOGICAL RESOURCES

3.6.1 Dock and Pile Surface Area Changes

The number of boat slips within the Harbor will decrease from 2,409 to 2,293. A total of 1,306 existing piles will be removed and 969 new piles will be emplaced. The total dock surface area will decrease from 492,530 square feet (sq ft) to 459,540 sq ft (a net decrease of 32,990 sq ft. 0.76 acres) One-thousand three hundred and six, 14-inch diameter pilings with a surface area of 1,396 sq ft will be replaced by 969 piles (851, 16-inch diameter piles and 118, 18-inch diameter piles) with a surface area of 1,395 sq ft.

A decrease in dock surface area will result in a long-term, beneficial impact to open water habitat. This will increase waterbird (and endangered species) seabird foraging habitat and reduce shading effects on harbor waters. In the long-term, there will be a net overall benefit to the marine ecosystem related to a decrease in dock surface area. Discussions of long-term impacts by habitat types are discussed below.

3.6.2 Intertidal Sandy Beach

Waterside improvements within Dana Point Harbor will not affect sandy beaches or sandy beach flora and fauna.

3.6.3 Soft-Bottom Benthos

The number of piles will decrease although the reduction in surface area of the piles will not substantially decrease (1 sq ft). This will have no adverse or beneficial effects on soft bottom-associated organisms.

3.6.4 Hard Substrate-Pilings, Docks, Rip Rap, and Natural Reefs

Docks and Pilings. The proposed project will result in a net decrease of biofouling organisms because of a decrease in dock surface area (0.76 acres) and 1 sq ft of piling habitat. This will not result in a regional or local loss of any invertebrate or algae species. Once new piles are re-installed in the marina basins, they will be recolonized by similar types of organisms that were initially removed. The process of recolonization would begin immediately upon the structures being placed in the water, but re-establishment of mature biofouling communities would take several years.

3.6.5 Water Column Organisms

Dana Point Harbor waterside improvements will have a long-term, beneficial effect on water column habitat and associated plankton and fish populations. In the long-term, an additional 0.76 acres of open water habitat will experience direct sunlight as consequent of the reconfiguration of the dock systems. Consequently, there will be a greater surface area of unshaded open water, that will locally increase primary (plankton) plankton production. Additionally, the increase in open water habitat will have a beneficial impact on fishes and foraging seabirds.

3.6.6 Reptiles (See Section 3.6.9)

No long-term impacts to sea turtles will occur as a result of the Harbor Waterside Improvement Project. The proposed project components will have no effect on sea turtle abundance or distribution.

3.6.7 Seabirds (See Section 3.6.9)

3.6.8 Marine Mammals (See Section 3.6.9)

3.6.9 Sensitive Species

Eelgrass. The proposed project has a potential to impact eelgrass in the vicinity of the proposed Sailing Center Dock (Section 3.2) as a consequence of shading from either dock structures or boats tied up to the dock. The level of impact and the mitigation required for any disturbance to eelgrass will be determined during pre-and-post construction surveys for the project according to the provisions of the Southern California Eelgrass Mitigation Policy (NMFS 1991, as amended). Should it be determined that a loss of eelgrass has occurred, appropriate mitigation measures to offset any observed eelgrass losses will be implemented.

Surfgrass. No long-term impacts to surfgrass will occur as a result of the Harbor Waterside improvement Project.

Abalone. No long-term impacts to abalone will occur as a result of the Harbor Waterside improvement Project.

Tidewater Goby. No long-term impacts to the tidewater goby will occur as a result of the Harbor Waterside improvement Project.

Steelhead Trout. No long-term adverse related impacts would occur on this species or its habitat. However, assuming this species' inland critical aquatic habitat is restored in the future to levels that would enhance the population of local steelhead trout, better water quality within Dana Point Harbor could potentially create a condition that might allow greater numbers of steelhead trout to transit through the Harbor.

California Halibut. No long-term impacts to California halibut will occur as a result of the Harbor Waterside improvement Project.

Green Sea Turtles. No long-term impacts to green sea turtles will occur as a result of the Harbor Waterside improvement Project.

Seabirds. Seabirds would be beneficially impacted by the increase of open-water foraging habitat. Additionally, there will be an increase of open water foraging habitat for the endangered least tern and the California brown pelican. The long-term waterside improvements within Dana Point Harbor will not result in the mortality of any species of endangered or other sensitive species of seabirds.

Marine Mammals. No long-term impacts to marine mammals will occur as a result of the Harbor Waterside Improvement Project.

3.6.10 Fishery Management Plan Species

No long-term adverse impacts to either coastal pelagic or groundfish FMP species will occur as a result of the Harbor Waterside improvement Project. Because there will be an increase in the amount of unobstructed open water habitat within Dana Point Harbor, this could potentially result in long-term beneficial effect on northern anchovy .

3.6.11 Sensitive Habitats

Reefs and Kelp Beds. No long-term impacts on reef or kelp beds are anticipated.

3.6.12 Invasive Species

Caulerpa algae is not expected to be present in Dana Point Harbor which precludes the potential for the spread of this species. However, if *Caulerpa* is found following waterside improvements, a *Caulerpa* algae eradication program will be required http://swr.ucsd.edu/hcd/*Caulerpa*ControlProtocol.html; (National Marine Fisheries Service 2006.

Undaria pinnatifida is not currently growing within the Harbor; however, if it is discovered following waterside improvements to the Harbor then thought should be given to its eradication, based on recommendations from the California Department of Fish and Game and the National Marine Fisheries Service.

Zostera japonica does not occur within Dana Point Harbor and will not be impacted by the project.

4.0 BEST MANAGEMENT PRACTICES

4.1 CONSTRUCTION

4.1.1 Water Quality

Short-term, potentially significant impacts on water quality related to sediment and contaminant resuspension are reduced to a less-than-significant impact through the implementation of the following Best Management Practices.

- No construction materials, equipment, debris, or waste shall be place or stored where it may be subject to tidal erosion and dispersion.

- Construction materials shall not be stored in contact with the soil. Any construction debris within the temporary cofferdam area shall be removed from the site at the end of each construction day.

- Reasonable and prudent measures shall be taken to prevent all discharge of fuel or oily waste from heavy machinery or construction equipment or power tools into Dana Point Harbor. Such measures include deployed oil booms and a silt curtain around the proposed construction zone at all times to minimize the spread of any accidental fuel spills, turbid construction related water discharge, and debris. Other measures include training construction workers on emergency spill notification procedures, proper storage of fuels and lubricants, and provisions for on-site spill response kits.

- All trash shall be disposed of in the proper trash receptacles at the end of each construction day. Any construction debris shall be removed from the site.

- During construction, floating booms shall be used to assist in containing debris discharged. Any debris discharged shall be removed as soon as possible but no later than the end of each day.

- Remove all construction debris from the seafloor. A post-construction bottom survey shall be conducted if all material has been successfully removed from construction areas.

- The County of Orange shall limit, to the greatest extent possible, the suspension of benthic sediments into the water column. If turbid conditions are generated during construction, a silt curtain shall be utilized to control turbidity.

- Construction methods shall be used that are the least damaging to benthic sediments and organisms.

- Reasonable and prudent measures shall be taken to prevent all discharge of fuel or oily waste from heavy machinery or construction equipment or power tools into Dana Point Harbor. The County of Orange shall have adequate equipment available to contain such spills immediately.

- Construction methods shall be used that are the least damaging to benthic sediments and organisms.

- Federal and State permit conditions related to the maintenance of water quality standards shall be implemented throughout the term of construction; and

4.1.2. Marine Resources

The following Best Management Practices (BMPs) are recommended to reduce potential adverse impacts to marine resources during the renovation of the Dana Point Harbor Marina.

- All BMPs identified in Section 4.1.1 apply to the protection of marine resources during waterside improvement construction activities.

Pre-Construction-General

- Prior to construction activities, a pre-construction marine biological survey should be conducted to identify sensitive marine biological resources (i.e., eelgrass, reefs and kelp beds, and seabirds). This survey shall be used to prepare a Marine Biological Impact Reduction Plan (MBIRP) to minimize construction impacts to marine resources. Sensitive biological resources shall be mapped.

- A project marine biologist shall meet with the construction crews prior to construction to review sensitive areas to avoid and to review proper construction techniques.

- Special design and engineering consideration should be given to the type of materials used for the Temporary Dock floats and pier to minimize shading effects on open water habitat. Such features could include the use of translucent materials.

During Construction:

- Barges and work vessels should be operated in a manner to ensure that sensitive resources within Dana Point Harbor are not impacted through grounding, propeller damage, or other activities that may disturb the sea floor. Such measures shall include speed restrictions, establishment of off-limit areas, and use of shallow draft vessels.

- Minimize direct pile drilling impacts to rocky intertidal and subtidal habitats in the vicinity of the Temporary Docks.

- The contractor shall be required to use sound abatement techniques to reduce noise and vibrations from pile-driving activities. Recommended sound abatement techniques can include, but not be limited to vibration or hydraulic insertion techniques, drilled or augured holes for cast-in-place piles, bubble curtain technology, and sound aprons depending upon their feasibility for the project.

- At the initiation of each pile-driving event and after breaks of more than 15 minutes, the pile driving shall also employ a “soft-start” in which the hammer is operated at less than full capacity (i.e., approximately 40 to 60 percent energy levels) with no less than a 1-minute interval between each strike for a 5-minute period. The operation of the hammer at 40 to 60 percent energy level during the soft start of pile driving is expected to result in similar levels of noise reduction (40 to 60 percent) underwater.

- The project marine biologist shall monitor the construction process on a regular basis to ensure that all water quality Best Management Practices (BMPs) are implemented, and to assist the project engineer in avoiding and minimizing environmental effects to harbor marine biological resources.

The following BMPs are proposed to avoid potential impacts to existing eelgrass resources in the project area.

- Impacts to eelgrass beds shall be avoided where practical and feasible. A project marine biologist shall mark the positions of eelgrass beds with buoys prior to the initiation of any construction to minimize damage to eelgrass beds outside the construction zone. To assist the construction crew in avoiding unnecessary damage to eelgrass, the project marine biologist shall meet with the construction crews prior to construction to review areas of eelgrass to avoid and to review proper construction techniques.

- Barges and work vessels shall avoid impacts to eelgrass beds located near Baby Beach and the Sailing Center. Barges and work vessels shall be operated in a manner to ensure that eelgrass beds are not impacted through grounding, propeller damage, or other activities that may disturb the seafloor. Such measures shall include speed restrictions, establishment of off-limit areas, and use of shallow draft vessels.

- An eelgrass mitigation plan shall be developed based upon the results of pre-and-post construction surveys. The Plan shall require that any direct losses, if any, to eelgrass vegetation will be mitigated at a ratio of 1.2:1 (mitigation to impact) and potential eelgrass habitat will be mitigated at a ratio of 1:1 according to requirements of the Southern California Eelgrass Mitigation Policy (SCEMP)

- As detailed in the SCEMP, the actual amount of eelgrass to be mitigated shall depend on pre-construction surveys, post-construction surveys.

The following BMPs are proposed to avoid potential impacts to sea turtles and marine mammals in the project area.

- A qualified marine biologist shall be on site during the construction period to monitor the presence of endangered species. The on-site biological monitor shall have the authority to halt construction operations and shall determine when construction operations can proceed. Construction crews and work vessel crews shall be briefed on the potential for this species to be present and will be provided with identification characteristics of sea turtles, since they may occasionally be mistaken for seals or sea lions.

- Vessel operators will be instructed by a qualified marine biologist on the goals of the Marine Mammal Protection Act (1972) and the need to avoid a “take” of a marine mammal. "The term 'take' means to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal. Feeding is prohibited." "The term 'harassment' means any act of pursuit, torment, or annoyance which: injures or has the potential to injure a marine mammal or marine mammal stock in the wild; or disturbs or is likely to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, surfacing, nursing, breeding, feeding or sheltering to a point where such behavior patterns are abandoned or significantly altered." (NOAA website, www.noaa.gov)

- Construction crews and work vessel crews shall be briefed on the potential for turtles and marine mammals to be present and will be provided with identification characteristics of sea turtles, since they may occasionally be mistaken for seals or sea lions.

- In the event that a sea turtle is sighted within 100 meters of the construction zone, all construction activity shall be temporarily stopped until the sea turtle is safely outside the outer perimeter of construction. The on-site biological monitor shall have the authority to halt construction operation and shall determine when construction operations can proceed.

- If a marine mammal is observed within a radius of 1,200 ft (366 meters) from the construction zone, then activities shall not be initiated until the animal has passed out of the project area. If an animal is periodically but not constantly observed during this period, construction activities shall not be initiated for a period of 15 minutes, which is the estimated amount of time for a seal lion or other marine mammals to transit out of the project area.

- The biological monitor shall prepare an incident report of any marine mammal or green sea turtle activity in the project area and shall inform the construction manager to have his/crews be aware of the potential for additional sightings. The report shall be provided within 24 hours to the California Department of Fish and Game (CDFG) and the National Marine Fisheries Service (NMFS).

- In the event of a watercraft collision with a marine mammal or sea turtle the biological monitor shall prepare an incident report of any green sea turtle activity in the project area and shall inform the construction manager to have his/crews be aware of the potential for additional sightings. The report shall be provided within 24 hours to the California Department of Fish and Game (CDFG) and the National Marine Fisheries Service (NMFS).

The following BMPs are proposed to determine the presence of invasive algae in the project area prior to construction and the procedures to be followed if invasive algae is found in the project area.

- A field survey to investigate the presence of the invasive algae *Caulerpa* taxifolia is required 30 to 60 days prior to commencement of construction by qualified divers certified by the California Department of Fish and Game (CDFG) and National Marine Fisheries Service (NMFS) to conduct such surveys. The pre-construction *Caulerpa* surveys will be conducted according to the accepted criteria of the Southern California *Caulerpa* Action Team (SCCAT) for conducting surveys for invasive algae and in accordance with the NMFS and CDFG *Caulerpa* survey protocols. In accordance with the recommendations of the SCCAT, and according to the NMFS *Caulerpa* Control Protocol (Version 4, adopted March 28th, 2008 [NMFS 2008]), a survey must be conducted in harbor areas that may be disturbed. In areas that are expected to be free of *Caulerpa*, a 20 percent visual Surveillance Level survey is required prior to any dredging. The survey will also identify any other marine vegetation in the proposed construction area, including eelgrass. Project reports will be transmitted by the County of Orange via *Caulerpa* Survey Reporting Form to NMFS and the CDFG within 48 hours of completion of the survey. If *Caulerpa* is identified in the project area, the County, NMFS, and CDFG will be notified within 24 hours of completion of the survey. In the event that *Caulerpa* is detected, disturbance shall not be conducted until such time as the infestation has been isolated, treated, or the risk of spread from the proposed disturbing activity is eliminated in accordance with Section F of the *Caulerpa* Control Protocol.

4.2 LONG-TERM MARINA OPERATIONS

Best Management Practices for marina operation and management should be implemented to reduce the potential for water quality and degradation of Dana Point Harbor marine resources. These BMPs include, but are not limited to:

- The County of Orange should provide each marina tenant with a copy of all applicable regulations regarding vessel discharges of wastes, antifouling paint use, and refuse management (including handling of hazardous wastes) as part of the lease materials;
- The County of Orange should provide each marina tenant with information regarding procedures for notifying appropriate authorities regarding spills of hazardous materials, containment measures, and applicable penalties for violations as a part of lease materials;
- The County of Orange should provide regular cleaning of the marina dock facilities and vacuum sweeping of the parking lots;
- Adequate signs should be posted to identify the location off pump-out stations, and hours of operation;
- The pump-out facility should be user friendly;
- The County of Orange should develop and adhere to a regular inspection and maintenance schedule for the pump-out facility;
- The County of Orange should provide educational information about the pump out station to tenant boaters;
- The County of Orange shall enforce existing local, state and federal regulations pertaining to marine sanitation devices and the illegal discharge of boat sewage; and;
- The County of Orange shall post and make available to boaters a list of other local pump out locations.

To prevent long-term impacts on local water quality, a Marina Management Plan should be developed to provide tenants and boaters with reasonable BMPs, safety guidelines, and steps to take in response to accidental spills, leakages and fires to reduce the potential for water quality degradation. In addition, two pamphlets *The Guide to Clean, Green Boating* (California Department of Fish and Game 1999) and *Clean Boating* (California Department of Boating and Waterways (undated material) should be distributed and made available to both hotel management and marina tenants.

Clean Marinas California Program (2006) has developed a guidebook for to making marinas environmentally clean facilities and to help protect the state's waterways from pollution. This guidebook is available at http://cleanmarinascalifornia.org. It is recommended that a copy of this document be kept onsite in the marina operations offices.

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APPENDIX 1. SPECIES LIST OF ORGANISMS OBSERVED IN DANA POINT HARBOR FEB/MARCH 2007 AND NOV/DEC 2007 COASTAL RESOURCES MANAGEMENT SURVEYS

Common Name	Scientific Name	Epi Benthos	Baby Beach	Marina Hard Scape	Youth Sailing Center Reefs	West Jetty Shoal and Channel Slope	West Main Channel	Temp Dock (South of Bait Barge)	Temp Dock (North of Bait Barge	Youth Sailing Center Rip Rap	Bridge Bases	Harbor Patrol Basin*	Sportfishing Dock Rip Rap and Reef	Dry Stack and Shipyard Basins	All
sponge	Porifera, Unid.	x		x	x		x				x	x			x
anemone	*Anthopleura sola*			x			x						x		x
hard coral	*Astrangia lajollenis*												x		x
hydroid	*Aglaophenia* sp.			x			x				x				x
gorgonian	*Muricea californica*						x						x		x
gorgonian	*Muricea fructicosa*			x	x			x					x		x
anemone	*Pachycerianthus fimbriatus*									x	x				x
polyclad flatworm	*Pseudoceros* sp.											x			x
polychaete	*Diopatra ornata*							x							x
polychaete	*Dodecaceria* sp.			x											x
polychaete	*Phragmatopoma californica*			x	x										x
polychaete	Sabelllidae, unid.			x											x
polychaete	Spionidae, unidl				x								x		x
polychaete	Serpulidae, unid.			x	x										x
polychaete	Spirorbidae, unid.			x	x										x
barnacle	*Cthamalus fissus/dalli*						x		x	x			x		x
barnacle	*Balanus amphitrite*			x	x										x
barnacle	*Balanus glandula*			x	x		x			x	x		x		x
lined shore crab	*Pachygrapsus crassipes*			x	x										x
lobster	*Panilurus interruptus*				x		x			x			x		x
snail	*Acanthina spirata*								x						x
limpet	*Collisella digitalis*														x
limpet	*Collisella scabra*				x		x		x				x		x
slipper shell	*Crepidula onxy*				x			x	x	x					x
Kellet's whelk	*Kelletia kelletii*				x										x
Gould's paper bubble	*Haminoea vesicula*							x							x
rock scallop	*Hinnites giganteus*			x			x								x
limpet	*Lottia gigantea*						x								x
limpet	*Lottia limatula*						x		x						x
bay mussel	*Mytilus edulis*										x				x
bay mussel	*Mytilus galloprovincialis*			x	x										x
sea slug	*Navanax inermis*	x					x	x	x	x		x			x
octopus	*Octopus* sp.	x													x
snail	*Roperia poulsoni*							x					x		x

Common Name	Scientific Name	Epi Benthos	Baby Beach	Marina Hard Scape	Youth Sailing Center Reefs	West Jetty Shoal and Channel Slope	West Main Channel	Temp Dock (South of Bait Barge)	Temp Dock (North of Bait Barge	Youth Sailing Center Rip Rap	Bridge Bases	Harbor Patrol Basin*	Sportfishing Dock Rip Rap and Reef	Dry Stack and Shipyard Basins	All
oyster	*Ostrea sp.*									x					x
sea cucumber	*Parastichopus parvimensis*					x	x								x
reverse chama	*Pseudochama exogyra*			x	x								x		x
festive murex snail	*Pteropurpura festiva*	x		x			x		x				x		x
scaled tube worm	*Serpulorbis squamigerus*						x								x
trochid snail	*Tegula eisenii*						x		x						x
soft ectorproct	*Anguinella palmata*			x											x
ectoproct	*Bugula neritina*			x											x
ectoproct	Encrusting ectoprocts			x			x								x
colonial tunicate	*Botryllus/Botrylloides*			x											x
colonial tunicate	colonial tunicates			x			x								x
solitary tunicate	Ascideacea, unid.			x	x		x						x		x
solitary tunicate	*Styela plicata*			x			x			x	x				x
opaleye perch	*Girella nigricans*				x		x		x	x	x		x		x
garibaldi	*Hypsypops rubicundus*				x		x		x						x
pile perch	*Damalichthys vacca*				x		x								x
blacksmith	*Chromis punctipinnis*				x		x								x
kelp bass	*Paralabrax clathratus*				x	x	x						x		x
unknown barred fish	juvenile, unid.				x		x			x					x
kelp fish	*Heterostrichus rostratus*								x						x
senorita	*Oxyjulis californica*				x		x								x
flatfish	unid. flatfish	x				x									x
round sting ray	*Urolophus halleri*	x													x
	Total	**9**	**3**	**36**	**31**	**5**	**49**	**10**	**25**	**15**	**12**	**6**	**25**	**0**	**88**