APPENDIX C

MARINE BIOLOGY REPORTS AND NESTING BIRD SURVEYS

MARINE RESOURCES ENVIRONMENTAL ASSESSMENT FOR THE FOR THE ALAMITOS BAY MARINA RENOVATION PROJECT ENVIRONMENTAL IMPACT REPORT

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1.0 INTRODUCTION

1.1 PROJECT BACKGROUND AND PURPOSE

The City of Long Beach is preparing to renovate the Alamitos Bay Marina dock system and conduct dredging in the Alamitos Bay marina basins. The project will be conducted within seven marina basins, and phased over a six year period beginning in 2009. The project plans include replacing the degraded dock systems within each basin and dredging to depths of between -13 and -15 ft MLLW within Marina Basin 1, and to depths of -10 ft MLLW in Basins 2, 3, 4, 5, and 7. General renovation plans are provided in Figure 2 (existing dock system) and Figure 3 (proposed dock system). An additional dock will be constructed along bulkhead southeast of the Long Beach Yacht Club. The dredge material collected from each marina basin will be transported by barge to a location designated for sediment disposal. A detailed discussion of the project components is provided in Section 3.0.

Coastal Resources Management, Inc. (CRM) was retained by LSA Associates, Inc. and the City of Long Beach to conduct marine biological surveys in Alamitos Bay, Long Beach, California, to prepare a project environmental assessment focused on eelgrass (*Zostera marina* habitat (Coastal Resources Management, Inc. 2009a), to prepare an Essential Fish Habitat (EFH) analysis, to evaluate potential eelgrass mitigation sites in Alamitos Bay, to and lastly, to prepare a comprehensive marine resources environmental assessment for the project MND. This document updates previous CRM studies and contains the comprehensive marine resources environmental assessment, including the Essential Fish Habitat (EFH) analysis for the project Environmental Impact Report (EIR).

1.2 PROJECT LOCATION

Alamitos Bay is located within the southeast region of the City of Long Beach, California (Figure 1). It is bounded on the northwest by the community of Belmont Shore and the Colorado Lagoon, on the northeast by Pacific Coast Highway and the Cerritos Channel, on the southeast by the San Gabriel River, and on the southwest by the Alamitos Bay Peninsula (Figure 1). Initially the area around Alamitos Bay was a marsh, with the San Gabriel River and the bay sharing a common opening into the ocean (Reish, 1968). Naples Island was developed in 1908-1909,

Figure 1.
Alamitos Bay Project Location

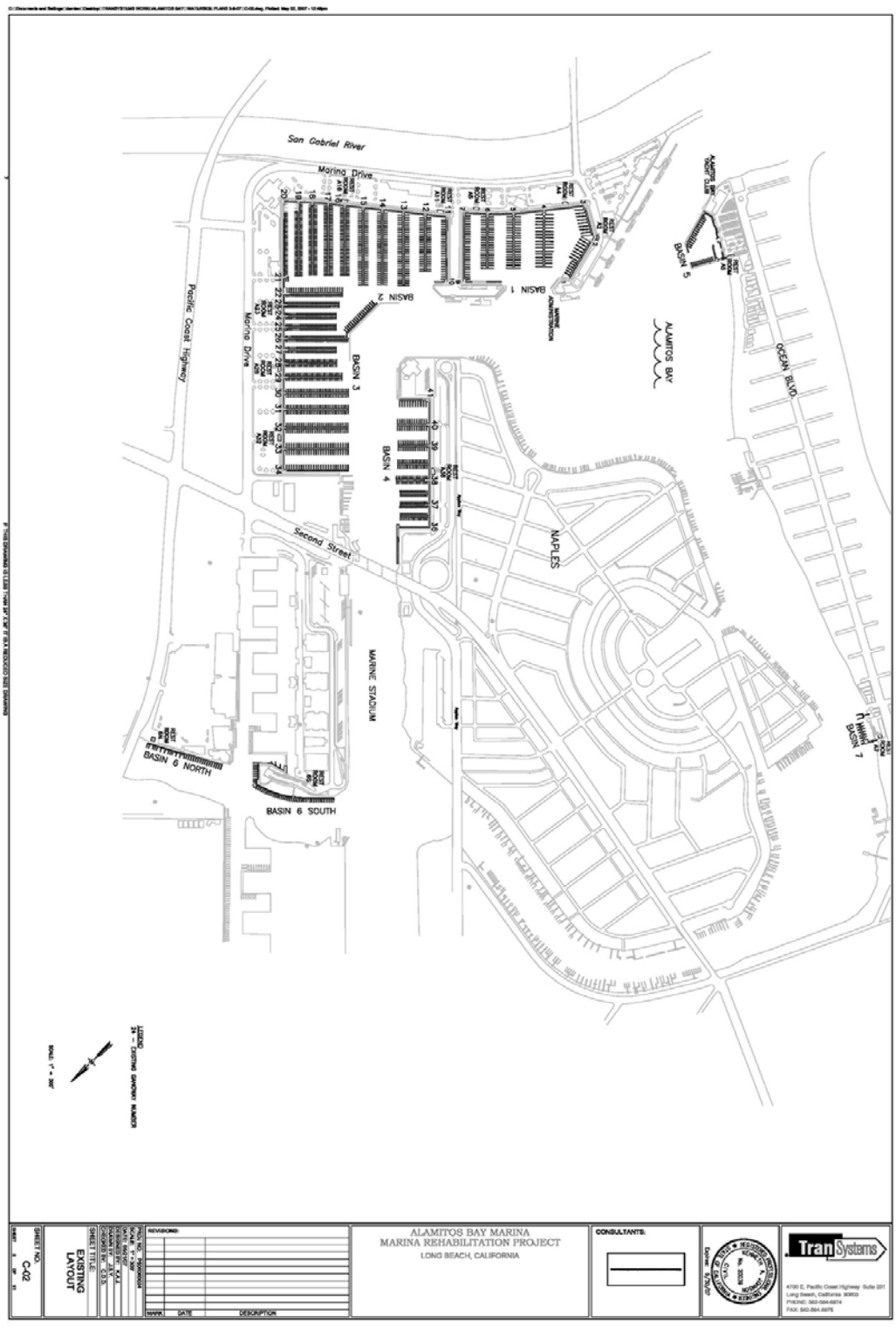


Figure 2. Existing Marina Basin Dock Configurations, Basins 1 through 7

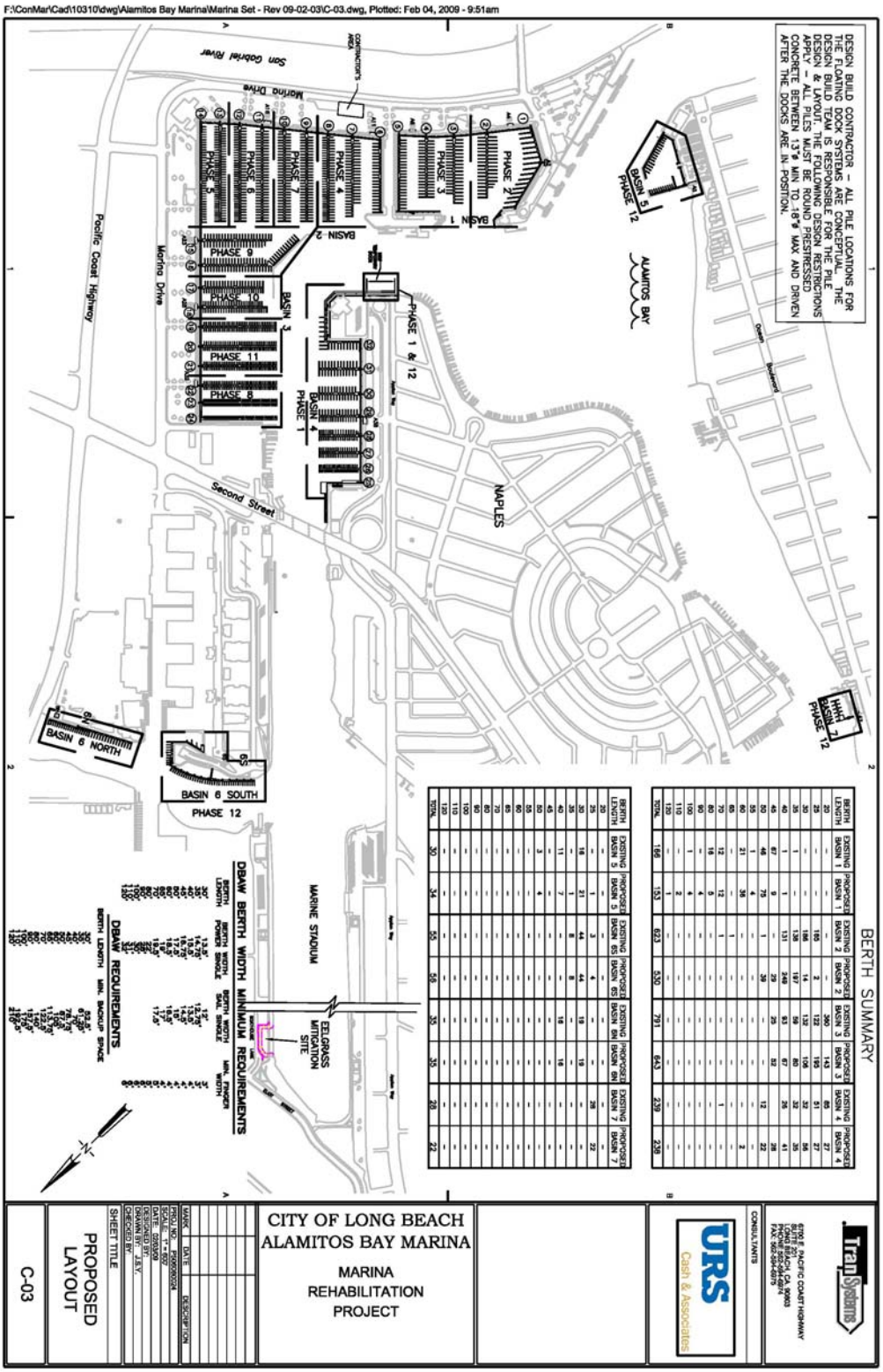


Figure 3. Proposed Marina Basin Dock Configurations, Basins 1 through 7

which was followed by the separation of the San Gabriel River and the bay with the construction of a rock jetty (early 1920s), the dredging of the Marine Stadium in 1932 for the 1932 Olympics, the construction of the Alamitos Bay Marina Basins between the mid-1950s and the mid 1960s, and the more recent additions of the Marina Pacifica and Spinnaker Cove development. Currently, there are 1967 slips located within Alamitos Bay Marina Basins 1-7.

2.0 EXISTING CONDITIONS

2.1 MARINE BIOLOGICAL ENVIRONMENT

The Alamitos Bay marine biological project area consists of several habitat types. 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 rock (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, and the water column. These habitats support marine plants, invertebrates, fishes, and birds.

2.1.1 Intertidal Sandy Beach

Sand beach habitat is found along the Alamitos Bay Peninsula and Bayshore Avenue, at Mothers Beach, End Beach in the Marine Stadium, and within the Cerritos Channel (Jack Dunster Marine Life Preserve). The sand beach environment is a low-energy environment that is affected primarily by wind waves and tidal action. Beaches along the Alamitos Bay Peninsula, Bayshore Ave, and at Mothers Beach are groomed whereas the other sandy shorelines are not. The high intertidal portion of the groomed public beach supports few if any marine organisms in the sediments because of the 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 more 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 sources.

2.1.2 Subtidal Soft Bottom Habitat

Benthic Infauna. The benthic (bottom-dwelling) invertebrate community of bays and harbors is made up of a complex of species that live on the sediment surface (epibenthic) or in the soft bottom sediments (infauna). The organisms are found in a range of sediment regimes from fine to coarse, and have affinities to both offshore benthic communities as well as to coastal bay and harbor communities that live in finer sediments and areas of restricted water circulation. 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.

Common types of benthic 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. As part of the characterization of marine sediments and water quality in southern California, California State Water Resources Control Board (SWRCB, 1998) sampled three stations within Alamitos Bay in 1992. One station, (Station 4023) was located immediately outboard of Basin 2 docks that front in the Long Beach Marina (see Figure 3). The five most abundance infaunal species identified from replicate grab samples taken in September 1992 included three polychaete worms (*Mediomastus californiensis, Prionospio heterobranchia* , *P. lighti* and two amphipod crustaceans (*Rudilemboides stenopropdus* and *Mayerella banksia*).

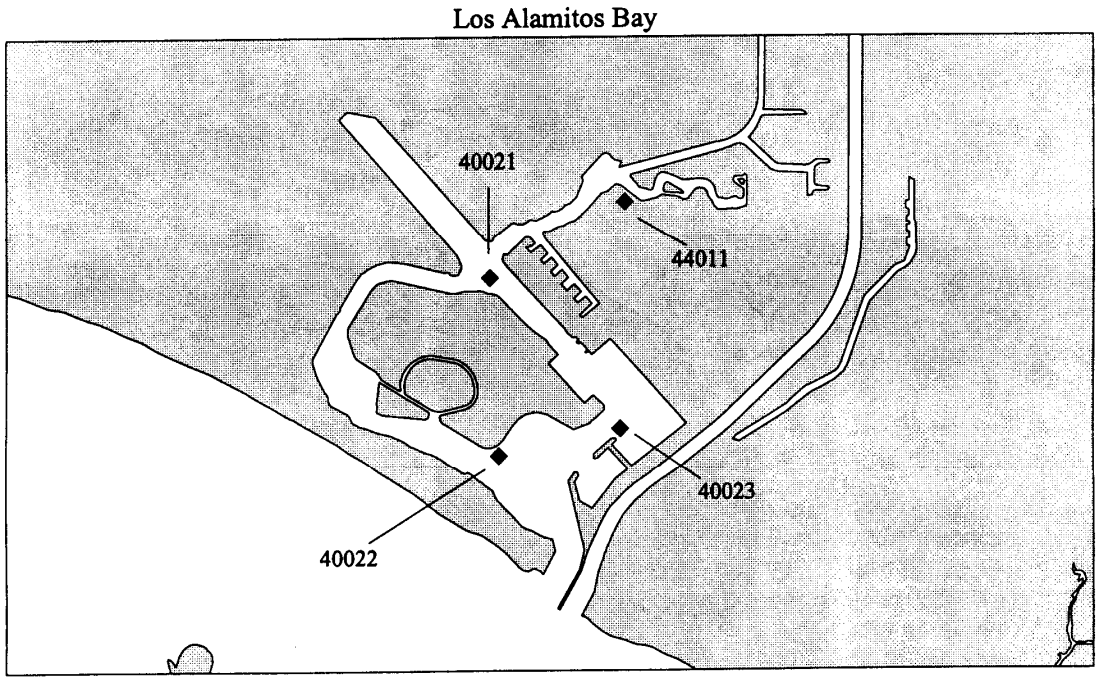


Figure 4. SCWRCB Benthic Infaunal Sampling Stations

Coastal Resources Management conducted intertidal and benthic infaunal sampling at End Beach in the Marine Stadium and Mothers Beach nearby the Alamitos Bay Marina in July, August, and September 1997 for the End Beach Mitigation Project at depths between -3 and +7 ft MLLW (Coastal Resources Management 1998). Fifty four species were identified, of these 16 were common to both areas sampled. Of 17 species of mollusks collected, only one of these occurred at End Beach, while 16 were present at Mothers Beach. Annelid worms, crustaceans, snails, and clams were the most abundant

and frequently occurring taxa. The most common species represented in the samples included the horse mussel *Musculista senhousia*, and the polychaete worms *Pseudopolydora paucibranchia*, *Neanthes acuminata*, *Capitella capitata*, *Armandia brevis*, *Leitoscoloplos pugettensis*, and *Lumbrineries* sp.

Clam beds are found within Alamitos Bay, primarily in the mid-to-low tide zone of sandy beaches and shallow subtidal habitats along the Peninsula, Bayshore Avenue, End Beach, Jack Dunster Marine Life Preserve, Mothers Beach and the inlet inshore of Basin 6 North, on the Cerritos Channel (R. Ware, pers. observations). The most common species present are Japanese littleneck clams (*Protothaca staminea*), *and "cockles" (Chione californiensis and C. undatella)* and secondarily, jackknife clams (*Tagelus* spp.) (Coastal Resources Management 1994, 1998). During September 2007 Coastal Resources Management, Inc. dive surveys in the Alamitos Bay project area for the proposed Alamitos Bay Marina renovation project, clams (*Protothaca staminea* and *Chione undatella*) were abundant within the shallow water habitat located behind the Basin 6 North docks (Coastal Resources Management, Inc. 2007a). Clams were only occasionally found in each of the other marina basins. A map of the CRM project area and a listing of all species observed by CRM biologists during the dive surveys and the remote video surveys are provided in Figure 5 and Table 1.

Epibenthic, Soft-Bottom Benthic Organisms. The sediments in the Alamitos Bay marina basins were uniformly silts with the exception of rip rap lining the bulkheads. Eighteen species of epibenthic organisms were observed during September 2007 and January 2009 diver and remote video surveys of the marina basins and channels (Table 1) and included large colonies of the ectoproct *Zoobotryon verticillatum*-a large, tree-like mass colonial species that is commonly found in high abundances during warm winter months attached to boat docks (Coastal Resources Management, Inc. 2007a, 2009a). However, when it breaks loose, it settles on the bayfloor to form a "bolus' of biofouling debris.

Other species that were observed, but were not abundant during the dive surveys included burrowing anemones (*Pachycerianthus fimbriatus*), octopus (*Octopus bimaculatus*), California horn snail (*Cerithidea californica),* Gould's bubble snails (*Bulla gouldiana*), predatory sea slugs (*Navanax inermis*), and tunicates. Of these, only the ectoproct *Zoobotryon* and burrowing anemones were present to common in the marina basins. A species-poor community of benthic epibiota is not uncommon in unvegetated environments compared to vegetated bayfloors (i.e., eelgrass) where the added structure of eelgrass above and beneath the sediment surface provides habitat and a food sources for many invertebrates.

Common epibiota in the low intertidal and shallow subtidal zones of Mothers Beach and End Beach in 1997 included benthic green algae the *Enteromorpha* spp,, the red algae *Gracilariopsis* sp., bubble snails Bulla *gouldiana*, and predatory sea slugs *Navanax inermis* (Coastal Resources Management, 1998).

Figure 5. Location of eelgrass surveys in Alamitos Bay. B1-B7 are marina basins; TD=proposed temporary dock during construction; MP=Marina Pacifica eelgrass survey area; DB=Davies Bridge eelgrass survey area

Table 1. List of Organisms Observed During Marine Biological Surveys in Alamitos Bay, September 2007-January 2009. Coastal Resources Management, Inc.

Common Name	Scientific Name	Eelgrass Beds and or/Soft Bottom Benthos	Marina Pilings , Rip Rap, and Bulkhead	All Areas
green algae	*Ulva intestinalis*			x
green algae	*Ulva californica*		x	x
brown algae	*Colpomenia perigrina*		x	x
brown algae	*Sargassum muticum*		x	x
red algae	*Caulacanthus sp.*		x	x
red algae	*Corallina spp.*		x	x
red algae	red turf algae (complex)		x	x
red algae	*Rhodymenia* sp.		x	x
sponge	*Haliclona* sp.	x	x	x
encrusting red algae	*Pseudolithopoma sp.*		x	x
green anemone	*Anthopleura sola*		x	x
hydroid	*Tubularia sp.*		x	x
stinging anemone	*Bunodeopsis sp*	x		x
burrowing anemone	*Pachycerianthus fimbriatus*	x		x
hydroid	*Corymorpha palma*	x		x
barnacle	*Balanus glandula*		x	x
barnacle	*Chthamalus fissus/dalli*		x	x
lined shore crab	*Pachygrapsus crassipes*		x	x
limpets	*MacClintokia (Collisella) spp*		x	x
giant keyhole limpet	*Megathura crenulata*		x	x
file limpet	*Lottia limatula*		x	x
slipper shell	*Crepidula onyx*		x	x
horn snail	*Cerithidea californica*	x		x
reverse chama	*Pseudochama exogyra*		x	x
ringed nudibranch	*Dialula sandiegensis*		x	x
lemon nudibranch	*Anisodoris nobilis*		x	x
sea slug	*Navanax inermis*	x		x
sea hare	*Aplysia vaccaria*	x	x	x
octopus	*Octopus bimaculoides*	x	x	x
carinate snail	*Alia carinata*	x		x
angled unicorn snail	*Acanthina spirata*		x	x
kellet's whelk	*Kelletia kelletii*		x	x
turban snail	*Tegula eiseni*		x	x
oyster	*Ostrea conchicola*		x	x

Table 5 (Continued)	Scientific Name	Eelgrass Beds and or/Soft Bottom Benthos	Marina Pilings, Rip Rap, and Bulkheads	All Areas
wavy top snail	*Lithopoma undosa*		x	x
Japanese littleneck	*Protothaca staminea*	x		x
wavy chione	*Chione undatella*	x		x
bay mussel	*Mytilus galloprovincialis*		x	x
soft ectoproct	*Zoobotryon verticillatum*	x	x	x
moss animal	*Thalamoporella californica*	x	x	x
ochre sea star	*Pisaster ochraceus*			x
bat star	*Asterina miniata*		x	x
sea cucumber	*Parastichopus parvimensis*		x	x
colonial tunicate	*Botrylloides spp.*			x
solitary tunicate	*Ciona intestinalis*		x	x
solitary tunicate	*Styela plicata*		x	x
round sting ray	*Urolophus halleri*	x		x
topsmelt	*Atherinops affinis*	x	x	x
black surfperch	*Embiotoca jacksoni*	x	x	x
opaleye perch	*Girella nigricans*		x	x
speckled sand dab	*Citharichthys stigmaeus*	x		x
California halibut	*Paralichthys californicus*	x		x
flatfish	unid. flatfish	x		x
	Total Taxa	**18**	**38**	**53**

2.1.3 Intertidal and Subtidal Hardscape Plants and Invertebrates (Marina Docks, Pier Pilings, Rip Rap, and Cement Bulkheads)

Man-made substrates (bulkheads, seawalls, docks, pilings, jetties) in Alamitos Bay are not particularly biologically sensitive habitats. However, hard substrate provides surface area for sessile marine animals and plants and mobile macro-invertebrates that would not be present in the absence of these structures. The hardscape of these structures support mussels, barnacles, sponges, and other types of invertebrates and plants that constitute the "biofouling community". The undersides of boat floats and docks are commonly colonized by green algae, barnacles, mussels, limpets, polychaete worms, moss animals (ectoprocts), and sea squirts (tunicates). Bay fishes are attracted to the biofouling habitat because it a constant source of food.

A total of 38 species were identified during dive and remote video surveys and included green algae (*Ulva intestinalis*, and *U. californica)*; brown algae (*Colpomenia perigrinus* and *Sargassum muticum*) *and red algae* (*Corallina* spp., *Caulacanthus* sp, *Rhodymenia* sp. and turf red algae complex); sponges (*Haliclona* sp.); green anemones (*Anthopleura sola*) angled unicorn whelk (*Acanthina spirata),* mussels (*Mytilus galloprovincialis*); barnacles (*Balanus glandula*, *Chthamalus fissus/dalli*); ectoprocts (*Zoobotryon verticillatum*); sea

stars (*Pisaster ochraceus*); and tunicates (*Botryllus/Botrylloides* complex, *Ciona intestinalis*, and *Styela plicata*). The rip rap in the vicinity of Basin 1 and Basin 2 also included numerous, larger macroinvertebrates, such as the nudibranchs *Dialula sandiegensis, Anisodoris nobilis;* sea hares *(Aplysia vaccaria),* octopus *(Octopus bimaculatus),* kellet's whelk *(Kelletia kelletii),* wavy top snails *(Lithopoma undosa*) sea stars *(Pisaster ochraceus), oysters* (*Ostrea conchilcola*); bat stars *(Asterina miniata*), and purple sea urchins *(Strongylocentrotus purpuratus).* Many of these species are more commonly associated with open coastal rocky and shallow subtidal reef environments, which suggests that water quality and water circulation within Basins 1 and 2 are more than adequate to support species typically associated with open coastal environments

2.1.4 Fishes

The types of fishes which commonly occur in protected marinas and harbors of southern California such as Alamitos Bay are a combination of species that are associated with soft-bottom habitat, hardscape of pilings, docks, cement bulkheads, and jetties. And open water (water column) species. Valle et al. (1999) identified 46 species of fish from Alamitos Bay during beam trawl surveys of vegetated and unvegetated soft bottom habitats between 1992 and 1995. The catch was dominated by only a few species and consisted mostly of juveniles and gobiid larvae. California halibut were six times more abundant in unvegetated areas than in eelgrass beds, whereas barred sand bass were captured almost exclusively in eelgrass. While the abundances of both halibut and barred sand bass decreased with distances from the bay mouth, other species abundances increased.

Studies conducted by Reish, (1968), Horn, (1974), and Allen (1976), also documented the presence of fishes within Alamitos Bay. Bottom-dwelling species such as various gobies (Gobiidae), staghorn sculpin (Leptocottus armatus), sand bass (*Paralabrax nebulifer*), spotted sand bass (*P. maculatofasciatus*), California halibut *(Paralichthys californicus*), diamond turbot *(Hypsopsetta guttulata*) are also representative of the soft-bottom bay environment. Many of these species are also associated with eelgrass habitat, or the ecotone between the sandy bottom and the vegetated eelgrass habitat.

Marinas provide additional structure (pilings, docks, and jetties) 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 jetty riprap protecting Alamitos Bay provides a habitat for species such as kelp bass (*P. clathratus*), sargo (*Anisotremus davidsoni*), halfmoon (*Medialuna californiensis*), and cryptic species (blennies and sculpins).

The most common species observed during 2005 eelgrass surveys in the Marine Stadium for the Termino Avenue Drain Project (Coastal Resources Management, 2005) included topsmelt (*Atherinops affinis*), black surfperch (*Embiotoca jacksoni*), shiner surfperch (*Cymatogaster aggregata*), unidentified gobies, round sting ray (*Urolophus halleri*), California halibut (*Paralichthys californicus*), and barred sand bass (*Paralabrax nebulifer*).

Fishes observed in the Colorado Lagoon for the Colorado Lagoon Restoration Feasibility Study by Chambers Group (2004) included 12 species; topsmelt, arrow goby (*Clevelandia ios*), bay pipefish, yellowfin goby (*Acanthogobius flavimanus*), shiner surf perch, shadow goby (*Quietula y-cauda*), round sting ray, California needlefish (*Stongylura exilis*), slough anchovy (*Anchoa delicatissima*, longjaw mudsucker (*Gillichthys mirabilis*), northern anchovy (2 individuals), and cheekspot goby (*Ilypnus gilberti*).

Common water column species in Alamitos Bay include northern anchovy (*Engraulis mordax*), topsmelt (*Atherinops affinis),* queenfish (*Seriphus politus*), white croaker (*Genyonemus lineatus*), although several other sciaenids such as black croaker, yellowfin croaker are also reported to be present. Shiner surfperch (*Cymatogaster aggregata*), black perch (*Embiotoca jacksoni*) and white surf perch (*Phanerodon furcatus*) are common-to-abundant in the bay (Coastal Resources Management, 2005).

Water column fishes in the vicinity of the Alamitos Bay Marina were studied as part of an entrainment/impingement study for the Haynes Generating facility by Intersea Research Corporation (1981), who sampled fish and planking from November 1978 through September 1979. The study included trawl and plankton sampling at several stations throughout Alamitos Bay (Figure 6).

The results of the Intersea Research study indicate seasonal variations in the plankton and ichthyofauna communities in Alamitos Bay. White croaker, queenfish, shiner surfperch (*Cymatogaster aggregata*), northern anchovy, and black perch (*Embiotoca jacksoni*) dominated fish collected in trawl samples at the "nearfield" station near Marina Basin 2.

The Intersea Research study also sampled fish impinged on the pump chamber (intake) screens of each generating unit. The composition of the fish fauna collected on the intake screens at the plant differed somewhat from that collected in trawls taken outboard of the small boat docks that front the intakes in Basin 2 of the Alamitos Bay. The species most commonly impinged and entrained were shiner surfperch, butterfish (*Peprilus simillimus*), white surfperch (*Phanerodon furcatus*), walleye surfperch (*Hyperprospon argenteus*), and topsmelt (*Atherinops affinis*). Most of these species are pelagic (commonly found in the near-surface water) and the perch are generally associated with pilings and other high-relief substrate.

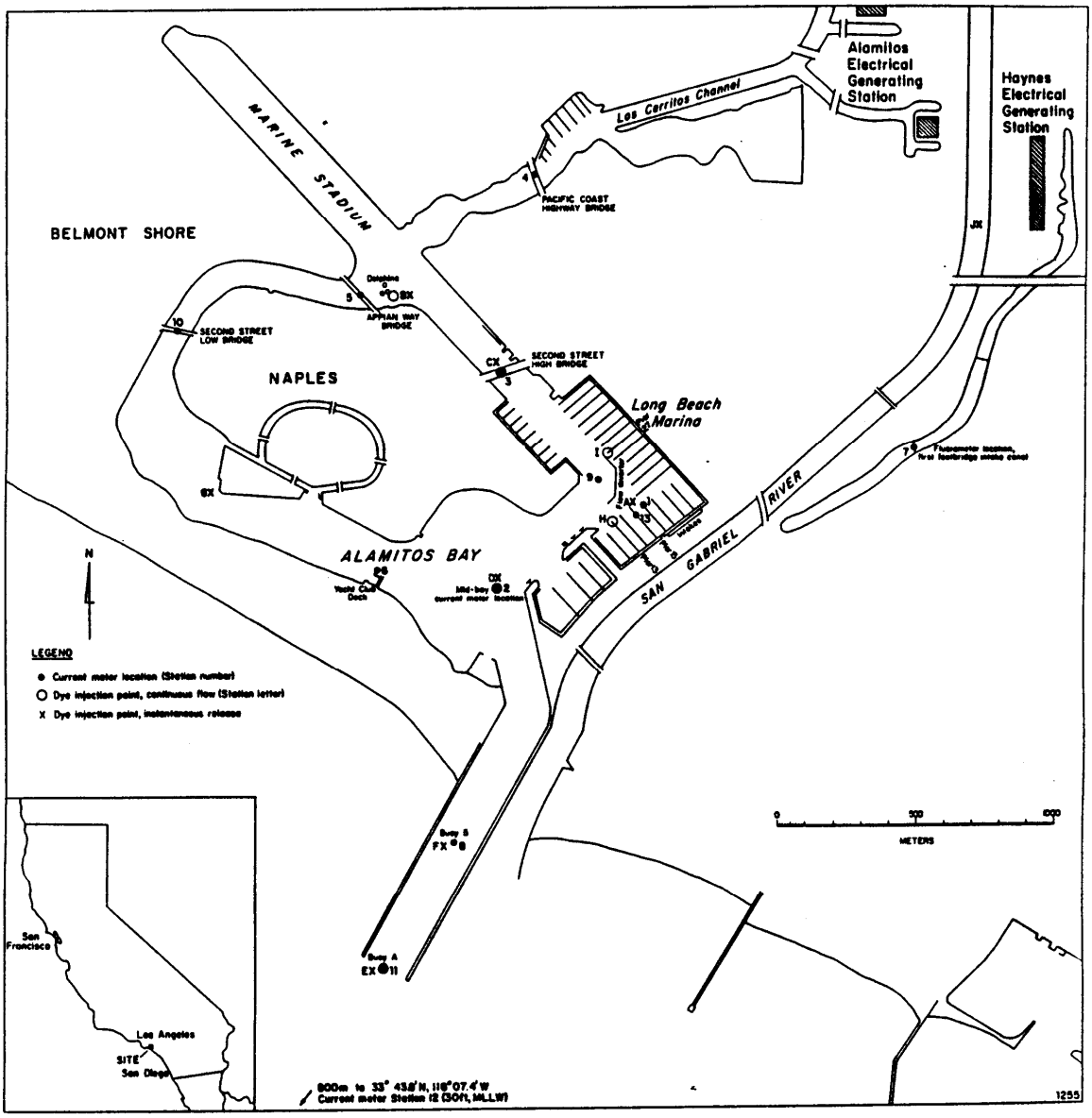


Figure 6. Intersea Research Corporation Fish Sampling Stations

During September 2007 dive surveys, CRM biologists observed only a few fish species within the marina basins, in the main channels of Alamitos Bay, or in the Cerritos Channel, in part due to poor water visibility. Those species observed included topsmelt (*Atherinops affinis*), black perch (*Embiotoca jacksoni*), unidentified flatfish, sand dabs (Citharichthys *stigmaeus*), and round sting ray (*Urolophus halleri*).

2.1.5 Essential Fish Habitat

This assessment of Essential Fish Habitat (EFH) for the Alamitos Bay Marina 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. Impacts to Habitat Areas of Particular Concern (HAPC) are described in the regulations as subsets of EFH which are rare, particularly susceptible to human induced degradation, especially ecologically important habitats, or located in an environmentally stressed area, including estuaries and eelgrass.

The proposed project is located within an area designated as EFH for the Coastal Pelagics (Pacific Fisheries Management Council (1998a) and the Pacific Groundfish (PFMC 1998b) . Species managed under the Highly Migratory Species Fisheries Management Plan may have EFH within the project area but EFH has not been designated for these species under the Migratory Species Act (MSA). In addition, because these are highly mobile species, these species are likely to be transient rather than stationary at the project site. Salmonids have designated EFH under the Pacific Salmonid Management Plan, but it is highly unlikely that the would occur in the project area, and therefore, are not considered.

Of 86 coastal pelagic species managed under all of the FMP, four are known to occur in the San Pedro Channel area, and potentially within Alamitos Bay (Table 2a). Northern anchovy, the only coastal pelagic management species known to occur within Alamitos Bay, 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 1997). It 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. Northern anchovy comprise a portion of the commercial bait fishery in San Pedro Bay. This species is a planktivore, and is preyed upon by larger fish and seabirds. Larvae of northern anchovy are also part of the Alamitos Bay ichthyofauna and icthyoplankton community.

Eight Pacific Groundfish FMP species have a potential to be present in Alamitos Bay (Table 3). Of these, three species-leopard shark, California sculpin, and Sebastes spp. have been reported within Alamitos Bay, each with very low occurrences. The potential presence of groundfish species occurring within the Alamitos Bay Marina project area is low, due to a lack of suitable habitat. Of the three species that may occur in the project area (Table 2b) all are be expected to be rare within marina habitat.

Table 2a. Coastal Pelagic Management Plan Species Potentially Affected By The Alamitos Marina Renovation Project

Common Name	Scientific Name	Comment
Northern anchovy	*Engraulis mordax*	Common to abundant during each of 11 surveys between 1972 and 1997. 2nd most abundant species overall offshore. Adult and larvae present in area. [1,2,3]. Present to abundant in fish trawls in Alamitos Bay Marina [4]
Pacific sardine	*Sardinops sagax*	Present during 6 of 11 surveys, low to moderate abundance; Mid-ranked in abundance compared to other species. Mostly adults in the general area. [1,2] Not known within Alamitos Bay proper
Pacific mackerel	*Scomber japonicus*	Incidental catch at depths shallower than 30 feet. Present in one survey (1997) Predominantly adults in project area [1,2,3] Not known within Alamitos Bay proper.
Jack mackerel	*Trachurus symmetricus*	Incidental catch at depths shallower than 30 feet. Present during one survey (1994). Predominantly adults in project area [1,2,3] . Not known from within Alamitos Bay.

Table 2b. Pacific Groundfish Managed Species Potentially Within the Project Area

Common Name	Scientific Name	Comment
English sole	*Parophrys vetulus*	Not reported from Alamitos Bay; present offshore
Pacific sanddab	*Citharichthys sordidus*	not present in Alamitos Bay
Leopard shark	*Triakis semifasciata*	Rare occurrence of adult individuals impinged upon Haynes Alamitos Generating Station Intake Screens-cooling water intake is located within the southeast corner of the Alamitos Bay Marina
Bocaccio	*Sebastes paucispinis*	Not present in Alamitos Bay; no suitable habitat in Alamitos Bay Marina
Rockfish	*Sebastes miniatus*	Juvenile *Sebastes* (*S. miniatus*) have been impinged on Haynes Alamitos intake screens, although in low numbers. Rare occurrences likely within the marina.
California scorpion fish	*Scorpaena guttata*	Potentially present on Alamitos Bay entrance channel jetty; rock rip rap present in the marina, although it is more commonly found in open coastal environs rather than bays and estuaries
Lingcod	*Ophiodon elongatus*	Not present in Alamitos Bay; no suitable habitat in Alamitos Bay Marina
Cabezon	*Scorpaenichthys marmoratus*	Not present in Alamitos Bay; no suitable habitat in Alamitos Bay Marina

Source: MBC Applied Environmental Sciences (2006); [1] MBC 1997;[2] MEC 1988;[3] MEC 1999; 4 Intersea Research Corporation, 1981

2.2 SENSITIVE SPECIES

2.2.1 Eelgrass (*Zostera marina*)

Eelgrass is considered a Habitat Area of Particular Concern (HAPC) and a subset of Essential Fish Habitat under 1996 amendments to the Magnuson-Stevens Fishery Management and Conservation Act (FR 62, 244, December 19, 1997). Eelgrass grows on sand and mud sediments throughout the bay in the Alamitos Bay Jetty entrance channel (Coastal Resources Management, 1994) along Bayshore Ave. and Ocean Blvd (Coastal Resources Management, 1999, Wetlands Support and Coastal Research, 2003), in the Marine Stadium (Coastal Resources Management, 1998, 2002, 2005); Spinnaker Cove and the Cerritos Channel (Coastal Resources Management, 1994, 1996), in the Naples Island Canals (Coastal Resources Management, Inc. 2007, Wetlands Support and Coastal Research, 2003,) and the periphery of Naples and Treasure Islands (Wetlands Support,2003, Coastal Resources Management, 2003). Very small patches of eelgrass have also been found in the Colorado Lagoon (Chambers Group, Inc., 2004).

This seagrass provides habitat and structure for benthic invertebrates and organisms that live on the protruding blades and shoots. Common invertebrates that live on this species of seagrass include anemones (*Epiactis* sp., and *Bunodeopsis* sp.), flatworms, polychaete worms, snails (*Alia carinata*), gammarid amphipods, and caprellid amphipods. These in turn, are fed upon by fishes that forage in the eelgrass beds.

Eelgrass canopy (consisting of shoots and leaves approximately two to three feet long) attracts many marine invertebrates and fishes. The vertical relief of the vegetation enhances the abundance and the diversity of the marine life compared to areas where the sediments are barren (Phillips, 1984; MBC, 1986; Hoffman, 1986, 1990, 1991. 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). A diverse community of bottom-dwelling invertebrates (i.e., clams, crabs, and worms) live within the soft sediments that cover the root and rhizome mass system. Eelgrass meadows are critical foraging centers for seabirds (such as the endangered California least tern) that seek out juvenile topsmelt 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.

Because of the high ecological value of eelgrass meadows, it is important to document the location and amount of eelgrass in areas of proposed waterside developments in Alamitos Bay and to mitigate any losses by avoiding or reducing, or compensating for any adverse effects on eelgrass habitats and communities.

Photograph 1. Eelgrass, *Zostera marina* Figure One "shoot" and the cluster of "blades" arising from the shoot is considered a "turion unit".

While their presence is not documented within Alamitos Bay, two other species of *Zostera* have a potential to be in the area. A wide-bladed eelgrass (*Zostera pacifica)* is known to occur along the outer coast of Santa Barbara County and the Channel Islands (Coyer et al. 2007), while a second species, *Zostera japonica,* (dwarf eelgrass) is an invasive and native to Asia. It threatens to upset the natural balance of California's wetlands. It has been found in Humboldt Bay (Frimodig and Ramey, 2009; Foss et al., 2007).

Results of the September 2007 and October 2008 Focused Eelgrass Survey in the Project Area

Coastal Resources Management conducted marine biological surveys between September 17-21st, September 24th-25th, and October 2nd, 2007 (Coastal Resources Management, Inc.,2009a). Surveys were conducting using three methods; side scan sonar, remote underwater video, and biologist-diver underwater studies to map and to record eelgrass bed characteristics. Nearshore and Wetland Surveys, Inc. provided side scan sonar field and data reduction assistance for CRM. The results of that survey are provided under separate cover. A breakdown of the amount of eelgrass within each area is provided in Table 3, and eelgrass maps are presented in Appendix 1. Eelgrass was found between the depths of 0.0 and -8.5 ft MLLW. Based on the combined mapping effort of the side-scan sonar and underwater diver-mapping surveys, a total of 2.9 acres (126,926 sq ft) of eelgrass was located in Basin 2, Basin 4, Basin 6N and 6S, Basin 7, the Marina Pacifica Channel, the Cerritos Channel extending east of Coast Highway Bridge, the main channel between the Davies Bridge and the Cerritos Channel, and along the Alamitos Bay Peninsula between 56th and 71st Places. It

did not occur in Basin 1, Basin 3, Basin 5, or in the vicinity of the proposed temporary dock located on the southeast side of the Long Beach Yacht Club bulkhead at the end of Appian Way. Of the 2.9 acres mapped, 1,373.04 sq ft of eelgrass is present within marina basins where dredging will occur. A total of 256 sq ft of eelgrass was present in the vicinity of Basin 7, but it is outside the zone of potential dredging activity.

CRM revisited each of the areas in the Marina in October 2008, and January using divers and remote video and determined that each of the areas mapped in 2007 was still vegetated with eelgrass, there was no observable increase in areal cover within these areas, and that eelgrass had not recolonized other areas of the Marina since the 2007 survey. CRM surveyed the fairways within Basin 3 where the marina docks have been abandoned (due to safety issues) to determine if a lack of vessel activity has resulted in any eelgrass colonization of the bayfloor since the Oct 2007 CRM eelgrass bed survey. The results indicate that eelgrass had not colonized any of these areas, despite a range of depths (less than 8 ft) where eelgrass can grow, and no light-limiting features due to shading, or turbidity caused by vessel activities.

Table 3. Acreage of Eelgrass Surveyed in Alamitos Bay
(Refer to Appendix 1 for Locations on Map)

Location	Eelgrass Area (sq ft)	% Total
Basin 1	0.00	0.00
Basin 2	1,019.78	0.80
Basin 3	0.00	0.00
Basin 4	123.26	0.10
Basin 5	0.00	0.00
Basin 6 South	11,943.40	9.41
Basin 6 North	230.00	0.18
Basin 7	255.97	0.20
Marina Pacifica Channels	11,543.54	9.09
West of Davies Launch Ramp	46,007.60	36.25
LBYC Long Dock (Proposed Temporary Dock	0.00	0.00
(55th-61st Place)	1,977.64	1.56
Peninsula 2 (63rd-71st Place)	32,682.41	25.75
Upper Cerritos Channel	21,142.88	16.66
Summary	Total Area (sq ft)	% Total
Eelgrass Area (sq ft)	126,926.5	100.00
Eelgrass Area (sq m)	11,796.1	
Eelgrass Area (acres)	2.9	

Eelgrass within the marina basins (B1-B7) accounted for 10.7% of the total amount mapped (13,572.41 sq ft), of which most occurred behind the docks of Basin 6 South. In Basins 2, 4, 6 North, and 7, eelgrass was extremely patchy, scattered, and accounted for only a small portion of eelgrass within all of the marina basins. The Marina Pacifica Channel accounted for 9.09% (11,543.54 sq ft); most of this was found at the confluence of the Cerritos Channel, with amounts decreasing with distance into the Marina Pacifica Channel.

The shallow subtidal habitat between the Davies Bridge Launch Ramp and the Cerritos Channel/Marine Stadium confluence accounted for the highest percentage of eelgrass within any one region, 36.25% or 46,007.6 sq ft. The combined total amount of eelgrass located along the Alamitos Bay Peninsula Beach contributed 27.31% to the total amount of eelgrass (34,060.05 sq ft) of which nearly all was located between 63rd and 71st Places. The Upper Cerritos Channel, east of the PCH Bridge, was also vegetated with a moderate amount of eelgrass, accounting for 16.66% of the total (21,142.88 sq ft).

2.2.2 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. This species is also an important forage fish for several species that are protected or regulated. 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). The beaches on the Oceanside of the Alamitos Bay Peninsula are known spawning areas; they are not know to utilize Alamitos Bay proper.

Steelhead Trout (*Onchorynchus mykiss*). Steelhead trout are a Federal endangered and California State species of special concern. It is also one of the species listed in the . Pacific Salmonid Management Plan The steelhead trout is an anadromous sea-going rainbow trout that 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 (http://www.nmfs.noaa.gov/pr/species).

Except for the colonization of a 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).

Tidewater Goby (*Eucyclogobius newberryi*). The tidewater goby is a Federally-listed endangered species that has been expatriated from many southern California creek mouths. 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 (U.S. Fish and Wildlife 1994). 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 1994). Habitat conducive to tidewater gobies is absent from Alamitos Bay.

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 and is a dominant member of the Alamitos Bay fish assemblage (Valle et al., 2009). 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 Bay (Horn and Allen, 1981; Allen, 1976b, Allen 1986. The species uses inshore waters of bays, harbors, and estuaries as a nursery and foraging habitat. Juvenile to sub-adult halibut are known to occur through Alamitos Bay (Valle et al., 1999; Coastal Resources Management, Inc. 2009a).

2.2.3 Reptiles

Sea Turtles. Several species of federally-listed threatened and endangered sea turtles could potentially occur in the nearshore open water habitats surrounding Alamitos Bay. There are no known nesting beaches for these species in the United States, but they have been observed off the coast of southern California (California State Lands Commission 1998). These include the endangered leatherback sea turtle (*Dermochelys coriacea*), the threatened green sea turtle (*Chelonia mydas*), loggerhead sea turtle (*Caretta caretta*), and olive ridley sea turtle *(Lepodochelys olivacea*).

In the eastern North Pacific, green turtles have been sighted from Baja California to southern Alaska, but most commonly occur from San Diego south. Occasionally, green sea turtles have been found offshore of Orange County and Los Angeles County, north of their more common southerly range limit due to movement during warmer water El Nino periods (Coastal Resources Management, 2007c and d; pers. com with Eric Wilson, EDAW, Inc.). Green sea turtles have been reported in the San Gabriel River where they encounter the warmer, discharged waters of the power generating facilities located farther up the River. According to the Long Beach Lifeguards and Marine Bureau staff, green sea turtles have been seen in Alamitos Bay and appear to be curious (Vivian Cook, Marine Bureau; Allen Powder, Long Beach Lifeguards pers. Com with R. Ware 27 July 2007). However, no records are kept as to where they have been seen, the time of year of occurrence, or the numbers observed.

There is no evidence that these species breed in the project area. Green turtles are mostly herbivorous. They spend most of their time feeding on algae in the sea and seagrasses that grow in shallow waters. As juveniles, they eat plants and other organisms such as: jellyfish, crabs, sponges, snails, and worms. As adults, they are strictly herbivorous (Ernst 1994; Crite, J. 2000). Because Alamitos Bay has a productive eelgrass system, green sea turtles may be utilizing the seagrass beds located throughout the bay as one source of their nutritional requirements, (Coastal Resources Management 2009; pers. com with Eric Wilson, EDAW, Inc).

Green sea turtles have been stranded or have been sighted along the Long Beach shoreline and the vicinity of Alamitos Bay In October, 2004, three green sea turtles stranded in the Belmont Shore area and one green sea turtle stranded in the Treasure Island Marina area. In October, 2006, the Long Beach Aquarium attached a satellite transmitter to a green sea turtle that had live-stranded in Long Beach. The turtle was tracked south to the San Clemente area and then turned around and headed back north to the Long Beach area, where it remained for several weeks, presumably foraging on eel grass or algae in the area (EDAW, 2007; Christina Fahy, National Marine Fisheries pers. com. with EDAW, Inc. July 2007). 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.

2.2.4 Marine Mammals

The occurrences of any cetacean, including gray whales (*Eschricthius robustus*), would be uncommon within Alamitos Bay although both bottlenose dolphins (*Tursiops truncatus*) and gray whales may occasionally be found in the Alamitos Bay entrance channel or the San Gabriel River mouth (R. Ware, pers. observation). California sea lions (*Zalophus californianus*) and harbor seals (*Phoca vitulina*) rest on harbor buoys outside the harbor, but will also occasionally enter Alamitos Bay although in very low numbers (Chambers Group, Inc. 2004). Alamitos Bay is not considered a breeding habitat for pinnipeds (Bonnell and Dailey, 1993) but it is a potential secondary foraging area due to their observed presence within the bay and the presence of fishes that make up their prey base.

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 (Brownell, 1977). 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 (Brownell and Dailey. 1993). Solitary animals generally lead the northbound migration with cow-calf pairs following 1 to 2 months later (Foster and Schiel 1985). Gray whales migrate within 125 miles (200 km) of the shoreline and many are sighted within 9 miles (15 km) of shore (Brownell and Dailey. 1993). On the northbound migration, cow-calf pairs are believed to more closely follow the shoreline rather than the offshore route (Brownell and Dailey. 1993). Gray whales are observed commonly in the nearshore waters in the San Pedro Channel, but are not expected to enter Alamitos Bay except perhaps on a rare occasion.

2.3 INVASIVE SPECIES

Caulerpa taxifolia. The invasive *Caulerpa taxifolia* algae (Photograph 2) 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 (National Marine Fisheries Service, 2008). *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

Photograph 2. *Caulerpa taxifolia*. Source: NMFS

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 is presence using standard agency-approved protocols and by National Marine Fisheries Service/California Department of Fish and Game Certified Field Surveyors (National Marine Fisheries Service, 2008).

No *Caulerpa* algae was observed during the remote video or diver surveys within the project area. During the survey, a total of 7.82 acres were surveyed, of a total 43.97 acres of bayfloor habitat with the marina basins and the proposed temporary dock areas. This represents a total of 17.9 percent cover. It should be noted that the surveys were not conducted specifically to address pre-construction survey invasive algae conditions which are conducted using more stringent protocols related to areas of coverage. A 20% minimum covered is required in non-infected systems (including Alamitos Bay) when Caulerpa pre-and-post construction surveys are conducted.

Undaria pinnatifida. The brown macrophyte *Undaria pinnatifida* has been recorded in Long Beach Harbor and Anaheim Bay (R. Ware, pers. observation) This species was not observed during the survey of the marina basins or the temporary dock area.

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 Alamitos Bay.

3.0 IMPACT ASSESSMENT

3.1 PROJECT COMPONENTS

The proposed project would renovate the existing Marina facilities and enhance the existing recreational boating facilities within the harbor. The project encourages boating use by providing upgraded ADA-compliant facilities, upgraded restrooms, and dredged basins to ensure safe navigation. The project will be completed over a sequence of 12 phases. Table 4 summarizes the project components.

Table 4. Alamitos Bay Marina Renovation

Component	Existing Conditions	Proposed Project Improvements
Dock System (Basins 1-7)	Floating docks supported by 808 concrete steel reinforced pipes	Replace existing piles with 620 piles (loss of 188 piles). Average pile diameter 15”
	1,967 boat slips provided by timber floating docks	1,646 boat slips provided by floating concrete docks. Loss of 321 slips.
	Approximately 476,839 square feet of area covered by floating docks	Approximately 474,239 square feet of area covered by floating docks. Loss of 2,600 square feet.
Temporary/Long Dock	N/A	One 565’ x 10’ long dock to be located adjacent to Long Beach Yacht Club (Basin 4). Approx 200’ of this dock is temporary. Approx. 3,150 sq ft. of water area covered permanently and 2,000 sq ft. covered temporarily during construction.
Access	47 ADA gangways (none ADA)	46 gangways (including 9 ADA)
Dredging	N/A	Basin 1 – 53,700 cy Basin 2 – 89,900 cy Basin 3 – 55,900 cy Basin 4 – 65,300 cy Basins 5, 6S, 6N, 7 – 22,320 cy Total: 287,120 cy (with 2 ft over-dredge) Target dredging depth is -13 to -15 MLLW in Basin 1; -10 MLLW in Basins 2-7
Sea Wall Repairs	N/A	Approx. 8,250 lf of repair required
Habitat Mitigation Area	N/A	Site in north east Marine Stadium to be excavated to a depth of -2 to -3 MLLW. Approximately 10,500 sq ft.
Dry Boat Storage	None	23 new spaces for boats under 30’ in Basin 4 parking lot. Loss of 16 spaces at habitat mitigation site. Total gain of 7 dry storage spaces.
Restroom Facilities	13 restroom buildings	Refurbish 3 restroom buildings in place; demolish and rebuild 10 restroom buildings. Total of 13 restroom buildings.
Parking Lots	2,515 parking spaces	2,524 parking spaces provided including ADA spaces. 930,622 sq ft of parking lot areas to be repaved

The Marina Rehabilitation Project would accommodate changes in the boating needs of the public by providing longer average slip lengths. The dock and slip facilities were developed 50+ years ago, when the average length of recreational boating slips was shorter than current boater demand. However, providing longer slips will reduce the total number of slips within the Marinas. There are currently 1,967 existing slips in Marina Basins 1 through 7; the proposed project includes installation of 1,646 slips, resulting in the loss of 321 slips. As of the date of this notice, there are 1,430 customers in the Marina, so there would be a slip for every existing customer once the renovations are complete.

The proposed project consists of a number of improvements to the existing Marina and includes the following: (1) dredging the Marina basins down to original design depths; (2) replacing and/or upgrading 13 restrooms along with their associated water and sewer laterals; (3) repairing the sea wall where necessary to reestablish the rock revetment along the slope to the basin floor; (4) complete dock and piling replacement; and (5) replacing the pavement in the Marina's parking lots. The project includes two construction staging areas: one located in a parking lot on Marina Drive near Basin 2; and a second staging area located in a parking lot on Marina Drive near Basin 3, adjacent to the Marina Shipyard.

Based on preliminary analysis, dredging activities would require mitigation for potential impacts to marine eelgrass. The City has identified a site adjacent to the northeast shore of Marina Stadium to convert to an open space/habitat mitigation site. This mitigation habitat area will therefore be analyzed in the Environmental Impact Report (EIR) as a part of the project. Each of these project components is described in greater detail below.

Dredging. As part of the proposed project, the Marina basins would be dredged to the original design depths. The purpose of this dredging is to remove accumulated materials that prevent safe navigation throughout the Marina basins. The total dredge quantity is approximately 262,000 cy of sediment. The proposed disposal site for dredge materials from Basins 2 through 7 is the United States Environmental Protection Agency (EPA) designated offshore disposal site, known as LA-2, with material discharged via a dump barge. Preliminary testing indicates that a portion of dredge materials from Basin 1 contain elevated levels of metals and would not be acceptable at LA-2. Therefore, approximately 25, 504 cy of material from Basin 1 would be trucked off-site and disposed of at an appropriate landfill, with the remainder being disposed of at LA-2. The dredging work would be phased by basin along with the dock and piling replacement work. Dredge depths for Basins 2,3,4,5, 6 North, 6 South, and 7 will be -10 MLLW, Basin 1 dredge depths will be -13 to -15 ft MLLW.

Restrooms. There are a total of 13 restrooms located throughout the Marina basins that are included as part of this project. Three (3) restroom structures, located in Basin 6-South, Basin 6-North, and Basin 7, respectively, would be remodeled and renovated in place. The remaining 10 restroom buildings would be demolished and replaced with similar structures that contain toilet, shower, and laundry facilities. Six of the 10 structures to be demolished would be relocated to accommodate ADA ramps and

gangways. However, each basin would continue to have the same number of restroom buildings that currently exist, in the same approximate locations.

The restrooms would be constructed in compliance with the ADA guidelines. This portion of the project includes replacement of the existing water and sewer lines with 6-inch (in) lines from all restrooms to the existing water and sewer mains.

Sea Wall Repairs. It is anticipated that 8,250 linear feet (lf) of sea wall repair would be required as part of the proposed project. The repairs are primarily focused on restoring the eroded bearing surface and reestablishing the rock revetment along the slope to the basin floor. Sea wall repairs would be done in phases that correspond with each basin's dock and piling replacement work.

Dock and Piling Replacement. There are 1,967 existing slips in Marina basins 1 through 7 that total approximately 476,839 sf of dock surface area. The proposed project includes installation of 1,646 slips that total approximately 474,239 of new dock surface area. Therefore, the proposed project would result in the loss of approximately 321 slips and a reduction of approximately 2,600 sf of dock surface area. In addition, the proposed project would result in the removal of approximately 808 existing piles and installation of 620 new piles to support the new dock system. The new docks, accessory gangways, and ramps would meet ADA requirements. Upgraded water, electricity, and phone utilities would be provided to the new slip facilities.

Temporary/Long Dock. The project includes one temporary dock that would accommodate displaced boats during each phase of the rehabilitation process. The temporary dock would be located adjacent to the parking lot of the Long Beach Yacht Club. It is anticipated that a portion of the temporary dock would remain in place as a permanent dock at the completion of the Marina rehabilitation.

Parking Lot Replacement. The project includes the replacement of the paved parking lot surfaces adjacent to the Marina slips in Basins 1, 2, 3, 4, 6-North, and 6-South. New asphalt paving would be installed and the lots would be restriped (repaving areas total 930,622 sf). No landscaped islands within the parking lots areas would be removed. In addition, new utility connections including electricity, water, wastewater, and storm drain facilities would be installed in conjunction with the repaving of the parking areas. Concrete ramps meeting ADA requirements and concrete sidewalks and curbs are also included in the parking lot or landside improvement portion of the project.

Open Space/Habitat Mitigation Site. The City has identified a site adjacent to the northeast shore of Marina Stadium to convert to an open space/habitat mitigation site. The open space/habitat mitigation site is located within a City-owned storage area. The fenced storage area is currently used, in part, to store impounded items. The project includes abandoning a portion of the storage yard to create an open space habitat. An area of 218 feet by 105 feet would be excavated to a depth of 2 to 3 feet below MLLW. The rock revetment would be relocated to the eastern boundary of the site to allow the area to fill with water from the adjacent channel. [Alternatively, culverts would be placed in the

rock revetment to allow water to circulate into the planting area. Design is still underway] The new open space area would be planted with eelgrass to mitigate for the project's potential impacts to marine biological resources.

Project Timing. Implementation of the project is anticipated to be accomplished in a 12-phase program, extending over approximately six years. Each basin will be dredged after removal of the docks and slips within that respective basin. Seawall repair will occur as necessary within each phase. Rehabilitation of the restroom facilities and the parking lot replacement will be completed after installation of all dock facilities and related utilities.

3.2 SHORT-TERM CONSTRUCTION IMPACTS

3.2.1 Water and Sediment Quality

Pile and Dock Extraction and Placement. Concrete production piles (averaging 15 inches in diameter will be driven into the sediments. These activities could increase the levels of water turbidity as each phase of the project is being conducted. However, this method is the environmentally preferred alternative over hydro jetting because it produces less turbidity, and the potential for resuspension of potential contaminants is lower. Turbidity is expected to be limited to the specific basin where dock improvements will be made, and the turbidity plume will 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 six years. Thus, site-specific turbidity levels may be above-ambient with a portion of the Alamitos Bay Marina for an extended period. Turbidity may also increase if vessel propellers impact the bay floor or prop wash stirs up bottom sediments. To prevent the spread of any turbidity plume out of the area, Best Management Practices (BMPs) should be implemented, when feasible, by installing a siltation curtain around the work zone.

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

Consequently, pile removal and replacement in the vicinity may result in the resuspension of material that could degrade water quality. This has a potential to result in a potentially short-term adverse, significant impact to water quality within each Basin. Mitigation measures to reduce the level of impact to less-than-significant is provided in Section 4, Mitigation Measures.

Seawall repairs will result in site-specific, short-term increases in local turbidity. Such activities include the lifting, repositioning and subsequent placement of protective rip rap, against the seawall and repairing the seawall's surface. Turbidity increases will be short-

term, and limited to specific sections of seawalls involving the repair of 8,250 linear feet (lf) of seawall. This will be a less-than-significant impact on water quality with the implementation of Water Quality Best Management practices during seawall repairs.

Oil and Fuel Discharges. Accidental oil or fuel spills that could potentially occur during the proposed dredging and pile removal and dock emplacement operations could result in significant effects on water quality, and subsequently, the fish and wildlife of the harbor depending on the severity of the spill. 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 but the potential for significant, long-term effect on marine resources would be moderate to high. The inclusion and implementation of a Marina Construction and Dredging Management Plan for the project will assist in preventing accidental spills and providing the necessary guidelines to follow in case of an oil or fuel spill and reduce the potential for a significant long term impact to less than significant.

Mitigation measures and Best Management Measures (BMPs) to avoid water quality degradation are provided in Section 4. With the inclusion of avoidance/mitigation measures, there will be no adverse environmental impacts on water quality.

3.2.2 Water Column Biota

Pile Removal and Replacement. The project area water column habitat supports a plankton and fish community of species that are common to bays and harbors of southern California. Living in bays and harbors, with constant sources of turbidity from runoff and other sources, this community of marine organisms has acclimated to some degree, to turbid conditions that might arise from site-specific pile removal and replacement.

During pile replacement, an increase in turbidity will result in a temporary reduction in submarine light levels. Increased turbidity will temporarily reduce the amount of submarine light levels, resulting in a short-term reduction of plankton productivity. Because plankton drift with the currents and turbidity is expected to be localized, there will be only short-term, less-than-significant impacts to the plankton community.

There will be no mortality of open water schooling fishes (atheriniids or anchovies) or fishes associated with piling habitats (i.e., black surfperch, pile perch, kelpfish, and pipefish). Water column fishes will swim away from the immediate work area due to a potential increase in underwater pressure and noise levels from work equipment. Pile-associated species will also avoid the immediate area of pile activity, but may also but may be attracted to biofouling debris that is removed from piles that settles on the harbor floor.

Mortality of bottom-dwelling species such as halibut and gobies is not expected because they will move away from the source of impact upon disturbance. Once piles are in-place, bottom-dwellers will return to the area.

Secondary impacts of increased water turbidity on fishes will be less-than-significant. 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). Phasing of the dock and pile replacement over six years will allow fish to find sources of food on nearby hard substrata.

Water column dissolved oxygen concentrations would decrease due to the resuspension of organically-enriched sediments and the resuspension of potentially toxic levels of copper and DDT would increase, particularly in areas near storm drains. These impacts would physiologically stress the fish in the area, and result in their movement out of the area. Because fish will likely move out of the immediate zone of turbidity, their exposure to elevated levels of contaminants is expected to be minimal. Turbidity will return to ambient levels upon cessation of pile removal and replacement through tidal flushing and circulation and fishes would return to the area. Overall, potential impacts arising from pile and dock removal and construction activity will result in less than significant impacts to the fish community.

3.2.3 Soft-Bottom Benthic and Hardscape Associated Communities

Dredging. Dredging will be phased over a 6-year period so that it will occur at the beginning of each of the 12 phases of renovation. Dredging will result in the temporary loss (mortality) of all benthic infauna within the dredge footprint. This will have an unavoidable, significant, but short-term localized impact on the benthic community. There will be no long-term reductions in the amount of benthic soft bottom habitat or populations of benthic invertebrates within the marina basins as a consequence of dredging. The affected species are typical of other bay and estuarine environments in southern California and are dominated by species adapted to constant environmental stresses. Following the completion of dredging, benthic invertebrates will begin the recolonization process. Within one to 3 years, the benthic community in the dredge zone would be expected to recover to pre-impact levels of species diversity and abundance, assuming successful recruitment and recolonization, and water quality and adequate flushing is maintained.

Pile Removal and Placement. The removal of docks and dock pilings will result in an initial loss of biofouling (pile-dwelling) associated flora and fauna on each of the 808 piles and the 476,839 sq ft of dock space. Because the marina redevelopment will occur over several phases, losses will not occur throughout the harbor at the same time, limiting the overall impact to a particular area within each phase over a six year period. 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. However, most of the biofouling organisms will 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. Once the new piles and docks are re-installed, they will be recolonized by similar types of organisms that were initially removed. The process of recolonization will begin immediately upon placement; however, re-establishment of mature communities on 620 of the original 808 pilings (78% of the original total) will be phased over a period of one-to-six years. The removal and replacement of pilings and docks will have a less–than-significant impact on the biofouling community. There are no sensitive species associated with the piling community that would be impacted by marina renovations.

Repairs made to the 8,250 lf of seawall and rip rap will result in short-term reductions of hard bottom associated species such as mussels, barnacles, limpets, sea squirts, and algae. Marine organisms will begin to repopulate the seawall and rip rap upon cessation of seawall repairs with no expected long-term impacts to hard-bottom benthic algae, invertebrate, or fish populations. Consequently, seawall repairs will have a temporary, less-than-significant impact upon these resource groups. All repairs will be made within the existing footprint of the hardscape of the rip rap and will not impact soft bottom ESH habitat.

3.2.4 Sensitive Species

Eelgrass. Barges, scows, and support vessels have a potential to impact eelgrass through (1) deployment of anchors and anchor chain within eelgrass habitat (2) grounding of the vessels over eelgrass habitat and (3) propeller scarring and propeller wash. These activities would create furrows and scars within the eelgrass vegetation, and perhaps temporarily increase turbidity that could potentially cause additional adverse losses of eelgrass habitat along the transit corridor in-and-out of the marina. . With Best Management Practices for vessel movements and support vessels implemented for the project, vessel-related impacts to eelgrass will be less-than-significant.

Dredging in Basins 2, 4, and 6 will remove 1,373.04 sq ft of eelgrass (Table 5) located within these basins. This will have an adverse impact on Essential Fish Habitat. This loss is discussed in Section 3.3.

Tidewater Goby. Tidewater gobies are not known to occur within Alamitos Bay Marina; no construction-related impacts will occur on this species or its habitat.

Steelhead Trout. There are no known populations of this species in Alamitos Bay, Therefore, there will be construction-related impacts on Steelhead Trout EFH for salmonids.

California Halibut. Juvenile halibut are found in many areas of Alamitos Bay, and they will potentially be present within the marina basins. During pile installation, any juveniles in the immediate area of pile driving activity will swim to areas outside the immediate impacted zone. No mortality is anticipated as a result of construction activities. The level of impact on halibut is expected to be less-than- significant.

Sea Turtles. Construction activities associated with the marina basins would occur in the mid-region of Alamitos Bay where reports from the Marine Department indicate that sightings of green sea turtle occur. In addition, dredge disposal barge activity entering and leaving Alamitos Bay would be transiting the area in which green sea turtle also enter and leave Alamitos Bay. Therefore, there is a potential that green sea turtles may be in the general project area when marina renovations are occurring, phased over a 6-year period.

Although an occasional green sea turtle may be in Alamitos Bay at the time of marina renovations, the potential for adverse impacts to an individual is low. Dredging, dock reconstruction, the construction of the temporary dock near the Long Beach Yacht Club, and vessel movements to-and-from the project area would potentially result in a behavioral modification to sea turtles that would include a change in swimming behavior to avoid excessive noise, turbidity, or the vessel movements. Sea turtles forage in Alamitos Bay outside the marina basins due to the availability of larger, lusher, eelgrass beds y compared to Basins 2, 4, and 6. Therefore, the project is expected to have less-than-significant impacts on sea turtles.

No mortality would be expected to occur as a result of the proposed project. If a sea turtle is present in the project area during marina renovation the Mitigation Measures identified in Section 4 will reduce these potential short-term construction impacts to a less-than-significant level.

Fisheries Management Plan Fishes. Project activities that would affect identified Coastal Pelagic FMP species (northern anchovy) include increased water turbidity caused by the demolition and replacement of docks, bulkheads, and dredging activities proposed for the project. These impacts could result in northern anchovy temporarily avoiding the project areas, and a minimal potential for mortality of larval anchovy. An increase in the suspended sediment load would temporarily increase the exposure of these species to potentially harmful levels of contaminants and clog their gills, resulting in a reduced ability to feed.

FMP pelagic schooling species potentially present within Alamitos Bay (four species) also use utilize large expanses of San Pedro Bay. Of the four species, only the northern anchovy is expected to be in Alamitos Bay, but numbers within individual marina basins of Alamitos Bay are not expected to be a major part of the northern anchovy population. The majority of the anchovy population is expected to occur both in the main channels of Alamitos Bay and outside of Alamitos Bay in San Pedro Bay at depths greater than 12 feet deep. Therefore, potential impacts on coastal pelagic FMP species or their EFH are expected to be less- than- significant.

Of eight identified groundfish FMP species, three species-the leopard shark, California sculpin, and rockfish- have been reported within Alamitos Bay, each with very low occurrences. The potential impact of the project on FMP groundfish species is expected to be less-than- significant.

Groundfish ESH Areas of Particular Concern (eelgrass) will be permanently affected by the project with the loss of 1,367 sq ft of eelgrass habitat. See Section 3.3 for a discussion of this impact.

There will be no construction-related impacts on salmonid or highly-migratory species or EFH.

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.

Vessel traffic coming in and going out of Alamitos Bay (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 occur. Work vessels transiting to and from Alamitos Bay Marina have a low potential to collide with marine mammals or could exposure these resource groups to contaminants and interference with foraging. 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 vessels commonly transit in-and-out of the Alamitos Bay. 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 City 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.

A total of 620 concrete production piles averaging 15 inches in diameter will be driven into the sediments. 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 Alamitos Bay 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. Over time, marine mammals would acclimate to the noise. If pinnipeds or cetaceans were present in Alamitos Bay, they would likely be located nearer to the entrance of Alamitos Bay entrance channel (nearer to Basin 5) than within the other Alamitos Bay Marina basins 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 Alamitos Bay (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 Alamitos Bay Marina 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 15 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 Alamitos Bay Marina 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 City 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 Alamitos Bay Marina 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 5 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 City's marina management program. With the implementation of this BMP, impacts related to contamination would be less than significant. No mitigation would be required.

Noises Production from Dredging. The duration of such noise production for each phase would be an approximately 50 days for each marine dredging phase over a six year period and the work would be conducted in different locations and at different times.

The measured sound exposure levels of a clamshell dredge may range between 75-88 dBA (re 20 /-lPa) at 50 feet. Animals have been observed flushing from haul out sites at a sound exposure level of less than 100dBA, and it is possible that marine mammals may modify their behavior as a result of the noise produced by the pile driving and dredging operations (NMFS, 2009)

Based on Port of Los Angeles responses to comments on the Port of Los Angeles (2009) Channel Deepening Project EIR/EIS, NMFS Comment NMFS 08, page 14-08, April underwater noise from the clamshell dredging would be 150-162 dB (re1 μPa) in LA Harbor, which is below the designated level A harassment threshold of190 dBrms (re 1 μPa) for pinnipeds. This would imply that clamshell and dredging effects for pinnipeds, or any other marine mammals near the Alamitos Bay Marina would be less-than-significant. Hydraulic dredging activity in the Alamitos Bay Marina would result in less sound production than clam shell dredging, and therefore, will not result in significant sound effects on sea lions or other marine mammals.

3.2.5 Invasive Species

Caulerpa taxifolia. No *Caulerpa* is present within the project area which precludes the potential spread of this species during construction and/or the operation of the facilities. However, a *Caulerpa* algae survey will be conducted according to the National Marine Fisheries Service Control Protocol prior to construction. 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/CaulerpaControlProtocol.htm) The City will conform to the 2008 Caulerpa Control Protocol, which requires survey results to be submitted to NOAA and California Department of Fish and Game (CDFG) within 15 days of completion. This protocol also requires that NOAA and CDFG be notified within 24 hours if Caulerpa is identified at a permitted project site.

Undaria pinnatifida. No Undaria has been reported from the Alamitos Bay marina, although it has been reported to be present in nearby Long Beach Harbor. Therefore, it is unlikely to be spread as a consequence of the renovation of the marinas.

Zostera japonica. No dwarf eelgrass has been reported from the area; its presence within the project area is unlikely, because it is found on mudflat habitat. However, if it is found within the project area during construction and/or the operation of the marina or the proposed eelgrass mitigation habitat in the Marine Stadium, then its presence will be reported immediately to the National Marine Fisheries Service and the California Department of Fish and Game and eradication efforts undertaken.

3.3 LONG TERM IMPACTS

3.3.1 Water and Sediment Quality

Marina Operations. Water and sediment quality within the marina basins 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 will result in a long-term significant adverse effects on water quality with subsequent adverse impacts on local marine life. Surface runoff from the marina will be regulated by the NPDES permit for storm water discharges.

To prevent long-term impacts on local water and sediment 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.

3.3.2 Water Column Organisms

The reduction in dock surface area by 2,600 sq ft will also have a beneficial impact on open water areas within the marina basins by reducing the amount of shading and allowing a greater amount of light to reach and penetrate the water's surface. Consequently, there will be a greater surface area of unshaded open water habitat that will increase plankton production within each marina basin. Additionally, the increase in open water habitat will have a beneficial impact on fishes and foraging seabirds. This will result in a beneficial, long-term impact on water column resource groups.

3.3.3 Soft-Bottom Benthic and Hardscape Associated Communities

Benthic Infauna. The number of dock piles for the Alamitos Bay Marina renovation project will decrease from 808 to 620 pile surface area will decrease from 1,260.5 sq ft to 967.2 sq ft. Upon removal of the piles, there will be a net increase of 293.3 sq ft of soft bottom benthic habitat. The result will be a long-term, beneficial impact to soft bottom benthic habitat, benthic infauna, and benthos-associated fishes.

Pile, Dock, Riprap, and Bulkhead Organisms. The reduction in both the amount of pile habitat and dock structure (2,600 sq ft) will result in a loss of hardscape structure for biofouling species of invertebrates, algae, and fishes that forage on biofouling species. However, the loss will not result in population impacts to these resources groups. In addition, no sensitive species are associated with this habitat type. The reduction of pile and dock habitat will not have any long-term impacts on hardscape-associated organisms.

Seawall repairs along 8,250 sq ft of the marina periphery will be limited to existing hardscape habitat of both the seawalls and the protective rip rap that slope down from the seawall to the soft bottom environment. There will no long-term reduction in the type or abundance of marine organisms associated with seawall repair.

This work will not result in any loss of soft bottom habitat.

3.3.4 Sensitive Species

The long-term operation of the marina will not result in the mortality of any endangered species. Additionally, there will be an increase of 2,600 sq ft of open water foraging habitat for the endangered least tern and the California brown pelican.

Eelgrass. A long-term reduction of eelgrass within Basins 2, 4, and 6 is predicted, related to dredging to depths beyond eelgrass depth limits. Areas that will be affected by the proposed project's dredging activities include Basin 2, Basin 4, and Basin 6N (Table 5). Dredging will be conducted to depths of -10 ft (MLLW), removing eelgrass and deepening the basins to depths beyond the normal depth ranges for eelgrass survival. This loss is a long-term, but mitigatable impact on Essential Fish Habitat. Project-related dredging impacts will result in the loss of 1,373.04 sq ft (0.03 acres) of eelgrass vegetation. Mitigation for these losses will be required per requirements of the Southern California Eelgrass Mitigation Policy (National Marine Fisheries Service, 1991 as amended). See Section 4.0 that discusses the project's eelgrass mitigation plan. Upon successful mitigation for these losses, the level of impact will be reduced to a less than- significant impact. See Section 4.0 which describes the eelgrass mitigation plan.

Table 5. Project Habitat Impacts. Losses of Eelgrass Vegetation

Location	Total Area (sq ft)	Eelgrass Vegetation Affected (sq ft)	Mitigation Requirement
Basin 1	0.00	no impact	0.00
Basin 2 Dredge Impacts	1,019.78	1,019.78	1,223.73
Basin 3	0.00	no impact	0.00
Basin 4 Dredge Impacts	123.26	123.26	147.92
Basin 5	0.00	no impact	0.00
Basin 6 South Dredge Impacts	11,943.40	no impact	0.00
Basin 6 North Dredge Impacts	230.00	230.00	276.00
Basin 7	255.97	no impact	0.00
Marina Pacifica Channel	11,543.54	no impact	0.00
Davies Launch Ramp	46,007.60	no impact	0.00
Temporary Docks 2 (LBYC)	0.00	no impact	0.00
Peninsula (55th-61st Place) Mitigation Site	1,977.64	no impact	0.00
Peninsula 2 (63rd-71st Place)	32,682.41	no impact	0.00
Upper Cerritos Channel	21,142.88	no impact	0.00
Eelgrass Area (sq ft)	**126,926.47**	**1,373.04**	**1,647.65**
Eelgrass Area (acres)	**2.91**	**0.03**	**0.04**

Potential Eelgrass Habitat. The Southern California Eelgrass Mitigation Policy (National Marine Fisheries Service 1991 as amended) defines potential eelgrass habitat as "areas where eelgrass would normally be expected to occur but where no vegetation currently exists. Factors to be considered in delineating potential habitat areas include appropriate circulation, light, sediment, slope, salinity, temperature, dissolved oxygen, depth, proximity to eelgrass, history of eelgrass coverage, etc." It should be noted that there is no conclusive scientific basis for why eelgrass grows in some locations and not in others. It can be attributed to a combination of any of the environmental conditions listed above.

Further, in response to recent concerns regarding the interpretation of the SCEMP, correspondence between Rodney R. McInnis, Regional Administrator for the NMFS and Mr. Jack Peveler, President of the California Association of Harbor Masters and Port Captains, (Appendix 2) clarified that the potential eelgrass clause has been implemented only where "clear and convincing evidence is available that a given area is potential eelgrass habitat (e.g. previous eelgrass surveys documenting presence)."

Abiotic features such as water salinity, temperature, and underwater light levels are within normal ranges for eelgrass survival and growth in the Alamitos Bay Marina at depths between 0.0 and -8.5 ft MLLW where eelgrass is known to occur (Coastal Resources Management, Inc. 2009b). While the marina's original design depths were below the depth limits known for eelgrass, shoaling in the marina has subsequently resulted in depths that will support eelgrass, where light levels are sufficient to support eelgrass.

The original and/or design depths of the Marina basins ranged from -12 to -15 ft MLLW. Because the shallower depths within the Marina basins are a result of shoaling over the past 50 years, and because no maintenance dredging has occurred, there are now depths within the basins which are less than 8 ft deep, or "depth suitable" for eelgrass.

Eelgrass vegetation would not be expected to occur in these areas as the site has historically and consistently been used as a marina and the basins had the depths been maintained as close as possible to the original depth (-12 to -15 MLLW). However, over time, shoaling has decreased water depths in 3.39 acres of shaded and unshaded habitat to depths less than 8.0 ft deep (Source: TranSystems, Inc. Alamitos Bay Marina Bathymetric Maps, August 2008) and within the known depth range where eelgrass can survive.

Of the 3.39 acres within the 0 to 8 ft depth range, 2.82 acres are unshaded, but depth-suitable habitat (Table 6). However, there is "clear and convincing evidence" that eelgrass has only been found in seven of the of 38 marina fairway channels (Figures 7-9, and the total amount of depth-suitable habitat within these seven marina fairway channels is 1.47 acres (Table 6). While 1.47 acres of soft bottom habitat within these areas can be classified as "depth-suitable" eelgrass habitat within the seven fairways, CRM's remote video survey in October 2008 indicated that each of the areas mapped in 2007 was still

vegetated with eelgrass, but that there was no observable increase in areal cover, and eelgrass had not colonized in any other areas in the Marina.

Therefore, based on these two (and only available) surveys indicating that eelgrass has not increased in cover or colonized in any other areas, and because eelgrass would not historically been expected to occur in the Marina due to the depths required to maintain navigation, no potential eelgrass habitat is considered to be present within the areas impacted by proposed dredging. Therefore, impacts to potential eelgrass habitat are considered less than significant and no mitigation is required.

Table 6. Determination of Eelgrass Habitat Vegetation Losses

Location	TranSystems Initial Amount Calculated: (sq ft)	Depth-Suitable Unshaded Eelgrass Habitat-All Marina Basins (sq ft)	Depth Suitable, Unshaded Base Minus Fairways or Basins Without Eelgrass (sq ft)	Existing Eelgrass (sq ft)	Impacted Amount of Eelgrass (sq ft)	Amount of Potential Eelgrass Habitat (sq ft)	Mitigation Requirement: Eelgrass Vegetation: 1.2 to 1
Basin 1	0.0	0.0	0.0	0.0	0.0	0.0	none
Basin 2	71,976.0	70,956.2	61,181.0	1,019.78	1,019.78	0.0	1,223.73
Basin 3	27,274.0	27,274.0		0.0	0.0	0.0	none
Basin 4	19,334.0	19,210.4	2,083.0	123.26	123.26	0.0	147.91
Basin 5	2,233.0	2,233.0		0.0	0.0	0.0	none
Basin 6 South	24,913.0	1,456.0		23,457.0	0.0	0.0	none
Basin 6 North	742.0	512.0	742.0	230.0	230.0	0.0	276
Basin 7	1,400.0	1,400.0		0.0	0.0	0.0	none
						0.0	
Total (ft)	147,872.0	123,041.6	64,006.0	24,830.4	1,373.04	0.0	1,647.65
Total (Acres)	3.39	2.82	1.47	0.57	0.03	0..0	0.04

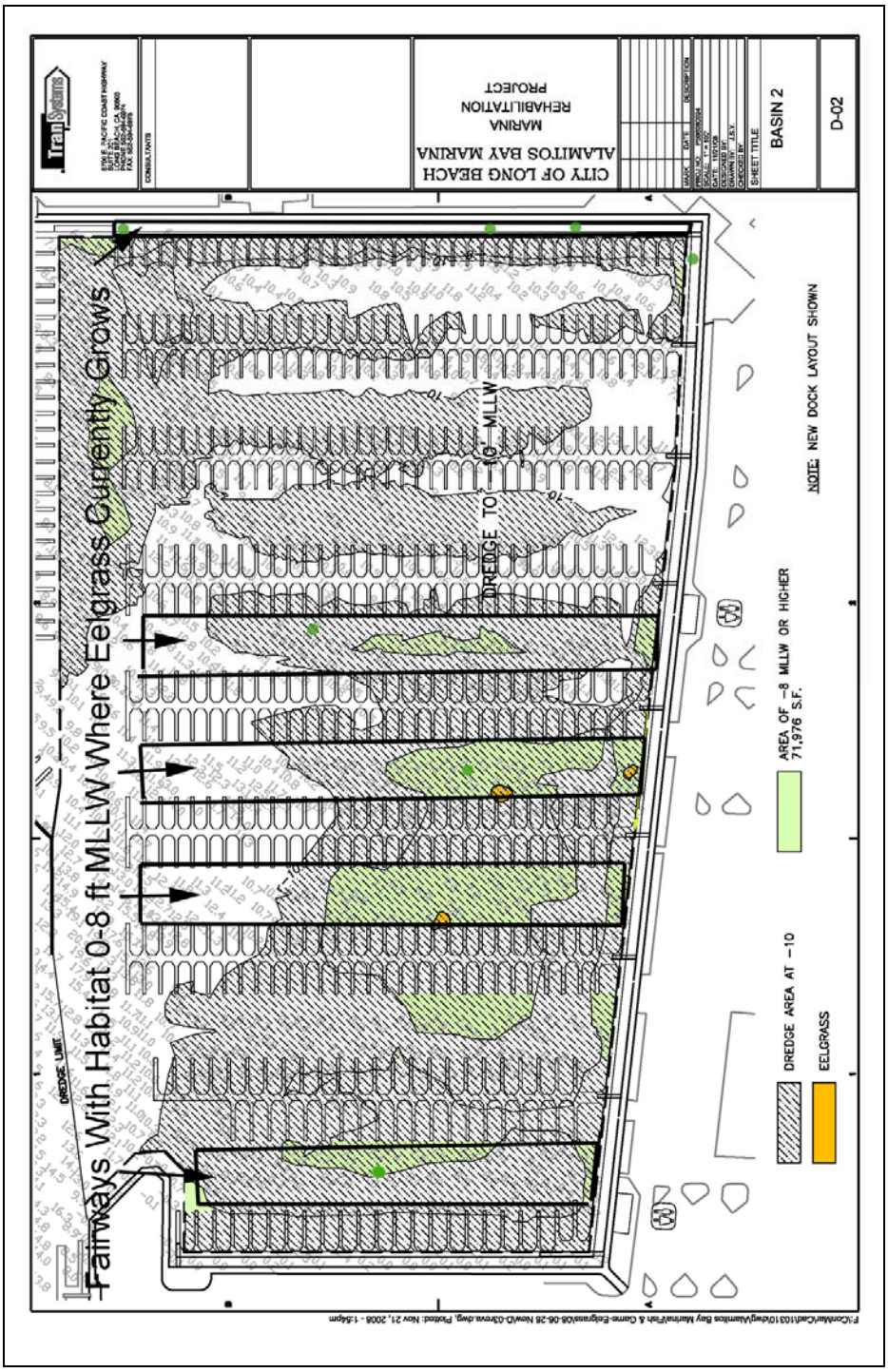


Figure 7. Depth-Suitable Eelgrass Habitat in Basin 2. Note: Area of -8 ft MLLW include both shaded and unshaded habitat. Table 4 includes only the habitat that is unshaded and potentially capable of supporting eelgrass

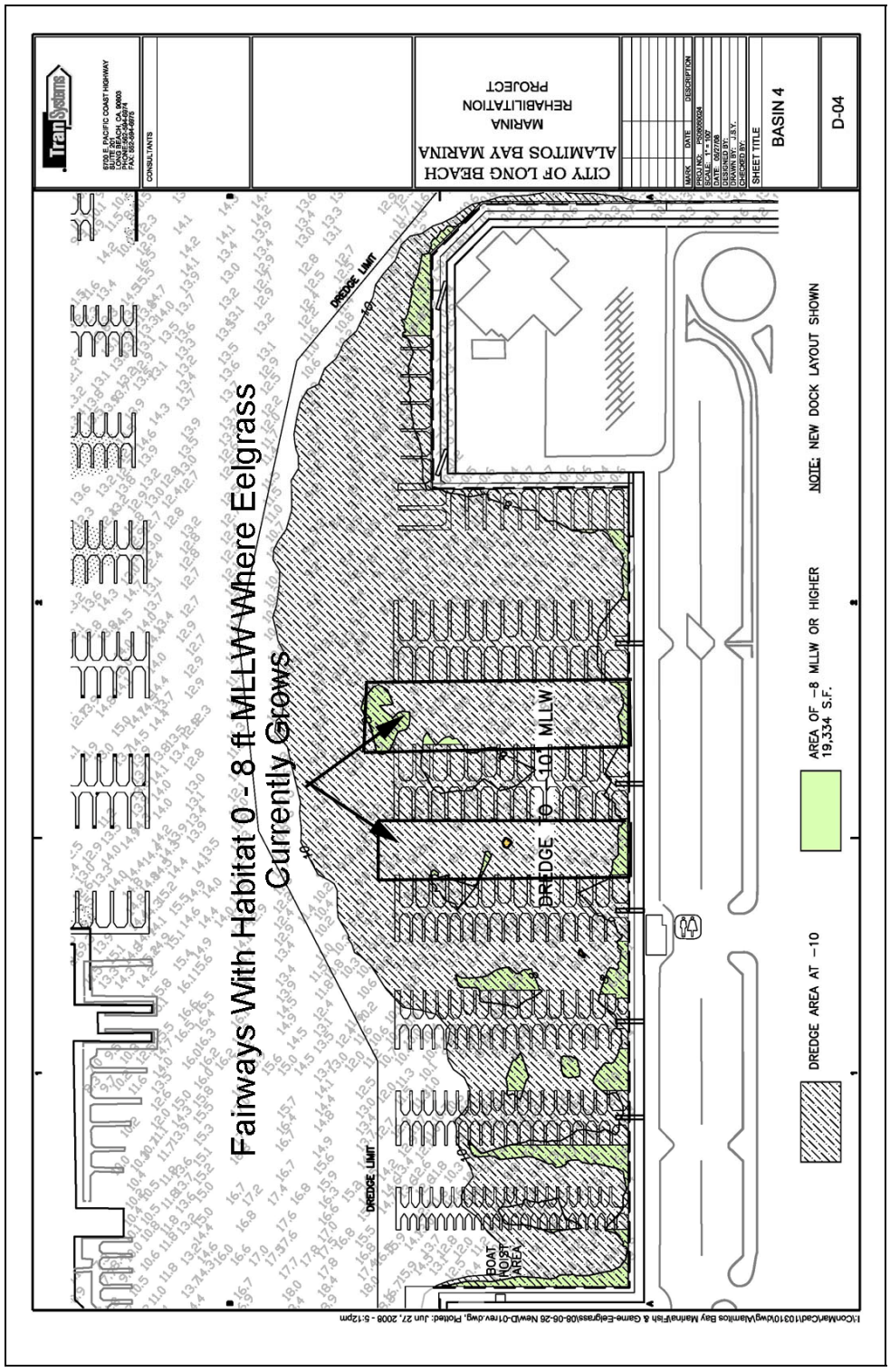


Figure 8. Depth-Suitable Eelgrass Habitat in Basin 4. Note: Area of -8 ft MLLW include both shaded and unshaded habitat. Table 4 includes only the habitat that is unshaded and potentially capable of supporting eelgrass

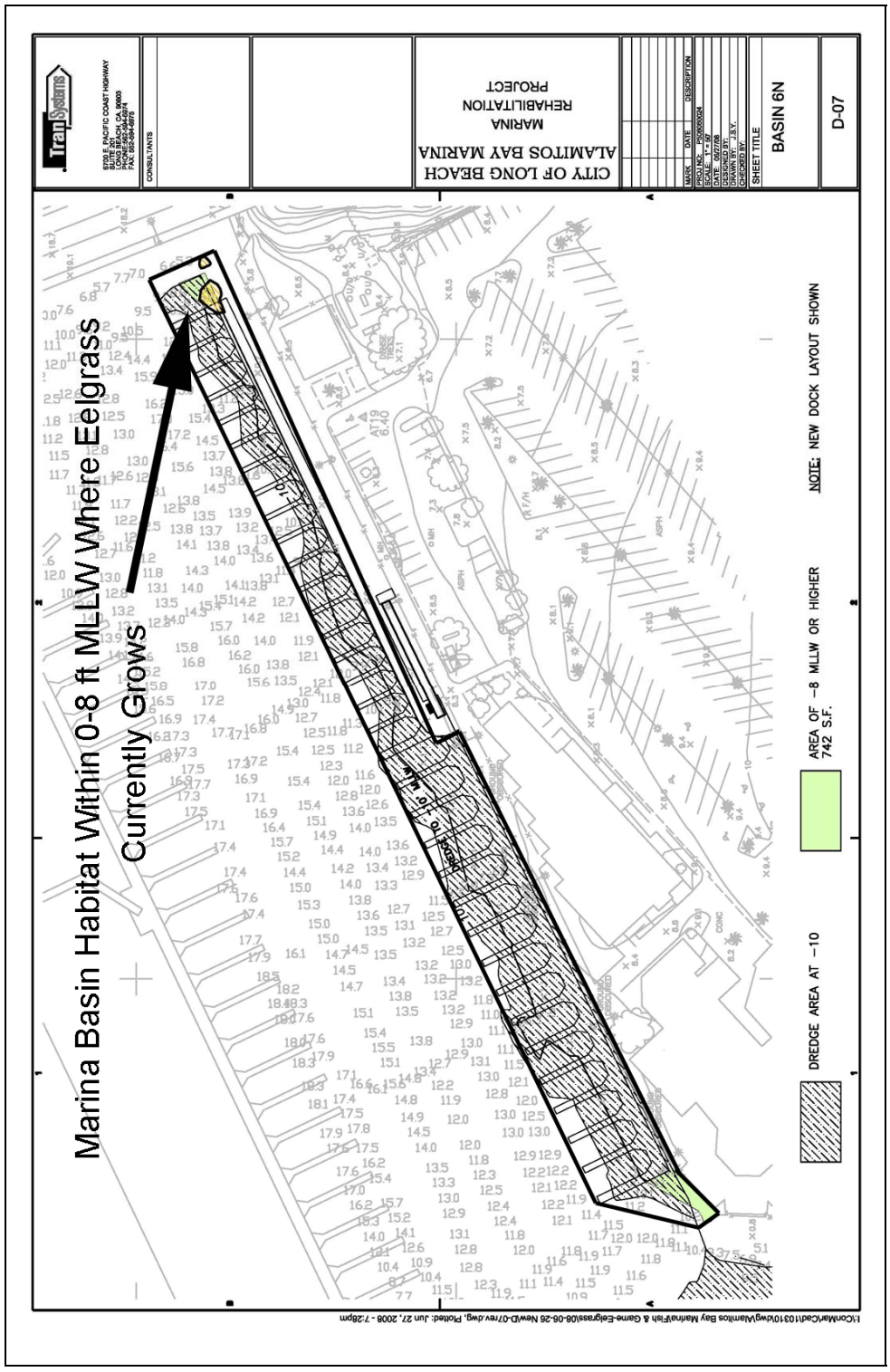


Figure 9. Depth-Suitable Eelgrass Habitat in Basin 6. Note: Area of -8 ft MLLW include both shaded and unshaded habitat. Table 4 includes only the habitat that is unshaded and potentially capable of supporting eelgrass

Tidewater Goby. Tidewater gobies are not known to occur within Alamitos Bay Marina; no long-term operational impacts on this species or its habitat are anticipated to occur.

Steelhead Trout. There are no known populations of this species in Alamitos Bay, Therefore, there will be no long-term operational impacts on Steelhead Trout.

California Halibut. As a consequence of the reduction in the size of the marina docks by 2,600 sq ft, there will be an increase in the unobstructed subtidal habitat within the marina basins. In addition, there will be an increase of soft bottom habitat in the marina related to the removal of piles. These predicted changes in the amount of open water and benthic soft bottom will improve the quality of halibut nursery habitat within the marina basins. This will have a potentially beneficial impact on California halibut nursery habitat.

Sea Turtles. No operational impacts to green sea turtles are anticipated as a result of normal marina operations.

Marine Mammals. No long-term impacts to marine mammals will occur as a consequence of the operation of the renovated Alamitos Bay Marina .

Fisheries Management Plan Fishes. The proposed marina renovation project will have no long-term adverse impacts on Coastal Pelagic, Highly Migratory Species, or Salmonid EFH or species within these fishery management plans. Groundfish EFH will be adversely affected by the loss of eelgrass habitat (HAPC). This is a significant-but-mitigatable long-term impact with the successful establishment of eelgrass vegetation through a mitigation program identified in Section 4.

3.3.5 Invasive Species

Caulerpa is not currently present within Alamitos Bay. In the event that it colonizes the marina during its operation, an eradication program would be implemented immediately under the supervision of the Regional Water Quality Control Board, National Marine Fisheries Service, and the California Department of Fish and Game according to the *Caulerpa* Eradication Protocol (National Marine Fisheries Service, 2008). Informational and educational pamphlets alerting boaters and visitors of this potentially destructive species should be included in the Marina Management Plan.

Undaria pinnatifida does not currently exist in Alamitos Bay. There are no accepted procedures for the eradication of this species at the current time. In the event this species is found during pre-and-post construction surveys, the California Department of Fish and Game and the National Marine Fisheries Service will be consulted to determine if, and how to deal with any infestation.

Zostera japonica will not be impacted by this project. There are no accepted procedures for eradication of this species at the current time. In the event this species is found during pre-and-post construction surveys, the California Department of Fish and Game and the

National Marine Fisheries Service will be consulted to determine if, and how to deal with any infestation.

4.0 MITIGATION MEASURES

4.1 WATER QUALITY

Impacts to water quality associated with the Alamitos Bay Renovation Project are considered temporary, less-than-adverse, and would be minimized through (1) the implementation of construction Best Management Practices (BMP) to minimize turbidity plumes and possible contaminants released into the water column during construction activity and dredging. Turbidity will be minimized by using silt curtains where feasible. All floatable debris generated by the construction activity will be contained and trash and debris will be disposed of properly. All construction debris will be removed from the seafloor.

With the implementation of water quality BMPs to reduce the spread of any turbidity plume, there should be no significant impacts to marine resources, including benthic communities, eelgrass, and fish communities outside of the localized construction zone.

4.2 MARINE RESOURCES (General)

Project mitigation measures to reduce potential adverse impacts to marine resources, sensitive species, and rare, and endangered species are provided below.

- 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.

- 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.

- Floating booms shall be used to contain debris discharged and any debris discharged shall be removed no later than the end of each day.

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

- 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 Alamitos Bay. The City of Long Beach shall have adequate equipment available to contain such spills immediately.

4.3 EELGRASS PROTECTION PLAN FOR CONSTRUCTION IMPACTS

The following mitigation measures will be implemented during prior to and during construction to avoid and reduce additional adverse impacts to eelgrass.

- The project marine biologist shall provide the project engineer with the coordinates of eelgrass beds within each project construction zone (California Zone V, NAD 83, feet). prior to the initiation of any dredging to avoid unnecessary damage to eelgrass beds outside the construction zones;

- The project marine biologist shall meet with the dredging crew project manager prior to dredging to review areas of eelgrass to avoid. Eelgrass areas shall be marked prior to construction to assist the construction crew in avoiding unnecessary damage to eelgrass.

- Barges and work vessels shall avoid impacts to eelgrass beds in Basin 2 and 4 and other vegetated areas by anchoring or placing anchor chains outside of eelgrass beds and by preventing damage from vessel propellers.

4.4 MITIGATION FOR EELGRASS HABITAT LOSSES

4.4.1 Eelgrass Mitigation Requirements

- Eelgrass vegetation losses shall be mitigated at a 1.2 to 1 ratio (mitigation to impact ratio) such that the loss of 1,373.04 sq ft of eelgrass will be mitigated with the successful transplant of 1,647.65 sq ft of eelgrass vegetation, according to the *Southern California Eelgrass Mitigation Policy* (National Marine Fisheries Service, 1991 as amended).

4.4.2. Mitigation Site Siting Alternatives

Agencies require that mitigation be conducted "in kind" (i.e., mitigation of eelgrass), and "on site" (i.e., within the same system- Alamitos Bay). If this cannot be achieved, than offsite mitigation areas can be evaluated. However, off-site mitigation is extremely difficult to achieve because agencies prefer that mitigation is conducted in the system that was affected by the project impacts. The following sites were evaluated between November 2007 and July 2008 as possible eelgrass mitigation sites. The preferred project alternative is **#6 (Marine Stadium, Northeast Corner Tidal Basin).**

1. **Alamitos Bay Peninsula Between Balboa and 56th Place-Rejected Site**
    - Eelgrass grows in small patches along this section of bay shoreline, but there are open areas of bare sediments that potentially could serve as a mitigation site.

- Water quality is not limiting; good tidal current flushing. Water quality (temperature, salinity, pH, underwater light-levels) and depth are not limiting to eelgrass growth.
- However, beach and subtidal profiles indicate a steep slope and a narrow intertidal to shallow subtidal bench to depths of -5 feet Mean Lower Low Water (MLLW) is likely limiting eelgrass distribution. It is extremely abundant between 64th Place and 71st Place where the beach and subtidal profiles indicate a wide, gradual slope into the eelgrass zone.
- Public use (swimming, and sports fishing activity along shoreline and fishing from kayak/inter tube fishermen may also be limiting to eelgrass growth along this side of beach (according to the California Department of Fish and Game).
- California Department of Fish and Game does not approve of this site as an eelgrass mitigation site because of high public use.

2. Cerritos Channel (north of Pacific Coast Highway)-Rejected Site

- Eelgrass is abundant along the south bank east of PCH Bridge, leading to the Cerritos Wetlands. No opportunity to transplant along this bank.
- Potential, long-term opportunity to include eelgrass mitigation for future restoration of the Cerritos Wetlands, but these plans are not far enough along, nor is funding currently available for implementing any eelgrass mitigation for the resource agencies and regulatory agencies to approve this site as a mitigation area.

3. Basin 6-Cerritos Channel (south of Pacific Coast Highway-Rejected Site

- Initial eelgrass mitigation site evaluation was feasible from a biological standpoint. Preliminary designs for the mitigation site were prepared by Coastal Resources Management, Inc. However, the site was rejected by the Marine Bureau due to a substantial reduction in the number of boat slips and future income for the marina.

4. Long Beach Shoreline between Junipero Ave to 1st Street (Downtown Marina)-Rejected Site

- This site was investigated because eelgrass is known to occur immediately offshore of the surf zone along this stretch of protected beach. The specific site investigated was the shallow water shoal that has been formed at the junction of the Downtown Marina and the shoreline, and the shallow waters immediately outside the surf zone. Sediments tend to consist of silty sand, and water depths are between -2 and -8 ft MLLW. It actively competes with the red algae *Gracilariopsis* for light and space throughout this stretch of nearshore shallow water habitat.
- However, based on CRM diver surveys of the site in May 2008, eelgrass has colonized this shoal and grows extensively throughout the area which precludes this as a mitigation site.

5. Rainbow Marina, Along the South Jetty/Breakwall)-<u>Rejected Site</u>

- Dive surveys were conducted by CRM in May 2008 at depths between 0.0 and -15 ft MLLW. The area investigated was a narrow sandy beach/quarry rock shoreline. The quarry rock shoreline extends subtidally to a depth of -15 ft Mean Lower Low Water in front of the Long Beach Aquarium dock facilities and other commercial vessels in the marina. In order for this area to be used as an eelgrass mitigation site, the waterway would have to be narrowed and filled in with appropriate sandy sediments to depths of -2 to -5 ft MLLW between the end of the docks at the western end of the site, east to the entrance to the marina. Biologically, the subtidal rip rap is highly productive, and it would be unlikely from an agency standpoint that the loss of the subtidal, "artificial structure" and associated marine life would be approved by the resource and regulatory agencies. From a navigable waterway standpoint the narrowing of the channel could be a navigational hazard.

6. Marine Stadium, Northeast Corner Tidal Basin-<u>High Potential For Eelgrass Mitigation</u>

- The Marine Stadium supports one of the most productive eelgrass beds in Alamitos Bay based on detailed eelgrass mapping of the Bay (Coastal Resources Management, 2005).
- Modification of the Marine Stadium boundary to include an "eelgrass mitigation basin" at the northeast end near End Beach has a high potential for eelgrass mitigation success if site conditions mimic those of the Marine Stadium (tidal influence and circulation, sediment types, water depth, temperature, salinity, and pH).
- This can be accomplished by constructing a tidal basin at the site which is currently a parking lot and City boat storage area. Direct connection to the Marine Stadium is required to achieve the water quality objectives needed to support eelgrass.
- A tidal hydraulic analysis was conducted to provide water circulation information needed to evaluate existing hydrodynamic conditions, project-related differences in hydrodynamic conditions, and sedimentation rate differences within the mitigation site. (Everest International Consultants, Inc. 2009). The results of the study indicated that conditions within the proposed tidal basin would be similar to conditions within the Marine Stadium. Therefore, water quality objectives based upon tidal hydraulics can be met with the open tidal basin alternative. Secondly, the results of sediment borings and sediment chemistry analyses (Terra Costa Consulting Group 2009; Positive Lab Service, 2009) indicate alluvial deposits at depths of -2 to -3 ft MLLW (depths to which mitigation area sediments will be exposed) consist of clays, silts, and sands, and they are not toxic according to EPA standards for pesticides, PCBS, and metals. This will promote eelgrass transplant success. Tidal flushing rates and current velocities within the proposed site will be similar to those found

within the Marine Stadium. Therefore, this is the preferred alternative for the project.

7. **Marine Stadium, Northeast Corner-Muted Tidal Basin-<u>Low Potential for Eelgrass Mitigation Site Success. Rejected</u>**
    - This alternative assumes that the shoreline quarry rock rip rap must remain in place to comply with the historic design of the Marine Stadium. It should be noted however, that the historic design of the Marine Stadium has been modified for at least one City mitigation project. The End Beach Mitigation Project (construction of a sandy beach and extension of the shoreline to create the Marine Reserve) was implemented in 1995-1996 by the City Public Works Department to mitigate for the loss of sandy beach habitat associated with the construction of the Alamitos Bay Sailing Center on the Alamitos Bay Peninsula.
    - The muted-tidal basin alternative would require that a tidal basin be constructed behind the existing shoreline, and one-or-more tidal culverts be installed along the length of the tidal basin to allow for tidal exchange. This would in itself, modify the existing historic shoreline because the entire shoreline would have to be first removed, and then put back in once the tidal culverts are installed.
    - This process would likely result in the loss of a significant amount of eelgrass at the base of rip rap during construction due to the footprint of the tidal culverts, which would increase the need for mitigation.

    - Long tidal residence times and poor water quality for eelgrass growth within the muted tidal basin are likely to be limiting factors for a successful eelgrass mitigation project.

    - This alternative would not achieve eelgrass mitigation goals due to (1) long tidal residence periods that would elevate water temperatures and decrease dissolved oxygen levels (2) an accretion of fine sediments within the muted tidal basin that would remain in suspension, and (3) lower underwater light levels that would inhibit eelgrass growth.
    - Computer modeling of this is currently being conducted to determine how many culverts would be required and if this alternative is actually feasible from an engineering standpoint. Based upon the issues associated with biofouling of the Colorado Lagoon tidal culvert, it is likely that long-term maintenance of the tidal culverts would be required.
    - The costs associated with this alternative are considerably greater than the preferred alternative, due to the requirement that the shoreline be restored to its initial line, and the need for long-term and constant maintenance of tidal culverts.

8. **Off Site Mitigation-Huntington Beach Wetlands Restoration Project, Huntington Beach, California. –Rejected**
    - The Huntington Beach Wetlands Conservancy, with local and state funding has renovated wetland habitat along Pacific Coast Highway for fishery habitat, and is planning to do additional work set aside for specific wetland mitigation projects. The Conservancy has indicated willingness to accommodate the City's need for eelgrass habitat mitigation through the direct compensation of the costs required to create subtidal channel habitat to depths of -4 ft MLLW. The City however, has rejected this due to the off-site nature of the project, and believes the mitigation should be accomplished within the city's sphere of influence and not in Orange County.

The presence of large eelgrass beds in the Cerritos Channel east of the PCH Bridge, between 63rd and 71st Places along the Alamitos Bay Peninsula, and along the shoreline between Junipero Avenue and the Downtown Marina preclude these sites as project area mitigation sites. The presence of small, scattered eelgrass beds between Balboa Place to 61st Place along the Peninsula indicate that these areas, while they support limited amounts of eelgrass, are also not candidate sites for eelgrass transplants because the intertidal to shallow subtidal bottom slopes are steep and cannot support extensive amounts of eelgrass between their depth limits. In addition, public use of this part of the shoreline is high and recreational fishing in the area may be contributing to reduced eelgrass abundance (California Department of Fish and Game, pers. com, May 2008) which reduces their functional value as fishery habitat.

4.4.3 Transplant Elements

Permission to transplant within tideland areas. Permission will be required to transplant within tidelands that are under the City of Long jurisdiction. The appropriate agency will be contacted and permission to transplant obtained once the transplant site is selected. Contacts to obtain permission include Mr. Mark Sandoval, City of Long Beach Marine Bureau.

Permission to collect eelgrass donor material. State of California Scientific Collecting Permits will be required for staff involved with the actual collecting of donor material for the transplant. In addition, special permission will be required from the California Department of Fish and Game to collect eelgrass donor material. The CDF&G contact is Bill Paznokas (wpaznokas@dfg.gov.ca)

Responsible Parties. The Applicant, The City of Long Beach will be the responsible party for this project. The California Department of Fish and Game, National Marine Fisheries Service, the California Coastal Commission, and the U.S Army Corps of Engineers will be responsible for reviewing the project's monitoring program results and for determining if the project meets or does not meet criteria as a successful eelgrass mitigation project.

Selection and Construction of a Transplant (Receiver) Mitigation Area. Based upon site surveys of where eelgrass occurs and does not occur in Alamitos Bay and on historical eelgrass survey information for Alamitos Bay, the preferred eelgrass mitigation site is the northeast corner of the Marine Stadium (Figure 10). The site, currently a parking lot and boat storage area will be demolished. Proposed site plans are provided in Figure 11 and include (1) a rock revetment along three sides of the site (2) removal of all surficial material to expose pre-site fill sediments to a depth of -2 to -3 ft MLLW, an approximate 70 wide by 218 ft-long area for eelgrass transplants, and a wave attenuator to reduce the effects of wind waves within the transplant site. The approximately 10,500 sq will be used as an eelgrass mitigation site for the City of Long Beach that will include the transplant of 1,647.65 sq ft of vegetation for the Alamitos Bay Marina Project.

Eelgrass Transplant. The following program will be implemented to mitigate the loss of eelgrass associated with the Alamitos Bay Marina Renovation Project following the construction of the Marine Stadium eelgrass mitigation area (MSEMA). The eelgrass transplant will involve several steps; collecting stock material from the donor site(s), preparing the material for transplanting, replanting the eelgrass in the mitigation area receiver site, following up the transplant with monitoring surveys, and evaluating the success of the transplant.

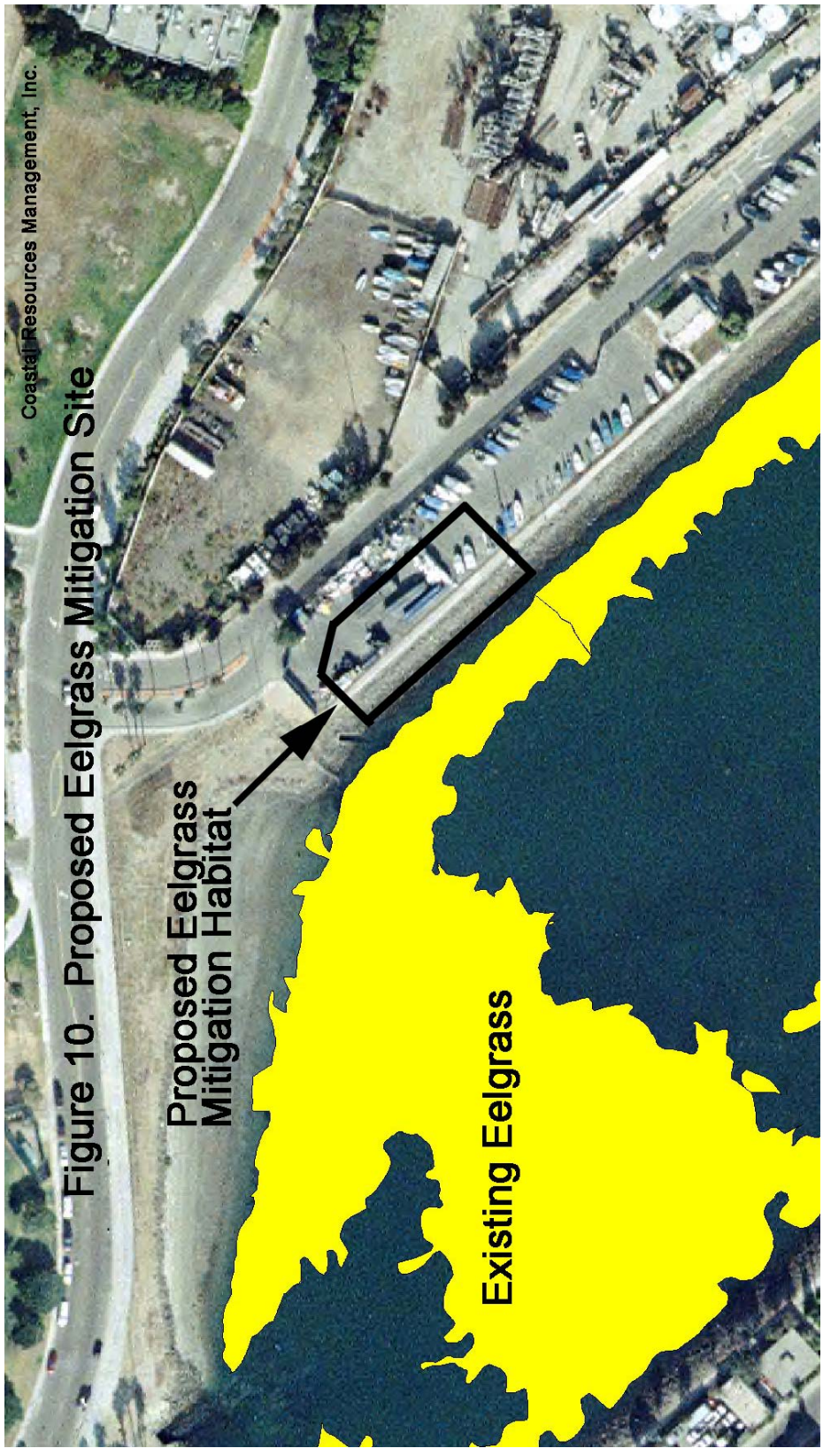


Figure 10. Proposed Eelgrass Mitigation Site

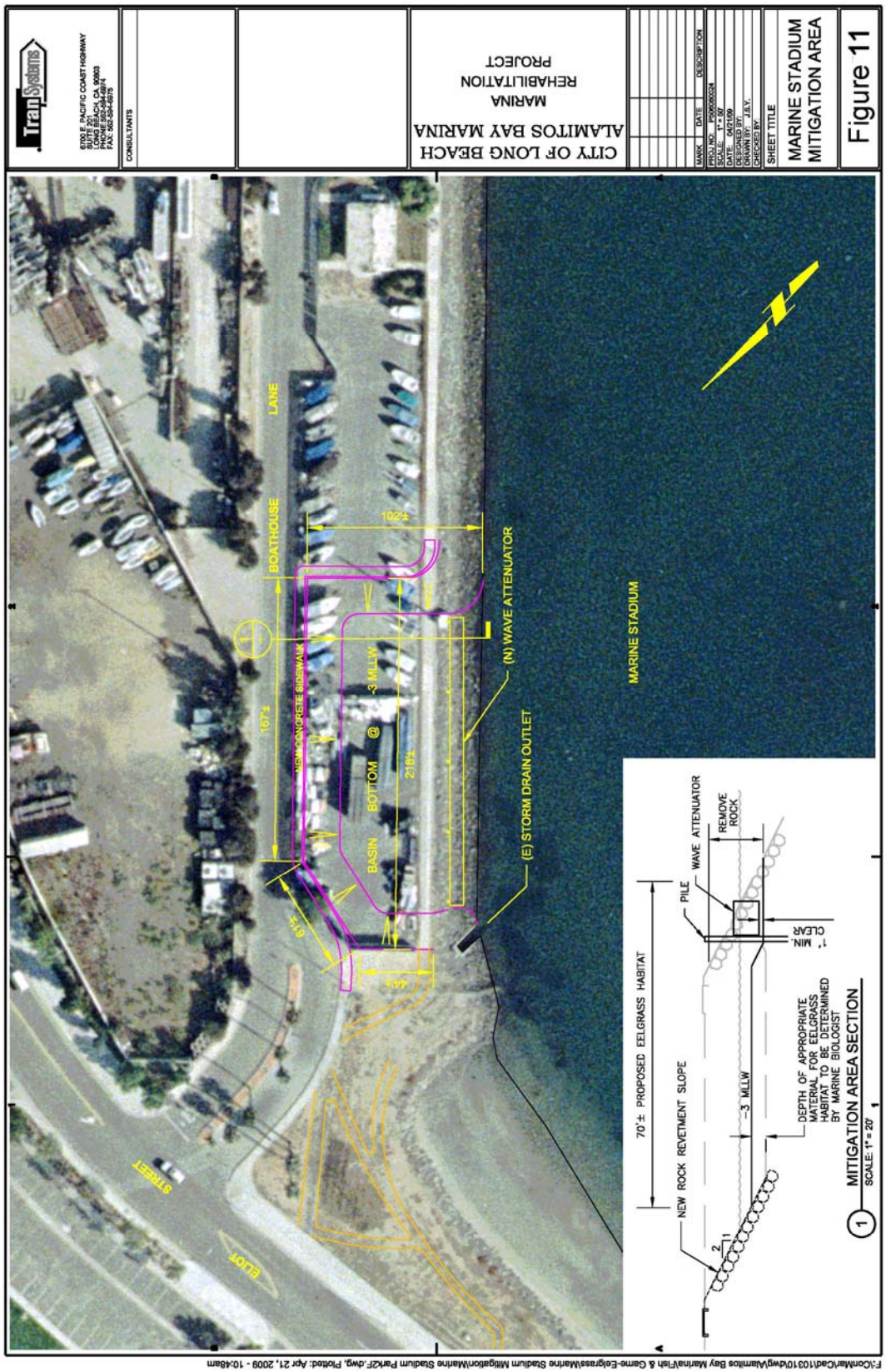


Figure 11
MARINE STADIUM MITIGATION AREA
CITY OF LONG BEACH
ALAMITOS BAY MARINA
MARINA REHABILITATION PROJECT
MARINE STADIUM
(N) WAVE ATTENUATOR
(E) STORM DRAIN OUTLET
BOATHOUSE
LANE
BASIN BOTTOM @ -3 MLLW
NEW ROCK REVETMENT SLOPE
70'± PROPOSED EELGRASS HABITAT
PILE
WAVE ATTENUATOR
REMOVE ROCK
1' MIN. CLEAR
-3 MLLW
DEPTH OF APPROPRIATE MATERIAL FOR EELGRASS HABITAT TO BE DETERMINED BY MARINE BIOLOGIST
MITIGATION AREA SECTION
SCALE: 1" = 20'

Collection and Preparation of Donor Eelgrass Material. Material will be harvested by diver-biologists from the shallow subtidal at a minimum of three sites in Alamitos Bay to increase genetic diversity in the transplanted material and to minimize disturbances within donor beds. Proposed donor sites include (1) Cerritos Channel eelgrass beds, Marine Stadium eelgrass Beds, and eelgrass in the vicinity of the Davies Launch Ramp north of the Davies Bridge. The preferred transplant method is the bundle method (Fonseca et al. 1982) in which eelgrass is collected by divers from the donor site, transferred to shore, separated into planting units, and replanted by divers along a pre-determined grid. The donor material from each area will be mixed together and then integrated into planting units consisting of about 10 shoots and associated substrate and root mass. Shoots will be bundled and tied together with biodegradable line and a sediment anchoring device.

The bundles will be transferred to the divers who will then replant the eelgrass bundles in spacing units of 1 unit per 1 sq meter. The preliminary number of eelgrass bundles and eelgrass shoots required for the transplant is calculated in Table 7.

Table 7. Estimated Amount of Eelgrass Vegetation Required for the Alamitos Bay Marina Renovation Project

MINIMUM TOTAL NUMBER OF PLANTING UNITS (P.U.)

Total eelgrass surface area/(P.U. Density)^2

$\frac{153\ m^2}{1\ m^{(2)}}$ (1,647.65 sq ft)

= 153 P.U.

Estimated Additional Material Required (20%)

=30 P.U.

Total Planting Units

= **183**

TOTAL NUMBER OF SHOOTS

Total number of P.U. x 12 shoots/P.U.

12 shoots/P.U. x 183 P.U.

= 2,196 shoots

Transplant timing. The transplants will occur during the early active growing period for eelgrass (March-June). It is anticipated that the transplants will be conducted over a three-day period. Mitigation will be conducted for losses associated with all marina renovations at the same time, regardless of marina renovation phase.

4.5 FIELD MONITORING

4.5.1 Pre-Construction Survey

An updated pre-construction eelgrass habitat mapping survey for this project will be completed within 120 days of the each of the proposed start dates of each project phase in accordance with the Southern California Eelgrass Mitigation Policy (NMFS 1991 as amended) to amend, if required, the amount of eelgrass that will likely be affected by dredging activity. The results of this survey will be integrated into a Final Eelgrass Mitigation Plan and used to calculate the amount of eelgrass to be mitigated.

4.5.2 Post-Construction Survey

A post-dredging project eelgrass survey will be completed within 30 days of the completion of dredging within each project phase in accordance with the Southern California Eelgrass Mitigation Policy (NMFS 1991 as amended). Each report will be presented to the resource agencies and the Executive Director of the California Coastal Commission within 30 days after the completion of each of the surveys. If any eelgrass has been impacted in excess of that determined in the pre-dredge survey, then any additional impacted eelgrass will be mitigated at a ratio of 1.2:1 (mitigation to impact).

4.5.3 Transplant Monitoring Surveys

A series of seven monitoring surveys will be required to evaluate transplant success over a period of five years. Furthermore, if the initial transplant fails to conform with required performance standards, a supplemental transplant area and monitoring program in conformance with the *Southern California Eelgrass Mitigation Policy* will be required.

Post-transplant monitoring surveys will be conducted during the active vegetative growth periods of eelgrass (March through October) at intervals of 3 months, 6 months, 1 year, 2 years, 3 years, 4 years, and 5 years after the transplant to determine the health of the transplanted vegetation and to evaluate transplant success based on established criteria (NMFS 1991 as amended). Eelgrass areal cover, percent cover and shoot density of eelgrass will be determined during each monitoring survey. Undisturbed areas of the eelgrass meadows in the vicinity of the transplant site will be used a control area when assessing the results of the transplant. If yearly criteria are not met, then a replant will be conducted. The amount to be replanted is based upon a formula that takes into account area and/or density deficiencies (NMFS 1991 as amended).

4.6 REPORTING

Transplant survey monitoring reports will be submitted to the resource agencies and the Executive Director of the California Coastal Commission in report format within 30 days of the pre-and post-project monitoring surveys, and seven post-transplant monitoring surveys. The reports will present eelgrass area and density data, an assessment of the functional quality of the area, a qualitative assessment of invertebrate and fish use of the area,

determination if mitigation success criteria have been met, and recommended remedial measures if the transplant is not meeting mitigation success criteria. Reporting summaries will also be included per NMFS 1991 Eelgrass Mitigation Policy Guidelines (NMFS 1991, as amended, see Appendix 2).

4.6.1 Mitigation Success Criteria (NMFS 1991 as amended, Revision 11)

Criteria for determination of transplant success shall be based upon a comparison of vegetation coverage (area) and density (turions per square meter) between the project adjusted impact area (i.e., original impact area multiplied by 1.2, or the amount of eelgrass habitat to be successfully mitigated at the end of five years) and mitigation site(s). Extent of vegetated cover is defined as that area where eelgrass is present and where gaps in coverage are less than one meter between individual turion clusters. Density of shoots is defined by the number of turions per area present in representative samples within the original impact area, control or transplant bed.

Specific criteria are as follows:

a. the mitigation site shall achieve a minimum of 70 percent area of eelgrass and 30 percent density as compared to the adjusted project impact area after the first year.

b. the mitigation site shall achieve a minimum of 85 percent area of eelgrass and 70 percent density as compared to the adjusted project impact area after the second year.

c. the mitigation site shall achieve a sustained 100 percent area of eelgrass bed and at least 85 percent density as compared to the adjusted project impact area for the third, fourth and fifth years.

Should the required eelgrass transplant fail to meet any of the established criteria, then a Supplementary Transplant Area (STA) shall be constructed, if necessary, and planted. The size of this STA shall be determined by the following formula:

$$STA = MTA \times (|A_t + D_t| - |A_c + D_c|)$$

MTA = mitigation transplant area.
A_t = transplant deficiency or excess in area of coverage criterion (%).
D_t = transplant deficiency in density criterion (%).
A_c = natural decline in area of control (%).
D_c = natural decline in density of control (%).

The STA formula shall be applied to actions that result in the degradation of habitat (i.e., either loss of areal extent or reduction in density).

Five conditions apply:

1) For years 2-5, an excess of only up to 30% in area of coverage over the stated criterion with a density of at least 60% as compared to the project area may be used to offset any deficiencies in the density criterion.
2) Only excesses in area criterion equal to or less than the deficiencies in density shall be entered into the STA formula.
3) Densities which exceed any of the stated criteria shall not be used to offset any deficiencies in area of coverage.
4) Any required STA must be initiated within 120 days following the monitoring event that identifies a deficiency in meeting the success criteria. Any delays beyond 120 days in the implementation of the STA shall be subject to the penalties as described in Section 8 of the Southern California Eelgrass Mitigation Policy.
5) Annual monitoring will be required of the STA for five years following the implementation and all performance standards apply to the STA.

4.7 REMEDIATION AND CONTINGENCY PLANS FOR UNSUCCESSFUL EELGRASS MITIGATION

If the initial transplant is unsuccessful, then one additional replanting at the primary on-site mitigation area will occur. The amount to be transplanted will be based upon the guidelines in the *Southern California Eelgrass Mitigation Policy* (NMFS 1991 as amended). If remedial transplants at the project site are unsuccessful, then eelgrass mitigation should be pursued at the secondary eelgrass transplant location on the Alamitos Bay Peninsula.

4.8 MITIGATION MEASURES TO LESSEN IMPACTS TO SEA TURTLES

The following nine mitigation measures would specifically reduce impacts to sea turtles to a less than significant level:

- Direct permanent and temporary impacts to marine sea grasses, which are a primary food source for sea turtles shall be mitigated at a ratio of 1.2:1, in accordance with the Southern California Eelgrass Mitigation Policy. A total of 1,373 sq ft of eelgrass will be replanted by the City of Long Beach within Alamitos Bay in a location determined by a qualified biologist. The proposed mitigation area is located between 56th and 61st Places, along the Alamitos Bay Peninsula. Monitoring the success of eelgrass mitigation shall be required for a period of five years in accordance with the Southern California Eelgrass Mitigation Policy.

- 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.

- The project marine biologist shall meet with the construction crews prior to dredging to review areas of eelgrass to avoid and to review proper construction techniques.

- 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 sea floor. Such measures shall include speed restrictions, establishment of off-limit areas, and use of shallow draft vessels.

- 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.

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

- A qualified biologist shall be on site during the construction period to monitor the presence of sensitive and endangered species, to ensure that all water quality Best Management Practices (BMPs) are implemented, and to assist the project engineers in avoiding and minimizing environmental effects to marine resources. The onsite biological monitor shall have the authority to halt construction operations and shall determine when construction operations can proceed.

To further reduce any potential impacts to green sea turtles, the City of Long Beach shall implement the following additional measures as part of the US Army Corps of Engineers permitting process under Section 404 of the Clean Water Act. These measures are above and beyond those required under the California Environmental Quality Act to mitigate biological resource impacts to a less than significant level:

- A qualified marine biologist shall be on site during the construction period to monitor the presence of endangered species. The onsite 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 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.

- 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(s) is safely outside the outer perimeter of construction. The onsite biological monitor shall have the authority to halt construction operation and shall determine when construction operations can proceed.

- 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 aware of the potential for additional sightings. The report shall be provided within 24 hrs to the California Department of Fish and Game and the National Marine Fisheries Service.

4.9 MITIGATION MEASURES TO LESSEN IMPACTS TO MARINE MAMMALS

- 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.

- A biological monitor shall be on site to monitor effects on marine mammals. The biological monitor shall also note (surface scan only) whether marine mammals are present within 100 meters (333 ft) of the pile driving and, if any are observed, temporarily halt pile driving until the observed mammals move beyond this distance.

5.0 CONCLUSIONS

Water Column Communities (Plankton and Fish). With the implementation of water quality Best Management Practices, there will be no long-term effect on water column organisms. A reduction in the surface area of docks by 2,600 sq ft for the new marina layout will result in a beneficial impact to fisheries and plankton by increasing the amount of open water habitat.

Benthic, Piling, Dock, and Rip Rap Communities. The loss of hard and soft bottom benthic organisms as a consequence of construction is considered a short-term, less-than-significant loss of marine life. Upon the cessation of dredging, benthic organisms will begin to recolonized the sediments, with full recolonization expected to be successful over a period of one to three years. A reduction in the number of piles used for marina renovation will result in a net increase of 293.38 sq ft soft-bottom benthic habitat and an increase of benthic biomass. This is a long-term, beneficial impact. Piling organism biomass will be initially reduced with the removal of 808 piles. However, recolonization will begin immediately upon placement of 620 new piles, with full recovery expected within one to six years. Phasing of the work over a six-year period will assist in reducing the impact to piling organisms. The repair of 8,250 linear feet of seawall will result in temporary impacts to hardscape species that will fully recover following the completion of the repair work. Seawall repairs will not impact soft-bottom habitat. Other than eelgrass, there are no sensitive benthic species that will be affected by the project. There are no sensitive piling or rip rap associated species.

Eelgrass and Essential Fish Habitat. Dredging will result in the loss of 1,373.04 sq ft of eelgrass vegetation. This is an adverse, long-term but mitigatable impact. A mitigation program is proposed to reduce the level of impact to less-than-significant with the successful restoration of 1,647.65 sq ft of eelgrass vegetation.

Fisheries Management Plan Species. Based upon the known distribution and abundance of one Coastal Pelagics FMP species and three Pacific Groundfish FMP species present in Alamitos Bay, the Alamitos Bay Marina Renovation Project will not have a significant impact on FMP species during the renovation or long-term use of the marina.

Sea Turtles. The potential for the marina renovation project to have adverse impacts on the green sea turtle is relatively low given the low population numbers present in the project region. They are however, occasionally found within the bay and the likely impact that the project might have on a sea turtle in the near vicinity of marina renovations would be a behavioral modification to avoid the construction area or transiting work vessel. No mortality is anticipated. Mitigation measures

Marine Mammals. Impacts related to potential vessel collisions, and noise production from pile driving and dredging operations are expected to be less than significant with the implementation of identified mitigation measures.

6.0 LITERATURE CITED

Allen, L. A. 1976. Abundance, Diversity, Seasonality and Community Structure of the Fish Populations of Newport Bay, California. M.S. Thesis, California State University, Fullerton. 108 pp.

Allen, L. G. 1988. Final report. Results of a Two-Year Monitoring Study on the Fish Populations in the Restored, Uppermost Portion of Newport Bay, California; With Emphasis on the Impact of Additional Estuarine Habitat on Fisheries-Related Species. Prepared for the National Marine Fisheries Service in fulfillment of Contract #WASC-85-00216.

Allen, L.A. 1976. Additions to the list of fish species known from Alamitos Bay, California based on studies in the Colorado Lagoon. CFG 64(4).

Aquarium of the Pacific. 2008. A little R&R for a green sea turtle. In: Pacific Currents. Winter 2009 Vol 12 Number 2. Pg 27.

Bonnell, Michael L. and M. D. Dailey. 1983. Marine Mammals. Chapter 11 in: Dailey, M. D., D. J. Reish, and J. W. Anderson. Ed. 1983. Ecology of the Southern California Bight. A synthesis and interpretation. University of California Press. 926 pp.

Brownell, R. L. Jr. 1977. Current status of the gray whale. Rep. Int. Whaling Comm. 27:209-211.

California State Water Resources Control Board, 1998. Sediment Chemistry, Toxicity, and Benthic Community Conditions in Selected Water Bodies of the Los Angeles Region. Final Report and Appendices. August 1998

Chambers Group, Inc. 2004. Biological assessment for the Colorado Lagoon Restoration Feasibility Study. Prepared for Moffatt & Nichol Engineers.

Coastal Resources Management, Inc. 2009a. Eelgrass mapping survey, impact assessment and eelgrass mitigation plan for the Alamitos Bay Marina Renovation Project, Long Beach, CA. Prepared for L.S.A. Associates, Inc. and the City of Long Beach. October 2009. 63 pp.

Coastal Resources Management, Inc. 2009b. Analysis of potential eelgrass habitat biotic and abiotic characteristics in Alamitos Bay Marina, Long Beach, California. Prepared for Anchor QEA, LP and LSA Associates, Inc. October 2009. 24 pp.

Coastal Resources Management, Inc. 2007a. Eelgrass mapping survey and environmental assessment for the Alamitos Bay Marina Renovation Project, Long Beach, CA. Prepared for L.S.A. Associates, Inc. and the City of Long Beach.

Coastal Resources Management, Inc. 2007b. Essential fish habitat analysis for the Alamitos Bay Renovation Project. Prepared for LSA Associates, 19 Dec 2007.

Coastal Resources Management, Inc. 2007c. Pers. com (Email memo) to EDAW, Inc., re: *Chelonia mydas*, Green Sea Turtle and Potential Impacts of the Terminal Street Storm Drain Project, 5/18/07.

Coastal Resources Management, Inc. 2007d. Pers.com (Email memo) to EDAW, Inc., re: *Chelonia mydas*, Green Sea Turtle and Potential Impacts of the Terminal Street Storm Drain Project, 7/2/07.

Coastal Resources Management, Inc. 2006. Eelgrass mapping survey and environmental assessment for the Termino Avenue Storm Drain Project, Alamitos Bay, Long Beach, CA. Prepared for EDAW, Inc. January 2nd, 2006.

Coastal Resources Management. 2002a. End Beach, Alamitos Bay eelgrass (Zostera marina) environmental assessment. Termino Avenue low flow outlet structure construction project. Long Beach, Ca. Prepared for BonTerra Consulting, Costa Mesa, CA. September, 2002.

Coastal Resources Management. 2002b. Kober residence marine biological assessment for seawall and dock renovations at 5615 Sorrento Drive, Long Beach, Ca. Prepared for Swift Slips Dock and Pier Builders, Costa Mesa, Ca. March, 2002.

Coastal Resources Management, 1996. Eelgrass (Zostera marina) habitat survey and impact analysis. City of Long Beach Basin 8 Marina Project. Prepared for Moffatt & Nichol Engineers and the City of Long Beach Department of Public Works. July 19th, 1996. 13 pp. plus appendices.

Coastal Resources Management 1999. Site assessment for eelgrass resources at the Gondola Getaway. Prepared for the City of Long Beach Department of Parks, Recreation, and Marine. July 21, 1999. 5pp. plus appendices

Coastal Resources Management, 1998. End Beach mitigation program. First year summary report. July-Dec, 1997. Prepared for the City of Long Beach Department of Public Works. June 17th, 1998.

Coastal Resources Management, 1995. Eelgrass (*Zostera marina*) habitat survey, impact analysis, and mitigation plan. City of Long Beach Bulkhead Repair Project, Mothers Beach, Alamitos Bay, CA. Prepared for the City of Long Beach Department of Public Works. Sept 29th, 1995. 13 pp.

Coastal Resources Management 1994a. Alamitos Bay Entrance Channel eelgrass habitat mapping survey and mitigation plan for the City of Long Beach Alamitos Bay Jetty Reconstruction Project. Prepared for the City of Long Beach Dept. of Public Works. 18 pp. plus appendices.

Coastal Resources Management 1994b. Fieldstone Park marine biological surveys and erosion control and educational site impact assessment. Prepared for Coastal Frontiers Corporation, June 30th, 1994. 23 pp. plus appendices.

Coastal Resources Management 1993. Alamitos Bay marine biological survey, seawall structural improvement project. June 16-18, 1993. Prepared for Cash and Associates, Huntington Beach, CA 14 pp. plus appendices.

Cook, Vivian. City of Long Beach Parks and Marine. Personal communication with R. Ware, Coastal Resources Management, Inc. 27 July 2007.

Coyer, J. A., K. A. Miller, J. M. Engle, J. Veldsink, A. Cabello-Pasini, W.T. Stam, and J. L. Olsen. Eelgrass meadows in the California Channel Islands and Adjacent Coast reveal a mosaic of two species, evidence for introgression and variable clonality. Annals of Botany 101: 73–87, 2008

Crite, J. 2000. "*Chelonia mydas*" (On-line), Animal Diversity Web. Accessed July 27, 2007 at: http://animaldiversity.ummz.umich.edu/site/accounts/information/Chelonia_mydas.html

EDAW, Inc. 2007. Green sea turtle analysis for the Termino Ave. Storm Drain EIR. Memo to Christina Fahy, National Marine Fisheries Service, August 7, 2007.

Ernst, C., R. Barbour, J. Lovich. 1994. TURTLES of the United States and Canada. Washington and London: Smithsonian Institution in: Crite, J. 2000. "Chelonia mydas" (On-line), Animal Diversity Web. Accessed July 27, 2007 at: http://animaldiversity.ummz.umich.edu/site/accounts/information/Chelonia_mydas.html

Everest International Consultants, Inc. 2009. Marine Stadium eelgrass mitigation site assessment-tidal hydraulics analysis. Prepared for Anchor QEA, LLC. 12 pp. plus appendices. April, 2009.

Foster, M. and D. R. Schiel. 1985. The ecology of giant kelp forests in California. A community profile. U.S. Fish Wildl. Serv. Biol . Rep. 85(7.2).

Foss, Stephen F., P. R. Ode, M. Sowby, and M. Ashe. Non-indigenous aquatic organisms in the coastal waters of California. California Fish and Game 93(3): 111-129. Summer 2007.

Fullerton, E. C. 1985. Letter to G. E. Hillier, District Manager, U.S. Bureau of Land Management, Riverside, CA. Feb 8, 1985 in: Robert Bein, William Frost Associates and MBC Applied Environmental Sciences, Inc. 2003. Dana Point Harbor Revitalization Plan EIR. Marine Oceanographic and Biological

Assessment. Prepared for the County of Orange Department of Harbors, Beaches, and Parks.

Fahy, Christina. National Marine Fisheries, Long Beach. pers. Com. with EDAW, Inc. July 2007.

Hastings, M. C. and A. N. Popper. 2005. Effects of Sound on Fish. (J&S 43A0139.) Prepared for the California Department of Transportation. Sacramento, CA.

Hoffman, R.S. 1986. Fishery utilization of eelgrass (*Zostera marina*) beds and non-vegetated shallow water areas in San Diego Bay. National Marine Fisheries Service Southwest Region, Administrative Report SWR-86-4. 29 pp.

Hoffman, R.S. 1990. Fishery utilization of natural versus transplanted eelgrass beds in Mission Bay, San Diego, California. Pages 58-64 in: K.W. Merkel and R. S. Hoffman, eds. Proceedings of the California Eelgrass Symposium. May 27 and 28, 1988. Chula Vista, California. 78 pp.

Hoffman, R.S. 1991. Relative fishery values of natural versus transplanted eelgrass beds Zostera marina) in Southern California. in: H. S. Bolton (ed). Coastal Wetlands. Coastal Zone '91. Seventh Symposium on Coastal and Ocean Management. Long Beach, California. July 8-12, 1991.

Horn, M. H., and L. G. Allen. 1981. Ecology of Fishes in Upper Newport Bay, California: Seasonal Dynamics and Community Structure. California Department of Fish and Game, Marine Resources Technical Report No. 45. 102 pp.

Horn, M. H. 1974. Fishes. Chapter 11. 124 pp. *in:* A summary of the knowledge of the southern California coastal zone and offshore areas. Vol 11. Biological environment. Southern California Ocean Studies Consortium, for the Bureau of Land Management, U.S. Dept of the Interior.

ICF Jones & Stokes and Illingworth and Rodkin, Inc. 2009. Final technical guidance for assessment and mitigation of the hydroacoustic effects of pile driving on fish. Prepared for the California Department of Transportation. February 2009.

Intersea Research Corporation, 1981. Haynes Generating Station Cooling Water Intake Study, 316(b) Demonstration Program. Prepared for LADWP, November 1981.

MBC Applied Environmental Sciences. 1997. National Pollutant Discharge Elimination System. 1997 Receiving Water Monitoring Report. Prepared for Los Angeles District of Water and Power and the Southern California Edison Company.

MEC Analytical Systems, Inc. 1999. Port of Los Angeles special study. August 1999. Prepared for the Port of Los Angeles.

MEC Analytical Systems, Inc. 1988. Biological baseline and an ecological evaluation of existing habitats in Los Angeles and adjacent waters. Volumes 1-3. Prepared for the Port of Los Angeles.

MBC Applied Environmental Sciences (MBC). 1986. Infauna and epifauna associated with transplants of eelgrass (Zostera marina) in Southern California. Prepared for Maguire Thomas Partners, The Huntington Partnership, National Marine Fisheries Service, and the U.S. Fish and Wildlife Service. 48 pp.

National Marine Fisheries Service. 2008. *Caulerpa* control protocol. Version 4, March 28th, 2008. National Marine Fisheries Service Southwest Region, Long Beach, CA. 7 pp.

National Marine Fisheries Service. (1991 as amended). Southern California eelgrass mitigation policy. 6 pp. National Marine Fisheries Service, Southwest Region, Long Beach, CA. Revision 11.

Phillips, R. C. 1984. The ecology of eelgrass meadows in the Pacific Northwest: A community profile. FWS/OBS-84/24. 85 pp.

Port of Los Angeles. 2008. Pacific LA Marine Terminal LLC, Pier 400, Berth 408 Project Final Supplemental Environmental Impact Statement/Final Subsequent Environmental Impact Report (Final SEIS/SEIR). Response to comments 3.3-23 and 3.3 24. November 2008.

Port of Los Angeles. 2009. Final EIR/EIS for the Port of Los Angeles Channel Deepening Project EIR/EIS, Response to National Marine Fisheries Service Comment NMFS 08, page 14-08. April 2009)

Positive Lab Service. 2009. Certificate of Analysis. Sediment chemical analyses for proposed Marine Stadium eelgrass mitigation site. Prepared for Bellingham Marine Industries, Inc. Dixon, California. February 2nd, 2009.

Power, Allen, City of Long Beach Parks and Marine (Lifeguards). Personal communication with R. Ware, Coastal Resources Management, Inc. 27 July 1007.

Reish, D.J. 1968. Marine life of Alamitos Bay. Forty-niner Shops, Inc. 92 pp.

Richardson, W. J., C. Greene, J. Hickie, and R. Davis. Effects of offshore petroleum operations on cold water marine mammals. A literature review. Prepared by LGL Limited for the American Petroleum Institute. October 1983.

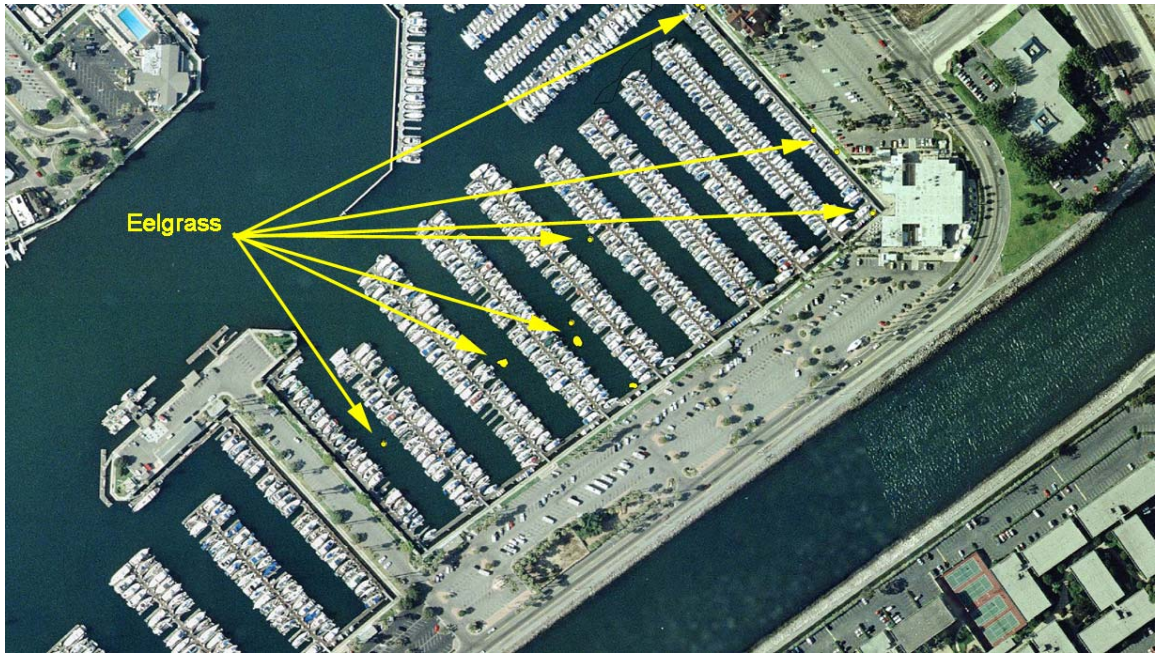
TerraCosta Consulting Group. 2009. Geotechnical evaluation. Alamitos Bay Marina eelgrass mitigation. Long Beach, California. Prepared for: Bellingham Marine Industries, Dixon, California. February 12th, 2009. 7 pp. plus appendices.

Valle, Charles F., J. W. O'Brien, and K. B. Wiese. 1999. Differential habitat use by California halibut, Paralichthys californicus, barred sand bass, Paralabrax nebulifer, and other juvenile fishes in Alamitos Bay, California. Fish. Bull. 97:656-660.

Walker, Boyd W. 1952. A guide to the grunion. Calif. Fish Game 38 (3):410-420

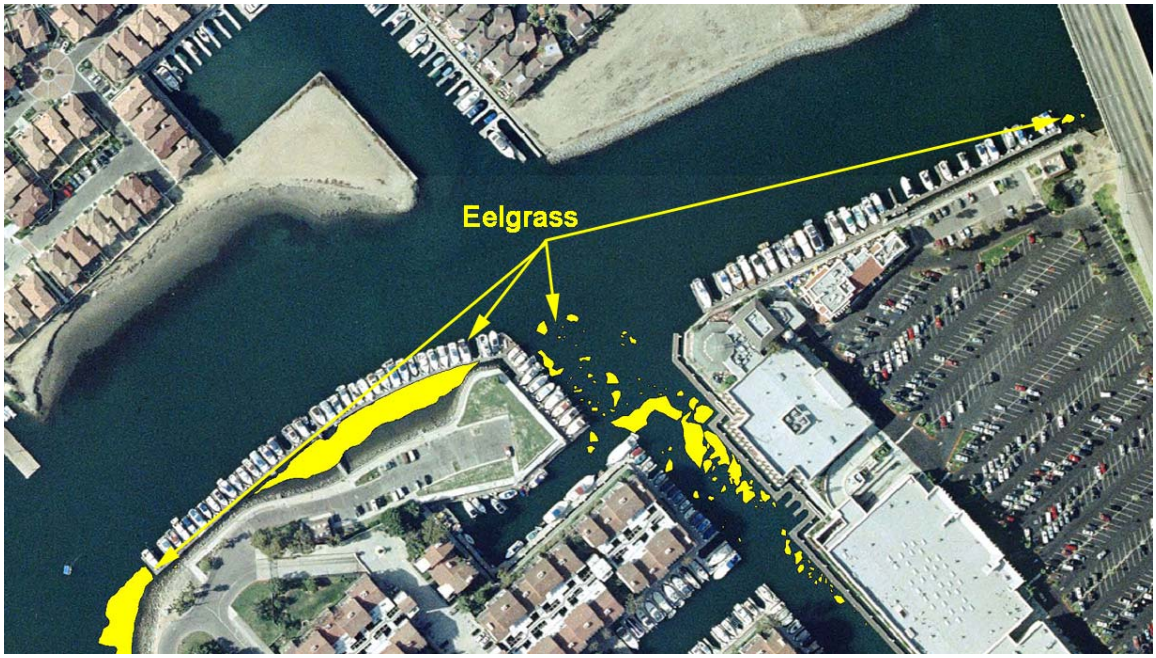
Wetlands Support. 2003. Eelgrass mapping in Alamitos Bay, Los Angeles County. *Center for Natural Lands Management.* 2000-2003.

APPENDIX 1. EELGRASS HABITAT MAPS FOR AREAS SURVEYED IN ALAMITOS BAY SEPTEMBER AND OCTOBER, 2007

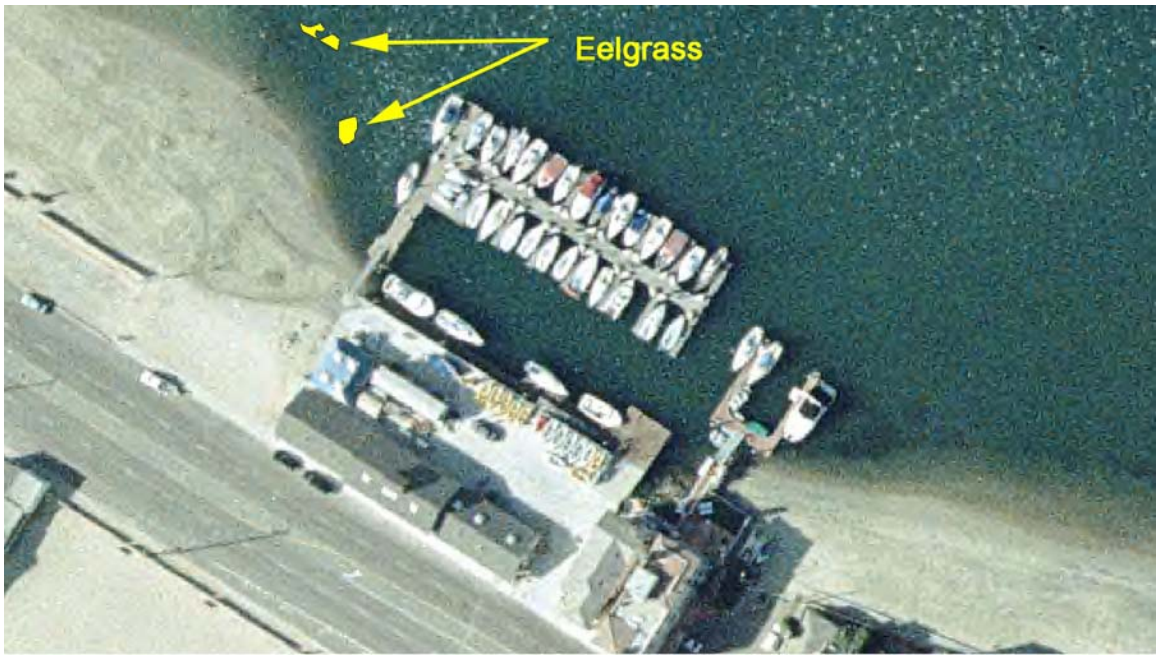


Basin 2 Eelgrass Habitat

Basin 4 Eelgrass Habitat



Basin 6 (South and North) and Marina Pacific Channel North Eelgrass Habitat



Basin 7 Eelgrass Habitat

Davies Bridge and Marina Pacifica Eelgrass Habitat

55th Place to 61st Place (Peninsula 1) Eelgrass Habitat

63rd Place to 71st Place (Peninsula 2) Eelgrass Habitat

Upper Cerritos Channel Eelgrass Habitat

APPENDIX 2
NATIONAL MARINE FISHERIES SERVICE LETTER TO THE CALIFORNIA ASSOCIATION OF HARBOR MASTERS AND PORT CAPTAINS

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802- 4213

JAN 26 2009

Mr. Jack Peveler
President
California Association of Harbor Masters and Port Captains
P.O. Box 510
Sonoma, California 95476

Dear Mr. Peveler:

NOAA's National Marine Fisheries Service (NMFS) has reviewed your letter dated December 9, 2008, regarding the application of the Southern California Eelgrass Mitigation Policy. We appreciate your interest and constructive criticism of our efforts to protect and conserve eelgrass habitat within California.

As a result of the recognized ecosystem functions, eelgrass beds and other submerged aquatic beds, are given special status under the Clean Water Act, 1972 (as amended), Section 404(b)(1), "Guidelines for Specification of Disposal Sites for Dredged or Fill Material," Subpart E, "Potential Impacts on Special Aquatic Sites." This special status and high resource value has led to more stringent regulatory protections of this habitat and requirements for avoidance, minimization, and mitigation of unavoidable impacts.

As a furtherance of efforts to curb losses and reduce the negative trends in seagrass habitat, resource and regulatory agencies around the nation have been working on development of resource management plans and resource protection policies addressing seagrass. In southern California, the Southern California Eelgrass Mitigation Policy (SCEMP) (1991, as revised) was developed by NMFS, U.S. Fish and Wildlife Service, and California Department of Fish and Game to provide further guidance on the necessary steps to compensate for unavoidable impacts to eelgrass resources through regulatory programs. NMFS recognizes that the SCEMP is not part of official NOAA regulations. Rather, it is a coordinated, multiple-agency approach that is intended to provide guidance and consistency for all entities that impact this sensitive resource.

NMFS also recognizes that, as currently written, the potential eelgrass habitat clause could be interpreted more broadly than intended. To date, we have only implemented this clause when clear and convincing evidence is available that a given area is potential eelgrass habitat (e.g. previous eelgrass surveys documenting presence). We intend to clarify this aspect of the SCEMP in future revisions and will solicit your organization's input prior to doing so. Similarly, we also believe the SCEMP should be based upon the

best scientific information available and will incorporate such information in future revisions as it becomes available. We welcome any scientific information you can provide that could further refine the SCEMP.

Lastly, one of your last statements regarding shoaling of marinas implies that harbor/marina design depths are the appropriate baseline for environmental effect determinations. When evaluating effects to habitat, NMFS considers the current habitat condition. If NMFS' effects analysis indicates that there would be a reduction in quality and/or quantity of habitat, NMFS will provide conservation recommendations to avoid, minimize or offset such effects. If compensatory mitigation is recommended for a continuing operation (e.g. maintenance dredging), we believe it necessary to do so only once. For example, impacts to eelgrass habitat in Agua Hedionda Lagoon associated with maintenance dredging were mitigated according to the SCEMP, but, assuming future maintenance dredging remains in the same footprint, no additional compensation would be recommended if eelgrass recolonized the area at a later date.

Thank you for your interest in this matter. NMFS encourages your participation in future developments related to eelgrass conservation efforts and will keep you updated accordingly. If you have any questions about these comments or the application of SCEMP, please contact Bryant Chesney at Bryant.Chesney@noaa.gov or 562-980-4037.

Sincerely,

Rodney R McInnis

Rodney R. McInnis
Regional Administrator

APPENDIX 3.
SOUTHERN CALIFORNIA EELGRASS MITIGATION POLICY

SOUTHERN CALIFORNIA EELGRASS MITIGATION POLICY

(Adopted July 31, 1991)

Eelgrass (Zostera marina) vegetated areas are recognized as important ecological communities in shallow bays and estuaries because of their multiple biological and physical values. Eelgrass habitat functions as an important structural environment for resident bay and estuarine species, offering both predation refuge and a food source. Eelgrass functions as a nursery area for many commercially and recreational important finfish and shellfish species, including those that are resident within bays and estuaries, as well as oceanic species that enter estuaries to breed or spawn. Eelgrass also provides a unique habitat that supports a high diversity of non-commercially important species whose ecological roles are less well understood.

Eelgrass is a major food source in nearshore marine systems, contributing to the system at multiple trophic levels. Eelgrass provides the greatest amount of primary production of any nearshore marine ecosystem, forming the base of detrital-based food webs and as well as providing a food source for organisms that feed directly on eelgrass leaves, such as migrating waterfowl. Eelgrass is also a source of secondary production, supporting epiphytic plants, animals, and microbial organisms that in turn are grazed upon by other invertebrates, larval and juvenile fish, and birds.

In addition to habitat and resource attributes, eelgrass serves beneficial physical roles in bays and estuaries. Eelgrass beds dampen wave and current action, trap suspended particulates, and reduce erosion by stabilizing the sediment. They also improve water clarity, cycle nutrients, and generate oxygen during daylight hours.

In order to standardize and maintain a consistent policy regarding mitigating adverse impacts to eelgrass resources, the following policy has been developed by the Federal and State resource agencies (National Marine Fisheries Service, U.S. Fish and Wildlife Service, and the California Department of Fish and Game). While the intent of this Policy is to provide a basis for consistent recommendations for projects that may impact existing eelgrass resources, there may be circumstances (e.g., climatic events) where flexibility in the application of this Policy is warranted. As a consequence, deviations from the stated Policy may be allowed on a case-by-case basis. This policy should be cited as the Southern California Eelgrass Mitigation Policy (revision 11).

For clarity, the following definitions apply. "Project" refers to work performed on-site to accomplish the applicant's purpose. "Mitigation" refers to work performed to compensate for any adverse impacts caused by the "project". "Resource agencies" refers to National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS), and the California Department of Fish and Game (CDFG).

1. **Mitigation Need.** Eelgrass transplants shall be considered only after the normal provisions and policies regarding avoidance and minimization, as addressed in the Section 404 Mitigation Memorandum of Agreement between the Corps of Engineers and

Environmental Protection Agency, have been pursued to the fullest extent possible prior to the development of any mitigation program. Mitigation will be required for the loss of existing vegetated areas, loss of potential eelgrass habitat, and/or degradation of existing/potential eelgrass habitat. Mitigation for boat docks and/or related work is addressed in section 2.

2. **Boat Docks and Related Structures**. Boat docks, ramps, gangways and similar structures should avoid eelgrass vegetated or potential eelgrass vegetated areas to the maximum extent feasible. If avoidance of eelgrass or potential eelgrass areas is infeasible, impacts should be minimized by utilizing, to the maximum extent feasible, construction materials that allow for greater light penetration (e.g., grating, translucent panels, etc.). For projects where the impact cannot be determined until after project completion (i.e., vessel shading, vessel traffic) a determination regarding the amount of mitigation shall be made based upon two annual monitoring surveys conducted during the time period of August to October which document the changes in the bed (areal extent and density) in the vicinity of the footprint of the boat dock, moored vessel(s), and/or related structures. Any impacts determined by these monitoring surveys shall be mitigated per sections 3-12 of this policy. Projects subject to this section must include a statement from the applicant indicating their understanding of the potential mitigation obligation which may follow the initial two-year monitoring.

3. **Mitigation Map.** The project applicant shall map thoroughly the area, distribution, density and relationship to depth contours of any eelgrass beds likely to be impacted by project construction. This includes areas immediately adjacent to the project site which have the potential to be indirectly or inadvertently impacted as well as potential eelgrass habitat areas. Potential habitat is defined as areas where eelgrass would normally be expected to occur but where no vegetation currently exists. Factors to be considered in delineating potential habitat areas include appropriate circulation, light, sediment, slope, salinity, temperature, dissolved oxygen, depth, proximity to eelgrass, history of eelgrass coverage, etc.

Protocol for mapping shall consist of the following format:

1) Bounding Coordinates

Horizontal datum - Universal Transverse Mercator (UTM), NAD 83, Zone 11 is the preferred projection and datum. If another projection or datum is used, the map and spatial data must include metadata that accurately defines the projection and datum.

Vertical datum - Mean Lower Low Water (MLLW), depth in feet.

2) Units

Transects and grids in meters.

Area measurements in square meters/hectares.

3) File format

A spatial data layer compatible with readily available geographic information system software must be sent to NMFS and any other interested resource agency when the area mapped has greater than 10 square meters of eelgrass. For those areas with less than 10 square meters, a table must be provided giving the bounding x,y coordinates of the eelgrass areas. In addition to a spatial layer or table, a hard-copy map should be included within the survey report. The projection and datum should be clearly defined in the metadata and/or an associated text file.

All mapping efforts must be completed during the active growth phase for the vegetation (typically March through October) and shall be valid for a period of 60 days with the exception of surveys completed in August - October. Surveys completed after unusual climatic events (i.e., high rainfall) may have modified requirements and surveyors should contact NMFS, CDFG, and USFWS to determine if any modifications to the standard survey procedures will be required. A survey completed in August - October shall be valid until the resumption of active growth (i.e., in most instances, March 1). After project construction, a post-project survey shall be completed within 30 days. The actual area of impact shall be determined from this survey.

4. **Mitigation Site.** The location of eelgrass transplant mitigation shall be in areas similar to those where the initial impact occurs. Factors such as, distance from project, depth, sediment type, distance from ocean connection, water quality, and currents are among those that should be considered in evaluating potential sites.

5. **Mitigation Size.** In the case of transplant mitigation activities that occur concurrent to the project that results in damage to the existing eelgrass resource, a ratio of 1.2 to 1 shall apply. That is, for each square meter adversely impacted, 1.2 square meters of new suitable habitat, vegetated with eelgrass, must be created. The rationale for this ratio is based on, 1) the time (i.e., generally three years) necessary for a mitigation site to reach full fishery utilization and 2) the need to offset any productivity losses during this recovery period within five years. An exception to the 1.2 to 1 requirement shall be allowed when the impact is temporary and the total area of impact is less than 100 square meters. Mitigation on a one-for-one basis shall be acceptable for projects that meet these requirements (see section 11 for projects impacting less than 10 square meters).

Transplant mitigation completed three years in advance of the impact (i.e., mitigation banks) will not incur the additional 20 percent requirement and, therefore, can be constructed on a one-for-one basis. However, all other annual monitoring requirements (see sections 8-9) remain the same irrespective of when the transplant is completed.

Project applicants should consider increasing the size of the required mitigation area by 20-30 percent to provide greater assurance that the success criteria, as specified in Section 10, will be met. In addition, alternative contingent mitigation must be specified,

and included in any required permits, to address situation where performance standards (see section 10) are not likely to be met.

For potential eelgrass habitat, a ratio of 1 to 1 of equivalent habitat shall be created.

Degradation of existing eelgrass vegetated habitat that results in a reduction of density greater than 25 percent shall be mitigated on a one-for-one basis. For example, a 25 percent reduction in density of a 100 square meter (100 turions/meter) eelgrass bed to 75 turions/meter would require the establishment of 25 square meters of new eelgrass with a density at or greater than the pre-impact density. All other provisions of the Policy would apply.

6. **Mitigation Technique.** Techniques for the construction and planting of the eelgrass mitigation site shall be consistent with the best available technology at the time of the project. Donor material shall be taken from the area of direct impact whenever possible, but also should include a minimum of two additional distinct sites to better ensure genetic diversity of the donor plants. No more than 10 percent of an existing bed shall be harvested for transplanting purposes. Plants harvested shall be taken in a manner to thin an existing bed without leaving any noticeable bare areas. Written permission to harvest donor plants must be obtained from the California Department of Fish and Game.

Plantings should consist of bare-root bundles consisting of 8-12 individual turions. Specific spacing of transplant units shall be at the discretion of the project applicant. However, it is understood that whatever techniques are employed, they must comply with the stated requirements and criteria.

7. Mitigation Timing. For off-site mitigation, transplanting should be started prior to or concurrent with the initiation of in-water construction resulting in the impact to the eelgrass bed. Any off-site mitigation project which fails to initiate transplanting work within 135 days following the initiation of the in-water construction resulting in impact to the eelgrass bed will be subject to additional mitigation requirements as specified in section 8. For on-site mitigation, transplanting should be postponed when construction work is likely to impact the mitigation. However, transplanting of on-site mitigation should be started no later than 135 days after initiation of in-water construction activities. A construction schedule which includes specific starting and ending dates for all work including mitigation activities shall be provided to the resource agencies for approval at least 30 days prior to initiating in-water construction.

8. **Mitigation Delay.** If, according to the construction schedule or because of any delays, mitigation cannot be started within 135 days of initiating in-water construction, the eelgrass replacement mitigation obligation shall increase at a rate of seven percent for each month of delay. This increase is necessary to ensure that all productivity losses incurred during this period are sufficiently offset within five years.

9. **Mitigation Monitoring.** Monitoring the success of eelgrass mitigation shall be required for a period of five years for most projects. Monitoring activities shall

determine the area of eelgrass and density of plants at the transplant site and shall be conducted at initial planting, 6, 12, 24, 36, 48, and 60 months after completion of the transplant. All monitoring work must be conducted during the active vegetative growth period and shall avoid the winter months of November through February. Sufficient flexibility in the scheduling of the 6 month surveys shall be allowed in order to ensure the work is completed during this active growth period. Additional monitoring beyond the 60 month period may be required in those instances where stability of the proposed transplant site is questionable or where other factors may influence the long-term success of transplant.

The monitoring of an adjacent or other acceptable control area (subject to the approval of the resource agencies) to account for any natural changes or fluctuations in bed width or density must be included as an element of the overall program.

A monitoring schedule that indicates when each of the required monitoring events will be completed shall be provided to the resource agencies prior to or concurrent with the initiation of the mitigation (see attached monitoring and compliance summary form).

Monitoring reports shall be provided to the resource agencies within 30 days after the completion of each required monitoring period and shall include the summary sheet included at the end of this policy.

10. **Mitigation Success.** Criteria for determination of transplant success shall be based upon a comparison of vegetation coverage (area) and density (turions per square meter) between the **adjusted project impact area** (i.e., original impact area multiplied by 1.2) and **mitigation site(s)**. Extent of vegetated cover is defined as that area where eelgrass is present and where gaps in coverage are less than one meter between individual turion clusters. Density of shoots is defined by the number of turions per area present in representative samples within the original impact area, control or transplant bed. Specific criteria are as follows:

a. the mitigation site shall achieve a minimum of 70 percent area of eelgrass and 30 percent density as compared to the adjusted project impact area after the first year.

b. the mitigation site shall achieve a minimum of 85 percent area of eelgrass and 70 percent density as compared to the adjusted project impact area after the second year.

c. the mitigation site shall achieve a sustained 100 percent area of eelgrass bed and at least 85 percent density as compared to the adjusted project impact area for the third, fourth and fifth years.

Should the required eelgrass transplant fail to meet any of the established criteria, then a Supplementary Transplant Area (STA) shall be constructed, if necessary, and planted. The size of this STA shall be determined by the following formula:

$$STA = MTA \times (|A_t + D_t| - |A_c + D_c|)$$

MTA = mitigation transplant area.
A_t = transplant deficiency or excess in area of coverage criterion (%).
D_t = transplant deficiency in density criterion (%).
A_c = natural decline in area of control (%).
D_c = natural decline in density of control (%).

The STA formula shall be applied to actions that result in the degradation of habitat (i.e., either loss of areal extent or reduction in density).

Five conditions apply:

1) For years 2-5, an excess of only up to 30% in area of coverage over the stated criterion with a density of at least 60% as compared to the project area may be used to offset any deficiencies in the density criterion.
2) Only excesses in area criterion equal to or less than the deficiencies in density shall be entered into the STA formula.
3) Densities which exceed any of the stated criteria shall not be used to offset any deficiencies in area of coverage.
4) Any required STA must be initiated within 120 days following the monitoring event that identifies a deficiency in meeting the success criteria. Any delays beyond 120 days in the implementation of the STA shall be subject to the penalties as described in Section 8.
5) Annual monitoring will be required of the STA for five years following the implementation and all performance standards apply to the STA.

11. **Mitigation Bank.** Any mitigation transplant success that, after five years, exceeds the mitigation requirements, as defined in section 10, may be considered as credit in a "mitigation bank". Establishment of any "mitigation bank" and use of any credits accrued from such a bank must be with the approval of the resource agencies and be consistent with the provisions stated in this policy. Monitoring of any approved mitigation bank shall be conducted on an annual basis until all credits are exhausted.

12. **Exclusions.**

1) Placement of a single pipeline, cable, or other similar utility line across an existing eelgrass bed with an impact corridor of no more than 1 meter wide may be excluded from the provisions of this policy with concurrence of the resource agencies. After project construction, a post-project survey shall be completed within 30 days and the results shall be sent to the resource agencies. The actual area of impact shall be determined from this survey. An additional survey shall be completed after 12 months to insure that the project or impacts attributable to the project have not exceeded the allowed

1 meter corridor width. Should the post-project or 12 month survey demonstrate a loss of eelgrass greater than the 1 meter wide corridor, then mitigation pursuant to sections 1-11 of this policy shall be required.

2) Projects impacting less than 10 square meters. For these projects, an exemption may be requested by a project applicant from the mitigation requirements as stated in this policy, provided suitable out-of-kind mitigation is proposed. A case-by-case evaluation and determination regarding the applicability of the requested exemption shall be made by the resource agencies.

(last revised 08/30/05)

Southern California Eelgrass Mitigation Policy
Monitoring and Compliance Reporting Summary

PERMIT DATA:

Permit (Type, Number)	Issuance Date	Expiration Date	Agency Contact
ACOE:_____			
CDP:_____			
Other:_____			

EELGRASS IMPACT AND MITIGATION REQUIREMENTS SUMMARY:

Permitted Eelgrass Impact Estimate	(m^2)	
Actual Eelgrass Impact,	(m^2)	(post-const. survey date)
Eelgrass Mitigation Requirement	(m^2)	(mitigation plan ref.)
Impact Site Location	(location)	
Impact Site Center Coordinates	(define projection and datum)	
Mitigation Site Location	(location)	
Mitigation Site Center Coordinates	(define projection and datum)	

PERMITTEE CONTACT INFORMATION:

Project Name	(same as permit ref.)
Permittee Information	(permittee name)
	(mailing address)
	(city, state, zip)
	(permittee contact)
	(phone, fax., e-mail)
Mitigation Consultant	(consultant contact)
	(phone, fax., e-mail)

PROJECT ACTIVITY DATA:

Activity	Start Date	End Date	Reference Info.
Eelgrass Impact			
Installation of Eelgrass Mitigation			
Initiation of Mitigation Monitoring			

MITIGATION STATUS DATA:

Mitigation Milestone	Scheduled Survey	Survey Date	Area (m^2)	Density (turions/m^2)	Reference Info.
Requirement					
0-month					
6-month					
12-month					
24-month					
36-month					
48-month					
60-month					

FINAL ASSESSMENT:

Was mitigation met?	
Were mitigation and monitoring performed timely?	
Was delay penalty required or were supplemental mitigation programs necessary?	