Draft

ENVIRONMENTAL ASSESSMENT
Pier 8 Replacement
Naval Base San Diego

San Diego, California

March 2015

Acronyms and Abbreviations

ACM	asbestos-containing materials
AMEC	AMEC Earth & Environmental Inc.
APE	Area of Potential Effect
ATFP	Anti-terrorism Force Protection
BMPs	Best Management Practices
BOWTS	Bilge Oily Water Wastewater Treatment System
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resources Board
CASHPO	California State Historic Preservation Officer
CCC	California Coastal Commission
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CH_4	methane
CMAV	Continuous Maintenance Availability
CNEL	Community Noise Equivalent Level
CNRSW	Commander, Navy Region Southwest
CO	carbon monoxide
CO_2	carbon dioxide
CO_{2e}	carbon dioxide equivalent
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
dB	decibels
dBA	A-weighted decibels
DEH	Department of Environmental Health
DOD	Department of Defense
DTSC	(California) Department of Toxic Substances Control
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EO	Executive Order
EPCRA	Emergency Planning and Community Right-to-Know Act
ESA	Endangered Species Act
ESQD	Explosive Safety Quantity Distance
FICUN	Federal Interagency Committee on Urban Noise
FMP	Fishery Management Plan
FONSI	Finding of No Significant Impacts
ft	feet/foot
GHG	Greenhouse Gas(s)
GWP	Global Warming Potential
HDPE	high density polyethylene
HAPC	Habitat Areas of Particular Concern
HWMP	Hazardous Waste Management Plan
I	Interstate
INRMP	Integrated Natural Resources Management Plan
IR	Installation Restoration
LBP	lead based paint
LCS	Littoral Combat Ships
Leq	Energy Equivalent Levels
Ldn	Day-Night Average Noise Level
LOS	Level of Service
LPD	Landing Platform Dock
LSD	Landing Ship Dock
µPa	micro Pascal
m	meter(s)
MBTA	Migratory Bird Treaty Act
Metro PA	San Diego Metro Area Programmatic Agreement
MHP	Modular Hybrid Pier
MILCON	Military Construction
MLLW	Mean Lower Low Water
MMPA	Marine Mammal Protection Act
MOU	Memorandum of Understanding
MSDS	Material Safety Data Sheets
NAAQS	National Ambient Air Quality Standards
NASNI	Naval Air Station North Island
NAVFAC	Naval Facilities Engineering Command
NBSD	Naval Base San Diego
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
N_2O	nitrous oxide
NO_2	nitrogen dioxide
NO_X	oxides of nitrogen
NOSSA	Naval Ordnance Safety and Security Activity
NPDES	National Pollutant Discharge Elimination System
NRSW	Navy Region Southwest
O_3	ozone
OPNAVINST	Office of the Chief of Naval Operations Instruction
OWS	oil-water separator
PAH	polycyclic aromatic hydrocarbons
PCBs	polychlorinated biphenyls
PFMC	Pacific Fishery Management Plans
PM_x	particulate matter ≤ x microns in diameter
ppm	parts per million
RAQS	Regional Air Quality Strategy
RCRA	Resource Conservation and Recovery Act
RMS	root mean square
ROI	region of influence
RWQCB	Regional Water Quality Control Board
SCAQMD	South Coast Air Quality Management District
SCM	special conservation measure
SDAB	San Diego Air Basin
SDAPCD	San Diego Air Pollution Control District
SEL	Sound Exposure Level
SIP	State Implementation Plan
SO_2	sulfur dioxide
SO_x	oxides of sulfur
SPL	sound pressure level
SR	State Route
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TMDL	total maximum daily load
TRB	Transportation Research Board
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USCG	U.S. Coast Guard
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UXO	unexploded ordnance
V/C	volume to capacity ratio
VOC	volatile organic compound

DRAFT ENVIRONMENTAL ASSESSMENT
PIER 8 REPLACEMENT
NAVAL BASE SAN DIEGO
SAN DIEGO, CALIFORNIA

ABSTRACT

The United States Department of the Navy (Navy) has prepared this Environmental Assessment (EA) in accordance with: the 1969 National Environmental Policy Act (NEPA) (42 United States Code [USC] § 4321, as amended); The Council on Environmental Quality Regulations for Implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508); and the Chief of Naval Operations Instructions for Implementing NEPA (OPNAVINST 5090.1D, CH-1).

The EA addresses the issues related to the current inadequacies of the existing Naval Base San Diego (NBSD) Pier 8. It evaluates the environmental effects of two action alternatives that would correct the inadequacies and provide for the berthing and maintenance needs of existing Navy ships. A No-Action Alternative is also evaluated.

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DRAFT ENVIRONMENTAL ASSESSMENT
PIER 8 REPLACEMENT
NAVAL BASE SAN DIEGO
SAN DIEGO, CALIFORNIA

EXECUTIVE SUMMARY

The United States Department of the Navy (Navy) has prepared this Environmental Assessment (EA) in accordance with: the 1969 National Environmental Policy Act (NEPA) (42 United States Code [USC] § 4321, as amended); The Council on Environmental Quality Regulations for Implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508); and the Chief of Naval Operations Instructions for Implementing NEPA (OPNAVINST 5090.1D, CH-1).

The Navy proposes to demolish the aging and inadequate Pier 8 at Naval Base San Diego (NBSD), and construct a new pier and associated utilities with the infrastructure necessary to support modern Navy ship classes that have deep-draft and power-intensive requirements.

This EA addresses the potential environmental impacts of: the Conventional Pier Alternative; Modular Hybrid Pier Alternative (MHP); and the No-Action Alternative.

PURPOSE AND NEED FOR THE PROPOSED ACTION

Pier 8 at NBSD is essential to the mission of the U.S. Navy. It provides berthing for vessels undergoing continuous maintenance while docked at Navy piers, and offload/load service to deep-draft vessels while in port, in particular, the rear-loaded landing platform dock and landing dock ships that support the U.S. Marine Corps with vehicles and aircraft.

The Proposed Action is needed to provide adequate ship berthing to support the mix of Pacific Fleet ships for current and future homeporting requirements, and to support ships that require temporary facilities in San Diego Bay. A 70- year-old structure, the existing Pier 8 was not designed to be compatible with the dimensions of modern vessels, and is nearing the end of its service life. The load restriction for mobile cranes operating on the existing Pier 8 is 35 tons (crane and load combined weight). As described in Section 1.3 of this EA (*Purpose and Need*), the existing Pier 8 is inadequate to support these types of berthing needs due to: inadequate deck size and load-bearing capability; structural deterioration that will render the pier non-functional by 2018; and utility lines that are insufficient to supply electricity to power-intensive modern vessels.

The purpose of the Proposed Action is to address the current and impending shortfall at NBSD of pier infrastructure necessary to support modern Navy ship classes with deep-draft and power-intensive requirements.

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The Proposed Action comprises demolishing the inadequate existing Pier 8; constructing a replacement Pier 8; and providing associated pier utilities at NBSD. The construction alternatives for implementing the Proposed Action are the Conventional Pier Alternative and the MHP Alternative.

REASONABLE ALTERNATIVES SCREENING FACTORS

The criteria used to select reasonable alternatives that would allow mission, operational, and support functions to be fulfilled for modern Navy ships are as follows:

- Pier design that accounts for operational and safety considerations as influenced by tidal and seismic conditions in San Diego Bay, as well as efficiency and reliability to provide necessary support functions:
  - *Tidal Conditions* - Accommodate ship berthing at a normal (astronomical) tidal range of 5.73 feet (ft) mean lower low water (MLLW) to mean higher high water and at an extreme high water of 8.35 ft (relative to MLLW) and at an extreme low water equal to -2.88 ft (relative to MLLW). Must be capable of adaptation (to provide ship berthing) for a sea level rise of 3 ft that may occur within the facility's life cycle (Naval Facilities Engineering Command [NAVFAC] Southwest 2008a).
  - *Seismic Conditions* - Provide life safety, no loss of operational performance, and no release of hazardous materials to the environment after a Level 2 seismic event (Naval Facilities Engineering Service Center 1999, Department of Defense [DOD] 2005). A Level 2 seismic event has a 10 percent probability of exceedance in 50 years (475 year return).
- Location in a security-controlled setting in San Diego Bay that would not interfere with navigation channels.
- Ability to accommodate ship explosive safety quantity distance (ESQD) arcs within Navy-controlled areas.
- Pier design features that accommodate an existing dredge depth of 37 ft MLLW and landside facilities (e.g., ship hotel services including: compressed air, wastewater and water facilities, and a bilge oily water wastewater treatment system (BOWTS).

CONVENTIONAL PIER CONSTRUCTION ALTERNATIVE

The existing Pier 8 would be demolished in approximately 11 months in a bayward-to-landward, top-down process. A total of 2,173 concrete and plastic piles would be removed with a vibratory hammer and crane. The Pier 8 replacement would be constructed at the site of the existing Pier 8 as a single-deck, concrete pier that would be 117 ft wide by 1,600 ft long. The footprint of the existing Pier 8 is approximately 2.44 acres. The footprint of the proposed Conventional Pier Alternative would be approximately 4.30 acres. The footprint of the MHP Alternative would be approximately 3.22 acres. With the Conventional Pier Alternative, the increase in bay shading would be approximately 1.86 acres, as compared with approximately

0.78 acres for the MHP Alternative. Approximately 512 concrete octagonal structural piles, 204 square fender piles, 230 round fender piles, and 4 octagonal piles for loadout cradles would be installed with a floating crane and diesel pile driver. The pier deck would consist of rebar-reinforced concrete. All pile and deck construction for the replacement Pier 8 and would comply with current seismic standards. The construction period is estimated to be approximately 10 months. The overall demolition-construction period is estimated to be from 2018 through 2019.

Improvements for the replacement Pier 8 would include a stormwater collection system with an oil-water separator (OWS) and copper and zinc treatment to meet current National Pollutant Discharge Elimination System (NPDES) permit requirements, and structural capacity for a 150 ton crane. Pier utilities would include: potable water, wastewater, compressed air, steam, BOWTS pipelines, and compensating water systems. The 15-kilovolt cables from the existing Pier 8 would be replaced and upgraded to four sets of 750 thousand Circular Mils 15-kilovolt cables. Two new electrical vaults and spare 6-inch ducts-conduits would be installed to support a future upgrade of ship-to-shore power from 480 volts to 4,160 volts. The new Pier 8 would accommodate berthing requirements for four modern-sized ships. Anti-Terrorism/Force Protection (AT/FP) measures would include: a security gate and fencing, pedestrian turnstile, a 20-ft-high watch tower, a guard house, and high mast lighting consistent with current security requirements. No dredging would occur because Pier 8 is already designed as a deep-draft pier.

MODULAR HYBRID PIER CONSTRUCTION ALTERNATIVE

The demolition process and duration would be the same as for the Conventional Pier Alternative. Five double-deck, floating concrete modules would be constructed at a concrete pre-cast facility and towed to the Pier 8 site at NBSD where they would be connected to mooring shafts secured by foundation piles. The MHP Alternative would be 90 ft wide by 1,560 ft long. The double-deck design would: place utility pipelines and wiring on the lower deck; leave the upper deck open for crane and maintenance operations; and allow a lesser pier width of 90 ft as compared with the 117-ft width of the single-deck Conventional Pier Alternative. The MHP Alternative would involve minimal pile driving activities: 96 concrete foundation piles (24-inch diameter octagonal) would be driven as compared with 512 concrete octagonal structural piles, 204 square fender piles, 230 round fender piles, and 4 octagonal piles for loadout cradles for the Conventional Pier Alternative. No fender piles would be driven because the MHP Alternative would use floating foam-filled fenders and internal shock-absorbing rubber fenders. Unlike a conventional pier that stands above the water on fixed piles, the MHP Alternative would be moored to steel shafts. The deck of the MHP Alternative would float in the water similar to a vessel, leaving no open space between the deck bottom and the water surface. The total construction period is estimated to be approximately 4 months. The MHP Alternative would occur within the same estimated time range of 2018-2019 as for the Conventional Pier Alternative; however, the construction period would be shorter (4 months for the MHP Alternative as compared with 10 months for the Conventional Pier Alternative) (NBSD 2014).

The same improvements and AT/FP measures would be constructed as described for the Conventional Pier Alternative. As with the Conventional Pier Alternative, the MHP Alternative would accommodate berthing requirements for four modern-sized ships, and no dredging would occur.

Under either alternative, the new Pier 8 would be wider than the existing Pier 8, and would be designed and constructed to ensure that vessels can navigate safely within the bay.

Table ES-1 compares the specifications of the two action alternatives with existing Pier 8.

Table ES-1 Comparison of Alternatives

Specifications	Conventional Pier Construction Alternative	Modular Hybrid Pier Construction Alternative	Existing Pier 8 (No-Action Alternative)
Length (feet)	1,600	1,560	1,610
Width (feet)	117	90	66
Height (feet mean lower low water level)	12.0 at quaywall sloping up to 17.0 at the end	13.9 – 16.9 (varies with tides)	12.0 for entire length (approximately)
Bay Shading (acres)	4.30	3.22	2.44
Number of Piles	950	96	2,173
Days of Pile Driving	190	20	None
Total Length of Piles in Water Column (feet)	22,181	1,062	44,546
Total In-Water Surface Area (square feet)	153,411	192,093*	279,360
Change in In-Water Surface Area from Existing Pier 8	45 percent reduction	31 percent reduction	no change
Electrical Capacity: Ship-to-shore Power	Replace 14-kilovolt cables and upgrade to 4 sets of 750,000 Circular Mils 15-kilovolt cables. Support future upgrade from 480 volts to 4,160 volts to meet future power-intensive Fleet requirements.	Same as Conventional Pier Alternative.	No upgrade: remain at 480 kilovolts, unable to supply the power required for power-intensive vessels.

Note: *Surface area for MHP Alternative includes surface area of six square mooring shafts; each five feet wide; the submerged deck bottom and sides submerged to depth of 14 ft; and 96 piles. Surface areas for Conventional Pier Alternative and Existing Pier 8 include only the indicated number of piles.

NO-ACTION ALTERNATIVE

Under the No-Action Alternative, the Navy would not implement demolition of the existing Pier 8, or construction of a replacement. Since the existing pier is not suitable for berthing, servicing, and loading the Navy's current fleet, the No-Action Alternative would not allow

NBSD to meet its mission of maintaining combat-ready Naval forces, as described in Chapter 1. The existing Pier 8 would continue to degrade until all activity is restricted due to deteriorated and unsafe conditions.

The No-Action Alternative is not considered a reasonable alternative because it does not meet the purpose of and need for the Project as required under the CEQ regulations (40 CFR 1502.14[d]). However, it does provide a measure of the baseline conditions described in Chapter 3, against which the potential adverse impacts of the Project can be compared.

AGENCY CORRESPONDENCE AND PUBLIC INVOLVEMENT

Regulatory agencies participating in this project include: U.S. Army Corps of Engineers (USACE); U.S. Fish and Wildlife Service; National Marine Fisheries Service; San Diego Regional Water Quality Control Board (RWQCB); United States Coast Guard (USCG); and the California Coastal Commission as described in Section 1.6. Appendix A documents the correspondence between the Navy and the regulatory agencies involved in this project.

Regarding the public involvement process, a Notice of Availability for the Draft EA was published in the San Diego Union Tribune on 6, 7, and 8 March 2015 to initiate a 30-day public review of the Draft EA. The public review period of the Draft EA was 30 days beginning on 6 March 2015 and ending on 6 April 2015. The Draft EA was made available to the public via the Navy website at http://www.cnic.navy.mil/regions/cnrsw/om/environmental_support/Public_Review_of_Navy_Projects/Naval_Base_San_Diego_Pier_8_Replacement_Draft_EA.html

and at the following local libraries: San Diego Central Library, Point Loma/Hervey Branch Library, and Ocean Beach Branch Library.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Potential environmental impacts have been analyzed for the following resources: water resources, marine biological resources, hazardous materials and wastes, noise, and air quality. Table ES-2 summarizes determinations of environmental consequences followed by the respective avoidance and minimization measures/special conservation measures (SCMs) for: the Conventional Pier Alternative; the MHP Alternative; and the No-Action Alternative. Chapter 3 provides a detailed discussion of the environmental consequences. As described in Table ES-2, implementation of the Conventional Pier Alternative, the MHP Alternative, or the No-Action Alternative would not result in significant impacts to any resource area.

Table ES-2. Summary of Potential Impacts and Avoidance and Minimization Measures/SCMs

Resource Area	Conventional Pier Construction Alternative	Modular Hybrid Pier Construction Alternative	No-Action Alternative
Water Resources	There would be no dredging or other alteration of the elevation of the bay bottom, so demolition and replacement of Pier 8 would have a less than significant impact on bathymetry in San Diego Bay. There would be minor, short-term localized increases to circulation in San Diego Bay in the project areas caused by vessel movement, in-water demolition, and construction. These increases would cease when each particular activity ends. The new Pier 8 would have fewer piles than the existing pier, and would not form a barrier to the natural movement of water in San Diego Bay. Increased turbidity because of sediment resuspension during pile removal and installation would be short-term and limited to the demolition/construction areas around Pier 8 and nearby Navy piers. The localized, short-term resuspension of sediments during demolition of Pier 8 would not change water chemistry sufficiently to impair beneficial use for aquatic life and aquatic-dependent life, or to further impair beneficial use with respect to human health. During demolition and construction, protective measures would be implemented to minimize impacts to marine water quality. Protective measures for demolition and construction would include the use of catch devices and sheeting to prevent the release of debris and hazardous materials/waste into San Diego Bay. All in-water work would comply with the requirements of a Section 401 Water Quality Certification from the San Diego Regional Water Quality Control Board (RWQCB) and Section 404/Section 10 permits from the USACE. For the reasons listed in the preceding paragraphs, there would be no significant impacts to: bathymetry, circulation, marine water quality, and surface water quality from implementation of the Conventional Pier Alternative. **Avoidance and Minimization Measures/SCMs:** • The demolition/construction contractor would be required to develop, receive Base approval	The demolition activities, equipment, and protective measures would be the same as for the Conventional Pier Alternative, and no dredging would occur. The MHP Alternative would have less in-water construction and pile driving which would result in less localized disturbance of bottom sediments as compared with the Conventional Pier Alternative. The same construction equipment, procedures and protective measures would be used as for the Conventional Pier Alternative. Therefore, there would be no significant impacts to: bathymetry; circulation; marine water quality; and surface water quality from implementation of the MHP Alternative. **Avoidance and Minimization Measures/SCMs:** Under the MHP Alternative, avoidance and minimization measures/SCMs would be the same as those for the Conventional Pier Alternative.	Under the No-Action Alternative, no demolition or construction activities would occur and existing water resources would not be affected. Therefore, there would be no significant impacts to: bathymetry; circulation; marine water quality; and surface water quality from implementation of the No-Action Alternative. **Avoidance and Minimization Measures/SCMs:** Under the No-Action Alternative, avoidance and minimization measures/SCMs would not be necessary.

Table ES-2. Summary of Potential Impacts and Avoidance and Minimization Measures/SCMs

Resource Area	Conventional Pier Construction Alternative	Modular Hybrid Pier Construction Alternative	No-Action Alternative
	for, and implement a project-specific Construction Stormwater Pollution Prevention Plan (SWPPP) that would include best management practices (BMPs) for: minimizing and containing dust and debris and preventing spills of concrete, fuels, and hydraulic fluid from vehicles. BMPs would include, but are not necessarily limited to: a floating boom around the project area to contain floating surface debris; the use of catch devices and sheeting; sediment barriers; inlet covers; covering stockpiles; and inspecting equipment and vehicles for drips, and placing drip pans beneath vehicles and equipment; or other alternative measures developed during the USACE Section 404 and Section 10 permitting process. • The contractor would be required to prepare and implement a Construction Demolition Plan that would cover all phases of the work to be done and specify materials, equipment, and procedures to be used to contain all construction and demolition waste and debris, including dust. The Construction Demolition Plan would be approved by Naval Facilities Engineering Command (NAVFAC) Southwest. • The contractor would be required to develop and receive Base approval for a Spill Prevention Plan to address spill prevention and containment within their equipment and vessels. • Prior to demolition, the bilge oily wastewater treatment system (BOWTS) and ships' wastewater pipelines on Pier 8 would be flushed with high-pressure water from service lines on Pier 8. Water flushed from the BOWTS pipeline would be treated at the BOWTS treatment plant. Flush water from the ships' wastewater pipelines would be pumped to the City of San Diego metropolitan sanitary sewer pump station # 1. • Prior to demolition, the wastewater manhole on the quaywall at Pier 8 would be sealed to prevent sea water from entering the wastewater system during high tide. • Per the NBSD Facility Response Plan any		

Table ES-2. Summary of Potential Impacts and Avoidance and Minimization Measures/SCMs

Resource Area	Conventional Pier Construction Alternative	Modular Hybrid Pier Construction Alternative	No-Action Alternative
	petroleum release or petroleum sheen observed on the water surface would be reported to NBSD Port Operations and the U.S. Coast Guard National Response Center. Booms and other spill containment equipment kept on hand would be immediately deployed; the source of the release would be determined and secured; and the NBSD Fire Department would respond to clean up the spill. • The new Pier 8 would include a stormwater collection system with an oil/water separator (OWS) sediment filtration, and copper and zinc treatment to meet current National Pollutant Discharge Elimination System (NPDES) permit requirements. Design and construction of the new Pier 8 stormwater treatment system would be coordinated with the San Diego RWQCB to ensure that it is constructed in accordance with applicable federal requirements for stormwater retention and treatment. • Upon completion of the new Pier 8, the existing Basewide SWPPP and NPDES Permit would continue to apply to Pier 8. Basewide BMPs for preventing and minimizing contact of potential pollutants with stormwater would continue to be followed, including: restricting access; regular cleaning and sweeping; controlling spills and reducing waste; permanently sealing drains in critical areas that lead to storm drains; and regular inspection and maintenance of the storm drain system. • Pier 8-specific BMPs would continue to be followed upon completion of the new Pier 8, including: placement of berms around electrical substations and transformers; testing accumulated precipitation to prevent discharge of contaminants; covering storm drains during maintenance activities; proper maintenance of the BOWTS and sanitary sewage tanks; and piping and valves to prevent leaks of bilge and sanitary waste water. The Basewide SWPPP and BMPs would be reviewed, and revised/updated as needed to incorporate changes resulting from the		

Table ES-2. Summary of Potential Impacts and Avoidance and Minimization Measures/SCMs

Resource Area	Conventional Pier Construction Alternative	Modular Hybrid Pier Construction Alternative	No-Action Alternative
	changes to new Pier 8.		
Marine Biological Resources	The Conventional Pier Alternative would temporarily affect a very small portion of the deep subtidal and developed shoreline habitat that exists in San Diego Bay. There would be no long-term, large-scale changes in marine habitats and communities. A Section 401 Water Quality Certification from the RWQCB and a Clean Water Act Section 404 and Rivers and Harbors Act Section 10 permit from the USACE would be obtained prior to implementation of the Proposed Action. Compared with the existing Pier 8, the Conventional Pier Alternative would result in an increase in bay shading of 1.86 acres. However, the deep subtidal area subject to shading lacks eelgrass or attached algae, so effects on productivity would be negligible. Due to the characteristics of the fish and benthic invertebrate species in the affected area, the relatively small increase in shading and artificial substrate would not have an effect outside the immediate area of Pier 8, and therefore would not have a long-term adverse effect on biological resources in San Diego Bay. Pier demolition and construction activities for the Conventional Pier Alternative would cause minor and short-term impacts to biological resources. Organisms occurring in the immediate area may be lost or displaced during demolition or construction activities, either directly by pile removal or equipment and noise associated with these activities or indirectly by exposure to short-term changes in: suspended sediments; turbidity; dissolved oxygen; and light diffusion. However, Benthic invertebrate species and fish communities are expected to recolonize the disturbed habitat within a relatively short period of time from adjacent undisturbed areas, and typical epifaunal invertebrate and fish communities would gradually develop on the new pilings. Sediment resuspension, increased turbidity, or chemical changes would be limited to the areas of bottom disturbance, and would persist for less than one hour following disturbance. Therefore, neither project activities nor increased turbidity would significantly impact benthic or fish communities or	Impacts associated with the MHP Alternative would be similar to those of the Conventional Pier Alternative, although the MHP Alternative would disturb bottom sediments less and would produce less underwater noise because of reduced pile driving. The MHP Alternative would also shade a smaller additional area (0.78 acres) compared to the Conventional Pier Alternative (1.86 acres). Therefore, the MHP Alternative would not involve long-term, large-scale changes in marine habitats and communities and there would be no significant impacts to benthic invertebrate communities. Like the Conventional Pier Alternative, the MHP Alternative, with the implementation of the proposed avoidance and minimization measures, would not affect eelgrass or any other special aquatic sites; would not result in long-term adverse effects on EFH but would have a minor, short-term adverse effect on EFH from pier removal that would not be significant; would not have a significant effect on migratory bird populations or their habitats under the MBTA,	Under the No-Action Alternative, no demolition or construction activities would occur and existing marine biological resources would not be affected. Therefore, there would be no significant impacts to marine biological resources with implementation of the No-Action Alternative. **Avoidance and Minimization Measures/SCMs:** Under the No-Action Alternative, avoidance and minimization measures/SCMs would not be necessary.

Table ES-2. Summary of Potential Impacts and Avoidance and Minimization Measures/SCMs

Resource Area	Conventional Pier Construction Alternative	Modular Hybrid Pier Construction Alternative	No-Action Alternative
	water column habitats in the project area. Implementation of the Conventional Pier Alternative would not result in long-term adverse effects on Essential Fish Habitat (EFH). Pier removal would temporarily reduce the algal and invertebrate production associated with encrusting communities on the pilings. Hence, there would be a minor, short-term adverse effect on EFH from pier removal that would not be significant under NEPA. Since no eelgrass or any other special aquatic sites are found in the project area, no effects to special aquatic sites would occur. Impacts to breeding birds would be minimal because (1) bird abundance in the project area is low; (2) birds do not use the man-made structures; developed shoreline; and artificial substrate within the project area for breeding; (3) the proposed project would only affect a relatively small area of San Diego Bay; and (4) impacts would cease upon construction completion. These impacts would not be significant because of their limited duration and because birds on the water regularly experience the noise and disturbance of passing vessels, while the project area is routinely subject to the elevated noise and activity of workers and equipment associated with common industrial practices. Bird perches on the existing pier would be lost. However, this is not expected to create a significant impact to migratory birds as there are several other structures in San Diego Bay that could be used for this purpose and because migratory birds are expected to recolonize the new pier once constructed. Therefore, implementation of the Conventional Pier Alternative would not have a significant effect on migratory bird populations or their habitats under the Migratory Bird Treaty Act (MBTA), nor have a significant impact under NEPA. Marine mammals are not expected within the project area. Therefore, with implementation of the proposed Avoidance and Minimization Measures, the Conventional Pier Alternative would not result in significant impacts to marine mammals and no reasonably foreseeable "takes" of marine mammals as defined by the MMPA	nor have a significant impact under NEPA; no reasonably foreseeable "takes" of marine mammals as defined by the MMPA would occur; and would not result in significant impacts to marine mammals ; would not affect the California least tern, and would not have significant impacts to the species under NEPA. The MHP Alternative may affect but is not likely to adversely affect the green sea turtle under the ESA and would have no significant impacts on the green sea turtle under NEPA. **Avoidance and Minimization Measures/SCMs:** Under the MHP Alternative, avoidance and minimization measures/SCMs would be identical to those associated with the Conventional Pier Alternative.	

Table ES-2. Summary of Potential Impacts and Avoidance and Minimization Measures/SCMs

Resource Area	Conventional Pier Construction Alternative	Modular Hybrid Pier Construction Alternative	No-Action Alternative
	would occur, and there would be no significant impacts to marine mammals under NEPA. The Pier 8 project area: is not a nesting or foraging area in the Tern Memorandum of Understanding; does not have any special characteristics such as extraordinary size; eelgrass beds; unique fish habitat; or an abundance of least tern prey species; and least terns are not expected to occur within the project area. Due to the distance to known nesting areas and high value foraging areas and the localized nature of impacts associated with project activities, project activities would not affect individuals or have a persistent effect on numbers and distribution of the species. Therefore, implementation of the Conventional Pier Alternative would not affect the California least tern and there would be no significant impact to the species under NEPA. The Conventional Pier Alternative may affect, but is not likely to adversely affect the green sea turtle under the Endangered Species Act (ESA). Any such effects would be localized to the immediate area of the activity and, with implementation of the proposed Avoidance and Minimization Measures, would be unlikely to cause harm to individuals or have a persistent effect on numbers and distribution of the species. The Conventional Pier Alternative would have no significant impacts on the green sea turtle under NEPA. **Avoidance and Minimization Measures/SCMs:** • The following avoidance and minimization measures would be followed during the proposed pile driving activities. - The Navy would perform a visual sweep of the bay within a 384-ft (117-meters [m]) radius prior to commencing pile driving activities, and after a break in pile driving for more than 30 minutes. - If any marine mammals or green sea turtles are seen within this visual range, the Navy would not commence pile driving activities until 15 minutes have passed since the last such sighting, or the animal has moved out of the established range. - If a marine mammal or green sea turtle moves within the established range while		

Table ES-2. Summary of Potential Impacts and Avoidance and Minimization Measures/SCMs

Resource Area	Conventional Pier Construction Alternative	Modular Hybrid Pier Construction Alternative	No-Action Alternative
	pile driving activities are occurring, such activities would cease until the animal moves out of the area. - Prior to the start of pile driving each day, after each break of more than 30 minutes, and if any increase in the intensity is required, the Navy shall use a ramp-up procedure. The procedure involves a slow increase in the pile driving to allow any undetected animals in the area to voluntarily depart. • A cable net and floating boom would be used to capture debris that falls into the water during pier demolition. Such debris would be collected and disposed of onshore. • A *Caulerpa* survey (Surveillance Level) would be conducted prior to in-water project activities, consistent with National Marine Fisheries Service and California Department of Fish and Wildlife requirements. If Caulerpa was found in the study area during this survey, eradication techniques would be used in accordance with approved Caulerpa Control Protocols. • Subject to the terms and conditions identified in the project-specific USACE Section 404 and Section 10 permit, the Navy would deploy precautionary measures to alleviate turbidity associated with demolition and construction activities.		
Hazardous Materials and Wastes	**Hazardous Materials and Waste:** Demolition and construction contractors involved with the Conventional Pier Alternative would be subject to all applicable requirements for hazardous materials and hazardous waste management, and would be required to follow the Navy's Hazardous Waste Management Plan (HWMP) for the San Diego Metro Area. In addition, a site-specific construction SWPPP would be developed; approved by the Base, and implemented by the demolition and construction contractor which would incorporate BMPs designed to minimize the potential for hazardous material releases during demolition and construction activities. Through implementation of the above-mentioned procedures, there would be no increase in human	Under the MHP Alternative, the impacts associated with demolition and construction activities would be similar to those discussed under the Conventional Pier Alternative. No increase in solid waste impacts, human health risk or environmental exposure to hazardous materials or hazardous wastes would occur; therefore, there would be no significant	Under the No-Action Alternative, no demolition or construction activities would occur and industrial activities currently being conducted in the area would continue. Therefore, there would be no significant impacts with respect to: solid waste; hazardous materials and hazardous waste impacts from implementation of the No-Action Alternative.

Table ES-2. Summary of Potential Impacts and Avoidance and Minimization Measures/SCMs

Resource Area	Conventional Pier Construction Alternative	Modular Hybrid Pier Construction Alternative	No-Action Alternative
	health risk or environmental exposure to hazardous materials or hazardous wastes from implementation of the Conventional Pier Alternative. Completion of the Navy's site approval process, and adherence to the NBSD Explosives Safety Officer's requirements would ensure that implementation of the Conventional Pier Alternative would not result in a significant impact to explosives safety and handling at NBSD, or pose a safety risk to contractor personnel involved in the demolition and construction. The contractor would also be notified of the potential presence of unexploded ordnance (UXO) at the project site. The risk associated with any potential explosive safety hazard would be further minimized by setting up and following explosive safety procedures to train and protect onsite workers. Therefore, no significant impacts with respect to: hazardous materials; hazardous wastes; or explosives would occur with implementation of the Conventional Pier Alternative. **Hazardous Materials/Waste Avoidance and Minimization Measures/SCMs:** • All Pier 8 maintenance contractor-owned hazardous materials and wastes from prior jobs would be removed from Pier 8 before demolition activities begin. • Project contractors' vehicles would be parked within an on-shore staging area. No vehicle fueling or maintenance would take place at the project site. • Contractors would be required to follow the HWMP for the San Diego Metro Area, which contains guidance ensuring that Navy commands and contractors manage hazardous waste in accordance with requirements specified in: federal; state and local laws and regulations including Title 40 Code of Federal Regulations; Title 22 California Code of Regulations; California Health and Safety Code and San Diego County Code of Regulatory Ordinances. • A site-specific construction Stormwater Pollution Prevention Plan (SWPPP) incorporating best management practices	impacts with respect to: hazardous materials; hazardous waste; and solid waste from implementation of the MHP Alternative. **Avoidance and Minimization Measures/SCMs:** Under the MHP Alternative, avoidance and minimization measures/SCMs would be the same as those for the Conventional Pier Alternative.	**Avoidance and Minimization Measures/SCMs:** Under the No-Action Alternative, avoidance and minimization measures/SCMs would not be necessary.

Table ES-2. Summary of Potential Impacts and Avoidance and Minimization Measures/SCMs

Resource Area	Conventional Pier Construction Alternative	Modular Hybrid Pier Construction Alternative	No-Action Alternative
	(BMPs) designed to minimize the potential for hazardous material releases during demolition and construction activities would be: developed; approved by the Base; and implemented by the demolition and construction contractor. • Any hazardous materials and wastes generated during construction and operational activities would also be subject to installation-wide Emergency Planning and Community Right-to-Know Act Section 312 and 313 reporting requirements. • During the removal of lead-based paint, temporary work site containment structures would be erected to capture and filter all contaminated air during abrasive blasting and cleanup. Air monitoring would be completed each day. Samples would be gathered each day and tested by a California certified lab to establish the permissible exposure limit over an eight-hour time weighted average. • All asbestos containing materials (ACM) would be removed using wet methods and appropriate personal protective equipment would be used by personnel. Sections of abated materials would be placed in a double poly lined closed container. The San Diego Air Pollution Control District (SDAPCD) would be notified in writing of the planned removal of friable ACM per regulations. Notification would also be made to the California Division of Occupational Safety and Health. The latest applicable requirements of federal, state, and local regulations governing removal and disposal of ACM would be complied with. • All waste would be characterized for: proper reuse; recycling; or disposal; including paint chips, piping, etc. • NBSD would send the San Diego County Department of Environmental Health (DEH) written notice of its intent to demolish the BOWTS pipeline. Prior to demolition, the BOWTS high density polyethylene (HDPE) pipeline would be flushed with high-pressure water from the service lines on Pier 8. The cleaning water would be pumped through the BOWTS for treatment at the NBSD BOWTS		

Table ES-2. Summary of Potential Impacts and Avoidance and Minimization Measures/SCMs

Resource Area	Conventional Pier Construction Alternative	Modular Hybrid Pier Construction Alternative	No-Action Alternative
	treatment plant. • NBSD would be required to submit to DEH the professional engineer certification of the new pipelines before the lines could be used. • The demolition and construction contractor would be required to place booms around the demolition and excavation footprint to avoid ground-disturbance at closed Installation Restoration Site 8. • To ensure safety during the project demolition and construction activities, the NBSD Explosives Safety Officer must be provided contractor points of contact. The Safety Officer would notify the contractors when explosives would be handled at Pier 7, so that contractor personnel can be evacuated from the site. • The contractor would be notified of the potential presence of UXO at the project site through a contract clause that includes Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8020.15. • Should UXO be encountered during pier demolition; pile driving; or pier construction, the following steps would be followed: - The contractor site project manager would notify the Navy project manager. Naval Base Point Loma and the Navy's Silver Strand Training Complex for Special Forces security would also be notified. - All work would stop that would put personnel, equipment, or property at risk due to the presence of UXO. - The servicing Navy Explosive Ordnance Disposal (EOD, the U.S. Navy experts for disposal of waste military munitions) mobile unit or detachment would be notified. - NOSSA Ordnance Environmental Support Office would be notified. **Solid Waste:** NBSD has a program in place to divert its construction and demolition waste from Miramar Landfill to the maximum extent possible. Based on adherence to these NBSD requirements, implementation of the		

Table ES-2. Summary of Potential Impacts and Avoidance and Minimization Measures/SCMs

Resource Area	Conventional Pier Construction Alternative	Modular Hybrid Pier Construction Alternative	No-Action Alternative
	Conventional Pier Alternative would not result in significant solid waste impacts. **Solid Waste Avoidance and Minimization Measures/Special Conservation Measures (SCMs):** • The Navy Region Southwest Integrated Solid Waste Management Program would attempt to determine a resale or recycling use for the materials resulting from the Pier 8 demolition before approving them for landfill disposal. • The contractor would be required to submit a Solid Waste Management Plan to the NBSD Construction and Demolition Debris Diversion Manager. • An estimated 75 to 90 percent of the concrete debris from the demolition of Pier 8 would be crushed for recycling in future construction projects. Only concrete that could not be recycled would be landfilled. • Iron, steel, high density polyethylene (HDPE) pipe and asphalt demolition debris would also be recycled rather than landfilled, as determined by suitability. • During demolition activities, the contractor would be required to submit monthly diversion summary reports and weight tickets from recyclers to prove that materials are being diverted according to the project's Solid Waste Management Plan. • Throughout the demolition phase, a spud-anchored barge and barge mounted cranes would be used as well as scows for the collection and removal of demolition debris.		
Noise	Pile driving would be the dominant noise-generating activity associated with the proposed project. Airborne noise levels in residential areas and schools in National City would be less than the National City construction ordinance limit of 60 A-weighted decibel (dBA) Energy Equivalent Level (Leq). Therefore, there would be no significant airborne noise impacts from implementation of the Conventional Pier Alternative. Pile driving likely would disturb fish, marine mammals, and sea turtles in the immediate	Under the MHP Alternative, the impacts associated with demolition and construction activities would be similar to those discussed under the Conventional Pier Alternative. However, under this alternative, there would be less pile driving, which would	Under the No-Action Alternative, no demolition or construction activities would occur and the area's acoustical environment would remain unchanged. Therefore, there would be no significant airborne and underwater noise impacts from implementation of the No-Action Alternative.

Table ES-2. Summary of Potential Impacts and Avoidance and Minimization Measures/SCMs

Resource Area	Conventional Pier Construction Alternative	Modular Hybrid Pier Construction Alternative	No-Action Alternative
	vicinity of the project site. However, these organisms would be able to move out of the area during project activities and return after in-water project activities are completed. Given the low levels of disturbance and limited abundance of these animals (marine mammals and green sea turtles) in the project region, no significant long-term impacts would occur and there would be no reasonably foreseeable "takes" of marine mammals as defined by the Marine Mammal Protection Act. Further, the project area would represent a small percentage of the available resources, and project activities are considered localized. Therefore, there would be no significant underwater noise impacts from implementation of the Conventional Pier Alternative. **Avoidance and Minimization Measures/SCMs:** The following avoidance and minimization measures would be followed during the proposed pile driving activities: • The Navy would perform a visual sweep of the bay within a 384-ft (117-m) radius prior to commencing pile driving activities, and after a break in pile driving for more than 30 minutes. • If any marine mammals or green sea turtles are seen within this visual range, the Navy would not commence pile driving activities until 15 minutes have passed since the last such sighting, or the animal has moved out of the established range. • If a marine mammal or green sea turtle moves within the established range while pile driving activities are occurring, such activities would cease until the animal leaves the area. • During pile driving, the Navy shall use a ramp-up procedure as follows: prior to the start of pile driving each day; after each break of more than 30 minutes; and if any increase in the intensity is required. The procedure involves a slow increase in the pile driving to allow any undetected animals in the area to voluntarily depart.	result in a shorter duration of noise impacts. As with the Conventional Pier Alternative, any noise would be localized and would cease upon completion of demolition and construction activities; therefore, there would be no significant airborne and underwater noise impacts from implementation of the MHP Alternative. **Avoidance and Minimization Measures/ SCMs:** Under the MHP Alternative, avoidance and minimization measures/SCMs would be the same as those for the Conventional Pier Alternative.	**Avoidance and Minimization Measures/SCMs:** Under the No-Action Alternative, avoidance and minimization measures/SCMs would not be necessary.

Table ES-2. Summary of Potential Impacts and Avoidance and Minimization Measures/SCMs

Resource Area	Conventional Pier Construction Alternative	Modular Hybrid Pier Construction Alternative	No-Action Alternative
Air Quality	Estimated emissions associated with the Conventional Pier Alternative would be below the *de minimis* levels for Clean Air Act (CAA) conformity; therefore, there would be no significant impacts to air quality from implementation of the Conventional Pier Alternative. **Avoidance and Minimization Measures/Special Conservation Measures (SCMs):** Emissions would be below the *de minimis* levels for CAA conformity, therefore, no avoidance and minimization measures/SCMs are proposed.	Emissions associated with the MHP Alternative would be less than those estimated for the Conventional Pier Alternative. Emissions would be below the *de minimis* levels for CAA conformity; therefore, there would be no significant impacts to air quality from implementation of the MHP Alternative. **Avoidance and Minimization Measures/Special Conservation Measures (SCMs):** Emissions would be below the *de minimis* levels for CAA conformity, therefore, no avoidance and minimization measures/SCMs are proposed.	Under the No-Action Alternative, no demolition or construction activities would occur and existing air quality would not be affected. Therefore, there would be no significant impacts to air quality from implementation of the No-Action Alternative. **Avoidance and Minimization Measures/Special Conservation Measures (SCMs):** Under the No-Action Alternative, avoidance and minimization measures/SCMs would not be necessary.

DRAFT

ENVIRONMENTAL ASSESSMENT

PIER 8 REPLACEMENT AND DEMOLITION

NAVAL BASE SAN DIEGO

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CHAPTER 1
PURPOSE AND NEED FOR PROPOSED ACTION

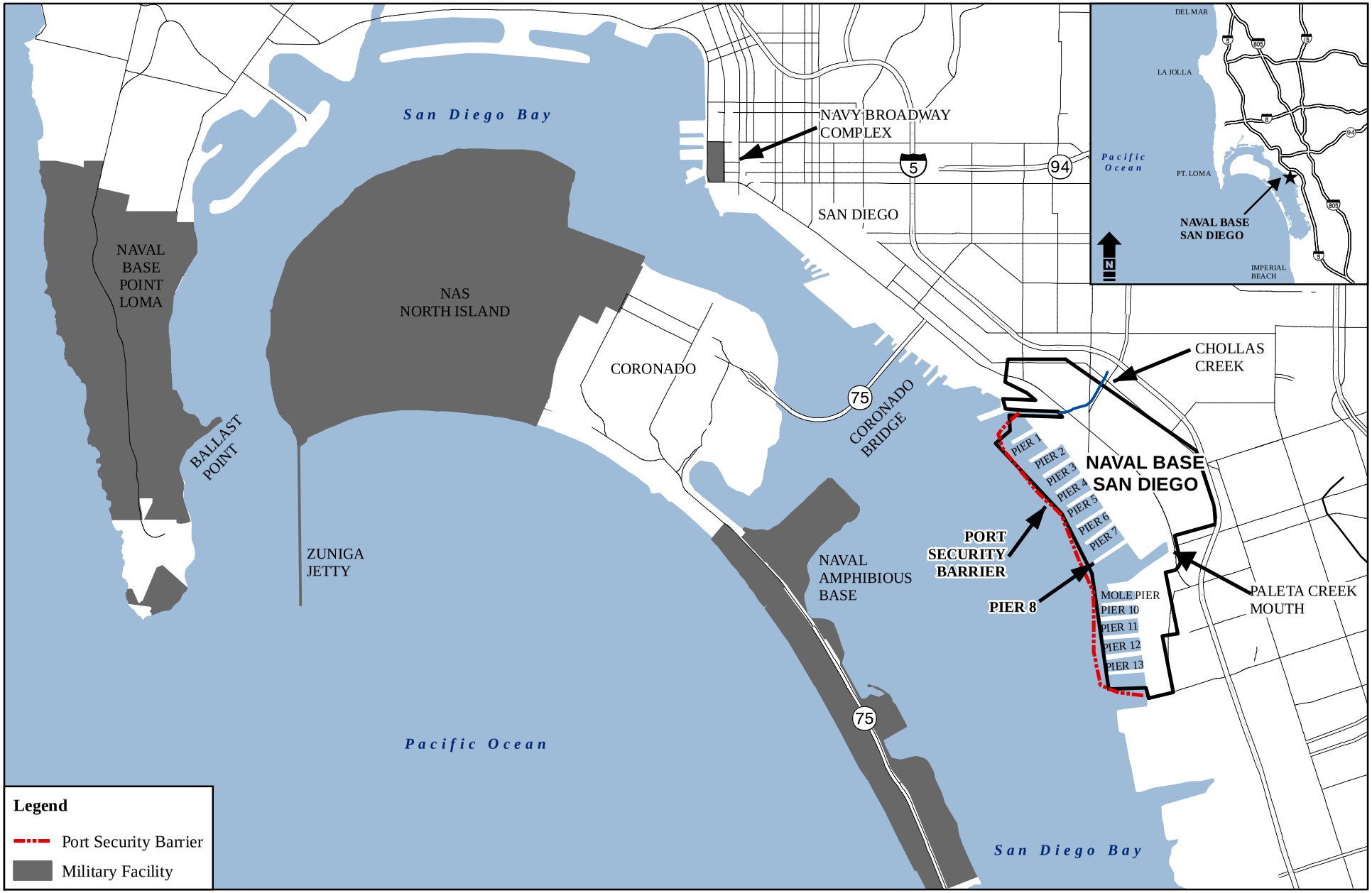
1.1 INTRODUCTION/BACKGROUND

This Environmental Assessment (EA) has been prepared by the United States (U.S.) Department of the Navy (Navy) in accordance with the National Environmental Policy Act of 1969 (NEPA) and other applicable laws.

Pier 8 is located at Naval Base San Diego (NBSD), a major port for Navy ships assigned to the Pacific Fleet and the major West Coast logistics base for surface forces of the Navy, dependent activities, and other commands (Figure 1-1). NBSD activities include performing Continuous Maintenance Availabilities (CMAVs) and loading supplies for fleet vessels (Navy Region Southwest 2012, Navy 2010). CMAVs are on-going repairs, maintenance work, alterations, and testing for ships while docked at the Navy piers rather than waiting for a major maintenance issue to arise resulting in increased costs for off-site shipyard work. Continuous maintenance allows work to be done more frequently when it is needed, keeps the ships in better ongoing condition, and keeps the ships mission-ready at all times. Since 2010, an average of 29 CMAVs has been completed annually at NBSD, requiring laydown support on the piers. The annual rate of CMAVs, and need for pier laydown space is anticipated to increase with the increase in the number of vessels to be homeported at NBSD by the year 2020.

NBSD has 12 piers, 7 of which (including Pier 8) are capable of serving deep-draft vessels; 29 deep-draft vessels are currently homeported at NBSD (NBSD 2014). Large deep-draft amphibious vessels that transport vehicles, aircraft, logistics support, etc. for the U.S. Marine Corps must be loaded from the rear (NBSD 2013a). Just two of the NBSD 12 deep-draft piers (Piers 6 and 8) comprise over 66 percent of NBSD's capability to load these vessels known as dock landing ships/landing platform docks (Landing Ship Dock [LSD]/Landing Platform Dock [LPD]) (Navy Region Southwest [NRSW] 2012). Piers 6 and 8 are the most time-and cost-efficient locations for loading the LSD/LDP vessels (NBSD 2013a). Effective support of current and future NRSW port activities depends on the ability to maintain piers in good condition.

A 70-year-old structure, the existing Pier 8 was not designed to be compatible with the dimensions of modern vessels, and is nearing the end of its service life. The load restriction for mobile cranes operating on Pier 8 is 35 tons (crane and load combined weight). Modern piers are designed and constructed to support 150-ton capacity crane and material combined weight. The width of existing Pier 8 is 66 feet (ft). A standard modern pier is 117 ft wide providing enough lay down area for movement of supplies, storage for items being loaded and unloaded, crane operations, truck and forklift operations, utilities, and to ensure safe passage for emergency vehicles.



0 0.5 1 2 Kilometers

0 0.5 1 2 Miles

Figure 1-1
Regional Location of Naval Base San Diego

The combined weight and width limitations at Pier 8 result in 80 percent of crane operations being diverted to floating cranes, increasing crane costs by approximately $730,000 annually. The existing fire lane on Pier 8 is inadequate, and infrastructure (power, potable water, waste water, and steam lines) are old and in poor condition.

No new ship homeporting actions are specifically planned as a part of the proposed project. However, the proposed project would allow the future-year berthing of newer, larger, and more power-intensive ships. Port loading at NBSD is coordinated between the Commander Navy Region Southwest (CNRSW) Region Port Operations Shore Infrastructure Plan and Chief of Naval Operations Strategic Laydown Plan 2013 (CNRSW 2013). Ship berthing and pier operations (including pier maintenance) are included in these two plans and any potential operational impacts at Pier 8, both in water and on land, were analyzed as a part of the plan adoption process. Therefore, ship berthing operations associated with the Proposed Action are not addressed in this EA.

1.2 PROJECT LOCATION

The Proposed Action would be implemented at NBSD, which is located on the east side of San Diego Bay as shown in Figure 1-1. NBSD consists of approximately 723.5 acres of land and 326 acres of water (Naval Facilities Engineering Command [NAVFAC] Atlantic 2005). Harbor Drive divides NBSD into two main parts: the mainly industrial bay front area to the west of Harbor Drive and the community support complex to the east of Harbor Drive. The NBSD boundary is bordered to the north by the community of Barrio Logan, to the east by Interstate (I) 5, and to the south by the border of National City and Chula Vista.

The proposed Pier 8 project area is located in the NBSD pier complex. Pier 8 is located just north of the Mole Pier and the Paleta Creek Channel (Figure 1-2). Existing Pier 8 is approximately 1,610 ft long, 60 ft wide, and about 2.44 acres (NBSD 2012). The height of existing Pier 8 is approximately 12 ft above mean lower low water (MLLW) for its entire length (NAVFAC Southwest 2014). The landside of Pier 8 intersects Brinser Street.

1.3 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The project is needed to achieve and maintain Fleet readiness as a part of the Navy's overall mission to maintain, train, and equip combat-ready Naval forces capable of winning wars, deterring aggression, and maintaining freedom of the seas. Providing support for Fleet readiness requires adequate deep-draft berthing capabilities at NBSD for vessels undergoing CMAVs and offload/onload services. Pier 8 is essential to the mission of the NBSD and the Navy to maintain combat-ready Naval forces by providing deep-draft berthing for vessels for these activities. To further support Fleet readiness, the Proposed Action is needed to provide adequate ship berthing to support the mix of Pacific Fleet ships for current and future homeporting requirements, and to support ships that require temporary facilities in San Diego Bay. The existing Pier 8 is inadequate to support Fleet berthing needs due to the following factors (NBSD 2012, NRSW 2012):

0 250 500 Meters

0 1,000 2,000 Feet

Figure 1-2
Pier 8 Location at Naval Base San Diego

N

- Inadequate deck size: The existing Pier 8 is only 66 ft wide by 1,610 ft long, versus a proposed 117 ft wide by 1,600 ft long pier with load capabilities to support modern ships and support facilities such as cranes, in accordance with current military construction handbook standards (NBSD 2012). Further, the existing Pier 8 is not wide enough for cranes, ship maintenance vehicles and equipment, and the passage of emergency vehicles should an accident occur.
- Structural deterioration: The existing pier has cracked and broken deck areas and piles along with attendant health and safety concerns for personnel during berthing operations and non-compliance with current structural and seismic criteria. Due to its deterioration and deficiencies, by 2018 existing Pier 8 will no longer be considered functional.
- Inadequate utilities: Existing Pier 8 is unable to supply the required power for power-intensive vessels.
- Outdated: Existing Pier 8 was constructed in 1945, was designed for World War II-era ships, and is not suitable for berthing and servicing the Navy's current and future fleet (NBSD 2012). Existing Pier 8 is too narrow to support maintenance of the USS Essex LHD 2 amphibious assault ship without work-arounds that would add approximately $4.1 million in extended months in dry-dock and worker overtime. Since 2009, the Navy has been bringing the littoral combat ship into the fleet; this vessel has an extensive, more demanding pierside footprint requirement than typical vessels (NBSD 2013a). The Navy estimates that eventually 55 to 60 percent of all littoral combat ship vessels will be in San Diego at any given time as all 16 vessels work to reach full operating capacity. Based on the continuing need for berths to support modern and future classes of ships, failure to construct a replacement pier would not allow current and future missions at NBSD to be fulfilled.

The purpose of the Proposed Action is to address the current and impending shortfall at NBSD of pier infrastructure necessary to support modern Navy ship classes with deep-draft and power-intensive requirements. In particular, the effective berthing requirement for ships homeported at NBSD is 38, based on a total requirement of 57 ships (NBSD 2012). Of these 57 ships, 27 are deep-draft and power-intensive and 4 are power-intensive, which underscores the importance of having piers such as the proposed Pier 8 that can support these classes of ships. Experience at NBSD shows that the number of ships undergoing CMAVs, training, or decommissioning; visiting ships; and pier repairs combine to reduce the number of actual available berths to 37 at any given time (NBSD 2012). The replacement Pier 8 would provide an additional four deep-draft and power-intensive berths to support the U. S. Pacific Fleet with necessary utilities, deck space, and berthing capacity for modern vessels.

1.4 DECISION TO BE MADE

The decision to be made as a result of the analysis in this EA is to decide if an Environmental Impact Statement (EIS) needs to be prepared. An EIS will need to be prepared if it is determined that the Proposed Action or other alternative ultimately selected for implementation would

have significant impacts to the human or natural environment. Should an EIS be deemed unnecessary based on the effects analysis of the alternative selected for implementation, this selection would be documented in a Finding of No Significant Impact (FONSI).

1.5 SCOPE OF THE ANALYSIS

NEPA and Council on Environmental Quality (CEQ) regulations and Navy procedures for implementing NEPA specify that an EA should address only those resource areas potentially subject to impacts. In addition, the level of analysis should be commensurate with the anticipated level of environmental impact. Relevant pre-planning studies that determined the scope of analysis include:

- CNRSW Region Port Operations Shore Infrastructure Plan dated 1 September 2010;
- Chief of Naval Operations Strategic Laydown Plan 2013;
- Navy Region Southwest Business Case Analysis NBSD Pier 8 Assessment 31 October 2012;
- Water Quality Monitoring Report P-440 Pier 8 Reconstruction and Pier 14 Demolition Project, Naval Base San Diego (AMEC Earth & Environmental, Inc. [AMEC] March 2008);
- Sediment Quality Characterization Naval Station San Diego Final Summary Report. Technical Report 1777. Space and Naval Warfare Systems Center San Diego (Chadwick *et al.* 1999);
- Inventory and Evaluation of National Register of Historic Places Eligibility for Cold War Era Buildings and Structures on Naval Base San Diego, San Diego County, California. (JRP Historical Consulting Services 1999);
- San Diego Bay Circulation, a Study of the Circulation of Water in San Diego Bay for the Purpose of Assessing, Monitoring and Managing the Transport and Potential Accumulation of Pollutants and Sediment in San Diego Bay (Largier 1995); and
- Programmatic Agreement Among the CNRSW the Advisory Council on Historic Preservation, and California State Historic Preservation Officer Regarding Navy Region Southwest Undertakings within the San Diego Metropolitan Area, California (CNRSW 2003).

Resources carried forward for detailed analysis in this EA include: air quality, water resources, marine biological resources, noise, and hazardous materials and wastes. Several resource areas have not been carried forward for detailed analysis in this EA since potential impacts were considered non-existent or negligible. The resources not carried forward for analysis, and the rationale for not carrying these resources forward are discussed below.

- **Cultural Resources –** No known archaeological or cultural resources sites at NBSD are found within the proposed Area of Potential Effect; the proposed project site is more than 100 meters (m) from identified historic properties. The project site is located on

tidelands backfilled with excavated materials, thus the potential for buried archaeological resources is precluded.

- **Geological Resources –** Minimal surficial modifications associated with the proposed project would not result in impacts to geology and topography, and the proposed new Pier 8 and associated infrastructure would be designed and constructed in accordance with U.S. Army Corps of Engineers (USACE) Unified Facilities Criteria seismic standards.
- **Transportation –** Implementation of the Proposed Action would not involve any new land uses or activities, such as ship berthing or pier operations and maintenance that could result in additional and recurring daily traffic generation. With either the Conventional Pier or the Modular Hybrid Pier (MHP) Alternative, the temporary vehicle trip generation during demolition and construction (comprising worker commute and truck trips) would be lower than the volumes that would trigger a significant traffic impact according to City of San Diego minimum performance standards for streets. The construction contractor would be required to prepare and receive Navy approval of a separate Traffic Control Plan to address the estimated minimal temporary increases in traffic during the construction period. Vessel traffic would be negligible and in-water activities would take place inside existing restricted navigation zone (Security Zone) that is outside the federal navigation channel and off-limits to civilian vessels, so there would be no significant impacts to vessel transportation.
- **Land Use –** The current land use of the project area consists of pier infrastructure to accommodate NBSD's ship berthing requirements. Beyond demolition and replacement of Pier 8 and its associated utilities, no additional land use modifications would occur. The existing military land use would continue to support NBSD pier operations and no land use compatibility issues would occur.
- **Coastal Zone Management** (Coastal Zone Management Act [CZMA] Compliance) **–** The Navy conducted an effects analysis as part of its determination of the action's effects for purposes of federal consistency review under the CZMA. The analysis determined that the Proposed Action would have no significant effects to coastal uses and resources. The Navy prepared a Coastal Consistency Negative Determination and consulted with the California Coastal Commission (CCC) on all project components. The CCC found the proposed project would not adversely affect coastal resources and concurred with the Navy's Negative Determination (refer to Appendix A).
- **Aesthetics –** The proposed new Pier 8 would have the same general appearance as the existing Pier 8 and therefore, would blend in with the suite of piers that occupy the bay. Views within the San Diego Bay would remain consistent with the military and industrial nature of the surrounding area.
- **Socioeconomics and Environmental Justice –** The Proposed Action would take place within NBSD property boundaries. It would be result in beneficial socioeconomic effects as short-term demolition and construction jobs would be generated, bringing revenue

- **Public Services**. – Demolition and construction for the Proposed Action within NBSD would not place any additional demand on public services such as fire protection and police protection, nor would it interfere with their operations. The short-term increase in employment would not change demand for health care services and or public schools. Therefore, there would be no significant impacts to public services.

- **Utilities** – No new public utilities are required and none are proposed. Replacement of Pier 8 would include upgrading the electrical utilities from 480 volts to 4,160 volts to adequately service the ships. The electrical utilities upgrade for the new Pier 8 is already being implemented via the NBSD Pier 12 Replacement Project (Military Construction P-327). The electrical cables would be installed at the switching station and connect to the end of the pier. Upgrading the Pier 8 electrical utilities can be accommodated without significantly impacting the NBSD utility system/network capacity and the public utility infrastructure. The Proposed Action comprises demolition and replacement of Pier 8 over its existing footprint at NBSD in San Diego Bay, where there are no submarine utility cables or pipelines. There are no buried cables or pipelines in the approximately 250 square-foot on-shore construction footprint. Therefore, the Proposed Action would have no significant impact to utilities and utility corridors.

- **Public Health and Safety and Protection of Children** – The demolition and construction phases of the Proposed Action would take place within a secure area not accessible to the general public. The demolition and construction contractor(s) would be required to prepare and implement health and safety plans in accordance with federal and state regulations. As described in Section 3.5 of this EA, hazardous materials and wastes associated with the Proposed Action would be properly managed in accordance with applicable regulations.

  The contractor would be notified of the potential presence of unexploded ordnance (UXO) at the project site through a contract clause that includes Naval Ordnance Safety and Security Instruction 8020.15, which contains definitions of military munitions and UXO, and assigns responsibility and establishes procedures and reporting requirements for oversight, review, and verification of the explosives safety aspects of the Navy's Munitions Response Program followed.

  Completion of the Navy explosives site approval process, and adherence to the NBSD Explosives Safety Officer's requirements would ensure that implementation of the Proposed Action would not result in a significant impact to explosives safety and handling at NBSD, or pose a safety risk to the public or contractor personnel involved in the demolition and construction. Therefore, the Proposed Action would not have a significant impact on public health and safety.

  The Proposed Action would not substantially affect human health or the environment, and would take place within a secure area not accessible to the public. Therefore, with regard to Executive Order (EO) 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, the Proposed Action would not create disproportionate risks to children.

- **Public Services: Police; Fire; Schools –** The Proposed Action would take place entirely within the boundaries of NBSD, and would not involve or affect civilian public services such as police, fire, and school departments.

1.6 INTERGOVERNMENTAL COORDINATION

The Navy is working with the following agencies to obtain the necessary authorizations, concurrences, or permits for implementation of the project (in progress unless otherwise noted):

- Regional Water Quality Control Board (RWQCB): Section 401 Water Quality Certification;
- Storm Water Pollution Prevention Plan (SWPPP) pursuant to the general permit for construction-related discharges as regulated by the RWQCB (to be prepared by the construction contractor before demolition/construction activities);
- California Coastal Commission (CCC): The Navy prepared a Coastal Consistency Negative Determination and has received concurrence from the CCC (see Appendix A);
- National Marine Fisheries Service (NMFS): concurrence on the Essential Fish Habitat (EFH) analysis and determination (see Appendix A);
- NMFS: concurrence on the Endangered Species Act (ESA) Section 7 informal consultation (see Appendix A); and
- U.S. Coast Guard (USCG): coordination regarding Notices to Mariners for construction barge crane and other project vessels (to be obtained by the construction contractor before demolition/construction activities).

1.7 PUBLIC AND AGENCY PARTICIPATION

Regulatory agencies participating in this project include: USACE, U.S. Fish and Wildlife Service (USFWS), NMFS, RWQCB, USCG, and the CCC as described in Section 1.6. Appendix A documents the correspondence between the Navy and the regulatory agencies involved in this project.

Regarding the public involvement process, a Notice of Availability for the Draft EA was published in the San Diego Union Tribune on 6, 7, and 8 March 2015 to initiate a 30-day public review of the Draft EA. The public review period of the Draft EA was 30 days beginning on 6 March 2015 and ending on 6 April 2015. The Draft EA was made available to the public at the following local libraries: San Diego Central Library; Point Loma/Hervey Branch Library; and Ocean Beach Branch Library and via the Navy website:

http://www.cnic.navy.mil/regions/cnrsw/om/environmental_support/Public_Review_of_Navy_Projects/Naval_Base_San_Diego_Pier_8_Replacement_Draft_EA.html

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CHAPTER 2
PROPOSED ACTION AND ALTERNATIVES

This chapter includes the reasonable alternative screening criteria, a description of the Proposed Action and alternatives, and alternatives considered but not carried forward for detailed analysis. It also includes a brief summary of the anticipated environmental impacts that would occur from each alternative.

Pier Operations

Potential effects for the Proposed Action components (i.e., existing Pier 8 demolition and new Pier 8 and facilities replacement) are addressed in Chapter 3. As previously noted, no new ship homeporting actions are specifically planned as a part of the proposed project. Port loading at NBSD is coordinated between the CNRSW Region Port Operations Shore Infrastructure Plan and Chief of Naval Operations Strategic Laydown Plan 2013 (CNRSW 2013). Ship berthing and pier operations (including pier maintenance) are included in these two plans and any potential operational impacts at Pier 8, both in water and on land, were analyzed as a part of the plan adoption process. Therefore, ship berthing operations associated with the Proposed Action are not addressed in this EA. While Pier 8 is being demolished and replaced, existing berthing operations would be re-distributed to the other NBSD piers (refer to Figure 1-2). Piers 2, 3, 6, 7, 10, 12, and 13 would accommodate deep-draft vessels (NBSD 2013). Piers 12 and 13 would also accommodate power-intensive vessels (NBSD 2013).

2.1 REASONABLE ALTERNATIVES SCREENING FACTORS

The criteria used to select reasonable alternatives that would allow mission, operational, and support functions to be fulfilled for modern Navy ships are as follows:

- Pier design that accounts for operational and safety considerations as influenced by tidal and seismic conditions in San Diego Bay, as well as efficiency and reliability to provide necessary support functions;
    - *Tidal Conditions* - Accommodate ship berthing at a normal (astronomical) tidal range of 5.73 ft MLLW to mean higher high water and at an extreme high water of 8.35 ft (relative to MLLW) and at an extreme low water equal to -2.88 ft (relative to MLLW). Must be capable of adaptation (to provide ship berthing) for a sea level rise of 3 ft that may occur within the facility's life cycle (NAVFAC Southwest 2008a).
    - *Seismic Conditions* - Provide life safety, no loss of operational performance, and no release of hazardous materials to the environment after a Level 2 seismic event (Naval Facilities Engineering Service Center 1999, DOD 2005). A Level 2 seismic event has a 10 percent probability of exceedance in 50 years (475-year return).
- Location in a security-controlled setting in San Diego Bay that would not interfere with navigation channels;

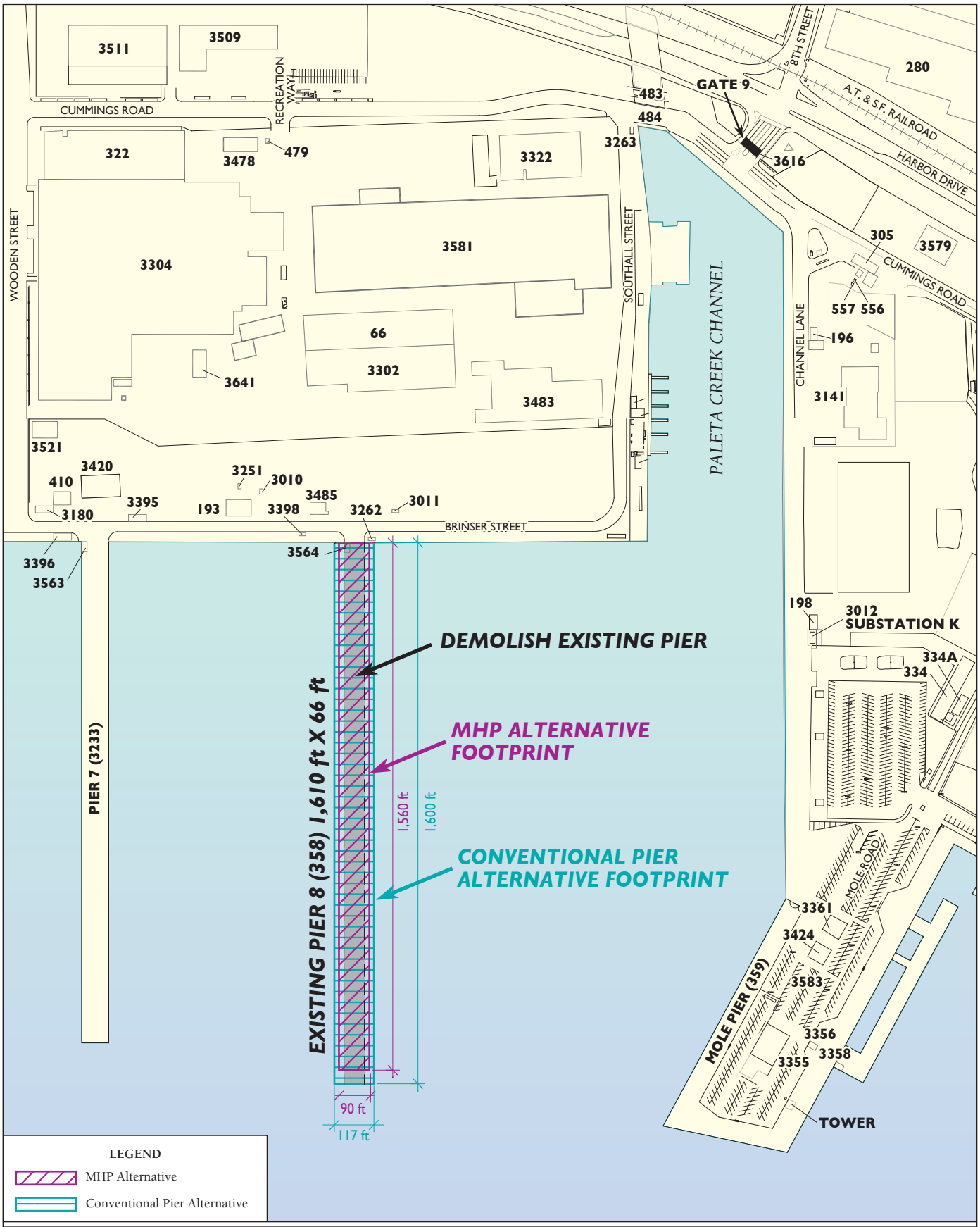


Figure 2-1
Site Plan for Pier 8

- Ability to accommodate ship explosive safety quantity distance (ESQD) arcs within Navy-controlled areas; and
- Pier design features that accommodate an existing depth of 37 ft MLLW and landside facilities (e.g., ship hotel services including compressed air, wastewater and water facilities, and a bilge oily water wastewater treatment system [BOWTS]).

2.2 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The Proposed Action comprises demolishing the inadequate existing Pier 8, constructing a replacement Pier 8, and providing associated pier utilities at NBSD (see Figure 2-1). Replacing Pier 8 would provide the necessary infrastructure and berthing space to adequately accommodate the Navy's modern ship classes. Provided below in Section 2.2.2 are the construction alternatives for implementing the Proposed Action: the Conventional Pier Alternative and the MHP Alternative.

The Proposed Action would also create the infrastructure necessary to support modern Navy ship classes with deep-draft and power-intensive requirements; however, as discussed in Section 1.1, future port operations supported by the Proposed Action are not addressed in this EA. The proposed project does not include dredging because Pier 8 is already designed as a high deep-draft pier; however, maintenance dredging could possibly be done if needed.

Anti-Terrorism/Force Protection (AT/FP) measures for the new pier would include a security gate and fencing, pedestrian turnstile, a watch tower 20 ft in height, a guard house, and high mast lighting, consistent with current security requirements.

2.2.1 Pier Demolition

Demolition of existing Pier 8 would occur with either construction alternative presented below in Section 2.2.2. The analysis contained in this EA assumes that demolition of Pier 8 would take approximately 11 months and would begin no sooner than 2018 (NAVFAC Southwest 2014a).

Typical pier demolition takes place bayward to landward and from the top down (NAVFAC Southwest 2007a). First, the fender piles and exterior appurtenances (such as utilities) would be demolished above and below the pier deck. Then, the deck would be demolished using sawcutting and jack hammering. Subsequently, structural piles would be extracted with cranes. A total of 1,830 concrete structural piles would be removed using dry pulling alone or with the assistance of a vibratory hammer to loosen the piles. An additional 343 fender piles (concrete and plastic) would also be removed using the same method(s) (NAVFAC Southwest 2014b); the total number of piles removed would be 2,173. Table 2-1 summarizes the piles to be removed during demolition. Throughout the demolition phase, the following would be used to remove, collect, and transport the demolition debris (NAVFAC Southwest 2007b): a spud-anchored barge, barge and wharf cranes, one tug boat, mobile construction equipment, transport trucks, and scows (NAVFAC Southwest 2007b).

Table 2-1. Existing Pier 8 Piles to be Removed

Pile Dimensions and Type	Number of Piles	Total Length (approx.) ft	Surface Area (approx.) square ft
18-inch square concrete structural	1,830	37,515	249,940
16-inch diameter concrete fender	160	3,280	13,723
16-inch diameter plastic fender	183	3,751	15,696
Total	**2,173**	**44,546**	**279,360**

Sources: NAVFAC Southwest 2004. Control Inspection of Piers 2, 4, 6, 8, and 14 at NBSD. Site Specific Report SSR-2947-SHR. June; NAVFAC Southwest 2014a.

Shoreside, all water and sewer laterals connected to Pier 8 would be cut and capped at the mains to prevent the formation of dead-end pipes in the water and sewer systems. An excavation permit would be obtained and underground utilities would be located prior to performing any drilling or excavation work at the site. All water meters and back flow devices would be turned over to NAVFAC Utilities. In the event of damage to the utility infrastructure, the demolition and construction contractors would notify the NAVFAC Utilities Duty Desk (NAVFAC Southwest 2008c).

Demolition Equipment

Two driving/demolition crane barges (60 ft by 120 ft and 50 ft by 100 ft) and two support barges (both approximately 35 ft by 90 ft) would be used during demolition. In addition, a system of rafts would be used onto which demolition materials would be lowered and that would capture any incidental debris. The system of rafts would consist of six 5.5-ft by 8-ft rafts, six 5.5-ft by 28-ft rafts, and smaller rafts that would be added to fill any holes, for approximately 1,100 square ft of raft within the work area. The rafts would be lashed together and tied off to the existing pier pile. The rafts would be moved throughout the project as necessary. Debris that is collected would be floated out of the work area on rafts and would be disposed of or recycled as appropriate.

During demolition, floating slick bar booms would be used to provide a complete barrier to floating debris; however, because of the use of the system of rafts described above, very little debris (approximately 0.5 percent) is expected to reach the water. Any floating debris would be gathered in work boats and rafts and would be disposed of or recycled as appropriate.

Demolition Process

Hazardous Material Abatement

Hazardous material abatement would include the proper removal and disposal of lead-based paint (LBP) and asbestos-containing material (ACM) if present by licensed abatement contractors. Hazardous lead paint removal and ACM abatement would be completed by licensed contractors before demolition, as described in Section 3.3.3. The construction contractor would use the Navy's manifesting procedures for hazardous wastes. This work would be completed ahead of demolition activities and would last approximately 2 months.

Plastic Fendering System

This work would be performed from floating barge cranes as described above. Salvageable materials from this demolition process would be loaded onto flatbed trucks and hauled away for recycling. All other materials removed from the fendering system would be sized and hauled away to an approved disposal facility. This work would last approximately 1 month and would occur concurrently with the hazardous material abatement.

Mechanical and Electrical Utilities

All electrical and mechanical utilities would be properly terminated prior to demolition. Demolition of utilities under the pier would either occur with a hydraulic crane from the pier topside or a floating crane barge. Salvageable piping and electrical materials would be loaded in dumpsters and transported to a local recycler. This work would occur concurrently with the hazardous material abatement and would occur within the same 2-month timeframe.

Electrical Vaults

This work would include the removal of eight existing electrical vaults made of reinforced concrete that are part of the main pier structure. Temporary H-piles would be installed to support the vaults while the vaults' wall connections to the pier structure are being demolished. Once the vault walls are free of the pier structure, the vaults would be placed on a barge and floated to the quaywall where a large crane would remove them from the water. The vaults would be demolished to transportable sizes and hauled away for recycling. This operation would take approximately 1 month and would occur concurrently with the removal of cleat and bollard bases and the removal of the pier deck.

Cleat and Bollard Bases

This work would be performed with a mini excavator with a concrete breaker. All bollards and cleats would be hauled away for recycling. This operation would take approximately 18 days and would occur concurrently with the removal of electrical vaults and the removal of the pier deck.

Reinforced Concrete Pier Deck

Segmental concrete saw cutting of the pier deck would be performed and segments would be sawcut to transportable sizes and lifted by a floating crane barge onto a support barge and transported to the quaywall, where they would be offloaded on a flatbed truck and hauled away for recycling. Concrete slurry from the sawcut operation would be vacuumed as the saw cutting occurs. The system of rafts described above would be used under the demolition locations to capture any debris. This operation would take approximately 4 months and would occur concurrently with the removal of electrical vaults and cleat and bollard bases.

Removal of Concrete Pier Pilings

This work would be performed with a floating crane barge. The pilings would be dry pulled with a crane. A vibratory hammer may be used to loosen the piles. Once extracted, the piles would be loaded onto a support barge where they would be floated over to the quaywall, split

in half to maximize trucking, and then loaded on to a flatbed truck and transported for recycling. This operation would take approximately 4 months and would occur after the removal of the pier deck.

Repair Ramp; Quaywall; and Bollards

The final phase of work would occur after the completion of other work phases and take approximately 18 days to perform. It would include the placement of approximately 20 cubic yards of concrete, and a renovated steel ramp on the existing quaywall.

Demolition Debris

Several types of debris would result from the demolition of Pier 8, including concrete, steel, and asphalt. The Proposed Action would be in compliance with the Low-Impact Development Initiative requiring all demolition projects that take place after 2011 to recycle and divert materials from local landfills to the maximum extent practicable. Materials appropriate for recycling including concrete, steel, and asphalt would be recycled. Materials that cannot be recycled would be transported to a permitted landfill.

- Concrete debris would comprise the largest volume of demolition material, approximately 26,000 cubic yards of concrete from existing Pier 8 (NAVFAC Southwest 2008d). Approximately 75 to 90 percent of the concrete is estimated to be suitable for recycling. The steel reinforcement (re-bar) within the concrete would be removed and recycled separately. Alternately, an on-site mobile crusher would be used to crush the concrete debris. The crushed concrete would be stockpiled at an approved location on NBSD and would be available for use (e.g., roadbase or revetment construction [NAVFAC Southwest 2008e]) by other construction projects. The concrete debris from Pier 8 that could not be recycled, estimated to be in the range of 10 to 25 percent of the total (2,600 to 6,500 cubic yards) would be hauled to the upland Miramar (San Diego) or Otay Landfills (Chula Vista) that have capacity to accept this waste (NRSW 2008, Allied Waste Industries 2008).
- Steel debris, including approximately 1,800 tons of steel ties, steel rebar removed from the concrete, and wiring (e.g., utility wires) from Pier 8 (NAVFAC Southwest 2008d) would also be recycled or appropriately disposed as a requirement of the demolition contract (CNRSW 2008). Steel debris that could not be recycled would be disposed at Miramar or Otay Landfills, which have adequate capacity to accept the waste (NRSW 2008, Allied Waste Industries 2008).
- Asphalt debris would comprise a minor amount, approximately 100 cubic yards of the material generated from demolition at the base of Pier 8 where it abuts the adjacent roadway. The asphalt from Pier 8 would be trucked off site to an asphalt recycling facility if the quantity is sufficient for recycling in a cost effective manner. If recycling is determined not to be feasible, the asphalt debris would be placed in a nearby landfill, such as the Miramar Landfill (San Diego) or the Otay Landfill (Chula Vista), which have adequate capacity to accept the waste (NRSW 2008, Allied Waste Industries 2008).

2.2.2 New Pier Construction Alternatives

Three alternatives are carried forward for detailed analysis in this EA: the Conventional Pier Alternative, the MHP Alternative, and the No-Action Alternative. Section 2.4 of this EA, *Alternatives Considered but Not Carried Forward for Detailed Analysis* describes in detail why no other pier designs were carried forward for detailed analysis in this document.

2.2.2.1 Conventional Pier Construction Alternative

The demolition process described above in Section 2.2.1, *Pier Demolition* would be conducted under this Alternative.

One of the design alternatives for Pier 8 replacement would be to construct a single-deck, concrete berthing pier 117 ft wide by 1,600 ft long (NAVFAC Southwest 2007b). The footprint of the existing Pier 8 is approximately 2.44 acres. The footprint of the proposed Conventional Pier Alternative would be approximately 4.30 acres. The footprint of the MHP Alternative would be approximately 3.22 acres. With the Conventional Pier Alternative, the increase in bay shading would be approximately 1.86 acres, as compared with approximately 0.78 acres with the MHP Alternative. The height of the Conventional Pier Alternative would be the same as the existing pier at the quaywall (about 12 ft MLLW) but would gradually slope upward to reach 17 feet MLLW at the bayward (southwestern) end (NAVFAC Southwest 2014b).

With the Conventional Pier Alternative, the following would be installed using a floating crane and diesel hammer (pile driver): approximately 512 concrete octagonal structural piles; 4 24-inch concrete octagonal loadout cradle piles; and 204 concrete and composite square fender piles (NAVFAC Southwest 2014b). The structural piles would be 24 inches in diameter. The concrete/composite fender piles would be 24 inches square. Two hundred and thirty 14-inch diameter round plastic fender piles would also be installed with the pile driver (NAVFAC Southwest 2014b). The total number of piles installed would be 950. The average length of all the piles in the water column would range from 20.5 to 26 ft. The use of concrete, composite, and plastic piles rather than creosote-treated wood pilings is consistent with Navy policy and is preferred by the RWQCB because, unlike creosote-treated wood pilings, they are not a potential source for polycyclic aromatic hydrocarbons (PAHs) to the bay. Pile installation would occur during an approximately 11-month period (NRSW 2011). The fender system for the Conventional Pier Alternative would include 24 foam-filled fenders at the berths and plastic log camels.

The pier deck would be constructed on-site of rebar-reinforced concrete. Deck support would be by pre-stressed concrete (structural) piles with cast-in-place concrete pile caps and a concrete deck structure (NAVFAC Southwest 2007b). All pile and deck construction for Pier 8 would comply with current seismic standards. A single-deck replacement pier is expected to provide the best operational situation for NBSD, and last 67 years with the lowest life-cycle cost (NBSD 2012, NRSW 2012).

With the Conventional Pier Alternative, all construction materials would be delivered by truck. This would involve 188 truck trips to NBSD per day for delivery of materials such as concrete and rebar (see Table 3-1 in Chapter 3 under *Ground Transportation*).

The analysis contained in this EA assumes that construction of the Conventional Pier Alternative would take approximately 10 months. Assuming demolition begins in 2018 and lasts 11 months as stated in Section 2.2.1, construction of the Conventional Pier Alternative could occur in the period from 2018 through 2019 (NAVFAC Southwest 2014a ;NBSD 2014).

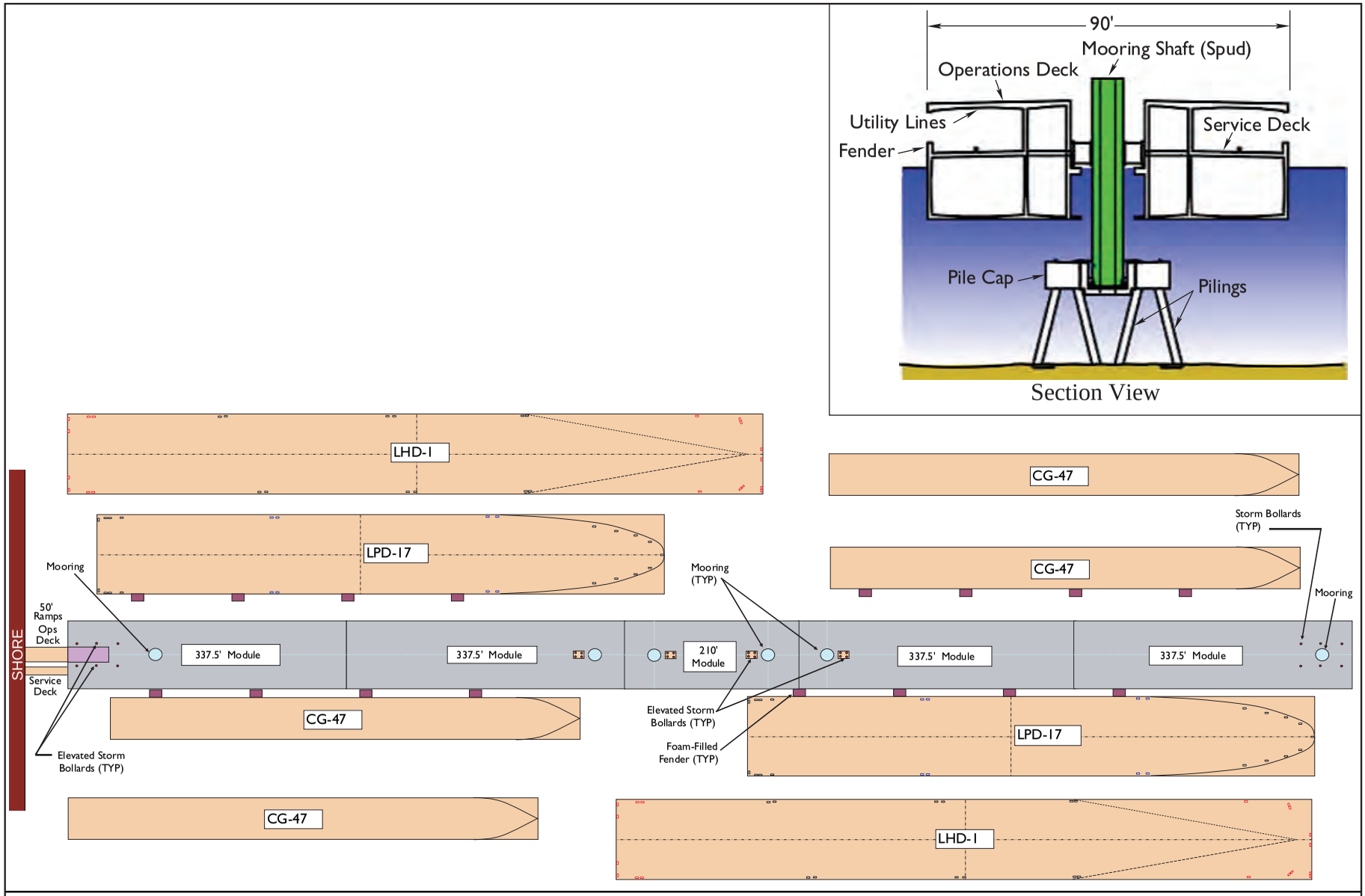
2.2.2.2 MHP Construction Alternative

The demolition process described above in Section 2.2.1, *Pier Demolition* would be conducted under this Alternative.

A second alternative for the Pier 8 replacement would be to construct a double-deck pier following the MHP design (Figure 2-2). The main difference between the MHP Alternative and the Conventional Pier Alternative is that the MHP Alternative would consist of five floating deck modules that would be constructed at a concrete pre-cast facility and towed to NBSD, i.e., the majority of the construction process would take place off-site (Navy 2003).

The MHP Alternative for Pier 8 would consist of five individual modules and six moorings resulting in a structure that would be 90 ft wide by 1,560 ft long (NAVFAC Southwest 2008b). The double-deck design would place utility pipelines and wiring on the lower deck, leaving the upper deck uncluttered for crane and maintenance operations, and allowing a lesser pier width of 90 ft as compared with the 117-ft width of the single-deck Conventional Pier Alternative. The narrower width meets requirements identified by Navy stakeholders (NAVFAC Southwest 2008g). The MHP Alternative would have a smaller footprint (3.22 acres) than the Conventional Pier Alternative (4.30 acres). With the MHP Alternative, the increase in bay shading over the existing Pier 8 (2.44 acres) would be approximately 0.78 acres, as compared with approximately 1.86 acres with the Conventional Pier Alternative. As shown in Figure 2-2 inset, the MHP is essentially a hollow concrete box that "floats" in the water, similar to a vessel. The draft for the MHP when fully loaded is assumed to be 14 ft (Springston 2004).

The MHP would be moored by six steel shafts that would stand on underwater pile dolphins (Figure 2-2 inset). The mooring shafts would be square, 3- to 5-ft wide, depending on site-specific tide and subsurface conditions (NAVFAC Engineering Expeditionary Warfare Center 2014). The underwater dolphins supporting the six moorings for the five floating modules would have 96, 24-inch diameter octagonal foundation concrete piles (16 piles per mooring) (NAVFAC Southwest 2008b). The average combined length of each mooring shaft and pile dolphin in the water column is assumed to be 13 ft. The average length of the piles in the water column is assumed to range from 7.5 to 13 ft. The MHP would also include elevated storm bollards, or mooring posts that are used for holding vessels steady by ropes against turbulence during lock operation. The MHP's elevation fluctuates with the tide, maintaining constant relative distance from ship decks to the pier deck. Ships can be berthed at less standoff distance since there is no risk that flared hulls or ship appendages will contact the pier as the tide drops (Springston 2004). The elevation of the MHP deck would vary over the light-to-loaded condition from approximately 13.9 ft MLLW to approximately 16.9 ft MLLW (NAVFAC Engineering Expeditionary Warfare Center 2014).



Not to Scale

Figure 2-2
Modular Hybrid Pier
Pontoon Structure

Unlike the Conventional Pier Alternative deck that would stand over the water on fixed piles, the MHP deck modules would be partially submerged in the water, and there would be no open space between the bottom of the pier and the water surface. Because the bottom and up to 14 ft of the sides of the MHP would be submerged, the MHP would have an in-water surface area of approximately 192, 093 square ft (including the surface area of the deck bottom, sides, 6 steel shafts, and 96 concrete piles).

The MHP Alternative would involve minimal pile driving activities: 96 concrete foundation piles would be driven as compared with 950 total piles for the Conventional Pier Alternative. The minimal number of foundation piles needed for the MHP Alternative equates to: shorter construction duration; decreased equipment mix; and decreased number of material transport truck trips (NAVFAC Southwest 2008b). The MHP Alternative would involve only 18 truck trips per day to NBSD for delivery of construction materials (Table 3-1 in Chapter 3 under Ground Transportation). Pier deck installation time would be considerably less than for the Conventional Pier Alternative, representing approximately four months to install the deck and pilings. Assuming demolition begins in 2018 and lasts eleven months as stated in Section 2.2-1, construction of the MHP Alternative could occur in the period from 2018 through 2019 (NAVFAC Southwest 2014a; NBSD 2014).

As with the Conventional Pier Alternative, the use of concrete rather than creosote-treated wood piles is consistent with Navy policy and is preferred by the RWQCB because, unlike creosote-treated piles, concrete piles are not a potential source for PAHs to the bay. In addition, no fender piles would be needed for the MHP (Springston 2004). Instead, the MHP would use floating foam-filled fenders positioned along the hull and internal rubber fenders positioned at the mooring shafts to absorb energy from vessel mooring (Springston 2004). The internal rubber fenders would be tailored to the types of ships that would be berthed at Pier 8, environmental conditions such as wind and current loading on the ships, and site seismicity. The internal fenders allow the MHP to displace during an earthquake without undergoing structural damage.

Access from land would be via an operations deck ramp that would be 50 ft long by 20 ft wide and would be built into the first module (i.e., shore interface module), thereby reducing the grade of the operations ramp and the overall footprint of the MHP (NAVFAC Southwest 2008b). Expansion joints between the base of the ramp and the quaywall allow for movement of the pier while maintaining the connection of the necessary utilities.

The service life of the MHP is approximately 75 to 100 years versus the 67 year service life of a conventional fixed pier structure (Springston 2004). Pier modules could be added or subtracted to adapt to changing homeport requirements and could be disassembled and reassembled to relocate the MHP for future optimization of regional infrastructure assets. Future NEPA analysis would be required for any additional modules adding to the pier size or change of location.

Table 2-2 compares the types and numbers of piles that would be installed, and in-water surface areas that would result with either of the two action alternatives.

Table 2-2. Comparison of Piles Installed and In-water Surface Area for Conventional Pier or MHP Alternatives

Alternative	Pile or Shaft Dimensions and Type	Number of Piles or Shafts	Length (feet approx.)*	Total Length	Surface Area (square feet approx.)
Conventional Pier	24-in-diameter octagonal structural	256	26	5,248	41,957
	24-inch-diameter octagonal structural	256	20.5	6,656	53,214
	24-inch-square fender	102	26	2,091	16,717
	24-inch-square fender	102	20.5	2,652	21,202
	14-inch-diameter round plastic	115	26	2,356	8,631
	14-inch-diameter round plastic	115	20.5	2,990	10,946
	24-inch-diameter octagonal loadout cradle	2	26	41	328
	24-inch-diameter octagonal loadout cradle	2	20.5	52	416
Total		***950***	***--***	***22,088***	***153,411***
MHP	24-in-diameter octagonal structural	48	7.5	360	1,439
	24-in-diameter octagonal structural	48	13	624	2,494
	5-feet square mooring shaft	6	13	78	1,560
Subtotal (Piles/shafts)		***96***	***--***	***1,062***	***5,493***
	MHP Submerged Deck Bottom				140,400
	MHP Submerged Deck Sides				46,200
Total					***192,093***

Note: *Pile length for Conventional Pier assumed to be half in shallow water (20.5 feet) and half in deeper water (26 feet). MHP Alternative steel shaft length in water assumed to be 13 feet; half the piles in shallow water assumed to be 7.5 feet (total length shaft plus pile in water= 20.5 feet); half the piles in deep water 13 feet (total length shaft plus pile in water= 26 feet).

Sources: NAVFAC Southwest 2014b, Springston 2008b.

2.2.2.3 Elements Common to Either Alternative

Under either the Conventional or the MHP Alternative, improvements for the new Pier 8 would include a stormwater collection system with an oil-water separator (OWS) and copper and zinc treatment to meet current National Pollutant Discharge Elimination System (NPDES) permit requirements, and structural capacity for a 150 ton crane (NBSD 2012). Pier utilities would

include potable water, wastewater, compressed air, steam, BOWTS pipelines, and compensating water systems. Additional ship-to-shore utilities would include electrical, telephone, cable television, fiber optic communications, Supervisory Control and Data Acquisition system for energy monitoring and control, and fire alarms (NBSD 2012). The project would support a future upgrade of ship-to-shore power from 480 volts to 4,160 volts to meet future power-intensive Fleet requirements (e.g., for guided missile destroyers-1000 and multi-purpose amphibious assault ship -8 classes that are planned for berthing at the new Pier 8) by providing two new electrical vaults and spare 6-inch ducts-conduits. However, the future ship-to-shore power upgrade is not included in the Proposed Action (NBSD 2012). In addition, the project would require replacing the 15 kilovolt cables from the existing Pier 8 and upgrading to four sets of 750 thousand Circular Mils 15 kilovolt cables (NAVFAC Southwest 2008f).

Under either alternative, the new Pier 8 would be wider than the existing Pier 8, and would be designed and constructed to ensure that vessels can navigate safely within the bay (NBSD 2012). The pier would provide a minimum of two outer end pierside berths for modern Navy ships comparable in size to a Multi-Purpose Amphibious Assault Ship, the largest ship that would be supported by the project. The inner berths would have enough room for two other modern Navy ships, such as guided missile destroyers. Thus, the new Pier 8 would accommodate berthing requirements for four modern-sized ships. No dredging would occur because Pier 8 is already designed as a deep-draft Pier.

Shoreside excavation associated with either alternative would be conducted over an approximately 20-day period using standard construction equipment, including an excavator and dump trucks. The excavation area would be approximately 50 ft by 50 ft and 10 ft deep (NAVFAC Southwest 2007b).

AT/FP measures with either alternative would include a security gate and fencing, pedestrian turnstile, a new 20-ft high watch tower, a new guard house, and new high mast lighting consistent with current security requirements.

Sustainable design would be integrated into the design, development, and construction of the project in accordance with EO 13123, *Greening the Government through Efficient Energy Management*, and other directives.

2.3 ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD FOR DETAILED ANALYSIS

Upon application of the reasonable alternative screening factors (Section 2.1), no off-site alternatives, or other on-site alternatives were deemed "reasonable" per the following discussion for each alternative considered but not carried forward for detailed analysis.

2.3.1 On-Site Alternatives

2.3.1.1 Double-Deck Fixed Concrete Pier Design

A double-deck, fixed concrete pier design would accommodate berthing requirements for four modern-sized ships, similar to the Proposed Action. It would be the same length as a single-deck, fixed concrete pier (1,600 ft), but would be narrower (93 ft vs. 117 ft) because the utilities

would be located on the lower deck (similar to the MHP Alternative). However, a double-deck, fixed concrete design would not be as efficient for handling many of the classes of ships that require support at NBSD. For example, the tidal range in San Diego Bay (which is on the order of 5.6 ft with a 10 ft maximum [National Oceanic and Atmospheric Administration 2008]) would cause interferences between mooring lines and deck elevations relative to pier appurtenances, and deck elevations would not allow for the use of ramps (sideport ramps) for some classes of ships. A double-deck, fixed concrete design is eliminated from further consideration in this EA since it would not fulfill the purpose of and need for the Proposed Action or the reasonable alternatives screening factors related to operations (e.g., need for ramps to support some classes of ships and tidal range constraints) and safety (e.g., seismic).

2.3.1.2 Renovation-Modernization

Renovation and modernization of the existing, deteriorating Pier 8 would require similar demolition and replacement or construction activities as would be required for a new pier. For example, the existing Pier 8 would require widening to an appropriate size (e.g., 90-117 ft), structural repairs (pier deck, underdeck, pile caps, and piles), addition of a new fender system, installation of additional utilities to support ship services, and retrofit of a new stormwater collection system. Renovation and modernization would involve replacing or updating each of the existing pier functions over time and this would not be cost or operationally efficient (NBSD 2012). In addition, renovation and modernization would be less reliable both in terms of durability and load response, and would not solve the mobile crane weight restriction of 35 tons (NRSW 2012). Regarding durability, the underlying concrete structure is 70 years old and would require increased maintenance. Based on the age of the concrete and the associated chloride content, the service life of the renovated pier would only be 30 to 40 years (as compared with 67 years for the Conventional Pier Alternative, or 75 to 100 years for the MHP Alternative). Regarding load response, there would be a loss of operational performance due to seismic events (i.e., the pier design does not comply with current seismic design standards and specifications). This alternative would not be a viable alternative to the Proposed Action because it does not meet the reasonable alternative screening factor for seismic conditions. Therefore, this alternative was considered but eliminated from further consideration.

2.3.2 Off-Site Alternatives

2.3.2.1 Leasing

Leasing instead of constructing a new pier is not feasible because there are no facilities available in the San Diego region to accommodate the berthing requirements of the Navy's Fleet, including appropriate utility services, ESQD arc requirements, security, and operational considerations, as judged by comparison with reasonable alternatives screening factors.

2.3.2.2 Alternative Sites

Four NRSW Metro San Diego Installations that are offsite from NBSD were considered for the proposed replacement pier: (1) Naval Base Point Loma, (2) Naval Air Station North Island, (3) Naval Amphibious Base Coronado, and (4) Navy Complex at the Broadway Pier (refer to Figure 1-1). The first three installations are eliminated from consideration because the berthing and

operational spaces at these sites are already occupied by ships, submarines, or aircraft carriers. Further, based on existing ship-loading plans, these installations have no surplus area that would be suitable for constructing the type of pier necessary to fulfill support needs for berthing four modern Navy ships as required by the purpose and need for the Proposed Action (NAVFAC Southwest 2008h). Therefore, these sites are eliminated from further consideration.

The Navy Complex at Broadway Pier is planned for commercial replacement and would not be available for the operational requirements of pier development and berthing support for modern Navy ships. In the present configuration, the site is located on only 5.9 acres of land, which do not provide sufficient space for a replacement pier and adjacent wharf, warehouse, and maintenance areas and adequate AT/FP and ESQD setback distances. The Navy Complex also would have inadequate truck access to the pier area from the public street that passes within a few feet of the piers (NAVFAC Southwest 2008h). Therefore, this site is eliminated from further consideration.

2.4 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, the Conventional Pier Alternative or the MHP Alternative would not occur, meaning existing Pier 8 would not be demolished and a new Pier 8 and associated utilities would not be constructed. Since the existing pier is not suitable for berthing and servicing the Navy's current fleet, the No-Action Alternative would not allow NBSD to meet its mission of maintaining combat-ready Naval forces, as described in Chapter 1. The existing Pier 8 would continue to degrade until all activity is restricted due to deteriorated and unsafe conditions.

The No-Action Alternative does not meet the purpose of and need for the Proposed Action as required under California Environmental Quality Act (CEQA) regulations (40 Code of Federal Regulations [CFR] 1502.14[d]), but it does provide a measure of the baseline conditions described in Chapter 3, against which the potential adverse impacts of the Proposed Action can be compared. As such, the No-Action Alternative is carried forward for analysis.

2.5 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

The following resource areas are analyzed in this EA: water resources, marine biological resources, hazardous materials and wastes, noise, and air quality. Table 2-3 summarizes determinations of environmental consequences followed by the respective avoidance and minimization measures/special conservation measures (SCMs) for the Conventional Pier Alternative, the MHP Alternative, and the No-Action Alternative. Chapter 3 provides a detailed discussion of the environmental consequences. The No-Action Alternative would, however, forgo the opportunity to demolish inadequate Pier 8 and replace it with adequate berthing for ships homeported at NBSD. The No-Action Alternative does not meet the purpose of and need for the Proposed Action.

Table 2-3. Summary of Potential Impacts and Avoidance and Minimization Measures/SCMs

Resource Area	Conventional Pier Construction Alternative	Modular Hybrid Pier Construction Alternative	No-Action Alternative
Water Resources	There would be no dredging or other alteration of the elevation of the bay bottom, so demolition and replacement of Pier 8 would have a less than significant impact on bathymetry in San Diego Bay. There would be minor, short-term localized increases to circulation in San Diego Bay in the project areas caused by vessel movement, in-water demolition, and construction. These increases would cease when each particular activity ends. The new Pier 8 would have fewer piles than the existing pier, and would not form a barrier to the natural movement of water in San Diego Bay. Increased turbidity because of sediment resuspension during pile removal and installation would be short-term and limited to the demolition/construction areas around Pier 8 and nearby Navy piers. The localized, short-term resuspension of sediments during demolition of Pier 8 would not change water chemistry sufficiently to impair beneficial use for aquatic life and aquatic-dependent life, or to further impair beneficial use with respect to human health. During demolition and construction, protective measures would be implemented to minimize impacts to marine water quality. Protective measures for demolition and construction would include the use of catch devices and sheeting to prevent the release of debris and hazardous materials/waste into San Diego Bay. All in-water work would comply with the requirements of a Section 401 Water Quality Certification from the San Diego Regional Water Quality Control Board (RWQCB) and Section 404/Section 10 permits from the USACE. For the reasons listed in the preceding paragraphs, there would be no significant impacts to: bathymetry, circulation, marine water quality, and surface water quality from implementation of the Conventional Pier Alternative. **Avoidance and Minimization Measures/SCMs:** • The demolition/construction contractor would be required to develop, receive Base approval for, and implement a project-specific Construction Stormwater Pollution Prevention	The demolition activities, equipment, and protective measures would be the same as for the Conventional Pier Alternative, and no dredging would occur. The MHP Alternative would have less in-water construction and pile driving which would result in less localized disturbance of bottom sediments as compared with the Conventional Pier Alternative. The same construction equipment, procedures and protective measures would be used as for the Conventional Pier Alternative. Therefore, there would be no significant impacts to: bathymetry; circulation; marine water quality; and surface water quality from implementation of the MHP Alternative. **Avoidance and Minimization Measures/SCMs:** Under the MHP Alternative, avoidance and minimization measures/SCMs would be the same as those for the Conventional Pier Alternative.	Under the No-Action Alternative, no demolition or construction activities would occur and existing water resources would not be affected. Therefore, there would be no significant impacts to: bathymetry; circulation; marine water quality; and surface water quality from implementation of the No-Action Alternative. **Avoidance and Minimization Measures/SCMs:** Under the No-Action Alternative, avoidance and minimization measures/SCMs would not be necessary.

Table 2-3. Summary of Potential Impacts and Avoidance and Minimization Measures/SCMs

Resource Area	Conventional Pier Construction Alternative	Modular Hybrid Pier Construction Alternative	No-Action Alternative
	Plan (SWPPP) that would include best management practices (BMPs) for: minimizing and containing dust and debris and preventing spills of concrete, fuels, and hydraulic fluid from vehicles. BMPs would include, but are not necessarily limited to: a floating boom around the project area to contain floating surface debris; the use of catch devices and sheeting; sediment barriers; inlet covers; covering stockpiles; and inspecting equipment and vehicles for drips, and placing drip pans beneath vehicles and equipment; or other alternative measures developed during the USACE Section 404 and Section 10 permitting process. • The contractor would be required to prepare and implement a Construction Demolition Plan that would cover all phases of the work to be done and specify materials, equipment, and procedures to be used to contain all construction and demolition waste and debris, including dust. The Construction Demolition Plan would be approved by Naval Facilities Engineering Command (NAVFAC) Southwest. • The contractor would be required to develop and receive Base approval for a Spill Prevention Plan to address spill prevention and containment within their equipment and vessels. • Prior to demolition, the bilge oily wastewater treatment system (BOWTS) and ships' wastewater pipelines on Pier 8 would be flushed with high-pressure water from service lines on Pier 8. Water flushed from the BOWTS pipeline would be treated at the BOWTS treatment plant. Flush water from the ships' wastewater pipelines would be pumped to the City of San Diego metropolitan sanitary sewer pump station # 1. • Prior to demolition, the wastewater manhole on the quaywall at Pier 8 would be sealed to prevent sea water from entering the wastewater system during high tide. • Per the NBSD Facility Response Plan any petroleum release or petroleum sheen observed on the water surface would be		

Table 2-3. Summary of Potential Impacts and Avoidance and Minimization Measures/SCMs

Resource Area	Conventional Pier Construction Alternative	Modular Hybrid Pier Construction Alternative	No-Action Alternative
	reported to NBSD Port Operations and the U.S. Coast Guard National Response Center. Booms and other spill containment equipment kept on hand would be immediately deployed; the source of the release would be determined and secured; and the NBSD Fire Department would respond to clean up the spill. • The new Pier 8 would include a stormwater collection system with an oil/water separator (OWS) sediment filtration, and copper and zinc treatment to meet current National Pollutant Discharge Elimination System (NPDES) permit requirements. Design and construction of the new Pier 8 stormwater treatment system would be coordinated with the San Diego RWQCB to ensure that it is constructed in accordance with applicable federal requirements for stormwater retention and treatment. • Upon completion of the new Pier 8, the existing Basewide SWPPP and NPDES Permit would continue to apply to Pier 8. Basewide BMPs for preventing and minimizing contact of potential pollutants with stormwater would continue to be followed, including: restricting access; regular cleaning and sweeping; controlling spills and reducing waste; permanently sealing drains in critical areas that lead to storm drains; and regular inspection and maintenance of the storm drain system. • Pier 8-specific BMPs would continue to be followed upon completion of the new Pier 8, including: placement of berms around electrical substations and transformers; testing accumulated precipitation to prevent discharge of contaminants; covering storm drains during maintenance activities; proper maintenance of the BOWTS and sanitary sewage tanks; and piping and valves to prevent leaks of bilge and sanitary waste water. The Basewide SWPPP and BMPs would be reviewed, and revised/updated as needed to incorporate changes resulting from the changes to new Pier 8.		

Table 2-3. Summary of Potential Impacts and Avoidance and Minimization Measures/SCMs

Resource Area	Conventional Pier Construction Alternative	Modular Hybrid Pier Construction Alternative	No-Action Alternative
Marine Biological Resources	The Conventional Pier Alternative would temporarily affect a very small portion of the deep subtidal and developed shoreline habitat that exists in San Diego Bay. There would be no long-term, large-scale changes in marine habitats and communities. A Section 401 Water Quality Certification from the RWQCB and a Clean Water Act Section 404 and Rivers and Harbors Act Section 10 permit from the USACE would be obtained prior to implementation of the Proposed Action. Compared with the existing Pier 8, the Conventional Pier Alternative would result in an increase in bay shading of 1.86 acres. However, the deep subtidal area subject to shading lacks eelgrass or attached algae, so effects on productivity would be negligible. Due to the characteristics of the fish and benthic invertebrate species in the affected area, the relatively small increase in shading and artificial substrate would not have an effect outside the immediate area of Pier 8, and therefore would not have a long-term adverse effect on biological resources in San Diego Bay. Pier demolition and construction activities for the Conventional Pier Alternative would cause minor and short-term impacts to biological resources. Organisms occurring in the immediate area may be lost or displaced during demolition or construction activities, either directly by pile removal or equipment and noise associated with these activities or indirectly by exposure to short-term changes in: suspended sediments; turbidity; dissolved oxygen; and light diffusion. However, Benthic invertebrate species and fish communities are expected to recolonize the disturbed habitat within a relatively short period of time from adjacent undisturbed areas, and typical epifaunal invertebrate and fish communities would gradually develop on the new pilings. Sediment resuspension, increased turbidity, or chemical changes would be limited to the areas of bottom disturbance, and would persist for less than one hour following disturbance. Therefore, neither project activities nor increased turbidity would significantly impact benthic or fish communities or water column habitats in the project area. Implementation of the Conventional Pier	Impacts associated with the MHP Alternative would be similar to those of the Conventional Pier Alternative, although the MHP Alternative would disturb bottom sediments less and would produce less underwater noise because of reduced pile driving. The MHP Alternative would also shade a smaller additional area (0.78 acres) compared to the Conventional Pier Alternative (1.86 acres). Therefore, the MHP Alternative would not involve long-term, large-scale changes in marine habitats and communities and there would be no significant impacts to benthic invertebrate communities. Like the Conventional Pier Alternative, the MHP Alternative, with the implementation of the proposed avoidance and minimization measures, would not affect eelgrass or any other special aquatic sites; would not result in long-term adverse effects on EFH but would have a minor, short-term adverse effect on EFH from pier removal that would not be significant; would not have a significant effect on migratory bird populations or their habitats under the MBTA, nor have a significant impact under NEPA; no	Under the No-Action Alternative, no demolition or construction activities would occur and existing marine biological resources would not be affected. Therefore, there would be no significant impacts to marine biological resources with implementation of the No-Action Alternative. **Avoidance and Minimization Measures/SCMs:** Under the No-Action Alternative, avoidance and minimization measures/SCMs would not be necessary.

Table 2-3. Summary of Potential Impacts and Avoidance and Minimization Measures/SCMs

Resource Area	Conventional Pier Construction Alternative	Modular Hybrid Pier Construction Alternative	No-Action Alternative
	Alternative would not result in long-term adverse effects on Essential Fish Habitat (EFH). Pier removal would temporarily reduce the algal and invertebrate production associated with encrusting communities on the pilings. Hence, there would be a minor, short-term adverse effect on EFH from pier removal that would not be significant under NEPA. Since no eelgrass or any other special aquatic sites are found in the project area, no effects to special aquatic sites would occur. Impacts to breeding birds would be minimal because (1) bird abundance in the project area is low; (2) birds do not use the man-made structures; developed shoreline; and artificial substrate within the project area for breeding; (3) the proposed project would only affect a relatively small area of San Diego Bay; and (4) impacts would cease upon construction completion. These impacts would not be significant because of their limited duration and because birds on the water regularly experience the noise and disturbance of passing vessels, while the project area is routinely subject to the elevated noise and activity of workers and equipment associated with common industrial practices. Bird perches on the existing pier would be lost. However, this is not expected to create a significant impact to migratory birds as there are several other structures in San Diego Bay that could be used for this purpose and because migratory birds are expected to recolonize the new pier once constructed. Therefore, implementation of the Conventional Pier Alternative would not have a significant effect on migratory bird populations or their habitats under the Migratory Bird Treaty Act (MBTA), nor have a significant impact under NEPA. Marine mammals are not expected within the project area. Therefore, with implementation of the proposed Avoidance and Minimization Measures, the Conventional Pier Alternative would not result in significant impacts to marine mammals and no reasonably foreseeable "takes" of marine mammals as defined by the MMPA would occur, and there would be no significant impacts to marine mammals under NEPA.	reasonably foreseeable "takes" of marine mammals as defined by the MMPA would occur; and would not result in significant impacts to marine mammals ; would not affect the California least tern, and would not have significant impacts to the species under NEPA. The MHP Alternative may affect but is not likely to adversely affect the green sea turtle under the ESA and would have no significant impacts on the green sea turtle under NEPA. **Avoidance and Minimization Measures/SCMs:** Under the MHP Alternative, avoidance and minimization measures/SCMs would be identical to those associated with the Conventional Pier Alternative.	

Table 2-3. Summary of Potential Impacts and Avoidance and Minimization Measures/SCMs

Resource Area	Conventional Pier Construction Alternative	Modular Hybrid Pier Construction Alternative	No-Action Alternative
	The Pier 8 project area: is not a nesting or foraging area in the Tern Memorandum of Understanding; does not have any special characteristics such as extraordinary size; eelgrass beds; unique fish habitat; or an abundance of least tern prey species; and least terns are not expected to occur within the project area. Due to the distance to known nesting areas and high value foraging areas and the localized nature of impacts associated with project activities, project activities would not affect individuals or have a persistent effect on numbers and distribution of the species. Therefore, implementation of the Conventional Pier Alternative would not affect the California least tern and there would be no significant impact to the species under NEPA. The Conventional Pier Alternative may affect, but is not likely to adversely affect the green sea turtle under the Endangered Species Act (ESA). Any such effects would be localized to the immediate area of the activity and, with implementation of the proposed Avoidance and Minimization Measures, would be unlikely to cause harm to individuals or have a persistent effect on numbers and distribution of the species. The Conventional Pier Alternative would have no significant impacts on the green sea turtle under NEPA. **Avoidance and Minimization Measures/SCMs:** • The following avoidance and minimization measures would be followed during the proposed pile driving activities. – The Navy would perform a visual sweep of the bay within a 384-ft (117-meters [m]) radius prior to commencing pile driving activities, and after a break in pile driving for more than 30 minutes. – If any marine mammals or green sea turtles are seen within this visual range, the Navy would not commence pile driving activities until 15 minutes have passed since the last such sighting, or the animal has moved out of the established range. – If a marine mammal or green sea turtle moves within the established range while pile driving activities are occurring, such activities would cease until the animal		

Table 2-3. Summary of Potential Impacts and Avoidance and Minimization Measures/SCMs

Resource Area	Conventional Pier Construction Alternative	Modular Hybrid Pier Construction Alternative	No-Action Alternative
	moves out of the area. – Prior to the start of pile driving each day, after each break of more than 30 minutes, and if any increase in the intensity is required, the Navy shall use a ramp-up procedure. The procedure involves a slow increase in the pile driving to allow any undetected animals in the area to voluntarily depart. • A cable net and floating boom would be used to capture debris that falls into the water during pier demolition. Such debris would be collected and disposed of onshore. • A *Caulerpa* survey (Surveillance Level) would be conducted prior to in-water project activities, consistent with National Marine Fisheries Service and California Department of Fish and Wildlife requirements. If Caulerpa was found in the study area during this survey, eradication techniques would be used in accordance with approved Caulerpa Control Protocols. • Subject to the terms and conditions identified in the project-specific USACE Section 404 and Section 10 permit, the Navy would deploy precautionary measures to alleviate turbidity associated with demolition and construction activities.		
Hazardous Materials and Wastes	**Hazardous Materials and Waste:** Demolition and construction contractors involved with the Conventional Pier Alternative would be subject to all applicable requirements for hazardous materials and hazardous waste management, and would be required to follow the Navy's Hazardous Waste Management Plan (HWMP) for the San Diego Metro Area. In addition, a site-specific construction SWPPP would be developed; approved by the Base, and implemented by the demolition and construction contractor which would incorporate BMPs designed to minimize the potential for hazardous material releases during demolition and construction activities. Through implementation of the above-mentioned procedures, there would be no increase in human health risk or environmental exposure to hazardous materials or hazardous wastes from	Under the MHP Alternative, the impacts associated with demolition and construction activities would be similar to those discussed under the Conventional Pier Alternative. No increase in solid waste impacts, human health risk or environmental exposure to hazardous materials or hazardous wastes would occur; therefore, there would be no significant impacts with respect to: hazardous materials;	Under the No-Action Alternative, no demolition or construction activities would occur and industrial activities currently being conducted in the area would continue. Therefore, there would be no significant impacts with respect to: solid waste; hazardous materials and hazardous waste impacts from implementation of the No-Action Alternative. **Avoidance and Minimization Measures/SCMs:**

Table 2-3. Summary of Potential Impacts and Avoidance and Minimization Measures/SCMs

Resource Area	Conventional Pier Construction Alternative	Modular Hybrid Pier Construction Alternative	No-Action Alternative
	implementation of the Conventional Pier Alternative. Completion of the Navy's site approval process, and adherence to the NBSD Explosives Safety Officer's requirements would ensure that implementation of the Conventional Pier Alternative would not result in a significant impact to explosives safety and handling at NBSD, or pose a safety risk to contractor personnel involved in the demolition and construction. The contractor would also be notified of the potential presence of unexploded ordnance (UXO) at the project site. The risk associated with any potential explosive safety hazard would be further minimized by setting up and following explosive safety procedures to train and protect onsite workers. Therefore, no significant impacts with respect to: hazardous materials; hazardous wastes; or explosives would occur with implementation of the Conventional Pier Alternative. **Hazardous Materials/Waste Avoidance and Minimization Measures/SCMs:** • All Pier 8 maintenance contractor-owned hazardous materials and wastes from prior jobs would be removed from Pier 8 before demolition activities begin. • Project contractors' vehicles would be parked within an on-shore staging area. No vehicle fueling or maintenance would take place at the project site. • Contractors would be required to follow the HWMP for the San Diego Metro Area, which contains guidance ensuring that Navy commands and contractors manage hazardous waste in accordance with requirements specified in: federal; state and local laws and regulations including Title 40 Code of Federal Regulations; Title 22 California Code of Regulations; California Health and Safety Code and San Diego County Code of Regulatory Ordinances. • A site-specific construction Stormwater Pollution Prevention Plan (SWPPP) incorporating best management practices (BMPs) designed to minimize the potential for hazardous material releases during demolition	hazardous waste; and solid waste from implementation of the MHP Alternative. **Avoidance and Minimization Measures/SCMs:** Under the MHP Alternative, avoidance and minimization measures/SCMs would be the same as those for the Conventional Pier Alternative.	Under the No-Action Alternative, avoidance and minimization measures/SCMs would not be necessary.

Table 2-3. Summary of Potential Impacts and Avoidance and Minimization Measures/SCMs

Resource Area	Conventional Pier Construction Alternative	Modular Hybrid Pier Construction Alternative	No-Action Alternative
	and construction activities would be: developed; approved by the Base; and implemented by the demolition and construction contractor. • Any hazardous materials and wastes generated during construction and operational activities would also be subject to installation-wide Emergency Planning and Community Right-to-Know Act Section 312 and 313 reporting requirements. • During the removal of lead-based paint, work containment would be erected to capture and filter all contaminated air during abrasive blasting and cleanup. Air monitoring would be completed each day. Samples would be gathered each day and tested by a California certified lab to establish the permissible exposure limit over an eight-hour time weighted average. • All asbestos containing materials (ACM) would be removed using wet methods and appropriate personal protective equipment would be used by personnel. Sections of abated materials would be placed in a double poly lined closed container. The San Diego Air Pollution Control District (SDAPCD) would be notified in writing of the planned removal of friable ACM per regulations. Notification would also be made to the California Division of Occupational Safety and Health. The latest applicable requirements of federal, state, and local regulations governing removal and disposal of ACM would be complied with. • All waste would be characterized for: proper reuse; recycling; or disposal; including paint chips, piping, etc. • NBSD would send the San Diego County Department of Environmental Health (DEH) written notice of its intent to demolish the BOWTS pipeline. Prior to demolition, the BOWTS high density polyethylene (HDPE) pipeline would be flushed with high-pressure water from the service lines on Pier 8. The cleaning water would be pumped through the BOWTS for treatment at the NBSD BOWTS treatment plant. • NBSD would be required to submit to DEH the professional engineer certification of the		

Table 2-3. Summary of Potential Impacts and Avoidance and Minimization Measures/SCMs

Resource Area	Conventional Pier Construction Alternative	Modular Hybrid Pier Construction Alternative	No-Action Alternative
	new pipelines before the lines could be used. • The demolition and construction contractor would be required to place booms around the demolition and excavation footprint to avoid ground-disturbance at closed Installation Restoration Site 8. • To ensure safety during the project demolition and construction activities, the NBSD Explosives Safety Officer must be provided contractor points of contact. The Safety Officer would notify the contractors when explosives would be handled at Pier 7, so that contractor personnel can be evacuated from the site. • The contractor would be notified of the potential presence of UXO at the project site through a contract clause that includes Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8020.15. • Should UXO be encountered during pier demolition; pile driving; or pier construction, the following steps would be followed: – The contractor site project manager would notify the Navy project manager. Naval Base Point Loma and the Navy's Silver Strand Training Complex for Special Forces security would also be notified. – All work would stop that would put personnel, equipment, or property at risk due to the presence of UXO. – The servicing Navy Explosive Ordnance Disposal (EOD, the U.S. Navy experts for disposal of waste military munitions) mobile unit or detachment would be notified. – NOSSA Ordnance Environmental Support Office would be notified. **Solid Waste:** NBSD has a program in place to divert its construction and demolition waste from Miramar Landfill to the maximum extent possible. Based on adherence to these NBSD requirements, implementation of the Conventional Pier Alternative would not result in significant solid waste impacts. **Solid Waste Avoidance and Minimization Measures/Special Conservation Measures**		

Table 2-3. Summary of Potential Impacts and Avoidance and Minimization Measures/SCMs

Resource Area	Conventional Pier Construction Alternative	Modular Hybrid Pier Construction Alternative	No-Action Alternative
	(SCMs): • The Navy Region Southwest Integrated Solid Waste Management Program would attempt to determine a resale or recycling use for the materials resulting from the Pier 8 demolition before approving them for landfill disposal. • The contractor would be required to submit a Solid Waste Management Plan to the NBSD Construction and Demolition Debris Diversion Manager. • An estimated 75 to 90 percent of the concrete debris from the demolition of Pier 8 would be crushed for recycling in future construction projects. Only concrete that could not be recycled would be landfilled. • Iron, steel, high density polyethylene (HDPE) pipe and asphalt demolition debris would also be recycled rather than landfilled, as determined by suitability. • During demolition activities, the contractor would be required to submit monthly diversion summary reports and weight tickets from recyclers to prove that materials are being diverted according to the project's Solid Waste Management Plan. • Throughout the demolition phase, a spud-anchored barge and barge mounted cranes would be used as well as scows for the collection and removal of demolition debris.		
Noise	Pile driving would be the dominant noise-generating activity associated with the proposed project. Airborne noise levels in residential areas and schools in National City would be less than the National City construction ordinance limit of 60 A-weighted decibel (dBA) Energy Equivalent Level (Leq). Therefore, there would be no significant airborne noise impacts from implementation of the Conventional Pier Alternative. Pile driving likely would disturb fish, marine mammals, and sea turtles in the immediate vicinity of the project site. However, these organisms would be able to move out of the area during project activities and return after in-water project activities are completed. Given the low	Under the MHP Alternative, the impacts associated with demolition and construction activities would be similar to those discussed under the Conventional Pier Alternative. However, under this alternative, there would be less pile driving, which would result in a shorter duration of noise impacts. As with the Conventional Pier Alternative, any noise would be localized and	Under the No-Action Alternative, no demolition or construction activities would occur and the area's acoustical environment would remain unchanged. Therefore, there would be no significant airborne and underwater noise impacts from implementation of the No-Action Alternative. **Avoidance and Minimization Measures/SCMs:** Under the No-Action Alternative, avoidance and

Table 2-3. Summary of Potential Impacts and Avoidance and Minimization Measures/SCMs

Resource Area	Conventional Pier Construction Alternative	Modular Hybrid Pier Construction Alternative	No-Action Alternative
	levels of disturbance and limited abundance of these animals (marine mammals and green sea turtles) in the project region, no significant long-term impacts would occur and there would be no reasonably foreseeable "takes" of marine mammals as defined by the Marine Mammal Protection Act. Further, the project area would represent a small percentage of the available resources, and project activities are considered localized. Therefore, there would be no significant underwater noise impacts from implementation of the Conventional Pier Alternative. **Avoidance and Minimization Measures/SCMs:** The following avoidance and minimization measures would be followed during the proposed pile driving activities: • The Navy would perform a visual sweep of the bay within a 384-ft (117-m) radius prior to commencing pile driving activities, and after a break in pile driving for more than 30 minutes. • If any marine mammals or green sea turtles are seen within this visual range, the Navy would not commence pile driving activities until 15 minutes have passed since the last such sighting, or the animal has moved out of the established range. • If a marine mammal or green sea turtle moves within the established range while pile driving activities are occurring, such activities would cease until the animal leaves the area. • During pile driving, the Navy shall use a ramp-up procedure as follows: prior to the start of pile driving each day; after each break of more than 30 minutes; and if any increase in the intensity is required. The procedure involves a slow increase in the pile driving to allow any undetected animals in the area to voluntarily depart.	would cease upon completion of demolition and construction activities; therefore, there would be no significant airborne and underwater noise impacts from implementation of the MHP Alternative. **Avoidance and Minimization Measures/ SCMs:** Under the MHP Alternative, avoidance and minimization measures/SCMs would be the same as those for the Conventional Pier Alternative.	minimization measures/SCMs would not be necessary.

Table 2-3. Summary of Potential Impacts and Avoidance and Minimization Measures/SCMs

Resource Area	Conventional Pier Construction Alternative	Modular Hybrid Pier Construction Alternative	No-Action Alternative
Air Quality	Estimated emissions associated with the Conventional Pier Alternative would be below the *de minimis* levels for Clean Air Act (CAA) conformity; therefore, there would be no significant impacts to air quality from implementation of the Conventional Pier Alternative. **Avoidance and Minimization Measures/Special Conservation Measures (SCMs):** Emissions would be below the *de minimis* levels for CAA conformity, therefore, no avoidance and minimization measures/SCMs are proposed.	Emissions associated with the MHP Alternative would be less than those estimated for the Conventional Pier Alternative. Emissions would be below the *de minimis* levels for CAA conformity; therefore, there would be no significant impacts to air quality from implementation of the MHP Alternative. **Avoidance and Minimization Measures/Special Conservation Measures (SCMs):** Emissions would be below the *de minimis* levels for CAA conformity, therefore, no avoidance and minimization measures/SCMs are proposed.	Under the No-Action Alternative, no demolition or construction activities would occur and existing air quality would not be affected. Therefore, there would be no significant impacts to air quality from implementation of the No-Action Alternative. **Avoidance and Minimization Measures/Special Conservation Measures (SCMs):** Under the No-Action Alternative, avoidance and minimization measures/SCMs would not be necessary.

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CHAPTER 3
AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the existing environmental conditions on and around NBSD for resources potentially affected by implementation of the action alternatives discussed in Chapter 2. Information presented in this chapter represents baseline conditions and identifies potential impacts against which the Conventional Pier Alternative, the MHP Alternative, and the No-Action Alternative are evaluated.

In compliance with NEPA and CEQ regulations, and Navy procedures for implementing NEPA, the description of the affected environment and environmental consequences focuses only on those resources potentially subject to impacts. In addition, the level of analysis presented in the EA is commensurate with the anticipated level of impact. Accordingly, the discussion of the affected environment (and associated environmental analyses) focuses on: water resources, marine biological resources, hazardous materials and wastes, noise, and air quality. Conversely, the following resource areas were not carried forward for analysis in this EA, as potential impacts were considered to be negligible or non-existent:

Cultural Resources. Implementation of either the Conventional Pier Alternative or the MHP Alternative would affect no archaeological sites or other cultural resources, as none are found within the Area of Potential Effect, as defined under the CNRSW Metro San Diego Programmatic Agreement (Metro PA) (CNRSW 2003, NAVFAC Southwest 2008a). The proposed project is located more than 100 meters (m) from identified historic properties. Consistent with Stipulation 6.A. of the Metro PA, the Area of Potential Effect is defined as the discrete site of the undertaking and any associated staging or laydown areas. Construction laydown areas would be staged outside the 100-meter Area of Potential Effect buffer of identified historic properties, the Naval Station San Diego Historic District (revised 2007) and individually-eligible Dry Dock No. 1.

Previous cultural resources investigations confirm that no historic properties are present within the Area of Potential Effect. Pier 8 (Structure 358, 1945) has previously been determined by consensus to be ineligible for the National Register of Historic Places (JRP Historical Consulting Services 1999, California State Historic Preservation Officer [CASHPO] 2001).

Pier 8 was also part of a reevaluation of World War II-era properties at NBSD (CASHPO 2007). The pier was determined ineligible, both individually and as a potential historic district contributor. The Naval Station San Diego Historic District (revised 2007) and the individually-eligible Dry Dock No. 1 Site, lie well beyond the Area of Potential Effect buffer prescribed in the Metro PA.

The project would affect no known archaeological resources. Its location is on lands created by backfilling tidelands with excavated material in 1930 (Navy 1996, NAVFAC Southwest 2008a), thus precluding the potential for presence of buried archaeological deposits. Consistent with

Stipulation 8.A. of the Metro PA, the Conventional Pier Alternative and the MHP Alternative qualify for determinations of "No Historic Properties Affected."

Under the No-Action Alternative, no demolition or construction activities would occur, and cultural resources would not be affected.

Geology and Topography. No changes to terrain would occur as a result of the Conventional Pier Alternative or the MHP Alternative. The majority of the proposed construction would occur within previously developed areas within the San Diego Bay. Because construction of the Replacement Pier 8 would occur in the same location as the existing Pier 8, only minor on-shore excavation and finish grading would be necessary to accommodate the new Pier 8. These minimal surficial modifications would not result in impacts to geology and topography. San Diego is a seismically active region, as is most of southern California. Seismic hazards can include landslides, ground-shaking, surface displacement and rupture, liquefaction, and tsunamis. Implementation of the Conventional Pier Alternative or the MHP Alternative would adhere to the provisions of the USACE Unified Facilities Criteria, which provide planning, design and construction criteria, and are used for all DOD projects where appropriate. In addition, industry standard seismic engineering measures would be incorporated into the Replacement Pier 8 design to minimize any potential effects of seismically induced ground movement. With implementation of structural and seismic design standards for facilities built on artificial fill, no significant impact to geology and topography would occur.

Under the No-Action Alternative, no demolition or construction activities would occur. There would be no excavation or grading; therefore, impacts to geology and topography would not occur.

Ground Transportation. Pier 8 demolition and replacement would not involve any new land uses or activities, such as ship berthing or pier operations and maintenance, which could result in recurring daily traffic generation. However, temporary increases in ground traffic would occur as the result of proposed demolition and construction activities. The following paragraphs describe the potential effects of Pier 8 demolition and replacement on ground transportation.

Temporary additional ground traffic would be added to the street network as the result of demolition and construction of Pier 8, and would consist of truck haul trips and construction worker trips, as shown in Table 3-1. Demolition activities would occur over a period of 231 days and it is assumed that demolition truck trips would occur continuously throughout this period. For the purpose of calculating ground traffic trips associated with construction, it was assumed that for either the Conventional the MHP pier Alternative, delivery of construction materials would be completed in one month. As shown in Table 3-1, this is based upon the volume of construction materials divided by the volume one truck can haul. An assumed adjustment factor of 33 percent was then applied to the demolition and construction trips to ensure that the traffic generation estimate is conservative (NRSW 2011). As shown in this table, conventional pier construction would have the highest level of traffic generation, consisting of 254 daily trips. Demolition would involve 76 trips per day, or 30 percent of the trips associated with conventional pier construction. Similarly, MHP pier construction would result in 84 daily trips,

approximately 33 percent of the traffic that would result from conventional pier construction. However, as described in Section 2.2.2, the overall construction period for the Conventional Pier Alternative is assumed to be 10 months, and the overall construction period for the MHP Alternative is assumed to be about 4 months (20 days of pile driving and 3 months of deck installation and other associated construction).

Table 3-1. Daily Vehicle Trips by Activity

Trip Types	Vehicles per Day	Trips per Vehicle	Adjustment Factor	Adjusted Trips per Day [1]
Demolition				
Truck Trips [2]	4	2	1.33	10
Worker Trips	25	2	1.33	66
Total Daily Demolition Trips	**29**	**-**	**-**	**76**
Conventional Pier Construction				
Truck Trips [3]	71	2	1.33	188
Worker Trips	25	2	1.33	66
Total Conventional Pier Construction Trips	**95**	**-**	**-**	**254**
MHP Pier Construction				
Truck Trips [4]	7	2	1.33	18
Worker Trips	25	2	1.33	66
Total MHP Pier Construction Trips	**32**	**-**	**-**	**84**

Notes: [1] Trips are rounded to the highest even number so there is a balance between inbound and outbound trips.
[2] 8,080 cubic yards of debris, 20 cubic yards per truck, two trips per truck per day for 231 days.
[3] 950 piles with two piles per truck, plus 1,368 concrete mixer trucks, two trips per truck per day for one month (approximately 26 days).
[4] 96 piles with three piles per truck, plus 58 concrete mixer trucks, two trips per truck per day for one month (approximately 26 days).
Source: NAVFAC Southwest 2008b, 2014.

The trips presented in the table above would be distributed throughout the course of a typical business day. Employee trips would likely be concentrated in the peak commuting periods (i.e., typically between the hours of 7:00 and 9:00 a.m. and 4:00 and 6:00 p.m.), while truck trips would occur at various times throughout the day. Assuming 9 hours of operation per day, and an even distribution of truck trips throughout the day (NRSW 2011), demolition activities would involve an average of 1 truck trip per hour, conventional pier construction would involve an average of 20 truck trips per hour, and MHP pier construction would involve an average of 2 truck trips per hour. Conventional pier construction would have the highest peak hour traffic generation, with 25 inbound worker trips in the morning peak hour, 25 outbound worker trips in the afternoon peak hour, and 20 truck trips (10 inbound and 10 outbound) during the both peak hours. The maximum concentration of peak hour trips would be 35 (i.e., 25 workers plus 10 trucks).

The City of San Diego Traffic Impact Study Manual (City of San Diego 1998) is used to guide the analysis of traffic impacts within the City's jurisdiction. The Proposed Action's daily and peak hour traffic generation is below the thresholds specified in the Traffic Impact Study Manual that would warrant the preparation of a traffic study. Specifically, the conventional pier construction's traffic generation of 254 daily trips and 35 peak hour trips is below the thresholds

of 500 daily trips or 50 peak hour trips that may require the preparation of a focused traffic study as described in the Traffic Impact Study Manual.

As discussed in Section 2.2.1, construction debris would be disposed of at the Miramar or Otay Landfills. Project truck traffic travelling from Pier 8 to either landfill would move along internal roadways within NBSD, exit the installation at Gate 9, and then proceed on public streets and freeways en route to either landfill. Traffic conditions are commonly described in terms of Level of Service (LOS). LOS is a method used to rate the performance of streets, intersections, and other types of highways. Developed by the Transportation Research Board (TRB) and documented in various editions of the Highway Capacity Manual since 1950, LOS rates performance on a scale of A to F, with LOS A reflecting free-flowing conditions and LOS F representing heavily congested conditions (TRB 2010). The following paragraphs describe traffic conditions within NBSD and the surrounding street network. The minimum performance standard for streets within urbanized areas of the City of San Diego is LOS D. LOS E and LOS F are considered unacceptable.

On-base Roadways

Construction traffic would enter NBSD at Gate 9, which is located on 8th Street; to the north of Cummings Road (refer to Figure 2-1 in Chapter 2). Construction truck and worker trips within the installation would travel a relatively short distance (i.e., less than 0.5 mile) from Gate 9 to Pier 8 along 8th Street, Cummings Road, Southall Street, and Brinser Street. As noted in the Naval Base San Diego Mobility Master Plan (NAVFAC Southwest 2012), Cummings Road is characterized by LOS A under existing conditions, and is projected to operate at LOS B under year 2035 conditions. Also, the intersection of Cummings Road and 8th Street operates at LOS B or better conditions during both the morning and afternoon peak hours under existing conditions. This intersection is projected to operate at LOS B during both peak hours in the year 2035. Given the relatively short distance travelled by construction traffic, and considering the absence of existing (or projected future) congestion along the travel route, no significant traffic impact would occur within NBSD.

Off-base Roadways

The travel route from NBSD to Miramar Landfill would consist of the following:

1. Leave NBSD via Gate 9 and head eastbound on 8th Street;
2. Continue on 8th Street through Harbor Drive and onto northbound I-5;
3. Transition onto northbound State Route (SR) 15[1];
4. Transition onto westbound SR-52;
5. Exit westbound SR-52 at Convoy Street; and
6. Head north on Convoy Street to landfill entrance.

[1] This freeway is designated as a State Route south of I-8, and becomes an Interstate freeway north of I-8.

Existing LOS for roadway segments along the route is presented in Table 3-2, while Table 3-3 summarizes existing freeway segment LOS on the travel route.

As described in Table 5 of the Traffic Impact Study Manual, a significant traffic impact on a segment characterized by LOS E or LOS F would occur if a project were to increase the volume to capacity (V/C) ratio by 0.02 or more. Based on this criterion, no significant impact would occur on either Convoy Street or 8th Street, as both roadways are characterized by LOS B or better conditions. However, several freeway segments experience congested LOS E or F conditions during one or both peak hours. The congested freeway segment having the lowest capacity (i.e., SR-52 westbound) has a capacity of 7,050 vehicles per hour. Based on the City's criteria, a significant effect would occur if a project were to add 141 peak hour directional trips (i.e., 7,050 X 0.02). As discussed above, the Proposed Action would generate a maximum of 35 peak hour directional trips (i.e., 25 employee trips and 10 truck trips). Therefore, the Proposed Action would not cause any significant traffic impacts along the route to the Miramar Landfill.

The Traffic Impact Study Manual includes thresholds that are used for an initial assessment to determine whether or not a given road may be included in the geographic scope of a traffic analysis. These thresholds are based on the increase in the V/C on a roadway caused by project traffic. For roads characterized by LOS D, E, or F conditions, a V/C increase of 0.02 indicates that the road would be included in the study area. The threshold for LOS C is 0.04, the threshold for LOS B is 0.06, and the threshold for LOS A is 0.10. As shown in Table 3-2, 8th Street is characterized by LOS B and has a capacity of 30,000 ADT. Based on the threshold described above, the Proposed Action would need to add 1,800 daily trips (i.e., 30,000 X 0.06) to warrant including this segment in the study area. Similarly, analysis of Convoy Street would be warranted if project traffic were to add 800 daily trips. As described in Table 3-1, the traffic trip generation for the proposed project is 254. Therefore, it would not be necessary to include either road in the study area.

The City of San Diego commonly requires analysis of signalized intersections along roadway segments that are included in a traffic study. Given that the Proposed Project's trip generation is below the threshold triggering a traffic study, and because no roadway segment analysis would be required based on the scoping process described above, no intersection analysis is necessary.

Although freeway segment analysis is based on peak hour, rather than daily, traffic volumes, the same scoping logic described above can be applied. As discussed above, the lowest capacity for congested segments is 7,050 peak hour vehicles on three-lane freeways. Analysis would be warranted if the Proposed Action were to add 141 peak hour vehicles in one direction of travel. However, as noted above, the Proposed Action would generate a maximum of 35 peak hour directional vehicles (i.e., 25 workers plus 10 truck trips). Therefore, the V/C change is below the threshold indicating that freeway segment analysis should be performed.

Table 3-2. Existing Roadway Segment Level of Service (LOS)

Roadway Segment	Street Classification	LOS E Capacity [1]	Existing		
			ADT [2]	V/C [3]	LOS [1]
8th Street					
From Gate 9 to I-5	4 Lane Collector	30,000	13,900	0.46	B
Convoy Street					
From SR-52 to Landfill Entrance	2 Lane Collector (commercial-industrial fronting)	8,000	2,470	0.31	A

Notes: [1] LOS E Capacity and LOS obtained from Table 2 of the City of San Diego Traffic Impact Study Manual.
[2] Average Daily Traffic (ADT)
[3] ADT (volume) divided by LOS E Capacity
Sources: City of San Diego 1998, 2014; San Diego Association of Governments 2014.

Table 3-3. Existing Freeway Segment Level of Service (LOS)

Freeway Segment	Lanes (Direction)	LOS E Capacity [1]	Peak Hour		
			Volume [2]	V/C [3]	LOS [4]
Interstate 5					
From 8th Street to SR-15	4 Lanes (northbound)	9,400	9,133	0.97	**E**
	4 Lanes (southbound)	9,400	8,151	0.87	D
State Route 15					
I-5 to SR-94	3 Lanes (northbound)	7,050	5,063	0.72	C
	3 Lanes (southbound)	7,050	4,581	0.65	C
SR-94 to I-805	5 Lanes (northbound)	11,750	7,620	0.65	C
	5 Lanes (southbound)	11,750	6,705	0.57	B
I-805 to I-8	4 Lanes (northbound)	9,400	8,424	0.90	D
	4 Lanes (southbound)	9,400	7,924	0.84	D
Interstate 15					
I-8 to Balboa Avenue	4 Lanes (northbound)	9,400	11,136	1.18	**F(0)**
	4 Lanes (southbound)	9,400	10,490	1.12	**F(0)**
Balboa Avenue to SR-52	4 Lanes (northbound)	9,400	7,716	0.82	D
	4 Lanes (southbound)	9,400	7,255	0.77	C
State Route 52					
I-15 to Convoy Street	3 Lanes (eastbound)	7,050	5,862	0.83	D
	3 Lanes (westbound)	7,050	6,587	0.93	**E**

Notes: **Bold** values indicate freeway segments operating at LOS E or F.
[1] LOS E Capacity based on 2,350 vehicles per hour per lane (City of San Diego 2012).
[2] Peak hour volumes obtained Caltrans (2012).
[3] Volume divided by LOS E Capacity.
[4] LOS based on the following V/C thresholds: A <0.41; B 0.62; C 0.80; D 0.92; E 1.00; F(0) 1.25; F(1) 1.35; F(2) 1.45; F(3) >1.46.*Sources:* NRSW 2011, City of San Diego 2012, Caltrans 2012.

The impacts of construction traffic along the route from NBSD to the Otay Landfill are presented in Section 3.9.1 of the Final EA, *P-327 Pier 12 Replacement and Dredging, Naval Base San Diego* (the "Pier 12 EA") (NRSW 2011), which is incorporated by reference into this EA. The Pier 12 EA may be reviewed at the following local libraries: San Diego Central Library, Point Loma/Hervey Branch Library, and Ocean Beach Branch Library and via the Navy website http://www.cnic.navy.mil/regions/cnrsw/om/environmental_support/Public_Review_of_Navy_Projects/Naval_Base_San_Diego_Pier_8_Replacement_Draft_EA.html The analysis contained in the Pier 12 EA is pertinent to the Proposed Action's impacts along the route to the Otay Landfill for the following reasons:

- Pier 12 is located within NBSD, approximately 0.8 mile south of Pier 8;
- the Pier 12 project is similar in scope to the Pier 8 project, in that an existing pier would be demolished and replaced by a proposed new pier;
- Pier 12 construction traffic would access NBSD using Gate 9; and
- the Pier 12 EA evaluated construction traffic impacts along the route from NBSD to the Otay Landfill.

The volume of Pier 12 construction traffic (i.e., 270 daily truck trips) is higher than that of Pier 8 (i.e., 188 daily truck trips). The Pier 12 EA concluded that there would be no significant traffic impact along the route from NBSD to the Otay Landfill due to Pier 12 construction activities. There have been no substantive changes on the route from NBSD to the Otay Landfill since completion of the Pier 12 EA. Because of the similarity between the Proposed Action and the Pier 12 project, and because the Proposed Action would generate fewer trips than the Pier 12 project, this analysis and conclusion are also applicable to the Proposed Action. In addition, the Pier 12 project is expected to be complete by the summer of 2016. Because work for the Pier 8 Replacement project is not expected to begin before 2018, construction traffic from the two projects will not use the route from NBSD to Otay Landfill at the same time. Therefore, the Proposed Action would not result in any significant traffic impact along the route from NBSD to the Otay Landfill.

Construction of the MHP Alternative would involve substantially fewer trips than the Conventional Pier Alternative; therefore, no significant traffic impact would occur from implementation of the MHP Alternative. With either the Conventional Pier or the MHP Alternative, the same volume of demolition debris would be hauled to the Miramar Landfill or the Otay Landfill. Given that the trip generation during demolition of 76 daily trips (comprising 66 worker commute trips plus 10 truck trips) is substantially lower than the volumes associated with conventional pier construction, there would be no significant traffic impact from demolition from implementation of either the Conventional Pier or MHP Alternative.

The segment analysis summarized in Tables 3-2 and 3-3 reflects existing traffic conditions. However, given that construction of the Proposed Action would be completed in 2019, it is likely that traffic on these streets and freeways would increase over time. This increase would occur as the result of present and reasonably foreseeable future projects near NBSD and other development in San Diego County and surrounding areas. As stated in the preceding paragraph, one known project near Pier 8 is the Pier 12 Replacement and Dredging Project that

is expected to be complete by summer of 2016. As discussed above, because work for the Pier 8 Replacement project is not expected to begin before 2018, Pier 12 project construction traffic will no longer be on the transportation network when Pier 8 construction activities begin. Therefore, the Pier 12 project will not contribute toward future traffic growth at the time the Pier 8 project is adding traffic to the transportation network as a whole.

Other cumulative projects are described in Chapter 4 of this EA. The majority of these projects involve temporary traffic impacts associated with construction activities. The Littoral Combat Ship Homeporting Project would be expected to increase traffic on nearby roadways as the result of operations. While future traffic increases from other projects may cause a deterioration of LOS on streets and freeways, with either the Conventional Pier Alternative or the MHP Alternative, traffic generation is below the threshold that would trigger a significant traffic impact. Therefore, no significant temporary traffic impact would occur from implementation of the Conventional Pier Alternative or the MHP Alternative.

To minimize potential temporary construction and demolition traffic impacts, a separate Traffic Control Plan would be prepared by the construction contractor and approved by the Navy prior to the beginning of trucking activities. The Plan would specify the following:

- Truck and worker trips associated with demolition and construction activities will be scheduled outside of the peak commuting periods of 7:00 to 9:00 a.m. and 4:00 to 6:00 p.m. to the maximum extent practicable in order to minimize the potential for peak hour traffic congestion;
- No oversized construction vehicles will be used on public roadways (i.e., all vehicles will comply with the size and weight limits specified in the California Vehicle Code);
- Only designated truck routes will be used; and
- Specific traffic control measures will be developed for circumstances where trucks would be temporarily stacked in the right-of-way (e.g., signs; delineators; and/or flaggers would be required on 8th Street at or near a gate or site access driveway).

Given that the maximum level of traffic generated by either Alternative would fall below the significance thresholds on streets and freeways along both the Miramar Landfill and Otay Landfill routes; and considering the measures listed above; there would be no significant traffic impacts from implementation of the Conventional Pier Alternative or the MHP Alternative.

Under the No-Action Alternative, no demolition or construction activities would occur. There would be no changes to the existing traffic flow patterns and numbers of vehicle trips. Therefore, there would be no significant impacts ground transportation from implementation of the No-Action Alternative.

Marine Transportation. There would be a temporary increase in vessel traffic during the demolition and construction periods. Vessel trips associated with the Conventional Pier Alternative would comprise the one-time transit of the demolition and construction vessels (four barges each assisted by one tug and one support boat) to and from Pier 8 at NBSD. There would be no additional vessel trips associated with demolition and construction because all

debris and construction materials would be transported overland by truck. The number of temporary vessel trips associated with demolition and construction would therefore be negligible. To ensure safety of all vessels using San Diego Bay and nearshore waters, the Navy would coordinate with the USCG to issue a Notice to Mariners when in-water components of this project are occurring, including transit of the demolition/construction vessels to and from the work site and the in-water demolition and construction activities. Proposed temporary demolition and construction activities would take place inside an existing restricted navigation zone (Security Zone) that is outside the federal navigation channel and off-limits to civilian vessels (National Oceanic and Atmospheric Administration 2014). The positions and movements of the demolition and construction vessels thus would not affect civilian recreational and commercial vessel movement. Because the Conventional Pier Alternative would generate negligible temporary vessel traffic whose transit of San Diego Bay and nearshore waters would be communicated to vessels in the area via the USCG Notice to Mariners, and because the temporary presence of project-related vessels would not affect civilian vessels during the demolition and construction periods, there would be no significant impacts to vessel transportation from implementation of the Conventional Pier Alternative.

Vessel trips associated with the MHP Alternative would comprise the one-time transit of the demolition and construction vessels (one to two barges assisted by one tug and one support boat) to and from Pier 8 at NBSD. The MHP Alternative would also involve five vessel transport trips to bring the five pier modules from the off-site pre-cast facility to NBSD (i.e., each module would be towed by one tug, for a total of five trips). There would be no additional vessel trips associated with demolition and construction because all debris and construction materials would be transported overland by truck. The number of temporary vessel trips associated with demolition and construction would therefore be negligible. To ensure safety of all vessels using San Diego Bay and nearshore waters, the Navy would coordinate with the USCG to issue a Notice to Mariners when in-water components of this project are occurring, including transit of the demolition/construction vessels to and from the work site, transit of the pier modules to NBSD, and the in-water demolition and construction activities. Proposed temporary demolition and construction activities would take place inside an existing restricted navigation zone (Security Zone) that is outside the federal navigation channel and off-limits to civilian vessels (National Oceanic and Atmospheric Administration 2014). The positions and movements of the demolition and construction vessels thus would not affect civilian recreational and commercial vessel movement. Because the MHP Alternative would generate negligible temporary vessel traffic whose transit of San Diego Bay and nearshore waters would be communicated to vessels in the area via the USCG Notice to Mariners, and because the temporary presence of project-related vessels would not affect civilian vessels during the demolition and construction periods, there would be no significant impacts to vessel transportation from implementation of the Modular Hybrid Pier Alternative.

Under the No-Action Alternative, no demolition or construction activities would occur. There would be no changes to the existing traffic flow patterns and numbers of vessel trips. Therefore, there would be no significant impacts marine transportation from implementation of the No-Action Alternative.

Land Use. The current land use of the project area consists of pier infrastructure to accommodate NBSD's ship berthing requirements. Beyond demolition and replacement of Pier 8 and its associated utilities, no additional land use modifications would occur under the Conventional Pier Alternative or the MHP Alternative. The existing military land use would continue to support NBSD pier operations and no land use compatibility issues would occur. The Navy has filed a notice under a programmatic agreement with the CCC. Therefore, no land use impacts would occur.

Under the No-Action Alternative, no demolition or construction activities would occur. There would be no changes to the existing land use. Therefore, no impacts to land use would occur.

Coastal Zone Management (CZMA Compliance). The Navy conducted an effects analysis as part of its determination of the action's effects for purposes of federal consistency review under the CZMA. This was done to factually determine whether the action would affect any coastal use or resource. The effects analysis found that the Proposed Action would not interfere with public access or boater recreation; would have no long-term effects on biological productivity, water quality and sensitive biological species; would not increase human health risk or environmental exposure to hazardous materials or hazardous wastes; would not disturb archaeological sites or other cultural resources; would not alter the visual character of the area, and would not generate regionally significant air emissions. Therefore, the Proposed Action would have no significant impact to coastal uses and resources. The Navy prepared a Coastal Consistency Negative Determination (refer to Appendix A) and consulted with the California Coastal Commission (CCC) on all project components. The CCC found the proposed project would not adversely affect coastal resources and concurred with the Navy's Negative Determination (refer to Appendix A).

Under the No-Action Alternative, no demolition or construction activities would occur. There would be no changes to the existing Coastal Zone use. Therefore, no impacts with respect to CZMA compliance would occur.

Aesthetics. The height of existing Pier 8 is approximately 12 ft above mean lower low water level (MLLW) for its entire length. The height of the Conventional Pier Alternative would be the same as the existing pier at the quaywall, but would slope gradually upward to 17 ft MLLW at its bayward (southwestern) end (NAVFAC Southwest 2014). With the MHP Alternative, the new Pier 8 would be a floating pier (i.e., the height is not constant as it is with a conventional/ fixed pier). The elevation of the MHP deck would vary over the light-to-loaded condition from approximately 13.9 ft MLLW to approximately 16.9 ft MLLW (NAVFAC Engineering Expeditionary Warfare Center 2014). Since the MHP is a floating pier, ships that are docked at the pier would respond equally to tidal conditions and, therefore, the ship and pier deck elevation would remain constant relative to one another. The difference in height between either the Conventional Pier Alternative or the MHP and existing pier (ranging from approximately 0 ft to 5 ft) is minor and, when viewed as one of a suite of piers within the bay, would be compatible with surrounding piers and would not alter the visual characteristics of the area. In addition, the Conventional Pier or MHP would have the same general appearance as the existing Pier 8 and therefore, would blend in with the suite of piers that occupy the bay.

The 20-ft high security watchtower that would be constructed with either alternative would stand higher than the parking areas near the quay wall. However, the visual setting for the tower would be large Navy vessels that would frequently be docked at the pier, and the multi-story industrial buildings that are set back from quay wall and piers. Views within the San Diego Bay would remain consistent with the military and industrial nature of the surrounding area. Therefore, there would be no significant aesthetics impacts from implementation of the Conventional Pier Alternative or the MHP Alternative.

Under the No-Action Alternative, no demolition or construction activities would occur. There would be no changes to the existing views at NBSD. Therefore, there would be no significant aesthetics impacts from implementation of the No-Action Alternative.

Socioeconomics and Environmental Justice. EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-income Populations* requires that "each Federal Agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health effects of its programs, policies, and activities on minority populations and low income populations" (59 *Federal Register* 1994). The Conventional Pier Alternative or the MHP Alternative would not substantially affect human health or the environment. The Conventional Pier Alternative or the MHP Alternative would take place within the NBSD property boundaries isolated from the general population; therefore, there would be no displacement of minority or low-income populations. Portions of National City immediately adjacent to the southeast of NBSD have low-income population (Navy Region Southwest and Naval Base Point Loma 2013). During project demolition/construction, the low-income population would experience construction noise levels that would not be as loud further to the east, in higher-income areas. However, the estimated construction noise levels in the low-income areas would not exceed the City of San Diego and National City Daytime Weekday Ordinance limits for noise, so there would be no significant airborne noise impact. Project demolition and construction would add vehicle trips to roadways adjacent to NBSD (32nd Street and I-5, as described above under *Ground Transportation*) at volumes that would not trigger a significant effect according to City of San Diego minimum performance standards for streets, so there would be no significant traffic impacts. Therefore, there would be no significant impacts with respect to environmental justice from implementation of the Conventional Pier Alternative or the MHP Alternative.

Under the No-Action Alternative, Pier 8 would not be replaced. There would be no short-term changes to the existing noise levels, traffic volume, and local economy in low-income areas adjacent to NBSD associated with the demolition and construction of Pier 8. Therefore, no significant impacts with respect to socioeconomics and environmental justice would occur.

Public Services. Demolition and construction would take place within NBSD property boundaries and restricted navigation zones as described above under *Ground Transportation* and *Vessel Transportation*, where emergency response services are provided by the Navy. Implementation of the Proposed Action would therefore not place any additional demand on public services such as fire protection and police protection, nor would it interfere with their operations. The short-term increase in employment would be expected to utilize workers

already present in the local area, so there would be no change in demand for health care services and or public schools. Therefore, there would be no significant impacts to public services.

Utilities. No new public utilities are required and none are proposed. Replacement of Pier 8 would include upgrading the electrical utilities from 480 volts to 4,160 volts to adequately service the ships. However, this electrical utilities upgrade is already being implemented via the NBSD Pier 12 Replacement Project (Military Construction [MILCON] P-327). The electrical cables would be installed at the switching station and connect to the end of the pier. The new cables would be required to be 750 thousand Circular Mils in diameter and be placed in a 6-inch conduit. Upgrading the electrical utilities can be accommodated without significantly impacting the utility system/network capacity (NAVFAC Southwest 2008c). Therefore, no significant impacts to public services and utilities would occur.

The Proposed Action comprises demolition and replacement of the new Pier 8 over its existing footprint at NBSD in San Diego Bay, where there are no submarine utility cables or pipelines. There are no buried pipelines or cables in the approximately 250-square ft on-shore construction footprint. Therefore, no impacts to utility corridors and connections would occur.

Under the No-Action Alternative, demolition and construction activities would not occur. There would be no changes to the existing public services and utility connections to the existing Pier 8. Therefore, no impacts to public services and utilities would occur.

Public Health and Safety and EO 13045, Protection of Children from Environmental Health Risks and Safety Risks. The demolition and construction phases of the Conventional Pier Alternative or the MHP Alternative (i.e., demolition of Pier 8) would take place within a secure area not accessible to the general public. The demolition and construction contractor(s) would be required to prepare and implement health and safety plans in accordance with federal and state regulations. As described in Section 3.3 of this EA, hazardous materials and wastes associated with the Conventional Pier Alternative or the MHP Alternative would be properly managed in accordance with applicable regulations. Any hazardous materials and wastes generated during construction and operational activities would also be subject to installation-wide Emergency Planning and Community Right-to-Know Act (EPCRA) 312 and 313 reporting requirements (NAVFAC Southwest 2008d). As discussed in detail in Section 3.3.3, the demolition and construction contractor(s) would be required to place booms around the demolition and excavation footprint to avoid ground-disturbance at the closed Installation Restoration (IR) Site 8. In addition, no inhabited buildings, other than the watch tower, would be constructed as part of the Conventional Pier Alternative or the MHP Alternative (NBSD 2012). Per existing explosive handling procedures, the Safety Officer would notify the occupants of the watch tower when explosives would be handled at Pier 7, so that the occupants can be evacuated from the site (NBSD 2008). Therefore, there would be no change to explosives handling requirements or procedures as a result of the Conventional Pier Alternative or the MHP Alternative.

Also discussed in detail in Section 3.3.3, the contractor would be notified of the potential presence of UXO at the project site through a contract clause that includes Naval Ordnance

Safety and Security Activity (NOSSA) Instruction 8020.15, which contains definitions of military munitions and UXO, and assigns responsibility and establishes procedures and reporting requirements for oversight, review, and verification of the explosives safety aspects of the Navy's Munitions Response Program (Navy 2004, NAVFAC Southwest 2008d). The risk associated with any potential explosive safety hazard would be further minimized by setting up and following explosive safety procedures to train and protect on site workers. An Explosives Safety Plan would be developed. The Navy and all contractors and subcontractors would be required to adhere to the procedures established in NOSSA Instruction 8020.15 (NAVFAC Southwest 2008e).

Finally, as discussed in detail in Section 3.3.3, the new pier must be clearly marked to designate the explosives handling area (DOD 2005). Explosives handling would only be allowed within the outermost 400 ft of the pier, and the pier must be clearly marked to designate the explosives handling area (DOD 2005). The southwest corner of the Mole Pier (see Figures 1-1 and 1-2) lies within the Pier 8 ESQD arc and must be evacuated when Hazard Division 1.1 (explosives that have a mass explosion hazard) operations take place at Pier 8. In addition, Pier 8 lies within the ESQD arc for Pier 7. To ensure safety during the project demolition and construction activities, the NBSD Explosives Safety Officer must be provided contractor points of contact. The Safety Officer would notify the contractors when explosives would be handled at Pier 7, so that contractor personnel can be evacuated from the site (NBSD 2008). Completion of the site approval process, and adherence to the NBSD Explosives Safety Officer's requirements would ensure that implementation of the MHP Alternative or Conventional Pier Alternative would not result in a significant impact to explosives safety and handling at NBSD, or pose a safety risk to the public or contractor personnel involved in the demolition and construction. Therefore, the Conventional Pier Alternative or the MHP Alternative would not have a significant impact on public health and safety.

EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, states that each Federal agency must, to the extent permitted by law and appropriate and consistent with the agency's mission: (a) make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and (b) ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks (62 *Federal Register* 1997). The Conventional Pier Alternative or the MHP Alternative or would not substantially affect human health or the environment and, thus, would not create disproportionate risks to children. In addition, the demolition and construction phases of the Conventional Pier Alternative or the MHP Alternative would take place within a secure area not accessible to the general public. Therefore, EO 13045 impacts would not occur.

Under the No-Action Alternative, demolition and construction activities would not occur. There would be no changes to the existing health and safety conditions at NBSD. In addition, there would be no changes to environmental health and safety conditions affecting children, so impacts with respect to EO 13045 would not occur. Therefore, there would be no impacts to public health and safety.

Public Services: Police; Fire; Schools. The Proposed Action would take place entirely within the boundaries of NBSD, and would not involve or affect civilian public services such as police, fire, and school departments. Therefore, there would be no significant impact to civilian police, fire, and school departments. Under the No-Action Alternative, demolition and construction would not occur. Therefore, there would be no impact to civilian police, fire, and school departments.

3.1 WATER RESOURCES

3.1.1 Definition of Resource

Water quality describes the chemical and physical composition of water as affected by natural conditions and human activities. Water resource regulations focus on the right to use water and protection of water quality. The principal federal laws enforced by the U.S. Environmental Protection Agency (USEPA) to protect water quality are the Clean Water Act (CWA), as amended (33 U.S. Code [USC] § 1251 *et seq.*), and the Safe Drinking Water Act (42 USC § 300f *et seq.*). The CWA provides protection of surface water quality and preservation of wetlands. The Safe Drinking Water Act is directed at protection of drinking water supplies. At the state level, the Porter-Cologne Water Quality Control Act (California Water Code §§ 13000-13999.10) gives the State Water Resources Control Board (SWRCB) and nine Regional Water Quality Control Boards (RWQCBs) responsibilities for protection of the waters within their regions. The regional boards are also responsible for implementing provisions of the CWA delegated to states, such as the National Pollutant Discharge Elimination System (NPDES), which regulates point (industrial) and non-point (stormwater) sources of pollutants.

In the Water Quality Control Plan for the San Diego Basin (Basin Plan), the California RWQCB, San Diego Region designated beneficial uses for the surface and ground waters in the San Diego Region (RWQCB 1994). Beneficial uses are defined as the uses of water necessary for the survival or well-being of man, plants, and wildlife; and are protected against degradation of their quality under the state Porter-Cologne Act (RWQCB 1994). Examples include: drinking, swimming, industrial, and agricultural water supplies, and the support of fresh and saline aquatic habitats. Specific beneficial uses established for San Diego Bay include the following (RWQCB 1994): Industrial Service Supply; Navigation; Contact Water Recreation; Non-contact Water Recreation; Commercial and Sport Fishing; Preservation of Biological Habitats of Special Significance; Estuarine Habitat; Wildlife Habitat; Rare, Threatened, or Endangered Species; Marine Habitat; Migration of Aquatic Organisms; and Shellfish Harvesting. The Basin Plan sets objectives for water quality that must be maintained to protect the designated beneficial uses of water resources in the San Diego region and conform to the state's antidegradation policy. The California Ocean Plan establishes limits or levels of water quality characteristics for ocean waters to ensure the reasonable protection of beneficial uses and the prevention of nuisance (SWRCB 2005).

3.1.2 Affected Environment

The following section describes existing conditions for water resources at the proposed project site (Pier 8) located in San Diego Bay.

3.1.2.1 Existing Conditions

San Diego Bay is a narrow, crescent-shaped natural embayment oriented northwest-southeast with an approximate length of 15 miles (Port of San Diego 2007). The width of the bay ranges from 0.2 to 3.6 miles, and depths range from -74 ft MLLW near the tip of Ballast Point (see Figure 1-1) to less than 4 ft at the southern end (Merkel & Associates, Inc. 2009). About half of the bay is less than 15 ft deep and most of it is less than 50 ft deep (Merkel & Associates, Inc. 2009).

On average, the San Diego region receives 10 inches of rainfall per year, occurring mostly between November and March (NAVFAC Southwest and Unified Port of San Diego 2013). Seasonal inputs of freshwater from the land to the east are conveyed to the bay through the three sub-watersheds of the San Diego Bay watershed (Port of San Diego 2007). The Pueblo San Diego sub-watershed encompasses the northern portion of the bay. This sub-watershed has the smallest drainage area, but is the most densely developed and populated because it includes the City of San Diego (Port of San Diego 2007). Chollas Creek and Paleta Creek are two of the major drainages of the Pueblo San Diego sub-watershed (Port of San Diego 2007). Paleta Creek (see Figure 2-1), which outlets into the bay just south of Pier 8, maintains a slight dry season flow consisting mostly of irrigation run-off from its upland areas (NAVFAC Southwest 2008a). Freshwater contribution to the Bay comes primarily from the Otay and Sweetwater Rivers in the south portion of the Bay, and secondarily from Chollas and Paleta Creeks in the central portion (USACE 2009). For approximately 9 months of the year, the Bay receives no significant amount of fresh water input. The fresh water that does flow into the bay is limited to surface runoff from urban areas (e.g., the over 200 storm drains and intermittent flows from the rivers and creeks after storms) (USACE 2009).

<u>Bathymetry and Circulation</u>

The bathymetry of the bay floor near Pier 8 is typical of that found in areas surrounding piers in the San Diego Bay, i.e., a gradual deepening toward the center and mouth of the bay (NAVFAC Southwest 2001a). The bay floor sediments in the pier areas have been altered from their natural state by dredging and propeller action from ships moving through the area (Navy 1999). The bottom depth at Pier 8 is -37 ft MLLW (NAVFAC Southwest 2008b).

Circulation within the San Diego Bay is affected by the bay's crescent shape and narrow bay mouth, tides, and seasonal salinity and temperature variations (Port of San Diego 2007). Tidal flushing rates depend on distance from the bay mouth, season, and amplitude of the tidal cycle (Port of San Diego 2007). San Diego Bay can be divided into four regions based upon circulation characteristics. The North Bay – Marine Region extends from the bay mouth to the area offshore from downtown San Diego. Tidal action has the greatest influence on circulation in this area where bay water is exchanged with sea water over a period of 2 to 3 days (Port of San Diego 2007). The North-Central Bay – Thermal Region runs from north bay to Glorietta Bay (south of Coronado Island). In the Thermal Region, currents are mainly driven by surface heating (Port of San Diego 2007). The incoming tide brings cold ocean water from deeper areas, which is then replaced with warm bay surface water when the tide recedes. These tidal processes lead to strong vertical mixing (Port of San Diego 2007). The region between Glorietta Bay and

Sweetwater Marsh is characterized as the South-Central Seasonally Hypersaline (i.e., higher salt content than seawater) Region. Here, variations in salinity due to warm-weather evaporation at the surface separate the water into upper and lower zones driven by density differences (Port of San Diego 2007). The South Bay estuarine region south of Sweetwater marsh receives occasional freshwater inflows from the Otay and Sweetwater Rivers (Port of San Diego 2007). Residence time of bay water in the estuarine region may be greater than one month (Port of San Diego 2007). Common salinity values for the bay range from 33.3 to 35.5 practical salinity units for the bay mouth and the south bay, respectively (Chadwick *et al.* 1999).

San Diego Bay has mixed diurnal/semi-diurnal tides, with the semi-diurnal component being dominant (Largier 1995). The interaction between these two types of tides is such that the higher high tide occurs before the lower low tide, creating the strongest currents on the larger ebb tide (Largier 1995). The tidal range (difference between MLLW and mean highest high water) is about 5.5 ft (Largier 1995). In general, tidal currents are strongest near the bay mouth, with maximum velocities of 1.6 to 3.3 ft per second (Largier 1995). Tidal current direction generally follows the center of the bay channel (Chadwick *et al.* 1999). Residence time for water in the bay increases from approximately 5 to 20 days in mid-bay to over 40 days in south bay (Chadwick *et al.* 1999). During an average tidal cycle, about 13 percent of the water in the bay mixes with ocean water and then moves back into the bay (Port of San Diego 2007). The complete exchange of all the water in the bay can take 10 to 100 days, depending on the amplitude of the tidal cycle (Port of San Diego 2007). Tidal flushing and mixing are important in maintaining water quality within the bay. The tidally-induced currents regulate salinity, moderate water temperature, and disperse pollutants (Port of San Diego 2007).

Marine Water Quality

San Diego Bay

Before the 1960s, San Diego Bay was one of the most polluted harbors in the world. This was due to over 70 years of discharge of raw sewage and industrial waste as the population of the City of San Diego increased and became a major harbor for the U.S. Navy and civilian commerce (Navy 1999). Construction of the San Diego Metropolitan Sewage System at Point Loma in 1963 to properly treat sanitary sewage prior to disposal via pipeline offshore at Point Loma and elimination of industrial discharges in the 1970s resulted in rapid water quality improvements in the bay (Port of San Diego 2007).

Water quality is commonly assessed by measuring dissolved nutrients, dissolved oxygen, pH, turbidity, chlorophyll *a,* and coliform bacteria (Chadwick *et al.* 1999). Measured values for dissolved nutrients in San Diego bay such as phosphate and silicates range from 0.9 to 4 parts per million (ppm) for silicon and 0.02 to 0.3 ppm phosphorus in the winter, to 0.3 to 1.3 ppm for silicates and 0.2 ppm phosphorus in the summer (Chadwick *et al.* 1999). This variation is the result of inflow of these nutrients with winter runoff, and uptake by phytoplankton growth in the summer (Chadwick *et al.* 1999). Dissolved oxygen levels range from about 4 (summer) to 8 milliliters per liter (winter) (Chadwick *et al.* 1999). These oxygen levels are typically at or near atmospheric equilibrium levels. The pH of seawater in San Diego Bay is relatively uniform, ranging from about 7.9 to 8.1 throughout the bay and the year (Chadwick *et al.* 1999).

Turbidity is a measure of water clarity or murkiness, and can be caused by suspended sediments transported in runoff or increased algal/bacterial growth (Tierra Data Inc. 2010). Turbidity can also be created by natural and man-made resuspension of bottom sediments. Bottom sediments are resuspended by the action of tides; winds; and movements of ships with drafts deeper than 22 ft in the shallow waters of the south bay around NBSD (Chadwick *et al.* 1999). Increased turbidity reduces the amount of light available for plant growth underwater, so it can affect the entire ability of the Bay to support living organisms (Tierra Data Inc. 2010). Turbidity in San Diego Bay varies, depending on the tides, seasons, and location within the Bay (Tierra Data Inc. 2010). The Basin Plan sets limits for allowable increases in turbidity over existing conditions (RWQCB 1994).

Chlorophyll *a* (a measure of the amount of phytoplankton present in the bay) ranges from 0.2 to 25 micrograms per liter (Chadwick *et al.* 1999). The highest values were measured in the south bay in winter, when runoff carries high levels of nutrients into the south bay. In summer, chlorophyll *a l*evels return to background levels of 1 to 2 micrograms per liter. These chlorophyll *a l*evels are generally much higher than those found in the adjacent open ocean. Before 1964, when untreated sewage was still being discharged into San Diego Bay, bacterial counts (fecal coliform) were as high as 82 per milliliter in the south bay (Chadwick *et al.* 1999). Since these discharges ended, bacterial counts typically remain below 10 per milliliter except during some winter storms. These levels are below federal limits for water contact, implying that the bay is generally safe for recreational use (Chadwick *et al.* 1999).

Current sources of pollution to the bay include underground dewatering, industries on the bay and upstream, marinas and anchorages, DOD and Department of Homeland Security activities, materials used for underwater hull cleaning and vessel antifouling paints, and urban runoff (Navy 1999). Additional pollution sources include creosote-treated wood pier pilings, which are a source of PAHs; stormwater runoff from land used for industrial, commercial, and transportation purposes; bilge water discharge; and oil spills (Navy 1999). Recent advances at NBSD have included replacing approximately half of the pier pilings with plastic or untreated wood, and eliminating bilge water inputs (Navy 1999). Overall, the levels of contamination in the water and sediment in San Diego Bay appear to be lower now than in decades past, including levels of some metals and PAHs (Port of San Diego 2007). However, copper concentrations remain routinely higher than federal and state limits for dissolved copper (Port of San Diego 2007).

Project Location

The proposed project site is located in the Pueblo-San Diego sub-watershed portion of the San Diego bay watershed. The Paleta Creek channel outlet runs between Pier 8 and the Mole Pier (see Figure 2-1). A large fraction of total suspended solids and copper loading in stormwater outflow from Paleta Creek is flushed into the bay in the vicinity of the outfall, which includes Pier 8. In the vicinity of NBSD, tidal currents are present, with faster moving water found in the deeper main shipping channel. Current speeds range from 5 centimeters per second near the quaywall to 10 to 15 centimeters per second between the piers (Navy 1999). Currents and bottom stresses between the piers are generally too weak to cause significant sediment

resuspension (Navy 1999). However, the large shear forces caused by vessel propellers involved in tugging and docking in the vicinity of NBSD are the source of 29 percent of the total suspended sediment load, and add twice the amount of sediment to the water column as storm water inflow. About half of the resuspended sediments settle out within the vicinity of the piers (Navy 1999).

Existing water quality conditions at Pier 8 and a reference location in the vicinity of San Diego Bay Main Channel Buoy 30 (offshore of Pier 8) were monitored by AMEC Earth & Environmental, Inc. in conjunction with the drafting of this EA. The complete Water Quality Monitoring Report is included in Appendix B of this EA (AMEC Earth & Environmental, Inc. 2008). The following parameters were measured in increasing depths at 3-ft intervals: turbidity, temperature, salinity, pH, and dissolved oxygen. The results of the Water Quality Monitoring Report showed that turbidity increased with depth, but was consistent overall with results found in coastal embayments in Southern California (AMEC Earth & Environmental, Inc. 2008). Concentrations of dissolved oxygen in seawater at Pier 8 ranged from 5.43 to 6.18 milligrams per liter, well above the San Diego RWQCB Basin Plan Objective of 5.0 milligrams per liter, established to maintain adequate dissolved oxygen to support aquatic life (AMEC Earth & Environmental, Inc. 2008, RWQCB 1994). The dissolved oxygen concentrations measured at Pier 8 were consistent with those of the reference location and the values recorded over a one-year period during the Port of San Diego's Bay-wide Water Quality Monitoring Program. Seawater pH, salinity, and temperature at the piers were found to be consistent with the AMEC study reference location and within the expected range of background conditions.

The existing Pier 8 discharges stormwater runoff through grated drains into San Diego Bay. Basewide Best Management Practices (BMPs) for preventing and minimizing contact of potential pollutants with stormwater are implemented and include restricting access, regular cleaning and sweeping, controlling spills and reducing waste, permanently sealing drains in critical areas that lead to storm drains, and regular inspection and maintenance of the storm drain system (NBSD 2004a). Pier 8 follows additional BMPs specific to the operations there, including the following: berms around electrical substations and transformers, testing accumulated precipitation to prevent discharge of contaminants, covering storm drains during maintenance activities, and proper inspection and maintenance of the BOWTS and wastewater tanks, piping, and valves to prevent leaks of bilge and sanitary wastewater (NBSD 2004a). The existing stormwater drainage facilities on Pier 8 do not include sediment traps or OWS to remove pollutants from stormwater before it drains into the bay (NBSD 2012).

The existing shore-side storm drainage system for Pier 8 consists of a combination of sheet flow and storm drain catch basins that discharge via tidally-influenced outfalls along the quaywalls (NAVFAC Southwest 2008a). There are no protective measures in place (sediment traps or OWS) for the shoreside storm drain facilities at these two pier walls (NAVFAC Southwest 2008a).

Industrial discharges, non-stormwater discharges, and stormwater runoff from NBSD are regulated under the installation's NPDES Permit (Permit No. CA 0109169 Order No. R9-2002-0169) (RWQCB 2002a). Regulated industrial non-storm water discharges include condensate

from the Pier 8 steam lines, which have five release points on each side of the pier, and boom cleaning with high-pressure potable water. No NPDES permit violations were issued to NBSD in the period from 2000 to 2013 (SWRCB 2007, NAVFAC Southwest 2014a).

Pier 8 is equipped with a wastewater collection piping system to provide service for berthed ships (NAVFAC Southwest 2008a). The Pier 8 wastewater collection system is connected to the San Diego Metropolitan Sewer Pump Station #1 (NAVFAC Southwest 2008c).

Surface Water Quality

The three sub-watersheds that contribute runoff to San Diego Bay are developed with agricultural, residential, commercial, and industrial uses (Port of San Diego 2007). Resulting surface water quality in these watersheds reflects the impacts of these uses (Port of San Diego 2007). The following have been noted as concerns in the San Diego Bay sub-watersheds: pesticides, turbidity, bacteria, copper, and zinc (Port of San Diego 2007). Paleta Creek stormwater from upstream urban sources has historically contributed copper, lead, and zinc to the bay at its outfall point south of Pier 8. Polychlorinated biphenyls (PCBs), pesticides and pesticide breakdown products were also noted during one storm event (San Diego RWQCB and CNRSW 2005). Navy stormwater outfalls into the lower reaches of Paleta Creek also introduce copper, lead, and zinc. In addition, leaching from ship hulls and anode components are also major sources of copper and zinc (San Diego RWQCB and CNRSW 2005).

Section 303(d) of the CWA requires states to conduct biennial assessment of waters that do not meet protective water quality standards, and develop lists of "water quality limited segments" for impaired water bodies (RWQCB 2013). All of San Diego Bay is listed as an impaired water body on the CWA Section 303(d) list due to PCBs (RWQCB 2009). The San Diego Bay shoreline at Seventh Street Channel (Paleta Creek) is listed as impaired because concentrations of PCBs, total chlordane (a pesticide), and PAH exceed water quality standards (RWQCB 2013). Paleta Creek is listed on the CWA section 303(d) list as impaired due to concentrations of lead and copper that exceed water quality standards (RWQCB 2009). As required by Section 303(d), the San Diego RWQCB is working to develop total maximum daily loads (TMDLs) for the constituents that do not meet water quality standards. TMDLs typically contain the total load (i.e., the allowable concentrations that protect benthic communities from direct effect of these pollutants, and protect human health for pollutants that bioaccumulate) and load allocations (the portion of the total load to assigned to each source), as required by Section 303(d). San Diego RWQCB has proposed the following mass-based TMDLs for Paleta Creek: chlordane – 0.105 grams per day, total PAHs – 3.20 grams per day, total PCBs – 0.438 milligrams per day (RWQCB 2013). TMDLs for lead and copper at Paleta Creek are anticipated for 2021, and a TMDL for PCB for San Diego Bay overall is expected in 2019 (RWQCB 2009).

3.1.3 Environmental Consequences

3.1.3.1 Approach to Analysis

Water quality impacts are evaluated based on the potential for a substantial increase in turbidity, discharge of suspended sediments, or discharge of contaminants that exceeds Federal or state water quality standards or objectives. Impacts to water resources would occur if

implementation of the Proposed Action or alternatives would substantially degrade surface water, groundwater, or marine water quality or cause impairment to beneficial use.

3.1.3.2 Conventional Pier Alternative

<u>Bathymetry and Circulation</u>

Pier Demolition

Demolition would not include dredging, so there would be no changes to bathymetry at the existing Pier 8 site. Piles (1,830 structural and 343 fender piles, 2,173 in total) would be dry-pulled with a crane and a vibratory hammer if needed to loosen them. Barges, tugs, and other vessels would move about the work area. All these operations would increase water movement in the area where the removal occurs, but the effect would be strictly limited to the duration of the demolition period and work area. As stated in Section 3.1.2.1, the primary mechanisms controlling circulation in San Diego bay are tidal currents and seasonal variations in temperature and salinity. Small-scale, localized increases in water movements associated with demolition activities would not be expected to have a significant effect on bay circulation. Therefore, there would be no significant impacts to bathymetry and circulation from demolition of Pier 8 for implementation of Conventional Pier Alternative.

Pier Construction

There would be no dredging or other alteration to the elevation of the bay bottom with construction of the Conventional Pier Alternative. Construction would involve the use of barges, tugs, other vessels that would move about the work area and a diesel hammer to install the piles. These operations would increase water movement in the area where the construction occurs, but the effect would be strictly limited to the duration of the construction period and work area. Approximately 950 piles would be installed throughout the approximately 4.30-acre footprint of the Conventional Pier Alternative, which would encompass the smaller footprint (approximately 2.44 acres) of the existing Pier 8 (see Figure 2-1). When construction is complete, the Conventional Pier Alternative would have less than half the number of piles distributed over an area twice as large as the existing Pier 8, which has 2,173 piles. This pile spacing would be wide enough so that the new pier would not form a barrier to local circulation. There would be no changes to bathymetry in San Diego Bay and existing patterns of circulation would continue; therefore, there would be no significant impacts to bathymetry and circulation with implementation of the Conventional Pier Alternative.

<u>Marine Water Quality</u>

Pier Demolition

Pier demolition would involve removal of the pier infrastructure and concrete decks, followed by removal of the existing pier pilings with a crane. Potential sources of impacts to water quality associated with demolition activities would include residue inside the BOWTS and ships' sanitary wastewater pipelines, debris and dust from disassembling the concrete and asphalt decks, petroleum products associated with the asphalt debris, vessel and equipment

fuels, and bottom sediments resuspended by the pile removal action and demolition vessel movement.

Before demolition begins, the BOWTS and ships' wastewater pipelines would be flushed with high-pressure water from service lines on Pier 8. The wastewater manhole on the quaywall at Pier 8 would be sealed to prevent sea water from entering the wastewater system during high tide (NAVFAC Southwest 2008c). Water flushed from the BOWTS pipeline would be treated at the NBSD BOWTS treatment plant and the flush water from the ships' wastewater pipelines would be pumped to the City of San Diego metropolitan sanitary sewer pump station #1. Flushing the pipelines would minimize accidental release of pipeline residue during demolition activities. During demolition and construction activities, there would be sufficient capacity at other NBSD piers to provide BOWTS and wastewater services to ships berthing at NBSD (NAVFAC Southwest 2008d).

Debris and dust from demolition activities could form floating scum on the water surface, and increase turbidity by contributing additional material to the water column. The contractor would be required to develop, receive NBSD Base Environmental approval of, and implement a project-specific Storm Water Pollution Prevention Plan (SWPPP) that would include BMPs for minimizing and containing dust and debris (NAVFAC Southwest 2008a). Debris from work on barges would be captured on-board the barges. All captured material would be swept up and disposed in accordance with the SWPPP. As a part of the BMPs outlined in the SWPPP, the demolition contractor would be required to provide a floating boom around the project area to contain floating surface debris, and use catch devices and sheeting. The contractor would also be required to prepare and implement a Construction Demolition Plan that would cover all phases of the work to be done and specify materials; equipment; and procedures to be used to contain all construction and demolition waste and debris, including dust (NAVFAC Southwest 2008d). The Construction Demolition Plan would be approved by NAVFAC Southwest Facilities and Engineering Design (NAVFAC Southwest 2008d).

A Section 401 Water Quality Certification from the RWQCB would be obtained, as would a Section 404/Section 10 permit from the USACE; these permits would apply to all in-water components of the project. The contractor would be required to comply with all permit conditions.

Oily residue in the BOWTS pipelines, vessel and equipment fuels and hydraulics, and asphalt debris are potential sources of petroleum waste. The demolition contractor would be required to develop and receive Base approval of a Spill Prevention Plan to address spill prevention and containment procedures within their equipment and vessels (NAVFAC Southwest 2008e). Accidental releases of petroleum and debris from vessels and equipment would be limited and prevented by the following: proper maintenance, inspection, and operation of vessels and equipment, flushing the BOWTS pipelines before demolition, and implementation of a site-specific SWPPP and Spill Prevention Plan. Per the NBSD Facility Response Plan, any petroleum release or petroleum sheen observed on the water surface would be reported to NBSD Port Operations and the USCG National Response Center (CNRSW 2003). In the event of an accidental release, clean-up procedures would take place; booms and other spill containment

equipment kept on hand would be immediately deployed, the source of the release would be determined and secured, and the NBSD Fire Department would respond to clean up the spill (CNRSW 2003). These procedures would prevent impacts to water quality from petroleum products associated with demolition activities.

The sediments of the Paleta Creek mouth area, including the south side of Pier 8, were assessed under the Bay Toxic Cleanup Program to determine whether the sediments were impaired with respect to beneficial use for aquatic life; aquatic-dependent life; or human health (San Diego RWQCB and CNRSW 2005). The sediments were not found to be impaired with respect to aquatic and aquatic-dependent life, but possibly impaired to human health due to the presence of carcinogens benzo (a) pyrene (a PAH) and PCBs in shellfish if consumed (San Diego RWQCB and CNRSW 2005).

More recently, sediments surrounding Pier 8 were analyzed in preparation for proposed maintenance dredging. A composite sample was analyzed from sediments collected at six locations around Pier 8. The sediment surrounding Pier 8 were found to consist of 73 percent silt and clay, i.e., fine-grained material. According to the analytical results, the Pier 8 composite sample had concentrations of PAHs that exceeded the effects range-median (concentrations above which biological effects are likely expected to occur, a sediment quality benchmark established by the National Oceanic and Atmospheric Administration) (NAVFAC Southwest 2014b). The Pier 8 composite sample also had concentrations of metals, PAHs, pesticides and PCBs that exceeded the NOAA effects range-low (concentrations below which biological effects are rarely expected to occur (NAVFAC Southwest 2014b). However, toxicity modeling conducted on the Pier 8 sample indicated low potential for toxic impacts to the water column because potential contaminants dissipated to below the level of concern after the 4-hour mixing period approved by USEPA/USACE (for modeling the effects of disposal of dredged materials at an approved ocean dredged material disposal site) (NAVFAC Southwest 2014b). This is consistent with the findings of Sediment Quality Characterization Naval Station San Diego Final Summary Report, which indicated that acute toxicity due to exposure during resuspension events is unlikely (Navy 1999).

Vessel movement associated with demolition activities and removal of the existing piles would cause disturbance of bottom sediments and increased turbidity as a result of sediment resuspension. However, the sediment resuspension and increased turbidity would be short-term and limited to the areas of bottom disturbance and localized to the immediate Pier 8 area. Observations of San Diego Bay sediments disturbed from dredging and ship propeller turbulence at water depths similar to those of the proposed project area found that sediments resettled quickly. Within 1 hour of cessation of the disturbing forces, water clarity conditions returned to pre-disturbance levels (AMEC Earth & Environmental, Inc. 2008a; see Appendix B). The bulk of the sediments in the Pier 8 area are fine-grained and may be transported in the tidal current. However, as stated above, the currents are weak in the Pier 8 area: speeds range from 5 centimeters per second near the quaywall to 10 to 15 centimeters per second between the piers (Navy 1999). Currents and bottom stresses between the piers are generally too weak to cause significant sediment resuspension, but the propellers of ships moving about the piers generate

about 29 percent of the sediment load in the area (Navy 1999). About half of the resuspended sediments settle out within the vicinity of the piers (Navy 1999). However, the eastern coastline of San Diego Bay is, and has historically been, developed with industrial marine facilities, including NBSD. There are multiple similar Navy berthing piers to the north and south of Pier 8, commercial shipyards to the north of NBSD, and the commercial 24th Street Marine Terminal to the south. In general, historical and ongoing activities from both Navy and non-Navy sources have led to the loading of bay sediments with a range of chemicals (Navy 1999). Should fine sediments resuspended by pier removal and project-related vessel movements be transported in the weak currents, they would likely settle out around the nearby Navy piers, where sediment and water quality conditions are similar to those at Pier 8 (i.e., not pristine). Therefore, the impact to marine water quality due to turbidity and sediment resuspension would be less than significant.

In summary, procedures would be followed to reduce impacts to a level of insignificance. Implementation of the SWPPP and Spill Prevention Plan would prevent input of additional contaminants related to demolition and construction. Flushing BOWTS and wastewater pipelines prior to disassembly and implementation of the SWPPP and Spill Prevention Plan would ensure that there would be no input of additional contaminants to the CWA Section 303 (d) listed impaired water quality segment at Paleta Creek.

The contractor would be required to prepare and implement a Construction Demolition Plan that would cover all phases of the work to be done and specify materials; equipment; and procedures to be used to contain all construction and demolition waste and debris, including dust (NAVFAC Southwest 2008d). The Construction Demolition Plan would be approved by NAVFAC Southwest Facilities and Engineering Design (NAVFAC Southwest 2008d). Turbidity due to resuspension of bottom sediments during demolition activities would be short-term and localized to Pier 8 and the nearby Navy piers and unlikely to cause toxic impacts to the water column. However, to further minimize turbidity during demolition activities, the contractor would be required to comply with RWQCB and USACE permit requirements. Therefore, there would be no significant impacts to marine water quality with demolition of existing Pier 8 for implementation of the Conventional Pier Alternative.

Pier Construction

Construction of the Conventional Pier Alternative would include installing approximately 950 piles with a pile driver, and vessel activities that would result in localized, short-term disturbances of bottom sediments. The total number of piles to be installed would be less than half the number removed during demolition of existing Pier 8 (2,173). There would be a 45 percent reduction in pile surface area as compared with the existing Pier 8. Because there would be fewer pile installations than removals, and the process of pile driving displaces a smaller volume of sediment than pile removal, constructing the Conventional Pier Alternative would cause fewer disturbances, and therefore less resuspension of bottom sediments, than the action of removing the old Pier 8 piles (AMEC Earth & Environmental, Inc. 2008a). The impact to water quality from turbidity and suspended sediments would be limited to the Pier 8 area and possibly other nearby Navy piers and would cease when the pile driving is finished. As

described above under *Demolition*, the potential for toxic impacts to the water column resulting from sediment resuspension would be low. The construction contractor would be required to follow the same project-specific precautionary measures that were used to reduce turbidity during demolition and comply with RWQCB and USACE permit requirements. The contractor would also be required to develop and implement a SWPPP identifying methods to prevent spills of concrete, fuels and hydraulic fluid from vehicles and equipment, including inspecting equipment and vehicles for drips and placing drip pans beneath vehicles and equipment (NAVAFC Southwest 2008a). Because potential sediment resuspension from pile driving would be localized to the project area, and minimized through the use of precautionary measures, and the potential for spills of construction-related materials and hazardous materials would be minimized through the requirement for the SWPPP, there would be no significant impacts to marine water quality from implementation of the Conventional Pier Alternative.

Surface Water Quality

Pier Demolition & Pier Construction

Potential surface water quality impacts associated with the Conventional Pier Alternative include spills and releases of hazardous and non-hazardous materials, materials involved with demolition and construction, and conditions that would exist after Pier 8 is replaced.

In accordance with the installation's NPDES Permit (Permit No. CA S000002, SWRCB Order No. 99-08-DWQ), *Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction Activity*, demolition and construction contractors would be required to develop, receive Base approval of, and implement a site-specific construction SWPPP (NAVFAC Southwest 2008a, d). The SWPPP would specify BMPs to prevent construction pollutants from contacting stormwater, eliminate or reduce non-stormwater discharges, and perform inspections of all BMPs (SWRCB 2008). The SWPPP would also include BMPs to minimize potential impacts related to the on-shore construction components, such as: preventing erosion; the use of sediment barriers; inlet covers; covering stockpiles; inspecting equipment and vehicles for drips; and placing drip pans beneath vehicles and equipment (SWRCB 2008).

The new Pier 8 would include a stormwater collection system equipped with a three-stage filtration system that would remove floating particles, oil and grease, and sediment. The stormwater treatment system for the new Pier 8 would meet current NPDES permit requirements (NBSD 2012). The NPDES permit contains specifications for industrial stormwater discharges for copper (63.6 micrograms per liter) and zinc (117 micrograms per liter). The permit also has a separate toxicity standard that must be met: in a 96-hour static or continuous flow bioassay (toxicity test) undiluted storm water shall not produce less than 90 percent survival, 50 percent of the time, and not less than 70 percent survival, less than 10 percent of the time, using standard test species and protocol. To achieve compliance with the NPDES requirements, the new Pier 8 stormwater treatment system would include the capability to reduce copper and zinc to within the quantitative and toxicity limits as stated in the California RWQCB San Diego Region Fact Sheet Order No. R9-2002-0169 NPDES Permit No. CA 0109169 Waste Discharge Requirements for U.S. Navy, NBSD, San Diego County (RWQCB 2002b). Design and construction of the new Pier 8 stormwater system would be coordinated with the

San Diego RWQCB to ensure that it is constructed in accordance with applicable federal, state, and local regulations and requirements for stormwater retention and treatment. Water discharged from the new stormwater treatment system would flow into the bay (NAVFAC Southwest 2008a).

Pier 8 Operation

Upon completion of the new Pier 8, the existing NBSD NPDES Permit for industrial and stormwater discharges would apply. The NBSD SWPPP and Basewide BMPs for preventing and minimizing contact of potential pollutants with stormwater would continue to be followed, including: restricting access; regular cleaning and sweeping; controlling spills and reducing waste; permanently sealing drains in critical areas that lead to storm drains; and regular inspection and maintenance of the storm drain system. Pier 8-specific BMPs would continue to be followed upon completion of the new Pier 8, including: placement of berms around electrical substations and transformers; testing accumulated precipitation to prevent discharge of contaminants; covering storm drains during maintenance activities; and proper inspection and maintenance of the BOWTS, wastewater tanks, piping and valves to prevent leaks of bilge and sanitary wastewater. The NBSD SWPPP and the Pier 8 BMPs would be reviewed, and revised/updated as needed to be consistent with the new Pier 8 (NAVFAC Southwest 2008a).

With the exception of the new Pier 8 stormwater collection system with OWS and copper and zinc treatment which would be a beneficial impact, the Conventional Pier Alternative would replace the existing conditions following the demolition and construction period. Vessel maintenance contractors working at the new Pier 8 would be required to develop and implement SWPPPs and Spill Prevention Plans to manage their job-related debris and contaminants to minimize impacts to water quality. Therefore, there would be no significant impacts to water quality, and no impacts to beneficial use from implementation of the Conventional Pier Alternative.

3.1.3.3 MHP Alternative

Demolition

Under the MHP Alternative, the existing Pier 8 would be removed as described under the Conventional Pier Alternative. The same demolition activities would take place, and the same SWPPP, Spill Prevention Plan, BMPs, and precautionary measures would be implemented to minimize potential impacts to water quality. With the MHP Alternative, no dredging would occur during demolition and construction. Therefore, there would be no significant impacts to: bathymetry; circulation; marine water quality; and surface water quality resulting from demolition of Pier 8 for implementation of the MHP Alternative.

Construction

The five concrete deck modules for the MHP Alternative would be constructed at the concrete pre-cast facility, significantly reducing the on-site presence of concrete powder, transit mixers, and other construction vehicles as well as the duration of construction. The reduced on–site presence of construction materials, equipment, and shorter construction period associated with the MHP Alternative would correspondingly reduce the potential for accidental spills of

construction materials and fuels. The contractor would be required to develop and implement a SWPPP and Spill Prevention Plan to plan for and contain construction- related contaminants to minimize impacts to water quality.

Each of the five MHP deck modules would be moored by one steel shaft that would stand on an underwater pile dolphin (Figure 3-1 [notional illustration only- not to scale]).

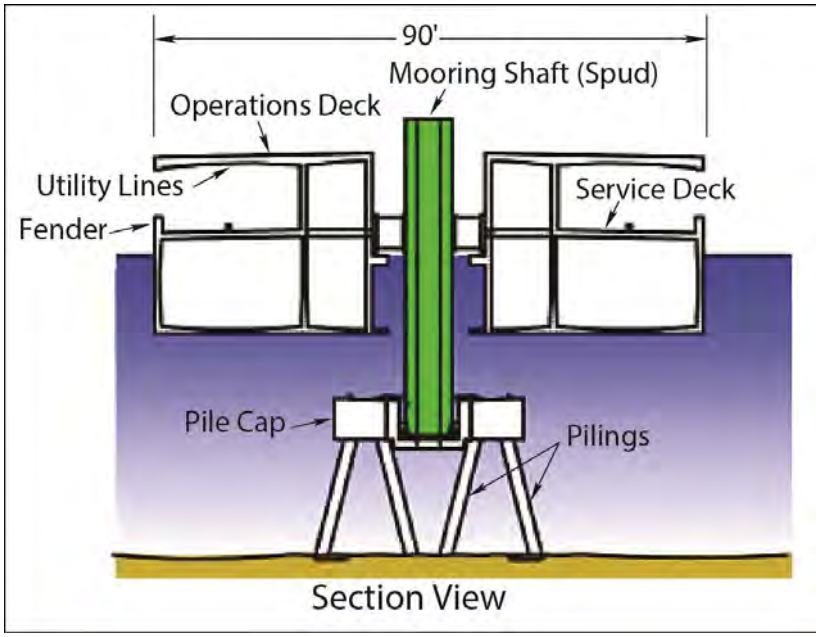

Figure 3-1 MHP Mooring Shaft and Pile Dolphin (cap)

Each pile dolphin would be supported by 16, 24-inch diameter concrete piles. The mooring shafts would be square, three to five ft wide, depending site-specific tide and subsurface conditions (NAVFAC Engineering Expeditionary Warfare Center 2014). With six moorings, and 16 piles per mooring, the MHP Alternative would have approximately 96 concrete piles total. The MHP design would greatly reduce pile driving (approximately 96 piles would be driven for the MHP Alternative, compared with approximately 950 piles for the Conventional Pier Alternative). The width of the mooring shafts would be larger than the diameter of the piles, but the six steel shafts would not be driven into the sediment. As a result of driving fewer piles, construction of this alternative would disturb less bottom sediments than would be disturbed with construction of the Conventional Pier Alternative. The potential for increased turbidity with the MHP would consequently be much smaller. The impact to water quality from turbidity and suspended sediments would be limited to the Pier 8 area, and would cease when the pile driving is finished. Figure 2-2 in Chapter 2 shows the anticipated length of the five deck modules and placement of the moorings. Four modules would be 337.5 ft long. The fifth would be 210 ft long. There would be one mooring at the shoreside end of the pier and one at the bayside end. The other four moorings would be placed approximately in the center of the pier, with one near each end of the 210-foot-long module and one near the end of each adjoining 337.5 foot-long module. The presence of the four mooring shafts (each one up to five ft wide) with their 64 supporting piles arrayed over a distance of perhaps 300 ft (including the area

below the ends of the two 337.5-foot-long modules) could create localized zones of decreased water circulation beneath the pier. The MHP floats on the water surface similar to a vessel and the deck is always submerged to a depth of approximately 14 ft. The design of the MHP does not allow a gap between the deck bottom and the water surface, and so there would be localized effects on circulation. However, any long-term reduction in water circulation would be strictly limited to the areas directly surrounding the mooring shafts and pile dolphins, and beneath the pier itself. There would likely be several hundred feet of water free of piles and other obstructions to circulation between the two ends of the pier and the moorings in the center. On a small scale, water circulation may change slightly, but any such change would be negligible given that the boundaries, bathymetry, configuration, and use of Pier 8 would remain essentially unchanged. This, and the reduction in the number of piles in the water overall as compared with the existing Pier 8, would serve to offset any localized zones of reduced circulation that might occur. Therefore, there would be no significant impacts to bay circulation with implementation of the MHP Alternative.

Through the combination of this alternative's minor in-water construction activities and the use of precautionary measures such as the SWPPP and Spill Prevention Plan, there would be no significant impacts to bathymetry; circulation; marine water quality; and surface water quality, and no impacts to beneficial use, from implementation of the MHP Alternative.

3.1.3.4 Mitigation Measures

Implementation of the Conventional Pier Alternative or the MHP Alternative would not result in significant impacts to water resources; therefore, no mitigation measures are proposed.

3.1.3.5 No-Action Alternative

Under the No-Action Alternative, the demolition and replacement of Pier 8 would not occur. There would be no changes to the existing conditions with respect to water resources. Existing Pier 8 would be retrofitted with a new stormwater collection system (NRSW 2012); therefore, there would be no significant impacts to bathymetry; circulation; marine water quality; and surface water quality from implementation of the No-Action Alternative.

3.2 MARINE BIOLOGICAL RESOURCES

3.2.1 Definition of Resource

This section describes native and naturalized plants and animals and the habitats in which they occur within areas that may be directly or indirectly affected by the Proposed Action. For purposes of this EA, these resources are divided into three major categories: 1) Habitats and Communities; 2) Fish and Wildlife; and 3) Threatened and Endangered Species.

The marine habitats of the project area (seaward of the high tide line) are navigable waters of the U.S. under the CWA (33 USC § 1344) and Rivers and Harbors Act (33 USC § 403). In-water work affecting navigable waters is regulated under these statutes by the USACE under Section 404 of the CWA and Section 10 of the Rivers and Harbors Act, respectively; regulations are at 33 Code of Federal Regulations (CFR) 320-330.

3.2.2 Affected Environment

The following description of existing conditions is based on the following references:

- The San Diego Bay Integrated Natural Resources Management Plan (INRMP) (NAVFAC Southwest and Port of San Diego 2013);
- The 2008 San Diego Bay Eelgrass Inventory and Bathymetry Update (Merkel & Associates, Inc. 2009) and follow-up 2011 eelgrass survey (NAVFAC Southwest and Port of San Diego 2011);
- The Characterization of Essential Fish Habitat (EFH) in San Diego Bay (NAVFAC Southwest 2010);
- Fish surveys conducted in San Diego Bay during 1994-1999 by Allen et al. (2002) and during 2005 and 2008 by Pondella and associates (Vantuna Research Group 2006, 2009);
- Draft Wharf Shading Study for the Pier 8 Replacement and Demolition Project, Naval Base San Diego. Prepared for NAVFAC Southwest. (Merkel and Associates March 2014);
- Personal communications with Navy Natural Resource Specialists; and
- Site visits on August 29, 2007 and January 30, 2013 and other sources as cited.

3.2.2.1 Habitats and Communities

Habitats of San Diego Bay are differentiated by: elevation or depth; substrate; and manmade or natural biological features. Habitats associated with the project area include: the developed shoreline and artificial substrates such as Pier 8; and marine benthic (bottom); the water column; and surface water habitats. Depths in the project area vary from 14 ft to 39 ft (NAVFAC Southwest and Port of San Diego 2013). Habitats and associated biological communities of the affected environment are described below, and Figure 1-1 displays the northern and central portions of San Diego Bay including the location of Pier 8.

<u>Shoreline and Artificial Substrates</u>

The shoreline of the affected environment consists of developed adjacent upland and artificial substrates. Artificial substrates comprise: pier pilings; bulkheads; rock riprap; floating docks; seawalls; mooring systems; artificial reefs; and derelict ships and ship parts. These substrates form extensive artificial habitat in the northern and central portions of the bay. Collectively, the man-made structures support a wealth of invertebrates and seaweeds. California spiny lobster (*Panulirus interruptus*), along with a variety of: crabs; worms; mussels; barnacles; echinoderms (sea stars and sea urchins); sponges; sea anemones; and tunicates (sea squirts) are all known to inhabit artificial substrates in San Diego Bay (NAVFAC Southwest and Unified Port of San Diego [POSD] 2013). These structures provide microhabitats and support communities similar to those of natural rocky shores, which are lacking in San Diego Bay. These areas may also provide refuge and feeding areas for juvenile and predatory fishes. Riprap niches are often filled with invertebrate fauna. Small mobile invertebrates including: nemertean worms (ribbon worms); amphipods; shrimp; decorator crabs; and gastropods are common on piles (NAVFAC

Southwest and POSD 2013). Seventy-four percent (45.4 miles) of the shoreline of San Diego Bay is armored by man-made structures that protect developed sites (NAVFAC Southwest 2011).

Although a number of potential negative impacts have been attributed to overwater structures (Nightingale and Simenstad 2001; NMFS 2012), wharves, docks, and piers in San Diego Bay provide increased three dimensional substrate and cover that locally increases the productivity of benthic organisms as well as the species richness and abundance of fish compared to more open waters (Merkel and Associates 2014).

To provide a site-specific baseline for the Pier 8 replacement, and to augment data from previous studies of pier-associated biota in San Diego Bay, a detailed survey of the fish and encrusting and infaunal invertebrate communities was conducted during 2013 along the edges, underneath, and in the open water adjacent to Pier 8 and Pier 2 (a larger pier) (Merkel and Associates 2014). The resulting report is provided in Appendix A (Agency Correspondence). The study found a high diversity and abundance of fish associated with both piers, although abundance dropped markedly in the deeper recesses under the middle of the piers, as compared with low diversity and abundance in the adjacent deep subtidal habitat (see Appendix A for details). The abundance and biomass of benthic infauna were also higher at the piers compared to the deep subtidal habitat. The pier pilings were found to be heavily encrusted with: oysters; mussels; and barnacles in the intertidal zone; and a subtidal epibiota of sponges; hydroids; and tunicates (Appendix A).

Intertidal – Shoreline Stabilization Structures (7.8 to -2.2 ft MLLW)

This type of artificial shoreline substrate is composed of sea wall and pier pilings adjacent to Pier 8. A hardened shoreline typically produces a very steep shore profile that can provide elevated roosting sites for bay waterbirds, such as California brown pelicans (*Pelicanus occidentalis californicus*), cormorants, and gulls, which allow them to conserve energy and avoid harsh weather conditions (NAVFAC Southwest and Port of San Diego 2013). The surface roughness and complexity of a structure can affect its ability to provide refuge niches and allow water retention at low tides.

Shallow Subtidal (-2.2 to -12 ft MLLW)

Shallow subtidal habitats are highly productive and important in San Diego Bay, in part due to the presence of eelgrass (*Zostera marina*) beds and algal mats on shallow sandy to muddy substrates in many areas of the bay (Merkel and Associates 2009; NAVFAC Southwest 2002, 2011; NAVFAC Southwest and Port of San Diego 2013). However, except to the extent that this depth range exists where shoreline and artificial substrates extend into deeper waters, shallow subtidal habitats do not occur in the affected areas, and there is no suitable substrate at the appropriate depths for eelgrass. The nearest eelgrass beds are found approximately 1.5 miles west and 1.5 miles south of Pier 8, on the opposite shore of the bay and at the mouth of the Sweetwater River, respectively (Merkel and Associates 2009) (Figure 3-2).

Moderately Deep Subtidal (-12 to -20 ft MLLW)

A small portion adjacent to the sea wall is approximately 17 ft deep (U.S. Department of Commerce 2000; Merkel and Associates 2014). Approximately 2,219 acres (17 percent) of bay surface area falls into the moderately deep category, primarily in the south-central bay and in inlets of the North Bay (NAVFAC Southwest and Port of San Diego 2013).

For both the moderately deep and deep subtidal (see below) habitats, primary production by phytoplankton occurs in the overlying water column, but benthic primary production is limited because of low light penetration; algal mats and eelgrass beds are lacking. The base of the food chain for the benthic community is provided instead by organic detritus that originates in shallower water and drifts/sinks into deeper water. Fauna residing in subtidal benthic habitats (across all depths) include: the warty sea cucumber (*Parastichopus parvimensis*); and a diversity of infaunal species; such as suspension feeders; burrowers; and tube builders. Feeding by: nematode and polychaete worms; clams; gastropod mollusks; brittlestars; crabs; isopods; and a wide variety of smaller crustaceans transforms detritus and small invertebrates into usable food for larger invertebrates and fishes. The soft bottom benthos provides other functional roles besides serving as a prey base for fish and birds. The less conspicuous mollusks, polychaete worms, small crustaceans, and other invertebrates living at the bottom of the bay mineralize organic wastes as it accumulates, consume algae, and return essential chemicals and organic matter to the water column (NAVFAC Southwest and Port of San Diego 2013). Although a variety of organisms inhabit the area surrounding Pier 8, the sediments in the area are historically known to be contaminated; as recently as 1998 the macrobenthic community structure was so sparse it was considered degraded (Fairey et al. 1996, 1998).

Typical fish species include round stingray (*Urobatis halleri*), spotted sand bass (*Paralabrax maculatofasciatus*), California halibut, and barred sand bass (*Paralabrax nebulifer*) (NAVFAC Southwest and Port of San Diego 2013).

Deep Subtidal (>-20 ft MLLW)

Deep subtidal habitat includes the overlying surface water, water column, and sediments for areas greater than 20 ft in depth, constituting about 4,440 acres (34 percent) of the bay surface area and is associated primarily with navigational channels. Most of the project area for Pier 8 is deep subtidal, ranging from 20 to 39 ft deep; the shallowest area is adjacent to the sea wall (Merkel and Associates 2014).

The deep subtidal water column is home to phytoplankton and zooplankton, including species that spend their entire lives (holoplankton), or only a portion of their life cycle, e.g., as eggs, larvae, or juveniles (meroplankton), in the plankton. For the meroplankton, which includes many fish and invertebrates, an important function of the deep subtidal environment is transport into and out of the relatively warm, sheltered waters of the bay which provide nursery habitats. The most common fish species found here are round stingray, spotted sand bass, and bat ray (*Myliobatis californica*) (NAVFAC Southwest and Port of San Diego 2013; Merkel and Associates 2014).

not to scale

Figure 3-2
California Least Tern Nesting Sites, Foraging Areas, and Eelgrass in the Vicinity of the Proposed Project

Sources: NAVFAC SW 2010, 2012.

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3.2.2.2 Fish and Wildlife

This section includes fisheries and EFH, birds, and marine mammals potentially occurring within the affected environment. Threatened and endangered wildlife species, including sea turtles, are discussed in Section 3.2.2.3.

<u>Fisheries</u>

Numerous surveys have been conducted over the last few decades in the San Diego Bay region to quantify fish diversity and abundance. Among the most comprehensive were surveys by Allen et al. (2002) and the Vantuna Research Group (2006, 2009). It should be noted that the south-central bay sites sampled in these studies were across the bay from NBSD at Glorietta Bay and the Naval Amphibious Base, and probably are not representative of the fish community associated with the NBSD piers. These and other works related to fish and EFH were characterized by Merkel & Associates, Inc. (2014; NAVFAC Southwest 2010). One hundred and nine species of bottom living and open water fishes occur in the bay. There is a greater variety of fish species in the North Bay area than in the south bay, and the greatest fish diversity can be found at artificial reefs. Increased levels of flushing found in the North Bay also increases food availability, the supply of larval recruits, and water quality (NAVFAC Southwest 2010). Eelgrass beds in particular are recognized as highly productive and important nursery habitat for a number of fish species in San Diego Bay, but they do not occur in the project area (NAVFAC Southwest and Port of San Diego 2013; Merkel and Associates 2014). While there is no commercial fishing within the bay, seven fish species inhabiting the bay support commercial fisheries elsewhere in southern California waters. Examples of notable fishery populations found in the bay include California halibut and white seabass (*Atractoscion nobilis*). At least 58 species are involved in the recreational catch (NAVFAC Southwest and Port of San Diego 2013).

At Pier 8, just below the seawall and continuing to the end of the pier, the water is approximately 25 to 37 ft deep and is somewhat shallower under the pier due to the accumulation of sediment and shells and other biogenic debris produced by the "fouling community" that inhabits the pilings (Appendix C).

Appendix C provides lists of San Diego Bay fish species that are associated with deep subtidal versus manmade structural habitats, based on the recent surveys of Piers 2 and 8 and previous studies. Despite much less intensive sampling than the deep subtidal habitat, a large number of species have been documented around piers and other artificial structures including most of the common species found in the bay. When comparably sampled, piers have been found to support a greater abundance and species diversity of fish than adjacent open water areas.

Fish species observed in transects along the edges of and/or underneath Piers 2 and 8 included spotted sand bass (*Paralabrax maculatofasciatus*); barred sand bass (*Paralabrax nebulifer*); kelp bass (*Paralabrax clathratus*); black croaker (*Cheilotrema saturnum*); round stingray (*Urobatis halleri*); yellowfin croaker (*Umbrina roncador*); white sea bass (*Atractoscion nobilis*); midshipman (*Porichthys* sp.); sargo (*Anisotremus davidsonii*); slough anchovy (*Anchoa delicatissima*); giant kelpfish (*Heterostichus rostratus*); and bay blenny (*Hypsoblennius gentilis*). In contrast, in deep subtidal habitat away from the piers, only one fish species, black croaker, was observed (next to

a tire on the bottom), although other species considered likely to use this habitat include spotted sand bass; round stingray; barred sand bass; midshipman; and gobies (family Gobiidae). California spiny lobsters were also observed under Pier 2, but were not observed and are not likely to occur in the open deep subtidal habitat (Appendix C).

EFH

Many marine habitats are critical to the productivity and sustainability of marine fisheries. The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) set forth the EFH provisions to identify and protect important habitats of federally managed marine and anadromous fish species. Section 305(b)(2) of the amended Magnuson-Stevens Act directs each Federal Agency to consult with the National Marine Fisheries Service (NMFS) with respect to any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency that may adversely affect any EFH identified under the Magnuson-Stevens Act. Implementing regulations for this requirement are at 50 CFR 600. Because the project area is located within an area designated as EFH for two Fishery Management Plans (FMPs) – the Pacific Coast Groundfish (Pacific Fishery Management Council [PFMC] 2011) and the Coastal Pelagic Species (PFMC 1998a) – and may adversely affect EFH, the U.S. Navy is required to consult with NMFS. As such, a written assessment of the effects of the Proposed Action on EFH is provided in Appendix A and is summarized in this EA.

Of the 109 species of fish previously identified in San Diego Bay, ten are managed by NMFS (PFMC 1998a, 1998b, 2011). Four are managed under the Coastal Pelagics FMP: northern anchovy (*Engraulis mordax*); pacific sardine (*Sardinops sagax*); pacific mackerel (*Scomber japonicus*); and jack mackerel (*Trachurus symmetricus*). Six species are covered under the Pacific Groundfish FMP and occur, although not in abundance, in San Diego Bay: California scorpionfish (*Scorpaena guttata*); grass rockfish (*Sebastes rastrelliger*); English sole (*Parophrys vetulus*); curlfin sole (*Pleuronichthys decurrens*); leopard shark (*Triakis semifasciatus*); and soupfin shark (*Galeorhinus galeus*) (NAVFAC Southwest 2010; NAVFAC Southwest and Port of San Diego 2013). These species are discussed briefly below and are discussed in detail in Appendix C.

Coastal pelagic species (CPS) are those fish that live in the water column as opposed to groundfish species that live near the sea floor. The coastal pelagic species fishery includes four finfish: (Pacific sardine; Pacific [chub] mackerel; northern anchovy; and jack mackerel) and the invertebrate, market squid (PFMC 1998b). Pelagic species can generally be found anywhere from the surface to 3,300 ft deep. San Diego Bay is entirely within the boundary of EFH for CPS finfish. All except for market squid are likely to occur in San Diego Bay. Finfish are highly transient and two, northern anchovy and Pacific sardine, can be found throughout San Diego Bay. Jack mackerel are typically only found in the North Bay, in the vicinity of the project area, and Pacific mackerel are found throughout much of the bay excluding its southern portion (Allen et al. 2002). All the coastal pelagic fish species have been documented to occur in deep subtidal habitat, and all but the jack mackerel - which is less common and hence less likely to have been detected in the few surveys conducted - have been documented around manmade

structures (Merkel and Associates 2014; Appendix A). Appendix A provides descriptions of these species.

The Pacific Coast Groundfish FMP manages 91 species over a large ecologically diverse area covering the entire west coast of the continental United States. Although groundfish are those fish considered demersal (fish that live on or near the seabed), they occupy diverse habitats at all stages in their life histories. EFH areas may be large because a species' pelagic eggs and larvae are widely dispersed, for example, or comparatively small as is the case with the adults of many nearshore rockfishes which show strong affinities to a particular location or type of substrate. Appendix A provides descriptions of six designated FMP groundfish species that are known to occur in the bay; however, the species rarity in all or parts of the bay makes it unlikely that any will occur the project area (Merkel and Associates 2014; Appendix A). These species are: curlfin sole; English sole; California scorpionfish; grass rockfish; leopard shark; and soupfin shark.

In addition to designating EFH, the PFMC is also responsible for identifying Habitat Areas of Particular Concern (HAPC) for federally managed species. EFH that is considered to be particularly important to the long-term productivity of populations of one or more managed species, or to be particularly vulnerable to degradation, also may be identified by NMFS as a HAPC. For types or areas of EFH to be considered HAPC, at least one of the following must be demonstrated:

- The importance of the ecological function provided by the habitat;
- The extent to which the habitat is sensitive to human-induced environmental degradation;
- Whether, and to what extent, development activities are, or will be, negatively impacting the habitat type; and
- The rarity of the habitat.

HAPCs include: seagrass; canopy kelp; rocky reef; and estuarine habitats along the Pacific coast (PFMC 2011). HAPCs may also: include high value intertidal and estuarine habitats; offshore areas of high habitat value or vertical relief; and habitats used for migration, spawning and rearing of fish and shellfish. The PFMC has only designated HAPC for groundfish, none of which occur within or adjacent to the project area (PFMC 2011; however, eelgrass is found approximately 1.5 miles west and 1.5 miles south of Pier 8, on the opposite shore of the bay and at the mouth of the Sweetwater River, respectively (Merkel and Associates 2009) (see Figure 3-2).

Special Aquatic Sites

In addition to EFH and HAPC, the USEPA defined Special Aquatic Sites as geographic areas, large or small, possessing special ecological characteristics of: productivity; habitat; wildlife protection; or other important and easily disrupted ecological values (Environmental Protection Agency, 40 CFR § 230.3[q-1]). Special Aquatic Sites are recognized as those that significantly influence or positively contribute to the general overall environmental health or vitality of the

entire ecosystem of a region, and include: sanctuaries and refuges; wetlands; mud flats; vegetated shallows; coral reefs; and riffle and pool complexes. Eelgrass present in San Diego Bay would qualify as vegetated shallows, but there is no eelgrass, or any other special aquatic sites, located in the vicinity of the proposed project area (see Figure 3-2).

Birds

The Migratory Bird Treaty Act (MBTA) of 1918 (16 USC 703 et seq.) and the Migratory Bird Conservation Act (16 USC 715–715d; 715e; 715f–715r) of 18 Feb 29, (45 Stat. 1222) are the primary legislation in the United States established to conserve migratory birds. These statutes implement the United States' commitment to four bilateral treaties, or conventions, with Canada, Mexico, Russia, and Japan for the protection of a shared migratory bird resource. The MBTA prohibits: the taking; killing; or possessing of migratory birds; or the parts; nests; or eggs of such birds, unless permitted by regulation. The species of birds protected by the MBTA appears in Title 50, Section 10.13, of the (50 CFR 10.13) and represent almost all avian families found in North America. In general there are only three species that are not protected by the MBTA and they include: the rock pigeon (*Columba livia*); European starling (*Sturnus vulgaris*); and house sparrow (*Passer domesticus*)."

Migratory bird conservation relative to non-military readiness is addressed separately in a Memorandum of Understanding (MOU) developed in accordance with EO 13186, signed January 10, 2001, "Responsibilities of Federal Agencies to Protect Migratory Birds." The MOU between the DOD and the USFWS was signed on July 31, 2006. DOD responsibilities discussed in the MOU include, but are not limited to:

1. Obtaining permits for import and export, banding, scientific collection, taxidermy, special purposes, falconry, raptor propagation, and depredation activities;
2. Encouraging incorporation of comprehensive migratory bird management objectives in the planning of DOD planning documents;
3. Incorporating conservation measures addressed in Regional or State Bird Conservation Plans in INRMPs;
4. Managing military lands and activities other than military readiness in a manner that supports migratory bird conservation;
5. Avoiding or minimizing impacts to migratory birds, including incidental take and the pollution or detrimental alteration of the environments used by migratory birds; and
6. Developing, striving to implement, and periodically evaluating conservation measures for management actions to avoid or minimize incidental take of migratory birds, and if necessary, conferring with the service on revisions to these conservation measures.

The project area is located on the mainland side of central San Diego Bay, and includes man-made structures and open water habitat. Bird abundance and diversity are low and medium, respectively, in the project area (NAVFAC Southwest and Port of San Diego 2013). A number of species covered by the MBTA are found within the project area, including the species mentioned below. A number of the species covered under the MBTA are also federally or state-listed as

threatened or endangered. However, there are also many other species that occur in and around San Diego Bay and the project area that are not otherwise listed as threatened or endangered that would fall under the MBTA. These include species that are transiting or migrating through the area.

San Diego Bay is part of a major bird migratory pathway, the Pacific Flyway, and supports large populations of over-wintering birds traveling between northern breeding grounds and southern wintering sites (NAVFAC Southwest and Port of San Diego 2013). Over 300 migratory and resident bird species have been documented to use San Diego Bay (NAVFAC Southwest and Port of San Diego 2013), including: shore birds; gulls; and other waterfowl. The most common birds species in the bay include: surf scoter; scaup species; bufflehead; eared grebe (*Podiceps nigricollis*); Forster's tern; California brown pelican; elegant tern; Heermann's gull (*Larus heermanni*); California least tern; double-crested cormorant (*Phalacrocorax auritus*); mallard (*Anas platyrhynchos*); and great blue heron. Several species, as noted below, are considered sensitive by the U.S. Fish and Wildlife Service (USFWS) or California Department of Fish and Wildlife (CDFW). For more detailed information on the California least tern, see Section 3.2.2.3.

Two bird species were observed during a site visit within the vicinity of the proposed project area, California brown pelican and cormorant (*Phalacrocorax* spp.). Other marine and water birds expected to occur in the project vicinity include: western gull (*Larus occidentalis*); California gull (*Larus californicus*); Heermann's gull; ring-billed gull (*Larus delawarensis*); Forster's tern (*Sterna fosteri*); great blue heron (*Ardea herodias*); black skimmer; terns (*Sterna* spp.); grebes (*Podiceps* spp. and *Aechmophorus* spp.); surf scoter (*Melanitta perspicillata*); scaup (*Athya* spp.); and bufflehead (*Bucephala albeola*).

Bird species that are not threatened or endangered but are of state or federal concern that have the potential to occur in the vicinity of the proposed project include the common loon (*Gavia immer*); double-crested cormorant; osprey (*Pandion haliaetus*); gull-billed tern (*Sterna nilotica*); California gull; black skimmer; great blue heron; black-crowned night heron (*Nycticorax nycticorax*) Forster's tern; and the elegant tern. Most of these species are considered sensitive only where breeding or nesting occurs. These birds use intertidal flats, shallow water habitat, or manmade structures for foraging or resting, similar to areas adjacent to the project area.

Marine Mammals

Marine mammals are protected from "taking" under the Federal Marine Mammal Protection Act (MMPA) of 1972. Taking is defined as "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal." The term harassment is defined under the MMPA as any act of pursuit, torment, or annoyance that has the potential to do one or both of the following:

- Injure a marine mammal or marine mammal stock in the wild.
- Disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including but not limited to: migration; breathing; nursing; breeding; feeding; or sheltering.

Marine mammals in San Diego Bay include: the California sea lion (*Zalophus californianus*), which often rests on buoys and other structures and occurs throughout the bay; coastal bottlenose dolphin (*Tursiops truncatus*), which is regularly seen in the northern part of the bay; Pacific harbor seal (*Phoca vitulina*), which frequently enters the northern part of the bay; common dolphins (*Delphinus* spp.), which are rare visitors in the northern part of the bay; and the California gray whale (*Eschrichtius robustus*), which is occasionally sighted near the mouth of the bay during its winter migration (NAVFAC Southwest and Port of San Diego 2013). There are no known haul outs or rookery sites for sea lions or harbor seals in the project vicinity.

Based on many years of observations and numerous Navy-funded surveys, marine mammals rarely occur south of the Coronado Bay Bridge, are not known to visit Naval Base San Diego and any occurrence in the project area would be very rare (Merkel & Associates, Inc. 2008; NAVFAC Southwest 2011; NAVFAC Southwest and Port of San Diego 2013; NAVFAC Southwest 2014).

3.2.2.3 Threatened and Endangered Species

Table 3-4 lists the federally threatened or endangered species known to occur or having the potential to occur in or adjacent to the project area. The only Federally listed threatened or endangered species known to occur within the vicinity of the project area are the California least tern and green sea turtle, each of which is described in more detail below. There is no designated critical habitat for these species in the project area.

Table 3-4. Federally Threatened and Endangered Species Known to Occur or Have the Potential to Occur in the Vicinity of Pier 8

Species	Status	Habitat	Occurrence
California least tern (*Sterna antillarum browni*)	Endangered	Bays; estuaries; lagoons; shoreline; river mouths; sandy unvegetated strips. Resident. Localized breeding.	Locally common summer resident and migrant, feeding in bay and ocean waters. Nesting colonies outside of the project area within San Diego Bay. Foraging habitat is present across the bay, outside of the project area.
Green sea turtle (*Chelonia mydas*)	Endangered	Warm oceans, eelgrass beds. Non-breeding migrant.	Primarily occurs in south bay. Recent data suggests sea turtles are expanding their home ranges northward; one turtle has been seen at the USS Midway Museum, four miles north of the proposed project area. Feeds on marine algae and sea grasses, such as eelgrass. No known breeding sites occur in San Diego Bay.

Note: Endangered = Listed as endangered under the federal Endangered Species Act.

<u>California Least Tern</u>

The California least tern was listed as endangered in 1970; there is currently no designated critical habitat for this species (USFWS 2006). It is the smallest North American tern and is found along: seacoasts; beaches; bays; estuaries; lagoons; lakes; and banks of rivers and lakes.

Least terns are surface-feeding fish eaters who are opportunistic in their search for prey, eating fish that are small enough to catch including anchovies and smelt (NAVFAC Southwest and Port of San Diego 2013). Terns will frequently forage in the open waters of the ocean and bays, and although eelgrass is an important habitat for several prey species, terns do not demonstrate any preference for feeding in eelgrass (NAVFAC Southwest and Port of San Diego 2013).

Five key foraging areas exist in the San Diego Bay region. Two are located outside of the Bay in the shallow ocean waters off of Coronado and Silver Strand Beach; a third is at the mouth of the bay; one is across the bay from the project sites along the Silver Strand; the fifth is in southern San Diego Bay, within the Sweetwater Marsh National Wildlife Refuge. The foraging area located nearest to the project area is approximately 1.3 miles west of Pier 8 on the other side of the Bay (refer to Figure 3-2). Abundance of California least tern prey species is low in the vicinity of Pier 8 (NAVFAC Southwest and Port of San Diego 2013). California least tern are not expected to occur within the project area (Tierra Data Inc. 2011).

California least terns are residents in San Diego Bay from late spring to early fall, with the breeding season beginning 1 April and ending 15 September. There are six recognized least tern nesting colonies in the bay, spanning from an area near the San Diego International Airport at the northern portion of the bay to the Sweetwater Marsh National Wildlife Refuge in the southern portion of the bay (refer to Figure 3-2; USFWS and U.S. Navy 2004). Central portions of the bay house the largest nesting populations in the bay (USFWS and U.S. Navy 2004). The nesting colonies closest to the project area are located approximately 1.8 miles southwest and 1.8 miles south of Pier 8, on the opposite shore of the bay and at the mouth of the Sweetwater River, respectively.

California least terns nest in open expanses of sand or light-colored dirt on or near beaches and the shores of coastal bays. The nest is a small depression that may be natural, man-made, or excavated by the birds. One to four eggs are laid, although most nests have two or three. This species forages over shallow waters within 2 to 3 miles of the nest, feeding primarily on small fish, including silversides (*Atherinidae* spp.) and northern anchovy (Massey and Atwood 1985).

The least tern nesting population in the bay has increased dramatically from 187 in 1993 to an estimated 1,160-1,341 in 2011 (U.S. Navy 2006; CDFW 2012). The tern population has increased in the bay due to coordinated management strategies with the USFWS and the Department of the Navy on Navy lands. These strategies include predator management, tern monitoring, site preparation of tern nesting colonies, and biological information gathering (USFWS and U.S. Navy 2004).

The closest least tern nesting colonies to the project area are located approximately 2 miles (3.2 km) across the bay at North Delta Beach, South Delta Beach, and Naval Amphibious Base Ocean Beach, all of which are on Navy land. All three nesting sites have foraging areas nearby on the west side of the bay. Other nesting colonies within the central and south bay are found at "D" Street, Chula Vista Wildlife Reserve (2 miles [3.2 km] south of Pier 8), and South Bay Refuge (4 miles [6.4 km] south of Pier 8), with the foraging areas located at the southwestern-most portion of the south bay (USFWS and U.S. Navy 2004). All of these nesting areas, with the exception of the airport location, have been used annually since 1994. Abundance of California

least tern prey species is low in the vicinity of Pier 8 (NAVFAC Southwest and Port of San Diego 2013). California least tern are not likely to occur within the project area.

The Navy implements an extensive program of: research; monitoring; protection; nest site enhancement; and avoidance measures to minimize the take of California least tern from Navy activities (USFWS and U.S. Navy 2004). An MOU between the USFWS Ecological Services and Refuges and the NAVFAC Southwest and NRSW (USFWS and Navy 2004, NRSW 2008) summarizes efforts and commitments by the U.S. Navy and USFWS to California least tern conservation and enhancement in San Diego Bay.

With regard to the Proposed Action, the Pier 8 project area is not designated as a nesting or forage area in the Tern MOU; does not have any special characteristics such as extraordinary size, eelgrass beds, unique fish habitat, or an abundance of least tern prey species; and least terns are not expected to occur within the project area.

Green Sea Turtle

The green sea turtle is federally threatened throughout its eastern North-Pacific range, and a small population resides in San Diego Bay. Historically, the population's home range has been relatively small, limited to the Bay's southernmost waters that were heated by cooling water discharge from the South Bay Power Plant. The power plant was decommissioned in 2011, and recent data suggests that sea turtles in San Diego Bay are now expanding their use of the Bay northward. One turtle has been observed as far north as the USS Midway Museum, approximately four miles northwest of Pier 8. Green sea turtles are not expected to permanently abandon the Bay as a foraging habitat due to the decommissioning of the power plant as they occurred in San Diego Bay before the power plant was built (Brennan 2013). Satellite tagging has documented the movement of green sea turtles between San Diego Bay and the San Gabriel River (NRSW 2013).

As part of an ongoing cooperative effort between the U.S. Navy, NMFS, and the Port of San Diego to monitor green sea turtle presence in the bay, green sea turtles are tagged with hydrophone tags by NMFS personnel and detected acoustically by hydrophones placed in various locations around the bay. Five individual green sea turtles have been detected at NAB Coronado, directly across the bay from the current project area. It is also believed that other green sea turtles migrate from nesting sites in Mexico to San Diego Bay to forage on red algae, sea lettuce (*Ulva*), and eelgrass. Accordingly, green sea turtles may occur in the project area.

3.2.3 Environmental Consequences

3.2.3.1 Approach to Analysis

The analysis identifies the potential significance of impacts to terrestrial and marine biological resources based on: (1) the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource; (2) the proportion of the resource that would be affected relative to its occurrence in the region; (3) the sensitivity of the resource to proposed activities; and (4) the duration of ecological ramifications. For example, an impact would be considered significant if it would permanently reduce the population size or distribution of a protected species.

3.2.3.2 Avoidance and Minimization Measures

To avoid and/or minimize potential impacts to biological resources, the following measures would be implemented:

1. A cable net and floating boom would be used to capture debris that falls into the water during pier demolition. Such debris would be collected and disposed of onshore;
2. Spill kits and cleanup materials would be present during construction should there be a leak into the surrounding water;
3. The contractor would use only clean construction materials suitable for use in the oceanic environment. The contractor would ensure no: debris; soil; silt; sand; sawdust; rubbish; cement or concrete washings thereof; chemicals; oil or petroleum products from construction would be allowed to enter into or placed where it may be washed by rainfall or runoff into waters of the U.S. Upon completion of the project authorized, any and all excess material or debris would be completely removed from the work area and disposed of in an appropriate upland site;
4. All debris would be transported to, and disposed of, at an appropriate upland disposal site, or recycled, if appropriate; and
5. An observer would be present during pile driving and other activities that could pose a risk of harm or harassment to a marine mammal or sea turtle if these animals were within a specified buffer distance of the activity. For impact pile driving, to avoid any potential effects, this distance is 384 ft (117 m). A visual sweep of the bay within this distance would be done prior to commencing pile driving activities, and after a break in pile driving for more than 30 minutes. If a marine mammal or sea turtle is seen within this visual range, pile driving activities would not commence until 15 minutes have passed since the last such sighting, or the animal has moved out of the established range. If a marine mammal moves within the established range while pile driving activities are occurring, such activities would cease until the animal leaves the area. For other potentially hazardous in-water demolition and construction activities a safety buffer of 33 ft (10 m) would apply.

3.2.3.3 Conventional Pier Alternative

Impacts to marine biological resources associated with the Conventional Pier Alternative would be primarily from demolition of existing Pier 8 and construction of a new, larger Pier 8. Activities described below that could potentially impact marine biological resources include turbidity and noise associated with pier demolition and construction.

<u>Habitats and Communities</u>

Pier demolition and construction activities for the Conventional Pier Alternative would cause minor and short-term impacts to existing nonvegetated soft bottom benthic communities within the project area. Organisms occurring in the immediate area may be lost or displaced during demolition or construction activities, either directly by equipment and noise associated with these activities or indirectly by exposure to short-term changes in suspended sediments,

turbidity, dissolved oxygen, and light diffusion. Potential impacts to plankton communities could include a localized decrease in primary productivity due to reduced photosynthesis. However, sediment resuspension, increased turbidity, or chemical changes would be limited to the areas of bottom disturbance, and would persist for less than one hour following disturbance. Therefore, the increased turbidity would not significantly impact benthic or water column habitats in the project area.

Pier demolition would impact benthic community resources (infauna and epifauna) by disturbing some organisms due to pile driving and removal. Some infaunal species (e.g. polychaete worms) and some epifaunal species (e.g. sea cucumbers) would be disturbed or lost as a result of these activities, including existing pier piling epifauna (e.g. sea stars), due to pile removal. The open-water area would be decreased by the replacement of Pier 8. Compared with the existing Pier 8 as described above, the Conventional Pier Alternative would result in an increase in bay shading of 1.86 acres. However, the deep subtidal area subject to shading lacks eelgrass or attached algae, so effects on productivity would be negligible. Benthic invertebrate species are expected to recolonize the disturbed benthic habitat within a relatively short period of time from adjacent undisturbed areas, and a typical epifaunal invertebrate community would gradually develop on the new pilings. Therefore, implementation of the Conventional Pier Alternative would not result in significant impacts to the benthic communities due to pier demolition or construction.

Concrete, steel, and asphalt debris would be removed via barge cranes and/or wharf cranes, then transported for recycling or disposed of in a landfill. Due to the limited area and duration of sediment resuspension that would occur, pier demolition would have a low potential for mobilizing sediment contaminants into the water column. Therefore, significant impacts to water quality or aquatic life would not occur.

Since no eelgrass or any other special aquatic sites are found in the project area, no effects to special aquatic sites would occur due to any project activities. Even though the invasive alga *Caulerpa taxifolia* has never been recorded in San Diego Bay (NAVFAC Southwest and Port of San Diego 2013), a *Caulerpa* survey (Surveillance Level) would be conducted prior to in-water project activities, consistent with NMFS and CDFW requirements (NMFS 2008). If *Caulerpa taxifolia* was found in the study area during this survey, NMFS approved *Caulerpa* Control Protocols would be followed (NMFS 2008). Therefore, implementation of the Conventional Pier Alternative would not result in significant impacts to marine plants and no effects to special aquatic sites would occur.

<u>Fish and Wildlife</u>

Fisheries

Fish species occurring in the immediate area may be displaced during demolition or construction activities, either directly by equipment and noise associated with these activities or indirectly by exposure to short-term changes in suspended sediments, turbidity, and changes in light diffusion during pier demolition and construction activities. As discussed in Section 3.1.3.2 sediment resuspension and increased turbidity would be limited to the areas of bottom

disturbance and would persist for less than one hour following the disturbance. Fish present during project activities should be capable of avoiding project equipment and areas affected by increased turbidity and increased noise from pile driving and concrete removal.

As described above, the Conventional Pier Alternative would result in an increase in bay shading of 1.86 acres. Due to the characteristics of the fish species and the affected area, the relatively small increase in shading and artificial substrate would not have an effect outside the immediate area of Pier 8, and therefore would not have a long-term adverse effect on fish in San Diego Bay.

As described in Appendix A, most if not all of the fish species occurring in the area routinely experience turbid and noisy conditions due to natural processes such as wave action and sounds generated by fishes and invertebrates, and anthropogenic activities such as ship traffic and construction throughout the bay. In general, fish are likely to be temporarily disturbed or to leave the immediate project area of demolition and construction until activities cease. These effects are considered minimal due to their limited temporal and geographic scale. Furthermore, fish species would return to the project area following the completion of in-water activities. Therefore, implementation of the Conventional Pier Alternative would not result in significant impacts to fish communities.

Essential Fish Habitat

A written assessment of the effects of the Proposed Action on EFH is provided in Appendix A and is discussed here in brief. Four managed coastal pelagic fish species (PFMC 1998a): northern anchovy; pacific sardine; pacific mackerel; and jack mackerel; and six managed groundfish species: curlfin sole; English sole; California scorpionfish; grass rockfish; and leopard and soupfin sharks occur in San Diego Bay (NAVFAC Southwest 2010; NAVFAC Southwest and Port of San Diego 2013). These species are highly transient and can be found throughout San Diego Bay. Generally, impacts from in-water components of the Conventional Pier Alternative would be the same as described above for other fish communities. Effects would occur from increased suspended sediments and turbidity and increased underwater noise levels from pier demolition and construction activities. Based on observations of turbidity caused by bottom disturbances in areas similar to the project sites, turbidity plumes are expected to be limited to the areas of bottom disturbance, and would persist for less than one hour following disturbance (AMEC 2008). Subject to the terms and conditions identified in the project-specific USACE Section 404 and Section 10 permit, the Navy would deploy precautionary measures to alleviate turbidity associated with demolition and construction activities. Precautionary measures are provided in Section 3.2.3.2. Other precautionary measures may be developed during the USACE permitting process.

EFH species expected to occur in the project area (Table 3-5) are highly mobile and not closely tied to artificial substrates, so would likely leave the project area during demolition and return when these activities are completed. Pier removal would reduce the algal and invertebrate production associated with encrusting communities on the pilings. Hence, there would be minor, short-term adverse effects on EFH from pier removal that would not be significant.

Table 3-5. Summary of Federally Managed Fishes Observed in Habitats of the Northern and Southern Half of San Diego Bay

Species	Bare sand*	Bare mud*	Eelgrass*	Riprap*	Marina	Wharf*	Artificial Reef	Bulkhead wall*	Launch ramp
Coastal Pelagic Species									
Northern anchovy	N, S	N, S	N, S	N	N	N	N	N	N
Pacific sardine	N, S	N, S	N, S	N, S	N, S	N	N	N	N
Pacific mackerel	N	N	N		N	N	N	N	N
Jack mackerel	N	N	N ***		N	N			
Pacific Coast Groundfish									
Curlfin sole	N	N							
English sole	N	N							
California scorpionfish			N, S	N, S	N	N	N, S	N	
Grass rockfish			N						
Leopard shark			N **						
Soupfin shark#									

N = Observed in habitats of the northern half of San Diego Bay.
S = Observed in habitats of the southern half of San Diego Bay.
* habitat present in the proposed project area based on maps from NAVFAC SW 2010.
** leopard shark observed by Hoffman 1986 referenced by Robbins 2006.
***may occur in bar sand and eelgrass habitat; observed in an eelgrass transplantation bed (Pondella et al.2006).
caught by recreational anglers in the San Diego Bay (Pondella et al. 2009), whereabouts unknown.
Source: NAVFAC Southwest 2010

On a small scale, water circulation may change slightly, but any such change would be negligible given that the boundaries, bathymetry, configuration, and use of Pier 8 would remain essentially unchanged. The site does not support eelgrass beds, so the net effect of increased shading on benthic primary production would be negligible, although there would be reduced sunlight in the water column. Over time, algae and invertebrates are expected to colonize the new pier, and the resultant production of organic material from the new pier would tend to offset the effects of reduced sunlight. To the extent that structural and/or shaded habitats are preferred or avoided by certain species, utilization of the project sites by different fish species may shift slightly toward or away from the project site, relative to the existing condition. However, due to the characteristics of the EFH species that may potentially occur in the project area and the habitat characteristics of the area itself, the small increase in shading and artificial substrate would not have an effect outside the immediate area of Pier 8, and therefore would not have long-term adverse effects on EFH for coastal pelagic or Pacific coast groundfish species in San Diego Bay.

The Navy consults with NMFS regarding actions that have the potential to adversely affect EFH. Appendix A contains the Navy's EFH Assessment as provided to NMFS.

Birds

Responses to noise from pile driving would be limited to short-term behavioral or physiological responses (e.g., alert response, startle response, and temporary increase in heart rate). However, human activity such as vessel or boat movement, and equipment setting and movement, could cause seabirds to flee the activity area before the onset of pile driving. If seabirds were in the activity area, they would likely flee the area prior to, or just after, the initial strike of the pile at the beginning of the ramp-up procedure. In-air pile driving noise would not disrupt major behavior patterns, such as: migrating; breeding; feeding; and sheltering, or to result in serious injury to any seabirds.

Information regarding the impacts from acoustic sources on seabirds and the ability for seabirds to hear underwater is virtually unknown. The exposure to underwater sounds by seabirds, other than pursuit diving species, is likely to be very limited due to spending a very short time under water (plunge-diving or surface-dipping) or breeding only at the water surface. Pursuit divers may remain under water for minutes, increasing the chance of underwater sound exposure. However, assuming that a seabird disturbed by an underwater sound would avoid the stressor by swimming to the surface, a physiological impact, such as hearing loss, would only occur if a seabird is close to an intense sound source. Furthermore, birds are generally less susceptible to both temporary and permanent threshold shift than mammals (Saunders and Dooling 1974), so an underwater sound exposure would have to be intense and of a sufficient duration to cause temporary or permanent threshold shift. Avoiding the sound by returning to the surface would further limit the potential for extended or multiple sound exposures underwater. Therefore, any impacts would be short-term, localized, and would not impact bird populations.

Project activities would result in increases in noise and human activity and decreases in water quality in the project area during demolition and construction. In-water construction impacts would also alter fish behavior due to increased underwater noise levels (discussed above), which

may make fish more or less available as prey. The impact to breeding birds; however, would be minimal because: (1) bird abundance in the project area is low; (2) birds do not use the man-made structures, developed shoreline, and artificial substrate within the project area for breeding; (3) the proposed project would only affect a relatively small area of San Diego Bay; and (4) impacts would cease upon construction completion. These impacts would not be significant because of their limited duration and because birds on the water regularly experience the noise and disturbance of passing vessels, while the project area is routinely subject to the elevated noise and activity of workers and equipment associated with common industrial practices. Bird perches on the existing pier would be lost. However, this is not expected to create a significant impact to migratory birds as there are several other structures in San Diego Bay that could be used for this purpose and because migratory birds are expected to recolonize the new pier once constructed.

In conclusion, implementation of the Conventional Pier Alternative would not have a significant effect on migratory bird populations or their habitats under the MBTA, nor have a significant impact under NEPA. Potential effects on California least tern are discussed below.

Marine Mammals

Marine mammals are not expected in the project area, and any potential for project activities to disturb marine mammals would be limited to a 384-ft (117-m) radius of the pile being driven. The proposed avoidance and minimization measures (see Section 3.3.3.2), include a visual sweep of the bay within this distance prior to commencing pile driving activities, and after a break in pile driving for more than 30 minutes. If any marine mammal is seen within this visual range, pile driving activities would not commence until 15 minutes have passed since the last such sighting, or the animal has moved out of the established range. If a marine mammal moves within the established range while pile driving activities are occurring, such activities would cease until the animal leaves the area. In addition to avoiding behavioral effects, the implementation of this measure would preclude the occurrence of injurious effects, which could only occur within a much smaller distance than behavioral effects. Therefore, there would be no reasonably foreseeable "takes" of marine mammals as defined by the MMPA and no significant impacts to the species under NEPA with implementation of the Conventional Pier Alternative.

<u>Special Status Species</u>

Federally Listed Species

California Least Tern. As described above, the Pier 8 project area is not a nesting or foraging area in the Tern MOU. Nor does the Pier 8 Project Area have any special characteristics such as: extraordinary size; eelgrass beds; unique fish habitat; or an abundance of least tern prey species. Least terns are not expected to occur within the project area. Due to the distance to known nesting areas and high value foraging areas and the localized nature of impacts associated with project activities, project activities would not affect individuals or have a persistent effect on numbers and distribution of the species. Therefore, implementation of the Conventional Pier Alternative would not affect the California least tern and there would be no significant impact to the species under NEPA.

Green Sea Turtles. No green sea turtle habitat would be impacted by any project activities and there is nothing that would attract sea turtles to the project area. The Navy considers two primary categories of sound sources in its analyses of sound impacts to sea turtles: impulsive sources (e.g.: explosives; air guns; weapons firing; and impact pile driving) and non-impulsive sources (e.g.: sonars; pingers; and countermeasure devices). Potential impacts to green sea turtles from implementation of the proposed action would primarily be from impact pile driving and vibratory pile extraction. The threshold value for injury to sea turtles from impact and vibratory pile driving is 190 dB re 1 µPa SPL RMS. During impact pile driving, potential behavioral harassment to a marine mammal is presumed to occur when the animal is exposed to an underwater SPL of 160 dB re 1 µPa RMS or greater. The Navy will conservatively apply the same threshold as indicating the possibility of behavioral effects on green sea turtles.

Underwater sound levels associated with impact pile driving would be 176 dB re 1 µPa RMS at 10 meters. Assuming that underwater sound propagates in accordance with the practical spreading loss model, in which sound attenuates 4.5 dB for every doubling of distance, the potential for injury (190 re 1 µPa SPL RMS) from impact pile driving is discountable, being within 6 ft. The potential for disturbance (160 re 1 µPa SPL RMS) is 384 ft. As such, the Navy will monitor a 384-ft safety buffer zone for the presence of sea turtles before, during, and after pile removal activities. If sea turtles are found in the safety buffer zone, pile driving activities would be halted until the sea turtles have voluntarily left the safety buffer zone. As such, sea turtles would likely hear noise associated with the proposed impact pile driving activities but would not be injured or disturbed.

Underwater sound levels associated with vibratory pile extraction would be 160 dB re 1 µPa SPL RMS at 10 m. With implementation of the proposed monitoring, vibratory pile extraction would not injure or disturb any sea turtles.

Therefore, the Navy has concluded that the Conventional Pier Alternative may affect, but is not likely to adversely affect, the green sea turtle. The Navy will consult informally with NMFS to request concurrence with this conclusion. There would be no significant impact on the green sea turtle under NEPA.

For the remaining installation and facilities projects subject to programmatic informal consultation with NMFS, covering all San Diego Bay construction activities that could have potential negative impact on the green sea turtles, the Navy would continue to work with the regulator to arrive at agreed upon avoidance and minimization measures. These measures would support a programmatic "may affect, not likely to adversely affect" finding that would be subject to the regulator's written concurrence.

Other Special Status Species

The project sites are not in proximity to important foraging, resting, or breeding areas for bird species, and similar habitats are abundant throughout San Diego Bay. Potential disturbance of shoreline and adjacent open water areas that may be used on a transient basis by sensitive water and shore bird species would be short-term and less than significant. Noise generated during demolition activities such as pile and concrete removal and pile driving at the project site would

not substantially increase noise levels. Additionally, these increases in noise and activity would not vary substantially from normal levels of activity, vehicular traffic, and marine vessels operating in the immediate area and would cease upon completion of demolition and construction activities. Therefore, there would be no adverse effect on these species' populations or habitats and no significant impact to the species under NEPA as a result of the Conventional Pier Alternative.

In conclusion, for the reasons discussed in the preceding paragraphs, there would be no significant impacts to marine biological resources from implementation of the Conventional Pier Alternative.

3.2.3.4 MHP Alternative

Under the MHP Alternative, the impacts associated with demolition activities would be the same as those discussed under the Conventional Pier Alternative, since Pier 8 would also be removed under the MHP Alternative.

<u>Habitats and Communities</u>

As discussed under the Conventional Pier Alternative, pier demolition and construction activities for the MHP Alternative would cause minor and short-term impacts to existing nonvegetated soft bottom benthic communities within the project area. Species occurring in the immediate area may be displaced during demolition or construction activities, either directly by equipment and noise associated with these activities or indirectly by exposure to short-term changes in suspended sediments, turbidity, and changes in light diffusion. However, sediment resuspension, increased turbidity, or chemical changes would be limited to the areas of bottom disturbance, and would persist for less than one hour following disturbance. Therefore, the increased turbidity would not significantly impact benthic or water column habitats in the project area. Under this alternative, a smaller additional area (0.78 acre) would be shaded when compared with the Conventional Pier Alternative (1.86 acres). As with the Conventional Pier Alternative, impacts to productivity would be negligible because the deep subtidal area subject to shading lacks eelgrass or attached algae. Compared to the Conventional Pier Alternative, the MHP Alternative also requires significantly less pile driving that would occur over a shorter period of time and, therefore, would produce less noise and turbidity than the Conventional Pier Alternative. Benthic invertebrate species are expected to recolonize the disturbed benthic habitat within a relatively short period of time from adjacent undisturbed areas and a typical epifaunal invertebrate community would gradually develop on the new pilings. Implementation of the Conventional Pier Alternative would not result in significant impacts to the benthic communities due to pier demolition or construction. Because no eelgrass or any other special aquatic sites are found in the project area, no effects to special aquatic sites and no significant impacts under NEPA would occur due to any project activities.

<u>Fish and Wildlife</u>

Impacts associated with the MHP Alternative would be similar to those of the Conventional Pier Alternative, although the MHP Alternative would disturb bottom sediments less and would produce less underwater noise because of reduced pile driving. Sediment resuspension,

increased turbidity, and noise associated with the MHP Alternative would be short-term, would be limited to the areas of disturbance, and would persist for less than one hour following disturbance. The amount of vessel traffic is not expected to change with the new pier, even though modern Navy vessels would be better accommodated by the new pier. With the implementation of the avoidance and minimization measured outlined in Section 3.2.3.2, the MHP Alternative would have very minor impacts to fish and wildlife in the project area. Implementation of the MHP Alternative would not result in long-term impacts on EFH for coastal pelagic or Pacific coast groundfish species in San Diego Bay. It also would not have a significant effect on migratory bird populations or their habitats under the MBTA, nor have a significant impact under NEPA. There would be no "takes" of marine mammals under the MMPA. For the reasons stated above, the MHP Alternative would not result in significant impacts to fish and wildlife.

Special Status Species

Federally Listed Species

California Least Tern. As described above, the Pier 8 project area is not a nesting or foraging area in the Tern MOU; does not have any special characteristics such as extraordinary size, eelgrass beds, unique fish habitat, or an abundance of least tern prey species; and least terns are not expected to occur within the project area. Due to the distance to known nesting areas and high value foraging areas and the localized nature of impacts associated with project activities, project activities would not affect individuals or have a persistent effect on numbers and distribution of the species. Therefore, implementation of the MHP Alternative would not affect the California least tern and there would be no significant impact to the species under NEPA.

Green Sea Turtles. With the MHP Alternative, there would be reduced underwater noise because of reduced pile driving compared to the Conventional Pier Alternative, and noise would cease upon completion of demolition and construction activities. As with the Conventional Pier Alternative, all avoidance and minimization measures, as described in Section 3.2.3.2 above, would be implemented. These avoidance and minimization measures include monitoring a 384-ft safety buffer zone for the presence of sea turtles before, during, and after pile driving. Therefore, implementation of the MHP Alternative with the inclusion of avoidance and minimization measures may affect, but is not likely to adversely affect green sea turtles under the ESA and there would be no significant impacts to the species under NEPA.

Other Special Status Species

As discussed under the Conventional Pier Alternative, potential disturbance of shoreline and adjacent open water areas that may be used on a transient basis by sensitive water and shore bird species would be short-term and less than significant. There would be reduced underwater noise under this alternative because of reduced pile driving. Noise generated would not substantially increase noise levels. Additionally, noise and activity associated with implementation of the MHP Alternative would not vary substantially from normal levels of activity, vehicular traffic, and marine vessels operating in the immediate area and would cease upon completion of demolition and construction activities. Therefore, there would be no

significant impact on these species' populations or habitats under NEPA as a result of the MHP Alternative.

In conclusion, for the reasons discussed in the preceding paragraphs, there would be no significant impacts to marine biological resources from implementation of the Modular Hybrid Pier Alternative.

3.2.3.5 Mitigation Measures

Because potential impacts to marine biological resources would be localized, would cease upon completion of demolition and construction activities, and would not be significant under the Conventional Pier Alternative or the MHP Alternative, no mitigation measures are proposed.

3.2.3.6 No-Action Alternative

Under the No-Action Alternative, the demolition and replacement of Pier 8 would not occur. Existing conditions would remain unchanged. Therefore, there would be no significant impacts to marine biological resources from implementation of the No-Action Alternative.

3.3 HAZARDOUS MATERIALS AND WASTES

3.3.1 Definition of Resource

3.3.1.1 Hazardous Materials

Hazardous materials addressed in this EA are chemical substances that pose a substantial hazard to human health or the environment. For purposes of this EA, a hazardous material is any item or agent (biological, chemical, physical) which has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors. Types of hazardous materials include extremely hazardous substances, hazardous chemicals, and toxic chemicals. Hazardous materials are characterized by their ignitability, corrosiveness, reactivity, and toxicity. In general, these materials pose hazards because of their quantity, concentration, physical, chemical, or infectious characteristics.

3.3.1.2 Hazardous Wastes

A hazardous waste may be a solid, liquid, semi-solid, or contained gaseous material that alone or in combination may: 1) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible illness; or 2) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed. Hazardous wastes are regulated by the Solid Waste Disposal Act; Comprehensive Environmental Response, Compensation, and Liability Act; and Resource Conservation and Recovery Act (42 19 USC § 6901 *et seq*.). Hazardous wastes are also controlled under the California Code of Regulations and these regulations are implemented by the California Department of Toxic Substances Control and the local Certified Unified Program Agency. The U.S. Navy is required to comply with these acts and all DOD requirements, as well as management plans specific to NBSD.

3.3.1.3 Emergency Planning and Community Right-to-Know Act (EPCRA)

The EPCRA (42 USC § 11001 *et seq.*) has four major provisions:

1. Emergency planning (Section 301-303);
2. Emergency release notification (Section 304);
3. Hazardous chemical storage reporting requirements (Sections 311-312); and
4. Toxic chemical release inventory (Section 313).

Section 311 requires facilities that have Material Safety Data Sheets (MSDS) for chemicals held above certain quantities to submit either copies of their MSDS or a list of MSDS chemicals to the Local Emergency Planning Committee and local fire department. Facilities that need to report under EPCRA Section 311 must also submit an annual inventory report (Tier I or Tier II form) for the same chemicals. This inventory report must be submitted to the State Emergency Response Commission and local fire department by March 1 each year. The information submitted under Sections 311 and 312 are available to the public from Local Emergency Planning Committees and State Emergency Response Commissions. In California, the chemical storage reporting thresholds under the California Health and Safety Code Chapter 6.95 are 55 gallons, 500 pounds, and 200 cubic ft of a compressed gas. Otherwise, the federal threshold limits are 500 pounds for extremely hazardous substances and 10,000 pounds for all other hazardous substances. Any hazardous materials and wastes generated during construction and operation would be subject to installation-wide EPCRA reporting.

3.3.2 Affected Environment

The APE for hazardous materials and hazardous waste for the Proposed Action is NBSD.

3.3.2.1 Hazardous Materials

Hazardous materials aboard NBSD are managed in accordance with the procedures established in Office of the Chief of Naval Operations Instruction (OPNAVINST) 5100.23E, *Navy Occupational Safety and Health Program Manual* (5 October 2000) (NAVFAC Southwest 2007a). Chapter 7 of OPNAVINST 5100.23E defines requirements and responsibilities for shore activity hazardous material control and management. Hazardous material control and management focuses on: preventing, minimizing or eliminating the introduction of hazardous materials into the Navy system; substituting less hazardous materials for those already in the Navy system; safely using hazardous materials in the workplace; and safely handling and disposing of hazardous waste (U.S. Navy 2002).

There are no fuel pipelines to NBSD piers and the Navy does not have hazardous materials storage facilities on Pier 8 (NAVFAC Southwest 2008a, b). The only hazardous materials related to Navy operations currently present at Pier 8 are fuel and hydraulic fluid inside vehicles and cranes operated on the pier and non-PCB insulating oil contained within four electrical transformers and switchgear inside three substations (NAVFAC Southwest 2008a, c; NBSD 2004a). Each transformer contains about 890 gallons of oil (NBSD 2004a). The switchgear may contain either oil or gas (NAVFAC Southwest 2008c). In approximately 1992-1993 seven

transformers containing PCBs were removed from concrete vaults below Pier 8 and the four new, non-PCB transformers were placed on concrete pads on top of the pier. Each non-PCB transformer is surrounded by a containment berm (NAVFAC Southwest 2008b). The old vaults are still in place beneath the pier and have a mixture of seawater and rainwater in them (NAVFAC Southwest 2008c).

The SWPPP for NBSD contains Basewide and site-specific BMPs for Pier 8 to eliminate activities that could release hazardous materials into surface water (NAVFAC Southwest 2007a; NBSD 2004a). Pier 8 BMPs include: berms around the electrical substations to contain potential oil leaks from the transformers; overpack containers for hazardous materials being loaded onto berthed ships; checking vehicles and equipment for leaks; and having absorbent materials on hand to control spills (NBSD 2004a).

Contractors with work in progress on Pier 8 may use and store hazardous materials on the pier in accordance with these procedures as well as all applicable local, state, and federal regulations for properly labeling, containing and storing hazardous materials (NAVFAC Southwest 2008b). Contractors are required to store hazardous materials in accordance with all federal, state, and County of San Diego requirements, and to develop a Spill Prevention Plan for containing releases of hazardous materials (NAVFAC Southwest 2008b). In the event of a hazardous materials release, procedures in the Naval Base San Diego Facility Response Plan are followed to contain the release and properly dispose of any spilled materials in compliance with the code of California Regulations (CCR) Title 14 (CNRSW 2003).

3.3.2.2 Hazardous Wastes

Hazardous wastes aboard NBSD are managed according to OPNAVINST 5090.1D *Environmental and Natural Resources Program Manual* and the Hazardous Waste Management Plan (HWMP) for the San Diego Metro Area (NAVFAC Southwest 2007a; CNRSW 2007). The guidance in the HWMP ensures that Navy commands and contractors manage hazardous waste in accordance with requirements specified in: federal; state and local laws and regulations including Title 40 Code of Federal Regulations; Title 22 California Code of Regulations; California Health and Safety Code; and San Diego County Code of Regulatory Ordinances. The HWMP contains instructions for: hazardous waste minimization; waste characterization; use of proper containers and storage practices; inspection; and disposal via a licensed hazardous waste hauler (CNRSW 2007). Navy hazardous wastes handled at Pier 8 consist of wastes off-loaded from berthed vessels awaiting removal by the waste hauler, and oily waste water contained within the BOWTS pipeline (NAVFAC Southwest 2008b). The licensed hazardous waste hauler has scheduled daily pick-ups at Pier 8, so any waste off-loaded from ships is only present on the pier for a period of a few hours, always with an attendant present (NAVFAC Southwest 2008b). The Pier 8 BMPs also include procedures for minimizing spills and leaks during materials transfer (NBSD 2004a).

Contractors with jobs in progress may store job-related hazardous waste at Pier 8 for up to 90 days and are subject to the requirements of the HWMP (CNRSW 2007). Contractors are responsible for proper disposal of their own waste (CNRSW 2007). Contractors whose work

generates Navy-owned hazardous waste are required to properly characterize the waste before it may be disposed through the Navy's hazardous waste management program (CNRSW 2007).

Pier 8 is equipped with two BOWTS pipelines that run the length of the pier to connections at the quaywall with the on-shore portion of the BOWTS (NAVFAC Southwest 2008b). The BOWTS pipelines carry various wastewaters from shipboard and contractor operations as well as bilge water pumped from ships berthed at the pier (NAVFAC Southwest 2008b). The Pier 8 BOWTS pipelines consist of a smaller (typically six-inch diameter) high density polyethylene (HDPE) pipe inside a larger one (eight-inch diameter), and are hung flush with the deck on both sides of the pier (NAVFAC Southwest 2008b). The entire BOWTS consists of several miles of pipelines, bulk storage tanks, and a wastewater treatment plant. The pipeline system has a continuous monitoring system that reports leaks to the nearest pump station and the plant controller (NAVFAC Southwest 2008b). If a leak is reported, all pumps are shut down including those on board ship, until the problem is addressed (NAVFAC Southwest 2008b).

The NBSD BOWTS operates under USEPA ID#CA6170024289 and Conditional Authorization Tiered Permit Unit ID #NAVSD-26-owt-3529 and is regulated by the San Diego County Department of Environmental Health (DEH) as a hazardous waste tank system. The waste water is typically 1 percent to 5 percent oil, with a mix of sea water and waste water from shipboard operations. The NBSD treatment plant removes sludge and oil. Sludge is disposed as non-Resource Conservation and Recovery Act (RCRA) waste and treated water is sent to the San Diego municipal sewer system via the NBSD ships' wastewater system (NAVFAC Southwest 2008b, d). The San Diego County DEH Hazardous Materials Division conducts periodic inspections of the BOWTS, and personnel from the NAVFAC Waste Program inspect the facility a minimum of twice per year (NAVFAC Southwest 2008b).

In the event of a release of hazardous materials or hazardous waste, procedures in the Naval Base San Diego Facility Response Plan are followed to contain the release and properly dispose of any spilled materials in compliance with the CCR Title 14 (CNRSW 2003).

3.3.2.3 Explosives Safety Quantity Distances

ESQD arcs are calculated for all locations where explosives are handled and stored (U.S. Navy 2001a). The distance (size of the arc) depends on the quantities and types of explosives present at that location (U.S. Navy 2001a). No habitable development may occur within an ESQD arc (U.S. Navy 2001a). Explosives on ships berthed at NBSD piers and pierside activities that require the handling of explosives create areas of potential risk. Pier 8 has an ESQD arc, and lies within the arcs calculated for explosives aboard ships berthed at Pier 7 (NBSD 2004b).

3.3.2.4 Unexploded Ordnance

UXO is military munitions that have been: primed; fuzed; armed; or otherwise prepared for action; and then been fired; dropped; launched; or placed in such a way as to remain unexploded and therefore pose an explosive safety hazard to personnel and equipment (USEPA 1997). The potential presence of UXO associated with historical activities in the areas between the piers at NBSD including the proposed project area is documented in the Final Preliminary Assessment of Munitions in San Diego Bay Primary Ship Channels and USS Stennis Beach

Replenishment Areas (NAVFAC Southwest 2001a). During the dredging for the re-build of Piers 10 and 12, 25 millimeters, 45 millimeters and small arms rounds were found in the dredged sediments (NBSD 2008).

3.3.2.5 Solid Waste

To support the City of San Diego in reaching its solid waste diversion goals (i.e. 50 percent of 1990 baseline as required by the California Integrated Waste Management Act Division 30), the U.S. Navy and U.S. Marine Corps agreed to limit the amount of waste sent annually to Miramar Landfill from U.S. Navy and U.S. Marine Corps installations in San Diego County to 10.81 percent of the City's annual baseline disposal figure (CNRSW 2000). To that end, NBSD has established an extensive recycling program. Over 70 different materials are collected and recycled rather than sent to a landfill (CNRSW 2008). NBSD also has a program in place to divert its construction and demolition waste from Miramar Landfill to the maximum extent possible (CNRSW 2008). In 2007, 64 percent of the NBSD construction and demolition waste was diverted from Miramar Landfill (CNRSW 2008).

3.3.3 Environmental Consequences

3.3.3.1 Approach to Analysis

Federal, DOD, and U.S. Navy regulations govern the storage, disposal, and transportation of hazardous materials and wastes. These laws and specifications have been established to protect human health and the environment from potential impacts. The significance of impacts associated with hazardous materials and wastes is based on the toxicity of the substance, the quantity of the substance involved, the risk of exposure, and the method of disposal. Impacts are considered significant if the storage, use, transportation, or disposal of these substances increase human health risks or environmental exposure.

3.3.3.2 Conventional Pier Alternative

<u>Hazardous Materials and Wastes</u>

All Pier 8 vessel maintenance contractor-owned hazardous materials and wastes from prior jobs would be removed from Pier 8 before demolition activities begin. Hazardous materials associated with proposed demolition and construction activities would include: lead-based paint chips and dust removed from deck hardware and striping; potential asbestos containing material (ACM) insulation on the steam pipeline; the oil in the transformers and switchgear to be removed from Pier 8; fuel and hydraulic fluid contained in heavy equipment, vehicles and vessels performing the overall demolition and construction tasks; and paints to be used on deck infrastructure and deck striping.

Lead-Based Paint (LBP) Removal. The metal bollards (mooring posts where ships tie up) and the guard shacks at the ends of the Pier 8 are painted. If paint is flaking or peeling from such infrastructure, the paint chips may require disposal as hazardous waste based on the content of lead or other metals (NAVFAC Southwest 2008b).

A lead survey would be conducted to identify potential LBP on Pier 8 prior to demolition. LBP abatement would be performed by trained, state- certified and licensed lead paint removal

contractors. The licensed contractors would be required to prepare and implement a site-specific health and safety plan that complies with California Occupational Safety and Health Administration regulations for: air monitoring; engineering and work practices controls of lead emissions; signage; and personal protective equipment such as face masks; respirators; and protective clothing. During the removal of LBP, work containment would be erected to capture and filter all contaminated air during lead removal and cleanup.

All removed LBP materials/residue would be captured and properly containerized. The contractor would be required to use catch devices and sheeting in the work area to ensure that LBP paint chips, flakes, or dust would not enter San Diego Bay. All waste would be properly stored while waiting for proper disposal per federal and state requirements. After testing is completed, the waste stream would be properly characterized for disposal as hazardous waste, excluded recycled waste, or landfill waste, as per the requirements of the NRSW Waste Management Plan San Diego Metro Area (Hazardous Waste Guidance for Construction Debris Containing Lead-based Paint) (NRSW 2007). After all bulk waste has been removed from the containment, all surfaces would be wiped down with a damp rag to remove dust. No compressed air blowing would be allowed, only vacuuming and wiping would be allowed for final cleanup.

ACM Removal. Before demolition, an asbestos survey of the steam pipe insulation would be conducted by a California licensed abatement contractor. If ACM are determined to be present, asbestos abatement would be performed by properly trained and licensed abatement contractors. All ACM and debris would be removed using wet methods. Asbestos barrier tape would be placed around the individual sites of removal. Wearing appropriate personal protective equipment, the contractor personnel would thoroughly wet the area, and then prepare for abatement by setting up containment bags along the perimeter of the ACM area. The ACM would be cut to sections of a manageable size, and the sections would be placed in double-polyethylene-lined, closed container. The San Diego Air Pollution Control District (SDAPCD) would be notified in writing of the planned removal of friable (brittle) ACM per regulations. If more than 260 linear ft of asbestos were found, an asbestos abatement permit would be filed with SDAPCD in coordination with the NBSD Asbestos Program Manager. The latest applicable requirements of federal, state, and local regulations governing removal and disposal of ACM would be complied with.

Project demolition and construction contractors would be required to park their vehicles within an on-shore staging area, where they would be allowed to store fuels for small portable equipment use following approval from the NBSD Public Works Office and Fire Department (NAVFAC Southwest 2008a, e). No vehicle fueling or maintenance would take place at the project site (NAVFAC Southwest 2008a, e). Contractors involved with the Conventional Pier Alternative would be subject to all federal, state, and San Diego County requirements for hazardous materials and hazardous waste management, and would be required to follow the HWMP (NAVFAC Southwest 2008a). In addition, a site-specific construction SWPPP would be developed and implemented by the demolition and construction contractor that would incorporate BMPs designed to minimize the potential for hazardous material releases during

demolition and construction activities. Any hazardous materials and wastes generated during construction and operational activities would also be subject to installation-wide EPCRA 312 and 313 reporting requirements (NAVFAC Southwest 2008f).

The electrical substations and switchgear at Pier 8 are in good condition and capable of being reused, however, they are not capable of meeting vessel maintenance contractors' power needs (NAVFAC Southwest 2013). This equipment would be sent to an off-base facility for maintenance and then be re-installed on elsewhere on NBSD (NAVFAC Southwest 2013). Each transformer would be shipped to the maintenance facility as an intact unit. The Pier 8 BMPs include procedures to minimize spills of transformer oil during materials transfer (NBSD 2004a). The off-base facility would remove the oil from the transformers, filter it, and re-fill the transformers as part of the maintenance process. The Conventional Pier Alternative would be constructed with four new industrial power mounds/skids capable of providing 1,200 amps at 480 volts with containment berms (NAVFAC Southwest 2013).

Prior to demolition and offsite transport, the vaults located beneath Pier 8 that previously contained PCB transformers would be sampled for traces of PCBs. The sample analysis results would dictate the appropriate disposal options.

Prior to demolition, the BOWTS pipeline would be flushed with high-pressure water from the service lines on Pier 8. The cleaning water would be pumped through the BOWTS for treatment at the NBSD BOWTS treatment plant (NAVFAC Southwest 2008a). NBSD would send the San Diego County DEH written notice of its intent to demolish the BOWTS pipeline (NAVFAC Southwest 2008b). Flow to the Pier 8 portion of the BOWTS would be shut off and capped. The HDPE pipelines along the pier and quaywall would be removed. The BOWTS piping for the new Pier 8 would be designed and tested in accordance with the requirements of California Code of Regulations (CCR) Title 22, Chapter 15- *Interim Status Standards for Owners and Operators of Hazardous Waste Transfer, Treatment, Storage, and Disposal Facilities, Article 10 Tank Systems* (NAVFAC Southwest 2008b). Compliance with these regulations would ensure that the new pipeline is: compatible with the materials it contains; structurally sound; and is pressure-tested and certified by an independent professional engineer before use (CCR Chapter 15, Article 10, Section 66265.192). NBSD would also be required to submit to DEH the professional engineer certification of the new pipelines before the lines could be used (NAVFAC Southwest 2008b).

New HDPE piping and fittings would be used to ensure a full-warranty operational system (NAVFAC Southwest 2008a). HDPE piping is joined by heat fusion welding (NAVFAC Southwest 2008b). Installation of the new HDPE piping would not involve the use of hazardous materials other than fuel for the fusion welding machine or a generator (McElroy Manufacturing Inc. 2008).

The HDPE piping and fittings removed from the existing Pier 8 would not be reused (NAVFAC Southwest 2008a). If analytical testing determines that it is not suitable for recycling or solid waste disposal, the used HDPE material would be disposed at a hazardous waste facility in accordance with all federal, state, and County of San Diego requirements (NAVFAC Southwest 2008b, e; CNRSW 2008).

Other than the oily wastewater contained within the BOWTS pipelines and hazardous wastes off-loaded from berthed ships, there would be no Navy-owned hazardous materials or wastes present at the replaced Pier 8. The licensed hazardous waste hauler would continue daily pick-ups of waste off-loaded from ships at Pier 8. Contractors working on Pier 8 would once again be permitted to store hazardous materials and wastes associated with work in progress on Pier 8, subject to the conditions in the HWMP and all applicable federal, state, and County of San Diego requirements (NAVFAC Southwest 2008b).

Through the use of the measures described above (proper management of hazardous materials and waste during demolition and construction, and resumption of operations at the replacement Pier 8) no increase in human health risk or environmental exposure to hazardous materials or hazardous wastes would result from implementation of the Conventional Pier Alternative. Therefore, there would be no significant impact with respect to the use, storage, or disposal of hazardous materials or hazardous wastes from implementation of the Conventional Pier Alternative.

Installation Restoration (IR) Program and Resource Conservation and Recovery Act and (RCRA) Facility Assessment Sites

The DOD established the IR Program to identify and clean up areas at military facilities that have been affected by past use of hazardous materials and disposal of hazardous waste (NBSD 2006). Cleanup of the IR Program sites is legislated through the Comprehensive Environmental Response, Compensation and Liability Act ([CERCLA [commonly known as "Superfund"]) that primarily addresses contamination resulting from past disposal practices (NBSD 2006). RCRA establishes requirements for current hazardous waste handling practices, as well as for investigation and cleanup of existing hazardous waste handling facilities. The U.S. Navy and the California Department of Toxic Substances Control (DTSC) work together on the cleanup of the IR Program and RCRA Facility Assessment sites at NBSD per the Federal Facility Site Remediation Agreement signed by the two parties in 2007 (State of California and United States Department of the Navy 2007). The Navy conducts cleanup for each site listed in the FFRSA according to the DTSC-approved Site Management Plan and schedule (State of California and United States Department of the Navy 2007).

As of 2009, seven of the 19 IR Program sites at NBSD had been either cleaned up and closed with a No Further Action Record of Decision, or transferred to another program (NBSD 2009). One of the closed sites, Site 8, the former Fire-Fighting Training Facility is located at the eastern end of Pier 8. Excavation and a remediation system removed petroleum contaminants from soil and groundwater, and in March 2004 Site 8 was closed under the NBSD Petroleum Program with No Further Action concurrence from RWQCB (NAVFAC Southwest 2007b). Two petroleum-product recovery trenches associated with the former remediation system were located approximately 180 ft northeast of the shoreside base of Pier 8 (NAVFAC Southwest 2007b). Although no further action is required for Site 8, and the nearest Site 8 zone of contamination is located approximately 400 ft to the southeast of Pier 8, it is possible that fugitive hydrocarbons from Site 8 may be released into the bay as a result of demolition and excavation activities. Therefore, the demolition and construction contractor would be required

to place booms around the demolition and excavation footprint to avoid ground-disturbance at closed IR Site 8. There are no RCRA Facility Assessment sites identified for investigation or cleanup in the vicinity of Pier 8 (NBSD 2009) therefore there would be no significant impacts from RCRA sites.

County of San Diego Unauthorized Release Sites

The County of San Diego oversees investigation and cleanup of sites where releases of petroleum products and hazardous wastes from storage tanks have taken place. There are no such sites in the immediate vicinity of Pier 8 (County of San Diego 2008).

Explosives Safety Quantity Distances

The APE for ESQDs is NBSD. The Conventional Pier Alternative would have a significant impact on ESQD if the construction of facilities not involving ammunition and explosives were to occur near enough to ammunition and other explosives that the new facilities or workers would have the potential to be exposed to hazards, or that a reasonable doubt exists regarding exposure to hazards (U.S. Navy 2001b).

Site and final safety approvals for demolishing Pier 8 and constructing the new Pier 8 according to the same ESQD limits now in effect were granted by the DOD Explosives Safety Board on 16 August 2005 (DOD 2005). The inhabited building distance, net explosive weight limit, and public traffic route distance remain unchanged (DOD 2005). No inhabited buildings, other than the watchtower, would be constructed as part of the Conventional Pier Alternative (NBSD 2012). Site approval would include demolition of existing Pier 8 and consultation with Navy Explosives Safety would be done before action is taken to record changes (if any) to the Pier 8 ESQD arcs. No such changes are expected within the timeframe of this EA (NBSD 2013). Therefore, there would be no change to explosives handling requirements or procedures as a result of the Conventional Pier Alternative.

The new pier must be clearly marked to designate the explosives handling area (DOD 2005). Explosives handling would only be allowed within the outermost 400 ft of the pier, and the pier must be clearly marked to designate the explosives handling area (DOD 2005). The southwest corner of the Mole Pier lies within the Pier 8 ESQD arc and must be evacuated when Hazard Division 1.1 (explosives that have a mass explosion hazard) operations take place at Pier 8. In addition, Pier 8 lies within the ESQD arc for Pier 7. To ensure safety during the project demolition and construction activities, the NBSD Explosives Safety Officer must be provided contractor points of contact. The Safety Officer would notify the contractors when explosives would be handled at Pier 7, so that contractor personnel can be evacuated from the site (NBSD 2008).

Completion of the site approval process, and adherence to the NBSD Explosives Safety Officer's requirements would ensure that implementation of the Conventional Pier Alternative would not result in a significant impact to explosives safety and handling at NBSD, or pose a safety risk to contractor personnel involved in the demolition and construction.

Unexploded Ordnance

The APE for UXO is NBSD and eastern San Diego Bay. The Conventional Pier Alternative would have a significant impact with respect to an explosive safety hazard if project-related activities caused UXO to explode resulting in human injury or equipment and property damage. However, the risk of such an explosion would be minimal because the only UXO that has been recovered in the course of similar Navy construction projects in the vicinity of the project area has been small arms ammunition (i.e. for handguns and rifles) and because UXO encountered by pile driving operations associated with those projects generated only slight anomalies visible at the water surface (NAVFAC Southwest 2008d). The contractor would be notified of the potential presence of UXO at the project site through a contract clause that includes NOSSA Instruction 8020.15, which contains definitions of military munitions and UXO, and assigns responsibility and establishes procedures and reporting requirements for oversight, review, and verification of the explosives safety aspects of the Navy's Munitions Response Program followed (U.S. Navy 2004; NAVFAC Southwest 2008d). The risk associated with any potential explosive safety hazard would be further minimized by setting up and following explosives safety procedures to train and protect onsite workers. An Explosives Safety Plan would be developed. The U.S. Navy and all contractors and subcontractors would be required to adhere to the procedures established in NOSSA Instruction 8020.15 (NAVFAC Southwest 2008d). Should UXO be encountered during pier demolition, pile driving, or pier construction, the following steps would be followed (U.S. Navy 2004):

1. The contractor site project manager would notify the Navy project manager. Naval Base Point Loma and the Navy's Silver Strand Training Complex for Special Forces security would also be notified;
2. All work would stop that would put personnel, equipment, or property at risk due to the presence of UXO;
3. The servicing Navy Explosive Ordnance Disposal (EOD, the U.S. Navy experts for disposal of waste military munitions) mobile unit or detachment would be notified; and
4. NOSSA Ordnance Environmental Support Office would be notified.

With adherence to the procedures required in NOSSA 8020.15, implementation of the Conventional Pier Alternative would not result in a significant explosive safety hazard impact.

Solid Waste

The APE for solid waste includes NBSD and the Miramar Landfill. Implementation of the Conventional Pier Alternative would have a significant solid waste impact if the amount of solid waste resulting from the action would consume a disproportionate amount of Miramar Landfill's available disposal capacity.

The NRSW Integrated Solid Waste Management Program would attempt to determine a resale or recycling use for the materials resulting from the Pier 8 demolition before approving them for landfill disposal (NRSW 2008). HDPE piping from the BOWTS at Pier 8 would be tested to determine whether it is appropriate for such use, may be landfilled, or requires disposal as

hazardous waste (NAVFAC Southwest 2008b). The iron sewage piping from Pier 8 would be cleaned prior to demolition to prepare it for salvage (NAVFAC Southwest 2008a).

NRSW Instruction 11350.1A (Regional Construction and Demolition Debris Landfill Diversion) requires that all construction projects submit a solid waste management plan during the project planning phase that must include: the types and quantities of waste expected to be generated; actions that would be taken to divert at least 54 percent (in 2012; increasing by two percent each year until 60 percent is reached in 2015) of the construction and demolition waste stream from landfilling; a list of the specific waste materials that would be salvaged for resale; reuse; or recycling; and identification and justification for materials that cannot be reused/recycled. While the project is ongoing, the contractor must submit monthly solid waste reports that include the waste tonnages recycled and landfilled (NRSW 2006). The Sustainable Solid Waste program uses a database to track reuse opportunities for recycling materials resulting from construction projects, and to track solid waste diversion for every project. As of 2011, Navy construction projects in the San Diego area are required to divert a minimum of 52 percent of construction and demolition waste from landfill disposal. It is estimated that 75 to 90 percent of the concrete debris resulting from the demolition of Pier 8 would be crushed and re-cycled for use in other construction projects, with only 10 percent to 25 percent of the material (3,900 to 9,750 cubic yards) requiring landfill disposal (NAVFAC Southwest 2008f). With adherence to these NBSD requirements, there would be no significant solid waste impact from implementation of the Conventional Pier Alternative.

3.3.3.3 MHP Alternative

Under the MHP Alternative, the same demolition activities would take place as for the Conventional Pier Alternative. Demolition would generate the same waste types and volumes under the MHP Alternative as under the Conventional Pier Alternative. Due to the smaller construction footprint of the MHP Alternative, a lesser volume of hazardous materials, hazardous waste, and solid waste would be associated with construction of this alternative. The BOWTS pipeline would be demolished and replaced according to the same procedures described for the Conventional Pier Alternative. The existing Pier 8 electrical substations and switchgear would be sent to an off-base facility for maintenance, and then re-installed elsewhere on NBSD. The MHP Alternative would be constructed with four new industrial power mounds, as described for the Conventional Pier Alternative. The same hazardous materials, hazardous waste, and solid waste management and disposal procedures would be followed in compliance with all applicable federal, state and county, regulations, and Navy requirements, for the MHP Alternative as for the Conventional Pier Alternative.

The MHP Alternative would be constructed in the same location as the Conventional Pier Alternative, i.e., within approximately 400 ft of closed IR Site 8. Demolition and construction contractors would therefore be required to place booms around the demolition and excavation footprint to avoid ground-disturbance at closed IR Site 8. Because the MHP Alternative would be constructed in the same location as the Conventional Pier Alternative, ESQD impacts associated with demolition and construction activities would be similar to those discussed under the Conventional Pier Alternative. Therefore, there would be no significant hazardous

materials, hazardous waste, and solid waste impacts from implementation of the MHP Alternative.

With respect to UXO under this alternative, less pile driving would occur than under the Conventional Pier Alternative, and therefore the associated explosive hazard due to the potential encounter with UXO would be lower. However, as described under the Conventional Pier Alternative, the risk of such an explosion would be minimal and the contractor would be notified of the potential presence of UXO at the project site through a contract clause that includes NOSSA Instruction 8020.15, which contains definitions of military munitions and UXO, and assigns responsibility and establishes procedures and reporting requirements for oversight, review, and verification of the explosives safety aspects of the Navy's Munitions Response Program followed (U.S. Navy 2004; NAVFAC Southwest 2008d). The risk associated with any potential explosive safety hazard would be further minimized by setting up and following explosive safety procedures to train and protect onsite workers. Therefore, implementation of the MHP Alternative would not result in a significant explosive safety hazard impact.

Under the MHP Alternative, there would be no increase in solid waste impacts, human health risk or environmental exposure to hazardous materials or hazardous wastes. Therefore, there would be no significant impacts with respect to hazardous materials, hazardous waste, and solid waste from implementation of the MHP Alternative.

3.3.3.4 Mitigation Measures

Implementation of the Conventional Pier Alternative or the MHP Alternative would not result in significant hazardous materials, hazardous waste, or solid waste impacts; therefore, no mitigation measures are proposed.

3.3.3.5 No-Action Alternative

Under the No-Action Alternative, the demolition and replacement of Pier 8 would not occur. Industrial activities currently being conducted in the area would continue. Therefore, there would be no significant impact with respect to hazardous materials, hazardous wastes, and solid waste from implementation of the No-Action Alternative.

3.4 NOISE

3.4.1 Definition of Resource

3.4.1.1 Airborne Noise

Noise is defined as unwanted sound that interferes with normal activities or otherwise diminishes the quality of the environment. It may be intermittent or continuous, steady or impulsive, stationary or transient. There is wide diversity in responses to noise that not only vary according to the type of noise and the characteristics of the sound source, but also according to the sensitivity and expectations of the receptor, time of day, and distance between the noise source (e.g., a bulldozer) and the receptor (e.g., a person or animal).

Noise levels are measured in decibels (dB), which are represented on a logarithmic scale of about 20 to 120 dB. On this scale, everyday noises range from 30 dB for a quiet room to 90 dB for a power lawn mower at close range (Noise Pollution Clearinghouse 2008). At a constant level of 70 dB, noise can be irritating and disruptive to speech; at louder levels, hearing losses can occur. A difference of three dB represents a doubling of sound levels in terms of energy. However, because of how we hear, it is necessary to have a 10-dB increase to be *perceived* as a doubling in sound (USEPA 1974). Noise measurements are usually on an "A-weighted" scale that filters out very low and very high frequencies in order to replicate human sensitivity. It is common to add the "A" in order to identify that the measurement has been made with this filtering process (dBA).

Because noise levels vary widely during the day, it is customary to average noise levels over a period of time. Time-averaged noise levels form the basis for land use compatibility guidelines. For instance, the term Day-Night Average Level (L_{dn}) is used to describe the average noise level during a 24-hour day with a penalty of 10 dBA added to nighttime sound levels (10 P.M. to 7 A.M.). Community Noise Equivalent Levels (CNEL) add a five dBA penalty for noise events that occur in the evening (7:00 P.M. to 10:00 P.M.), as well as a 10 dBA penalty for noise events at night (10:00 PM to 7:00 A.M.). Shorter measurement durations (typically one hour) are described as Energy Equivalent Levels (L_{eq}) indicating the total energy contained by the sound over a given sample period. The L_{eq} for one hour is the energy average noise level during the hour; specifically, the average noise based on the energy content (acoustic energy) of the sound. It can be thought of as the level of a continuous noise that has the same energy content as the fluctuating noise level. The L_{eq} for a 24-hour period (L_{eq24}) is the L_{dn} CNEL without the penalties.

3.4.1.2 Underwater Noise

Sound propagation characteristics are different in water than in air. Sound levels are calculated as a ratio of the measured acoustic energy to a reference value. The reference level for airborne sound is 20 µPa, consistent with the minimum level detectable by humans. However, a reference level of one µPa is used for underwater sound because a reference based on the threshold of human hearing in air is not appropriate. Also, the source levels of airborne noise are conveniently measured at 1,000 ft. For underwater sound sources, the standard reference range is 3.3 ft to permit use with transmission loss measurements referenced to 3.3 ft. As a result, waterborne sounds can only be meaningfully compared to airborne sounds if a 26-dB correction factor is added to airborne sound levels.

Airborne sound can be transmitted into the water. However, the amount of acoustic energy directly transmitted from a source is limited due to refraction and reflection. Sound transmission in shallow water is also influenced by reflection losses from the bottom and the surface, refraction from sound speed gradients, reflection and refraction from shallow bottom layers, and scattering from rough surfaces.

3.4.2 Affected Environment

This section provides information on airborne and underwater noise, including characterization of existing noise conditions in the general vicinity of the proposed project. No site-specific noise

data are available for this project, but information is available for the general San Diego Bay area.

3.4.2.1 Existing Conditions and Sensitive Receptors

Airborne Noise

Land use compatibility with differing noise levels is regulated at the local level, although the federal government has established suggested land use compatibility criteria for different noise zones (Federal Interagency Committee on Urban Noise [FICUN] 1980). Based on the Land Use Guidelines contained in the FICUN criteria (FICUN 1980), residential areas and schools are considered compatible where the L_{dn} is up to 65 dBA; outdoor recreational activities such as fishing and golfing are compatible with noise levels up to 70 dBA; and parks are compatible with noise levels up to 75 dBA.

The proposed project site lies well beyond the 65 dB CNEL noise contours generated by aircraft activity at Naval Air Station North Island (NASNI) (Naval Base Coronado 2011). The project site also lies outside the 65 dB CNEL contours for the San Diego International Airport (City of San Diego 2007). Ambient noise levels in the NBSD waterfront area are associated with a variety of activities. The primary noise sources are ship repair equipment used on Pier 8, marine terminal operations, vehicular traffic, and air traffic associated with NASNI, the U.S. Coast Guard Air Station, and San Diego International Airport.

Measured, site-specific data are not available for baseline noise levels at the project site. However, ambient noise levels estimated for the NBSD Pier 12 Replacement Project (MILCON P-327) (NAVFAC Southwest 2011), located in the immediate vicinity of the project site, are approximately 58-59 dBA. The representative ambient noise levels were estimated using the methodology of the National Research Council, Committee on Hearing, Bioacoustics, and Biomechanics (National Research Council 1977). These estimates considered expected human activity in an urban area and were based on population density per square mile (NAVFAC Southwest 2011).

The City of San Diego has a noise ordinance that limits construction noise, such as the effect of any construction noise that reaches residentially zoned property. This limit is an average sound level (L_{eq}) of 75 dBA or less during the 12 hour period from 7 A.M. to 7 P.M. (City of San Diego 2008b). The ordinance also limits construction activity outside of these hours and during certain days (i.e., Sundays and major holidays) where it may create an excessive impact on neighboring sites (City of San Diego 2008).

Noise in National City, adjacent to, and east of the proposed project site, is regulated by the City's Noise Control Ordinance. National City standards indicate an allowable noise level of 80 dBA (L_{eq}) in heavy industrial areas, including NBSD (National City 2008). Noise levels in commercial areas in National City are limited to 60 dBA (L_{eq}) between 10:00 P.M. and 7:00 A.M., and to 65 dBA (L_{eq}) between 7:00 A.M. and 10:00 P.M. (National City 2008). In single family residential areas (less than nine dwelling units), allowable noise levels are 45 dBA (L_{eq}) between 10:00 P.M. and 7:00 A.M. and 55 dBA (L_{eq}) between 7:00 A.M. and 10:00 P.M. (National City 2008). Noise levels emanating off-site during construction activities in National City may not exceed

60 dBA (L_{eq}) on weekdays and 50 dBA (L_{eq}) on Sundays and holidays in residential zones at city boundaries (National City 2008). However, because construction noise is considered to be temporary and intermittent under these types of ordinances, noise limits in other areas, such as residential, are also allowable up to 60 dBA (L_{eq}) on weekdays. Therefore, the noise limit during weekdays for proposed project activities is 60 dBA (L_{eq}), as applied in Section 3.4.3.2 for comparisons with calculated noise levels at various receptor points. Both the City of San Diego and National City noise ordinances indicate that noise levels generated from project activities are to be analyzed independently; therefore, a cumulative analysis in conjunction with existing ambient noise is not necessary (City of San Diego 2008; National City 2008).

Underwater Noise

Two common metrics used to measure underwater sound are the peak sound pressure level (Peak) and the RMS SPL. The former is the instantaneous maximum positive or negative pressure observed during the impulse; the latter represents the mean square pressure level of the pulse and is the metric used by the National Marine Fisheries Service as a criterion for judging noise impacts to marine mammals. Baseline data on underwater noise are not available from the project region; however, measurements of ambient conditions over a one-month period in northern San Diego Bay suggest a range from approximately 64 to 87 dB (Finneran et al. 2005). Details pertaining to potential noise effects on marine organisms in the project region are presented in Section 3.2.3.3, *Marine Biological Resources*.

3.4.3 Environmental Consequences

3.4.3.1 Approach to Analysis

The primary factor considered in determining the significance of noise effects includes the extent or degree to which implementation of the alternatives would affect baseline noise environments. The primary issue of concern with regard to noise is the potential for impacts to humans and wildlife. Noise impacts would occur if implementation of the alternatives would directly or indirectly do one or both of the following:

- Increase ambient CNEL levels at noise-sensitive land uses beyond the "normally acceptable" land use compatibility criteria (typically 60 or 65 dB CNEL for residential, education, and health care land uses); and/or
- Establish noise-sensitive land use (residential, educational, and health care uses) in areas exposed to ambient noise levels that are higher than the applicable land use compatibility criteria (typically 60 or 65 dB CNEL).

Less stringent guidelines are applied to temporary noise sources that are restricted to daytime hours (such as most construction and demolition activities) unless they affect noise-sensitive land uses and result in CNEL levels more than 10 dB above the respective land use compatibility criteria.

3.4.3.2 Conventional Pier Alternative

Airborne Noise

Project activities primarily would involve demolition and construction on weekdays during daylight hours using standard construction equipment ranging from trucks and cranes to pile drivers, all of which would create noise. The tugboat used to move and position the crane barge would also generate some noise, but would be consistent with the acoustical noise environment characteristic of the project site. The sound level of the pile driver during construction would dominate and would almost exclusively determine the total sound level emanating from the project site. While the maximum sound level of a piece of construction equipment may vary considerably depending on factors such as maintenance, age, activity, and load; most pile drivers generally produce a nominal peak noise level of approximately 105 dBA at a distance of 50 ft (Eaton 2000). Thus, when the pile driver is operating, it would be the predominant noise source, and it would determine the maximum noise levels in the project vicinity.

Noise levels decrease with increasing distance from the source. Under normal conditions when sound propagation is unhindered by built-up terrain, noise decreases approximately six dB with each doubling of the distance. This means that at a distance of approximately 100 ft from the pile driver location, the peak noise level would be approximately 94 dBA; at 200 ft, it would be 88 dBA; and so on. At a distance of 6,400 ft or about 1.2 miles, the peak noise level would dissipate to a relatively low 58 dBA. Thus, noise levels can be calculated for sensitive receptor locations at any given distance.

A Finding of No Significant Impact was signed following completion of NEPA analysis for the NBSD Pier 12 Replacement Project (MILCON P-327) (NAVFAC Southwest 2011) and construction for this project began in March 2012. Due to project similarities and essentially the same general vicinity, the estimated noise levels generated by this project were used to assess potential impacts of demolition and construction related noise under the Conventional Pier Alternative. This estimate provides a conservative estimate since the NBSD Pier 12 Replacement Project (MILCON P-327) would generate more noise due to dredging components that are not included under the Conventional Pier Alternative. As described under the NBSD Pier 12 Replacement Project (MILCON P-327), on-site equipment usage was modeled using the Federal Highway Administration's *Roadway Construction Noise Model* (U.S. Department of Transportation 2006). Noise levels in the model originated from data developed by the USEPA, and were refined using an "acoustical usage factor" to estimate the fraction of time each piece of construction equipment would be operating at full power (i.e., its loudest condition) during the project (U.S. Department of Transportation 2006).

The *Roadway Construction Noise Model* collects acoustic data at identified receptor points, and reports equivalent noise levels (L_{eq}) at those points. Six points landside of Pier 12 and at varying distances from the site-center were identified as potential sensitive receptors. These points represent areas with a range of land uses that could be sensitive to elevated noise levels. Residences, schools, and parks are considered noise sensitive land uses. To consider potential noise impacts, three residential areas, two schools, and a park located in National City were identified for specific assessment. Based on standard noise modeling protocols, these points

were randomly selected, but the locations and numbers of points are considered appropriate for this assessment because they reflect representative land uses in the proximate project area. In general, the points describe an arc to the south-east, east, and north-east around the NBSD Pier 12 Replacement Project (MILCON P-327) site.

As discussed in Section 3.4.2.1, to assess project-related impacts representative noise levels generated off-site by construction activities were not added to ambient noise levels since city ordinances specify separate limits for each (City of San Diego 2008; National City 2008). Based on the representative model results, noise levels at the receptor points would be less than the construction ordinance limit of 60 dBA (L_{eq}) (Table 3-6). The noise estimates presented in Table 3-6 represent a conservative estimate (i.e., over-estimate), since in reality noise levels under the Conventional Pier Alternative are expected to be less than those estimated for the NBSD Pier 12 Replacement Project (MILCON P-327). In addition, demolition and construction noise generated under the Conventional Pier Alternative would be generally consistent with the industrial nature of the site, and would not significantly alter the overall noise environment. Therefore, there would be no significant airborne noise impacts from implementation of the Conventional Pier Alternative.

Table 3-6. Noise Levels at Representative Receptor Points in National City

Receptor Point	Distance		Construction-Related Noise
	MILES	KILOMETERS	
Residential (W 20th St & Wilson Ave)	0.7	1.1	59.4
Residential (W 17th St & Wilson Ave)	0.8	1.3	58.6
Residential (West Plaza Blvd & Hoover Ave)	1.0	1.6	56.9
National City Middle School	1.4	2.3	53.6
Kimball School	0.9	1.5	57.6
Kimball Park	1.2	1.9	55.1

Note: The National City Daytime Weekday Construction Ordinance Limit is 60 dBA (L_{eq}).
Source: NAVFAC Southwest 2011; National City 2008.

Underwater Noise

Underwater noise transmission, such as would occur from project in-water activities due to pile driving and vessel operations, is highly variable and site-specific, because it is strongly influenced by the acoustic properties of the bottom and surface as well as by variation in sound speed within the water column. Pile driving would be the greatest source of noise under the Conventional Pier Alternative; however, human recreational activities and military and civilian vessels operating in the San Diego Bay also contribute to underwater noise within the project area. No site-specific data are available to quantify noise levels associated with pile driving at the project site. As discussed in Section 3.2.3.3, pile driving likely would disturb fish, marine mammals, and sea turtles in the immediate vicinity of the project site. However, fish would be able to move out of the area during project activities and return after in-water project activities are completed, so no significant long-term impacts would occur. Any marine mammals present in the general vicinity would be able to detect the noise and associated in-water activities and may avoid the project area during demolition and construction activities. Given the low levels of disturbance and limited abundance of these animals in the project region, the Conventional

Pier Alternative would not result in significant impacts to marine mammals and no reasonably foreseeable "takes" of marine mammals as defined by the MMPA would occur. Further, as previously discussed, the project area would represent a small percentage of the available resources, and project activities are considered temporary and localized. Therefore, there would be no significant underwater noise impacts from implementation of the Conventional Pier Alternative.

3.4.3.3 MHP Alternative

Under the MHP Alternative, the impacts associated with demolition activities would be the same as for the Conventional Pier Alternative, because the existing Pier 8 would be removed using the same equipment and methods as described for the Conventional Pier Alternative. Impacts associated with construction activities would be similar to those described under the Conventional Pier Alternative; because pile driving would be the dominant noise source of construction noise. The MHP Alternative would install the same type of foundation pile as the Conventional Pier Alternative (24-inch diameter octagonal concrete piles) and use the same equipment (impact pile driver). As with the Conventional Pier Alternative, the noise estimates presented in Table 3-6 represent a conservative estimate, since in reality noise levels under the Conventional Pier Alternative are expected to be less than those estimated for the NBSD Pier 12 Replacement Project (MILCON P-327) due to the lack of dredging. However, with the MHP Alternative, only 96 foundation piles would be driven, as compared with 950 piles total for the Conventional Pier Alternative, and no fender piles would be driven, so the duration of pile driving, and therefore the duration of the increased noise, would be much shorter. In addition, demolition and construction noise generated under the MHP Alternative would be generally consistent with the industrial nature of the site, and would not significantly alter the overall noise environment. Therefore, there would be no significant noise impacts from implementation of the MHP Alternative.

3.4.3.4 Mitigation Measures

Implementation of the Conventional Pier Alternative or the MHP Alternative would not result in significant noise impacts; therefore, no mitigation measures are proposed.

3.4.3.5 No-Action Alternative

Under the No-Action Alternative, the demolition and replacement of Pier 8 would not occur. Industrial activities currently being conducted in the area would continue, and the area's acoustical environment would remain unchanged. Therefore, there would be no significant noise impacts from implementation of the No-Action Alternative.

3.5 AIR QUALITY

3.5.1 Definition of Resource

3.5.1.1 Criteria Pollutants and Air Quality Standards

Estimated emissions from a proposed federal action are typically compared with the relevant national and state standards to assess the potential for increases in pollutant concentrations.

Impacts would occur if the action alternatives directly or indirectly produce emissions that would be the primary cause of, or would significantly contribute to, a violation of state or federal ambient air quality standards. Emission thresholds associated with Clean Air Act (CAA) conformity requirements are another means of assessing the significance of air quality impacts. A formal conformity determination is required for federal actions occurring in nonattainment or maintenance areas when the total direct and indirect stationary and mobile source emissions of nonattainment pollutants or their precursors exceed *de minimis* thresholds.

Air quality in a given location is defined by pollutant concentrations in the atmosphere and is generally expressed in units of ppm or micrograms per cubic meter. One aspect of significance is a pollutant's concentration in comparison to a national and state ambient air quality standard. These standards represent the maximum allowable atmospheric concentrations that may occur and still protect public health and welfare with a reasonable margin of safety. The national standards, established by the USEPA, are termed the National Ambient Air Quality Standards (NAAQS). The NAAQS represent maximum acceptable concentrations that generally may not be exceeded more than once per year; the annual standards are never allowed to be exceeded. State standards, established by the California Air Resources Board (CARB), are termed the California Ambient Air Quality Standards (CAAQS). As shown in Appendix D, the CAAQS are at least as restrictive as the NAAQS and include pollutants for which national standards do not exist (CARB 2010a).

Areas that violate ambient air quality standards are designated as nonattainment areas. Nonattainment designations for ozone (O_3) and carbon monoxide (CO) include subcategories indicating the severity of the air quality problem (e.g., the classifications range from moderate to serious for CO and from marginal to severe for O_3). Areas that comply with federal air quality standards are designated as attainment areas. Areas that have been redesignated from nonattainment to attainment are designated as maintenance areas. Areas that lack monitoring data to demonstrate attainment or nonattainment status are designated as unclassified and are considered to be in attainment for regulatory purposes.

The air pollutants that are considered in this analysis include: volatile organic compounds (VOCs); O_3; CO; nitrogen oxides (NO_x); sulfur dioxide (SO_2); particulate matter less than or equal to 10 microns in diameter (PM_{10}); and particulate matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$). Emissions are often characterized as being "primary" or "secondary" pollutants. Primary pollutants are those emitted directly into the atmosphere such as: CO; SO_2; $PM_{10;}$ and $PM_{2.5}$. Secondary pollutants are those formed through chemical reactions in the atmosphere such as O_3 and nitrogen dioxide (NO_2). SO_2 and NO_2 are commonly referred to and reported as oxides of sulfur (SO_x) and NO_x, respectively, as SO_2 and NO_2 constitute the majority of their respective oxides. Although VOCs (also referred to as hydrocarbons or reactive organic gases) and NO_x (other than nitrogen dioxide) have no established ambient standards, they are important as precursors to O_3 formation.

3.5.1.2 Greenhouse Gas Emissions (GHGs)

GHGs are gases that trap heat in the atmosphere. These emissions occur from natural processes as well as human activities. The accumulation of GHGs in the atmosphere regulates, in part, the

earth's temperature. Scientific evidence suggests a trend of increasing global temperature over the past century potentially due to an increase in GHG emissions from human activities. Potential climate change associated with GHGs may produce negative economic and social consequences across the globe.

The most common GHGs emitted from natural processes and human activities include: carbon dioxide (CO_2); methane (CH_4); and nitrous oxide (N_2O). Examples of GHGs created and emitted primarily through human activities include fluorinated gases (hydro fluorocarbons and perfluorocarbons) and sulfur hexafluoride. Each GHG is assigned a global warming potential (GWP). The GWP is the ability of a gas or aerosol to trap heat in the atmosphere. The GWP rating system is standardized to CO_2, which has a value of one. For example, CH_4 has a GWP of 21, which means that it has a global warming effect 21 times greater than CO_2 on an equal-mass basis. Total GHG emissions from a source are often reported as a CO_2 equivalent (CO_2e). The CO_2e is calculated by multiplying the emission of each GHG by its GWP and adding the results together to produce a single, combined emission rate representing all GHGs. On a national scale, federal agencies are addressing emissions of GHGs by reductions mandated in federal laws and EOs. Most recently, EO 13423 *Strengthening Federal Environmental, Energy, and Transportation Management,* and EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance,* were enacted to address GHG in detail, including GHG emissions inventory, reduction, and reporting. Several states have promulgated laws as a means to reduce statewide levels of GHG emissions. In particular, the California Global Warming Solutions Act of 2006 (Assembly Bill 32) directs the State of California to reduce statewide GHG emissions to 1990 levels by the year 2020.

In an effort to reduce energy consumption, reduce dependence on petroleum, and increase the use of renewable energy resources in accordance with the goals set by EO 13123 and the Energy Policy Act of 2005, the Navy has implemented a number of renewable energy projects. The types of projects currently in operation within the NAVFAC Southwest region include: thermal and photovoltaic solar systems; geothermal power plants; and wind generators. The military also purchases one-half of the biodiesel fuel sold in California. The Navy continues to promote and install new renewable energy projects within the NAVFAC Southwest region.

The potential effects of proposed GHG emissions are by nature global and cumulative impacts, as individual sources of GHG emissions are not large enough to have an appreciable effect on climate change. Therefore, the impact of GHG emissions (associated with the project) to global climate change is discussed in the context of cumulative impacts in Section 4.2.5 of this EA.

3.5.2 Regulatory Setting

3.5.2.1 Federal Requirements

Section 176(c) of the CAA, as amended, requires federal agencies to ensure that actions undertaken in nonattainment or maintenance areas are consistent with the CAA and with federally enforceable air quality management plans. The USEPA general conformity rule applies to federal actions occurring in nonattainment or maintenance areas when the total direct and indirect emissions of nonattainment pollutants (or their precursors) exceed specified

thresholds. The emission thresholds that trigger requirements for a conformity analysis are called *de minimis* levels. *De minimis* levels (in tons per year) vary from pollutant to pollutant and are also subject to the severity of the nonattainment status. The applicable *de minimis* levels for the project area are listed in Table 3-7.

Table 3-7. Applicable Criteria Pollutant *de minimis* Levels (tons per year)

VOCs[1]	NO_x[1]	CO[2]	SO_2[2]	PM_{10}[2]	$PM_{2.5}$[2]
100	100	100	NA	NA	NA

Notes: [1] San Diego Air Basin (SDAB) is a marginal nonattainment area for the 8-hour O_3 NAAQS; VOCs and NO_x are precursors to the formation of O_3.
[2] SDAB is considered a maintenance area for the CO NAAQS and is in attainment of the NO_2, SO_2, PM_{10} and $PM_{2.5}$ NAAQS.
NA = Not Applicable. *De minimis* levels are not applicable because the SDAB is in attainment of the SO_2, PM_{10} and $PM_{2.5}$ NAAQS.
Sources: CARB 2013b; USEPA 2013.

The USEPA conformity rule establishes a process that is intended to demonstrate that a proposed federal action would not: 1) cause or contribute to new violations of federal air quality standards; 2) increase the frequency or severity of existing violations of federal air quality standards; and 3) delay the timely attainment of federal air quality standards. Compliance is presumed if the net increase in direct and indirect emissions from a federal action would be less than the relevant *de minimis* level. However, if the increase in emissions for a nonattainment pollutant exceeds *de minimis* levels, a formal conformity determination process must be implemented. For the purposes of this air quality analysis, project emissions would be potentially significant if they exceed federal *de minimis* levels. If emissions exceed their respective *de minimis* levels, further analysis of the emissions and their consequences would be performed to assess whether there is a likelihood of a significant impact to air quality.

3.5.2.2 State Requirements

The CAA requires each state to develop, adopt, and implement a State Implementation Plan (SIP) to achieve, maintain, and enforce federal air quality standards throughout the state. SIPs are developed on a pollutant-by-pollutant basis whenever one or more air quality standards are being violated. State standards, established by the CARB, are termed the CAAQS. The CAAQS are at least as restrictive as the NAAQS and include pollutants for which national standards do not exist (CARB 2010a) (refer to Appendix D). Local governments and air pollution control districts have had the primary responsibility for developing and adopting the regional elements of the California SIP. In the San Diego region, the SDAPCD is responsible for governing air quality and reports to CARB.

3.5.2.3 Local Regulations

The SDAPCD is responsible for regulating stationary sources of air emissions in the San Diego Air Basin (SDAB). The SDAPCD Rules and Regulations (SDAPCD 2009) establish emission limitations and control requirements for stationary sources, based on their source type and magnitude. In addition, SDAPCD Conformity Rule 1501 provides general conformity guidance to ensure that Federal actions are consistent with the efforts of the SDAPCD to achieve its NAAQS attainment goals.

The SDAPCD and the San Diego Association of Governments are responsible for developing and implementing the clean air plan for attainment and maintenance of the ambient air quality standards in the SDAB. The San Diego County Regional Air Quality Strategy (RAQS) was initially adopted in 1991, and is updated on a triennial basis. The RAQS was updated in 1995, 1998, 2001, 2004, and most recently in 2009. The 2009 Triennial RAQS Revision is the most recent plan to bring the SDAB into compliance with the CAAQS. This plan includes all feasible control measures that can be implemented for the reduction of O_3 precursor emissions. To be consistent with the RAQS, a project must conform to emission growth factors outlined in this plan. Control measures for stationary sources proposed in the RAQS and adopted by the SDAPCD are incorporated into the SDAPCD Rules and Regulations.

The SDAPCD has also developed the air basin's input to the SIP. The SIP includes the SDAPCD's plans and control measures for attaining the O_3 NAAQS. The SIP is also updated on a triennial basis. The CARB adopted its 2007 State Strategy for California's 2007 State Implementation Plan on 27 September 2007 (CARB 2010c). The State Strategy was submitted to the USEPA on 16 November 2007 for their review and approval, and the USEPA approved the SIP in 2012. As part of that State Strategy, the SDAPCD developed its *Eight-Hour Ozone Attainment Plan for San Diego County*, which provides plans for attaining and maintaining the 8-hour NAAQS for O_3.

Air Quality Permitting Requirements

Air quality permits are required for activities or equipment that emit air contaminants. The SDAPCD requires air permits prior to construction or installation and again before any operational activities begin. An "Authority to Construct" permit is used to authorize construction or installation activities. A "Permit to Operate" is used to authorize operation of specific equipment. All necessary construction or operationally-related permits must be authorized by the SDAPCD before project implementation occurs.

3.5.3 Affected Environment

The region of influence for air quality includes the 4,260-square mile SDAB, which encompasses all of San Diego County.

3.5.3.1 Climate and Meteorology

The climate of the project region is classified as Mediterranean, characterized by dry summers and wet winters. The major influences on the regional climate are the Eastern Pacific high-pressure system, topography, and the moderating effects of the Pacific Ocean. Seasonal variations in the position and strength of the high-pressure system are a key factor in area weather changes.

The Eastern Pacific High is a persistent anticyclone that attains its greatest strength and most northerly position during summer, when it is centered west of northern California. In this position, the High effectively shelters southern California from the effects of polar storm systems. As winter approaches, the Eastern Pacific High weakens and shifts to the south, allowing polar storm systems to pass through the region. Subsiding air associated with the

High warms the upper levels of the atmosphere and produces an elevated temperature inversion (temperature increases with height) along the west coast.

The base of this temperature inversion is generally from 1,000 ft to 3,000 ft above mean sea level during the summer. The subsidence inversion acts like a lid on the lower atmosphere and traps air pollutants near the surface of the earth by limiting vertical dispersion.

Mountain ranges in eastern San Diego County constrain the horizontal movement of air and also inhibit the ventilation of air pollutants out of the region. These two factors, combined with the emission sources of over three million people, help to create the high pollutant conditions sometimes experienced in San Diego County.

During the colder months, the Eastern Pacific High can combine with high pressure over the continent to produce extended periods of light winds and low-level inversion conditions in the region. These atmospheric conditions can produce adverse air quality. Excessive build-up of high pressure over the continent can produce a "Santa Ana" condition, characterized by warm, dry, northeast winds. Santa Ana winds help to ventilate the air basin of locally generated emissions. However, Santa Ana conditions can also transport air pollutants from the Los Angeles metropolitan area into the project region. When stagnant atmospheric conditions occur during a weak Santa Ana, local emissions combined with pollutants transported from the Los Angeles area can lead to significant O_3 impacts in the project region.

Marine air trapped below the base of the subsidence inversion is often condensed into fog and stratus clouds by the cool Pacific Ocean. This is a typical weather condition of coastal San Diego County during the warmer months of the year. Marine stratus usually forms offshore and moves into the coastal plains and valleys during the evening hours; when the land heats up the following morning, the clouds burn off to the immediate coastline and reform the following evening.

3.5.3.2 Regional and Local Air Pollutant Sources

An emission rate represents the mass of a pollutant released into the atmosphere by a given source over a specified period of time. Emission rates can vary considerably depending on type of source, time of day, and schedule of operation. The SDAPCD periodically updates emissions for the entire SDAB for purposes of forecasting future emissions, analyzing emission control measures, and for use in regional air quality modeling. The largest regional sources of air emissions are on-road vehicles. The 2008 inventory determined that on-road vehicles emitted 33 percent of the VOCs, 60 percent of the NO_x, and 65 percent of the CO emissions within the SDAB (CARB 2010d). Another large source of VOCs is the use of surface coatings and solvents. Combustion sources produce both primary fine particulate matter and fine particulate precursor pollutants, such as NO_x, which react in the atmosphere to produce secondary fine particulates. Coarser particles mainly occur from soil-disturbing activities, such as: construction; mining; agriculture; and vehicular road dust.

3.5.3.3 Baseline Air Quality

Representative air quality data for NBSD for the period 2010 - 2012 are shown in Table 3-8. The USEPA designates all areas of the U.S. as having air quality better than or equal to (attainment), or worse than (nonattainment), the NAAQS. The criteria for nonattainment designation vary by pollutant. An area is in nonattainment for O_3 if its NAAQS has been exceeded more than three discontinuous times in three years and an area is generally in nonattainment for any other pollutant if its NAAQS have been exceeded more than once per year. Former nonattainment areas that have attained the NAAQS are designated as maintenance areas. The SDAB is in marginal nonattainment for the O_3 NAAQS (VOCs and NO_x are precursors to the formation of O_3), while it is considered a maintenance area for the CO NAAQS, and is in attainment of the NAAQS for all other criteria pollutants. The SDAB is in nonattainment of the O_3, PM_{10} and $PM_{2.5}$ CAAQS (CARB 2013a; USEPA 2013).

Table 3-8. Representative Air Quality Data for NBSD (2010-2012)

Air Quality Indicator	2010	2011	2012
Ozone (O_3)(1)			
Peak 8-hour value (ppm)	0.066	0.061	0.065
Days above federal standard (0.075 ppm)()	0	0	0
Days above state standard (0.070 ppm)	0	0	0
Carbon monoxide (CO)(1)			
Peak 8-hour value (ppm)	2.17	2.44	1.81
Days above federal standard (9.0 ppm)	0	0	0
Days above state standard (9.0 ppm)	0	0	0
Particulate matter less than or equal to 10 microns in diameter (PM_{10})(1)			
Peak 24-hour value (μg/m^3)	40.0	48.0	45.0
Days above federal standard (150 μg/m^3)	0	0	0
Days above state standard (50 μg/m^3)	0	0	0
Particulate matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$)(1)			
Peak 24-hour value (μg/m^3)	29.7	34.7	39.8
Days above federal/state standard (35 μg/m^3)	0	0	1
Sulfur Dioxide (SO_2)(1)			
Peak 24-hour value (ppm)	0.002	NA	NA
Days above federal standard (0.14 ppm)	0	NA	NA
Days above state standard (0.04 ppm)	0	NA	NA
Nitrogen Dioxide (NO_2)(1)			
Peak 1-hour value (ppm)	0.077	0.067	0.062
Days above state standard (0.18 ppm)	0	0	0

Notes: (1) Data from the San Diego-1110 Beardsley Street Monitoring Station. ppm = parts per million; μg/m^3 = micrograms per cubic meter; NA = not available.
Source: CARB 2013b.

Ozone concentrations are generally the highest during the summer months and coincide with the period of maximum insolation. Maximum O_3 concentrations tend to be regionally distributed, since precursor emissions become homogeneously dispersed in the atmosphere. Inert pollutants, such as CO, tend to have the highest concentrations during the colder months of the year, when light winds and nighttime or early morning surface-based temperature

inversions inhibit atmospheric dispersion. Maximum inert pollutant concentrations are usually found near an emission source.

3.5.3.4 NBSD Emissions

Emission sources associated with the existing use of NBSD include: civilian and military personal vehicles; commercial and military vehicles; military ships; heavy machinery; portable equipment; and vessel and tug boat activity within the San Diego Bay.

3.5.4 Environmental Consequences

3.5.4.1 Approach to Analysis

Air quality impacts would be significant if emissions associated with the action alternatives would: 1) increase ambient air pollution concentrations above the NAAQS; 2) contribute to an existing violation of the NAAQS; 3) interfere with, or delay timely attainment of the NAAQS; or 4) impair visibility within federally-mandated Prevention of Significant Deterioration Class I areas.

3.5.4.2 Conventional Pier Alternative

<u>Demolition and Construction Assumptions</u>

Air quality impacts from proposed demolition and construction activities would occur from the use of: vehicles; tugboats; heavy machinery; and support equipment (e.g. air compressors, generators, etc.). The demolition and construction contractor must certify all equipment used during demolition and construction activities with the SDAPCD and would apply for an "Authority to Construct" permit through the SDAPCD prior to project implementation.

A list of estimated equipment required for demolition and construction, estimates of workforce requirements, and haul truck travel are provided in Appendix D, along with the emission calculations for all demolition and construction activities. The Conventional Pier Alternative would involve pile driving activities to install 950 structural and fender piles, and other on-site construction activities. It was conservatively estimated that the demolition phase would consist of approximately 11 months and the construction phase would be completed within approximately 10 months. As previously noted, operational activities associated with ship berthing were analyzed as part of the adoption process for the CNRSW Region Port Operations Shore Infrastructure Plan and Chief of Naval Operations Strategic Laydown Plan 2013 (CNRSW 2013), therefore, operational activities are not addressed in this analysis. For this reason only emissions associated with demolition and construction have been analyzed for the Conventional Pier Alternative.

Total emissions resulting from demolition and construction activities was estimated using data presented in Chapter 2, general air quality assumptions, and emission factors compiled from the following sources: *OFFROAD Emission Factors* (CARB 2007a); *CARB EMFAC2007* Model (CARB 2007b); and Emission Factors from *Analysis of Commercial Marine Vessel Emissions and Fuel Consumption Data* (USEPA 2000).

After PM_{10} was estimated, the fraction of fugitive dust emitted as $PM_{2.5}$ was estimated, based on the South Coast Air Quality Management District (SCAQMD) Final Methodology to calculate $PM_{2.5}$ and $PM_{2.5}$ significance thresholds (SCAQMD 2006). This guidance document indicates the following: fugitive dust PM_{10} is 21 percent $PM_{2.5}$; heavy equipment PM_{10} is 89 percent $PM_{2.5}$; and vehicular emissions of PM_{10} are 99 percent $PM_{2.5}$ (SCAQMD 2006).

Demolition and Construction Impacts

Estimated demolition and construction emissions due to implementation of the Conventional Pier Alternative are shown in Table 3-9. Estimated emissions associated with the Conventional Pier Alternative would be below the *de minimis* levels for CAA conformity; therefore, there would be no significant impacts to air quality from implementation of the Conventional Pier Alternative.

Table 3-9. Total Estimated Emissions Resulting from Implementation of the Conventional Pier Alternative

Component	Emissions (tons per year)					
	CO[2]	VOCs[1]	NO_x[1]	SO_x[2]	PM_{10}[2]	$PM_{2.5}$[2]
Pier 8 Demolition Emissions						
Piling Removal	0.39	0.10	1.16	0.00	0.06	0.05
Deck Removal	1.13	0.29	3.38	0.00	0.16	0.14
Debris Removal	1.01	0.27	2.76	0.00	0.15	0.13
Truck Trips - Demolition	0.29	0.09	0.55	0.00	0.01	0.01
Worker Trips - Demolition	0.92	0.04	0.08	0.00	0.01	0.01
Support Vessels	0.44	0.04	4.77	0.00	0.12	0.12
Pier 8 Replacement and Emissions						
Piling Installation	1.26	0.32	3.82	0.00	0.18	0.16
Deck Installation	2.53	0.70	6.63	0.01	0.39	0.35
Shoreline Excavation	0.62	0.16	1.85	0.00	0.09	0.08
Truck Trips - Construction	0.93	0.28	1.76	0.00	0.02	0.02
Worker Trips - Construction	0.88	0.04	0.07	0.00	0.01	0.01
Support Vessels	1.84	0.16	19.79	0.01	0.49	0.49
Subtotal	**12.23**	**2.49**	**46.62**	**0.02**	**1.68**	**1.57**
de minimis threshold	100	100	100	NA	NA	NA
Exceeds *de minimis* threshold?	No	No	No	No	No	No

Notes: [1] SDAB is a marginal nonattainment area for the 8-hour O_3 NAAQS; VOCs and NO_x are precursors to the formation of O_3.

[2] SDAB is considered a maintenance area for the CO NAAQS and is in attainment of the NO_2, SO_2, PM_{10} and $PM_{2.5}$ NAAQS.

NA = Not Applicable. *De minimis* levels are not applicable because the SDAB is in attainment of the SO_2, PM_{10} and $PM_{2.5}$ NAAQS.

Values may not total precisely due to rounding and decimal places.

Sources: CARB 2013a; USEPA 2013.

As discussed in Section 2.3.2, the service life of the Conventional Pier Alternative would be 67 years, as compared with 75 to 100 years for the MHP Alternative.

3.5.4.3 MHP Alternative

Demolition and Construction Assumptions

Demolition and construction assumptions for the MHP Alternative are similar to the Conventional Pier Alternative with the exception that the MHP Alternative would involve significantly less pile driving activities (e.g. 950 piles for the Conventional Pier Alternative vs. 96 foundation piles for the MHP Alternative). Based on similar assumptions presented in the MHP Test Bed EA (U.S. Navy 2003), it was conservatively assumed that the MHP modules would be transported from Tacoma, Washington. Approximately 95 percent of the MHP construction (by volume of concrete materials) would occur at an off-site pre-cast plant, including the modules and piles. The remaining 5 percent of the MHP construction consists of the moorings, in which 1,700 cubic yards of concrete is poured on-site, and associated pile driving activities (i.e., 96 pre-cast concrete piles) (NAVFAC Southwest 2008a). Since the pre-cast plant produces similar construction emissions as part of its normal course of business and is permitted for these operations, only project emissions associated with the on-site construction aspect of the MHP and transport activities of the pre-cast modules and piles have been estimated. On-site construction activities for the MHP Alternative would therefore be of shorter duration and require less construction equipment (NAVFAC Southwest 2008a). It was conservatively estimated that the demolition phase would consist of approximately 11 months and the construction phase would be completed within approximately four months. Demolition activities would be identical to the Conventional Pier Alternative.

Demolition and Construction Impacts

Estimated demolition and construction emissions due to implementation of the MHP Alternative are shown in Table 3-10. The vast majority of emissions associated with the MHP Alternative, would be from support vessels used to transport the MHP modules to NBSD (i.e., one tugboat per each of the five modules). These emissions would not all occur at the project site, instead they would be distributed along the entire transport route (i.e., Tacoma, Washington to NBSD). Although, the majority of the 1,265 nautical mile trip from Tacoma Washington to NBSD would occur outside the 24 nm limit from shore, emissions have been estimated for the entire length of transport (Table 3-10). For the purposes of demonstrating CAA conformity within the SDAB, emissions occurring only within three nm of the SDAB are shown separately in Table 3-11. Emissions associated with the MHP Alternative would be below the *de minimis* levels for CAA conformity; therefore, there would be no significant impacts to air quality from implementation of the MHP Alternative.

Table 3-10. Total Estimated Emissions Resulting from Implementation of the MHP Alternative

Component	Emissions (tons per year)					
	CO[2]	VOCs[1]	NO_x[1]	SO_x[2]	PM_{10}[2]	$PM_{2.5}$[2]
Piers 8 Demolition Emissions						
Piling Removal	0.39	0.10	1.16	0.00	0.06	0.05
Deck Removal	1.13	0.29	3.38	0.00	0.16	0.14
Debris Removal	1.01	0.27	2.76	0.00	0.15	0.13
Truck Trips - Demolition	0.29	0.09	0.56	0.00	0.01	0.01
Worker Trips - Demolition	0.92	0.04	0.08	0.00	0.01	0.01
Support Vessels	0.44	0.04	4.77	0.00	0.12	0.12
Pier 8 Replacement Emissions						
Piling Installation	0.13	0.03	0.40	0.00	0.02	0.02
Deck Installation	0.76	0.21	1.99	0.00	0.12	0.11
Shoreline Excavation	0.62	0.16	1.85	0.00	0.09	0.08
Truck Trips - Construction	0.05	0.02	0.10	0.00	0.00	0.00
Worker Trips - Construction	0.33	0.02	0.03	0.00	0.00	0.00
Support Vessels	4.30	0.37	46.27	0.03	1.15	1.13
Subtotal	**10.37**	**1.63**	**63.34**	**0.05**	**1.88**	**1.80**
de minimis threshold	100	100	100	NA	NA	NA
Exceeds *de minimis* threshold?	No	No	No	No	No	No

Notes: [1] SDAB is a marginal nonattainment area for the 8-hour O_3 NAAQS; VOCs and NO_x are precursors to the formation of O_3.

[2] SDAB is considered a maintenance area for the CO NAAQS and is in attainment of the NO_2, SO_2, PM_{10} and $PM_{2.5}$ NAAQS.

NA = Not Applicable. *De minimis* levels are not applicable because the SDAB is in attainment of the SO_2, PM_{10} and $PM_{2.5}$ NAAQS.

Values may not total precisely due to rounding and decimal places.

Sources: CARB 2013a, USEPA 2013.

Table 3-11. Estimated Emissions Resulting from Implementation of the MHP Alternative within three nm of the SDAB

Component	Emissions (tons per year)					
	CO[2]	VOCs[1]	NO_x[1]	SO_x[2]	PM_{10}[2]	$PM_{2.5}$[2]
Piers 8 Demolition Emissions						
Piling Removal	0.39	0.10	1.16	0.00	0.06	0.05
Deck Removal	1.13	0.29	3.38	0.00	0.16	0.14
Debris Removal	1.01	0.27	2.76	0.00	0.15	0.13
Truck Trips - Demolition	0.30	0.09	0.57	0.00	0.01	0.01
Worker Trips - Demolition	0.92	0.04	0.08	0.00	0.01	0.01
Support Vessels	0.44	0.04	4.77	0.00	0.12	0.12
Pier 8 Replacement Emissions						
Piling Installation	0.13	0.03	0.40	0.00	0.02	0.02
Deck Installation	0.76	0.21	1.99	0.00	0.12	0.11
Shoreline Excavation	0.62	0.16	1.85	0.00	0.09	0.08
Truck Trips - Construction	0.05	0.02	0.10	0.00	0.00	0.00
Worker Trips - Construction	0.33	0.02	0.03	0.00	0.00	0.00
Support Vessels	0.62	0.05	6.66	0.00	0.16	0.16
Subtotal	**6.70**	**1.32**	**23.75**	**0.00**	**0.90**	**0.83**
de minimis threshold	100	100	100	NA	NA	NA
Exceeds *de minimis* threshold?	No	No	No	No	No	No

Notes: [1] San Diego Air Basin (SDAB) is a marginal nonattainment area for the 8-hour O_3 NAAQS; VOCs and NO_x are precursors to the formation of O_3.

[2] SDAB is considered a maintenance area for the CO NAAQS and is in attainment of the NO_2, SO_2, PM_{10} and $PM_{2.5}$ NAAQS.

NA = Not Applicable. *De minimis* levels are not applicable because the SDAB is in attainment of the SO_2, PM_{10} and $PM_{2.5}$ NAAQS.

Values may not total precisely due to rounding and decimal places.

Sources: CARB 2013a, USEPA 2013.

3.5.4.4 Conformity Application Analysis

The estimated emissions associated with the Conventional Pier Alternative and MHP Alternative would be below the *de minimis* threshold levels for conformity. Therefore, the Conventional Pier Alternative and MHP Alternative would conform to the SDAB SIP and would not trigger a conformity determination under Section 176(c) of the CAA. The Navy has prepared a Record of Non-Applicability (refer to Appendix D) for CAA conformity in accordance with Navy CAA Conformity Guidance, OPNAVINST 5090.1D, Appendix F.

3.5.4.5 Mitigation Measures

Implementation of the Conventional Pier Alternative or the MHP Alternative would not result in significant air quality impacts; therefore, no mitigation measures are proposed.

3.5.4.6 No-Action Alternative

Under the No-Action Alternative, the demolition and replacement of Pier 8 would not occur. Project related emissions would not be generated and baseline air quality conditions would remain unchanged. Therefore, there would be no significant impacts to air quality from implementation of the No-Action Alternative.

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CHAPTER 4
CUMULATIVE IMPACT ANALYSIS

Federal regulations implementing National Environmental Policy Act (NEPA) (42 United States [U.S.] Code 4321 *et seq.*) and California regulations for Implementing NEPA (32 Code of California Regulations [CFR] 775), as described in Chief of Naval Operations Instruction 5090.1D, require that the cumulative impacts of a Proposed Action be assessed. Council on Environmental Quality (CEQ) regulations implementing the procedural provisions of NEPA define cumulative impacts as:

> The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions (40 CFR 1507).

In order to analyze cumulative effects, a cumulative effects region must be identified for which effects of the Proposed Action and other past, present, and reasonably foreseeable actions would be cumulatively recorded or experienced. The region where cumulative effects may occur includes the entire San Diego Bay, including Naval Base San Diego (NBSD). The cumulative projects described in Section 4.1 focus on other military projects planned within San Diego Bay. The analysis presented in Section 4.2 considers additional impacts arising from the impacts of the Proposed Action combined with the impacts of other known past, present, and reasonably foreseeable future actions within this region.

4.1 PAST, PRESENT, AND REASONABLY FORESEEABLE PROJECTS

4.1.1 Past Projects

4.1.1.1 Pier 5002 Sub-Fender Installation (Naval Base Point Loma)

Military Construction (MILCON) Project P-118 modified Submarine Pier 5002, south of the P-135 project area, at Naval Base Point Loma. It allowed mooring of submarines next to the maintenance building. The principal modification was removal of deteriorating timber piles and replacement with composite piles with an expected life of 50 years. Supplemental foam-filled fenders were interspersed between the submarine fenders to accommodate surface ships. There was no increase in the pier footprint and no dredging was done. New power supply booms routing shore power to moored submarines and extra communications lines were installed. A Categorical Exclusion was signed for the project. The project occurred in 2008.

4.1.1.2 Quay Wall Repair (Special Project RM11-05) (Naval Air Station North Island [NASNI], Naval Base Coronado)

Special Project RM11-05 comprised in-water and land based construction to repair the deteriorated portions of the quay wall along Berths “L” through “P” at NASNI. The quay wall became distressed because of scouring at the base, which compromised its structural integrity. Repairs were needed to prevent structural failure of the quay wall and to provide for its continued functionality in support of the Navy's operational and support mission. Project

components included: (1) dredging and disposal of 49,000 cubic yards of bay sediment; (2) placement of rock armoring layers on the base of the sheet piling along the entire length of the quay wall (3,200 feet [ft]); (3) demolition and replacement of a portion (150 linear ft) of the damaged quay wall cap; (4) replacement of 150 linear ft of damaged steam line; (5) filling voids behind the quay wall; and (6) installation of new fendering at the location of the quay wall repairs. A Finding of No Significant Impact (FONSI) was signed for the project. Construction was completed in 2008.

4.1.1.3 Developing Home Port Facilities for Three NIMITZ-Class Aircraft Carriers in Support of the U.S. Pacific Fleet (P-704)

The Navy assessed the impacts of three carrier vessel nuclear-designated ships at NASNI in a 1999 Final Environmental Impact Statement (EIS) but is supplementing the assessment to account for new infrastructure improvements not previously addressed; to re-evaluate utilities upgrades; and to provide a supplemental traffic analysis validating traffic impacts and assessing the effectiveness of mitigation measures. Infrastructure improvements included demolition of existing fenders; moorings; and pier pavement; installation of a new fender pile system and mooring fittings; construction of anti-terrorism and force protection features (watch tower; guard kiosk; fencing and surveillance equipment); demolition; repair; and paving of the wharf; sidewalks; curbing; storm water drainage features and vehicle parking areas; and landscaping. Utilities upgrades included repairs and upgrades to electrical power; communications and information systems; security lighting; fire protection; steam, compressed air; potable water; wastewater; and fueling systems. A Supplemental EIS has been completed for this action and project construction has also been completed.

4.1.2 Present Projects

4.1.2.1 Littoral Combat Ship Homeporting Project

The Navy proposed to homeport its first 12 Littoral Combat Ships (LCS) at NBSD. The Navy considered the west coast and Hawaii surface combatant homeports for homeporting the LCS. Alternative homeporting locations considered include: Naval Base Kitsap Bremerton/Bangor, Washington; Naval Station Everett, Washington; Naval Base San Diego, California, and Joint Base Pearl Harbor-Hickam, Hawaii. Based on the analysis of these potential locations, only NBSD met the mission, logistic and operational criteria critical to the success of the LCS program. Furthermore, maintaining a single homeport for the initial 12 ships: 1.) supports the spiral development concept for the LCS Fleet; 2.) provides logistic and operational synergies; and 3.) facilitates standardization of support procedures and enhances training effectiveness. An EA addressing homeporting the ships and supporting mission modules, permanent assignment of crew, and related facility improvements required to support the homeporting was prepared and a FONSI was signed in 2012. As of March 2014, four LCS are homeported at NBSD (NBSD 2014).

4.1.2.2 Naval Base Point Loma Fuel Pier Replacement and Dredging (MILCON P-151/DESC1306)

The Proposed Action would involve the demolition and replacement of the existing fuel pier (Pier 180) in San Diego Bay at Naval Base Point Loma. This project would replace the aging, seismically deficient, and increasingly dysfunctional and obsolete fuel Pier 180 with a new fuel pier that would meet current state and Navy seismic construction standards, meet projected ship fueling requirements and enable the Navy and Department of Homeland Security to meet their and national defense mission and security missions. The Proposed Action would also involve sediment dredging with beneficial reuse of the dredge sediments in the nearshore zone at the Navy's Silver Strand Training Complex. The proposed dredging would allow the replacement fuel pier to serve deeper draft ships. An EA was completed for this project and a FONSI was signed in August 2013. Dredging for this project began in September 2013. Construction for the project is anticipated to end in January 2017; however there will be no in-water work for this project during the least-tern nesting season each year (1 April through 15 September).

4.1.2.3 Pier 12 Replacement and Dredging NBSD (MILCON P-327)

This project involves: demolition of an inadequate existing pier (Pier 12) at NBSD; dredging in berthing and approach areas for the new single-deck pier; dredged material disposal at an approved ocean disposal site and permitted landfill; construction of a new general purpose berthing pier and associated pier utilities including upgrades to the electrical utilities at adjacent Pier 13; and construction of fish enhancement structures (artificial habitat for fish) using concrete debris from pier demolition. An Environmental Assessment (EA) was completed for this project and a FONSI was signed. Demolition and dredging for this project began in March 2012**.** Construction for this project is estimated to be completed in summer of 2016 (NAVFAC Southwest 2015a).

4.1.3 Reasonably Foreseeable Projects

4.1.3.1 Maintenance Dredging at Naval Base San Diego Pier 8

The berthing area around Pier 8 would be excavated to a depth of -37 ft mean lower low water level, plus 2 ft overdredge (Naval Facilities Engineering Command [NAVFAC] Southwest 2013). The proposed dredge footprint surrounding Pier 8 would be about 65 ft wide on the south side, 50 ft wide on the north side, and 30 ft wide on the west (bayward) side (AMEC Earth & Environmental 2013). An estimated 16,135 cubic yards of sediment including overdredge would be excavated. It is anticipated that a portion of the dredged sediments would be disposed at a designated ocean dredge material disposal site and a portion would be disposed at an upland landfill (NAVFAC Southwest 2013). This project would likely occur after the completion of the Pier 12 project in the summer of 2016 (NAVFAC Southwest 2015a).

4.1.3.2 ST11-3543 Maintenance Dredging Various Piers (Piers 2, 6, 7, 13 and 14) at Chollas Creek Naval Base San Diego

This is estimated to begin when Pier 12 Replacement and Dredging NBSD (MILCON P-327) is finished. Because the Pier 12 project is estimated to end in summer of 2016, this project would begin sometime after that (NAVFAC Southwest 2015b).

4.1.3.3 Maintenance Dredging Mole Pier and Pier 8 at Naval Base San Diego

This project would take place after Project ST11-3543 described above. However, it is expected to be completed in 2016 (NAVFAC Southwest 2014b).

4.2 CUMULATIVE IMPACTS

This section addresses the additive effects of the Conventional Pier Alternative and the Modular Hybrid Pier (MHP) Alternative evaluated in this EA in combination with the relevant actions described above. Due to the short-term nature of the proposed demolition and construction activities, impacts are typically not cumulative, nor do they cause off-site impacts.

4.2.1 Water Resources

Implementation of the Conventional Pier Alternative or the MHP Alternative would have short-term, localized, and less than significant impacts on water resources. The Conventional Pier Alternative or the MHP Alternative and reasonably foreseeable projects would not likely occur at the same time and location, so potential impacts would be moderated over space or time. Therefore, the Conventional Pier Alternative or the MHP Alternative in conjunction with other projects on or in the vicinity of NBSD would not result in significant cumulative impacts to water resources.

4.2.2 Marine Biological Resources

Implementation of the Conventional Pier Alternative or the MHP Alternative would have no adverse effect to threatened or endangered species, no long-term adverse effect to Essential Fish Habitat (EFH) and associated Fishery Management Plan species, and only short-term, localized, and less than significant impacts to: marine habitats; invertebrates; fish; and marine birds that occur in the project vicinity. For EFH, the Conventional Pier Alternative or the MHP Alternative would result in minor impacts to bay bottom and water column habitats and fishes from increased suspended sediments and turbidity, and increased underwater noise levels from pier demolition and construction activities. A small increase in artificial substrate that would occur with the construction of the new Pier 8 would be offset by the habitat it would provide for some fish species. The Conventional Pier Alternative or the MHP Alternative and reasonably foreseeable projects would not likely occur at the same time and location, so potential impacts would be moderated over space or time. Therefore, the Conventional Pier Alternative or the MHP Alternative, in conjunction with other projects on or in the vicinity of NBSD, would not result in significant cumulative impacts to marine biological resources.

4.2.3 Hazardous Materials and Waste

Implementation of the Conventional Pier Alternative or the MHP Alternative would not result in a significant hazardous materials and wastes impact. Hazardous materials currently present

on Pier 8 consist of large quantities of non- polychlorinated biphenyls transformer oil sealed within the four transformer units that are surrounded by containment berms. The transformer oil would be reconditioned and re-used elsewhere at NBSD, and the containment berms would be reconstructed. Site-specific Pier 8 best management practices (BMPs) include BMPs for minimizing potential leaks and spills of oil from the transformers and from the bilge oily water wastewater treatment system (BOWTS) pipelines. Hazardous waste present at Pier 8 also includes oily waste water inside the BOWTS pipelines that would be disconnected, cleaned, and properly disposed as part of the Pier 8 demolition. New BOWTS pipelines would be installed in accordance with applicable state regulations for hazardous waste tank systems and site-specific BMPs would continue to be followed. There is one closed Installation Restoration site (Site 8) in the vicinity of the proposed project site. As described in Section 3.3.3, protective measures would be implemented during demolition and construction for the Conventional Pier or the MHP Alternative to avoid ground disturbance at the closed IR site. Solid waste from the alternatives would be evaluated for resale, recycling, and diversion in accordance with the NRSW Integrated Solid Waste Management Program to minimize the volume of waste landfilled. Therefore, the Conventional Pier Alternative or the MHP Alternative in conjunction with other projects on or in the vicinity of NBSD would not result in significant cumulative impacts associated with the use, storage, or disposal of hazardous materials and wastes, or have a significant impact with respect to solid waste.

4.2.4 Noise

Airborne noise impacts from the Conventional Pier Alternative or the MHP Alternative would be less than significant since levels would be below established limits and construction noise would cease upon completion of demolition and construction activities. Underwater noise would not cause significant impacts to fish and would not affect marine mammals and sea turtles since these species are highly mobile and can avoid these short-term disturbances. The Conventional Pier Alternative or the MHP Alternative when combined with reasonably foreseeable projects would not likely occur at the same time and location, so potential impacts would be moderated over space or time. Therefore, the Conventional Pier Alternative or the MHP Alternative, in conjunction with other projects on or in the vicinity of NBSD, would not result in significant cumulative noise impacts.

4.2.5 Air Quality

<u>Criteria Pollutants</u>

Implementation of either the Conventional Pier Alternative or the MHP Alternative would not significantly impact air quality. Proposed demolition and construction activities would generate short-term emissions from construction-associated vehicles and equipment. Due to the mobile nature of most construction emission sources and the relatively short duration of proposed project activities, these sources would not be expected to contribute to significant localized or regional impacts. The Conventional Pier Alternative or the MHP Alternative and reasonably foreseeable projects would not likely occur at the same time and location, so potential impacts would be moderated over space or time. Therefore, the Conventional Pier Alternative or the

MHP Alternative, in conjunction with other projects on or in the vicinity of NBSD, would not result in significant cumulative impacts to air quality.

Greenhouse Gases (GHGs)

The potential effects of GHG emissions are by nature global and cumulative impacts, as individual sources of GHG emissions are not large enough to have an appreciable effect on climate change. Therefore, an appreciable impact on global climate change would only occur when proposed GHG emissions combine with GHG emissions from other man-made activities on a global scale.

Currently, there are no formally adopted or published NEPA thresholds for GHG emissions. On February 18, 2010, the CEQ released draft guidance on addressing climate change in NEPA documents (CEQ 2010). The draft guidance, which has been issued for public review and comment, recommends quantification of GHG emissions, and proposes a threshold of 25,000 metric tons of CO_2 equivalent (CO_2e) emissions. The CEQ indicates that use of 25,000 metric tons of CO_2e emissions as a reference point would provide federal agencies with a useful indicator, rather than an absolute standard of significance, for agencies to provide action-specific evaluation of GHG emissions and disclosure of potential impacts.

Formulating such thresholds is problematic, as it is difficult to determine what level of proposed emissions would substantially contribute to global climate change. In the absence of formally-adopted thresholds of significance, this EA compares GHG emissions that would occur from the alternatives with the 25,000 metric ton level, as well as comparing the net GHG emissions associated with the alternatives to the U.S. GHG baseline inventory of 2006 to determine the relative increase in proposed GHG emissions.

Table 4-1 summarizes the annual GHG emissions associated with implementation of the Conventional Pier Alternative or the MHP Alternative. Appendix D presents estimates of GHG emissions generated by the Conventional Pier Alternative or the MHP Alternative. The CO_2e emissions associated with the Conventional Pier Alternative would amount to approximately 0.0000578 percent of the total CO_2e emissions generated by the U.S. The CO_2e emissions associated with the MHP Alternative would amount to approximately 0.0000643 percent of the total CO_2e emissions generated by the U.S. The total CO_2e emissions associated with the MHP Alternative are slightly higher than those for the Conventional Pier Alternative due to the use of tugboats to tow the MHP modules from the concrete-casting facility (assumed to be in Tacoma, Washington) to Naval Base San Diego. Emissions under the Conventional Pier Alternative or the MHP Alternative are below the 25,000 metric tons of CO_2e level proposed in the draft NEPA guidance by the CEQ. Under the Conventional Pier Alternative or the MHP Alternative, cumulative impacts to global climate change would not be significant.

Table 4-1. Estimated Annual GHG Emissions

Scenario/Activity	Metric Tons per Year[1]			
	CO_2	CH_4	N_2O	CO_2e
Conventional Pier Alternative	3,303.48	0.21	1.45	3,757.26
MHP Alternative	3,962.44	0.10	0.70	4,181.61
Draft NEPA Threshold				25,000
U.S. 2012 Baseline Emissions (10^6 metric tons) [2]	-	-	-	6,501.5
Conventional Pier Emissions as a percent of U.S. Emissions	-	-	-	0.0000578 percent
MHP Emissions as a percent of U.S. Emissions	-	-	-	0.0000643 percent

Notes: [1]$CO_2e = (CO_2 * 1) + (CH_4 * 21) + (N_2O * 310)$
Source: [2]USEPA 2014.

4.3 CUMULATIVE IMPACTS CONCLUSION

Cumulative impacts to the environmental resource areas evaluated herein from the Conventional Pier Alternative or the MHP Alternative, in conjunction with other past, present, and reasonably foreseeable actions, would not be significant.

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CHAPTER 5
OTHER NEPA CONSIDERATIONS

5.1 POSSIBLE CONFLICTS BETWEEN THE ACTION AND THE OBJECTIVES OF FEDERAL, REGIONAL, STATE, AND LOCAL PLANS, POLICIES, AND CONTROLS

Implementation of the Conventional Pier Alternative or the Modular Hybrid Pier (MHP) Alternative would be consistent with federal, regional, state and local plans, policies, and controls to the extent required by federal law and regulation. No potential conflicts have been identified. Table 5-1 provides a summary of environmental compliance for with implementation of the Conventional Pier Alternative or the MHP Alternative (collectively referred to as the action alternatives).

5.2 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Resources that are irreversibly or irretrievably committed to a project are those that are used on a long-term or permanent basis. This includes the use of non-renewable resources such as metal and fuel, and other natural or cultural resources. These resources are irretrievable in that they would be used for this project when they could have been used for other purposes. Human labor is also considered an irretrievable resource. Another impact that falls under this category is the unavoidable destruction of natural resources that could limit the range of potential uses of that particular environment.

Although proposed demolition and construction activities would result in the consumption of fuel, oil, and lubricants, the action alternatives would not result in a significant irreversible or irretrievable commitment of resources at Naval Base San Diego (NBSD).

5.3 RELATIONSHIP BETWEEN SHORT-TERM ENVIRONMENTAL IMPACTS AND LONG-TERM PRODUCTIVITY

National Environmental Policy Act (NEPA) requires an analysis of the relationship between a project's short-term impacts on the environment and the effects that these impacts may have on the maintenance and enhancement of the long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. This refers to the possibility that choosing a single development option reduces future flexibility in pursuing other options, or that giving over a parcel of land or other resource to a certain use often eliminates the possibility of other uses being performed at that site.

The action alternatives would, reversibly, dedicate parcels of land, equipment, and other resources to a particular use during a limited period of time. These resources would not be available for other productive uses throughout the duration of the action alternatives. However, these impacts are considered negligible, as the facilities and geographic areas associated with the action alternatives are designated for and have historically accommodated the types of uses proposed. Therefore, the action alternatives would not result in any impacts that would reduce environmental productivity or permanently narrow the range of beneficial uses of the environment.

Table 5-1. Status of Compliance with Relevant Land Use Plans, Policies, and Controls

Plans, Policies, and Controls	Responsible Agency	Status of Compliance
NEPA (42 USC § 4321 *et seq*.) Department of the Navy Procedures for Implementing NEPA (32 CFR 775)	U.S. Navy	This EA has been prepared in accordance with the CEQ Regulations implementing NEPA and United States (U.S. Navy NEPA procedures.
Coastal Zone Management Act (16 CFR § 1451 *et seq*.)	U.S. Navy	The Coastal Zone Management Act (CZMA) of 1972 (16 USC Section 1451) encourages coastal states to be proactive in managing coastal zone uses and resources. CZMA established a voluntary coastal planning program and participating states submit a Coastal Management Plan to the National Oceanic and Atmospheric Administration for approval. Under the CZMA, federal agency actions within or outside the coastal zone that affect any land or water use or natural resource of the coastal zone shall be carried out in a manner that is consistent to the maximum extent practicable with the enforceable policies of the approved state management programs. Each state defines its coastal zone in accordance with the CZMA. Excluded from any coastal zone are lands the use of which by law is subject solely to the discretion of the federal government or which is held in trust by the Federal government (16 USC 1453). Accordingly, although Naval Base San Diego land is federal government property and therefore, excluded from the coastal zone, the Navy nonetheless conducted an effects analysis as part of its determination of the action's effects for purposes of federal consistency review under the CZMA. This was done to factually determine whether the action (even if conducted entirely within a federal enclave) would affect any coastal use or resource. A Coastal Consistency Negative Determination (ND-0044-14) was prepared by the Navy and provided to the CCC (refer to Appendix A). The CCC found that the proposed project would not adversely affect coastal resources and concurred with the Navy's Negative Declaration (see Appendix A).
CWA (§§ 401-402 and 404, 33 USC § 1251 *et seq*.)	USEPA, U.S. Army Corps of Engineers (USACE)	The action alternatives would not involve dredging or the release of chemicals requiring a discharge permit and would be in compliance with the CWA. The project would involve in-water demolition and construction activities, thus a CWA Section 404 and Rivers and Harbors Act Section 10 permit from the USACE would be required prior to implementation of the action alternatives.
CAA, as amended (42 USC § 7401 *et seq*.)	USEPA	Per CAA regulations, the action alternatives would not compromise air quality attainment status or conflict with attainment status and maintenance goals established in the SCAQMD SIP. A formal CAA conformity determination is not required. The action alternatives would be in compliance with the CAA and would comply with all applicable SDAPCD Rules and Regulations.
Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986, 42 USC §§ 11001-11050.	U.S. Navy	The Navy would inform Local Emergency Planning Committees of the action alternatives as required to assist them in developing plans to prepare for and respond to chemical emergencies.
EO 11990, *Protection of Wetlands* (42 Federal Register 26961)	U.S. Navy	The action alternatives would not impact wetlands (none are present in the project area) and would be in compliance with EO 11990.

Plans, Policies, and Controls	Responsible Agency	Status of Compliance
Endangered Species Act (16 USC § 1531)	NMFS/USFWS	The action alternatives are not likely to adversely affect any federally listed endangered or threatened species or critical habitat and formal consultation with USFWS is not required. The Navy has provided a letter to National Marine Fisheries Service (NMFS) (green sea turtle, refer to Appendix A); therefore, the action alternatives would be in compliance with the federal Endangered Species Act.
Marine Mammal Protection Act of 1972 (16 USC § 1361-1407)	NMFS	The action alternatives would not take (harass or kill) marine mammals and no effect on endangered or threatened marine mammals would occur; therefore, the action alternatives would be in compliance with the MMPA.
EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (59 Federal Register 7629)	U.S. Navy	There would be no disproportionately high and adverse human health or environmental effects on minority populations and low-income populations. The action alternatives would be in compliance with EO 12898.
EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (62 Federal Register 19885)	U.S. Navy	The action alternatives would not disproportionately expose children to environmental health risks or safety risks and would be in compliance with EO 13045.
EO 13089, *Coral Reef Protection* (63 Federal Register 32701)	U.S. Navy	The action alternatives would not affect any coral reef ecosystem and would be in compliance with EO 13089.
Magnuson-Stevens Fishery Conservation and Management Act 16 U.S.C § 1801, et. Seq. as amended by the Sustainable Fisheries Act of (Public Law 104-267)	NMFS	The action alternatives may have relatively minor, temporary adverse effects on EFH for federally managed fish species within the Coastal Pelagic Species and Pacific Coast Groundfish FMPs. However, the action alternatives contain adequate measures to avoid and minimize potential adverse effects to EFH. The Navy has consulted informally with NMFS (refer to Appendix A); therefore, the action alternatives would be in compliance with the Magnuson-Stevens Fishery Conservation and Management Act.
EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds* (66 Federal Register 3853)	U.S. Navy	The action alternatives are not likely to have a measurable negative effect on migratory bird populations and would be in compliance with EO 13186.
National Historic Preservation Act (Section 106, 16 USC 470 et seq.)	Advisory Council in Historic Preservation, California State Historic Preservation Office	The action alternatives would be designed to avoid effects on National Register of Historic Places or eligible properties. The action alternatives would not have direct or indirect effects to historic properties. Although more than 50 years old, Pier 8 (NBSD Bldg. 358, 1945) (NBSD Bldg. 363, 1946) has been previously recommended in the "Inventory and Evaluation of Cold War Era Buildings and Structures" on NBSD to not meet the criteria for listing in the National Register. Similarly, both the recently (2007) reevaluated Naval Station San Diego Historic District and the individually-eligible Dry Dock No. 1 Site, lie well beyond the 100-meter area of potential effect (APE) buffer prescribed in the San Diego Metro Area Programmatic Agreement (Metro PA). In addition, construction laydown areas would be staged outside the Historic Districts' 100-meter APE buffer. The action alternatives would be in compliance with the National Historic Preservation Act.
Sikes Act Improvement Act (16 USC § 670a *et seq.*)	U.S. Navy	The action alternatives would be in compliance with the Sikes Act Improvement Act.

5.4 PROBABLE ADVERSE ENVIRONMENTAL EFFECTS THAT CANNOT BE AVOIDED AND MITIGATED

No probable adverse environmental effects that cannot be avoided and are not amenable to mitigation were identified.

CHAPTER 6
AGENCIES, ENTITIES AND PERSONS CONTACTED

Agencies

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National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) Southwest Region Office, Will Stelle

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CHAPTER 4

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Appendix A

Agency Correspondence

- Navy Request for Informal Section 7 Consultation and Concurrence from National Marine Fisheries Service
- Essential Fish Habitat Assessment
- California Coastal Commission Negative Determination
- Navy Request for California Coastal Commission Negative Determination

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National Marine Fisheries Service Correspondence

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DEPARTMENT OF THE NAVY
COMMANDING OFFICER
NAVAL BASE SAN DIEGO
3455 SENN RD
SAN DIEGO, CALIFORNIA 92136-5084

IN REPLY REFER TO:
5090
Ser N411/U644
18 FEB 15

Regional Administrator
National Marine Fisheries Service
Southwest Regional Office
501 West Ocean Boulevard
Long Beach, CA 90802-4213

Dear Mr. Stelle:

SUBJECT: SECTION 7 CONSULTATION AND ESSENTIAL FISH HABITAT ASSESSMENT FOR MILITARY CONSTRUCTION PROJECT (MILCON) P-440 PIER 8 REPLACEMENT NAVAL BASE SAN DIEGO, SAN DIEGO, CALIFORNIA

The United States Navy, Naval Base San Diego, requests informal Section 7 consultation and concurrence regarding its conclusion that the Pier 8 Replacement Project at Naval Base San Diego (NBSD) is not likely to adversely affect the endangered green sea turtle (*Chelonia mydas* [GST]). The project consists of in-water construction and is located at Pier 8 on NBSD. Pier 8 is centered at 32.673133, -117.22714. No other threatened or endangered species of marine mammals are expected to occur in the project action area.

The proposed project is anticipated for contract award prior to 2018. Monitoring for sea turtles and marine mammals is proposed to ensure the avoidance of impacts to these sensitive resources (see below).

The purpose of the Proposed Action is to address the current and impending shortfall at NBSD of pier infrastructure necessary to support modern Navy ship classes with deep draft-power and power intensive requirements. The U.S. Navy proposes to demolish Pier 8, which is considered to be inadequate due to deteriorating physical condition and lack of necessary modernized infrastructure (e.g., electrical utilities). A new Pier 8 and associated pier utilities would be constructed at the same location as the existing Pier 8 at NBSD. No new ship homeporting actions are specifically planned in association with the proposed project. See enclosed project description and

figures for more details. As you know, the Navy has been in informal consultation with the National Oceanic and Atmospheric Administration (NOAA) since the beginning of the GST study (NOAA, Scripps, Port of San Diego and Navy Partners) in December of 2007. Shallow subtidal habitats do not occur in the affected project areas (Pier 8 is situated in depths of 21 to 39 feet [6.4 to11.8 meters] mean lower low water level) and there is no suitable substrate at the appropriate depths for eelgrass. There is no historic occurrence of eelgrass at the project site. There have been no green sea turtle sightings in the project area, which is a heavily used maritime industrial area and lacks eelgrass or other habitat features that might attract green sea turtles. The nearest eelgrass beds are approximately 1.5 miles away across the bay.

Based on recent research, the San Diego Bay population of GST includes both year-round and seasonal (winter) residents, and in recent years has numbered between 30 and 90 individual GSTs in San Diego Bay foraging in eelgrass beds, consuming a mixed diet of invertebrates, eelgrass, and algae. San Diego Bay's GSTs have historically resided in south San Diego Bay, attracted by warm-water discharge from the South Bay Power Plant. Mark-recapture studies have shown greater mobility during warm water months, suggesting that during winter, cold water in the northern bay acted as a barrier to GST movements resulting in their confinement to the warm-water area of the south bay. With the closure of the power plant in 2011 and its recent demolition, the seasonal distribution of GSTs in San Diego Bay may change and other locations with eelgrass or more stable temperature regimes may be attractive to GSTs. Although no GSTs have been observed or are expected in the immediate project area, GSTs may move throughout the southern half of the bay, and could pass near the project area; if so, adequate measures to avoid and minimize potential adverse effects will be taken.

Based on the foregoing, we consider the only mechanism of potential effect on GST to be the underwater noise associated with impact pile driving. During impact pile driving, potential behavioral harassment to a marine mammal is presumed to occur when the animal is exposed to an underwater sound pressure level (SPL) of 160 dB (root mean square [RMS]) re- 1µPa or greater. The Navy would conservatively apply the same threshold as indicating the possibility of behavioral effects on GST based on

an estimated sound source level for the pile driver of 176 dB RMS re- 1µPa at 33 ft (10 m) and a sound attenuation rate of 4.5 dB per doubling of distance (referred to as practical spreading 117-m) radius. Accordingly, the Navy would perform a visual sweep of the bay within this distance prior to commencing pile driving activities, and after a break in pile driving for more than 30 minutes. If any marine mammal or green sea turtle is seen within this visual range, pile driving activities would not commence until 15 minutes have passed since the last such sighting, or the animal has moved out of the established range. If a marine mammal or green sea turtle moves within the established range while pile driving activities are occurring, such activities would cease until the animal leaves the area.

In addition, prior to the start of pile driving each day, after each break of more than 30 minutes, and if any increase in the intensity is required, the Navy shall use a ramp-up procedure. The procedure involves a slow increase in the pile driving to allow any undetected animals in the area to voluntarily depart.

While avoiding behavioral effects, the implementation of these measures would also preclude the occurrence of injurious effects due to pile driving, which could only occur within a much smaller distance than behavioral effects.

The Navy has determined that the proposed project may affect but is not likely to adversely affect GST. Pursuant to Section 7 of the Endangered Species Act we request your concurrence with this determination within 30 days.

Also provided as Enclosure (1) is the Essential Fish Habitat (EFH) Assessment as required by the Magnuson-Stevens Fishery Conservation and Management Act. As described in the effects analysis, the Navy has determined that the project may have localized and temporary adverse effects on EFH for federally managed fish species within the Coastal Pelagic Species and Pacific Coast Groundfish FMPs. However, the project contains adequate measures to avoid and minimize potential adverse effects to EFH.

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If you have any questions, please feel free to contact Ms. Lisa Seneca, NEPA Planner, at (619) 556-9167 (Lisa.Seneca@navy.mil), or Mr. Mitchell A. Perdue, Project Biologist, at (619) 556-7187 (mitchell.perdue@navy.mil).

Sincerely,

JAMES J. CHO
Commander, U. S. Navy
Public Works Officer
By direction of the
Commanding Officer

Encl: (1) Essential Fish Habitat Assessment.

Essential Fish Habitat Assessment

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Final

Essential Fish Habitat Assessment
Pier 8 Replacement
Naval Base San Diego

October 2014

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ACRONYMS AND ABBREVIATIONS

°C	degree Celsius
CFR	Code of Federal Regulations
cm	centimeter
CPS	Coastal Pelagic Species
dB	decibel
BOWTS	Bilge Oily Water Wastewater Treatment System
DDG	guided missile destroyer
EFH	Essential Fish Habitat
FMP	Fishery Management Plan
ft	feet
g	gram
HAPC	Habitat Area of Particular Concern
km	kilometer
LHA	amphibious assault ship
m	meter
mg O2/l	milligram oxygen per liter
MHHW	Mean Higher High Water
MLLW	Mean Lower Low Water
NAVFAC	Naval Facilities Engineering Command
NBSD	Naval Base San Diego
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRSW	Navy Region Southwest
OWS	oil water separator
PAH	polycyclic aromatic hydrocarbon
PFMC	Pacific Fishery Management Council
POSD	Port of San Diego
rms	root mean square
RWQCB	Regional Water Quality Control Board
SAV	submerged aquatic vegetation
SCEMP	Southern California Eelgrass Mitigation Policy
SEL	Sound Exposure Level
TL	transmission loss

USC	United States Code
USFWS	U.S. Fish and Wildlife Service
ZOI	Zone of Influence
µPa	microPascal

1.0 INTRODUCTION

Many marine habitats are critical to the productivity and sustainability of marine fisheries. The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) set forth the Essential Fish Habitat (EFH) provisions to identify and protect important habitats of federally managed marine and anadromous fish species. Section 305(b)(2) of the amended Magnuson-Stevens Act directs each Federal Agency to consult with the National Marine Fisheries Service (NMFS) with respect to any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency that may adversely affect any EFH identified under the Magnuson-Stevens Act. Implementing regulations for this requirement are at 50 Code of Federal Regulations (CFR) 600.

The project area overlaps designated EFH for two Fishery Management Plans (FMPs): Pacific Coast Groundfish (Pacific Fishery Management Council [PFMC] 2011a) and Coastal Pelagic Species (PFMC 2011b). Since adverse impacts to these EFHs may occur, consultation with NMFS is required. The Navy and NMFS signed an agreement in 2001 which allows the Navy's National Environmental Policy Act (NEPA) and Fish and Wildlife Coordination Act process to satisfy EFH analysis requirements. Therefore, the Navy will notify NMFS in writing as early as practicable regarding actions that may adversely affect EFH. Notification will facilitate discussion of measures to conserve EFH. For any Federal action that may adversely affect EFH, Federal agencies must provide NMFS with a written assessment of the effects of that action on EFH. The level of detail required in the assessment is commensurate with the magnitude of potential adverse impacts, so an action that may only result in minor impacts would only require a brief assessment. Mandatory contents of the assessment are outlined in 50 CFR 600.920.e.3.

This EFH Assessment is for the U.S. Department of the Navy's demolition and replacement of existing Pier 8 and is being provided in conformance with the 1996 amendments to the Magnuson-Stevens Act. The 1996 amendments to the Magnuson-Stevens Act set forth a number of new mandates for the NMFS, eight regional fishery management councils (Councils), and other federal agencies to identify and protect important marine fish habitat. The Councils, with 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 fisheries service's recommendations.

As the project location is within a general area designated as EFH by the Pacific Coast Groundfish and Coastal Pelagic Species FMPs, the species covered by these plans are considered in this assessment.

2.0 PROPOSED ACTION

2.1 Pier Demolition

Demolition of existing Pier 8, which is 66 feet (ft) wide by 1,610 ft long, would take approximately 11 months and would begin no sooner than 2017 (NBSD 2014). A total of 1,830 concrete structural piles would be removed using dry pulling alone or with the assistance of a vibratory hammer to loosen the piles. An additional 343 fender piles (concrete and plastic) would also be removed using the same method(s) (Naval Facilities Engineering Command [NAVFAC] Southwest 2004; NAVFAC Southwest 2014). Throughout the demolition phase, a spud-anchored barge, barge and wharf cranes, tug boat, mobile construction equipment, transport trucks, and scows for the collection and removal of demolition debris would be used to remove all pier deck material and pilings (NAVFAC Southwest 2007).

During demolition, floating slick bar booms would be used to provide a complete barrier to floating debris; however, because of the use of the system of rafts, very little debris (approximately 0.5 percent) is expected to reach the water. Any floating debris would be gathered in work boats and rafts and would be disposed of or recycled as appropriate.

Two driving/demolition crane barges (60 ft by 120 ft and 50 ft by 100 ft) and two support barges (both approximately 35 ft by 90 ft) would be used during demolition. In addition, a system of rafts would be used onto which demolition materials would be lowered and that would capture any incidental debris.

Several types of debris would result from the demolition of Pier 8, including concrete, steel, and asphalt. The Proposed Action would be in compliance with the Low-Impact Development Initiative requiring all demolition projects that take place after 2011 to recycle and divert materials from local landfills to the maximum extent practicable. Materials appropriate for recycling including concrete; steel; and asphalt would be recycled. Materials that cannot be recycled would be transported to an on-shore permitted landfill.

- Concrete debris would comprise the largest volume of demolition material, totaling approximately 26,000 cubic yards (NAVFAC Southwest 2008a). Approximately 75 to 90 percent of the concrete is estimated to be suitable for recycling. The steel reinforcement (re-bar) within the concrete would be removed and recycled separately. Alternately, an on-site mobile crusher would be used to crush the concrete debris. The crushed concrete would be stockpiled at an approved location on Naval Base San Diego (NBSD) and would be available for use (e.g., roadbase or revetment construction [NAVFAC Southwest 2008b]) by other construction projects. The concrete debris from Pier 8 that could not be recycled, estimated to be in the range of 10 to 25 percent of the total (2,600 to 6,500 cubic yards) would be hauled to the upland Miramar (San Diego) or Otay

Landfills (Chula Vista) that have capacity to accept this waste (Navy Region Southwest [NRSW] 2008; Allied Waste Industries 2008).

- Steel debris, including approximately 1,800 tons of steel ties, steel rebar removed from the concrete, and wiring (e.g., utility wires) from Pier 8 (NAVFAC Southwest 2008a) would also be recycled or appropriately disposed as a requirement of the demolition contract (Navy Region Southwest [NRSW] 2008). Steel debris that could not be recycled would be disposed at Miramar or Otay Landfills, which have adequate capacity to accept the waste (NRSW 2008; Allied Waste Industries 2008).
- Asphalt debris would comprise a minor amount, approximately 100 cubic yards of the material generated from demolition at the base of Pier 8 where it abuts the adjacent roadway. The asphalt from Pier 8 would be trucked off site to an asphalt recycling facility if the quantity is sufficient for recycling in a cost effective manner. If recycling is determined to not be feasible, the asphalt debris would be placed in a landfill, such as Miramar or Otay Landfills.

During pier demolition, turbidity would be increased in the immediate vicinity by pile extraction, which would stir up bottom sediments. Underwater noise and vibration will be generated from the operation of machinery to break up the existing structures and remove pier pilings. Navy vessels would relocate to other piers as needed during demolition and construction.

To the extent that the existing structures provide food and cover resources, fishes utilizing those resources would be affected by the activities and leave the immediate project area. However, similar structures and artificial habitats are abundant along the shoreline nearby. When the project activities are completed, the fish community is expected to return to the vicinity of Pier 8.

2.2 New Pier and Facilities Construction

2.2.1 Conventional Pier Option

There are two construction options to replace Pier 8. One is to construct a single-deck, concrete berthing pier that is 117 ft wide by a length of 1,600 ft. This sized pier is needed to accommodate berthing requirements for four modern-sized ships (NAVFAC Southwest 2007). Construction would take approximately 10 months.

Approximately 512 concrete octagonal structural piles, four 24-inch concrete octagonal loadout cradle piles, and 204 concrete and composite square fender piles would be installed using a floating crane and diesel hammer (pile driver) (NAVFAC Southwest 2014). The structural piles would be 24 inches in diameter. The concrete/composite fender piles would be 24 inches square. Two hundred and thirty 14-inch diameter round plastic fender piles would also be installed with the pile driver, of a similar length (NAVFAC Southwest 2014). The average length of all the piles in the water column would range from 20.5 to 26 ft. The use of concrete, composite, and plastic piles in lieu of

creosote-treated wood pilings is consistent with Navy policy and is preferred by the Regional Water Quality Control Board (RWQCB) because, unlike creosote-treated wood pilings, they are not a potential source for polycyclic aromatic hydrocarbons (PAHs) to the bay. The total number of piles installed for the Conventional Pier option would be approximately 950.

The fender system for the Conventional Pier option would include 24 foam-filled fenders at the berths and plastic log camels, and would comply with current seismic standards. Pile installation would occur during an approximately 11-month period (NRSW 2011).

The pier deck would be constructed on-site of rebar-reinforced concrete. Deck support would be by pre-stressed concrete (structural) piles with cast-in-place concrete pile caps and a concrete deck structure (NAVFAC Southwest 2007). Construction would temporarily increase turbidity and noise in the area. The amount of vessel traffic is not expected to change with the new pier, but modern Navy vessels would be better accommodated by the new pier.

Improvements for the new Pier 8 would include a stormwater collection system with an oil-water separator (OWS) and copper and zinc treatment to meet current National Pollutant Discharge Elimination System (NPDES) permit requirements, and structural capacity for a 150 ton crane (NBSD 2012). Pier utilities would include potable water; wastewater; compressed air; steam; bilge oily water wastewater treatment system (BOWTS) pipelines; and compensating water systems. Additional ship-to-shore utilities would include: electrical; telephone; cable television; fiber optic communications; Supervisory Control and Data Acquisition system for energy monitoring and control; and fire alarms (NBSD 2012). The project would support a future upgrade of ship-to-shore power from 480 volts to 4,160 volts to meet future power-intensive Fleet requirements (e.g., for guided missile destroyers-1000 and multi-purpose amphibious assault ship -8 classes that are planned for berthing at the new Pier 8) by providing two new electrical vaults and spare six-inch ducts-conduits. However, the future ship-to-shore power upgrade is not included in the Proposed Action (NBSD 2012). In addition, the project would require replacing the 15 kilovolt cables from the existing Pier 8 and upgrading to four sets of 750 thousand Circular Mils 15 kilovolt cables (NAVFAC Southwest 2008d).

2.2.2 Modular Hybrid Pier (MHP) Option

The other option for Pier 8 replacement would be an MHP. The MHP is based on standardized floating modules that are constructed at a concrete pre-cast facility and towed to the location where they will be used, reducing on-site construction activities and duration. The MHP replacement for Pier 8 would be constructed with 5 individual modules and 6 moorings, forming a structure that would be 90 ft wide by 1,560 ft long (NAVFAC Southwest 2008c) (Figure 2-1, notional only, not to scale).

Four of the MHP modules would be 337.5 ft long. The fifth would be 210 ft long. There would be one mooring at the shoreside end of the pier and one at the bayside end. The other four moorings would be placed approximately in the center of the pier, with one near each end of the 210-foot-long module and one near the end of each adjoining 337.5 foot-long module. The presence of the four mooring shafts (each one up to five ft wide) with their 64 supporting piles arrayed over a distance of perhaps 300 ft (including the area below the ends of the two 337.5-foot-long modules) could create localized zones of decreased water circulation beneath the pier. However, any long-term reduction in water circulation would be strictly limited to the areas directly surrounding the mooring shafts and pile dolphins. There would likely be several hundred feet of water free of piles and other obstructions to circulation between the two ends of the pier and the moorings in the center.

The MHP option would represent an increase in bay shading of about 0.78 acre as compared to the existing Pier 8. Similar to the Conventional Pier option, the MHP option would accommodate berthing requirements for four modern-sized ships, and though it would be wider than the existing Pier 8, would be designed and constructed to ensure safe navigation within San Diego Bay (U.S. Navy 2007). The MHP option would have the same special features and utilities as the Conventional Pier option. Also similar to the Conventional Pier option, the amount of vessel traffic is not expected to change with the new pier, even though modern Navy vessels would be better accommodated by the new pier.

The MHP would be moored by six steel shafts that would stand on underwater pile dolphins (Figure 2-1). The mooring shafts would be square, three to five ft wide, depending site-specific tide and subsurface conditions (NAVFAC Engineering Expeditionary Warfare Center 2014). The underwater dolphins supporting the six moorings for the five floating modules would have 96, 24-inch diameter octagonal foundation concrete piles (16 piles per mooring) (NAVFAC Southwest 2008c). The average length of the mooring shafts in the water column is assumed to be 13 ft. The average length of the piles in the water column is assumed to range from 7.5 to 13 ft.

Unlike a conventional pier deck that stands above the water on fixed piles, the deck of the MHP option would float in the water similar to a vessel, leaving no open space between the deck bottom and the water surface. Because the bottom and up to 14 ft of the sides of the MHP deck would be submerged, the MHP option would have an in-water surface area of approximately 192, 093 square feet (including the surface area of the deck bottom, sides, six steel shafts and 96 concrete piles) (Springston 2004).

The MHP option involves significantly fewer piles overall than the Conventional option (e.g., 96 structural piles for the MHP option as compared with 950 structural, loadout, and fender piles for the Conventional Pier). No fender piles would be needed for the MHP, because internal rubber fenders located in the moorings absorb energy and limit motion (Springston 2004). As with the Conventional Pier option, the use of concrete piles rather than creosote-treated wood piles is consistent with Navy policy and is preferred

by the Regional Water Quality Control Board (RWQCB) because creosote piles are a potential source of polycyclic aromatic hydrocarbons (PAHs) to San Diego Bay.

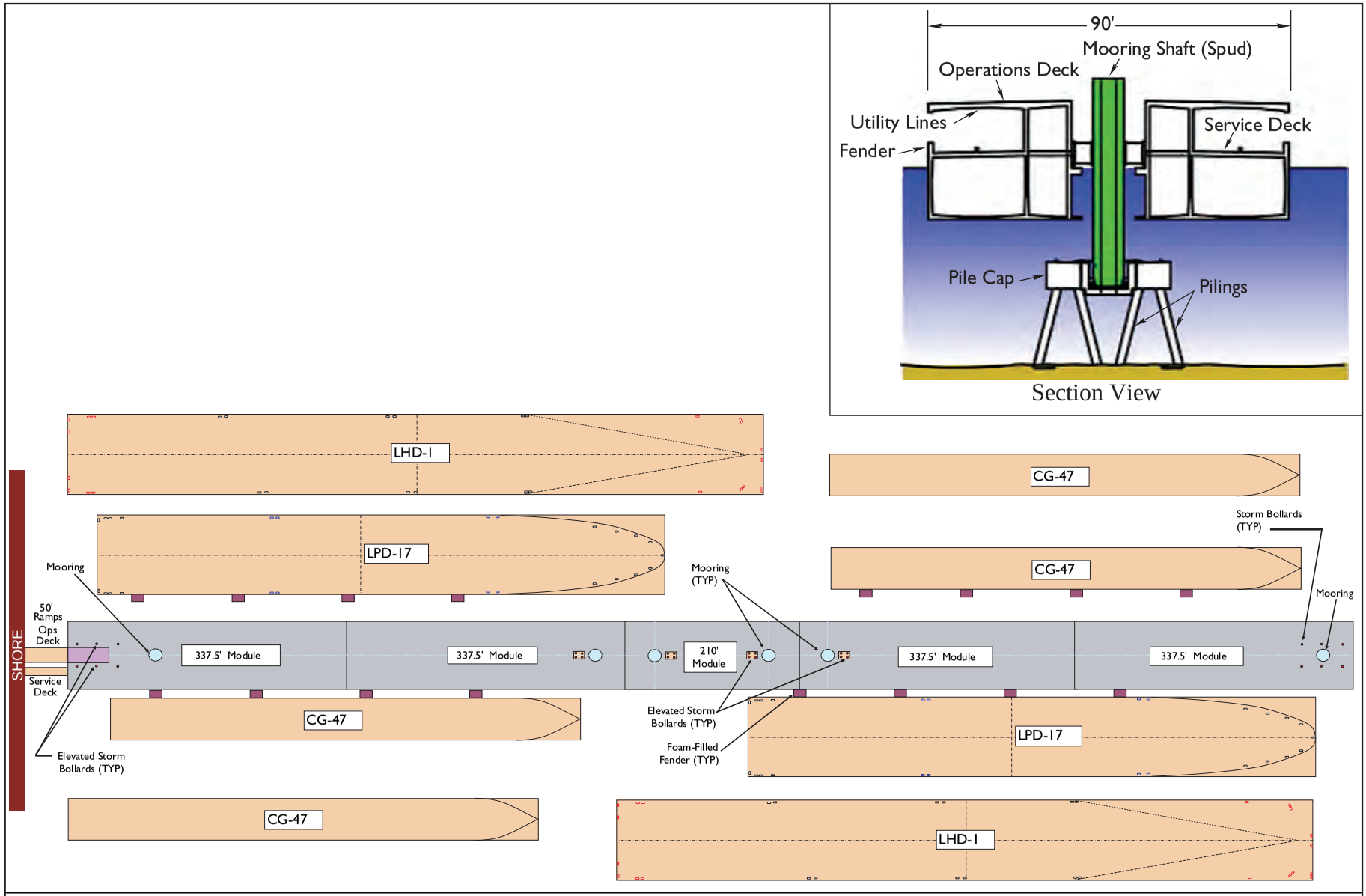
The MHP's elevation fluctuates with the tide, maintaining constant relative distance from ship decks to the pier top deck. Ships can be berthed at less standoff since there is no risk that flared hulls or ship appendages will contact the pier as the tide drops (Springston 2004).

Access from land would be via an operations deck ramp that would be 50 ft long by 20 ft wide and would be built into the first module (i.e., shore interface module), thereby reducing the grade of the operations ramp and the overall footprint of the MHP (NAVFAC Southwest 2008c). Shoreside excavation for the operations deck ramp would be conducted over an approximate 20-day period using standard construction equipment, including an excavator and dump trucks.

Similar to the Conventional Pier option, construction of the MHP option would temporarily increase turbidity and noise in the area. Pier deck and piling installation would take approximately 4 months, considerably less time than needed for a conventional fixed pier installation. The installation of 96 structural piles for the MHP option, rather than 950 structural and fender for the Conventional Pier option would result in less noise and sediment disturbance, and therefore, fewer disturbances to fish in the project area. As with the Conventional Pier option the replacement of Pier 8 with a larger structure would yield a net increase in area of bay surface that is shaded.

The service life of the MHP option is approximately 75 to 100 years versus the 67 year service life of a conventional fixed pier structure (Springston 2004; NRSW 2012).

Table 2-1 compares the specifications of the two construction options with existing Pier 8.



Not to Scale

Figure 2-1
Modular Hybrid Pier
Pontoon Structure

Table 2-1 Comparison of Pier 8 Replacement Options and Existing Pier 8

Specifications	Conventional Pier	Modular Hybrid Pier	Existing Pier 8 (No-Action Alternative)
Length (feet)	1,600	1,560	1,610
Width (feet)	117	90	66
Height (feet mean lower low water level)	12.0 at quaywall sloping up to 17.0 at the end	13.9 – 16.9 (varies with tides)	12.0 for entire length (approximately)
Bay Shading (acres)	4.30	3.22	2.44
Total Number of Piles	950	96	2,173
Days of Pile Driving	190	20	None
Total Length of Piles in Water Column (feet)	22,181	1,062	44,546
Total In-Water Surface Area (square feet)	153,411	192,093*	279,360
Change in Total In-Water Surface Area from Existing Pier 8	45 percent reduction	31 percent reduction	no change
Electrical Capacity: Ship-to-shore Power	Replace 14 kilovolt cables and upgrade to 4 sets of 750,000 Circular Mils 15 kilovolt cables. Support future upgrade from 480 volts to 4,160 volts to meet future power-intensive Fleet requirements.	Same as Conventional Pier.	No upgrade: remain at 480 kilovolts, unable to supply the power required for power-intensive vessels.

Legend *Surface area for MHP option includes surface area of six square mooring shafts, each five feet wide, the submerged deck bottom and sides submerged to depth of 14 ft, and 96 piles. Surface areas for Conventional Pier option and Existing Pier 8 include only the indicated number of piles.

3.0 ESSENTIAL FISH HABITAT

3.1 EFH and Habitat Areas of Particular Concern (HAPC) Designations

EFH is described as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (50 CFR § 600.10). Regional Fishery Management Councils are required by the Magnuson-Stevens Act to identify EFH in Fishery Management Plans [16 United States Code [USC] §180l-189ld]. The PFMC is responsible for designating EFH for all federally managed species occurring in the coastal and marine waters off the coasts of Washington, Oregon, and California, including the Puget Sound. The PFMC has designated EFH for species within the FMPs for each of the four primary fisheries that they manage: Pacific Coast Groundfish (PFMC 2011a), Pacific Coast Salmon (PFMC 2012), Coastal Pelagic Species (PFMC 2011b), and West Coast Fisheries for Highly Migratory Species (PFMC 2011c).

In addition to designating EFH, the PMFC is also responsible for identifying Habitat Ares of Potential Concern (HAPC) for federally managed species. EFH that is considered to be particularly important to the long-term productivity of populations of one or more managed species, or to be particularly vulnerable to degradation, also may be identified by NMFS as HAPC. For types or areas of EFH to be considered HAPC, at least one of the following must be demonstrated:

- The importance of the ecological function provided by the habitat
- The extent to which the habitat is sensitive to human-induced environmental degradation
- Whether, and to what extent, development activities are, or would be, negatively impacting the habitat type
- The rarity of the habitat

The PFMC has only designated HAPC for groundfish. The HAPC are seagrass, canopy kelp, rocky reef, and estuarine habitats along the Pacific coast, including Puget Sound (PFMC 2008a). Two HAPC, estuarine habitats and eelgrass (*Zostera marina*), a species of seagrass, are in San Diego Bay (NAVFAC Southwest 2010). No HAPC occurs within or adjacent to the project area.

San Diego Bay has been described as a partitioned estuary with complex circulation and stratification components, and can be divided into four hydrodynamic regimes: marine region; thermal region; seasonally hypersaline region; and estuarine region (NAVFAC Southwest and Port of San Diego [POSD] 2013). NBSD is within the seasonally hypersaline region, which extends from Glorietta Bay to the Sweetwater Marsh National Wildlife Refuge. In this portion of the bay, circulation typically is not influenced by freshwater input, and water is seasonally stratified by salinity gradients that are induced by evaporation.

Estuarine conditions in the bay occur intermittently and are generally limited to the southern portion of the bay. For about nine months of the year, the bay receives no

significant amount of fresh water. The absence of significant fresh water inflow for much of the year means that normal estuarine circulation in the bay is weak (NAVFAC Southwest 2010). Freshwater discharges from the Paleta Creek, Sweetwater and Otay River drainages, and other small urban creeks, storm drains and surface runoff flow into San Diego Bay only during periods of heavy rainfall. Freshwater input to the Bay is limited for the most part to surface runoff from urban areas (e.g., from the over 200 storm drains).

Eelgrass habitat is extensive in San Diego Bay. This shallow water habitat supports a unique assemblage of juvenile and adult fishes (Pondella and Williams 2009a). It provides important nursery areas for fish and invertebrates that are forage for the California least tern and other marine birds. Furthermore, these sites are noted for overall higher diversity compared to unvegetated bottom habitat which characterizes the Pier 8 project area (Hoffman 1986). Results of recent eelgrass habitat mapping of San Diego Bay showed that approximately 11 percent of the Bay (about 1,319 acres out of 12,100 acres is vegetated with eelgrass (DoN 2011). The nearest beds of eelgrass, an established HAPC for Pacific Coast Groundfish, are approximately 1.5 mile south of Pier 8 (at the mouth of the Sweetwater River) and approximately 1.5 miles west, on the opposite shore of the bay.

3.2 Descriptions of Managed Species

Of the 109 species of fish identified in San Diego Bay (Bay), ten are managed by NMFS under the Coastal Pelagics and Pacific Groundfish Management Plans combined (PFMC 2011a, 2011b). The Coastal Pelagics of the Bay include northern anchovy (*Engraulis mordax*), pacific sardine (*Sardinops sagax*), pacific mackerel (*Scomber japonicus*), and jack mackerel (*Trachurus symmetricus*); whereas Pacific Groundfish of the Bay include California scorpionfish (*Scorpaena guttata*), grass rockfish (*Sebastes rastrelliger*), English sole (*Parophrys vetulus*), curlfin sole (*Pleuronichthys decurrens*), leopard shark (*Triakis semifasciatus*), and soupfin shark (*Galeorhinus galeus*) (NAVFAC Southwest 2010; NAVFAC Southwest and POSD 2013). These fish species are discussed in detail below.

3.2.1 Coastal Pelagic Species (CPS)

The CPS fishery includes four finfish (Pacific sardine, Pacific [chub] mackerel, northern anchovy, and jack mackerel) and the invertebrate, market squid (PFMC 1998b). CPS finfish are pelagic in the water column near the surface and are not associated with substrate. These fishes generally occur above the thermocline in the upper mixed layer. For the purposes of EFH, the four CPS finfish are treated as a single species complex, because of similarities in their life histories and similarities in their habitat requirements. Market squid are also treated in this same complex because they are similarly fished above spawning aggregations.

All except for market squid are likely to occur in San Diego Bay. The CPS finfish are highly transient and two, northern anchovy and Pacific sardine, can be found throughout San Diego Bay. Jack mackerel are typically only found in the north bay,

whereas Pacific mackerel are found throughout much of the bay excluding its southern portion (Allen et al. 2002). Northern anchovy, Pacific sardine, and Pacific mackerel have all been found to occur around manmade habitats such as Pier 8 and in the deep subtidal habitat that occurs next to the pier (Merkel and Associates 2014). The Merkel and Associates 2014 *Draft Wharf Shading Study for the Pier 8 Replacement and Demolition Project, Naval Base San Diego* follows this Final Essential Fish Habitat Assessment.

EFH for the CPS finfish is defined both through geographic boundaries and by sea-surface temperature ranges (PFMC 2011a). The east-west geographic boundary of EFH for each individual CPS finfish and market squid is defined to be all marine and estuarine waters from the shoreline along the coasts of California, Oregon, and Washington offshore to the limits of the exclusive economic zone (200 miles) and above the thermocline where sea surface temperatures range between 10 degrees Celsius (°C) and 26°C. The southern extent of EFH for CPS finfish is the U.S.-Mexico maritime boundary. The northern boundary of the range of CPS finfish is more dynamic and variable due to the seasonal cooling of the sea surface temperature. The northern EFH boundary is, therefore, the position of the 10°C isotherm which varies both seasonally and annually. San Diego Bay is entirely within the boundary of EFH for CPS finfish.

Aside from their value to commercial Pacific fisheries, CPS finfish species are also recognized for their importance as food for other fish, marine mammals, and birds (63 FR 13833). CPS are considered sensitive to overfishing, the loss of habitat, reduction in water and sediment quality, and changes in marine hydrology (PFMC 2011a).

Following are descriptions of CPS finfish that occur in San Diego Bay. All the CPS finfish have been documented to occur in deep subtidal habitat, and all but the jack mackerel - which is less common and hence less likely to have been detected in the few surveys conducted - have been documented around manmade structures (Merkel and Associates 2014).

Northern anchovies are small, short-lived fish that are typically found in schools near the water's surface. They are found from British Columbia to Baja California and have recently appeared in the Gulf of California. Northern anchovies are divided into northern, central, and southern sub-populations. The central subpopulation is located in the Southern California Bight, between Point Conception, California and Point Descanso, Mexico. They grow to approximately 8 inches (18 centimeters [cm]) and rarely live beyond four years. Northern anchovies spawn during every month of the year, but spawning increases in late winter and early spring (peaking from February to April).

In San Diego Bay, highly mobile schools of northern anchovies spend the majority of their time and feed in the water column in all the natural and man-made habitats primarily in the north bay. The bay serves as a nursery area for this species; 100 percent of northern anchovies collected in quarterly surveys throughout the bay over a course of five years (1994-1999) were juveniles (Allen et al. 2002). Spawning primarily occurs outside of the bay, and the pelagic eggs and larvae are advected into the bay. Young-of-year northern anchovies recruit to the midwater of nearshore habitats and the channel,

and abundances peak in late spring and early summer (Allen et al. 2002; Allen 1999 referenced by Robbins 2006). During this time, northern anchovies can numerically dominate the fish assemblage in the northern quadrant of the bay (Allen et al 2002; Pondella and Williams 2009a and 2009b).

Northern anchovies eat phytoplankton and zooplankton. Northern anchovies are subject to natural predation throughout all life stages and are important forage for other species. Eggs and larvae fall prey to an assortment of invertebrate and vertebrate planktivores. As juveniles, anchovies are vulnerable to a wide variety of predators, including many recreationally and commercially important species of fish. Adult anchovies are fed upon by numerous fishes (some of which have recreational and commercial value), marine mammals, and birds (PFMC 2011a; NAVFAC Southwest 2010).

Pacific sardines are also small schooling fish. At times, they have been the most abundant fish species in the California current, a highly productive current that extends up to 1,000 kilometers (km) (660 miles) offshore from Oregon to Baja California. When the population of Pacific sardines is large, they are abundant from the tip of Baja California to southeastern Alaska, and throughout the Gulf of California. Sardines typically grow to approximately 12 inches (30 cm) in length and may live as long as 13 years, but they are usually younger than five years old.

Pacific sardines are typically distributed more offshore than northern anchovies. Pacific sardines occur in estuaries, but the fish are most common in the nearshore and offshore domains along the coast (PFMC 1998). Spawning occurs year-round peaking April through August. Eggs and larvae occur nearly everywhere adults are found and eggs are most abundant between 14°C and 15°C. Sardines spawn in loosely aggregated schools in the upper 164 ft (50 meters [m]) of the water column. The main spawning area for the historical population off the U.S. was between Point Conception and San Diego, CA, out to approximately 100 mi (160 km).

In the proposed project area, Pacific sardines, like northern anchovies, occur in highly mobile schools and feed in the water column in all natural and man-made habitats. The species is among the numerically dominant taxa during the summer and fall in the bay (Allen et al 2002; Pondella and Williams 2009a and 2009b). The bay serves as a nursery area for this species; 96 percent of Pacific sardines collected in quarterly surveys throughout the bay over a course of five years (1994-1999) were juveniles (Allen et al. 2002).

Pacific sardines feed on phytoplankton and zooplankton. The fish are heavily preyed upon at all life stages. Sardine eggs and larvae are consumed by an assortment of invertebrate and vertebrate planktivores including northern anchovies. Juvenile and adult sardines are consumed by a variety of predators, including commercially important fish (e.g., yellowtail, barracuda, bonito, tuna, marlin, mackerel, hake, salmon, and sharks), seabirds (pelicans, gulls, and cormorants) and marine mammals (sea lions, seals, porpoises, and whales). In all probability, sardines are forage for the same predators that prey on northern anchovies (PFMC 1998a).

Pacific mackerel range from Mexico to southeastern Alaska. Pacific mackerel can grow to 25 inches (63 cm) and reach 11 years old; commercially fished Pacific (chub) mackerel rarely exceed 16 in (40 cm) and are under four years old. Adults are midwater pelagic fish and migrate inshore from July to November. They are most abundant south of Point Conception, California and usually appear within 20 mi (30 km) offshore. Pacific stock spawns from Eureka, California, south to Cabo San Lucas in Baja California between 2 and 199 mi (3 to 320 km) from shore. In general, juvenile Pacific mackerel are found along open coast sandy beaches, in kelp beds, bays, and estuaries (PFMC 2011a).

In San Diego Bay, Pacific mackerel have been observed in all major natural and man-made habitats except the shallow waters over riprap. This highly summer-seasonal species is far less abundant than northern anchovy or Pacific sardine in the bay, and like these two species, is most likely to occur in the northern quadrant than elsewhere in the bay (Allen et al. 2002). The species is likely to occur in the proposed project area.

Like sardines and anchovies, Pacific mackerel are schooling fish, and they may school with other pelagic species such as jack mackerel and sardines. Pacific mackerel feed on copepods, squid, euphausiids, and small fishes including their own larvae (Robbins 2006). They are also heavily preyed upon by a variety of fish, mammals, and sea birds.

Jack mackerel are schooling fish that range widely throughout the northeastern Pacific. They grow to about 24 inches (60 cm) and can live 35 years or longer. Much of their range lies far offshore outside the 200-mile U.S. Exclusive Economic Zone. Jack mackerel in southern California are more likely to appear on offshore banks in late spring, summer, and early fall. The spawning season for jack mackerel off California extends from February to October, with peak activity from March to July. Little is known about the maturity cycle of large fish offshore, but peak spawning appears to occur later in more northerly waters. Small jack mackerel (up to six years of age) are most abundant in the Southern California Bight, where they are often found near the mainland coast and islands and over shallow rocky banks.

Young juvenile fish sometimes form small schools beneath floating kelp and debris in the open sea. In southern California waters, jack mackerel schools are often found over rocky banks, artificial reefs, and shallow rocky coastal areas including kelp beds. They remain near the bottom or under kelp canopies during daylight and venture into deeper surrounding areas at night.

Jack mackerel is least common among the managed pelagic finfish species in the bay (Allen et al. 2002). Jack mackerel has been observed over bare sand, bare mud, and eelgrass, in marinas and under wharves in northern San Diego Bay (Table 3-1). Jack mackerel have been observed over eelgrass only in an experimental transplanted bed located across the channel from the proposed project area (Pondella et al. 2006). The species could occur in the proposed project area, although it has not been observed in the southern half of the bay.

Small jack mackerel taken off southern California and northern Baja California eat large zooplankton, juvenile squid, and juvenile northern anchovies. Larvae feed almost entirely on plankton. They provide forage for a variety of fish, mammals, and sea birds. In the north bay, sea lions and coastal bottlenose dolphin opportunistically prey on this species.

3.2.2 Pacific Groundfish Species

The Pacific Coast Groundfish FMP manages 91 species over a large ecologically diverse area covering the entire west coast of the continental United States. Although groundfish are those fish considered demersal (fish that live on or near the seabed), they occupy diverse habitats at all stages in their life histories. EFH areas may be large because a species' pelagic eggs and larvae are widely dispersed, for example, or comparatively small as is the case with the adults of many nearshore rockfishes which show strong affinities to a particular location or type of substrate. The following are descriptions of the six FMP groundfish species that are known to occur in the bay, although only one, California scorpionfish, is likely to occur in the project area (Merkel and Associates 2014).

Curlfin sole are found along the Pacific Coast of North America from the Bering Sea south to San Quintin, Baja California (NMFS 2007). Adults are demersal (bottom dwellers) flatfish and are associated with soft bottoms, occurring all along the west coast at depths from 38 to 350 m (125 to 1,150 ft). This species spawns from April to August and grows to a maximum size of 37 cm (15 inches). Curlfin sole feed primarily on polychaete worms, crustacean eggs, and brittle star fragments.

Curlfin sole are documented to occur in bare sand and bare mud habitat in northern San Diego Bay (Table 3-1, NAVFAC Southwest 2010). However, the species is very uncommon in San Diego Bay; no specimens were collected during quarterly surveys from 1994-1999 or surveys in 2008 (Allen et al. 2002; Pondella and Williams 2009a and 2009b). Kramer (1991) conducted extensive trawl and seine surveys in San Diego County and found that curlfin sole were very uncommon nearshore along the open coast and absent from catches in San Diego Bay. This flatfish has not been found in eelgrass beds of San Diego Bay. Thus, curlfin sole is unlikely to occur in the proposed project area.

English sole are found in water less than 300 m (1,000 ft) from Baja California to the Gulf of Alaska (PMFC 1998b). Spawning occurs offshore in waters shallower than 100 m (330 ft), primarily during the autumn and winter, depending on the stock. English sole use nearshore coastal and estuarine waters as nursery areas. Adults and juveniles prefer soft bottoms composed of fine sands and mud, but also occur in eelgrass habitats. This species may reach ages in excess of 20 years. Females generally reach maturity after four years. Juveniles and adults are carnivorous, feeding on polychaetes, small bivalves, clam (*Tagelus californianus*) siphons, and other benthic invertebrates. English sole is uncommon in the San Diego Bay, and few have been collected infrequently over bare mud and sand habitat in the northern quadrant of the bay (Allen et al. 2002; NAVFAC

Southwest 2010; Merkel and Associates 2014). English sole is unlikely to occur in the proposed project area.

California scorpionfish is a benthic species found from central California to the Gulf of California in depths between the inter-tidal and 170 m (555 ft). Although it generally inhabits rocky reefs, it also aggregates over sandy or muddy substrate, depending on the area or season (PFMC 2006). California scorpionfish migrate to deeper water to spawn from May to September (peaking in July). This species feeds on a wide variety of prey, including crabs, fishes, octopi, isopods and shrimp. California scorpionfish will utilize eelgrass beds as juvenile nursery habitat and a resource for prey.

California scorpionfish occur somewhat frequently in very low numbers in San Diego Bay. From 1994-1999, 37 California scorpionfish were collected in quarterly surveys in the north bay comprising less than 0.01 percent of the total catch throughout the bay, and only 2 individuals were collected in the southern half of the bay (Allen et al. 2002). NAVFAC Southwest (2010) indicates that California scorpionfish occur in all manmade habitats comprised of hard structure. Juvenile and adult California scorpionfish has been collected in eelgrass (a designated HAPC) and channel habitats of north and north-central San Diego Bay (Allen et al. 2002; Pondella and Williams 2009a and 2009b). Pondella et al. (2006) report the species was observed in an established natural eelgrass bed near Shelter Island and in experimental artificial reefs set in the north bay across the channel from the proposed project area. Merkel and Associates (2014) report additional observations of California scorpionfish within structured habitats, including the seawall of the Tenth Avenue Marine Terminal, on the Coronado Bridge piles, and on the pendant wall at the J. Street Marina. Thus, California scorpionfish may occur, although in small numbers, under piers, including Pier 8, in NBSD. The Merkel and Associates 2014 *Draft Wharf Shading Study for the Pier 8 Replacement and Demolition Project, Naval Base San Diego* follows this Final Essential Fish Habitat Assessment.

Grass rockfish is a common, shallow-water rockfish found from Playa Maria Bay, Baja California to Yaquina Bay, Oregon, although they are most common south of southern Oregon. Among rockfishes, they have one of the shallowest and narrowest depth ranges. They are found from the intertidal zone to 184 ft, frequently less than 49 ft, and are commonly found from the intertidal to 20 ft. The species is common in nearshore rocky areas, along jetties, and in kelp. Around reef structures, adults may be found hiding in crevices (PFMC 2005). Grass rockfish have become an important component of the live-fish fishery.

Both sexes of grass rockfish begin to mature at 9 inches and are fully mature at 11 inches; these lengths correspond to ages 2 to 5 years for males and 3 to 5 years for females. Larvae are released from January to March (PFMC 2005). Grass rockfish habitat generally is restricted to rocky areas (Leet et al. 2001).

Grass rockfish are documented to occur in eelgrass beds, a designated HAPC, but not in any other habitat in the north bay. Juveniles of shallow dwelling rockfish species will inhabit eelgrass habitat as shelter and resource for prey for months; however, no life

history stage of this or other rockfish species is dependent on eelgrass beds. Grass rockfish is very uncommon in San Diego Bay; no specimens of this species or other rockfishes (Sebastes spp.) were collected in more than five years of fish surveys in eelgrass, unvegetated nearshore and channel habitats in the bay (Allen et al. 2002; Pondella et al. 2006; Pondella and Williams 2009a and 2009b). Thus, grass rockfish are unlikely to occur in the project area.

Leopard sharks are found from southern Oregon to Baja California, Mexico including the Gulf of California. They are most common at depths ranging from 0 to 5 m (0 to 15 ft) in muddy bays, and reside in estuaries, bays, and kelp beds over soft and hard bottoms, as well as along open coast sandy beaches (PFMC 2006). Leopard sharks are most common on or near the bottom in waters less than 4 m (13 ft) deep, but have been caught as deep as 91 m (300 ft).

Leopard sharks spawn and give birth to live young ("pup") in shallow water. Seasonally, pups occur along sandy beaches and in protected bays. Leopard sharks will utilize eelgrass beds as juvenile nursery habitat and a resource for prey. The maximum recorded length of a leopard shark is 180 cm (6 ft), but most do not exceed 150 cm (5 ft) in length. Females may take 10 to 15 years to reach maturity, while males may only take 7 to 13 years. Maximum age is reported to be 30 years. This species feeds on a variety of prey including crabs, clams, fish, and octopus.

Leopard sharks have been documented to utilize intertidal sandy beach and subtidal soft–bottom sediments (mud, sand, and silty sand), two habitat components of San Diego Bay (Hoffmann 1986 referenced by Robbins 2006). These habitats can be influenced by seasonal freshwater input, and thus are designated estuarine HAPC for this managed groundfish species. In Humboldt and San Francisco Bay, females have been observed releasing their young in beds of eelgrass, while in southern California females are thought to release their pups along more open coastal areas (Carlisle and Smith 2009). No specimens were collected over six years of surveys by Allen et al. (2002) and Pondella and Williams (2009a and 2009b). Thus, leopard shark is expected to be very uncommon in San Diego Bay and the project area.

Soupfin sharks range from northern British Columbia to Abreojos Point, Baja California and the Gulf of California. This shark is an abundant coastal-pelagic species of temperate continental and insular waters. They are often associated with the bottom, inhabiting bays and muddy shallows. Males and females apparently segregate by gender; adult males occur in deeper water and adult females occur closer inshore. Females and young tend to be more common in southern California waters. Primary nursery grounds are in southern California inshore areas south of Point Conception, with females moving in to bays to bear live young (PFMC 2005). Soupfin sharks are opportunistic carnivores, preying upon moderate-sized bony fishes, echinoderms, shrimp, invertebrates and squid. This species is one of many caught by recreational fishermen in the San Diego Bay (NAVFAC Southwest 2000). Although the whereabouts

of this species in the bay is unknown, its rarity makes it unlikely to occur in the project area.

3.3 Description of Habitats in the Proposed Project Area

This EFH assessment refers to habitat-specific information in NAVFAC Southwest (2010) and Merkel and Associates (2014) to evaluate how the actions proposed may affect managed fish species and EFH designated by the PFMC. NAVFAC Southwest (2010) provides a broad-scale, qualitative assessment of habitat classifications within San Diego Bay with a map and description of those habitats. The habitat characterization provides information on the use of dominant habitat in San Diego Bay by managed fish species and on ecosystem function and productivity generally within these habitats present in the bay. Habitats found in the project area are the water column, bare mud, wharf, and bulkhead wall. Additional information about habitat use by fishes was from field surveys reported in Allen et al. (2002), Pondella and Williams (2009a and 2009b), and Merkel and Associates (2014).

San Diego Bay presently has 8,779 acres of shallow and deep water habitats. The Bay is characterized by a wide range of marine habitats including soft-bottom, which predominates in the bay, eelgrass, and artificial hard substrates primarily associated with piers and jetties (NAVFAC Southwest 2000). These habitats represent important breeding, nursery, and feeding areas for hundreds of fish and their prey species. Many fish species, but particularly the pelagic species, are forage for marine mammals and birds (NAVFAC Southwest and POSD 2013).

San Diego Bay has experienced substantial historical degradation and loss in quantity and quality of intertidal and subtidal habitat as a result of human development. Losses of intertidal habitat have been severe; up to 90 percent of intertidal areas in the San Diego Bay have been lost, due to historic reclamation activities (NAVFAC Southwest and POSD 2013). Intertidal areas have historically been filled with dredged material. The intertidal zone is also threatened by shoreline alteration and development such as the building of piers, docks and seabreaks, as well as the placing of riprap to slow erosion of the crumbling sandstone cliffs, which can often lead to unintended but devastating changes in sedimentation along the shoreline. Less than 16 miles of "soft" shoreline remain (NAVFAC Southwest and POSD 2013). The entire shoreline inshore of the proposed project area, Pier 8, is armored (a bulkhead wall).

The Pier 8 project site is characterized by a developed shoreline, and manmade structures such as pier pilings and seawalls that descend steeply to unvegetated soft-bottom subtidal habitat. The hardened shoreline typically has a vertical profile and provides the poorest habitat for marine species, as their relatively smooth surfaces reduce suitable areas for attachment (NAVFAC Southwest and POSD 2013). Pier pilings at the project site support a productive epifaunal-encrusting community dominated by sponges, but including attached bivalves, tunicates, and bryozoans, relatively scant algae, and abundant associated mobile invertebrates. The pier structure creates a shaded open water environment of which the area under the center of the pier is permanently

shaded (Merkel and Associates 1999; NAVFAC Southwest and POSD 2013; U.S. Navy 2001). Merkel and Associates (2014) measured light levels as a function of depth and location under Pier 8 and Pier 2. They found that at both piers, light levels decreased to approximately 20 percent of ambient (as measured in adjacent open water) at the pier face; to 4 percent at the quarter pier width; and to 2 percent at the midline of the pier. It is noteworthy that although light levels were diminished under the piers, they did not approach zero, even at the larger pier (Pier 2). The elevation of the deck above the waterline, especially for the larger pier, evidently allows considerable light penetration, which in turn facilitates the use of the piers by fish. The Merkel and Associates 2014 *Draft Wharf Shading Study for the Pier 8 Replacement and Demolition Project, Naval Base San Diego* follows this Final Essential Fish Habitat Assessment.

Table 3-1 is a summary of the local-scale habitats that the ten managed fishes are expected to utilize in the northern and southern halves of San Diego Bay. The data is excerpted from NAVFAC Southwest (2010) which provides characterizations of the potential community of fishes, including the managed species, and other marine organisms at each habitat. One natural habitat, bare mud, is in the proposed project areas. Six habitats are man-made: riprap, marina, wharf, artificial reef, bulkhead wall, and launch ramp. Mud, wharf and bulkhead wall habitats are in the proposed project areas.

Highly mobile, mixed schools of pelagic finfish frequently occur under and around piers/wharfs in the north bay and very likely occur in this habitat in the south bay and in the proposed project area around Pier 8. Northern anchovies and Pacific sardines move through and feed in the water column of all natural and manmade habitats (Table 3-1, NAVFAC Southwest 2010). Pacific mackerel and jack mackerel occur infrequently in the northern bay, but would be expected to occur in the water column of all habitats with the likely exception of waters along the armored shoreline (riprap and bulkhead wall). These two open coastal species are likely to be rare in the vicinity of Pier 8.

The managed groundfish species are expected to be uncommon if not rare in the proposed project area. California scorpionfish is a rocky reef residing species known to occur under wharfs and other man-made hard structured habitats in north San Diego Bay (Table 3-1, NAVFAC Southwest 2010). Similarly, grass rockfish reside in shallow rocky reef habitat in coastal waters; however, the species has not been observed around wharfs and other artificial hard structures in the north bay nor any habitat in the south bay. Wharf habitat offer little or no crevices and ledges that rocky reef residing groundfish use as shelter. Curlfin sole and English sole, both uncommon in the bay, would be expected to utilize unvegetated soft bottom habitat (i.e., bare sand and bare mud) but have not been observed under wharves in the north bay nor anywhere in the south bay. Leopard shark has not been observed in the various man-made hard structured habitats in north or south San Diego Bay (NAVFAC Southwest 2010). Soupfin shark have reportedly been caught by anglers in San Diego Bay (NAVFAC Southwest and POSD 2013); however, the whereabouts is unknown and the species is unlikely to occur in the proposed project area.

Table 3-1. Summary of Federally Managed Fishes Observed in Habitats of the Northern (N) and Southern (S) Half of San Diego Bay

Species	Bare sand*	Bare mud*	Eelgrass*	Riprap*	Marina	Wharf*	Artificial Reef	Bulkhead wall*	Launch ramp
Coastal Pelagic Species									
Northern anchovy	N, S	N, S	N, S	N	N	N	N	N	N
Pacific sardine	N, S	N, S	N, S	N, S	N, S	N	N	N	N
Pacific mackerel	N	N	N		N	N	N	N	N
Jack mackerel	N	N	N ***		N	N			
Pacific Coast Groundfish									
Curlfin sole	N	N							
English sole	N	N							
California scorpionfish			N, S	N, S	N,S	N,S	N, S	N,S	
Grass rockfish			N						
Leopard shark			N **						
Soupfin shark#									

* habitat present in the proposed project area based on maps from NAVFAC Southwest 2010.
** leopard shark observed by Hoffman 1986 referenced by Robbins 2006.
***may occur in bar sand and eelgrass habitat; observed in an eelgrass transplantation bed (Pondella et al.2006).
caught by recreational anglers in the San Diego Bay (Pondella et al. 2009), whereabouts unknown.
Source: NAVFAC Southwest 2010; Merkel and Associates 2014

Pier 8 is situated in depths of 21-39 ft which is categorized as "deep water" in the bay (DoN 2011). Sediment accumulation under the pier has resulted in shallower depths - approximately 15 ft under the midline of the pier (Merkel and Associates 2014). Many soft bottom habitats throughout San Diego Bay are covered with mats of various algal species; however, densities typically are reduced due to lower light levels at bottom depths greater than about 20 ft (7 m) (DoN 2011). This habitat supports an infaunal and epifaunal invertebrate community (DoN 2011). Infaunal benthic invertebrate communities in these areas are dominated by polychaete worms, with a lesser abundance and diversity of crustaceans, snails, bivalves, and other groups (Merkel and Associates 1999; U.S. Navy 2001; Merkel and Associates 2014)

On the pilings of Piers 2 and 8, Merkel and Associates (2014) documented an intertidal epifaunal community of oysters, mussels, and barnacles, but no attached algae. Below the intertidal zone, the pilings supported a typical epifaunal "fouling" community of sponges, hydroids, tunicates, bryozoans, and anemones; and mobile snails, crustaceans, and echinoderms (U.S. Navy 2001; Merkel and Associates 2014). A rain of detritus from surface waters is the primary source of production supporting the infaunal and epifaunal community of deep water, unvegetated soft bottom habitat in the bay. Detrital material from the encrusting community of the pilings probably increases the productivity of the habitat beneath these structures, relative to the benthic habitat of open deep water areas in the bay (Merkel and Associates 1999, 2013). Merkel and Associates (2014) documented similar infaunal abundances but much greater biomass under Pier 8, including under the midline, as compared to a reference site in open water. The larger Pier 2 showed a similar pattern but declining abundance and biomass under the midline.

The most abundant fish species that occur in the subtidal habitats such as those around Pier 8 typically include round stingray (*Urobatis halleri*), spotted sand bass (*Paralabrax maculatofasciatus*), juvenile California halibut (*Paralichthys californicus*), and barred sand bass (*Paralabrax nebulifer*) close to the bottom; whereas the most abundant fishes of the overlying water column include topsmelt (*Atherinops affinis*) shiner surfperch (*Cymatogaster aggregata*) and several species of anchovies (Allen et al. 2002; Vantuna Research Group 2006). Other species documented in a survey of Pier 13, which is in close proximity and structurally similar to the project site, included kelp bass (*Paralabrax clathratus*), California scorpionfish (*Scorpaena guttata*), giant kelpfish (*Heterostichus rostratus*), and black croaker (*Cheilotrema saturnum*) (Merkel and Associates 1999). Spotted sand bass, barred sand bass, kelp bass, black croaker, round stingray, yellowfin croaker (*Umbrina roncador*), slough anchovy (*Anchoa delicatissima*), and giant kelpfish were all observed under Pier 8, and another 34 fish species, including all of the remaining subtidal species mentioned above, are listed by Merkel and Associates (2014) as being associated with man-made structural habitats in San Diego Bay.

3.3.1 Use of Water Column Habitat by Fishes

The kind of substrate in the vicinity will influence the species assemblage in the water column habitat. Furthermore, the water column properties of temperature, salinity, stratification, turbidity, dissolved oxygen, and turbidity also influences what species are likely to occur.

In San Diego Bay, the water column habitat extends over subtidal depths ranging from -2.2 (-0.7 m) to >-20 ft (6 m) MLLW. The substrates in the water column habitat differ with depth and location in the bay, and include mud, sand, and man-made hard structure. In general, coastal pelagic fishes numerically dominated the catches of surveys conducted over 5 years in San Diego Bay (Allen et al. 2002). The slough anchovy, an indigenous estuarine species that utilizes the bay throughout its life history, was most abundant in the southernmost quadrant and decreased in abundance further north toward the mouth of the bay. In the south-central ecoregion, slough anchovy was the most abundant fish species comprising 55 percent of the total catch. This species together with other pelagic schooling fishes, topsmelt at 22 percent, northern anchovy (a managed species) at 6 percent across all habitats comprised 83 percent of the total fish collected across all habitats (vegetated and unvegetated nearshore habitats and the channel) in the south-central ecoregion of San Diego Bay (Allen et al. 2002).

Natural, or ambient, turbidity comprised of both organic and inorganic suspended particles is distinguished here from turbidity caused by dredging or other human activities. Ambient turbidity varies spatially and over time, with waters of San Diego Bay becoming more turbid, or less transparent, as distance increases from the entrance. Wind and wave action cause a marked increase in turbidity during the winter and early spring in the bay. Shallow areas are more affected than deep waters. The wind is able to scour up the finer sediments of this region at that time of year. Turbidity also varies through the day with both wind and tides.

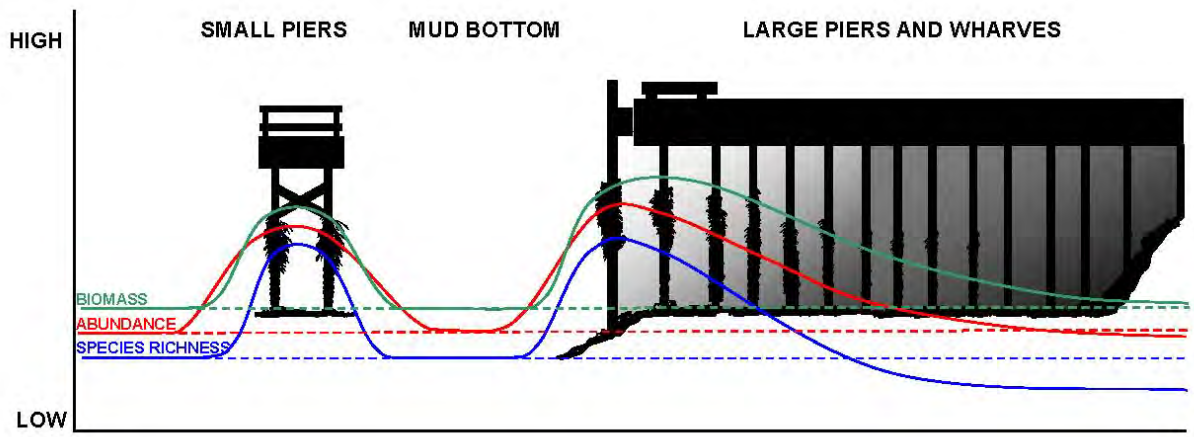
Dissolved oxygen concentrations in surface waters of San Diego Bay in April and July 2008 and June 2009 ranged between about 4.5 and 6.6 milligrams oxygen per liter (mg O2/l) (Pondella and Williams 2009a, 2009b). Dissolved oxygen concentrations in the north bay are most similar to that in coastal waters outside of the bay. Dissolved oxygen generally decreases from north to south with most of the decrease observed between the North and North-Central quadrants of the bay.

The water column habitat is an important nursery area for coastal pelagic fishes: juveniles represented 100 percent of the northern anchovy catch in San Diego Bay, 96 percent of the Pacific sardine, 73 percent of topsmelt, 66 percent of California grunion, and 43 percent of slough anchovy (Allen et al. 2002). These pelagic fish species are forage for other fishes, marine mammals, and birds. California least terns forage in waters less than 60 ft deep; however, the birds do not utilize the proposed project area (NAVFAC Southwest and POSD 2013).

3.3.2 Artificial Hard Substrate habitat and its Use by Fishes

Large piers, such as the existing and proposed new construction of Pier 8, provide a high concentration of piles, and impose shading on the water column (NAVFAC Southwest 2010). In contrast to small piers, water movement and illumination can be significantly affected around and under large pier structures (Figure 3-1). While Figure 3-1 was generalized from previous studies, the recent work at Piers 2 and 8 indicates that even under the furthest recesses of large piers, abundance and species richness, along with biomass, can be equal to or higher than in the adjacent mud bottom/open water habitat (Merkel and Associates 2014).

Figure 3-1. Biomass, Abundance, and Species Richness at small and large piers



At more exposed portions of larger piers, similar elevation of biomass, abundance and richness of fish communities is seen as with smaller piers (NAVFAC Southwest 2010). Microalgae and drift kelp are within the upper portions of the pier at elevations that would be low intertidal and shallow subtidal zones. Below the algal communities, encrusting growth of sponges, bryozoans, rock jingles, and tube-forming polychaetes often occur. These algal and encrusting invertebrate communities host a number of mobile invertebrates and small fish such as blennies, pipefish and kelpfish and can also attract perches, opaleye, and scorpionfish. Sand bass and kelp bass often occur in association with such piers. As encrusting organisms die or are broken free of the piles, they drop to the bay floor and create a zone of enriched sediment and more diverse rubble that supports gobies, blennies, and scavenging demersal fish at higher concentrations than typically observed away from the structures. Within the water column around piers, schooling pelagic fish tend to aggregate for shelter or forage. This often attracts larger predatory fish as well. Around small piers and at the exposed portions of larger piers, the biomass, abundance, and species richness of fish typically rises relative to that observed in surrounding open mud bottom habitats.

Larger piers tend to include areas beneath the piers that experience reduced circulation and light levels (NAVFAC Southwest 2010). Pile communities of large piers are distinguished from natural intertidal reefs and the man-made hard substrate habitats of riprap armament, pontoons, docks, and artificial reefs, by having extensive intertidal areas (periodically exposed to air) and limited light. Merkel & Associates (1999 referenced in NAVFAC Southwest 2010) performed a study of wharf shading impacts to associated encrusting communities and to fish. Infaunal communities continued to be present in the shaded regions. In contrast, it was determined that encrusting pile communities were not as numerous or species rich on the inside shaded piles. These areas promote a gradient of cryptic invertebrate community development beginning with jingles and bryozoans in the twilight zone, transitioning to sponges and ultimately very little growth in the darkest most quiescent waters beneath the piers. Only one detailed study including multi-season data has been conducted describing the invertebrate communities on concrete and wooden piles in San Diego Bay (Ford et al. 1975 referenced in NAVFAC Southwest 2010). This study was conducted on concrete and wooden piles at the B Street, Broadway, and Navy Piers during 1972-1973. The attached and free living invertebrates associated with the piles included polychaete worms, crustaceans, molluscs, cnidarians, tunicates, and sponges in order of abundance. Species composition and abundance was found to be highly seasonally variable.

The invertebrate fouling community on the pilings appears to attract schooling fish, which feed on the attached invertebrates and algae. The piers provide refuge to principally nocturnal species such as black croaker, round stingray, and smooth hound. As a result, large numbers of fish may be found beneath pier structures and biomass may exceed that of open waters due to fish size, however, species richness generally is depressed below that observed in open bay environments. In the deepest recesses of the piers, fish abundance and biomass also decline to low levels (NAVFAC Southwest 2010). Total fish abundance is heavily influenced by transient, schooling pelagic fish. Fish surveys beneath large wharfs at Pier 13 at NBSD and CVN Pier 700 at Naval Air Station North Island showed that seasonal differences in fish communities can be greater than differences associated with the light gradient (NAVFAC Southwest and POSD 2013).

The invertebrate and fish community of large piers are reported to differ between the north and south areas of San Diego Bay. The communities present on these and other manmade structures, as well as communities on soft bottom habitats and in the water column are subject to the same gradient in availability of oceanic water with distance from the mouth of the bay. The availability of food with a moving current, the supply of larval recruits, and water quality all depend on the level of flushing (NAVFAC Southwest 2010). Species characteristic of open coastal communities were observed in a north bay pier site and were not present at a pier site in the southern bay (NAVFAC Southwest 2010). These included the California scorpionfish, rock scallop (*Crassedoma giganteum*), California sea cucumber (*Parastichopus californicus*), giant spined star (*Pisaster giganteus*), and giant keyhole limpet (*Megathura crenulata*).

3.3.3 Use of Unvegetated Soft Substrate Habitat by Fishes

Estuarine sediments are the sites of key ecological functions such as decomposition, nutrient cycling, and nutrient production (NAVFAC Southwest 2010). Infaunal invertebrates in these sediments increase percolation of water and oxygen levels through bioturbation and suspension feeding. Shredders such as gastropod mollusks break up large pieces of organic matter, while deposit feeders both transform and bury or bring up organic matter. Dominant suspension feeders are often bivalve mollusks, but some polychaetes, crustaceans, and sponges also perform this function. These animals can increase water clarity and light levels, and reduce pollutants. Infaunal and epifaunal invertebrates serve as the major food base for many species of fish and larger invertebrates including shrimp, crabs, lobster, halibut and croaker which transfer this production across habitats.

Based on the abundances and distribution of 40 top ranking fishes by total biomass or abundance in surveys from 1994 through 1999 of intertidal, unvegetated nearshore, eelgrass (vegetated nearshore), and channel habitats within San Diego Bay, Allen et al (2006) reported that at least 8 fish species were associated with soft substrate habitats in the nearshore and channel habitats in the south bay. Large, predatory benthic species, spotted sand bass (*Paralabrax maculatofasciatus*), barred sand bass (*Paralabrax nebulifer*), round stingray (*Urolophus halleri*), and black croaker (*Cheilotrema saturnum*) are residents in the nearshore areas and channels of the north bay and throughout the interior of the bay to its southernmost area. Four resident, benthic flatfishes occur primarily in channel habitat: juveniles and adults of California halibut (*Paralichthys californicus*) and diamond turbot (*Hypsopsetta guttulata*) occur throughout the bay in both channel and nearshore sand and mud habitat. None are EFH groundfish species.

4.0 ASSESSMENT OF IMPACTS AND CONSERVATION MEASURES

An adverse effect to EFH is "any impact that reduces the quality and/or quantity of EFH" (see 50 CFR § 600.91O (a) for further clarification).

4.1 Impacts to Essential Fish Habitat

Four managed coastal pelagic fish species (PFMC 1998a), northern anchovy, Pacific sardine, jack mackerel, and Pacific mackerel occur in San Diego Bay (NAVFAC Southwest and POSD 2013; Allen et al. 2002; Pondella et al. 2006; Pondella and Williams 2009a and 2009b). Northern anchovy and Pacific sardine can be found throughout the bay in all habitats. Jack mackerel were only found in the north bay survey area and Pacific mackerel were found at all but the southern survey stations (Allen et al. 2002). The managed groundfish species, California scorpionfish, curlfin sole, English sole, grass rockfish, leopard shark, and soupfin shark are known to occur in San Diego Bay; however, with the exception of California scorpionfish, all are uncommon in the bay at large and unlikely to occur in the proposed project area (NAVFAC Southwest and POSD 2013; Allen et al. 2002; Pondella et al. 2006; Pondella and Williams 2009a and 2009b; Merkel and Associates 2014).

The area surrounding Pier 8 is not optimal habitat for FMP species in San Diego Bay due to the existing usage of the facilities, armored shoreline, and historic dredging in the channel adjacent to the site. Juvenile and adult pelagic fish of species which might visit the area are mobile and would be able to avoid any action that may occur at the project site. EFH species and most other fish species that are known to occur around eelgrass habitat, non-vegetated intertidal and subtidal mud and sand habitats, and man-made structures in San Diego Bay may already avoid the proposed project site due to the large amount of vessel traffic through the area and routine dredging activities. Eggs and larvae should not be harmed by the renovations at Pier 8. Short-term impacts associated with pier demolition and replacement will occur from increased suspended sediments and noise levels. Turbidity may impact sight feeding, but affected EFH species and other fishes will presumably disperse to surrounding habitats where feeding will be less problematic.

Impacts from in-water project activities may adversely affect EFH by temporarily displacing EFH species due to underwater noise from pier demolition and construction activities. However, all of the managed species are not dependent on artificial substrates, and routinely experience turbid and noisy conditions due to natural processes and ship traffic within the bay. Furthermore, there is an abundance of pier structures and other artificial habitat in the vicinity of NBSD outside of the proposed project area of Pier 8. For these reasons and for the reasons discussed below, the adverse effects that would be created by the proposed project would be minimal.

4.1.1 Underwater Acoustic Analysis

In 2008, NOAA Fisheries, U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Game, and transportation agencies of California, Oregon, and Washington agreed in principle to assess project effects using Interim Criteria for Injury to Fish from Pile Driving Activities (Fisheries Hydroacoustics Working Group 2008). These interim criteria are provided in Table 4-1. The criteria were developed principally for salmonids in the Northwest and they are conservative, indicating the potential for the identified effect, rather than a likelihood of occurrence.

Table 4-1. Interim Criteria for Fish Injury and Disturbance by Underwater Sound from Pile Driving

Effect	Size of Fish	Underwater Impact Pile Driving Criteria	Underwater Vibratory Pile Driving Criteria
Onset of Injury	All fish	206 dB peak re: 1μPa	N/A
	≥ 2 grams	187 dB SEL re: 1μPa2sec	N/A
	< 2 grams	183 dB SEL re: 1μPa2sec	N/A
Behavioral Impacts	All fish	150 dB rms re: 1μPa	150 dB rms re: 1μPa

Notes: dB peak re: 1μPa = peak decibels referenced to one microPascal
dB SEL re: 1μPa2sec = sound exposure level decibels referenced to one microPascal squared per second
dB rms re: 1μPa = decibels root mean square referenced to one micro Pascal

Popper and Hastings (2009) critically examined the peer-reviewed and grey literature on the effects of anthropogenic sounds on fishes and found that very little is known and the results from what are mostly cage-in-field and tank studies are equivocal. Moreover, there is uncertainty in extrapolating the physiological and behavioral effects of sound at different frequencies, pulse rates, intensities, and distances from the source.

Injury to fish from intermittent sounds can begin at 206 decibels (dB) root mean square (rms) re 1 microPascal (μPa) (National Oceanic and Atmospheric Administration [NOAA] et al. 2008). However, reef-associated fish have shown only minor behavioral responses to sounds of 210 dB re 1 μPa at 16 m and 195 dB re 1 μPa at 109 m from a seismic air-gun source while remaining on the reef (Wardle et al 2001 summarized in Popper and Hastings 2009). Sound levels as low as 160 dB re 1 μPa for continuous and/or intermittent sounds and 140 dB re 1 μPa from pile driving can cause behavioral disturbance observable as changes in swimming speed and direction (Navy 2011; Mueller-Blenke 2010; CALTRANS 2009). No physical injury or behavioral response has been associated with vibratory pile driving in two reported studies which did not report sound levels (Popper and Hastings 2009).

Recent controlled experiments exposing fish to pile driving noise (CALTRANS 2010; Halverson et al. 2011) and critical reviews (Popper and Hastings 2009; Halverson et al.

2011) have not found evidence of injuries at SELs well above these criteria, and thus do not support their use as thresholds for injuries to fish from pile driving operations.

Underwater sound levels received at a given distance from an acoustic source such as pile driving are a function of the source level and transmission loss (TL). TL underwater is the decrease in acoustic intensity as an acoustic pressure wave propagates out from a source. TL parameters vary with frequency, temperature, sea conditions, current, source and receiver depth, water depth, water chemistry, and bottom composition and topography. The following equation is used to estimate transmission loss:

$TL = F * \log10 (D1/D2)$ where

TL= transmission loss

F = attenuation constant, a logarithmic (predominantly spreading) loss

D1=distance at which the targeted transmission loss occurs

D2= distance from which the transmission loss is calculated

The attenuation constant, F, is site-specific based on several conditions, including water depth, pile type, pile length, substrate type, and other factors. The NMFS Office of Protected Resources and USFWS have accepted the use "practical spreading loss" in which F=15, resulting in the following formula for transmission loss:

$TL = 15 \log10 (D1/D2)$.

To estimate the Sound Exposure Level (SEL) to which a fish at a given location would be exposed through multiple hammer strikes, a simple summation procedure is used where

Total SEL = Single Strike SEL + 10log (number of strikes).

The number of strikes per day is conservatively estimated to be 1,000 strikes per day based on 200 repeat strikes per pile and 5 piles per day. The limits of potential effects within associated potential distances of influence are shown in Table 4-2. Underwater noise from vessels moving through the bay would presumably fill in and dominate the underwater soundscape across the frequency range of pile driving; masking sound that is of lesser amplitude than typical vessel noise of 150-160 dB (Kipple and Gabrielle 2007).

Table 4-2. Calculated radius of the Potential Zones of Influence (ZOIs) (km) Corresponding to Interim Criteria for Fish

Description	Source Levels			Radius of Potential ZOI (m)			
	Source, dB peak @ 10m	Source, dB rms @ 10m	Source, dB SEL @ 10m	All Fish Injury – 206 dB peak	Fish ≥2g Injury – 187 dB SEL	Fish < 2g Injury - 183 dB SEL	All Fish Behavior 150 dB rms
Vibratory extraction – non-steel piles	170	160	160	N/A	16	29	46
Impact driving 24-inch concrete piles	188	176	166	1	40	74	541

All sound levels expressed in dB re 1 µPa rms. dB = decibel; N/A = not applicable; rms = root-mean-square; µPa = microPascal. Pile driving sound sources based on CALTRANS 2009; Washington State Department of Transportation 2010, 2012, NMFS 2010. SELs for fish injury were calculated by assuming 1000 hammer strikes per day (200 strikes per pile, 5 piles per day).

In general, the area of the potential adverse effect of underwater noise on fishes from pier demolition and construction is small and limited (Table 4-2). Fish behavior is not expected to be disrupted by the underwater noise from the vibratory extraction of concrete piles beyond 46 m from the immediate area where the pile is being removed. The area of potential injury from impact pile driving extends out to a distance of 74 m. The areas of potential behavioral effects, particularly for concrete pile installation by impact driving, are limited to a distance 0.541 m (0.54 km).

The 206 dB injury threshold would only be exceeded during impact installation of the concrete piles, and only encompassing a zone of 1-m radius from the pile driver. It is unlikely that fish would remain this close to the pile being driven after the ramp-up period. The areas encompassing the weight-based criteria for potential injury are somewhat larger, 40 m for fish < 2 grams (g), 74 m for fish > 2 g, but as noted previously, there is little evidence for injurious effects to fish at these SELs (Popper and Hastings 2009; CALTRANS 2010; Halverson et al. 2011). All fish species that are likely to occur in the area would be able to swim the distance beyond the threshold.

Fish species occurring in the area routinely experience noisy conditions due to anthropogenic activities such as ship traffic, construction, and other industrial activity at NBSD. In general, fish are likely to be temporarily disturbed or leave the immediate project area of demolition and construction until activities cease. Thus, underwater noise would create an adverse effect on EFH under the Magnuson-Stevens Act, but this effect

would be minimal due to its limited temporal and geographic scale. Furthermore, fish species would return to the project area following the completion of in-water activities.

4.1.2 Sediment Disturbance

Increased turbidity due to sediment disturbance during pile removal and installation would have temporary adverse effects due to direct displacement of pelagic and benthic fishes, possibly including managed coastal pelagic and groundfish species.

Turbidity plumes of suspended particulates may reduce light penetration and lower the rate of photosynthesis (e.g., adjacent eelgrass beds) and the primary productivity of an aquatic area if suspended for variable periods of time. CPS finfish may suffer reduced feeding ability if suspended particulates persist. The contents of the suspended material may react with the dissolved oxygen in the water and result in short-term oxygen depletion to aquatic resources. Toxic metals and organics, pathogens, and viruses absorbed or adsorbed to fine-grained particulates in the material may become biologically available to organisms either in the water column or through food chain processes.

This greater potential for adverse effects would exist if there were substantial amounts of fine sediments; however, grain sizes are predominately of coarser grain, beach-compatible grain sands, in historically dredged areas such as around Pier 8. In addition, as a result of the rain of shells from the invertebrate community on the pilings, a considerable amount of shell hash is present in the sediment around and under the piers (Merkel and Associates 2014). The sandy-shelly material settles quickly instead of remaining suspended in the water column. Based on observations of turbidity caused by bottom disturbances in areas similar to the project sites, turbidity plumes are expected to be localized within the project area and persist for less than one hour following disturbance (AMEC 2008).

Hence, there would be minimal, temporary, adverse effects on EFH due to sediment disturbance during project activities.

4.1.3 Habitat Alteration

With the replacement of the existing pier, there would be no increase in vessel activity and consequently no increase in vessel-related substrate and water column disturbance.

Demolition of existing Pier 8, which is 66 ft wide by 1,610 ft long, would take approximately 11 months and follow the same course for either the Conventional Pier or the MHP option. A total of 1,830 concrete structural piles would be removed using dry pulling alone or with the assistance of a vibratory hammer to loosen the piles. An additional 343 fender piles (concrete and plastic) would also be removed using the same method(s) (NAVFAC Southwest 2014).

Pier removal would reduce the algal and invertebrate production associated with encrusting communities on the pilings; however, over time, algae and invertebrates are expected to colonize the replacement pier. With the removal of the existing pier, the area

of unshaded moderately deep and deep subtidal habitat would increase temporarily, although this area would be subject to recurring noise and substrate disturbance until construction of the new pier is completed. As all of the CPS and groundfish species that could be present use both shaded and unshaded habitats, intermittent use of the area would occur through the construction period and as the fouling community develops on the pilings. Hence, there would be minimal, temporary, adverse effects on EFH from habitat alteration due to pier removal activities.

Based on the number and diameter of piles that are part of the existing Pier 8 compared to the either the Conventional Pier or the MHP option, there would be a net decrease in underwater hard surface area. This may be beneficial in terms of a) reduced impediments to water movement, i.e. greater circulation and less tendency for sediment accumulation under the pier; and b) a smaller area of artificial substrate available for colonization by non-native species. However, the net change represents a minute fraction of the artificial substrate habitat in the relatively industrialized, east-central part of the bay, and is thus considered inconsequential for EFH.

The replacement of Pier 8 with either option would result in a larger deck area, which would shade the existing deep subtidal habitat at the edge of the existing pier. Since the habitat is unvegetated and light levels reaching the bottom are very low (Merkel and Associates 2014), there would be no local effect on primary production. The larger deck area would incrementally increase the shading of the uppermost surface layer inhabited by phytoplankton, and as these organisms drift through the bay, their overall rates of photosynthesis should, theoretically, be correlated with the duration of exposure to sunlight versus shading, although other factors (e.g., turbulence, turbidity, nutrients, temperature) would also be important. Net primary production from the phytoplankton could also be affected by the filter feeding invertebrates that inhabit the pilings. In this respect, the reduction in surface area should reduce the size of the fouling community on the pilings and in turn reduce the amount of phytoplankton grazing by barnacles, oysters, tunicates, etc. However, it should be noted that the production of planktonic larvae by the fouling community also contributes to the food supply for managed fish species. Overall, the net effect of pier replacement on phyto- and zooplankton food resources is uncertain, but would be very small in any case given the magnitude of change in the context of San Diego Bay. The Merkel and Associates 2014 *Draft Wharf Shading Study for the Pier 8 Replacement and Demolition Project, Naval Base San Diego* follows this Final EFH Assessment.

The Shading Study (Merkel and Associates 2014) suggests that the structural habitat of the existing Pier 8 supports a greater abundance, biomass, and diversity of fish and invertebrates than the adjacent deep subtidal habitat. Either new pier option would create habitat for fish that is generally similar to that of the existing pier, with a net loss of hard substrate habitat from the reduction of the number of pilings in the water, and a corresponding gain of open water habitat under the pier. Overall, the small magnitude of change and similarity of existing and future conditions suggests no ecological change related to fish abundance, diversity, or biomass would be expected to occur in the

project vicinity. To the extent that structural and/or shaded habitats are preferred or avoided by certain species, utilization of the project site by different fish species may shift slightly toward or away from the project site, relative to the existing condition. Considering this, and the characteristics of the EFH species that may potentially occur in the project area and the habitat characteristics of the project area itself, there would be no adverse effect to EFH from the small increase of open water habitat and increased areal shading.

Conventional Pier Option

Temporary impacts to bay bottom and water column habitats would occur from increased suspended sediments and turbidity, and increased underwater noise levels from pier demolition and construction activities. Based on observations of turbidity caused by bottom disturbances in areas similar to the project sites, turbidity plumes are expected to be limited to the areas of bottom disturbance, and would persist for less than one hour following disturbance (AMEC 2008).

The open-water area of San Diego Bay would be decreased by the replacement of Pier 8. On a small scale within the project site, water circulation may change slightly due to the removal of old and addition of new in-the-water structures, but any such changes would be negligible given that the boundaries, bathymetry, configuration and use of all piers at NBSD would remain essentially unchanged. The proposed project area is soft-bottom substrate and supports no eelgrass beds, so the net effect of increased shading on benthic primary production would be negligible, although there would be reduced sunlight in the water column. To the extent that structural and/or shaded habitats are preferred or avoided by certain species, utilization of the project sites by different fish species may shift slightly toward or away from the project site, relative to the existing condition. However, due to the characteristics of the EFH species and the affected area, the small increase in shading and artificial substrate would not have an effect outside the immediate area of the piers, and therefore would not have a long-term adverse effect on EFH for coastal pelagics or groundfish in San Diego Bay.

The pelagic and groundfish species of concern are highly mobile and not closely tied to artificial substrates. Hence, individuals would be expected to move away from and avoid the areas of demolition and construction activity, but to return and utilize the area in essentially the same extent as at present once the activities cease. Pier removal would temporarily reduce the algal and invertebrate production associated with encrusting communities on the pilings. Over time, algae and invertebrates are expected to colonize the new pier, and the resultant production of organic material from the new pier would tend to offset the effects of reduced sunlight. Hence, there would be a minimal, temporary adverse effect on EFH.

The Conventional Pier option would involve installing a total of 950 structural and fender piles. Assuming a rate of five concrete piles installed per day, impact pile driving activities would occur for approximately 190 days (Navy Region Southwest and Naval Base Point Loma 2013).

Relative to the existing pier, the Conventional Pier option would increase bay shading by 1.86 acres, but reduce the in-water surface area of artificial structure by 125,949 square feet (Table 2-1). As discussed in Section 4.1.3, there are a variety of ecological ramifications associated with these physical changes, but in the context of the industrialized shoreline of the project area, the overall effects on EFH are considered minimal and inconsequential in terms of populations of managed species.

MHP Option

Under the MHP option, the impacts associated with demolition activities would be similar to those discussed under the Conventional Pier option. However, with this option, the duration of pile driving activities would be decreased due to the lesser number of piles in the MHP design. The MHP option would involve installing 96, 24-inch diameter octagonal concrete foundation piles (16 piles support each of the 6 moorings) (NAVFAC Southwest 2008). Assuming a rate of five concrete piles installed per day, approximately 20 days of pile driving would be needed to install the 96 structural piles, far less than would be needed for the Conventional Pier option (Navy Region Southwest and Naval Base Point Loma 2013).

Construction of the MHP option would temporarily increase turbidity and noise in the project area. The installation of 96 structural piles for the MHP option, rather than 950 structural and fender piles for the Conventional Pier Alternative would result in less sound and sediment disturbance, and therefore, fewer disturbances to fish in the project area, than the Conventional Pier option. The MHP option would have minimal adverse effects similar to those of the Conventional Pier option, although the temporary impacts associated with in-the-water activities will be substantially shorter in duration.

Relative to the existing pier, the MHP option would increase bay shading by 0.78 acres, but reduce the in-water surface area of artificial structure by 87,267 square feet (Table 2-1). As discussed in Section 4.1.3, there are a variety of ecological ramifications associated with these physical changes, but in the context of the industrialized shoreline of the project area, the overall effects on EFH are considered minimal and inconsequential in terms of populations of managed species.

Comparison of Pile Density and Bay Shading

In terms of pile density and bay shading, the Conventional Pier option represents the worst-case of the two construction options. However, either option would have minimal adverse effects on EFH.

Programmatic EFH Consultation Considerations (NMFS 2013)

The negative effects of overwater structures that are identified in the Programmatic EFH Consultation developed by NMFS for the U.S. Army Corps of Engineers permitting of overwater structures in southern California waters (NMFS 2013) do not apply to this project for the following reasons.

1. Since the project area does not contain estuarine, seagrass, kelp canopy, rocky reef HAPC or other areas of interest, there would be no negative effects to groundfish HAPC.
2. The direct and indirect effects of overwater structures cited in the Programmatic Consultation (NMFS 2013), including shading, wave energy and substrate, water quality, noise, and non-indigenous species evidently do not reduce fish and invertebrate abundance, diversity or biomass under existing Pier 8 and other Navy piers relative to adjacent deep subtidal habitat. Since negative effects are not being manifested in the fish community, there do not appear to be potentially negative corresponding cumulative effects.

4.2 Proposed Conservation Measures and Guidelines for EFH Protection

4.2.1 Consideration of NMFS (2013) Programmatic EFH Conservation Recommendations

As recommended by NMFS, the following provides the Navy's detailed consideration of the conservation recommendations developed in the Programmatic EFH Consultation for Overwater Structures (NMFS 2013). For the sake of completeness, the NMFS measures are reproduced in their entirety, followed by Navy responses in **bold**.

<u>General Recommendations</u>

1. All overwater structure construction (including in-kind replacement) should be required to follow eelgrass monitoring requirements put forth in the Southern California Eelgrass Mitigation Policy (SCEMP). Exceptions may be granted for areas that U.S. Army Corps of Engineers and NMFS believe are highly unlikely to support eelgrass habitat. **Not applicable because the project area does not support eelgrass**.
2. Given the significant alteration of existing shoreline and shallow water habitats in southern California, all overwater structures should be water dependent. Proposed projects should clearly explain their water dependency and why the project is in the public's best interest. **The project is water dependent.**
3. As part of the project application, the proponent should describe how their proposal addresses the specific conservation recommendations identified below. NMFS recognizes that not all conservation recommendations will be relevant in all situations. Therefore, the proponent should clearly articulate when a particular recommendation is not applicable to the proposed project. Based upon the project application, the U.S. Army Corps of Engineers should determine if the project implements appropriate conservation recommendations and, therefore, can be covered by this programmatic consultation. **See measures and discussion below**.

Mooring Anchors and Persistently Moored Vessels

For all projects, the project proponent should strive to implement avoidance measures to the extent feasible. When avoidance measures are not feasible, minimization measures should be implemented.

Avoidance:

1. All new anchored moorings and persistently moored vessel should be placed in areas in which suitable submerged aquatic vegetation (SAV) (e.g., eelgrass, kelp) habitat is absent. This will prevent adverse shading impacts to SAV. **Not applicable because SAV does not occur.**
2. Persistently moored vessels should be placed in waters deep enough so that the bottom of the vessel remains a minimum of 18 inches off the substrate during extreme low tide events. This will prevent adverse grounding impacts to benthic habitat. **Water depths are sufficient to preclude grounding by Navy vessels that use the pier.**

Minimization:

1. Mooring anchors placed within suitable SAV habitat should be of the type which use midline floats to prevent chain scour to the substrate. This will prevent adverse impacts to SAV and other benthic habitat. **Not applicable because SAV does not occur.**
2. Persistently moored vessels that are moored over SAV or rocky reef habitats with less than 18 inches between the bottom of the vessel and the substrate at low tides should utilize float stops. This will prevent adverse grounding impacts to benthic habitat. **Not applicable because SAV and rocky reef habitats do not occur.**

Pile Removal and Installation

Minimization:

1. When feasible, remove piles with a vibratory hammer rather than a direct pull or clamshell method. The piles would be removed using dry pulling, with the assistance of a vibratory hammer to loosen piles as needed, which only would be the case if they were heavily coated with mud. Otherwise, if the piles can be easily removed by crane, indicating they are relatively free of mud, use of the vibratory hammer would not be feasible because it would be substantially slower and would not result in a meaningful reduction in sediment resuspension.
2. Slowly remove pile to allow sediment to slough off at or near the mudline.
3. Hit or vibrate the pile first to break the bond between the sediment and the pile to minimize the likelihood of the pile breaking and to reduce the amount of sediment sloughed.

4. Encircle the pile with a silt curtain that extends from the surface of the water to the substrate, where appropriate and feasible. **This is not proposed because currents are weak in the Pier 8 area: speeds range from five centimeters per second near the quaywall to 10 to 15 centimeters per second between the piers. Sediments resuspended by pier removal/installation and construction vessel movements would settle out around the nearby Navy piers, where sediment and marine water quality conditions are similar to those at Pier 8 (i.e., industrial marine facilities where water and sediments are not pristine).**
5. If contaminated sediment occurs in the footprint of the proposed project, cap all holes left by the piles with clean native sediments. **This is not proposed because the holes will fill rapidly as a result of a) inward collapse of the unconsolidated sediments as pile is removed; and b) filling of the residual volume by sediment dispersed through the project area by the continuing project activities as well as tidal currents.**
6. Drive piles during low tide periods when substrates are exposed in intertidal areas. This minimizes the direct impacts to fish from sound waves and minimizing the amount of sediments re-suspended in the water column. **Not applicable because all of the piles are in deep water.**
7. Use a vibratory hammer to install piles, when possible. Under those conditions where impact hammer are required (i.e. substrate type and seismic stability) the pile should be driven as deep as possible with a vibratory hammer prior to the use of the impact hammer. This will minimize noise impacts. **The Navy does not believe this measure is warranted because of the relatively small ZOIs for potential injury to fish associated with the use of an impact pile driver for 24-inch piles (Table 4-2). Fish are expected to leave the immediate area of pile driving and not incur injury. The larger ZOI of potential behavioral effects (Table 4-2), would encompass an area of heavy ship traffic from Navy and other vessels in this part of the bay. Given the absence of sensitive habitats and the background of underwater noise from vessels, the Navy does not believe that there would be important added behavioral effects from pile driving.**

Pile-supported Overwater Structures

For all projects, the project proponent should strive to implement avoidance measures to the extent feasible. When avoidance measures are not feasible, minimization measures should be implemented.

Avoidance:

1. To the maximum extent practicable, site overwater structures in areas not occupied by or determined to be suitable for sensitive habitat (e.g., SAV, salt marsh, intertidal flats). **Sensitive habitats are not present in the project area.**
2. Any cross or transverse bracing should be placed above the Mean Higher High Water (MHHW) to avoid impacts to water flow and circulation. **For the Conventional Pier option, all pier deck structures are above the MHHW. The MHP option, however, floats on the water surface similar to a vessel and the deck is always submerged to a depth of approximately 14 ft. The design of the MHP does not allow a gap between the deck bottom and the water surface, and so there would be localized effects on circulation.**

Minimization:

1. Minimize, to the maximum extent practicable, the footprint of the overwater structure. The overwater structure should be the minimum size necessary to meet the water- dependent purpose of the project. **The proposed new pier design is no larger than necessary to meet the purpose and need.**
2. Design structures in a north-south orientation, to the maximum extent practicable, to minimize persistent shading over the course of a diurnal cycle. **Not feasible.**
3. For residential dock and pier structures, the height of the structure above water should be a minimum of 5 feet above MHHW. **Not applicable.**
4. For residential dock and pier structures, the width of the structure should be limited to a maximum of 4 ft wide. Exceptions may be provided to comply with the Americans with Disabilities Act. **Not applicable.**
5. For residential dock and pier structures, one turnaround is permitted not exceeding 10 ft in length and 6 ft wide, or 60 square ft. The turnaround is intended to accommodate efficient unloading/loading of boating equipment and is not intended to be used for non-water-dependent uses. **Not applicable.**
6. For residential dock and pier structures, a terminal platform should not exceed 5 ft long by 20 ft wide, or 100 square ft. **Not applicable.**
7. Extend the structure's terminal platform into nearest adjacent deep water to minimize the need for dredging and to minimize the likelihood of boat grounding, propeller scar/scour in shallow water habitat. **The pier is in deep water that is already maintained by dredging.**

8. Use the fewest number of piles as practicable for necessary support of the structure to minimize pile shading, substrate impacts, and impacts to water circulation. Pilings should be spaced a minimum of 10 ft apart on center. **Some parts of the Conventional Pier option would have pilings spaced 10 ft apart on center; however, the majority of the Conventional Pier would have pilings spaced further than 10 feet apart on center. As described in Section 2.2.2, the MHP option has only 96 piles total, in groupings of 16 per mooring shaft. At their most dense, 64 piles would be arrayed over an area of approximately 300 ft, surrounded by several hundred ft of open water. As noted in Table 2-1, the MHP option has the fewest number of piles.**
9. Gaps between deck boards should be a minimum of 1/2 inch. If the overwater structure is placed over SAV or salt marsh habitat, 1-inch deck board spacing or use of light transmitting material with a minimum of 40 percent transmittance should be used. Exceptions may be provided to comply with the Americans with Disabilities Act. **Not applicable.**
10. The use of floating dock structures should be minimized to the extent practicable and should be restricted to terminal platforms placed in the deepest water available at the project site. **Pier 8 is a deep water pier maintained by dredging. Should the MHP option be chosen, it would be constructed in deep water.**
11. Incorporate materials into the overwater structure design to maximize light transmittance. When suitable SAV habitat is within the project vicinity, the use of appropriate grating should be used to permit sufficient light for SAV production. **Not applicable due to the depth of water under the pier, and would not be practicable because a solid concrete deck is needed to support loads on the pier deck.**

4.2.2 Additional Proposed Measures

To reduce and avoid the potential impacts to FMP species, the following measures would be implemented to minimize impacts:

- A cable net and floating boom would be used to capture debris that falls into the water during pier demolition. Such debris would be collected and disposed of onshore.
- Spill kits and cleanup materials would be present during construction should there be a leak into the surrounding water.
- The contractor would use only clean construction materials suitable for use in the oceanic environment. The contractor would ensure no debris, soil, silt, sand, sawdust, rubbish, cement or concrete washings thereof, chemicals, oil or petroleum products from construction would be allowed to enter into or placed where it may be washed by rainfall or runoff into waters of the U.S. Upon completion of the project authorized, any and all excess material or debris would

be completely removed from the work area and disposed of in an appropriate upland site.

- All debris would be transported to, and disposed of, at an appropriate upland disposal site, or recycled, if appropriate.
- During project implementation the Navy would regularly monitor construction activities to ensure that no deviation from the project as described herein are occurring. The Navy would report any violation of authorized impacts to NMFS within 24 hours of its occurrence.

5.0 CONCLUSION

According to the final rule implementing the EFH provisions of the Magnuson-Stevens Act, temporary impacts are those that are limited in duration and that allow the particular environment to recover without measurable impact. Minimal impacts are those that may result in relatively small changes in the affected environment and insignificant changes in ecological functions (50 CFR Part 600 2002).

As described in the above effects analysis, the Navy has determined that the project may have relatively minimal, temporary adverse effects on EFH for federally managed fish species within the Coastal Pelagic Species and Pacific Coast Groundfish FMPs. However, the project contains adequate measures to avoid and minimize potential adverse effects to EFH. The negative effects of overwater structures identified in the NMFS (2013) Programmatic EFH Consultation on Overwater Structures with the Los Angeles District do not apply. Since no long-term adverse effects would occur with either construction option, no compensatory mitigation is proposed for either construction option.

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Coastal Consistency Negative Determination

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CALIFORNIA COASTAL COMMISSION
45 FREMONT, SUITE 2000
SAN FRANCISCO, CA 94105-2219
VOICE (415) 904-5200
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December 19, 2014

Commander James J. Cho
Public Works Officer
Naval Base San Diego
3455 Senn Road
San Diego, CA 92136-5084

Subject: Negative Determination ND-0044-14 (Replacement of Pier 8, Naval Base San Diego, San Diego County)

Dear Commander Cho:

The Coastal Commission staff has reviewed the above-referenced negative determination for the replacement of Pier 8 at Naval Base San Diego (NBSD). The Navy states that the project is necessary in order for NBSD to support modern Navy ship classes with deep drafts and large power requirements, and will provide modern berthing, logistics, maintenance, and utility support for ships homeported in the San Diego region. The replacement pier will provide two outer berths for modern Navy vessels comparable in size to amphibious assault ships, and two inner berths for smaller ships such as guided missile destroyers. The project consists of: (1) demolishing the 50-year-old Pier 8 and disposing all pilings, debris, and other materials at an off-site location; (2) constructing a new pier at the same location using a conventional piling-supported pier design or a floating modular hybrid pier design; and (3) installation of utility infrastructure on the pier, including water, wastewater, and electric power lines. The Navy expects demolition and construction to take approximately 21 months in 2017 and 2018.

The Navy has not yet selected the pier design to be used in the Pier 8 replacement project and is requesting concurrence with both design options. The existing single-deck Pier 8 is 66 feet wide, 1,610 feet long, is supported by 2,173 timber pilings, and shades 2.44 acres of bay water. The proposed conventional pier would be constructed as a single-deck, concrete pier 117 feet wide and 1,600 feet long, would be supported by 950 concrete pilings, and would shade 4.3 acres of bay water. The proposed modular hybrid pier would consist of five 90-foot-wide, double-deck floating concrete modules constructed off-site, towed to the Pier 8 site, and connected to mooring shafts and 96 concrete pilings to create a 1,560-foot-long pier. The double-deck design would separate utilities on the lower deck from crane, vehicle, and maintenance operations on the upper deck. This floating pier design provides for a narrower pier and reduced shading of bay water (3.22 acres) compared to the conventional pier.

Under the federal consistency regulations, a negative determination can be submitted for an activity "which is the same as or similar to activities for which consistency determinations have

been prepared in the past." The proposed project is similar to previously concurred with consistency and negative determinations for adjacent pier replacement and construction projects at NBSD (CD-031-01 and ND-011-11).

The Navy reports that the proposed project contains and is consistent with the water quality and marine resource avoidance, monitoring, and mitigation commitments agreed to under the Commission's concurrence with demolition of Piers 10 and 11 and construction of a single replacement pier (CD-031-01) and the Executive Director's concurrence with the demolition of Pier 12 and construction of a replacement pier (ND-011-11). A stormwater pollution prevention plan will be implemented to minimize water quality degradation from demolition and construction activities by using site-specific best management practices, standard erosion control measures, and spill prevention and containment measures to avoid or minimize the potential for accidental release of debris or fuels during construction. Special construction features for the replacement pier would include installation of a stormwater collection system with an oil-water separator to meet current National Pollutant Discharge Elimination System permit requirements.

No dredging would occur with this project. Disturbance of bottom sediments during removal of existing timber pilings and installation of new concrete pilings would cause a temporary increase in turbidity in the waters adjacent to the pier. The Navy will implement turbidity control measures to ensure that resuspension of bottom sediments into the water column during construction are confined to the immediate project area. The project area does not support eelgrass beds nor does it include nesting or foraging habitat for listed species. Pile driving could temporarily disturb fish, marine mammals, and sea turtles in the immediate vicinity of the project site. To minimize potential impacts to these species, the project includes monitoring and minimization measures to avoid exposing marine mammals and sea turtles to excessive noise from pile driving.

The proposed pier would result in a small increase in bay coverage over the existing pier – 1.86 acres for the conventional pier option and 0.78 acres for the modular hybrid pier option. The Navy reports that the San Diego Bay Integrated Natural Resources Management Plan (INRMP) was updated in 2013 and concurred with by the U.S. Fish and Wildlife Service (USFWS). The Navy stated that the INRMP included an analysis of wharf shading of San Diego Bay waters and found that "newly designed Navy replacement piers and overwater structures provide different but still beneficial habitat thus having a positive benefit to the ecosystem." Notwithstanding the increase in bay water shading, the removal from the bay of the 2,173 timber pilings that support the existing Pier 8, and the reduced number of pilings required for both replacement pier options, will significantly improve marine habitat at the project site over current conditions.

The project will not adversely affect public access or boating recreation. The pier area is currently off limits to public access and boating for military security and public safety reasons, and the replacement pier would not create additional burdens on public access or recreation. The replacement of Pier 8 with either design option would not adversely affect the visual characteristics of the area and would be compatible with adjacent piers at NBSD. The industrial nature of NBSD, when viewed from either San Diego Bay or adjacent upland areas, would remain unchanged with construction of the replacement.

In conclusion, the Commission staff **agrees** that with the monitoring, avoidance, and mitigation measures the Navy has incorporated into the proposed Pier 8 replacement project (both the conventional and modular hybrid pier design options), the project will not adversely affect coastal resources, and that with these commitments the project is similar to previously concurred with consistency and negative determinations for pier replacement projects at NBSD. We therefore **concur** with your negative determination made pursuant to 15 CFR 930.35 of the NOAA implementing regulations. Please contact Larry Simon at (415) 904-5288 should you have any questions regarding this matter.

Sincerely,

(for) CHARLES LESTER
Executive Director

cc: CCC – San Diego Coast District
U.S. Fish and Wildlife Service
National Marine Fisheries Service
U.S. Army Corps of Engineers

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DEPARTMENT OF THE NAVY
COMMANDING OFFICER
NAVAL BASE SAN DIEGO
3455 SENN RD
SAN DIEGO, CALIFORNIA 92136-5084

IN REPLY REFER TO:
5090
Ser N411/U627
16 Oct 14

Mr. Mark Delaplaine
California Coastal Commission
45 Fremont Street, Suite 2000
San Francisco, CA 94105-2219

Dear Mr. Delaplaine:

SUBJECT: COASTAL CONSISTENCY NEGATIVE DETERMINATION FOR PIER 8 REPLACEMENT AT NAVAL BASE SAN DIEGO

I am submitting this Coastal Consistency Negative Determination (CCND) for Pier 8 Replacement Military Construction (MILCON) P-440 at Naval Base San Diego (NBSD). The proposed project comprises the demolition and replacement of Pier 8 and is needed to address the current and impending shortfall of pier infrastructure at NBSD necessary to support modern Navy ship classes with deep draft and power intensive requirements.

This submittal is in compliance with Section 930.35 (d) of the National Oceanic and Atmospheric Administration (NOAA) Federal Consistency Regulations (15 CFR 930). The Navy has determined that the proposed project would have no effect to coastal resources for the reasons identified in the enclosure (1).

I request your concurrence on this proposed project. When completed, please email a letter of concurrence to Ms. Deb McKay, Region NEPA Coordinator, at deborah.mckay@navy.mil. If you have any questions or need further information, please contact Ms. Deb McKay at (619) 532-2284.

Sincerely,

JAMES J. CHO
Commander, U. S. Navy
Public Works Officer
By direction of the
Commanding Officer

Enclosure: (1) Coastal Consistency Negative Determination

Coastal Consistency Negative Determination

In accordance with the Federal Coastal Zone Management Act of 1972 as amended, Section 307c(1), the United States Department of the Navy (DoN) has determined that the proposed project, Pier 8 Replacement, Military Construction (MILCON) P-440, at Naval Base San Diego (NBSD) in San Diego, CA will not affect the resources or uses of the coastal zone. Therefore, the Navy has concluded that a Coastal Consistency Determination is not required and is requesting your concurrence with this Coastal Consistency Negative Determination (CCND) in compliance with the Ocean and Coastal Resource Management regulations (15 CFR 930.35).

This project and consultation are consistent with prior pier construction projects at Naval Base San Diego (ND-011-011, CD-031-01, CD-51-94, CD-64-92, and CD-51-87) and at Naval Base Coronado (CD-89-99). In those decisions, the Commission found that Navy activities had either no effect on resources or uses of coastal waters and that the activities complied with water quality, public access and recreation, and environmentally sensitive habitat policies of the Coastal Act or were allowable uses for dredging and filling of coastal waters for pier construction.

An Environmental Assessment has been prepared for this project and will be available for public review soon.

PROJECT DESCRIPTION

The proposed Pier 8 replacement project area is located at NBSD (Figure 1). Pier 8 is located approximately in the center of the NBSD pier complex, just north of the Mole Pier and the Paleta Creek Channel; and extends 1,610 ft into San Diego Bay (Figure 2).

The purpose of the project is to address the current and impending shortfall at NBSD of pier infrastructure necessary to support modern Navy ship classes with deep draft and power intensive requirements. The U.S. Navy proposes to demolish Pier 8, which is considered to be inadequate due to deteriorating physical condition and lack of necessary modernized infrastructure (e.g., electrical utilities). A new Pier 8 and associated pier utilities would be constructed at the same location as the existing Pier 8 at NBSD (Figure 3).

Demolition of existing Pier 8, which is 66 feet (ft) wide by 1,610 ft long, would take approximately 11 months. Typical pier demolition takes place bayward to landward and from the top down. First, the fender piles and exterior appurtenances (such as utilities) would be demolished above and below the pier deck. Then, the deck would be demolished using sawcutting and jack hammering. Subsequently structural piles would be extracted with a vibratory hammer (if needed) and a crane. Throughout the demolition, barge-mounted cranes and scows would be used for the collection and removal of demolition debris.

There are two construction options to replace Pier 8: the Conventional Pier option or the Modular Hybrid Pier (MHP) option. In either case, the new Pier 8 would be constructed in the footprint of the old Pier 8 following demolition.

The Conventional Pier option would be constructed as a single-deck, concrete berthing pier that would be 117 ft wide and 1,600 ft long. The deck would be constructed on-site. This option would represent a net increase in bay shading of about 1.86 acres (0.75 hectare) for total bay shading of approximately 4.30 acres (1.7 hectares), based on an increase in width of 51 ft and a decrease in length of 10 ft as compared to the existing Pier 8.

The MHP option would consist of five double-deck, floating concrete modules that would be constructed at a concrete pre-cast facility and towed to the Pier 8 site where they would be connected to mooring shafts secured by foundation piles. The double-deck design would separate utility pipelines and wiring on the lower deck from crane and maintenance operations on the upper deck. This would allow a lesser pier width. The MHP option would be 90 ft wide by 1,560 ft long compared with the 117-ft width of the single-deck Conventional Pier option. The MHP option would have a smaller footprint (3.22 acres/1.3 hectares) than the Conventional Pier option (4.30 acres/1.7 hectares). With the MHP option, the increase in bay shading over the existing Pier 8 (2.44 acres/0.98 hectares) would be approximately 0.78 acres/0.31 hectare, as compared with approximately 1.86 acres/0.75 hectare with the Conventional Pier option. The MHP option would be moored to steel shafts and would involve minimal pile driving activities: 96 concrete foundation piles (24-inch [61 centimeter] diameter octagonal) would be driven as compared with 950 piles (including foundation and fender piles) for the Conventional Pier option. No fender piles would be driven because the MHP option would use floating foam-filled fenders and internal shock-absorbing rubber fenders between the concrete modules and the mooring shafts. Unlike a conventional pier that stands above the water on fixed piles the deck of the MHP option would float in the water similar to a vessel, leaving no open space between the deck bottom and the water surface (see Figure 4 for notional illustration only-not to scale).

Although either option for the new Pier 8 would be wider than the existing Pier 8, the new pier would be designed and constructed to ensure that vessels can navigate safely within San Diego Bay. The new pier would provide a minimum of two outer end pierside berths for modern Navy ships comparable in size to a Multi-Purpose Amphibious Assault Ship, the largest ship that would be supported by the project. The inner berths would have enough room for two additional modern Navy ships, such as guided missile destroyers. It is estimated that construction would last 10 months and is anticipated to occur from 2017 through 2018.

Table 1 below compares the details of the two construction options against the existing pier.

Table 1 Comparison of Pier 8 Replacement Options and Existing Pier 8

Specifications	Conventional Pier Option	Modular Hybrid Pier Option	Existing Pier 8 (No-Action Alternative)
Length (feet)	1,600	1,560	1,610
Width (feet)	117	90	66
Height (feet mean lower low water level)	12.0 at quaywall sloping up to 17.0 at the end	13.9 – 16.9 (varies with tides)	12.0 for entire length (approximately)
Bay Shading (acres)	4.30	3.22	2.44
Number of Piles	950	96	2,173

Days of Pile Driving	190	20	None
Total Length of Piles in Water Column (feet)	22,181	1,062	44,546
Total In-Water Surface Area (square feet)	153,411	192,093*	279,360
Change in In-Water Surface Area from Existing Pier 8	45 percent reduction	31 percent reduction	no change
Electrical Capacity: Ship-to-shore Power	Replace 14 kilovolt cables and upgrade to 4 sets of 750,000 Circular Mils 15 kilovolt cables. Support future upgrade from 480 volts to 4,160 volts to meet future power-intensive Fleet requirements.	Same as Conventional Pier Alternative.	No upgrade: remain at 480 kilovolts, unable to supply the power required for power-intensive vessels.

Legend *Surface area for MHP Alternative includes surface area of six square mooring shafts; each five feet wide; the submerged deck bottom and sides submerged to depth of 14 ft; and 96 piles. Surface areas for Conventional Pier Alternative and Existing Pier 8 include only the indicated number of piles.

EFFECTS ANALYSIS

As defined in Section 304 of the Coastal Zone Management Act (CZMA), the term "coastal zone" does not include "lands the use of which is by law subject solely to the discretion of or which is held in trust by the Federal Government." NBSD is owned and operated by the Navy. Although the Navy does not own the adjacent submerged lands, it does have navigational servitude (exclusive use) of them due to implementation of a security zone as shown *in National Oceanographic and Atmospheric Administration (NOAA) Nautical Chart 18773: United States West Coast San Diego Bay (2012)* (NOAA Office of Coast Survey 2012). The Navy recognizes that actions outside the coastal zone may affect land or water uses or natural resources of the coastal zone via "spill over" and, therefore, are subject to the provisions of CZMA. The Navy analyzed the impacts of the proposed project on the coastal zone by looking at reasonable foreseeable direct and indirect effects on the coastal use or resources, and reviewing relevant management program enforceable policies and the Coastal Resources Planning and Management Policies (CRPMP).

Public Access (CRPMP Section 30210 *et seq.*) and Recreation (CRPMP Sections 30220 *et seq.*)

This project would not affect public access or boater recreation. The project is located in an industrial area of NBSD where access to the project area is controlled by the Department of the Navy and restricted to military personnel, Department of Defense employees, and authorized contractors. Public access is also restricted in the waters around NBSD due to the U.S. Coast Guard (USCG) Security Zone that encompasses all piers at NBSD. Public access to the project area would remain restricted with implementation of the proposed project. The project would be

compatible with existing adjacent land uses and no changes to public access or recreational opportunities would occur. Therefore, there would be no effect to public access and recreation.

Marine Environment (CRPMP Sections 30230 *et seq*)

The project would have no long-term effects on biological productivity or water quality. A Storm Water Pollution Prevention Plan (SWPPP) would be implemented to minimize water quality degradation from demolition and construction activities by implementing site-specific Best Management Practices (BMPs), standard erosion control measures, and spill prevention and containment measures to avoid or minimize the potential for accidental releases of debris or fuels during construction. Special construction features for the replacement pier would include installation of a stormwater collection system with an oil-water separator to meet current National Pollutant Discharge Elimination System (NPDES) permit requirements.

No increase in human health risk or environmental exposure to hazardous materials or hazardous wastes would result from implementation of the project and no significant effects associated with the use, storage, or disposal of hazardous materials or hazardous wastes would occur.

All contractor-owned hazardous materials and wastes from prior jobs would be removed from Pier 8 before demolition activities begin. Hazardous materials associated with proposed demolition and construction activities would include lead-based paint chips and dust removed from deck hardware and striping; potential asbestos containing material (ACM) insulation on the steam pipeline; the oil in the transformers and switchgear to be removed from Pier 8; fuel and hydraulic fluid contained in heavy equipment, vehicles and vessels performing the overall demolition and construction tasks; and paints to be used on deck infrastructure and deck striping.

Contractors would be required to park their vehicles within an on-shore staging area. No vehicle fueling or maintenance would take place at the project site. Demolition and construction contractors involved with the project would be subject to all federal, state, and San Diego County requirements for hazardous materials and hazardous waste management, and to follow the Navy Region Southwest Hazardous Waste Management Plan (HWMP) for the San Diego Metro Area. The Storm Water Pollution Prevention Plan for Naval Base San Diego (SWPPP) contains basewide and site-specific Best Management Practices (BMPs) to eliminate activities that could release hazardous materials into the surface water. The BMPs for demolition and construction activities include berms around the electrical substations to contain potential oil leaks from the transformers; overpack containers for hazardous materials being loaded onto berthed ships; checking vehicles and equipment for leaks; and having absorbent materials on hand to control spills. Therefore, there would be no effect to the environment from oil and hazardous substances.

No dredging would occur as a part of this project. Disturbance of bottom sediments during demolition and construction would cause a temporary and spatially-limited increase in turbidity. Turbidity due to resuspension of bottom sediments during demolition activities would be short-term and localized to Pier 8 and the nearby Navy piers and unlikely to cause toxic impacts to the water column. Subject to the terms and conditions identified in the project-specific U.S. Army Corps of Engineers Section 404/Section 10 permit, the Navy would deploy precautionary measures to alleviate turbidity associated with demolition and construction activities.

The project region is located within a general area designated as Essential Fish Habitat (EFH) by two Fishery Management Plans, the Pacific Coast Groundfish and Coastal Pelagic Species. Temporary impacts to EFH species may occur from increased suspended sediments and increased noise levels from pier construction activities such as pile driving. However, EFH species are highly mobile and will likely leave the project area during demolition and construction activities and return when these activities are completed. There are no sensitive invertebrate or plant species (including eelgrass (*Zostera marina*)) occurring in the project area. In addition, no habitat for sensitive terrestrial wildlife and no nesting or foraging habitat for any sensitive bird species occurs in the project area. Therefore, no effect on sensitive biological species would occur.

Pile driving would temporarily disturb fish, marine mammals, and sea turtles in the immediate vicinity of the project site. However, fish would be able to move out of the area during project activities and return after in-water project activities are completed; therefore, no significant long-term effects would occur. Marine mammals, protected under the Marine Mammal Protection Act, and green sea turtles (GST), protected under the Endangered Species Act, may be encountered in San Diego Bay and may transit through the project area. However, the likelihood of encountering marine mammals or GST during construction is low and since they are highly mobile they would be able to detect the noise and associated in-water activities and may temporarily avoid the project area. The following avoidance and minimization measures would be implemented during pile driving activities:

- The Navy would perform a visual sweep of the bay within a 384-ft (117-meters [m]) radius prior to commencing pile driving activities, and after a break in pile driving for more than 30 minutes.

- If any marine mammals or green sea turtles are seen within this visual range, the Navy would not commence pile driving activities until 15 minutes have passed since the last such sighting, or the animal has moved out of the established range.

- If a marine mammal or green sea turtle moves within the established range while pile driving activities are occurring, such activities would cease until the animal moves out of the area.

- Prior to the start of pile driving each day, after each break of more than 30 minutes, and if any increase in the intensity is required, the Navy shall use a ramp-up procedure. The procedure involves a slow increase in the pile driving to allow any undetected animals in the area to voluntarily depart.

Given the low levels of disturbance and limited abundance of these animals in the project region, project activities are not expected to adversely affect marine mammals or sea turtles. Therefore, implementation of the Proposed Action would not have a significant effect on these species.

The project would have no long-term adverse effect on threatened or endangered species and only short-term, localized, and less than significant effects to marine habitats, invertebrates, fish, marine mammals, and sea turtles in the project vicinity.

Land Resources (CRPMP Section 30240 *et seq.*)

The project area falls under the coverage of the Naval Base San Diego Programmatic Agreement (NBSD PA) executed in May 2014 between Commanding Officer, NBSD, the Advisory Council on Historic Preservation, and the California State Historic Preservation Officer. In conformance with Stipulation 8A of the NBSD PA, the Cultural Resource Management Program (CRMP) has determined that the proposed action will not affect listed, contributing or eligible National Register of Historic Places (NRHP) properties. Consistent with 36 CFR 800.4(d)(1), the CRMP has accordingly made a determination of "no historic properties affected" for the proposed action.

Although Pier 8 is more than 50 years old, the 1999 "Inventory and Evaluation of National Register of Historic Places Eligibility for Cold War Era Buildings and Structures on Naval Station, San Diego" recommended that this pier does not meet the criteria for listing in the National Register. Similarly, the Naval Station San Diego Historic District was reevaluated in 2007 and the individually-eligible Dry Dock No. 1 lies well beyond the 100 meter area of potential effect (APE) buffer prescribed in the NBSD PA. In addition, construction lay-down/staging areas would not encroach within 100 meters of the Historic District or Dry Dock No. 1. Furthermore, because the project area is located in an area created by backfilling tidelands with excavated material, there is no potential for the buried presence of prehistoric archaeological deposits. Therefore, no effects to cultural resources would occur, and no historic properties would be affected by demolition or construction activities.

Development (CRPMP Section 30250 *et seq.*)

The replacement of Pier 8 under the Proposed Action would be compatible with surrounding piers and would not alter the visual characteristic of the area. With the Conventional Pier option, the new Pier 8 would be constructed to be approximately the same height (12.0 ft mean lower low water level at the quaywall sloping up to 17.0 ft mean lower low water level at the bayward end of the pier). The height of the MHP option would vary with the tides from 13.9 to 16.9 ft mean low lower water level. Since the MHP is a floating pier, ships that are docked at the pier would respond equally to tidal conditions and, therefore, the ship and pier deck elevation would remain constant relative to one another. The difference in height between either the Conventional Pier option or the MHP option and existing pier (ranging from approximately 0 ft to 5 ft) is minor and, when viewed as one of a suite of piers within the bay, would be compatible with surrounding piers and would not alter the visual characteristics of the area. In addition, either the Conventional Pier option or the MHP option would have the same general appearance as the existing Pier 8 and therefore, would blend in with the suite of piers that occupy the bay. The 20-ft-high security watchtower that would be constructed along with the new Pier 8 would stand higher than the parking areas near the quay wall. However, the visual setting for the tower would be large Navy vessels that would frequently be docked at the pier, and the multi-story industrial buildings that are set back from quay wall and piers. Views within the San Diego Bay area would remain consistent with the military and industrial nature of the surrounding area. Therefore, no effects to visual resources would occur as a result of the project.

The estimated emissions associated with the either the Conventional Pier option or the MHP option would be below the de minimis threshold levels for conformity. In addition, estimated

emissions would not be regionally significant, as they would be substantially less than 10 percent of the VOC, NOx, and CO emissions estimated for the San Diego Air Basin (SDAB). Therefore, either the Conventional Pier option or the MHP option would conform to the SDAB State Implementation Plan and would not trigger a conformity determination under Section 176(c) of the CAA. The Navy has prepared a Record of Non-Applicability (RONA) for CAA conformity in accordance with Navy CAA Conformity Guidance, OPNAV M-5090.1.

CONCLUSION

In accordance with the Federal Coastal Zone Management Act of 1972, as amended, Section 307 (c)(1), the Coastal Consistency Negative Determination demonstrates that the proposed action will be undertaken in a manner as to not affect coastal uses or resources. The Navy respectfully requests your concurrence. If you need additional information, or if you have any questions, please do not hesitate to contact Deb McKay at (619) 532-2284 or email at deborah.mckay@navy.mil.

Figure 1: Vicinity Plan

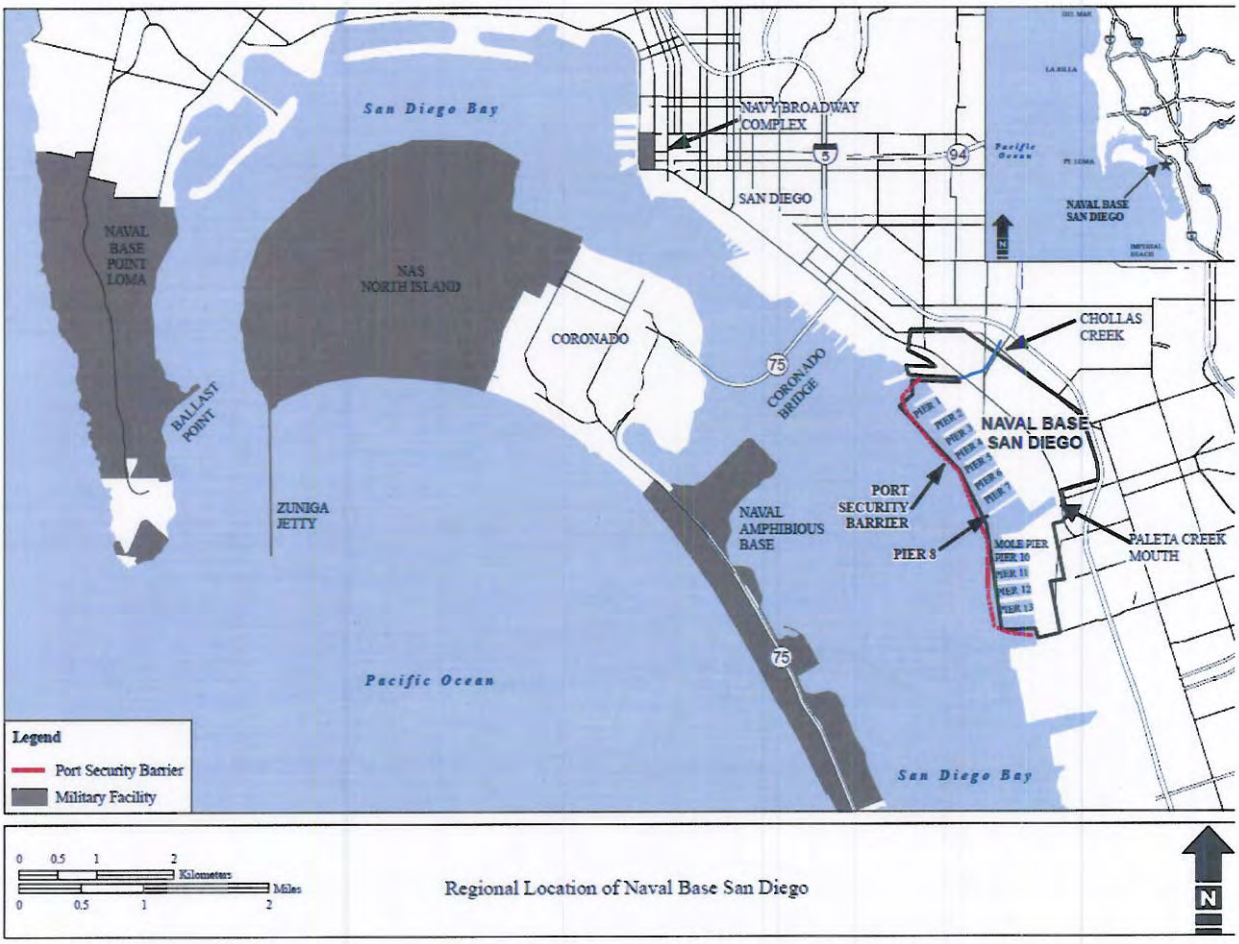


Figure 2: Map of NBSD Piers – Project Location

Figure 3: Site Plan – with Both Options

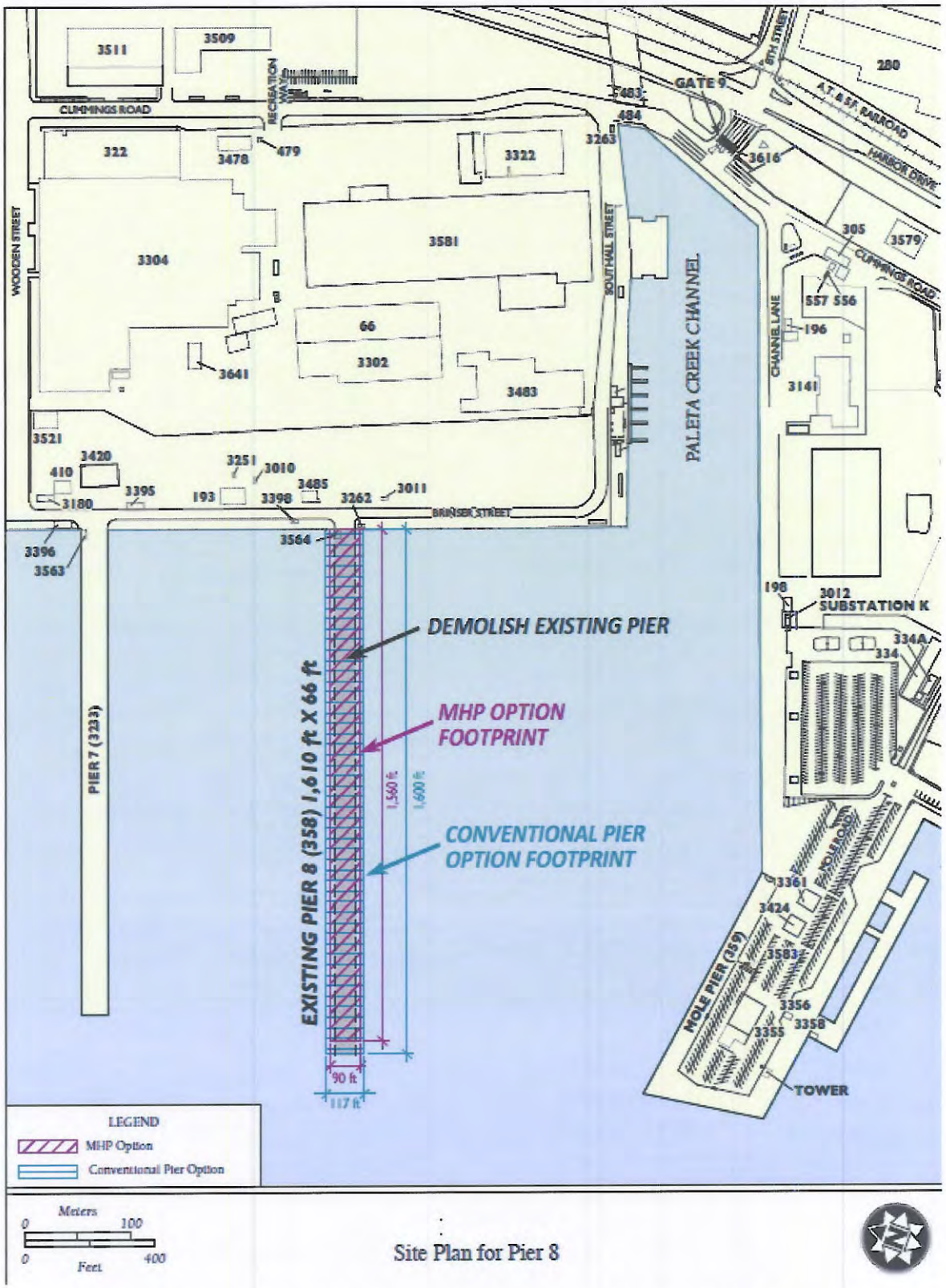
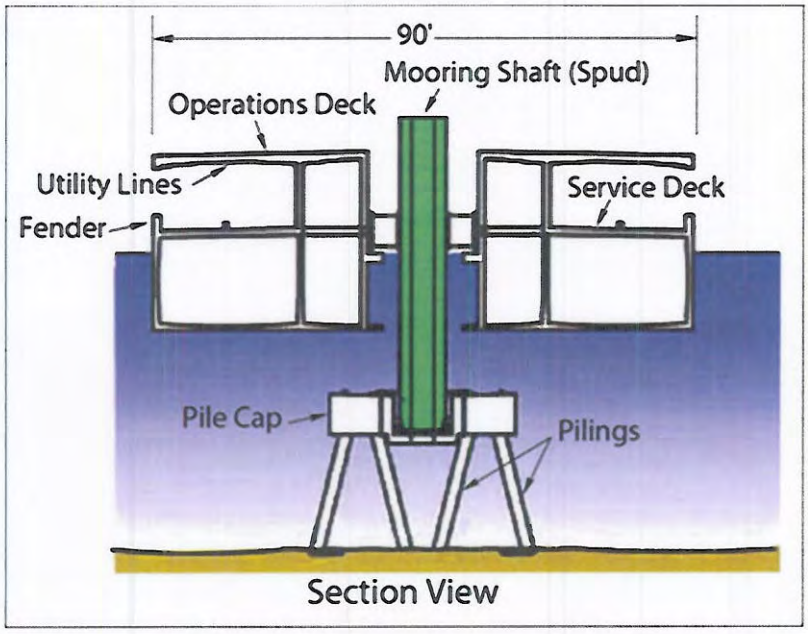


Figure 4: MHP Mooring Shaft and Pile Dolphin (cap)

(Notional Illustration Only-not to scale)



Appendix B

Water Quality Monitoring Report

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3 March 2008

Project No. 8151000100

Mr. Doug Billings
TEC Incorporated
1819 Cliff Drive, Suite F
Santa Barbara, CA 93109

Subject: Water Quality Monitoring Report P-440 Pier 8 Reconstruction and Pier 14 Demolition Project, Naval Base San Diego

Dear Mr. Billings:

Water quality in the vicinity of Piers 8 and 14 was characterized by collecting data in order to inform the National Environmental Policy Act review currently underway for the proposed project. This report describes the methods used to conduct the water quality investigation as well as the results of the survey.

Methods and Techniques

Mr. Tyler Huff and Mr. Nicholas Buhbe of AMEC Earth & Environmental undertook water quality monitoring at Naval Base San Diego on Monday, 25 February 2008. Monitoring was undertaken from the AMEC vessel *Velella* from approximately 1400 to 1600 hours. A Seabird SBE-19 CTD instrument equipped with a YSI oxygen sensor, Wetstar light transmittance sensor, and pH, temperature and pressure sensors was used to characterize the water column. AMEC's CTD was recently calibrated with respect to pH and dissolved oxygen data processing coefficients (as recommended by the manufacturer). GPS locations were recorded by an on-board GPS system.

In order to quantify the water quality near Pier 8 and Pier 14, the immediate vicinity of the piers were divided into three sub areas: East, Central and West. A CTD instrument cast was deployed in each of these three sub areas adjacent to both piers. Pier 8's deployment was conducted on the south side of the Pier, as access was restricted on the north side by US Navy vessels. Sampling adjacent to Pier 14 was conducted on the north side of the pier. Differences between the north and south sides of the piers are expected to be minimal due to the similar

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bathymetry, similar use histories, and the lack of vessel movements to/from the pier during or immediately prior to the effort. A reference water quality cast was also collected in the vicinity of San Diego Bay Main Channel Buoy 30 (offshore Pier 8).

The tidal cycle during the time of sampling was ebbing from a high tide of +3.7 feet at 1124 hours falling to a low of +1.3 feet at 1659 hours. Sunny conditions predominated with moderate winds. In the 48 hours prior to sampling, 0.16 inches of precipitation was recorded in Bonita, San Diego, California. However, the rainfall concluded at approximately noon on 24 February 2008, creating 24 hours of absence of precipitation directly prior to sampling. No storm water or plume influences were observed during sampling.

Results

A data quality review was undertaken and consisted of comparing upcast and downcast data (i.e., data collected during the descent and ascent of the CTD instrument). This type of review is undertaken to verify that the two sets of data for respective water column parameters are in agreement. For the first two casts (Pier 8 East and Central), pH and dissolved oxygen data were not in agreement and were therefore rejected (and not reported). A similar result was also observed for the Pier 8 central data, but differences were judged not of significant magnitude to reject the data. Results of the water column CTD casts are presented below in Tables 1 – 7.

Table 1. Water Column Data – Pier 8 East

Station:	Pier 8 - East*
Latitude:	32° 40' 24.2"
Longitude:	117° 07' 16"
Time:	1445

Depth (meter)	Light Transmissivity (%)	Temperature (°C)	Salinity (PSU)
1	64.4	15.3	32.5
2	65.8	15.2	32.5
3	65.0	15.2	32.5
4	64.3	15.0	32.6
5	65.8	15.0	32.7
6	67.2	15.0	32.7
7	68.7	14.9	32.7
8	70.0	14.9	32.7
9	70.4	14.9	32.7
10	71.7	14.9	32.7
11	64.0	14.9	32.7
12	67.3	14.9	32.7

* pH and dissolved oxygen concentration data were rejected due to data validity issues (see text).

Table 2. Water Column Data – Pier 8 Central

Station:	Pier 8 - Central
Latitude:	32° 40' 21.1"
Longitude:	117° 07' 22.4"
Time:	1501

Depth (meter)	Light Transmissivity (%)	Temperature (°C)	Salinity (PSU)
1	67.9	15.4	32.4
2	67.8	15.2	32.5
3	66.1	15.0	32.6
4	64.7	15.0	32.6
5	64.7	14.9	32.6
6	63.5	14.9	32.7
7	64.5	14.9	32.7
8	66.1	14.9	32.7
9	67.5	14.9	32.7
10	67.6	14.9	32.7
11	65.8	14.9	32.7
12	65.5	14.9	32.7

* pH and dissolved oxygen concentration data were rejected due to data validity issues (see text).

Table 3 – Water Column Data – Pier 8 West

Station:	Pier 8 - West
Latitude:	32° 40' 18.1"
Longitude:	117° 07' 25"
Time:	1506

Depth (meter)	Light Transmissivity (%)	pH	Temperature (°C)	Dissolved Oxygen Concentration (Mg/L)	Salinity (PSU)
1	68.8	7.9	15.3	5.43	32.6
2	70.5	7.9	15.3	5.64	32.6
3	70.5	7.9	15.3	5.56	32.6
4	70.1	7.9	15.2	5.57	32.6
5	69.1	7.9	15.2	5.57	32.6
6	67.8	7.9	15.1	5.56	32.6
7	65.6	7.9	15.1	5.55	32.7
8	64.6	7.9	15.1	5.55	32.7
9	64.8	7.9	15.0	5.55	32.7
10	65.5	7.9	14.9	5.56	32.7
11	63.5	7.9	14.9	5.57	32.7
12	61.8	7.9	14.8	5.65	32.7
13	61.5	7.9	14.8	5.63	32.7

Table 4 – Water Column Data – Pier 14 West

Station:	Pier 14 - West
Latitude:	32° 39' 37.8"
Longitude:	117° 07' 22.6"
Time:	1519

Depth (meter)	Light Transmissivity (%)	pH	Temperature (°C)	Dissolved Oxygen Concentration (Mg/L)	Salinity (PSU)
1	60.4	8.0	15.3	5.50	32.5
2	60.5	8.0	15.3	5.68	32.5
3	61.2	8.0	15.3	5.73	32.5
4	61.8	8.0	15.2	5.77	32.6
5	62.4	7.9	15.2	5.79	32.6
6	62.9	7.9	15.1	5.81	32.6
7	68.1	8.0	15.1	5.67	32.6
8	51.5	7.9	15.2	6.10	32.6
9	58.5	7.9	15.2	6.18	32.6

Table 5. Water Column Data – Pier 14 Central

Station:	Pier 14 - Central
Latitude:	32° 39' 38"
Longitude:	117° 07' 16.7"
Time:	1525

Depth (meter)	Light Transmissivity (%)	pH	Temperature (°C)	Dissolved Oxygen Concentration (Mg/L)	Salinity (PSU)
1	62.7	8.1	15.3	5.56	32.5
2	61.9	8.0	15.3	5.75	32.6
3	60.8	8.0	15.2	5.74	32.6
4	61.4	8.0	15.2	5.77	32.6
5	61.9	8.0	15.2	5.78	32.6
6	59.6	8.0	15.2	5.80	32.6
7	60.5	8.0	15.2	5.81	32.6
8	62.1	8.0	15.2	5.80	32.6
9	61.1	8.0	15.2	5.96	32.6

Table 6. Water Column Data – Pier 14 East

Station:	Pier 14 - East
Latitude:	32° 39' 38.5"
Longitude:	117 ° 07' 11.1"
Time:	1534

Depth (meter)	Light Transmissivity (%)	pH	Temperature (°C)	Dissolved Oxygen Concentration (Mg/L)	Salinity (PSU)
1	62.6	8.1	15.4	5.62	32.6
2	63.6	8.1	15.4	5.75	32.5
3	63.3	8.1	15.3	5.71	32.5
4	63.6	8.1	15.3	5.72	32.6
5	63.5	8.1	15.3	5.73	32.6
6	63.0	8.1	15.3	5.74	32.6
7	60.9	8.1	15.3	5.42	32.6
8	66.1	8.1	15.3	5.98	32.6

Table 7. Water Column – San Diego Bay Reference Location – Channel Buoy 30

Station:	S.D. Bay
Latitude:	32° 40' 08.7"
Longitude:	117° 07' 39.0"
Time:	1551

Depth (meter)	Light Transmissivity (%)	pH	Temperature (°C)	Dissolved Oxygen Concentration (Mg/L)	Salinity (PSU)
1	60.1	8.1	15.3	5.64	32.6
2	60.9	8.1	15.3	5.83	32.6
3	61.6	8.1	15.2	5.79	32.6
4	62.4	8.1	15.2	5.79	32.6
5	63.2	8.1	15.1	5.75	32.6
6	64.5	8.1	15.1	5.71	32.6
7	65.8	8.1	15.0	5.70	32.6
8	66.6	8.1	14.9	5.70	32.6
9	66.3	8.1	14.9	5.69	32.7
10	66.8	8.1	14.9	5.64	32.7
11	66.6	8.1	14.9	5.66	32.7
12	66.4	8.1	14.9	5.66	32.7

Discussion

Water quality results were generally consistent with rough expected values. At Pier 8, waters were approximately one-third of a degree Celsius warmer at the surface than at depth, a pattern consistent with results observed at the reference location. At Pier 14, no such change was apparent, likely due to the shallower bathymetry in the area. Salinities ranged between 32 and 33 parts per thousand, values slightly less saline than seawater, possibly a reflection of recent storm activity. Salinities were consistent throughout the areas sampled.

Light transmissivity ranged from 51 to 71 percent, but most values were between 60 and 65 percent, turbidity values consistent with that of coastal embayments in Southern California. The pH values ranged slightly from minimum of 7.9 to a maximum of 8.1, values consistent with a slightly basic pH typical of seawater. Dissolved oxygen concentrations ranged from 5.43 to 6.18 milligrams per liter and were lower than expected (well below the theoretical oxygen saturation concentration of 8.2 for seawater at the temperatures observed). However, values were consistent with conditions observed at the San Diego Bay reference location and above the San Diego Regional Water Quality Control Board Basin Plan objective (5 mg/L). In addition, dissolved oxygen values were compared to those of the Port of San Diego's Bay-wide Water Quality Monitoring Program, which was conducted over a period of approximately 1 year. Station 4 (located in the vicinity of the National City Marine Terminal, to the south of Pier 14) data indicated a range from 4.34 in July 2002 to 7.87 in December 2001. Values observed in this study were therefore within the range of values observed in the Port's study.

Therefore, in conclusion, the data observed in this monitoring effort indicated that water quality data at both Piers 8 and 14 at Naval Station San Diego were consistent with measurements taken at a nearby reference location and with expected values.

Should any additional information be needed, please contact me at 858-300-4321.

Regards,

Mr. Nick Buhbe
Senior Marine Scientist
AMEC Earth & Environmental, Inc.

NB/nb

7 March 2008

Project No. 8151000100

Mr. Doug Billings
TEC Incorporated
1819 Cliff Drive, Suite F
Santa Barbara, CA 93109

Subject: Water Quality Monitoring Report P-440 Pier 8 Reconstruction and Pier 14 Demolition Project, Naval Base San Diego

Dear Mr. Billings:

Per your request and in order to inform the National Environmental Policy Act review currently underway, this report is in response to your request to investigate potential turbidity effects for the proposed project at Piers 8 and 14, Naval Base San Diego. This report describes the methods used to conduct our investigation as well as the results of field surveys. The proposed project includes both removal of pier pilings and installation of replacement piles.

The proposed project will be conducted to project-specific specifications, and due to the innovative design of the project, the general rarity of these types of projects in San Diego Bay, and general lack of water quality monitoring requirements during construction activities direct background information relating to water quality during this type of project does not exist. However, turbidity data and other types of monitoring are available, and we have undertaken this data review and field study to assess potential turbidity impacts from the proposed project. Three approaches were undertaken: 1) water quality monitoring data collected during the dredging of Naval Base San Diego Pier 10 in 2002 and 2003 was reviewed; 2) AMEC undertook turbidity monitoring during ship departure to determine the longevity of turbidity plumes, and 3) background water quality data was collected in the vicinity of the proposed project site for comparison purposes. Comparisons to dredging activities and ship movement effects are both considered to be very conservative estimates of turbid effects in relation to the proposed project, since mechanical disturbance of sediments will be far less during either piling removal or installation.

1. Review of U.S. Navy P-326 Dredging Water Quality Monitoring Program Data (Pier 10)

In 2002 and 2003, the Navy dredged areas in the vicinity of Pier 10 as part of a pier replacement and upgrade project known as P-326. Monitoring was undertaken as described in California Regional Water Quality Control Board Monitoring and Reporting Program Number 2001-325, and included collection of total suspended solids (TSS) samples on a weekly basis

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during dredging activities. Several summary water quality monitoring reports (dated 19 February and 25 March 2002, and 29 April and 27 May 2003) were reviewed for the purposes of this task.

Monitoring was undertaken at three sites: an upcurrent reference site, a sample within the turbidity plume, and at a downcurrent station between 0 and 250 feet from the dredging operations. Grab samples for TSS testing were collected from mid-water column. TSS data are a measurement of the mass of solids suspended in the water column within a discrete sample. These turbidity data, while representative of dredging operations, are believed to represent a higher magnitude of impact than for the proposed project, since clam-shell dredging is much more severe in terms of sediment disturbance and mobilization. Furthermore, as the clamshell is lifted above the water surface (to a scow for offloading in the Pier 10 case), a large volume of residual (and highly turbid) water drains off the clamshell bucket. The volume of water is a much greater volume than would be expected during piling removal, and would contain suspended particulates due to entrainment of sediments.

Data collected from within the dredging plume and downcurrent of the operations varied considerably, from a maximum of 110 milligram per liter to below detectable levels (less than 1 milligram per liter). Turbidity was highly heterogeneous within the project site. In 16 out of 24 cases reviewed, TSS concentrations were highest in the dredge plume and lower at both the respective upcurrent and downcurrent monitoring stations. In the remaining cases, only one case exsited where the both upcurrent and downcurrent station turbidity data were higher than plume station data. Turbidity as a result of dredging, therefore, was observed to be limited to a small area in the vicinity of the dredge during the majority of the time, and only rarely created a sub-surface plume on a wider scale.

2. Water Column Turbidity Longevity Study

Since a piling-removal and/or placement project similar to the proposed project is not ongoing within San Diego Bay as of the time of this report, movement of a large vessel was determined to be a reasonable worst-case representation of turbidity impacts, since propeller wash of deep-draft ships entrain sediment from the bay bottom and create turbidity. The purpose of this aspect of our assessment was to sample a turbidity plume in a time series from creation through dissipation. Although applicability to the proposed project is limited due by potential confounding factors such as specific tide conditions, the discrete nature of the event (i.e., a single event as opposed to an 8-hour period of construction work), sediment particle size distributions at the site (and hence in the turbidity plume), and displacement of water from propeller wash, this scenario was deemed an appropriate surrogate for project activities.

Investigation of the departure of the cruise ship *Carnival Spirit* from the San Diego Cruise Ship Terminal was initially determined to be a suitable event for this study, but delay of the ship's scheduled departure precluded efforts on 5 March 2007 due to health and safety considerations. The study was rescheduled to coincide with the departure of the *Ryndam* from the terminal the following day at 1700 hours. The *Ryndam* is a considerably large vessel: it is 720 feet long, displaces 55,819 gross registered tons, and is capable of carrying 1,260 passengers (Holland America Cruise Line website, accessed 7 March 2008).

Upon arrival at the site, the ship was departing, and a turbidity plume was visible along the west end of the pier, apparently from the propwash of the main propellers as well as bow thrusters. Sampling was undertaken immediately from the AMEC vessel *Velella*, which followed the *Ryndam* westward as it departed. Water quality was characterized using a Seabird SBE-19 CTD instrument. The CTD instrument records data continuously in time (two data records per second), and is equipped with a Wetstar light transmittance sensor, and conductivity, temperature and pressure sensors. A light transmissometer is used to measure the amount of light passing across a 25-centimeter field: in clear water the light beam passes through and in highly turbid waters suspended particles block transmittance of the light. Resulting percent light transmission data is therefore a reflection of turbidity.

The instrument was lowered to the bottom of the bay upon the *Ryndam's* departure at approximately 1700 hours and at 15 minute intervals thereafter until approximately 1800 hours. The instrument was always lowered approximately 15 from the pier face from within a section of pier approximately 20 ft long (this comprised the study area). Effort to begin the CTD instrument deployment at the same location was made, but slight breezes, currents and/or vessel wakes often moved the sampling vessel from that location by the end of the deployment. Reference data were collected well offshore the *Star of India* at a distance from the shoreline commensurate with the end of the cruise ship terminal pier (prior to the potential for ship departure impacts) and off the end of the terminal in San Diego Bay (after 1800 hours). Data are presented in Table 1.

Considerable depth variation was encountered at the Cruise Ship Terminal due to the irregular bathymetry at the end of the pier, most likely due to long-term erosional effects of vessel propwash. The CTD instrument was deployed to a maximum of 12 meters, but as little as 10 meters in shallower areas within the study area. The tide was flooding at the time of the sampling, but currents or moving flotsam were not observed; effects of tidal currents were therefore believed to be negligible.

Data in Table 1 indicate a background condition of approximately 68 to 69 percent light transmittance at the reference locations. Light transmissivity was reduced throughout the water column upon the ship's departure (first data column, 0 minutes from departure), but at a greater magnitude near the bottom. The differential effect may be explained by proximity to the vessel propellers (the cause of water movement and suspension of sediment particles) and the fact that larger grain sizes would not be expected to be transported as far up into the water column due to their heavier mass. Data from 15 minutes following the ship's departure show a increase in percent light transmittance throughout the water column, with a greater effect (an increase in light transmittance of more than 10 percent) at the bottom of the water column. Thirty minutes following the ship's departure, percent light transmittance values throughout the water column were consistent with reference values; this was true for the remaining time series data.

In conclusion, the ship departure data indicate that the turbidity effects of the considerable disturbance caused by large vessel movements throughout the water column are limited in time to a period of less than 30 minutes.

Table 1 Time Series Percent Light Transmittance Results Following Departure of the *Ryndam* from the San Diego Cruise Ship Terminal.

Location	**Cruise Ship Terminal**					**San Diego Bay Post-Departure Reference**	***Star of India* Pre-Departure Reference**
CTD Cast	1	3	4	5	6	7	2
Time from Ship Departure (minutes)	**0**	**11**	**29**	**43**	**59**	**-**	**-**
Time (hours)	1703	1714	1732	1746	1802	1805	1509
Depth (meters):	Percent Light Transmittance					Percent Light Transmittance	
1	61.8	62.8	68.8	69.3	69.4	68.8	68.2
2	58.7	63.1	68.7	69.2	69.3	69.1	68.1
3	57.2	63.3	68.7	69.3	69.3	69.2	68.6
4	55.9	62.4	68.7	69.3	69.3	69.4	68.8
5	55.7	61.9	68.9	69.1	69.4	69.2	68.9
6	56.3	63.6	68.5	68.9	69.5	69.3	68.1
7	55.4	65.8	68.4	68.9	69.6	69.3	68.0
8	51.1	66.0	68.6	69.0	70.0	69.3	
9	49.0	63.4	68.8	68.9	70.2	69.3	
10	49.7	60.3	68.0	69.0	69.6	69.3	
11	50.3			69.1	69.2	68.6	
12	46.8			68.9			

3. Project Site Background Conditions

Background water quality monitoring at Naval Base San Diego was undertaken on Monday, 25 February 2008. Monitoring was undertaken from the AMEC vessel *Velella* from approximately 1400 to 1600 hours using the Seabird CTD instrument.

In order to quantify the turbidity near Pier 8 and Pier 14, the immediate vicinity of the piers were divided into three sub areas: East, Central and West. The CTD instrument cast was deployed in each of these three sub areas adjacent to both piers. Pier 8's deployment was conducted on the south side of the Pier, as access was restricted on the north side by US Navy vessels. Sampling adjacent to Pier 14 was conducted on the north side of the pier. Differences between the north and south sides of the piers were expected to be minimal due to the similar bathymetry, similar use histories, and the lack of vessel movements to/from the pier during or immediately prior to the effort. A reference water quality cast was also collected in the vicinity of San Diego Bay Main Channel Buoy 30 (offshore of Pier 8).

The tidal cycle during the time of sampling was ebbing from a high tide of +3.7 feet at 1124 hours falling to a low of +1.3 feet at 1659 hours. Sunny conditions predominated with moderate winds. In the 48 hours prior to sampling, 0.16 inches of precipitation was recorded in Bonita, San Diego, California. However, the rainfall concluded at approximately noon on 24 February 2008, creating 24 hours of absence of precipitation directly prior to sampling. No storm water or plume influences were observed during sampling. Results of the water column CTD casts are presented below in Tables 2 and 3.

Table 2. Pier 8 and Bay Reference Transmissivity Data

Station	Pier 8 - East	Pier 8 - Central	Pier 8 - West	S.D. Bay Reference
Latitude	32° 40' 24.2"	32° 40' 21.1"	32° 40' 18.1"	32° 40' 08.7"
Longitude	117° 07' 16"	117° 07' 22.4"	117° 07' 25"	117° 07' 39.0"
Date	25-Feb-08	25-Feb-08	25-Feb-08	25-Feb-08
Time	1445	1501	1506	1551
Depth (meters)	Percent Light Transmissivity			
1	64.4	67.9	68.8	60.1
2	65.8	67.8	70.5	60.9
3	65.0	66.1	70.5	61.6
4	64.3	64.7	70.1	62.4
5	65.8	64.7	69.1	63.2
6	67.2	63.5	67.8	64.5
7	68.7	64.5	65.6	65.8
8	70.0	66.1	64.6	66.6
9	70.4	67.5	64.8	66.3
10	71.7	67.6	65.5	66.8
11	64.0	65.8	63.5	66.6
12	67.3	65.5	61.8	66.4
13	-	-	61.5	-

Water quality results in the vicinity of the project site were generally consistent with expected values. Light transmissivity ranged from 51 to 71 percent, but most values were between 60 and 65 percent. Turbidity values were slightly lower than those observed at the San Diego Cruise Ship Terminal in the northern portion of the bay, consistent with that of the inner areas of coastal embayments in Southern California. Values were consistent with conditions observed at the San Diego Bay reference location

Therefore, in conclusion, the data observed in this monitoring effort indicated that water quality data at both Piers 8 and 14 at Naval Station San Diego were consistent with measurements taken at a nearby reference location and with expected values.

Table 3. Pier 14 and Bay Reference Transmissivity Data

Station	Pier 14 - East	Pier 14 - Central	Pier 14 - West	S.D. Bay Reference
Latitude	32° 39' 38.5"	32° 39' 38"	32° 39' 37.8"	32° 40' 08.7"
Longitude	117 ° 07' 11.1"	117° 07' 16.7"	117° 07' 22.6"	117° 07' 39.0"
Date	25-Feb-08	25-Feb-08	25-Feb-08	25-Feb-08
Time	1534	1525	1519	1551
Depth (meters)	Percent Light Transmissivity			
1	62.6	62.7	60.4	60.1
2	63.6	61.9	60.5	60.9
3	63.3	60.8	61.2	61.6
4	63.6	61.4	61.8	62.4
5	63.5	61.9	62.4	63.2
6	63.0	59.6	62.9	64.5
7	60.9	60.5	68.1	65.8
8	66.1	62.1	51.5	66.6
9	-	61.1	58.5	66.3
10	-	-	-	66.8
11	-	-	-	66.6
12	-	-	-	66.4

Conclusions

Since sediments will be physically mobilized during the proposed project, turbidity impacts are expected. These impacts are expected to be of greater magnitude as a result of pier piling removal than for pile driving operations. The difference in the magnitude of the impact is due to the physical nature of the removal process, during which sediments will be mobilized as pilings are pulled up through the water column. During pile driving operations, mechanical vibrations may mobilize sediments from the sea floor, but any mobilization of sediments would be limited to the portion of the water column in the immediate vicinity of the harbor bottom and would likely settle out rapidly in close proximity to the work location.

As stated above, resuspension of sediments due to pier piling removal is likely to cause a turbidity plume in the vicinity of the work area since sediments are likely to adhere to the pilings as they are removed and may slough off as the piling is moved upward or laterally in the water column, or during the out-of-water pile handling process. However, turbidity plumes are not expected outside the immediate vicinity of the project area since the volume of sediment adhering to pilings is expected to be minor. Data collected during the Pier 10 project indicate that any plume created would remain in close proximity to the project site under most circumstances. Furthermore, based on the ship departure turbidity data, any turbidity impacts

are likely to dissipate in a short period of time. Therefore, turbidity impacts as a result of the proposed project should be considered limited in terms of spatial extent and short-term in duration.

Should any additional information or clarification be needed, please contact me at 858-300-4321.

Regards,

Nicholas Buhbe, M.S.
Senior Marine Scientist
AMEC Earth & Environmental, Inc.

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Appendix C

Marine Biological Resources

• Draft Wharf Shading Study for the
Pier 8 Replacement and Demolition Project, Naval Base San Diego
(Merkel & Associates, Inc. 2014)

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DRAFT

WHARF SHADING STUDY FOR THE PIER 8 REPLACEMENT AND DEMOLITION PROJECT, NAVAL BASE SAN DIEGO

Prepared for:

Naval Facilities Engineering Command
Southwest Division
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INTRODUCTION

PROPOSED PROJECT

The United States Navy (USN) is proposing to demolish one inadequate existing pier (Pier 8) and construct a new pier and associated pier utilities at Naval Base San Diego (NBSD), California (Figure 1). The new replacement Pier 8 would either be constructed as a modular hybrid pier (MHP) or a conventional pier. The MHP Alternative is based on standardized floating modules, thereby eliminating support and fender piles. The MHP Alternative would have five individual modules resulting in a structure that would be 90 feet (ft) wide by 1,560 ft long (Figure 2). The Conventional Pier Alternative would consist of a single-deck, concrete berthing pier and would be 117 ft wide by a length of 1,600 ft (Figure 2). The dimensions for the existing Pier 8 and proposed replacement alternatives are provided in Table 1.

Table 1. Dimensions of existing Pier 8 and proposed replacement alternatives.

Description	Length (ft)	Width (ft)	Area (ft^2)	Area (Acres)	Water Depth (ft MLLW)
Existing Pier 8	1,610	66	106,260	2.4	-37
MHP Alternative	1,560	90	140,400	3.2	-37
Conventional Pier Alternative	1,600	117	187,200	4.3	-37

Although the new Pier 8 would be wider than the existing Pier 8, the pier would be designed and constructed under either alternative to ensure that vessels can navigate safely within the bay. The pier would provide a minimum of two outer end pierside berths for modern Navy ships comparable in size to a multi-purpose amphibious assault ship, the largest ship that would be supported by the project. The inner berths would have enough room for two other modern Navy ships, such as guided missile destroyers. No dredging is proposed since Pier 8 is already designed as a deep draft pier (water depth > -37 ft MLLW) (Figure 3).

Replacing Pier 8 would provide the necessary infrastructure and berthing space to adequately accommodate the Navy's modern ship classes. The Proposed Action would create the infrastructure necessary to support modern Navy ship classes that have deep draft-power intensive or power intensive requirements.

Figure 1. Pier 8, Naval Base San Diego

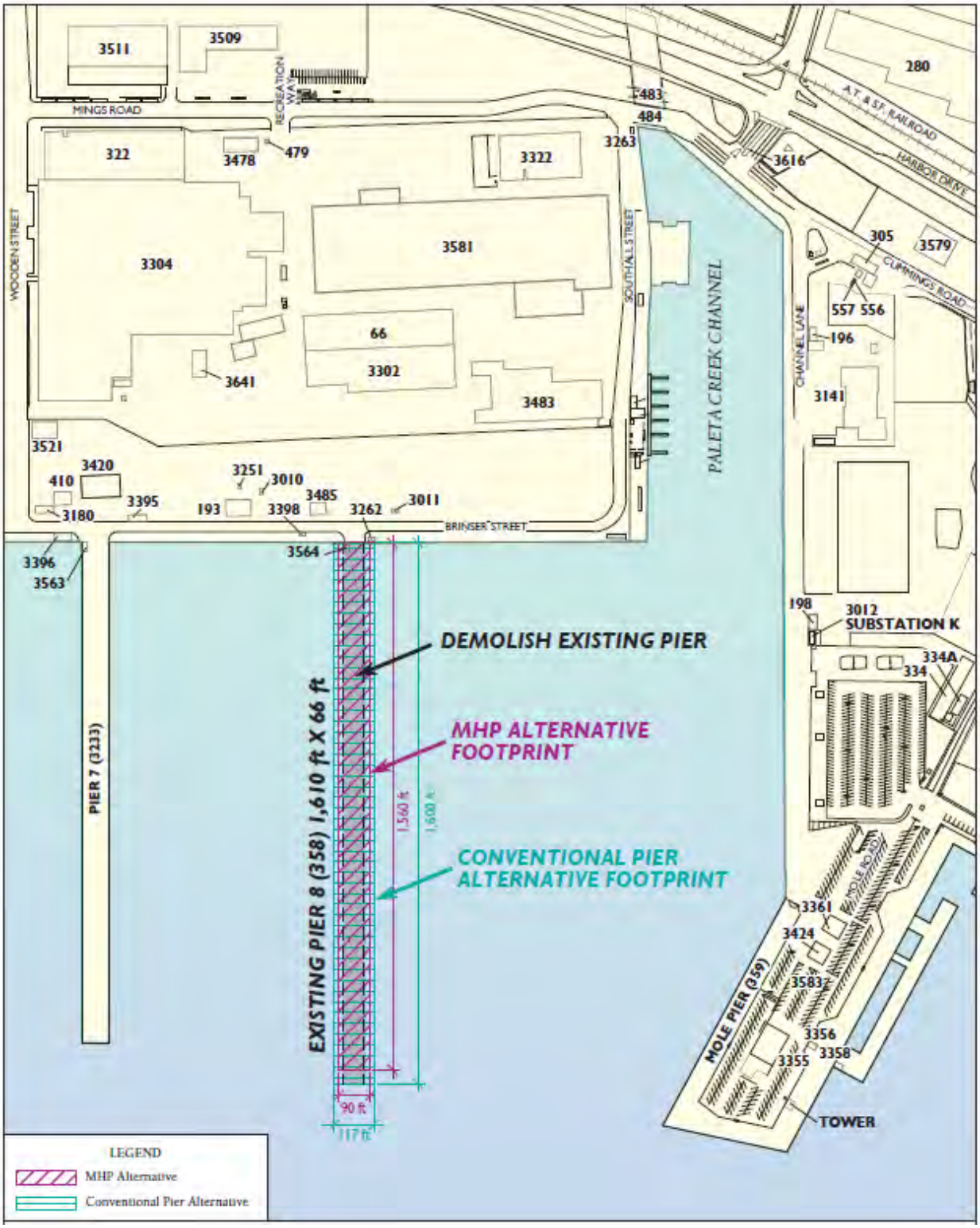


Figure 2. Existing Pier 8 and proposed MHP and Conventional Pier footprints.

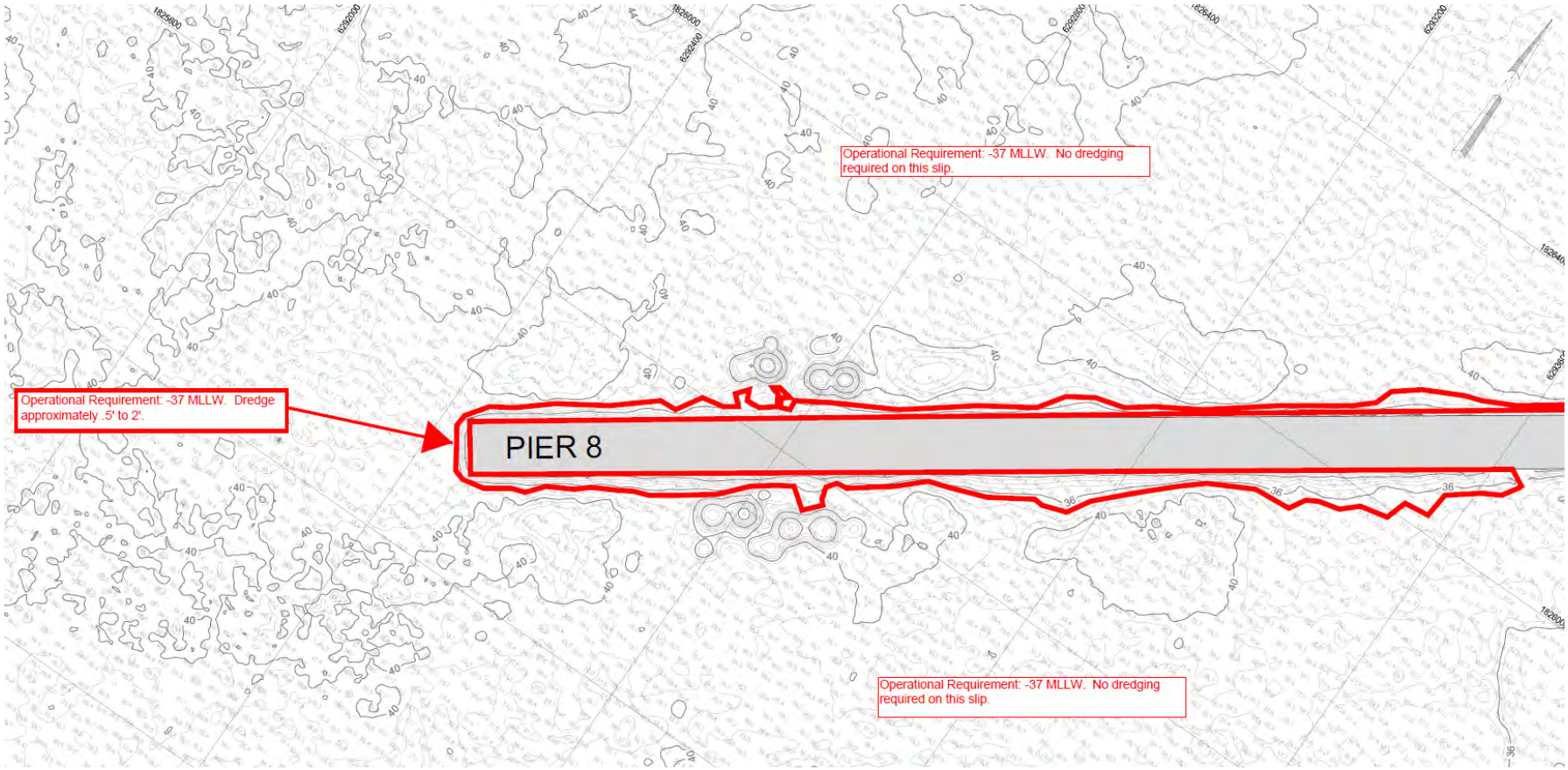


Figure 3. Bathymetry in vicinity of Pier 8, Naval Base San Diego.

WHARF SHADING BACKGROUND INFORMATION

Wharf structures are a common component of port and harbor facilities and are particularly prevalent within Naval facilities where broad equipment and personnel embarking facilities are required to support ship operations. Historically, the placement of wharves, docks, and piers has been viewed as reasonably self-mitigating or neutral with respect to impacts to fish and benthic communities. Such structures tend to provide increased three dimensional substrate and cover that locally increases productivity of encrusting benthic organisms and also serves to locally increase richness and abundance of fish over the conditions observed in more open waters (Figure 4; Merkel & Associates 2010).

However, there has been some discussion that there may be diminishing return from larger structures and that negative impacts may result which exceed the positive effects associated with structures. Biological communities under more expansive structures may be fundamentally different than those found along the fringes of the structure or around smaller structures. Intuitively, this concern has some merit. The physical environment beneath a larger structure would be expected to differ from that observed along the edges of the structure. Under large pile supported structures, light levels are lower, support piles reduce currents and wave energies, and create strongly depositional environments, and water circulation is expected to be reduced.

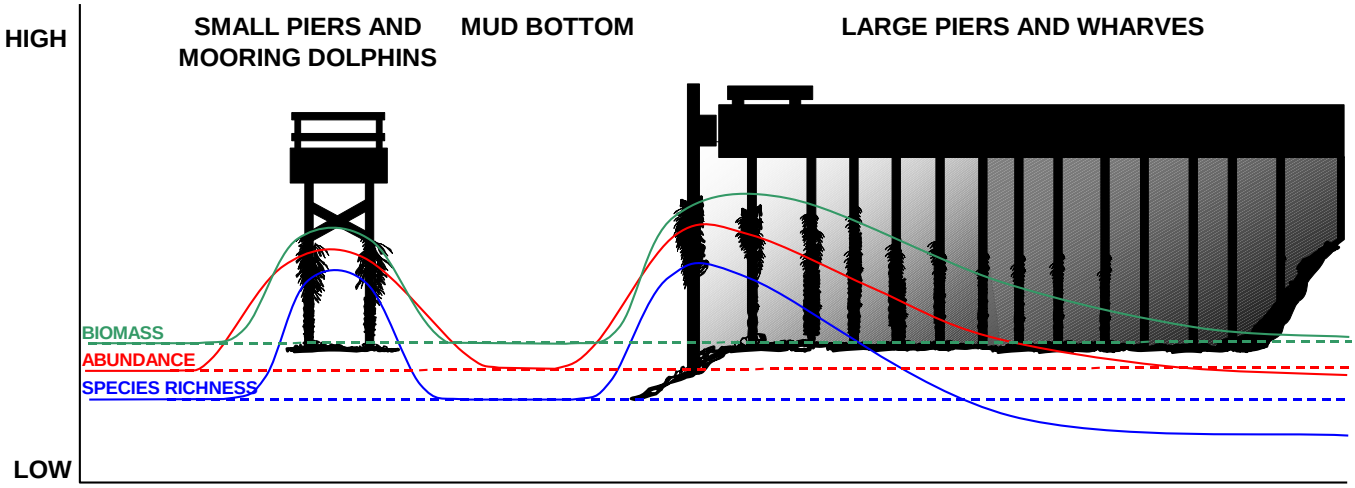


Figure 4. Qualitative biological metrics for small and larger piers.

National Marine Fisheries Service (NMFS 2012) provides a summary of both direct and indirect impacts associated with overwater structures. Overwater structures and associated activities can impact the ecological functions of habitat through the alteration of habitat controlling factors. These alterations can, in turn, interfere with habitat processes supporting the key ecological functions of spawning, rearing, and refugia. The matrix presented in Table 2 identifies the potential mechanisms of impact overwater structure can pose to nearshore habitats. Whether any of these impacts occur and to what degree they occur at any one site depends upon the nature of site-specific habitat controlling factors and the type, characteristics, and use patterns of a given overwater structure located at a specific site (Nightingale and Simenstad 2001).

Table 2. Overwater structure nearshore habitat impact mechanisms (from Nightingale and Simenstad 2001).

Habitat Controlling Factors	Overwater Structure and Activities	Direct Impacts	Indirect Impacts
Light Regime	• Piers/Docks • Wharves/Marinas • Floats/Moored Vessels • Pilings	• Reduced light levels • Altered ambient light • patterns	• Limited plant growth and recruitment • Altered plant and animal assemblages • Altered animal behavior
Wave Energy Regime	• Piers/Docks • Wharves/Marinas • Floats/Moored Vessels • Pilings	• Altered wave and tidal energy patterns	• Altered plant and animal assemblages • Altered substrate type • Altered sediment transport and distribution
Substrate	• Propeller and anchor scour • Floats and moored vessels (grounding) • Piling install/removal	• Substrate disturbance and smothering	• Altered plant and animal assemblages • Altered substrate type • Altered sediment transport and distribution
Water Quality	• Discharges from marinas/wharves • Boat and upland runoff • Piling install/removal	• Increased Nonindigenous species • Increased toxics • Increased nutrients and bacterial introductions	• Altered plant and animal assemblages • Limited growth and recruitment • Exotic species replacement of natives

SAN DIEGO BAY BACKGROUND INFORMATION

Specific differences exist in areas of wharfs that differ from open bay environments include shading of the water column and seafloor by structures, decrease in water circulation as a result of pile fields and berthed vessels, and increased sediment deposition due to reduced circulation. Conversely, wharfs increase vertical structure, provide hard surfaces for primary and secondary substrate colonizers in areas that typically lack hard surfaces, and increase presence of substrate in upper water column environments, allowing for increased primary production along the wharf margins where wharf shading is not a prevalent issue. As encrusting organisms fall to the bottom from hard structures or shed waste, there is a benthic enrichment that occurs below structures.

To evaluate the biologic conditions expected to develop under a proposed wharf structure at Naval Air Station North Island (NASNI), a preliminary study was made of comparable conditions occurring elsewhere in San Diego Bay (Merkel & Associates 1999). Surveys were conducted during both the

winter and summer seasons at the end of Pier 13 at NBSD and the CVN Pier 700 on NASNI. At each of the surveyed piers, three sampling regions were established, and included:

1. The exposed region outside of any pier cover along the face of the pier;
2. The shade region beneath the pier approximately 10m from the face where light levels were such that objects could be seen, but fine details could not be distinguished, and;
3. The dark region located approximately 30m from the face of the pier and 10m from each side of the NBSD pier (the presence of berthed ships further shades the sides of the pier).

Within each of the three regions, surveys were conducted along transects located approximately 3m below the surface and along the bottom in approximately 10m of water. Transects ran parallel to the width of the pier, approximately 20m. However, the two transects in the dark sampling region ran perpendicular to the other transects to avoid the twilight areas along the pier edges in order to ensure complete darkness within that sampling region. All studies were conducted using SCUBA, and divers slowly swam the length of each transect and recorded the numbers and species of all fish encountered. In addition, within each of the three regions, three sediment core samples were collected along the bottom transect at an approximate depth of 10m. Each sample was rinsed through a 1.0 mm sieve and organisms from each sample were transferred to Whir-Pak bags, and preserved with a 10% formalin:seawater mixture. After approximately one week, benthic samples were transferred in the laboratory from the formalin solution into 70% isopropyl alcohol and stained with rose bengal. All individuals in each replicate sample were identified to family and counted. Pier pilings were closely examined along each transect to note visual differences in the composition of encrusting communities. A video camera was used to document pile communities and allow for later review. No scrapings were taken and no detailed analysis of community composition was made.

Results indicated that an infaunal community persisted under pile supported structures within San Diego Bay and that, for this study, a numerically greater number of organisms were found in the infauna under the piers than outside of the piers (Merkel & Associates 1999). Fish were found in all areas across a light gradient extending from the face of the pile supported structures to the darkest regions beneath the structures. The species counts and fish abundance did not appear to appreciably differ across this gradient, except for the lack of pelagic schooling fish being found beneath the structures. The pile community observed under the pier was reduced in richness from that found along the outer edges of the pier, however a developed pile community existed in all areas. Another study conducted at the National City Marine Terminal noted that the major difference in pile-associated biota was that no algae were present on the shaded piles and that the thickness of the epibiota on the shaded piles was estimated to be approximately 50% of that on the exposed piles (San Diego Unified Port District 1999). It should be noted that the Merkel & Associates 1999 study was not a comprehensive study, and conclusions differ from those of Able and Duffy-Anderson (2005) which noted that under-pier areas were poor-quality habitats because they supported low fish abundances, inhibit feeding, and suppress growth. However, the Able and Duffy-Anderson (2005) study was conducted in relatively shallow water looking at shading effects and growth on specific fish species, and therefore results may not be directly comparable.

STUDY OBJECTIVES

The project proposes to demolish the existing Pier 8 and construct a new replacement pier. The new pier is proposed to be similar in length, but much wider (and therefore a larger area) than the existing pier (Table 1), and similar to other "newer" piers at NBSD. The objective of the current study was to supplement the Merkel & Associates 1999 study by incorporating new technologies and methodologies to characterize similar communities that were previously studied (i.e., fish, benthic

infauna, and epifauna), and to predict the potential community structure of the new pier. The habitats within NBSD that were surveyed included:

- Open water deep subtidal habitat (open area between piers)
- Smaller pier structure (approximately 60 ft wide)
- Larger pier structure (approximately 120 ft wide)

Recognizing that the study area is a heavily industrialized area, it was determined that sampling pristine reference areas (i.e., areas unaffected by industrial activities) would not provide value in making comparisons and impact assessments. While they may not be directly comparable, data from previous studies were used to determine community structure for relatively undisturbed deep subtidal habitats in San Diego Bay. As a reference in the current study, the industrialized harbor area between piers served as a better tool for evaluation of community changes, as these areas would be equivalent to the habitat lost to pier expansion.

METHODS

PROJECT PERSONNEL

Merkel & Associates, Inc. (M&A) conducted the study in June 2013, and key project personnel are listed in Table 3.

Table 3. Key project personnel.

Organization	Name	Title	Office Phone	Cell Phone
NFECSW Coastal IPT	Mitch Perdue	Project Manager	619-556-7594	619-726-5688
U.S. Navy	Paul Patricio	Waterfront Operations	619-556-2772	
Merkel & Associates	Lawrence Honma	M&A Project Manager; Site Safety Supervisor	858-560-5465	858-229-1444

STUDY DESIGN

The study area included Pier 8 (small pier), Pier 2 (large pier), and the waters adjacent to each pier (Figure 5). Similar to the M&A 1999 study, four sampling regions were established at each pier and included:

1. The exposed region outside of any pier cover along the face of the pier;
2. The shade region beneath the pier approximately 15 to 30 ft from the pier face
3. The darkest regions located along the centerline of the pier, and;
4. The waters adjacent to each pier.

Within each of the regions, surveys were conducted along transects located approximately 10 ft below the surface and along the bottom (Figure 6). The study utilized a variety of methodologies, to various degrees of success, and included interferometric sidescan sonar, Remotely Operated Vehicle (ROV), low-light video camera, and SCUBA.

Figure 5. Pier 2 and Pier 8, Naval Base San Diego.

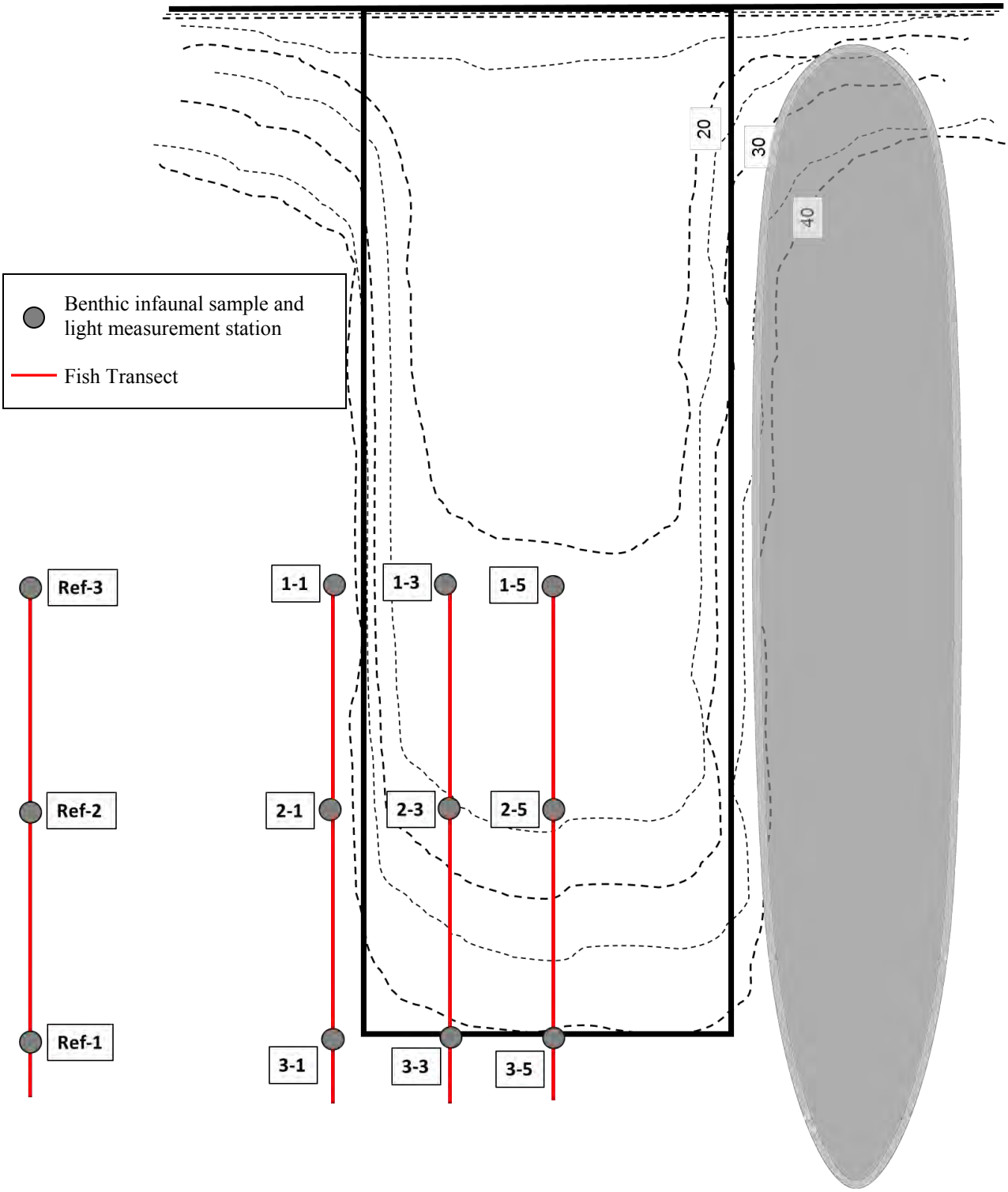


Figure 6. Sampling design schematic.

Ambient Light Measurements

Ambient light measurements were collected through the water column (surface, mid-water, and bottom) at each benthic station (Figure 6). Results were averaged by sampling region and depth, and compared to percent of ambient (reference) condition.

Fish Community

Similar to previous surveys, divers slowly swam the length of each 100 meter transect (approx. 330 ft) and recorded the numbers and species of all fish encountered. A flashlight was used to aid in fish identification within the shade and dark regions. Only fish within an approximate distance of 10 ft from the centerline of the transect were counted. Fish surveys included a search of all microhabitats represented on the transect including open water, on and around piles, as well as on the bottom, where such areas are present. Species composition and abundance of fishes were compared among the regions and between small and large piers to note any patterns or differences.

Benthic Infaunal Community

Benthic infaunal communities were examined to determine if there were notable differences in this fish forage resource across a gradient from the exposed to the dark region. Within each of the three regions, three sediment core samples (46 cm^2) were collected along the bottom transect. Each sample was rinsed through a 1.0 mm sieve and organisms from each sample were transferred to jars, and preserved with a 10% formalin-seawater mixture. After approximately one week, benthic samples were transferred in the laboratory from the formalin solution into 70% isopropyl alcohol. All individuals in each replicate sample were identified to lowest practicable taxon and counted. Organisms were grouped by phylum and weighed to determine the wet weight biomass of each phylum. Wet weight was determined by first transferring an entire sample (or phylum), including alcohol, onto a paper towel and quickly blotting excess liquid from the animals. Organisms were then transferred to a tared weighing dish and weighed to the nearest 0.001g using an analytical balance. Species richness and composition of benthic invertebrate species were compared among the three regions and between small and large piers.

Encrusting Pile Community

A comprehensive assessment of the pier piling community was not proposed for this study. Other, more comprehensive studies have been conducted in San Diego Bay (e.g., SDUPD 1999), and provide general community structure and species composition. For this study, pier pilings were closely examined along each transect to note visual differences in the composition of encrusting communities. An underwater camera and/or video camera were also used to document pile communities and allow for later review. No scrapings were taken and no detailed analyses of community composition were made.

HEALTH AND SAFETY

All on-water and diving operations met U.S. Army Corps of Engineers EM385 1-1 and Occupational Safety and Health Administration (OSHA) CFR 1910 Subpart T health and safety requirements. Additional safety requirements mandated by the Navy regarding scientific diving included the use of redundant 30 ft^3 air sources, a fully equipped standby diver, and a dive supervisor. All appropriate health and safety documents and security notices were completed and approved prior to

implementation, and present on site. In addition, daily on-site communications with Navy security were maintained.

RESULTS

Several items to note is the design and elevation of the pier decking for Pier 2 and Pier 8, which factor into the results, and include:

- Pier 2 (large pier) has a higher deck with fewer pilings and trusses (Figure 7). It is estimated that the underside of the decking is approximately 10 ft above the water at low tide, and approximately 4 ft above the water at high tide. This higher design and broadly offset bumper placement (i.e., vessels remain farther away from pier) increases ambient light levels below the pier.

- Pier 8 (small pier) has a lower deck and numerous pilings (Figure 8). The bottom of the decking is submerged at high tide, and approximately 6 ft above the water at low tide. This lower design required that sampling occur at a lower tide.

- For safety purposes, no vessels were present during the sampling. The presence of vessels may reduce ambient light conditions under the pier depending on the time of day; however, large mooring fenders are also present along the pier which ensures that vessels standoff away from the piers, which may allow for light to filter under the piers.

NOTE ON SAMPLING METHODOLOGIES EMPLOYED

Given the limitations of conducting visual surveys under low to no light conditions, and possible avoidance response when underwater lights are used, other methods were attempted to better qualitatively and quantitative assess the fish community, most had varying degrees of success, and is briefly discussed in the following text.

One approach considered using underwater cameras and having the diver remain still for a period of several minutes prior to taking a picture. Unexpectedly, the lighting, while reduced under the pier, was not considered zero visibility as was encountered during the 1999 M&A study. It was still possible to determine fish species by viewing the profile/outline, and wide-angle underwater photographs were not possible under ambient conditions. Therefore, while the method was attempted, it did not assist in data collection. Similarly, an ROV was also considered, but given the numerous obstructions (i.e., pilings) and lighting necessary for the cameras to operate, it was determined that it would not assist in data collection. Lastly, a low-light video camera was lowered through the water column from a kayak; however, given the limited depth of field (i.e., range), no useable data were obtained.

Another method that was implemented including using sidescan sonar alongside the piers to detect any schooling fishes underneath the piers. While there appeared to be a school of fish detected during the survey, the resolution was poor due to all the pier pilings, and it was not possible to identify the species, only the limited presence of schooling fish around the piers, but not in the open reference areas.

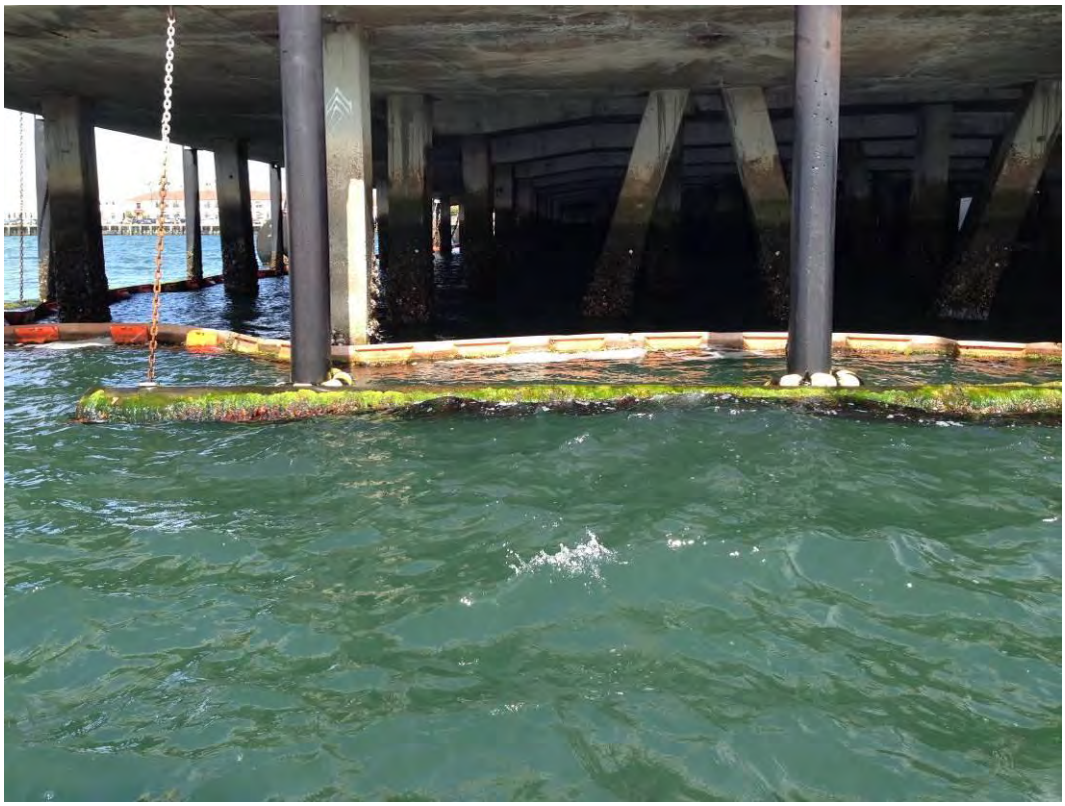


Figure 7. Pier 2 end-view (top) and side view (bottom).

Figure 8. Pier 8 side view (top) and close-up (bottom).

PHYSICAL SITE CONDITIONS

The survey area is within a working Naval facility and consists of hard structures including bulkhead wall, piers, and pier pilings. The bottom habitat is unvegetated mud bottom (Figure 9), and the slope of the bottom is relatively steep along the bulkhead wall and pier face, from a depth of approximately -15 ft MLLW underneath the pier to a depth of approximately -37 ft MLLW at the bayward edge of the piers (Figure 9). The area adjacent to the pier contained some debris items and shell hash, while underneath the pier, shell hash was present but not as concentrated as the area along the slope (Figure 9).

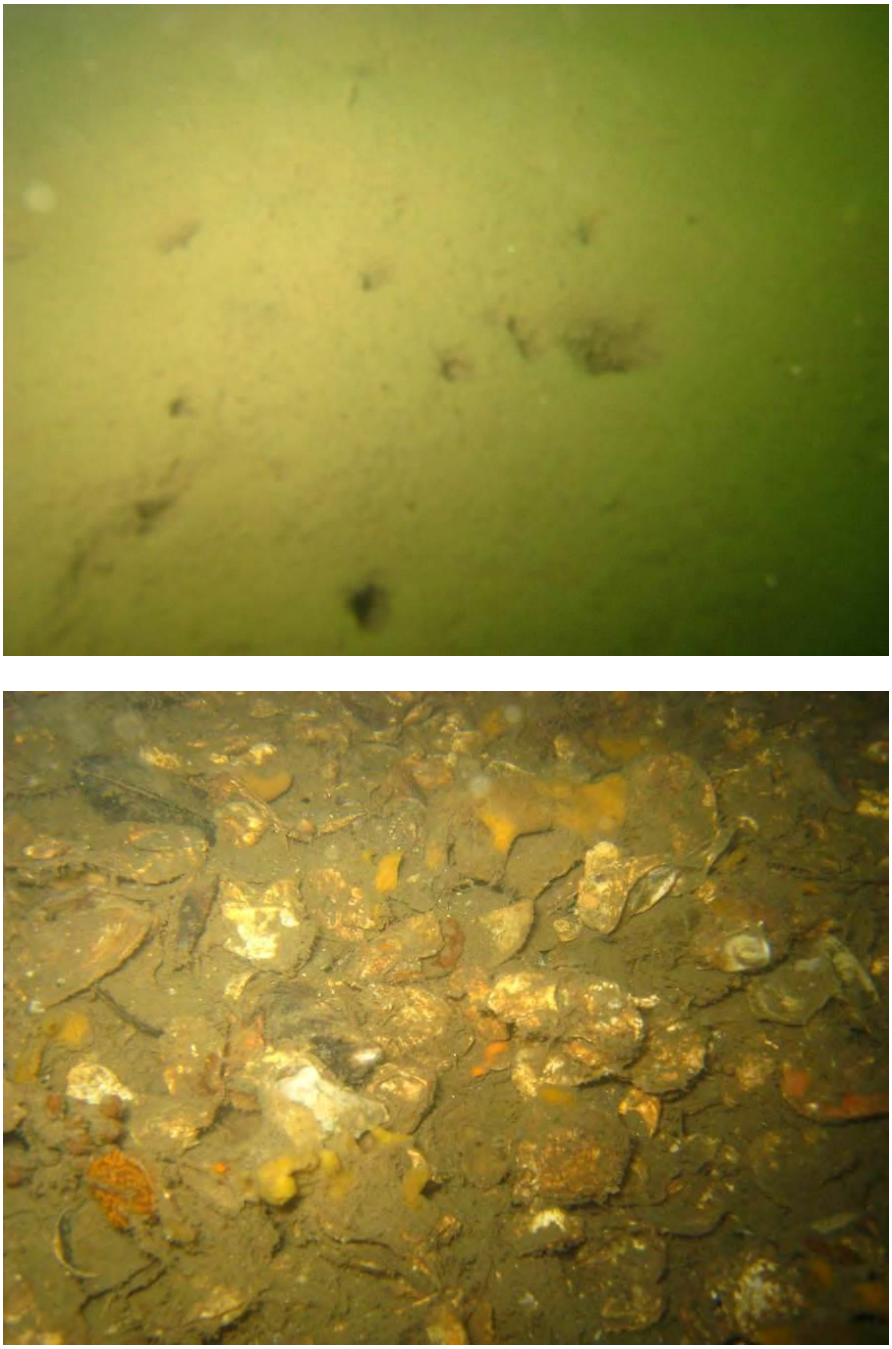
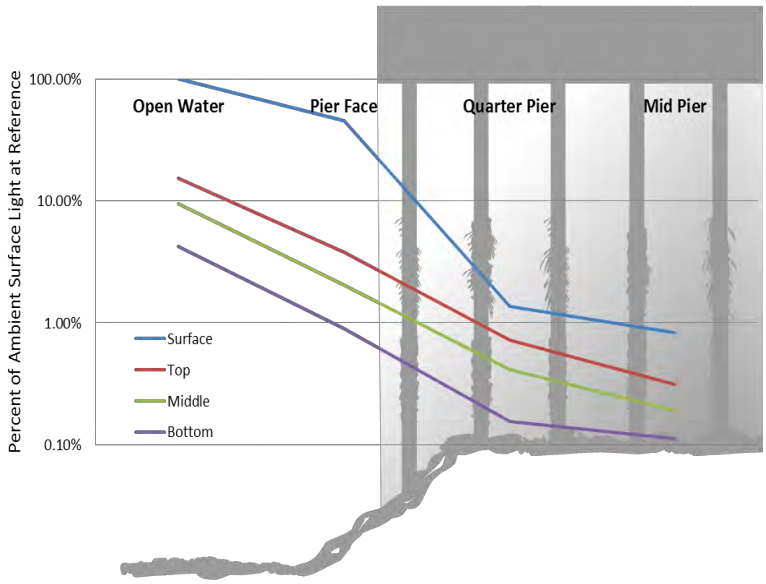


Figure 9. Unvegetated mud bottom (top) and shell hash adjacent to pier (bottom).

AMBIENT LIGHT CONDITIONS

As expected, light measurements adjacent to and underneath the piers were lower than reference (ambient) conditions, and similarly decreased as one moved further under the pier or deeper in the water column. When examined at Pier 2 using surface light at the open water reference site as a standard, this light reduction is easily seen. A logarithmic scale is necessary to effectively observe the levels of light reduction across all sampled areas. Bottom light intensity under the middle of the pier was only 0.11% that of the light reaching the water surface at the reference site.



When light levels were analyzed as a percent reduction from the open water reference area at the same depth strata (top water, mid-depth, and bottom), the reduction in light intensity was fairly consistent for both Pier 2 (large pier) and Pier 8 (small pier). Regardless of pier size, ambient light decreased to approximately 20 percent of ambient along the pier face and further decreased to approximately 4 percent of ambient at the quarter pier width and 2 percent of ambient at the mid-line of the pier (Table 4 and Figure 10). Despite the larger surface area (i.e., greater shaded area), light measurements under the large pier were similar to the small pier, and it is believed this was due to construction design and tidal level during sampling.

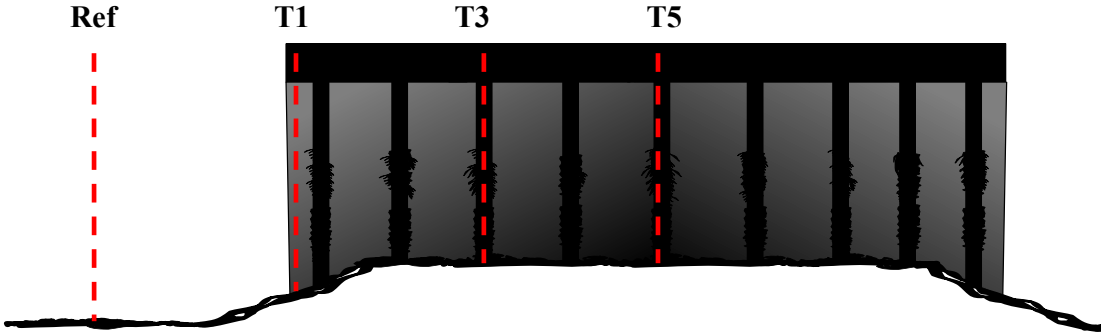
As noted, the decking on the large pier was approximately 10 ft above the water at low tide, and approximately 4 ft above the water at high tide, while the bottom of the decking on the small pier was submerged at high tide, and approximately 6 ft above the water at low tide (Figure 11). All sampling occurred at low tide, and it would be expected that results would differ more substantially between piers, had the sampling occurred at high tide, when surface light levels would be expected to be more dissimilar between the piers.

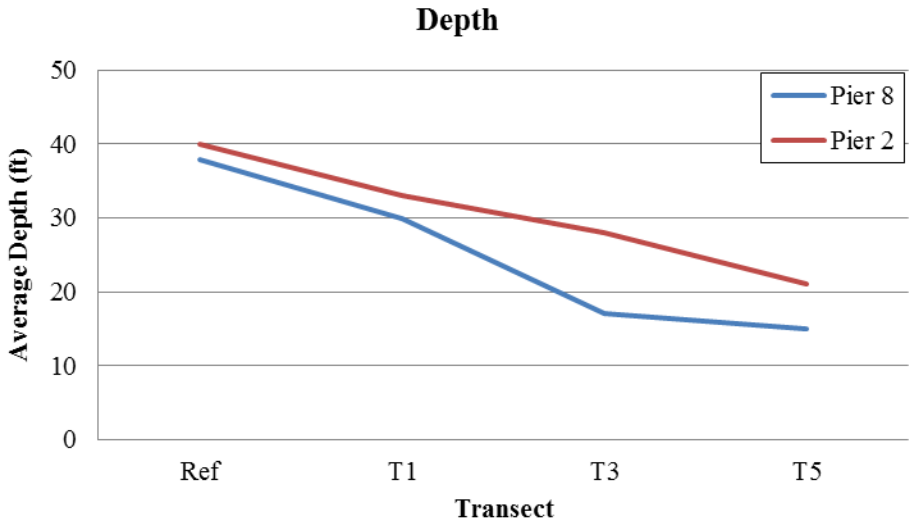
Also as noted, vessels were not present during the sampling for safety purposes, and the presence of vessels would be expected to reduce light levels, although large mooring fenders are present along the piers which ensures that vessels standoff away from the piers, and may allow for light to filter under the piers. This lack of vessel presence is a key difference between the observed light levels during the present survey and those observed in the 1999 M&A surveys when the central portion of the pier was completely dark. During the 1999 surveys, vessels were tied to both sides of the pier, thus significantly reducing surface light both at the edge and beneath the pier. Further, at the time of the 1999 survey, there was substantially less than a meter of space between the pier bottom and the surface of the water, further limiting availability of surface light to the center of the pier.

Table 4. Average light measurements at Pier 8 and Pier 2 along transects compared to percent of ambient (reference site) at same survey depth level.

Pier 8 – Small Pier								
Depth Level	**Ref**		**T1**		**T3**		**T5**	
	Depth (ft)	**% Ambient**	**Depth (ft)**	**% Ambient**	**Depth (ft)**	**% Ambient**	**Depth (ft)**	**% Ambient**
T	5	100%	5	13%	5	1%	4	0%
M	15	100%	15	21%	12	4%	9	2%
B	31	100%	26	25%	19	7%	14	4%
Mean light measurement			20%		4%		2%	
Pier 2 – Large Pier								
Depth Level	**Ref**		**T1**		**T3**		**T5**	
	Depth (ft)	**% Ambient**	**Depth (ft)**	**% Ambient**	**Depth (ft)**	**% Ambient**	**Depth (ft)**	**% Ambient**
T	5	100%	5	25%	5	5%	5	2%
M	15	100%	15	21%	10	4%	10	2%
B	30	100%	24	21%	17	4%	17	3%
Mean light measurement			22%		4%		2%	

Notes: T – Top; M – Mid-depth; B – Bottom survey depth level
T1 – Adjacent to Pier
T3 - Approximately 15 to 30 ft from the pier face
T5 – Along centerline of the pier





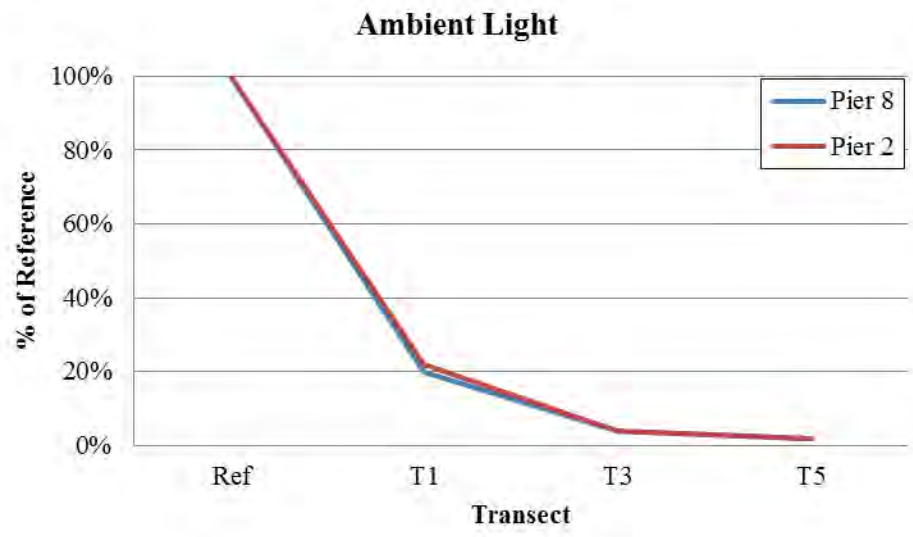


Figure 10. Average depth (top) and light measurements (bottom) along transects at Pier 8 and Pier 2.

Figure 11. Pier 2 (top) and Pier 8 (bottom) at low tide. Inset – Pier 8 at high tide.

FISH COMMUNITY

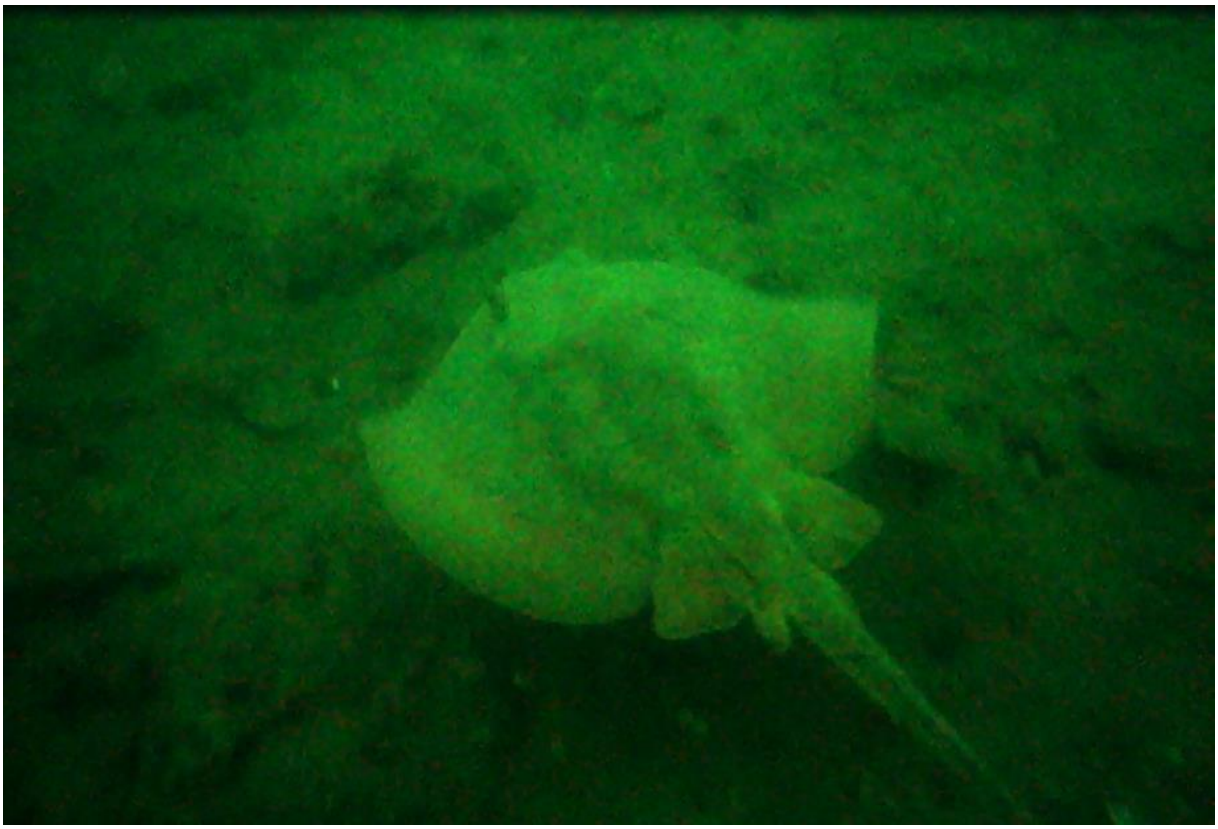
While lighting was reduced under the pier, it would not be considered zero visibility as was encountered during the 1999 M&A study, and it was possible to detect fishes during the survey and generally identify them based on outline or profile. Note that positive fish detection and species identification was sometimes hampered by light levels in combination with typical underwater visibility for south San Diego Bay which was estimated to be approximately 5 to 10 ft. As a result, it is anticipated that lower detection and identification rates occurred with reduced light under the piers.

Generally, few to no fish were observed along transects away from the piers (Table 5). The only fish observed along the reference transects was at Pier 2 and was one black croaker (*Cheilotrema saturnum*), which was present in association with a tug bummer tire that was the only structure occurring on the surveyed reference transects. Fishes observed in all regions of the piers include spotted bay bass (*Paralabrax maculatofasciatus*), kelp bass (*P. clathratus*), barred sand bass (*P. nebulifer*), and round rays (*Urobatis halleri*) (Figure 12). Spiny lobster were also observed adjacent to and underneath the piers (Figure 12). Other species that were generally present adjacent to the piers, and were also associated with the boom surrounding the piers included slough anchovy (*Anchoa delicatissima*) and giant kelpfish (*Heterostichus rostratus*) (Figure 13). Fishes observed primarily underneath the piers included black croaker (*Cheilotrema saturnum*), white seabass (*Atractoscion nobilis*), yellowfin croaker (*Umbrina roncador*), sargo (*Anisotremus davidsoni*), and small, cryptic species such as midshipman (*Porichthys* spp.) and bay blenny (*Hypsoblennius gentilis*) that were only detecting upon viewing video (Figure 14). Since video transects were not conducted, it is likely, that the abundance of these smaller species is greatly underestimated. While no statistical tests were conducted, fish richness and abundance were similar between large and small piers, and substantially higher than reference areas (Figure 15).

Table 5. Organisms observed during fish transects along transects at Pier 8 and Pier 2.

		Pier 8 – Small Pier				Pier 2 – Large Pier			
Common Name	**Scientific Name**	**Ref**	**T1**	**T3**	**T5**	**Ref**	**T1**	**T3**	**T5**
Spotted Bay Bass	*Paralabrax maculatofasciatus*		12	5	7		3	4	
Barred Sand Bass	*Paralabrax nebulifer*		4	3	2		2	1	9
Kelp Bass	*Paralabrax clathratus*		2	1					
Black Croaker	*Cheilotrema saturnum*				26	1*		17	
Round Ray	*Urobatis halleri*		3	2	4		2	5	2
Yellowfin Croaker	*Umbrina roncador*								3
White Sea Bass	*Atractoscion nobilis*						1		1
Midshipman	*Porichthys* sp.								1
Sargo	*Anisotremus davidsoni*							6	
Slough Anchovy	*Anchoa delicatissima*		500+**				500+**		
Giant Kelpfish	*Heterostichus rostratus*		2**				5**		
Bay Blenny	*Hypsoblennius gentilis*								2
Spiny Lobster	*Panulirus interruptus*						2		4

*next to tire on mud
**adjacent to boom



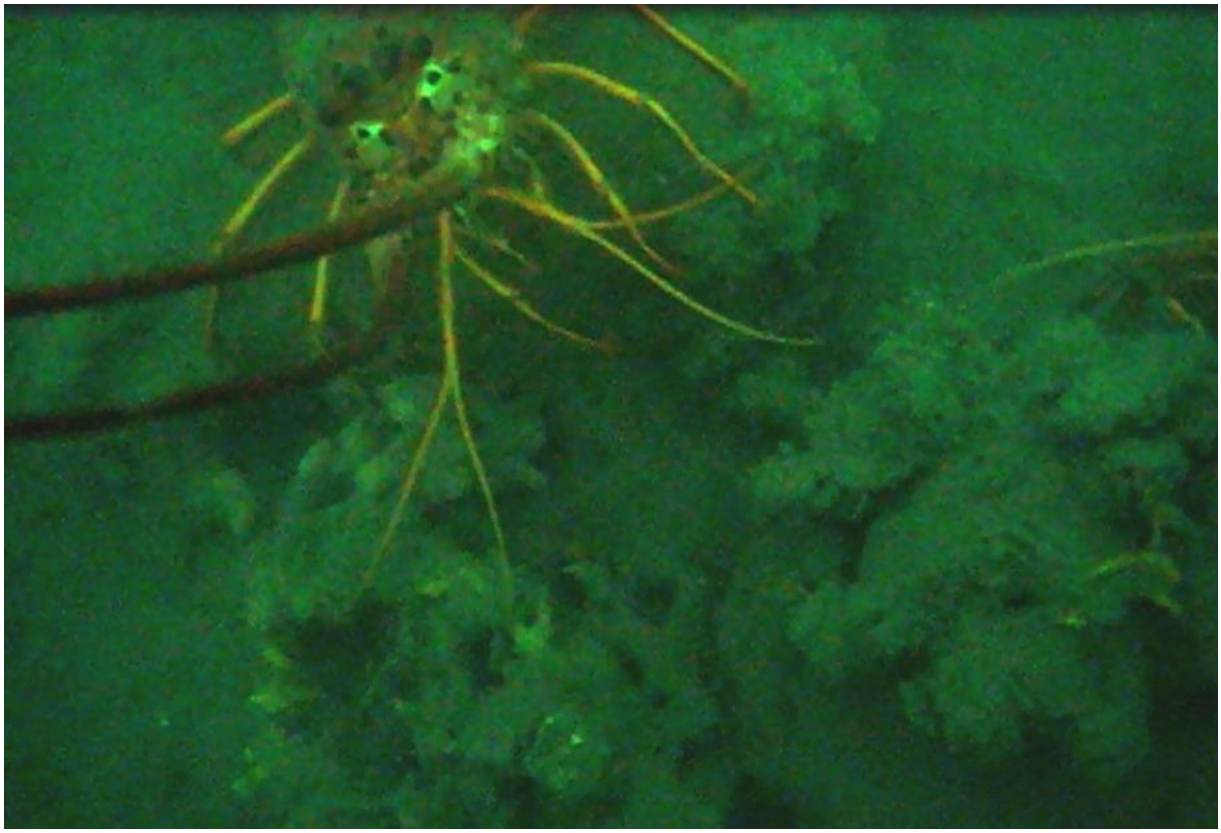


Figure 12. Round ray (top) and spiny lobster (bottom) adjacent to pier.

Figure 13. Giant kelpfish (top) and slough anchovy (bottom) near boom adjacent to pier.

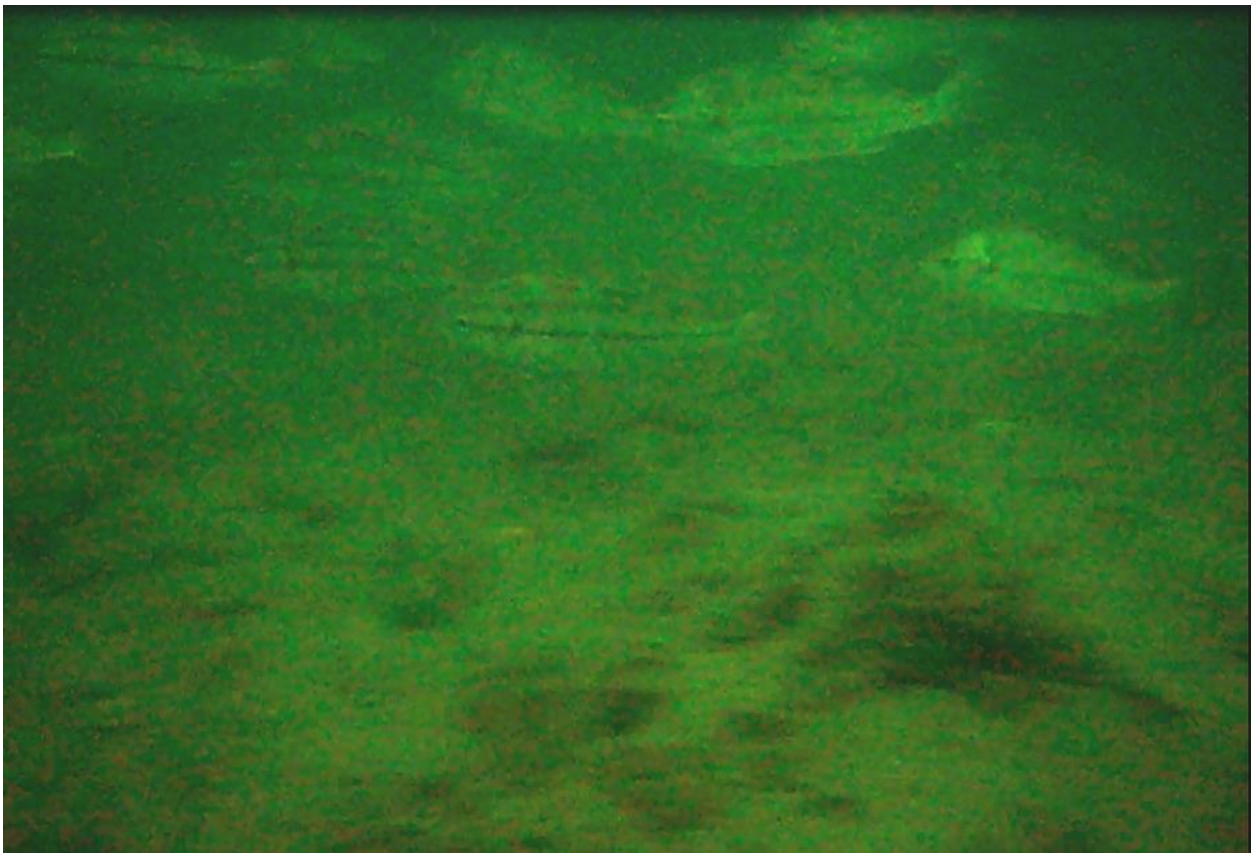
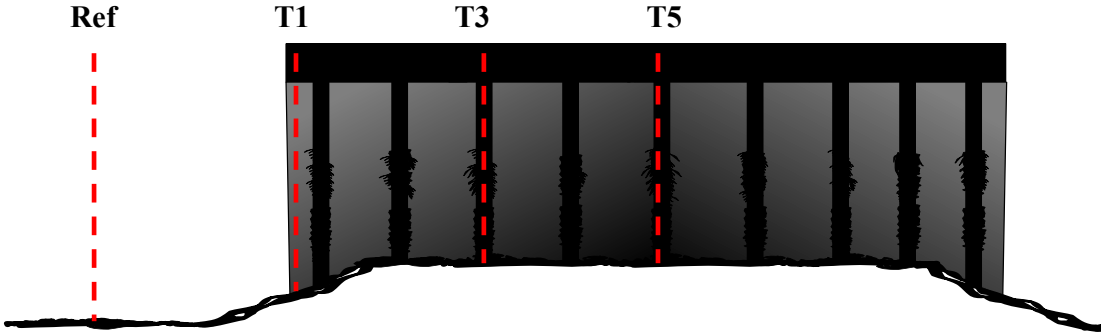


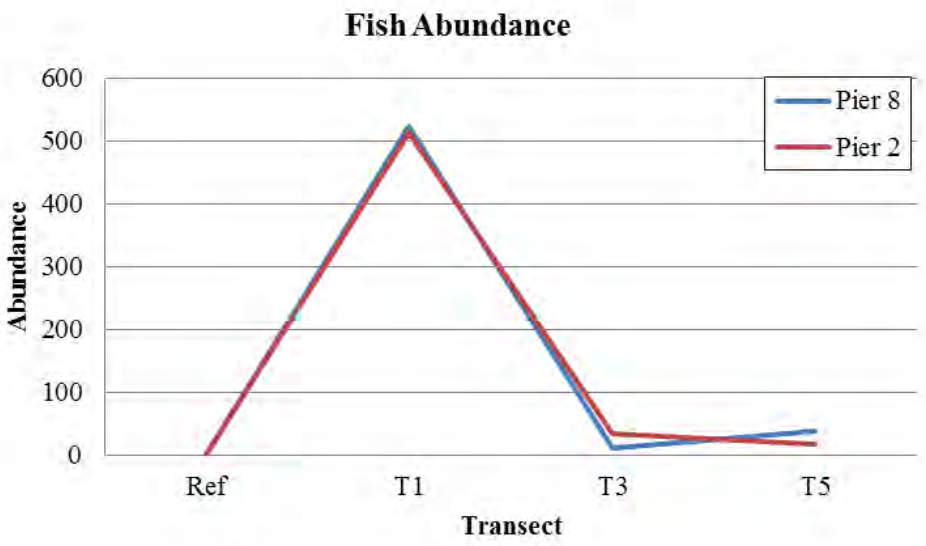
Figure 14. School of juvenile black croaker underneath the pier.

California scorpionfish (*Scorpaena guttata*) are likely to be associated with the pile communities, although none were observed during the survey and this species tends to be more common in northern San Diego Bay than the more southerly portions of the Bay. California scorpionfish is managed by the National Marine Fisheries Service under the Pacific Groundfish Fishery Management Plans (NMFS 2008).

BENTHIC INFAUNA COMMUNITY

Abundance and biomass of benthic infauna was generally higher at Pier 2 (large pier) compared to Pier 8 (small pier), and both were higher than reference areas (Tables 6 and 7; Figure 16). The results displayed the expected patterns; however, no significant differences were detected among the treatments using a one-way analysis of variance (ANOVA), except for the biomass data between Pier 2 and the Pier 8 reference area (Appendix A). Polychaete worms, crustaceans, and molluscs were the most abundant taxa (Table 6), while polychaetes worms, flatworms, and tunicates constituted the highest biomass (Table 7).





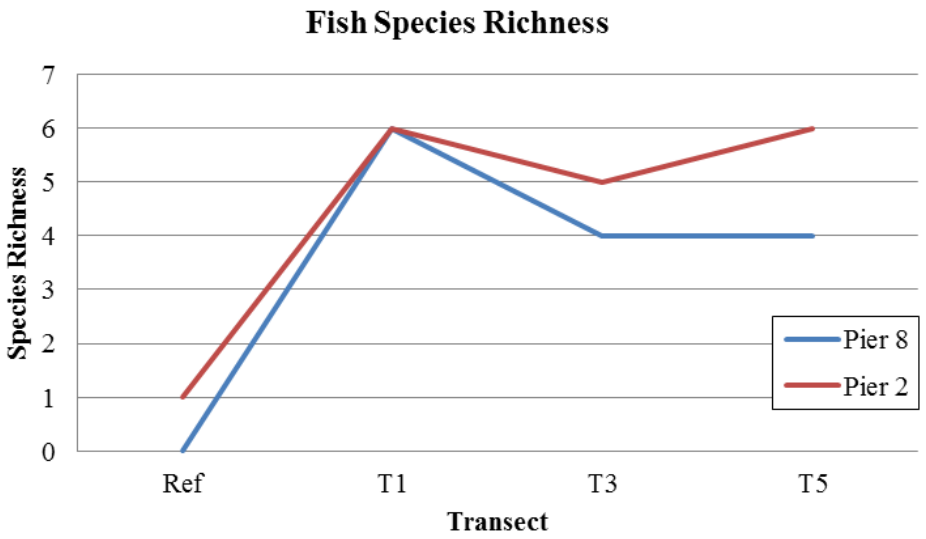


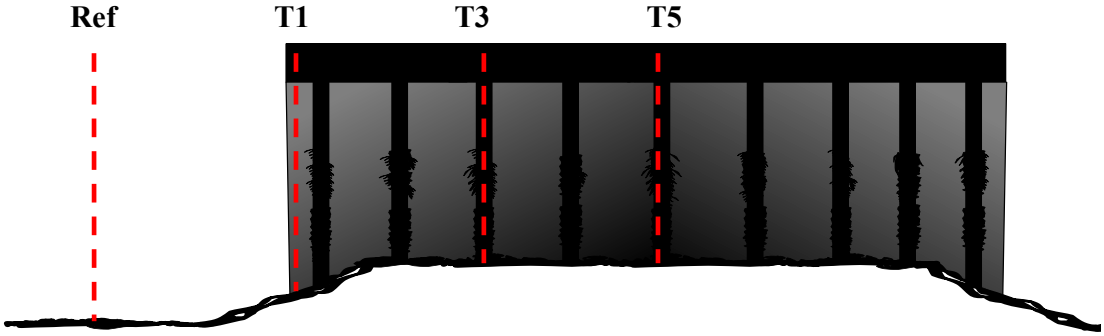
Figure 15. Fish abundance (top) and species richness (bottom) along transects.

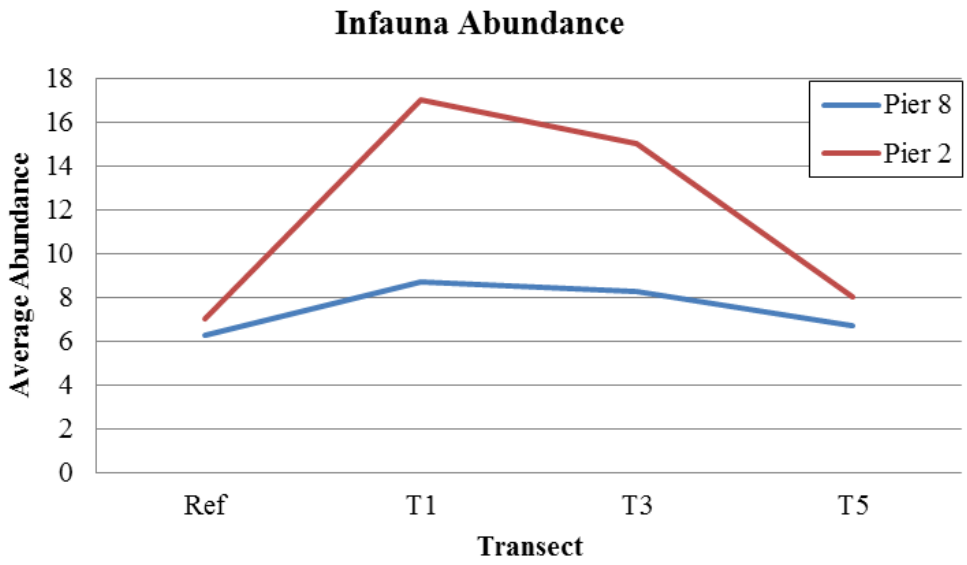
Table 6. Average abundance of benthic infauna for sampling regions at Pier 8 and Pier 2.

	Pier 8 – Small Pier				Pier 2 – Large Pier			
Phylum	**Ref**	**T1**	**T3**	**T5**	**Ref**	**T1**	**T3**	**T5**
Annelida	5.0	6.0	5.3	3.3	4.0	10.3	7.3	3.7
Arthropoda	0.3	1.3	1.7	0.7	1.0	2.3	2.7	2.0
Chordata	0.0	0.0	0.0	0.3	0.0	0.3	0.3	0.3
Cnidaria	0.0	0.0	0.0	0.7	0.3	0.3	0.3	0.0
Echinodermata	0.0	0.7	0.7	0.7	0.3	0.0	1.0	1.0
Ectoprocta	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
Mollusca	0.7	0.7	0.3	0.7	1.0	3.3	2.7	1.0
Nemertea	0.3	0.0	0.3	0.0	0.3	0.3	0.3	0.0
Platyhelminthes	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0
Average	6.3	8.7	8.3	6.7	7.0	17.0	15.0	8.0

Table 7. Average biomass (milligrams) of benthic infauna for sampling regions at Pier 8 and Pier 2.

	Pier 8 – Small Pier				Pier 2 – Large Pier			
Phylum	**Ref**	**T1**	**T3**	**T5**	**Ref**	**T1**	**T3**	**T5**
Annelida	29	205	404	355	79	528	629	150
Arthropoda	10	15	37	3	4	12	5	6
Chordata	3	3	1	150	13	150	208	176
Cnidaria	14	1	39	15	2	6	19	9
Echinodermata	0	0	0	4	1	0	0	0
Ectoprocta	0	0	0	0	0	0	0	0
Mollusca	0	0	0	1	0	0	0	0
Nemertea	0	1	2	0	0	0	0	0
Platyhelminthes	0	0	0	35	0	0	971	201
Average	56	224	483	565	98	696	1,833	542





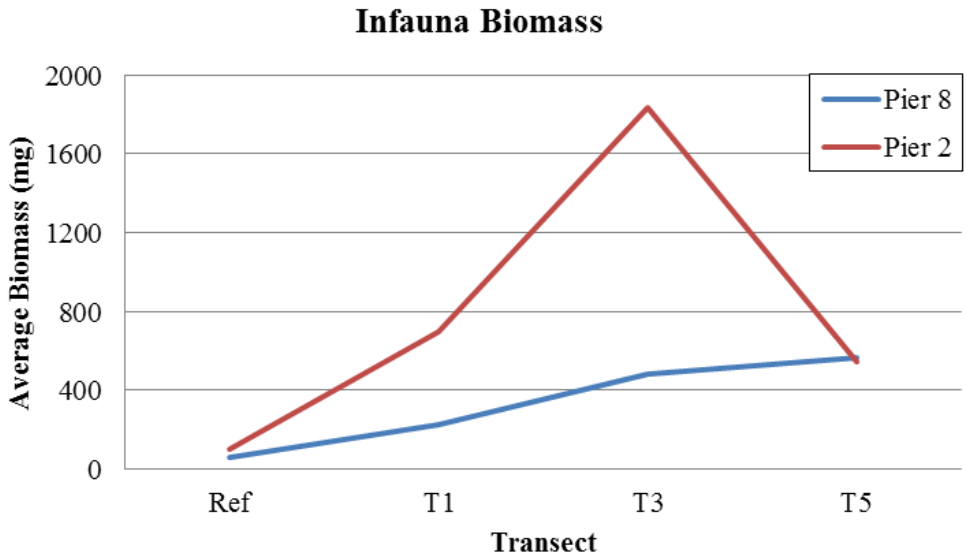


Figure 16. Benthic infuana abundance (top) and species richness (bottom) along transects.

PILING COMMUNITY

A comprehensive assessment of the pier piling community was not conducted for this study as other comprehensive studies have been conducted in south San Diego Bay (e.g., SDUPD 1999), and provide general community structure and species composition, and is anticipated to have similar species assemblages.

For this study, pier pilings were examined along each transect to note visual differences in the composition of encrusting communities. Within the intertidal zone (+6 to -2 ft MLLW), the piles supported a less diverse assemblage compared to the subtidal zone, and were dominated by oysters (*Crassostrea gigas*, *Ostrea lurida*), mussels (*Mytilus* spp.), and barnacles (*Balanus* spp., *Chthalamus* spp.) (Figure 17). No attached algae were observed on the pilings.

Below the intertidal zone, epibiota attached to the pilings included a variety of sponges, hydroids, and tunicates (Figure 18), and the thickness of the epibiota ranged from approximately 3 cm (1 in) to approximately 20 cm (8 in), with the percent cover ranging from approximately 10 to 100 percent. Common species of sponges observed on the pilings at the National City Marine Terminal included *Haliclona bowerbankia*, *Hymeniacidon sinapium*, and *Lucetta losangelensis* (SDUPD 1999). Several species of solitary and compound ascidians also present included *Ciona savignyi*, *Styela canopus*, and *Styela plicata*. Compound ascidians included a grey and white massed species believed to be *Aplidium* spp. and *Botrylloides diegonsis* (SDUPD 1999). Orange gorgonians (*Adelogorgia phyllosclera*) were infrequently observed during the current survey (Figure 18). Algal species were noted on the booms adjacent to the pier, but not on the pilings. *Undaria pinnatifida* is a non-native, invasive kelp species that has been observed in south San Diego Bay, but was not detected during this survey. When established, *U. pinnatifida* occurs in dense, vigorous stands and forms a thick canopy over the native biota (IUCN Invasive Species Specialist Group 2007). The area adjacent to the pier contained some debris items and shell hash, while underneath the pier shell hash was present but not as concentrated as the area along the slope (Figure 19).

Figure 17. Piling in the intertidal zone at Pier 2.

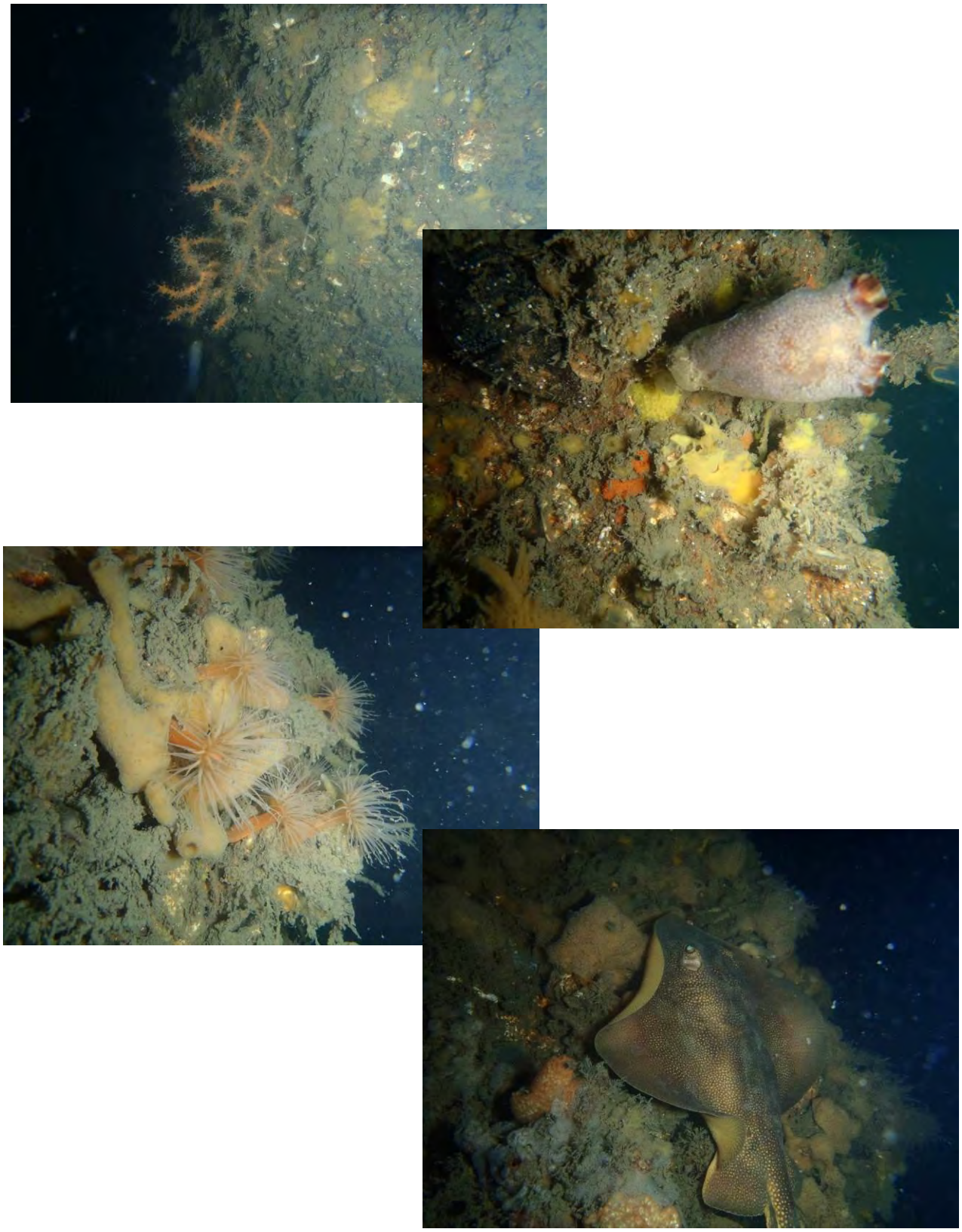


Figure 18. Pilings in the subtidal zone both Pier 2 and Pier 8.

Figure 19. Substrate underneath piers.

DISCUSSION

SAN DIEGO BAY ESSENTIAL FISH HABITAT

Under the provisions of the 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (Federal Register 1997), the amendments require the delineation of Essential Fish Habitat (EFH) for all managed species. EFH has been designated over all tidal marine waters in southern California. Federal action agencies which fund, permit, or carry out activities that may adversely impact EFH are required to consult with the NMFS regarding the potential effects of their actions on EFH, and respond in writing to the NMFS's recommendations.

The ichthyofauna in San Diego Bay has been previously studied (Pondella and Williams 2009, Merkel & Associates 2000, Allen 1999, Hoffman 1994; Figure 20). These studies have identified 78 species of fish in San Diego Bay. The following analysis makes extensive use of Allen's (1999) data set because it is both recent and comprehensive (surveys were completed quarterly for five and a half years, at four stations throughout San Diego Bay, utilizing six sampling gear types) with a total of 78 species identified. The other studies reviewed for this analysis are utilized primarily to confirm the presence of fish species and to identify any additional species not captured by Allen.

Of these 78 species observed in San Diego Bay, six are managed by the NMFS under two Fishery Management Plans (FMPs)-the Coastal Pelagics and Pacific Groundfish Management Plans (Table 3) (NMFS 1998a, 1998b). Four of the five fish managed under the Coastal Pelagics FMP are represented in San Diego Bay. The northern anchovy and pacific sardine are the most abundant pelagics identified by Allen, ranking 1st and 4th in abundance and 3rd and 10th in biomass, respectively (Table 8). Together, these two species accounted for 46.3% of the total abundance and 11.6% of the total biomass of fish enumerated by Allen (1999). The pacific mackerel and jack mackerel are the other two coastal pelagics of potential concern in the project area. These two species were much lessabundant than the northern anchovy and pacific sardine and were ranked by Allen as 32nd and 52nd in total abundance and 24th and 73rd in total biomass, respectively. Together the two species accounted for less than 1% of total abundance and biomass of fish captured (Allen 1999).

Of the 89 species managed under the Pacific Groundfish FMP (NMFS 2008), two have been found in San Diego Bay during the studies analyzed for this assessment: California scorpionfish and English sole. These species were observed only rarely in San Diego Bay during the five and a half years of Allen's study, ranking 41st and 76th by abundance and 24th and 73rd by biomass, respectively (Table 8). Together these two species accounted for less than 0.5% of the total abundance and biomass of fish captured (Allen 1999). Suitable soft bottom habitat for English sole has been well sampled within San Diego Bay and the paucity of capture of English sole is likely a reflection of the general low level occurrence of this species within San Diego Bay. Conversely, the low level of capture of California scorpionfish, is most likely related to a combination of both limited occurrence of suitable habitat and the difficulty of capture of this species within its preferred structured hard bottom habitat. This belief is based on the common detection of this species on artificial reefs and Zuniga Jetty, located at Naval Air Station North Island (Pondella et al. 2006). Observations over many years of diver survey suggest that scorpionfish are less common further into San Diego Bay than nearer the mouth of the Bay. California scorpionfish have been observed further into the Bay within structured habitats such as piers and riprap revetment, including on the cyclopean seawall of the Tenth Avenue Marine Terminal (TAMT), on the Coronado Bridge piles, and on the pendant wall at the J Street Marina (K. Merkel, pers. obs.).

HABITAT DESIGNATION OF PROPOSED PROJECT AREA

Using the habitat designation provided in the San Diego Bay Integrated Natural Resources Management Plan (INRMP) (Navy and SDUPD 2010), the habitat associated with the proposed study area includes deep subtidal habitat. Deep subtidal habitat includes the surface water, water column and sediments in areas greater than 20 ft in depth. This habitat constitutes about 4,440 acres (1,797 ha) (34%) of the Bay. It is associated primarily with navigational channels. Except for a few areas in north bay that have no dredging record, all deep subtidal habitat has been dredged since the 1940s; most areas were dredged in the 1960s or more recently. Within this habitat type, various categories may also be present, and an example includes artificial hard substrate (e.g., rip-rap revetment, concrete bulkhead walls, and piers). A summary of fish species within these habitats is provided in the following sections.

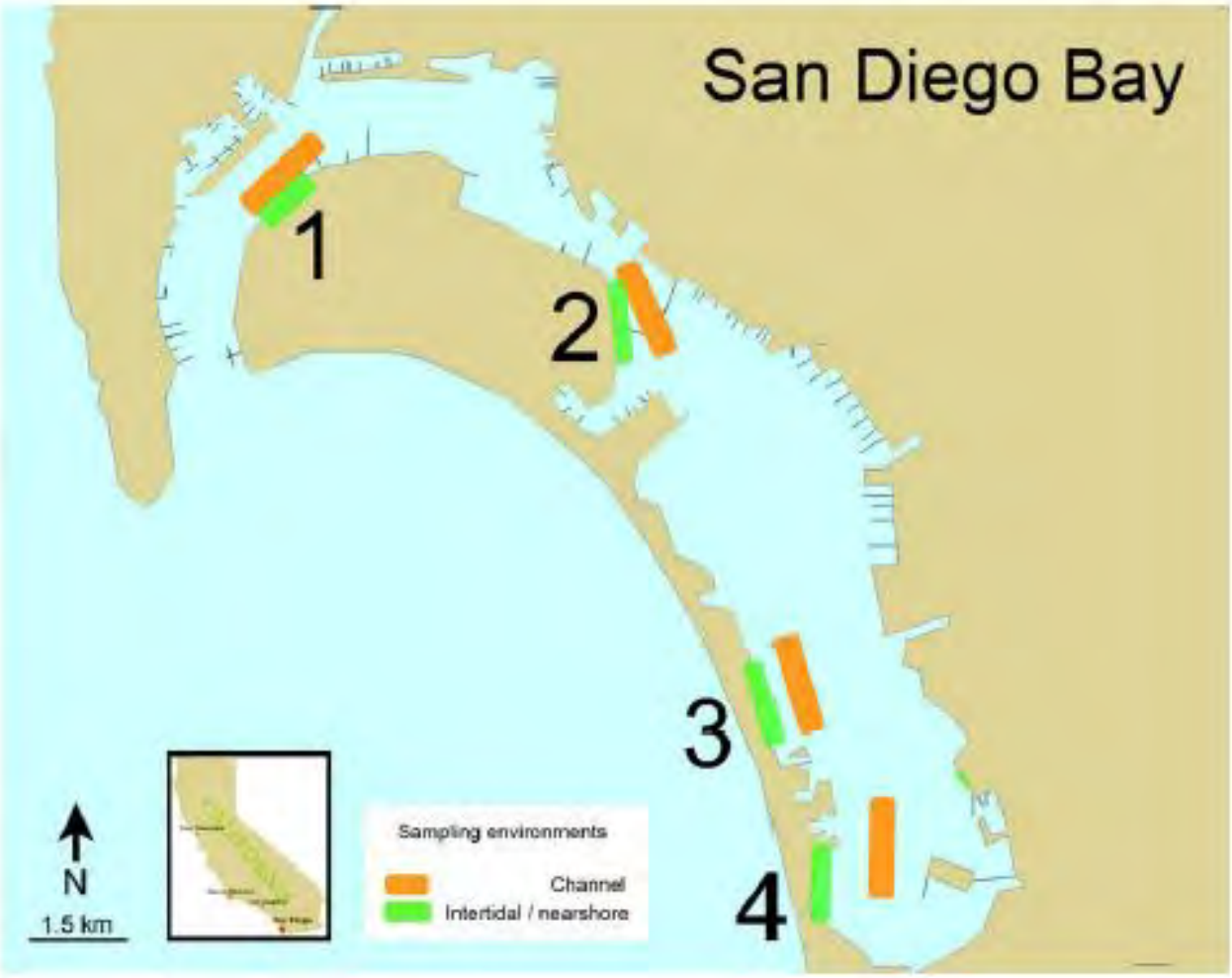


Figure 20. Fish sampling locations of the North (1), North-Central (2), South- Central (3) and South (4) Ecoregions in San Diego Bay. From Pondella and Williams 2009.

Table 8. Table of NMFS managed fish species previously found in San Diego Bay. Rank refers to the relative rankings among 78 fish species observed by Allen (1999). Ranks are total abundance and biomass, respectively.

Common Name	Scientific Name	Rank	
		Abundance	Biomass
Coastal Pelagics FMP			
Northern Anchovy	*Engraulis mordax*	1st	3rd
Pacific Sardine	*Sardinops sagax*	4th	10th
Pacific Mackerel	*Scomber japonicus*	32nd	17th
Jack Mackerel	*Trachurus symmetricus*	52nd	29th
Pacific Groundfish FMP			
California Scorpionfish	*Scorpaena gutatta*	41st	24th
English Sole	*Parophrys vetulus*	76th	73rd

Fishes Associated with Deep Subtidal Habitats

The group of fish species taken in deep subtidal habitats (>20 ft below MLLW) is listed in Table 9. This species list is based on all samples taken during the period 1994 through 1997 (Allen 1999), and the surveys performed from 1994 to1999 and again in 2005 found that fish inhabiting open water had numerical and biomass densities which were the lowest of all sampled habitats (Allen 1999, VRG 2006).

Table 9. San Diego Bay fish species taken in deep subtidal habitats.[1]

Scientific Name	Common Name	Scientific Name	Common Name
Heterodontus francisi	California horn shark	*Xenistius californiensis*	salema
Mustelus californicus	gray smoothhound	*Seriphus politus*	queenfish
Rhinobatus productus	shovelnose guitarfish	*Atractoscion nobilis*	white sea bass
Myliobatis californica	bat ray	*Cheilotrema saturnum*	black croaker
Urolophus halleri	round stingray	*Genyonemus lineatus*	white croaker
Sardinops sagax caeruleux	pacific sardine	*Roncador stearnsii*	spotfin croaker
Engraulis mordax	northern anchovy	*Umbrina roncador*	yellowfin croaker
Anchoa compressa	deepbody anchovy	*Cymatogaster aggregata*	shiner surfperch
Anchoa delicatissima	slough anchovy	*Embiotoca jacksoni*	black surfperch
Synodus lucioceps	California lizardfish	*Phanerodon furcatus*	white surfperch
Porichthys myriaster	specklefin midshipman	*Mugil cephalus*	striped mullet
Porichthys notatus	plainfin midshipman	*Oxyjulis californica*	senorita
Hyporhamphus rosae	California halfbeak	*Halichoeres semicinctus*	rock wrasse
Strongylura exilis	California needlefish	*Hypsoblennius gentilis*	bay blenny
Atherinopsis californiensis	jacksmelt	*Heterostichus rostratus*	giant kelpfish
Atherinops affinis	topsmelt	*Scomber japonicus*	Pacific mackerel
Syngnathus californiensis	kelp pipefish	*Citharichthys stigmaeus*	speckled sand dab
Hippocampus ingens	Pacific seahorse	*Xysteurys liolepis*	fantail sole
Syngnathus leptorhynchus	bay pipefish	*Symphurus atricauda*	California tonguefish
Syngnathus auliscus	barred pipefish	*Hypsopsetta guttulata*	diamond turbot
Scorpaena guttata	spotted scorpionfish	*Paralichthys californicus*	California halibut
Leptocottus armatus	staghorn sculpin	*Pleuronectes vetulus*	English sole
Paralabrax clathratus	kelp bass	*Pleuronichthys coenosus*	CO turbot
Paralabrax maculatofasciatus	spotted sand bass	*Pleuronichthys ritteri*	spotted turbot
Paralabrax nebulifer	barred sand bass	*Pleuronichthys verticalis*	hornyhead turbot

[1] Based on Data for 1994–1997 (Allen 1999)

Fishes Associated with Artificial, Man-Made Habitats

Fishes associated with artificial or man-made habitats have not been studied extensively in San Diego Bay. The species list shown in Table 10 was compiled by reviewing data from a large series of ecological studies conducted to develop environmental impact statements for projects throughout the Bay and focused reef surveys (Navy and SDUPD 2010, Pondella et al. 2006). The species listed in Table 10 also occur in natural San Diego Bay habitats, as well as areas that have been modified by the presence of rock riprap, concrete bulkheads, piers, marina floats, and a wide variety of other artificial habitats.

Table 10. San Diego Bay fish species associated with artificial, man-made habitats.

Scientific Name	Common Name	Scientific Name	Common Name
Platyrhinoidis triseriata	thornback	*Medialuna californiensis*	halfmoon
Rhinobatus productus	shovelnose guitarfish	*Cymatogaster aggregata*	shiner surfperch
Urolophus halleri	round stingray	*Damalichthys vacca*	pile surfperch
Sardinops sagax caeruleux	Pacific sardine	*Embiotoca jacksoni*	black surfperch
Engraulis mordax	northern anchovy	*Hyperprosopon argenteum*	walleye surfperch
Anchoa compressa	deepbody anchovy	*Phanerodon furcatus*	white surfperch
Anchoa delicatissima	slough anchovy	*Rhacochilus toxotes*	rubberlip surfperch
Porichthys myriaster	specklefin midshipman	*Hypsoblennius gentilis*	bay blenny
Atherinops affinis	topsmelt	*Hypsoblennius jenkensi*	mussel blenny
Syngnathus leptorhynchus	bay pipefish	*Paraclinus integripinnis*	reef finspot
Scorpaena guttata	spotted scorpionfish	*Gibbonsia elegans*	spotted kelpfish
Leptocottus armatus	staghorn sculpin	*Gibbonsia montereyensis*	crevice kelpfish
Paralabrax clathratus	kelp bass	*Heterostichus rostratus*	giant kelpfish
Paralabrax maculatofasciatus	spotted sand bass	*Clevelandia ios*	arrow goby
Paralabrax nebulifer	barred sand bass	*Ilypnus gilberti*	cheekspot goby
Anisotremus davidsoni	sargo	*Lepidogobius lepidus*	bay goby
Seriphus politus	queenfish	*Quietula ycauda*	shadow goby
Cheilotrema saturnum	black croaker	*Scomber japonicus*	Pacific mackerel
Genyonemus lineatus	white croaker	*Hypsopsetta guttulata*	diamond turbot
Umbrina roncador	yellowfin croaker	*Paralichthys californicus*	California halibut
Girella nigricans	opaleye		

HABITAT CONTROLLING FACTORS AND CONCLUSIONS

The construction of a new conventional pier to replace the inadequate existing pier would result in the modification of approximately 2.1 acres of open water habitat to waters affected by overwater structure (Table 1). This change would affect approximately 0.05% of the available deep unvegetated subtidal habitat in San Diego Bay (Navy and SDUPD 2010). Presumably, the replacement pier would be similar in construction and size as the "newer" piers (i.e., higher decking with fewer piles), and therefore, over time, biological conditions would also be expected to be similar to those found at Pier 2 in the present investigations.

While only one individul black croaker (*Cheilotrema saturnum*) was observed associated with a tire located in the bare mud bottom reference areas, other demersal fish species including spotted sand bass (*Paralabrax maculatofasciatus*), round stingrays (*Urobatis halleri*), barred sand bass (*P. nebulifer)*, specklefin midshipman (*Porichthys myriaster*), and gobies (Family Gobiidae) are likely to use this habitat (Navy and SDUPD 2010), although at relatively lower densities compared to other habitats. Invertebrates were also sparse, although the mud bottom showed numerous signs of burrowing invertebrate activities, likely from bivalves (*Chione* spp., *Macoma nasuta*), the amphipod (*Grandidierella japonica*), bay ghost shrimp (*Callianassa californiensis*), burrowing anemones (*Harenactis attenuata*), and tube-dwelling anemones (*Pachycerianthus fimbriatus*). Other invertebrates occasionally seen in these habitats are the opisthobranch, *Navanax inermis*, slender sea pen (*Stylatula elongata*), as well as calcareous bryozoans and soft bryozoans such as the non-native *Zoobotryon verticillatum* (Navy and SDUPD 2010). The very fine silty sediments found within the Naval Station would be expected to significantly limit the occurrence of many species requiring firm or stable bottom conditions.

Pier and wharf pilings provide habitat for an assemblage of organisms known as the fouling community. This community appears to attract schooling fish, which feed on the attached invertebrates and algae, and obtain refuge from predation (Glasby 1999). The species present and the overall complexity of the fouling community on pier pilings are dependent upon a number of factors including tidal elevation and inundation time, light availability, wave exposure, and size and shape of the pilings themselves (Connell and Glasby 1999, Connell 2001). While several studies indicate that man-made structures do not support the same complexity of organisms as do natural reefs, it is apparent that pier pilings do provide habitat value for fouling communities and associated fish assemblages (Clynick 2008). Piles exposed to greater circulation and higher light levels tend to support the most complex and productive communities. This is the case within the study area for piles near the ends of the piers and on exposed sides, which appear to support more diverse encrusting communities. Whether an artificial structure provides benefit or detriment to community assemblages are based not only on the structure characteristics but also the baseline habitat conditions into which the structure would be introduced.

While the discussion of diminishing returns from a larger structure does have merit, it appears that the proposed increase does not constitute a large enough change to affect light levels, currents, wave energies, and water circulation, and that despite the increase in surface area, no apparent biological difference between small and large pier were observed; although presumably a larger pier could provide more habitat than a smaller pier. The history of pier replacement at Naval Station San Diego has been to replace piers with low decks with piers that are higher off the water and which are supported by few pilings. The result of this replacement methodology has been to reduce the influence of structures on circulation patterns and light penetration beneath the piers, even though the piers themselves increase in size.

A summary of the results from this study were assessed based on the habitat controlling factors noted in Nightingale and Simenstad (2001), and provided in Table 11. The results from this study further support the conclusion that overwater structures provide increased three dimensional substrate and cover that locally increases productivity of encrusting and benthic organisms and also serves to locally increase richness and abundance of fish and infauna over the conditions observed in more open waters (Merkel & Associates 2010).

Table 11. Summary of habitat controlling factors and potential effects associated with conversion of small pier to larger pier at NAVSTA San Diego.

Habitat Controlling Factors	Conversion of existing small pier to larger pier
Light Regime	• Conversion of approximately 1.9 acres of open water habitat to overwater structure and associated habitat (or approximately 0.05% of the available deep unvegetated subtidal habitat in San Diego Bay). • Despite increase in surface area, light levels adjacent to and underneath small and large piers similar. • New design may actually increase light levels underneath pier at low tide.
Wave Energy Regime	• No anticipated change in currents or wave energy since the reduction in the number of piles and higher decking may result in similar effect or may possibly increase circulation beneath the pier structure.
Substrate	• Conversion of approximately 0.05% of available deep subtidal habitat to overwater structure. • Given the same or increased water flow, sedimentation pattern anticipated to be similar or reduced with larger pier.
Water Quality	• Anticipated reduction in number of piles may decrease attachment areas for nonindigenous species. • Anticipated modernization and infrastructure may decrease inputs to water column.

The M&A 2010 investigations outlined a conceptual model of how common community metrics of biomass, abundance, and species richness would be expected to change around pier structures. The present study confirms that the model holds true at Piers 2 and 8. The addition of structure in the otherwise unstructured habitat of the waters of NAVSTA San Diego, serve to increase fish and invertebrate richness, abundance, and biomass over that otherwise occurring in open waters and soft silty bottom habitats of the base.

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APPENDIX A

RESULTS OF ONE-WAY ANALYSIS OF VARIANCE FOR BENTHIC INFAUNA DATA

Macrofauna Counts (Density per sample unit)
Summary:

Sample	No. of observations	Minimum	Maximum	Range	Sum	Mean	Standard error of the mean
N | Pier 2	9	9.000	104.000	95.000	360.000	40.000	11.999
N | Pier 2 Ref	3	8.000	23.000	15.000	46.000	15.333	4.333
N | Pier 8	9	6.000	59.000	53.000	238.000	26.444	5.819
N | Pier 8 Ref	3	10.000	22.000	12.000	45.000	15.000	3.606

All variables displayed a normal distribution, except Pier 2, but acceptable for ANOVA assumptions.

ANOVA results:

Analysis of variance:

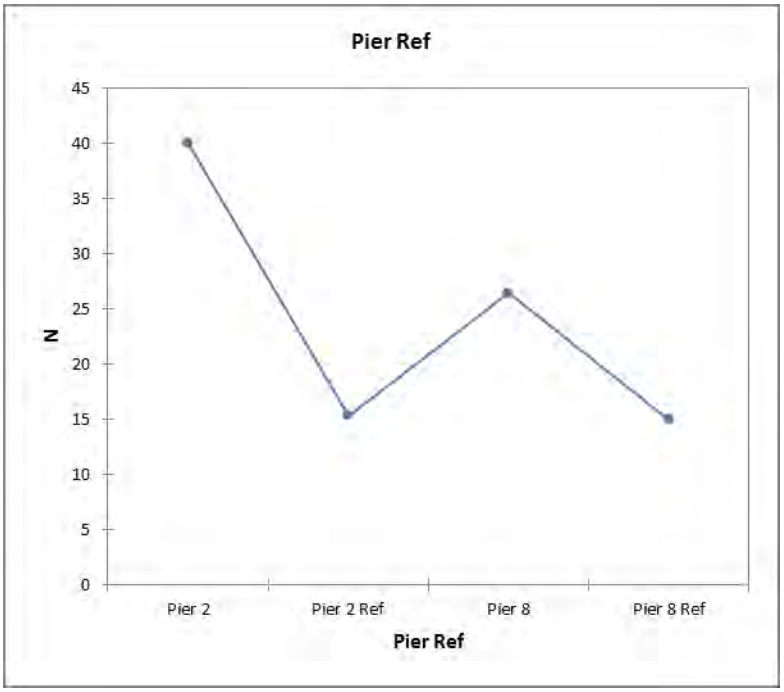
Source	DF	Sum of squares	Mean squares	F	Pr > F
Model	3	2294.069	764.690	1.177	0.343
Error	20	12994.889	649.744		
Corrected Total	23	15288.958			

Computed against model Y=Mean(Y)

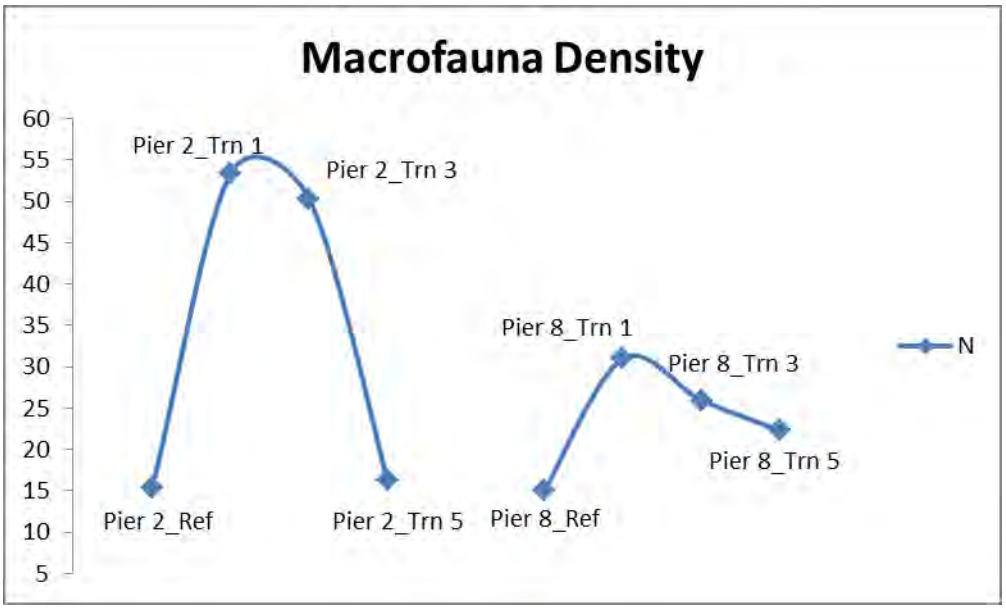
Pier Ref / Tukey (HSD) / Analysis of the differences between the categories with a confidence interval of 95%:

Contrast	Difference	Standardized difference	Critical value	Pr > Diff	Significant
Pier 2 vs Pier 8 Ref	25.000	1.471	2.799	0.472	No
Pier 2 vs Pier 2 Ref	24.667	1.452	2.799	0.484	No
Pier 2 vs Pier 8	13.556	1.128	2.799	0.677	No
Pier 8 vs Pier 8 Ref	11.444	0.673	2.799	0.906	No
Pier 8 vs Pier 2 Ref	11.111	0.654	2.799	0.913	No
Pier 2 Ref vs Pier 8 Ref	0.333	0.016	2.799	1.000	No
Tukey's d critical value:			3.958		

Macrofauna counts means plot



Macrofauna counts pier density profile



Species richness summary

Sample	No. of observations	Minimum	Maximum	Range	Sum	Mean	Standard error of the mean
S | Pier 2	9	6.000	26.000	20.000	120.000	13.333	2.357
S | Pier 2 Ref	3	4.000	10.000	6.000	21.000	7.000	1.732
S | Pier 8	9	4.000	15.000	11.000	71.000	7.889	1.124
S | Pier 8 Ref	3	5.000	8.000	3.000	19.000	6.333	0.882

All variables displayed a normal distribution therefore ANOVA was used to test for differences.

ANOVA results:

Analysis of variance:

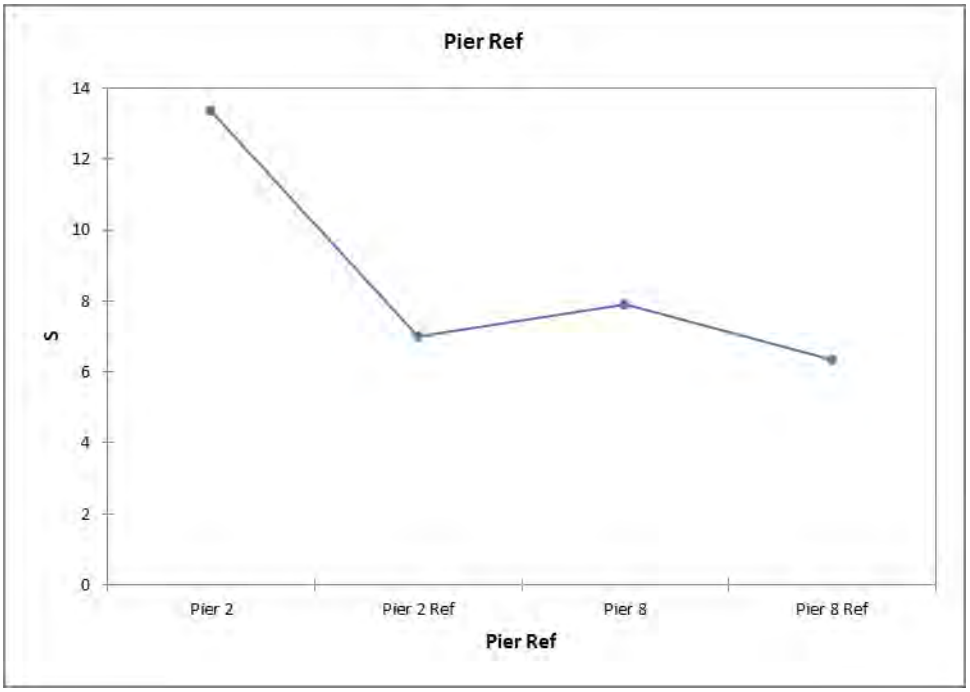
Source	DF	Sum of squares	Mean squares	F	Pr > F
Model	3	204.069	68.023	2.649	0.077
Error	20	513.556	25.678		
Corrected Total	23	717.625			

Computed against model Y=Mean(Y)

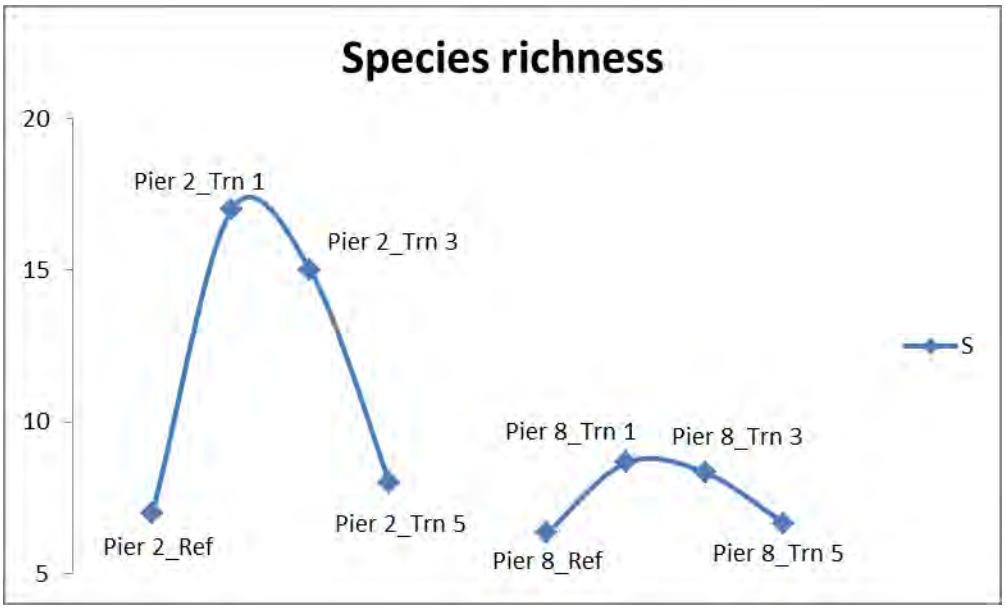
Pier Ref / Tukey (HSD) / Analysis of the differences between the categories with a confidence interval of 95%:

Contrast	Difference	Standardized difference	Critical value	Pr > Diff	Significant
Pier 2 vs Pier 8 Ref	7.000	2.072	2.799	0.196	No
Pier 2 vs Pier 2 Ref	6.333	1.875	2.799	0.270	No
Pier 2 vs Pier 8	5.444	2.279	2.799	0.137	No
Pier 8 vs Pier 8 Ref	1.556	0.460	2.799	0.967	No
Pier 8 vs Pier 2 Ref	0.889	0.263	2.799	0.993	No
Pier 2 Ref vs Pier 8 Ref	0.667	0.161	2.799	0.998	No
Tukey's d critical value:			3.958		

Species richness means plot



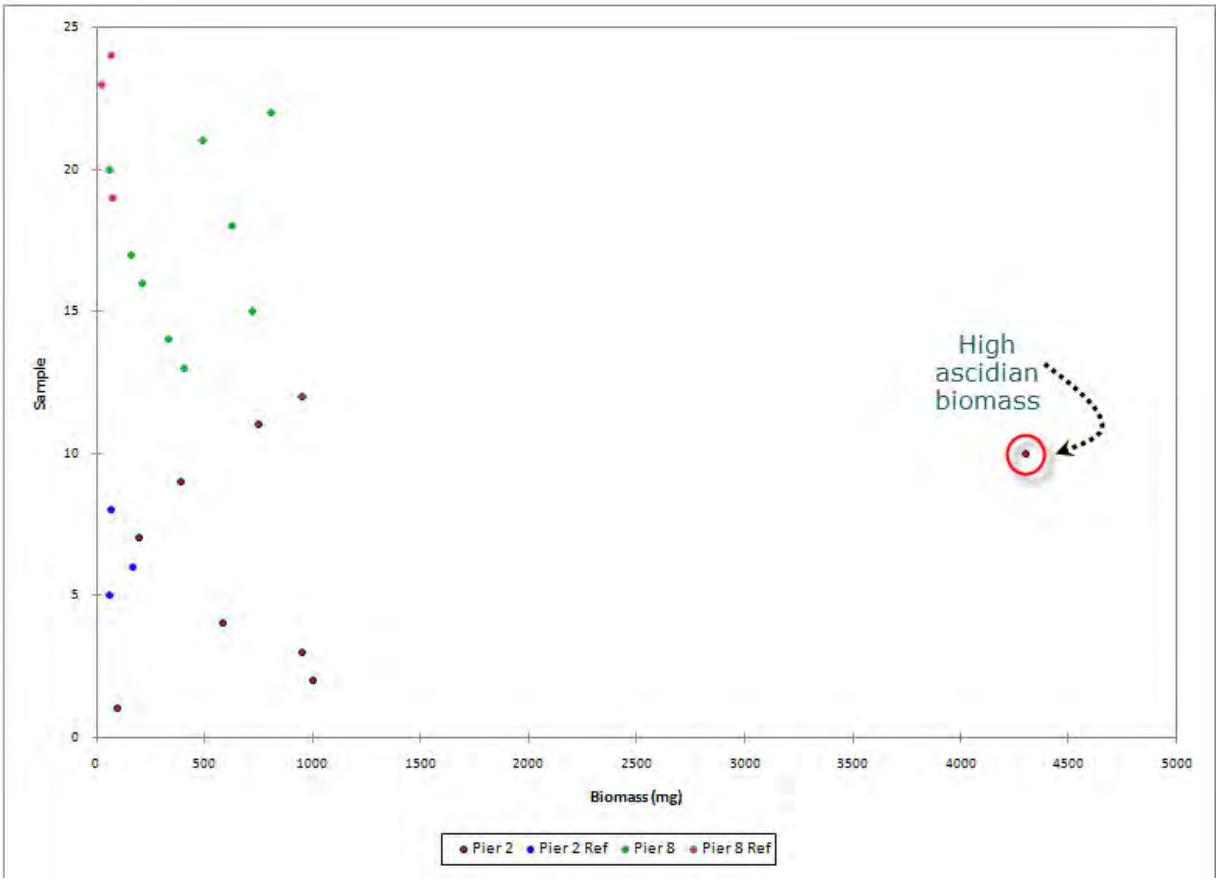
Species richness pier profile



Macrofauna Biomass (mg)

Before performing statistics a Cleveland plot was produced to detect possible outliers, one sample in Pier 2 showed a high ascidian biomass, therefore this sample was omitted from statistical analysis.

Biomass Cleveland plot



Biomass summary:

Descriptive statistics (Quantitative data):

Sample	No. of observations	Minimum	Maximum	Range	Sum	Mean	Standard error of the mean
Biomass (mg) | Pier 2	8	92.900	999.300	906.400	4912.600	614.075	126.095
Biomass (mg) | Pier 2 Ref	3	61.600	166.800	105.200	295.100	98.367	34.248
Biomass (mg) | Pier 8	9	58.100	810.500	752.400	3814.700	423.856	86.623
Biomass (mg) | Pier 8 Ref	3	24.800	78.000	53.200	169.400	56.467	16.172

All variables displayed a normal distribution therefore ANOVA was used to test for differences.

ANOVA results:

Analysis of variance:

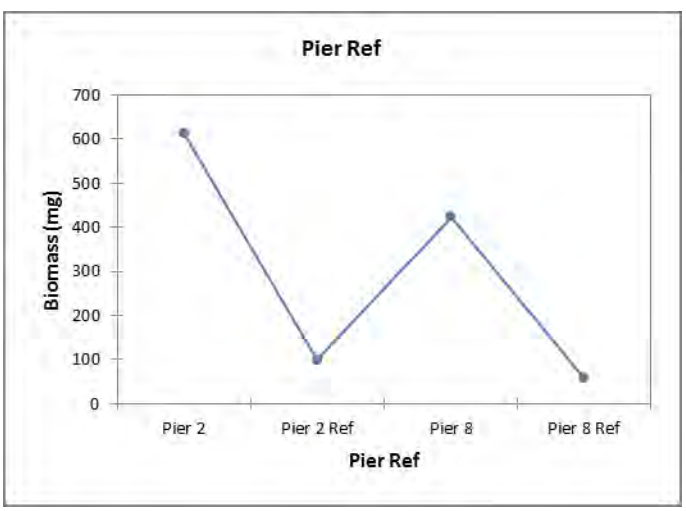
Source	DF	Sum of squares	Mean squares	F	Pr > F
Model	3	998737.166	332912.389	4.395	0.016
Error	19	1439258.391	75750.442		
Corrected Total	22	2437995.557			

Computed against model Y=Mean(Y)

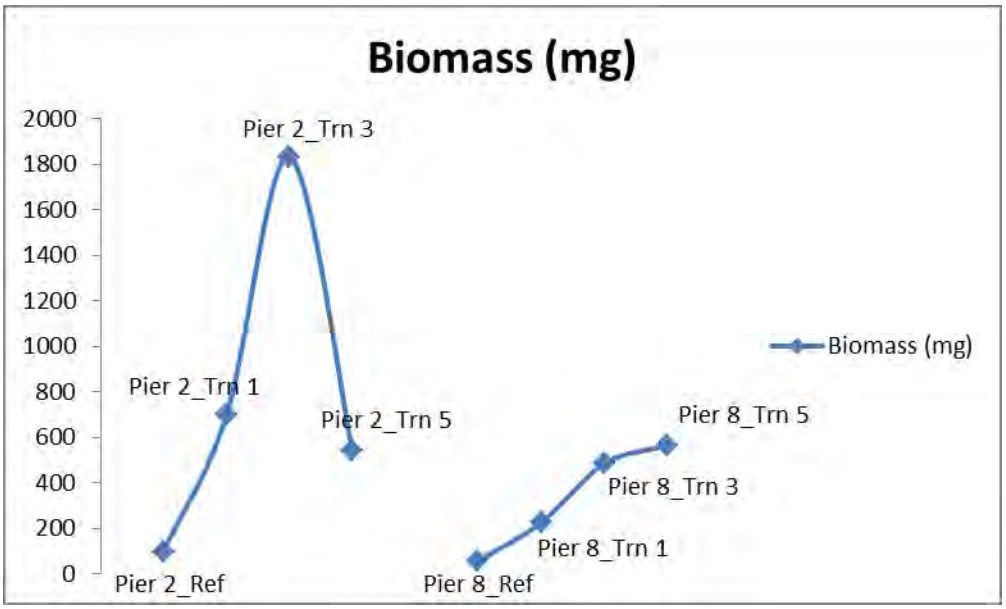
Pier Ref / Tukey (HSD) / Analysis of the differences between the categories with a confidence interval of 95%:

Contrast	Difference	Standardized difference	Critical value	Pr > Diff	Significant
Pier 2 vs Pier 8 Ref	557.608	2.993	2.812	0.035	Yes
Pier 2 vs Pier 2 Ref	515.708	2.768	2.812	0.055	No
Pier 2 vs Pier 8	190.219	1.422	2.812	0.501	No
Pier 8 vs Pier 8 Ref	367.389	2.002	2.812	0.222	No
Pier 8 vs Pier 2 Ref	325.489	1.774	2.812	0.316	No
Pier 2 Ref vs Pier 8 Ref	41.900	0.186	2.812	0.998	No
Tukey's d critical value:			3.977		

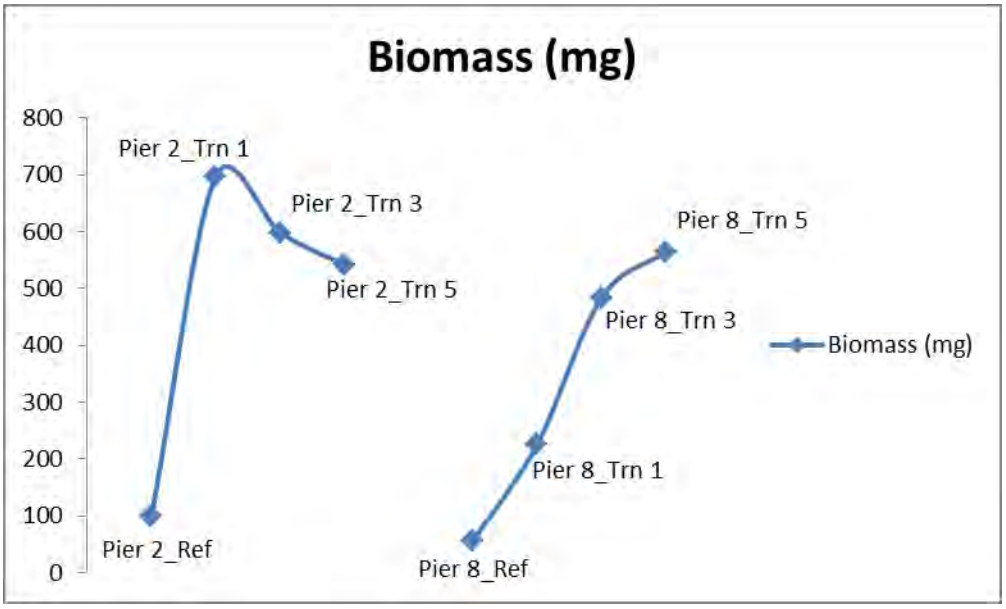
Biomass means plot



Biomass pier profile (including high ascidian biomass sample)



Biomass pier profile (excluding high ascidian biomass sample)



Appendix D

Record of Non-Applicability (RONA) and Air Quality Data

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RECORD OF NON-APPLICABILITY (RONA) FOR CLEAN AIR ACT CONFORMITY

NAVAL BASE SAN DIEGO PIER 8 REPLACEMENT

SAN DIEGO AIR BASIN

INTRODUCTION

The U.S. Environmental Protection Agency (USEPA) published *Determining Conformity of General Federal Actions to State or Federal Implementation Plans; Final Rule* in the 30 November 1993, Federal Register (40 Code of Federal Regulations [CFR] Parts 6, 51, and 93). The U.S. Navy published *Clean Air Act (CAA) General Conformity Guidance* in OPNAVINST 5090.1C (Appendix F) dated 30 October 2007. These publications provide implementing guidance to document CAA Conformity Determination requirements.

Federal regulations state that no department, agency, or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license to permit, or approve any activity that does not conform to an applicable implementation plan. It is the responsibility of the Federal agency to determine whether a Federal action conforms to the applicable implementation plan, before the action is taken (40 CFR Part 1, Section 51.850[a]).

The general conformity rule applies to federal actions proposed within areas which are designated as either nonattainment or maintenance areas for a National Ambient Air Quality Standard (NAAQS) for any of the criteria pollutants. Former nonattainment areas that have attained a NAAQS are designated as maintenance areas. Emissions of pollutants for which an area is in attainment are exempt from conformity analyses.

The project would occur within the San Diego Air Basin (SDAB) portion of Naval Base San Diego (NBSD). This portion of the SDAB is currently in marginal nonattainment of the 8-hour ozone (O_3) NAAQS and is a maintenance area for carbon monoxide (CO) NAAQS. The SDAB attains the NAAQS for all other criteria pollutants. Therefore, only project emissions of CO and O_3 (or its precursors, volatile organic compounds [VOCs] and oxides of nitrogen [NO_x]) are analyzed for conformity rule applicability.

The annual *de minimis* levels for this region are 100 tons of VOC, NO_x, and CO, as listed in Table 1. Federal actions may be exempt from conformity determinations if they do not exceed designated *de minimis* levels (40 CFR Part 1, Section 51.853[b]) and are not regionally significant (totals less than 10 percent of projected regional emissions for that pollutant) (40 CFR Part 1, Section 93.153).

Table 1. Conformity *de minimis* Levels for Criteria Pollutants in the San Diego Air Basin

Criteria Pollutant	*De minimis* Level (tons/year)
Carbon Monoxide (CO)	100
Volatile Organic Compounds (VOC)	100
Oxides of Nitrogen (NO_x)	100

PROPOSED ACTION

Action Proponent: The U.S. Navy proposes to demolish an inadequate existing pier (Pier 8), and replace Pier 8 with either a new conventional pier or a Modular Hybrid Pier (MHP). The project would create the infrastructure necessary to support modern Navy ship classes with deep-draft and power intensive or power-intensive requirements.

Location: Naval Base San Diego, Pier 8.

Proposed Action Name**:** Pier 8 Replacement, NBSD.

Proposed Action & Emissions Summary: The Proposed Action involves the demolition of existing Pier 8, and construction of a new Pier 8 and associated pier utilities. The new replacement Pier 8 would either be constructed as a conventional pier or a MHP. The Conventional Pier Alternative would consist of a single-deck, concrete berthing pier and would be 117 ft wide by a length of 1,600 ft. The MHP Alternative is based on standardized floating modules that are moored to steel shafts, thereby eliminating support and fender piles. The MHP Alternative would have five individual modules resulting in a structure that would be 90 feet (ft) wide by 1,560 ft long. Although the new Pier 8 would be wider than the existing Pier 8, the pier would be designed and constructed under either alternative to ensure that vessels can navigate safely within the bay.

Conventional Pier Alternative Emissions:

Annual emissions from all demolition and construction activities were calculated by assuming that the demolition phase would consist of approximately 11 months and the construction phase would be completed within approximately 10 months. The Conventional Pier Alternative would involve pile driving activities to install 950 piles (516 foundation and 434 fender) and on-site construction activities. Operational activities associated with ship berthing were analyzed as part of the adoption process for the Commander Navy Region Southwest (CNRSW) Region Port Operations Shore Infrastructure Plan (RSIP) and Chief of Naval Operations Strategic Laydown Plan 2013 (SLD 2013), therefore, operational activities are not addressed in this analysis.

Estimated demolition and construction emissions due to implementation of the Conventional Pier Alternative are shown in Table 2. Based on the air quality analysis for the Conventional Pier Alternative, the maximum estimated emissions would be below conformity *de minimis* levels (Table 2).

Table 2. Estimated Emissions Resulting from Implementation of the Conventional Pier Alternative

Component	Emissions (tons per year)		
	CO[2]	VOCs[1]	NO_x[1]
Pier 8 Demolition Emissions			
Piling Removal	0.39	0.10	1.16
Deck Removal	1.13	0.29	3.38
Debris Removal	1.01	0.27	2.76
Truck Trips - Demolition	0.30	0.09	0.55
Worker Trips - Demolition	0.92	0.04	0.08
Support Vessels	0.44	0.04	4.77
Pier 8 Replacement Emissions			
Piling Installation	1.26	0.32	3.82
Deck Installation	2.53	0.70	6.63
Shoreline Excavation	0.62	0.16	1.85
Truck Trips - Construction	0.93	0.28	1.76
Worker Trips - Construction	0.88	0.04	0.07
Support Vessels	1.84	0.16	19.79
Subtotal[3]	**12.23**	**2.49**	**46.62**
de minimis threshold	100	100	100
Exceeds *de minimis* threshold?	No	No	No

Notes: [1] SDAB is a marginal nonattainment area for the 8-hour federal O_3 standard; VOCs and NO_x are precursors to the formation of O_3.
[2] SDAB is considered a maintenance area for the federal CO standard and is in attainment of the federal NO_2, SO_2, PM_{10} and $PM_{2.5}$ standards.
[3] Numbers in table may not add precisely due to rounding and decimal places.

MHP Alternative Emissions:

Demolition and construction assumptions for the MHP Alternative are similar to the Conventional Pier Alternative with the exception that the MHP Alternative would involve significantly less pile driving activities (e.g. 516 foundation piles for the Conventional Pier Alternative vs. 96 foundation piles for the MHP Alternative). Based on similar assumptions presented in *Environmental Assessment for the MHP Test Bed Project at Naval Station San Diego (U.S. Navy, May 2003),* it was conservatively assumed that the MHP modules would be transported from Tacoma, Washington. Approximately 95% of the MHP construction (by volume of concrete materials) would occur at a pre-cast plant, including the modules and piles. The remaining 5% of the MHP construction consists of the moorings, in which 1,700 cubic yards of concrete is poured on-site, and associated pile driving activities (i.e., 96 pre-cast concrete piles). Since the pre-cast plant produces similar construction emissions as part of its normal course of business and is permitted for these operations, only project emissions associated with the on-site construction aspect of the MHP and transport activities of the pre-cast modules and piles have been estimated. On-site construction activities for the MHP Alternative would therefore be of shorter duration and require less construction equipment. Annual emissions from all demolition and construction activities were calculated by assuming that the demolition phase would consist of approximately 11 months and the construction phase would be completed within approximately 4 months. Estimated demolition and construction emissions due to implementation of the MHP Alternative are shown in Table 3. The vast majority of emissions associated with the MHP Alternative, would be from support vessels used to transport the MHP modules to NBSD (i.e., one tugboat per each of the five modules). These emissions would not all

occur at the project site, instead they would be distributed along the entire transport route (i.e., Tacoma, Washington to NBSD). The majority of the 1,265 nautical mile (nm) trip from Tacoma Washington to NBSD would occur outside the 24 nm limit from shore. Overall project emissions can be found in the Pier 8 Replacement Environmental Assessment (EA); however, for the purposes of demonstrating CAA conformity within the SDAB, emissions occurring only within 3 nm of the SDAB are shown in Table 3. Based on the air quality analysis for the MHP Alternative, the maximum estimated emissions would be below conformity *de minimis* levels (Table 3).

Table 3. Estimated Emissions Resulting from Implementation of the MHP Alternative within 3 nm of the SDAB

Component	Emissions (tons per year)		
	CO[2]	VOCs[1]	NO_x[1]
Piers 8 Demolition Emissions			
Piling Removal	0.39	0.10	1.16
Deck Removal	1.13	0.29	3.38
Debris Removal	1.01	0.27	2.76
Truck Trips - Demolition	0.29	0.09	0.56
Worker Trips - Demolition	0.92	0.04	0.08
Support Vessels	0.44	0.04	4.77
Pier 8 Replacement			
Piling Installation	0.13	0.03	0.40
Deck Installation	0.76	0.21	1.99
Shoreline Excavation	0.62	0.16	1.85
Truck Trips - Construction	0.05	0.02	0.10
Worker Trips - Construction	0.33	0.02	0.03
Support Vessels	0.62	0.05	6.66
Subtotal[3]l	**6.70**	**1.32**	**23.75**
de minimis threshold	100	100	100
Exceeds *de minimis* threshold?	No	No	No

Notes: [1] SDAB is a marginal nonattainment area for the 8-hour federal O_3 standard; VOCs and NO_x are precursors to the formation of O_3.

[2] SDAB is considered a maintenance area for the federal CO standard and is in attainment of the federal NO_2, SO_2, PM_{10} and $PM_{2.5}$ standards.

[3] Numbers in table may not add precisely due to rounding and decimal places.

Affected Air Basin: San Diego Air Basin

Date RONA Prepared: 5 March 2014

RONA Prepared By: Cardno

PROPOSED ACTION EXEMPTION(S)

The Proposed Action is located within a nonattainment and maintenance area; therefore, the Proposed Action is **not** exempt from General Conformity Rule Requirements.

ATTAINMENT AREA STATUS AND EMISSIONS EVALUATION CONCLUSION

The SDAB is a marginal nonattainment area for the 8-hour federal O_3 standard; VOCs and NO_x are precursors to the formation of O_3.The SDAB is considered a maintenance area for the federal CO standard.

Emissions associated with the MHP and Conventional Pier Alternatives were calculated using data presented in Chapter 2 of the EA, general air quality assumptions, and emission factors compiled from the following sources: *OFFROAD Emission Factors*; *CARB EMFAC2007* Model; and Emission Factors from *Analysis of Commercial Marine Vessel Emissions and Fuel Consumption Data*.

The U.S. Navy concludes that *de minimis* thresholds for applicable criteria pollutants would not be exceeded as a result of implementation of the Conventional Pier Alternative or MHP Alternative. The emissions data supporting that conclusion is shown in Table 2, which is a summary of the calculations, methodology, and data included in Attachment A. Therefore, the U.S. Navy concludes that formal Conformity Determination procedures are not required, resulting in this RONA.

RONA APPROVAL

To the best of my knowledge, the information presented in this RONA is correct and accurate, and I concur in the finding that implementation of either the MHP or Conventional Pier Alternative, does not require a formal CAA Conformity Determination.

_____ _____

CDR ALEXANDER M. KOHNEN Date
PUBLIC WORKS OFFICER
NAVAL BASE SAN DIEGO

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Ambient Air Quality Standards

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Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards [1]		National Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.075 ppm (147 µg/m^3)		
Respirable Particulate Matter (PM10)[8]	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter (PM2.5)[8]	24 Hour	—	—	35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12.0 µg/m^3	15 µg/m^3	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
Nitrogen Dioxide (NO_2)[9]	1 Hour	0.18 ppm (339 µg/m^3)	Gas Phase Chemiluminescence	100 ppb (188 µg/m^3)	—	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)		0.053 ppm (100 µg/m^3)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[10]	1 Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	—	Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 µg/m^3)	
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[10]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[10]	—	
Lead[11,12]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m^3 (for certain areas)[12]	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 µg/m^3		
Visibility Reducing Particles[13]	8 Hour	See footnote 13	Beta Attenuation and Transmittance through Filter Tape	No National Standards		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[11]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

See footnotes on next page …

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.

3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

4. Any equivalent measurement method which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

7. Reference method as described by the U.S. EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the U.S. EPA.

8. On December 14, 2012, the national annual PM2.5 primary standard was lowered from 15 $\mu g/m^3$ to 12.0 $\mu g/m^3$. The existing national 24-hour PM2.5 standards (primary and secondary) were retained at 35 $\mu g/m^3$, as was the annual secondary standard of 15 $\mu g/m^3$. The existing 24-hour PM10 standards (primary and secondary) of 150 $\mu g/m^3$ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

9. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

10. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

    Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

11. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

12. The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

13. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

Attachment A

Construction Emissions Calculations

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Construction Emissions Summary
Pier 8 Replacement EA

Proposed Action - Conventional Pier	Emission (tons/year)					
	CO	VOC	NOx	SOx	PM10	PM2.5
Pier 8 Demolition Emissions						
Pilling Removal	0.39	0.10	1.16	0.00	0.06	0.05
Deck Removal	1.13	0.29	3.38	0.00	0.16	0.14
Debris Removal	1.01	0.27	2.76	0.00	0.15	0.13
Truck Trips - Demolition	0.29	0.09	0.55	0.00	0.01	0.01
Worker Trips - Demolition	0.91	0.04	0.08	0.00	0.01	0.01
Support Vessels	0.44	0.04	4.77	0.00	0.12	0.12
Conventional Pier Construction						
Piling Installation	1.26	0.32	3.82	0.00	0.18	0.16
Deck Installation	2.53	0.70	6.63	0.00	0.39	0.35
Shoreline Excavation	0.62	0.16	1.85	0.00	0.09	0.08
Truck Trips - Construction	0.93	0.28	1.76	0.00	0.02	0.02
Worker Trips - Construction	0.88	0.04	0.07	0.00	0.01	0.01
Support Vessels	1.84	0.16	19.79	0.01	0.49	0.49
Subtotal	**12.23**	**2.49**	**46.61**	**0.03**	**1.68**	**1.56**

Notes:Numbers may not add precisely due to rounding and decimal places

	Emission (tons/year)					
	CO	VOC	NOx	SOx	PM10	PM2.5
Pier 8 Demolition Emissions						
Pilling Removal	0.39	0.10	1.16	0.00	0.06	0.05
Deck Removal	1.13	0.29	3.38	0.00	0.16	0.14
Debris Removal	1.01	0.27	2.76	0.00	0.15	0.13
Truck Trips - Demolition	0.29	0.09	0.55	0.00	0.01	0.01
Worker Trips - Demolition	0.92	0.04	0.08	0.00	0.01	0.01
Support Vessels	0.44	0.04	4.77	0.00	0.12	0.12
MHP Construction						
Piling Installation	0.13	0.03	0.40	0.00	0.02	0.02
Deck Installation	0.76	0.21	1.99	0.00	0.12	0.11
Shoreline Excavation	0.62	0.16	1.85	0.00	0.09	0.08
Truck Trips - Construction	0.05	0.02	0.10	0.00	0.00	0.00
Worker Trips - Construction	0.33	0.02	0.03	0.00	0.00	0.00
Support Vessels	4.30	0.37	46.27	0.03	1.15	1.13
Subtotal	**10.37**	**1.63**	**63.34**	**0.05**	**1.88**	**1.80**

Notes:Numbers may not add precisely due to rounding and decimal places

Modular Hybrid Pier Alternative - within 3 nautical miles of San Diego Air Basin	Emission (tons/year)					
	CO	VOC	NOx	SOx	PM10	PM2.5
Pier 8 Demolition Emissions						
Pilling Removal	0.39	0.10	1.16	0.00	0.06	0.05
Deck Removal	1.13	0.29	3.38	0.00	0.16	0.14
Debris Removal	1.01	0.27	2.76	0.00	0.15	0.13
Truck Trips - Demolition	0.29	0.09	0.55	0.00	0.01	0.01
Worker Trips - Demolition	0.92	0.04	0.08	0.00	0.01	0.01
Support Vessels	0.44	0.04	4.77	0.00	0.12	0.12
MHP Construction						
Piling Installation	0.13	0.03	0.40	0.00	0.02	0.02
Deck Installation	0.76	0.21	1.99	0.00	0.12	0.11
Shoreline Excavation	0.62	0.16	1.85	0.00	0.09	0.08
Truck Trips - Construction	0.05	0.02	0.10	0.00	0.00	0.00
Worker Trips - Construction	0.33	0.02	0.03	0.00	0.00	0.00
Support Vessels	0.62	0.05	6.66	0.00	0.16	0.16
Subtotal	**6.69**	**1.32**	**23.73**	**0.02**	**0.90**	**0.83**

Notes:Numbers may not add precisely due to rounding and decimal places

Emissions Summary Heavy Equipment Demolition
Pier 8 Replacement EA

				Emission Factors								Emissions						Emission, tons (total)					
Equipment	FUEL	HP	Load Factor	CO (lb/bhp-hr)	VOC (lb/bhp-hr)	NOX (lb/bhp-hr)	SOX (lb/bhp-hr)	PM10 (lb/bhp-hr)	No of Equipment	Hrs Per Day	Days in Service	CO lbs/day	VOC lbs/day	NOX lbs/day	SOX lbs/day	PM10 lbs/day	PM2.5 lbs/day	CO tons (total)	VOC tons (total)	NOX tons (total)	SOX tons (total)	PM10 tons (total)	PM2.5 tons (total)
Piling Removal																							
Air Compressor	DIESEL	50	48	7.69E-03	2.18E-03	1.93E-02	1.08E-05	1.52E-03	2	4	63	1.48	0.42	3.70	0.00	0.29	0.26	0.047	0.013	0.117	0.000	0.009	0.008
Barge Crane - 250 ton	DIESEL	314	41	5.95E-03	1.50E-03	1.80E-02	1.08E-05	8.38E-04	2	4	63	6.13	1.54	18.55	0.01	0.86	0.77	0.193	0.049	0.584	0.000	0.027	0.024
Wharf Crane - 150 ton	DIESEL	247	41	5.95E-03	1.50E-03	1.80E-02	1.08E-05	8.38E-04	2	4	63	4.82	1.21	14.59	0.01	0.68	0.60	0.152	0.038	0.460	0.000	0.021	0.019
												12.43	**3.18**	**36.85**	**0.02**	**1.83**	**1.63**	**0.39**	**0.10**	**1.16**	**0.00**	**0.06**	**0.05**
Deck Removal																							
Air Compressor	DIESEL	50	48	7.69E-03	2.18E-03	1.93E-02	1.08E-05	1.52E-03	2	4	84	1.48	0.42	3.70	0.00	0.29	0.26	0.062	0.018	0.156	0.000	0.012	0.011
Loader	DIESEL	147	54	5.95E-03	1.50E-03	1.80E-02	1.08E-05	8.38E-04	2	4	84	3.78	0.95	11.44	0.01	0.53	0.47	0.159	0.040	0.480	0.000	0.022	0.020
Barge Crane - 150 Ton	DIESEL	314	41	5.95E-03	1.50E-03	1.80E-02	1.08E-05	8.38E-04	2	2	84	3.07	0.77	9.28	0.01	0.43	0.38	0.129	0.032	0.390	0.000	0.018	0.016
Dump Truck	DIESEL	489	59	5.95E-03	1.50E-03	1.80E-02	1.08E-05	8.38E-04	2	4	84	13.74	3.46	41.57	0.02	1.93	1.72	0.577	0.145	1.746	0.001	0.081	0.072
Wharf Crane	DIESEL	247	41	5.95E-03	1.50E-03	1.80E-02	1.08E-05	8.38E-04	2	4	84	4.82	1.21	14.59	0.01	0.68	0.60	0.203	0.051	0.613	0.000	0.029	0.025
												26.88	**6.82**	**80.58**	**0.05**	**3.87**	**3.44**	**1.13**	**0.29**	**3.38**	**0.00**	**0.16**	**0.14**
Debris Removal																							
Air Compressor	DIESEL	50	48	7.69E-03	2.18E-03	1.93E-02	1.08E-05	1.52E-03	2	4	84	1.48	0.42	3.70	0.00	0.29	0.26	0.062	0.018	0.156	0.000	0.012	0.011
Dump Truck	DIESEL	489	59	5.95E-03	1.50E-03	1.80E-02	1.08E-05	8.38E-04	2	4	84	13.74	3.46	41.57	0.02	1.93	1.72	0.577	0.145	1.746	0.001	0.081	0.072
Excavator	DIESEL	56	58	7.69E-03	2.18E-03	1.93E-02	1.08E-05	1.52E-03	2	4	84	2.00	0.57	5.01	0.00	0.40	0.35	0.084	0.024	0.211	0.000	0.017	0.015
Generator	DIESEL	45	74	1.10E-02	3.97E-03	1.52E-02	1.08E-05	1.68E-03	2	4	84	2.94	1.06	4.05	0.00	0.45	0.40	0.123	0.044	0.170	0.000	0.019	0.017
Loader	DIESEL	147	54	5.95E-03	1.50E-03	1.80E-02	1.08E-05	8.38E-04	2	4	84	3.78	0.95	11.44	0.01	0.53	0.47	0.159	0.040	0.480	0.000	0.022	0.020
												23.93	**6.46**	**65.78**	**0.04**	**3.60**	**3.20**	**1.01**	**0.27**	**2.76**	**0.00**	**0.15**	**0.13**
TOTAL												**63.25**	**16.45**	**183.21**	**0.11**	**9.30**	**8.28**	**2.53**	**0.66**	**7.31**	**0.00**	**0.37**	**0.33**

Assumptions:

* Assumes pier removal would occur over the course of 11 months.
* Pier Removal assumes 3 months (63 days without weekend or holidays).
* Deck Removal assumes 4 months (84 days without weekend or holidays).
* Debris Removal assumes 4 months (84 days without weekend or holidays).

Notes:Numbers may not add precisely due to rounding and decimal places

Emissions Summary Construction of Conventional Pier
Pier 8 Replacement EA

				Emission Factors								Emissions						Emission, tons (total)					
Equipment	FUEL	HP	Load Factor	CO (lb/bhp-hr)	VOC (lb/bhp-hr)	NOX (lb/bhp-hr)	SOX (lb/bhp-hr)	PM10 (lb/bhp-hr)	No of Equipment	Hrs Per Day	Days in Service	CO lbs/day	VOC lbs/day	NOX lbs/day	SOX lbs/day	PM10 lbs/day	PM2.5 lbs/day	CO tons (total)	VOC tons (total)	NOX tons (total)	SOX tons (total)	PM10 tons (total)	PM2.5 tons (total)
Piling Installation																							
Barge Crane - 150 Ton	DIESEL	314	41	5.95E-03	1.50E-03	1.80E-02	1.08E-05	8.38E-04	1	8	190	6.13	1.54	18.55	0.01	0.86	0.77	0.582	0.147	1.762	0.001	0.082	0.073
Impact Hammer	DIESEL	300	50	5.95E-03	1.50E-03	1.80E-02	1.08E-05	8.38E-04	1	8	190	7.14	1.80	21.61	0.01	1.01	0.89	0.679	0.171	2.053	0.001	0.096	0.085
												13.27	**3.34**	**40.17**	**0.02**	**1.87**	**1.66**	**1.26**	**0.32**	**3.82**	**0.00**	**0.18**	**0.16**
Deck Installation																							
Air Compressor	DIESEL	50	48	7.69E-03	2.18E-03	1.93E-02	1.08E-05	1.52E-03	2	8	200	2.95	0.84	7.41	0.00	0.58	0.52	0.295	0.084	0.741	0.000	0.058	0.052
Barge Crane - 150 Ton	DIESEL	314	41	5.95E-03	1.50E-03	1.80E-02	1.08E-05	8.38E-04	1	8	200	6.13	1.54	18.55	0.01	0.86	0.77	0.613	0.154	1.855	0.001	0.086	0.077
Concrete Truck	DIESEL	210	20	5.95E-03	1.50E-03	1.80E-02	1.08E-05	8.38E-04	1	8	200	2.00	0.50	6.05	0.00	0.28	0.25	0.200	0.050	0.605	0.000	0.028	0.025
Concrete Pump Truck	DIESEL	210	20	5.95E-03	1.50E-03	1.80E-02	1.08E-05	8.38E-04	1	8	200	2.00	0.50	6.05	0.00	0.28	0.25	0.200	0.050	0.605	0.000	0.028	0.025
Fork Lift	DIESEL	83	30	7.69E-03	2.18E-03	1.93E-02	1.08E-05	1.52E-03	2	8	200	3.07	0.87	7.69	0.00	0.61	0.54	0.307	0.087	0.769	0.000	0.061	0.054
Generator	DIESEL	33	74	1.10E-02	3.97E-03	1.52E-02	1.08E-05	1.68E-03	2	8	200	4.31	1.55	5.94	0.00	0.65	0.58	0.431	0.155	0.594	0.000	0.065	0.058
Wharf Crane - 150 ton	DIESEL	247	41	5.95E-03	1.50E-03	1.80E-02	1.08E-05	8.38E-04	1	8	200	4.82	1.21	14.59	0.01	0.68	0.60	0.482	0.121	1.459	0.001	0.068	0.060
												25.28	**7.02**	**66.28**	**0.04**	**3.95**	**3.51**	**2.53**	**0.70**	**6.63**	**0.00**	**0.39**	**0.35**
Shoreline Excavation																							
Air Compressor	DIESEL	50	48	7.69E-03	2.18E-03	1.93E-02	1.08E-05	1.52E-03	1	8	20	1.48	0.42	3.70	0.00	0.29	0.26	0.015	0.004	0.037	0.000	0.003	0.003
Dump Trucks	DIESEL	489	59	5.95E-03	1.50E-03	1.80E-02	1.08E-05	8.38E-04	4	8	20	54.96	13.84	166.29	0.10	7.73	6.88	0.550	0.138	1.663	0.001	0.077	0.069
Excavator	DIESEL	250	58	5.95E-03	1.50E-03	1.80E-02	1.08E-05	8.38E-04	1	8	8	6.90	1.74	20.89	0.01	0.97	0.86	0.028	0.007	0.084	0.000	0.004	0.003
Generator	DIESEL	45	74	1.10E-02	3.97E-03	1.52E-02	1.08E-05	1.68E-03	1	8	8	2.94	1.06	4.05	0.00	0.45	0.40	0.012	0.004	0.016	0.000	0.002	0.002
Loader	DIESEL	147	54	5.95E-03	1.50E-03	1.80E-02	1.08E-05	8.38E-04	1	8	8	3.78	0.95	11.44	0.01	0.53	0.47	0.015	0.004	0.046	0.000	0.002	0.002
												70.05	**18.01**	**206.38**	**0.12**	**9.98**	**8.88**	**0.62**	**0.16**	**1.85**	**0.00**	**0.09**	**0.08**
TOTAL												**108.61**	**28.38**	**312.83**	**0.19**	**15.79**	**14.06**	**4.41**	**1.18**	**12.29**	**0.01**	**0.66**	**0.59**

Notes:Numbers may not add precisely due to rounding and decimal places

Emissions Summary Construction of MHP
Pier 8 Replacement EA

							Emissions						Emission, tons (total)					
Equipment	FUEL	HP	Load Factor	No of Equipment	Hrs Per Day	Days in Service	CO lbs/day	VOC lbs/day	NOX lbs/day	SOX lbs/day	PM10 lbs/day	PM2.5 lbs/day	CO tons (total)	VOC tons (total)	NOX tons (total)	SOX tons (total)	PM10 tons (total)	PM2.5 tons (total)
Piling Installation																		
Barge Crane - 150 Ton	DIESEL	314	41	1	8	20	6.13	1.54	18.55	0.01	0.86	0.77	0.061	0.015	0.186	0.000	0.009	0.008
Impact Hammer	DIESEL	300	50	1	8	20	7.14	1.80	21.61	0.01	1.01	0.89	0.071	0.018	0.216	0.000	0.010	0.009
							13.27	**3.34**	**40.17**	**0.02**	**1.87**	**1.66**	**0.13**	**0.03**	**0.40**	**0.00**	**0.02**	**0.02**
Deck Installation																		
Air Compressor	DIESEL	50	48	2	8	60	2.95	0.84	7.41	0.00	0.58	0.52	0.089	0.025	0.222	0.000	0.018	0.016
Barge Crane - 150 Ton	DIESEL	314	41	1	8	60	6.13	1.54	18.55	0.01	0.86	0.77	0.184	0.046	0.557	0.000	0.026	0.023
Concrete Truck	DIESEL	210	20	1	8	60	2.00	0.50	6.05	0.00	0.28	0.25	0.060	0.015	0.182	0.000	0.008	0.008
Concrete Pump Truck	DIESEL	210	20	1	8	60	2.00	0.50	6.05	0.00	0.28	0.25	0.060	0.015	0.182	0.000	0.008	0.008
Fork Lift	DIESEL	83	30	2	8	60	3.07	0.87	7.69	0.00	0.61	0.54	0.092	0.026	0.231	0.000	0.018	0.016
Generator	DIESEL	33	74	2	8	60	4.31	1.55	5.94	0.00	0.65	0.58	0.129	0.047	0.178	0.000	0.020	0.017
Wharf Crane - 150 ton	DIESEL	247	41	1	8	60	4.82	1.21	14.59	0.01	0.68	0.60	0.145	0.036	0.438	0.000	0.020	0.018
							25.28	**7.02**	**66.28**	**0.04**	**3.95**	**3.51**	**0.76**	**0.21**	**1.99**	**0.00**	**0.12**	**0.11**
Shoreline Excavation																		
Air Compressor	DIESEL	50	48	1	8	20	1.48	0.42	3.70	0.00	0.29	0.26	0.015	0.004	0.037	0.000	0.003	0.003
Dump Trucks	DIESEL	489	59	4	8	20	54.96	13.84	166.29	0.10	7.73	6.88	0.550	0.138	1.663	0.001	0.077	0.069
Excavator	DIESEL	250	58	1	8	8	6.90	1.74	20.89	0.01	0.97	0.86	0.028	0.007	0.084	0.000	0.004	0.003
Generator	DIESEL	45	74	1	8	8	2.94	1.06	4.05	0.00	0.45	0.40	0.012	0.004	0.016	0.000	0.002	0.002
Loader	DIESEL	147	54	1	8	8	3.78	0.95	11.44	0.01	0.53	0.47	0.015	0.004	0.046	0.000	0.002	0.002
							70.05	**18.01**	**206.38**	**0.12**	**9.98**	**8.88**	**0.62**	**0.16**	**1.85**	**0.00**	**0.09**	**0.08**
TOTAL							**108.61**	**28.38**	**312.83**	**0.19**	**15.79**	**14.06**	**1.51**	**0.40**	**4.24**	**0.00**	**0.23**	**0.20**

Notes:Numbers may not add precisely due to rounding and decimal places

Emissions Summary Construction Trips Demolition
Pier 8 Replacement EA

Construction Phase	Vehicle Class	No. of Vehicles Per Day	Speed (mph)	VMT (mi/vehicle-day)	CO Running Exhaust (g/mi)	CO Start-Up (g/start)[a]	NO_X Running Exhaust (g/mi)	NO_X Start-Up (g/start)[a]	VOCs Running Exhaust (g/mi)	VOCs Start-Up (g/start)[a]	VOCs Hot-Soak (g/trip)	VOCs Resting Loss (g/hr)	VOCs Running Evaporative (g/mi)	VOCs Diurnal Evaporative (g/hr)	SOx Running Exhaust (g/mi)	SOx Start-Up (g/start)[a]	PM10 Running Exhaust (g/mi)	PM10 Start-Up (g/start)[a]	PM10 Tire Wear (g/mi)	PM10 Brake Wear (g/mi)	Emissions, lbs/day CO	NOx	VOCs	SOx	PM10	PM2.5	Days of Demo	Emissions, tons per year CO	NOx	VOCs	SOx	PM10	PM2.5
Demolition																																	
Transport Trucks	Heavy-duty truck, diesel	4	15	26	11.383		21.608		3.438						0.025		0.141		0.036	0.028	2.52	4.78	0.76	0.01	0.05	0.04	231	0.29112	0.55263	0.08793	0.000639	0.0052429	0.00519
TOTAL																					**2.52**	**4.78**	**0.76**	**0.01**	**0.05**	**0.04**		**0.29**	**0.55**	**0.09**	**0.00**	**0.01**	**0.01**

ASSUMPTIONS:

* Assuming 26 miles round trip per vehicle (distance to Miramar Landfill =
* Assume startup after 8 hours
* Assume 45 minutes run time total
* 2008 Emission Factors from EMFAC2007, average temp 60F

* Assume 11 months for demolitions debris disposal (231 days without weekends or holidays)

Debris Generation:

			Truck Trips, total
Concrete Debris Pier 8	201286.8	cubic feet	373
Steel Debris Pier 8	720	tons	24
Asphalt Debris Pier 8	2700	cubic feet	5
		Total =	**402**

Truck Trips:

Assume each truck holds 20 cubic yards of debris

Notes:Numbers may not add precisely due to rounding and decimal places

Emissions Summary Construction Truck Trips Conventional Pier
Pier 8 Replacement EA

Construction Phase	Vehicle Class	No. of Vehicles Per Day	Speed (mph)	VMT (mi/vehicle-day)	CO		NO_x		VOCs						SOx		PM10				Emissions, lbs/day							Emissions, tons per year					
					Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Hot-Soak (g/trip)	Resting Loss (g/hr)	Running Evaporat-ive (g/mi)	Diurnal Evapora-ive (g/hr)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Tire Wear (g/mi)	Brake Wear (g/mi)	CO	NOx	VOCs	SOx	PM10	PM2.5	Days of Delivery	CO	NOx	VOCs	SOx	PM10	PM2.5
Conventional Pier																																	
Transport Trucks	Heavy-duty truck, diesel	71	15	40	11.383		21.608		3.438						0.025		0.141		0.036	0.028	71.15	135.07	21.49	0.16	1.28	1.27	26	0.92501	1.7559	0.27938	0.002	0.0167	0.01649
TOTAL																					**71.15**	**135.07**	**21.49**	**0.16**	**1.28**	**1.27**		**0.93**	**1.76**	**0.28**	**0.00**	**0.02**	**0.02**

ASSUMPTIONS:

* Assuming 40 miles round trip per vehicle
* Assume startup after 8 hours
* Assume 45 minutes run time total
* 2008 Emission Factors from EMFAC2007, average temp 60F
* Assume 1 month for deliveries

Construction Materials		**Truck Trips, total**
Concrete Structural Piles	516 piles	258
Fender Piles	434 piles	217
Construction Materials	Concrete mixer	1368
	Total =	**1843**

Emissions Summary Construction Truck Trips MHP
Pier 8 Replacement EA

Construction Phase	Vehicle Class	No. of Vehicles Per Day	Speed (mph)	VMT (mi/vehicle-day)	CO Running Exhaust (g/mi)	CO Start-Up (g/start)[a]	NO_X Running Exhaust (g/mi)	NO_X Start-Up (g/start)[a]	VOCs Running Exhaust (g/mi)	VOCs Start-Up (g/start)[a]	VOCs Hot-Soak (g/trip)	VOCs Resting Loss (g/hr)	VOCs Running Evaporat-ive (g/mi)	VOCs Diurnal Evaporat-ive (g/hr)	SOx Running Exhaust (g/mi)	SOx Start-Up (g/start)[a]	PM10 Running Exhaust (g/mi)	PM10 Start-Up (g/start)[a]	PM10 Tire Wear (g/mi)	PM10 Brake Wear (g/mi)	Emissions, lbs/day CO	NOx	VOCs	SOx	PM10	PM2.5	Days of Delivery	Emissions, tons per year CO	NOx	VOCs	SOx	PM10	PM2.5
MHP Construction																																	
Transport Trucks	Heavy-duty truck, diesel	4	15	40	11.383		21.608		3.438						0.025		0.141		0.036	0.028	4.02	7.62	1.21	0.01	0.07	0.07	26	0.052198	0.09909	0.0158	0.00011	0.00094	0.00093
TOTAL																					**4.02**	**7.62**	**1.21**	**0.01**	**0.07**	**0.07**		**0.05**	**0.10**	**0.02**	**0.00**	**0.00**	**0.00**

ASSUMPTIONS:

* Assuming 40 miles round trip per vehicle
* Assume startup after 8 hours
* Assume 45 minutes run time total
* 2008 Emission Factors from EMFAC2007, average temp 60F
* Assume 1 month for deliveries

Construction Materials		**Truck Trips, total**
Concrete Structural	96 piles	32
Concrete	concrete mixers	58
	Total =	**90**

Emissions Summary Worker Vehicle Trips Conventional Pier
Pier 8 Replacement EA

Construction Phase	Vehicle Class	No. of Workers Per Construct-ion Phase	Speed (mph)	VMT (mi/ vehicle-day)	CO Running Exhaust (g/mi)	CO Start-Up (g/ start)[a]	NO_x Running Exhaust (g/mi)	NO_x Start-Up (g/ start)[a]	VOCs Running Exhaust (g/mi)	VOCs Start-Up (g/ start)[a]	VOCs Hot-Soak (g/trip)	VOCs Resting Loss (g/hr)	VOCs Running Evapora-tive (g/mi)	VOCs Diurnal Evapora-tive (g/hr)	SOx Running Exhaust (g/mi)	SOx Start-Up (g/ start)[a]	PM10 Running Exhaust (g/mi)	PM10 Start-Up (g/ start)[a]	Tire Wear (g/mi)	Brake Wear (g/mi)	Emissions, lbs/day CO	NOx	VOCs	SOx	PM10	PM2.5	Days	Emissions, tons per trip CO	NOx	VOCs	SOx	PM10	PM2.5
Demolition	Light-duty truck, catalyst	25	35	40	3.019	11.792	0.27	0.586	0.056	0.867	0.177	0.026	0.047	0.061	0.004	0.002	0.01	0.015	0.008	0.013	7.96	0.66	0.38	0.01	0.07	0.07	230	0.9149	0.0759	0.044127	0.001039	0.00805	0.0079691 7
Conventional Pier Construction	Light-duty truck, catalyst	25	35	40	3.019	11.792	0.27	0.586	0.056	0.867	0.177	0.026	0.047	0.061	0.004	0.002	0.01	0.015	0.008	0.013	7.96	0.66	0.38	0.01	0.07	0.07	222	0.88308	0.0732	0.042593	0.001003	0.00777	0.00769199
TOTAL																					**15.91**	**1.32**	**0.77**	**0.02**	**0.14**	**0.14**		**1.80**	**0.15**	**0.09**	**0.00**	**0.02**	**0.02**

ASSUMPTIONS:

* Assume 11 months for demolition
* Assume 10 months total for Conventional Pier construction
* Assuming 40 miles round trip per vehicle
* Assume startup after 8 hours
* Assume 45 minutes run time total
* 2008 Emission Factors from EMFAC2007, average temp 60F

Notes:Numbers may not add precisely due to rounding and decimal places

Emissions Summary Worker Vehicle Trips MHP
Pier 8 Replacement EA

Construction Phase	Vehicle Class	No. of Workers Per Construct-ion Phase	Speed (mph)	VMT (mi/vehicle-day)	CO Running Exhaust (g/mi)	CO Start-Up (g/ start)*	NO_X Running Exhaust (g/mi)	NO_X Start-Up (g/ start)*	VOCs Running Exhaust (g/mi)	VOCs Start-Up (g/ start)*	VOCs Hot-Soak (g/trip)	VOCs Resting Loss (g/hr)	VOCs Running Evaporative (g/mi)	VOCs Diurnal Evaporative (g/hr)	SOx Running Exhaust (g/mi)	SOx Start-Up (g/ start)*	PM10 Running Exhaust (g/mi)	PM10 Start-Up (g/ start)*	Tire Wear (g/mi)	Brake Wear (g/mi)	Emissions, lbs/day CO	NOx	VOCs	SOx	PM10	PM2.5	Days	Emissions, tons per trip CO	NOx	VOCs	SOx	PM10	PM2.5
Demolition	Light-duty truck, catalyst	25	35	40	3.019	11.792	0.27	0.586	0.056	0.867	0.177	0.026	0.047	0.061	0.004	0.002	0.01	0.015	0.008	0.013	7.96	0.66	0.38	0.01	0.07	0.07	231	0.91888	0.07621	0.044319	0.00104	0.008085	0.008004
MHP Construction	Light-duty truck, catalyst	25	35	40	3.019	11.792	0.27	0.586	0.056	0.867	0.177	0.026	0.047	0.061	0.004	0.002	0.01	0.015	0.008	0.013	7.96	0.66	0.38	0.01	0.07	0.07	84	0.33414	0.02771	0.016116	0.00038	0.00294	0.00291
TOTAL																					**15.91**	**1.32**	**0.77**	**0.02**	**0.14**	**0.14**		**1.25**	**0.10**	**0.06**	**0.00**	**0.01**	**0.01**

ASSUMPTIONS:

* Assume 11 months for demolition
* Assume 4 months total for MHP construction
* Assuming 40 miles round trip per vehicle
* Assume startup after 8 hours
* Assume 45 minutes run time total
* 2008 Emission Factors from EMFAC2007, average temp 60F

Notes: Numbers may not add precisely due to rounding and decimal places

Emissions Summary Tugboats Conventional Pier
Pier 8 Replacement EA

											Emission Factors						Hourly Emission Rates (lb/hr)					Annual Emission Rates (ton/yr)				
Equipment Type	**Operation/ Location**	**power rating or fuel usage**	**units**	**Load %**	**No. of units**	**Fuel Type**	**hrs per day**	**Days/ year**	**hrs/ year**	**Fuel Consumption (g/kW-hr)**	**PM10**	**NOx**	**CO**	**SO2**	**VOC ***	**Emission factor units**	**CO**	**VOC**	**NOx**	**SO2**	**PM10**	**CO**	**VOC**	**NOx**	**SO2**	**PM10**
Support Boat	Demolition support	2,000	kW	85.0%	1	California Diesel	2	102	204	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	4.34	0.37	46.74	0.03	1.16	0.4	0.0	4.8	0.0	0.1
Tugboats	Construction support	3,183	kW	85.0%	1	California Diesel	2	202	404	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	6.91	0.60	74.38	0.06	1.84	1.4	0.1	15.0	0.0	0.4
Support Boat	Construction support	2,000	kW	85.0%	1	California Diesel	2	102	204	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	4.34	0.37	46.74	0.03	1.16	0.4	0.0	4.8	0.0	0.1
Total Emissions																MAX Daily:	**11.25**	**0.97**	**121.12**	**0.09**	**3.00**	**1.84**	**0.16**	**19.79**	**0.01**	**0.49**

SOURCE:

Load factors based on recommdations in EPA420-R-00-002, Table 5-2, assumed for maneuvering.
Auxiliary loads from Table 5-2, kW
Emission Factors from Analysis of Commercial Marine Vessel Emissions and Fuel Consumption Data, USEPA, Feb 2000, EPA420-R-00-002, page 5-3.
Emission factors from AP-42 1.3 for Fuel Oil Combustion - No 6 Oil Industrial Fired Boilers
* VOC emissions are actuallyTHC for Marine Vessels

0.0015	% Sulfur content of the Fuel Oil used in the boiler and main engines,
0.15	% Nitrogen content of the Fuel Oil used for the boilers
0.0015	% Sulfur content of the Fuel Oil used in the boiler and main engines,
0.944	kg/l density of residual oil, from AP-42 Appendix A

Notes:Numbers may not add precisely due to rounding and decimal places

Emissions Summary Tugboats MHP
Pier 8 Replacement EA

											Emission Factors						Hourly Emission Rates (lb/hr)					Annual Emission Rates (ton/yr)				
Equipment Type	**Operation/Location**	**power rating or fuel usage**	**units**	**Load %**	**No. of units**	**Fuel Type**	**hrs**	**Days/year**	**hrs/year**	**Fuel Consumption (g/kW-hr)**	**PM10**	**NOx**	**CO**	**SO2**	**VOC ***	**Emission factor units**	**CO**	**VOC**	**NOx**	**SO2**	**PM10**	**CO**	**VOC**	**NOx**	**SO2**	**PM10**
Support Boat	Demolition Support	2,000	kW	85.0%	1	California Diesel	2	102	204	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	4.34	0.37	46.74	0.03	1.16	0.4	0.0	4.8	0.0	0.1
Tugboats	Transit from Module drydock	3,183	kW	85.0%	1	California Diesel	120	9	1080	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	6.91	0.60	74.38	0.06	1.84	3.7	0.3	40.2	0.0	1.0
Tugboats	Construction support	3,183	kW	85.0%	1	California Diesel	2	62	124	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	6.91	0.60	74.38	0.06	1.84	0.4	0.0	4.6	0.0	0.1
Support Boat	Construction support	2,000	kW	85.0%	1	California Diesel	2	32	64	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	4.34	0.37	46.74	0.03	1.16	0.1	0.0	1.5	0.0	0.0
Total Emissions																MAX Daily:	**18.16**	**1.57**	**195.50**	**0.15**	**4.84**	**4.30**	**0.37**	**46.27**	**0.03**	**1.15**

within 3 nm of SDAB

Equipment Type	**Operation/Location**	**power rating or fuel usage**	**units**	**Load %**	**No. of units**	**Fuel Type**	**hrs**	**Days/year**	**hrs/year**	**Fuel Consumption (g/kW-hr)**	**PM10**	**NOx**	**CO**	**SO2**	**VOC ***	**Emission factor units**	**CO**	**VOC**	**NOx**	**SO2**	**PM10**	**CO**	**VOC**	**NOx**	**SO2**	**PM10**
Support Boat	Demolition Support	2,000	kW	85.0%	1	California Diesel	2	102	204	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	4.34	0.37	46.74	0.03	1.16	0.4	0.0	4.8	0.0	0.1
Tugboats	Transit from Module drydock	3,183	kW	85.0%	1	California Diesel	15	1	15	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	6.91	0.60	74.38	0.06	1.84	0.1	0.0	0.6	0.0	0.0
Tugboats	Construction support	3,183	kW	85.0%	1	California Diesel	2	62	124	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	6.91	0.60	74.38	0.06	1.84	0.4	0.0	4.6	0.0	0.1
Support Boat	Construction support	2,000	kW	85.0%	1	California Diesel	2	32	64	222.33	0.26	10.61	0.99	0.01	0.09	g/kW-hr	4.34	0.37	46.74	0.03	1.16	0.1	0.0	1.5	0.0	0.0
Total Emissions																MAX Daily:	**18.16**	**1.57**	**195.50**	**0.15**	**4.84**	**0.62**	**0.05**	**6.66**	**0.00**	**0.16**

Assuming 5 knots within 5 nm of San Diego Mainland

SOURCE:

Load factors based on recommdations in EPA420-R-00-002, Table 5-2, assumed for maneuvering.
Auxiliary loads from Table 5-2, kW
Emission Factors from Analysis of Commercial Marine Vessel Emissions and Fuel Consumption Data, USEPA, Feb 2000, EPA420-R-00-002, page 5-3.
Emission factors from AP-42 1.3 for Fuel Oil Combustion - No 6 Oil Industrial Fired Boilers
* VOC emissions are actuallyTHC for Marine Vessels

0.0015	% Sulfur content of the Fuel Oil used in the boiler and main engines,
0.15	% Nitrogen content of the Fuel Oil used for the boilers
0.0015	% Sulfur content of the Fuel Oil used in the boiler and main engines,
0.944	kg/l density of residual oil, from AP-42 Appendix A

* Assume transit from as far as Tacoma, WA; transport emissions based on 5 trips, 9 days/trip

Notes:Numbers may not add precisely due to rounding and decimal places

Construction Emissions Summary: Emission Factors
Pier 8 Replacement EA

Emission Factors

Commercial Marine Vessel Emissions

Pollutant	Exponent (x)	Intercept (b)	Coefficient (a)
PM	1.5	0.2551	0.0059
NOX	1.5	10.4496	0.1255
NO2	1.5	15.5247	0.18865
SO2	0	0	2.3735
CO	1	0	0.8378
HC	1.5	0	0.0667
CO2	1	648.6	44.1

Emission Factor equation is in the form:

Emissions Rate (g/kW-hr) = a * (Fractional Load of Engine Power)$^{-x}$ + b

For SO2, the equation is:
Emissions Rate (g/kW-hr) = a * (Fuel Sulfur Flow in g/kW-hr) + b = a * (fuel consumption in g/kW-hr) * (% sulfur in fuel/100) + b
Requires an estimate of the % sulfur in the fuel.

Fuel Consumption Estimation equation:
Fuel Consumption (g/kW-hr) = 14.12/(Fractional Load) + 205.717

Emission Factor Source: Analysis of Commercial Marine Vessel Emissions and Fuel Consumption Data,
USEPA, February 2000, EPA420-R-00-002, page 5-3.

Notes:Numbers may not add precisely due to rounding and decimal places

Greenhouse Gas Emissions Calculations

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Greenhouse Gas Emissions Summary
Pier 8 Replacement EA

Proposed Action - Conventional Pier	Emission (metric tons/year)			CO_2e
	CO2	CH4	N2O	
Pier 8 Demolition Emissions				
Pilling Removal	71.85	0.01	0.07	
Deck Removal	171.70	0.02	0.16	
Debris Removal	152.26	0.02	0.14	
Truck Trips - Demolition	66.39	0.00	0.05	
Worker Trips - Demolition	100.87	0.01	0.01	
Support Vessels	285.54			
Conventional Pier Construction				
Piling Installation	291.64	0.03	0.19	
Deck Installation	588.59	0.09	0.58	
Shoreline Excavation	86.54	0.01	0.07	
Truck Trips - Construction	210.95	0.01	0.17	
Worker Trips - Construction	91.70	0.01	0.01	
Support Vessels	1,185.43			
Subtotal	**3,303.48**	**0.21**	**1.45**	**3,757.26**

Modular Hybrid Pier Alternative	Emission (metric tons/year)			CO_2e
	CO2	CH4	N2O	
Pier 8 Demolition Emissions				
Pilling Removal	71.85	0.01	0.07	
Deck Removal	171.70	0.02	0.16	
Debris Removal	152.26	0.02	0.14	
Truck Trips - Demolition	66.39	0.00	0.05	
Worker Trips - Demolition	100.87	0.01	0.01	
Support Vessels	285.54			
MHP Construction				
Piling Installation	30.70	0.00	0.02	
Deck Installation	176.58	0.03	0.18	
Shoreline Excavation	86.54	0.01	0.07	
Truck Trips - Construction	11.90	0.00	0.01	
Worker Trips - Construction	36.68	0.00	0.00	
Support Vessels	2,771.43			
Subtotal	**3,962.44**	**0.10**	**0.70**	**4,181.61**

Modular Hybrid Pier Alternative - within 3nm of SDAB	Emission (metric tons/year)			CO_2e
	CO2	CH4	N2O	
Pier 8 Demolition Emissions				
Pilling Removal	71.85	0.01	0.07	
Deck Removal	171.70	0.02	0.16	
Debris Removal	152.26	0.02	0.14	
Truck Trips - Demolition	66.39	0.00	0.05	
Worker Trips - Demolition	100.87	0.01	0.01	
Support Vessels	285.54			
MHP Construction				
Piling Installation	30.70	0.00	0.02	
Deck Installation	176.58	0.03	0.18	
Shoreline Excavation	86.54	0.01	0.07	
Truck Trips - Construction	11.90	0.00	0.01	
Worker Trips - Construction	36.68	0.00	0.00	
Support Vessels	399.20			
Subtotal	**1,590.22**	**0.10**	**0.70**	**1,809.38**

Notes:

Conversion to metric tons = 1 short ton = 0.90718474 metric tons

$CO_{2e} = (CO_2*1)+ (CH_4*21)+(N_2O*310)$

Conventional Pier Emissions as a % of U.S. Emissions =	0.0000578%
MHP Emissions as a % of U.S. Emissions =	0.0000643%

Notes: Numbers may not add precisely due to rounding and decimal places

GHG Emissions Summary Heavy Equipment Demolition
Pier 8 Replacement EA

				Emission Factors						Emissions			Emission, metric tons (total)		
Equipment	FUEL	HP	Load Factor	CO2 (lb/hr)	CH4 (lb/hr)	N2O (lb/hr)	No of Equipment	Hrs Per Day	Days in Service	CO2 lbs/day	CH4 lbs/day	N2O lbs/day	CO2 tons (total)	CH4 tons (total)	N2O tons (total)
Piling Removal															
Air Compressor	DIESEL	50	48	2.23E+01	1.05E-02	2.27E-02	2	4	63	178.40	0.08	0.18	5.098	0.002	0.005
Barge Crane - 250 ton	DIESEL	314	41	1.80E+02	1.64E-02	1.68E-01	2	4	63	1,440.00	0.13	1.35	41.150	0.004	0.038
Wharf Crane - 150 ton	DIESEL	247	41	1.12E+02	1.12E-02	1.18E-01	2	4	63	896.00	0.09	0.94	25.605	0.003	0.027
										2,514.40	**0.30**	**2.47**	**71.85**	**0.01**	**0.07**
Deck Removal															
Air Compressor	DIESEL	50	48	2.23E+01	1.05E-02	2.27E-02	2	4	84	178.40	0.08	0.18	6.797	0.003	0.007
Loader	DIESEL	147	54	1.01E+02	1.10E-02	9.16E-02	2	4	84	808.00	0.09	0.73	30.787	0.003	0.028
Barge Crane - 150 Ton	DIESEL	314	41	1.12E+02	1.12E-02	1.18E-01	2	2	84	448.00	0.04	0.47	17.070	0.002	0.018
Dump Truck	DIESEL	489	59	2.72E+02	2.25E-02	2.20E-01	2	4	84	2,176.00	0.18	1.76	82.910	0.007	0.067
Wharf Crane	DIESEL	247	41	1.12E+02	1.12E-02	1.18E-01	2	4	84	896.00	0.09	0.94	34.140	0.003	0.036
										4,506.40	**0.49**	**4.09**	**171.70**	**0.02**	**0.16**
Debris Removal															
Air Compressor	DIESEL	50	48	2.23E+01	1.05E-02	2.27E-02	2	4	84	178.40	0.08	0.18	6.797	0.003	0.007
Dump Truck	DIESEL	489	59	2.72E+02	2.25E-02	2.20E-01	2	4	84	2,176.00	0.18	1.76	82.910	0.007	0.067
Excavator	DIESEL	56	58	7.36E+01	1.26E-02	7.98E-02	2	4	84	588.80	0.10	0.64	22.435	0.004	0.024
Generator	DIESEL	45	74	3.06E+01	1.01E-02	2.92E-02	2	4	84	244.80	0.08	0.23	9.327	0.003	0.009
Loader	DIESEL	147	54	1.01E+02	1.10E-02	9.16E-02	2	4	84	808.00	0.09	0.73	30.787	0.003	0.028
										3,996.00	**0.53**	**3.55**	**152.26**	**0.02**	**0.14**
TOTAL										**11,016.80**	**1.32**	**10.10**	**395.81**	**0.05**	**0.36**

Assumptions:

* Assumes pier removal would occur over the course of 11 months and that pier 8 & 14 demolition would occur simultaneously.
* Pier Removal assumes 3 months (63 days without weekend or holidays).
* Deck Removal assumes 4 months (84 days without weekend or holidays).
* Debris Removal assumes 4 months (84 days without weekend or holidays).

Notes: Numbers may not add precisely due to rounding and decimal places

GHG Emissions Summary Conventional Pier Construction
Pier 8 Replacement EA

				Emission Factors						Emissions			Emission, metric tons (total)		
Equipment	FUEL	HP	Load Factor	CO2 (lb/hr)	CH4 (lb/hr)	N2O (lb/hr)	No of Equipment	Hrs Per Day	Days in Service	CO2 lbs/day	CH4 lbs/day	N2O lbs/day	CO2 tons (total)	CH4 tons (total)	N2O tons (total)
Piling Installation															
Barge Crane - 150 Ton	DIESEL	314	41	1.12E+02	1.12E-02	1.18E-01	1	8	190	896.00	0.09	0.94	77.220	0.008	0.081
Impact Hammer	DIESEL	300	50	3.11E+02	3.14E-02	1.62E-01	1	8	190	2,488.00	0.25	1.30	214.424	0.022	0.112
										3,384.00	**0.34**	**2.24**	**291.64**	**0.03**	**0.19**
Deck Installation															
Air Compressor	DIESEL	50	48	2.23E+01	1.05E-02	2.27E-02	2	8	200	356.80	0.17	0.36	32.369	0.015	0.033
Barge Crane - 150 Ton	DIESEL	314	41	1.12E+02	1.12E-02	1.18E-01	1	8	200	896.00	0.09	0.94	81.285	0.008	0.085
Concrete Truck	DIESEL	210	20	1.67E+02	1.48E-02	1.53E-01	1	8	200	1,336.00	0.12	1.23	121.201	0.011	0.111
Concrete Pump Truck	DIESEL	210	20	1.67E+02	1.48E-02	1.53E-01	1	8	200	1,336.00	0.12	1.23	121.201	0.011	0.111
Fork Lift	DIESEL	83	30	7.36E+01	1.26E-02	7.98E-02	2	8	200	1,177.60	0.20	1.28	106.831	0.018	0.116
Generator	DIESEL	33	74	3.06E+01	1.01E-02	2.92E-02	2	8	200	489.60	0.16	0.47	44.416	0.015	0.042
Wharf Crane - 150 ton	DIESEL	247	41	1.12E+02	1.12E-02	1.18E-01	1	8	200	896.00	0.09	0.94	81.285	0.008	0.085
										6,488.00	**0.95**	**6.44**	**588.59**	**0.09**	**0.58**
Shoreline Excavation															
Air Compressor	DIESEL	50	48	2.23E+01	1.05E-02	2.27E-02	1	8	20	178.40	0.08	0.18	1.618	0.001	0.002
Dump Trucks	DIESEL	489	59	2.72E+02	2.25E-02	2.20E-01	4	8	20	8,704.00	0.72	7.05	78.962	0.007	0.064
Excavator	DIESEL	250	58	7.36E+01	1.26E-02	7.98E-02	1	8	8	588.80	0.10	0.64	2.137	0.000	0.002
Generator	DIESEL	45	74	3.06E+01	1.01E-02	2.92E-02	1	8	8	244.80	0.08	0.23	0.888	0.000	0.001
Loader	DIESEL	147	54	1.01E+02	1.10E-02	9.16E-02	1	8	8	808.00	0.09	0.73	2.932	0.000	0.003
										10,524.00	**1.07**	**8.84**	**86.54**	**0.01**	**0.07**
TOTAL										**20,396.00**	**2.36**	**17.51**	**966.77**	**0.12**	**0.85**

Notes: Numbers may not add precisely due to rounding and decimal places

GHG Emissions Summary Construction of MHP
Pier 8 Replacement EA

				Emission Factors						Emissions			Emission, metric tons (total)		
Equipment	FUEL	HP	Load Factor	CO2 (lb/hr)	CH4 (lb/hr)	N2O (lb/hr)	No of Equipment	Hrs Per Day	Days in Service	CO2 lbs/day	CH4 lbs/day	N2O lbs/day	CO2 tons (total)	CH4 tons (total)	N2O tons (total)
Piling Installation															
Barge Crane - 150 Ton	DIESEL	314	41	1.12E+02	1.12E-02	1.18E-01	1	8	20	896.00	0.09	0.94	8.128	0.001	0.009
Impact Hammer	DIESEL	300	50	3.11E+02	3.14E-02	1.62E-01	1	8	20	2,488.00	0.25	1.30	22.571	0.002	0.012
										3,384.00	**0.34**	**2.24**	**30.70**	**0.00**	**0.02**
Deck Installation															
Air Compressor	DIESEL	50	48	2.23E+01	1.05E-02	2.27E-02	2	8	60	356.80	0.17	0.36	9.711	0.005	0.010
Barge Crane - 150 Ton	DIESEL	314	41	1.12E+02	1.12E-02	1.18E-01	1	8	60	896.00	0.09	0.94	24.385	0.002	0.026
Concrete Truck	DIESEL	210	20	1.67E+02	1.48E-02	1.53E-01	1	8	60	1,336.00	0.12	1.23	36.360	0.003	0.033
Concrete Pump Truck	DIESEL	210	20	1.67E+02	1.48E-02	1.53E-01	1	8	60	1,336.00	0.12	1.23	36.360	0.003	0.033
Fork Lift	DIESEL	83	30	7.36E+01	1.26E-02	7.98E-02	2	8	60	1,177.60	0.20	1.28	32.049	0.005	0.035
Generator	DIESEL	33	74	3.06E+01	1.01E-02	2.92E-02	2	8	60	489.60	0.16	0.47	13.325	0.004	0.013
Wharf Crane - 150 ton	DIESEL	247	41	1.12E+02	1.12E-02	1.18E-01	1	8	60	896.00	0.09	0.94	24.385	0.002	0.026
										6,488.00	**0.95**	**6.44**	**176.58**	**0.03**	**0.18**
Shoreline Excavation															
Air Compressor	DIESEL	50	48	2.23E+01	1.05E-02	2.27E-02	1	8	20	178.40	0.08	0.18	1.618	0.001	0.002
Dump Trucks	DIESEL	489	59	2.72E+02	2.25E-02	2.20E-01	4	8	20	8,704.00	0.72	7.05	78.962	0.007	0.064
Excavator	DIESEL	250	58	7.36E+01	1.26E-02	7.98E-02	1	8	8	588.80	0.10	0.64	2.137	0.000	0.002
Generator	DIESEL	45	74	3.06E+01	1.01E-02	2.92E-02	1	8	8	244.80	0.08	0.23	0.888	0.000	0.001
Loader	DIESEL	147	54	1.01E+02	1.10E-02	9.16E-02	1	8	8	808.00	0.09	0.73	2.932	0.000	0.003
										10,524.00	**1.07**	**8.84**	**86.54**	**0.01**	**0.07**
TOTAL										**20,396.00**	**2.36**	**17.51**	**293.81**	**0.04**	**0.27**

Notes: Numbers may not add precisely due to rounding and decimal places

GHG Emissions Summary Construction Trips Demolition
Pier 8 Replacement EA

Construction Phase	Vehicle Class	No. of Vehicles	Speed	VMT	CO2		N2O		CH4		Emissions, lbs/day				Emissions, metric tons per year		
		Per Day	(mph)	(mi/vehicle-day)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	CO2	CH4	N2O	Days of Demo	CO2	CH4	N2O
Demolition																	
Transport Trucks	Heavy-duty truck, diesel	4	15	26	2,595.96		2.05276		0.16		574.82	0.04	0.45	231	66.392	0.00409	0.0525
TOTAL											**574.82**	**0.04**	**0.45**		**66.39**	**0.00**	**0.05**

ASSUMPTIONS:

* Assuming 26 miles round trip per vehicle (distance to Miramar Landfill = 13 miles)
* Assume startup after 8 hours
* Assume 45 minutes run time total
* 2008 Emission Factors from EMFAC2007, average temp 60 degrees
* Assume 11 months for demolitions debris disposal (231 days without weekends or holidays)

Debris Generation:

		Units	Truck Trips, total
Concrete Debris Pier 8	201,286.80	cubic feet	373
Steel Debris Pier 8	720.00	tons	24
Asphalt Debris Pier 8	2,700.00	cubic feet	5
		Total =	**402**

Truck Trips:

Assume each truck holds 20 cubic yards of debris

Notes: Numbers may not add precisely due to rounding and decimal places

GHG Emissions Summary Construction Truck Trips Conventional Pier
Pier 8 Replacement EA

Construction Phase	Vehicle Class	No. of Vehicles	Speed	VMT	CO2		N2O		CH4		Emissions, lbs/day				Emissions, metric tons per year		
		Per Day	(mph)	(mi/vehicle-day)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	CO2	CH4	N2O	Days of Delivery	CO2	CH4	N2O
Conventional Pier																	
Transport Trucks	Heavy-duty truck, diesel	71	15	40	2,595.96		2.05276		0.16		16,227.30	1.00	12.83	26	210.95485	0.013002	0.166813
TOTAL											**16,227.30**	**1.00**	**12.83**		**210.95**	**0.01**	**0.17**

ASSUMPTIONS:

* Assuming 40 miles round trip per vehicle
* Assume startup after 8 hours
* Assume 45 minutes run time total
* 2008 Emission Factors from EMFAC2007, average temp 60F
* Assume 1 month for deliveries

Construction Materials	Units	Truck Trips, total
Concrete Structural Piles	516 piles	258
Fender Piles	434 piles	217
Construction Materials	Concrete mixer	1368
	Total =	**1,843**

Notes: Numbers may not add precisely due to rounding and decimal places

GHG Emissions Summary Construction Truck Trips MHP
Pier 8 Replacement EA

Construction Phase	Vehicle Class	No. of Vehicles	Speed	VMT	CO2		N2O		CH4		Emissions, lbs/day				Emissions, metric tons per year		
		Per Day	(mph)	(mi/ vehicle-day)	Running Exhaust (g/mi)	Start-Up (g/ start)[a]	Running Exhaust (g/mi)	Start-Up (g/ start)[a]	Running Exhaust (g/mi)	Start-Up (g/ start)[a]	CO2	CH4	N2O	Days of Delivery	CO2	CH4	N2O
MHP Construction																	
Transport Trucks	Heavy-duty truck, diesel	4	15	40	2,595.96		2.05276		0.16		915.70	0.06	0.72	26	11.90413	0.00073	0.00941
TOTAL											**915.70**	**0.06**	**0.72**		**11.90**	**0.00**	**0.01**

ASSUMPTIONS:

* Assuming 40 miles round trip per vehicle
* Assume startup after 8 hours
* Assume 45 minutes run time total
* 2008 Emission Factors from EMFAC2007, average temp 60F
* Assume 1 month for deliveries

Construction Materials		Truck Trips, total
Concrete Structural Piles	96 piles	32
Concrete	concrete mixers	58
	Total =	**90**

Notes: Numbers may not add precisely due to rounding and decimal places

GHG Emissions Summary Worker Vehicle Trips Conventional Pier
Pier 8 Replacement EA

Construction Phase	Vehicle Class	No. of Workers Per Construction Phase	Speed (mph)	VMT (mi/vehicle-day)	CO2 Running Exhaust (g/mi)	CO2 Start-Up (g/start)[a]	N2O Running Exhaust (g/mi)	N2O Start-Up (g/start)[a]	CH4 Running Exhaust (g/mi)	CH4 Start-Up (g/start)[a]	Emissions, lbs/day CO2	Emissions, lbs/day CH4	Emissions, lbs/day N2O	Days	Emissions, metric tons per trip CO2	Emissions, metric tons per trip CH4	Emissions, metric tons per trip N2O
Demolition	Light-duty truck, catalyst	25	35	40	385.949	203.874	0.02565	0.05567	0.025	0.046	873.35	0.06	0.06	231	100.87189	0.0069515	0.0072402
Conventional Pier Construction	Light-duty truck, catalyst	25	35	40	385.949	203.874	0.02565	0.05567	0.025	0.046	873.35	0.06	0.06	210	91.701721	0.0063196	0.006582
TOTAL											**1,746.70**	**0.12**	**0.13**		**192.57**	**0.01**	**0.01**

ASSUMPTIONS:

* Assume 11 months for demolition
* Assume 10 months total for Conventional Pier construction
* Assuming 40 miles round trip per vehicle
* Assume startup after 8 hours
* Assume 45 minutes run time total
* 2008 Emission Factors from EMFAC2007, average temp 60F

Notes: Numbers may not add precisely due to rounding and decimal places

GHG Emissions Summary Worker Trips MHP
Pier 8 Replacement EA

Construction Phase	Vehicle Class	No. of Workers Per Construction Phase	Speed (mph)	VMT (mi/vehicle-day)	CO2 Running Exhaust (g/mi)	CO2 Start-Up (g/start)[a]	N2O Running Exhaust (g/mi)	N2O Start-Up (g/start)[a]	CH4 Running Exhaust (g/mi)	CH4 Start-Up (g/start)[a]	Emissions, lbs/day CO2	Emissions, lbs/day CH4	Emissions, lbs/day N2O	Days	Emissions, metric tons per trip CO2	Emissions, metric tons per trip CH4	Emissions, metric tons per trip N2O
Demolition	Light-duty truck, catalyst	25	35	40	385.949	203.874	0.02565	0.05567	0.025	0.046	873.35	0.06	0.06	231	100.87189	0.0069515	0.0072402
MHP Construction	Light-duty truck, catalyst	25	35	40	385.949	203.874	0.02565	0.05567	0.025	0.046	873.35	0.06	0.06	84	36.680688	0.0025278	0.0026328
TOTAL											**1,746.70**	**0.12**	**0.13**		**137.55**	**0.01**	**0.01**

ASSUMPTIONS:

* Assume 11 months for demolition
* Assume 4 months total for MHP construction
* Assuming 40 miles round trip per vehicle
* Assume startup after 8 hours
* Assume 45 minutes run time total
* 2008 Emission Factors from EMFAC2007, average temp 60F

Notes: Numbers may not add precisely due to rounding and decimal places

GHG Emissions Summary Tugboats Conventional Pier
Pier 8 Replacement EA

Equipment Type	Operation/Location	power rating or fuel usage	units	Load %	No. of units	Fuel Type	hrs per day	Days/ year	hrs/ year	Fuel Consumption (g/kW-hr)	Emission Factors CO2	Emission factor units	Emissions, lbs/hr CO2	Emissions, lbs/day CO2	Emissions, metric tons/yr CO2
Support Boat	Demolition support	2,000	kW	85.0%	1	California Diesel	2	102	204	222.33	700.48	g/kW-hr	3,085.83	6,171.65	285.54
Tugboats	Construction support	3,183	kW	85.0%	1	California Diesel	2	202	404	222.33	700.48	g/kW-hr	4,910.63	9,821.25	899.89
Support Boat	Construction support	2,000	kW	85.0%	1	California Diesel	2	102	204	222.33	700.48	g/kW-hr	3,085.83	6,171.65	285.54
Total Emissions												Total		**22,164.56**	**1,470.97**

SOURCE:

Load factors based on recommdations in EPA420-R-00-002, Table 5-2, assumed for maneuvering.
Auxiliary loads from Table 5-2, kW
Emission Factors from Analysis of Commercial Marine Vessel Emissions and Fuel Consumption Data, USEPA, Feb 2000, EPA420-R-00-002, page 5-3.
Emission factors from AP-42 1.3 for Fuel Oil Combustion - No 6 Oil Industrial Fired Boilers
* VOC emissions are actuallyTHC for Marine Vessels

0.0015	% Sulfur content of the Fuel Oil used in the boiler and main engines,
0.15	% Nitrogen content of the Fuel Oil used for the boilers
0.0015	% Sulfur content of the Fuel Oil used in the boiler and main engines,
0.944	kg/l density of residual oil, from AP-42 Appendix A

GHG Emissions Summary Tugboats MHP
Pier 8 Replacement EA

Equipment Type	Operation/Location	power rating or fuel usage	units	Load %	No. of units	Fuel Type	hrs	Days/ year	hrs/ year	Fuel Consumption (g/kW-hr)	Emission Factors CO2	Emission factor units	Emissions, lbs/hr CO2	Emissions, lbs/day CO2	Emissions, metric tons/yr CO2
Support Boat	Demolition Support	2,000	kW	85.0%	1	California Diesel	2	102	204	222.33	700.48	g/kW-hr	3,085.83	6,171.65	285.54
Tugboats	Transit from Module drydock	3,183	kW	85.0%	1	California Diesel	120	9	1080	222.33	700.48	g/kW-hr	4,910.63	117,855.06	2,405.64
Tugboats	Construction support	3,183	kW	85.0%	1	California Diesel	2	62	124	222.33	700.48	g/kW-hr	4,910.63	9,821.25	276.20
Support Boat	Construction support	2,000	kW	85.0%	1	California Diesel	2	32	64	222.33	700.48	g/kW-hr	3,085.83	6,171.65	89.58
Total Emissions												Total		**140,019.61**	**3,056.97**

within 3 nm of SDAB

Equipment Type	Operation/Location	power rating or fuel usage	units	Load %	No. of units	Fuel Type	hrs	Days/ year	hrs/ year	Fuel Consumption (g/kW-hr)	Emission Factors CO2	Emission factor units	Emissions, lbs/hr CO2	Emissions, lbs/day CO2	Emissions, metric tons/yr CO2
Support Boat	Demolition Support	2,000	kW	85.0%	1	California Diesel	2	102	204	222.33	700.48	g/kW-hr	3,085.83	6,171.65	285.54
Tugboats	Transit from Module drydock	3,183	kW	85.0%	1	California Diesel	15	1	15	222.33	700.48	g/kW-hr	4,910.63	73,659.41	33.41
Tugboats	Construction support	3,183	kW	85.0%	1	California Diesel	2	62	124	222.33	700.48	g/kW-hr	4,910.63	9,821.25	276.20
Support Boat	Construction support	2,000	kW	85.0%	1	California Diesel	2	32	64	222.33	700.48	g/kW-hr	3,085.83	6,171.65	89.58
Total Emissions												Total		**95,823.97**	**684.74**

Assuming 5 knots within 5 nm of San Diego Mainland

SOURCE:

Load factors based on recommdations in EPA420-R-00-002, Table 5-2, assumed for maneuvering.
Auxiliary loads from Table 5-2, kW
Emission Factors from Analysis of Commercial Marine Vessel Emissions and Fuel Consumption Data, USEPA, Feb 2000, EPA420-R-00-002, page 5-3.
Emission factors from AP-42 1.3 for Fuel Oil Combustion - No 6 Oil Industrial Fired Boilers
* VOC emissions are actuallyTHC for Marine Vessels

0.0015	% Sulfur content of the Fuel Oil used in the boiler and main engines,
0.15	% Nitrogen content of the Fuel Oil used for the boilers
0.0015	% Sulfur content of the Fuel Oil used in the boiler and main engines,
0.944	kg/l density of residual oil, from AP-42 Appendix A

* Assume transit from as far as Tacoma, WA; transport emissions based on 5 trips, 9 days/trip

Notes: Numbers may not add precisely due to rounding and decimal places

Emission Factors

Commercial Marine Vessel Emissions

Pollutant	Exponent (x)	Intercept (b)	Coefficient (a)
PM	1.5	0.2551	0.0059
NOX	1.5	10.4496	0.1255
NO2	1.5	15.5247	0.18865
SO2	0	0	2.3735
CO	1	0	0.8378
HC	1.5	0	0.0667
CO2	1	648.6	44.1

Emission Factor equation is in the form:
Emissions Rate (g/kW-hr) = a * (Fractional Load of Engine Power)$^{-x}$ + b

For SO2, the equation is:
Emissions Rate (g/kW-hr) =
a * (Fuel Sulfur Flow in g/kW-hr) + b = a * (fuel consumption in g/kW-hr) * (% sulfur in fuel/100) + b
Requires an estimate of the % sulfur in the fuel.

Fuel Consumption Estimation equation:
Fuel Consumption (g/kW-hr) = 14.12/(Fractional Load) + 205.717

Emission Factor Source: Analysis of Commercial Marine Vessel Emissions and Fuel Consumption Data, USEPA, February 2000, EPA420-R-00-002, page 5-3.