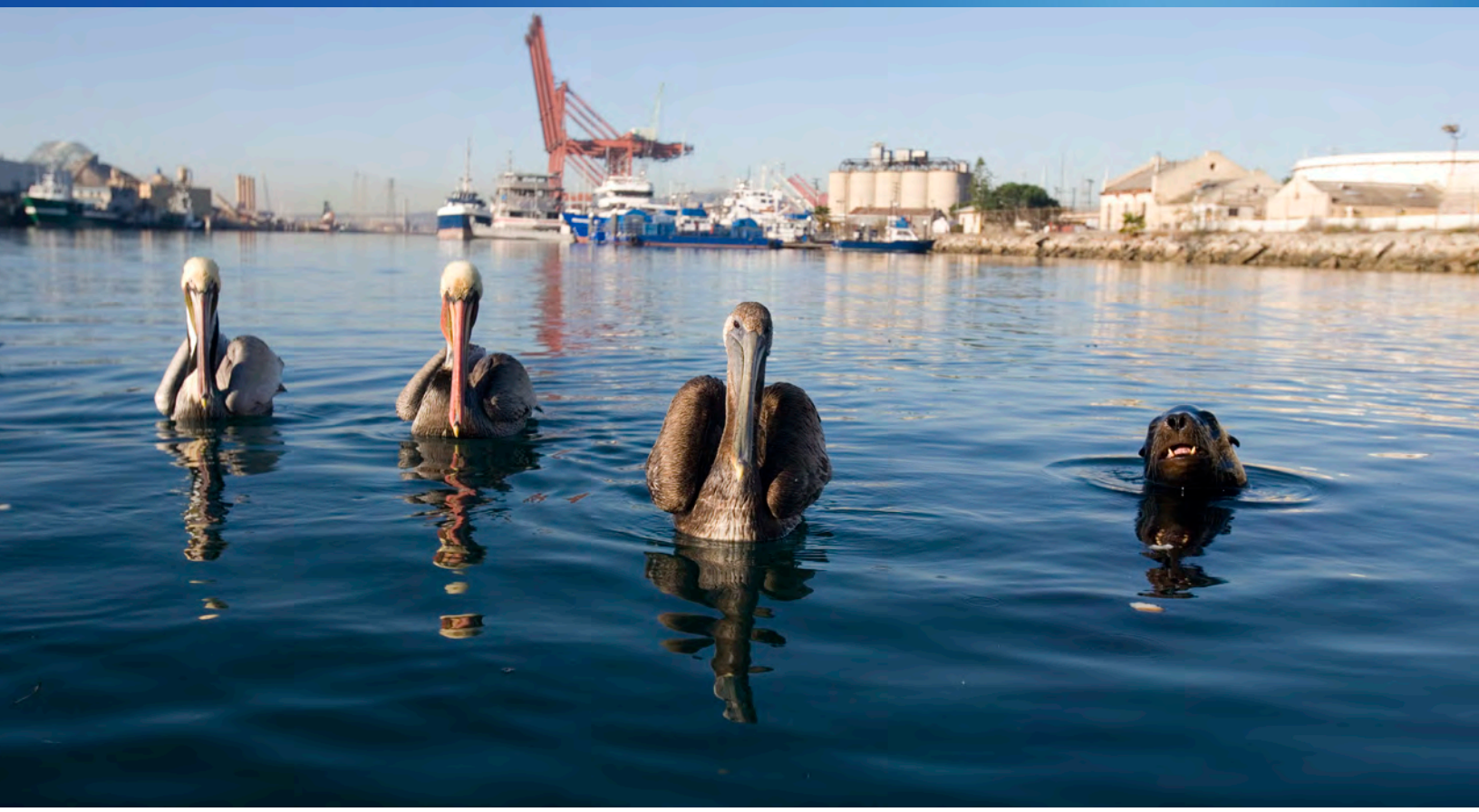
Port of Los Angeles and Port of Long Beach

Water Resources Action Plan

Final Report, August 2009



THE PORT OF LOS ANGELES

The Port of LONG BEACH
The Green Port

Prepared with the participation and cooperation of the staff of the US Environmental Protection Agency and the Los Angeles Regional Water Quality Control Board

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LIST OF ACRONYMS AND ABBREVIATIONS

AAPA	American Association of Port Authorities
AB411	Assembly Bill 411
ACZA	Ammoniacal Copper Zinc Arsenate
AMP	Alternative Maritime Power
Basin Plan	The California Water Quality Control Plan, Los Angeles Region
BAT	best available technology
BCT	best control technology
BHC	benzene hexachloride
BMP	Best Management Practice
Board	Los Angeles Board of Harbor Commissioners
CAAP	Clean Air Action Plan
CCC	Criterion Continuous Concentration
CDF	Confined Disposal Facility
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CEQA	California Environmental Quality Act of 1970
CFR	Code of Federal Regulations
CH3D	Curvilinear-grid Hydrodynamics in 3 Dimensions
CMC	Criterion Maximum Concentration
CMP	Clean Marinas Program
Commission	California State Lands Commission
Construction Stormwater Permit	General Permit for Stormwater Discharges Associated With Construction
Corps	United States Army Corps of Engineers
CSTF	Contaminated Sediment Task Force
CTR	California Toxics Rule
CUPA	Certified Unified Program Agencies
CUT	California United Terminals
CWA	Clean Water Act
DCEM	Dominguez Channel Estuary Model
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane
DO	dissolved oxygen
DOC	diesel oxidation catalyst
DTSC	Department of Toxic Substances Control
DWAC	Dominguez Watershed Advisory Council
ECA	Environmental Compliance Assessment

EEZ	Exclusive Economic Zone
EFDC	Environmental Fluid Dynamics Code
EIR	Environmental Impact Report
EPA	Environmental Protection Agency
EMS	Environmental Management Systems
ER-L	effects range-low
ER-M	effects range-medium
GCASP	General Construction Activities Stormwater Permit
GIASP	General Industrial Activities Stormwater Permit
GIS	Geographic Information System
HEPA	High Efficiency Particulate Air
HMW	high molecular weight
ICCP	impressed current cathodic protection
ILWU	International Longshore and Warehouse Union
Industrial Stormwater Permit	General Permit for Stormwater Discharges Associated with Industrial Activities
LAX	Los Angeles International Airport
LMW	low molecular weight
MARPOL	International Convention for the Prevention of Pollution from Ships
MS4	Municipal Separate Stormwater Sewer System
MSB	Marine Safety Branch
MOU	Memorandum of Understanding
NGO	non-governmental organization
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NT	numeric target
OEHAA	Office of Environmental Health Hazard Assessment
OSPR	Oil Spill and Response
P2	Pollution Prevention
PAC	Plan Advisory Committee
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
pH	hydrogen ion concentration
Pile Program	Alternative Wood Pile Material/ WRAP Evaluation Program
POLA	Port of Los Angeles
POLB	Port of Long Beach
Ports	Port of Los Angeles and Port of Long Beach
POTW	Publicly Owned Treatment Works
RCRA	Resource Conservation and Recovery Act
ROW	right-of-way

RWQCB	Regional Water Quality Control Board
SARA	Superfund Amendments and Reauthorization Act
SB	Senate Bill
SCCWRP	Southern California Coastal Water Research Project
SOPEP	Shipboard Oil Pollution Emergency Plans
SQO	Sediment Quality Objectives
SUSMP	Standard Urban Stormwater Mitigation Plan
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAP	Technology Advancement Program
TBD	to-be-determined
TBT	tributyltin
TMDL	Total Maximum Daily Load
TSCA	Toxic Substances Control Act
TSS	total suspended solids
TTLC	total threshold limit concentrations
TTRL	threshold tissue residual levels
USEPA	United States Environmental Protection Agency
UV	ultraviolet
VGP	Vessel General Permit
VRP	Vessel Response Plans
WPD	Watershed Protection Division
WQLS	Water-Quality Limited Segment
WRAP	Water Resources Action Plan

UNITS OF MEASURE

ft	feet
g	gram
gal	gallon
in	inch
mg/L	milligrams per liter
mL	milliliter
MPN	most probable number
m/s	meter per second
ng/g	nanograms per gram
ng/L	nanograms per liter
ppb	parts per billion
ppm	parts per million
ppt	parts per trillion

sq mi	square miles
ug/g	micrograms per gram
ug/kg	micrograms per kilogram
ug/L	micrograms per liter
%	percent

EXECUTIVE SUMMARY

Introduction

The Port of Los Angeles and the Port of Long Beach (Ports) have as their goals for the Water Resources Action Plan (WRAP) 1) to support the attainment of full beneficial uses of harbor waters and sediments by addressing the impacts of past, present, and future port operations, and 2) to prevent port operations from degrading existing water and sediment quality. The Ports, their cities, the US Environmental Protection Agency (EPA), and the Los Angeles Regional Water Quality Control Board (LA-RWQCB) have cooperated in the preparation of this WRAP for the harbors of San Pedro Bay.

The WRAP has two main driving forces: 1) the Ports‟ need to achieve their broad mission to protect and improve water and sediment quality, and 2) the imminent promulgation by the LA-RWQCB and the EPA of Total Maximum Daily Loads (TMDLs) for harbor waters, and the associated Clean Water Act (CWA) permits. The WRAP‟s purpose is to put in place the programs and mechanisms for the Ports to achieve the goals and targets that will be established in the relevant TMDLs and to comply with the Industrial Activities, Construction Activities, and Municipal Separate Storm Sewer System (MS4) permits issued to the Ports and their respective cities and tenants. Throughout the process of implementing the WRAP the Ports will be guided by the basic principle of promoting science-based studies and methods in the integration of regulatory requirements with water and sediment management programs.

Both Ports have formally adopted environmental policies (Port of Los Angeles‟ [POLA] Environmental Management Policy and Port of Long Beach‟s [POLB] Green Port Policy) committing them to implement programs and take actions that will protect and improve the quality of the harbor environment with respect to water resources. Both policies include provisions aimed at protecting and improving water and sediment quality, and the WRAP is a direct outcome of those policies.

Water Quality and Sediment Background

A number of pathways that carry pollutants into and out of the harbor complex directly affect water and sediment quality in the Ports. The major pathways are:

- Landside Runoff: Stormwater, dry-weather flows, and groundwater inputs into harbor waters from port lands and adjacent non-port lands;

- Aerial Deposition: Debris and fine particulates moved by wind from sources both inside and outside of the Ports;

- Direct Discharge: Vessel discharges of various types, hull leaching, jettisoning of debris into harbor waters, leaching from pilings and derelict vessels, and sediment resuspension from vessel activities and natural processes;

- Regional Influences: River, stream, and storm drain inputs from outside the Ports, as well as ocean water moving in and out of the Ports.

Each of these pathways presents unique challenges for managing water and sediment resources, particularly in view of the complex regulatory and jurisdictional issues in the harbor area. In preparing the WRAP, the Ports have taken into account the pollutant pathways, historical pollution, stakeholders efforts to date, and current water quality and sediment conditions.

Geographic Scope of the WRAP: The WRAP addresses water and sediment quality within the boundaries of the harbor districts. That boundary is appropriate because recent modeling has shown that, with the exception of the portion of the Long Beach Harbor District east of Pier H, the waters of the harbors are largely separate, hydrodynamically, from the rest of San Pedro Bay; harbor waters and port activities appear to have very little influence on other portions of San Pedro Bay. The exception to this geographic scope is that the Ports, as owners of land outside their harbor districts, recognize their obligation to ensure that activities on those properties comply with relevant stormwater permits.

Regulations and Total Maximum Daily Loads: Water-related activities in the harbor complex are controlled by a complex network of local, state, federal, and international laws and regulations. The principal laws governing water and sediment quality in Southern California are the federal CWA and the corresponding California law, the Porter-Cologne Water Quality Act. These two laws establish policies, programs, and standards for the protection and improvement of water and sediment quality. In particular, Section 303(d) of the CWA directs regulatory agencies to develop a list of water bodies that are impaired as a result of pollutants in water and sediments, and then develop TMDLs. The Los Angeles/Long Beach Harbor is included on the State of California‟s 303(d) list for a number of pollutants, requiring that TMDLs be developed by the LA-RWQCB and EPA.

The WRAP has been developed with the recognition that the goal of TMDLs and related permits will be to attain the water quality standards (there are no adopted sediment quality standards) promulgated by the state and local water quality agencies. The

TMDLs will be focused on addressing the existing water quality impairments set forth in the 303(d) listings of various areas of the harbors.

Current Water Quality Conditions: Today, dissolved oxygen concentrations in most of Los Angeles/Long Beach Harbor approach those of the nearby ocean; with the exception of copper, concentrations of dissolved metals do not exceed any regulatory criteria (copper concentrations above the California Toxic Rule [CTR] criteria were detected in samples from two locations); dissolved organics such as pesticides and polychlorinated biphenyls (PCB) are rarely detected and, with the exception of tributyltin (TBT), do not exceed regulatory criteria; and a 2002-2003 LA-RWQCB study found no instances of toxicity from harbor waters. Exceedances of the bacteria criteria occur in one area of the harbor complex (Cabrillo Beach). The listings under Section 303(d) of the CWA for the harbors are not based on concentrations of dissolved pollutants, but rather on localized areas of sediment contamination and on the presence of sediment toxicity, benthic community effects, and elevated concentrations of pollutants in fish tissue.

Current Sediment Conditions: The overall quality of sediments within the Outer Los Angeles/Long Beach Harbor varies widely. Sediment data for the two Ports clearly identifies localized areas of sediment contamination "hotspots," which appear to be driving the 303d listings and creation of TMDLs for the Harbor. Sediments with contaminant concentrations above relevant TMDL listing criteria are often localized in back channels, along wharf faces, and near storm water outfalls. Much of the sediment pollution in the harbors is so-called "legacy contamination" left over from past port activities and watershed inputs.

A comprehensive review of all sediment data for the harbors indicates that in most areas of the harbors contaminant concentrations are below regulatory limits. While copper, lead, zinc, mercury, silver, and various organics occur at elevated concentrations in localized hotspots within Los Angeles/Long Beach Harbor, they are otherwise not present in combinations of concentrations and number of samples that would indicate a harbor-wide concern. Of the organic compounds on the 303(d) list, only chlordane, di-chloro-diphenyl-trichloroethane (DDT), and PCBs are widespread at concentrations above their numeric targets, chlordane near storm drain outfalls and in the Consolidated Slip, and DDTs and PCBs at a number of areas throughout the harbors. Certain PAHs are elevated in localized areas that are often associated with storm drain runoff (e.g., Consolidated Slip, Fish Harbor, and dead-end slips). Furthermore, recent data indicate that impaired benthic communities appear to be largely confined to localized areas in back channels, along wharf faces in the Inner Harbor, and in Consolidated Slip, where the physical and chemical environment may be adversely affecting benthic communities. Sediment

toxicity has been observed in Consolidated Slip, Los Angeles/Long Beach Inner and Outer Harbors, and Fish Harbor. There are still areas of sediment contamination in both Ports that need some form of remediation or focused management, however.

The Ports have a number of programs underway to reduce water and sediment pollution in the harbors. Some of those programs implement permits whereas others implement port initiatives undertaken to achieve their environmental policies. Programs include permit implementation programs, a variety of internal management programs, and participation in local and regional task forces, initiatives, and committees aimed at addressing regional issues such as contaminated sediment and watershed management.

Implementation Strategies

The Ports have available to them several types of strategies to implement the control measures developed in the WRAP. These include specific water-resource-related projects and initiatives undertaken by the Ports; incentive programs to encourage and support tenant actions; and requirements that the Ports, as landlords and harbor administrators, are able to impose on users of harbor facilities through leases and tariffs. The Ports intend to apply all of these strategies, in various combinations, to the control measures described in this plan in order to meet the Ports‟ goals. Because the two Ports are separate entities, each subject to its own political and organizational regimes, implementation of some elements of the WRAP is likely to differ between the two Ports.

Programs and Initiatives

The WRAP control measures have been developed without numerical goals for pollution reduction; instead, this WRAP establishes the framework and mechanisms by which the Ports will achieve the goals and targets that the LA-RWQCB and the EPA will set out in the TMDLs and associated permits. Once TMDLs have been established and translated into National Pollutant Discharge Elimination System (NPDES) permits, the Ports expect to be able to focus the WRAP on compliance with those permits. The control measures have been formulated under the assumption that the Ports and their cities will soon receive new industrial and municipal permits that will be substantially modified from those now in force; the WRAP summarizes the expected elements in those permits. Furthermore, most of the control measures address sources, rather than specific pollutants, since a given measure is likely to be effective for more than one pollutant.

Four basic types of sources are addressed by the WRAP‟s control measures:

- Land Use Discharges: Land-based uses such as cargo and passenger terminals, industrial facilities, roads and rail lines, and shops, restaurants, fishing piers, beaches, and marinas. These uses include cargo handling areas, maintenance and fueling areas; various landscaping and area maintenance activities; roads, parking lots, and other public access areas; construction sites; railroad facilities; commercial fishery facilities; auto repair/dismantling businesses; visitor-serving areas such as restaurants and boat launches; and port-owned properties outside the harbor districts.

- On-Water Discharges: Cargo and passenger vessels, harborcraft, fishing vessels, and in-water structures.

- Sediments: Contaminated sediments, which serve as a repository for and a potential source of contaminants into the water.

- Watershed Discharges: Inputs of stormwater and wastewater originating outside the harbors (and beyond the jurisdiction of the Ports), and conveyed into the harbors by the Dominguez Channel, the Los Angeles River, and storm drains.

Control measures consist of both improvements on current control measures and the addition of new measures.

Land Use Control Measures: Landside sources are currently addressed through the various stormwater and other pollution control programs of the two Ports and their respective city agencies. Nevertheless, the Ports have identified eight control measures (Table ES-1) for certain categories of landside activities that encompass both the existing programs and new practices. These control measures need to be implemented in order to improve the Ports‟ ability to control pollutant discharges from land uses in the harbor districts.

Table ES-1. Landside Sources Control Measures

CONTROL MEASURE	DESCRIPTION	SCHEDULE
LU-1: Enhance housekeeping Best Management Practices (BMPs) in maintenance and fueling areas, general cargo handling areas, certain dry-bulk cargo handling areas, automobile dismantling and boat repair facilities, oil production facilities, and	Increase the scope of housekeeping BMP application, and improve and add BMPs; apply BMPs already in use more uniformly to facilities port-wide, and institute new BMPs as needed. Review individual facility Stormwater Pollution Prevention Plans (SWPPPs) and recent inspection/audit and annual reports in the normal course of program management to identify needed improvements in terms of existing and	POLB: identify new measures by end of 2009. POLA: Initiate inspection strategy by end of 2009, identify new measures by end of 2010.

Table ES-1. Landside Sources Control Measures

CONTROL MEASURE	DESCRIPTION	SCHEDULE
building maintenance and landscaping areas.	new housekeeping BMPs.	
LU-2: Develop a port-wide guidance manual for design of new and redeveloped facilities, including design criteria and operational BMPs.	Develop a guidance manual, in coordination with agencies and city departments, to ensure that port-specific conditions are reflected in SUSMP design guidance for measures instituted on port property.	Both Ports: Complete the guidance manual by mid 2010.
LU-3: Evaluate the need for structural BMPs for key discharges and targeted pollutants at existing facilities and install where necessary to ensure compliance.	Where LU-1 proves inadequate in high-risk areas, evaluate the need for new or additional structural BMPs (e.g., berms, separators, containment, valves, in-line hydrodynamic treatment units, diversion to sewer, stormwater recycling, and drain capping), and install those deemed necessary and appropriate.	POLB: Ongoing in Storm Water Program. POLA: Initiate inspection strategy by end of 2009, identify new measures by the end of 2010.
LU-4: Continue and expand upon existing stormwater/dust control programs for vacant/undeveloped property.	Inventory vacant and undeveloped areas within both ports to determine areas of highest priority for runoff and pollutant control measures. For those areas deemed highest priority, install temporary measures pending long-term solutions.	POLB: Continue existing program POLA: Implement new program by end of 2010.
LU-5: Enhance and expand litter control programs and implement relevant elements of those programs in specific sources.	Review all facilities to determine where the scope of existing litter-related housekeeping and structural BMP application needs to be increased and where additional BMPs (e.g., fences, stormceptors, public education, enforcement, new equipment) are necessary.	Both Ports mid-to-late-2010.
LU-6: Enhance and expand street and public parking area sweeping/cleaning programs.	Evaluate sweeping/cleaning activities and inspect all sites to assess debris levels and problem areas (e.g., dry bulk and recycled metals terminals access streets, truck queuing lanes, parking lots at restaurants and fishing piers). Evaluate existing street sweeping and cleaning equipment. Revise sweeping/cleaning schedules and equipment as needed.	POLB: Program recommendations by end of 2009. POLA: Program recommendations by mid-2010.
LU-7: Evaluate existing construction permit compliance procedures and enhance as necessary.	Evaluate recent inspection reports and reporting protocols, review upcoming revisions to the General Construction Permit, and formulate the necessary program enhancements (e.g., revised permit structure, inspection frequency, and construction specifications).	Implementation following General Construction Activities Permit issuance (TBD by LA-RWQCB).
LU-8: Evaluate port-owned properties outside the harbor districts and ensure permit compliance as necessary.	Develop a management program that includes procedures for ensuring that remote site facilities found to be deficient in their compliance work with their local agencies to achieve compliance.	Program implementation by the end of 2010.

On-Water Control Measures: Although stormwater control efforts naturally focus on landside sources, a comprehensive approach to managing water quality in the Ports must consider potentially polluting on-water activities as well. Oceangoing vessels, harborcraft, and pleasure craft are potential sources of a variety of discharges, in-water structures such as docks, piers, and cathodic protection devices can leach metals, and bottom paints on vessel hulls are designed to do so.

Although most on-water sources fall largely under state and federal jurisdiction, the Ports have identified three WRAP control measures that could help to control discharges from on-water activities (Table ES-2). These measures would complement and build upon recently-enacted federal and state permits.

Table ES-2. On-Water Sources Control Measures

CONTROL MEASURE	DESCRIPTION	SCHEDULE
OW-1: Develop guidance manual for on-water activities (e.g., allowable and prohibited vessel maintenance activities and discharges).	Develop manuals that will be distributed to vessel operators (including cargo vessels, harbor craft, and recreational vessels) as guidance for allowable and prohibited on-water activities.	Guidance manuals completed by the end of 2009.
OW-2: Develop port policy and standards for maintenance, in-kind replacement, and eventual phasing out of exposed treated pilings from in-water applications.	Develop plans for phasing out exposed treated pilings by establishing BMPs for current piling management practices (wrapping, storage, installation, and disposal) and identifying feasible alternatives to the use of treated wood pilings.	Plans completed by the end of 2010.
OW-3: Develop BMPs and Port standards for zinc-based cathodic protection of port structures and vessels.	Identify the feasibility of alternative anti-corrosion technology (e.g., other metals or induced-current systems) and develop guidance for applying those alternatives to port practices.	Guidance material completed by the end of 2010.

Sediment Control Measures: The legacy of historical inputs of contamination remains in the form of sediment contamination, especially in older portions of the harbors. Some of the pollutants were produced by activities inside the harbors, but much of the pollution came through storm drains and streams, from areas outside the Ports‟ jurisdiction. Many former areas of legacy contaminants have already been cleaned up by port development projects or individual port and agency remediation projects. Nevertheless, a number of areas of legacy contamination remain, including portions of Long Beach West Basin and the Consolidated Slip in Los Angeles. Additional areas of sediment contamination are associated with major storm drain outfalls, currents, storms, and vessel activities.

The WRAP sediment control measures (Table ES-3) have been developed in recognition of the legacy of contamination; ongoing contamination through storm drains, streams, and in-harbor activities; and the existing guidance available to the Ports concerning sediment management. That guidance is largely set forth in the Los Angeles Region Contaminated Sediment Task Force (CSTF) Strategy, and includes inter-agency coordination, engagement of non-governmental stakeholders, use of BMPs for dredging and disposal, beneficial re-use of sediments, and an established hierarchy of disposal options, including the principle that aquatic disposal (e.g., confined aquatic disposal, ocean disposal) is the last resort.

Table ES-3. Sediment Control Measures

CONTROL MEASURE	DESCRIPTION	SCHEDULE
S-1: Develop sediment management policy/guidance establishing priorities for removal, disposal, and management of sediments with a clear decision-making framework.	Develop sediment management policy and guidance that will apply the CSTF Long-Term Management Strategy to the port situation. Policy will include identification of data gaps and priority areas, and short-term and long-term management strategies for future projects.	Draft guidance completed by mid 2010, adoption by Boards end of 2010.
S-2: Develop a sediment management policy establishing priorities for the management of areas of legacy contaminated sediments and hotspots.	Complete remediation of IR Site 7, continue participation in Consolidated Slip Restoration Task Force. Work with regulatory agencies and stakeholders to develop scientifically-based TMDLs; develop implementation plan to manage hotspots and comply with TMDLs. Any remedial process will ultimately be driven by the regulatory agencies and may include other responsible parties.	IR Site 7 remediation complete by end of 2010. Participation in other efforts ongoing, pending TMDLs.

Watershed Strategies: The Ports are considered to be part of the Dominguez watershed, although the Los Angeles River, which is a separate watershed, does influence the eastern side of Long Beach Harbor. The Ports are at the seaward end of the watershed, and are thus influenced by upstream discharges. Factors outside the control of the Ports that can affect harbor water and sediment quality include direct discharge from adjacent land uses, aerial deposition, conveyance of pollutants from nearby water bodies and storm water outfalls, and resuspension of, and flux from, harbor sediments. Given the reality that the Ports have no jurisdiction or control over sources outside the harbor districts, other than on properties that they actually own (addressed by Control Measure LU-8), and are unable to control the influx of pollutants to the harbors from those outside sources, Control Measure WS-1 (Table ES-4) for watershed sources emphasizes cooperative activities such as data gathering and participation in regional water quality and source

control efforts, particularly through the ongoing TMDL effort. In addition, the measure commits the Ports to use all legal means available to urge the agencies and upstream stakeholders to abate discharges that could reach the harbors.

Watershed actions to be undertaken by the Ports under the WRAP include comprehensive characterization of pollutant loading from rivers, streams, and municipal storm drains entering the harbor, additional development and employment of the WRAP hydrodynamic model of the harbor system, participation in regional aerial deposition study efforts, and completion of the TMDL development process. All of these activities will be undertaken as part of watershed working groups and stakeholder groups.

Table ES-4. Watershed Control Measure

CONTROL MEASURE	DESCRIPTION	SCHEDULE
WS-1: Employ all available means to support efforts to reduce upstream pollutant loadings that adversely affect harbor water and sediment quality.	Participate in local and regional efforts to characterize pollutant inputs to the harbors from outside sources; participate in watershed planning efforts; encourage the LA-RWQCB and EPA to use their authority to address upstream discharges.	Ongoing.

Costs

The control measures described in this WRAP consist largely of plan formulation and the expansion and reorganization of activities that the Ports are already engaged in. Accordingly, the cost of implementation of those control measures will be predominantly from staff and consultant time, although several control measures will likely involve capital costs at the implementation phase. In addition, other entities, including port tenants and users as well as agencies and municipalities outside the Ports, will incur costs to implement the WRAP control measures.

SECTION 1: INTRODUCTION

The ports of Los Angeles and Long Beach (Ports; Figure 1-1) comprise a vital regional and national economic engine. The Los Angeles Customs District accounts for approximately $300 billion in annual trade. More than 40% of all containerized trade in the nation flows through the San Pedro Bay Ports. The economic benefits of the Ports are felt throughout the nation, but the environmental impacts of trade are more locally concentrated. Both Ports have adopted and are implementing a wide range of new environmental initiatives. These efforts include better documentation of environmental impacts and more detailed evaluation of effective mitigation measures. The Ports are cognizant of the view of environmental groups, local residents and regulatory agencies that not enough is being done to address port-related water quality issues. The Ports are also aware of the views of port users and operators that inconsistent or conflicting environmental measures could have unintended and even counterproductive effects.

The Ports recognize that their ability to accommodate the projected growth in trade will depend upon their ability to address adverse environmental impacts that result from such trade. Accordingly, the Ports are determined to accelerate their efforts to reduce water and sediment pollution from "goods movement" activities and other regional activities using all the powers available to them.

1.1 Mission of the Ports to Protect and Improve Water Resources

The Ports have been controlling water pollution and sediment contamination (sediment contamination can affect water quality) within their boundaries, to the extent of their authority, since passage of the Clean Water Act (CWA) and other water pollution control regulations in the early 1970s. A great deal has been accomplished: comprehensive stormwater management in concert with city and regional authorities; tariff provisions restricting discharges of potential pollutants by ocean-going vessels; programs to address marinas and ancillary users of the harbors; removal of contaminated sediments through various Port dredging projects; and active participation in regional efforts to manage water and sediment quality. As far as they have come, however, the Ports recognize that impairments still exist and that more needs to be done, particularly with respect to stormwater, sediment, and watershed management, in order to address those impairments and to fulfill the Ports" clean water mandate.

Figure 1-1. Ports of Los Angeles and Long Beach.

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That mandate has given the Ports a mission with respect to water resources: to promote sustainable port operations by protecting and improving water and sediment quality in the harbors while allowing port development to continue. Given the bay-wide nature of many of the activities that need to be addressed, the most efficient way to achieve further pollution reductions will be for the two Ports to work together under a common vision; that vision is provided by this Water Resources Action Plan (WRAP).

The Ports, their cities, the EPA, and the Los Angeles Regional Water Quality Control Board (LA-RWQCB) have cooperated in the preparation of this WRAP. The Ports have established two basic goals for the WRAP:

1. to support the attainment of full beneficial uses of harbor waters and sediments by addressing the impacts of past, present, and future port operations, and

2. to prevent port operations from degrading existing water and sediment quality.

The WRAP has two main driving forces: 1) the Ports‟ need to achieve their broad mission to protect and improve water and sediment quality, and 2) the imminent promulgation of Total Maximum Daily Loads (TMDLs; see Section 2.1.1 for more detail) for harbor waters and the associated CWA permits. The WRAP‟s purpose, as explained in more detail in Section 4.1.1, is to provide the framework and mechanisms for the Ports to achieve the goals and targets that will be established in the relevant TMDLs and to comply with the Industrial Activities, Construction Activities, and Municipal permits issued to the Ports and their respective Cities and tenants through the National Pollutant Discharge Elimination System (NPDES) program.

1.2 Legal Mandate

1.2.1 Tidelands Trust

In the early 1900s, the State conveyed the tidelands now occupied by the Ports to the cities of Los Angeles and Long Beach, as trustees for the people of the State of California, to accommodate and promote harbor commerce, navigation, and fisheries. The cities, in turn, established Harbor Commissions to manage those portions of the tidelands devoted to maritime commerce, i.e., Los Angeles/Long Beach Harbor. The Ports are landlord ports: they own most of the land and water in their districts, build terminal facilities on that land and water, lease those terminals to shipping lines and stevedoring companies, and build and maintain the supporting infrastructure. The Ports do not own or operate the ships, yard equipment, trucks, or trains that move the cargo.

The Ports also support non-cargo related uses such as manufacturing, fishing, oil extraction, waterfront recreation, and recreational boating.

Under the Tidelands Trust, the Ports have an obligation to protect the natural resources within their jurisdiction in order to ensure the integrity of those resources for future generations of Californians. As water and sediment quality are key components of the natural environment, the Ports have a clear mandate under the Tidelands Trust to protect and improve those elements.

1.2.2 California Coastal Act

In 1972 the California legislature passed the Coastal Act, which implemented the federal Coastal Zone Management Act. The Coastal Act identifies several harbor districts throughout the state, including the Ports, and charges those ports with the responsibility not only to promote maritime commerce but also to "provide for other beneficial uses consistent with the public trust, including, but not limited to, recreation and wildlife habitat uses." Implicit in that charge is the responsibility to protect and improve the quality of the marine habitat, which in turn requires that the Ports address water and sediment quality, key foundations of marine habitat quality.

1.3 Policy Mandate

Both Ports have formally adopted environmental policies committing them to implement programs and take actions that will improve the quality of the harbor environment with respect to water resources. These policies recognize the Ports" obligations with respect to laws and regulations, but also establish institutional mandates to go beyond those minimum requirements.

1.3.1 Port of Los Angeles Environmental Management Policy

On August 27, 2003, the Los Angeles Board of Harbor Commissioners (Board) approved development of an Environmental Management Policy for the Port of Los Angeles (POLA). The purpose of the Environmental Management Policy is to provide an introspective, organized approach to environmental management; further incorporate environmental considerations into day-to-day port operations; and achieve continual environmental improvement.

The Environmental Management Policy includes existing environmental initiatives for POLA and its customers, but also encompasses development of new initiatives such as the Clean Marina Program. These programs are port-wide initiatives to reduce

environmental pollution. To ensure this policy is successfully implemented, POLA has developed and maintains an environmental management program that will:

- Ensure this environmental policy is communicated to port staff, its customers, and the community
- Ensure compliance with all applicable environmental laws and regulations
- Ensure environmental considerations include feasible and cost-effective options for exceeding applicable regulatory requirements
- Define and establish environmental objectives, targets, and Best Management Practices (BMPs), and monitor performance towards those objectives
- Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations through environmental awareness and communication with employees, customers, regulatory agencies, and neighboring communities.

Every element of this policy is tied to POLA‟s mission with respect to water resources.

1.3.2 Port of Long Beach Green Port Program

In January 2005, the Long Beach Board of Harbor Commissioners adopted the Green Port Policy that would serve as a guide for decision making and establish a framework for environmentally friendly port operations at the Port of Long Beach (POLB). The Green Port Program includes six basic program elements, each with an overall goal:

- Wildlife - Protect, maintain, or restore aquatic ecosystems and marine habitats
- Air - Reduce air emissions from port activities
- Water - Improve the quality of Long Beach Harbor waters
- Soil/Sediment - Remove, treat, or render suitable for beneficial reuse contaminated soils and sediments in the Harbor District
- Community Engagement – Interact with and educate the community regarding port operations and environmental programs
- Sustainability – Implement sustainable practices in design and construction, operations, and administrative practices throughout POLB.

Under the Water element, POLB is committed to developing and pursuing programs aimed at improving water quality in the Harbor District, and under the Soil/Sediment element its charge is to address contaminated sediments. Accordingly, the Green Port Program is closely tied to POLB‟s mission with respect to water resources.

1.4 WRAP Development, Review, and Adoption

The Ports have developed this WRAP, with the guidance and participation of the EPA, the LA-RWQCB, and the Plan Advisory Committee (PAC), which is a public stakeholder group open to the public and composed of regulatory agencies, non-governmental organizations, and community representatives. Development of the WRAP has included a comprehensive analysis of potential pollutant sources and contaminants of concern, identification of key issues associated with water and sediment quality, examination of existing programs, an analysis of key issues in water and sediment quality, and an evaluation of what additional control measures are needed to achieve the mission of the Ports with respect to water and sediment resources. Throughout the process, the input of the EPA, the LA-RWQCB, and the PAC was solicited, evaluated, and incorporated into the WRAP via monthly progress meetings, e-mails, and on the two Ports‟ websites (www.portofla.org; www.polb.com). Information on the WRAP, including the PAC meeting minutes, is available on the Ports‟ websites. The WRAP outline and the schedule for developing the document were presented to the PAC in September 2008, a list of the proposed control measures was presented to the PAC in the November 2008 meeting, and a draft of Section 4, which contains the control measure write-ups, was provided to the PAC in March 2009. The comments of PAC members, EPA, and the LA-RWQCB on the draft measures and text prompted a number of refinements to the document, including the addition of two control measures (LU-8 and S-2) that were not originally envisioned.

SECTION 2: WATER QUALITY AND SEDIMENT BACKGROUND

This section establishes the background against which the WRAP has been developed. It includes the regulatory setting within which the Ports, their tenants, and other users of the water resources of San Pedro Bay operate; the geographic scope of the Ports‟ jurisdiction; the existing status of water and sediment quality in the harbor districts; and the status of those elements of the control measures that the Ports are already undertaking.

Any consideration of water and sediment quality in Los Angeles-Long Beach Harbor needs to be informed by a knowledge of the historical factors that have caused the current conditions, the efforts that the various stakeholders have undertaken to date to address past and current problems, and the current status of water quality and sediment contamination. The issues have a geographical context that is crucial to acknowledge as past efforts are evaluated and future efforts are proposed.

It is important to recognize that there is a suite of pathways that carry pollutants into and out of the harbor complex, the major ones being:

- **Landside Runoff** – stormwater and dry-weather flows into harbor waters from Port lands and adjacent non-Port lands;
- **Aerial Deposition** – Debris and fine particulates moved into and out of the Ports by wind, which can deposit on both land and water areas;
- **Direct Discharge** – Vessel and other on-water discharges of various types, including but not limited to hull leaching, jettisoning of debris into harbor waters, leaching from pilings and derelict vessels, and sediment resuspension from vessel activities and natural processes;
- **Regional Influences** – River, stream, and storm drain inputs from watersheds outside the Ports, as well as ocean water moving in and out of the Ports through tidal action.

Each of these pathways presents unique challenges for managing water and sediment resources, particularly in view of the complex regulatory and jurisdictional issues in the harbor area.

2.1 Regulatory Framework

Water-related activities in the harbor complex are controlled by an overlapping network of local, state, federal, and international laws and regulations. Because maritime commerce involves interstate and international commerce, the various elements of the goods movement chain fall under a number of jurisdictions. As a result, the authority to address a given discharge or activity is not always clear.

The principal laws governing water and sediment quality in Southern California are the federal (CWA) and the corresponding California law, the Porter-Cologne Water Quality Act. These two laws contain a variety of provisions that set forth policies, establish programs, and set standards for the protection and improvement of water and sediment quality. In addition, there are a number of other international, federal, state, and regional regulations and requirements that affect the management of water resources in the harbor area.

2.1.1 Federal Laws, Regulations, and Programs

CWA: The CWA (92-500), which is administered primarily by the EPA, governs the discharge of pollutants to waters of the United States through the NPDES permit system (see below). Amendments to the CWA in 1987 and 1990 added provisions for the regulation of municipal and industrial stormwater discharges, which led to the stormwater programs of the cities of Los Angeles and Long Beach, the two Ports, and the County of Los Angeles (for additional detail see http://www.epa.gov/watertrain/cwa).

NPDES: Section 402 of the CWA created the system for permitting wastewater discharges known as the NPDES (see www.epa.gov/npdes/pubs/101pape.pdf for more information). Under NPDES, all facilities that discharge pollutants from any point source into waters of the United States are required to obtain an NPDES permit. Permits under the NPDES program include *individual* permits tailored and issued to a specific facility, and *general* permits covering multiple facilities within a specific category and a specific geographical area. General permits are issued, for example, to stormwater sources and to groups of facilities that require the same type of monitoring.

The term *pollutant* means any type of industrial, municipal, and agricultural waste discharged into water. For regulatory purposes, pollutants have been grouped into three general categories under the NPDES Program: *conventional* (biological oxygen demand, total suspended solids, pH, fecal coliform bacteria, and oil and grease), *toxic* (126 listed pollutants), and *non-conventional* (certain other substances such as chlorine and ammonia).

The NPDES permit provides two levels of control: technology-based limits (based on the ability of dischargers in a given category to treat their wastewater) and water quality-based limits (if technology-based limits are not sufficient to provide protection of the water body). Permits can incorporate both types of control for different pollutants, and always incorporate some form of monitoring, either effluent, receiving water, or both, and reporting requirements.

Although EPA is directly responsible for implementing the NPDES Program, it may authorize state water quality agencies to implement most parts of the program, as it has in California. EPA retains the right to review the state"s implementation of the program and to step in to administer any program elements where it finds the state"s implementation inadequate.

CWA Section 301(a): This section prohibits discharges without a permit, and is the basis for many of the NPDES permit programs described below. Until recently, most discharges from vessels were exempted from the CWA, but in December 2008 the EPA issued the Vessel General Permit (VGP; see below).

CWA Section 303(d): This section created the TMDL program (for more information on the federal TMDL program see http://www.epa.gov/region09/water/tmdl/). Section 303(d) requires that the states make a list of water bodies that are not attaining standards after the technology-based limits are put into place (the 303(d) list) and develop TMDLs for those water bodies. The EPA reviews and approves the State"s 303(d) list and TMDL submittals. A TMDL is a quantitative assessment of water quality conditions, contributing sources, and the load reductions or control actions needed to restore and protect bodies of water in order to meet their beneficial uses. It must account for all sources of the pollutants that caused the water to be listed, including point sources, such as stormwater, and nonpoint sources such as agricultural runoff and aerial deposition.

Section 303(d) and its implementing regulations require that approved TMDLs be incorporated into water quality control plans, such as watershed plans and regional (basin) plans, and EPA regulations require that NPDES permits, as issued or revised, be consistent with all approved TMDLs.

TMDLs in California are developed either by the EPA, the State Water Resources Control Board (SWRCB), or the RWQCBs. TMDLs developed by the RWQCBs are designed as Basin Plan amendments and include implementation provisions.

CWA Section 401: This section requires any applicant for a Federal license or permit to discharge into navigable waters (including dredging and construction or operation of

facilities) to obtain a certification from the appropriate state or regional water quality control board that the discharge may meet applicable water quality standards. In the Los Angeles area, the LA-RWQCB issues the 401 Certification (for more information see http://www.epa.gov/OWOW/wetlands/regs/sec401.html).

CWA Section 404: This section regulates dredging and dredged material disposal. The regulations are administered cooperatively by the US Army Corps of Engineers (Corps), which is the federal permitting agency, and the EPA. Under Section 404, discharges of dredged material into waters of the United States require permits, and to obtain a permit the applicant must demonstrate that the dredged material is suitable for discharge at a given location based on levels of contaminants and/or response of aquatic organisms to the material).

General Industrial Activities Stormwater Permit (GIASP) Water Quality: The GIASP is a state-wide general NPDES permit issued by the SWRCB that regulates stormwater discharges associated with 10 broad categories of industrial activities. In the Los Angeles area, the GIASP is administered by the LA-RWQCB under Order 97-03-DWQ, with oversight by EPA (for more information on the GIASP program see http://www.waterboards.ca.gov/water_issues/programs/stormwater/industrial.shtml). The GIASP requires the implementation of management measures that will achieve the performance standard of best available technology (BAT) economically achievable and best conventional pollutant control technology (BCT). The GIASP also requires the development of a Stormwater Pollution Prevention Plan (SWPPP) and a monitoring plan. Through the SWPPP, sources of pollutants are identified and the means to manage the sources to reduce stormwater pollution are described.

Municipal Stormwater and Urban Runoff Discharge Permit: The Municipal Stormwater Permitting Program regulates stormwater discharges from municipal separate storm sewer systems (MS4s). The LA-RWQCB, with oversight by EPA, administers the MS4 permitting program in the Los Angeles area (for more detail on the MS4 program, see http://cfpub.epa.gov/npdes/stormwater/munic.cfm). The MS4 permits require the municipal discharger (typically, a city or county) to develop and implement a Stormwater Management Plan/Program with the goal of reducing the discharge of pollutants to the maximum extent practicable, the performance standard specified in Section 402(p) of the CWA. The programs specify what best management practices (BMPs) will be used to address certain program areas, which include public education and outreach; illicit discharge detection and elimination; construction and post-construction; and good housekeeping for municipal operations. MS4 permits also generally include a monitoring program.

General Construction Activities Stormwater Permit (GCASP): The GCASP is a state-wide general NPDES permit issued by the SWRCB that regulates stormwater discharges of from construction projects that encompass at least one acre of soil disturbance unless the discharge is in compliance with an NPDES Permit. In the Los Angeles area the GCASP is administered by the LA-RWQCB under Order 99-08-DWQ, with oversight by EPA. The GCASP requires the development and implementation of a SWPPP that sets forth 1) the BMPs the discharger will use to protect stormwater runoff and 2) monitoring programs to verify effectiveness of the BMPs (for more information on the GCASP see: http://www.swrcb.ca.gov/rwqcb4/water_issues/programs/stormwater/sw_construction.shtml).

VGP: Under the authority of the CWA Section 402, the EPA, recently issued a nationwide NPDES permit related to vessel discharges within U.S. waters (see http://cfpub.epa.gov/npdes/home.cfm?program_id=350 for more detail). The permit‟s requirements include narrative effluent discharge limits to be achieved through operational control measures and the use of best available technology; inspection, monitoring, recordkeeping, and reporting requirements; and additional requirements applicable to certain vessel types. The VGP is applicable to specific vessel types and lengths, including cruise ships, oil tankers, bulk carriers, container ships, and emergency response vessels, that operate within the Ports. All recreational, military, and fishing vessels, and other vessels less than 79 feet in length, are exempt from this permit. The VGP is administered and enforced by the EPA.

California Toxics Rule (CTR): This rule, promulgated by EPA in 2000 (Federal Register Vol. 65(97): 31682 – 31719), establishes numeric criteria for priority toxic pollutants in California‟s inland waters and enclosed bays and estuaries. The rule was federally established because legal actions in California left the state without numeric water quality criteria, which are required by the CWA. The criteria are intended to protect aquatic life and human health. The numeric criteria reflect EPA‟s recommendations in its CWA Section 304(a) guidance.

Rivers and Harbors Act of 1899 and Refuse Act of 1899: This act, which is administered by the Corps, prohibits discharges to navigable waters and their tributaries. It exempts storm drain and sewer discharges, but includes such discharges as dredged material, fill, and substances placed on the banks of navigable waters and their tributaries that could be washed into those waters.

Oil Pollution Control Act: As set forth in the Code of Federal Regulations (CFR), 33CFR40, this act requires vessel owners to report any hazardous waste spilled from a

vessel. Owners are responsible for cleanup and any damages. Marinas are responsible for any oil contamination resulting from activities at their facilities including dumping or spilling oil or oil-based paint and the use of chemically treated agents. The act is administered by the US Coast Guard.

Clean Vessel Act: The Clean Vessel Act of 1992 (33 U.S.C. 1322, 106 Stat 5039; see http://www.fws.gov/laws/lawsdigest/CLENVES.HTML for more detail) was established by Congress to provide funding for pump-out stations and waste reception facilities that would provide recreational boaters with alternatives to overboard waste dumping for recreational boaters. Originally it was to be funded for 5 years but was reauthorized in 1998 for more funding. The act is administered by the US Fish and Wildlife Service.

Marine Plastic Pollution Research and Control Act (33 U.S.C. 1901 et seq.): This act, the United States' version of the International Convention for the Prevention of Pollution from Ships (MARPOL), applies to foreign vessels in U.S. waters and U.S. vessels anywhere in the world. The act makes it illegal to throw plastic off any vessel within the U.S. Exclusive Economic Zone (EEZ) – within 200 miles of the U.S. shoreline – or to throw any garbage overboard in U.S. waters or within 3 nautical miles of the shoreline. This act is enforced by the US Coast Guard.

Vessel Response Plans (VRP)/Shipboard Oil Pollution Emergency Plans (SOPEP): These US Coast Guard programs implement several federal and national laws and agreements, including the Oil Pollution Act of 1990 and MARPOL (for more detail see Section 2.1.2). The purpose of these programs is to establish requirements for oil spill response plans for certain vessels. US-flagged vessels must prepare various response plans to deal with spills and other emergencies involving hazardous substances aboard ships (focused on petroleum products). Vessels that carry oil as cargo must have a VRP on US waters. All vessels over 400 gross tons traveling over international waters must have a SOPEP approved by their flag state. Some states, including California (see Oil Spill Prevention and Response [OSPR], below) require plans similar to the Federal VRP.

Coastal Nonpoint Source Pollution Control Program: The Coastal Nonpoint Source Pollution Control Program is a joint program of the EPA and the National Oceanic and Atmospheric Administration (NOAA; http://coastalmanagement.noaa.gov/) that was established by Congress during a reauthorization of the Coastal Zone Management Act in order to provide a more comprehensive solution to the problem of polluted runoff in coastal areas. The program builds upon existing coastal zone management and water quality programs by applying a consistent set of economically achievable measures to prevent and mitigate runoff pollution problems. State programs incorporate management

measures to address land-based sources of runoff from agriculture, forestry, urban developments, marinas, hydromodification (e.g., stream channelization), and the loss of wetland and riparian areas.

Comprehensive Environmental Response, Compensation and Liability Act/ Superfund Amendments and Reauthorization Act (CERCLA/SARA): This act and subsequent reauthorizations established broad Federal authority to respond to releases or threatened releases of hazardous substances that may endanger public health or the environment. It established prohibitions and requirements concerning closed and abandoned hazardous waste sites and provided for liability of persons responsible for releases of hazardous waste at these sites and for liability in connection with responses to hazardous substances releases. The act also created a fund (Superfund) to be used when responsible parties cannot be identified. CERCLA applies to Consolidated Slip, as it is in "Operable Unit 2" of the Montrose Superfund site, which is on the National Priorities List. The act is administered by the EPA.

2.1.2 State Laws, Regulations, and Programs

Porter-Cologne Act: This law allows California to administer its own clean water regulations (see http://www.swrcb.ca.gov/laws_regulations/docs/portercologne.pdf for more detail). It is at least as stringent as the federal CWA and in some cases, more restrictive. The Porter-Cologne Act established the SWRCB as the ultimate authority over water quality policy and the nine Regional Water Quality Control Boards (RWQCBs) to oversee water quality on a day-to-day basis at the local/regional level. One important function of the RWQCBs is to develop regional Basin Plans, which establish beneficial uses of protected surface and ground waters. The Basin Plans set narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the state‟s anti-degradation policy, and describe different implementation programs to protect all waters in the region. The plans also include measures to control non-point sources of pollution. For more detail on the Los Angeles Region Basin Plan (LA RWQCB, 1995) see http://www.swrcb.ca.gov/rwqcb4/water_issues/programs/basin_plan/.

TMDLs are addressed in the Porter-Cologne Act implementing regulations promulgated by the SWRCB, which has decided that TMDL implementation must be included in the Basin Plans. The LA-RWQCB incorporates TMDLs into its Basin Plan through water quality standards (for more detail on the State‟s approach to TMDLs, see www.waterboards.ca.gov/water_issues/programs/tmdl/background.shtml).

Bays and Estuaries Plan: The California Bay Protection and Toxic Cleanup Act requires the SWRCB to develop sediment quality objectives for toxic pollutants to protect the state‟s enclosed bays and estuaries. The SWRCB has been developing sediment quality objectives to achieve that goal, and in 2007 issued its Draft Water Quality Control Plan for Enclosed Bays and Estuaries. The SWRCB is in the process of adopting part 1 of the plan, related to sediment quality objectives. The objectives are based on a "multiple lines of evidence" approach utilizing information on sediment chemistry, toxicity and benthic health (for details of Part 1 see www.swrcb.ca.gov/water_issues/programs/bptcp/docs/sediment/071808appendixa_draftpart 1.pdf).

SB 1916 Marine Vessel Service and Repair Project: This technical assistance and outreach project of the Department of Toxic Substances Control (DTSC) is designed to implement Pollution Prevention (P2) BMPs for the reduction or elimination of hazardous waste in the boatyard and marina environment (see DTSC‟s program website, http://www.dtsc.ca.gov/PollutionPrevention/SB1916/upload/P2_REP_sb1916_06-08_workplan.pdf for more detail). The project seeks to expand P2 outreach to marine vessel service and repair facilities through liaisons with existing industry associations and local and regional government organizations, i.e., the Clean Marinas California Program, Department of Boating and Waterways, and the Certified Unified Program Agencies (CUPA), that currently provide regulatory and informational assistance for commercial and recreational boating activities within the State.

Office of Spill Prevention and Response (OSPR): This program is a multi-agency effort that includes the US Coast Guard and California State Lands Commission (Commission), but the lead agency is the California Department of Fish and Game‟s Marine Safety Branch (MSB; for more detail see http://www.dfg.ca.gov/ospr/). Part of OSPR's comprehensive program is the requirement for all marine facilities and tank vessels carrying petroleum product as cargo, as well as all non-tank vessels over 300 gross tons, to have California approved oil spill contingency plans. The MSB is responsible for the review and approval of oil spill contingency plans submitted to OSPR and for ensuring that those vessels entering California State waters that are required to have California oil spill contingency plans have approved plans. The OSPR has also helped to fund and has brought on line a Vessel Traffic Service system for Los Angeles and Long Beach Harbors. Additionally, the OSPR has created and funded Harbor Safety Committees for the State's five busiest ports.

California Clean Coast Act: This statute (26 H&SC Sections 39630-39632) authorizes the SWRCB and the Commission to regulate the release of gray water, sewage, sewage

sludge, oily bilge water, hazardous waste, or other waste by oceangoing ships, as defined, into the marine waters of the state and marine sanctuaries. Beginning in 2006, vessel operators must provide certain information relating to ports of call and sewage, gray water, and black water discharge to the SWRCB and the Commission upon the vessel‟s departure from its first port of call in California. The Act is summarized at http://www.waterboards.ca.gov/water_issues/programs/npdes/sb771.shtml.

2.1.3 Local Laws and Regulations

Port Tariffs: A Port Tariff is the published set of rates, charges, rules and regulations for those doing business with a port. A tariff is generally applicable to all port users, although individual tenant operating leases may set additional and/or different requirements. Port Tariffs govern a variety of activities in the two San Pedro Bay Ports, including vessel operating procedures, fees, wharf and dock usage, and the use of hazardous or polluting substances on or near the water. Each port publishes its own version of the tariff, but the two versions address largely the same issues. The tariff contains prohibitions on discharging oil, wastes, waste and bilge waters, and rubbish into or near harbor waters. POLA‟s Tariff (Section 22) also establishes restrictions on recreational boats in port marinas. Because they are enforceable and can set penalties similar to municipal codes, the tariffs give the Ports broad powers to regulate activities within their boundaries.

City of Los Angeles Stormwater and Urban Runoff Pollution Control Ordinance: Section 64.70 of the municipal code sets out uniform restrictions and prohibitions on stormwater discharges (www.lacity.org/SAN/wpd/Siteorg/residents/ordinance.htm), providing the City of Los Angeles with a tool for enforcing laws, standards, and orders related to water quality. In particular, the Stormwater Ordinance makes it unlawful to dump pollutants in the City‟s storm drain system and provides inspection and enforcement authority as well as development planning oversight. The ordinance specifically defines classes of activities that are illegal (e.g., certain industrial, commercial, residential, and parking lot activities) and defines and prohibits illicit connections and discharges, with specified exceptions.

2.1.4 International Regulations

International Convention for the Prevention of Marine Pollution from Ships (MARPOL): The International Maritime Organization, a United Nations group established in 1948 to promote maritime safety, adopted the MARPOL treaty as a reaction to oil spills in international waters. Eventually it was recognized that further measures needed to be addressed regarding pollution of the marine environment by ships

from operational or accidental causes. After the addition of several amendments called "annexes," as well as the Protocol of 1978 related to oil pollution, the convention now covers pollution by oil, chemicals, packaged harmful substances, sewage, garbage, and air emissions. MARPOL contains requirements for managing the various classes of pollutants on board vessels. As an example, Annex I (Oil Pollution) specifies how oily ballast and bilge waters must be contained and managed, and establishes specifications for new construction that include ballast water and oily waste tanks that are separate from the cargo tanks, as well as double-hulled construction for oil tankers. See http://www.imo.org/Conventions/contents.asp?doc_id=678&topic_id=258 for more detail.

2.2 Geographic Setting

2.2.1 Location

The Los Angeles/Long Beach Harbor complex consists of approximately 15,000 acres of land and water in western San Pedro Bay, to the south of the Palos Verdes peninsula. It is bounded on the landward side by the communities of San Pedro and Wilmington and the City of Long Beach, and on the seaward side by the three breakwaters that protect the port facilities. Terminal Island, which is shared by the two ports and supports a number of large cargo terminals and other port uses, comprises nearly a quarter of the total land area and is separated from the mainland by the Los Angeles Main Channel, Long Beach Back Channel, and the Cerritos Channel that links the two. A major drainage channel, the Dominguez Channel, discharges into Los Angeles Harbor via the Consolidated Slip, and the Los Angeles River discharges into eastern San Pedro Bay at the east side of Long Beach Harbor.

The two Ports are considered to be part of the Dominguez Watershed (watershed is the term used to describe a geographic area of land that drains water to a shared destination, in this case the harbor complex and, ultimately, the Pacific Ocean), which encompasses 133 sq mi of largely urban and industrial land uses, as well as the waters of the harbor complex itself. The Dominguez Watershed extends as far north as Inglewood and includes several small cities as well as portions of Los Angeles and part of LAX. The combined land area of POLA and POLB (11.6 sq mi) comprises less than 10 % of the total watershed land area.

The two Ports include approximately 200 berths for cargo vessels; two cruise terminals; marinas; visitor-serving areas such as restaurants, commercial facilities, research facilities, and fishing piers; commercial fishing facilities; port-related support facilities

such as tugboat and vessel fueling facilities, marine construction facilities, roads and railroads, and ship repair facilities; and oilfields and oilfield support facilities. The cargo terminals handle a diverse array of cargos, including containers; liquid bulk (crude oil, chemicals, and petroleum products); dry bulk cargos (cement, gypsum, petroleum coke, sulfur, scrap metal, and aggregate); breakbulk cargos such as lumber, newsprint, fruit, steel, and machinery; and automobiles.

Most of the land and water in Los Angeles/Long Beach Harbor is owned by the cities of Los Angeles and Long Beach, acting under the Tidelands Trust Act through their respective harbor commissions, but some property remains that is owned by private parties and other governmental entities (Figure 2-1). Private property is not subject to lease restrictions, port initiatives, and, generally tariff provisions, but is subject to laws and regulations (see Section 2.1.3). In addition, both ports own property outside their harbor districts. Figure 2-1 shows the port-owned properties in the immediate vicinity of the Ports.

2.2.2 Storm Drain Infrastructure

Storm drains convey stormwater from land areas into water bodies, in order to protect residences, businesses, and infrastructure (roads, utilities, etc.) from flooding and water damage. Inevitably, storm drains also convey dry weather surface runoff that results from normal activities in developed areas (e.g., landscape irrigation, vehicle washing, area washdown, water main leaks and breaks). In the harbor area, the water bodies that receive runoff include the Dominguez Channel, the Los Angeles River, Machado Lake, and the Los Angeles/Long Beach Harbor itself.

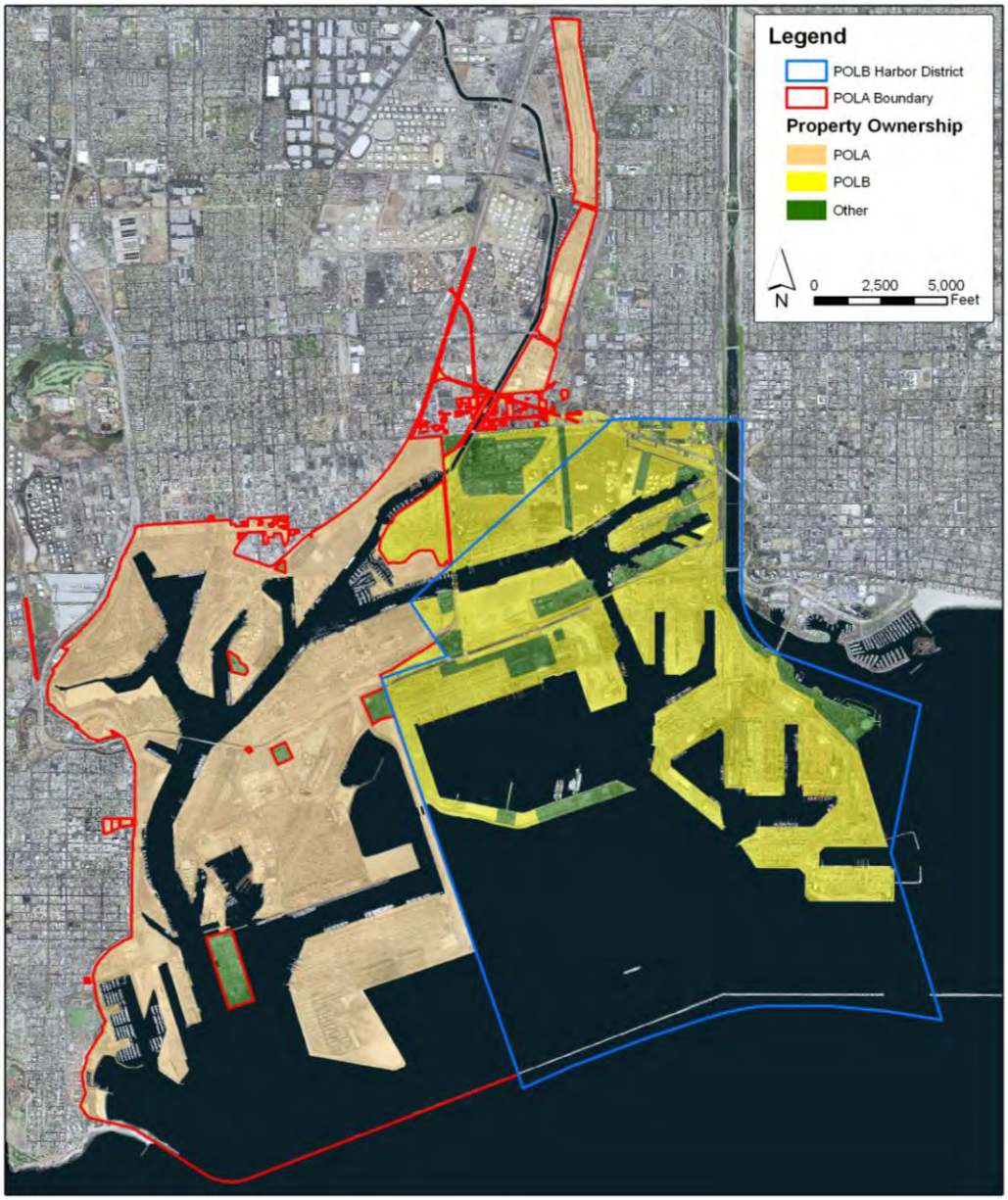

Figure 2-1. Property Ownership in the LA/LB Harbor Complex

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POLA receives stormwater not only from its own lands but also from a wide area outside of the port. Over 90% of the Dominguez Watershed drains into POLA. There are twelve major county and city storm drains that convey stormwater from over 100 sq mi of residential, commercial and industrial areas outside POLA into the harbor (including the Dominguez Channel and Machado Lake). Four of these storm drains are owned and maintained by the County of Los Angeles; the rest are owned and maintained by the City of Los Angeles. POLA itself has over 1,000 catch basins that drain 6.7 sq mi of POLA- and tenant-operated facilities into the harbor through a smaller system of drains. In addition, many of the older wharfs drain directly to the harbor via sheet flow.

The vast majority of the outfalls located in the Long Beach Harbor District discharge stormwater that originates inside the Harbor District. POLB‟s storm drain infrastructure drains a largely impervious and highly industrialized sub-watershed, and includes approximately 463,000 linear feet of pipe and 1,150 stormwater catch basins. Four of the 142 stormwater outfalls located in the Harbor District discharge stormwater originating from drainage basins outside the harbor district. These four outfalls are fed by pump stations located on Piers A and B, and convey stormwater to the Cerritos Channel. POLB owns and operates two of these pump stations and the County of Los Angeles and the City of Long Beach each own and operate one.

2.2.3 Geographic Scope of the WRAP

As mentioned in Section 1.2, the Ports consist of harbor districts administered by the Harbor Departments of the cities of Los Angeles and Long Beach. The boundaries of the harbor districts (Figure 2-1) were established on the basis of legal delineations rather than natural hydrography or some other geographical basis. Nevertheless, as is described in Section 2.3, recent modeling has shown that with the exception of the portion of the Long Beach Harbor District east of Pier H, the waters of the harbors are, hydrodynamically, largely separate from the eastern portion of San Pedro Bay. Harbor waters and port activities appear to have very little influence on portions of San Pedro Bay to the east; in fact, the reverse is more likely.

Accordingly, the Ports have established the region of influence of the WRAP as encompassing all harbor waters and lands within the two Harbor Districts. The exception to this geographic scope is that the Ports, as owners of land outside their harbor districts, recognize their obligation to ensure that activities on those properties comply with applicable stormwater permits. This WRAP contains a control measure, LU-8, that addresses that obligation.

2.3 Hydrodynamics

2.3.1 Harbor Area Modeling Efforts

Over the past several years the Ports have participated in a number of efforts to model the hydrodynamics and water quality of the Los Angeles/Long Beach Harbor complex and its major tributary, the Dominguez Channel. One of the most established and widely used models, a joint effort by the Corps and the Ports, is the Corps‟ Curvilinear-grid Hydronamics in 3 Dimensions (CH3D) model, which is used to support engineering planning efforts associated with the various capital improvement projects and resulting landfills. The CH3D model has been supplemented with a water quality component. The EPA, with the assistance of Tetra Tech, has developed a model based on the Environmental Fluid Dynamics Code platform, and participated in information sharing activities with the various stakeholders to support its development. This model is specifically intended to support the development of TMDLs for the harbor, Dominguez Channel, and eastern San Pedro Bay; both models, however, are expected to support watershed management efforts.

More recently, the Ports have undertaken an independent modeling effort specifically associated with water and sediment quality programs in the harbors and Dominguez Channel. The first product of that effort, the Dominguez Channel Estuary Model (DCEM), was developed under a Proposition 13 Grant to the POLA and completed in 2007. This model is based on the EFDC platform rather than the platform used for the Corps‟ CH3D model. It was designed to predict water elevations, velocities, and pollutant transport in the estuarine and marine portions of the Dominguez Channel. The model was calibrated and verified with hydrodynamic and water quality data collected in the vicinity of the Dominguez Channel Estuary for a period of one year; hence, both dry and wet weather conditions were included.

The second product of that effort, developed as part of the WRAP effort, is a hydrodynamic and water quality model for the Los Angeles/Long Beach Harbor (the WRAP Model; Everest 2009). This model is built upon the DCEM, using the EFDC platform, and will enable the Ports to improve their predictions of the effectiveness of current and future control measures. The WRAP Model expands the DCEM to cover the entire Los Angeles/Long Beach Harbor, as well as the adjacent Los Angeles River and San Gabriel River estuaries, and expands the capability of the DCEM to include sediment transport. The model is three-dimensional and grid-based (Figure 2-2), and was calibrated and verified using the same data collected for DCEM, as well as other water quality data collected throughout Los Angeles/Long Beach Harbor. The sediment

transport element also used data collected by the Corps for a study of sediment transport from the Los Angeles River into the Los Angeles/Long Beach Harbor. In addition to being used to describe existing hydrodynamic conditions of the Harbor, the WRAP model will be used in the future to evaluate effectiveness of control measures to improve water quality in the Harbor.

2.3.2 Harbor Circulation

The Ports occupy the western half of San Pedro Bay and are protected from incoming waves and currents by the Federal breakwater, which consists of three distinct segments (Figure 1-1). The three segments are separated by the harbor entrances (Angel‟s Gate and Queen‟s Gate) through which much of the water exchange between the harbors and the rest of the bay occurs. In the last three decades, the Ports have undergone several major capital development projects to increase the capacity of the Ports. These projects have included construction of new land (including Pier 400 in POLA and the southern expansion of Pier J in POLB) from dredged material, resulting in altered circulation patterns within the harbors.

The WRAP Model (Section 2.3.1) was used to predict the hydrodynamic setting of the harbors. The model shows that flood currents (Figure 2-3) entering Los Angeles Harbor through Angel‟s Gate are influenced by Pier 400 and forced to go around the structure into the Outer Harbor and up the Los Angeles Main Channel. Flood currents entering Long Beach Harbor through Queen‟s Gate flow to either side of Pier J, but primarily to the west of Pier J up the Long Beach Main Channel. During the ebb tide (Figure 2-4) water is drawn from all areas of the harbors toward the entrance gaps. On the Long Beach side, ebbing water from Long Beach Harbor and from Queensway Bay to the east exits through Queen‟s Gate; water exiting through the opening at the eastern tip of the Federal breakwater comes from eastern San Pedro Bay and Alamitos Bay.

Tidal currents are generally not strong: as shown in Figure 2-3 and Figure 2-4, typical maximum tidal currents are less than 0.08 m/s. Tidal currents entering and exiting Angel‟s Gate and Queen‟s Gate are higher, but are in general less than 0.2 m/s. These velocities are in general too small to cause re-suspension and transport of bed sediments, although re-suspension and transport of bed sediments could occur during rain events which will be discussed later.

Wind plays an important role in driving the surface currents in the vast open water area of Los Angeles/Long Beach Harbor. Wind can sometimes drive the surface water in a counterclockwise direction, creating an ebb dominant flow along Dominguez Channel Estuary (Everest 2009). Modeling shows that the presence of wind not only increases the

speed of the surface current under the same tidal conditions but it also changes the flow pattern. The flood current pattern in Figure 2-3 incorporates the influence of the typical wind field in the harbors.

Three major rivers, the Dominguez Channel, Los Angeles River, and San Gabriel River; discharge into Los Angeles/Long Beach Harbor and eastern San Pedro Bay. During the dry season, the freshwater flows from these rivers have little impact on harbor circulation, but during rain events the increased flow can substantially change the circulation. The fresh water from the rivers, being lighter than sea water, can spread far away from the river mouths as fresh water plumes, carrying suspended sediments and their associated contaminants into the harbor. As an example, Figure 2-5 shows the surface flow pattern predicted by the WRAP Model with a 100-year flood discharging from all the three rivers during the ebb tide. The results show that discharges from the Los Angeles River would flow around Pier J into Long Beach Harbor. Currents in the Los Angeles River Estuary (Queensway Bay) could be as high as 2 m/s, sufficient to re-suspend bottom sediment and transport the deposited sediment into POLB. Fresh water from the Los Angeles River would spread over most of eastern San Pedro Bay and into the POLB, while fresh water from Dominguez Channel would spread into the Cerritos Channel and POLA Main Channel.

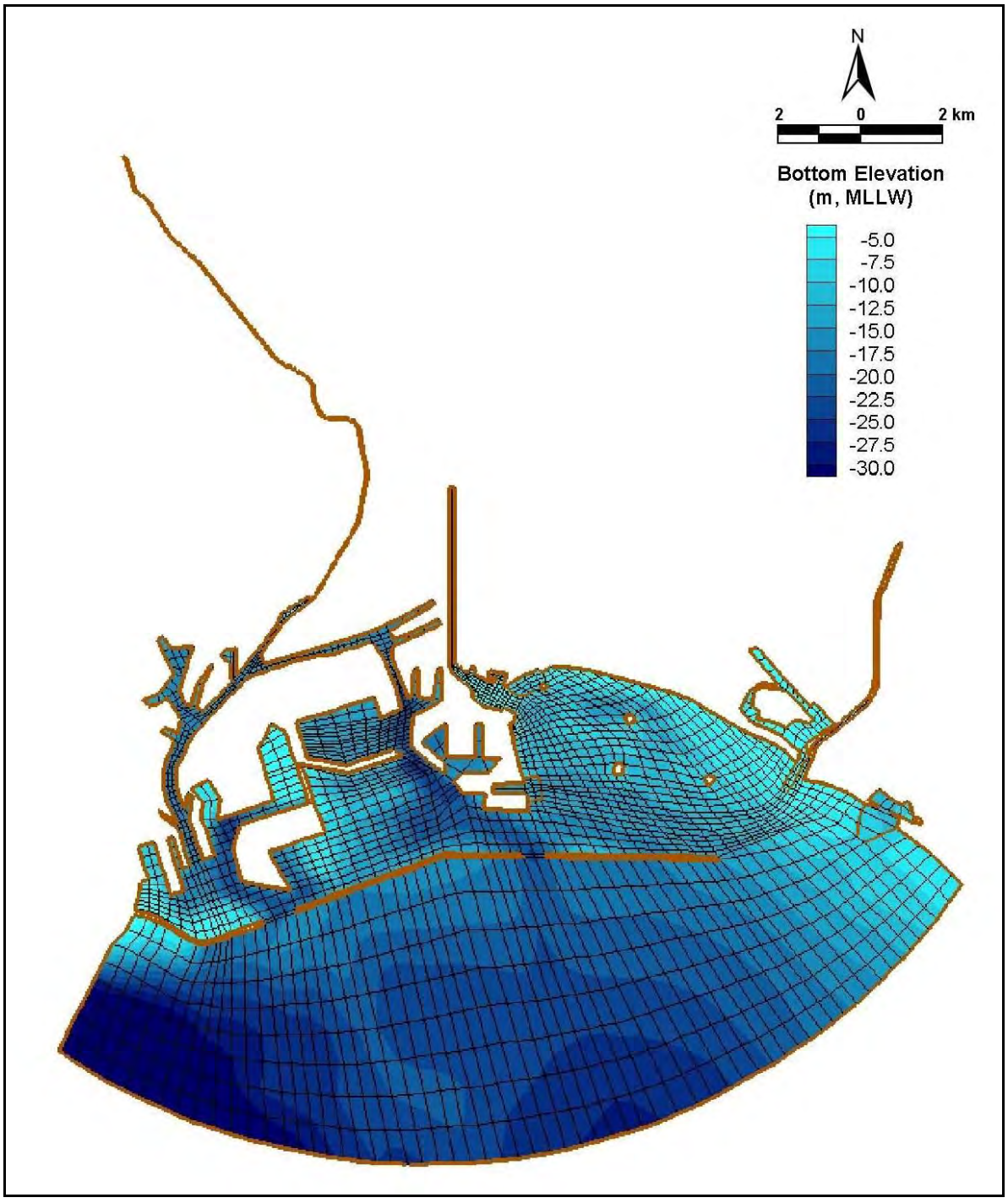

Figure 2-2. Grid Array of the WRAP Model

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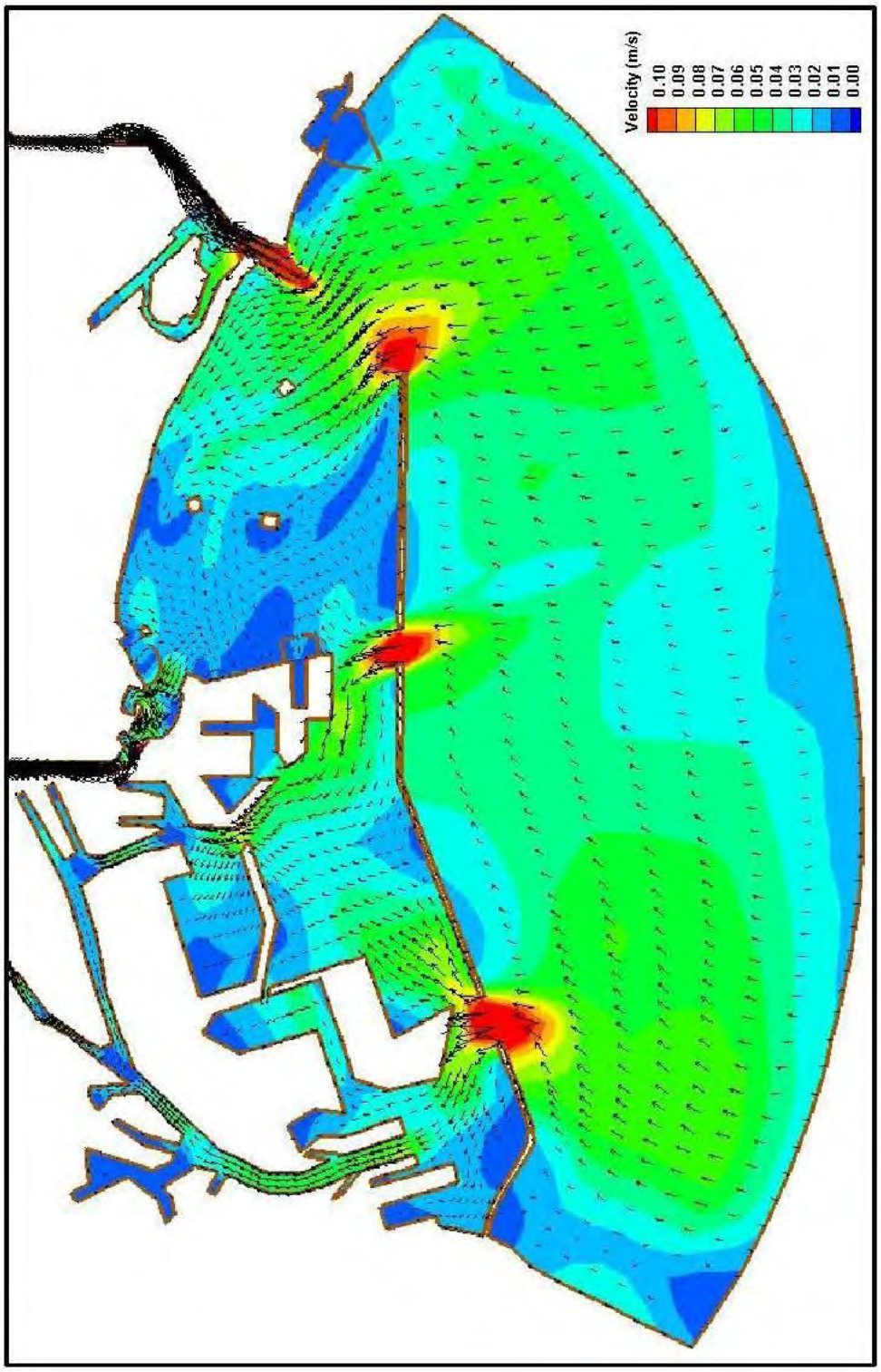

Figure 2-3. WRAP Model Predictions of Surface Currents During Flood Tide

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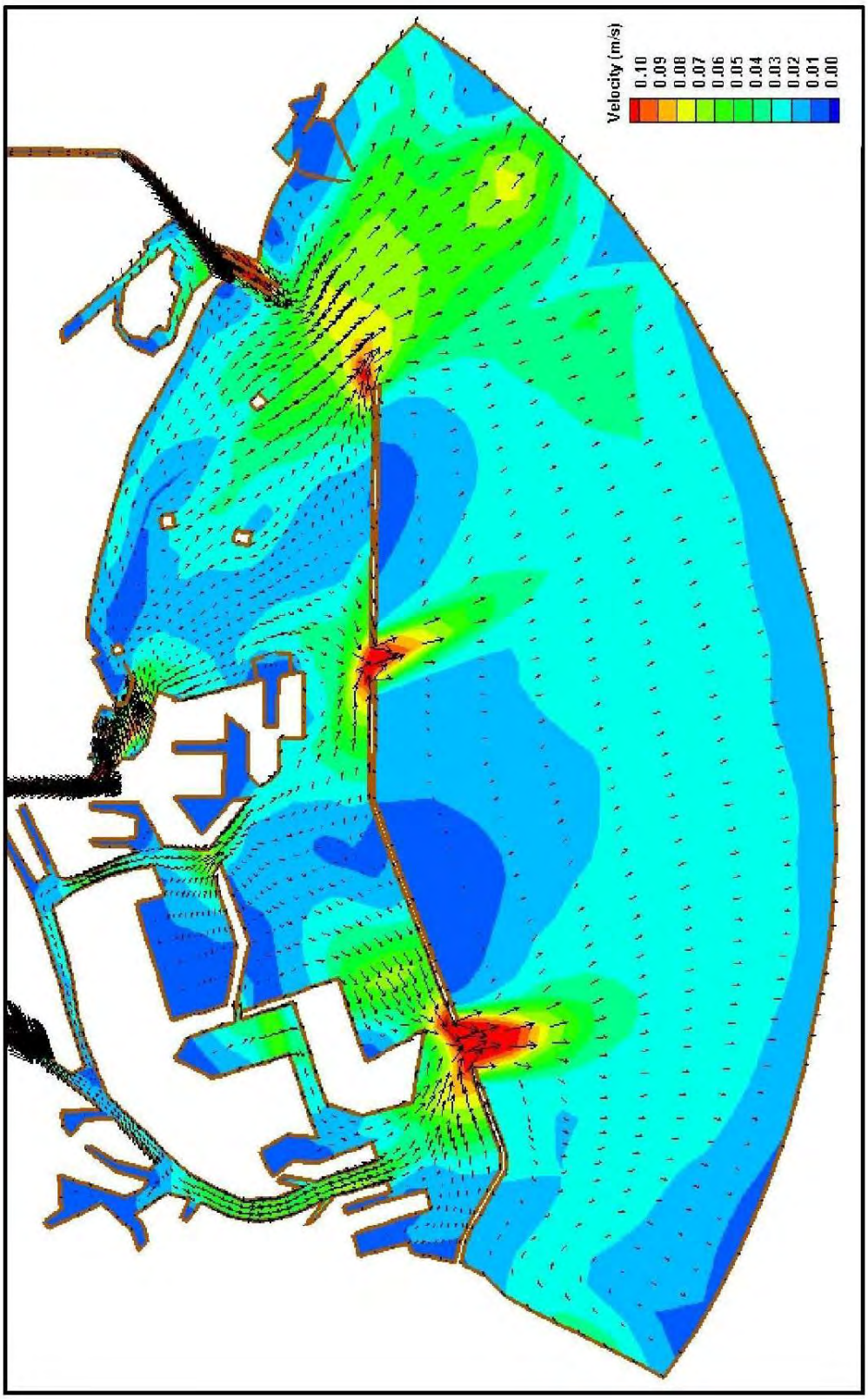

Figure 2-4. WRAP Model Predictions of Surface Currents During Ebb Tide

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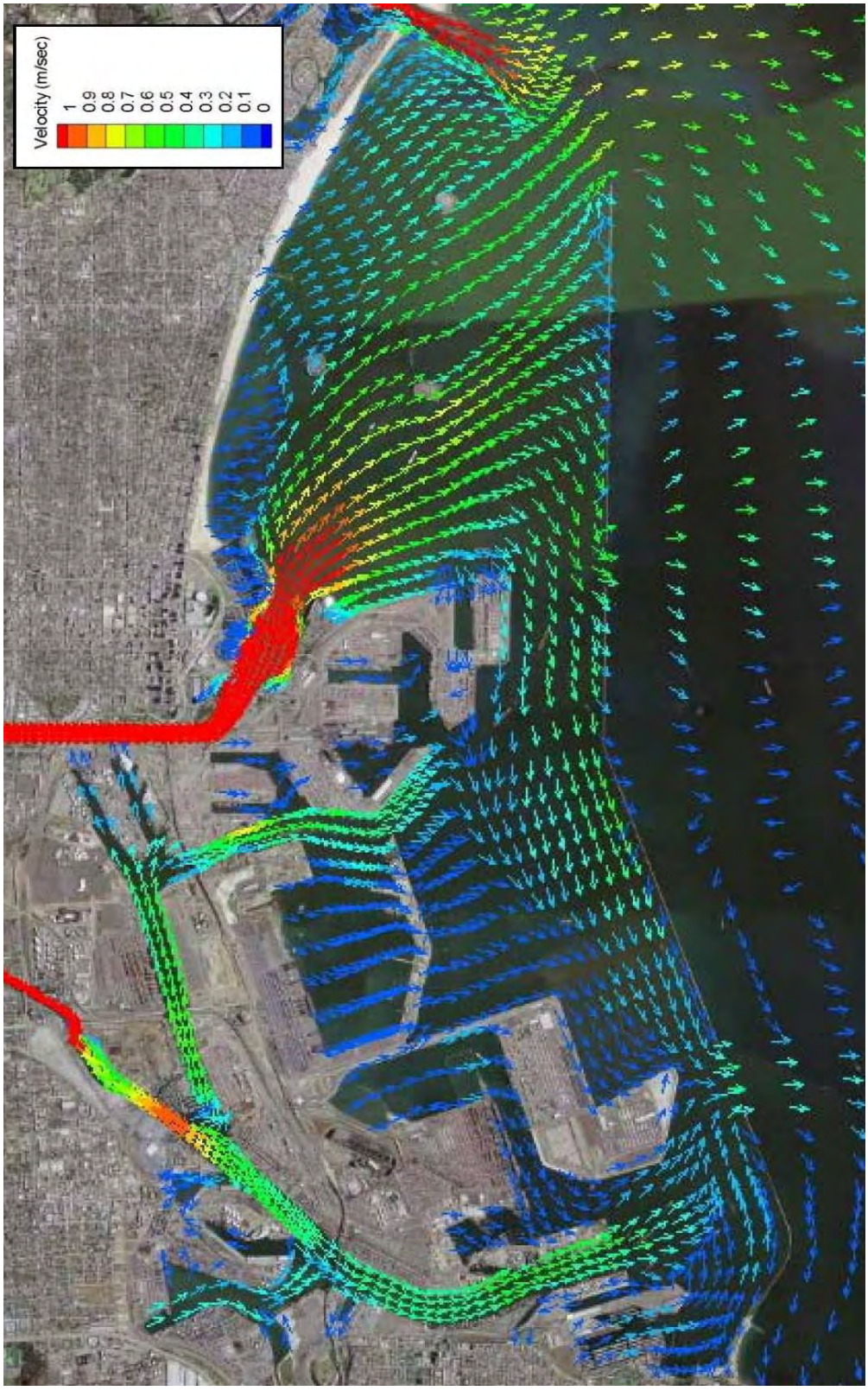

Figure 2-5. Surface Currents in San Pedro Bay -- 100-year Flood Flows

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2.4 Water Quality Standards and Los Angeles-Long Beach Harbor TMDLs

2.4.1 Introduction

TMDLs are being developed for Los Angeles/Long Beach Harbor to control inputs of water quality contaminants via stormwater and the continued input to the harbors of waterborne contaminants from non-point sources such as land uses inside and outside the harbors, aerial deposition, and vessel activities. The TMDLs will also address the presence of legacy sediment contaminants that have prompted Section 303(d) listings.

As described in Section 2.1, Section 303(d) of the CWA requires states to develop a list of bodies of water that are impaired according to the listing criteria. Listings can be made on the basis of water, sediment, tissue, and/or biological factors such as toxicity and benthic community structure. By placing a water body on the Section 303(d) list, the state identifies it as a "Water-Quality Limited Segment" (WQLS). Once a water body is identified as a WQLS, it is assumed that it will always need additional limitations beyond technology-based controls. These limitations usually take the form of TMDLs. A TMDL establishes a maximum limit for a specific pollutant that can be discharged into a waterbody without causing it to become impaired.

The regulatory agencies have expanded their evaluation of attainment of water quality standards to include consideration of contaminant movement through water to or from other media, and in the coastal marine environment of the harbors "other media" includes sediment and biota. The California Water Quality Control Plan, Los Angeles Region (Basin Plan), sets standards for surface waters, sediments, and tissues (where relevant). These standards are comprised of designated beneficial uses and the numeric and narrative objectives necessary to support those beneficial uses.

Water quality listing criteria are used as a measure to define whether a water body is in exceedance for specific pollutants in one or more of the media. The criteria are based upon the concentrations of the various pollutants that are expected to cause impacts to water quality. A water body becomes Section 303(d) listed for a pollutant based on the number of samples that exceed the listing criteria compared to the total number of samples collected (SWRCB 2004, Table 2-4). If the threshold number of samples is reached in any one medium (e.g., water column, sediment chemistry), the whole water body is listed for that pollutant.

TMDL-specific numeric targets are set for each medium at levels that will ensure the water body will meet the water quality necessary to support all beneficial uses. Note that

there are no impairments listed for the Los Angeles/Long Beach Harbor based on water column chemistry; all 303(d) listings in the harbor are based upon sediment chemistry, fish tissue, and benthic organisms.

At this point, the Los Angeles Harbor/Inner Cabrillo Beach Bacteria TMDLs, the Los Angeles River Metals TMDLs, and the Machado Lake Nutrients TMDLs have been completed by the State of California and approved by EPA. The Los Angeles River Bacteria TMDLs have not been completed nor approved by the SWRCB; they are still in development and the public review draft is scheduled for early 2010. The Dominguez Channel and greater Los Angeles/Long Beach Harbor Toxics TMDLs are still in development; the public review draft is scheduled for 2009.

2.4.2 Water Standards

This section includes a discussion of water column chemistry and bacteria standards used to develop TMDLs. Pursuant to the various laws and regulations related to water quality (Section 2.1), various state and local agencies have promulgated standards for water chemistry and bacteria to protect beneficial uses, aquatic life, and public health. Numeric standards, discussed in more detail below, cover dissolved oxygen, a variety of metals, some organic compounds, and bacteria. Narrative standards cover a variety of issues such as trash, odor, and color.

To evaluate chemical levels in enclosed bays and estuaries, such as the harbors, EPA developed numerical water standards for 64 pollutants that are designed to be protective of aquatic organisms and human health. The 64 "priority pollutants" and their numerical standards are defined under the CTR, (Section 2.1.2), which applies to inland waters, bays, and estuaries within California.

Dissolved Oxygen (DO): Adequate dissolved oxygen concentrations are necessary for good water quality and to sustain a healthy environment in which aquatic organisms can survive and reproduce. In general, dissolved oxygen concentrations consistently below 5 mg/L are considered to be deleterious to marine life, and most water quality standards use that criterion. The Los Angeles area is no exception: for the Los Angeles/Long Beach Harbor, the Basin Plan standard for dissolved oxygen in harbor waters reads as follows:

> For that area known as the Outer Harbor area of Los Angeles-Long Beach Harbors, the mean dissolved oxygen concentrations shall be 6.0 mg/L or greater, provided that no single concentration be less than 5.0 mg/L.

Metals: The CTR provides two water quality standards for priority pollutant metals (Table 2-1): the criterion maximum concentration (CMC) or "saltwater acute criterion", the highest concentration of a pollutant to which aquatic life can be exposed for a short period of time without deleterious effects; and the criterion continuous concentration (CCC), or "saltwater chronic criterion", the highest concentration of a pollutant to which aquatic life can be exposed for an extended period of time (4 days) without deleterious effects.

Table 2-1. CTR Water Quality Criteria for Dissolved Metals For the Protection of Aquatic Life

Pollutant	Criteria for the Protection of Saltwater Aquatic Life		Criteria for the Protection of Human Health	
	Acute CMC (µg/L)	Chronic CCC (µg/L)	Water & Organisms (µg/L)	Organisms only (µg/L)
Dissolved Metals				
Arsenic	69	36	-	-
Cadmium[1]	40	8.8	-	-
Chromium VI	1100	50	-	-
Copper	4.8	3.1	1,300	-
Lead	210	8.1	-	-
Mercury[1]	1.8	0.94	0.050	0.051
Nickel	74	8.2	610	4,600
Selenium	290	71	-	-
Silver	1.9	-	-	-
Zinc	90	81	-	-
Chlorinated Pesticides				
Aldrin	1.3	-	0.00013	0.00014
Alpha-BHC	-	-	0.0039	0.013
Beta-BHC	-	-	0.014	0.046
Gamma-BHC	0.16		0.019	0.063
Delta-BHC	-	-	-	-
Chlordane	0.09	0.004	0.00057	0.00059
4,4'-DDT	0.13	0.001	0.00059	0.00059
4,4'-DDE	-	-	0.00059	0.00059
4,4'-DDD	-	-	0.00083	0.00084
Dieldrin	0.71	0.0019	0.00014	0.00014
Alpha-Endosulfan	0.034	0.0087	110	240
Beta-Endosulfan	0.034	0.0087	110	240

Table 2-1. CTR Water Quality Criteria for Dissolved Metals For the Protection of Aquatic Life

Pollutant	Criteria for the Protection of Saltwater Aquatic Life		Criteria for the Protection of Human Health	
	Acute CMC (µg/L)	Chronic CCC (µg/L)	Water & Organisms (µg/L)	Organisms only (µg/L)
Endosulfan Sulfate	-	-	110	240
Endrin	0.037	0.0023	0.76	0.81
Endrin Aldehyde	-	-	0.76	0.81
Heptachlor	0.053	0.0036	0.00021	0.00021
Heptachlor Epoxide	0.053	0.0036	0.00010	0.00011
Toxaphene	0.21	0.0002	0.00073	0.00075
Polychlorinated Biphenyls				
Total PCBs[2]	-	0.03	0.00017	0.00017
Polycyclic Aromatic Hydrocarbons				
Acenapththene	-	-	1,200	2,700
Acenaphthylene	-	-	-	-
Anthracene	-	-	9,600	11,000
Benzo(a)Anthracene	-	-	0.0044	0.049
Benzo(a)Pyrene	-	-	0.0044	0.049
Benzo(b)Fluoranthene	-	-	0.0044	0.049
Benzo(ghi)Perylene	-	-	-	-
Benzo(k)Fluoranthene	-	-	0.0044	0.049
2-Chloronaphthalene	-	-	1,700	4,300
Chrysene	-	-	0.0044	0.049
Dibenz(a,h)Anthracene	-	-	0.0044	0.049
Fluoranthene	-	-	300	370
Fluorene	-	-	1,300	14,000
Indeno(1,2,3-cd)Pyrene	-	-	0.0044	0.049
Naphthalene	-	-	-	-
Phenanthrene	-	-	-	-
Pyrene	-	-	960	11,000

CMC = Criterion Maximum Concentration

CCC = Criterion Continuous Concentration

- indicates no criteria available

[1]Cadmium and mercury criteria recommended by the EPA

[2]Total PCBs are the sum of all congener, isomers, homologs or aroclors

From a toxicological standpoint, the dissolved metal fraction is considered to be more relevant because it is more bioavailable (meaning the chemical can more readily enter an organism‟s body and cause lethal or sub-lethal effects). Consequently, CTR standards for priority pollutant metals are based upon the dissolved fraction.

Bacteria: Water quality regulations have established a set of indicator bacteria designed to be protective of human health. These include total and fecal coliform bacteria and enterococcus. The concentration of these indicator bacteria determine whether a water body is safe for human contact, or should be avoided. Pursuant to the Health and Safety Code provisions (Sections 115880, 115885, 115915) established by Assembly Bill 411 (AB 411), the California Department of Health Services has developed minimum protective bacteriological standards for the waters adjacent to public beaches and water-contact sports areas. Those standards state that the following limits should not be exceeded for bacterial indicators: 10,000 MPN/100 mL for total coliform, 400 MPN/100 mL for fecal coliform, and 104 MPN/100 mL for enterococcus. In addition to the AB 411 standards, the Basin Plan also includes bacteria standards for marine waters designated for water contact recreation. These standards are similar to the AB 411 standards for single sample limits, but also include geometric mean limits: 1,000 MPN/100 mL for total coliform, 200 MPN/100 mL for fecal coliform, and 35 MPN/100 mL for enterococcus.

2.4.3 Sediment Standards

This section includes a discussion of sediment chemistry, sediment toxicity, and benthic community effects used to develop TMDLs. Assessments of contaminant related impacts in marine environments often include chemical, toxicological, and biological evaluations in order to determine contaminant-related impacts by determining if (1) contaminants are present within the sediment, (2) the sediment is toxic, and (3) the benthic community has been impacted by contaminants by examining alterations in the community structure. Therefore, sediment quality can be defined by this triad of indicators; chemistry, toxicity, and benthic community. When listings are generated based on contaminant concentrations, there are often listings for toxicity and benthic community effects.

At the present time, there are no promulgated sediment standards. In the absence of promulgated standards, sediment quality is evaluated by comparing concentrations found in the sediments to published benchmark values, such as the 303(d) listing criteria presented in Table 2-2. In addition, the SWRCB is developing Sediment Quality Objectives (SQOs) to characterize sediments in enclosed bays and estuaries that will likely be incorporated into listing policy. Phase I (direct effects) SQOs have been

approved by the State Board and Office of Administrative Law and are currently being reviewed by the EPA. Once approved, the SQOs will be sent to Regional Boards for incorporation into Basin Plans. The Phase I SQOs are based on a multiple-lines-of-evidence approach in which the lines of evidence are sediment toxicity, sediment chemistry, and benthic community condition.

Table 2-2. Marine Sediment Quality 303(d) Listing Guidelines

Analyte	Listing Criterion	Numeric Targets	Units
Cadmium	4.21	1.2	ppm
Copper	270	34	ppm
Chromium	370	81	ppm
Lead	112.18	46.7	ppm
Silver	1.77	1	ppm
Zinc	410	150	ppm
Mercury	2.61	0.15	ppm
Chlordane	6	0.5	ppb
Dieldrin	8	not established	ppb
Total DDT	590	1.58	ppb
Total PCBs	400	22.7	ppb
Total PAHs	180000	4022	ppb
Total HMW PAHs	9600	1700	ppb
Total LMW PAHs	1442	522	ppb
Benzo[a]anthracene	692.53	261	ppb
2-methyl-napthalene	201.28	not established	ppb
Benzo[a]pyrene	763.22	430	ppb
Chrysene	845.98	384	ppb
Dibenz[a,h]anthracene	260	260	ppb
Phenanthrene	543.53	240	ppb
Pyrene	1397.4	665	ppb
Toxaphene	not established	10	ppb
Source: Table adapted from the Functional Equivalent Document [SWRCB and Cal EPA, 2004 Table 12] and the Draft Problem Statement [LA-RWQCB and USEPA Region IX, 2008, Table 3-2]) Unit equivelents: ug/g = ppm; ng/g = ppb			

The Basin Plan includes a narrative toxicity objective which states, in part: "*All Waters shall be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in, human, plant, animal, or aquatic life.*" Toxic substances, like those listed in the table above, will elicit toxic responses in test organisms if the concentrations are elevated enough to interfere with cellular processes, the whole organism, or population.

To determine if toxic substances are at concentrations in sediment that produce detrimental physiological responses to benthic organisms, sediment toxicity tests are conducted. Toxicity is measured by exposing standardized organisms to test sediments for specified times, following prescriptive procedures detailed in testing protocols. Toxicity is observed when there is an adverse effect or decrease in survival of an organism after exposure to the test sediments. A numeric sediment toxicity target of no observable sediment toxicity has been established (LA RWQCB 1995). Sediment toxicity is observed when standardized tests result in: 1) a statistically significant difference ($p<0.05$) in mean organism response (e.g., percent survival) between a sample and the control, and 2) the mean organism response in the toxicity test is less than 90 % survival.

Patterns of distribution of benthic species are used to determine if toxic substances are at concentrations in sediment that affect the community structure. Benthic organisms are considered good indicators of sediment quality because these organisms live within the sediments where they are directly exposed to contaminants through ingestion, burrowing, and respiration. These organisms are often the base of food chains and are therefore considered important to ecosystem health. Benthic community impacts are determined by examining the types of organisms that are living in the sediment. For example, the number of species, the presence of pollution-tolerant organisms, and the absence of pollution sensitive organisms are indicators of poor benthic health.

2.4.4 Tissue Chemistry Guidelines

Understanding the dynamic processes involving uptake, storage, metabolism and excretion is important in shielding organisms from the adverse effects of contaminant exposure and accumulation, and has become an important consideration in the regulation of chemicals in the environment. Contaminants accumulate in the tissues of marine organisms through bioaccumulative processes, which occur within an organism when the uptake rate of a persistent compound (i.e., due to lipid content and hydrophobicity) exceeds the metabolization or excretion rate. This results in a potentially greater risk of chronic effects, even if levels of the substance are found in trace amounts in the surrounding environmental media (e.g., water and sediment). The bioaccumulative

contaminants of greatest concern such as DDTs and PCBs, are those that biomagnify within food chains, resulting in significantly elevated chemical contaminant concentrations in tissues of higher trophic level organisms such as the brown pelican (*Pelecanus occidentalis*).

Numeric screening criteria for fish tissue have been developed for contaminants of concern that are protective of human health due to fish consumption (Table 2-3). Threshold tissue residue levels (TTRLs) are the target maximum pollutant concentrations in edible fish tissue. The California EPA‟s Office of Environmental Health Hazard Assessment (OEHHA) values are also provided for other analytes.

Table 2-3. Numeric Targets for DDT and PCBs in fish tissue

Pollutant	TTRL Edible tissue conc. (ppb =µg/kg wet)	OEHHA Values (ppb = µg/kg wet)
Total DDT		100
4,4'-DDT	32	
4,4'-DDE	32	
4,4'-DDD	45	
Total PCBs	5.3	20
Toxaphene	9.8	30
Arsenic		1.0
Cadmium		3.0
Mercury		0.3
Chlordane		30
Dieldrin		2.0
OEHHA values from OEHHA 1999.		

2.4.5 Current 303(d) Listings and TMDLs

Specific water bodies within the Ports‟ jurisdiction were identified as impaired for several pollutants on the most recent (2006) California Section 303(d) list (LA RWQCB, 2007; Figure 2-6). The list for the Dominguez Channel estuary and Los Angeles/Long Beach Harbor waters is the basis of the TMDLs. Recently, the LA-RWQCB and EPA developed a draft TMDL problem statement (LA-RWQCB and EPA Region IX, 2008) which incorporates some newer data and recommends additions and deletions to the original list; the modified list is provided in Table 2-4. TMDLs will be developed for 303(d) listed and new impairment findings, unless the problem statement provides

conclusions of non-impairment for specific waterbody-pollutant combinations. The Ports assume that the 303(d) List will be modified to reflect the problem statement.

Table 2-4. 2006 Section 303(d) List of Water Quality Limited Segments Requiring Pollutant-Specific TMDLs

Water Body	Pollutants Requiring TMDL (Sediment and/or Tissue)	Other Impairments
Los Angeles/Long Beach Inner Harbor	Tissue: DDT and PCBs Sediment: Copper, Zinc, Lead, Benzo(a)pyrene, Chrysene	Benthic community effects, sediment toxicity
Los Angeles/Long Beach Outer Harbor	Tissue: DDT and PCBs	Sediment toxicity
Los Ángeles Harbor – Inner Cabrillo Beach	Tissue: DDT and PCBs	None
Los Angeles Harbor – Cabrillo Marina	Tissue: DDT and PCBs Sediment: Benzo(a)pyrene, Pyrene, Chlordane	None
Los Angeles Harbor – Fish Harbor	Tissue: DDT and PCBs Sediment: Copper, Lead, Zinc, Chlordane, Total DDT, Total PCBs, Benzo[a]pyrene, Phenanthrene, Benzo[a]anthracene, Chrysene, Pyrene, Dibenz[a,h]anthracene,	Sediment toxicity
Los Angeles Harbor – Consolidated Slip	Tissues: Chlordane, Dieldrin, DDT, PCBs, toxaphene Sediment: Cadmium, Copper, Chromium, Lead, Zinc, Mercury, Chlordane, Total DDT, Total PCBs, Benzo[a]pyrene, 2-methyl-napthalene, Phenanthrene, Benzo[a]anthracene, Chrysene, Pyrene	Sediment toxicity, benthic community effects
Source: LA-RWQC and EPA Region IX, 2008 and Personal Communication Peter Kozelka April 2009		

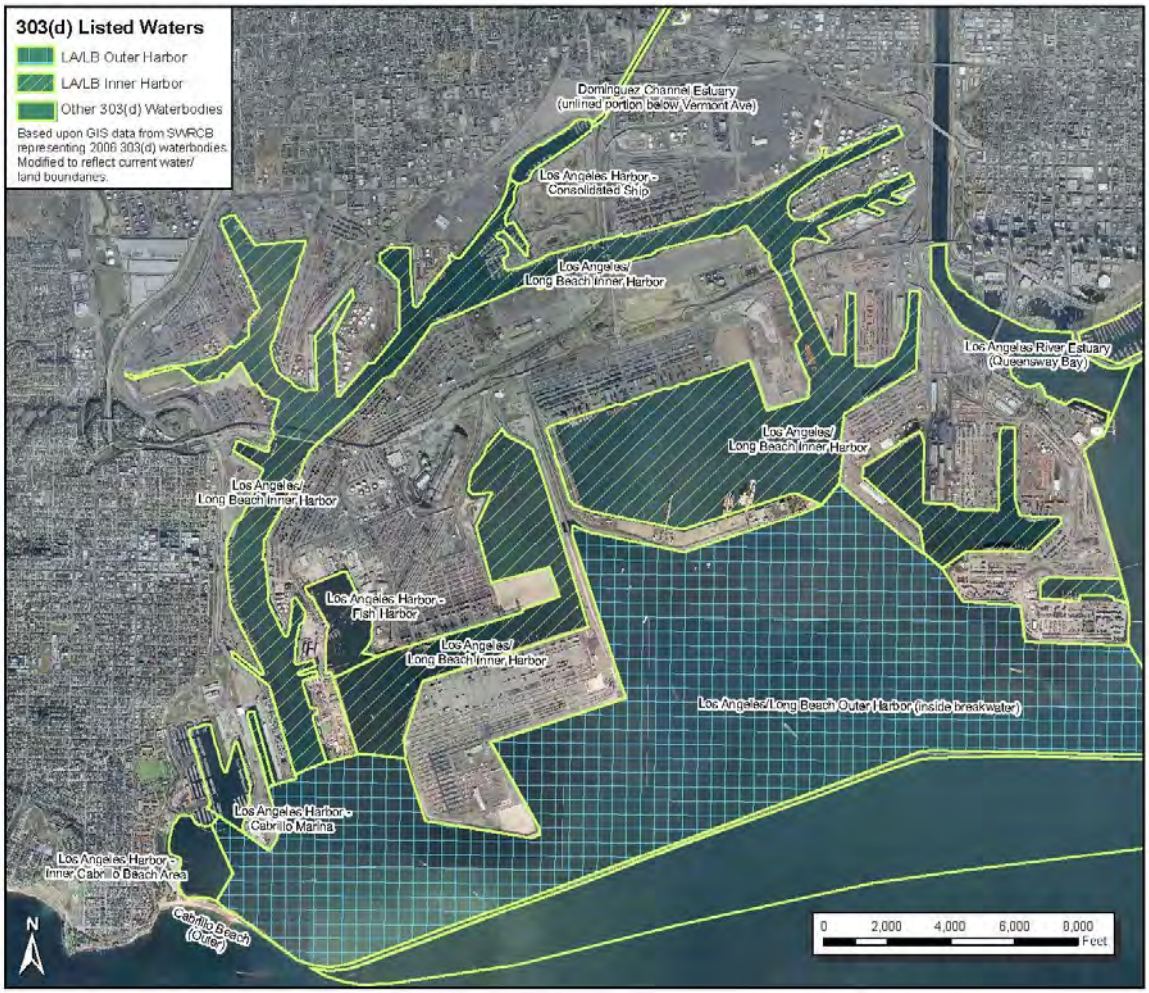

Figure 2-6. TMDL Boundary Areas, Ports of Los Angles and Long Beach

2.5 Water Column Chemistry and Bacteria Data in Los Angeles/Long Beach Harbors

2.5.1 Introduction

In the past, harbor water quality was adversely affected by a number of direct and indirect discharges. The canneries in Fish Harbor, the Terminal Island Treatment Plant, and the Proctor & Gamble manufacturing plant are just some of the facilities that used to discharge wastewater of varying quality into the harbors. Prior to NPDES regulations, the Dominguez Channel was used as a drainage ditch for process water and waste from industries north of the harbor. In the early 1960s, the six largest dischargers alone were releasing a total of 10 million gal per day of waste into the channel (Parkhurst, 1966).

Unregulated urban runoff resulted in stormwater that is certain to have been substantially more polluted than it is today (the introduction of DDT and PCBs into harbor sediments via storm drains and the accumulation of contaminants in the Consolidated Slip are examples). In fact, prior to the 1970s it was not uncommon for the DO levels in the harbor to average 1-2 mg/L, well below today‟s minimum standards of 5 mg/L. The low DO concentrations were especially evident in inner harbor areas where pollutant inputs were high and tidal flushing with fresh ocean water was low. Such low concentrations of DO severely affected marine life in the harbors. The past inputs of pollutants have left their imprint on harbor sediments such that sediment-water column interactions could be releasing historic contaminants back into today‟s harbors and may be affecting water quality.

Following the passage of the CWA in 1972, the elimination of most point source discharges to the harbor, and the implementation of the NPDES to regulate all remaining point source discharges, water quality has improved to a point where much of the harbor supports healthy and diverse biological communities. The 2000 Biological Baseline conducted by the Ports (MEC 2002) found 74 species of fish in the various habitats in the harbor, with commercially and recreationally valuable species among the most abundant and a wide variety of eggs and larvae; the benthic community includes over 400 species of invertebrates, and the composition of the community indicates a marked improvement in habitat quality in recent decades; and well-established kelp communities in the Outer Harbor and eelgrass in shallow-water areas indicate good water quality, especially in terms of clarity. With the harbor-wide improvements in water quality observed over the past few decades, focus has largely shifted to the potential impacts on water quality related to chemical contaminants that originate from storm water sources, but, as described below, other point sources remain an important issue in harbor water quality.

2.5.2 Sources of Harbor Water Pollutants

Water quality in the harbors is influenced by a variety of processes and inputs. One of the obvious influences on water quality is landside runoff, consisting of stormwater, normal dry weather flows, and other point-source discharges. Urban stormwater is a substantial source of a variety of constituents to downstream receiving waters, primarily because the pollutants generated by urban activities collect on land and are washed into storm drains by rain storms (e.g., Stein, Tiefenthaler, and Schiff 2007). That fact emphasizes the importance of minimizing the accumulation of pollutants on land areas, whether through source control or physical removal, before the wet season begins. Contaminated soil and groundwater from landside activities may also enter the harbors.

Direct discharges from ships, harbor craft, recreational vessels, and in-water structures are also thought to contribute to harbor water pollution. Modern maritime operations involve large vessels that use a variety of potentially toxic materials such as petroleum products, metallic and organic anti-fouling and anti-corrosion substances and paints; they discharge particulates into the air; and they produce human wastes and refuse. Recreational vessels produce similar discharges that, although individually small, may be collectively of concern. These operations are concentrated in harbors, where large oceangoing vessels call and where recreational vessels are concentrated in numbers that can reach the thousands. Another influence on water quality is direct discharges from industrial and municipal uses, i.e., outfalls. In Los Angeles/Long Beach Harbor such influences are relatively minor: a small number of small industrial facilities and two relatively small power plants have permitted discharges, but the major dischargers of the past (see above) have been phased out of the harbors.

The last major influence on water quality is regional in nature. In particular, coastal circulation brings ocean water into the harbor and moves harbor water out to the ocean via tidal exchange and wind-driven currents, and can also bring pollutants in from adjacent coastal areas (see Section 2.3).

2.5.3 Current Conditions

This description of current conditions in the harbors summarizes some of the general parameters and provides additional detail on the pollutants for which the harbors are listed as impaired, although, as mentioned in Section 2.4, the harbors are listed on the basis of sediment and tissue concentrations, not water column pollutants. Water quality is typically characterized on the basis of both a suite of general parameters, such as DO concentrations and water clarity, and of specific pollutants of concern, such as certain metals, organic compounds, bacteria, and trash.

Water quality conditions in the Los Angeles/Long Beach Harbor complex have been documented by a number of studies and monitoring efforts over the past four decades. The most comprehensive data in terms of areal extent and length of data record, however, come from routine monitoring programs conducted since the 1960s. These programs have yielded long-term data bases of basic harbor water quality parameters (e.g., DO, temperature, pH, water clarity) that can be used to track long-term changes in water quality. In addition, a harbor-wide program to measure chemical constituents started in 2005. Monitoring of contaminant concentrations in runoff water from port land uses is also being conducted and has utility in the evaluation of the effectiveness of stormwater management and landside control measures.

POLA collects routine water quality data at approximately 30 open-water stations throughout the harbor. Since 2005, an enhanced analysis has been conducted periodically to examine the ambient water column for a comprehensive suite of chemicals of concern (Appendix A). The focus of the POLB sampling has been on characterizing storm drain water quality at 21 storm drain outfalls and one receiving water station in support of its industrial permit. Since 1996, data have been collected three times a year, once during dry weather, twice during storm events. This sampling strategy means that the POLB data can be used to characterize runoff from port lands, thus complementing the receiving water sampling conducted by POLA.

Note that there are no numeric effluent limits for stormwater discharges in the permits currently regulating stormwater discharges in Los Angeles/Long Beach Harbor. Receiving waters in the harbors must meet CTR criteria, but the discharges need not. It is the effect of the discharges on harbor water quality that is critical, not the quality of the discharges themselves.

Dissolved Oxygen

Results of recent studies in Los Angeles/Long Beach Harbor (summarized in Appendix A) indicate that the ambient DO concentrations throughout the harbor area are adequate to support a healthy and diverse biological community. In recent years, DO concentrations throughout Los Angeles/Long Beach Harbor have generally met or exceeded the 5 mg/L standard, with average values in the 6 to 8 mg/L range. As expected, concentrations in samples collected in the Pacific Ocean beyond the breakwater were the highest, averaging nearly 8 mg/L. Samples collected in the outer harbor area averaged just over 7 mg/L, and inner harbor stations averaged just under 7 mg/L.

Metals

Metal results in water samples can be expressed in two ways: total and dissolved. Total metals are analyzed on whole water samples, without filtration, and include both particulate and dissolved fractions. When a sample is filtered before analysis, the particles are removed, leaving only the dissolved metals. As mentioned above, the CTR criteria are based upon the dissolved fraction, and the data presented here are expressed as dissolved concentrations.

The 2005 harbor-wide monitoring study found only five instances in which metals concentrations in harbor water exceeded CTR criteria for chronic exposure of marine life (Appendix A). All five exceedances were for dissolved copper (two in the Cabrillo Marina complex, including one that exceeded the acute exposure criterion, one in Fish Harbor, and two in POLB Inner Harbor). For most other metals, maximum concentrations throughout the harbor complex were no more than a tenth of the CTR chronic criterion for that metal. For example, the maximum lead concentrations were less than 1 µg/L (µg /L = ppb, or parts per billion), whereas the CTR chronic exposure criterion is 81 µg/L.

Overall, the results indicated that dissolved metal levels in Los Angeles/Long Beach Harbor waters are low and not the cause of the Section 303(d) listings. In the vast majority of the samples analyzed, the dissolved metal levels were many times lower than the State standards at which negative impacts on marine life would be expected to occur.

POLB‟s recent monitoring of storm drain outfalls (MBC 2007, 2008) shows that stormwater runoff consistently contains most of the 15 metals for which samples are analyzed (copper and zinc are discussed in more detail below). Concentrations in stormwater runoff vary considerably among metals, years, storms, and outfalls, but for most metals concentrations range from undetectable to a few ppb. Storm drain concentrations are consistently higher than concentrations in the receiving waters for all but a few of the metals. Results from the first storm of 2008 showed that cadmium reaches 5 ppb in runoff, chromium reaches 25 ppb, lead reaches 200 ppb, mercury rarely exceeds 1 ppb, and silver is usually not detected. Results from the second storm of the year showed much lower concentrations of all metals – typically less than a quarter of the values from the first storm. This pattern illustrates the phenomenon mentioned by Stein, Tiefenthaler, and Schiff (2007) concerning the role of the first storm in coastal ocean water pollution.

Copper: Harbor-wide receiving water monitoring shows that concentrations of dissolved copper in harbor waters are typically less than 2 ppb. As mentioned above, the only

locations where elevated dissolved copper concentrations were observed are Cabrillo Marina, Fish Harbor, and POLB Inner Harbor. Five samples in the 2005 – 2008 survey exceeded CTR water quality criteria (Figure 2-7): two samples in the Cabrillo Marina region, one sample in Fish Harbor, and two samples in POLB Inner Harbor exceeded the CCC of 3.1 ppb, and the concentration in one sample from the Cabrillo Marina (9.91ppb) was over twice the CMC of 4.8 ppb.

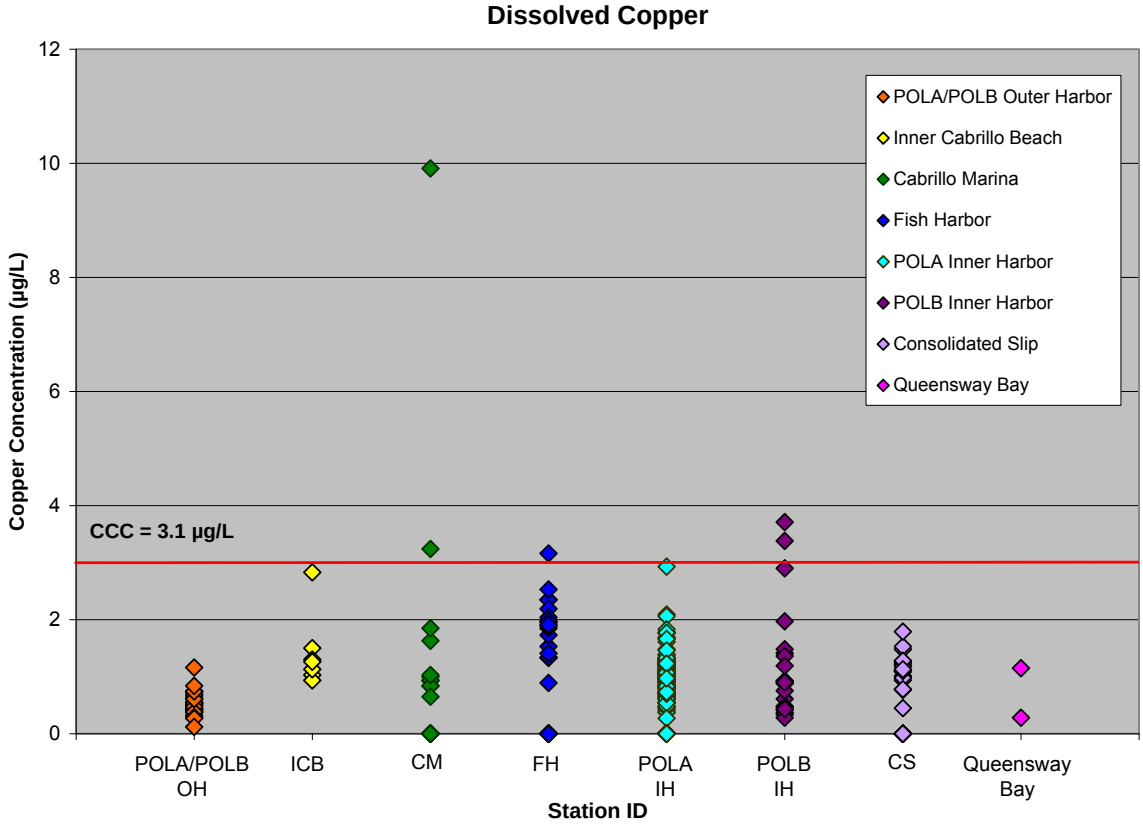

Figure 2-7. Concentrations of dissolved copper in Los Angeles/Long Beach Harbor, 2005 – 2006 (source: Appendix A)

POLB‟s recent outfall monitoring shows that copper concentrations in the runoff of the first storm of 2008 ranged from approximately 10 ppb to over 400 ppb, whereas in the second storm the highest concentration was 101 ppb.

Zinc: POLA‟s receiving water monitoring shows that concentrations of dissolved zinc in harbor waters are typically less than 10 ppb and often undetectable (Figure 2-8). No samples in the 2005 – 2006 survey exceeded CTR water quality criteria, but samples in POLA‟s Inner Harbor approached the CCC of 81 ppb.

POLB"s recent outfall monitoring shows that zinc concentrations in the runoff of the first storm of 2008 ranged from approximately 572 ppb to over 7,600 ppb, whereas in the second storm the highest concentration was 1,000 ppb.

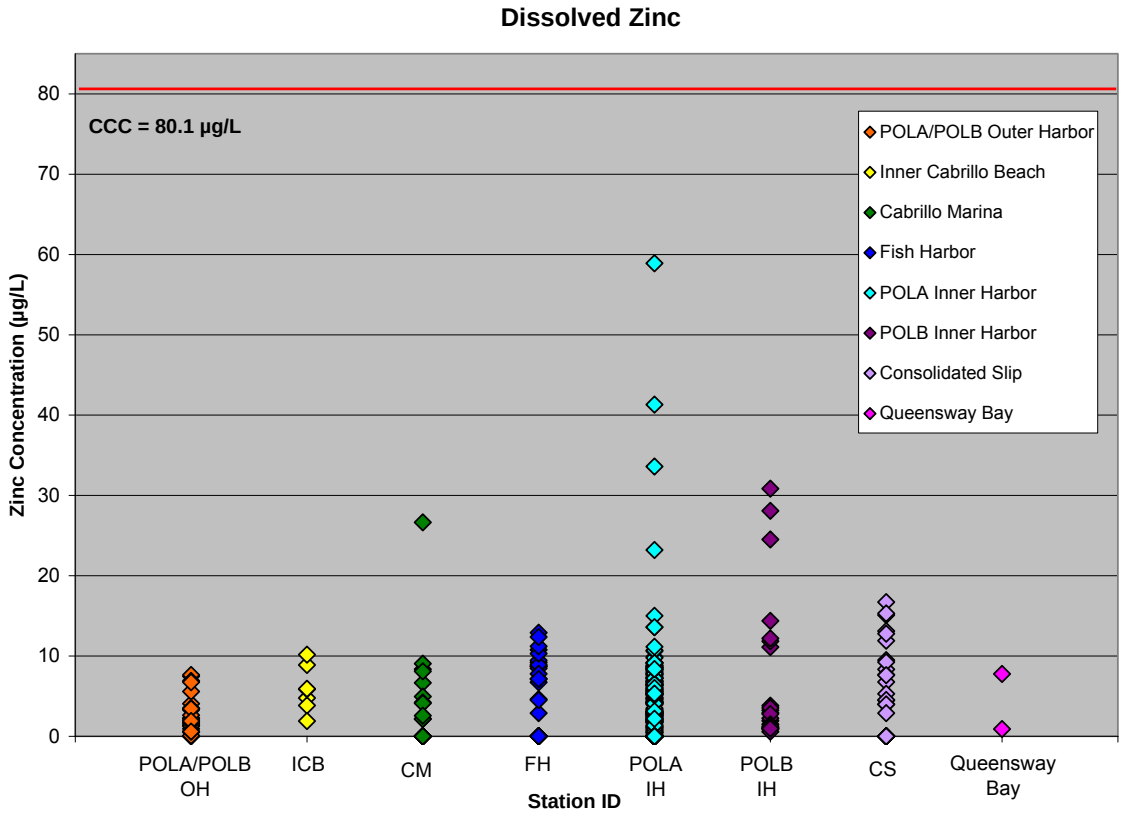

Figure 2-8. Concentrations of dissolved zinc in Los Angeles/Long Beach Harbor, 2005 – 2006 (Appendix A)

Organic Compounds

Organic pollutants typically of concern in industrial harbors include chemicals such TBT, chlorinated pesticides, PCBs, PAHs, phenols, and phthalates. Most organic compounds of concern are not very soluble in water, so it is typical to find them at very low concentrations, if at all. Focused studies using sophisticated analytical instrumentation and techniques have detected chlorinated pesticides and PCBs in low ppt concentrations in harbor waters, which could raise water quality concerns.

Very low concentrations are also of concern due to the bioaccumulative properties of many organic compounds. Many organisms can accumulate organic compounds in their tissues from very low concentrations in the water column, sediments, and food. This phenomenon may contribute to the reason the harbors are listed under Section 303(d) for

fish tissue, although the extent to which water column pollutants are responsible is not yet clear.

Each of these chemicals was analyzed as part of the harbor-wide monitoring program, although not all organic chemicals were tested during every sampling event. The concentrations of organic chemicals were always very low, generally below detection. With one exception, detected concentrations were always below relevant California salt water aquatic life standards for chronic exposure, generally several orders of magnitude below these standards. The exception is TBT, for which no California standards, including CTR, exist. Harbor-wide sampling found that only 7 of the 234 samples analyzed for TBT showed concentrations that exceeded the published National Ambient Water Quality Criteria chronic exposure limit. As discussed in Appendix A, however, the majority of the samples tested (225 out of 234) were non-detect, and the samples that did exceed criteria were only slightly elevated.

Of the various chlorinated pesticides (chlordane, dieldrin, and DDT and its metabolites), only DDE was detected in water samples, and that in only one of the more than 100 samples analyzed. As indicated above, however, concentrations below the level of detection of routine analytical techniques could still raise concerns related to bioaccumulation.

PCBs, formerly used as a coolant in electrical transformers and in the manufacture of various products, were not detected in the vast majority of samples in both harbors. There were only three instances in which PCBs were detected: one in Los Angeles Harbor Main Channel and two in Long Beach Harbor Channel Two. All three samples were only slightly above the analytical detection level of 0.001 µg/L, and well below the CTR CCC aquatic life criterion of 0.03 µg/L. As indicated above, however, concentrations below the level of detection of routine analytical techniques could still raise concerns related to bioaccumulation, and it is important to note that the human health criterion is well below the detection limit in the harbor studies (Table 2-1).

PAHs are a product of the incomplete combustion of petroleum fuels, coal, and wood, and are found naturally in a variety of organic substances such as creosote. Some PAHs are known human carcinogens. Using the standard analytical method, PAHs were not detected in harbor water samples. Using a new, ultra-low-detection-limit analytical method, however, PAHs were detected in most samples, although only slightly above the ppt detection limit. There are no CTR ambient water criteria for PAHs for aquatic life effects, but a number of PAHs have human health criteria (Table 2-1).

Low concentrations of phthalates, which are common ingredients of plastics, were found at stations throughout the harbor, typically after rain storms. The concentrations at which phthalates cause effects on marine organisms in surface waters are not well understood and are currently the focus of considerable scientific research. There are no aquatic life CTR criteria for phthalates in surface waters.

Bacteria

Bacteria tests are conducted on ambient water samples in order to identify total and fecal coliform bacteria and enterococcus. The concentration of these indicator bacteria determine whether it is safe for human contact, or should be avoided. People who swim in runoff-contaminated waters are more likely to be exposed to bacteria levels that could result in illness. In addition to impacting humans, high levels of bacteria in harbor waters may be an indicator of potential problems upstream (such as the illicit discharge of wastes) that need to be identified and controlled.

Bacteria tests in Los Angeles Harbor were conducted concurrently with each of the seven enhanced monthly port-wide water quality sampling events. An additional special study was performed in the East Basin/Consolidated Slip area in conjunction with a sailing center siting study. Collection events occurred during dry and wet seasons as well as immediately following storm events. The vast majority of the samples collected during the four dry weather events had non-detectable levels of indicator bacteria. As expected, the majority of the AB 411 and Basin Plan exceedances were observed following storm events.

Additional focused bacteria sampling has been conducted in conjunction with the ongoing POLA Main Channel and Cabrillo Beach Bacteria TMDL. POLA has implemented numerous measures to achieve TMDL compliance at Inner Cabrillo Beach, with additional measures planned over the next year. Recent data from the Main Channel compliance point indicate favorable bacteria levels, while the Cabrillo Beach area continues to experience exceedances in both dry and wet weather. Based on various investigations conducted over a number of years, bacteria exceedances appear to be localized at Cabrillo Beach.

In summary, AB 411 indicator bacteria levels in Los Angeles Harbor are low during dry weather conditions and elevated immediately following storm events. The Inner Harbor is more susceptible to elevated bacteria levels compared to the Outer Harbor, indicating that the Dominguez Channel and other storm drains in the vicinity are the primary source of the observed bacteria. One exception to this pattern is the Cabrillo Beach area in the Outer Harbor.

2.6 Sediment Quality in Los Angeles/Long Beach Harbor

2.6.1 Introduction

Activities in San Pedro Bay associated with port land uses, on-water discharges, and watershed influences have all contributed to historical and current sediment contamination. In recent decades, CWA requirements, dredging and removal of contaminated sediments, implementation of port water and sediment quality programs and studies, and port participation in key regulatory programs have resulted in a substantial improvement in sediment quality. However, most areas within Los Angeles/Long Beach Harbor are listed under CWA Section 303(d) for sediment pollutants (Section 2.4.5).

The overall quality of sediments within the Outer Los Angeles/Long Beach Harbor varies widely. Sediments with contaminant concentrations above relevant TMDL listing criteria are often localized in back channels (e.g., Fish Harbor), along wharf faces, and near storm water outfalls (e.g., Consolidated Slip; Figure 2-9). Contaminant concentrations in newly developed areas and open channel areas are typically below the listing criteria. Open-water areas, such as Cabrillo Beach and the Outer Harbor, are typically well below listing criteria. The benthic community and sediment toxicity assessments have also yielded widely varied findings that have been found to depend to a considerable degree on the analyses or test species used.

2.6.2 Sources of Sediment Contamination

In past decades, a variety of activities in the harbors and surrounding areas contributed to sediment contamination. Before the CWA, land uses such as manufacturing, military facilities, fish processing plants, wastewater treatment plants, oil production facilities, and shipbuilding/repair yards in both Ports discharged untreated or partially treated wastes into harbor waters. Those effluents resulted in sediment contamination. Stormwater and wastewater discharges from upstream brought a wide range of pollutants to the harbor, including large quantities of metals, PAHs, DDT, and PCBs, that tended to settle in harbor sediments. As a result, much of the sediment pollution in the harbors is so-called "legacy contamination" left over from those past activities. Examples of past activities include: POLA's Fish Harbor sediments are contaminated by decades of cannery wastes; POLB's West Basin sediments are contaminated by 50 years of US Navy activities; POLA's Southwest Slip sediments are contaminated by a major storm drain and nearly a century of Todd Shipyard activities; POLA's Consolidated Slip sediments are contaminated by storm runoff and former direct waste discharge from communities

and industries upstream along the Dominguez Channel; also, throughout the harbor complex, sediments contaminated by various amounts of DDT, have been carried into the harbor through storm drainage and ocean waters.

Current activities can also contribute pollutants to harbor sediments. In particular, stormwater runoff from port lands and from upstream areas can bring contamination into harbor sediments. Potential sources of sediment contamination include municipal storm drains, the Dominguez Channel, industrial outfalls, stormwater runoff from port facilities, commercial vessels (ocean going vessels and harbor craft), recreational vessels, aerial deposition and the redistribution into the harbors, by ocean currents, of sediments from outside the harbors.

2.6.3 Current Conditions

This description of current conditions in the harbors summarizes some of the general parameters and provides additional detail on the pollutants for which the harbors are listed as impaired. As mentioned in Section 2.4, the harbors are listed on the basis of sediment and tissue concentrations. Currently, sediment conditions, including chemical contaminant concentrations, benthic community health and toxicity, are driving the TMDL development.

Sediment quality in the Los Angeles/Long Beach Harbor complex has been documented by numerous focused studies and monitoring efforts over the past four decades (Appendix B). Sediment samples have been collected for a variety of reasons, including dredge material characterization, regional monitoring, and hot spot delineation. Depending on the purpose of the study, very different scientific approaches have been used. The two major sampling strategies are 1) randomized sampling, generally used in regional monitoring and waterbody characterization, and 2) non-randomized sampling, typically used for dredge material and hot spot characterization. Both strategies can collect either surficial sediments alone at each station or a series of samples to establish a depth profile of sediment chemistry, but it is typical of regional programs to collect surface samples and of dredge and hot spot sampling to collect depth profiles. Both of these methods have been used in studies of the Los Angeles/Long Beach Harbors, as described more fully below.

As is consistent with the TMDL and SQO efforts undertaken by the agencies, only surface sediment chemistry is used in this document to describe sediment quality in Los Angeles/Long Beach Harbor. Unlike subsurface sediment, surface sediment has the potential to contribute to the concentrations of pollutants in the water column and is likely to be bioavailable to benthic organisms that inhabit this biologically active layer.

Sediment data collected in support of dredging programs is not relevant to current conditions because the sediments are usually removed; accordingly, sediment data on completed dredging programs is not included in this assessment. However, the regulatory agencies often use all available sediment data in their analyses.

All sediment data presented in support of the developing TMDLs has been validated and summarized. Two sets of maps displaying sediment chemistry data categorized by numeric target and listing criteria for each contaminant of concern have been developed; based on different data sets. The first set of maps (Figure 2-9 is an example for copper; maps of other contaminants are provided in Appendix B) summarizes both randomized and site-specific sediment chemistry data that reflect current conditions within the harbors. The second set of maps (Figure 2-10 is an example for copper; maps of other contaminants are presented in Appendix B) summarizes only the randomized chemistry data.

All data determined to be reflective of current conditions are presented in the first set of maps, and include:

- Randomized Studies: The 1998 and 2003 Bight Programs (SCCWRP, 2003, 2007a), 2006 Port TMDL study (Weston Solutions, Inc. [WESTON], 2007), EPA"s Western Environmental Monitoring and Assessment Program (WEMAP, 1999), and EPA"s Environmental Monitoring and Assessment Program (EMAP, 2005).

- Data Gap Study: A harbor-wide study was conducted in support of the WRAP in order to identify data gaps (WESTON, 2008).

- Other Studies: Data collected in both Ports as part of the Bay Protection and Toxic Cleanup Program studies conducted from 1992 to 1997 (BPTCP, 2008) and a SCCWRP study called PV88 (Anderson et al., 1988).

- "Hot Spot" Characterizations: "Hot spot" characterization studies require a large number of sediment samples in a targeted area in order to clearly define the magnitude and extent of contamination. In POLA, these studies include sediment characterization evaluations within the vicinity of Fish Harbor, Dominguez Channel, yacht harbors, and boat maintenance facilities, (WESTON, 2005, 2006, 2007b-g). In POLB, these studies include the Long Beach Naval Station Feasibility Study (Bechtel, 2003) and the Installation Restoration Site 7 Sediment Characterization Study (WESTON, 2007h).

The following summary of the various classes of contaminants in Los Angeles/Long Beach Harbor sediments is based upon the first set of data, as described above.

Metals

Copper, lead, mercury, and zinc are metals of concern within the harbors, several areas of which are listed as impaired for all four metals (Table 2-4). These metals are often elevated in localized areas related to specific activities, such as marinas and boat repair yards. As an example, Figure 2-9 presents the sample locations and values for copper (maps of other metals are provided in Appendix B). During sediment characterization studies conducted in these localized areas, concentrations of copper and mercury greater than the regulatory limits or total threshold limit concentration (TTLC) have been measured in surface sediment in Los Angeles Harbor, and concentrations greater than the effects-range median (ER-M) sediment quality guideline have been measured in the Long Beach West Basin. Lead or zinc was present in a number of samples at concentrations exceeding the 303(d) listing criteria, but only one sample out of over 100 analyzed exceeded the 303(d) listing criteria for both lead and zinc.

Organics

Of a number of the organic compounds on the 303(d) list, only chlordane, DDT, and PCBs are widespread at concentrations above the numeric target. However, specific PAHs, including total LMW PAHs, benzo[a]anthracene, and phenanthrene, are present in a few locations at concentrations that exceed both the numeric targets and the listing criteria. According to WESTON (2008), chlordane is often elevated near storm drain outfalls, and chlordane, DDTs, and PCBs are significantly elevated in POLA‟s Consolidated Slip as a result of storm runoff from Dominguez Channel. DDTs and PCBs are persistent contaminants of concern that are elevated in sediments throughout the harbors. Concentrations of DDTs, PCBs, and PAHs commonly exceed ER-M levels, especially in slips as opposed to more open waters.

Because TBT is a component of many boat anti-fouling bottom paints, elevated concentrations are often found in areas related to specific activities such as marinas and boat repair facilities. During sediment characterization studies conducted in the vicinity of boatyards and marinas, concentrations above the TTLC have been measured in surface sediments. There are no numeric targets or listing criteria for TBT.

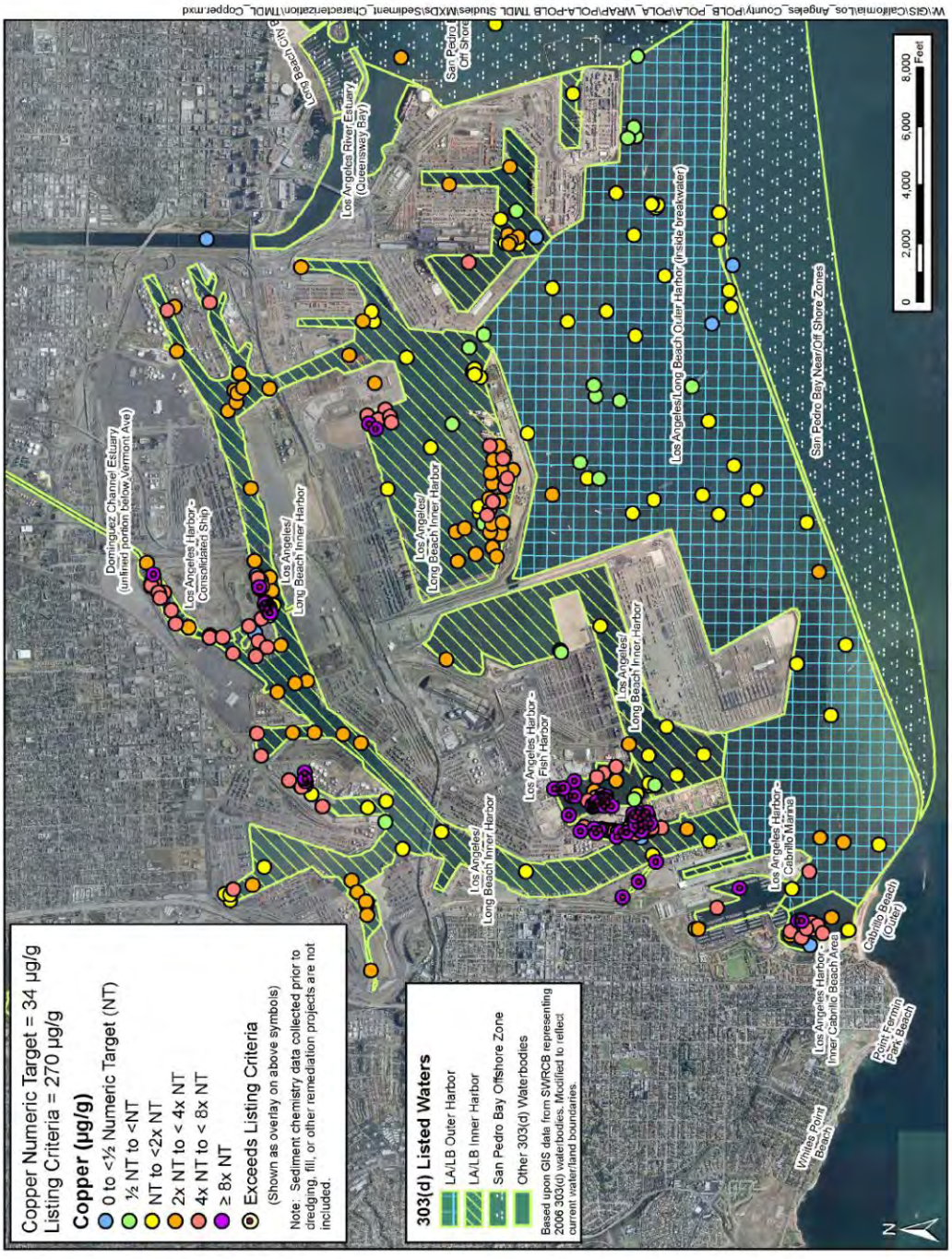

Figure 2-9. Los Angeles/Long Beach Harbors surface sediment site specific and monitoring data compared to relevant TMDL criteria

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Comparing the first and second sets of maps shows that contamination is predominantly concentrated in several hotspots. In many cases, it is these hotspots that are driving the TMDL development and will be key to future TMDL implementation strategies.

In order to understand what conditions are likely to be once localized areas of concern are addressed, it is useful to examine data from randomized studies, omitting the site-specific data focused on hotspots. These data were collected using randomized study designs developed to characterize the harbors or waterbodies as a whole (Figure 2-10 shows the copper data; maps of other contaminants are presented in Appendix B). These data include:

- Randomized Studies: The 1998 and 2003 Bight Programs (SCCWRP, 2003, 2007), 2006 Port TMDL study (WESTON, 2007a), EPA"s WEMAP (1999), and EPA"s EMAP (2005).

The five randomized studies listed above provide good spatial coverage for characterizing existing general conditions. These data indicate that, aside from localized hot spots, overall chemical concentrations in sediments are generally below TMDL listing criteria.

Sediment Toxicity

As discussed in Section 2.4.3, assessments of contaminant-related impacts in marine environments often include chemical, toxicological, and biological evaluations in order to determine contaminant-related impacts. Sediment toxicity has been observed in Consolidated Slip, Los Angeles/Long Beach Inner and Outer Harbors, and Fish Harbor. Amphipod mortality, marine invertebrate developmental toxicity, and impaired dinoflagellate growth are effects that have been previously measured in sediment or interstitial water toxicity tests in association with elevated concentrations of sediment metals, or legacy contaminants collected from localized areas of Los Angeles/Long Beach Harbors.

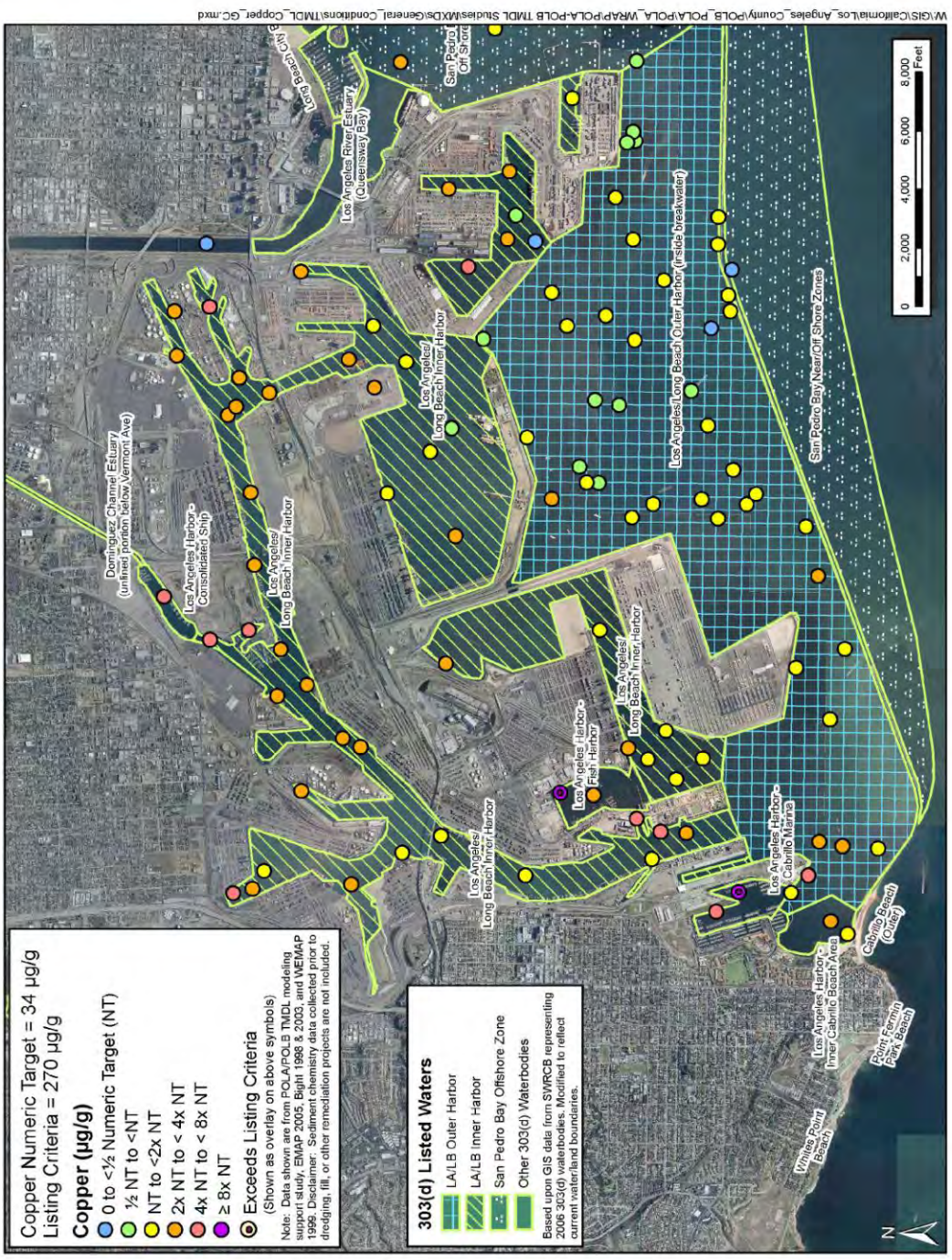

Figure 2-10. Los Angeles/Long Beach Harbors surface sediment monitoring data compared to relevant TMDL criteria

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Benthic Community Effects

Benthic community evaluations have found the benthic community in specific locations within the Los Angeles/Long Beach Harbors to exhibit adverse effects such as altered community structure (infauna population and species composition). Consolidated Slip and Inner Harbor are 303(d)-listed for degraded benthic communities. As with chemistry data, recent benthic assessments (e.g., MEC 2002, SAIC in prep.) indicate that the benthic community may not be as degraded throughout the harbor as previously thought. As with the sediment chemistry data, degraded impacted benthos appear to be largely confined to localized areas in back channels and along wharf faces, where the physical and chemical environment may be adversely affecting benthic communities.

Conclusion

Recent studies have shown that a number of localized areas of poor sediment quality and impaired benthic community still exist (e.g., Consolidated Slip, Long Beach West Basin, Fish Harbor, Inner Harbor slips). It is those hotspots that are driving the TMDL development and will be key to future TMDL implementation strategies. Examination of the randomized-sampling studies has shown that in most of the harbors, contaminant concentrations are below regulatory limits and supports the distinction between hotspots, which require focused efforts, and waterbody-wide issues that require regional approaches. The evaluation summarized in this section characterizes sediment quality harbor-wide and places hotspots in their limited spatial context. This approach allows resources to be focused on feasible solutions for hotspot remediation.

2.7 Tissue Chemistry in Los Angeles/Long Beach Harbor

2.7.1 Introduction

Once contaminants reach surface waters, they may concentrate through food webs and bioaccumulate in the tissues of organism. Bioaccumulation is the increase in concentration of a substance in an organism due to all uptake sources including air, water, sediments, and food. Top predators in aquatic/marine ecosystems can potentially bioaccumulate environmental contaminants in excess of one million times the concentrations detected in the water column (EPA, 1992). Consequently, fish tissue monitoring provides an important gauge of contaminants in the environment. Tissue monitoring also allows state/local agencies to detect levels of contaminants in fish that may be harmful to human consumers. If consumption of chemically tainted fish poses a human health risk, local advisories or bans for specific water bodies and particular species populations may be issued for the general population and/or sensitive subpopulations (e.g. pregnant women, nursing mothers, and children).

Fish consumption advisories for all waterbodies within the Los Angeles/Long Beach Harbors for DDT and PCBs have been issued and are supported by recent fish tissue results.

2.7.2 Sources of Tissue Contamination

DDTs and PCBs are the tissue contaminants of greatest concern in organisms inhabiting Los Angeles/Long Beach Harbors. DDTs and PCBs are very persistent in the environment, as a consequence of their insolubility in water and low degradation rates in the environment, and can be found in the tissues of aquatic organisms at concentrations a million times greater than the concentration in the surrounding water. Large quantities of DDTs, most of which emanated from Montrose Chemical Corporation (Torrance, CA), were historically discharged into coastal waters of Los Angeles through the sanitary sewer system ocean outfall off Palos Verdes and through storm drains into the Dominguez Channel. Since 1970, when the use of DDT was banned and Montrose halted production, discharges from the ocean outfalls have dramatically decreased.

As with DDTs, the commercial production of PCBs commenced in the early 20th century and continued until the1970s, when it was determined that PCBs were widely dispersed and could accumulate and cause detrimental effects in wildlife. As a consequence of the 1976 Toxic Substances Control Act (TSCA), PCB production was banned in the US and regulations concerning the presence of PCBs in the environment were promulgated.

These legacy contaminants are still observed at elevated concentrations in sediment, water, and biota throughout southern California coastal waters (SCCWRP 2008).

2.7.3 Current Conditions

Even the limited fish tissue data collected from each waterbody within the Los Angeles/Long Beach Harbors over the last 20 years have demonstrated DDT and PCBs concentrations that are elevated above Listing Policy screening values. Fish Harbor and Consolidated Slip are also listed for other chlorinated organic compounds in the tissues of fish collected in those areas. Because most fish are transient (i.e., traveling in and out of the harbor) it is not clear where their tissues uptake and retain they are exposed to the contaminants of concern. The complex nature of bioaccumulative processes only further complicates the identification of contaminant sources.

2.8 Port Programs Addressing Water and Sediment Quality

2.8.1 Water Quality Programs

The Ports have a number of programs underway to reduce water pollution in the harbors. Some of those programs implement permit requirements whereas others implement port initiatives undertaken to achieve the policies described in Section 1. The following descriptions summarize key elements of the major port water quality programs.

POLB Storm Water Program (NPDES): The Port of Long Beach Harbor District includes POLB facilities, tenant facilities, and privately owned facilities. Although POLB is not responsible for stormwater pollution coming from tenant facilities or privately owned facilities, it is responsible for managing stormwater quality discharged from its storm drain system, whether the discharge originates from a tenant facility or a privately owned facility. Since many tenants and privately owned facilities discharge pollutants into the POLB‟s storm drain system, POLB is particularly concerned with minimizing pollutant contact with stormwater throughout the Harbor District. Although the number of participants varies over time, in 2008 there were approximately 50 participants in POLB‟s Storm Water Program.

POLB initially developed its Storm Water Program in 1992 on behalf of itself and as a service to participating facilities (principally its tenants) to comply with the requirements of the NPDES General Permit for Stormwater Discharges Associated with Industrial Activities (Industrial Stormwater Permit). POLB has implemented and continually re-examined and refined its program, which is now called the Master Storm Water Program (POLB 2000). The Program now also includes the General Permit for Stormwater

Discharges Associated With Construction Activity (Construction Stormwater Permit) and elements of the City of Long Beach‟s municipal (MS4) permit, which the Port implements in the Harbor District through its Storm Water Management Plan. The number of construction permits varies from year to year, but is typically less than ten.

The Master Storm Water Program is organized to address activities and responsibilities, rather than specific permits. There are three basic elements to the program: controls and monitoring for industrial and commercial facilities; Port operating and maintenance activities; and planning and construction of new development and redevelopment projects.

Industrial and Commercial Facilities: This element of the Master Storm Water Program describes how POLB implements those elements of the Industrial and Municipal permits as they apply to the industrial and commercial facilities in the Harbor District. Under the program, POLB holds the GIASP for all port-owned land within the harbor district and supervises the compliance of participating facilities with the permit. The City of Long Beach holds the Municipal Permit and is responsible for its administration. POLB implements the provisions of the permit within the Harbor District, including monitoring and inspections, and submits compliance reports to the City Department of Public Works.

The bulk of this element applies to tenants, including cargo terminals, oil operations, tugboat companies, marine construction firms, and small commercial enterprises, but a few private property owners in the Harbor District have elected to participate in the program. Each participating facility is required to prepare and implement a SWPPP for the POLB‟s approval and to revise the SWPPP whenever there are significant changes in operation or configuration. Participants are also required to conduct employee training to standards established by POLB, to make periodic inspections of their facilities, and to keep the appropriate records. POLB is responsible for conducting the stormwater monitoring and sampling, conducting annual comprehensive site compliance evaluations of participating facilities, following up on the compliance evaluations, and preparing annual compliance reports for submittal to the LA-RWQCB.

Port Operations and Maintenance Activities**:** This element of the Master Storm Water Program describes how POLB implements specific elements of the GIASP, the Municipal permit, and the GCASP. Under the program, certain POLB divisions and bureaus, especially Environmental Planning, Maintenance, and Engineering, have various responsibilities for managing stormwater quality discharged from POLB‟s storm drain system, whether originating from POLB, tenant, or private facilities. Responsibilities include program administration, inspections and record-keeping, monitoring and

reporting, and interaction with the LA-RWQCB and the City (Environmental Planning), infrastructure design, plan review, and construction (Engineering), and infrastructure maintenance, including storm drain and stormwater pump station maintenance, street sweeping and trash collection, and building and grounds maintenance (Maintenance). All POLB divisions have responsibilities for employee training, progress evaluation, and recordkeeping. The program describes in detail the responsibilities of each entity, the procedures to be followed, the BMPs to be employed during field activities, and the lines of communication to ensure effective implementation and permit compliance.

Development Planning and Construction Activities**:** In 1999, POLB determined that the Master Storm Water Program should be expanded to address compliance with the GCASP and those elements of the City‟s Municipal Stormwater Permit dealing with construction and new development. This element of the Master Storm Water Program describes how that compliance is to be achieved. The element includes an overview of the City‟s stormwater management requirements, a description of POLB‟s planning, environmental documentation (CEQA), and permitting procedures for handling development and redevelopment projects, construction inspection procedures, and education, outreach, and training materials and procedures for construction stormwater management.

Under this element, POLB has developed stormwater management guidelines for reviewing projects with respect to the California Environmental Qualilty Act of 1970 (CEQA) and the City‟s MS4 permit. Those guidelines incorporate the specific requirements of the permit (POLB 2000, vol. 3). In addition, the Master Storm Water Program has incorporated the construction-related requirements of the GCASP and the MS4 permit, such as denying permits to projects that have not filed a Notice of Intent, requiring construction SWPPPs and source control BMPs, and conducting regular inspections of construction sites. Each project for which a Harbor Development Permit (POLB‟s Coastal Development and construction permit) is being considered is screened at the pre-application phase and during the permit review period to evaluate its consistency with POLB‟s GCASP and the City‟s Stormwater Management Plan. The screening process allows POLB to determine appropriate BMPs for a proposed development and to include them either through the pre-application consultation or as mitigation measures in the CEQA document, and to require preparation of a Standard Urban Stormwater Mitigation Plan (SUSMP) where appropriate. The BMPs are applied to both construction and operation of the development.

Construction activities on areas greater than 1 acre are covered under the GCASP, with basic requirements such as the elimination or reduction of non-stormwater discharges to

storm drain systems and receiving waters as well as the development of construction SWPPPs. Construction contractors are required to implement BMPs such as:

- General site management
- Construction materials and waste management
- Erosion control
- Sediment control

Construction projects are inspected by POLB Construction Inspectors, to ensure that BMPs are in place and the construction SWPPPs are updated and adequate. Information material is also available to POLB‟s clients through the Environmental Planning division.

Port of Long Beach Stormwater Infrastructure GIS System Update: Accurate stormwater drainage basin and infrastructure maps are necessary to allow characterization of pollutant loading in stormwater due to land uses. In addition, performing tasks such as responding to hazardous material spills, infrastructure maintenance, and installing stormwater sampling devices requires accurate and complete drawings.

POLB is updating its stormwater infrastructure data and compiling it into a new GIS system. Review and verification of existing data for areas that have not been recently developed, incorporation of "as-built" drawings for recently re-developed areas, and field verification efforts will be incorporated into a comprehensive model of stormwater infrastructure in the Harbor District that reflects current conditions. In addition, areas outside of the Harbor District that drain into San Pedro Bay will also be represented in the database. This effort will update information regarding the location of outfalls, stormwater treatment devices, catch basins, pump stations, manholes, and auto-sampling equipment as well as data regarding storm drain lines such as pipe sizes and locations, construction material, and flow direction. The effort will also update drainage basin and sub-drainage basin information. A system for periodic updating of the drawings will be implemented to incorporate re-development projects into the database. The data will be incorporated into POLB‟s GIS system and will be web-accessible to POLB staff through a central server.

Port of Long Beach Storm Water Pollution Prevention and Dust Control Program: Initiated early in 2005, this program targets undeveloped or vacant areas that require stabilization for soil erosion and dust control. POLB has implemented stormwater and fugitive dust control measures in undeveloped parcels of land throughout the harbor

totaling approximately 100 acres. The program is divided into two phases, short-term (temporary) measures and long-term measures. The temporary measures phase began in early 2005 and will continue until all of the permanent measures are in place. The BMPs applied as short-term measures include silt fences, sand bags, rock barriers, and sediment control rolls for controlling stormwater runoff. Under the long-term program, a combination of different types of sustainable measures including, but not limited to, hydroseeding, placement of crushed miscellaneous base, hardscape, and sustainable landscape are being developed and implemented. Additionally, different types of soil stabilization materials are used to stabilize the surface dirt layer as a temporary dust control measure.

POLA Stormwater Programs (NPDES): The City of Los Angeles Department of Public Works plays a large role in the MS4 permit structure that covers POLA and its tenants. The Department‟s Bureau of Sanitation Watershed Protection Division is ultimately responsible for administering the MS4 permit City-wide, including the Harbor District, with POLA providing additional oversight and assistance at the harbor; this arrangement affects how POLA administers its stormwater permit, as described below.

NPDES General Industrial Stormwater Permit (GIASP): POLA serves as the landlord, leasing property to a variety of industrial and commercial tenants. The tenants file and report directly with the LA-RWQCB for the GIASP. POLA believes that it is essential that the tenants be responsible for compliance with the requirements in the GIASP Permit as they are ultimately the operators of their facilities and have direct oversight of their facility‟s activities. Operators that fall under the GIASP are responsible for creating and implementing a SWPPP, conducting employee training, performing stormwater sampling and site monitoring, and submitting an annual report to the LA-RWQCB. Currently, there are approximately 40 industrial filers in POLA.

Although POLA is not directly involved in its tenants‟ GIASP permits, it does maintain an outreach and coordination effort with its tenants. This includes POLA providing stormwater outreach materials for the tenants, and for selected tenants, conducting site evaluations to assist them in understanding the GIASP requirements and identifying activities that require BMPs to prevent stormwater pollution. The basis for this effort is POLA‟s belief that increasing tenant awareness of the impact of their industrial activities on water quality in the harbor will be key to limiting pollutant discharges and keeping harbor waters clean. Additionally, many industrial and commercial POLA tenants are considered as “Critical Sources” as listed in the MS4 Permit, and these facilities with greater potential to pollute stormwater through their activities are audited regularly by the City‟s enforcement and inspection staff from the Watershed Protection Division (WPD).

NPDES MS4 Permit Program: As part of the City of Los Angeles, POLA actively participates in City‟s stormwater program compliance to implement the public agency activities requirements in the MS4 permit. The goal of the program is to reduce the discharge of pollutants to the City‟s storm drain system to the maximum extent practicable, through management practices, control techniques and systems, and designed engineering. Some specific examples implemented at POLA include: regular training of POLA maintenance staff on stormwater pollution prevention; scheduled stenciling, inspecting, and cleaning of all POLA-owned and operated storm drains; limiting yard materials with stormwater contact though the appropriate storage and management of material in POLA‟s maintenance yard; adhering to protocols in the application of pesticides/herbicides in landscaping; and eliminating maintenance vehicle wash water runoff in the maintenance yard by designating a wash area that is equipped with a clarifier to treat and capture wash water runoff.

In addition, POLA adheres to the City‟s Development Planning Program, as required under the MS4 Permit, by implementing the SUSMPs to various new POLA development and redevelopment projects. When appropriate and feasible, POLA projects are designed to incorporate any or a combination of BMPs as outlined in SUSMP, such as infiltration systems or stormwater capture and re-use units to reduce the quantity and improve the quality of rainfall runoff that leaves a site.

Construction General Stormwater NPDES Permit: Construction activities throughout POLA have the potential to affect harbor water quality adversely if the construction site is not appropriately managed for erosion, dust, and runoff. As part of the GCASP, POLA ensures that a Notice of Intent is filed (in cases of construction activities disturbing greater than 1 acre) in compliance with the State‟s Construction General Stormwater NPDES Permit requirements. The number of construction permits varies from year to year, but is typically less than ten.

POLA personnel also review site-specific construction SWPPPs, and inspect construction sites for the proper implementation of construction BMPs to control sediment erosion, dust and pollutant contaminated runoff. Construction contractors are required to implement BMPs such as:

- General site management
- Construction materials and waste management
- Erosion control
- Sediment control

POLA /WPD Inspections and Tenant Outreach: As part of the City of Los Angeles, POLA assists the WPD in the Critical Source Inspection component of the City‟s Stormwater Enforcement/Inspections Program, per the MS4 permit requirements. All tenant facilities that are considered Critical Sources, i.e., commercial and industrial facility with activities that have the greatest potential to discharge pollutants to the storm drain or harbor, are tracked and inspected to ensure compliance with the MS4-NPDES Permit requirements. Port facilities including, but not limited, to auto/boat repair, restaurants, gas stations, and many industrial facilities are expected to eliminate non-stormwater discharges prohibited in the MS4 permit, and limit contaminated stormwater runoff by implementing BMPs such as operational good housekeeping practices and structural changes to the facility.

POLA‟s Tenant Outreach Program assists tenant facilities to comply with their Industrial Stormwater General Permit requirements such as reducing polluted dry weather and stormwater runoff to the harbor. This is accomplished by providing stormwater outreach materials, training, and evaluating selected facilities to provide facility-specific recommendations on stormwater pollution prevention.

POLA Environmental Compliance Assessment (ECA): The ECA Program applies a partnering approach between the POLA and its tenants to evaluate the status of environmental compliance and conformity of POLA tenants‟ operations with applicable federal, state, and local environmental laws and regulations. The goals of the ECA Program are to achieve a Port-wide overall reduction in the risks and liabilities associated with environmental non-compliance and secondly, to allow POLA, through environmental compliance monitoring of its tenants, to attain continuous improvement of its overall environmental performance.

POLA Clean Marina and Responsible Marina Programs: POLA has developed the Clean Marinas Program (CMP) to help protect water and sediment quality in the harbor. The program advocates that marina operators and boaters use best management practices as alternative ways to perform some common boating activities that may cause pollution or contaminate the environment. It also includes several innovative clean water measures unique to POLA. The CMP features both voluntary components and measures required through leases, CEQA mitigation requirements, and established federal, state, and local regulations.

POLA has instituted the Responsible Marina Program – Vessel Disposal Program to help marinas and boaters dispose of derelict vessels that are in danger of sinking. All hazardous material on vessels is disposed of in accordance with applicable environmental

laws and vessels are demolished and materials recycled to the extent possible. By proactively removing derelict vessels, POLA prevents the release of hydrocarbons and other pollutants that can occur when a vessel sinks.

POLA Cabrillo Beach Water Quality Improvement Study: POLA is one of the few industrial ports in the world that also has a swimming beach. Inner Cabrillo Beach provides calm water for families with small children. However, the beach has a persistent bacteria problem limited to very close to the shoreline. POLA has taken an aggressive approach to investigate and remedy the problem, including scientific studies, water circulation models and pilot circulation devices, repairing and or replacing storm drains and sewer lines, replacing the sand on the beach, structural modifications, and installation of bird exclusion devices. POLA has continued to work with regulatory agencies in order to achieve compliance with the established TMDL for bacteria at Inner Cabrillo Beach and is committed to ensuring that Cabrillo Beach continues to be an important regional recreational asset.

Environmental Management Systems (EMS): Both Ports have instituted EMS programs, although the two programs are different. An EMS is a set of processes and practices that enable an organization to reduce environmental impacts and increase operational efficiency, and is structured along a "Plan-Do-Check-Act" model of continual improvement. It weaves environmental decision-making into the fabric of an organization's overall business practices, with a goal of systematically improving environmental performance.

Port of Los Angeles: In December 2003, POLA was selected by the EPA, American Association of Port Authorities (AAPA) and the Global Environment and Technology Foundation to participate in the Port Environmental Management System Assistance Project, and was the first California seaport to incorporate the program into its operations. Participating ports are selected on the basis of existing environmental programs, diverse maritime facilities and management resources. POLA has implemented the EMS within its Construction and Maintenance facilities, and has received ISO 14001 certification of the system. The EMS is used (1) to ensure that the operations, products and services are consistent with the environmental policy; (2) to minimize adverse environmental aspects and impacts; and (3) to ensure an ongoing commitment to regulatory compliance. Through the EMS POLA has established programs to reduce hazardous waste, improve housekeeping practices, and increase recycling, and is working on programs to obtain Leadership in Energy and Environmental Design-Existing Buildings Operation and Maintenance certification for the Construction & Maintenance administration building

and to establish a program that will minimize the use of treated wood pile. POLA intends to expand the EMS to additional functions over the course of the next several years.

Port of Long Beach: POLB is also participating in an EMS sponsored by AAPA and the Global Environment and Technology Foundation. POLB‟s EMS is being developed to ensure full implementation of the WRAP programs related to water and sediment quality. Additionally, POLB is sponsoring California United Terminals (CUT), one of POLB‟s terminal operators and a participating member in the industrial stormwater program, to participate in the EMS program. CUT will be developing an EMS to cover their stormwater program as well, offering POLB an opportunity to work alongside a tenant operator and look for ways to improve the current stormwater program.

Trash Collection/Street Sweeping Programs: Both Ports have active trash collection and street sweeping programs that reduce potential impacts to harbor waters from stormwater and dry weather runoff by minimizing the accumulation of trash in public areas and removing particles and associated pollutants.

POLA: As part of both municipal policy and NPDES MS4 permit compliance, POLA performs regular sweeping of POLA-controlled roads and parking lots, and the City of Los Angeles Public Works Department sweeps public roads and streets. POLA also performs daily trash collection activities throughout port-controlled areas of the Los Angeles Harbor District. Trash collection includes management of trash receptacles, and removal of trash on land and in water via two boats. POLA has ordered a third trash collection boat, equipped with trash collector arms and a conveyor, to increase the efficiency of collection of water-borne trash. In addition, the City‟s Bureau of Sanitation-WPD has evaluated structural trash control devices for catchment basins and implemented pilot programs to measure the effectiveness of the most promising ones (inserts and screen covers); POLA is using this information to implement a pilot program at its Construction and Maintenance yard.

POLB: POLB has traditionally addressed the control of litter through its Master Storm Water Program. Under the Master Storm Water Program, port tenants are required to implement BMPs at their facilities to control litter; POLB‟s Maintenance division conducts routine street sweeping (all public roads are swept at least once per week), public parking lot sweeping, and catch basin clean outs; construction projects are required to manage wastes and trash appropriately; and new facilities are being designed with stormwater treatment devices that help prevent litter from being discharged into the harbor.

Recognizing that litter in Long Beach Harbor remains an issue, in 2008 POLB initiated a litter control program that will expand upon the existing program described above and initiate new litter control initiatives including but not limited to: a public awareness campaign, installation of litter bins in key locations, and installation of litter control devices on key catch basins.

Sustainability Programs: Enhanced sustainability can reduce water and sediment pollution by reducing of waste and the over-application of substances. Both ports have embarked on sustainability efforts, POLA as part of its port-wide Environmental Management Program and POLB as part of its Green Port Program.

POLA Sustainability Management Plan: In conjunction with a City-wide effort, POLA is developing a sustainability program which will reach across all disciplines. Sustainable dredging will be considered in the Sediment Management Plan to help determine reuse and disposal alternatives for dredged materials.

POLB Green Port Sustainability Initiative: The goal of the sustainability element of the Green Port program is to implement sustainable practices in design, construction, operations, and administrative practices throughout POLB by developing policies and procedures that promote long-term ecological health, economic vitality, and community integrity. POLB has established a Sustainability Task Force that has guided its efforts such as a demonstration garden that is testing various sustainable landscaping concepts, an EMS in the Engineering Division, and recycling and low-waste programs in the maintenance and administration areas.

Dominguez Watershed Advisory Council (DWAC): The DWAC, a stakeholder group chaired by the Los Angeles County Department of Public Works, discusses water quality-related issues in the watershed that drains into the harbor, an area of approximately 110 sq mi that stretches from the harbor northward to Inglewood. The DWAC includes members of the public, regulatory agencies, industry, and representatives from the cities in the watershed. The two Ports have been active participants on the committee since its inception in 2000. The committee drafted the Dominguez Watershed Management Master Plan, which describes the watershed and recommends projects to improve water and sediment quality and to conserve water. Stakeholders meet on a quarterly basis to address current issues.

Bight-Wide Surveys: Both Ports participate in periodic surveys of the San Pedro Bay Bight (the coastal waters from approximately White‟s Point on the Palos Verdes Peninsula to Newport Beach) coordinated by the Southern California Coastal Water Research Project (SCCWRP) as part of ongoing studies of the Southern California Bight

(Point Concepcion to the Mexican border). The periodic program (Bight '08 is the fourth major survey since 1990) studies many measures of ecosystem health in southern California bays, estuaries, river mouths, wetlands, and offshore environments, including water and sediment quality. A major focus of the program is defining watershed inputs to coastal waters, particularly during storm events. The Ports are participating by contributing resources toward the assessment of sediment conditions (toxicity, chemical analysis, and animals), and POLA supported a study of the special rocky reef environment on rip rap slopes in the Outer Harbor and along the breakwater

San Pedro Bay Ports Clean Air Action Plan (CAAP): This joint plan describes the measures that the Ports will take toward reducing air emissions related to port operations. The focus of the plan is on five source categories: ocean-going vessels, harbor craft, cargo handling equipment, heavy duty vehicles, and rail locomotives. One of the plan components is air quality monitoring at several stations in the harbor area. This monitoring network may contribute information related to aerial deposition, and the projected emissions reductions from CAAP programs will reduce contaminants that contribute to aerial deposition.

2.8.2 Current Sediment Programs

Sediment cleanup in Los Angeles/Long Beach Harbor is accomplished in two basic ways; dredging programs that have removed millions of cubic yards of contaminated sediments, and focused sediment remediation programs that have removed many hundreds of thousands of cubic yards. The Ports conduct dredging in the course of modernization, in order to construct or upgrade wharves and deepen waterways to accommodate larger vessels, and conduct periodic maintenance dredging to restore necessary design depth at berths and in channels. In both cases, sediments in the dredging area are tested prior to dredging to determine appropriate disposal options, then removed, and disposed of in accordance with regulations.

In several cases, the Ports have teamed with federal and state regulatory agencies, and in some cases tenants on adjacent lands, to address specific sediment contamination issues in the harbor complex. These projects are typically prompted by hazardous waste laws such as the Resource Conservation and Recovery Act (RCRA), and directed by EPA, the California Department of Toxic Substances Control (DTSC), and/or the LA-RWQCB, but the Ports also conduct independent remediation projects.

Contaminated Sediment Task Force: The Contaminated Sediments Task Force (CSTF) was formed to create a long-term strategy for managing contaminated sediments within the Los Angeles region, as authorized by California Senate Bill (SB) 673 (Water Code

Sections 13396.9(a), (b)). The CSTF includes the Coastal Commission, the LA-RWQCB, the EPA, the Corps, federal and state resource agencies, the City of Long Beach, Los Angeles County Department of Beaches and Harbors, the two Ports, and Heal the Bay. The CSTF was designed to provide a forum for discussion and a process whereby dredging proponents, state and federal regulators, and representatives of environmental organizations work together to minimize potential adverse environmental impacts associated with the dredging and disposal of contaminated sediments.

The CSTF developed the CSTF Long-Term Management Strategy, which recommends regional coordination of sediment management efforts, lays out a process for evaluating contaminated sediment dredging projects, recommends BMPs for dredging and handling contaminated sediments, establishes a long-term goal of beneficially reusing all contaminated sediments, and commits to continue working on future treatment and reuse issues. The CSTF Strategy seeks to ensure protection of aquatic resources from the discharge of contaminated dredged materials, as well as to provide the dredging community with greater certainty and predictability about the results and the decision-making process. The CSTF Strategy is the guidance document for port planning related to dredged sediment management.

Harbor-wide Characterization Studies: As discussed in Section 2.6, the Ports are currently compiling a sediment quality inventory of the harbor complex. Both Ports recently undertook studies to characterize sediments throughout their harbors, including in areas not previously sampled. Summaries of those programs are included in Section 2.6 and Appendix B. In addition to conducting sediment characterization for dredging projects, the Ports also conduct sediment sampling in conjunction with lease renewals, where there is evidence of adjacent landside soil and/or groundwater contamination, and in response to agency requests. These sediment data will be included in the sediment quality inventory, which will be part of the Ports‟ respective Sediment Management Policy/Guidance (see Section 4.4).

Removal and Capping Projects: Two examples of sediment remediation projects that are not part of port modernization programs are POLA Berths 49-51 and Long Beach IR Site 7. In the Berths 49-51 project, POLA tested sediments over a wide area in order to define the extent of copper contamination from a former copper ore loading facility, and worked with the CSTF and non-governmental organizations (NGOs) to identify remedial options. POLA subsequently implemented a sediment removal project at the site in conjunction with the ongoing POLA Main Channel Deepening project, sequestering the material in a Confined Disposal Facility (CDF) in Southwest Slip.

IR Site 7 is the designation for an area of Navy-contaminated sediments in POLB‟s West Basin. POLB has been working with the DTSC to identify and implement removal and capping options for those sediments, and will accomplish the remediation in 2009-2010. Over the past several years POLA has been in discussion with the EPA, the LA-RWQCB, and other agencies regarding cleanup of contaminated sediments in Consolidated Slip; however, this area is part of a superfund site and there are numerous responsible parties involved. No formal remediation plan has been developed or committed to at this point.

SECTION 3: GOALS AND IMPLEMENTATION STRATEGY

Although many of the control measures described in Section 4 of this WRAP respond to existing regulations, some go beyond regulatory requirements. In both cases, the Ports must take specific steps to implement those measures. The Ports have available to them several types of implementation strategies, as described below. These include specific water-resource-related projects and initiatives undertaken by the Ports; incentive programs to encourage and support tenant actions; requirements that the Ports, as landlords and harbor administrators, are able to impose on users of harbor facilities; and the promotion and incorporation of new technology into existing and future control measures. The Ports intend to apply all of these strategies, in various combinations, to the control measures described in this plan in order to meet the Ports' goals.

Because the two Ports are separate entities, each subject to its own political and organizational regimes, implementation of some elements of the WRAP may differ between the two Ports. One example is the fact that each Port has its own philosophy and practices regarding tenant relations and resource allocation. As a result, one Port may elect to emphasize tenant incentives to implement a given measure whereas the other may rely on its own initiatives. Despite these differences in implementation strategy, the Ports share common goals for the WRAP and are committed to working cooperatively to achieve those goals.

3.1 Goals

As stated in Section 1.1, the Ports' goals for the WRAP are 1) to support the attainment of full beneficial uses of harbor waters and sediments by addressing the impacts of past, present, and future port operations, and 2) to prevent port operations from degrading existing water and sediment quality.

These broad goals are supplemented by more specific goals that guide the development of control measures and implementation mechanisms. Within the harbor districts, the Ports intend to protect and improve water and sediment quality through coordinated management of stormwater conveyance system discharges and the land use practices that those conveyances support. With respect to participating in watershed management efforts, the Ports' goals are 1) to increase awareness of watershed management and stormwater conveyance system pollution prevention programs both within and outside the harbors; 2) to continue and augment participation in watershed management efforts that relate directly to harbor waters and sediments; and 3) to support the development of

scientifically-based TMDLs for the Dominguez Channel and Los Angeles/Long Beach Harbor through active participation in the stakeholder group.

3.2 Implementation Mechanisms

The Ports have identified a variety of mechanisms for implementing the control measures that emerge from the WRAP process. Some of the mechanisms overlap; for example, incentive programs could be incorporated into a lease as part of the lease negotiations. For each mechanism, the WRAP will establish monitoring procedures to ensure that the effectiveness of the various control measures can be documented and reported.

These mechanisms will be employed in a two-tiered process. The first step is to enhance and/or establish the programs described in the control measures through port initiatives and projects, with the goal of having the necessary programs in place that will enable the Ports to achieve TMDL limits and goals once those are developed. The second step will be to evaluate the TMDLs and permit requirements as they become available and identify the appropriate implementation mechanisms that will be needed for each control measure.

3.2.1 Port Initiatives and Projects

Port initiatives and projects are those actions undertaken by the Ports using their own resources (staff, funds, contractors). Reasons for undertaking such actions include:

- avoiding imposing additional fees or burdensome requirements on port tenants and other users
- furthering specific port priorities
- evaluating new technologies and potential alternative operational procedures
- supporting regulatory compliance efforts.

Initiatives and projects are an effective approach to implementing control measures that do not require the active participation of tenants or other governmental agencies, although some do include voluntary participation or cooperation. They have been widely used in the Ports‟ air quality programs – for example, the operation of a network of air quality reporting stations in the port area, the POLB Diesel Emissions Reduction Program of a few years ago, and the efforts by both ports to institute shoreside power for cargo vessels (Alternative Maritime Power [AMP] and cold-ironing) – and should be equally effective in efforts to manage water and sediment quality. Examples of port initiatives related to the WRAP that are already in place include POLA‟s and POLB‟s

EMS (see Section 2.7), POLB‟s Pier G street sweeping program (which includes voluntary participation by tenants), and the recent joint port project to characterize sediment quality throughout the harbors.

Port initiatives cannot be the only approach, however, as they do not cover every situation. The need to ensure that some control measures are applied evenly, fairly, and consistently means that port initiatives must be supplemented by mechanisms that require implementation by port users. Furthermore, port initiatives, being paid for largely out of port funds, do not distribute the financial burden of regulatory compliance among the entities subject to those regulations. Finally, some port initiatives may need to be supplemented by incentive programs in order to reduce their financial impact on port users (see Section 3.2.4).

3.2.2 Port Tariffs

As described in Section 2.1.3, each of the Ports has its own tariff that it could employ to allow more uniform application of port requirements on its customers and other users. However, all potential tariff changes need to go through legal evaluation prior to being enacted, and application of the tariff approach to implementation can only be used in selected instances. As ordinances, tariff changes must be developed following specific procedures. Accordingly, tariffs will generally not be used as an implementation strategy in the initial stages of control measure implementation. A potential scenario for this strategy could be a tariff item that adopts a water quality protection program (specifying, for example, allowable on-water vessel maintenance activities).

3.2.3 Lease Requirements

This implementation strategy offers the opportunity for control measures to be negotiated and required in a terminal‟s lease that would reduce discharges, increase performance on voluntary or incentive-based measures, or require customers to implement specific water pollution control measures. This opportunity exists for renegotiated, amended, and new leases. Renegotiations and amendments to a lease could be triggered, for example, by a terminal improvement that requires an Environmental Impact Report (EIR) in accordance with CEQA.

One benefit of the lease strategy is that placing a requirement in a lease provides a legally binding mechanism for ensuring that the desired action is achieved and provides remedies for noncompliance (because noncompliance would constitute a breach of the lease terms). Another benefit is that, since leases are negotiated on a terminal-by-terminal basis, the mix of requirements can be tailored to terminal-specific considerations. For example,

break bulk terminals might be more in need of sweeping BMPs than a container terminal, so a break bulk terminal‟s lease may contain a specific requirement to that end. In addition, new pollution reduction technologies may emerge over time that could be incorporated into leases. A limitation of this strategy is that all leases have different renewal dates and terms. Most leases are issued for long periods -- e.g., 20 to 30 years -- so that implementation through leases must be phased over time as leases come due or are renegotiated.

3.2.4 Port Incentives

Incentive-based measures provide a business incentive for the participant to reduce discharges beyond what is currently required by regulation or lease requirements. Incentive funding is targeted at "buying" pollution reductions ahead of regulation milestones or lease renewals. Incentive funding can come from several sources, including port revenues, local and state regulatory programs, federal agency programs and grants, or an additional impact fee that generates money to be used as an incentive to pollution reduction. An incentive-based approach makes the adoption of the various strategies cost-neutral for the participant, or provides just enough incentive for a participant to enter the program. The advantages of this strategy are that it can accelerate implementation of control measures that will become lease requirements or proposed regulations, and it avoids issues of regulatory authority. The disadvantage is that there is not adequate funding to support all measures, either in the Ports‟ operating budgets or in regional, state, or federal grant programs.

Examples of successfully implemented incentive-based programs at the Ports include several air-quality-related programs, including shore power (e.g., AMP/cold-ironing), yard tractor diesel oxidation catalyst (DOC) retrofits, harbor craft engine repowers, and the Gateway Cities Truck Modernization Program.

SECTION 4: PROGRAMS AND INITIATIVES

This section describes the framework within which the WRAP has been developed, the assumptions driving that development, and the control measures that the Ports will use to fulfill their water resources mission. Throughout the process, the Ports will be guided by the basic principle of promoting science-based studies and methods in the integration of regulatory requirements with water and sediment management programs. POLB intends to manage the WRAP through its newly-developed EMS (see Section 2.7). Although POLA does not intend to establish a formal EMS program for the WRAP itself, POLA will establish a comprehensive, consistent process for development, implementation, and monitoring of each control measure.

4.1 Introduction

4.1.1 WRAP Framework

One of the driving forces in the formulation of the WRAP is the imminent promulgation of TMDLs for harbor waters. As summarized in Section 2.1.1, TMDLs will define waste load allocations for each pollutant for which an impairment has been established, so that, over time, the water body can recover and its beneficial uses can be preserved or restored. The TMDLs will identify waste load allocations for the various sources that discharge to the water body.

The TMDLs for Los Angeles/Long Beach Harbor are being produced and adopted by the LA-RWQCB with the assistance of the EPA, which will ultimately approve them. Key issues in TMDL development include a reasonably accurate inventory of pollutant discharges to the water body, a good understanding of the fate and transport of those pollutants, and a reasonable allocation, among the various sources, of the total load that the water body can sustain. The lack of any one of those elements will lead to a TMDL that does not achieve water quality standards and/or places an undue burden on certain sources (e.g., cities and industries currently subject to the NPDES permit program).

The allocations established by the TMDL process will be translated into discharge limits that will be incorporated into the NPDES discharge permits that the LA-RWQCB issues periodically to the municipalities and industries under its jurisdiction. The permits will include monitoring requirements that will allow the agencies to determine whether or not pollutant reductions consistent with the waste load allocations are being achieved. Each permittee must develop and implement a strategy for complying with its permit(s); the WRAP is intended to provide the framework and mechanisms for the Ports to achieve the goals and targets that will be established in the relevant TMDLs and to comply with the

Industrial Activities, Construction Activities, and MS4 permits issued to the Ports, their tenants, and their respective cities. The LA-RWQCB and the EPA have the responsibility to promulgate applicable TMDLs and to incorporate those TMDLs into permits in a clear, enforceable, and implementable manner. Those TMDLs and permits will need to be in place for this WRAP to be effective.

It is important to note that, at this point, there are no numeric effluent limits for most of the sources that the WRAP addresses, nor is there an accurate pollutant inventory for the discharges from those sources. These are sources for which discharge limits have not been established (e.g., stormwater runoff), or mobile, small-scale sources that have not been included in NPDES permits (e.g., recreational vessels). Furthermore, with the exception of the POLA Main Channel/Cabrillo Beach Bacteria TMDL, no TMDL load allocations have been developed for the Harbor. Finally, fate and transport in the Los Angeles/Long Beach Harbor and Dominguez Channel have not yet been fully described.

Accordingly, the WRAP is being developed without numerical goals for pollution reduction; instead, it establishes the framework and mechanisms by which the Ports will achieve the goals and targets that the EPA and the LA-RWQCB will set out in the TMDLs and associated permits. Once TMDLs have been established and translated into NPDES permits, the Ports expect to be able to focus the WRAP on compliance with those permits. In the meantime, the WRAP is focused on improving harbor water and sediment quality through the implementation of the control measures described in the following sections. Those control measures have been formulated under the assumption that the Ports and their cities will soon receive new industrial and municipal permits that will be substantially modified from those now in force.

The metrics for the control measures in this WRAP focus on development and/or enhancement, and implementation of water quality programs. A typical metric is the development of a program to address a particular control measure, and monitoring would track the progress of development to the end point of confirming that the program has been implemented. Once numeric pollutant limits have been established, performance-based metrics that track pollutant reductions – i.e., the effectiveness of the control measure -- can be established.

4.1.2 Structure of Future Port and City NPDES Permits

This WRAP has been prepared in the context of three basic factors concerning the current permitting situation of the two Ports. First, the Ports have no legal authority to enforce NPDES permits; that enforcement authority rests with the cities and the LA-RWQCB. Second, the Ports and their cities have different approaches to complying with the various

stormwater permits, as described in Section 2.7. Third, a number of those permits are actually expired or under major revision, meaning that the WRAP must make some assumptions about future permit structure. Specifically, the Los Angeles County MS4 permit (which includes the City and POLA), the POLB"s GIASP, and the City of Long Beach"s MS4 permit have expired. In addition, the LA-RWQCB is in the process of a major revision of the GCASP that covers construction-related stormwater management in the two Ports. Accordingly, the Ports and their respective cites will apply for and receive new industrial, municipal, and construction permits that will cover stormwater management in the Ports and their cities; that process is expected to occur during 2010.

The Ports and their respective cities will work with the LA-RWQCB to obtain new permits, which would be either different in structure from the existing permits or generally similar in structure to the existing permits but containing new or modified permit requirements. They will not, however, necessarily comply with the permits in the same way; it will be up to each port to develop the program or programs that would actually implement the permits. For example, POLB might elect to modify its Master Storm Water Program, in which the Port is responsible for all elements of permit compliance within its harbor district, whereas POLA and the City of Los Angeles will continue to divide responsibility. The two Ports will incorporate the control measures in this WRAP into their respective compliance programs, working with their cities and the LA-RWQCB as necessary.

Municipal Element: The Ports will be required to continue to maintain permit coverage under their respective city"s Municipal (MS4) Permit, but each MS4 permit may contain a port-specific section that covers those aspects of the Port environment that past MS4 permits have not explicitly acknowledged. For example, container terminals are not currently listed as a "critical source" under the County of Los Angeles MS4 permit and therefore no inspections of these facilities are currently required under that permit. The new permit may expand the "critical source" definition such that terminal facilities, and possibly other Port uses, will be covered. POLA expects that under the new permit POLA will retain its current relationship with the City WPD, which is primarily responsible for municipal permit compliance. The City WPD"s responsibilities under the municipal permit would then continue to include inspections of the POLA"s critical source facilities and enforcement actions as necessary.

When the City of Long Beach"s MS4 Permit is reissued, POLB will update and implement its Stormwater Management Programs in accordance with new permit requirements. Although the LA-RWQCB will continue to be ultimately responsible for

enforcement, the city may be designated as the responsible entity for enforcement of the Municipal (and Industrial) permit in the port area through the MS4 permit.

This approach of city enforcement authority over port tenants has a number of advantages, some of which have already been recognized in POLA"s current permit structure:

- It would promote collaboration between each port and its city.
- Maintaining coverage of the port area under the cities" MS4 permits would facilitate a watershed-based approach to stormwater management, given that the Ports are part of the watersheds.
- It would represent an efficient and cost-effective use of increasingly scarce port and city resources, as it would reduce the redundancy of inspections.
- It would avoid conflict of interest between the port"s landlord/permittee role and an enforcement agency role, resulting in a more cooperative partnership between the Ports and their tenants.

Industrial Element: The Ports will work with the LA-RWQCB to obtain new permits that retain the key elements of their existing permit structures. However, specific requirements of the permits would be strengthened to reflect the LA-RWQCB"s potentially revised approach to industrial stormwater management following EPA audits of port facilities in May 2007. Accordingly, the Ports will have fundamentally different structures for their Industrial coverage.

Long Beach: The POLB will likely obtain coverage under a separate industrial permit, with its tenants and other participants covered as co-permittees. This separate industrial permit will be crafted to identify roles and responsibilities and to maintain the beneficial elements of the current POLB Master Storm Water Program (e.g., comprehensive monitoring and reporting program, single point of contact, consistent record-keeping).

The POLB would be responsible for the following permit requirements:

- All reporting to the LA-RWQCB
- Paying the permit fee
- Inspecting all facilities covered by the permit annually before the wet-weather season

- Managing the harbor-wide monitoring programs
- Performing monthly visual observations at all storm drain outfalls
- Assisting tenant facilities with SWPPP development.

Co-permittee (tenant) facilities covered under the permit would be responsible for:

- Developing and implementing a facility SWPPP based on the current POLB template
- Conducting employee stormwater pollution prevention training
- Conducting monthly wet season and quarterly dry season visual observations
- Performing an annual facility self evaluation
- Updating and re-certifying the SWPPP annually.

The enforcement provisions of the permit will specify that permitted entities could be cited for deficiencies in their responsibilities but not for deficiencies in other co-permittee responsibilities. For example, tenants would not be cited for the Port"s failure to submit annual reports on time, nor would the Port be cited for an illegal discharge by a tenant. The POLB"s harbor-wide monitoring program will feature a watershed approach and be focused on obtaining loading data to assist in complying with TMDL regulations.

A co-permittee structure will have a number of advantages over the current situation in which the POLB"s tenants have little involvement with the enforcement agency:

- Clearly identifying individual roles and responsibilities for both tenants and the principal permittee (the POLB) will put more responsibility for industrial compliance on the tenants and clarify liability for identified deficiencies.
- A co-permittee structure will promote collaboration among tenants and with the POLB.
- It will maintain a watershed-based approach to compliance.
- Protection of water quality will be enhanced through joint responsibilities and a collaborative program. The ability to work together with explicit responsibilities will facilitate the achievement of water quality goals

- Performance tracking will be more effective than it would be with individual permits and individual reporting requirements, as the POLB experience has already shown.

- The co-permittee structure will allow a more efficient and cost-effective use of resources.

- Redundancy in program development will be minimized: for example, the POLB could develop the program requirements and require the tenants to adopt the program elements, thus standardizing program implementation.

- Uniform monitoring and reporting on a port-wide basis will ensure that all the information about the discharges is reported and assessed in one place and that the data are consistent from site to site and with other permit monitoring programs.

Los Angeles: At this time, the POLA expects to retain its existing permit structure under which tenant facilities are required to obtain individual facility coverage under the GIASP, as applicable, and the POLA will continue to be covered under the City‟s MS4 permit for only its own activities (see Sections 2.1.1 and 2.4.2). The City‟s WPD would continue its inspection and enforcement functions under the industrial component of the Municipal permit (see above), but the critical source categories would be expanded to encompass additional key port land uses that are not covered under the current MS4 permit. The POLA will modify its tariff to include specific requirements related to tenant permit coverage, including providing evidence to the POLA that they are performing all activities required by the GIASP permit, and submittal of reports and data to the POLA as requested.

Individual tenant facilities covered under the permit would be responsible for fulfilling all the requirements of the GIASP, including:

- Preparing and submitting all required reports to the LA-RWQCB

- Paying the permit fee

- Performing monthly visual observations at all storm drain outfalls

- Developing and implementing facility SWPPPs

- Conducting employee stormwater pollution prevention training

- Conducting monthly wet season and quarterly dry season visual observations

- Performing an annual facility self evaluation
- Updating and re-certifying facility SWPPPs.

Tenants will also submit copies of reports to the Port as requested.

POLA will expand its current tenant outreach program to include additional assistance to tenants related to SWPPP preparation, monitoring, and other permit compliance activities. In addition, POLA will develop and take the lead on managing a harbor-wide monitoring program. A port-wide, uniform monitoring program will result in more efficient and meaningful water quality evaluation. POLA‟s harbor-wide monitoring program will also feature a watershed approach and be focused on obtaining loading data to assist in complying with TMDL regulations.

These modifications to POLA‟s current permit compliance approach will have advantages over the current practices at the Port by:

- Increasing the POLA‟s involvement in, and assistance with, its tenants‟ compliance issues by requiring tenants to be accountable through the tariff language, which in turn would result in enhanced performance tracking by the POLA
- Encompassing more POLA tenants within the City‟s MS4 permit coverage and oversight
- Increasing tenant outreach activities to promote better collaboration between the POLA and its tenants, and promoting consistency in SWPPP development/ permit compliance strategies
- Instituting uniform monitoring and reporting on a port-wide basis, which will ensure that all the information about discharges is reported and assessed in one place and that the data are consistent from site to site and with other permit monitoring programs
- Requiring minimal changes from the current permit, thus simplifying its administration.

Construction Element: Each port will work with the LA-RWQCB to obtain an individual construction permit covering all port-sponsored construction projects within its jurisdiction. The individual construction permits will be crafted to provide a systematic, streamlined approach to port construction projects. The permit will require each port to

develop a single, comprehensive umbrella SWPPP covering all port construction projects, with project-specific information and BMPs incorporated as necessary on an individual project basis. The standard SWPPP template will ensure consistency between port construction projects, while the project-specific SWPPP language will contain needed site-specific information and describe the required actions for that project.

The single-permit model will have a number of distinct advantages over the current structure:

- It will promote a systematic approach to addressing construction impacts and attaining water quality goals throughout the Ports.
- Tracking performance will be more effective than with individual permits and individual reporting requirements.
- Consolidating the administrative, monitoring, and reporting obligations required for individual projects under one permit will reduce administrative burdens, increase efficiency, and be more cost effective.
- Port-wide, uniform monitoring and reporting will ensure that all the information about the discharges is centrally reported and consistent both within the construction permit and with industrial monitoring requirements.

4.1.3 Sources and Control Measures

The new permits described above will be implemented through existing and new programs at the two Ports and their respective cities. The existing programs include the various control measure elements that are part of the existing municipal, industrial, and construction stormwater permits, the Ports‟ normal operational controls (e.g., infrastructure maintenance, tariff and lease requirements), and the special programs the Ports have already instituted. The following sections describe new controls that the Ports have identified as necessary to respond to the new permits and TMDL requirements, and to perceived deficiencies in existing measures and programs. An important element of the WRAP is the incorporation of metrics by which the Ports‟ progress in implementing the control measures is measured. The metrics in this WRAP are mostly whether or not the Ports have taken the actions set forth in the measures. Pollutant reductions will be measured quantitatively in future WRAP updates in the context of limits set by TMDLs.

Water and sediment quality control measures must be developed in the context of the pathways, or conveyances, by which water pollutants reach the harbor (see Section 2),

and must focus on the major conveyances for pollutants of concern. Control measures are typically developed to address sources, rather than specific pollutants, since a given measure is likely to be effective for more than one pollutant.

Four basic types of sources are addressed by the WRAP through existing and proposed programs.

- **Land Use Discharges:** These are discharges from the various land uses in the harbors, including industrial uses such as cargo and passenger terminals, port-related industrial facilities, roads and rail lines, related activities such as equipment maintenance, and non-industrial uses such as shops and restaurants, fishing piers, beaches, and marinas.

- **On-Water Discharges:** Vessels discharge fishing wastes, trash, and cooling water, and may, despite laws to the contrary, discharge bilge water, black water, and gray water. Leaching from bottom paint and corrosion also releases contaminants from vessels. Leaks and spills from on-water vessel fueling activities also occur.

- **Sediments:** Whether resuspended into the water column or in place on the bottom, sediments are a repository and a potential source of contaminants into the water.

- **Watershed Discharges:** Watershed discharges originate outside the harbors (and beyond the jurisdiction of the Ports), and are conveyed into the harbors by larger inputs, such as the Dominguez Channel and the Los Angeles River, and by storm drains that drain areas outside the harbors and discharge into the harbors.

In each of these source categories, any of the four conveyances described in Section 2 (landside runoff, aerial deposition, direct discharge, and regional influences) may be at work. The various activities in each of these sources that could generate pollutants are discussed in the following sections.

The objective of the WRAP is to identify the extent to which the current programs may have room for improvement with respect to any of these sources and to establish measures that will remedy the deficiencies. Control measures consist of both improvements on existing control measures (see Section 2.8) and the addition of new measures. Control measures for these sources that could be implemented by the Ports fall into three broad categories:

- **Housekeeping Practices** (e.g., street sweeping, inspections, waste minimization procedures, waste collection points)

- **Structural Controls** (e.g., storm drain inserts, containment berms, slot drains, clarifiers, wind screens, covers, trash cans)

- **Outreach/Education** (e.g., guidance manuals/policies, training programs, storm drain stenciling, signage, public service messages)

The non-structural categories essentially consist of operational controls, most of which target activities rather than specific conveyances or pollutants. Some of these operational controls are proactive, in the sense that they are aimed at preventing pollutants from being generated, or at least from entering the environment. The structural controls and some of the operational controls (e.g., street sweeping and trash collection) tend to be reactive, in the sense that they are aimed at managing pollutants that have already been generated and could enter (or have already entered) harbor waters.

4.2 Land Use Discharges

4.2.1 Sources and Activities

Port land uses include a variety of cargo terminals, two cruise terminals, roads, rail lines, port-related uses such as warehouses, ancillary uses (e.g., support facilities, maintenance and service companies, commercial fishing), light industrial operations, visitor-serving facilities (e.g., restaurants, commercial establishments, fishing piers, beaches, boat ramps, marinas), and port administration facilities.

Many of these uses have in common certain types of activities that generate similar pollutants. As an example, many uses include maintenance facilities that conduct vehicle and equipment maintenance and vehicle fueling activities, regardless of whether those uses are cargo terminals, oilfield facilities, warehouse operations, or port administration facilities. These types of activities are called "Port-Wide Sources". Other potential sources are limited to certain types of uses; for example, cargo-handling areas are a potential source limited to marine terminals and restaurants are limited to the visitor-serving land use. These form the categories of "Other Non-Public Facilities" and "Visitor-Serving Sources." The Ports have identified nine of those potential sources (Table 4-1) as being of concern, and have focused the WRAP on addressing discharges from those sources. This list does not, of course, include all possible landside sources of pollution to the harbors, but rather those that represent significant potential threats to harbor water quality.

Although the sources and activities vary, most discharge a common suite of pollutants (Table 4-1): metals, organics, total suspended solids (TSS), and trash. Additional pollutants that the Ports have identified as being of concern include pesticides and herbicides from landscaping and nutrients and pathogens (bacteria) from certain other activities.

4.2.2 Control Measures for Land Use Sources

Landside sources are currently addressed through the various stormwater management programs and other pollution control programs currently implemented by the two ports and their respective city agencies (See Section 2.8). As Table 4-1 shows, the Ports have identified additional control measures for the landside activities identified as priority uses. The additional control measures being proposed would be incorporated into the existing programs.

Many of the control measures are the same, or essentially the same, across several sources (e.g., enhance and expand housekeeping BMPs). This WRAP identifies eight control measures that need to be implemented in order to address the known or suspected deficiencies in controlling pollutant discharges from land uses in the harbor districts (Table 4-1).

Table 4-1. Water Quality – Land-Use Sources, Activities, and Control Measures

SOURCES	ACTIVITIES	KEY POLLUTANTS	MEASURES (*)
PORT-WIDE SOURCES			
Vehicle & Equipment Maintenance and Landside Fueling	• Maintenance areas in terminals, other tenant facilities, and POLA/POLB maintenance yards • Hazardous materials storage and use, outdoor parts storage • Land-based mobile fueling operations	Metals, organics, TSS, trash	LU-1, LU-2, LU-3, LU-5
Grounds and Facility Maintenance	• Landscape, building exteriors, and miscellaneous structures in terminals and other leased areas • Vacant/unleased areas and natural areas • Parks, beaches, promenades, marinas, research facilities, aquaculture, other uses • Landscaping along roads and other right-of-ways (ROWs)	Pesticides/ herbicides, nutrients, metals, organics, TSS, trash, pathogens	LU-1, LU-2, LU-3, LU-4, LU-5, LU-6
Roads and Parking Lots	• Designated parking areas in tenant facilities (longshore, staff, visitor) • Public roads	TSS, trash, metals, organics	LU-5, LU-6
Construction Sites	• Materials storage • Ground disturbance	TSS, metals, organics, trash	LU-7
OTHER NON-PUBLIC FACILITIES			
Cargo Handling Areas	• Paved areas for storage of packaged cargo (including containers, break bulk, and vehicles) and use of cargo-handling equipment • Tank farms, piping, loading/unloading points for petroleum, fuels, petroleum-based products, chemicals, rocket fuels, and other oils and liquids • Conveyors, barns and silos, paved areas, and truck and rail loading/unloading points for coke, sulfur, salt, gypsum, cement, recycled metals, aggregate, etc.	Metals, organics, TSS, trash	LU-1, LU-2, LU-3, LU-5
Commercial Fish Market/Fish Processing Facilities	• Packing, canning, and marketing facilities • Landside support areas (e.g., outside net storage	Pathogens, TSS, trash, nutrients	LU-2, LU-3

Table 4-1. Water Quality – Land-Use Sources, Activities, and Control Measures

SOURCES	ACTIVITIES	KEY POLLUTANTS	MEASURES (*)
Rail Facilities	• Locomotive and railcar maintenance • ROW maintenance	TSS, trash, metals, organics	LU-1, LU-2, LU-5
Auto Repair/Dismantling & Boat Repair	• Operational discharges from commercial facilities within the harbor districts • Sandblast grit, hazardous materials storage and use, outdoor parts storage	Metals, organics, TSS, trash	LU-1, LU-2
VISITOR-SERVING SOURCES			
Restaurants, Boat Launches	• Operational discharges from various locations throughout both harbors under city and county jurisdiction • Washdown discharges	Pathogens, nutrients, TSS, trash, metals, organics	LU-2, LU-5

*: Land-use control measures described in detail below

LU-1. Enhance and expand housekeeping BMPs in maintenance and fueling areas, general cargo handling areas, certain dry bulk cargo handling areas, automobile dismantling/boat repair facilities, oil production facilities, and building maintenance and landscaping areas

LU-2. Develop port-wide guidance manual for design of new and redeveloped facilities, including design criteria and structural BMPs

LU-3. Evaluate the need for structural BMPs for key discharges and targeted pollutants at existing facilities and install where necessary to ensure compliance

LU-4. Continue and expand upon existing stormwater/dust control programs for vacant/undeveloped property

LU-5. Enhance/expand litter control programs

LU-6. Enhance/expand street and parking area sweeping and cleaning programs

LU-7. Evaluate existing construction permit compliance procedures and enhance as necessary

LU-8. Evaluate Port-owned properties outside the harbor districts and implement additional stormwater controls as necessary

4.2.3 Description of Control Measures

For each of the control measures, this WRAP describes the necessity for the proposed measure, the nature of the measure, how and when the measure will be implemented, including schedule and costs, and how the progress in implementing the measure will be monitored and evaluated (the metrics).

Control Measure LU-1: Housekeeping BMPs

Enhance and expand housekeeping BMPs in maintenance and fueling areas, general cargo handling areas, certain dry-bulk cargo handling areas, automobile dismantling and boat repair facilities, oil production facilities, and building maintenance and landscaping areas.

The enhancement or addition of housekeeping BMPs in areas with demonstrated deficiencies in existing BMPs or a high probability of contributing to stormwater pollution will reduce overall pollutant loading from port activities into harbor waters.

Current Status: Vehicle maintenance facilities in cargo terminals, other tenant facilities, and the port authority maintenance divisions handle hazardous materials such as solvents, lubricants, fuels, and paints and other coatings, and generate wastes such as spent solvents, oily rags, used sorbent, and other expendables. In addition to fixed maintenance facilities, some cargo terminals conduct mobile fueling and maintenance of terminal equipment in areas outside the fixed fueling facilities. Potential pollutants from these facilities include organics from fuels, lubricants and solvents; metals from cutting, leaking batteries, and corrosion; TSS; and trash.

Certain general terminal activities are also of concern. For example, truck queuing lanes inside container terminals and terminal parking lots are sources of trash, oil, and grease. In the POLA, sweeping in terminals is conducted by tenants and private property owners in accordance with their NPDES permits. The POLB is involved with tenant and private property sweeping activities through the Master Storm Water Program, and has the authority to require additional sweeping in problem areas.

The cargo-handling areas in terminals include the dock-side areas where vessels are loaded and unloaded, which experience cargo spillage and releases from cargo handling equipment, and outside cargo storage areas. Stormwater issues associated with most cargos are concentrated in the storage areas because that is where leakage, leaching, and corrosion are most likely, but dockside areas also require stormwater controls. Typical cargos that may be stored outside include containers, automobiles, lumber, heavy equipment, certain dry bulk products (e.g., salt, recyclable metals, and aggregates), raw and finished metals, and a number of miscellaneous products. Potential pollutants include metals, TSS, organics, and trash. Cargos that are stored inside (e.g., liquid bulk; most dry bulk such as cement, petroleum coke, sulfur, soda ash, and gypsum; and high-value, refrigerated, or bagged/drummed products) present a negligible stormwater threat.

Dry-bulk cargos that arrive at and depart from terminals by vessel, truck, and train have a particular potential for leaks and spills. At-risk areas include conveyor belt systems, truck and railcar dumps and loading points, and rail yards where loaded railcars sit awaiting unloading. Cargoes that may escape to the environment at these points and that could enter stormwater include soda ash, which can spill from loaded railcars; petroleum coke, which is released from conveyors, railcars, and trucks; gypsum and sulfur, which spill from conveyors; and cement, which escapes from conveyors and truck loading facilities.

In accordance with the General Industrial and Municipal Stormwater Permit programs at the two Ports (see Section 2.8), tenants and the Ports implement a variety of housekeeping BMPs aimed at reducing the exposure of stormwater runoff to the pollutants generated by their maintenance and fueling activities. Typical housekeeping BMPs currently in place at most facilities include inspections, periodic area sweeping and pavement cleaning, materials and waste inventory, storage and handling procedures (e.g., spill and drip prevention, oily rag and solvent storage, use of containment structures for toxic chemicals, lubricants and solvents, fertilizers, and paint and cleaning wastes), portable berming, control of washdown activities, collection of errant product and cargo-related debris, regular inspections of cargo handling equipment, litter control, and inspection and adjustment of irrigation systems.

Required Actions: This control measure will, as necessary, increase the scope of housekeeping BMP application and improve and add BMPs. For example, BMPs already being used could be more uniformly applied to facilities port-wide and especially in high-priority areas, and new BMPs could be instituted where appropriate.

Individual facility SWPPPs and recent inspection/audit and annual reports need to be reviewed in the normal course of program management to determine where improvements in existing housekeeping BMPs are needed and which facilities would benefit from additional BMPs.

Enhancements to existing BMPs could include:

- more frequent/extensive sweeping
- more rigorous spill prevention procedures for mobile fueling operations, equipment maintenance and storage procedures, cargo, and hazardous materials storage
- improved hazardous materials management procedures

- enhanced dust and runoff control at recyclable metal terminals
- more frequent trash collection.

Additional BMPs could include:

- requiring periodic zero-discharge pavement cleaning in key areas (see Control Measure LU-6 on specific actions that could be required)
- providing covered storage of materials and idle equipment where necessary and feasible
- instituting operational controls such as modified cargo storage, cargo loading/unloading, and materials handling and storage protocols
- employment of dust and runoff controls at auto dismantling and boat yards where they are not already employed
- employment of sustainable landscaping materials and practices to reduce water, fertilizer, and pesticide use
- introduction of sustainable materials and practices in building and structure maintenance.

Implementation: Port initiatives. POLB will implement this measure through modifications of facility SWPPPs and the Master Storm Water Program. POLA will implement this control measure by working with the City"s WPD for critical source facilities, and working with its tenants through the ECA, NPDES MS4 Permit, and tenant outreach programs to improve facility SWPPPs.

Schedule: By the end of 2009 POLB will identify the first set of new measures to implement through on-going annual inspections. POLA will develop its inspection strategy, in concert with WPD, by the end of 2009, and identify the first set of new measures to implement through those inspections by the end of 2010.

Monitoring and Metrics: The metric for this measure is the implementation of required program changes. The Ports" progress in instituting the changes will be monitored and reported annually. Once the changes are in place, and TMDLs and the new permits have been approved, the Ports will develop new metrics.

Control Measure LU-2: Design Guidance Manual

Develop a port-wide guidance manual for design of new and redeveloped facilities, including design criteria and structural BMPs.

The identification of port-specific and appropriate development/redevelopment criteria, including low-impact development, and structural BMPs will reduce overall pollutant loading from port activities into the harbor.

Current Status: The City of Los Angeles"s municipal stormwater program contains provisions to follow SUSMP requirements for new development and significant redevelopment projects. These requirements, which the POLA follows, include capturing and/or treating runoff from an up to 0.75-in. storm event through provisions such as encouraging the reduction of impervious cover and installing catch basin inserts and mechanical separation units. Examples of BMPs to accomplish this include stormceptors, detention basins, bioretention devices, and infiltration trenches.

The City of Los Angeles has infiltration guidelines and currently prioritizes SUSMP BMP selection as follows:

1. Infiltration Systems
2. Biofiltration/Bioretention Systems
3. Stormwater Capture and Re-Use
4. Mechanical/Hydrodynamic Units
5. Combination of Any of the Above

SUSMP guidelines include infiltration restrictions such as locations consisting of heavy industrial uses and a minimum depth to high groundwater level (10 ft). This latter requirement is problematic in the low-lying port environment, where depth to groundwater is more often than not less than ten ft.

Similarly, the Port of Long Beach currently imposes SUSMP stormwater design criteria through the Harbor Development Permit process, using guidance from the City"s MS4 permit.

Required Actions: The Ports are unique environments due to their location immediately adjacent to a receiving water body, the associated high water table underlying port land, and the requirement for port land to be used as efficiently as possible for maritime

commerce, navigation and fisheries. As a result, some of the provisions established in the SUSMPs, often focusing on residential or commercial development further up the watershed, may not be practical or appropriate in a port setting. Development of a port-wide guidance manual, in coordination with the LA-RWQCB and each city, will ensure that appropriate and effective measures are instituted on port property. New and innovative structural BMPs that may be identified and tested through the WRAP's TAP will be incorporated into the guidance as appropriate.

The guidance manual will take into account current and upcoming permit requirements and port-specific conditions, then recommend design criteria, including performance criteria, for structural BMPs appropriate for the land uses and potential contaminants of concern. Responsibility for on-going maintenance of structural BMPs and for implementation of operational BMPs will be clearly designated in leases.

Implementation: Port initiatives and lease requirements. The Ports will formally adopt the guidance manual, then establish internal procedures for ensuring that the guidance manual is incorporated into port and city development permit processes. New developments will be designed and constructed in accordance with the guidance, and new and renegotiated leases will specify clear responsibility for their construction, operation, and maintenance.

Schedule: The Ports expect to complete the guidance manual by mid 2010.

Monitoring and Metrics: The initial metric for this control measure is completion of the guidance manual. Subsequent metrics will track the incorporation of the guidance into port developments. Ports will report annually on progress towards completing and incorporating the manual. Implementation of the controls specified in the manual will be reported as it occurs, and the Ports will report periodically on the effectiveness of the BMPs. BMP effectiveness will be evaluated on the extent to which on-site inspections indicate that the BMPs have resolved the issues they targeted and attained the design performance criteria.

Control Measure LU-3: Structural BMPs

Evaluate the need for structural BMPs for key discharges and targeted pollutants at existing facilities and install where necessary to ensure compliance.

The modification, enhancement, and/or installation of structural BMPs in areas with a high probability of contributing to stormwater pollution, and a demonstrated deficiency in current housekeeping, operational and/or structural BMPs, will reduce overall pollutant loading from port activities into the harbor.

Current Status: In most areas of the Ports, housekeeping BMPs are the principal means of preventing or minimizing discharges of contaminated stormwater. Contained and covered storage, regular sweeping, appropriate waste management practices, and personnel training are key measures for preventing contaminated runoff. In some instances, however, structural BMPs such as containment, oil/water separators, and covers are needed, and they are key control measures that are incorporated into the GIASP and Municipal stormwater permits under which most facilities at the two Ports operate. In the two Ports, housekeeping and structural BMPs are implemented through each port‟s respective stormwater program and individual facility permits (see Section 2.8.1 for more detail on the structure of the Ports‟ stormwater programs).

Required Actions: If the housekeeping improvements implemented through Control Measure LU-1 cannot adequately address a particular stormwater issue, the need for new or additional structural BMPs will be evaluated. This evaluation will be made in the normal course of the stormwater program management on a case by case basis. In each case, the facility‟s SWPPP, recent inspection reports, current site conditions, stormwater monitoring results, and recent annual reports will be evaluated to determine whether the facility would benefit from the addition of structural BMPs where none exist, improvements in existing structural BMPs, or the installation of additional structural BMPs beyond those already present.

The evaluation will rely heavily on the types of structural BMPs that have already proven to be effective in use at various Port facilities, including:

- Secondary containment berms
- Oil water separators
- Contained hazardous material storage areas
- Awnings or roofs

- Hydrodynamic separation-type stormwater treatment units
- Valve-controlled storm drains
- Process water or maintenance area drainage diverted to the sanitary sewer system
- Non-discharge areas equipped with stormwater retention tanks which recycle stormwater for re-use in facility processes
- Capped storm drains prohibiting discharge from high-risk areas
- Storm drain inserts to capture trash, sediment, and/or oil/grease for key pollutants in high pollutant generating areas.

In addition, new stormwater control technology will be considered as it is proven effective through field experience elsewhere and through the TAP.

Implementation: Port initiatives and leases. POLB will implement this measure through modifications of facility SWPPPs and the Master Storm Water Program. POLA will implement this control measure by working with the City‟s WPD for critical source facilities and with its other tenants and its own operations through the ECA, NPDES MS4 Permit, and tenant outreach programs to modify facility SWPPPs. Lease requirements may be necessary to ensure long-term maintenance of structural BMPs.

Schedule: POLB will implement this measure through its ongoing site inspection program under the Master Storm Water Program. POLA will develop its inspection strategy, in concert with the other City agencies, by the end of 2009, and by the end of 2010 will have identified the first set of structural measures that need to be implemented.

Monitoring and Metrics: The overall metric for this measure is the implementation of required program changes. The initial metric will be the Ports‟ progress in identifying needed structural BMPs. The subsequent metric will be the Ports‟ progress in installing those BMPs.

Control Measure LU-4: Stormwater/Dust Control for Orphan Sites

Continue and expand upon existing stormwater/dust control programs for vacant/undeveloped property.

Through the continuation and expansion of existing stormwater and dust control measures for vacant and/or undeveloped property within the ports, runoff containing high levels of suspended solids and other pollutants would be reduced. Potential measures may include the introduction of sustainable landscaping or the use of swales, berms, or re-grading.

Current Status: Vacant and undeveloped land can be found throughout both ports. Such land can be located near roadways and freeway ramps, between existing facilities, and on a number of intermittently-leased or undeveloped areas within the ports. Vacant land that is unsupported by vegetation or erosion control structures can be a significant source of fugitive dust and other pollutants through erosion and other natural weather conditions. Fugitive dust can escape these areas and enter harbor waters during rain events or as the result of wind. Trash and other pollutants that accumulate in vacant areas can enter storm drains as a result of rain or wind.

In 2005, the POLB initiated a Port-wide Storm Water Pollution Prevention and Dust Control Program to implement stormwater and fugitive dust control programs for land identified as vacant and/or undeveloped. The program identifies both short-term and long-term measures to reduce runoff from over 100 acres of vacant or undeveloped land. Short-term measures, considered to be temporary, have been applied to previously identified areas within the POLB and include such BMPs as silt fences. Long-term measures include clearing debris and other obstructions located on vacant lots, along with rough re-grading for stormwater control and hydroseeding of expansive areas to reduce erosion. Currently, POLB has identified over 100 acres of vacant and undeveloped land that is covered by this program.

POLA has addressed vacant and undeveloped property on a case-by-case basis, as the need has arisen. Stormwater controls such as berms and sandbags have been installed at several sites at which runoff was observed to convey material off site or to storm drains.

Required Actions: While the POLB has been successful in the early measures taken to reduce fugitive dust and runoff from high-risk vacant and undeveloped lots, lower-risk sites need to be incorporated into the program. The introduction of sustainable landscaping, appropriate re-grading, and the use of swales and berms could reduce erosion and result in a reduction of fugitive dust. There are a number of other locations

within POLB, as well as areas within POLA, that could benefit from additional runoff control measures. An inventory of all vacant and undeveloped areas within both ports is required to determine areas of highest priority for runoff and pollutant control measures. For those areas deemed highest priority, temporary measures shall be put in place to await long-term solutions.

Implementation: Port initiatives. POLB will continue its existing Port-wide Storm Water Pollution Plan and Dust Control Program. POLA will implement this control measure by establishing a similar program for vacant and undeveloped land.

Schedule: POLB will continue its existing program; POLA expects to have its new program ready to implement by the end of 2010.

Monitoring and Metrics: The initial metric for POLA will be to establish a program to implement this measure on Port lands. Subsequently, both Ports will continue to monitor and report on their progress in addressing all identified sites.

Control Measure LU-5: Litter Control Program

Enhance and expand litter control programs and implement relevant elements of those programs in specific sources.

The enhancement, modification, or addition of both structural and housekeeping BMPs targeting trash and litter, coupled with a comprehensive education and outreach program targeting relevant industry groups including the International Longshore and Warehouse Union (ILWU), port tenants, and trucking firms, will reduce loading of trash and litter from port activities into harbor waters.

Current Status: Housekeeping BMPs such as street sweeping, hand sweeping, and litter removal from the harbor via specialized water craft are currently conducted by the maintenance divisions of the Ports in areas under the Ports" jurisdiction such as public roads, harbor waters, and unleased sites. In leased areas litter control is the responsibility of the tenant, and they utilize mainly street sweeping and hand sweeping to remove accumulated trash and litter from their leaseholds. Structural BMPs currently utilized include trash cans strategically placed to accommodate the needs of truckers and longshoremen, and fencing that acts as a barrier to prevent trash from being windblown off site. Because these measures are not totally effective, however, trash is still conveyed to the harbor via both wind and stormwater.

Required Actions: This control measure would review all facilities, including SWPPPs, recent inspection/audit reports, and annual reports, to determine where the scope of existing housekeeping and structural BMP application needs to be increased and where additional BMPs are necessary. For example, BMPs already being used could be more uniformly applied to facilities port-wide, especially in high-priority areas, and new BMPs could be instituted where appropriate.

Some key elements of this control measure could include:

1. Identification of key spots where litter accumulates;

2. More frequent or extensive litter collection activities by both port maintenance and tenant facility operators;

3. Modern and effective litter removal watercraft with greater capabilities than the existing vessels;

4. Structural BMPs installed on catch basins to block trash from entering the storm drain system;

5. Additional strategically placed trash receptacles placed at heights for easy trucker/ILWU access;

6. More wind screens to prevent wind from blowing trash from facilities into off-site areas such as railroad right-of-ways;

7. Enforcement activities involving fines or other penalties; and

8. An anti-litter campaign that includes a comprehensive education/outreach program to target relevant industry groups such as port tenants, truckers, and the ILWU with the objective of changing behavior patterns and attitudes towards littering. This outreach program could be multi-media and bi-lingual in nature, utilizing signs, radio, the internet, television and other media to educate the targeted groups about the importance of keeping the harbor free of trash and litter.

Implementation: Port initiatives, leases, and possible tariff changes. POLB will implement this measure by forming a litter control task force (composed of the Environmental, Engineering, Maintenance, and Communications divisions) that will oversee implementation of the measure. POLA will implement this control measure by working with the City"s WPD for critical source facilities and with its tenants and its own operations through the ECA, NPDES MS4 Permit, and tenant outreach programs to modify facility SWPPPs. Both ports will revise their tariffs as necessary to incorporate changes in stormwater permit compliance requirements. Lease requirements may be used to enlist tenant participation.

Schedule: POLB expects to complete formulation of its task force, development of specific measures, and implementation of the resultant program by mid 2010; POLA will begin program implementation in late 2010.

Monitoring and Metrics: The initial metric for this measure is the Ports" progress in developing their litter control programs. Once the Ports have developed their programs they will monitor and report on their progress in applying program elements throughout the harbors.

Control Measure LU-6: Public Area Sweeping Programs

Enhance and expand street and public parking area sweeping/cleaning programs.

Debris and other pollutants from vehicle traffic, surrounding uses, and air deposition can accumulate on streets and parking lots, and be carried into the harbor with stormwater flows. The enhancement and/or expansion of street and parking area sweeping and cleaning programs will reduce overall pollutant loading into harbor waters from these activities.

Current Status: Both Ports conduct street and parking lot sweeping throughout their harbor districts. However, debris is still present, particularly in certain problem areas where trash and other pollutants accumulate. Furthermore, it is not clear whether sweeping in public parking areas, where oil, grease, and TSS can accumulate, is effective.

Per the requirements in the Los Angeles County-wide municipal stormwater permit, public streets are swept on a schedule by the POLA‟s Construction and Maintenance Division, and the Los Angeles City Bureau of Street Services. The municipal permit also requires POLA to conduct focused pre- and post-event cleaning in conjunction with special events (e.g., Lobsterfest, held in the Ports O‟ Call parking lot). POLB‟s Maintenance Division conducts street sweeping in accordance with the POLB Master Storm Water Program. In addition, POLB has a joint port-tenant sweeping program focused on removing track-out petroleum coke from streets on and near Pier G.

Required Actions: The Ports will evaluate current sweeping/cleaning activities and inspect all sites to assess debris levels and problem areas. Areas that are of particular concern in both ports include streets leading to and from dry bulk and recycled metals terminals, truck queuing lanes outside container terminals, and public access parking lots such as at restaurants and fishing piers. Based on the results of the evaluation, revised sweeping/cleaning schedules will be developed as needed. The Ports will also evaluate existing street sweeping/cleaning equipment to determine whether more efficient technology is available and required. Recommendations to upgrade equipment will be made if warranted.

Possible enhancements and additions could include establishing more joint port-city sweeping programs to increase sweeping frequency and coverage, substituting more effective sweeping equipment such as HEPA-capable vacuum sweepers, and developing programs for routine, zero-discharge pavement cleaning at priority parking areas

Implementation: Port initiatives, leases, and possibly incentives. Multiple divisions at both ports and their respective cities will need to be actively involved in enhancing the

sweeping and cleaning programs. Port and City departments include, but are not limited to, POLA Environmental Management, Construction & Maintenance, and Real Estate, City of Los Angeles Bureau of Sanitation Watershed Protection Division, POLB Environmental Planning, Maintenance, and Real Estate, and City of Long Beach Public Works Department.

Schedule: POLB expects to have its recommendations for program changes and equipment upgrades completed by the end of 2009. POLA expects to reach the same point in mid-2010.

Monitoring and Metrics: The initial metric is completing the evaluation of the existing sweeping programs at the two Ports, including developing recommendations for changes. The subsequent metric will be to implement the recommended changes, including the incorporation of new technology.

Control Measure LU-7: Port-Wide Stormwater Construction Permits

Evaluate construction permit compliance procedures and enhance as necessary (e.g., inspection frequency, construction specifications, and revised permit structure).

Evaluating the construction permitting process and procedures will allow port staff to determine areas for improvement in permitting compliance that will reduce pollutant runoff from such sites. These enhancements could be in the form of modification of inspection procedures, improved construction specifications, and revised permit structuring.

Current Status: Both Ports are required to comply with the SWRCB"s GCASP, which the SWRCB is in the process of revising. That permit"s requirements include the elimination or reduction of non-stormwater discharges to storm drain systems and receiving waters as well as the development of construction SWPPPs. Construction contractors are required to implement BMPs such as: general site management, construction and waste materials management, erosion control, and sediment control. Construction projects are inspected by port construction inspectors to ensure that BMPs are in place and that construction SWPPPs are updated and adequate. Through a new EMS, POLB recently completed a comprehensive revision of design and construction management procedures intended to reduce impacts of construction activities on harbor waters.

Required Actions: Port staff need to evaluate recent inspection reports and reporting protocols, review upcoming revisions to the GCASP, and formulate the necessary program enhancements. As examples of potential changes, beneficial BMPs already in place could be more uniformly applied, the frequency and scope of inspections could be increased, if warranted, and construction specifications and contracts could be made more specific with respect to stormwater controls.

In addition, the Ports will also pursue obtaining individual construction permits from the LA-RWQCB in lieu of coverage under the new GCASP.

These changes would be incorporated into the revised permit structure described in Section 4.1.2; the port-wide individual construction permit could include modified requirements for increased use of BMPs and site inspections. Furthermore, changes to the SWRCB"s construction permit requirements not anticipated at this time could result in additional requirements.

Implementation: Port initiative. POLB will implement this measure through modifications to the Master Storm Water Program, which encompasses construction permitting requirements. POLA will implement this control measure by incorporating

changes into the procedures followed by the POLA‟s Engineering and Construction Division.

Schedule: Review and revisions to the Ports‟ existing construction programs are ongoing. The Ports expect to begin negotiations with the LA-RWQCB on the structure of the GCASP in mid-2009.

Monitoring and Metrics: The initial metric will be the completion of the program evaluation and the obtaining of individual permits by the two Ports. Subsequently, progress in implementing the recommended changes in the Ports‟ construction management programs will be monitored.

Control Measure LU-8: Remote Sites Stormwater Compliance

Evaluate port-owned properties within the watershed but outside the harbor districts, and ensure permit compliance as necessary.

Inventorying and evaluating all port-owned properties outside the immediate harbor area will allow port staff to ensure that stormwater management is in compliance with all regulations and permits.

Current Status: Both Ports own property outside their immediate harbor districts ("remote sites" in this WRAP, located north of Anaheim Street). Most of these remote port-owned properties fall under the jurisdiction of other governmental agencies (cities and counties), and thus are covered by the stormwater requirements of those entities. For example, properties lying within the City of Vernon would be required to comply with that city"s stormwater permit and other requirements.

Required Actions: Although the Ports have limited jurisdiction over the stormwater activities of tenants on remote sites, their environmental mandates obligate them, as landlords, to ensure that stormwater management on those properties complies with all regulations and permits. Accordingly, port staff will evaluate the compliance status of all remote sites and develop a management program to ensure future compliance. Program development will be aimed at establishing procedures for ensuring that facilities found to be deficient in their compliance work with the local agency to achieve compliance.

Implementation: Port initiative.

Schedule: Initial remote site evaluation and the adoption of a long-term management program for remote site stormwater compliance will be completed by the end of 2010.

Monitoring and Metrics: The initial metric will be the completion of the management program by the two Ports.

4.3 On-Water Discharges

4.3.1 On-Water Sources and Activities

Although stormwater control efforts naturally focus on landside sources, a comprehensive approach to managing water quality in the Ports must consider potentially polluting on-water activities as well (Table 4-2). The two ports experience some 10,000 visits per year by ocean-going cargo vessels and are home port to dozens of harbor craft – tugs, ferries, workboats, bait barges, and patrol boats. In addition, some 4,000 recreational pleasure craft are berthed in, and use the waters of, the POLA. Cargo vessels, commercial harbor craft, fishing vessels, and recreational vessels are all potential sources of water pollutants via direct discharge. In addition, in-water structures such as docks, piers, and cathodic protection devices can leach contaminants into harbor waters, and the bottom paint on vessel hulls is designed to leach toxic substances.

4.3.2 Control Measures for On-Water Sources

Most on-water sources fall under state and federal jurisdiction, although the two ports and their respective city agencies have some additional controls. Nevertheless, the Ports have identified three WRAP control measures that could help to control discharges from on-water activities (Table 4-2). These measures would complement and build upon the new federal and state permits described in Section 2.1.3.

4.3.3 Description of Control Measures

For each of the control measures, this WRAP describes the necessity for the proposed measure, the nature of the measure, how the measure will be implemented, including schedule and costs, and how the progress in implementing the measure will be monitored and evaluated (the metrics).

Table 4-2. Water Quality – On-Water Sources, Activities, and Control Measures

SOURCES	ACTIVITIES	KEY POLLUTANTS	MEASURES (*)
Vessel Discharges and On-Water Vessel Maintenance/Fueling	• Commercial and recreational vessels • Black water (sewage), gray water (showers, sinks, laundry, kitchen), bilge water, and ballast water • Fuel transfer over water, accidental releases (spills), and jettisoning of solids (trash) • Sanding, painting, mechanical repairs while underway or at anchor • Miscellaneous discharges • Anti-fouling coatings and cathodic protection • Fishing wastes	Organics, metals (incl. copper and zinc), trash, pathogens, nutrients	OW-1
Contaminant Leaching	• Pilings • Anodes	Zinc, organics	OW-2, OW-3

*: On-water control measures described in detail below

OW-1. Develop guidance manual for on-water activities (e.g., allowable and prohibited vessel maintenance activities and discharges)

OW-2. Develop BMPs and Port standards for maintenance, in-kind replacement, and eventual phasing out of treated piles

OW-3. Develop BMPs and Port standards for the use of zinc-based cathodic protection in Port vessels and structures.

Control Measure OW-1: Vessel Guidance Manual

Develop guidance manual for on-water activities (e.g., allowable and prohibited vessel maintenance activities and discharges).

The identification and communication of allowable and prohibited on-water maintenance activities and vessel discharges as set forth in the VGP and state permit (see Sections 2.1.1 and 2.1.2) will reduce overall pollutant loading from port activities into the harbor.

Current Status: Currently, several types of on-water operational and maintenance activities occur regularly in the ports, many required for the safety of the vessel, which can result in discharges to harbor waters. The following list illustrates the variety of on-water discharges that are associated with those activities; for a complete listing refer to the VGP (http://cfpub.epa.gov/npdes/home.cfm?program_id=350):

- Deck and hull wash down, chain locker effluent
- Bilge and ballast water
- Anti-fouling hull coatings‟ seawater piping additives, and cathodic protection
- Gray water and black water
- Oily water from various activities (e.g., separators, pits, bearings)
- Non-oily machinery wastewaters (e.g., scrubbers, condensers, cooling water, fire mains, boiler/economizer blowdown
- Underwater hull husbandry
- Solid waste.

Not all of these discharges are unregulated, nor do they necessarily occur in Los Angeles/Long Beach Harbor: federal and state regulations (see Section 2.1) prohibit discharges of pollutants and contaminated water in the harbors, and port tariff provisions prohibit discharge of any potentially polluting material into the harbor without approval of the Executive Directors. Nevertheless, it is likely that many of these discharges occur to some extent, due to a combination of factors including carelessness, ignorance of the law, unclear or incomplete regulations, and lack of oversight and enforcement. In general, however, the Ports lack knowledge concerning the nature and extent of such discharges or of the impacts they may have on water quality in the harbors.

Some port-specific information is available on two of the sources covered by the VGP, namely anti-fouling bottom paints and cathodic protection. Antifouling coatings (bottom paints) are used on nearly all vessels in the harbors, from small recreational boats to oceangoing cargo vessels. These paints typically contain toxic substances such as heavy metals and organic toxins (copper and tin are widely used on recreational vessels) that are intended to discourage the growth of marine organisms on the hull. The toxic substances are known to leach into the water, in fact, that is the basis for the effectiveness of the coatings, with the result that in some areas of heavy use, such as marinas, water and sediments have been shown to have elevated concentrations of copper and tin. The fact that the harbors are on the Section 303(d) list for copper makes this source an area of concern.

Cathodic protection inhibits the corrosion of ferrous metal (iron and steel) components of vessels resulting from the electrolytic action of seawater. On vessels, cathodic protection is normally accomplished by the use of sacrificial anodes, most commonly a lump of metallic zinc, whose function is to protect the steel by corroding in its place. Even small vessels such as recreational craft have sacrificial anodes to protect propeller shafts and other below-water metal fittings. The anode‟s corrosion releases dissolved zinc into the water column, and in situations such as marinas, where there are thousands of boats, there is a real potential for water quality impacts. The fact that the harbors are on the 303(d) list for zinc makes this source an area of concern.

Required Actions: Although the tariffs of the two Ports include general prohibitions of discharge into the harbor, they do not have specific guidance on which activities are prohibited, which are allowed, and what BMPs to employ during allowable activities. Furthermore, as mentioned above, the Ports have very little information concerning on-water discharges in the harbors. This control measure will rectify those deficiencies by developing manuals that will be distributed to vessel operators (including cargo vessels, harbor craft, and recreational vessels) as guidance for allowable and prohibited discharge-related activities. Assessing the extent of the problem will likely involve a survey of harbor users.

A significant portion of the guidance manual for commercial vessels and those harbor craft subject to the new state and federal NPDES permits will consist of a discussion of those permits, but it will also include:

- a summary of tariffs and existing regulations
- a description of water quality impacts associated with vessel operations and maintenance activities

- information sources related to on-water activities
- the requirements for vessel discharge, including potential BMPs and technology improvements
- narrative water-quality based effluent limits in state and federal permits
- inspection, monitoring, recordkeeping, and reporting requirements in state and federal permits
- additional requirements applicable to certain vessel types.

Guidance manuals for international commerce vessels, harbor craft, and exempt vessels will help operators of foreign-flagged vessels understand what to expect when they come to San Pedro Bay, and will help domestic operators understand how they can reduce pollution from their activities. The development of such manuals is not on the agenda of any state, federal, or local regulatory agency, nor is it required by any regulation. Accordingly, the Ports will undertake this initiative, although they expect relevant agencies (e.g., US Coast Guard, State Lands Commission, Coastal Commission, LA-RWQCB) and stakeholders (the maritime community and NGOs) to participate in the effort. Enforcement of the relevant NPDES permits would be undertaken by EPA, the LA-RWQCB, and the SWQCB, not the Ports.

The guidance for the recreational and non-federal commercial vessels ("exempt vessels"; see Section 2.1.3) will provide recommendations for BMPs as they relate to recreational and fishing vessels. The guidance will address discharges and activities of concern to the State of California and to the Ports, and will build upon and extend the provisions of POLA's existing CMP. A particular focus will be education and outreach to reduce water quality impacts associated with anti-fouling paints and cathodic protection (Control Measure OW-3 addresses cathodic protection of port-owned structures and vessels).

New and innovative vessel maintenance BMPs may be identified and tested through the WRAP's TAP.

Implementation: Port initiatives, leases, and tariff modifications. The Ports will work together to develop the guidance manuals and conduct outreach to distribute the manuals and educate the stakeholders. The Ports' tariffs will be revised if it appears necessary in order to incorporate provisions of the manuals and to require that the guidance be used by all vessel operators.

Schedule: The guidance manuals will be completed by the end of 2009.

Monitoring and Metrics: The initial metric will be publication of the guidance manuals. The subsequent metric will be accomplishing the distribution and outreach. Staff will monitor and report on progress toward that end. Once the manuals are adopted, progress towards outreach activities will be reported annually.

Control Measure OW-2: Piling Replacement Policy & Standards

Develop port policy and standards for maintenance, in-kind replacement, and eventual phasing out of exposed treated pilings from in-water applications.

Minimizing and eventually phasing out the use of treated piles by identifying and implementing effective alternatives for in-kind replacement and maintenance will reduce pollutant loading due to leaching from treated wooden piles.

Current Status: Wooden pilings and other treated timber elements are widely used in wharves, fender piles, dolphins, and other types of ship docking infrastructure. Historically, piles treated with creosote (a coal-tar derivative) have been used in the harbors to prevent marine boring organisms from destroying the piles. A number of other pile types have been used in the harbors in limited applications, including ACZA-treated piles, plastic piles, and untreated ("clear") piles. Piles that have reached the end of their service life as a result of marine borers or decomposition must be replaced, although ongoing maintenance in the form of replacing damaged segments is also common.

The POLA maintains over 15,000 wooden piles: approximately two-thirds are bearing piles, nearly one-third are fender piles, and a small percentage are other piles, such as those known as "dolphins". A large portion of those piles are in the recreational marinas. The POLB maintains an estimated 3,000 fender, 200 bearing, and 100 "dolphin" timber piles, almost entirely associated with the cargo terminals.

Both ports hold permits from the Corps for in-kind replacement of wooden piles that allow the use of creosote-treated piles only with certain provisions, including that piles be wrapped in plastic. Both ports have already taken steps consistent with Control Measure OW-2, as described below.

POLA Pile Program: Since the late 1970s POLA has wrapped creosote piles in plastic after installation to further protect the piles and prolong their service life. Currently, as part of its EMS, POLA is initiating the Alternative Wood Pile Material/Wrap Evaluation Program (Pile Program) that is intended to ensure a coordinated effort to minimize impacts of treated wood piles to the harbor environment in a cost-efficient manner and to allow on-going, unimpeded maintenance of wooden in-water structures. The program consists of a systematic evaluation of alternative wrapping materials and procedures, coatings, and alternative treatments and pile materials.

To ensure that structural, maintenance, and environmental issues are addressed in the evaluation process, the Pile Program includes the participation of the Engineering, Construction and Maintenance, and Environmental Management divisions. The goal of

the Pile Program is to evaluate potential treated wood pile and wrap strategies to minimize or eliminate the use of treated piles in the harbor and minimize impacts to harbor waters. The expected product of the Pile Program is a guidance document that POLA will apply to future decisions regarding the purchase and installation of new and replacement pilings.

POLB Practices: While POLB has no formally designated piling program, it has actively addressed the issue. Since 1993, POLB has experimented with the use of plastic piles, installing steel-core plastic piles under fender panels. These piles proved unsatisfactory: ultraviolet (UV) rays caused the plastic to crack over time, exposing the steel core to rust, and the steel cores could bend under impact (such as from a vessel) to a position that would not allow them to function properly. Solid plastic piles were installed in test locations in 2001, followed in early 2008 by plastic piles with steel cage cores and fiberglass-reinforced plastic piles. These installations are too new to permit an assessment of service life and durability. However, improved plastic in the outer shell and the use of fiberglass raise the expectation that UV light will not negatively impact the structural integrity of the piles.

In 2000, POLB initiated a plan to eliminate the use of creosote-treated pilings. Due to an existing stockpile, creosote-treated pilings are allowed to be used under the condition that they are wrapped with a thick polyethylene plastic wrap secured with aluminum alloy nails. The stockpiles are stored at the POLB maintenance facility, and are transported, as needed, to replace broken or damaged piles.

Required Actions: Although each port has taken steps in the direction of phasing out the use of treated pilings, both need to continue those efforts with the goal of establishing a plan for phasing out exposed treated pilings entirely. This measure does not contemplate replacing existing treated-timber piles all at once, but rather as they reach the end of their service lives and must be replaced, and as new in-water structures are constructed. Total replacement of exposed treated-timber structures is likely not to be completed in the short term, as many wooden structures will last many years under normal conditions.

The Ports will focus their efforts in two areas. First, they will establish BMPs for the practices that are currently used for managing pilings, including piling wrapping materials and procedures, pile storage, pile and pile segment installation, and the disposal of spent treated timber. This step will ensure that current practices, which include the use of plastic piles and plastic-wrapped piles, minimize the risk of water quality impacts while other alternatives are explored.

Second, the Ports will continue their efforts to identify feasible alternatives to the use of treated wood pilings. The POLB needs to establish a formal program of evaluating potential alternatives, and the POLA needs to modify its existing program to evaluate potential alternatives systematically. It is expected that the Ports‟ programs will continue to be independent, and they may result in different approaches to the common goal of phasing out the use of exposed treated-timber pilings. The programs will evaluate such possible alternatives as improved wrapping practices and materials, plastic or recycled-material piles, different reinforcements for plastic piles that will allow them to be driven and increase their durability. The evaluation process will include literature reviews and industry surveys, estimation of the costs, and possibly the installation, monitoring, and assessment of test piles for promising technologies.

The product of the evaluation effort will be plans that will guide each port as it manages its wooden pilings in the future. The plans will emphasize cost-effective approaches; it is possible, for example, that simply improving wrapping of treated piles will prove to be the most cost-effective alternative, although it is also possible that the increased life of non-wooden piles could offset their high cost, thus making the use of alternative materials cost-effective. Alternatives to current practices will be documented, locations where alternative piles are placed in the harbor will be noted, and the performance of piles and wraps will be assessed and documented.

Implementation: Port initiatives. POLA will continue and refine its existing Piling Program, and will implement its findings through the EMS Program. POLB will apply the guidance developed by its ongoing testing programs to its maintenance programs.

Schedule: The guidance for each port will be completed by the end of 2010.

Monitoring and Metrics: The initial metric will be to develop guidance based on each port‟s piling evaluation program. Subsequently, the application of that guidance to Port practices will be documented and reported annually. The Ports expect that the guidance will be modified and enhanced as new results are available from the ongoing port evaluations and from other programs.

Control Measure OW-3: BMPs & Standards for Cathodic Protection

Develop BMPs and port standards for zinc-based cathodic protection of port structures and vessels.

Identifying and implementing effective BMPs and providing guidance for the use of zinc as cathodic protection will reduce zinc loading from contaminant leaching by zinc anodes.

Current Status: Unprotected ferrous metals (iron and steel) corrode rapidly in seawater as a result of the electrolytic action of the salts. Both Ports have extensive in-water steel structures, including sheet metal retaining walls, underwater pipelines, conduits, pilings, and other steel structures, and a number of port-owned harbor craft that must be protected from corrosion. Protection can take the form of paints and other coatings, but painting is only feasible for above-water structures or structures that can be removed from the water for painting. In addition, some metal parts cannot be painted. In such cases, corrosion is often prevented by cathodic protection, which uses the surface of the metal to be protected as the cathode in an electrochemical reaction with seawater.

Cathodic protection can be provided in two basic ways. In the first, an electron-donating metal (the anode), generally zinc but often aluminum, magnesium, or titanium, is attached to the steel part (the cathode). The anode corrodes instead of the steel (releasing zinc ions into the water column), and is hence called a sacrificial anode. This method is commonly used in small-scale situations such as isolated pilings and vessels. In the second, called impressed current cathodic protection (ICCP), an electric current provides the electrons. ICCP is widely used for linear structures, such as pipelines, or large structures that cannot be economically protected by sacrificial anodes.

In the Ports, both sacrificial anodes and ICCP are widely used for port structures and vessels (sacrificial anodes on non-port harbor craft and recreational vessels are addressed by Measure OW-1). Given the number of ferrous metal in-water structures in the Ports and the fact that all port-owned vessels are protected by zinc anodes, it is possible that leaching of zinc from sacrificial anodes represents a threat to water and sediment quality in the Ports. In addition, various areas of the harbors are Section 303(d)-listed for zinc.

Required Actions: In order to develop effective controls on leaching from cathodic protection, the Ports need first to assemble available information on the magnitude of the Ports‟ cathodic protection activities, the use of ICCP as opposed to sacrificial anodes, and the toxicity, cost, and effectiveness of alternatives such as aluminum, titanium, and magnesium. This information will then be evaluated by port engineering staff to identify

the feasibility of alternatives and develop guidance for applying those alternatives to port practices.

The Ports do not propose to undertake chemical engineering research projects to discover alternative anti-fouling and anti-corrosion technologies. Instead, they will attempt to apply existing technology to the situations that prevail in the harbor complex. For example, a survey of the literature and current practice around the world could indicate that a different, less toxic, anode metal could be effective, or that ICCP has been successfully applied in situations where sacrificial anodes are currently the norm. Either finding could prompt the Ports to undertake pilot programs to determine the applicability of the technology to the port situation and to identify the institutional constraints and opportunities that would be involved. The Ports will also look for opportunities to support research and pilot projects involving less toxic approaches to anti-corrosion technology through the TAP.

Implementation: Port initiatives. The Ports will evaluate existing information, develop guidance for the use of existing cathodic protection technology, and adopt the guidance into port practice.

Schedule: The guidance material for the Ports will be completed by the end of 2010.

Monitoring and Metrics: The initial metric for this measure is the development of guidance for port practice in cathodic protection. The subsequent metric will be implementation of the guidance in port practice. Progress towards those goals will be reported to the Boards.

4.4 Sediment Quality Measures

4.4.1 Sources and Activities

Legacy Contaminants: As mentioned in Section 2.6.2, harbor sediments have been subjected to pollutant inputs for many decades. Although many of those inputs have been eliminated or greatly reduced, their legacy remains in the form of areas of sediment contamination, especially in older portions of the harbors. Some of the pollutants were produced by activities inside the harbors, but much of the pollution came from outside the harbors, particularly through storm drains and streams. Accordingly, although the sediments are within the Ports‟ jurisdiction, the parties responsible for some of the contamination are not. Many former areas of legacy contaminants have already been cleaned up by Port development and channel deepening projects or individual Port and agency remediation projects. Nevertheless, a number of areas of legacy contamination remain, including portions of Long Beach West Basin and the Consolidated Slip in Los Angeles. Additional areas of sediment contamination are associated with major storm drain outfalls into the harbor; this is especially true in Los Angeles Harbor, where there are more storm drains from upstream areas than in Long Beach.

Sediment Resuspension: Sediments themselves can contaminate other sediments and the water column as they are resuspended and redistributed by tidal and wind currents, storms, and vessel movements. This mechanism is very likely responsible for the widespread occurrence of DDT and PCBs, which are thought to have originally entered the harbors via individual storm drains.

Sediment Dredging and Disposal Options: In developing control measures for sediment management, the Ports have considered the options available to them. In general, those are based upon the guidance contained in the CSTF Strategy (Los Angeles Regional Contaminated Sediments Task Force, 2005), which the Ports helped to develop and which has guided port sediment planning for the past ten years. That guidance includes a number of key principles:

- inter-agency coordination in planning efforts, including an open public process
- use of various best management practices for dredging, particularly of contaminated sediments
- beneficial re-use of all sediments
- employment of a hierarchy of disposal methods in the planning process.

The CSTF Strategy considers in-water disposal a last resort, preferring beneficial re-use, sediment remediation, and confined disposal facilities as being more protective of the environment and incorporating principles of sustainability.

4.4.2 Control Measures

As mentioned above, most of the control measures developed for land-use, on-water, and watershed sources will, in the long term, benefit sediment quality by reducing the influx of pollutants that could make their way into the sediments. The Ports have developed the following control measures, including one that is specific to a key sediment quality issue, the legacy contaminants that cannot be addressed by source control measures.

Control Measure S-1: Operations Sediment Management Plans

Develop sediment management policy/guidance establishing priorities for removal, disposal, and management of sediments with a clear decision-making framework.

Establishing a sediment quality baseline and formulating a management strategy to address testing, dredging, and disposal of sediments, whether contaminated or not, will help to address TMDL sediment listings and also minimize potential water quality impacts from water column exposure to dredged sediments.

Current Status: The Ports conduct maintenance dredging to maintain design depth at berths, capital improvement dredging for wharf construction or creation of new land, and dredging associated with remediation of contaminated sediments. Sediment testing per established EPA/Corps guidance is conducted prior to any dredging activity to determine the need for any special protocols or BMPs during dredging, as well as identify suitable disposal options for the dredged materials.

Both Ports were signatories to the Memorandum of Understanding (MOU) forming the Los Angeles Region CSTF (see Section 2.7.2) in 1999, and have been active participants in this organization since that time. The CSTF"s Long Term Management Strategy for contaminated sediment management in the region (LA CSTF 2005) will be used as guidance when formulating the Ports" sediment management plans.

The Ports have traditionally managed dredged material within the harbor complex when feasible, usually for creation of new land, or upland disposal. The POLA currently has an approved upland disposal site adjacent to the Cerritos Channel marinas, which is used primarily for maintenance dredging material and other material not suitable for open water disposal. The POLB has stored and disposed of contaminated sediments at various upland sites within the harbor district. The Ports have also accepted dredged material from outside sources when capacity in a fill was available (e.g., Marina del Rey and Los Angeles River sediments). Remediation of sediments in IR Site 7 (Long Beach West Basin) is ongoing.

Required Actions: The Ports will each develop sediment management policy and guidance that will establish the specific application of the CSTF Long-Term Management Strategy to each port situation. The policies will establish the procedures for coordination with the responsible regulatory agencies (Corps, EPA, LA-RWQCB, and Coastal Commission) and other interested parties (environmental organizations, other agencies, and stakeholders) on a project-specific basis. The following elements will be included in each plan:

- Identification of gaps in the available sediment data
- Identification of priority sediment management areas and development of a strategy for managing each area
- Guidelines for agency coordination to obtain approval of the site-specific management strategies
- Procedures for early involvement of non-governmental stakeholders
- Short- and long-term management strategies to address future port dredging and disposal activities related to contaminated sediments
- Maintenance of a current sediment database for use in re-evaluating sediment conditions and management needs in the harbor on a periodic basis.

Management strategies for individual sites will take into consideration sources of contamination to ensure that all responsible parties are involved in the remedy, port development projects, and regulatory mandates.

Implementation: Port initiatives. The Ports will develop and implement their respective sediment management plans. Each port will coordinate its plan with the regulatory agencies involved in permitting dredging and disposal activities, to ensure that the plans meet all regulatory requirements.

Schedule: The Ports expect to complete their draft comprehensive sediment management plans by mid-2010. Adoption of the final management plans is expected to occur by end of 2010.

Monitoring and Metrics: The metric for this control measure is the adoption by each port of its sediment management plan. Progress toward that goal will be reported to the Boards annually.

Control Measure S-2: Legacy/Hotspot Management Plans

Develop a sediment management policy establishing priorities for the management of areas of legacy contaminated sediments and hotspots.

Establishing clear port policies and priorities related to legacy contaminated sediment will facilitate cleanup and management of these areas.

Current Status: As discussed above, Los Angeles/Long Beach Harbor contains areas of contaminated sediments that are the result of past practices and watershed inputs, including sediment hotspot areas such as Consolidated Slip in POLA and Installation Restoration (IR) Site 7 in POLB‟s West Basin. The Ports have relied on their participation in the multi-agency CSTF, the Consolidated Slip Restoration Task Force, and other agency coordination to address sediment management issues associated with legacy contaminants, and have approached hotspots on a case-by-case basis.

The POLB is currently engaged in the remediation of IR Site 7. Many other areas of legacy contamination have been eliminated, by being either dredged or covered by fill, in the course of port development and maintenance programs. Examples include areas of the POLA West Basin (Southwest Slip) and POLB Slip 2, both filled and covered by container terminal developments; contaminated sediments in POLB West Basin removed as part of the redevelopment of the Naval Complex; and sediments associated with POLA Berth 49-51 removed as part of a voluntary project conducted by POLA.

Required Actions: Legacy sediment remediation actions include the imminent remediation of sediments in IR Site 7 and POLA‟s participation in the multi-agency Consolidated Slip Restoration Task Force. The Ports also recognize that legacy contamination must be addressed as part of future TMDL implementation because the majority of the 303(d)-listed areas within the Ports are also areas of legacy contamination and the TMDLs will drive how, and to what level, those areas are remediated. The Ports will continue to work with the regulatory agencies and other TMDL stakeholders to develop scientifically-based TMDLs. Once those TMDLs are established, a comprehensive implementation plan will be developed to strategically manage remaining legacy sediments (hotspots) and comply with TMDLs. The Ports acknowledge that while they may take a leadership role in some of the remedial actions, all responsible parties will be called upon to participate. It is important to recognize that the remedial process will ultimately be driven by the regulatory agencies.

Implementation: Port initiatives and regulatory action. The Ports will continue to work with the applicable regulatory agencies to move forward on identification of remediation

projects. Furthermore, the Ports will develop and adopt their respective sediment management guidance, including identification of sediment management priorities, based on the outcome of the TMDL process.

Schedule: POLB will complete the IR Site 7 Remediation Project by the end of 2010. POLA will renew and re-vitalize its participation in the Consolidated Slip Restoration Task Force discussions. Both Ports, in conjunction with review of sediment baseline information, will identify additional areas of concern and begin the process of determining remediation options. Completion of the remediation strategy/guidance is dependent on completion of the TMDL process.

Monitoring and Metrics: The metric for this control measure is the completion of remedial work at IR Site 7, continued participation in the Consolidated Slip Restoration Task Force, and completion of each port‟s contaminated sediment policy and management priorities for legacy contaminated sediments. Progress toward that goal will be reported to the Ports‟ Boards and the LA-RWQCB annually.

4.5 Watershed Sources

4.5.1 Watershed Sources and Activities

The Ports are part of the Dominguez Watershed, as described in Section 2.2, although the Los Angeles River, which is a separate watershed, does influence the eastern side of Long Beach Harbor. The Dominguez Watershed is a 110-square mile area that includes portions of the southern part of the City of Los Angeles, much of the cities of Lomita, Carson, Gardena, Inglewood, Hawthorne, Lawndale, and Torrance, and portions of the South Bay cities, the Palos Verdes peninsula, and the City of Long Beach. The Dominguez Channel receives storm water from those areas as well as permitted discharges from a number of major industrial facilities, including refineries and water treatment facilities. The Ports, whose land area constitutes less than 10% of the entire watershed, are downstream of the watershed at its seaward edge, and are thus considerably influenced by upstream discharges (the exception is the relatively small amount of port-owned property within the upper watershed). Given the fact that 90% of the watershed is outside Los Angeles/Long Beach Harbor, careful consideration of watershed sources of pollution is essential in order to craft a plan for continued improvements to water and sediment quality in the Ports.

It is important to note that while a portion of the City of Los Angeles is part of the same watershed as its port, the same is not the case with Long Beach. The City of Long Beach is part of the Los Angeles River watershed and, with the exception of the Pier H portion of the Port and four outfalls in the Cerritos Channel, is not upstream of its Port. Modeling has shown that during large storm events, the Los Angeles River also has effects on the entire harbor complex.

Section 2 describes factors outside the direct control of the ports that can affect water quality in the harbor. These include direct discharge from adjacent land uses outside the Ports, aerial deposition into harbor waters, the conveyance of pollutants into harbor waters from nearby water bodies and stormwater outfalls, and resuspension of, and flux from, harbor sediments. The WRAP considers these processes under the heading of "Watershed Sources," summarized in Table 4-3.

Given the reality that the Ports have no jurisdiction or direct control over sources outside the harbor districts (other than the remote properties addressed by LU-8) and are unable to control the influx of pollutants to the harbors from those outside sources, the control measure for watershed sources emphasizes cooperative activities such as data gathering and participation in regional water quality and source control efforts, particularly through

the ongoing TMDL effort, and potential legal remedies. One exception to this is the portion of the Dominguez Watershed that is outside POLA boundaries but within the City of Los Angeles: POLA, working with the City‟s WPD, has some control over this area. The other exception is the properties owned by the Ports that lie outside the harbor districts: because the Ports are able to exert a greater degree of direct control over those properties, control measure LU-8, which envisions continuing oversight and the imposition of BMPs as necessary, will be applied to those properties. The Ports‟ proposed control measure addressing existing legacy contaminated sediments in the harbor is described in Section 4.4.2, Control Measure S-2.

4.5.2 Control Measure for Watershed Sources

Most water sources fall under state and federal jurisdiction, although POLA and the City of Los Angeles have some additional control. Nevertheless, as Table 4-3 shows, the Ports have identified one WRAP control measure that could help to control discharges from watershed activities. These measures would complement and build upon the new federal and state permits described in Section 2.1.

Pollution control efforts outside the Ports are undertaken by numerous entities through a variety of programs. Efforts include permit compliance programs, projects involving physical modifications of infrastructure, the TMDL development process, and various monitoring, data gathering, and coordination efforts.

Table 4-3. Water Quality – Watershed Sources and Issues

SOURCES	ISSUES	KEY POLLUTANTS	MEASURE
Stormwater and Dry Weather Runoff, Ocean Inputs, Aerial Deposition	• Dominguez Channel and Los Angeles River input • Storm drain input from outside the harbors • Publicly Owned Treatment Works (POTWs) and industry • Hydrodynamic connection between harbors and eastern San Pedro Bay and the ocean discharges	All constituents	WS-1
Legacy and Current Contamination	• Past watershed inputs and historic port activities • Current port activities and watershed inputs • Resuspension and redistribution	All constituents	WS-1
WS-1: Employ all available means to support efforts to reduce upstream pollutant loadings that adversely affect harbor water and sediment quality.			

4.5.3 Description of Control Measure

Control Measure WS-1: Support Pollutant Loading Reduction Efforts

Employ all available means to support efforts to reduce upstream pollutant loadings that adversely affect harbor water and sediment quality.

Participating in local and regional efforts to characterize pollutant inputs to the harbors from outside sources and participating in watershed planning efforts will support regional efforts at pollution reduction.

Current Status: As described in Section 2.1, the regulatory agencies are developing TMDLs for the Dominguez watershed. Characterization of pollutant loads to water bodies that empty into the harbors has been carried out by a number of regional organizations, most notably SCCWRP and the LA-RWQCB. The Ports have participated in these efforts through the bight-wide studies (see section 2.3.1 and 2.8), the Dominguez Channel Los Angeles/Long Beach Harbors TMDL Technical Advisory Committee, and participation in the Dominguez Watershed Advisory Council. Inputs via ocean circulation and air deposition, while recognized as potential sources, have not been fully addressed on either a local or regional level.

TMDL Development: A key watershed-wide water quality initiative is the TMDL program (see Section 2.1.1). The TMDL process involves municipalities, industries, regulatory agencies, and the public throughout Los Angeles County. TMDL development processes of concern to the Ports are underway for the Dominguez Channel, Machado Lake, and the Los Angeles River. Some TMDLs are already in place (Los Angeles River Trash, effective September 23, 2008, Los Angeles River Metals, effective October 29, 2008, Los Angeles Harbor Bacteria, effective March 1, 2005, Machado Lake Trash, effective March 6, 2008, Machado Lake Nutrients, effective March 11 2009) and others are in development, including Dominguez Channel and Los Angeles/Long Beach Harbor Toxic Pollutants (encompassing multiple TMDLs) and Los Angeles River Bacteria. Each TMDL will include a monitoring and implementation plan that will facilitate effective management and compliance. The coordination of TMDL monitoring and implementation activities among watershed stakeholders is a key process in meeting numeric limits and improving water quality upstream and to the downstream receiver, the harbor.

MS4 Permits: The City of Los Angeles and POLA are currently regulated under the Los Angeles Countywide MS4 Permit, and the City of Long Beach and POLB are regulated under a separate MS4 permit held by the City of Long Beach. These permits require the

cities to conduct a number of activities related to stormwater pollution prevention, including street sweeping, catch basin cleaning, public outreach, SUSMP implementation, SWPPP implementation, and public agency activities programs. The countywide permit that includes Los Angeles also includes an industrial/commercial facilities control program. The MS4 permits also require compliance monitoring and reporting, which provides information that facilitates watershed-wide planning and evaluation.

Watershed Projects: The City of Los Angeles has undertaken a number of upstream water quality improvement projects that will have beneficial effects on harbor water quality. These include several Proposition O projects near the harbors (e.g., Machado Lake Water Quality Improvement and Rehabilitation, Wilmington Drain Rehabilitation, and Peck Park Rehabilitation) as well as similar projects throughout the Dominguez watershed. Other municipalities in the watershed are undertaking similar efforts.

Other Watershed Activities: In addition to MS4 and TMDL activities, watershed improvements, monitoring, data generation, and watershed planning are occurring through other various stakeholder groups and agencies. Monitoring efforts include the City of Los Angeles‟ Status and Trends program, Cabrillo Beach bacteria monitoring, and Machado Lake Trash monitoring. Data gathering efforts include hydrodynamic models undertaken by EPA and the Ports (see Section 2.3), regional studies such as Bight „08 conducted by SCCWRP, special studies conducted by the Ports and their cities, and the ongoing air deposition study being coordinated by SCCWRP. The principal regional planning study relevant to the harbors is the ongoing project planning and implementation of the DWAC‟s Dominguez Watershed Management Master Plan.

These regional efforts have thus far provided preliminary information on pollutant inputs from the Dominguez Channel and on pollutant loads in the Los Angeles River. The Dominguez Channel TMDL effort has identified the need for substantially more information. Much less is known about inputs from storm drains that serve areas outside the harbors but empty into the harbors, and about the role of oceanic circulation in moving pollutants into and out of the harbors. In an effort to address one of those data gaps, the Ports have supported the development of a WRAP-related hydrodynamic model of the harbors (see Section 2.3.2) that will help define the role of pollutant loading on harbor water quality. Air deposition has been discussed in various southern California working groups, but only limited studies have been undertaken to measure the role of aerial deposition in pollutant transport or its contribution to pollutant loading of harbor waters.

Required Actions: Comprehensive characterization of pollutant loading from rivers, streams, and municipal storm drains entering the harbor complex will require the concerted efforts of local, regional, state, and federal entities, including the EPA, the LA-RWQCB, industry groups, municipalities, and the Ports. The agencies need to complete the process of developing and adopting TMDLs for the watershed, and incorporating those TMDLs into upstream NPDES permits. Agencies and upstream dischargers will need to develop implementation plans to ensure compliance with TMDLs to achieve reduction of pollutant loads into the harbors.

Aerial deposition is, by its nature, a regional phenomenon, involving a complex mix of sources and sinks spreading across many jurisdictions. Accordingly, a meaningful characterization of transport and deposition can only be undertaken as a multi-agency, regional effort based upon a scientifically sound scope of work and with adequate funding.

Through the DWAC and the TMDL process the Ports will continue to participate in and will urge the initiation and continuance of water quality and sediment characterization studies in the Dominguez Channel and the Los Angeles River, and will help support those studies as appropriate. Both ports will work with the LA-RWQCB, other city departments, and appropriate municipalities to characterize the discharges of storm drains that drain areas outside the ports, and will work with those entities to identify port and non-port contributions.

The Ports will continue development, validation, and testing of the WRAP hydrodynamic model of the harbor complex. Data from pollutant loading studies will be incorporated into the model as they become available, and modeling results will be shared with the agencies and TMDL stakeholders.

The Ports will continue their participation in regional working groups to address river and channel inputs and will continue analytical projects to characterize storm drain inputs. The City of Los Angeles is participating in the ongoing Los Angeles River air deposition study, and the Ports will continue to monitor the progress of that study.

Throughout the Dominguez Channel TMDL development efforts, the Ports and their respective cities will encourage the LA-RWQCB and EPA to acknowledge the responsibility of upstream dischargers for their contributions to watershed pollution and to use their authority to address those discharges. The Ports will employ all the means at their disposal, including the possibility of pursuing legal remedies, to support agency efforts aimed at reducing pollutant loadings from upstream that adversely affect harbor water and sediment quality.

Schedule: The Ports‟ participation in watershed management efforts will be a continuous process. The Ports will be involved with a variety of projects and initiatives, each with its own schedule tied to the schedules, priorities, and funding of various agencies and other entities outside the Ports.

Monitoring and Metrics: Each of these watershed-wide actions, comprising numerous independent projects, will have its own monitoring and performance metrics. Port staff will continue to monitor and report on the status of the various watershed activities as part of the regular WRAP reporting.

4.6 Technology Advancement Program

The WRAP"s TAP is intended to evaluate, demonstrate, and incorporate new technologies into the suite of control measures by which the Ports will advance towards their goal of protecting and improving water and sediment quality in the harbor complex. The TAP will establish and promote cooperative relationships among the Ports, their tenants, regulatory agencies, and industry to accomplish that goal.

For emerging technologies that appear to warrant testing in the port environment, the Ports and other stakeholders will work together to identify funding opportunities, secure field testing locations, establish testing protocols, and pursue the actual demonstration projects. Funding sources are expected to include, as economic conditions permit, federal and state grant programs, matching industry entrepreneurial funding, and port revenues as available. Demonstrations that prove to be successful and deemed feasible in the port environment will be incorporated into WRAP control measures as appropriate.

4.7 Schedule

Each control measure described in this WRAP has a schedule. In general, the schedules involve program or guidance development activities in the short term, followed by program implementation. As Table 4-4. Schedule For Control Measures) shows, a number of measures are expected to be implemented within six months of the adoption of the WRAP, with the ultimate goal of having all of WRAP measures implemented by the end of 2010. Details of the schedule for each measure are presented with the measure.

Table 4-4. Schedule For Control Measures

CONTROL MEASURE	POLB	POLA
LU-1: Housekeeping BMPs	End of 2009: Will identify 1st set of new measures to implement through on-going annual inspections	End of 2009: Develop Inspection Strategy End of 2010: Identify 1st set of measures to implement through inspections
LU-2: Design Guidance Manual	Draft Manual Mid 2010	
LU-3: Structural BMPs	On-going: Identified through annual inspections	End of 2009: Develop Inspection Strategy End of 2010: Identify 1st set of measures to implement through inspections
LU-4: Stormwater/Dust Control for Orphan Sites	On-going	End of 2010
LU-5: Litter Control Program	Mid 2010	End of 2010
LU-6: Public Area Sweeping Programs	End of 2009: List of recommendations	Mid 2010: List of recommendations
LU-7: Port-wide Stormwater Construction Permits	On-going: Existing program review and revision Mid 2009: Begin negotiations with LA-RWQCB	
LU-8: Remote Sites Compliance Programs	End of 2010: Adopt and implement Final Management Plan	
OW-1: Vessel Guidance Manual	End of 2009	
OW-2: Piling Replacement Policy & Standards	End of 2010	
OW-3: BMPs & Standards for Port Cathodic Protection	End of 2010	
S-1: Operations Sediment Management Plan	Mid 2010: Complete Draft Plan End of 2010: Adopt Final Management Plan	
S-2: Legacy Contaminated Sediment Management Policy	Subject to completion of the TMDL process	
WS-1: Watershed Activities	On-going	

4.8 Relationship to Regulatory Requirements

None of the control measures in this WRAP is specifically required by current regulations, but some are clearly intended to improve how the Ports comply with regulations. Specifically, measures LU-1 and LU-3 through LU-7 establish procedures and initiatives that will enhance the current storm water programs through which the Ports and their respective cities comply with the GIASP, GCASP, and Municipal Stormwater NPDES permits. In that sense, portions of those measures go beyond current regulatory requirements.

The remaining control measures address issues and establish procedures and initiatives well beyond current or anticipated regulatory requirements. LU-2 is intended to improve the Ports‟ stormwater management facilities in order to reduce potential pollutant inputs, but it is not part of any permit program. LU-8 reaches out beyond the existing stormwater permit programs, using the Ports‟ landlord authority to control port-owned properties elsewhere in the region.

All three on-water measures, OW-1, OW-2, and OW-3, were developed primarily to improve harbor water quality as part of the Ports‟ natural resources stewardship mandate, not in response to legislation or regulations. They are intended to help the Ports, their tenants, and other port users comply with federal and state regulations. For example, Measure OW-2 will help the Ports comply with future TMDL requirements related to copper, which is a component of treated wood pilings, but there is no current permit program that would require the Ports to have a piling replacement policy or program, and a similar situation exists with respect to OW-3 and zinc.

Both sediment measures, S-1 and S-2, will enhance sediment management efforts undertaken by the Ports, but neither is part of a permit or regulatory program. Both measures will help the Ports comply with existing regulations governing sediment dredging and disposal.

Since port participation in watershed activities is not required by regulation, Measure WS-1 goes beyond current regulatory requirements. However, the Ports regard their participation as a prudent course to ensure that all responsible parties address upstream pollutant loading that can adversely affect harbor water and sediment quality.

SECTION 5: COSTS

The control measures described in this WRAP consist largely of plan formulation and the expansion and reorganization of activities that the Ports are already engaged in. Accordingly, the cost of implementation of the control measures will be predominantly from staff and consultant time. Typical costs would include staff and consultant time to evaluate and modify existing programs (e.g., LU-1, LU-6, OW-2), develop guidance (e.g., LU-2, OW-1, OW-3, S-1), conduct public education and tenant and public outreach (e.g., LU-5, OW-1), and participate in stakeholder groups (e.g., watershed activities).

Several control measures will likely involve capital costs at the implementation phase (e.g., LU-3, LU-6). In the case of structural BMPs (LU-3), implementation costs for the installation and maintenance of specific measures would be evaluated on a case-by-case basis and could be borne by the port, the tenant, or both. For example, installation of a stormwater catchment basin could cost tens of thousands of dollars, whereas installation of trash fencing might cost a few thousand dollars, and such items as new street sweeping or waterborne trash collection equipment could be on the order of hundreds of thousands or a few million dollars, but other capital expenditures (e.g., additional trash receptacles) would be relatively modest.

The TAP will involve unknown costs, and the schedule for incurring those costs is unknown. As worthy projects are identified, the Ports will seek federal, state, and local grant funding, as well as other sources of funds.

SECTION 6: NEXT STEPS

6.1 Updates

This WRAP is a living document in the sense that the Ports expect to modify it as circumstances warrant. Periodic review of the WRAP by the Ports will determine the need for an update. Updates could be warranted by regulatory changes such as issuance of TMDLs and substantially modified NPDES permits, and the addition of new control measures.

6.2 Progress Reports

As control measures are developed and implemented, staff of the two Ports will report to their Boards on progress and on any other relevant information. These progress reports will be submitted annually on or near the anniversary of the adoption of the WRAP. The reports will not modify the WRAP itself, but rather inform the Boards on its implementation.

SECTION 7: REFERENCES

Anderson, J.W., S.M. Bay, and B.E. Thompson. 1988. Characteristics and Effects of Contaminated Sediments from Southern California. Southern California Coastal Water Research Project.

Bechtel National, Inc. (Bechtel). 2003. Final Feasibility Study Report, Installation Restoration Site 7, Naval Station Long Beach. Long Beach, CA.

Bay Protection Toxics Control Program (BPTCP). 2008 (website updated). Available Online at: http://www.waterboards.ca.gov/water_issues/programs/bptcp/

EMAP (Environmental Monitoring and Assessment Program). 2005. West EMAP Information Management Plan. Coastal EMAP Small Estuaries. National Estuary Program Coastal Condition Report. United States Environmental Protection Agency, Office of Water/Office of Research and Development/EPA-842/B-06/001. 2006. www.epa.gov/nccr and www.epa.gov/emap/ .

Everest. 2009. Los Angeles and Long Beach Harbor Model Development for the Water Resources Action Plan. Prepared by Everest International Consultants, Inc. for the Port of Los Angeles and the Port of Long Beach. April 2009.

Kozelka, P. 2009. US Environmental Protection Agency Region IX. Personal Communication. April.

LA CSTF (Los Angeles Regional Contaminated Sediment Task Force). 2005. Long-Term Management Strategy. Prepared for the California Coastal Commission, Los Angeles Regional Water Quality Control Board, US Environmental Protection Agency, US Army Corps of Engineers Los Angeles District, LA County Department of Beaches and Harbors, Southern California Coastal Water Research Project, California Department of Fish and Game, NOAA Fisheries, Port of Los Angeles, Port of Long Beach, City of Long Beach, Heal the Bay by Anchor Environmental, Everest International Consultants, and AMEC Earth and Environmental. May 2005.

LA RWQCB (Los Angeles Regional Water Quality Control Board). 1995. Water Quality Control Plan, Los Angeles Region. Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties.

LA RWQCB (Los Angeles Regional Water Quality Control Board). 2007. Surface Water Ambient Monitoring Program (SWAMP) – Water Quality in the Dominguez

Channel and Los Angeles/Long Beach Harbor Watershed Management Area (2002-2003).

LA RWQCB and EPA Region IX (Los Angeles Regional Water Quality Control Board and US Environmental Protection Agency Region IX). 2008. Total Maximum Daily Loads for Toxic Pollutants in Dominguez Channel and Greater Los Angeles and Long Beach Harbor Waters. Draft: Water Quality Assessment, Problem Statement, Numeric Targets.

Lyons, M.J. and S. Birosik. 2007. Water Quality In The Dominguez Channel and Los Angeles/Long Beach Harbor Watershed Management Area Under The Surface Water Ambient Monitoring Program Fiscal Year 2002-2003.

MBC (MBC Applied Environmental Sciences). 2007. 2007 Annual Report, Storm Water Discharge Monitoring, Port of Long Beach. Prepared for the Port of Long Beach Planning Division, June 2007.

MBC. 2008. 2008 Annual Report, Storm Water Discharge Monitoring, Port of Long Beach. Prepared for the Port of Long Beach Planning Division, June 2008.

MEC Analytical Systems. 2002. Ports of Long Beach and Los Angeles Year 2000 Biological Baseline Study of San Pedro Bay. June.

OEHHA [Office of Environmental Health Hazard Assessment]. 1999. Prevalence of Selected Target Chemical Contaminants in Sport Fish from Two Californa Lakes: Public Health Designed Screening Study. June 1999, RK Brodberg and GA Pollack, Pesticide and Environmental Toxicology Section, Office of Environmental Health Hazard Assessment, California EPA, Sacramento, CA.

Parkhurst, J.D., 1966. Dominguez Channel Study. Sanitation Districts of Los Angeles County.

Port of Long Beach. 2000. Port of Long Beach Master Storm Water Program. Environmental Planning Division.

SCCWRP (Southern California Coastal Water Research Project). 2003. Southern California Bight 1998 Regional Monitoring Program. Prepared by the Southern California Coastal Water Research Project, Costa Mesa, CA. ftp://ftp.sccwrp.org/pub/download/DOCUMENTS/TechnicalReports/386

SCCWRP. 2007. Southern California Bight 2003 Regional Monitoring Program. Prepared by the Southern California Coastal Water Research Project, Costa Mesa, CA. ftp://ftp.sccwrp.org/pub/download/DOCUMENTS/BightPlanningDocuments/Bight03/B03ES_final.pdf.

SWRCB (State Water Resources Control Board). 2004. Water Quality Control Policy for Developing California"s Clean Water Act Section §303(d) List.

SWRCB website. California State Water Resources Control Board. Total Maximum Daily Load Program. http://www.swrcb.ca.gov/water_issues/programs/tmdl/background.shtml

Stein, ED, LL Tiefenthaler, and K.C. Schiff. 2007. Sources, patterns and mechanisms of storm water pollutant loading from watersheds and land uses in the greater Los Angeles area, California, USA. Southern California Coastal Water Research Project Technical Report 510.

WEMAP (Western Environmental Monitoring and Assessment Program). 1999. National Coastal Condition Report. Environmental Protection Office of Water. United States Environmental Protection Agency, Office of Research and Development/ EPA-620/R-01/005. September 2001. Agency Washington, DC 20460. http://www.epa.gov/region09/water/wemap/.

Weston Solutions, Inc. (WESTON). 2005. Final Report. Chemical and Geotechnical Characterization of Sediments in the Vicinity of Southwest Marine, Port of Los Angeles, Port of Los Angeles, Environmental Management. December.

Weston Solutions, Inc. (WESTON). 2006. Draft Report. Contaminant Concentrations in Marine Sediments and Seawater Adjacent to Westway Terminal, Inc. Berths 70-71, Port of Los Angeles. Port of Los Angeles, Environmental Management. December.

Weston Solutions, Inc. (WESTON). 2007a. Final Report Characterization of Sediment Contaminant Flux for the Inner Harbor and Outer Harbor Waterbodies to Support Sediment TMDL Implementation Ports of Los Angeles and Long Beach, California. May.

Weston Solutions, Inc. (WESTON). 2007b. Final Report. Chemical and Geotechnical Characterization of Sediments in the Vicinity of Al Larson Boat Shop, Port of Los

Angeles. Prepared for the Port of Los Angeles, Environmental Management. April.

Weston Solutions, Inc. (WESTON). 2007c. Final Report. Chemical and Geotechnical Characterization of Sediments within the Cerritos Yacht Anchorage Leasehold Area, Port of Los Angeles. Prepared for Port of Los Angeles, Environmental Management. April.

Weston Solutions, Inc. (WESTON). 2007d. Final Report. Chemical and Geotechnical Characterization of Sediments within the Colonial Yacht Anchorage Leasehold Area, Port of Los Angeles. Prepared for Port of Los Angeles, Environmental Management. April.

Weston Solutions, Inc. (WESTON). 2007e. Final Report. Chemical Characterization of Sediments within the Southwest Marine Leasehold Areas for Use in Remediation Efforts, Port of Los Angeles. Prepared for Port of Los Angeles, Environmental Management. May.

Weston Solutions, Inc. (WESTON). 2007f. Final Report Chemical and Geotechnical Characterization of Sediments within the Wilmington Marine Service Leasehold Area, Port of Los Angeles. Prepared for Port of Los Angeles, Environmental Management. April.

Weston Solutions, Inc. (WESTON). 2007g. White Paper. Preliminary Characterization of Mercury Concentrations and Potential Environmental Impacts in Sediments, Port of Los Angeles. Prepared for Port of Los Angeles, Environmental Management. April.

Weston Solutions, Inc. (WESTON). 2007h. Draft Report Pre-Design Sediment Sampling IR Site 7 (West Basin) Sediment Remediation Project, Port of Long Beach, California. December.

Weston Solutions, Inc. (WESTON). 2008. Draft Report Sediment Characterization in Support of the Water Resources Action Plan, Ports of Los Angeles. September.

APPENDICES

A: AMEC Earth & Environmental, Inc. (AMEC). 2009. Harbor Ambient Water Quality Summary in Support of the Water Resources Action Plan. Draft report prepared for the Port of Los Angeles and the Port of Long Beach, April.

B1: Weston Solutions, Inc. (WESTON). 2009. Sediment Characterization in Support of the Water Resources Action Plan. Draft report prepared for the Port of Los Angeles, March.

B2: Weston Solutions, Inc. (WESTON). 2009. Sediment Characterization in Support of the Water Resources Action Plan. Draft report prepared for the Port of Long Beach, March.