

**FIRST FIVE-YEAR REVIEW REPORT FOR
PALOS VERDES SHELF (OPERABLE UNIT 5 OF THE
MONTROSE CHEMICAL CORPORATION SUPERFUND SITE)**

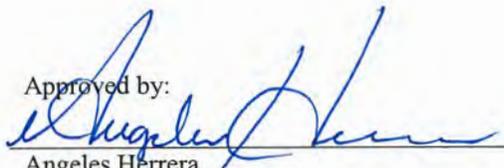
LOS ANGELES COUNTY, CALIFORNIA



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Executive Summary

This is the first Five-Year Review (FYR) for Palos Verdes Shelf (PV Shelf), Los Angeles County, California. PV Shelf is Operable Unit 5 of the Montrose Chemical Corporation Superfund Site, 20201 Normandie Avenue, Los Angeles, California. Montrose Operable Unit 5 encompasses a deposit of contaminated seafloor sediment about 88 square kilometers in size. The deposit sits on the continental shelf and slope off the coast of the Palos Verdes Peninsula, Los Angeles County, California, at water depths ranging roughly from 40 to 200 meters or greater. Sediment, ocean water, fish, and other ecological receptors at PV Shelf are contaminated due to discharged wastes from Montrose and other industries that entered the sanitary sewers and were released to the environment at the White Point ocean outfalls. The contaminants at Palos Verdes Shelf are DDT and its metabolites (referred to as “Total DDTs”), and congeners of polychlorinated biphenyls (referred to as “Total PCBs”). The quality of the wastewater discharge from the White Point outfalls has improved over the years – DDTs have not been detected in White Point discharge since 2002, and PCBs have not been detected since 1985.

In the Interim Record of Decision, the United States Environmental Protection Agency (EPA) selected an interim remedy for Palos Verdes Shelf to protect human health and the environment. This interim remedy consists of the following:

- Institutional controls component – Continue and strengthen the institutional controls program for PV Shelf that originated as a non-time-critical removal action.
- Monitored natural recovery component – Monitor the ongoing, naturally occurring processes that contain, destroy, or reduce the bioavailability or toxicity of contaminants in sediment.
- Isolation cap component – Place an in situ isolation cap over portions of the PV Shelf sediment bed that are erosive or are highly contaminated or both.

Currently, the interim remedy is progressing and remains protective of human health and the environment. The institutional controls program is well established and has been and remains effective in protecting human health. Site-specific processes of monitored natural recovery are evident and appear to be effective in reducing risk to human health and ecological receptors; these processes include biotransformation, burial, and mixing in place. In 2009, EPA conducted a baseline sediment sampling program which indicated lower than expected concentrations of DDTs and PCBs in the Palos Verdes Shelf sediment. The concentrations were so much lower than expected that the Palos Verdes Shelf Technical Exchange Group (PVSTIEG) initially expressed concern about relying on the results. However, PVSTIEG ultimately supported EPA’s decision to postpone implementation of the isolation cap component of the interim remedy, with the understanding that EPA will validate the 2009 sediment results by conducting additional sediment, water, and fish sampling programs. Additional response actions that can accelerate recovery, e.g. capping, will be assessed after the data from these programs are evaluated. At this time, no information has become available that would call into question the protectiveness of the remedy.

Although uncertainty exists regarding the 2009 sediment sampling data, results of that study and additional sampling programs and research by EPA and others indicate that natural recovery processes are occurring. The combination of institutional controls and monitored natural recovery is effective and is making progress towards attaining the specific interim cleanup goals and timelines set forth in the Interim Record of Decision.

EPA is currently conducting additional studies of the sediment, water column, fish tissue, and outreach effectiveness to validate the 2009 sampling results and the protectiveness of the remedy. The results of these additional studies will be used to evaluate remedy protectiveness as part of the next Five-Year Review.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Palos Verdes Shelf, Operable Unit 5 of the Montrose Chemical Superfund Site		
EPA ID: CAD008242711		
Region: 9	State: California	City/County: Los Angeles/Los Angeles County
SITE STATUS		
NPL Status: Proposed		
Multiple OUs? No	Has the site achieved construction completion? No	
REVIEW STATUS		
Lead agency: EPA If "Other Federal Agency" was selected above, enter Agency name:		
Author name (Federal or State Project Manager): Judy Huang, P.E.		
Author affiliation: EPA		
Review period: September 30, 2009 – March 31, 2014		
Date of site inspection: N/A		
Type of review: Statutory		
Review number: 1		
Triggering action date: September 30, 2009 – signature of the IROD		
Due date (<i>five years after triggering action date</i>): September 30, 2014		

Five-Year Review Summary Form (continued)

Protectiveness Statement		
<i>Operable Unit:</i> OU 5 of Montrose Chemical Corporation Superfund Site	<i>Protectiveness Determination:</i> Protective	<i>Addendum Due Date (if applicable):</i>
<i>Protectiveness Statement:</i> The interim remedy at Montrose Chemical Corporation Operable Unit 5 (Palos Verde Shelf) is protective of human health and the environment. Institutional controls are in place and are effective in protecting users of PV Shelf. Results of sampling programs and research by EPA and others indicate that natural recovery processes are occurring. The combination of institutional controls and monitored natural recovery is effective and is progressing towards attaining the specific interim cleanup goals and timelines set forth in the Interim Record of Decision.		

Contents

Executive Summary	i
Five-Year Review Summary Form	iii
List of Figures	vi
List of Tables	vi
List of Appendices	vii
List of Acronyms	viii
First Five-Year Review for Palos Verdes Shelf	1
1. Introduction	1
2. Site Chronology	2
3. Background	3
3.1. Physical Characteristics.....	3
3.2. Geology.....	4
3.3. Land and Resource Use	4
3.4. History of Contamination.....	4
3.5. Initial Response Actions.....	5
3.6. Basis for Taking Action	5
4. Remedial Action	5
4.1. Remedy Selection.....	5
4.2. Remedy Implementation.....	7
4.3. Operation and Maintenance (O&M)	9
5. Progress Since the Last Five-Year Review	9
6. Five-Year Review Process	9
6.1. Administrative Components	9
6.2. Community Involvement	9
6.3. Document Review.....	10
6.4. Data Review	14
6.5. Site Inspection	19
6.6. Interviews	19
6.7. Institutional Controls	22

7. Technical Assessment.....	22
7.1. Question A: Is the remedy functioning as intended by the decision documents?	22
7.2. Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives (RAOs) Used at the Time of Remedy Selection Still Valid? ..	24
7.3. Question C: Has Any Other Information Come to Light That Could Call Into Question the Protectiveness of the Remedy?	24
7.4. Technical Assessment Summary	24
8. Issues	25
9. Recommendations and Follow-up Actions	25
10. Protectiveness Statement.....	25
11. Next Review	25

List of Figures

Figure 1	Location Maps - PV Shelf Study Area
Figure 2	Fish Collection Locations - 2009 through 2012 (Institutional Controls Program)
Figure 3A	Monitored Fish Markets (1) (Institutional Controls Program)
Figure 3B	Monitored Fish Markets (2) (Institutional Controls Program)
Figure 4	Lobster Collection Locations – Year 2011 (Institutional Controls Program)
Figure 5	Locations of Baseline Sediment Cores (2009 Sampling Event)
Figure 6	Locations of Outfall Area Sediment Cores (2009 Sampling Event)
Figure 7	Carbon-Normalized Total DDTs in Sediment Bed 0-8-cm Interval (2009 Data Set)
Figure 8	Carbon-Normalized Total PCBs in Sediment Bed 0-8-cm Interval (2009 Data Set)
Figure 9	Locations of PSDs (2010 Water Sampling Program)
Figure 10	Locations of Flux Platforms (2011 Flux Study)

List of Tables

Table 1	Site Chronology
Table 2	Cleanup Levels for PV Shelf
Table 3	Evaluation of Applicable or Relevant and Appropriate Requirements
Table 4	Summary of Health Risks due to Consumption of White Croakers
Table 5	Summary of Health Risks due to Consumption of Lobster Tails and Tomalley
Table 6	Comparison of EPA’s 2009 Sediment Data to Previous Investigations
Table 7	Site-Wide Mean Contaminant Concentrations in Sediment (with Cleanup Goals)
Table 8	Site-Wide Average Concentrations of Dissolved Contaminants in Seawater (with Cleanup Goals)
Table 9	Ranges of Contaminant Concentrations in White Croakers (Skin-off Filets) – Institutional Controls Program 2008-2012
Table 10	Ranges of Contaminant Concentrations in Lobsters – Institutional Controls Program 2011

List of Appendices

Appendix A	List of Documents Reviewed
Appendix B	Press Notices
Appendix C	Interview Forms
Appendix D	Site Inspection Checklist
Appendix E	Photographs from Site Inspection Visit

List of Acronyms

ARARs	applicable or relevant and appropriate requirements
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cm	centimeters
EPA	United States Environmental Protection Agency
FCEC	Fish Contamination Education Collaborative
FYR	five-year review
IROD	Interim Record of Decision
JWPCP	Joint Water Pollution Control Plant
µg/kg	micrograms per kilogram (parts per billion)
Montrose	Montrose Chemical Corporation
ng/L	nanograms per liter (parts per trillion)
NOAA	National Oceanic and Atmospheric Administration
NPL	National Priorities List
OC	organic carbon
OEHHA	Office of Environmental Health Hazard Assessment
OU	operable unit
PCBs	polychlorinated biphenyls
PV Shelf	Palos Verdes Shelf
PVSTIEG	Palos Verdes Shelf Technical Information Exchange Group
RAO	remedial action objective
SAIC	Science Applications International Corporation
Sanitation Districts	Sanitation Districts of Los Angeles County
SCCWRP	Southern California Coastal Water Research Project
SMCA	State Marine Conservation Area

First Five-Year Review Report

for

Palos Verdes Shelf

1. Introduction

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy will continue to be protective of human health and the environment. The methods, findings, and conclusions of FYRs are documented in reports that identify issues found during the review, if any, and document recommendations to address them.

The United States Environmental Protection Agency (EPA) prepares FYRs pursuant to Section 121 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC §9621. Section 121 states:

“If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.”

EPA interpreted this requirement further in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR §300.430(f)(4)(ii), which states:

“If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such actions no less often than every five years after the initiation of the selected remedial action.”

EPA conducted the FYR and prepared this report regarding the remedy implemented at Palos Verdes Shelf (PV Shelf), Los Angeles County, California. PV Shelf is operable unit (OU) 5 of the Montrose Chemical Corporation Superfund Site. EPA Region 9 is the lead agency for developing and implementing the remedy for the Site. The Department of Toxic Substances Control (DTSC) is the

support agency representing the State of California, and has reviewed supporting documentation and provided input to EPA during the FYR process.

This is the first FYR for PV Shelf, and is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that would allow for unlimited use and unrestricted exposure. The triggering action for this statutory review was the signing of the Interim Record of Decision (IROD) that occurred in September of 2009.

The Montrose Chemical Corporation (Montrose) Superfund Site consists of seven operable units:

- Operable Unit 1: on/near property soil
- Operable Unit 2: stormwater pathway
- Operable Unit 3: ground water and dense non-aqueous phase liquids
- Operable Unit 4: historic stormwater pathway-north
- Operable Unit 5: PV Shelf
- Operable Unit 6: historical stormwater pathway-south
- Operable Unit 7: Jones Chemicals Inc.

This FYR only addresses EPA's response actions at PV Shelf; FYRs for the other Montrose operable units are being conducted separately.

PV Shelf is considered part of the Montrose Site because the source of the contamination is the former Montrose Chemical plant. Montrose discharged wastes containing DDT into the Sanitation Districts' sanitary sewer. Other industries also sent wastes containing PCBs and metals to the sanitary sewer.

The Sanitation Districts' sewer system carried wastes to the Joint Water Pollution Control Plant at Carson, from which treated wastewater containing contaminants including DDT, PCBs, and metals reached the Pacific Ocean via the Districts' White Point outfall system. The wastes were released through the diffuser portions of the outfall pipes, situated on the seafloor roughly 9 miles from the former Montrose Chemical Plant (see Figure 1). Likely sources of contaminants at PV Shelf other than the White Point outfall system include outfalls related to stormwater drains; ocean dumping of sediment from navigational dredging; ocean dumping of waste drums; and uncontrolled runoff from regional manufacturing and storage facilities.

Though metals including mercury have been detected in samples of fish caught at PV Shelf, metals were not addressed in this FYR. Several previous in-depth studies have indicated that metals are not significant risk drivers at PV Shelf, when compared to DDTs and PCBs (SAIC, 1999; CH2M Hill, 2003).

2. Site Chronology

Table 1 lists the notable events for PV Shelf.

Table 1. Site Chronology

Event	Date
Montrose operates a DDT-manufacturing plant on Normandie Avenue near Torrance, California.	1947 - 1982
Montrose discharges DDT-contaminated wastes from its Torrance plant to sanitary sewers operated by the Sanitation Districts. The sewers flow to the JWPCP at Carson. From JWPCP, treated wastewater containing DDTs and other industrial pollutants is released to the environment through ocean outfalls off White Point on the Palos Verdes Peninsula.	1953 - 1971
EPA adds Montrose's Normandie Avenue facility to the National Priorities List.	October 1989
EPA initiates Non-Time-Critical Removal Action to evaluate risks posed by DDT and PCB effluent-affected sediment at PV Shelf and the feasibility of response actions that could reduce threats to human health and the environment.	July 1996
EPA issues human health risk assessment and concludes that consumption of fish caught from PV Shelf poses a health risk due to high levels of chemicals of concern, i.e., DDTs and PCBs.	1999
EPA issues the Engineering Evaluation/Cost Analysis for PV Shelf identifying institutional controls as the preferred alternative.	March 2000
EPA conducts pilot study to assess the feasibility of using capping as a remedial alternative.	September 2000
EPA issues the Action Memorandum that initiates implementation of the institutional controls program.	September 2001
EPA conducts data gap studies including geotechnical study, large bioturbator study, resuspension study, and oceanographic study.	2004
EPA issues the final remedial investigation report for PV Shelf.	October 2007
EPA issues the final feasibility study report.	May 2009
EPA conducts pre-design studies including 2009 sediment sampling program and fish movement study.	2007-2013
EPA signs and issues Interim ROD.	September 2009

3. Background

3.1. Physical Characteristics

PV Shelf encompasses a bed of contaminated solids (sediment) that has settled on the seafloor in the Pacific Ocean at water depths varying from about 40 to 200 meters or greater. The bed of contaminated sediment is situated on the western edge of the North American continental shelf off the Palos Verdes Peninsula in southern California. The distance from the shoreline to the inshore edge of the sediment bed (water depth = 40 meters) is about 1.5 kilometers. Catalina Island, one of the Channel Islands, is the closest island to PV Shelf, at a distance of about 42 kilometers.

The sediment bed is about 1.5 to 4 kilometers in width and about 25 kilometers in length. The continental shelf in this area slopes in the seaward direction at about 1 to 4 degrees. A shelf break (i.e., the zone of transition from the relatively flat shelf to the steeper continental slope) occurs at water depths of 70 to 100 meters. The seafloor then drops sharply at a slope of about 13 degrees to a water depth of 800 meters (Lee, 1994). Figure 1 is a map showing the PV Shelf Study Area with bathymetry (depth) isobaths. The bed of contaminated sediment lies within the boundaries of the PV Shelf Study Area.

3.2. *Geology*

PV Shelf and the Palos Verdes Peninsula are parts of the California continental borderland that extends from Santa Barbara, California, to the Vizcaino Peninsula in Baja California, Mexico. The Palos Verdes Peninsula is a tectonic fault block of seafloor sediment and volcanic debris on a submerged mountain of metamorphic rocks that began rising out of the Pacific Ocean 1.5 million years ago. PV Shelf is a submerged continuation of the Palos Verdes Peninsula and extends approximately 4 kilometers offshore to the southwest (EPA, 2009b).

3.3. *Land and Resource Use*

Current Use

The contaminated sediment bed at PV Shelf is too deep for direct human contact. Fishing activities at portions of PV Shelf have been restricted by the California Department of Fish and Wildlife (CDFW) through its enforcement of the commercial catch ban for white croaker that was initiated in May 1990 (California Fish and Game Code § 7715(a) & (b) and California Code of Regulations Title 14, Section 104; see Figure 2). Recently in 2013, under the Marine Life Protection Act, CDFW designated two marine protection areas, the Abalone Cove State Marine Conservation Area (SMCA) and the Point Vicente No-Take SMCA, that are partially within the footprint of the PV Shelf Study Area (Figures 1 and 2). CDFW's marine protection areas are intended to protect natural habitats and marine life by protecting or limiting removal of wildlife from within their boundaries.

For the Abalone Cove SMCA, take (i.e., hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill) of any living marine resource is prohibited with the following exceptions: (1) recreational take of pelagic finfish, including Pacific bonito, and white seabass by spearfishing, and market squid by hand-held dip net is allowed; and (2) commercial take of coastal pelagic species and Pacific bonito by round haul net, and swordfish by harpoon is allowed. For the Point Vicente No-Take SMCA, take of any living marine resource is prohibited. For both the Abalone Cove and Point Vicente SMCAs, take pursuant to remediation activities associated with PV Shelf (Montrose OU 5) is allowed.

Other than these restrictions, the area at PV Shelf is open for other commercial and sport fishing. Sport fishermen angle from boats, rocky intertidal areas, and sandy beaches. Sport fishing also includes shell-fishing for lobsters and crabs in the near-shore, shallow waters of the Palos Verdes Peninsula. Other activities that occur in this coastal area include boating, swimming, windsurfing, surfing, scuba diving, snorkeling and shell-fishing.

3.4. *History of Contamination*

From 1953 until 1971, Montrose discharged DDT-contaminated wastes from its manufacturing operations at the Normandie Avenue facility to the sanitary sewer collection system operated by the Sanitation Districts. These sewers conveyed the wastes to the Sanitation Districts' Joint Water Pollution Control Plant in Carson, California, where the wastes received primary treatment. Treated wastewater was discharged to the Pacific Ocean through the Sanitation Districts' White Point outfalls located on PV Shelf. Montrose ceased discharges to the sanitary sewer in 1971. The estimated mass of DDTs

discharged from the White Point outfalls from the 1950s through 1971 was 1,000 metric tons. The IROD (EPA, 2009) reported that masses of DDTs and PCBs remaining in sediment at PV Shelf had been estimated at 110 and 10 metric tons, respectively.

In 1989, trustees of the natural resource damage assessment for PV Shelf determined that DDT and PCB contamination of the marine environment off the southern California coast, including PV Shelf, could be causing significant damage to natural resources.

Since Montrose ceased discharges in 1971, the quality of the wastewater discharge from the White Point outfalls improved – DDTs have not been detected in White Point discharge since 2002, and PCBs have not been detected since 1985.

3.5. Initial Response Actions

Based on the findings of the natural resource damage assessment, EPA initiated a removal action assessment in July 1996 to investigate possible impacts to human health due to contaminants at PV Shelf. EPA subsequently issued an Action Memorandum that recommended institutional controls to address the human health risks associated with consumption of contaminated fish (EPA, 2001).

3.6. Basis for Taking Action

DDTs and PCBs are regarded as probable human carcinogens, and their presence at PV Shelf provided the basis for EPA taking action under CERCLA. The primary threat to human health was due to consumption of contaminated fish bought at commercial outlets and caught by local anglers. DDTs and PCBs also were associated with harmful impacts to birds throughout the Southern California Bight (shown on Figure 1), and risks to sea lions near PV Shelf and on the Channel Islands. Sampling events conducted in 1997 indicated that concentrations of DDTs and PCBs in samples of ocean water collected at PV Shelf exceeded EPA's National Recommended Water Quality Criteria¹ for human health (for salt water). All water samples except for one exceeded EPA's recommended ecological criterion for DDTs. The ecological criterion for PCBs was not exceeded in any of the samples (EPA, 2009b

4. Remedial Action

4.1. Remedy Selection

EPA's interim remedy was selected in the September 30, 2009, Interim Record of Decision (IROD). The remedy consists of institutional controls, monitored natural recovery, and containment (outfall area cap). The RAOs summarized from the IROD are as follows:

- Reduce to acceptable levels the risks to human health from ingestion of fish contaminated with DDTs and PCBs.

¹ The National Recommended Water Quality Criteria list was formerly known and referred to in the IROD as the EPA ambient water quality criteria (AWQC) list. It can be found at <http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm>.

- Reduce to acceptable levels the risks from DDTs and PCBs to the ecological community (i.e., benthic invertebrates and fish) at PV Shelf.
- Reduce concentrations of DDTs and PCBs in water at PV Shelf to acceptable levels that meet ambient water quality criteria set by EPA for human health and ecological health.
- Minimize potential adverse impacts to sensitive habitats and biological communities on PV Shelf during remedial action.

Cleanup goals for sediment, presented in Table 2, are “normalized for organic carbon”, meaning that the analytical results reported by the laboratory for DDTs and PCBs are each divided by the reported value of total organic carbon for the particular sample. Two interim cleanup goals were selected in the IROD. The first interim cleanup goal was to be achieved upon placement of the cap which would decrease immediately the average concentrations of DDTs and PCBs when the highest concentration areas were capped. The second interim cleanup level was set for the first Five Year Review which assumed the cap would be in place and natural recovery processes would continue to reduce concentrations post cap placement.

Table 2. Cleanup Levels for PV Shelf

Medium	DDTs	PCBs	Related RAO
White croaker	400 µg/kg	70 µg/kg	Reduce risks to human health due to ingestion of contaminated fish.
Sediment – immediate achievement of interim cleanup levels after cap placement	78 mg/kg OC Mean Concentration	7 mg/kg OC Mean Concentration	Reduce risks to human health due to ingestion of contaminated fish.
Sediment – interim cleanup levels to be achieved by the first FYR	46 mg/kg OC Mean Concentration	7 mg/kg OC Mean Concentration	Reduce risks to human health due to ingestion of contaminated fish.
Sediment – final cleanup levels by 2039	23 mg/kg OC Mean Concentration	-	Reduce risks to human health due to ingestion of contaminated fish.
Water	0.22 ng/L within 30 years	0.064 ng/L	Reduce risks to meet EPA’s salt water criteria for ecological health and human health (human health criteria have been adopted because they are more stringent).

Abbreviations

FYR – Five-year review
 µg/kg – Micrograms per liter (parts per billion)
 mg/kg – Milligrams per liter (parts per million)
 ng/L – Nanograms per liter (parts per trillion)
 RA – Remedial Action

Each of the three components of the interim remedy is described below.

Institutional Controls

Institutional controls are “non-engineering instruments such as administrative and legal controls that minimize the potential for human exposure to contamination and protect the integrity of the remedy” (EPA, 2009b). The components of the institutional controls program are:

- **Public outreach and education** – to increase awareness and understanding of the existing fish consumption advisories and fishing restrictions.

- **Monitoring** – to evaluate and track contaminant concentrations in fish (i.e. white croaker) caught at or near PV Shelf, as well as those sold in retail fish markets and served in restaurants,
- **Enforcement** – to prevent commercial catch and sale of contaminated fish caught at and near PV Shelf based on restrictions established by CDFW.

Monitored Natural Recovery

The natural recovery processes at PV Shelf include biodegradation (for DDTs), burial, and dispersion, all processes that have been observed by investigators at PV Shelf. Monitoring will be used to evaluate the effectiveness of the cap and the natural recovery processes. The monitored natural recovery (MNR) component of the remedy includes additional studies to improve modeling of contaminant fate and transport. Studies included under MNR are transformation of DDE, rates of contaminant loss, and a fish tracking study to identify habitat usage by fish species.

Cap

The third component of the selected remedy at PV Shelf is placement of an in situ isolation cap (e.g., layer of clean sand) to prevent erosion and eliminate exposure to high concentrations of contaminants in sediment. The capping component consists of the following:

- Delineation of the proposed cap area by conducting sampling and analysis to better define horizontal and vertical boundaries of the deposit. This includes the collection of data on sediment characteristics (grain size, bulk density, shear stress) necessary for cap design. Modeling and treatability studies to pilot low-impact techniques are part of the cap placement component.
- Based on conceptual design work conducted by EPA, a 45-centimeter (cm)-thick layer of fine sand/silt will be placed over approximately 300 acres of the sediment bed to stop flux (movement of dissolved-phase contaminants from pore water into the open water column) and transport, and to provide a barrier for benthic invertebrates feeding in the most contaminated area of sediment. The cap was estimated to require 864,000 cubic yards of material. Cap construction will follow assessment of modeling and treatability studies. These design criteria will be reassessed during the formal remedial design.
- During cap construction, monitor any plume of resuspended sediment, measure turbidity, and collect samples of sediment and water column.
- Post-construction, monitor the cap to assess cap thickness and cap movement. To verify effectiveness and stability of the cap, collect samples of cap material and pore water to test for compaction and contaminant flux.

4.2. Remedy Implementation

Institutional Controls

As previously indicated, institutional controls were initiated in December 2001, when EPA issued a draft Implementation Plan (EPA, 2001b).

Public outreach and education. EPA coordinates a variety of federal, state and local agencies, along with community-based organizations, to implement outreach and education activities, including sponsoring the Fish Contamination Education Collaborative (FCEC). EPA also sponsors the Angler Outreach Program, which has been implemented by Heal the Bay and Cabrillo Marine Aquarium. This

program targets anglers at selected piers, shorelines and bait shops. FCEC meetings are held routinely (usually semi-annually) to update stakeholders on recent developments. EPA issues periodic updates to the FCEC website www.pvsfish.org (offered in English, Spanish, Vietnamese and Chinese).

Monitoring. EPA entered into formal agreements with the City of Long Beach, Los Angeles County Environmental Health, and the Orange County Healthcare Agency, to evaluate commercial availability of contaminated white croaker. A list of 57 fish retail markets initially was identified based on previous studies, with additional input from community based organizations and county health departments. The list of markets continues to evolve, and currently includes a rotating list of 256 markets and restaurants in Los Angeles County and Orange County (Figures 3-A and 3-B). The schedule for market monitoring is listed below.

- Orange County Markets – 12 times per year (monthly)
- Los Angeles markets – two times per year
- Long Beach markets – three times per year

Enforcement. Under a Cooperative Agreement with EPA, CDFW conducts inspections of local wholesalers/distributors and fish landing locations on a monthly basis. Furthermore, CDFW enforces a commercial catch ban for white croaker in the area between Point Vicente and Point Fermin and from the shoreline out approximately 3 miles. CDFW also implements a daily bag limit of 10 white croakers for recreational anglers fishing along the shoreline of the Palos Verdes Peninsula shoreline. CDFW conducts its enforcement patrols monthly. Figure 2 shows the CDFW enforcement areas.

Monitored Natural Recovery

The remedy includes a monitoring program to evaluate the effectiveness of the natural recovery processes, and additional studies to improve modeling of contaminant fate and transport. These studies address the biotransformation of DDT, rates of contaminant loss in the sediment bed, and movement patterns of white croakers and barred sand bass.

In 2009, EPA conducted a sediment sampling program including a baseline event (Figure 5) related to the natural recovery processes, and an outfall sampling event (Figure 6) related to possible design of the isolation cap. Results of the sediment sampling program are reflected in the concentration maps for DDTs and PCBs (Figures 7 and 8, respectively). EPA also conducted a water column sampling event in 2010 to assess contaminant concentrations in open water at PV Shelf, and a flux study event in 2011 to assess movement of contaminants from the pore water in the sediment bed to the open water column above.

Currently, EPA is conducting or is planning studies of characteristics of specific environmental media. These include sediment, water column, and fish tissue.

Cap

Currently, the cap component of the interim remedy has been postponed, pending data analysis from ongoing sediment sampling and analysis event, and the sampling programs for ocean water column and fish planned for 2014-2015.

4.3. Operation and Maintenance (O&M)

The selected interim remedy, consisting of institutional controls, monitored natural recovery, and outfall area cap (postponed), currently has no operation and maintenance requirements. Monitoring programs related to the remedy were described in Section 4.2 above.

5. Progress Since the Last Five-Year Review

This is the first FYR for PV Shelf.

6. Five-Year Review Process

6.1. Administrative Components

EPA's FYR team was led by Judy Huang of EPA, Remedial Project Manager for PV Shelf, with contractor support provided by Gilbane, Walnut Creek, California. On January 30, 2013, the team held a scoping meeting to discuss items of interest as they related to the protectiveness of the remedy currently in place at PV Shelf. A review schedule was established that consisted of the following:

- Community notification
- Document review
- Data collection and review
- Site inspection
- Local interviews
- FYR report development and review

6.2. Community Involvement

On February 11, 2014, EPA published an FYR public notice in the *Daily Breeze* (Torrance, California), announcing the commencement of the FYR process for PV Shelf, providing EPA's contact information, and inviting community participation. A copy of the press notice is included in Appendix B.

The FYR report will be made available to the public once it has been finalized. Copies of the document will be placed in the designated public repositories: (1) San Pedro Public Library, 931 South Gaffey Street, San Pedro, California 90731 (tel. 310-548-7779); (2) Redondo Beach Public Library, 303 North Pacific Coast Highway, Redondo Beach, California 90277 (tel. 310-318-0675); (3) Palos Verdes Peninsula District Library, 701 Silver Spur Road., Rolling Hills Estates, California 90274 (tel. 310-377-9584); and (4) Superfund Record Center, 95 Hawthorne Street, Suite 403S, San Francisco, California 94105 (tel. 415-972-3128).

Upon completion of the FYR, a public notice will be made in the *Daily Breeze* to announce the availability of the final FYR report in the document repositories. EPA will also post the FYR report with other PV Shelf documents at the EPA website www.epa.gov/region09/superfund/pvshelf.

6.3. Document Review

This FYR included a review of relevant, site-related documents including the IROD and recent monitoring data reports. A complete list of the documents reviewed can be found in Appendix A.

ARARS Review

Section 121(d)(2)(A) of CERCLA, 42 USC §9621(d)(2)(A), specifies that remedial actions conducted under EPA's Superfund program must meet any federal standards, requirements, criteria, or limitations that are determined to be legally applicable or relevant and appropriate requirements (ARARs). ARARs are those standards, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a Superfund site (applicable) or that address problems or pertain to circumstances similar to those encountered at a Superfund site (relevant and appropriate).

Table 3 lists the chemical-, location-, and action-specific ARARs from the IROD. Also included are the regulatory basis, current status, and regulatory changes, if any. In summary, there were no changes to any of the ARARs. There have been no revisions to laws and regulations that affect the protectiveness of the remedy.

Table 3. Evaluation of Applicable or Relevant and Appropriate Requirements

Requirement	Citation	Document	Description	Affects Protectiveness	Comments
Protection of aquatic life and human health.	Clean Water Act Section 304, 33 USC. §1314 (National Surface Water Quality Criteria	2009 IROD	Establishes surface water criteria for protection of fish-eating birds, birds feeding at higher trophic levels, and marine aquatic life.	There have been no changes to this law that affect protectiveness.	Protective of sensitive aquatic species and achievement of the Food and Drug Administration’s tolerance level of 5,000 µg/kg in fish after bioaccumulation (protection of human health).
Any response action should not jeopardize listed species or adversely modify critical habitat at PV Shelf.	Endangered Species Act of 1973, 16 USC. §1531-1544	2009 IROD	The goal of the Endangered Species Act is the conservation and recovery of species of fish, wildlife, and plants that are threatened with extinction.	There have been no changes to this law that affect protectiveness.	Endangered/threatened species are present at PV Shelf.
Selected remedy must be consistent with substantive requirements of the Coastal Zone Management Plan.	Section 307(c)(1) of the Coastal Zone Management Act	2009 IROD	Filling of surface waters is allowable only when (a) public benefits exceed public detriment from the loss of water areas, (b) the filling is for a water-oriented use, and (c) no alternative upland location is available.	There have been no changes to this law that affect protectiveness.	On-site activities are not subject to administrative review or permitting processes related to the Coastal Zone Management Act.

Requirement	Citation	Document	Description	Affects Protectiveness	Comments
For the purpose of constructing a cap, placement of material on the PV Shelf will comply with substantive requirements of these Sections.	Marine Protection, Research, and Sanctuaries Act of 1972 and Ocean Dumping Regulations, 33 USC. §§1411-1414, 40 CFR Parts 220-238 Section 404 of the Clean Water Act and Section 10 of the Rivers and harbors Act, 33 USC. §1344, 33 USC. §401, 40 CFR Part 230.	2009 IROD	Dredged material must meet federal testing guidelines to meet approval for disposal of material in the ocean.	There have been no changes to this law that affect protectiveness.	Establish dredge material reuse standards. Applies to capping material selection.
Taking of fish species	California Ocean Fishing regulations. CCR Title 14 §§28.05, 28.10	2009 IROD	Forbids the taking of garibaldi and giant (black) sea bass from California ocean waters.	There have been no changes to this law that affect protectiveness.	Applies to fish sampling activities undertaken under monitoring.
California Fish & Game (CDFG) Requirements	California Endangered Species Act California Fish & Game Code §2080	2009 IROD	Conserves, protects, restores, and enhances any endangered or threatened species and its habitat.	There have been no changes to this law that affect protectiveness.	Requirements of the Act may be applicable due to the presence of endangered/threatened species on the PV Shelf.
Protection of mammals.	California Fish & Game Code §4700	2009 IROD	Prohibits the take of any of the listed fully protected mammals, including the Northern elephant seal and Guadalupe fur seal.	There have been no changes to this law that affect protectiveness.	Areas at PV Shelf that will be impacted by the remedy are within the population range of the Northern elephant seal and the Guadalupe fur seal.

Review of Human Health Risk Assessments

There have been no changes to the exposure pathways that would affect the potential risk to human health due to fish consumption. The human health risk evaluation conducted in 1999 addressed potential health risks due to consumption of various species of fish by recreational anglers. The results indicated that the fish species presenting the highest estimated cancer risk and non-cancer health hazard (due to ingestion) was the white croaker (SAIC, 1999). The human health risk evaluation was updated in 2007. The results indicated that DDTs are the primary contributors to the cumulative cancer risk estimates, while PCBs are the primary contributors to the cumulative health hazard estimates.

In 2014, the human health risk evaluation was again updated to assess risk due to consumption of skin-off filets from white croakers (ITSI Gilbane, 2014). Fish were collected at near-shore locations from Santa Monica Bay to the Port of Long Beach (Figure 2) from March 2009 to May 2010. Whereas the 2007 data showed that DDTs were the primary contributors to the increased likelihood of cancer and PCBs were the primary contributors to non-cancer health effects, the 2014 evaluation showed that PCBs were the primary contributors to the increased likelihood of both cancer and non-cancer effects in the consumption of white croaker. Furthermore, the results show that the risk and hazard index estimates in 2014 were lower than the risk and hazard index estimates in 2007. Table 4 presents the risk estimates based on the reasonable maximum exposure scenario for recreational anglers, which incorporates the more health-protective high-end consumption rate of white croakers.

Table 4. Summary of Health Risks due to Consumption of White Croakers

Exposure Scenario and Pathway	Cancer Risk Estimate		Non-Cancer Hazard Quotient	
	DDTs	PCBs	DDTs	PCBs
Consumption of white croaker by recreational boaters (SAIC, 1999)	1×10^{-3}	6×10^{-4}	17	32
Consumption of white croaker by recreational Asian anglers (CH2M Hill, 2007)	4.6×10^{-3}	2.3×10^{-3}	63.4	134
Consumption of white croaker by recreational Asian anglers (ITSI Gilbane, 2014)	4×10^{-5}	2.4×10^{-4}	0.5	13.9

In December 2010, EPA expanded the monitoring efforts by collecting lobster samples from August to September 2011 to address concerns expressed by recreational fishermen. Ten lobsters were collected from each of four areas near PV Shelf, namely Rocky Point, Long Point, White Point, and the Los Angeles Harbor breakwater (Figure 4). The Los Angeles Harbor breakwater was considered representative of an area that was not affected by the historical discharges of DDTs and PCBs from the White Point outfalls.

Table 5 shows that the health risks associated with consumption of lobster tails and tomalley are extremely low. However, these results are based on only 10 lobster samples from each location, and conclusions based on these limited data have a considerable amount of uncertainty.

Table 5. Summary of Health Risks due to Consumption of Lobster Tails and Tomalley

Exposure Scenario and Pathway	Cancer Risk Estimate		Non-Cancer Hazard Quotient	
	DDTs	PCBs	DDTs	PCBs
Consumption of lobster tails by recreational boaters (ITSI Gilbane, 2014)	4.7 x 10 ⁻⁹ to 5.3 x 10 ⁻⁹	1.6 x 10 ⁻⁷ to 1.9 x 10 ⁻⁷	0.0001	0.01
Consumption of lobster tomalley by recreational Asian anglers (ITSI Gilbane, 2014)	5.3 x 10 ⁻⁸ to 2.1 x 10 ⁻⁷	2.3 x 10 ⁻⁶ to 3.6 x 10 ⁻⁶	0.0003 to 0.001	0.057 to 0.091

Toxicity Values

EPA’s Integrated Risk Information System is a program that provides updated toxicity values (when newer scientific information becomes available) to be used in risk assessment. In the past 5 years, there have been no changes to the toxicity values for the contaminants at PV Shelf.

Ecological Review

An ecological risk assessment was completed for PV Shelf in November 2003 to evaluate the likelihood of adverse effects on marine biota that are present at the SCB and at PV Shelf (EPA, 2003). The assessment indicated that primary exposure pathways are from the sediment to resident invertebrates and bottom-dwelling fish. Benthic and water-column invertebrates, water-column fish, and fish-eating consumers are potentially exposed through the food web due to bioaccumulation of chemicals of potential ecological concern. Bald eagles were assessed for exposure and risk through consumption of sea lion carcasses, and bald eagles and peregrine falcons were assessed for exposure through consumption of seabirds.

The 2003 assessment concluded that there was a gradient of ecological risk with the greatest risk in the vicinity of the PV Shelf outfalls and along a band extending up the coast to the northwest. Intermediate risks were found in the immediate PV Shelf vicinity and the lowest risks were estimated for the more distant SCB locations. DDTs posed greater risks to fish and invertebrates than PCBs, and the immediate area of the outfalls posed the highest risks to fish and invertebrates. Birds were also shown to have higher risk due to DDTs than to PCBs.

Since the 2003 ecological risk assessment, a decrease of DDT concentrations has been observed in sediments at PV Shelf, coupled with an increase in concentrations of known breakdown (“daughter”) products of DDT, i.e., DDT appears to be undergoing dechlorination. The breakdown of DDT to less toxic metabolites could mean changes to site conditions that could mitigate or reduce hazards to ecological receptors.

6.4. Data Review

This FYR includes a review of historical data generated from various investigators and data generated from EPA’s remedy-related programs, including the 2009 sediment sampling program, 2010 water sampling program, and the institutional controls program from 2009 through 2012.

Sediment

Investigations that preceded the IROD indicated that natural processes, including sediment transport, biological mixing, desorption from sediment to water, and biodegradation (dechlorination of DDTs) are contributing to lower concentrations of contaminants in surface sediment at PV Shelf (Drake, et al., 1994; and Eganhouse, et al, 2008).

In 2009, EPA retrieved sediment cores from 34 locations for the baseline program, and from an additional 25 locations in the area near the Sanitation Districts' outfall diffusers (Figures 5 and 6). The data analysis focused on sediment COCs in the 0-to-8-cm bed depth interval, that encompasses the biodiffusive mixing layers reported by previous investigators (SAIC, Santschi et al., 2001; SAIC, 2005a). The COCs present in bed intervals deeper than 8 cm are unlikely to enter into the food chain due to the lack of bio-mixing, and the depositional nature of the most-contaminated portions of PV Shelf.

Similar to previous investigations, the 2009 sediment results indicated a widespread pattern of DDT and PCB contamination, with areas of high concentrations near the diffuser portions of the White Point outfalls (Figures 7 and 8). However, contaminant concentrations decreased significantly compared to results from previous investigations. Table 6 presents a data subset comparing the 2009 results with previous data sets (values indicated are averaged for the 0-8-cm sediment bed interval).

Table 6. Comparison of EPA's 2009 Sediment Data to Previous Investigations

Year	Station/core name	Investigator	Total DDTs (mg/kg)	Total PCBs (mg/kg)
Location 1				
1994	522/124-B1	USGS	4.2	0.52
2009	3C/BA3C	EPA	0.60	0.031
Location 2				
1994	556/131-W1	USGS	11	1.4
2009	6C/BA6C	EPA	0.73	0.063
Location 3				
1991	8C/not available	Sanitation Districts	183	Not available
2009	8C/BA8C	EPA	100	2.5

Table 7 presents the calculated Site-wide mean concentrations for DDTs and PCBs based for the 2009 data set.

Table 7. Site-Wide Mean Contaminant Concentrations in Sediment (with Cleanup Goals)

Parameter	Total DDTs (mg/kg OC)	Total PCBs (mg/kg OC)
Surface (0-8-cm) interval (2009 data set)	56	0.23
Cleanup interim level - immediate achievement of interim cleanup levels after cap placement	78	7
Cleanup interim level - interim cleanup levels to be achieved by the first FYR	46	7
Cleanup level - final cleanup levels by 2039	23	-

Abbreviations

cm Centimeter
OC Organic carbon

Notes

1. Values are in milligrams per kilogram normalized for organic carbon.

The mean concentrations of DDTs and PCBs placement in surface sediment based on the 2009 data set are less than the cleanup levels for surface sediment identified in the IROD related to cap placement; however, did not achieve the interim cleanup levels for total DDTs set to be achieved by the first Five Year Review. The remedy relied on two components, a cap and natural recovery processes, and as of this first Five Year Review, the cap has not been installed as was anticipated in selecting the interim cleanup levels. Early indication is that the natural processes may be able to achieve final cleanup goals without implementation of the interim cap component.

The regulatory agencies reviewed EPA’s sediment data report for the 2009 sampling event and commented that more sampling needed to be conducted. EPA collected sediment samples in fall 2013 and is currently analyzing the samples. A report will be published in 2015.

Water Column

In September 2010, EPA used passive sampling devices to conduct a baseline water sampling event at 11 stations along PV Shelf and at a background station with historically low contaminant concentrations (Fernandez et al., 2012). Sampling depths were 5 m above the ocean floor, mid-column, and 5 m below the ocean surface. The sampling devices were collected after 32 days at sea and analyzed in a chemistry laboratory. Sample locations are shown in Figure 9.

The analytical data showed that *p,p*- DDE, DDMU, and *o,p*’-DDE were present in the water column, with decreasing concentrations from the 5 m above the seafloor to 5 m below the ocean surface. The DDT form with the highest dissolved concentrations was *p,p*’-DDE, with concentrations ranging from 0.036 nanograms per liter (ng/L) at the sampling location “up-current” (i.e., southeast) of the sampling location at the outfall diffusers to 0.99 ng/L at the station down-current of the outfall. The highest concentrations of DDTs and PCBs were “down-current” (i.e., northwest) of the deployment location at the outfall diffusers, and that concentrations decreased as distance from the Palos Verdes Peninsula (north towards Santa Monica Bay) increased. Concentrations of *p,p*’-DDE exceeded the human health National Recommended Water Quality Criteria (for salt water) at all stations, and exceeded the aquatic life National Recommended Water Quality Criteria at several locations.

The results supported the theory that reductive dechlorination of DDTs is occurring in the sediments, and the more water-soluble DDT forms (e.g., DDMU) are being transported into the water column. Also promising is the fact that the time trend for dissolved concentrations of contaminants indicates that concentrations may be decreasing (see Table 8; it should be noted that different sampling methods and sampling intervals were used - future sampling events will use the 5-meter standard).

Table 8. Site-Wide Average Concentrations of Dissolved Contaminants in Seawater (with Cleanup Goals)

Parameter or source	Depth of collection	Total DDTs (ng/L)	Total PCBs (ng/L)
1997 (Zeng et al., 1999)	1 meter above ocean floor	3.7	0.33
2010 (Fernandez et al., 2012)	5 meters above ocean floor	1.6	0.18
Cleanup level (IROD)*	-	0.22	0.064

Notes

*Based on National Recommended Water Quality Criteria

Pore Water in Sediment Bed

In July-August 2011, EPA deployed flux study platforms at five stations along PV Shelf and at one less contaminated station off site (Fernandez et al., 2014). The platforms were outfitted with passive adsorption-type sampling devices to assess concentrations of dissolved contaminants in the pore water in the sediment bed and in the water column immediately above the bed. Platforms were retrieved after 43 to 44 days at sea and the sampling devices were analyzed in a chemistry laboratory; platform locations are shown in Figure 10.

The study indicated that sediment at PV Shelf is a source of contamination to the water column, and that the stations with the highest historical contaminant concentrations in sediment showed the greatest flux from sediment to the water column. No noticeable flux was reported at the reference (off-site) location. The study also indicated that a layer of clean sand (cap) would be effective in isolating the contaminants from the environment, assuming methods for cap placement that would avoid resuspension and resettling of contaminated sediment on the clean cap material.

Institutional Controls Program – Monitoring Component

Prior to issuance of the 2009 IROD, the fish market study for PV Shelf was conducted from July 2004 through January 2005 (CH2M Hill, 2005), and consisted of purchasing 30 white croakers from six Los Angeles fish markets and analyzing fish tissue samples (skin-off filets) for DDTs and PCBs. Results from the study indicated that concentrations of Total DDTs ranged from 58 µg/kg to 12,000 µg/kg, and concentrations of Total PCBs ranged from 27 µg/kg to 1,000 µg/kg (CH2M Hill, 2005).

EPA entered into agreements with local environmental health agencies and the California Department of Fish and Wildlife (formerly Department of Fish and Game) to conduct inspections at retail and wholesale markets, and at in-water, dockside, and shoreline locations in late 2008. Since November 2010, no white croakers have been observed in any of the local markets, including markets where white croakers had been previously identified.

Table 9 is a summary of data from white croaker samples collected during the Phase 2 PV Shelf Fish Market Study. The data indicate that DDT concentrations were below the IROD cleanup goal of 400 µg/kg, but PCB concentrations were still higher than the corresponding cleanup goal of 70 µg/kg.

In 2010, the monitoring program was expanded to include the collection of lobsters from four areas near PV Shelf, namely White Point, Rocky Point, Long Point, and the Los Angeles Breakwater. The Los Angeles Breakwater is considered the non-impacted reference location. As indicated in Table 10, contaminants were detected in lobster tail (edible tissue) and the tomalley; however, the risk of cancer due to consumption of lobsters is below EPA's normal range of concern.

Table 9. Ranges of Contaminant Concentrations in White Croakers (Skin-Off Filets) – Institutional Controls Program 2008-2012

	Minimum	Maximum	Mean	Cleanup Goal
Near-Shore/In-Water				
Total DDTs	40	257	138.5	400
Total PCBs	28	254	129.7	70
Markets				
Total DDTs	5	90	34.7	400
Total PCBs	2	15	8.85	70
Piers				
Total DDTs	10	294	96.9	400
Total PCBs	6	516	104.4	70

Notes

1. All concentrations are in micrograms per kilogram = µg/kg = parts per billion.
2. Results for individual croaker filets are available in *Risk Evaluation of Fish Monitoring Results and Lobster Data – Palos Verdes Shelf* (ITSI Gilbane, 2014).

Table 10. Ranges of Contaminant Concentrations in Lobsters – Institutional Controls Program 2011

Analyte	Minimum	Maximum	Mean	Cancer Risk Estimates (based on Reasonable Maximum Exposure Conditions)
Lobster Tails				
LA Breakwater (reference point)				
Total DDTs	0.3	0.9	0.4	8×10^{-9}
Total PCBs	1.9	4.2	2.7	3×10^{-7}
Other Areas				
Total DDTs	0.3	0.9	0.3 – 0.4	5×10^{-9}
Total PCBs	1.7	4.2	1.9 – 2.1	2×10^{-7}
Lobster Tomalley				
LA Breakwater (reference point)				
Total DDTs	1.7	37	9.2	3×10^{-7}
Total PCBs	18.8	229	75.7	1×10^{-5}
Other Areas				
Total DDTs	0.6	27.1	5.1	5×10^{-8} to 2×10^{-7}
Total PCBs	6.3	59.2	24	2×10^{-6} to 4×10^{-6}

Notes

1. All concentrations are in micrograms per kilogram = µg/kg = parts per billion.
2. Results for individual lobsters are available in *Risk Evaluation of Fish Monitoring Results and Lobster Data – Palos Verdes Shelf* (ITSI Gilbane, 2014).

Institutional Controls Program – Enforcement and Outreach Components

Overall, data collected between early 2008 and the end of September 2013 have demonstrated the absence of white croakers in local markets, restaurants, and commercial fishing facilities. Of the 1,607 market inspections conducted during that time period, white croakers were observed on only 12 instances. White croakers have not been observed in any local markets or restaurants since 2011.

However, data suggest that white croakers still are commonly caught (and released) by recreational anglers fishing along the shoreline of the Palos Verdes Peninsula. Of the recreational anglers contacted

since 2008, up to 86 percent of them reported being aware of existing fish contamination issues (SGA 2012, 2013, 2014). Other “do not consume” fish, such as barred sand bass, also were commonly caught during enforcement and monitoring efforts.

The most recent data suggest a high awareness level of the fish contamination issue among market operators and employees; over 90 percent of the market/restaurant employees surveyed for Los Angeles and Orange County and 83 percent for Long Beach demonstrated awareness (SGA, 2014), although the most commonly reported sources of information varied between different jurisdictions. In Los Angeles County (including Long Beach), health inspectors were reported as the most common sources of information, while in Orange County the most common reported sources were FCEC materials.

The data demonstrate that contaminated fish are not reaching the local markets and also validate the continued effectiveness of the institutional controls program in reducing the presence of contaminated fish in local markets.

Fish Movement

EPA conducted a fish movement study at PV Shelf from 2010 to 2012 using acoustic telemetry methods. Objectives of the study included assessment of movement patterns, degree of site fidelity, habitat use, and migration patterns of white croakers and barred sand bass. Arrays of acoustic receivers (including a fine-scale array covering the White Point outfalls) were deployed at PV Shelf, and small arrays were installed at the breakwater gates to Los Angeles Harbor (Angels Gate and Queens Gate). Ninety-seven white croakers and 55 barred sand bass were caught using hook and line, transmitters were surgically implanted, and the “tagged” fish were released and tracked using the receiver arrays.

Results of the study showed that many white croakers exhibited “transient” behavior and spent only about 1 percent of their time in the vicinity of the White Point outfalls; other croakers exhibited foraging/refuging behavior, spending about 10 percent of their time near the White Point outfalls. The study concluded that these behavioral patterns could be a reason for wide-ranging COC concentrations historically detected in tissue samples of white croakers. Another conclusion of the study was that barred sand bass exhibited site fidelity for PV Shelf, and returned there after seasonal spawning migrations (Lowe, C.G., 2013).

6.5. Site Inspection

For practical reasons, typical site inspections at PV Shelf are not possible. The selected remedy consisting of institutional controls, monitored natural recovery, and containment (outfall area cap – postponed at this time) did not necessitate a physical site inspection.

6.6. Interviews

As part of the FYR process, interviews were conducted with regulatory agencies, community organizations, and members of the PV Shelf technical advisory group. Interview questions were sent out via e-mail to the list of interviewees below in January 2014. Those interviewed were also given the

option of conducting the interviews via phone. A summary of the interviews is presented below. Full transcripts of the responses are included in Appendix C.

Regulatory Agency Interviews

The following individuals representing regulatory agencies were interviewed regarding their knowledge of and/or concerns about the RA at PV Shelf.

- Robert Brodberg – Chief, California Office of Environmental Health Hazard Assessment (OEHHA)
- Rebecca Hartman – Boat Captain, CDFW
- Michael Lyons – Staff Environmental Specialist, Los Angeles Regional Water Quality Control Board
- Tayseer Mahmoud – Project Manager, California DTSC
- Salwa Mina – Environmental Health Specialist, Los Angeles County Public Health
- Mozghan Mofidi – Supervising Environmental Health Specialist, Orange County Environmental Health Division
- Patty Velez – Environmental Scientist, Superfund Program, CDFW

Overall, representatives from local and state regulatory agencies have indicated that the ICs component of the remedy has had a positive impact in protecting the public through outreach and education about risks associated with consuming contaminated fish from PV Shelf.

With regard to the monitored natural recovery component of the remedy, most agreed that the remedy was functioning as expected. Most were also aware of the decreasing contaminant mass and concentrations based on the 2009 sediment monitoring data. However, some parties questioned whether reductions in mass and concentrations were attributable to chemical transformations or biodegradation, or whether the contaminants had merely migrated to other locations. It was agreed that additional sampling of various environmental media, notably sediment, will prove valuable in addressing these questions.

Some particular concerns included the lack of participation from Hispanic and community-based organizations during meetings among the different stakeholders, and the need for continued outreach to market and commercial fishing entities.

Community Interviews

The following individuals representing community organizations were interviewed regarding their knowledge of and/or concerns about EPA's response actions for PV Shelf.

- James Alamillo – Heal the Bay, Urban Programs Manager
- Stephen Groner – S. Groner Associates, Inc.

Overall, these community representatives indicated that the institutional controls component of the remedy was functioning as expected, and is effective in reaching its outreach and educational goals. There was consensus that outreach and educational efforts need to continue, and there may be a need to

re-evaluate the program to better target specific audiences (e.g., recreational and sport-fish anglers, and vulnerable populations – notably women of child-bearing age and children).

With regard to the MNR component of the remedy, both of these representatives were aware of the decreasing mass and concentrations of DDTs and PCBs based on the 2009 sediment monitoring data. Heal the Bay expressed reservations as to whether the MNR was functioning properly without first addressing key issues regarding the site, such as: (1) a defensible explanation for the significant reduction in concentration of DDT and PCB in sediment; (2) an explanation of how PCBs are showing significant concentration reductions given their highly stable nature; and (3) an explanation for why the reduction in sediment concentrations is not reflected by an equally significant reduction in fish tissue concentrations.

Other particular concerns included the need for development of a descriptive food web model of that demonstrates the fate and transport of DDT and PCB within the PV Shelf ecosystem (to include the water column and sediment); addressing contamination in other areas hydrologically and ecologically linked to PV Shelf (i.e. Santa Monica Bay and San Pedro Bay); improving coordination between the stakeholders and PVSTIEG members; and addressing uncertainties with regard to risk associated with anglers fishing for barred sand bass.

Interviews with the PV Shelf Technical Advisory Group

The following individuals representing the PV Shelf technical advisory group were interviewed regarding their knowledge of and/or concerns about the RA at PV Shelf.

- Robert Eganhouse – United States Geological Survey, Research Chemist
- Mark Gold – UCLA Institute of the Environment and Sustainability, Associate Director
- Joseph Gully – Sanitation Districts of Los Angeles, Supervising Environmental Scientist
- Guangyu Wang – Santa Monica Bay Restoration Commission

Overall, representatives from PVSTIEG expressed that the ICs component of the remedy was functioning as expected, and has been the most successful aspect of the Superfund effort. Many also indicated that the project is taking adequate steps to protect public and environmental health, and is generally moving in the right direction. Several concerns raised by the interviewees are:

- Overall slow pace of the project
- Uncertainties in the results of the 2009 sediment data set
- Inexplicable reduction in the magnitude of contamination over a short period of time
- Need to replicate and expand 2009 sediment study
- Need for greater transparency and better communication among all parties involved with PV Shelf, a need for periodic project updates
- Need to revisit the institutional controls program to assess which aspects of the program have been and will be most effective

Specific concerns raised include:

- Recognition that reductive dechlorination of dominant DDT ‘parent’ compounds (i.e. DDE and DDD), can generate metabolites (e.g., DDMU, DDNU) that may exhibit toxicity
- CDFW’s commercial catch ban on white croaker has not changed in 20 years; expanding the regulatory component of ICs program is overdue,
- Need for clean fish certification program for fish caught in the Southern California Bight (Figure 1 shows the Southern California Bight)
- Need to re-assess current fish consumption message (with regard to certain populations consuming fish contaminated with mercury, which is not a chemical of concern at PV Shelf)
- Need for fish monitoring data to correspond with and support sediment data

6.7. Institutional Controls

The institutional controls program for PV Shelf was described in Section 4.1, *Remedy Selection*. Implementation of the program was described in Section 4.2, *Remedy Implementation*.

From 2008 through 2013, 1,607 market and restaurant inspections were conducted. White croaker was observed only 12 times, suggesting that outreach and monitoring efforts have been highly successful in preventing contaminated fish caught at PV Shelf from reaching local food facilities. White croaker has not been observed in any local markets or restaurants since 2011.

Recent data also suggest a high level of awareness regarding fish contamination issues among market operators and employees, with positive responses from over 90 percent of the market/restaurant employees for Los Angeles and Orange County locations, and 83 percent for Long Beach locations. The most commonly reported sources of information were materials and information disseminated by FCEC and local health agency partners. Similarly, recreational anglers contacted at piers and other shoreline locations on the Palos Verdes Peninsula have expressed a high level of awareness regarding fish contamination issues, with the most commonly reported sources of information being game wardens and signage.

CDFW continues its enforcement activities through patrols related to the commercial catch ban area and the daily catch limit restrictions for recreational anglers. CDFW has expanded its efforts to include inspection of wholesale fish retail businesses.

No improvements to the program are needed at this time.

7. Technical Assessment

7.1. Question A: Is the remedy functioning as intended by the decision documents?

Institutional Controls

The ICs component of the remedy is functioning as intended by the decision documents. The ICs program has been successful in limiting human exposure to contaminated fish through aggressive

outreach and education programs performed by EPA in partnership with other federal, state, and local agencies, and community-based organizations.

Based on data from recent years, the ICs program has been effective in preventing contaminated fish from reaching local markets and restaurants. Given this trend, the frequency of the market monitoring for Long Beach and Orange County markets could be reduced to a semi-annual schedule for all monitored areas (frequency of monitoring of Los Angeles markets is already semi-annual) and focus more efforts on the outreach efforts in the pier areas.

Monitored Natural Recovery

The MNR component of the remedy for PV Shelf is functioning as intended. As previously noted, concentrations of contaminants detected in sediment samples at PV Shelf derived from cores collected in fall 2009 showed significant decreases compared to results from pre-remedy sediment sampling events. Based on the significant decrease in concentrations of DDTs and PCBs detected in sediment samples, the design and installation of a clean sediment cap were suspended. Additional sediment monitoring data are being collected to determine if remedial action objectives can be achieved without the cap. The Sanitation Districts have reported a temporal decline in levels of contamination in sentinel fish species caught at PV Shelf (including white croaker) since the 1990s (Sanitation Districts, 2012). Limited fish tissue analyses indicate that the remedial action objective for DDTs in fish tissue is being achieved in white croaker. At this time the data set to evaluate compliance with applicable water quality objectives is insufficient. EPA is currently analyzing water column data from passive samplers that were deployed in fall 2013.

The standard sediment sampling approach established by the Sanitation Districts (and used by EPA) for PV Shelf is to process the sediment cores into samples by freezing them and then cutting them into slices 2-cm thick. For the 2009 event, this approach generated more than 1,000 samples that were analyzed for physical and chemical parameters; the 2013 event generated about 1,500 samples that are currently being analyzed. The sampling approach could be optimized by analyzing only the samples that represent the top 8 cm of the sediment bed, i.e., the biologically active zone where contaminants present a risk to human health by entering the food web. Sediment samples representing the deeper bed layer could be archived for possible future analysis if data from deeper zones become important to the remedy.

Cap

As previously described, the cap component of the interim remedy for PV Shelf has been postponed pending analysis of data sets for sediment, ocean water, and ecological receptors (fish). No statement regarding the effectiveness of the cap can be made at this time.

7.2. Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and Remedial Action Objectives (RAOs) Used at the Time of Remedy Selection Still Valid?

A review of the exposure assumptions and RAOs used at the time of remedy selection and the current understanding of the site indicate that they remain valid, as explained below.

- There has been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy.
- There have been no changes in the ARARs that would affect the protectiveness of the remedy.
- Uses of the area at or near PV Shelf have not and are not expected to change.
- No new human health or ecological routes of exposure or receptors have been identified, and none of those previously identified have changed.
- There are no newly identified contaminants or contaminant sources, nor any unanticipated toxic byproducts of the remedy not previously addressed by the decision documents.
- Neither physical site conditions nor the understanding of these conditions has changed.

Currently, the remedy is progressing as expected, and remains protective of human health and the environment. The ICs program is well established and has been and remains effective in protecting human health. The physical, chemical, and biological mechanisms of MNR appear to be effective in reducing contaminant levels in the sediment bed. The isolation cap as described in the IROD is postponed pending results of an ongoing sediment sampling program (samples were collected in fall 2013 and currently are being analyzed for chemicals of concern). The need for the cap will be re-evaluated after sediment results are examined.

7.3. Question C: Has Any Other Information Come to Light That Could Call Into Question the Protectiveness of the Remedy?

There is no information that could affect the evaluation of protectiveness of the remedy.

7.4. Technical Assessment Summary

Currently, the interim remedy is progressing and functioning as expected, and remains protective of human health and the environment. The ICs program is well established and has been and remains effective in protecting human health. Site-specific processes of MNR are evident and appear to be effective in reducing risk to human health and ecological receptors; these processes include biotransformation, burial, and mixing in place. EPA has postponed the isolation cap component of the interim remedy because the 2009 sediment sampling program indicated lower-than-expected contaminant concentrations. Additional response actions that can accelerate recovery, e.g., capping, will be assessed after the data from EPA's ongoing sediment, water, and fish sampling programs are evaluated.

8. Issues

There were no issues identified for PV Shelf that affect current or future protectiveness.

9. Recommendations and Follow-up Actions

Although there were no issues identified in this FYR, the following are recommendations that will support the effectiveness of the remedy:

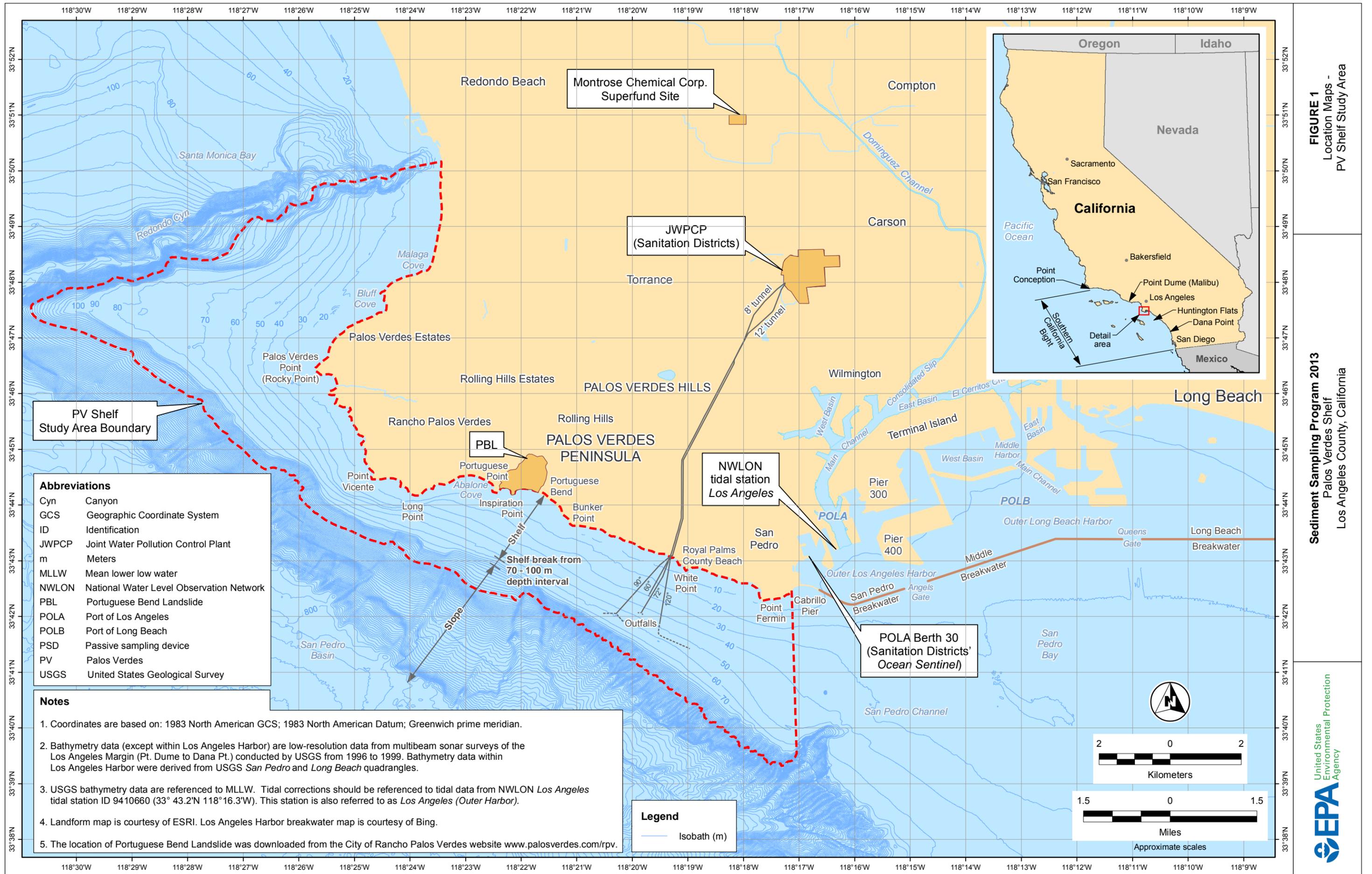
- The 2009 sediment sampling event represented EPA's baseline sediment event. Additional rounds of sediment sampling should be conducted approximately every 5 years to confirm the low contaminant concentrations reported in the baseline study. (A 5-year frequency for sediment sampling is appropriate for PV Shelf, as the shape and thickness of the contaminated sediment bed does not appear to undergo rapid change; there are no significant ongoing sources of contaminants; and the rates of contaminant biodegradation are low).
- The sediment sampling approach could be optimized by analyzing only the samples that represent the top 8 cm of the sediment bed, i.e., the biologically active zone where contaminants present a risk to human health by entering the food web. Sediment samples representing the deeper bed layer could be archived for possible future analysis if data from deeper zones become important to the remedy.
- Identification of a second indicator species of fish (in addition to white croaker) would help assess effectiveness. There has been a decrease over time in catch frequency of white croakers at PV Shelf, and currently the species demonstrates limited site fidelity. White croaker will continue to be used as an indicator species because traditionally they have been commonly caught in southern California and have shown high concentrations of PV Shelf contaminants.

10. Protectiveness Statement

The interim remedy at Montrose Chemical Corporation Operable Unit 5 (Palos Verde Shelf) is protective of human health and the environment. Institutional controls are in place and are effective in protecting users of PV Shelf. Results of sampling programs and research by EPA and others indicate that natural recovery processes are occurring. The combination of institutional controls and monitored natural recovery is effective and is progressing towards attaining the specific interim cleanup goals and timelines set forth in the Interim Record of Decision.

11. Next Review

This is a statutory site that requires ongoing FYRs as long as waste is left on site that does not allow for unrestricted use and unlimited exposure. The next FYR will be due within 5 years of the signature date of this FYR.



Abbreviations

Cyn	Canyon
GCS	Geographic Coordinate System
ID	Identification
JWPCP	Joint Water Pollution Control Plant
m	Meters
MLLW	Mean lower low water
NWLON	National Water Level Observation Network
PBL	Portuguese Bend Landslide
POLA	Port of Los Angeles
POLB	Port of Long Beach
PSD	Passive sampling device
PV	Palos Verdes
USGS	United States Geological Survey

- Notes**
- Coordinates are based on: 1983 North American GCS; 1983 North American Datum; Greenwich prime meridian.
 - Bathymetry data (except within Los Angeles Harbor) are low-resolution data from multibeam sonar surveys of the Los Angeles Margin (Pt. Dume to Dana Pt.) conducted by USGS from 1996 to 1999. Bathymetry data within Los Angeles Harbor were derived from USGS *San Pedro* and *Long Beach* quadrangles.
 - USGS bathymetry data are referenced to MLLW. Tidal corrections should be referenced to tidal data from NWLON *Los Angeles* tidal station ID 9410660 (33° 43.2'N 118° 16.3'W). This station is also referred to as *Los Angeles (Outer Harbor)*.
 - Landform map is courtesy of ESRI. Los Angeles Harbor breakwater map is courtesy of Bing.
 - The location of Portuguese Bend Landslide was downloaded from the City of Rancho Palos Verdes website www.palosverdes.com/rpv.

Legend

- Isobath (m)

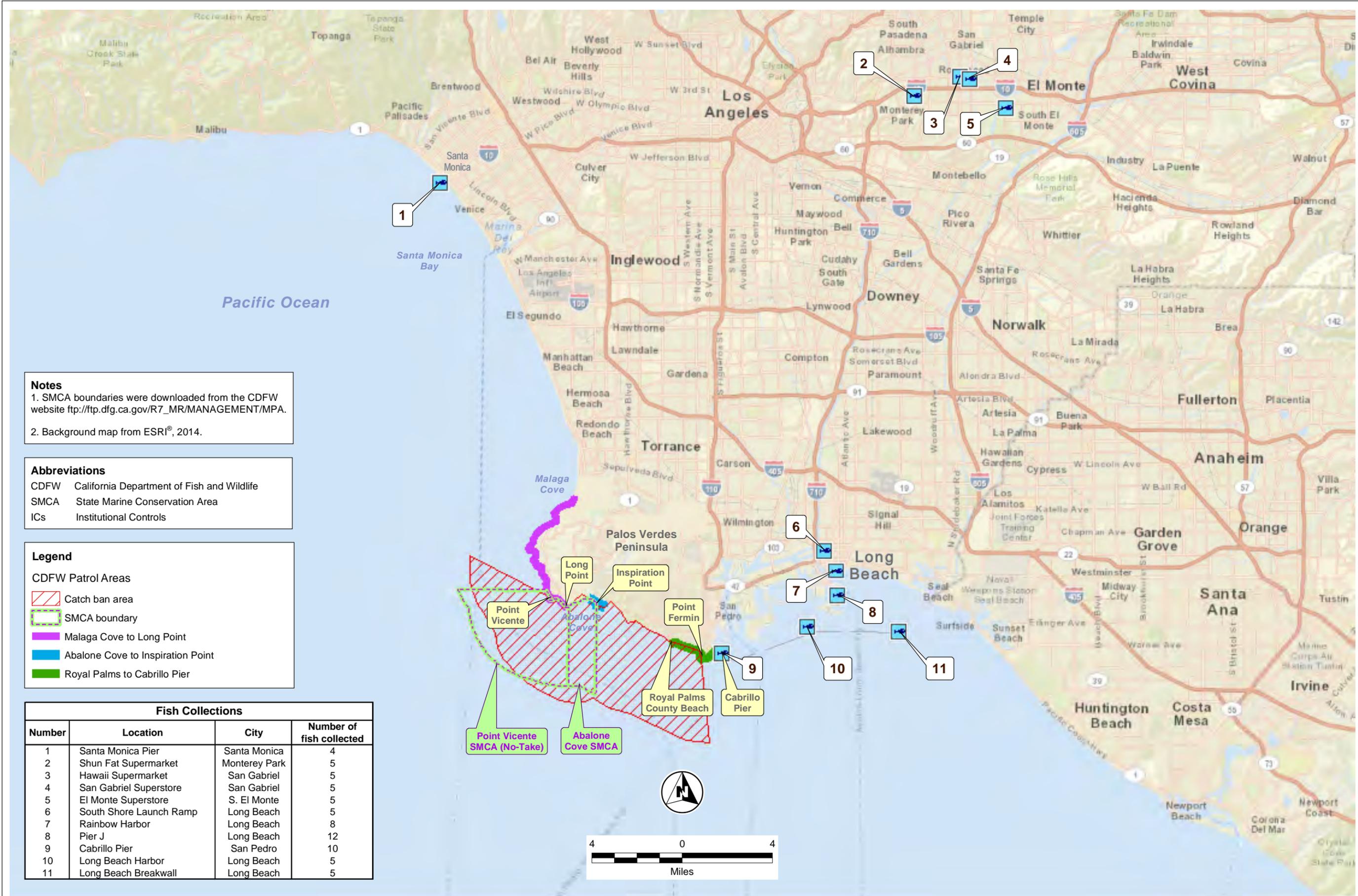
Scale bars and north arrow:

- Scale 1: 0 to 2 Kilometers
- Scale 2: 0 to 1.5 Miles
- Approximate scales

FIGURE 1
Location Maps -
PV Shelf Study Area

Sediment Sampling Program 2013
Palos Verdes Shelf
Los Angeles County, California





Notes
 1. SMCA boundaries were downloaded from the CDFW website ftp://ftp.dfg.ca.gov/R7_MR/MANAGEMENT/MPA.
 2. Background map from ESRI®, 2014.

Abbreviations
 CDFW California Department of Fish and Wildlife
 SMCA State Marine Conservation Area
 ICs Institutional Controls

Legend
 CDFW Patrol Areas
 Catch ban area (red hatched)
 SMCA boundary (green dashed)
 Malaga Cove to Long Point (purple)
 Abalone Cove to Inspiration Point (blue)
 Royal Palms to Cabrillo Pier (green)

Fish Collections			
Number	Location	City	Number of fish collected
1	Santa Monica Pier	Santa Monica	4
2	Shun Fat Supermarket	Monterey Park	5
3	Hawaii Supermarket	San Gabriel	5
4	San Gabriel Superstore	San Gabriel	5
5	El Monte Superstore	S. El Monte	5
6	South Shore Launch Ramp	Long Beach	5
7	Rainbow Harbor	Long Beach	8
8	Pier J	Long Beach	12
9	Cabrillo Pier	San Pedro	10
10	Long Beach Harbor	Long Beach	5
11	Long Beach Breakwall	Long Beach	5

FIGURE 2
 Fish Collection Locations -
 2009 through 2012
 (Institutional Controls Program)

Five-Year Review
 Palos Verdes Shelf
 Los Angeles County, California

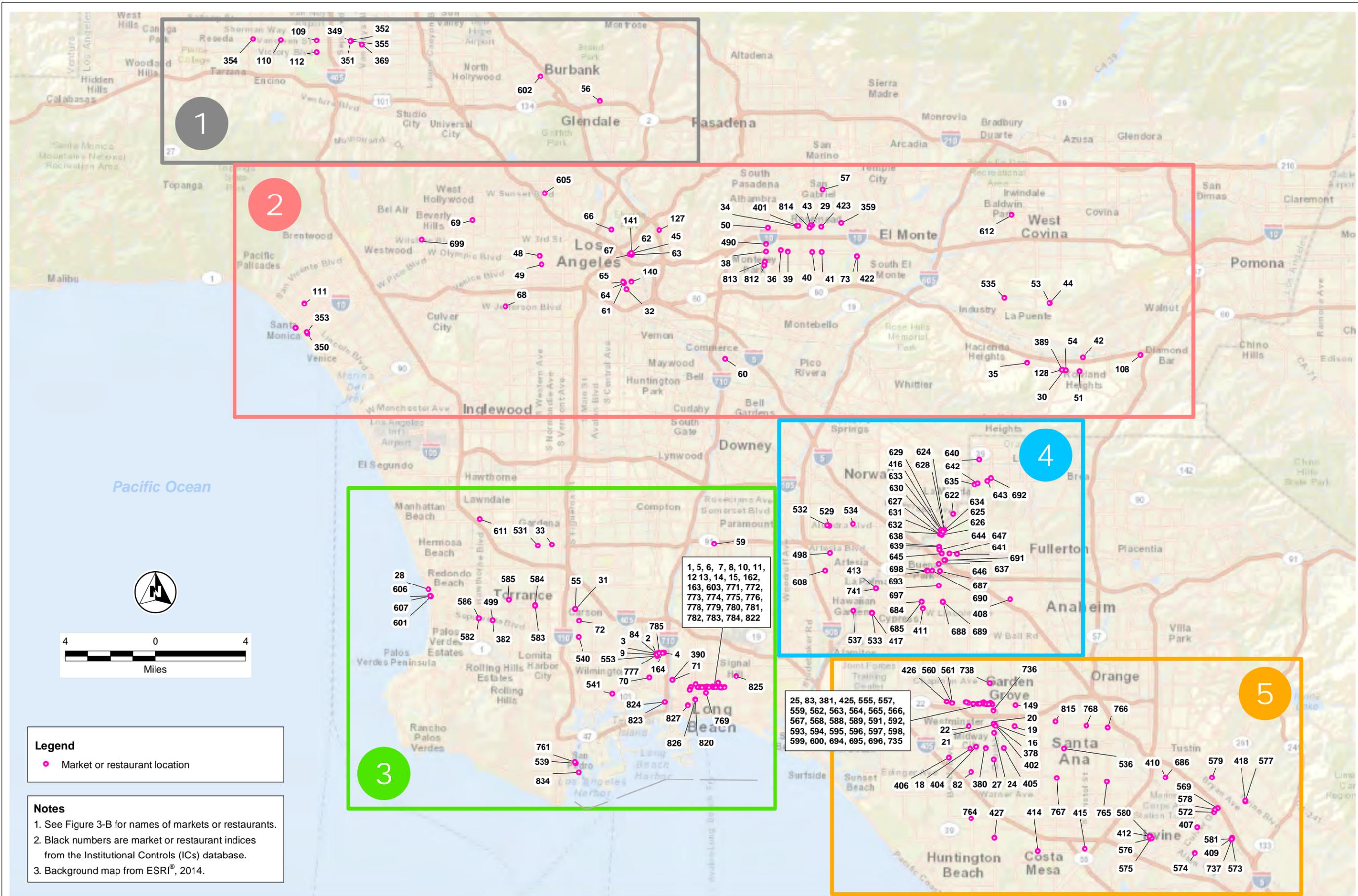


FIGURE 3-A
Monitored Fish Markets (1)
(Institutional Controls Program)

Five-Year Review
Palos Verdes Shelf
Los Angeles County, California

1 - Los Angeles - North		
Market or Name	LOCKEY	City
HK Market	56	Glendale
Mercado La Fiesta	109	Van Nuys
Q. Market	110	Van Nuys
Vallarta Supermarket #6	112	Van Nuys
Antojitos Latinos Cafe & Restaurant	349	Van Nuys
Mariscos Las Islitas	351	Van Nuys
Orozco Distributor	352	Van Nuys
Valley Produce, International Super Market	354	Reseda
Zaragoza Meat Market	355	Van Nuys
Jons Marketplace #2 (Also in #1, #3, #15, & #17)	369	Van Nuys
Fish King	602	Burbank

2 - Los Angeles - Central		
Market or Name	LOCKEY	City
Hawaii Supermarket	29	San Gabriel
Hong Kong Supermarket	30	Hacienda Heights
South China Seafood Center	32	Los Angeles
Valley Supermarket (formerly Quang Hoa)	34	Alhambra
99 Ranch	35	Hacienda Heights
Hong Kong Supermarket	36	Monetary Park
99 Ranch (formerly T&T Supermarket)	38	Monetary Park
Quang Hoa Supermarket	39	Monetary Park
Del Mar Market	40	Rosemead
99 Ranch	41	Rosemead
99 Ranch	42	Rowland Heights
99 Ranch	43	San Gabriel
Seafood City Supermarket	44	West Covina
Far East Supermarket	45	Los Angeles
Assi Supermarket	48	Los Angeles
Galleria Market	49	Los Angeles
Asia Supermarket	50	Alhambra
Greenland Market (Korean)	51	Hacienda Heights
Island Pacific Supermarket	53	West Covina
SF Supermarket	54	Hacienda Heights
Hong Kong Supermarket	57	San Gabriel
H&T Seafood Inc.	60	Bell
LA Seafood Direct	61	Los Angeles
Nam Hoa Fish	62	Los Angeles
On Time Seafood LLC	63	Los Angeles
Pacific Fresh	64	Los Angeles
Unified Seafood Corp	65	Los Angeles
A-Grocery Warehouse	66	Los Angeles
ABC Seafood	67	Los Angeles
Crenshaw Fish Market	68	Los Angeles
Fairfax Grocery	69	Los Angeles
Thuang Phat Supermarket	73	S. El Monte
Market World	108	Diamond Bar
Santa Monica Seafood	111	Santa Monica
Come Phat Supermarket	127	Los Angeles
HK SuperMarket	128	Rowland Heights
Jing San Food	140	Los Angeles
Vien Dong Seafood Com.	141	Los Angeles
L & K Market	350	Santa Monica
Santa Monica Frams, Jr.	353	Santa Monica
Rosemead Market - Meat/Fish	359	Rosemead
Galleria Market	389	Rowland Heights
168 Market	401	Alhambra
El Monte Superstore Meat and Seafood	422	S. El Monte
San Gabriel Superstore	423	San Gabriel
Shun Fat Supermarket	490	Monterey Park
Little Asia	535	La Puente
Haykazuni Fish Market	605	Los Angeles
Sea Ocean Seafood Market	612	West Covina
Urusawa	699	Los Angeles
Elite Restaurant	812	Monterey Park
Duck House Restaurant	813	Monterey Park
Five Star Restaurant	814	Monterey Park

3 - San Pedro & Long Beach		
Market or Name	LOCKEY	City
Kim Long Market	1	Long Beach
Tambuli Market	2	Long Beach
A&F Market	3	Long Beach
Li Hoa Market	4	Long Beach
Riverside Supermarket	5	Long Beach
Vin Hoa Market (a.k.a. Vinh Hao Super Market)	6	Long Beach
Kim Heng Market	7	Long Beach
Seng Heng Supermarket	8	Long Beach
Manila Trading Seafood Market	9	Long Beach
An Dong	10	Long Beach
New Soriya Market	11	Long Beach
Mekong Market	12	Long Beach
Vinh Heng Market	13	Long Beach
KH Market	14	Long Beach
Saigon Market	15	Long Beach
Quality Seafood	28	Redondo Beach

Tambuli Seafood Market	31	Carson
99 Ranch	33	Gardena
Seafood City Supermarket	55	Carson
Family Fish Market	59	Long Beach
Maruhide Marine Products Inc	70	Long Beach
Long Beach Seafoods Company	71	Long Beach
Seafood Ranch Market	72	Carson
Tita Susans Seafood Market	84	
Sean Market	162	Long Beach
Rainbow Seafood	163	Long Beach
EZ Fish Market	164	Long Beach
Han Nam Market	382	Torrance
Seng Heng Supermarket	388	Long Beach
Peninsula Seafoods	390	Long Beach
Market World	499	Torrance
Marukai Market	531	Gardena
Port O'Call - Various	539	San Pedro
Main Fish Market	540	Carson
Pacific Seafood	541	Wilmington
Peninsula Seafoods	553	Long Beach
Marukai Corporation	582	Torrance
Mitsuwa Marketplace	583	Torrance
Miyabi Tei	584	Torrance
S-Mart	585	Torrance
Sushi-Mori-Zo	586	Torrance
Charlie's Place	601	Redondo Beach
Hak Heang Restaurant	603	Long Beach
Pacific Fish Center	606	Redondo Beach
Redondo Beach Crabhouse	607	Redondo Beach
Saigon Market	611	Lawndale
San Pedro Fish Market	761	San Pedro
Crystal Thai	769	Long Beach
Dong Mai	771	Long Beach
El Sauz	772	Long Beach
Hong Ngy	773	Long Beach
Sreyrat Market	774	Long Beach
Bamboo Island	775	Long Beach

Binh Duong Restaurant	776	Long Beach
Chow Fun Express Restaurant	777	Long Beach
Dara Restaurant	778	Long Beach
Dragon Cafe	779	Long Beach
Golden Villa	780	Long Beach
Monorom Restaurant	781	Long Beach
New Pho	782	Long Beach
Pandanus Leaf	783	Long Beach
Siem Reap Restaurant	784	Long Beach
Tita Susan Restaurant	785	Long Beach
El Torazo	820	Long Beach
La Lune Imperial	822	Long Beach
Queens Wharf	823	Long Beach
Queens Wharf Berth 55	824	Long Beach
Sophy's	825	Long Beach
Sura Cafe	826	Long Beach
Chopstix Express	827	Long Beach
Los Angeles Fish and Oyster Company	834	San Pedro

4 - Buena Park		
Market or Name	LOCKEY	City
99 Ranch	408	Anaheim
Gemmae Bakeshop & Seafood	411	Buena Park
La Palma Hannam Supermarket	413	La Palma
Super 1 Mart	416	Buena Park
Tambuli Market	417	Cypress
99 Ranch	498	Artesia
H Mart	529	Norwalk
Seafood City	532	Cerritos
Tambuli Seafood Market	533	Cypress
Kaunlaran Oriental and Fish Market	534	Norwalk
Zion Market	537	Hawaiian Gardens
Uni Mart	608	Artesia
Jang Mo Gip Restaurant	622	Buena Park
Jjang Restaurant	624	Buena Park
Kum Kang San Restaurant	625	Buena Park
Wooga Korean BBQ	626	Buena Park
Gunul House	627	Buena Park
BBQ Chicken	628	Buena Park
BCD Tofu House	629	Buena Park
Beach Whaleo	630	Buena Park
Man Doo Rang	631	Buena Park
Myung Dong Tofu House	632	Buena Park
Myung Dong Restaurant	633	Buena Park
Surah	634	Buena Park
Ye Dang Korean Restaurant	635	La Habra
Abbaee Soondae Restaurant	637	Buena Park
Amadeus	638	Buena Park
Harubang	639	Buena Park
Knock Knock Restaurant	640	La Habra
Koko Chicken BBQ	641	Buena Park
Light Town House BBQ	642	La Habra
San Chon	643	La Habra
Shin Sa Young Dong Restaurant	644	Buena Park
Sonamu Restaurant	645	Buena Park
Soot Bul Gib	646	Buena Park
Southern Village	647	Buena Park
BBQ Town	684	Buena Park
Pine Hill BBQ and Seafood Buffet	685	Buena Park
Arirang Korean BBQ/Japanese Sushi	687	Buena Park
Cham Soot Gol	688	Buena Park
Cho Sun Ok	689	Buena Park
Daebok Plus Restaurant	690	Buena Park
Gol Mok Kil Inc	691	Buena Park
Ha Dong Kwan	692	La Habra
Han Yang Restaurant	693	Buena Park
Sagan	697	Buena Park
Wako Honeypig	698	Buena Park
Super 1 Mart	741	La Palma

Not shown on Figure 3-A		
Market or Name	LOCKEY	City
Alhadani Hala	554	
Tropical Seafood	538	Oxnard

5 - Orange County - South		
Market or Name	LOCKEY	City
Dong Loi Seafood Co.	16	Garden Grove
ABC Supermarket	18	Westminster
Nguoi Viet Supermarket	19	Garden Grove
SF Supermarket	20	Garden Grove
Hoa Binh Supermarket	21	Garden Grove
My Thuan Supermarket	22	Westminster
Quang Minh Supermarket	24	Garden Grove
AR Supermarket	25	Garden Grove

5 - Orange County - South (continued)		
Market or Name	LOCKEY	City
Saigon City Marketplace	27	Westminster
Green Farm Market (formerly known as A Chau Supermarket)	82	Fountain Valley
Super 1 Garden Grove (a.k.a. Hannam Chain)	83	Garden Grove
Dalat Supermarket	149	Garden Grove
Garden Grove Superstore (Formerly SF Supermarket)	378	Garden Grove
T & K Food Market	380	Westminster
Ka Ju Farmers Market	381	Garden Grove
Saigon Supermarket	402	Garden Grove
A Dong Supermarket	404	Westminster
Anh Minh Market	405	Westminster
Westminster Superstore	406	Westminster
99 Ranch	407	Irvine
99 Ranch	409	Irvine
Freshia Market	410	Tustin
H Mart	412	Irvine
Marukai Market	414	Costa Mesa
Mitsuwa Market Place #12	415	Costa Mesa
Zion Market	418	Irvine
H Mart Garden Grove	425	Garden Grove
Freshia Market	426	Stanton
Ebisu Supermarket	427	Fountain Valley
Vien Dong Seafood Market	536	Santa Ana
BCD Tofu House	555	Garden Grove
Dae Jang Gun	557	Garden Grove
Cham Soot Gol	559	Garden Grove
Flower Pig Korean BBQ	560	Garden Grove
Go Goo Ryeo	561	Garden Grove
Han Kook Kwan	562	Garden Grove
Hwang Hae Do	563	Garden Grove
Ka Ju Kim Bab	564	Garden Grove
Kaju Soft Tofu Restaurant	565	Garden Grove
Light Town House	566	Garden Grove
On Dai Zip	567	Garden Grove
So Moon Nan Whang Jok Bal	568	Garden Grove
Kaya Restaurant	569	Irvine
Koba Tofu House	572	Irvine
Shik Do Rak Restaurant	573	Irvine
Arirang BBQ Restaurant	574	Irvine
BCD Tofu House	575	Irvine
Chae Bahn Korean Cuisine	576	Irvine
Cho Dang Tofu & Korean BBQ	577	Irvine
Dae Myoung Ok Korean Restaurant	578	Irvine
Dumpling & Noodle House	579	Irvine
Hot Stone Bibigo	580	Irvine
Kaju Soft Tofu Restaurant	581	Irvine
Bon Juk Restaurant	588	Garden Grove
Ham Hung Restaurant	589	Garden Grove
Han Woo Ri Restaurant	591	Garden Grove
Hang A Ri Noodle House	592	Garden Grove
Hodori Restaurant	593	Garden Grove
Hyang Chon Restaurant	594	Garden Grove
Mi Ho Restaurant	595	Garden Grove
New Seoul BBQ Buffet	596	Garden Grove
Pho & Rolls	597	Garden Grove
Shik Do Rak	598	Garden Grove
Smile Restaurant	599	Garden Grove
Woorijip	600	Garden Grove
Woori Market Tustin	686	Tustin
Jang Toh Restaurant	694	Garden Grove
Mo Ran Gak	695	Garden Grove
Ogane Korean Restaurant	696	Garden Grove
Chung Dam Shun Nong Tang	735	Garden Grove
Incheonwon BBQ House	736	Garden Grove
Juju Pocha	737	Irvine
Korean House Restaurant	738	Garden Grove
99 Ranch	764	Fountain Valley
G & D Seafood Market	765	Santa Ana
La Bamba Market	766	Santa Ana
Ono Seafood Market	767	Santa Ana
Puerto Madero	768	Santa Ana
Saigon Wholesale Seafood Inc.	815	Garden Grove

Notes
1. See Figure 3-A for locations of markets and restaurants.

Abbreviations
LOCKEY Institutional Controls (ICs) database index

FIGURE 3-B
Monitored Fish Markets (2)
(Institutional Controls Program)

Five-Year Review
Palos Verdes Shelf
Los Angeles County, California



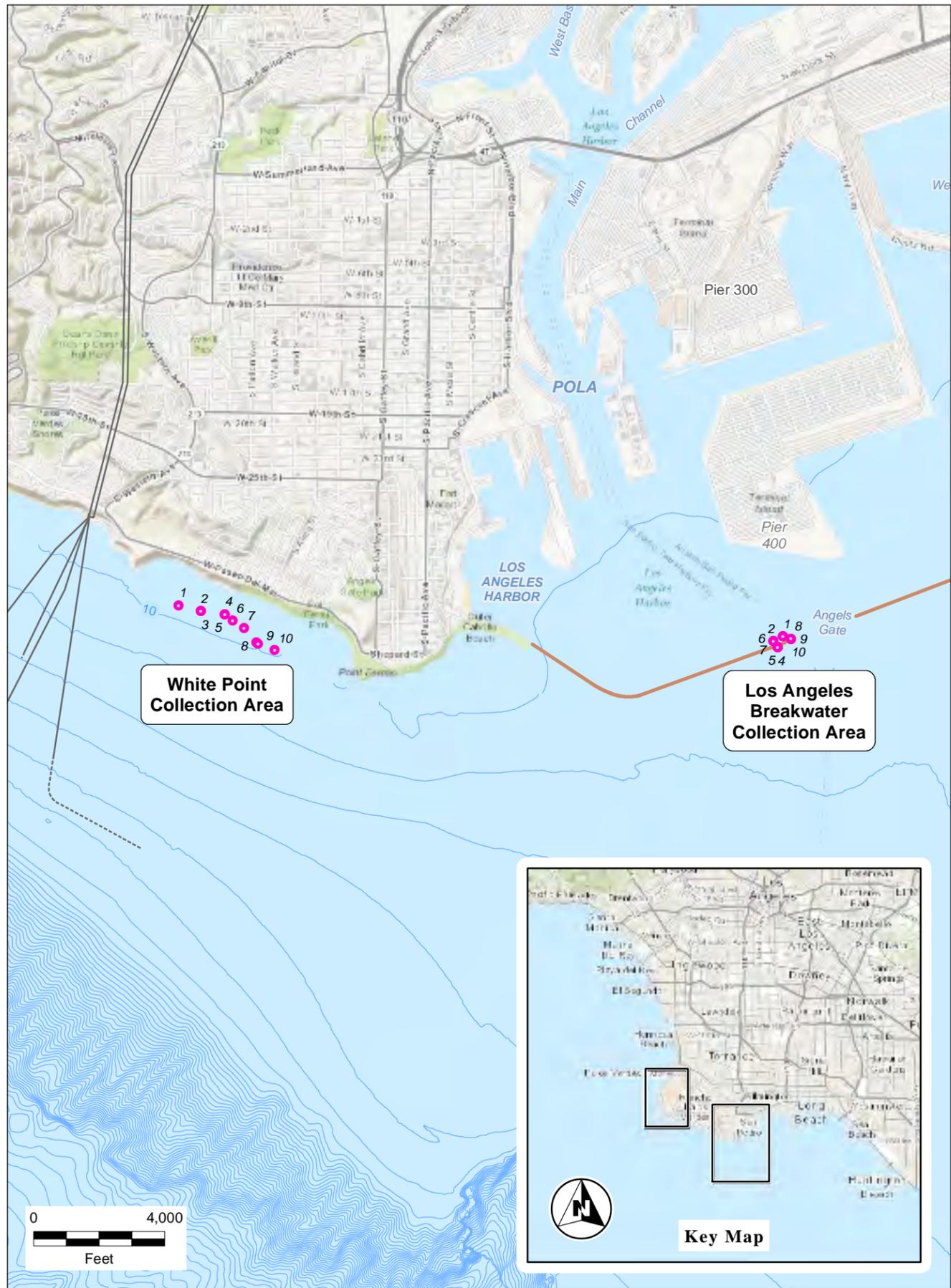
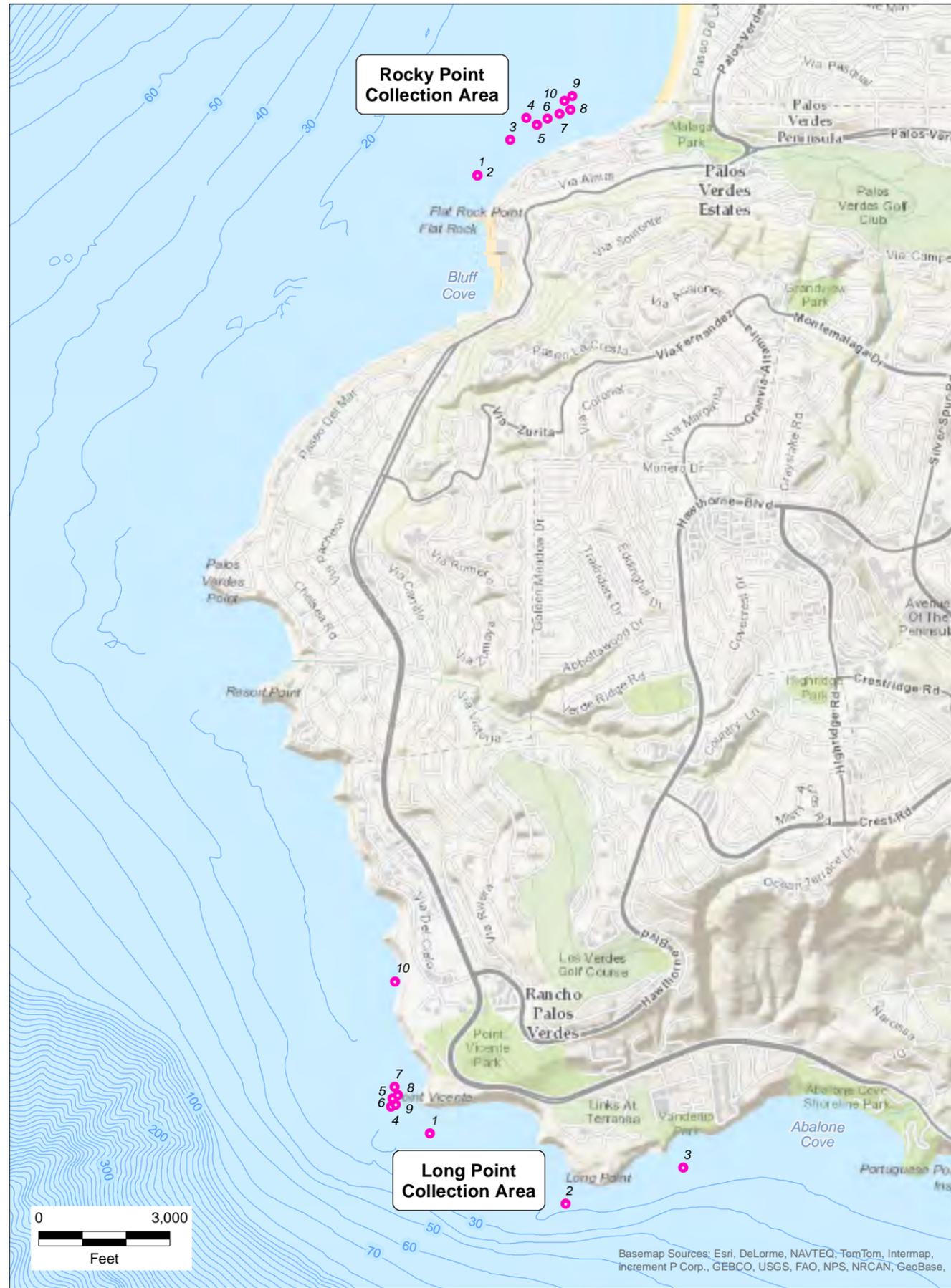


FIGURE 4
Lobster Collection Locations -
Year 2011 (Institutional Controls Program)

Five-Year Review
Palos Verdes Shelf
Los Angeles County, California

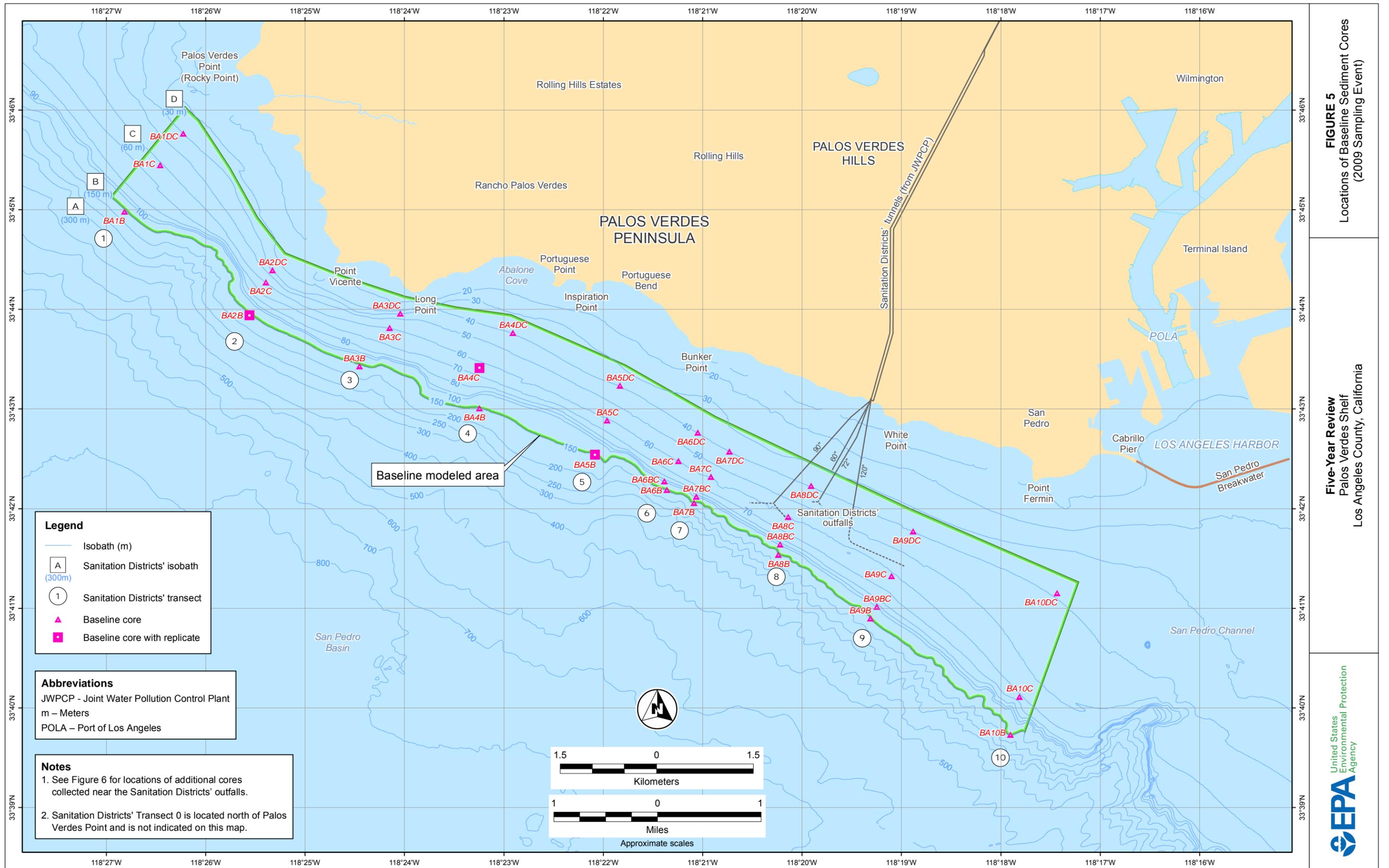
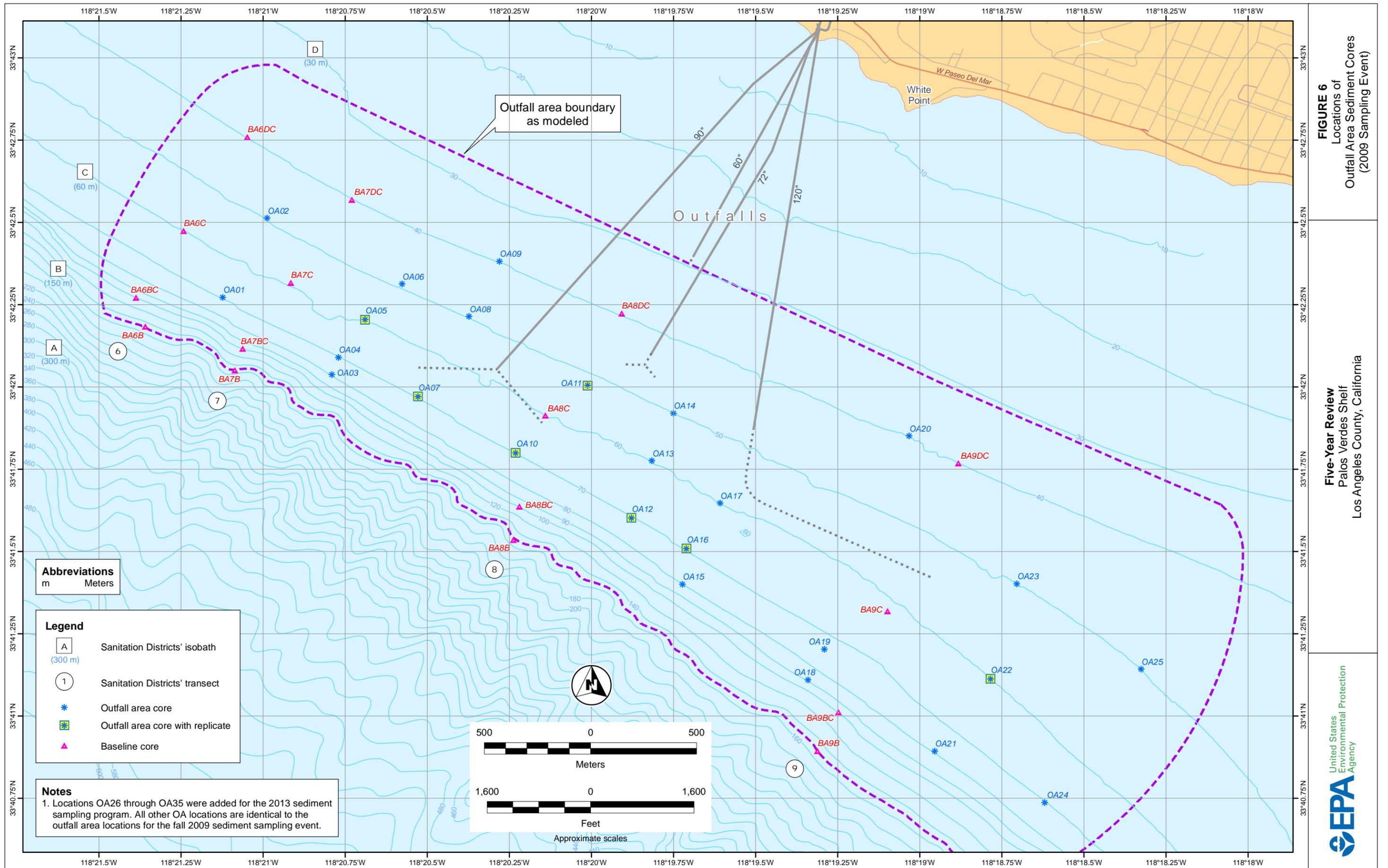


FIGURE 5
Locations of Baseline Sediment Cores
(2009 Sampling Event)

Five-Year Review
Palos Verdes Shelf
Los Angeles County, California





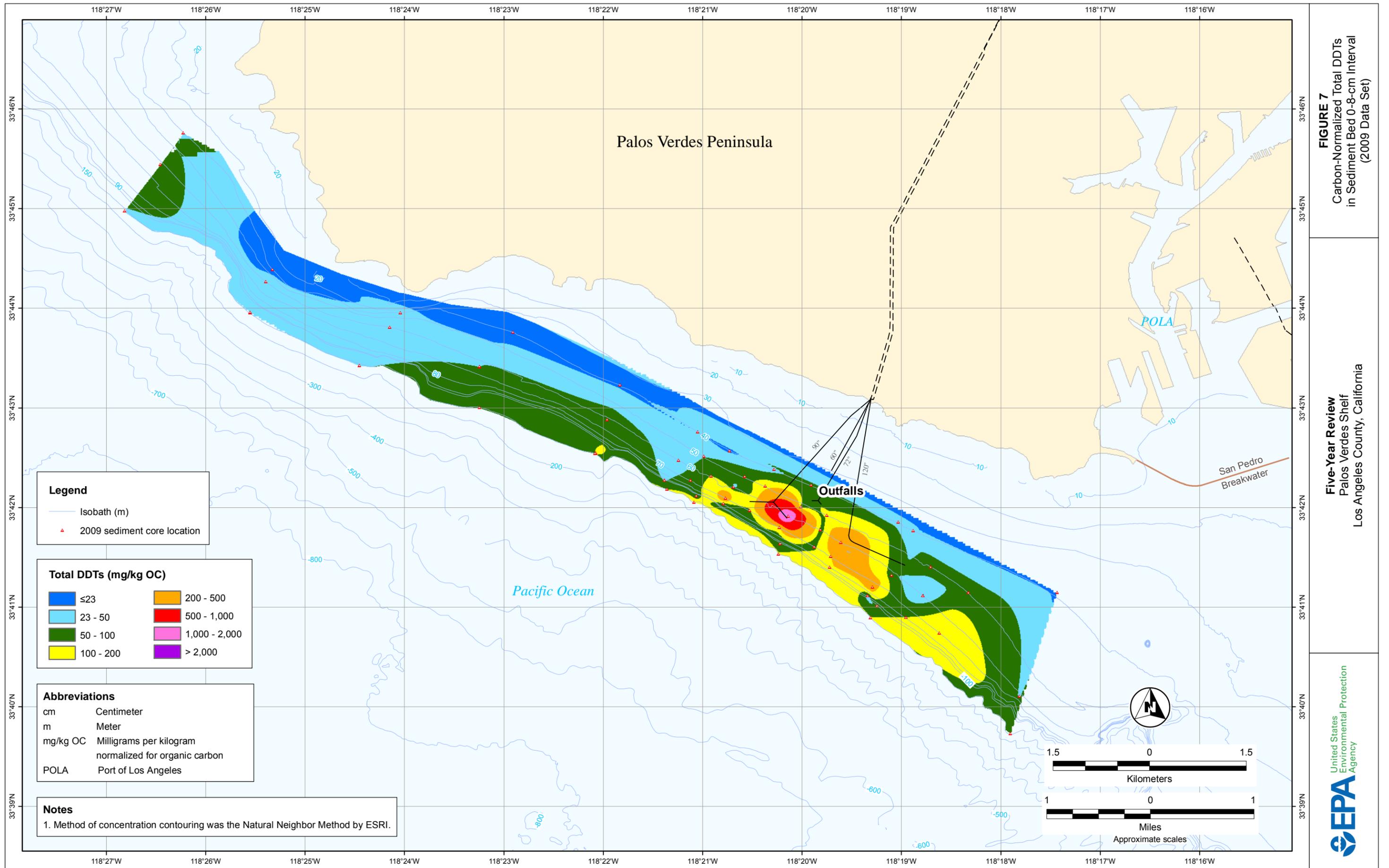


FIGURE 7
Carbon-Normalized Total DDTs
in Sediment Bed 0-8-cm Interval
(2009 Data Set)

Five-Year Review
Palos Verdes Shelf
Los Angeles County, California



Legend

- Isobath (m)
- ▲ 2009 sediment core location

Total DDTs (mg/kg OC)

Blue	≤23	Orange	200 - 500
Light Blue	23 - 50	Red	500 - 1,000
Green	50 - 100	Pink	1,000 - 2,000
Yellow	100 - 200	Purple	> 2,000

Abbreviations

- cm Centimeter
- m Meter
- mg/kg OC Milligrams per kilogram normalized for organic carbon
- POLA Port of Los Angeles

Notes

- Method of concentration contouring was the Natural Neighbor Method by ESRI.

1.5 0 1.5
Kilometers

1 0 1
Miles

Approximate scales

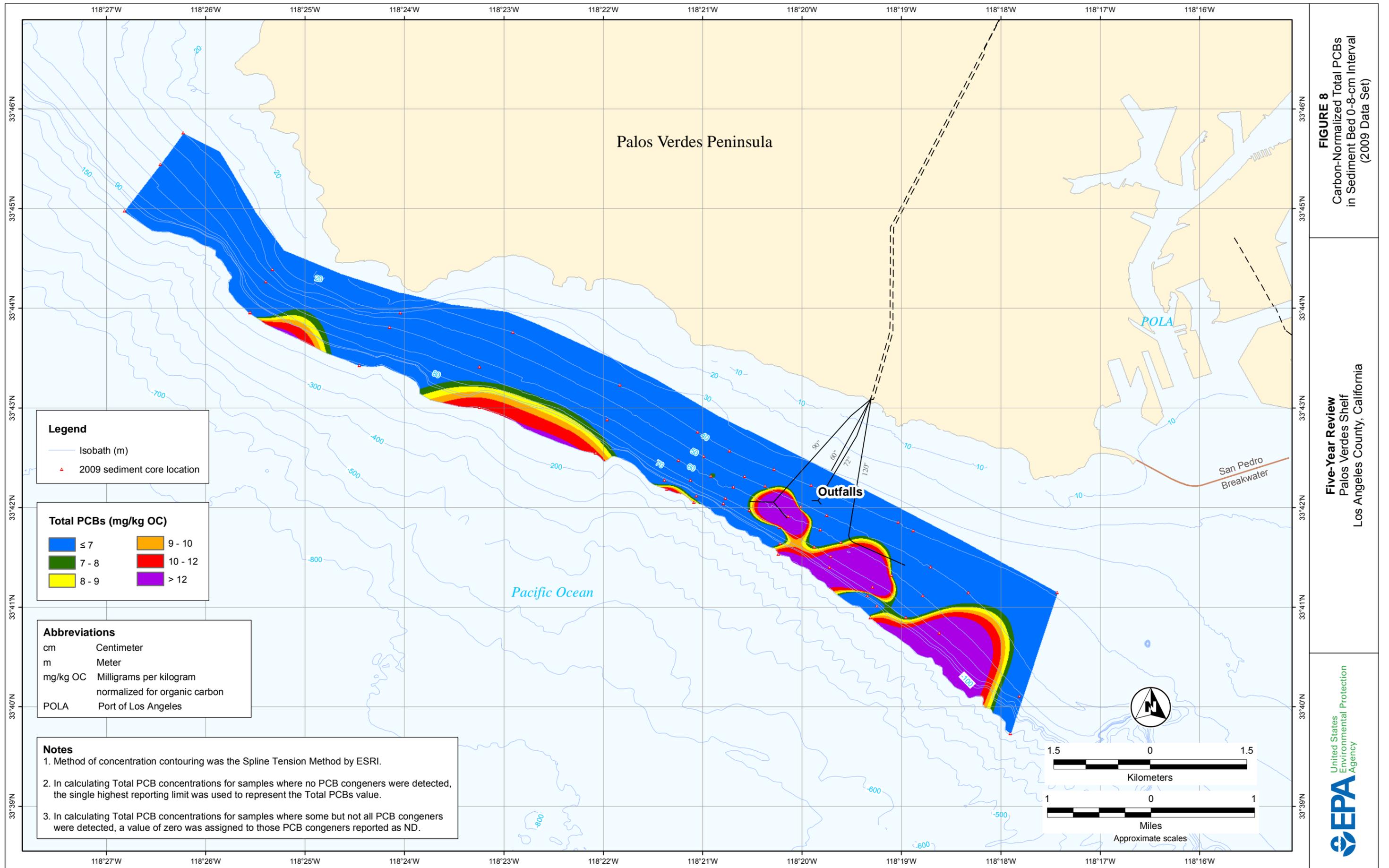


FIGURE 8
Carbon-Normalized Total PCBs
in Sediment Bed 0-8-cm Interval
(2009 Data Set)

Five-Year Review
Palos Verdes Shelf
Los Angeles County, California



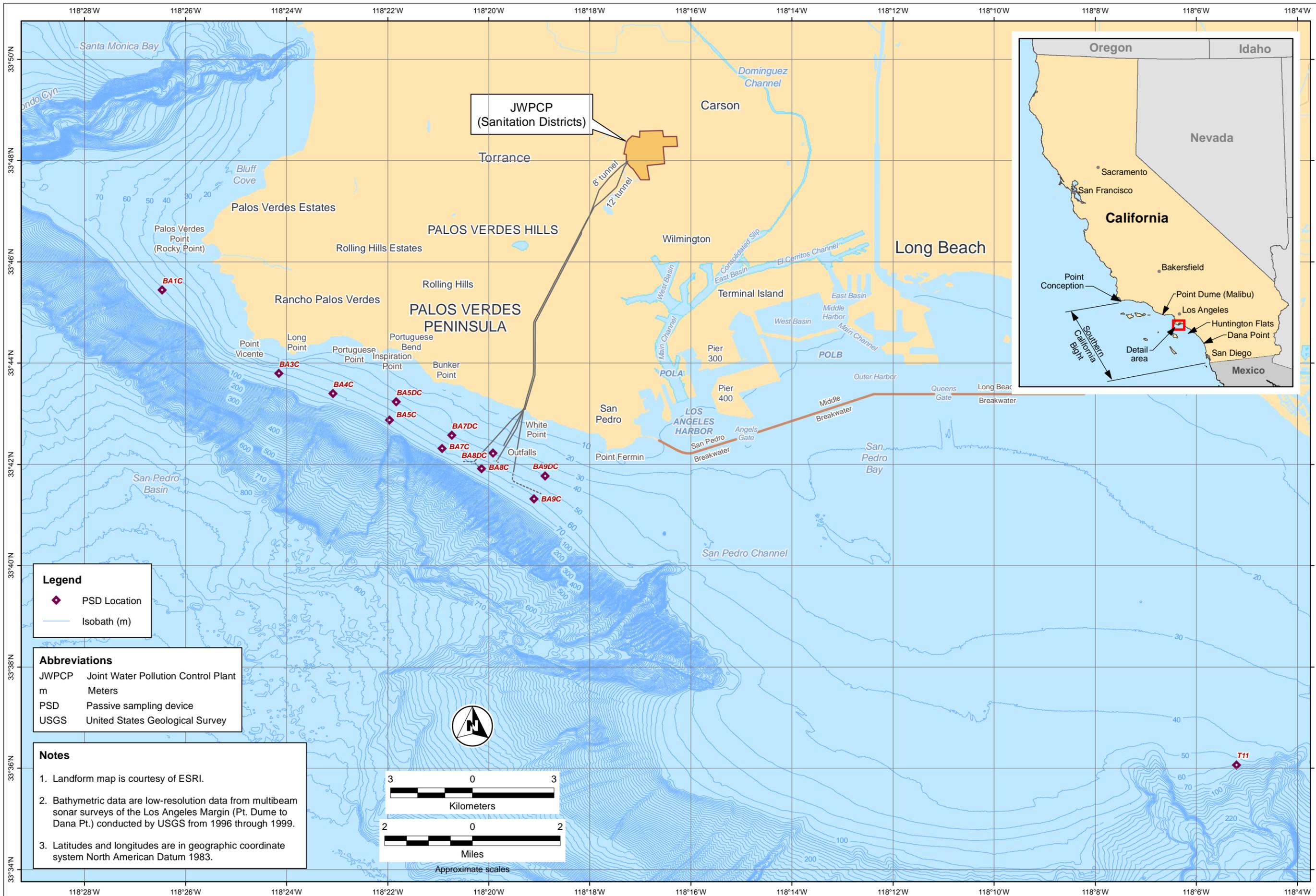


FIGURE 9
Locations of PSDs
(2010 Water Sampling Program)

Five-Year Review
Palos Verdes Shelf
Los Angeles County, California



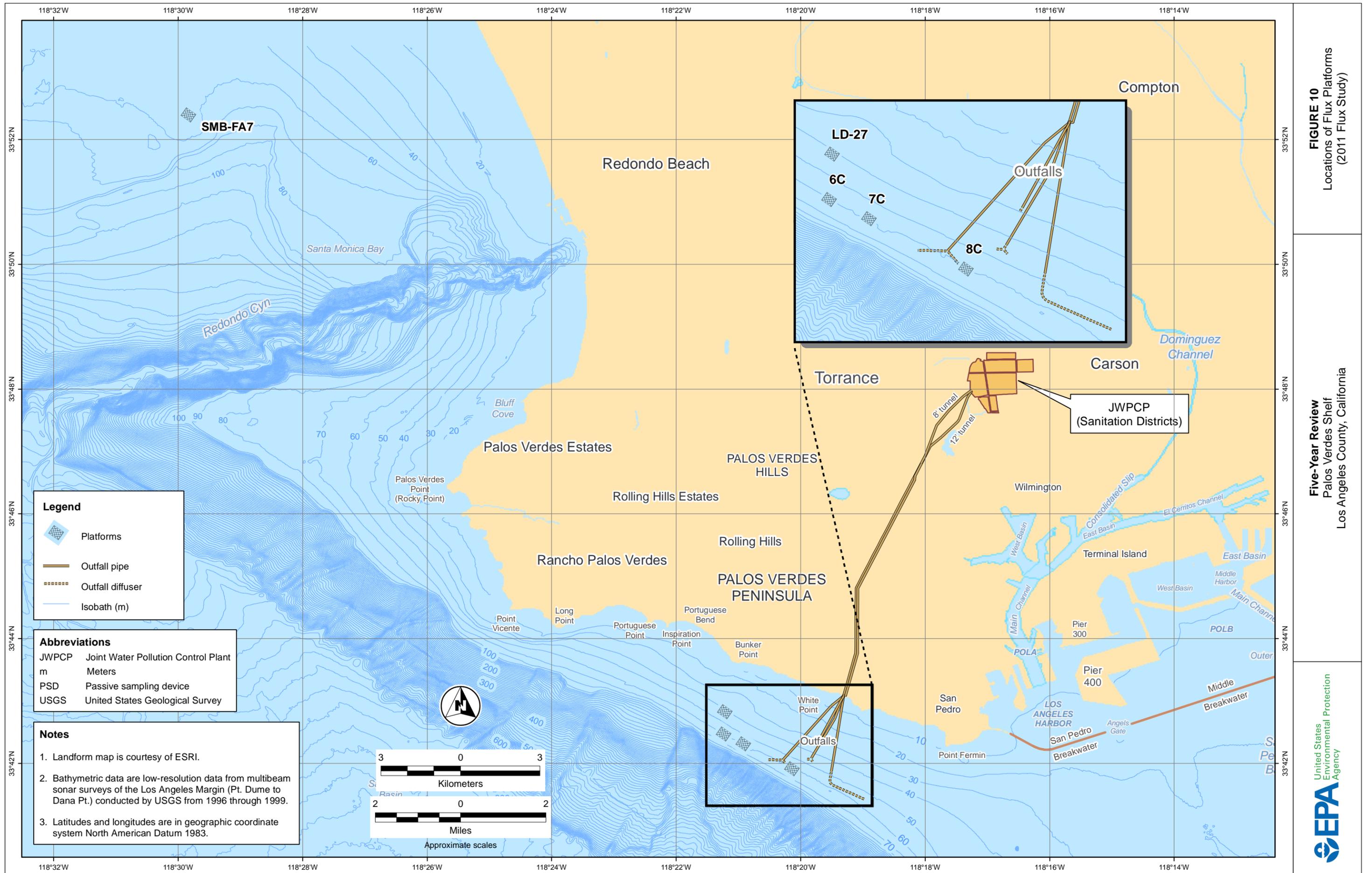


FIGURE 10
Locations of Flux Platforms
(2011 Flux Study)

Five-Year Review
Palos Verdes Shelf
Los Angeles County, California

Appendix A: List of Documents Reviewed

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List of Documents Reviewed

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- SGA, 2013. FCEC Enforcement Report. 31 May.
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- Zeng, Eddy Y., C.C. Yu, and K. Tran, 1999. In Situ Measurements of Chlorinated Hydrocarbons in the Water Column off the Palos Verdes Peninsula, California. Environmental Science & Technology/Volume 33, No. 3, 1999.

Appendix B: Press Notices

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PUBLIC NOTICE
EPA BEGINS FIRST FIVE-YEAR REVIEW OF THE INTERIM CLEANUP AT THE
PALOS VERDES SHELF
SITE

The United States Environmental Protection Agency (EPA) has begun the initial Five-Year Review (FYR) of interim cleanup actions undertaken at the Palos Verdes Shelf Site, Operable Unit 5 of the Montrose Chemical Corporation Superfund Site, located off the Los Angeles, California coast. The review will evaluate whether the cleanup actions for the Site remain protective of human health and the environment.

Specifically, EPA will look at the movement and breakdown of the Site's remaining contaminants, the effectiveness of the institutional controls, changes in scientific knowledge about site contaminants and exposure pathways, and changes in regulatory standards.

After September 30, 2014, a copy of the final report will be placed in the information repositories listed below. This Site's next FYR is scheduled for 2019.

INTERIM REMEDY

The Palos Verdes Shelf site is a large area of dichlorodiphenyltrichloroethane (DDT) and polybrominated biphenyls (PCBs) contaminated sediment located in the ocean off the coast of the Palos Verdes peninsula near Los Angeles, California. High levels of DDT and PCBs are found in the active biologic zone of the Palos Verdes Shelf sediments, and fish from the Shelf are contaminated with DDT and PCBs. On September 30, 2009, the EPA signed an interim Record of Decision that selected an initial remedial action for PV Shelf of capping, monitored natural recovery, and institutional controls.

COMMUNITY INVOLVEMENT

If you like to be interviewed for the FYR, please contact Judy Huang, EPA Project Manager at (415) 972-3681 or by email at huang.judy@epa.gov prior to February 17, 2014.

For more Site information, go to EPA's webpage at:
www.epa.gov/region09/pvshelf

To be added to the Site's mailing and email list, contact Carlin Hafiz at (213) 244-1814 or by email at hafiz.carlin@epa.gov.

INFORMATION REPOSITORY LOCATIONS:

San Pedro Public Library, 931 So. Gaffey Street, San Pedro, CA 90731, (310) 548-7779; Redondo Beach Public Library, 303 N. Pacific Coast Hwy., Redondo Beach, CA 90277, (310) 318-0675; Palos Verdes Peninsula Library, 650 Deep Valley Drive, Rolling Hills Estates, CA 90274, (310) 377-9584 and EPA Superfund Record Center, 95 Hawthorne St., San Francisco, CA 94105, (415) 820-4700.

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Appendix C: Interview Forms

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INTERVIEW RECORD

Site Name: Palos Verdes Shelf	EPA ID No.: CAD008242711	
Subject: Five-Year Review	Time: 14:45	Date: 02/07/14
Type: <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other (email) Location of Visit: N/A	<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	

Contact Made By:

Name: Ed Gillera	Title: Project Scientist	Organization: Gilbane Federal
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Individual Contacted:

Name: James Alamillo	Title: Urban Programs Manager	Organization: Heal the Bay
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Telephone No: 310-451-1500, ext 115	Street Address: 1444 9 th St.
Fax No: 310-496-1902	City, State, Zip: Santa Monica, CA 90401
E-Mail Address: jalamillo@healthebay.org	

1. What is your overall impression of the PV Shelf project? (general opinion)

There has been a great deal of work completed for the PV Shelf project, from studies (fish tissue study, fish consumption study) to award winning public outreach programs over the past 10 years. However, there is still a lot of work to be completed and questions answered about the site. Until then, public education and outreach will continue to be an important component of reducing the risk to public health from contaminated fish consumption.

2. Do you feel well informed about the site's activities and progress?

Yes. However, we still feel that there is room for improvement with regards to the members of the ICs and PVSTIEG collectively working with one another to inform not only PV Shelf stakeholders, but the greater Los Angeles/Orange County audiences. Too often, members of the public do not know the relationship of PV Shelf studies to PV Shelf policies or outreach education. An example of this would be the recently completed "2013 Palos Verdes Shelf Seafood Consumption Study" by SGA and USEPA and its implication of the Interim Record of Decision. Most of the public would see this report as an interesting study. However, the report, and its suggested 'fish consumption rate' have huge implications for how future PV Shelf resources are allocated. Few, if any, IC stakeholders from the community would recognize this issue. As such, USEPA needs to do a better job highlighting this to IC community stakeholders, as well as the public at large.

3. Are you aware of the 2009 sediment monitoring data? Are you aware that the data indicated that contaminant levels in sediment are decreasing? What are your thoughts about this?

Yes. In addition, we are aware that the data indicated that contamination levels in the sediment were reported as 'decreasing'. While the report can lead one to have enthusiastic, almost euphoric sentiment that the site is cleaning itself up without human intervention, Heal the Bay has taken a more reserved position until a number of questions can be answered. For example, the report fails to adequately address why the current results differ so drastically from previous sediment sampling results and assessments. In addition, the report does not address the fate or

transport of the ‘missing’ sediment other than stating it has ‘magically’ disappeared. Also, while DDT might be reducing at accelerated rates than previously thought possible, which is still being debated; PCBs concentrations were thought to be highly stable and more problematic in terms of remediating. To this end, while there might be an explanation for the reduction in DDT concentrations, the report made no mention of how and why PCBs concentrations were significantly reduced in the sediment.

4a. Are you aware of the Institutional Controls (ICs) component of the remedy (including outreach, education, and enforcement)?

Yes.

4b. In your opinion, is the ICs component functioning as expected? Yes. Is the ICs program reaching its outreach and education goals? Its enforcement and monitoring goals?

Yes, the ICs component is functioning as expected. And yes, the ICs program is reaching its outreach and education goals. However, within this context, we believe that more outreach and education needs to be targeted to those recreational and sport-fish anglers that target fish listed on ‘do not consume’ list, as well as have limited fish consumption advisories. In addition, greater effort needs to be made to determine/validate what anglers state that are consuming versus what they are actually catching and taking home.

As for the enforcement and monitoring goals, continuing to fund these efforts is critical despite the lack of white croaker being landed or found in markets. Given the fluctuations in fish populations and landings, and the number of fish under current health advisories, tracking and monitoring fish catch, and the fate of that catch, this effort needs to be constantly done.

5a. Are you aware of the monitored natural recovery (MNR) components of the remedy (including sampling of environmental media and reporting)?

Yes.

5b. In your opinion, is the MNR component functioning adequately? Is it effectively reducing contamination levels at PV Shelf?

No. There are still a number of unanswered questions associated with this site, such as 1) a defensible explanation for the significant reduction in concentration of DDT and PCB in sediment, 1a) an explanation of how PCB is showing significant concentration reductions given its highly stable nature, 2) an explanation for why an equally significant reduction in fish tissue does not mirror the sediment reduction, 3) the development of a descriptive food web model of that demonstrates the fate and transport of DDT and PCB within the PV Shelf ecosystem—to include the water column and sediment.

To date, the MNR has simply monitored conditions on the shelf. As such, the MNR has not effectively reduced contamination levels at the PV Shelf because the MNR has not actually completed any work to reduce contamination levels. Currently, any reductions of contamination have been completed by nature—through chemical breakdown or biological uptake, or erosion—the moving of contaminated sediment on-site and off-site. The MNR has neither facilitated this process nor physically cleaned-up/abated the contaminated sediment.

6. Have there been routine communications or activities (inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.

Heal the Bay conducts the Angler Outreach Program under the auspices of the Fish Contamination Education Collaborative, which is a component of the Institutional Controls Program (ICs). The Angler Outreach Component is designed to conduct educational outreach to anglers on piers regarding: fish consumption guidelines, portion sizes and cooking methods to reduce risk, pier locations with “safer” fish populations, and updates on activities associated with clean-up and abatement of the PV Shelf, as well as restoration efforts. To date, Heal the Bay’s Angler Outreach Program has reached over 120,000 anglers during the past 10 years.

In addition to our involvement in the ICs Program, Heal the Bay regularly participates in the Palos Verdes Shelf Technical Information and Exchange Group.

Finally, Heal the Bay is routinely in communication USEPA, along with local State and municipal agencies, regarding the Santa Monica Bay Toxics TMDL for DDT and PCB.

7. Have there been any complaints, violations, or other incidents related to PV Shelf that required a response by your office? If so, please give details of the events and results of the responses.

No.

8. Do you have any comments, suggestions, or recommendations regarding the remedy at PV Shelf?

To the extent that this is possible, the proponents of the proposed remedy should strive to work with other public agencies to collectively address the contamination issues affecting the Santa Monica Bay, San Pedro Bay (Port of LA and Port of LB) and the Palos Verdes Shelf. They are hydrological and ecologically linked, yet the responsible jurisdictional agencies rarely collaborate on regulatory compliance or oversight, monitoring studies, or public education to more holistically address, understand the issue.

INTERVIEW RECORD

Site Name: Palos Verdes Shelf	EPA ID No.: CAD008242711	
Subject: Five-Year Review	Time: 12:26	Date: 02/04/14
Type: <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other (email) Location of Visit: N/A	<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	

Contact Made By:

Name: Ed Gillera	Title: Project Scientist	Organization: Gilbane Federal
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Individual Contacted:

Name: Robert K. Brodberg, Ph.D.	Title: Chief, Fish, Ecotoxicology, and Water Section Cal/EPA	Organization: OEHHA
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Telephone No: 916-323-4763	Street Address: Mail Stop 12-B, PO Box 4010 City, State, Zip: Sacramento, CA 95812
Fax No: 916-327-7320	
E-Mail Address: robert.brodberg@oehha.ca.gov	

Summary Of Conversation

1. What is your overall impression of the PV Shelf project? (general opinion)

The project is progressing and evolving. Initially, the focus seemed to be on public health; including communication, protecting and working with a broad coalition of non-government organizations (NGOs) representing a diversity of ethnic communities. Now the focus seems to be more on the clean-up and working through consultants and fewer and larger NGOs. The goals remain the same the implementation feels different.

2. Do you feel well informed about the site's activities and progress? Yes

3. Are you aware of the 2009 sediment monitoring data? Yes. Are you aware that the data indicated that contaminant levels in sediment are decreasing? Yes. What are your thoughts about this? This is an interesting, somewhat unexpected development at this time in the project. The results need to be replicated/verified by repeated testing over several years. The time-frames for declines in sediment and fish may vary. Indicator species should be tested (analyzed for PCBs and DDTs in the PV area and entire "red zone" over several years to see if the levels in fish are also declining.

4a. Are you aware of the Institutional Controls (ICs) component of the remedy (including outreach, education, and enforcement)? Yes.

4b. In your opinion, is the ICs component functioning as expected? Yes. Is the ICs program reaching its outreach and education goals? Yes. Its enforcement and monitoring goals? Enforcement yes; sediment monitoring yes; now need to monitor fish. This may be earlier than anticipated, but fish monitoring is need to respond to the sediment data.

INTERVIEW RECORD (cont.)

5a. Are you aware of the monitored natural recovery (MNR) components of the remedy (including sampling of environmental media and reporting)? Vaguely aware.

5b. In your opinion, is the MNR component functioning adequately? Is it effectively reducing contamination levels at PV Shelf? It is too soon to say that contamination levels have been permanently reduced, and why.

6. Have there been routine communications or activities (inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results. No

7. Have there been any complaints, violations, or other incidents related to PV Shelf that required a response by your office? No. If so, please give details of the events and results of the responses.

8. Do you have any comments, suggestions, or recommendations regarding the remedy at PV Shelf?

a) The continued absence of white croaker in local fish markets and commercial landings suggests that the on-the-water Enforcement component is less critical. A reduction in white croaker tissue concentrations similar to what has been found for sediment would also support this conclusion. Develop a plan to re-examine the continued need and role of the Enforcement component of the program.

b) If white croaker tissue concentrations are found to be lower it will be necessary to do a broader tissue monitoring study of other species across the current "red zone" in order to make changes in the state advisory across this area

INTERVIEW RECORD

Site Name: Palos Verdes Shelf	EPA ID No.: CAD008242711	
Subject: Five-Year Review	Time: 05:31	Date: 02/14/14
Type: <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other (email)	<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
Location of Visit: N/A		

Contact Made By:

Name: Ed Gillera	Title: Project Scientist	Organization: Gilbane Federal
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Individual Contacted:

Name: Robert Eganhouse	Title: Research Chemist	Organization: United States Geological Survey
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Telephone No: 703-648-5879	Street Address: 12201 Sunrise Valley Drive, MS 432
Fax No: 703-648-5832	
E-Mail Address: eganhou@usgs.gov	
City, State, Zip: Reston, Virginia 20192	

1. What is your overall impression of the PV Shelf project? (general opinion)

The remedial plan is reasonable and realistic as long as ongoing research findings are used to inform decisions about the application of engineering solutions (i.e. capping) at the site. The PV Shelf is very complex and may be the most extensively studied of any portion of the continental shelf in the world. Consequently, questions still remain about the behavior of the contaminated deposit. Given that, it is only prudent that a staged approach be used in attempting to remediate the site and, thereby, mitigate impacts.

2. Do you feel well informed about the site's activities and progress?

Not particularly. I have only intermittent contact with the RPM and the prime contractor's representative (R. Lindfors). Clearly there are research activities going on and decisions being made, but I hear little, if any, about them and my input has rarely been solicited. One other comment I might make is that EPA's Palos Verdes website is only very infrequently updated. Thus, one must depend on direct contact with the RPM or EPA's prime contractor (e.g. via a PVSTIEG meeting or email) for information.

3. Are you aware of the 2009 sediment monitoring data? Are you aware that the data indicated that contaminant levels in sediment are decreasing? What are your thoughts about this?

Yes. I understand that the results suggest that the contaminant mass was significantly lower in 2009 than it was in the past. What are your thoughts about this? Well, it has been known since the early 1990s that reductive dechlorination of the major DDT compounds in Palos Verdes Shelf (PVS) sediments (DDE, DDD) was occurring. That process continues. In addition to microbially-mediated reductive dechlorination, it is also likely that contaminants are being lost from the sediments by physical processes (diffusion, resuspension/desorption, sediment transport). Our work appears to indicate that reductive dechlorination is the dominant mechanism for attenuation of DDE in PVS sediments. This is primarily due to the fact that most of the contaminant mass is found at significant depths below the sediment-water interface where physical loss processes are less likely to be effective.

Research we are just now completing indicates that the dechlorination rate of p,p'-DDE at two well-studied locations (LACSD stations 3C, 6C) differs, but it does not appear to have changed at either site over the period 1981-2010. The first-order dechlorination rates we have developed do not support the magnitude of the apparent decrease in mass of DDE suggested by comparison of the modeling of 2009 baseline survey data and data from previous studies (cf., Table 10, final report). Thus, we believe that the mass of DDE and surficial sediment (0-8 cm) concentrations (with and without organic carbon normalization) in PVS sediments that was estimated from data collected in the 2009 survey are almost certainly underestimates. Possible reasons for lower-than-expected masses and concentrations could include one or more of the following: 1) negative bias of the trace organic analytical chemistry (i.e., DDT, PCBs) results, 2) positive bias of the TOC results, 3) negative bias associated with the geostatistical methods used to estimate mass from the analytical chemistry measurements, and/or 4) differences in sampling methods (viz., sampling devices) and locations (navigation) used in the 2009 baseline survey and those used in principal preceding study (i.e. USGS [1992] survey) with which the 2009 survey data are being compared.

4a. Are you aware of the Institutional Controls (ICs) component of the remedy (including outreach, education, and enforcement)?

Somewhat. I have read a bit about them in the FS and some of the EPA documents/bulletins.

4b. In your opinion, is the ICs component functioning as expected? Is the ICs program reaching its outreach and education goals? Its enforcement and monitoring goals?

Don't know.

5a. Are you aware of the monitored natural recovery (MNR) components of the remedy (including sampling of environmental media and reporting)?

Yes.

5b. In your opinion, is the MNR component functioning adequately?

If by the 'MNR component' you mean the evaluation of whether and how MNR is proceeding, I would say the approach is working, but the results to date (i.e. the 2009 baseline survey) have not resulted in an accurate understanding of what is happening in the sediments.

Is it effectively reducing contamination levels at PV Shelf?

DDE concentrations are decreasing. It is really a question of how fast, how the rates vary spatially (vertically, laterally), and whether the rates are changing with time or not. It must be recognized that in the case of reductive dechlorination of the dominant DDT 'parent' compounds (i.e., DDE and DDD), products that could also exhibit toxicity (i.e., DDMU, DDNU, DDMS, DDNS) are being generated. Thus, while some contaminant concentrations are decreasing, others may be increasing. If the 'parent' compounds (DDE, DDD) or reductive dechlorination products (DDMU, DDNU, DDMS, DDNS) become sequestered within the sediments or are completely mineralized (to CO₂, HCl, H₂O) they are effectively removed from the system. This would, in my opinion, be the best outcome, but we don't yet know the extent to which this is occurring. It is also possible that the COCs are being transformed to other degradation products (e.g. DBP, DDA, DDOH), which may be more or less mobile and toxic, but these compounds are not presently being measured.

6. Have there been routine communications or activities (inspections, reporting activities, etc.) conducted by your office regarding the site?

I have supplied quarterly reports of our research to USEPA, Region IX for the last several years (since 2009). If so, please give purpose and results. The purpose is to keep the RPM informed of progress, expenditures, and, to some extent, research findings.

7. Have there been any complaints, violations, or other incidents related to PV Shelf that required a response by your office?

An article written by Ms. Marla Cone (Environmental Health News) on the apparent loss of DDE in PVS sediments as a result of the 2009 baseline survey results was published in Scientific American online. If so, please give details of the events and results of the responses. I was contacted by Ms. Cone in January 2013 and eventually I gave an interview. I got permission to review and comment on her draft article as well. Here is the publication link... <http://www.scientificamerican.com/article/the-mystery-of-the-vanishing-ddt-in-the-ocean-near-los-angeles/>

Somewhat later, I was contacted by an environmental reporter at Southern California Public Radio (Ms. Molly Peterson), but she never followed up with an interview. An article on the same subject, but with less information, came out in December 2013 (<http://www.scpr.org/news/2013/12/04/40725/scientists-turned-detectives-look-to-crack-the-cas/>).

Another article appeared in the Los Angeles Times in November, 2013 (<http://articles.latimes.com/2013/nov/17/local/la-me-palos-verdes-shelf-20131118>), but I was not contacted or interviewed for that article.

8. Do you have any comments, suggestions, or recommendations regarding the remedy at PV Shelf?

It would be good if all researchers involved at PV whose work is pertinent to the issues EPA is trying to address be given information on activities at the site. From my limited perspective, there is a need for greater transparency and better communication. My second suggestion is that all data being generated in support of decision making be taken into account before EPA invests in further remedial actions. This should include soliciting the advice of principle investigators who, in some cases, have unique in-depth knowledge of the site, are familiar with the large body of previous research, and have the best overall sense of current conditions on the PVS.

INTERVIEW RECORD

Site Name: Palos Verdes Shelf	EPA ID No.: CAD008242711	
Subject: Five-Year Review	Time: 09:18	Date: 02/18/14
Type: <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other (email) Location of Visit: N/A	<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	

Contact Made By:

Name: Ed Gillera	Title: Project Scientist	Organization: Gilbane Federal
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Individual Contacted:

Name: Mark Gold	Title: Associate Director	Organization: UCLA, Institute of the Environment and Sustainability
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Telephone No: 310-825-5324	Street Address: La Kretz Hall, Suite 300
Fax No: 310-825-9663	
E-Mail Address: gold@ioes.ucla.edu	
City, State, Zip: Los Angeles, CA 90095	

1. What is your overall impression of the PV Shelf project? (general opinion)

I'm disappointed at the pace of the project. I've been involved on this since the mid-1990s and I never thought we'd be sitting here in 2014 without implementation of a remedy. The research efforts have been slow as well.

2. Do you feel well informed about the site's activities and progress?

Pretty well informed. Yes.

3. Are you aware of the 2009 sediment monitoring data? Are you aware that the data indicated that contaminant levels in sediment are decreasing? What are your thoughts about this?

I am still in shock on this. It is contrary to all of the results prior to that point. Scientifically, it doesn't make much sense. There was no massive resuspension event. Even if DDT degraded more rapidly in a very short period of time, that doesn't explain the rapid drop in PCB concentrations. PCBs are not known to degrade rapidly.

4a. Are you aware of the Institutional Controls (ICs) component of the remedy (including outreach, education, and enforcement)?

Yes. The work on educating the most exposed public has gone well. Outreach and education has been the strongest part of the entire superfund effort. However, enforcement is still negligible. And the fact the commercial closure area hasn't changed in 20 years is unconscionable in light of the data that demonstrates that contaminated fish are found throughout San Pedro Bay. That could have been an easy change at CDFW, but it never happened. The same tiny, arbitrary closure area is being used. This feeds into the fact that enforcement has never been a big priority for the project. It has always been about outreach and education.

4b. In your opinion, is the ICs component functioning as expected? Is the ICs program reaching its outreach and education goals? Its enforcement and monitoring goals?

See above. Great work on outreach and education. Not much effort on the enforcement side.

5a. Are you aware of the monitored natural recovery (MNR) components of the remedy (including sampling of environmental media and reporting)?

Yes.

5b. In your opinion, is the MNR component functioning adequately? Yes Is it effectively reducing contamination levels at PV Shelf?

In light of my history on this project, I'm not even sure how to respond. This is not action. This is not protecting public health. Natural recovery is a euphemism for doing nothing. Monitoring is critical, but it isn't remediation

6. Have there been routine communications or activities (inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.

No. I'm still on the Board of Heal the Bay, and I helped create their pier outreach program. They are a partner on the project. I try to go to some EPA meetings and read the e-mail.

7. Have there been any complaints, violations, or other incidents related to PV Shelf that required a response by your office? If so, please give details of the events and results of the responses.

No. But Heal the Bay and me have been vocal about the slow pace of remediation and research (the fish study took years and the sediment flux study has yet to be completed) and the definition of site remediation success.

8. Do you have any comments, suggestions, or recommendations regarding the remedy at PV Shelf?

We'll have to wait for the results of the latest study to move forward on capping. It definitely feels as if EPA has thought capping was too difficult and too expensive, so natural recovery seems to be their preferred approach. Continuing the outreach and education program is critical. Expanding the regulatory component of ICs is over a decade overdue. People should not be catching and selling contaminated fish. Also, starting a clean fish certification program for fish caught in the bight is equally as important and long overdue.

INTERVIEW RECORD

Site Name: Palos Verdes Shelf	EPA ID No.: CAD008242711	
Subject: Five-Year Review	Time: 17:37	Date: 02/19/14
Type: <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other (email) Location of Visit: N/A	<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	

Contact Made By:

Name: Ed Gillera	Title: Project Scientist	Organization: Gilbane Federal
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Individual Contacted:

Name: Stephen Groner, P.E.	Title: President	Organization: S. Groner Associates, Inc.
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Telephone No: 562-597-0205	Street Address: 4510 Pacific Coast Highway, Ste 300
Fax No:	
E-Mail Address: sgroner@sga-inc.net	
City, State, Zip: Long Beach, CA 90804	

1. What is your overall impression of the PV Shelf project? (general opinion)

From the big picture stand point, it seems like EPA has done an excellent job developing a methodical plan for addressing the overall site including: gathering data, working with stakeholders, developing interim ICs, and coordinating with other agencies' expertise to collaborate and then basing remedial action decisions on the data they have on hand. The process has been slow, but very methodical and has made steady progress throughout the time I have been involved in the project.

The complexity of the site makes it difficult to provide stakeholders with clear and definitive answers on key long-term questions, which may be frustrating for some stakeholders. However, EPA has done a very thorough job of putting in place IC protections while long-term questions are methodically being answered through a step wise process of obtaining new data and incorporating it into the analysis of how to best remediate the site.

2. Do you feel well informed about the site's activities and progress?

As a contractor to the project, I do feel well informed. However an average stakeholder who is not as close to the project as we are may be confused, especially due to the fact that the data coming from the site has been so dynamic over time without clear explanation (this may confuse stakeholders that don't hear from EPA very often). In addition, the complexity of information may be difficult to follow, especially when they hear about the remediation portion of the project infrequently.

3. Are you aware of the 2009 sediment monitoring data? Are you aware that the data indicated that contaminant levels in sediment are decreasing? What are your thoughts about this?

Yes, I'm aware of the sediment monitoring data and the indication of a rapid decrease in contaminant levels. The data seems pretty straight forward that there has been clear declines in the contaminants in the soil sediment. While I am a registered environmental engineer familiar with soil sampling and remediation, I am not as familiar with the chemistry of DDT or PCB and/or its chemical decomposition process and how quickly it may naturally bio-remediate over time and/or chemically breakdown into "daughter" compounds, so it is hard for me to judge if this is out of the ordinary for these chemicals.

With that said, most people naturally think in linear terms, so the fact that there has been a rapid (non-linear) decrease in the last data set, I'm sure has many people questioning the situation. From my professional experience in communications, people want information to fit into an explainable model or narrative that fits into their mental prediction of what seemed plausibly. The non-linear nature of the data decline over time and that it did not fit into most people's mental expectation leading up to this last round of data, I'm sure makes many people uncomfortable.

4a. Are you aware of the Institutional Controls (ICs) component of the remedy (including outreach, education, and enforcement)?

Yes.

4b. In your opinion, is the ICs component functioning as expected? Is the ICs program reaching its outreach and education goals? Its enforcement and monitoring goals?

I do feel the IC component is functioning as expected. And I do feel the ICs program is reaching its outreach and educational goals.

I feel the pier outreach program is very solid and strong, which reaches the most direct audience (but not necessarily the most vulnerable – women of child bearing age and children being most at risk). The outreach to key EJ communities where fish may be brought back to families is harder to implement and assess the effectiveness, but the development of partnerships within key communities, plus development and distribution of multi-lingual outreach materials and online outreach has helped bridge this gap. The one area where I am least confident about and uncertain of the risk associated with the audience is anglers fishing for barred sandbass (both individuals fishing from private boats and from commercial passenger fishing vessels i.e., "party boats"). This is a different audience than pier anglers and is more difficult to reach, plus it seems like the data on barred sandbass is the least robust as far as its level of contaminants and sample size. So it is unclear what the risk level is and how much if any outreach is needed to protect this audience.

I also feel the enforcement and monitoring programs have done a good job keeping key "do not consume" fish out of the markets, specifically in Long Beach and Orange County. And the Department of Fish and Wildlife has added additional credibility, oversight and knowledge to the enforcement and monitoring effort which has been very valuable.

Between the education and outreach efforts and enforcement and monitoring efforts, I feel that EPA has put into place a comprehensive IC program that is protective of public health.

5a. Are you aware of the monitored natural recovery (MNR) components of the remedy (including sampling of environmental media and reporting)?

Yes.

5b. In your opinion, is the MNR component functioning adequately? Is it effectively reducing contamination levels at PV Shelf?

Yes it seems to be effectively working, especially given the latest round of data.

6. Have there been routine communications or activities (inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.

Yes, we implement/oversee the public education and outreach on behalf of EPA. We also work closely with the enforcement and monitoring program to ensure those efforts are aligned with the public education messaging. And lastly we assist EPA on conducting the annual strategic planning meetings and annual partner meetings.

7. Have there been any complaints, violations, or other incidents related to PV Shelf that required a response by your office? If so, please give details of the events and results of the responses.

No.

8. Do you have any comments, suggestions, or recommendations regarding the remedy at PV Shelf?

No additional comments at this time.

INTERVIEW RECORD

Site Name: Palos Verdes Shelf	EPA ID No.: CAD008242711	
Subject: Five-Year Review	Time: 09:49	Date: 02/07/14
Type: <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other (email) Location of Visit: N/A	<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	

Contact Made By:

Name: Ed Gillera	Title: Project Scientist	Organization: Gilbane Federal
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Individual Contacted:

Name: Joseph Gully	Title: Supervising Environmental Scientist, Ocean Monitoring and Research Group	Organization: Sanitation Districts Los Angeles
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Telephone No: 562-908-4288, ext 2818	Street Address: 1955 Workman Mill Rd.
Fax No: 562-908-4293	City, State, Zip: Whittier, CA 906010
E-Mail Address: jgully@lacsds.org	

Summary Of Conversation

1. What is your overall impression of the PV Shelf project? (general opinion)

The staff tracking the PV Shelf Project from the Ocean Monitoring and Research Group (OMRG) of the Sanitation Districts of Los Angeles County (Sanitation Districts) feel that the project is taking adequate steps to protect public and environmental health and restore lost resources resulting from the DDT and PCB contamination on the PV Shelf. The EPA Remediation leadership has been appropriately cautious in determining what, if any, engineered remediation (i.e. capping) is necessary and whether such an action would be worth the potential risk of resuspension of the contaminated sediments. This has taken great courage given the pressure by some environmental groups to take action immediately regardless of the risks or effectiveness.

2. Do you feel well informed about the site's activities and progress?

For the most part yes, although during significant (>4 months) lulls in activity, it would be helpful to get a periodic status report. Maybe a standing quarterly update should be considered.

3. Are you aware of the 2009 sediment monitoring data? Are you aware that the data indicated that contaminant levels in sediment are decreasing? What are your thoughts about this?

Yes and yes. We are not surprised that the contaminant levels on the PVS are decreasing. There are many mechanisms by which sediment contamination levels would be expected to decrease over time including burial, degradation, efflux to the water column, accumulation in biota, and sediment transport. Our 42 years of monitoring the area have documented such declines over time as well. What is surprising and difficult to explain is the magnitude of decline in just five years. It is hard to imagine that conditions on the PVS would have changed such that one or more of the aforementioned loss mechanisms would cause an 80% reduction in the deposit. EPA has made the right decision to repeat (and expand) the 2009 work to confirm this result before deciding on the appropriate remediation strategy.

INTERVIEW RECORD (cont.)

4a. Are you aware of the Institutional Controls (ICs) component of the remedy (including outreach, education, and enforcement)?

Yes, we have participated in the ICs program since their inception as a technical resource to the program.

4b. In your opinion, is the ICs component functioning as expected? Yes. Is the ICs program reaching its outreach and education goals? Its enforcement and monitoring goals?

Yes, we feel the ICs program is generally functioning as expected and reaching its outreach and education goals. One concern we have (and expressed at the time) is that the simplified fish consumption guidelines message unnecessarily restricts males and older women from consumption of certain fish contaminated with mercury. A goal of the IC program is to inform the public on which fish are safe to consume and the current consumption message is inaccurate in this regard. Further, mercury is not one of the contaminants associated with the PVS Superfund Site and perhaps should be eliminated from the ICs message altogether. That is not to say informing the public of mercury contamination issues should not occur, just that the ICs program should just focus on DDTs and PCBs and let OEHHA and DFW take care of mercury. As far as enforcement and monitoring is concerned, there has been considerable improvement in the past several years on both fronts. Hopefully this trend will continue into the future.

5a. Are you aware of the monitored natural recovery (MNR) components of the remedy (including sampling of environmental media and reporting)?

Yes. We provided in-kind support to the sediment coring (2009, 2013) and contaminant flux studies (2011).

5b. In your opinion, is the MNR component functioning adequately? Is it effectively reducing contamination levels at PV Shelf?

Yes, we feel the MNR component is functioning adequately. As far as effectively reducing contamination levels goes, the answer is yes give the circumstances. While MNR is slow, the uncertainty of the 2009 data and the demonstrated risk of resuspension associated with capping make MNR and ICs the best way to manage the site at this time. Hopefully, the 2013-2014 monitoring activities will provide more clarity on the rate and primary mechanisms of contamination decline at the site so the risk to reward factor associated with capping can be determined.

6. Have there been routine communications or activities (inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.

Yes, in addition to participating in the MNR and other special studies at the site over the years, we routinely monitor the sediments, benthic infauna and bottom fish/invertebrate communities, water column, and fish tissue contamination at the site for our NPDES permit. These data are provided annually and discussed in terms of impacts from our discharge and spatial/temporal trends every two years in our Receiving Water Monitoring Report submitted to the Los Angeles Regional Water Quality Control Board. Copies of these reports are available upon request.

7. Have there been any complaints, violations, or other incidents related to PV Shelf that required a response by your office? If so, please give details of the events and results of the responses.

No.

8. Do you have any comments, suggestions, or recommendations regarding the remedy at PV Shelf?

A single, high quality laboratory should be placed under long-term contract (5 yrs?) by EPA to ensure consistency and quality in the data.

INTERVIEW RECORD

Site Name: Palos Verdes Shelf	EPA ID No.: CAD008242711	
Subject: Five-Year Review	Time: 15:15	Date: 02/18/14
Type: <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other (email) Location of Visit: N/A	<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	

Contact Made By:

Name: Ed Gillera	Title: Project Scientist	Organization: Gilbane Federal
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Individual Contacted:

Name: Rebecca Hartman	Title: Captain	Organization: California Department of Fish and Wildlife
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Telephone No: (310) 678-4864	Street Address: 4665 Lampson Ave Suite C
Fax No: (562) 804-1548	
E-Mail Address: Rebecca.Hartman@wildlife.ca.gov	
City, State, Zip: Los Alamitos, CA 90720	

1. What is your overall impression of the PV Shelf project? (general opinion)

I think it is getting out an important message, but it does take a lot of people and time to get the messages out. I guess it's better to do it that way than to put out an outreach product that doesn't reach the intended people, or doesn't convey the right message.

2. Do you feel well informed about the site's activities and progress?

Yes, through the big meetings we have

3. Are you aware of the 2009 sediment monitoring data? Are you aware that the data indicated that contaminant levels in sediment are decreasing? What are your thoughts about this?

Yes, it looks like it is occurring naturally, right? Any the question I have, and the public asks too, is where is it going? Is it breaking down biologically into something else? Or being carried to another location?

4a. Are you aware of the Institutional Controls (ICs) component of the remedy (including outreach, education, and enforcement)?

Yes, very much so!

4b. In your opinion, is the ICs component functioning as expected? Is the ICs program reaching its outreach and education goals? Its enforcement and monitoring goals?

It is operating as expected, and meeting goals, but there are still people that don't know about the contamination issue showing up constantly, which is mind boggling since we have done so much outreach! I think the outreach would have to continue until the threat is gone, in order to reach our goals. Also, there haven't been any white croaker landed commercially because the fishermen aren't catching them. Where are they?! If the white croaker come back, the markets will see a ton of them, and then we will need to be reactive in warning businesses about the problems, unless we keep checking different markets and keep letting them know, even though they aren't buying white croaker now.

5a. Are you aware of the monitored natural recovery (MNR) components of the remedy (including sampling of environmental media and reporting)?

Not sure what this is... if you mean that is cleaning itself up naturally, then yes, but I'm still concerned about where it's going!

5b. In your opinion, is the MNR component functioning adequately? Is it effectively reducing contamination levels at PV Shelf?

See 5a.. I think it's functioning, and is probably the only way to go, it's just going to take awhile...

6. Have there been routine communications or activities (inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.

I am with Fish & Wildlife (Formerly Fish & Game), so we do the outreach and enforcement aspect. We have found that many people know of the contamination issues and are avoiding white croaker, but we are also learning that there is a limitless number that don't know.

7. Have there been any complaints, violations, or other incidents related to PV Shelf that required a response by your office? If so, please give details of the events and results of the responses.

No

8. Do you have any comments, suggestions, or recommendations regarding the remedy at PV Shelf?

It would be good if the sample size for contaminated fish species was larger, and I really want to know where the white croaker have gone, and where the contaminant has gone if it's not still there...

INTERVIEW RECORD

Site Name: Palos Verdes Shelf	EPA ID No.: CAD008242711	
Subject: Five-Year Review	Time: 10:00	Date: 4/1/14
Type: <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other (email)	<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
Location of Visit:		

Contact Made By:

Name: Ed Gillera	Title: Project Scientist	Organization: Gilbane Federal
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Individual Contacted:

Name: Michael Lyons	Title: Staff Level Environmental Specialist	Organization: Los Angeles Regional Water Quality Control Board
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Telephone No: 213-576-6718	Street Address: 320 West 4th Street #200 City, State, Zip: Los Angeles, California 90013
Fax No: 213-576-6640	
E-Mail Address: mlyons@waterboards.ca.gov	

Summary Of Conversation

1. What is your overall impression of the PV Shelf project? (general opinion)

It's taking forever to make a decision on how to proceed.

2. Do you feel well informed about the site's activities and progress?

Relatively well informed. However, given the infrequency of meetings and lack of updates, it's easy to lose track of when decisions will be made.

3. Are you aware of the 2009 sediment monitoring data? Are you aware that the data indicated that contaminant levels in sediment are decreasing? What are your thoughts about this?

I am aware of the 2009 monitoring data and the indications of decreasing contaminant levels. It would be nice if this turns out to be true, but it is puzzling why PCB and DDT levels would drop to the same extent if natural degradation is occurring, since these compounds have different degradation pathways. I wouldn't be surprised if material has sloughed off the shelf into deeper water or if it's simply an analytical technique anomaly.

4a. Are you aware of the Institutional Controls (ICs) component of the remedy (including outreach, education, and enforcement)?

Yes.

4b. In your opinion, is the ICs component functioning as expected? Is the ICs program reaching its outreach and education goals? Its enforcement and monitoring goals?

The IC program seems to be conducting a lot of outreach and education. Not sure if this is effectively reducing consumption of contaminated fish.

5a. Are you aware of the monitored natural recovery (MNR) components of the remedy (including sampling of environmental media and reporting)?

Yes.

5b. In your opinion, is the MNR component functioning adequately? Is it effectively reducing contamination levels at PV Shelf?

Bald eagles and other raptors seem to be experiencing improved reproductive success, so it looks like some reductions in contaminant transfer have occurred. However, fish continue to be contaminated and we still have fish advisories.

6. Have there been routine communications or activities (inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.

No.

7. Have there been any complaints, violations, or other incidents related to PV Shelf that required a response by your office? If so, please give details of the events and results of the responses.

No.

8. Do you have any comments, suggestions, or recommendations regarding the remedy at PV Shelf?

More frequent updates on progress would help. It would be useful to circulate a summary of meetings to the groups so that those that miss a meeting can stay informed.

INTERVIEW RECORD

Site Name: Palos Verdes Shelf	EPA ID No.: CAD008242711	
Subject: Five-Year Review	Time: 15:13	Date: 02/06/14
Type: <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other (email) Location of Visit: N/A	<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	

Contact Made By:

Name: Ed Gillera	Title: Project Scientist	Organization: Gilbane Federal
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Individual Contacted:

Name: Tayseer Mahmoud	Title: Senior Hazardous Substances Engineer	Organization: DTSC
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Telephone No: 714-484-5419	Street Address: 5796 Corporate Ave.
Fax No: (714) 484-5437	
E-Mail Address: Tayseer.Mahmoud@dtsc.ca.gov	
City, State, Zip: Cypress, California 90630	

Summary Of Conversation

1. What is your overall impression of the PV Shelf project? (general opinion)

The USEPA is working diligently to investigate the Site and address State and local agencies concerns to select at a final remedy for the Site that will be protective of public health and the environment. Also, USEPA holds technical meetings, strategic planning meetings, and information exchange meetings to keep the agencies involved and coordinate activities for the project.

2. Do you feel well informed about the site's activities and progress? Yes

3. Are you aware of the 2009 sediment monitoring data? Are you aware that the data indicated that contaminant levels in sediment are decreasing? What are your thoughts about this?

Yes. DTSC is aware that contaminant levels are decreasing. DTSC reviewed the draft report and sent comments to EPA. The responses to comments were acceptable and DTSC concurred with the 2009 Sediment Report on December 9, 2013. Additional sediment sampling is planned for the project.

4a. Are you aware of the Institutional Controls (ICs) component of the remedy (including outreach, education, and enforcement)? Yes.

4b. In your opinion, is the ICs component functioning as expected? Is the ICs program reaching its outreach and education goals? Its enforcement and monitoring goals?

The ICs component of the remedy is functioning as expected. Also, the outreach program is reaching the public and the ICs signs play a big role in keeping the public safe. In addition, state and local agencies are working with USEP to monitor and enforce the ICs.

INTERVIEW RECORD (cont.)

5a. Are you aware of the monitored natural recovery (MNR) components of the remedy (including sampling of environmental media and reporting)? Yes.

5b. In your opinion, is the MNR component functioning adequately? Is it effectively reducing contamination levels at PV Shelf?

Although the MNR is expected to function at the Site, additional sediment sampling is planned to confirm that the MNR is effectively reducing contamination levels.

6. Have there been routine communications or activities (inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results. No

7. Have there been any complaints, violations, or other incidents related to PV Shelf that required a response by your office? No. If so, please give details of the events and results of the responses.

8. Do you have any comments, suggestions, or recommendations regarding the remedy at PV Shelf?

The planned additional sediment sampling, water column sampling, and fish movement studies will support the selection of a final remedy for the Site.

INTERVIEW RECORD

Site Name: Palos Verdes Shelf	EPA ID No.: CAD008242711	
Subject: Five-Year Review	Time: 09:06	Date: 02/24/14
Type: <input checked="" type="checkbox"/> Telephone <input type="checkbox"/> Visit <input type="checkbox"/> Other (email) Location of Visit: N/A	<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	

Contact Made By:

Name: Ed Gillera	Title: Project Scientist	Organization: Gilbane Federal
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Individual Contacted:

Name: Salwa Mina	Title: Environmental Health Specialist II	Organization: Los Angeles County Public Health
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Telephone No: 626-813-3300	Street Address: 1435 West Covina Pkwy
Fax No:	
E-Mail Address: smina@ph.lacounty.gov	
City, State, Zip: West Covina, CA 91790	

Summary Of Conversation

1. What is your overall impression of the PV Shelf project? (general opinion)

It's a very good project. I've received so much information on the project when I joined [FCEC]. I feel that it's very good and should continue with the project.

2. Do you feel well informed about the site's activities and progress?

Yes, because of all the meetings. The meetings are very informative.

3. Are you aware of the 2009 sediment monitoring data? Are you aware that the data indicated that contaminant levels in sediment are decreasing? What are your thoughts about this?

Not sure about it. I'm aware of the decreasing concentrations in the sediment.

4a. Are you aware of the Institutional Controls (ICs) component of the remedy (including outreach, education, and enforcement)?

Yes, we are participants of the ICs program.

4b. In your opinion, is the ICs component functioning as expected? Yes. Is the ICs program reaching its outreach and education goals? Its enforcement and monitoring goals?

Yes, I'm aware. The results show that the program is doing a great job informing market operators and owners.

INTERVIEW RECORD (cont.)

5a. Are you aware of the monitored natural recovery (MNR) components of the remedy (including sampling of environmental media and reporting)?

Not sure about it.

5b. In your opinion, is the MNR component functioning adequately? Is it effectively reducing contamination levels at PV Shelf?

Not sure about it.

6. Have there been routine communications or activities (inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.

Yes, there have been.

7. Have there been any complaints, violations, or other incidents related to PV Shelf that required a response by your office? If so, please give details of the events and results of the responses.

No, never. No complaints.

8. Do you have any comments, suggestions, or recommendations regarding the remedy at PV Shelf?

Very wonderful project and it should continue.

INTERVIEW RECORD

Site Name: Palos Verdes Shelf	EPA ID No.: CAD008242711	
Subject: Five-Year Review	Time: 09:06	Date: 02/24/14
Type: <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other (email) Location of Visit: N/A	<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	

Contact Made By:

Name: Ed Gillera	Title: Project Scientist	Organization: Gilbane Federal
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Individual Contacted:

Name: Mozghan (Mo) Mofidi	Title: Supervising Environmental Specialist II	Organization: Illness Prevention and Response Section, Environmental Health Division
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Telephone No: 714-433-6075	Street Address: 1241 E Dyer Rd, Suite 120
Fax No: (714) 433-6426	
E-Mail Address: mmofidi@ochca.com	
City, State, Zip: Santa Ana, CA 92705	

Summary Of Conversation

1. What is your overall impression of the PV Shelf project? (general opinion)

This is a much needed project because it outreaches and protects the public from the health risks of consuming contaminated fish.

2. Do you feel well informed about the site's activities and progress?

Yes, updated information are provided via FCEC meetings, emails and the website.

3. Are you aware of the 2009 sediment monitoring data? Are you aware that the data indicated that contaminant levels in sediment are decreasing? What are your thoughts about this?

Yes, I'm aware of it. I think the environmental changes and enforcement efforts had an effect on this change. It is defiantly good news.

4a. Are you aware of the Institutional Controls (ICs) component of the remedy (including outreach, education, and enforcement)?

Yes

4b. In your opinion, is the ICs component functioning as expected? Is the ICs program reaching its outreach and education goals? Its enforcement and monitoring goals?

It has in Orange County

INTERVIEW RECORD (cont.)

5b. In your opinion, is the MNR component functioning adequately? Is it effectively reducing contamination levels at PV Shelf?

I'm not familiar with the details of it but I would say yes, based on the data

6. Have there been routine communications or activities (inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.

Yes, Orange County Environmental Health conducts 12 surveys per month at retail food facilities. The purpose has been to provide outreach, education and enforcement when needed. As of today, white croaker has not been found.

7. Have there been any complaints, violations, or other incidents related to PV Shelf that required a response by your office? If so, please give details of the events and results of the responses.

No

8. Do you have any comments, suggestions, or recommendations regarding the remedy at PV Shelf?

No

INTERVIEW RECORD

Site Name: Palos Verdes Shelf	EPA ID No.: CAD008242711	
Subject: Five-Year Review	Time: 16:35	Date: 02/18/14
Type: <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other (email) Location of Visit: N/A	<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	

Contact Made By:

Name: Ed Gillera	Title: Project Scientist	Organization: Gilbane Federal
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Individual Contacted:

Name: Patty Velez	Title: CERCLA Program	Organization: California Department of Fish and Wildlife
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Telephone No: 831-649-2876	Street Address: 20 Lower Ragsdale Dr, Suite 100 City, State, Zip: Monterey, CA 93940
Fax No:	
E-Mail Address: pvelez@ospr.dfg.ca.gov	

1. What is your overall impression of the PV Shelf project? (general opinion)

Good.

2. Do you feel well informed about the site's activities and progress?

Yes.

3. Are you aware of the 2009 sediment monitoring data? Are you aware that the data indicated that contaminant levels in sediment are decreasing? What are your thoughts about this?

Yes, Surprised to hear this (but in a good way) and waiting for the additional data

4a. Are you aware of the Institutional Controls (ICs) component of the remedy (including outreach, education, and enforcement)?

Yes.

4b. In your opinion, is the ICs component functioning as expected? Yes Is the ICs program reaching its outreach and education goals? Yes – but I would like to see a Hispanic CBO involved/participate in the FCEC meetings and activities. Its enforcement and monitoring goals?

Yes.

5a. Are you aware of the monitored natural recovery (MNR) components of the remedy (including sampling of environmental media and reporting)?

Yes.

5b. In your opinion, is the MNR component functioning adequately? Yes Is it effectively reducing contamination levels at PV Shelf?

It seems to be.

6. Have there been routine communications or activities (inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.

Yes. My Department (CDFW) participates on the TRC and the ICs activities – provides review of items (data, reports, etc); attends/participates in meetings; etc.

7. Have there been any complaints, violations, or other incidents related to PV Shelf that required a response by your office?

No, but our enforcement group may have additional information pertaining to this. If so, please give details of the events and results of the responses.

8. Do you have any comments, suggestions, or recommendations regarding the remedy at PV Shelf?

No additional comments.

INTERVIEW RECORD

Site Name: Palos Verdes Shelf	EPA ID No.: CAD008242711	
Subject: Five-Year Review	Time: 10:07	Date: 03/03/14
Type: <input type="checkbox"/> Telephone <input type="checkbox"/> Visit <input checked="" type="checkbox"/> Other (email) Location of Visit: N/A	<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	

Contact Made By:

Name: Ed Gillera	Title: Project Scientist	Organization: Gilbane Federal
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Individual Contacted:

Name: Guang-Yu Wang	Title: Staff Environmental Scientist	Organization: Santa Monica Bay Restoration Commission
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Telephone No: 213-576-6639	Street Address: 320 W 4 th St, Suite 200
Fax No:	
E-Mail Address: gwang@waterboards.ca.gov	
City, State, Zip: Los Angeles, CA 90013	

Summary Of Conversation

1. What is your overall impression of the PV Shelf project? (general opinion)

Overall, I feel that the project has been moving in the right direction and taking right steps. However, the progress is slow and the high turn-over of project managers did not help to keep the project on track.

2. Do you feel well informed about the site's activities and progress?

Overall the answer is yes because I am a member of the FCEC and the Technical Information Exchange Group.

3. Are you aware of the 2009 sediment monitoring data? Are you aware that the data indicated that contaminant levels in sediment are decreasing? What are your thoughts about this?

Yes, I am aware of the data and the preliminary findings. However, I think it is too early to draw conclusion and more sampling and testing are needed.

4a. Are you aware of the Institutional Controls (ICs) component of the remedy (including outreach, education, and enforcement)?

Yes, not only I am aware of the ICs but also I participate in many of its activities.

4b. In your opinion, is the ICs component functioning as expected? Is the ICs program reaching its outreach and education goals? Its enforcement and monitoring goals?

In my opinion, the ICs has functioned as expected in the most part. It has reached most of its outreach and education goals but less of its enforcement and monitoring goals.

INTERVIEW RECORD (cont.)

5a. Are you aware of the monitored natural recovery (MNR) components of the remedy (including sampling of environmental media and reporting)?

Yes, I'm aware of this component of the remedy.

5b. In your opinion, is the MNR component functioning adequately? Is it effectively reducing contamination levels at PV Shelf?

It is too early to conclude whether MNR is effective or not until more data are collected and analyzed. We all know that natural process reduce contamination eventually. But the real issue is the speed of recovery, and there is not sufficient evidence at this time to prove that natural process alone can meet the desired recovery timeline.

6. Have there been routine communications or activities (inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.

No, there are no routine communication activities conducted by our entity. We do obtain and use information collected from other agencies, including EPA and MRSP to report on the conditions of PV shelf in the State of the Bay report that we develop periodically (once every five years on average).

7. Have there been any complaints, violations, or other incidents related to PV Shelf that required a response by your office? If so, please give details of the events and results of the responses.

No, there are no such incidents because we are not a regulatory agency with jurisdiction over the site.

8. Do you have any comments, suggestions, or recommendations regarding the remedy at PV Shelf?

Because it seems that it will take quite a long time before finalization of any engineering-based remedy plan, including MNR, due to the new questions raised by sediment data collected in recent years, EPA should put more emphasis on the IC component of the program and plan it for long-term. As part of the long-term planning for the IC, EPA should conduct a comprehensive assessment of the current program to identify which outreach and enforcement mechanisms have been and will be most effective.

Appendix D: Site Inspection Checklist

(not applicable – Montrose OU 5 is a layer of contaminated sediment on the ocean bed with an average depth greater than 60 meters)

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Appendix E: Photographs from Site Inspection Visit

(not applicable – Montrose OU 5 is a layer of contaminated sediment on the ocean bed with an average depth greater than 60 meters)

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