



NFWF

Oakland Estuary Enhancement Project: Final Programmatic Report (AMENDED)

Recipient Organization/Agency: CalRecycle

Date Submitted: January 29, 2015

Project Period: 8/15/2013 to 5/13/2014

Award Amount: \$650,000

Matching Contributions: \$650,000

Total Disbursements: \$650,000

Project Number: #8006.12.033614

1. Summary of Accomplishments

The Oakland Estuary Enhancement Project began in August 2013 and was completed August 2014. Funding for this project was provided by the Cosco Busan Oil Spill Settlement – Recreational Use Grant Program and CalRecycle with support from the California State Lands Commission (CSLC), California Dept. of Fish and Wildlife, and Oakland Police Department. The most interesting achievement from the \$650,000 Cosco Busan Oil Spill Settlement Grant was the fact that CalRecycle was able to leverage additional funding and support for the Oakland Estuary Enhancement project from a variety of state and federal agencies. Additional funding and support for vessels and marine debris assessment was provided by United States Environmental Protection Agency (US EPA), Region IX, United States Coast Guard (USCG), Sector San Francisco, and US Army Corps of Engineers (USACE). Numerous other agencies and businesses also contributed time and resources, including the Alameda Police Department, Alameda Marina, Bay Conservation and Development Commission, National Oceanic and Atmospheric Administration, Coastal Conservancy, the San Francisco Bay Regional Water Quality Control Board, San Francisco Baykeeper, East Bay Regional Park District, County of Alameda, CalParks: Boating and Waterways, and the Port of Oakland.

A total of 77 sites were removed from the estuary. The breakdown included: 59 vessels (two commercial tugs greater than 100 ft. in length), nine marine debris sites, four docks, and over 100,000's of pounds of hazardous wastes and contaminated materials being removed from the estuary. The enhancement project restored 1,017 feet of shoreline and recovered 4.94 acres of seabed and navigable waterways, removed 17 wood piles and returned one public pier back to public use. Not only was the Oakland Estuary Enhancement project successful in removing long term recreational and environmental hazards from the Oakland Estuary, the Cosco Busan Oil Spill Settlement Recreational Use Grant program funds led to a total of \$9.16 million dollars in state and federal funding being spent on cleanup operations in the project area.

2. Project Activities & Outcomes

Activities

The project originally targeted nine sites and two shorelines with a total of 26 vessels; however, since one of the sites was considered to be historically significant by the CSLC, CalRecycle removed this site from its target list and expanded the number of sites and vessel removals with assistance from National Oceanic

and Atmospheric Administration (NOAA). Additionally, CalRecycle requested and received assistance to remove two abandoned, large scale, commercial tugs from the US EPA, USCG and the USACE. With this assistance CalRecycle was able remove additional debris and vessels from the estuary.

CalRecycle's response contractor was initially directed to start with sites 1-8 as listed in Table 1 of the Final Cleanup Report for this project (see Project Documents [below]). Based on two site visits in 2012, CalRecycle project engineer noticed the number and scope of abandoned vessel and marine debris varied over time. A significant number of the vessels changed location in attempt to avoid the attention of law enforcement.

After the US EPA committed to assisting CalRecycle in removing the vessels and debris, CSLC performed an archeological review of the entire project to preserve, protect, and honor the cultural, historical, and archaeological resources in the estuary. During a June 2013 consultation the State Land's Historic Preservation Officer deemed Site 2 – Coast Guard Island and Site 3 – Cryer Dock as historic and significant. Due to the estimated cost of \$125,000 to \$150,000 for an archeological report and the additional 12 to 18 month of time to document the historic marine debris, CalRecycle elected not to pursue any of the marine debris sites from Site 2. Without Site 2, CalRecycle needed to find an additional \$150,000 to \$250,000 in additional removal work to complete the initial project. Fortunately the NOAA's Navigation Response Team contacted CalRecycle in early July and inquired if the enhancement funds could be used to remove any of the 25 sites discovered during their November 2012 side sonar survey. Since all the vessels and debris were within the Oakland Estuary Zone and previously unknown, CalRecycle replaced Site 2 with Sites 9-25. See CalRecycle's Final Cleanup Report for further information on site details.

To complete the removal of the marine debris and vessels CalRecycle developed the following project activities. Removal activities included:

- Submitting a work plan;
- Developing a spill plan and obtaining countermeasures;
- Mobilizing resources;
- Accessing the vessels and debris;
- Assessing the reported sheen;
- Assessing and evaluating the vessels for hazardous materials;
- Assessing and evaluating the vessels for asbestos, heavy metals, and
- Obtaining waste estimates;
- Removing hazardous wastes, fuels, and debris;
- Removing vessel and debris;
- Transporting waste materials to an appropriate disposal facility;
- Implementing spill prevention and countermeasures; and
- Demobilizing resources.

Prior to the removal activities, CalRecycle's engineer, response contractor and health and safety consultant developed work plans, health and safety plans, and a spill plan. Before each vessel was removed, the team evaluated each vessel for hazards and the project engineer noted if an oil and/or fuel sheen was coming discharging from the site. Next environmental samples were collected from vessels that matched the asbestos and marine paint profiles. If household hazardous wastes (e.g., marine batteries), e-waste, explosives, or fuels were observed, they were removed by CalRecycle's contractor prior to disposal.

The waste stream from the project was as diverse as the abandoned vessels. The marine debris varied general household trash to previous parts of sunken vessels. Overall the project eliminated and

prevented the release of 3,894 gallons of oily water, 3,270 gallons of waste paint and related materials, 1,040 gallons of flammable liquids, 1150 cubic yards of contaminated soil (i.e., heavy metals and creosote), 3,270 tons of oily contaminated mud, 269.56 tons of treated wood, 88 tons of asbestos, 120 lbs toxic liquid, 40 lbs of acid liquid, 50 gallons of waste oil, 32 units of explosives (i.e., marine flares), 29 marine batteries, along with other household hazardous wastes. The final disposal from the project included 322.82 tons of solid waste, 741 tons of concrete, and 748.79 tons of recycled metal.

Benefits

While there were many localized recreational benefits (e.g., restoration of a public view pier, removal of navigational hazards, and the removal of a number of illegally moored vessels restricting public access) from NFWF's Cosco Busan Recreational Use Grant, a number of new activities occurred that should change the long term boating and recreational culture in the Oakland Estuary. Past abandoned vessel practices and site conditions of the estuary prior to 2012 left few with any optimism that it could change. If a law enforcement agency from one jurisdiction issued a citation to an owner of an illegally moored vessel, the owner would just move to the next jurisdiction to avoid the citation. The vast amount of vessels and debris in the estuary exceeded all the agencies responsible for abandoned vessels and marine debris operational budgets. Besides the funding limitations, each responsible agency has limited authorities to act and restrictions on their engagement. For example, the USCG, US EPA, USACE, all have the authority to act to protect the environment; however; depending on the vessel location and type of waste (e.g., hazardous and non-hazardous), only certain actions can be instituted by each agency. With the partnership between agencies, a matrix was developed to solve the permit, removal, and disposal issues from the debris in the Oakland Estuary. This partnership combined authorities, resources and funding to complete the mission. By using the partnerships a total of \$9.16 million dollars were combined with the NFWF grant of \$650,000 to restore the Oakland Estuary.

3. The Future

Should additional funding become available local, state, and federal agencies should once again combine resources and remove the remaining number of abandoned vessels and barges in the estuary debris. See CalRecycle's Final Report for further information on the remaining and on-going debris issues in the Oakland Estuary.

4. Lessons Learned

There were many operational lessons learned at the Oakland Estuary Project. The key lessons focused on preparation, coalitions, coordination, and countermeasures. The first lesson in removing abandoned vessels and marine debris is to expect that the scope of the project will evolve by the time you mobilize. Expect anywhere from 20% to 40% of your original project to change location, be eliminated by historical restrictions, or be abandoned before or during the project. Also, when estimating project costs, account for a number of new vessels that will appear during the project. Cleanup activities attract vessel owners that have been waiting to dispose of their vessel.

Other lessons include:

- Use all available federal, state, and local resources to accomplish vessel and marine debris removals;
- Be proactive and work with your coalition partners (i.e., Harbor Masters, local marinas, and local government facilities) and track down the next generation of abandoned vessels. Most coalition partners "know" where the high risk vessels are located.
- Use a coordinated marine enforcement action along with an area wide 'Notice of Trespass' by CSLC to eliminate illegal mooring;

- Establish working relationships with all parties involved. While state and federal agencies may not agree on the scope of work or procedures, by involving the local agencies and government, all the agencies will understand that the group as a whole will greatly benefit in the end;
- Coordinate your project with other agencies to maximize your available funding and resources;
- When applicable use federal authority granted to the US EPA or USCG under CERCLA to assist in navigating the federal, state and local agencies permit matrix;
- Expect the unexpected when it relates to hazardous waste, oil, and fuels. Abandoned vessels and marine debris attract illegal dumping and the waste stream expands greatly on and around derelict vessels; and
- Provide additional staff to manage the cost tracking and project documentation. Given cost and scope of the project, additional staff should be available to assist in the project.

Finally a number of additional Best Management Practices (BMP's) for marine and vessel removal were developed during this removal. They include the following:

- All removal work will be done in a manner that avoids additional dredging or filling;
- All removal work will minimize damage, to the extent as practicable, to seagrass beds, oyster beds, coral communities, wetlands, and live bottom;
- All work shall avoid impacts to species listed by the state and federal government as threatened or protected. If the impacts from the removal work cannot be minimized, additional consultation with the appropriate regulatory agency will be necessary before work can begin;
- The preferred method to process a vessel or marine debris will be to remove the vessel or marine debris intact and contained on a barge, landing craft, or on land where appropriate countermeasure can be implemented. The vessel and/or marine debris should be removed intact by crane, air bags, or launch ramp.
- The only time a vessel or marine debris may be processed in place, if it is determined by the CalRecycle Project Engineer or a licensed marine surveyor that the condition of the vessel or debris would not allow for an intact removal, such as abandoned docks, piles, or parts of former vessels. The decision to process in-place will be based on the integrity of the vessel/marine, prior attempt(s) to raise a vessel/marine debris intact, location, tidal influences, urgency and environmental threat.
- A debris boom and an absorbent boom with blankets shall be deployed at the commencement of work on the surface water around the vessel or marine debris if fuel, oil, or other free – floating pollutants are observed or suspected.
- Spill prevention will take precedence in removal operations;
- Each contractor and subcontractor working in the marine environment shall have a spill kit capable of handling the observed or suspected fluids;
- Prior to deconstruction, each vessel/ debris will be evaluated for fuels, marine paints, asbestos, PCBs, and other hazardous waste. The asbestos evaluation shall be completed by a licensed asbestos consultant.
- The Contractor will remove all known pollutants including fuels, batteries, paints, solvents, flares, mercury switches, asbestos, electronic wastes, compressed gas cylinders, household hazardous wastes, gray water, black water, and tires from the vessel and/or marine debris prior to deconstruction activities. Asbestos removal shall be completed by a licensed asbestos contractor.
- Prior to processing the vessel/marine debris, engines, auxiliary motors, generators, or any other mechanical device with fluid will be removed.

5. Project Documents

Additional project documents and reports were submitted. These include:

- CalRecycle's Final Cleanup Report (see below);
 - Appendix A. California Environmental Quality Act – Notice of Exemption (not included here);
 - Appendix B. US EPA's Environmental Evaluation (not included here);
 - Appendix C. Oakland Estuary Enhancement Project Photo Log (see below);
 - Appendix D. Site Work Plan (not included here);
 - Appendix E. Site Spill Plan (not included here);
 - Appendix F. Site Specific Health and Safety Plan (not included here);
 - Appendix G. Vessel and Marine Debris Guidance Document (not included here); and
- Oakland Estuary Enhancement Project invoices (not included here).

CalRecycle

FINAL CLEANUP REPORT
FOR THE
OAKLAND ESTUARY ENHANCEMENT PROJECT
ALAMEDA COUNTY, CALIFORNIA
Project #8006.12.033614
September 19, 2014



(Photo: Last Piece of Debris Being Removed from Enhancement Project)

Prepared By:
Todd Thalhamer, P.E. (with minor edits, primarily for accessibility, by Cosco Busan
Recreational Use Grant Program Grant Committee)
California Department of Resources Recycling and Recovery (CalRecycle)
1001 "I" Street
Sacramento, California 95814

Oversight by:
California Department of Fish and Wildlife and California State Lands Commission

Funding By:
Cosco Busan Recreational Use Grant Program
National Fish and Wildlife Foundation



NFWF

Page Intentionally Blank



Photo 1. US EPA and USCG Lifting the Tug Respect Out of the Oakland Estuary

EXECUTIVE SUMMARY

This report summarizes the debris and vessel removal of the Oakland Estuary Enhancement Project located in the Alameda County, California. The project began in August 2013 and was completed August 2014. Funding for this project was provided by the Cosco Busan Oil Spill Settlement – Recreational Use Grant Program and CalRecycle with support from the California State Lands Commission, California Dept. of Fish and Wildlife, and Oakland Police Department. Additional funding and support for vessels and marine debris assessment was provided by United States Environmental Protection Agency, Region IX, United States Coast Guard, Sector San Francisco, and US Army Corps of Engineers. Numerous other agencies and businesses also contributed time and resources, including the Alameda Police Department, Alameda Marina, Bay Conservation and Development Commission, National Oceanic and Atmospheric Administration, Coastal Conservancy, the San Francisco Bay Regional Water Quality Control Board, San Francisco Baykeeper, East Bay Regional Park District, County of Alameda, CalParks: Boating and Waterways, and the Port of Oakland.

The project originally targeted nine sites and two shorelines with a total of 26 vessels; however, since one of the sites was considered to be historically significant by the California State Lands Commission, CalRecycle removed this site from its target list and expanded the number of sites and vessel removals with assistance from National Oceanic and Atmospheric Administration. Additionally, CalRecycle requested and received assistance on two abandoned commercial tugs from the United States Environmental Protection Agency, Region IX, United States Coast Guard, Sector San Francisco, and US Army Corps of Engineers. With this assistance CalRecycle was able remove additional debris and vessels from the estuary.

A total of 77 sites were removed from the estuary. The breakdown included: 59 vessels (two commercial tugs greater than 100 ft. in length), nine marine debris sites, four docks, and over 100,000's of pounds of hazardous wastes and contaminated materials being removed from the estuary. The enhancement project restored 1,017 feet of shoreline and recovered 4.94 acres of seabed and navigable waterways, removed 17 wood piles and returned one public pier back to public use. Not only was \$650,000

Cosco Busan Recreational Use Grant successful in removing the long term recreational and environmental hazards from the Oakland Estuary, these funds lead to procurement of additional funds for a total of \$9.16 million dollars in state and federal funding.

DOCUMENTATION

The following documentation is based on daily observations and review of the work made by Mr. Todd Thalhamer, Project Engineer for the California Department of Resources Recycling and Recovery (CalRecycle).

Removal of the debris was performed by Pacific States Environmental, Inc, and their subcontractors in general conformance with their Work Plan, Site Specific Health and Safety Plan, Spill Plan, and project scope of work. The removal project was consistent with standard waste management, engineering, spill response, and construction practices.

All wastes were transported by licensed waste hauler and properly disposed.

Abbreviations

AWAP	Abandoned Watercraft and Abatement Program
BCDC	San Francisco Bay Conservation and Development Commission
BSY	Bay Ship and Yacht Company
CalRecycle	California Department of Resources Recycling and Recovery
CEQA	California Environmental Quality Act
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CSLC	California State Lands Commission
NFWF	National Fish and Wildlife Foundation
NOAA	National Oceanic and Atmospheric Administration
OPD	Oakland Police Department
PCBs	Polychlorinated Biphenyls
PSE	Pacific States Environmental, Inc.
RCRA	Resource Conservation and Recovery Act
RSLs	Regional Screening Levels
TPHd/mo	Total Petroleum Hydrocarbons as diesel/motor oil and gasoline
TPHg	Total Petroleum Hydrocarbons as gasoline
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
USFW	United States Fish and Wildlife

CONTENTS

Section	Page
Executive Summary	iii
Documentation	iv
Abbreviations	vi
Executive Summary	3
1.0 Introduction.....	8
1.1 Enhancement Project	8
1.2 Abandoned Vessel and Marine Debris Background	10
1.3 Report Purpose.....	11
1.4 Environmental Threat.....	11
1.5 Project Objectives	11
1.6 Initial Scope of Work.....	12
1.7 California Environmental Quality Act (CEQA)	12
2.0 Site Description	12
2.1 Initial Scope of Work.....	19
2.2 Preliminary Assessment	21
2.3 Preliminary Environmental Sampling and Results	25
2.4 Enforcement Activities	25
3.0 Waste Cleanup Activities.....	26
3.1 Pre-Removal Actions	26
3.2 Removal Actions	27
3.2.1 Vessel and Marine Debris Removal Best Management Practices.....	28
3.3 Summary of Project Activities	29
3.3.1 August 2013.....	29
3.3.2 September 2013	29
3.3.3 October 2013	29
3.3.4 November 2013	30
3.3.5 January 2014 to July 2014.....	30
3.4 US EPA Involvement	31
3.5 USCG Involvement	32
3.6 Waste Stream	32
3.7 Air Monitoring.....	34
3.8 Project Documentation.....	34
4.0 Project Costs	34
5.0 Benefits	35
6.0 Lessons Learned.....	36
7.0 Accomplishments	37
8.0 Conclusions.....	37

LIST OF TABLES

Table 1. Oakland Estuary Initial Scope of Work..... 20-21
Table 2. Project Vessel Details 23-24
Table 3. Vessel Assessment Sampling..... 27
Table 4. Waste Stream Totals 33
Table 5. Itemized Project Costs 34
Table 6. Oakland Estuary Funding..... 36

LIST OF FIGURES

Figure 1. Site Vicinity Map..... 13
Figure 2. Work Zone 1a and 1b 14
Figure 3. Work Zone 3 15
Figure 4. Work Zones 4 and 5 16
Figure 5. Work Zone 6 17
Figure 6. Work Zone 7 18
Figure 7. Work Zone 8 19
Figure 8. Side Sonar Evaluations..... 22

APPENDICES

- Appendix A. CEQA
- Appendix B. US EPA's Environmental Evaluation
- Appendix C. Photo Log
- Appendix D. Work Plan
- Appendix E. Spill Plan
- Appendix F. Site Specific Health and Safety Plan
- Appendix G. Vessel and Marine Debris Guidance Document

1.0 INTRODUCTION

The California Department of Resources Recycling and Recovery's (CalRecycle) Cleanup Branch is responsible for implementing solid waste removal actions in California. Public Resources Code (PRC) Section 48020 et seq. authorizes CalRecycle to expend funds from the Solid Waste Cleanup Trust Fund directly for cleanup, to provide loans to responsible parties who demonstrate the ability to repay, to provide matching grants to public entities for site cleanups, and to provide full grants to public entities for the abatement of illegal disposal sites. This program addresses the cleanup of solid waste disposal and codisposal sites where the responsible party either cannot be identified or is unable or unwilling to pay for a timely remediation and where cleanup is needed to protect public health and safety or the environment.

1.1 Enhancement Project

In late 2011 CalRecycle cleanup staff was approached by United State Environmental Protection Agency (US EPA) regarding submittal of a grant for the removal of marine debris in the bay area based on CalRecycle's past successes implementing projects on the Petaluma and Sacramento Rivers. After reviewing the grant requirements, staff determined that the US EPA funds were not sufficient and too restrictive to allow for a substantial amount of the project work to be completed; however, US EPA forward information about an additional grant program that was based on the 2011 Cosco Busan Spill legal settlement for natural resource damages. Funding for this second program was the result of legal actions taken by National Oceanic and Atmospheric Administration (NOAA), US Fish and Wildlife Service, National Park Service, California Department of Fish and Wildlife (CDFW), and the California State Lands Commission (CSLC) in response to the Cosco Busan Oil Spill of 2007. This second grant program was administered by the National Fish and Wildlife Foundation (NFWF), with oversight from CDFW and CSLC.

During this time, CalRecycle staff was contacted by Oakland Police Department (OPD) who requested assistance with the problems in the Oakland Estuary. Since the NFWF grant program had an area requirement (i.e., primarily the San Francisco Bay Area) and a specific funding allocation (i.e., East Bay was to receive the majority of the settlement), staff focused on the Oakland Estuary with OPD. After a preliminary site visit, staff determined the estuary contained enough marine debris, abandoned vessels and docks, and other navigational hazards to develop an initial grant request for the USFW's 2012 Cosco Busan Recreational Use Grant Program. In April, staff submitted an initial grant request for a 50% match by the NFWF grant program for the proposed \$1.3 million dollar cleanup. The proposal concept was to remove marine debris, abandoned vessels, old piers and docks, and navigational hazards from the estuary to provide visual and health and safety enhancements to the public and the estuary environment. The long term outcome of the project was to increase the level of safe recreational opportunities for the public by removing this debris and navigational hazards and to return more of the estuary to a beneficial use.

The enhancement project targeted the inlets of the Oakland Middle and Inner Harbors south of the San Leandro Bay and ended at the Bay Farm Island Bridge.

On June 21, 2012, CalRecycle staff was notified that NFWF received 78 pre-proposals requesting a total of \$34.5 million and only 40 projects were asked for full proposals. CalRecycle's Oakland Estuary Enhancement Project was one of the projects asked to submit a full proposal. On April 5, 2013, CalRecycle was awarded a \$650,000 grant from the National Fish and Wildlife Foundation (NFWF).

Additionally, CalRecycle worked with local, state and federal agencies concerning the permitting and mitigation of the waste in the estuary. On April 18, 2013, the San Francisco Bay Conservation and Development Commission (BCDC), was also able to contribute to the estuary project by approving a dry dock development for Bay Ship and Yacht Company (BSY) in the Oakland Estuary. As part of the dry dock project, BCDC required \$75,000 in mitigation funds be provided to CalRecycle's Oakland Estuary Cleanup Project due to the impacts from the shading and occupying from the dry dock. Specifically these funds and in-kind services would be directed to remove an old abandoned dock, two vessels, and marine debris at Union Point Park. In addition to funding, BSY would make its facilities available for the salvaging and dismantling of two 55-foot vessels that are submerged offshore of Union Point Park. These funds would be separate from the mitigation funds.

On July 12, 2013, CalRecycle approved \$650,000 from the Solid Waste Disposal and Codisposal Site Cleanup Program (Program) for a CalRecycle-managed cleanup to remove waste materials at these sites. The Program also received approval to enter into a grant with NFWF for the 50% match, and to enter into a memorandum of understanding with BSY for the \$75,000 dollars in mitigation funds and use of the facility. Initially the Department approved \$1.375 million dollars for the project.

During July and August of 2013, CalRecycle's project engineer worked with the CSLC legal counsel to develop protocols to use the recently enacted vessel trespassing regulations and apply these new regulations to the illegal moored vessels in the entire estuary.

On August 24, 2012, CalRecycle sent a letter to US Army Corps of Engineers (USACE), US Coast Guard (USCG), and US EPA requesting their participation in a joint venture raising, evaluating, assessing, and removing four abandoned wrecks and other hazardous waste from the Oakland Estuary. Since these abandoned wrecks have been completely under water for years they were deteriorating and causing a substantial threat of releasing a hazardous substance into the environment as well as potentially impeding navigation and creating public safety hazards, the US EPA offered to be the lead federal agency with the USACE and the USCG offered resources and support to the field effort. The USCG gave US EPA authority to be the Federal On-Scene Commander (FOSC) in the Coastal Zone for the assessment and removal of hazardous material, but retain the USCG FO SC authority for all oil related issues.

During August 2013 an estuary coalition meeting was convened to define the objectives and understand the roles and responsibilities of organization. Over 40 representatives attended this meeting and formed the Oakland Estuary Coalition. Many federal, state, local agencies and departments, and businesses came together with a common goal and mission. From this meeting and the NFWF grant a total of \$9.16 million in funding was secured to complete this enhancement project.

1.2 Abandoned Vessel and Marine Debris Background

Abandoned and derelict vessels and related marine debris are a pervasive environmental and public safety problem in coastal and inland waterways of California. The value of vessels decreases with age while the cost of maintaining the vessel in operating condition and the costs of storing or docking the vessels increase. This results in some vessel owners being unable or unwilling to pay to operate, maintain, and store their vessels. The cost to correctly dispose of a vessel can range from \$500 for small vessels and approach hundreds of thousands for larger commercial vessels. Vessel owners sometimes illegally abandon the vessels by (1) leaving them at berths or docks while failing to pay the storage costs; (2) running the vessels aground on the shores of public waterways; or (3) sinking the vessels in public waterways.

Abandoned and derelict vessels are threats to public health and safety and the environment in communities along California's coastal and inland waterways. Abandoned vessels can impact water quality due to hazardous pollutants they contain, including oil, antifreeze, gasoline, asbestos, anti-fouling paints, heavy metals, PCBs, sewage, etc. In addition, as vessels deteriorate they become sources of debris that washes onto the shore or remain a water hazard interfering with aquatic and marine life. Finally, vessels are typically abandoned on or very near shorelines where the pollutants and debris can impact water quality and people and present attractive nuisances that encourage additional dumping from the shore. Marinas and marine related businesses that have discontinued operations also leave sunken docks, metal pilings, cranes, barges and industrial engines that become illegal solid waste disposal sites.

The California Department of Boating and Waterways, recognizing this issue and the significant fiscal burden imposed on local agencies statewide, created the Abandoned Watercraft Abatement Program (AWAP) in 1997. The AWAP funding comes from registration fees on recreational boats, and the funding is therefore restricted to abatement projects involving recreational boats. Thus, AWAP funds cannot be used to remove abandoned commercial boats, which are boats/ships registered in California as vessels involved in commercial enterprises, boats documents by the U.S. Coast Guard (USCG) as commercial boats either from California or other states, and all boats with out of country documentation. While the USCG does have resources available to deal with vessels that present navigational hazards in major waterways, or that are discharging hazardous pollutants to the watercourse presenting an imminent threat to public health and safety and/or the environment, there are very limited resources for removing vessels (i.e., recreational and/or commercial) once they become abandoned and lie derelict along the shoreline or abandoned in a harbor. Likewise, there is no vessel-related funding available to remove abandoned materials related to the marine

industries. There is an ongoing series of meetings between federal, state, and local agencies to identify and implement a program and funding source for abatement of commercial marine vessels, but the issue remains unresolved. CalRecycle has in the past successfully partnered with the US EPA on a vessel and marine debris pilot project and was able to use this past partnership to develop another joint task force with local, state, and federal partners in the Oakland Estuary.

1.3 Report Purpose

The purpose of this report is to document the removal of the vessels and marine debris from the Oakland Estuary for the NFWF. This final report will be submitted to comply with the Cosco Busan Recreational Use Grant Program requirements outlined in contractor #8006.12.033614.

1.4 Environmental Threat

The threats from this project range from simple restricted access to public piers and shoreline by the public, to navigational hazards to boaters from sunken vessels and marine debris, to the release of hazardous substances into California waterways. All the targeted sites posed an immediate or future threat of releasing hazardous substances to the Oakland Estuary and surrounding sensitive ecosystems. The likelihood of direct human exposure, via ingestion and/or inhalation of hazardous substances, and the threat of future releases and migration of those substances, pose an imminent and substantial endangerment to public health or welfare of the environment based on the factors set forth in federal and state regulations.

Based on experience in past CalRecycle vessels and marine debris projects, there is potential of finding contaminants like oil, fuel, asbestos, PCBs, and heavy metal (such as lead) which can impact humans, animals, and marine life either by direct contact or ingestion at the source or through tidal event migration and particulate migration/inhalation.

1.5 Project Objectives

The project objectives for this cleanup action were to:

1. Evaluate each project site for the threat to recreational use, water quality, navigational hazards, environmental hazards, along with cost effectiveness and historical significance;
2. Reduce illegal mooring and abandoned vessels in the estuary;
3. Prevent hazardous releases that threaten recreational opportunities;
4. Enter, inspect, investigate, and evaluate the commercial vessels and debris for fuels, asbestos, heavy metals, hazardous wastes, and household hazardous wastes;
5. Install countermeasures to prevent a release of a hazardous substance;
6. Take photographs and video to document the removal;
7. Remove all known debris from the water and shoreline;
8. Properly transport and dispose of waste materials;

9. Recycle metals where feasible; and
10. Return recreational opportunities to the communities surrounding the estuary.

1.6 Initial Scope of Work

The proposed project included the removal of up to eighteen illegal marine debris sites, twenty-one sunken vessels, two sunken barges, three abandoned docks, and 20 to 25 illegally moored vessels in the estuary. The initial scope of the entire project exceeded the available funds by the NFWF and CalRecycle; however, CalRecycle requested additional cleanup assistance the USACE, USCG, and the US EPA Region IX, to assess and remove disposal of hazardous waste, universal wastes, and other regulated materials including petroleum products (e.g., fuels and oils) from the abandoned vessels. All three other federal agencies agreed to assist CalRecycle in the estuary. The federal involvement depended on the type and amount of hazardous materials encountered. Staff worked with OPD and its stakeholders to develop a removal priority list and implemented each site based on the environmental impact, navigational hazard, and cost effectiveness. Additionally, CalRecycle partnered with the CSLC to assist with the enforcement of the illegally moored vessels in the estuary.

1.7 California Environmental Quality Act (CEQA)

CalRecycle acting as the lead agency, determined that this project was exempt from CEQA. The basis for the exempt status is specified in Title 14, California Code of Regulations (14 CCR), section 15300. Program staff determined the project exempt per Class 8, Class 21, and Class 30 exemptions (Title 14, California Code of Regulations; §15308: Actions by Regulatory Agencies for Protection of the Environment, §15321: Enforcement Actions by Regulatory Agencies, and §15330: Minor Actions to Prevent, Minimize, Stabilize, Mitigate or Eliminate the Release or Threat of Release of Hazardous Waste or Hazardous Substances). Filing a Notice of Exemption with the State Clearinghouse on August 16, 2013 completed CEQA requirements. Appendix A contains a copy of the CEQA exemption.

2.0 SITE DESCRIPTION

The Oakland Estuary Marine Debris Removal Site is located in the Oakland Estuary, Alameda County, California. The Oakland Estuary is a tidal waterway situated between the cities of Oakland and Alameda, which connects the San Francisco Bay with the San Leandro Bay. The water of the estuary is essentially similar to the waters of the San Francisco Bay. The work areas are located between the inlets of the Oakland Middle and Inner Harbors and south to the San Leandro Bay. Figure 1 provides a general site vicinity map, while Figures 2 through 7 provide a more detailed aerial view of the work zones.

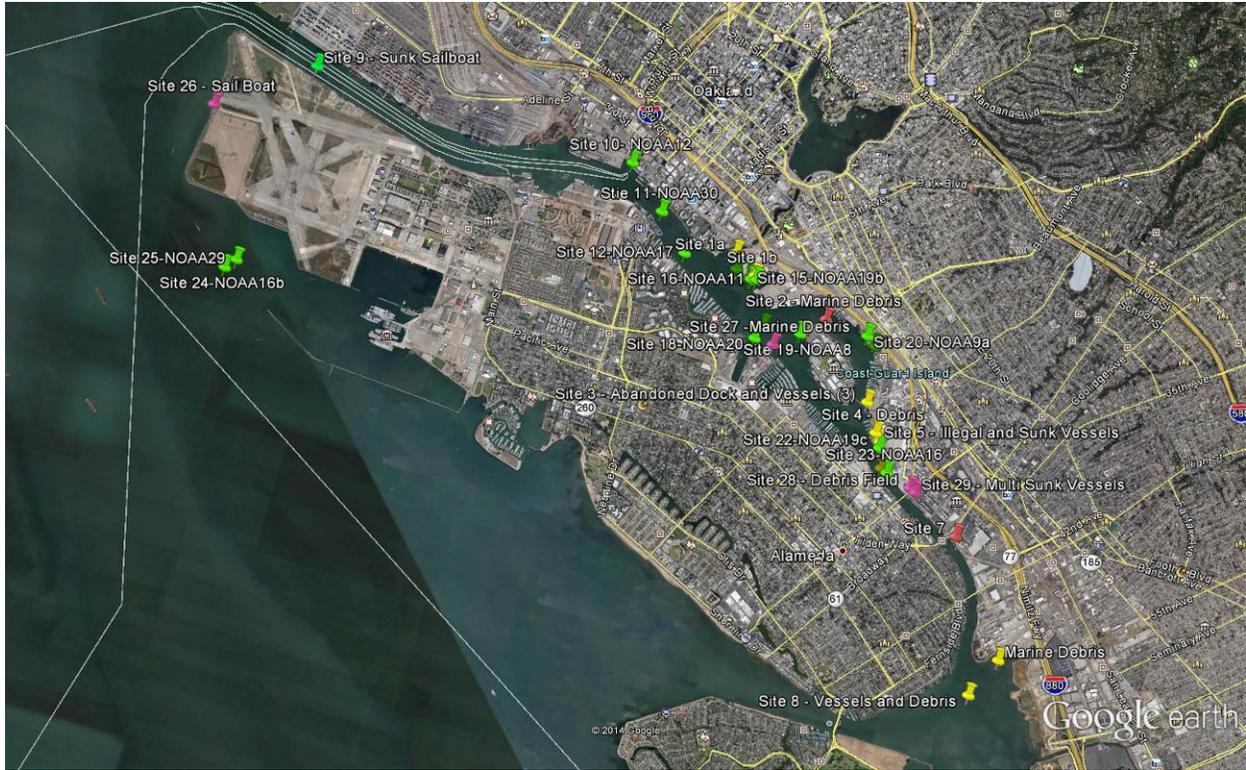


Figure 1. Site Vicinity Map and Project Sites for Oakland Estuary Enhancement Project, California (Source: Google Maps 2014).

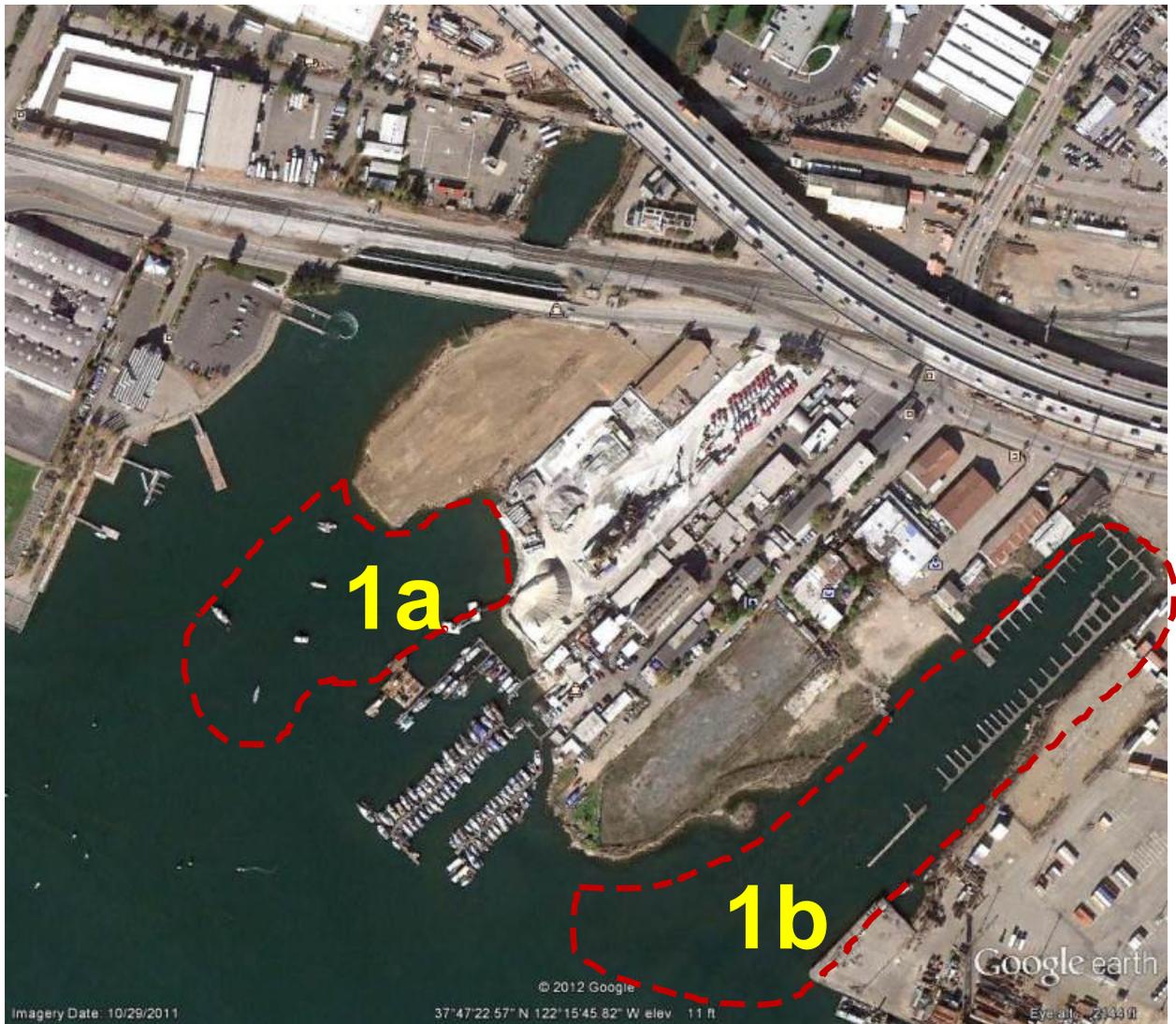


Figure 2. . Work Zones 1a and 1b – Jack London Square Marina, Oakland Estuary (Source: Google Maps 2011).



Figure 3. Work Zone 3 - Coast Guard Island and Cryer Boatyard, Oakland Estuary (Source: Google Maps 2011).

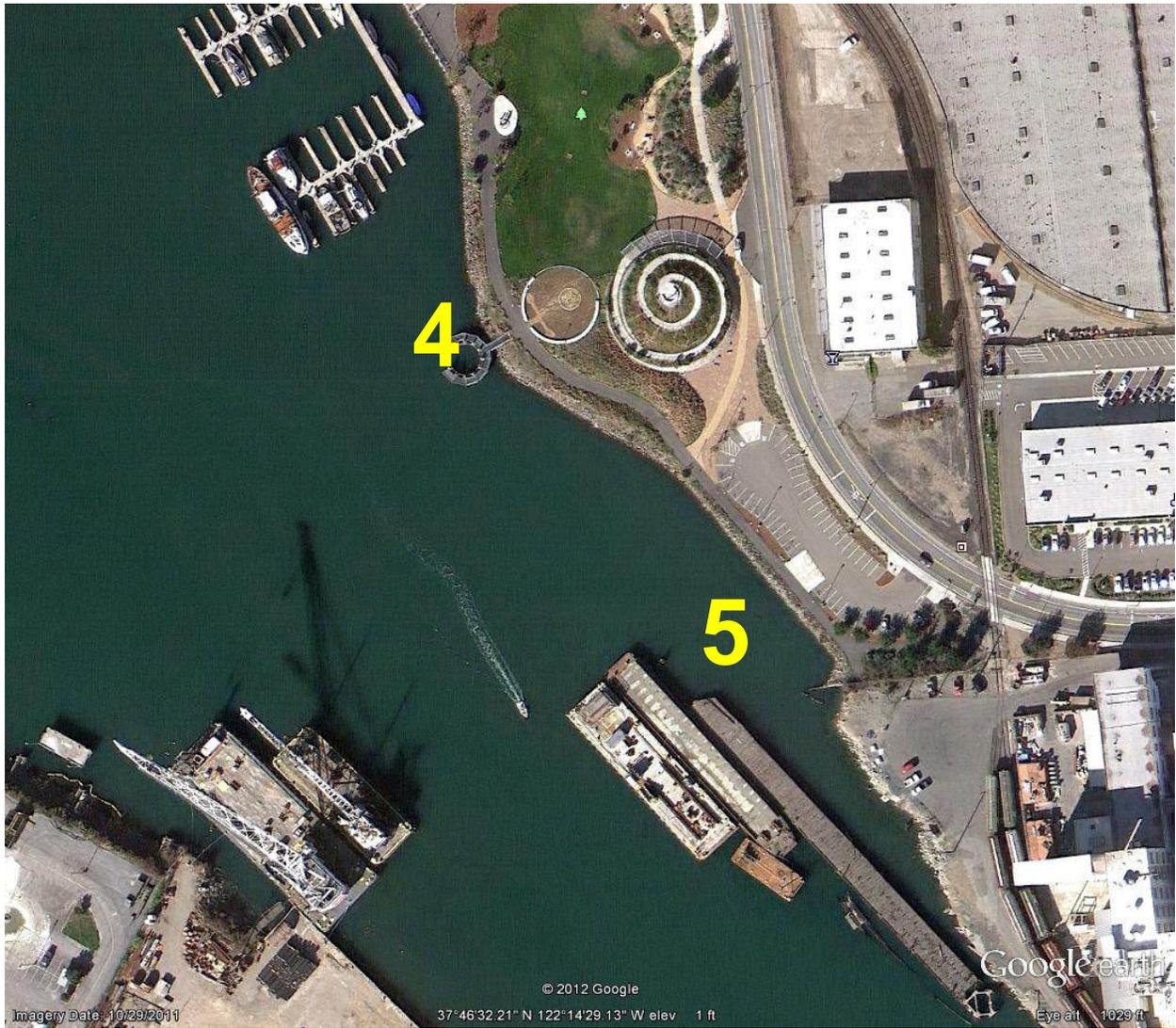


Figure 4. Work Zones 4 and 5 – Union Point Park, Oakland Estuary (Source: Google Maps 2011).

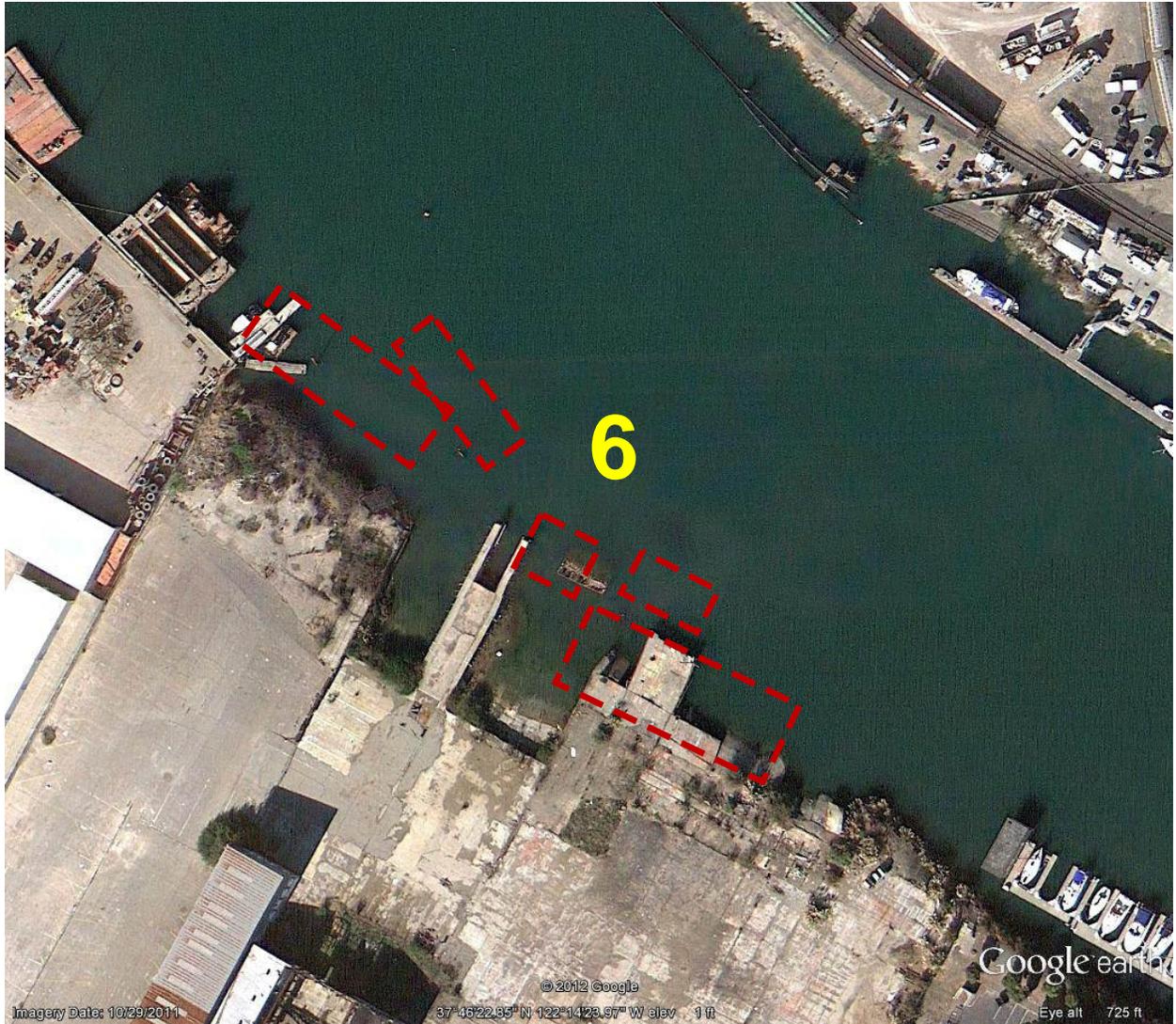


Figure 5. Work Zones 6 – Clement Ave Staging Area, City of Alameda, Oakland Estuary (Source: Google Maps 2011).



Figure 6. Work Zone 7 – Fruitvale Bridge, Oakland Estuary (Source: Google Maps 2011).



Figure 7. Work Zone 8 – San Leandro Bay, Oakland Estuary (Source: Google Maps 2011).

2.1 Initial Scope of Work

CalRecycle’s response contractor was initially directed to start with sites 1-8 as listed in Table 1. Based on two site visits in 2012, CalRecycle project engineer noticed the number and scope of abandoned vessel and marine debris varied over time. A significant number of the vessels changed location in attempt to avoid the attention of law enforcement.

Once US EPA committed to assisting CalRecycle in removing the vessels and debris, CSLC was obligated to perform an archeological review of the entire project to preserve, protect, and honor the cultural, historical, and archaeological resources in the estuary. During the June 2013 consultation the CSLC's Historic Preservation Officer deemed Site 2 – Coast Guard Island and Site 3 – Cryer Dock as historic and significant. Due to the estimated cost of \$125,000 to \$150,000 for an archeological report and the additional 12 to 18 month of time to document the historic marine debris, CalRecycle elected not to pursue any of the marine debris sites from Site 2. Without Site 2, CalRecycle needed to find \$150,000 to \$250,000 in additional removal work to complete the initial project. Fortunately the National Oceanic and Atmospheric Administration (NOAA), Navigation Response Team contacted CalRecycle in early July and inquired if the enhancement funds could be used to remove any of the 25 sites discovered during their November 2012 side sonar survey. Since all the vessels and debris were within the Oakland Estuary Zone and previously unknown, CalRecycle replace Site 2 with Sites 9-25. Figure 8 shows side sonar details and the location of Sites 9 to 25, while Table 2 provides the revised scope of work for the project as of October 2013. Note: due to cost, four of the sites on Table 2 were not remediated.

Table 1: Oakland Estuary Initial Scope of Work

Site Numbers	Description	Location	Action
1a and 1b	Assess and remove 5 to 15 abandoned vessels and marine debris.	Lat: 37°47'20.74"N/ Long 122°15'54.80"W	Remove hazardous materials including fuels, oils, household hazard wastes and asbestos. Crane barge to collect vessel and haul to laydown area; Vessel to be broken up and disposed of at local landfills as non-haz debris.
2	Remove marine debris along the tidal zone of Coast Guard Island. <i>Removed from project. Determined to be significantly historic by CSLC.</i>	Lat: 37°47'8.08"N/ Long 122°15'7.28"W	Remove hazardous materials including fuels, oils, household hazard wastes and asbestos. Crane barge to collect vessel and haul to laydown area; Vessel to be broken up and disposed of at local landfills as non-haz debris.
3	Remove docks, other abandoned vessels, and marine debris. Raise and assess abandoned fishing vessel. Remove hazardous materials.	Lat: 37°46'43.37"N/ Long 121°44'1.92"W	Remove hazardous materials including fuels, oils, household hazard wastes and asbestos. Crane barge to collect vessel and marine debris and haul to laydown area; Vessel/marine debris to be broken up and disposed of at local landfills as non-haz debris.
4	Remove abandoned vessel at public fishing pier. Assess for asbestos.	Lat: 37°46'33.74"N/ Long 122°14'30.71"W	Crane barge to collect pier debris and haul to laydown area; Debris to be broken up and disposed of at local landfills as non-haz debris.

Site Numbers	Description	Location	Action
5	Assess and remove 5 to 15 abandoned vessels and marine debris.	Lat: 37°46'30.76"N/ Long 122°14'27.74"W	Remove hazardous materials including fuels, oils, household hazard wastes and asbestos. Crane barge to collect vessel and haul to laydown area; Vessel to be broken up and disposed of at local landfills as non-haz debris.
6	Phase 1 - Assess and remove two barges, marine debris, docks and piers. Phase 2 - Remove two tug vessels and hazardous materials including fuels, oils, household hazard wastes and asbestos.	Lat: 37°46'22.47"N/ Long 122°14'24.09"W	Float and move vessel to laydown area; All fluids to be drained and contained appropriately for disposal. Vessel to be broken up and disposed of at local steel recyclers
7	Assess and remove 2 to 5 abandoned vessels and marine debris. <u>Removed from project:</u> <u>Owner removed vessels and dock per CSLC Legal Notice</u>	Lat: 37°46'11.94"N/ Long 122°13'57.03"W	Remove hazardous materials including fuels, oils, household hazard wastes and asbestos. Crane barge to collect vessel and haul to laydown area; Vessel to be broken up and disposed of at local landfills as non-haz debris.
8	Assess and remove 4 to 10 abandoned vessels and marine debris.	Lat: 37°45'14.29"N/ Long 122°13'17.19"W	Remove hazardous materials including fuels, oils, household hazard wastes and asbestos. Crane barge to collect vessel and haul to laydown area; Vessel to be broken up and disposed of at local landfills as non-haz debris.
9 to 25	Assess and raise vessel and marine debris	Various	Remove hazardous materials including fuels, oils, household hazard wastes and asbestos. Crane barge to collect vessel and haul to laydown area; Vessel to be broken up and disposed of at local landfills as non-haz debris.
General A and B	Marine debris from the shoreline	Various	Remove debris from shore as directed by CalRecycle

2.2 Preliminary Assessment

In April 2013 US EPA, in partnership with CalRecycle, Coast Guard, CDFW conducted a removal assessment of four abandoned wrecks. The assessment was conducted during a minus tide allowing access to portions of the abandoned wrecks that are normally under water. The abandoned wrecks were suspected of containing multiple sources of contaminants including engine fluids, peeling paints, insulation, marine batteries and miscellaneous orphan containers.

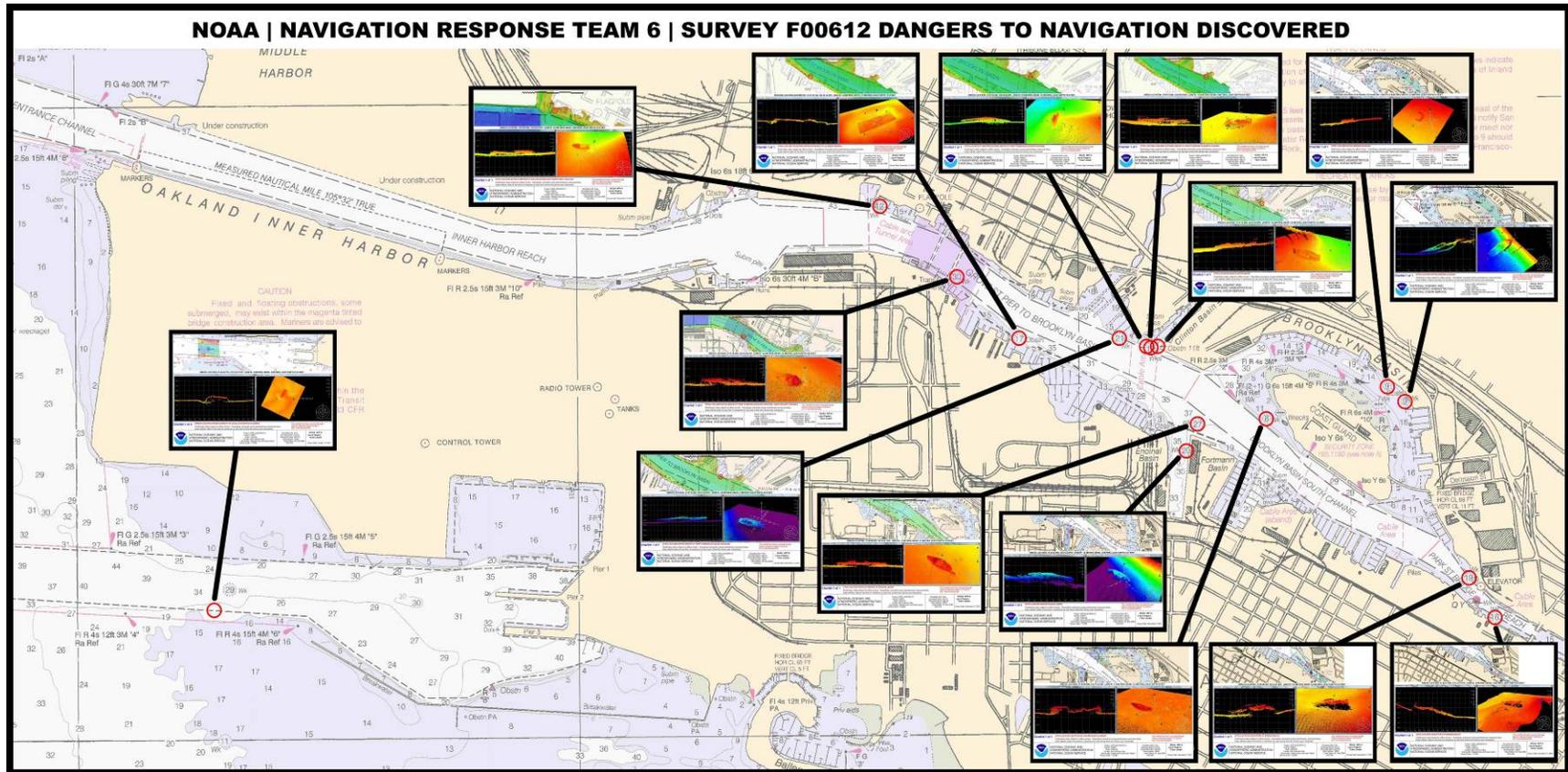


Table 2: Project Details of the Oakland Estuary Enhancement Project as of October 2013 (Removal Log, Version 2.3)

Site No.	Location Info	Description	Number of Vessels	Depth	Enforcement	Funding Status	US EPA Assistance	Hazmat and Oil Potential
Site 1a/1b	CalRecycle	Illegally Moored Vessels	1 to 10	Varies	Yes	NFWF Match	No	Yes
Site 2	CalRecycle	Marine Debris Sites (12 to 15 areas)	0	1 to 5 feet	No	Deleted	No	Yes
Site 3	CalRecycle	Dock, Marine Debris, 3 Sunk Vessels	3	5 to 10 feet	Yes	Deleted - BSY Funds for Dock Only	Yes	Yes
Site 4	CalRecycle	Marine Debris-Public Fishing Pier	2 to 3	5 feet	Yes	NFWF Match	No	Yes
Site 5	CalRecycle	Illegally Moored Vessels +5 Sunk Vessels	5 to 10	5 to 10 feet	Yes	NFWF Match	No	Yes
Site 6	CalRecycle	Three Sunk Vessels and Two Barges	Yes	10 to 25 feet	Yes	Partial NFWF Match	Yes	Yes
Site 7	CalRecycle	Illegally Moored Vessels	3	NA	NA	Deleted	NA	NA
Site 8	CalRecycle	Vessel and Marine Debris	1	0 to 5 feet	Yes	NFWF Match	No	Yes
Site 9	CalRecycle	NEW-Sunk Sailboat 30 ft	1	5 to 10 feet	Yes	New Request	No	Yes
Site 10	NOAA-12	Sunk Vessel 15 ft	1	12	Yes	New Request	No	Yes
Site 11	NOAA-30	Sunk Vessel 24 ft	1	30	Yes	New Request	No	Yes
Site 12	NOAA-17	Sunk Barge 102 ft	1	17	Yes	New Request	No	Yes
Site 13	NOAA-20	Sunk Vessel 27 ft	1	20	Yes	New Request	No	Yes
Site 14	NOAA-19a	Sunk Vessel 31 ft	1	19	Yes	New Request	No	Yes
Site 15	NOAA-19b	Sunk Vessel 32 ft	1	19	Yes	New Request	No	Yes
Site 16	NOAA-11	Sunk Vessel 24 ft	1	11	Yes	New Request	No	Yes
Site 17	NOAA-27	Sunk Vessel 33 ft	1	27	Yes	New Request	No	Yes
Site 18	NOAA-20	Sunk Vessel 30 ft	1	20	Yes	New Request	No	Yes
Site 19	NOAA-8	Sunk Vessel 22 ft	1	8	Yes	New Request	No	Yes
Site 20	NOAA-9a	Marine Debris 7 ft	1	9	Yes	New Request	No	Yes
Site 21	NOAA-9b	Sunk Vessel 24 ft	1	9	Yes	New Request	No	Yes
Site 22	NOAA-19c	Sunk Vessel 27 ft	1	19	Yes	New Request	No	Yes
Site 23	NOAA-16	Marine Debris 24 ft	1	16	Yes	New Request	No	Yes
Site 24	NOAA-16b	Sunk Vessel 15 ft	1	16	Yes	New Request	No	Yes
Site 25	NOAA-29	Sunk Vessel 15 ft	1	29	Yes	New Request	No	Yes
Site 26	CalRecycle	Sailboat/75% Submerged	1	5	No	New as of 10/6	No	Yes
Site 27	CalRecycle	Marine Debris	0	0 to 5 feet	No	New as of 10/14	No	No
Site 28	CalRecycle	Sunk Vessels and Marine Debris	4 to 6	10 to 20 feet	No	New as of 10/22	No	Yes
Site 29	CalRecycle	Marine Debris Field	0	10 to 20 feet	No	New as of 10/22	No	Yes
General A	CalRecycle	Shore Debris and Misc Wastes	0	Varies	No	New Request	No	No
General B	CalRecycle	Shore Debris and Misc Wastes	0	Varies	No	New Request	No	No

Table 2 (continued): Project Details of the Oakland Estuary Enhancement Project as of October 2013 (Removal Log, Version 2.3)

Site No.	Latitude (DDMMSS)	Longitude (DDMMSS)	GPS Latitude	GPS Longitude	General Area	Comments
Site 1a/1b	37°47'20.48"	122°15'52.38"	General Area	General Area	Oakland Estuary	Various illegally moored vessels. Enforcement necessary.
Site 2	37°47'7.17"	122°15'5.30"	General Area	General Area	Oakland Estuary	Debris deemed historic by State Lands. Site Deleted.
Site 3	37°46'43.26"	122°14'38.06"			Oakland Estuary	Deemed historic by State Lands. Requested federal assistance to raise the fishing vessel.
Site 4	37°46'33.77"	122°14'30.73"			Oakland Estuary	Marine debris/vessels located in or next to pier.
Site 5	37°46'31.28"	122°14'28.81"			Oakland Estuary	Various illegally moored and sunk vessels. Enforcement necessary.
Site 6	37°46'22.42"	122°14'24.03"			Oakland Estuary	Requested assistance on the Captain Tug and Respect Tug. Cost to raise these two vessels (\$1.8 million)
Site 7	NA	NA	NA	NA	NA	Owner removed vessels. Site Removed.
Site 8	37°45'14.99"	122°13'18.40"			San Leandro Bay	Four debris sites. One tug, one barge, two marine debris sites.
Site 9	37°47'41.32"	122°19'13.51"			Oakland Inner Harbor	Sunk sailboat, general area.
Site 10	37-47-40.32	122-16-47.67	37 47.672	122 16.7945	Cable and Tunnel Area	See NOAA Sheet 2012/2013 Marine Survey
Site 11	37-47-26.83	122-16-29.13	37 47.44716	122 16.4855	Cable and Tunnel Area	See NOAA Sheet 2012/2013 Marine Survey
Site 12	37-47-15.11	122-16-14.27	37 47.2518	122 16.23783	Pier to Brooklyn Basin	See NOAA Sheet 2012/2013 Marine Survey
Site 13	37-47-14.93	122-15-50.27	37 47.2488	122 15.83783	Pier to Brooklyn Basin	See NOAA Sheet 2012/2013 Marine Survey
Site 14	37-47-12.94	122-15-43.86	37 47.2159	122 15.731	Clinton Basin	See NOAA Sheet 2012/2013 Marine Survey
Site 15	37-47-13.00	122-15-43.92	37 47.2166	122 15.732	Clinton Basin	See NOAA Sheet 2012/2013 Marine Survey
Site 16	37-47-13.22	122-15-40.56	37 47.2203	122 15.676	Clinton Basin	See NOAA Sheet 2012/2013 Marine Survey
Site 17	37-46-58.50	122-15-31.74	37 46.975	122 15.529	Brooklyn Basin South	See NOAA Sheet 2012/2013 Marine Survey
Site 18	37-46-53.52	122-15-33.97	37 46.892	122 15.5661	Encinal Basin	See NOAA Sheet 2012/2013 Marine Survey
Site 19	37-46-59.48	122-15-15.18	37 46.9133	122 15.232	Brooklyn Basin South	See NOAA Sheet 2012/2013 Marine Survey
Site 20	37-47-05.41	122-14-46.32	37 47.0901	122 14.772	Brooklyn Basin	See NOAA Sheet 2012/2013 Marine Survey
Site 21	37-47-02.73	122-14-41.76	37 47.0455	122 14.696	Brooklyn Basin	See NOAA Sheet 2012/2013 Marine Survey
Site 22	37-46-29.04	122-14-27.22	37 46.484	122 14.4536	Park St Bridge	See NOAA Sheet 2012/2013 Marine Survey
Site 23	37-46-21.45	122-14-21.07	37 46.3575	122 14.3511	Park St Bridge	See NOAA Sheet 2012/2013 Marine Survey
Site 24	37-46-24.71	122-19-27.61	37 46.4118	122 19.4601	Bay Side Alameda	See NOAA Sheet 2012/2013 Marine Survey
Site 25	37-46-28.47	122-19-23.57	37 46.4745	122 19.3928	Bay Side Alameda	See NOAA Sheet 2012/2013 Marine Survey
Site 26	37°47'18.26	122°19'52.4	37 47.3043	122 19.8733	Bay Side Alameda	Discovered 10/6 - Removed 10/8
Site 27	37°46'53.06	122°15'25.38	37 46.8843	122 15.423	Fortmann Basin	Additional Task - Removal of shore debris and trash
Site 28	37°46'18.52	122°14'9.30	37 46.3086	122 14.155	Park St Bridge	Additional Task - Removal submerged debris field next to the bridge
Site 29	37°46'17.55	122°14'6.19	37 46.2925	122 14.1031	Park St Bridge	Additional Task - Removal of four to five sunk vessels
General A	Varies	Varies	NA	NA	Bay Side Alameda	General cleanup of marine debris along the shores of the Alameda side
General B	Varies	Varies	NA	NA	Oakland Estuary	General cleanup of marine debris along the shores and inlet of the estuary

2.3 Preliminary Environmental Sampling and Results

The US EPA collected samples from each abandoned vessel and analyzed them for Polychlorinated Biphenyls (“PCBs”), metals, asbestos and total petroleum hydrocarbons as diesel/motor oil (TPHd/mo) and gasoline (TPHg). Elevated levels of the following hazardous substances were identified:

- PCBs: Levels above Industrial Regional Screening Levels (“RSLs”) were found in peeling paint taken from the exterior of wrecks.
- Arsenic: Levels above Industrial RSLs were found in paint taken from exterior of wrecks
- Cobalt: Levels above Industrial RSLs were found in paint taken from exterior of wrecks
- Lead: Levels above Industrial RSLs were found in paint taken from exterior of wrecks
- Asbestos: Was found in samples collected from the hull of the wrecks
- TPHd/mo: Levels above San Francisco Regional Water Quality Control (SFRWCB) Environmental Screening Levels (ESL) for shallow soils and surface water bodies were found on wrecks

These results represented a small sample of the estimated volume of marine debris that was raised, recovered and disposed by CalRecycle, US EPA, and USCG during the removal action. During the removal assessment, marine debris was observed above and below the water line but was inaccessible for sampling. It was suspected that this marine debris also contain multiple sources of contaminants including engine fluids, peeling paints, compressed gas cylinders, insulation, marine batteries, miscellaneous orphan containers, and miscellaneous E-waste. CalRecycle used US EPA’s assessment to justify the removal of the observed marine debris where feasible.

Based on US EPA’s April 2013 assessment, actual and threatened releases of hazardous substances into the environment pose a risk to human health and the environment at this Site. Analytical results show that there is a potential for hazardous substances (asbestos, PCBs, lead, and arsenic) to be released into the environment from these abandoned wrecks. These hazardous substances can potentially kill marine life and enter into the food chain, ultimately being consumed by humans. Additionally, the other hazardous materials were present from marine debris site, namely varnish, paint, and batteries. Release of these substances into the aquatic environment is subject to dispersion and translocation via tidal action and ecosystem processes and therefore may be lethal to marine life.

2.4 Enforcement Activities

In an attempt to solve the illegal mooring problems in the estuary, the CSLC partnered with the local, state, and federal marine enforcement agencies and posted all the vessel in the estuary with a “Notice of Trespass” pursuant to California Public Resource Code 66302.1 (b)(1), (d) & 6302.3. The notice states that

“The vessel, on which this notice is posted is trespassing. You have 30 days to remove it to a legal mooring or anchorage. After that period it is abandoned property and the commission will dispose of it. Actions against you to recover its cost and damages. For information please contact the Commission’s office”

During the vessel posting a Boat Trespass Posting Log was collected to track each vessel in the estuary to determine when and where the vessel was posted. Since the CSLC performed this enforcement action, the trespass notification was enforceable throughout estuary. Vessels owners could no longer just move their vessel from one jurisdiction to another jurisdiction in the estuary. The owners had to find either a legal mooring location or leave the estuary.

3.0 WASTE CLEANUP ACTIVITIES

A general scope of work was developed by the CalRecycle’s project engineer and expanded upon by the remediation contractor, Pacific States Environmental, Inc. (PSE) in their Work Plan. Removal activities included:

- Submitting a work plan;
- Developing a spill plan and obtaining countermeasures;
- Mobilizing resources;
- Accessing the vessels and debris;
- Assessing the reported sheen;
- Assessing and evaluating the vessels for hazardous materials;
- Assessing and evaluating the vessels for asbestos, heavy metals, and
- Obtaining waste estimates;
- Removing hazardous wastes, fuels, and debris;
- Removing vessel and debris;
- Transporting waste materials to an appropriate disposal facility;
- Implementing spill prevention and countermeasures; and
- Demobilizing resources.

3.1 Pre-Removal Actions

Prior to the removal activities, CalRecycle’s engineer, response contractor and health and safety consultant developed work plans, health and safety plans, and a spill plan. Before each vessel was removed, the team evaluated each vessel for hazards and the project engineer noted if an oil and/or fuel sheen was coming discharging from the site. Next environmental samples were collected from vessels that matched the asbestos and marine paint profiles. If household hazardous wastes (e.g., marine batteries), e-waste, explosives, fuels, were observed this information was passed on to the contractor.

As the waste or vessel was brought to the staging area, it was evaluated for hazardous materials. CalRecycle’s subcontractor collected suspected asbestos containing materials and analyzed a number of paint samples for heavy metals and

polychlorinated biphenyls (PCBs). The sample matrix was based on the vessel's age, type, hull material, and a review of suspected asbestos-containing material by a licensed Certified Asbestos Consultant. If the suspected asbestos sample tested positive for asbestos, the material was removed by a licensed asbestos contractor. While a number of vessels had detectable levels of PCBs and heavy metals, the results were below hazardous waste thresholds for disposal. Table 3 provides a summary of the vessel sampling activities.

Table 3: Vessels Assessment Sampling for the Oakland Estuary Project

Vessel Name	CF Number	Sample Results	DEMO Date	Type of Construction
N/A	N/A		10/18/2013	FIBERGLASS HULL
PUNAUTA 11	CF1004 CC	Non-Detect	11/7/2013	FIBERGLASS HULL
(ON ROCKS)	CF3694 BM	lead/	11/18/2013	WOOD HULL,
No Name	CF9103 AX	asbestos/pcb	11/21/2013	WOOD HULL,
CHILLI PEPPER	CF9352 FJ	Non-Detect	11/13/2013	MODERN BOAT FIBERGLASS
No Name	CF8499 HL	lead	11/13/2013	MODERN BOAT FIBERGLASS
CHI	CF6303 EE	Non-Detect	11/13/2013	MODERN BOAT FIBERGLASS
BUSTIN LOOSE	CF9210 HN	Non-Detect	11/14/2013	MODERN BOAT FIBERGLASS
OLD TOWN	CF5524 FP	Non-Detect	11/13/2013	MODERN BOAT FIBERGLASS
BLUE/ WHITE	N/A	Non-Detect	11/12/2013	WOOD HULL, ROTTED
white/blue keel	CF4986 HZ	Non-Detect	11/22/2013	WOOD HULL,
GAMBLER	CF1053 FT	Non-Detect	11/15/2013	MODERN BOAT FIBERGLASS
FANTASY	CF1371 FM	Non-Detect	11/15/2013	MODERN BOAT FIBERGLASS
NORB U DEKE		Non-Detect	11/22/2013	METAL HULL
N/A	CF4389 EA	Non-Detect	11/19/2013	MODERN BOAT FIBERGLASS
MISS JIFF	CF4527CU	Non-Detect	11/25/2013	WOOD HULL, ROTTED
(STOLEN KEEL)	CF5891 SB	Non-Detect	11/22/2013	MODERN BOAT FIBERGLASS
LAS HISAS	N/A	Non-Detect	11/27/2013	WOOD HULL BOAT 52'
(BLUE SKIFF)	CF9700 SX	Non-Detect	12/3/2013	SKIFF
JULIANA	CF 8233 AX	Non-Detect	12/11/2013	WOOD HULL
No Name	N/A	Non-Detect	12/19/2013	WOOD HULL,
black bear	CF3893	Non-Detect	12/19/2013	WOOD SAIL BOAT
PRINCESA	CF 9876 KR	Non-Detect	12/24/2013	FIBERGLASS HULL,

3.2 Removal Actions

On September 23, 2013, CalRecycle authorized its contractor, Pacific States Environmental, to proceed with the Oakland Enhancement Project. Personnel, heavy equipment, and resources were mobilized on September 23rd and 24th, 2013. A staging area was created at Site 6, 2229 Clement Ave, in the City of Alameda.

Before any removal activities began, a site health and safety meeting was conducted. Topics included known chemical hazards, physical hazards, loading issues, water rescue procedures, spill response, and other safety protocols. Work attire consisted of safety vests, personal floatation devices, work boots, leather gloves, eye and hearing protection, and hard hats.

3.2.1 Vessel and Marine Debris Removal Best Management Practices

CalRecycle's project manager provided the contractor with the Best Management Practices (BMP's) to determining how each vessel or marine debris will be removed:

- All removal work will be done in a manner that avoids additional dredging or filling;
- All removal work will minimize damage, to the extent as practicable, to seagrass beds, oyster beds, coral communities, wetlands, and live bottom;
- All work shall avoid impacts to species listed by the state and federal government as threatened or protected. If the impacts from the removal work cannot be minimized, additional consultation with the appropriate regulatory agency will be necessary before work can begin;
- The preferred method to process a vessel or marine debris will be to remove the vessel or marine debris intact and contain it on a barge, landing craft, or on land where appropriate countermeasure can be implemented. The vessel and/or marine debris should be removed intact by crane, air bags, or launch ramp.
- The only time a vessel or marine debris may be processed in place, if it is determined by the CalRecycle Project Engineer or a licensed marine surveyor that the condition of the vessel or debris would not allow for an intact removal, such as abandoned docks, piles, or parts of former vessels. The decision to process in-place will be based on the integrity of the vessel/marine, prior attempt(s) to raise a vessel/marine debris intact, location, tidal influences, urgency and environmental threat.
- A debris boom and an absorbent boom with blankets shall be deployed at the commencement of work on the surface water around the vessel or marine debris if fuel, oil, or other free –floating pollutants are observed or suspected.
- Spill prevention will take precedence in removal operations;
- Each contractor and subcontractor working in the marine environment shall have a spill kit capable of handling the observed or suspected fluids;
- Prior to deconstruction, each vessel/ debris will be evaluated for fuels, marine paints, asbestos, PCBs, and other hazardous waste. The asbestos evaluation shall be completed by a licensed asbestos consultant.
- PSEC will remove all known pollutants including fuels, batteries, paints, solvents, flares, mercury switches, asbestos, electronic wastes, compressed gas cylinders, household hazardous wastes, gray water, black water, and tires from the vessel and/or marine debris prior to deconstruction activities. Asbestos removal shall be completed by a licensed asbestos contractor.
- Prior to processing the vessel/marine debris, engines, auxiliary motors, generators, or any other mechanical device with fluid will be removed.

3.3 Summary of Project Activities

The following CalRecycle removal activities are presented below. Activities performed by US EPA and the USCG are later discussed in sections 3.4 and 3.5.

3.3.1 August 2013

CalRecycle continued to work with the CSLC, Oakland and Alameda PD representatives to address the illegal mooring of recreational/live-aboard boats. In late August the CSLC and Oakland Police department posted 28 of these boats with a notification that they were illegally moored and that they had 30 days to move their boats out of the estuary or find a legal mooring facility.

3.3.2 September 2013

On September 23, 2013, CalRecycle authorized its contractor, Pacific States Environmental, to proceed with the Oakland Enhancement Project. Personnel, heavy equipment, and resources were mobilized on September 23rd and 24th, 2013. A staging area was created at Site 6, 2229 Clement Ave, in the City of Alameda.

Initial tasks included the mobilization of heavy equipment, site setup, construction of a demolition pad, set up for a job trailer, and the removal of 200 feet of shore debris along the channel of the Oakland Estuary. CalRecycle, CSLC and Oakland Police Department enforced the deadline this week towing several of the boats over to the Alameda Marina for temporary storage.

The contractor began pulling sunken boats out of the estuary and completed Site 4 by removing a sunken houseboat from inside a round public fishing pier at Union Point Park.

3.3.3 October 2013

The contractor completed the lined demolition pad and began sorting and recycling marine debris. The contractor removed numerous concrete and wood structures along the shoreline at Site 6 and off loaded vessels and debris. Household hazardous wastes, explosives, paints, fuel tanks and engines were placed in US EPA's hazardous waste processing area. Divers and barge crane operators began to locate and remove NOAA sites from the estuary. Waste debris and concrete were segregated and disposed by the contractor, while a number of the illegally moored vessels were signed over to the CSLC and processed in the demolition. CalRecycle's consultant acquired asbestos and paint samples from the debris stream and sent them in to be analyzed. CalRecycle's contractors responded to two sunken vessels from an October 29-30, 2013, wind storm that impacted the estuary. Both vessels were raised and brought to the staging area for processing.

3.3.4 November 2013

On November 17, 2013, a press event was hosted by CalRecycle, US EPA, and USCG at the site. The EPA Regional Administrator, USCG Captain of the Port, Oakland Police Department, CalRecycle, and the Regional Quality Control Board Director were present to make statements about the activities at the site. A tour was also provided.

CalRecycle crews removed old concrete retaining walls and contaminated soil and slag piles along Site 6 and graded the slopes from the low tide line back to the toe of slope. This removal work was based on an agreement with the San Francisco Bay Regional Water Quality Control Board, USACE, and the property owner. CalRecycle agreed to remove the California hazardous waste (i.e., Non-Resource Conservation and Recovery Act (RCRA) waste) from the USACE property, while the owner agreed to accept responsibility for the soil and dispose of it at a permitted facility based on past operations. The crews continued to offload docks, piers, piles, vessels and debris, and process household hazardous wastes, explosives, paints, fuel tanks and engines. The dive team completed locating the submerged debris. The crews continued to segregate, recycle, and dispose of the waste stream generated by the enhancement project. The contractor completed shoreline removal from both Alameda and Oakland. An additional number of illegally moored vessels were secured and processed. CalRecycle's consultant continued to acquire asbestos and paint samples for debris stream analysis.

CalRecycle accepted the tug "Captain Al" from the US EPA and performed emergency pumping to keep the vessel afloat until the shipyard was available. The vessel was then transferred to the Bay Yacht and Ship facility for demolition. The contractor successfully raised the "Captain Al" in dry dock and started scrapping activities over the weekend. The contractor completed the demolition and recycled metal and removed hazardous wastes from the Captain Al.

The contractor removed debris and the pier from the Cryer Boat Dock at Site 3 after the historic documentation was completed.

3.3.3 December 2013

The contractor continued to remove vessels and debris from the staging area and transported waste and recycled metal. The contractor cleared debris from the shoreline next to Site 21. Contractors took possession of the tug "Respect" from the USCG on December 13, 2013 and began the demolition process. After US EPA removed the known asbestos and contained mud, the contractor removed the superstructure of the vessel.

3.3.5 January 2014 to July 2014

CalRecycle transferred the "Respect" to the USACE dock in Sausalito, CA and began the final decommissioning of the vessels. Due to a number of unexpected events and

the discovery of additional bunker oil and asbestos, the final removal of the vessel was not completed until July 2014. After five change orders and an additional \$600,000 the Respect was demolishing on July 23, 2014.

3.4 US EPA Involvement

US EPA began mobilizing resources to the Oakland Estuary Abandoned Vessel and Marine Debris project on September 9, 2013. Activities during the week included the setup of the staging area, assembly of the working barge, mobilization of containment boom, a boom trailer, dive safety gear, two work boats, a dive boat and heavy lift salvage gear. Sediments were collected inside the two abandoned Tugs for disposal assessment. Divers began assessment dredging on the inside and outside of the Captain Al and the Respect and the sediment was pumped into it and a land based system for treatment. Unlike the tug Captain Al, the Tug Respect had more debris or flotsam in it. The dive crew encountered clothing, garbage bags and other items that could not be removed through the pump. The dive crew also discovered bags marked with "asbestos" that must have been part of a remedial effort on the ship. These bags were loaded into cubic yard boxes and staged in the hazardous waste segregation area.

US EPA Divers discovered a tank that contained an oil-type substance and notified the USCG the sediments were contaminated with oil.

On November 4, the Tug Captain Al was successfully raised and re-floated. The tug had several leaks and required 24/7 surveillance and pumping. On November 8, 2013 EPA transitioned pumping operations to CalRecycle. CalRecycle continued to provide pumping operations until transportation to the dry-dock. US EPA treated and discharged a total of 1,270,700 gallons of sea water through the land based settling system.

On November 15, as part of the commitment to the National Historic Preservation Act process, the EPA sponsored the evaluation and documentation of the Cryer boat wharf by a professional archeologist. The EPA and Coast guard met with representatives from National Pollution Fund Center to discuss the rigging, raising, and oil decontamination of the tug Respect. On December 2, 2014, the Respect was raised by the USGC.

On February 10, 2014, the USEPA re-mobilized to the Oakland Estuary Site to dispose of contaminated sediments stockpiled on the site. The sediments were recovered from the inside of the two commercial vessels (i.e., Tugs Captain AL and Respect) that were raised by the USEPA and USCG in the fall and early winter of 2013. The sediments contained elevated levels of lead and copper and were classified as a California Hazardous Waste.

In early March USEPA mobilized to Sausalito to begin asbestos abatement activities on the boiler and steam distribution system of the Respect. Brick, flanges and pipe were

removed from the vessel, double-bagged and stored in 20 cubic yard roll-off bins. The EPA and their contractor demobilized from the USACE dock on March 27, 2014.

3.5 USCG Involvement

On October 14, 2013, the USCG, Sector San Francisco was notified by US EPA that tar balls and heavy oil were discovered while removing sediment from inside the Tug Respect. In 2007 the Tug Respect was vandalized and sank with an unknown oil hazard. The USCG determined that 300 to 500 gallons of bunker fuel was left on board in a lower hold of the ship after removal operations were conducted in 1998. Based on this past knowledge and current site reports, the Federal On-Scene Coordinator determined the Tug Respect posed a substantial threat to the environment. The Oil Spill Liability Trust Fund was utilized to contain and remove all oils on board the tug to mitigate the impact to the public health and welfare. Since the oil was in the lower holds, the only safe way to access the oil was to raise the Tug Respect. On December 2, 2013, the USCG mobilized two barge cranes to par buckle and raise the Tug Respect. Once the vessel was stabilized, the Tug was taken to Bay Ship and Yacht where USCG and US EPA removed the oil laden sediments, asbestos, and hazardous substances. In January, 2014, CalRecycle took responsibility for the vessel and towed it to the USACE facility in Sausalito, California for demolition.

3.6 Waste Stream

The waste stream from the project was as diverse as the abandoned vessels. The marine debris varied general household trash to previous parts of sunken vessels. Overall the project eliminated and prevented the release of 3,894 gallons of oily water, 3,270 gallons of waste paint and related materials, 1,040 gallons of flammable liquids, 1150 cubic yards of contaminated soil (i.e., heavy metals and creosote), 3,270 tons of oily contaminated mud, 269.56 tons of treated wood, 88 tons of asbestos, 120 lbs toxic liquid, 40 lbs of acid liquid, 50 gallons of waste oil, 32 units of explosives (i.e., marine flares), 29 marine batteries, along with other household hazardous wastes. The final disposal from the project included 322.82 tons of solid waste, 741 tons of concrete, and 748.79 tons of recycled metal. Table 4 provides a summary of the waste stream.

Table 4: Waste Stream Totals for the Oakland Estuary Enhancement Project

Materials/Items	Quantity	Responsible Agency	Disposal/Recycle
Total Sites	77	Multi	Multi
Vessels	58	CalRecycle/NFWF	CalRecycle/NFWF
Vessels	2	BART	BART
Vessel	1	Alameda County DEA Enforcement Agreement	Private Party - Legal Settlement Agreement
Commercial Vessels (>90 ft)	2	USEPA and USCG	CalRecycle/NFWF
Debris Sites	9	CalRecycle/NFWF	CalRecycle/NFWF
Abandoned Docks/Piers	5	CalRecycle/NFWF	CalRecycle/NFWF
Wood Piles Removed	17	CalRecycle/NFWF	CalRecycle/NFWF
Non-RCRA Hazardous Waste - Oily Water	3590 gal	CalRecycle/NFWF	CalRecycle/NFWF
Non-RCRA Hazardous Waste - Oily Mud	65.65 tons	CalRecycle/NFWF	CalRecycle/NFWF
Flammable Liquid	40 gal	CalRecycle/NFWF	CalRecycle/NFWF
Contaminated Soil (heavy metals-CA/haz)	900 cy	CalRecycle/NFWF	Private Property Owner - Site 6
Contaminated Soil (heavy metals-CA/haz and creosote)	250 cy	USEPA	Private Property Owner - Site 6
Oily Contaminated Boom	1,200 lbs	CalRecycle/NFWF	CalRecycle/NFWF
Recycled Metal	748.79 tons	CalRecycle/NFWF	CalRecycle/NFWF
Concrete	741 tons	CalRecycle/NFWF	CalRecycle/NFWF
Solid Waste / Debris	322.82 tons	CalRecycle/NFWF	CalRecycle/NFWF
Treated Wood (creosote)	269.56 tons	CalRecycle/NFWF	CalRecycle/NFWF
Treated Wood	50 cy	BCDC	Private Property Owner
Solid Waste - Wood, Fiberglass, and Mud	23.61 tons	BART	BART
CA Haz Sediment	3425 tons	USEPA	USEPA
Asbestos Materials	88 tons	USEPA	USEPA
Waste Paint Related Material	3,270 lbs	USEPA	USEPA
Flammable Liquid	1,000 gal	USEPA	USEPA
Acid Liquid	40 lbs	USEPA	USEPA
Toxic Liquid	120 lbs	USEPA	USEPA
Waste Oil	50 gal	USEPA	USEPA
Explosives (flares)	32 units	USEPA	USEPA
Marine Batteries	29 units	USEPA	USEPA
Non-RCRA Debris	33 cy	USEPA	USEPA
Misc. (antifreeze, aerosols)	145 lbs	USEPA	USEPA
Non RCRA-Hazardouse Waste Solid (CA Haz Wastes)	180 cy	USCG	USCG
Non-RCRA Hazardous Waste Liquid (CA Haz Wastes)	4,100 gal	USCG	USCG
Restored Environment			
Shoreline	1,017 ft	CalRecycle/NFWF	CalRecycle/NFWF
Seabed	4.94 acres	CalRecycle/NFWF	CalRecycle/NFWF

3.7 Air Monitoring

Air monitoring was performed by US EPA at different intervals. Most notably US EPA performed air monitoring during the removal of the heavy metal contaminated soil from the USACE property at Site 6. Result from US EPA's evaluation can be found in Appendix B.

3.8 Project Documentation

Throughout the project, the project engineer kept a photo log of all activities. The project engineer also reviewed and approved daily expense logs by the contractor on the amount of labor and equipment utilized each day. Appendix C contains select photographs of removal activities and events that occurred during the project. Appendix D contains the contractor's work plan, while Appendix E contains the project spill plan. The Site Safety Plan can be found in Appendix F.

4.0 PROJECT COSTS

Originally the project was estimated to cost approximately \$1.3 million dollars to complete; however, a number of federal, state, and local agencies joined together and were able to provide direct and indirect expenditures for total of \$9.16 million dollars. CalRecycle alone expended approximately \$1.325 million on the estuary project. After US EPA and USCG spent over \$2.5 million to raise and remove the hazardous material off the Tug Respect, CalRecycle authorized and spent an additional \$600,000 dollars over the original matching fund of \$650,000 to complete the demolition of the Tug Respect. Table 5 provides the itemized cost under the NFWF Grant as of September 2014.

For the fiscal year 2012/2013, CalRecycle expended \$43,871.12 and disposed of 82 tons of wood debris (e.g. old piles, piers, and structural timber) and 280 tons of concrete decking and piles. Resources were demobilized from the project on September 27, 2013, and the project started again on October 7, 2013, under the new funding cycle.

Table 5: Overall Project Cost for the CalRecycle/NFWF Grant as of September 2014 (Note: Table does not show the additional costs for the removal of the Tug Respect).

Labor	Office Support Employees	Contractor Owned Equipment	Rental Equipment Water Trucks	Materials	Subcontractors	Non Hazardous Material Transport & Disposal	Other Authorized Services and Materials
\$313,515.78	\$6,822.92	\$92,686.36	\$131,109.76	\$31,168.93	\$558,041.20	\$98,108.73	\$13,978.80

5.0 BENEFITS

While there were many localized recreational benefits (e.g., restoration of a public view pier, removal of navigational hazards, and the removal of a number of illegally moored vessels restricting public access) from NFWF's Cosco Busan Recreational Use Grant, a number of new activities occurred that should change the long term boating and recreational culture in the Oakland Estuary. Past abandoned vessel practices and site conditions of the estuary prior to 2012 left few with any optimism that it could change. If a law enforcement agency from one jurisdiction issued a citation to an owner of an illegally moored vessel, the owner would just move to the next jurisdiction to avoid the citation. The cleanup of the large number of abandoned vessels and the large quantity of marine debris exceeded the operational budgets of the individual agencies responsible for these activities. Besides the funding limitations, each responsible agency has limited authorities to act and restrictions on their engagement. For example, the USCG, US EPA, USACE, all have the authority to act to protect the environment; however; depending on the vessel location and type of waste (e.g., hazardous and non-hazardous), only certain actions can be instituted by each agency. With the partnership between agencies, a matrix was developed to solve the permit, removal, and disposal issues from the debris in the Oakland Estuary. This partnership combined authorities, resources and funding to complete the mission. By using the partnerships a total of \$9.16 million dollars were combined with the NFWF grant of \$650,000 to restore the Oakland Estuary. Table 6 shows the agencies involved and the resulting leveraged funding to complete this project.

Table 6: Additional Funds to Match the NFWF Grant: Oakland Estuary Enhancement NFWF Leveraged Funding Summary

Agency	Funds (Millions)	Item
US EPA	\$ 3.90	Direct - Haz Waste and Vessel Contractor Expenditures
US EPA	\$ 0.10	Direct - Consultant Expenditures
USCG	\$ 2.20	Direct - Oil and Vessels Contractor Expenditures
USCG	\$ 0.05	Direct - Oil Trust Fund Reimbursement
CalRecycle	\$ 1.25	Direct - \$650,000 original NFWF grant match/\$600,000 additional funding
USACE	\$ 0.10	In-kind Expenditure - Dock Rental and Support
NOAA	\$ 0.05	In-kind Expenditure - Side Sonar Survey of the Oakland Estuary
CSLC	\$ 0.05	In-kind Expenditure - Enforcement
OPD	\$ 0.03	In-kind Expenditure - Enforcement Support
DFW	\$ 0.01	In-kind Expenditure - Enforcement Support
BART	\$ 0.08	Direct - Vessel Removal
Alameda DA	\$ 0.05	Direct - Vessel Removal and Enforcement
BCDC	\$ 0.03	Direct - Pier Removal
Bay and Ship	\$ 0.11	Direct - Cryer Dock Removal and Shipyard Rental
Property Owner - Clement Ave and USACE	\$ 0.35	Direct - Removal of Shoreline Haz Waste / Trans and Disposal
Property Owner - Clement Ave	\$ 0.15	Direct - Construction of Seawall and Rock
Total	\$ 8.51	

6.0 LESSONS LEARNED

There were many operational lessons learned at the Oakland Estuary Project. The key lessons focused on preparation, coalitions, coordination, and countermeasures. The first lesson in removing abandoned vessels and marine debris is to expect that the scope of the project will evolve by the time you mobilize. Expect anywhere from 20% to 40% of your original project to change location, be eliminated by historical restrictions, or be abandoned before or during the project. Also, when planning a vessel and debris removal program, set aside some funds to address vessels that will likely appear when the project is underway. Cleanup activities attract vessel owners that have been waiting to dispose of their vessel. Other lessons include:

- Use all available federal, state, and local resources to accomplish vessel and marine debris removals;
- Be proactive and work with your coalition partners (i.e., Harbor Masters, local marinas, and local government facilities) and track down the next generation of

abandoned vessels. Most coalition partners “know” where the high risk vessels are located.

- Use a coordinated marine enforcement action along with an area wide ‘Notice of Trespass’ by CSLC to eliminate illegal mooring;
- Establish working relationships with all parties involved. While state and federal agencies may not agree on the scope of work or procedures, by involving the local agencies and government, all the agencies will understand that the group as a whole will greatly benefit in the end;
- Coordinate your project with other agencies to maximize your available funding and resources;
- When applicable use federal authority granted to the US EPA or USCG under CERLA to assist in navigating the federal, state and local agencies permit matrix;
- Expect the unexpected when it relates to hazardous waste, oil, and fuels. Abandoned vessels and marine debris attract illegal dumping, and the waste stream expands greatly on and around derelict vessels; and
- Provide additional staff to manage the cost tracking and project documentation. Given cost and scope of the project, additional staff should be available to assist in the project.

Finally, a number of additional BMP’s were also realized during this removal. These lessons were summarized in a Vessel and Marine Debris Guidance Document in Appendix G.

7.0 ACCOMPLISHMENTS

The Oakland Estuary Project accomplished many tangible and non-tangible targets. Most importantly the long-term illegal mooring in the estuary has ceased according to the local harbor masters and law enforcement and the theft of maritime equipment has also dropped. The project restored 4.94 acres of seabed at 26 sites, removed debris from 1,017 feet of shoreline, and removed marine debris and/or vessels from 76 sites through the estuary. The project also restored one public fishing pier by removing a sunken houseboat within the pier and removed 17 wood piles that were impacting recreational boaters and windsurfers.

8.0 CONCLUSIONS

This remedial action and enhancement project has met most of the stated objectives. Due to funding limitations, water depth, and environmental risk, three commercial steel barges and three marine debris sites, all under 15 feet in length were left in the estuary. Should additional funds become available these site could be remediated.

APPENDIX C

Photo Log Oakland Estuary Enhancement Project Alameda, California

**By Todd Thalhamer, P.E
CalRecycle**



1. Illegal mooring in the Oakland Estuary



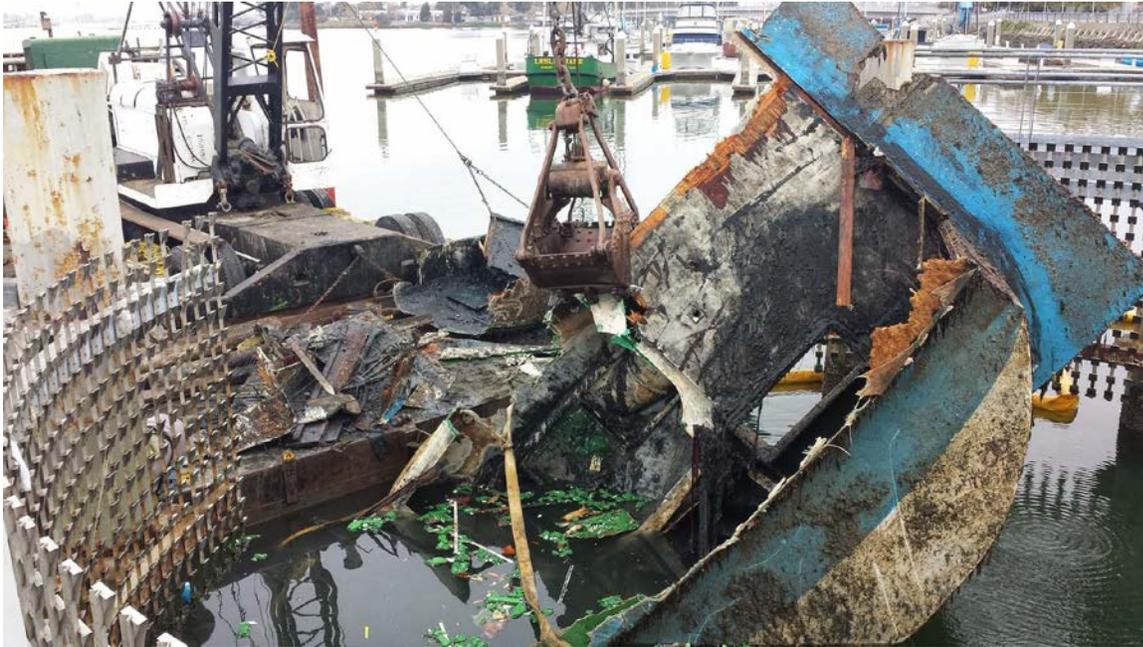
2. Illegal mooring in the Oakland Estuary



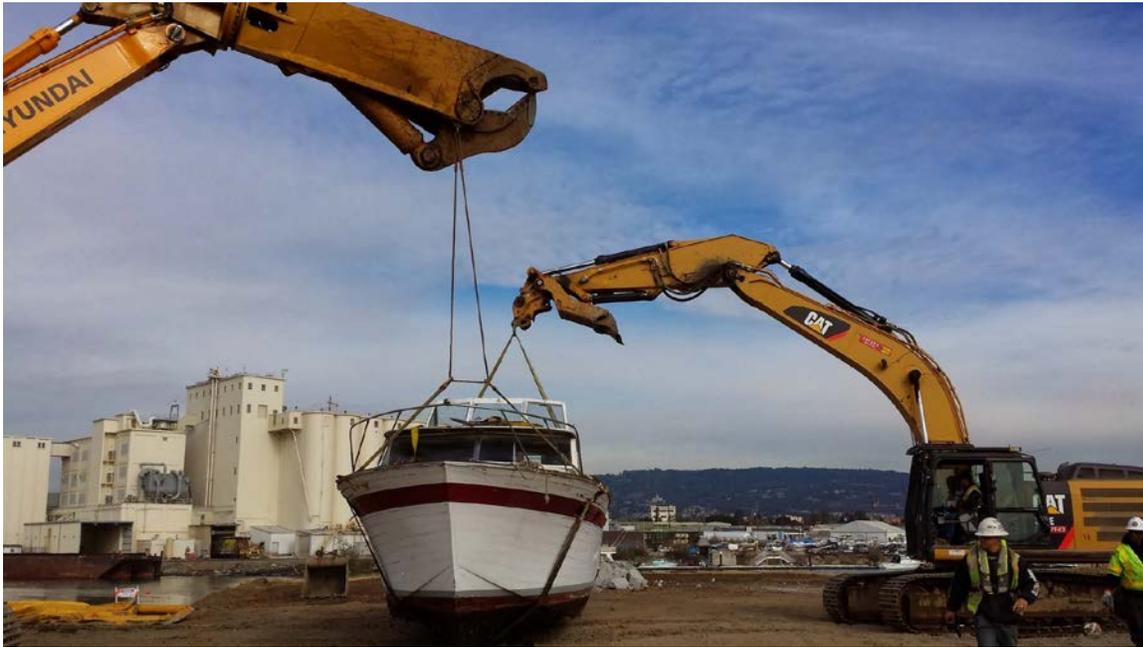
3. Issuance of Illegal Mooring Notice by State Lands Commission



4. Example of Notice of Trespass for the Oakland Estuary Project



5. Vessel removal from Viewing Pier (Site 4, Oakland Estuary)



6. Vessel removal using two excavators at the Staging Area



7. Vessel removal at Staging Area. Note: Vessel was not structurally sound to remove by boat lift.



8. Typical abandoned marine debris, Oakland Estuary



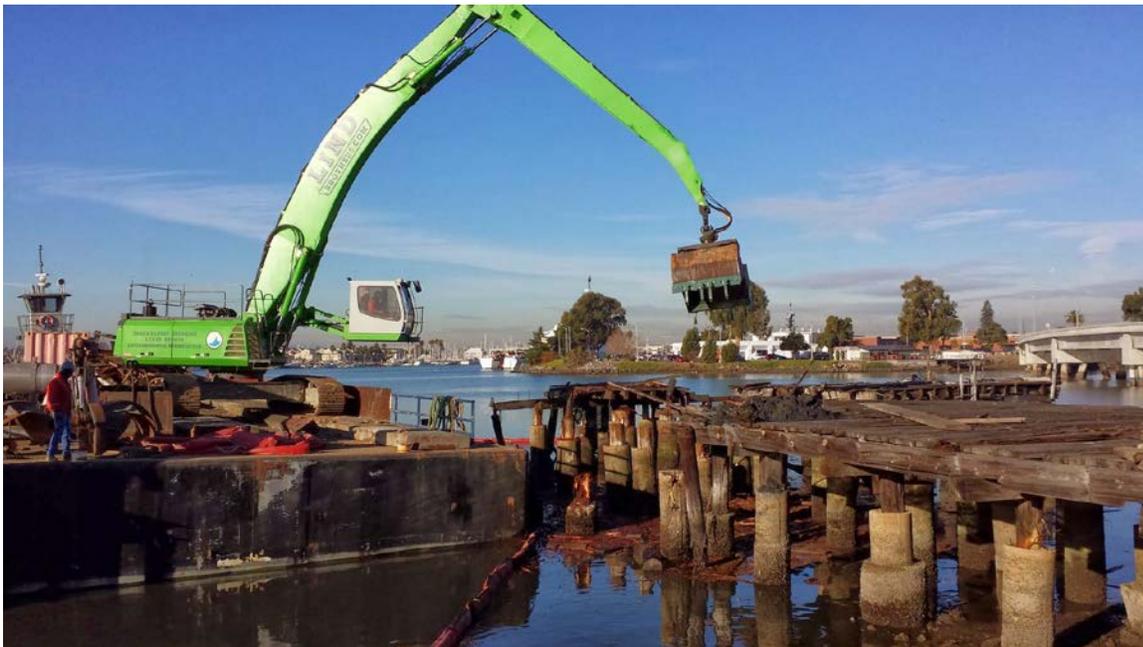
9. Typical abandoned marine debris, Oakland Estuary



10. Typical abandoned marine debris, Oakland Estuary



11. Emergency response to a sinking vessel in the Oakland Estuary



12. Wharf removal at the Oakland Estuary



13. Shoreline restoration before (Site 6, Oakland Estuary)



14. Shoreline restoration after (Site 6, Oakland Estuary)



15. Shoreline restoration before (Site 6, Oakland Estuary)



16. Shoreline restoration after (Site 6, Oakland Estuary)



17. The Tug Captain Al awaiting demolition, Oakland Estuary



18. The Tug Respect awaiting removal, Oakland Estuary



19. Last piece of the Tug Respect being removed by crane



20. Vessel removal at Site 6, Oakland Estuary



21. Project sign indicating agencies involved