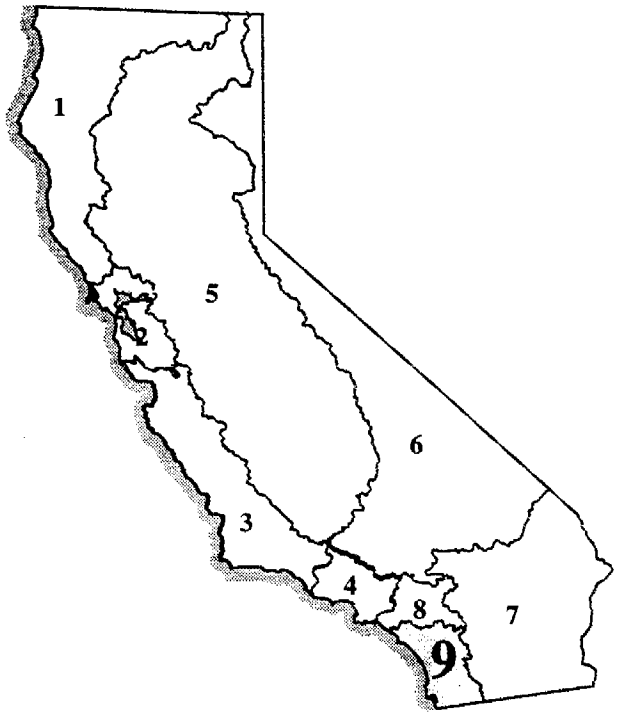
Bay Protection and Toxic Cleanup Program



Proposed Regional Toxic Hot Spot Cleanup Plan

December 1997

SAN DIEGO REGION

REGIONAL WATER QUALITY CONTROL BOARD
CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

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PROPOSED REGIONAL TOXIC HOT SPOT CLEANUP PLAN

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REGIONAL WATER QUALITY CONTROL BOARD SAN DIEGO REGION

Part I

I. INTRODUCTION

In 1989, The California State legislature established the Bay Protection and Toxic Cleanup Program (BPTCP). The BPTCP has four major goals: (1) to provide protection of present and future beneficial uses of the bays and estuarine waters of California; (2) identify and characterize toxic hot spots; (3) plan for toxic hot spot cleanup or other remedial or mitigation actions; (4) develop prevention and control strategies for toxic pollutants that will prevent creation of new toxic hot spots or the perpetuation of existing ones within the bays and estuaries of the State.

This Regional Toxic Hot Spot Cleanup Plan is intended to provide direction for the remediation or prevention of toxic hot spots in the San Diego Region (pursuant to Water Code Sections 13390 et seq.). Pursuant to Sections 13140 and 13143 of the Water Code, this Cleanup Plan is necessary to protect the quality of waters and sediments of the State from discharges of waste, in-place sediment pollution and contamination, and any other factor that can impact beneficial uses of enclosed bays, estuaries and coastal waters. This plan shall be reviewed periodically to ensure that the plan is adequate to complete the mandates of the Bay Protection and Toxic Cleanup Program (Water Code Section 13390 et seq.).

This Plan includes a specific definition of a Toxic Hot Spot, site ranking criteria, and the monitoring approach used to identify the Water Code-mandated requirements for Regional Toxic Hot Spot Cleanup Plans.

Region Description

The San Diego Region is located along the coast of the Pacific Ocean from the Mexican border to north of Laguna Beach. The Region is rectangular in shape and extends approximately 80 miles along the coastline and 40 miles east to the crest of the mountains. The Region includes portions of San Diego, Orange, and Riverside Counties.

The population of the Region is heavily concentrated along the coastal strip. Six deep water sewage outfalls and one across the beach discharge from the new border plant at the Tijuana River empty into the ocean. Two harbors, Mission Bay and San Diego Bay, support major recreational and commercial boat traffic. Coastal lagoons are found along the San Diego County coast at the mouths of creeks and rivers.

Weather patterns are Mediterranean in nature with an average rainfall of approximately ten inches per year occurring along the coast. Almost all the rainfall occurs during wet cool winters. The Pacific ocean generally has cool water temperatures due to upwelling. This nutrient-rich water supports coastal beds of giant kelp.

The cities of San Diego, National City, Chula Vista, Coronado, and Imperial Beach surround San Diego Bay in the southern portion of the Region. The Bay is long and narrow, 15 miles in length and approximately one mile across. A deep-water harbor, San Diego Bay has experienced waste discharge from former sewage outfalls, industries, and urban runoff. Up to 9,000 vessels may be moored in the Bay. San Diego Bay also hosts four major U.S. Navy bases with approximately 80 surface ships and submarines.

Legislative Authority

California Water Code, Division 7, Chapter 5.6 established a comprehensive program to protect the existing and future beneficial uses of California's enclosed bays and estuaries. SB 475 (1989), SB 1845 (1990), AB 41 (1989), and SB 1084 (1993) added and modified

Chapter 5.6 [Bay Protection and Toxic Cleanup (Water Code Sections 13390-13396.5)] to Division 7 of the Water Code.

The BPTCP has provided a new focus on RWQCBs efforts to control pollution of the State's bays and estuaries by establishing a program to identify toxic hot spots and plan for their cleanup.

Water Code Section 13394 requires that each RWQCB complete a toxic hot spot cleanup plan. Each cleanup plan must include: (1) a priority listing of all known toxic hot spots covered by the plan; (2) a description of each toxic hot spot including a characterization of the pollutants present at the site; (3) an assessment of the most likely source or sources of pollutants; (4) an estimate of the total costs to implement the cleanup plan; (5) an estimate of the costs that can be recovered from parties responsible for the discharge of pollutants that have accumulated in sediments; (6) a preliminary assessment of the actions required to remedy or restore a toxic hot spot; and (7) a two-year expenditure schedule identifying State funds needed to implement the plan.

Limitations

This proposed regional toxic hot spot cleanup plan contains information on sites that are believed to be the worst sites in the Region. Much of the data collected as part of the BPTCP have not been reported and some analyses have yet to be completed. Consequently, this regional toxic hot spot cleanup plan is subject to revision as new information on toxic hot spot identification becomes available. In future versions of the Plan there is an expectation that (1) other sites may be identified as candidate toxic hot spots; (2) potential toxic hot spots will be addressed in future versions of the cleanup plan; (3) cleanup levels for sites may be added to the cleanup plan; and (4) site rankings may change as new information becomes available.

II. TOXIC HOT SPOT DEFINITION

Codified Definition of A Toxic Hot Spot

Section 13391.5 of the Water Code defines toxic hot spots as:

"...[L]ocations in enclosed bays, estuaries, or adjacent waters in the 'contiguous zone' or the 'ocean' as defined in Section 502 of the Clean Water Act (33. U.S.C. Section 1362), the pollution or contamination of which affects the interests of the State, and where hazardous substances have accumulated in the water or sediment to levels which (1) may pose a substantial present or potential hazard to aquatic life, wildlife, fisheries, or human health, or (2) may adversely affect the beneficial uses of the bay, estuary, or ocean waters as defined in the water quality control plans, or (3) exceeds adopted water quality or sediment quality objectives."

Specific Definition of A Toxic Hot Spot

Although the Water Code provides some direction in defining a toxic hot spot, the definition presented in Section 13391.5 is broad and somewhat ambiguous regarding the specific attributes of a toxic hot spot. The following specific definition provides a mechanism for identifying and distinguishing between "candidate" and "known" toxic hot spots. A Candidate Toxic Hot Spot is considered to have enough information to designate a site as a Known Toxic Hot Spot except that the candidate hot spot has not been approved by the RWQCB and the SWRCB. Once a candidate toxic hot spot has been adopted into the consolidated statewide toxic hot spot cleanup plan then the site shall be considered a known toxic hot spot and all the requirements of the Water Code shall apply to that site.

Candidate Toxic Hot Spot:

A site meeting any one or more of the following conditions is considered to be a "candidate" toxic hot spot.

1. The site exceeds water or sediment quality objectives for toxic pollutants that are contained in appropriate water quality control plans or exceeds water quality criteria promulgated by the U.S. Environmental Protection Agency (U.S. EPA).

   This finding requires chemical measurement of water or sediment, or measurement of toxicity using tests and objectives stipulated in water quality control plans. Determination of a toxic hot spot using this finding should rely on recurrent measures over time (at least two separate sampling dates). Suitable time intervals between measurements must be determined.

2. The water or sediment exhibits toxicity associated with toxic pollutants that is significantly different from the toxicity observed at reference sites (*i.e.*, when compared to the lower confidence interval of the reference envelope), based on toxicity tests acceptable to the SWRCB or the RWQCBs.

   To determine whether toxicity exists, recurrent measurements (at least two separate sampling dates) should demonstrate an effect. Appropriate reference and control measures must be included in the toxicity testing. The methods acceptable to and used by the BPTCP may include some toxicity test protocols not referenced in water quality control plans (*e.g.*, the Bay Protection and Toxic Cleanup Program Quality Assurance Project Plan). Toxic pollutants should be present in the media at concentrations sufficient to cause or contribute to toxic responses in order to satisfy this condition.

3. The tissue toxic pollutant levels of organisms collected from the site exceed levels established by the United States Food and Drug Administration (FDA) for the protection of human health, or the National Academy of Sciences (NAS) for the protection of human health or wildlife. When a health advisory against the consumption of edible resident non-migratory organisms has been issued by Office of Environmental Health Hazard Assessment (OEHHA) or Department of Health Services (DHS), on a site or

water body, the site or water body is automatically classified a "candidate" toxic hot spot if the chemical contaminant is associated with sediment or water at the site or water body.

Acceptable tissue concentrations are measured either as muscle tissue (preferred) or whole body residues. Residues in liver tissue alone are not considered a suitable measure for known toxic hot spot designation. Animals can either be deployed (if a resident species) or collected from resident populations. Recurrent measurements in tissue are required. Residue levels established for one species for the protection of human health can be applied to any other consumable species.

Shellfish: Except for existing information, each sampling episode should include a minimum of three replicates. The value of interest is the average value of the three replicates. Each replicate should be comprised of at least 15 individuals. For existing State Mussel Watch information related to organic pollutants, a single composite sample (20-100 individuals), may be used instead of the replicate measures. When recurrent measurements exceed one of the levels referred to above, the site is considered a candidate toxic hot spot.

Fin-fish: A minimum of three replicates is necessary. The number of individuals needed will depend on the size and availability of the animals collected; although a minimum of five animals per replicate is recommended. The value of interest is the average of the three replicates. Animals of similar age and reproductive stage should be used.

4. Impairment measured in the environment is associated with toxic pollutants found in resident individuals.

Impairment means reduction in growth, reduction in reproductive capacity, abnormal development, histopathological abnormalities. Each of these measures must be made in comparison to a reference condition where the endpoint is measured in the same

species and tissue is collected from an unpolluted reference site. Each of the tests shall be acceptable to the SWRCB or the RWQCBs.

Growth Measures: Reductions in growth can be addressed using suitable bioassay acceptable to the State or Regional Boards or through measurements of field populations.

Reproductive Measures: Reproductive measures must clearly indicate reductions in viability of eggs or offspring, or reductions in fecundity. Suitable measures include: pollutant concentrations in tissue, sediment, or water which have been demonstrated in laboratory tests to cause reproductive impairment, or significant differences in viability or development of eggs between reference and test sites.

Abnormal Development: Abnormal development can be determined using measures of physical or behavioral disorders or aberrations. Evidence that the disorder can be caused by toxic pollutants, in whole or in part, must be available.

Histopathology: Abnormalities representing distinct adverse effects, such as carcinomas or tissue necrosis, must be evident. Evidence that toxic pollutants are capable of causing or contributing to the disease condition must also be available.

5. Significant degradation in biological populations and/or communities associated with the presence of elevated levels of toxic pollutants.

This condition requires that the diminished numbers of species or individuals of a single species (when compared to a reference site) are associated with concentrations of toxic pollutants. The analysis should rely on measurements from multiple stations. Care should be taken to ensure that at least one site is not degraded so that a suitable comparison can be made.

In summary, sites are designated as "candidate" hot spots after generating information which satisfies any one of the five conditions constituting the definition.

Known Toxic Hot Spot:

A site meeting any one or more of the conditions necessary for the designation of a "candidate" toxic hot spot that has gone through a full SWRCB and RWQCB hearing process, is considered to be a "known" toxic hot spot. A site will be considered a "candidate" toxic hot spot until approved as a known toxic hot spot in a Regional Toxic Hot Spot Cleanup Plan by the RWQCB and approved by the SWRCB.

III. MONITORING APPROACH

As part of the legislative mandates, the BPTCP has implemented regional monitoring programs to identify toxic hot spots (Water Code Section 13392.5). The BPTCP has pioneered the use of effects-based measurements of impacts in California's enclosed bays and estuaries. The Program has used a two-step process to identify toxic hot spots. The first step is to screen sites using toxicity tests. In the second step, the highest priority sites with observed toxicity are retested to confirm the effects. This section presents descriptions of the BPTCP monitoring objectives and sampling strategy.

Monitoring Program Objectives

The four objectives of BPTCP regional monitoring are:

1. Identify locations in enclosed bays, estuaries, or the ocean that are potential or candidate toxic hot spots. Potential toxic hot spots are defined as suspect sites with existing information indicating possible impairment but without sufficient information to be classified further as a candidate toxic hot spot.

2. Determine the extent of biological impacts in portions of enclosed bays and estuaries not previously sampled (areas of unknown condition);

3. Confirm the extent of biological impacts in enclosed bays and estuaries that have been previously sampled; and

4. Assess the relationship between toxic pollutants and biological effects.

Sampling Strategy

Screening Sites and Confirming Toxic Hot Spots

In order to identify toxic hot spots a two step process was used. Both steps are designed around an approach with three measures (sediment quality triad analysis) plus an optional bioaccumulation component. The triad analysis consists of toxicity testing, benthic community analysis, and chemical analysis for metals and organic chemicals.

The first step is a screening phase that consists of measurements using toxicity tests or benthic community analysis or chemical tests or bioaccumulation data to provide sufficient information to list a site as a potential toxic hot spot or a site of concern. Sediment grain size, total organic carbon (TOC), NH_3 and H_2S concentration are measured to differentiate pollutant effects found in screening tests from natural factors.

A positive result or an effect in any of the triad tests would trigger the confirmation step (depending on available funding). The confirmation phase consists of performing all components of the sediment quality triad: toxicity, benthic community analysis, and chemical analysis, on the previously sampled site of concern. Assessment of benthic community structure may have not be completed if there was difficulty in measuring or interpreting the information for a water body.

Region-specific Modifications of the Monitoring Approach

In the San Diego Region, the following factors were used to define chemistry hits:

- For Effects Range Median, ≥ 4 times the ERM for individual chemicals.
- For Effects Range Median Quotient, 0.85 times the ERMQ for total chemistry.
- For Probable Effects Level, ≥ 5.9 times the PEL for individual chamicals.
- For Probable Effects Level Quotient, ≥ 1.29 times the PELQ for total chemistry.

These factors were derived from empirical evidence and are presented in the San Diego Region report (State Water Resources Control Board et. al. 1996. *Chemistry, Toxicity and Benthic Community Conditions in Sediments of the San Diego Bay Region*).

IV. CRITERIA FOR RANKING TOXIC HOT SPOTS

A value for each criterion described below was developed if appropriate information existed or estimates were possible. Any criterion for which no information exists was assigned a value of "No Action". The RWQCB created a matrix of the scores of the ranking criteria. If the majority of ranking criteria were "High" then the site was listed in the "High" priority list of Toxic Hot Spots. The following ranking criteria was used:

Human Health Impacts

Human Health Advisory issued for consumption of non-migratory aquatic life from the site (assign a "High"); Tissue residues in aquatic organisms exceed FDA/DHS action level and U.S. EPA screening levels ("Moderate").

Aquatic Life Impacts

For aquatic life, site ranking was based on an analysis of the preponderance of information available (*i.e.*, weight-of-evidence). The measures considered were: the sediment quality triad (sediment chemistry, toxicity, and benthic community analysis), water toxicity, toxicity identification evaluations (TIEs), and/or bioaccumulation.

Stations with hits in any two of the measures if associated with high chemistry, were assigned a "High" priority. A hit in one of the measures associated with high chemistry was assigned "moderate". Stations with high sediment or water chemistry only were assigned "low".

Water Quality Objectives[1]:

Any chemistry data used for ranking under this section was no more than 10 years old, and was analyzed with appropriate analytical methods and quality assurance.

Water quality objective or water quality criterion: Exceeded regularly (assign a "High" priority), occasionally exceeded ("Moderate"), infrequently exceeded ("Low").

Areal Extent of Toxic Hot Spot

Select one of the following values: More than 10 acres, 1 to 10 acres, less than 1 acre.

Pollutant Source

Select one of the following values: Source(s) of pollution identified (assign a "High" priority), Source(s) partially known ("Moderate"), Source is unknown ("Low").

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1. Water quality objectives to be used are found in Regional Water Quality Control Board Basin Plans or the California Ocean Plan (depending on which plan applies to the water body being addressed). Where a Basin Plan contains a more stringent value than the statewide plan, the regional water quality objective will be used.

Natural Remediation Potential

Select one of the following values: Site is unlikely to improve without intervention ("High"), site may or may not improve without intervention ("Moderate"), site is likely to improve without intervention ("Low").

V. FUTURE NEEDS

Although only two sites appear at this time to qualify as candidate toxic hot spots, many other sites of concern were identified. A list of sites is presented below. Areas of interest include downtoen piers, the shipyard area in San Diego and National City, and military sites at the Submarine Base and Naval Station. Persistent pesticides such as chlordane and DDT are found in sediments of Mission Bay, San Diego Bay, and the Tijuana River.

Subsequent sampling under the Bay Protection Program has occurred at those stations at which toxicity and high chemistry were found, but at which benthic community analyses were not run. Amphipod toxicity, benthic community evaluation, and chemistry analyses were performed at these stations within the last year although the results have not yet been received. If the results come back positive, one or more of these stations could become a candidate toxic hot spot. Candidate hot spots may need toxicity identification evaluations (TIEs) to further identify chemicals causing biologic effects.

There is a need for coordination with other water quality programs now underway. For example, several shipyards may have begun dredging activities at Bay Protection sampling stations. Other San Diego Regional Board staff units should become acquainted with the Bay Protection Program data and consider whether candidate hot spots should be designated at the locations recommended.

Sites of Concern (Sites that do not qualify as Candidate Toxic Hot Spots)

WaterBody Name	Segment Name	Site Identification	Reason for Listing	Pollutants Present at the Site	Report Reference
Mission Bay	Northeast Bay	Rose Creek, San Diego	Aquatic life impacts	Chlordane	1
San Diego River	Flood Control Channel at Mouth	Sunset Cliffs Bridge, San Diego	Aquatic life impacts	Lead, zinc, Chlordane PAH	1
San Diego Bay	North Bay	Submarine Base, Ballast Point, San Diego	Aquatic life impacts	PAH	1
	North Bay	America's Cup Harbor/Commercial Basin, San Diego	Aquatic life impacts	Mercury	1
	North Bay	Laurel Street, San Diego	Aquatic life impacts	Chlordane	1
	North Bay	Grape St., San Diego	Aquatic life impacts	Copper, Chlordane	1
	North Bay	Downtown piers, San Diego	Aquatic life impacts	PAH	1
	Central Bay	Switzer Creek, San Diego	Aquatic life impacts	Copper, lead, PAH, Chlordane, DDT	1
	Central Bay	North of Crosby St., San Diego	Aquatic life impacts	PAH	1
	Central Bay	Coronado Bridge, San Diego	Aquatic life impacts	Antimony, copper, lead, zinc, PAH, PCB, Chlordane	1
	Central Bay	South of Coronado Bridge, San Diego	Aquatic life impacts	Antimony, copper, PAH, PCB	1
	Central Bay	Indian Point, south of Coronado Bridge, San Diego	Aquatic life impacts	Copper, lead, zinc, PAH, PCB, Chlordane	1
	Central Bay	Piers 3 and 4, Naval Station, San Diego	Aquatic life impacts	Copper, lead, zinc, mercury, PAH, PCB,	1

WaterBody Name	Segment Name	Site Identification	Reason for Listing	Pollutants Present at the Site	Report Reference
				Chlordane, DDT	
	Central Bay	Piers 5 and 6, Naval Station, San Diego and National City	Aquatic life impacts	Copper, lead, zinc, PAH, PCB, Chlordane	1
	Central Bay	Pier 14, Naval Station to 24th St. Marine Terminal, National City	Aquatic life impacts	PAH	1
Tijuana River Estuary	North Slough	West of Imperial Beach Naval Air Station	Aquatic life impacts	DDE, DDT	1
	Middle Slough	Half mile from mouth	Aquatic life impacts	DDE	1
	South Slough	Half mile from mouth	Aquatic life impacts	DDE, DDT	1

Reference list

State Water Resources Control Board et. al. 1996 *Chemistry, Toxicity and Benthic Community Conditions in Sediments of the San Diego Bay Region.* Final Report. Contributors include National Oceanic and Atmospheric Administration, California Dept. of Fish and Game Marine Pollution Studies Laboratory, and Moss Landing Marine Laboratories

Part II

Candidate Toxic Hot Spot List

WaterBody Name	Segment Name	Site Identification	Reason for Listing	Pollutants Present at the Site	Report Reference
San Diego Bay	**Central Bay**	**Chollas Creek, 28th St., San Diego**			
		BPTC Station 90006	Aquatic life impacts	Copper, Chlordane, DDT	1
		BPTC Station 93212	Aquatic life impacts	Chlordane	1
		BPTC Station 93213	Aquatic life impacts	Copper, Chlordane, DDT	1
San Diego Bay	**Central Bay**	**Seventh St. Channel, National City**			
		BPTC Station 90009	Aquatic life impacts	Copper, zinc, lead, PCB, Chlordane, DDT	1
		BPTC Station 93227	Aquatic life impacts	Copper, zinc, PAH, Chlordane, DDT	1
		BPTC Station 93228	Aquatic life impacts	Zinc, Chlordane	1

Reference list

State Water Resources Control Board et. al. 1996 *Chemistry, Toxicity and Benthic Community Conditions in Sediments of the San Diego Bay Region*. Final Report. Contributors include National Oceanic and Atmospheric Administration, California Dept. of Fish and Game Marine Pollution Studies Laboratory, and Moss Landing Marine Laboratories.

Ranking Matrix

Waterbody Name	Site Identification	Human Health Impacts	Aquatic Life Impacts	Water Quality Objectives	Areal Extent	Pollutant Source	Remediation Potential
High Priority Site							
San Diego Bay	Seventh St. Channel	No Action	High	No Action	1 to 10 acres	Moderate	High
Moderate Priority Site							
San Diego Bay	Chollas Creek	No Action	Moderate	No Action	1 to 10 acres	Moderate	High

Part III

High Priority Candidate Toxic Hot Spot Characterization

Site Name: CHOLLAS CREEK

Location: Central San Diego Bay, eastern shore, bounded by a shipyard to the north and the 32nd Street Naval Station to the south.

A. Areal Extent of the THS

Estimated area: 1.0 acre

Three Bay Protection stations, 90066, 93212, and 93213, are located at the mouth of Chollas Creek just outside the boundary of the Naval Station. The area affected could be substantially larger, but until other information is known, only the immediate area of benthic degradation will be considered for remediation. Also, dredging activities could have occurred in this area by the Navy or the Port of San Diego since San Diego Bay was sampled during the period 1992 to 1994. If so, this area may no longer be considered for designation as a candidate toxic hot spot.

B. Most Likely Sources of Pollutants

Possible dischargers of persistent wastes which could cause benthic degradation include businesses and residences tributary to Chollas Creek, former tenants of the area, passing ship traffic, fuel docks, National Steel and Shipbuilding Company (NASSCO), and U.S Naval Station at the Foot of Thirty-second Street. Chlordane, DDT, and the total chemical load could cause degraded benthic communities to exist at this location. Because benthic community analysis does not directly measure cause and effect between chemicals and fauna living in the sediment, it is possible that some of the degraded benthic communities could have been caused by physical disturbance of the bottom sediment from tug and ship propellers, or from recent disturbance caused by dredging.

Possible activities which could have resulted in discharges of chemical waste include ship refueling and bilge pumping (PAHs and petroleum hydrocarbons), direct disposal of industrial wastes, urban runoff from the watershed containing pesticides from lawns, streets, and buildings, and termite and insect control runoff from pest control operations.

C. Summary of actions that have been initiated by the Regional Boards to reduce the accumulation of pollutants at existing THSs and to prevent the creation of new THSs

Several programs have been initiated or strengthened in recent years. These include:

NPDES Permits for the NASSCO Shipyard

Starting in the 1970s, the Regional Board has issued federal Clean Water Act National Pollutant Discharge System (NPDES) permits to NASSCO. These permits cover discharges and threatened discharges of wastes from industrial activities. During the 1970s, 1980s, and early 1990s the permits required shipyards to clean dry docks to "broom clean standards" before submerging, and to manage other wastes. Self monitoring of sediment near the shipyards under NPDES permits was required by the Regional Board during the 1990s. The general NPDES permit which the Regional Board adopted on November 19, 1997 applies to NASSCO. NASSCO has since filed an appeal of that permit with the State Water Resources Control Board.

NPDES Permits for the Naval Station

The Naval Station Graving Dock, which lies midway between Chollas Creek and the Seventh Street Channel and a half mile south of Chollas Creek, currently is covered by its own NPDES permit. Discharges from Navy industrial facilities are currently covered under the State Water Resources Control Board General Industrial Storm Water Permit. The Regional Board may issue an NPDES permit for discharges from other Navy activities on and adjacent to San Diego Bay.

NPDES Municipal Storm Water Permit

In 1990, the Regional Board issued NPDES storm water permits to municipalities responsible for civilian areas, including those tributary to San Diego Bay. Activities underway in the Chollas Creek watershed by the City of San Diego include public education, public service announcements on television, street sweeping, and a water runoff sampling and analysis program.

D. Preliminary Assessment of Actions Required to Remedy or Restore a THS to an Unpolluted Condition Including Recommendations for Remedial Actions

The following discussion only applies to the limited area of one acre estimated to be contaminated. It is possible that a larger area could have been contaminated by industrial wastes.

Section 13360 of the Porter-Cologne Water Quality Control Act prohibits regional boards, the state board, and the courts from designating the means of compliance with the California Water Code. For this reason, the options presented below are not meant to influence the ultimate solution, but are presented to comply with Bay Protection and Toxic Cleanup Program legislative requirements and to provide a starting point for discussion. An action required by the Board could be to require potential responsible parties to submit Section 13267 technical reports documenting the amounts and types of wastes discharged.

The San Diego Regional Board has not reviewed this information or approved the release of this report. The Board could select more stringent actions or less stringent actions for this site. For consistency, the remediation methods offered here were derived from the State Board's 1995 draft *Water Quality Control Policy for Implementation of the Bay Protection and Toxic Cleanup Program* and October 1997 *Guidance on Development of Proposed Regional Toxic Hot Spot Cleanup Plans.*

Regional Board Procedures

A possible first step could be to convene a meeting between possible responsible parties to discuss the data and to receive comments and information about the site. After review by staff of available information, the Regional Board Executive Officer could ask potential dischargers to submit technical reports. Subsequently, the Board could require potential responsible parties to sample the site and surrounding area to document in detail the areal extent of the site and to identify specific pollutants. Only after extensive review of all available information would the Regional Board require remediation actions.

Persistence of Wastes at This Site

The chemical wastes found at the mouth of Chollas Creek, the pesticides Chlordane and DDT are known to be persistent in nature. These organic chemicals may be resistant to treatment or natural remediation processes such as oxidation, microbial degradation, and photolysis. For this reason, natural recovery or in situ treatment may not be feasible. In-place capping is presumed to be infeasible because of the frequent deep draft vessel traffic in this area of the Bay. Two options which may be feasible are dredging followed by placement in an upland confined disposal facility, and dredging followed by contained aquatic disposal. There is precedent for both options in San Diego Bay. Dredging of contaminated bottom material has occurred at boat yards in north San Diego Bay and at the 24th Marine Terminal in the south Bay. A submerged aquatic disposal site is being completed in the north Bay off the Teledyne Ryan storm drains.

Dredging and Upland Disposal

Stations 90006, 93212, and 93213 are located in a heavily-used dredged channel frequented by large ships and deep-draft tugs. Navigation charts show depths of between 22 and 24 feet at mean lower low water, although the depths may be shallower or deeper due to sedimentation or recent dredging. There do not appear to be nearby sites available which would be able to receive hydraulic dredge spoils and to contain settling ponds. A

method for sediment removal could include clamshell dredging and transportation to a suitable disposal site by barge, rail, or truck.

Dredging and Contained Aquatic Disposal

Another method could involve dredging a disposal site at another location in San Diego Bay, depositing the contaminated dredge spoil from the candidate toxic hot spot site, and capping the site with clean sand.

The following conditions would have to be met if this option were to be implemented:

- Clean Water Act Section 404 dredging permits would have to be obtained from the U.S. Army Corps of Engineers for the contaminated site and for the aquatic disposal site
- State waste discharge requirements would have to be obtained from the Regional Board for the disposal site
- The cap would provide adequate coverage to prevent spread of contaminated material
- Burrowing organisms would be prevented from mixing polluted sediments (i.e., bioturbation must not occur)
- The material covered would be able to support the cap
- The bottom slope would be able to support the cap during seismic events
- The cap would be well marked and protected against erosion or destruction from anchors, propellers, and strikes by vessels
- The site would be located away from major navigation lanes
- The exact location of the site would be noted on maps, charts, and deeds

E. Estimate of the Total Cost to Implement the Cleanup Plan

This preliminary cost list is based on the schedule found in the 1997 guidance document. High and low costs are provided. It is assumed that the Corps of Engineers would not allow disposal of contaminated dredge spoil at the LA-5 site 6 miles from Pt. Loma; however, there is always the possibility that the spoil could pass the Corps of Engineers toxicity tests. No costs were included for California Environmental Quality Act (CEQA)

compliance, Section 404 dredging permit and state waste discharge requirements acquisition, or sampling to determine the areal extent of the candidate toxic hot spot.

Costs for Dredging and Upland Disposal

High costs: Assume that 4840 square yards (one acre) need remediation and that sediment to a depth of one yard would have to be removed. The 4840 cubic yards of dredge spoil would then be placed on a barge, unloaded onto trucks, and transported to a suitable upland landfill.

Low costs: Assume that disposal would occur at a class 3 site.

Comparison of High and Low Costs for Dredging and Upland Disposal

High Cost per Cubic Yard		Low Cost per Cubic Yard	
Clamshell dredging	$10	Clamshell dredging	$10
Unloading from barge	TBD	Unloading from barge	TBD
Transport by truck	200	Transport by truck	200
Disposal at Class I site	300	Disposal at Class III site	30
Sub total per cubic yard	$510	Sub total per cubic yard	$240
4840 cubic yards X $510 = $2,468,400 (not including permits)		4840 cubic yards X $240 = $1,161,600 (not including permits)	

Costs for Dredging and Contained Aquatic Disposal

High costs: Assume that 4840 square yards (one acre) need remediation and that sediment to a depth of one yard would have to be removed. An aquatic disposal site would have to be dredged and clean sand obtained for use as a cap. Another suitable cap to prevent burrowing animals from penetrating the cap would have to be provided as well. The 4840 cubic yards of dredge spoil would then be placed on a barge and transported to the aquatic disposal site. The cap would then be constructed.

Low costs: Assume that confinement would not be necessary at the disposal site.

Comparison of High and Low Costs for Dredging and Contained Aquatic Disposal

High Cost per Cubic Yard		**Low Cost per Cubic Yard**	
Excavation of disposal site	TBD	Clamshell dredging and disposal (assuming confined disposal is not needed)	$10
Clamshell dredging	$10		
Barge transport of waste	TBD		
Disposal at aquatic site	9		
Cap at disposal site	TBD		
Monitoring at disposal site	TBD		
Sub total per cubic yard	$19	Sub total per cubic yard	$10
4840 cubic yards X $19 = $91,960 total (not including creating and maintaining disposal site or acquiring permits)		4840 cubic yards X $10 = $48,400 total (assuming a confined site is not needed)	

F. Estimate of Recoverable Costs from Potential Dischargers

No attempt has been made to ask potential responsible parties to participate in any remediation activities, so estimates shown here are based on conjecture. If fifty percent of the costs were recovered and the cleanup were to cost $2.4 million, the following schedule may be possible. Assume that $1.2 million would not be recoverable.

G. Two-year Expenditure Schedule Identifying Funds to Implement the Plans that are not Recoverable from Potential Dischargers

Assume that a total of $1.2 million would be needed, and that more than two years would be needed to remediate the Chollas Creek site.

Activity	Funds Needed	
Year 1:		
- Meeting between responsible parties		
- Request for technical information		
- Discharger response		
- Staff review of response		
- Cleanup and abatement order		
- Section 404 dredging permit application		
- State waste discharge requirements application		
	estimate	$200,000
Year 2:		
- Public hearings		
- Permits received		
- Sampling plan to characterize aerial extent		
- Request for bids for chemistry sampling and analysis		
- Contract awarded to labs		
- Sampling begins		
	estimate	$200,000

Part III, continued

Moderate Priority Candidate Toxic Hot Spot Characterization

Site Name: SEVENTH STREET CHANNEL

Location: Central San Diego Bay, eastern shore, at the mouth of Paleta Creek, National City. The Seventh Street Channel lies within the boundaries of the 32nd Street Naval Station.

A. Areal Extent of the THS

Estimated area: 1.0 acre

Three Bay Protection stations, 90009, 93227, and 93228 are located in the Seventh Street Channel within the Naval Station. The area affected could be substantially larger, but until other information is known, only the immediate area of benthic degradation will be considered for remediation. Also, dredging activities could have occurred in this area by the Navy since San Diego Bay was sampled during the period 1992 to 1994. If so, this area may no longer be considered for designation as a candidate toxic hot spot.

B. Most likely Sources of Pollutants

Possible dischargers of persistent wastes which could cause benthic degradation and sediment toxicity include businesses and residences tributary to Paleta Creek; former tenants of the area including the Pacific Steel automobile recycling yard; passing ship traffic; Navy fueling operations; Navy oil recovery operations; leaking underground fuel tanks; leaking toxic waste landfills surrounding the Channel; and past Navy practices involving washing trucks with diesel fuel, lifting the trucks by crane, and dipping them into Paleta Creek. Chlordane, DDT, and the total chemical load, including PAHs, could cause degraded benthic communities and sediment toxicity to exist at this location. It is possible that accidents could have occurred allowing waste water from the fire fighting school, located adjacent to the Channel, to enter the Bay. Because benthic

community analysis does not directly measure cause and effect between chemicals and fauna living in the sediment, it is possible that some of the degraded benthic communities could have been caused by physical disturbance of the bottom from tug and ship propellers, or from disturbance caused by recent dredging.

Possible activities which could have resulted in discharges of chemical waste include ship refueling and bilge pumping (PAHs and petroleum hydrocarbons), direct disposal of industrial wastes, urban runoff from the watershed containing pesticides from lawns, streets, and buildings, and termite and insect control runoff from pest control operations.

C. Summary of actions that have been initiated by the Regional Boards to reduce the accumulation of pollutants at existing THSs and to prevent the creation of new THSs

NPDES Permits for the Naval Station

The Naval Station Graving Dock, which lies midway between Chollas Creek and the Seventh Street Channel and a half mile north of the Seventh Street Channel, currently is covered by its own NPDES permit. Discharges from Navy industrial facilities are currently covered under the State Water Resources Control Board General Industrial Storm Water Permit. The Regional Board may issue an NPDES permit for discharges from other Navy activities on and adjacent to San Diego Bay.

NPDES Municipal Storm Water Permit

In 1990, the Regional Board issued NPDES storm water permits to municipalities responsible for civilian areas, including those tributary to San Diego Bay. Activities underway in the Paleta Creek watershed by the City of National City include public education, public service announcements on television, and street sweeping.

Pacific Steel Site

During the 1980s, the Regional Board took enforcement action against Pacific Steel, an automobile recycler. The company, which was located inland of the Seventh Street Channel, maintained a "fluff" pile of non-ferrous waste. Runoff from the pile entered San Diego Bay, but was subsequently required by the Board to be prevented from entering the Bay. Pacific steel subsequently routed the runoff to the sanitary sewer. The fluff pile was removed and the site cleaned up.

Environmental Restoration --Navy Account (ERNA)

The Regional Board has participated in Department of Defense Environmental Response Program (DERP) and ERNA activities to close former military hazardous waste sites on land. Several disposal sites are located around the Seventh Street Channel.

D. Preliminary Assessment of Actions Required to Remedy or Restore a THS to an Unpolluted Condition Including Recommendations for Remedial Actions

The following discussion only applies to the limited area of one acre estimated to be contaminated. It is possible that a larger area could have been contaminated by industrial wastes.

Section 13360 of the Porter-Cologne Water Quality Control Act prohibits regional boards, the state board, and the courts from designating the means of compliance with the California Water Code. For this reason, the options presented below are not meant to influence the ultimate solution, but are presented to comply with Bay Protection and Toxic Cleanup Program legislative requirements and to provide a starting point for discussion. An action required by the Board could be to require potential responsible parties to submit Section 13267 technical reports documenting the amounts and types of wastes discharged.

The San Diego Regional Board has not reviewed this information or approved the release of this report. The Board could select more stringent

actions or less stringent actions for this site. For consistency, the remediation methods offered here were derived from the State Board's 1995 draft *Water Quality Control Policy for Implementation of the Bay Protection and Toxic Cleanup Program* and October 1997 *Guidance on Development of Proposed Regional Toxic Hot Spot Cleanup Plans.*

Regional Board Procedures

A possible first step could be to convene a meeting between possible responsible parties to discuss the data and to receive comments and information about the site. After review by staff of available information, the Regional Board Executive Officer could ask potential dischargers to submit technical reports. Subsequently, the Board could require potential responsible parties to sample the site and surrounding area to document in detail the areal extent of the site and to identify specific pollutants at the site. Only after extensive review of all available information would the Regional Board require remediation actions.

Persistence of Wastes at This Site

The chemical wastes found in the Seventh Street Channel and at the mouth of Paleta Creek, the pesticides Chlordane and DDT, and the class of polynuclear aromatic hydrocarbon (PAH) "ring" compounds derived from fossil fuels, are known to be persistent in nature. These organic chemicals may be resistant to treatment or natural remediation processes such as oxidation, microbial degradation, and photolysis. For this reason, natural recovery or in situ treatment may not be feasible. In-place capping is presumed to be infeasible because of the frequent vessel traffic in this area of the Bay. Two options which may be feasible are dredging followed by placement in an upland confined disposal facility, and dredging followed by contained aquatic disposal. There is precedent for both options in San Diego Bay. Dredging of contaminated bottom material has occurred at boat yards in north San Diego Bay and at the 24th Marine Terminal in the south Bay. A submerged aquatic disposal site is being completed in the north Bay off the Teledyne Ryan storm drains.

Dredging and Upland Disposal

Stations 90009, 93227, and 93228 are located in a heavily-used dredged channel frequented by barges, boats, and tugs. Navigation charts show depths of between 18 to 21 feet at mean lower low water, although the depths may be shallower or deeper due to sedimentation or recent dredging. There may be suitable sites on land nearby able to receive hydraulic dredge spoils and to contain settling ponds. Therefore, the options for sediment removal include clamshell dredging or hydraulic dredging, and transportation to a suitable disposal site by barge, rail, or truck, or to settling ponds next to the Channel.

Dredging and Contained Aquatic Disposal

Another method could involve dredging a disposal site at another location in San Diego Bay, depositing the contaminated dredge spoil from the candidate toxic hot spot site, and capping the site with clean sand.

The following conditions would have to be met if this option were to be implemented:

- Clean Water Act Section 404 dredging permits would have to be obtained from the U.S. Army Corps of Engineers for the contaminated site and for the aquatic disposal site
- State waste discharge requirements would have to be obtained from the Regional Board for the disposal site
- The cap would provide adequate coverage to prevent spread of contaminated material
- Burrowing organisms would be prevented from mixing polluted sediments (i.e., bioturbation must not occur)
- The material covered would be able to support the cap
- The bottom slope would be able to support the cap during seismic events
- The cap would be well marked and protected against erosion or destruction from anchors, propellers, and strikes by vessels
- The site would be located away from major navigation lanes
- The exact location of the site would be noted on maps, charts, and deeds

E. Estimate of the Total Cost to Implement the Cleanup Plan

This preliminary cost list is based on the schedule found in the 1997 guidance document. High and low costs are provided. It is assumed that the Corps of Engineers would not allow disposal of contaminated dredge spoil at the LA-5 site 6 miles from Pt. Loma; however, there is always the possibility that the spoil could pass the Corps' toxicity tests. No costs were included for California Environmental Quality Act (CEQA) compliance, Section 404 dredging permit and state waste discharge requirements acquisition, or sampling to determine the areal extent of the candidate toxic hot spot.

Costs for Dredging and Upland Disposal

High costs: Assume that 4840 square yards (one acre) need remediation and that sediment to a depth of one yard would have to be removed. The 4840 cubic yards of dredge spoil would then be placed on a barge, unloaded onto trucks, and transported to a suitable upland landfill.

Low costs: Assume that the wastes were transported to a Class III site.

Comparison of High and Low Costs for Dredging and Upland Disposal

High Cost per Cubic Yard		**Low Cost per Cubic Yard**	
Clamshell dredging	$10	Clamshell dredging	$10
Unloading from barge	TBD	Unloading from barge	TBD
Transport by truck	200	Transport by truck	200
Disposal at Class I site	300	Disposal at Class III site	30
Sub total per cubic yard	$510	Sub total per cubic yard	$240
4840 cubic yards X $510 = $2,468,400 (not including permits)		4840 cubic yards X $240 = $1,161,600 (not including permits)	

Costs for Dredging and Contained Aquatic Disposal

High costs: Assume that 4840 square yards (one acre) need remediation and that sediment to a depth of one yard would have to be removed. An aquatic disposal site would have to be dredged and clean sand obtained for use as a cap. Another suitable cap to prevent burrowing animals from penetrating the cap would have to be provided as well. The 4840 cubic yards of dredge spoil would be placed on a barge and transported to the aquatic disposal site. The cap would then be constructed.

Low costs: Assume that confinement at the disposal site is not necessary.

Comparison of High and Low Costs for Dredging and Contained Aquatic Disposal

High Cost per Cubic Yard		**Low Cost per Cubic Yard**	
Excavation of disposal site	TBD	Clamshell dredging and disposal (assuming confined disposal is not needed)	$10
Clamshell dredging	$10		
Barge transport of waste (assume high truck costs)	TBD		
Disposal at aquatic site	9		
Cap at disposal site	TBD		
Monitoring at disposal site	TBD		
Sub total per cubic yard	$19	Sub total per cubic yard	$10
4840 cubic yards X $19 = $91,960 total (not including creating and maintaining disposal site or acquiring permits)		4840 cubic yards X $10 = $48,400 total (assuming a confined site is not needed)	

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Assume that a total of $1.2 million would be needed, and that more than two years would be needed to remediate the Chollas Creek site.

Activity	Deficit	
Year 1: - Meeting between responsible parties - Request for technical information - Discharger response - Staff review of response - Cleanup and abatement order - Section 404 dredging permit application - State waste discharge requirements application	estimate	$200,000
Year 2: - Public hearings - Permits received - Sampling plan to characterize aerial extent - Request for bids for chemistry sampling and analysis - Contract awarded to labs - Sampling begins	estimate	$200,000