# Bay Protection and Toxic Cleanup Program


# Proposed Regional Toxic Hot Spot Cleanup Plan

**December 1997**

**NORTH COAST REGION**

**REGIONAL WATER QUALITY CONTROL BOARD**
**CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY**

REGIONAL WATER QUALITY CONTROL BOARD
NORTH COAST REGION

# PROPOSED REGIONAL
# TOXIC HOT SPOT CLEANUP PLAN

DECEMBER 1997

# PROPOSED REGIONAL TOXIC HOT SPOT CLEANUP PLAN

## REGIONAL WATER QUALITY CONTROL BOARD NORTH COAST 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 North Coast 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

REGIONAL SETTING OF THE NORTH COAST REGION

This section provides an overview of the environmental and socioeconomic setting of the North Coast Region.

The North Coast Region is defined in Section 13200(a) of Porter-Cologne as follows:

North Coast region, which comprises all basins including Lower Klamath Lake and Lost River Basins draining into the Pacific Ocean from the California-Oregon state line southerly to the southerly boundary of the watershed of the Estero de San Antonio and Stemple Creek in Marin and Sonoma Counties.

The North Coast Region is divided into two natural drainage basins, the Klamath River Basin and the North Coastal Basin. The North Coast Region covers all of Del Norte, Humboldt, Trinity, and Mendocino Counties, major portions of Siskiyou and Sonoma Counties, and small portions of Glenn, Lake, and Marin Counties.

The North Coast Region encompasses a total area of approximately 19,390 square miles, including 340 miles of scenic coastline and remote wilderness areas, as well as urbanized and agricultural areas.

The North Coast Region is characterized by distinct temperature zones. Along the coast, the climate is moderate and foggy and the temperature variation is not great. For example, at Eureka, the seasonal variation in temperature has not exceeded 63° F for the period of record. Inland, however, seasonal temperature ranges in excess of 100° F have been recorded.

Precipitation over the North Coast Region is greater than for any other part of California, and damaging floods are a fairly frequent hazard. Particularly devastating floods occurred in the North Coast area in December of 1955, in December of 1964, and in February of 1986.

Ample precipitation in combination with the mild climate found over most of the North Coast Region has provided a wealth of fish, wildlife, and scenic resources. The mountainous nature of the Region, with its dense coniferous forests interspersed with grassy or chaparral covered slopes, provides shelter and food for deer, elk, bear, mountain lion, furbearers and many upland bird and mammal species. The numerous streams and rivers of the Region contain anadromous fish, and the reservoirs, although few in number, support both coldwater and warmwater fish.

Tidelands, and marshes too, are extremely important to many species of waterfowl and shore birds, both for feeding and nesting. Cultivated land and pasture lands also provide supplemental food for many birds, including small pheasant populations. Tideland areas along the north coast provide important habitat for marine invertebrates and nursery areas for forage fish, game fish, and crustaceans. Offshore coastal rocks are used by many species of seabirds as nesting areas.

Major components of the economy are tourism and recreation, logging and timber milling, aggregate mining, commercial and sport fisheries, sheep, beef and dairy production, and vineyards and some wineries.

In all, the North Coast Region offers a beautiful natural environment with opportunities for scientific study and research, recreation, sport and commerce. To ensure their perpetuation, the resources must be used wisely.

**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.

## 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").

**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").

[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.

## V. FUTURE NEEDS

Site characterization must be performed to determine depth, areal extent, and proper remediation approach, if any, for all Candidate Toxic Hot Spots, and Sites of Concern.

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 |
|---|---|---|---|---|---|
| Humboldt Bay | | 14002, Eureka "J" Street | Bioassay toxicity EE | Methoxychlor, PAH | BPTCP data |
| Humboldt Bay | | 10017, Eureka Slough | Bioassay toxicity RA | Cr, Cu, Hg | BPTCP data |
| Humboldt Bay | | 10020, Del Norte St., Old Pacific Lumber site | Bioassay toxicity RA | PAH | BPTCP data |
| Humboldt Bay | | 10038, Fuel Dock, "C" Street | Chemistry Pb, Hg, PAH, PCB | Sb, Cd, Cu, Pb, Hg, PAH, PCB | |
| Humboldt Bay | | 10023, Small Boat Basin, Waterfront Drive | Chemistry PAH | Dieldrin, PAH | BPTCP data |
| Arcata Bay | | 10004, McDaniel Slough | Bioassay toxicity RA | | BPTCP data |
| Arcata Bay | | 10016, Jolly Giant Slough | Chemistry Pb, Zn, PCB | Pb, Zn, Chlordane, DDT, Dieldrin, Methoxychlor, PCB, PAH | BPTCP data |

Reference list

State Water Resources Control Board. Bay Protection and Toxic Cleanup Program Database and Data Reports.

## Part II

Candidate Toxic Hot Spot List

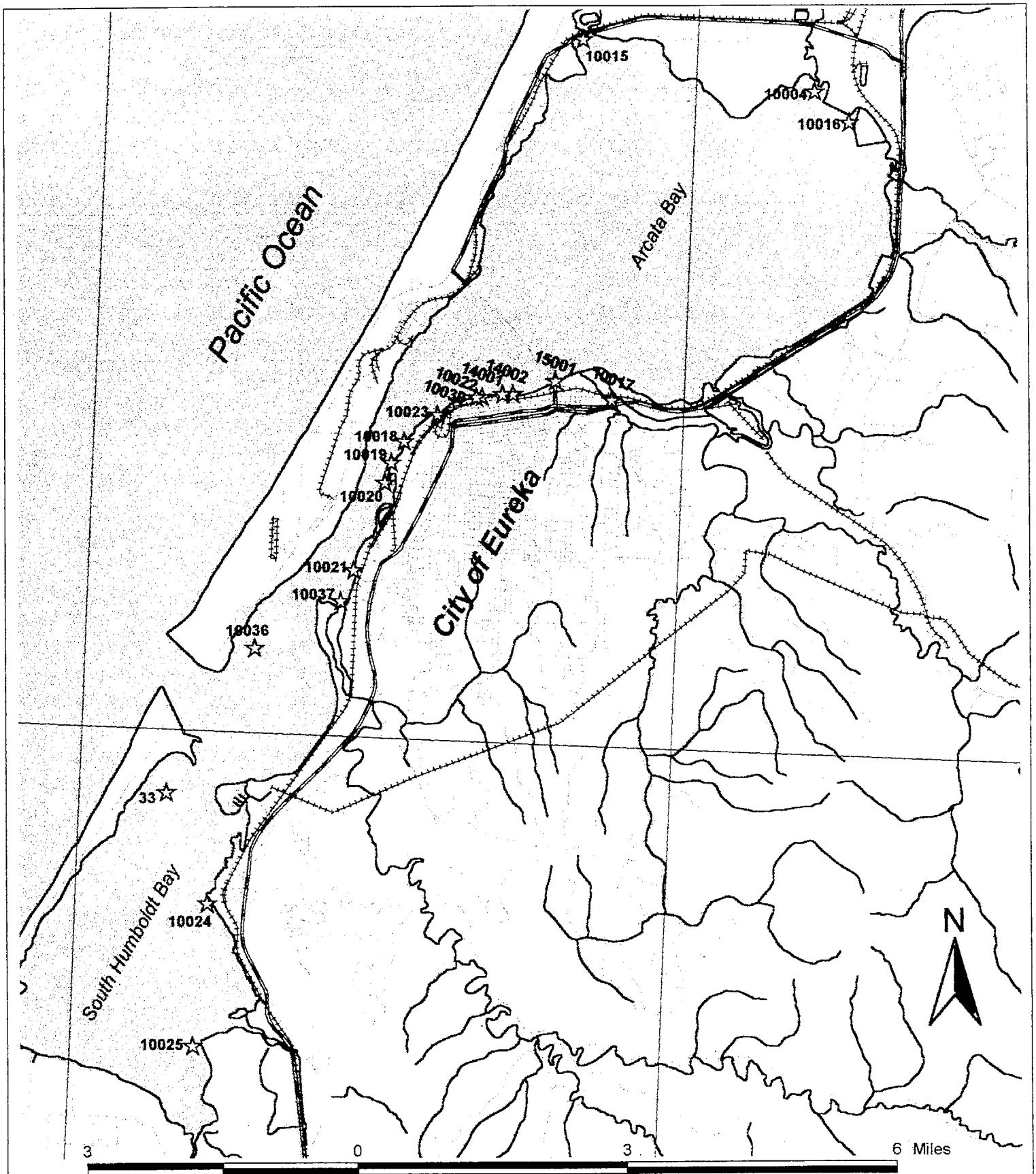
| Waterbody Name | Segment Name | Site Identification | Reason for Listing | Pollutants present at the site | Report reference |
|---|---|---|---|---|---|
| Humboldt Bay | | 14001, Eureka Waterfront "H" Street ("G&R Metals") | Bioassay toxicity EE | Pb, Ag, Sb, Zn, Methoxychlor, PAH | BPTCP data |
| Bodega Bay | | 10006, Mason's Marina | Bioassay toxicity RA; EE | Cd, Cu, TBT, PAH | BPTCP data |
| Bodega Bay | | 10028, Porto Bodega Marina | Bioassay toxicity EE | Cu, Pb, Hg, Zn, TBT, DDT, PCB, PAH | BPTCP data |
| Bodega Bay | | 10007, Spud Point Marina | Bioassay toxicity EE; SP | NA | BPTCP data |

Reference list

State Water Resources Control Board. Bay Protection and Toxic Cleanup Program Database and Data Reports.

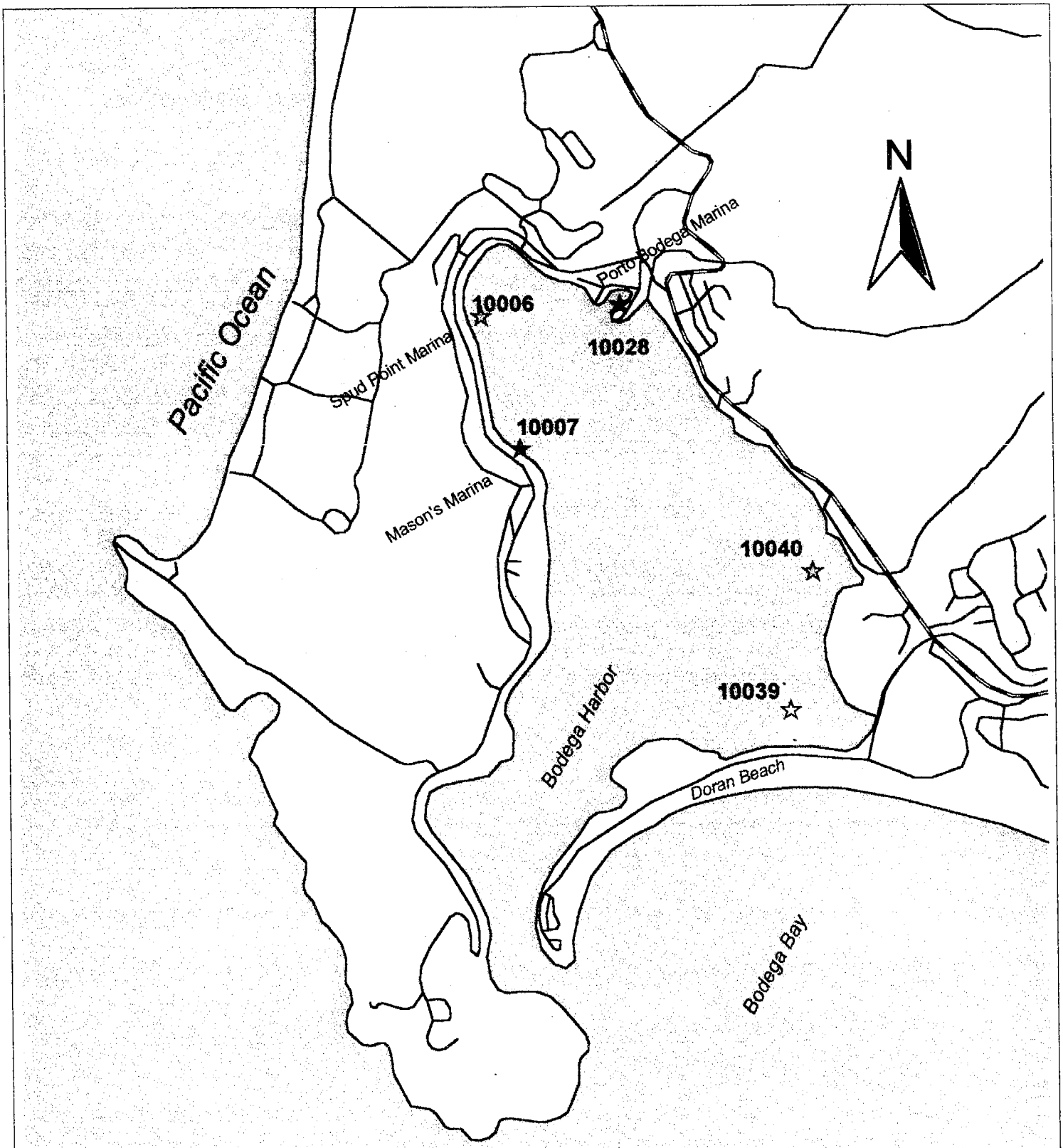
Ranking Matrix

| Waterbody Name | Site Identification | Human Health Impacts | Aquatic Life Impacts | Water Quality Objectives | Areal Extent | Pollutant Source | Remediation Potential |
|---|---|---|---|---|---|---|---|
| Humboldt Bay | 14001 | Moderate | High | Low | 3.5 acres with an average depth of 2 feet | High | High |
| Bodega Bay | 10006 | Moderate | High | Low | Unknown | Moderate | High |
| Bodega Bay | 10028 | Moderate | High | Low | Unknown | Moderate | High |
| Bodega Bay | 10007 | Moderate | Moderate | Low | Unknown | Moderate | High |




California Regional Water Quality Control Board, North Coast Region
Bay Protection Program Sites of Concern
Humboldt Bay
December, 1997

For information about this map, contact Bruce Gwynne at 707.576.2661




California Regional Water Quality Control Board, North Coast Region
Bay Protection Program Sites of Concern
Bodega Bay
December, 1997

For information about this map, contact Bruce Gwynne at 707.576.2661.

## Part III

High Priority Candidate Toxic Hot Spot Characterization
G&R Metals (scrap-yard)

A. Areal Extent of the THS

The areal extent of the toxic hot spot has been estimated to be 3.5 acres with an average depth of 2 feet. The total contaminated soil quantity is about 10,000 cubic yards. The constituents of concern are lead, arsenic, chromium, cadmium, cobalt, copper, mercury, zinc, and PCBs.

B. Most likely Sources of Pollutants

The responsible parties are the Rynecki Trust; Union Pacific Railroad; G&R Metals, a Division of Levin Metals Corporation; and Landon C. George.

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

The site has not been in operation since 1980. On-going site activity is limited to site assessment work to determine the extent of contamination and the appropriate remediation needed to cleanup the site. The issuance of a Cleanup and Abatement Order is planned for fiscal year 97/98.

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

The cleanup alternatives are limited to the removal of highly contaminated soils and capping of the site to prevent migration of metals to ground and surface waters.

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

It is estimated that the cost to implement the chosen cleanup plan will be between 500,000 dollars and 5 million dollars. These costs are based on a 500 dollar per ton cost for hauling and tipping fees at a hazardous waste disposal site. The exact amount of material that will be removed from the site will be determined at a later date when the assessment work is completed.

F. Estimate of Recoverable Costs from Potential Dischargers

The responsible parties will be required to pay for the cleanup. It appears that the responsible parties have the ability to pay for the entire cleanup effort.

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

Not applicable.