Inner Bellingham Bay Contaminated Sediments Total Maximum Daily Load

Submittal Report

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Washington State Department of Ecology
Water Quality Program

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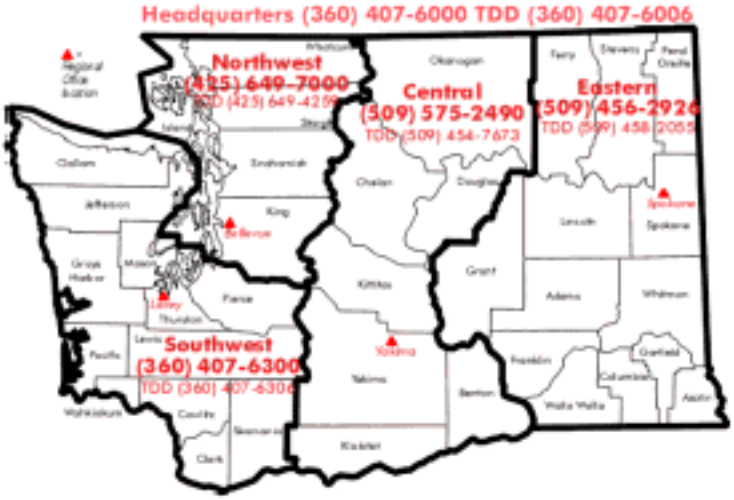

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Glossary of Terms

BMPs- Best Management Practices

BT- Bioaccumulation Trigger

CAD- Confined Aquatic Disposal

CAP- Cleanup Action Plan

CSL- Cleanup Screening Level

CY- Cubic Yards

DMMP- Dredged Material Management Program

Ecology- Washington State Department of Ecology

EIS- Environmental Impact Statement

EPA- Environmental Protection Agency

LA- Load Allocation

MCUL- Minimum Cleanup Level

ML- Maximum Level

MTCA- Model Toxics Control Act

NPDES- National Pollutant Discharge Elimination System

PAH – Polynuclear Aromatic Hydrocarbons

PLP- Potentially Liable Parties

PSDDA- Puget Sound Dredged Disposal Analysis

PSWQMP- Puget Sound Water Quality Management Plan

RCW- Revised Code of Washington

RI/FS- Remedial Investigation/Feasibility Study

SEDQUAL - Sediment Quality Information System, an extensive database containing sediment data from the state of Washington and other areas.

SIZ- Sediment Impact Zone

SL- Screening Level

SMS- Washington State Sediment Management Standards

SQS- Sediment Quality Standards

VCP- Voluntary Cleanup Program

WAC- Washington Administrative Code

WLA- Waste Load Allocation

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Introduction

Section 303(d) of the Federal Clean Water Act (CWA) mandates that states establish Total Maximum Daily Loads (TMDLs) for surface waters that do not meet standards after application of technology-based pollution controls. The U.S. Environmental Protection Agency (EPA) has established regulations (40 CFR 130) and developed guidance (EPA, 1991) for establishing TMDLs.

Under the Clean Water Act, every state has its own water quality standards designed to protect, restore, and preserve water quality. Water quality standards consist of designated uses, such as cold water biota and drinking water supply, and criteria, usually numeric, to achieve those uses. When a lake, river or stream fails to meet water quality standards after application of required technology-based controls, the Clean Water Act requires that the state place the water body on a list of "impaired" water bodies and to prepare an analysis called a **Total Maximum Daily Load (TMDL)**.

The goal of a TMDL is to ensure impaired waters will attain water quality standards. A TMDL includes a written, quantitative assessment of water quality problems and of the pollutant sources that cause the problem. The TMDL determines the amount of a given pollutant, which can be discharged to the water body and still meet standards, called the **loading capacity,** and allocates that load among the various sources. If the pollutant comes from a discrete source (referred to as a **point source**) such as an industrial facility's discharge pipe, that facility's share of the loading capacity is called a **waste load allocation**. If it comes from a diffuse source (referred to as a **nonpoint source**) such as a farm, that facility's share is called a **load allocation**.

The TMDL must also consider **seasonal variations** and include a **margin of safety** that takes into account any lack of knowledge about the causes of the water quality problem or its loading capacity. The sum of the individual allocations and the margin of safety must be equal to or less than the loading capacity.

The Washington State Department of Ecology (Ecology) is establishing a TMDL submittal for Inner Bellingham Bay to address impairments due to potential toxic effects from contaminated sediments in Bellingham Bay based on the 1998 Section 303(d) list of impaired waterbodies. The list contains 31 separate parameters at several locations in Inner Bellingham Bay. The contaminated areas addressed in this TMDL are those areas identified in the state's 1998 303(d) list and other areas that would have been included in the list if evaluated using current data.

This TMDL submittal documents new data that demonstrates meeting state standards for the majority of the parameters on the current 303(d) list. The remaining parameters addressed in this submittal are those currently violating state standards or those in need of establishing wasteload allocations (see Table 4, Page 16).

As a summary, the five elements of the Bellingham Bay Contaminated Sediments TMDL as required by the Clean Water Act are:

Loading Capacity

The loading capacity for this TMDL is the combination of the waste load and load allocations for the existing dischargers, which will fully meet the requirements of the Sediment Management Standards for sediment quality. The loading capacity throughout Inner Bellingham Bay is the mass loading (mg/kg) from historic and ongoing sources that maintains compliance with the state Sediment Management Standards. For Inner Bellingham Bay, the loading capacity is defined as the mass-based discharge that maintains compliance with sediment quality standards (e.g., for mercury: 1.2 mg/kg; phenol: 420 μg/kg; 4-methylphenol: 670μg/kg; wood debris: <50% by volume). The implementation strategy employs cleanup, source control, and monitoring to achieve compliance for all sediment quality parameters and to track potential recontamination problems.

Waste Load Allocations

Georgia-Pacific West, Inc.- the Waste Load Allocation for the Georgia-Pacific West, Inc. (G-P) wastewater discharge of total mercury to Bellingham Bay is 0.014 kg/day average mass loading. This was based on the existing NPDES permit and detailed receiving water modeling and monitoring presented in the Whatcom Waterway Final Remedial Investigation/Feasibility Study (Anchor Environmental/Hart Crowser, 2000).

Other Point Sources- Wasteload Allocations are applied to the stormwater sources in Inner Bellingham Bay. No ongoing sources have been documented as currently contributing to the sediment quality impairments in Inner Bellingham Bay. Where the discharge from any facility is not currently, nor expected to, result in sediment contamination to the SQS criteria, a WLA is not calculated. If a WLA were provided up to the SQS level, Ecology would in effect be allowing a greater mass loading of sediment contaminants than is currently released from these facilities. Compliance with the state's Sediment Management Standards (SMS) for each potential source is assured through site cleanups and long-term monitoring. The goal of this TMDL is to maintain compliance with the chemical and biological criteria for sediment quality in the SMS rule.

Load Allocations

There are no identified non-point sources contributing to Inner Bellingham Bay. All municipal and industrial stormwater sources are defined as point sources under NPDES permit rules.

Margin of Safety

The margin of safety is implicit due to the conservative assumptions that have been used throughout the analyses.

Seasonal Variation

Contaminated sediments in Bellingham Bay do not exhibit general variations related to seasons. The identified implementation strategies are applicable year round.

Background

Bellingham Bay is an urban bay in the heart of the city of Bellingham in northwest Washington State. The bay is an essential feature for navigation, commerce, and recreation in the region. Like many urban bays in Puget Sound, contaminated marine sediments are a legacy of past industrial practices that can pose a present threat to marine life and public health.

The Department of Ecology has developed the Inner Bellingham Bay Contaminated Sediment TMDL in response to the listing of contaminated sediments on the 1998 303(d) list. The purpose of this TMDL is to assure the CWA requirements are satisfied to ensure the sediment quality in the bay meet Washington State Standards.

The Inner Bellingham Bay Contaminated Sediment TMDL is designed to:

- Identify the portions of Bellingham Bay that are and designated on the 303(d) list as impaired due to contaminated sediments;
- Summarize the degree of sediment contamination;
- Review the applicable standards and regulatory procedures for improving sediment quality;
- Provide information on the technical analysis and modeling approach used for sediment remediation and source control;
- Identify direct dischargers to Inner Bellingham Bay;
- Identify sediment remediation (cleanup) and discharge source performance expectations (wasteload allocations) for Inner Bellingham Bay; and
- Document the implementation strategy for achieving compliance with the state Sediment Management Standards.

The geographic area of the Bellingham Bay Project and this TMDL is given in Figure 1.

The Bellingham Bay Contaminated Sediment TMDL Submittal Report analyzes the existing data and information to verify if the information is sufficient to satisfy the TMDL requirements. The TMDL Submittal Report puts forth and overview of the information, data, analysis, available regulatory tools, and implementation activities that will be used in Inner Bellingham Bay to achieve compliance with the Washington State Sediment Management Standards. Assuring compliance with the SMS is the goal of this TMDL submittal.

Over the past several years, the Bellingham Bay Demonstration Pilot Work Group has been working pursuing a comprehensive approach to the contaminated sediment problems in Bellingham Bay. The Pilot Work Group is an initiative of the Cooperative Sediment Management Program and is made up of 15 federal, state and local entities charged with addressing and coordinating contaminated sediment cleanup needs and other key management issues. The Pilot Project is designed to expand opportunities for achieving multiple goals in Bellingham Bay beyond sediment cleanup and sediment disposal to include source control, habitat restoration, and aquatic land use.

The Pilot Work Group members include:

- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife
- U.S. Environmental Protection Agency
- National Marine Fisheries Service
- Washington State Department of Ecology
- Washington State Department of Natural Resources
- Washington State Department of Transportation
- Washington State Department of Fish and Wildlife
- Puget Sound Water Quality Action Team
- City of Bellingham
- Port of Bellingham
- Whatcom County Health Department
- Lummi Nation
- Nooksack Tribe
- Georgia-Pacific West, Inc.

Sediment sampling in Bellingham Bay has found mercury and other contaminants at levels that exceed the state Sediment Management Standards (SMS) chemical criteria. Through Ecology's contaminated site determination process, several areas in Bellingham Bay have been identified as being in violation of the SMS and were subsequently placed on the 303(d) list. Table 2 (Page 12) gives the 1998 303(d) list for Inner Bellingham Bay. The contaminated areas identified in the 303(d) list correspond with the priorities identified in the Bellingham Bay Pilot Project. This TMDL does not address the Inner Bellingham Bay water column impairments on the 303(d) list (fecal coliform and pH).

The Inner Bellingham Bay Contaminated Sediment TMDL draws heavily from the work conducted by members of the Pilot Work Group, both individually and collectively, to meet the requirements of the CWA. This contaminated sediment TMDL is one of the first of its kind nationwide. It is designed to bring together the cleanup and source control efforts from sediment remediation program and the source control and evaluation methods available through the state water quality programs to improve and protect sediment quality in Inner Bellingham Bay and ultimately meet state standards for sediment quality.

The sediment cleanup and source control activities for the parameters addressed in this TMDL are conducted by the individual responsible parties through the Department of Ecology's authority under the Model Toxics Control Act (MTCA, Chapter 173-340 WAC), Water Quality Standards for Surface Waters in the State of Washington (Chapter 173-201A), the National Pollutant Discharge Elimination System Permit Program (NPDES, Chapter 173-220), and the Sediment Management Standards (SMS, Chapter 173-204 WAC).

Description of Pollutant Sources

The purpose of this TMDL is to address the water quality concerns related to the existing sediment contamination and to assess potential ongoing sources which may adversely impact sediments.

The presence of contaminated sediments in Inner Bellingham Bay has been documented to be due to historical practices. No ongoing sources have been identified as causing violations of marine Sediment Quality Standards, however, some sources may affect small areas of the bay immediately adjacent to outfall pipes (Anchor Environmental 1999). Source control and monitoring activities are to be used to verify predictions about capability for stormwater sources

to cause sediment contamination or recontamination. There are no non-stormwater point source dischargers in Inner Bellingham Bay with the exception of Georgia-Pacific West.

The Bellingham Bay Demonstration Pilot Project generated and proposed for public comment a Comprehensive Strategy that identifies a range of remedial alternatives for priority sediment cleanup sites and provides guidance for cleanup activities that coincide with 303(d) listed areas in Inner Bellingham Bay. However, the Comprehensive Strategy extends beyond TMDL needs in area and scope. Nonetheless, this TMDL has been developed to be consistent with the broad range of sediment cleanup plans and activities identified in the Bellingham Bay Comprehensive Strategy.

Applicable Criteria

Water Quality Standards

Within the State of Washington, water quality standards are published pursuant to Chapter 90.48 of the Revised Code of Washington (RCW). Authority to adopt rules, regulations, and standards as are necessary to protect the environment is vested with the Department of Ecology. Under the Federal Clean Water Act, the EPA Regional Administrator must approve the water quality standards adopted by the state (Section 303(c)(3)). Through adoption of these water quality standards, Washington has designated certain characteristic uses to be protected and the criteria necessary to protect these uses [Washington Administrative Code (WAC), Chapter 173-201A]. These standards were last adopted in November 1997.

The characteristic uses designated for protection in Bellingham Bay are as follows:

"Characteristic uses. Characteristic uses shall include, but not be limited to, the following:

(i) Water supply (domestic, industrial, agricultural).

(ii) Stock watering.

(iii) Fish and shellfish:

Salmonid migration, rearing, and harvesting.

Other fish migration, rearing, spawning, and harvesting.

Clam, oyster and mussel rearing and spawning,

Crustaceans and other shellfish rearing, spawning, and harvesting.

(iv) Wildlife habitat.

(v) Recreation (secondary contact recreation, sport fishing, boating, and aesthetic enjoyment).

(vi) Commerce and navigation."

[WAC 173-201A-030(3)]

The water quality standards incorporate the Sediment Management Standards by reference.

"Compliance with the surface water quality standards of the State of Washington require compliance with…chapter 173-204 WAC, Sediment Management Standards."

[WAC 173-201A-010(3)]

This TMDL is designed to address impairments of characteristic uses caused by toxic effects of contaminated sediments. The Sediment Management Standards (SMS) define criteria for toxic substances for the protection of characteristic uses. Twenty-five (25) toxic substances and sediment bioassay failure are responsible for the original 303(d) listings in Inner Bellingham Bay. However, recent data has revealed that there are only 10 parameters currently in exceedance of the sediment quality standards. The reduction in parameters from the original 303(d) list will be discussed in more detail under the "Water Quality Impairments" section.

The following section provides background and discussion on the applicable criteria in the Sediment Management Standards (SMS). The Model Toxics Control Act (MTCA) and how SMS and MTCA work together under the 303(d) list and TMDL development are also presented below. The SMS and MTCA rules are the primary tools for setting the standards and the implementation mechanisms for this TMDL.

Sediment Management Standards

In 1991, the Washington State Department of Ecology adopted the Sediment Management Standards (SMS), Chapter 173-204 WAC, to identify and designate sediments that have adverse effects on aquatic organisms or pose significant health risk to humans. The standards established a sediment quality goal for Washington State. The standards also include the requirements for how the standards are applied in source control and cleanup actions. The regulation includes numeric chemical and biological standards to address ecological effects of impaired marine sediment quality in Puget Sound. Sediment criteria for human health, freshwater, and other marine areas must be addressed on a site-specific, case-by-case basis.

The narrative sediment quality goal of the SMS is defined as no acute or chronic adverse effects to biological resources and no significant risk to humans (WAC 173-204-100). The Sediment Quality Standards (SQS) (WAC 173-204-320) include the Puget Sound marine numeric chemical and biological standards based on the goal of no acute or chronic adverse effects. The chemical standards are sufficient to identify priority areas and define areas warranting further investigation. The framework in the SMS establishes that the biological tests override the chemical results under WAC 173-204-310(2), confirmatory designation, which states "Sediment samples that pass all the required confirmatory biological tests are designated as passing the applicable sediment quality standards of WAC 173-204-320". Therefore, for example, when sediments do not meet quality criteria based on numerical chemical results, but do demonstrate compliance with biological standards, then the sediments are considered in compliance with SMS based on the principle of biological override.

The SMS also contain provisions for managing exceedances of the SQS (hence, the regulation is titled the "Sediment Management Standards" instead of simply the Sediment Quality Standards). The substantive requirements for how the SQS exceedances will be addressed for source control and cleanup are described Parts IV and V, respectively, of the SMS (WAC 173-204-400 through 590). Key to both Parts IV and V is the concept of the maximum allowable level for sediment concentrations, known as the Sediment Impact Zone Maximum Level (SIZmax) (WAC 173-204-420), the Cleanup Screening Level (CSL) (WAC 173-204-520), and the Minimum Cleanup Level (MCUL) (WAC 173-204-520). The standards for SIZmax, CSL, and MCUL are equivalent. Appendix A-1 describes the numeric criteria for SQS and CSL from the Sediment Management Standards.

The parameters addressed in this TMDL are those that currently exceed the applicable sediment standards in parts of Inner Bellingham Bay. Although the 1998 303(d) list for Inner Bellingham Bay includes a limited area as defined by grid cells, this TMDL submittal expands the area to include all grid cells that contained impaired sediments even if not currently on the 303(d) list. In other words, it includes areas that would be on the 303(d) list if they were evaluated using current data. The 1998 303(d) list is presented in detail in Table 2 of the following section and in Appendix A-2. Appendix A-3 contains a comparison of the 1996 and 1998 303(d) listings for Inner Bellingham Bay. This TMDL submittal address all 303(d) parameter listings and grid cells through either demonstrating compliance with standards by review of current data or defining a wasteload allocation. The compete list of parameters addressed in this TMDL is given in Table 4 (page 17).

Table 1- Sediment Quality and Cleanup Screening Level criteria for selected sediment contaminants in Inner Bellingham Bay.

SMS Parameter	Marine Sediment Quality Standards (SQS)	Marine Cleanup Screening Level (CSL)
	mg/kg dry weight	mg/kg dry weight
Mercury	0.41	0.59
Copper	390	390
Zinc	410	960
Lead	450	530
Arsenic	57	93
	mg/kg carbon	mg/kg carbon
PCBs	12	65
	µg/kg dry weight	µg/kg dry weight
Phenol	420	1200
4-methylphenol	670	670
Sediment bioassay	(1)	(2)
Wood waste		50% by volume[3]

1. The biological effects criteria under SQS are based on the premise of "no adverse effects on biological resources", defined by specific test results for any one of five marine sediment biological tests. The specific tests and target endpoints can be found in WAC 173-204-320(3). Under the SMS, if a sediment sample exceeds the numeric criteria, but pass the confirmatory biological tests, the sample location is considered "clean" or in compliance with the SQS.
2. The biological effects criteria under CSL are based on "minor adverse effects in marine biological resources" and are designed to screen sediment station clusters to define clusters of potential concern using the results of two acute and one chronic effects tests. The specific tests and target endpoints for CSL biological effects criteria for Puget Sound marine sediments can be found in WAC 173-204-520(3).
3. The Sediment Management Standards provide authority in WAC 173-104-520(5) to require cleanup of "other deleterious substances" on a case-by-case basis. The Department of Ecology has determined that a 50% wood waste by volume criteria is a level below which only minor adverse effects may result in marine sediments (Kendall and Michelsen, 1997).

Some of the key concepts of the Sediment Management Standards applicable to contaminated sediments and TMDLs in general include:

- Sediment Impact Zones (WAC 173-204-415) are sediment quality dilution zones that may be authorized around outfalls for ongoing sources predicted to cause sediment quality to exceed the SQS. Levels must not exceed SIZmax (equivalent to CSL). Under WAC 173-204-410(1)(b), one of the goals of the SMS is to minimize or eliminate the existence of SIZs whenever practicable. Nonetheless, SIZs remain a tool to be used under SMS if absolutely necessary. No SIZs are recommended under the Inner Bellingham Bay TMDL submittal.
- Cleanup Site Identification Process (WAC 173-204-530) – The numeric CSL values provide the basis for defining contaminated sediment "sites", which are typically addressed by either the Department of Ecology's Toxics Cleanup Program under the Model Toxics Control Act (see section below) or the EPA under federal authority. The average of three adjacent stations must exceed the CSL in order to be designated as a cleanup site. If concentrations exceed the SQS, but a group of stations are not designated as a cleanup site, it is termed a "station cluster of low concern" and not subject to cleanup actions (WAC 173-204-510(4)).

- Sediment Recovery Zones (WAC 173-204-590) are sediment quality dilution zones that may be granted for a limited time (10 years or less) to cleanup actions where the selected remedy leaves sediment that exceeds the SQS in place if the area is predicted to recover through natural processes.
- Sediment Quality Inventory (WAC 173-204-350)- The Sediment Quality Information System (SEDQUAL) was developed by the state to gather available data on sediments and produce an inventory of sediment sampling stations which pass or fail applicable standards.

The goal of the Bellingham Bay Comprehensive Strategy is to carryout cleanup actions and implementation activities that meet and maintain sediments in compliance with the SQS criteria. Therefore, this TMDL and associated cleanup and source control activities will not be requesting the authorization of Sediment Recovery or Impact Zones for any sediment area or discharger, respectively.

Model Toxics Control Act

The Model Toxics Control Act (MTCA) is the administrative/implementation component of the Sediment Management Standards used to address contaminated sediment remediation in Washington State. The state's Water Pollution Control Law (Chapter 90.48 RCW) can also be used by the Department of Ecology to compel sediment cleanup. The responsibility for implementing MTCA rests with Ecology's Toxic Cleanup Program.

Through MTCA, the Department of Ecology has the legal authority to force a responsible party to cleanup a contaminated site. However, Ecology prefers to achieve cleanups through cooperative means with potentially liable parties (PLPs). Therefore, the MTCA rules are designed to encourage PLPs to initiate cleanup actions, provide an open public process, and facilitate cooperative agreements rather than Ecology-initiated enforcement orders.

Negotiated agreements are one way in which Ecology and PLPs can work cooperatively in reaching cleanup solutions. Formal agreements under MTCA include consent decrees and agreed orders. A **consent decree** is a formal legal agreement filed in court and constitutes a settlement with the Department of Ecology. The work requirements in the decree and the terms under which it must be done are negotiated and agreed to by the PLP, Ecology, and the state Attorney General's office. An **agreed order**, unlike a consent decree, is not filed in court and is not a settlement. Rather, it is a legally binding, administrative order issued by Ecology and agreed to by the PLP. Agreed orders are available for remedial investigations, feasibility studies, and final cleanup actions. Both consent decrees and agreed orders must undergo a public review and comment process.

Under Ecology's Voluntary Cleanup Program (VCP) responsible parties can request technical assistance from Ecology to address contaminated sites. This informal consultation arrangement is non-binding for both the responsible parties and Ecology, however, it is an effective mechanism to provide greater assurance that actions are likely to occur and meet state requirements.

The rules that guide the cleanup process lay out each step of the process to ensure that cleanup actions are thorough and protective of human health and the environment. The following is a description of the steps typically taken for the cleanup of contaminated sediment sites.

Screening and Evaluation of Contaminated Sites under MTCA

1. Sediment quality standards **inventory** (WAC 173-204-350) is an identification process that screens all sediment station clusters. A cluster is a collection of contiguous stations. Ecology analyzes the sediment sampling data to identify station clusters of potential concern and station clusters of low concern per the standards of this section. Station clusters of potential concern are further evaluated using the hazard assessment standards of WAC 173-204-530. Station clusters of low concern remain on the inventory and no further cleanup action determinations are taken by Ecology, but the stations are to be reexamined at a future date.
2. Hazard **assessment and site identification** (WAC 173-204-530)- A hazard assessment is performed to gather existing and available information to further characterize each station cluster of potential concern.
3. Identification of **cleanup sites** – when the average chemical concentration of the three highest stations from a station cluster of potential concern exceeds the CSL, the cluster is defined as a cleanup site.
4. Sediment **site ranking** process (SEDRANK)- Ecology prepares and maintains a list of contaminated sediment sites in the order of their relative health and environmental risk (hazard ranking, WAC 173-204-540). This information is used as a planning and evaluation tool to direct cleanup resources.
5. Remedial investigation/feasibility studies (**RI/FS**)- a state RI/FS defines the nature and extent of contamination at a site, provides information to establish a cleanup target, and evaluates potential remedial alternatives.
6. Determining the **cleanup target**- while the Sediment Management Standards maintain SQS criteria as the cleanup goal, site specific cleanup targets are developed using a multiple-step process. Information from the RI/FS is analyzed to determine the potential for natural recovery and to establish the volumes or areal extent of sediments requiring remediation. Next, factors affecting the net environmental benefit, costs, and technical feasibility of a full range of cleanup options are evaluated. Human health and ecological risk assessment tools are then used to weigh the benefits, costs, and feasibility to determine an optimal cleanup standard, typically ranging between the SQS value and the higher minimum cleanup level (MCUL) standard.
7. Selection of **cleanup action**- based on the RI/FS, a cleanup action plan is developed. The plan identifies a preferred cleanup alternative and specifies cleanup standards at the site.
8. **Site cleanup**- actual cleanup begins when, following public comment, the cleanup action plan is approved by Ecology. This includes design, construction, operation and monitoring of cleanup actions as well as long term environmental monitoring to assure continued compliance with standards.
9. **Delisting**- a sediment site can be taken off the contaminated site list after cleanup is completed and Ecology determines cleanup standards have been met.

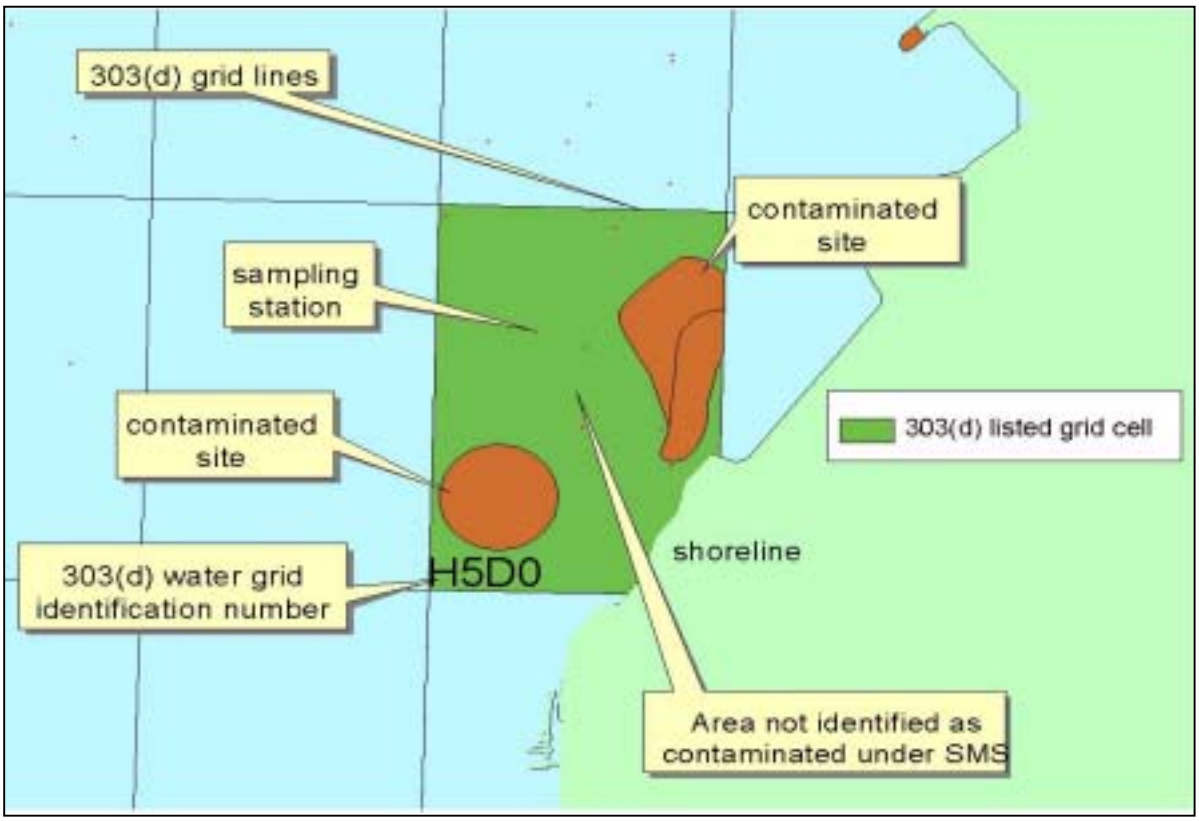
The 303(d) Listing Process

The Department of Ecology established a system of grids throughout Puget Sound to identify water quality impaired areas. In 1996, Ecology's Sediment Management Unit identified

contaminated sediment sites throughout Puget Sound in the Sediment Management Standards Contaminated Site List (Ecology, 1996). The 1998 303(d) list for the State of Washington then identifies the impaired sediment areas in the Contaminated Site List using the 303(d) grid system and lists the associated parameters of impairment. The grid system does not necessarily conform to the shape of a contaminated site defined in the SMS process. Furthermore, the data used to develop the sediment site list, including the 1996 list, is intended to identify areas of potential contamination (station clusters of concern). These data may not be comprehensive in nature and therefore, confirmation of contamination and/or the extent and severity of contamination can only be identified after a Sediment Remedial Investigation process has been completed.

Although an entire grid cell may be listed on the 303(d) list, the Remedial Investigation (RI) may result in the determination of the site as clean, or confirmation of site contamination. The RI would then be used to establish the boundaries of contamination by examining all sediment data within the grid cell as well as adjacent grid cells. If a site is confirmed as being contaminated, and the site boundaries established, the contaminated site boundaries may represent the only portion of a 303(d) grid cell that is identified as contaminated on the 303(d) list. The remainder of the 303(d) grid cell that is outside the boundary of a contaminated site is not considered contaminated under SMS. There may, however, be individual data points that exceed SMS numeric and/or bioassay contamination criteria within a listed grid area. If these data points are not contiguous with a minimum of 2 other data points that also exceed SMS contaminant criteria, these non-contiguous, individual data points do not constitute a station cluster. These occasional data outliers are therefore not considered in exceedance of SMS numeric and/or bioassay criteria and are not targeted for cleanup. Ecology examines the whole breadth of available data at each station to define areas of contamination. Figure 2 (next page) provides an illustration of contaminated sites within the structure of the 303(d) water grid system.

Figure 2- Generic depiction of a 303(d) listed grid cell and sediment contaminated sites.



Water Quality Impairments

The key areas of Inner Bellingham Bay on the 303(d) list are identified as Whatcom Waterway, I&J Waterway, G-P Outfall, and Harrison Avenue Shipyard. Four "water grid cells" are identified on the 303(d) list for impairments due to contaminated sediment. The 303(d) grid cell identification numbers, common site names, and the sediment quality impairment parameters are given in Table 2. A more detailed 303(d) list for Inner Bellingham Bay can be found in Appendix A-2. The Inner Bellingham Bay water column listings and Outer Bellingham Bay sediment listings are not addressed in this TMDL.

Table 2- 1998 303(d) parameter listings for Bellingham Bay (Inner) and Whatcom Waterway by waterbody ID number (WBID), grid cell number, and site name.

WBID	Grid cell #[1]	Cleanup site name	Parameters
WA-01-0050	**H4E8**	Whatcom Waterway	Sediment bioassay
	H4E9	Whatcom and I&J Waterways	2,4-Dimethylphenol 2-Methylnaphthalene Acenapthene Anthracene Arsenic Benz(a)anthracene Benzo(a)pyrene Benzo(b,k)fluoranthenes Benzo(ghi)perylene Bis(2-ethylhexyl)phthalate Chrysene Copper Dibenz(a,h)anthracene Dibenzofuran Fluoranthene Fluorene Indeno(1,2,3-cd)pyrene Mercury Pentachlorophenol Phenanthrene Phenol Pyrene Zinc
	H5D1[2]	G-P Outfall	Mercury
	H5C1	Harris Avenue Shipyard	PCBs Phenol Zinc Copper Mercury Arsenic Lead

[1] In the actual grid classification system, the numbers 48122 precede each grid cell number. Therefore, "H4E9" is actually "48122H4E9".

[2] Cell number H5D1 was incorrectly identified as H5D0 in the 1998 303(d) list for the G-P Outfall.

The 303(d) list for Inner Bellingham Bay contains 31 separate parameters and locators. When comparing the 303(d) listed grid cells to the contaminated sites in Inner Bellingham Bay, it was discovered that the grid cells present on the 303(d) list do not encompass all the sediment impaired areas identified in the Bay. Therefore, water grid cell numbers H4F9, H4D9, and H5D0 have been added and addressed in this TMDL. These additions include impaired sediment areas adjacent to Cornwall Avenue Landfill and Starr Rock, a former sediment disposal facility. Figure 3 depicts the location of each grid cell and site. Table 3 provides the comprehensive list of 303(d) grid cells and associated site names addressed in this TMDL. The parameters and grids cells on the 1998 303(d) list as well as additional grid cells and parameters are subject to the cleanup and monitoring activities identified in this TMDL.

Table 3- Comprehensive list of 303(d) grid cell numbers addressed in the Inner Bellingham Bay TMDL (WBID=WA-01-0050).

Grid cell #	Cleanup site name[1]	Grid cell listed on the 1998 303(d) list?	Additional cell-parameters addressed in this TMDL if not included in 1998 list
H4E8	Whatcom Waterway	yes	
H4F9[2]	Whatcom and I&J Waterways	no	(same as Whatcom Waterway)
H4E9	Whatcom Waterway[3]	yes	
H5E0[4]	Whatcom Waterway	no	(same as Whatcom Waterway)
H5D1	G-P Outfall	yes	
H5D0[5]	Whatcom Waterway (Starr Rock)	no	(same as Whatcom Waterway)
H4D9[5]	Whatcom Waterway and Cornwall Avenue Landfill	no	mercury, phenol, 4-methylphenol, PCBs, wood waste
H5C1	Harris Avenue Shipyard	yes	

1. All the cleanup sites are within the identified gird cells being address by the TMDL. Cleanup site areas are the footprints addressed by the remediation process and do not necessarily correspond exactly to the 303(d) grid system
2. H4F9 is grid cell within the Whatcom Waterway that was identified as containing a contaminated area in the Whatcom Waterway RI/FS. It is an additional grid cell for this TMDL. The parameters addressed include those originally identified for Whatcom Waterway.
3. H4E9 is exclusively in Whatcom Waterway, not "Whatcom and I&J Waterways" as originally identified in the 303(d) list.
4. Grid cell H5E0 was characterized extensively in the Whatcom Waterway RI/FS and is considered part of this TMDL evaluation. This grid cell is not on the 1998 303(d) list, but was originally present on the list developed in 1996.
5. H5D0 and H4D9 are grid cells within Whatcom Waterway that were identified as containing contaminated footprints in the RI/FS, but not included on the 1998 303(d) list.

The following section describes each of the 303(d) listing water gird cells and the sediment parameters responsible for the listing. The physical location of each grid cell is illustrated in Figure 3. In the following and subsequent analysis, I&J Waterway is dealt with separately from Whatcom Waterway. The parameters of concern and cleanup boundaries are distinct between the two areas and are treated accordingly.

Water grid cells # H4F9, H4E8, H4E9, H4D9, H5D0, H5E0- Whatcom Waterway

Sediment Parameters: 2,4-Dimethylphenol, 2-Methylnaphthalene, Acenapthene, Anthracene, Arsenic, Benz(a)anthracene, Benzo(a)pyrene, Benzo(b,k)fluoranthenes, Bis(2-ethylhexyl)phthalate, Chrysene, Copper, Dibenz(a,h)anthracene, Dibenzofuran, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Mercury, Pentachlorophenol, Phenanthrene, Phenol, Pyrene, Zinc and sediment bioassay.

Recent (1996 and 1998) sampling in Bellingham Bay revealed that all the 303(d) parameters in the Whatcom Waterway meet SQS chemical criteria in WAC 173-204-320, except for mercury, phenol, and sediment bioassay (Anchor Environmental/Hart Crowser, 2000). Due to natural recovery processes, the list of contaminants in the 303(d) list are not consistent with the recent characterization of the area. Furthermore, sampling has shown 4-methylphenol to exceed the SQS chemical criteria and wood debris to exceed a derived standard based on narrative criteria at some locations within the Whatcom Waterway study area. Neither 4-methylphenol nor wood debris are currently on the 303(d) list for Bellingham Bay.

This TMDL addresses all 303(d) parameters in Whatcom Waterway. Five parameters (mercury, phenol, 4-methylphenol, sediment bioassay, wood debris) are part of active cleanup activities and addressed in the implementation activities of this TMDL. The remaining listed parameters (2,4-dimethylphenol, 2-methylnaphthalene, acenapthene, anthracene, arsenic, benz(a)anthracene, benzo(a)pyrene, benzo(b.k)fluoranthenes, benzo(ghi)perylene, bis(2-ethylhexyl)phthalate, chrysene, copper, dibenz(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, pentachlorophenol, phenanthrene, phenol, pyrene, and zinc) have been shown to be in compliance with the SQS criteria of WAC 173-204-320 in Whatcom Waterway due to the natural deposition of clean sediments. (Anchor Environmental/Hart Crowser, 2000). The sampling data are sufficient to de-list these parameters in the next 303(d) listing cycle.

Water grid cell # H4F9 - I&J Waterway

Sediment Parameters: none.

Surface sediment sampling in I&J Waterway demonstrates consistent compliance with WAC 173-204-320 for all listed parameters on the 303(d) list. Occasionally, levels of mercury have exceeded the state SQS numerical criteria, however, all confirmatory biological testing data demonstrate compliance with the state SQS biological effects criteria. Appendix A-4 shows the I&J Waterway analytical and biological data. The Sediment Management Standards under WAC 173-204-310(2), confirmatory designation, states “Sediment samples that pass all the required confirmatory biological tests are designated as passing the applicable sediment quality standards of WAC 173-204-320”. The data from I&J Waterway therefore demonstrates compliance with SQS criteria. The recent sampling data are sufficient to de-list all parameters in the next 303(d) listing cycle. This is presented in more detail in the following Technical Analysis section of this report.

Water grid cell # H5D1- Georgia Pacific Outfall
Sediment parameters: mercury.

Mercury was the sediment parameter original responsible for listing this grid cell on the state's 303(d) list. However, surface sediment sampling at the G-P Outfall (Anchor Environmental, 2000A) demonstrates that a mercury sediment cleanup site no longer exists as defined under WAC 173-204-530. Therefore, the area is in compliance for mercury under the Sediment Management Standards and no cleanup actions will be taken. More detail on the G-P Outfall is presented in the Technical Analysis section.

Water grid cell # H4D9 – Cornwall Avenue Landfill (Whatcom Waterway)
Sediment Parameters: mercury, phenol, 4-methylphenol, PCBs, and wood waste.

Cornwall Avenue Landfill is a site that was not originally identified in the 1998 303(d) list. However, in 1996, the Port of Bellingham, City of Bellingham, and Washington State Department of Natural Resources performed an expanded site investigation and determined the landfill is actively eroding into Bellingham Bay. The investigation revealed that the nearshore sediments are composed mostly of solid waste debris and contain elevated levels of metals and organics.

Water grid cell # H5C1- Harris Avenue Shipyard
Sediment parameters: PCBs, phenol, zinc, copper, mercury, arsenic, lead.

All seven parameters for Harris Avenue Shipyard are being addressed in the RI/FS work conducted by the Port of Bellingham. Sampling data and planned cleanup activities are sufficient to de-list these parameters in the next 303(d) listing cycle.

For summary purposes, Table 4 provides a complete description of the grid cells and parameters addressed in this TMDL. As noted above, many parameters will be proposed for de-listing in the next cycle, while some will be addressed directly through the TMDL process (e.g., mercury, phenol, 4-methylphenol, sediment bioassay, and wood debris in Whatcom Waterway).

Table 4- The complete list of grid cells and parameters accounted for in this TMDL.

WBID	Grid cell #'s	Cleanup site name	Parameters
WA-01-0050	**H5D0*** **H5E0*** **H4D9*** **H4E8** **H4E9** **H4F9***	Whatcom and I&J Waterways (includes Cornwall Avenue Landfill)	**Sediment bioassay** 2,4-Dimethylphenol 2-Methylnaphthalene **4-Methylphenol*** Acenapthene Anthracene Arsenic Benz(a)anthracene Benzo(a)pyrene Benzo(b,k)fluoranthenes Benzo(ghi)perylene Bis(2-ethylhexyl)phthalate Chrysene Copper Dibenz(a,h)anthracene Dibenzofuran Fluoranthene Fluorene Indeno(1,2,3-cd)pyrene **Mercury** Pentachlorophenol Phenanthrene **Phenol** Polychlorinated biphenyls* Pyrene Zinc **Wood waste***
	H5D1	G-P Outfall	**Mercury**
	H5C1	Harris Avenue Shipyard	**PCBs** **Phenol** **Zinc** **Copper** **Mercury** **Arsenic** **Lead**

Asterisk (*) indicates grid cell and parameter additions not on the 1998 303(d) list.
Bold font indicates parameters directly subject to the TMDL submittal. For the remaining parameters (not bold), sufficient data exist for de-listing in the next 303(d) listing cycle.

Technical Analysis

Summary of Existing Conditions

The following summary is based on the Whatcom Waterway Final RI/FS (Anchor Environmental/Hart Crowser, 2000) and 1999 sampling results (Anchor Environmental, 2000A).

Sediment Quality

Of the more than 50 chemicals analyzed, only three were regularly detected at concentrations that exceed current state Sediment Quality Standards (SQS) chemical criteria. These chemicals include mercury, phenol, and 4-methylphenol. In addition, accumulations of wood material exceeding 50 percent by volume were also identified in the Whatcom Waterway area, and were often correlated with elevated phenol and 4-methylphenol concentrations.

Surface concentrations of mercury, 4-methylphenol, and wood material in the Whatcom Waterway area were significantly lower than concentrations detected several feet below the mudline. These patterns correspond to decreasing surface sediment concentrations over the past 25 years, due to source controls implemented at the G-P facility and in other areas of Bellingham Bay beginning in the early 1970's. This process of natural recovery is also a result of the gradual incorporation of clean sediment deposits primarily from the Nooksack River.

Sediment Toxicity

In 1996 through 1998, sediment samples from over 40 site locations were submitted for confirmatory biological testing to verify or refute sediment toxicity predicted on the basis of sediment chemical concentrations. The Sediment Management Standards utilize biological effects criteria to confirm the presence or absence of adverse effects on biological resources (WAC 173-204-320(3)). Sixty percent of these samples, collected from 24 locations were determined to be non-toxic, meaning they did not exceed the SQS minor biological effect criteria. The remaining 40 percent of the locations exceeded SQS minor adverse biological effects criteria. Sediment toxicity was not correlated with the concentration of mercury or other chemical parameters.

Most of the surface sediments located within the Whatcom Waterway navigation channel did not exceed SQS biological effects criteria, even though underlying subsurface sediments within the channel contained some of the highest concentrations of the contaminants of concern at the site. These data confirm the protectiveness of the natural sediment cap that has formed in the channel as the result of source controls and natural recovery. Sediments exceeding the SQS biological effects criteria were restricted to a small portion of the Whatcom Waterway Area. The areal extent of biological effects was significantly smaller than that represented by sediment chemistry.

Bioaccumulation

In addition to ecological risks, bioaccumulation of mercury in certain fish and shellfish populations within Inner Bellingham Bay (e.g., Dungeness crab caught within the Whatcom Waterway) may also have potential human health implications. Tissue mercury concentrations within the Whatcom Waterway area are currently elevated as much as three times above regional

background levels. However, even the maximum tissue concentrations reported in this area are below conservative benchmark concentrations calculated to protect tribal fishers and sensitive wildlife that may consume relatively large amounts of seafood (Anchor Environmental/Hart Crowser, 2000).

In order to address the potential for localized exposures, a sediment screening level was developed for mercury that is conservatively protective of potential bioaccumulation risks to human health and to high trophic level wildlife receptors. The screening level utilized the observed relationship between tissue concentrations and surface sediment concentrations within the sampled species' home range. Using screening-level risk assessment methods approved by Ecology, a conservative tissue benchmark mercury level was calculated to protect tribal fishers and wildlife that may consume relatively large amounts of seafood from Bellingham Bay. The sediment screening level determined using these methods was 1.2 milligrams per kilogram (mg/kg; dry weight basis) mercury (Anchor Environmental/Hart Crowser, 2000). For the Whatcom Waterway Area, sediments exceeding this health-based screening level generally corresponded to those areas of the site also targeted for cleanup to address sediment toxicity concerns.

Contaminated Sediment Evaluation

The contaminated sediment evaluation shall be presented using the project components consistent with the Bellingham Bay Demonstration Pilot Project. The known contaminated sediment sites and potential contaminant sources are given in Figure 4. The contaminated sediment components addressed in this TMDL are those listed on the state's 1998 303(d) list including I&J Waterway, Whatcom Waterway, G-P outfall, and Harris Avenue Shipyard. Grid cells and parameters associated with Cornwall Avenue Landfill is also addressed, although it is not included in the 1998 303(d) list.

For the following discussion, Figure 5 shows the sampling location plan, which can be correlated to the sampling sites described in the text and in analytical data tables. It is important to note that the cleanup site areas are the footprints addressed by the remediation process. They do not correspond directly to the 303(d) grid system, which is an arbitrary locator method used to identify areas in marine waters. Consequently, some sites correspond with more than one 303(d) grid cell and, likewise, some grid cells identify more than one contaminated site (refer to Figure 3).

Grid Cell Number H4F9- I&J Waterway

Surface sediment sampling in I&J Waterway has demonstrated consistent compliance with WAC 173-204-320 for all listed parameters on the 303(d) list. Occasionally, levels of mercury have exceeded the state SQS numerical criteria, however, **all confirmatory biological testing data demonstrate compliance with the state SQS minor biological effects criteria**. Appendix A-4 shows the I&J Waterway analytical and biological data. Sample locations for I&J Waterway and throughout the Bellingham Bay project are given in Figure 5. The Sediment Management Standards under WAC 173-204-310(2), confirmatory designation, states "Sediment samples that pass all the required confirmatory biological tests are designated as passing the applicable sediment quality standards of WAC 173-204-320".

Grid Cells numbers H4F9, H4E8, H4E9, H4D9, H5D0, H5E0- Whatcom Waterway

Whatcom Waterway has been characterized through chemical and biological assay determinations, and through bioaccumulation analysis. Figure 6 describes the sediment mercury

chemical concentrations in the Whatcom Waterway area. Figure 7 presents the sediment bioassay results, while Figure 8 provides the results of the bioaccumulation screening level analysis. The contaminant footprint for mercury encompasses the areas violating SQS criteria for phenol and 4-methylphenol. The union of the areas encompassing the SQS biological effects criteria failures and the areas with concentrations greater than the bioaccumulation screening level constitute the total area slated for active sediment remediation.

The major sediment cleanup areas of the Whatcom Waterway site include:

- Whatcom Waterway Federal Navigation Channel
- G-P Log Pond
- G-P Aerated Stabilization Basin (ASB)
- Port Log Rafting Area
- Former Starr Rock Disposal Area

Grid Cell Number H5D1- Georgia-Pacific Outfall

The G-P Outfall area was identified as a 303(d)-listed contaminated sediment site in Bellingham Bay due to levels of mercury above the cleanup screening level. A detailed contaminant transport analysis was carried out to evaluate the sediment recontamination potential for mercury for the current discharge levels of the G-P Outfall. The steps involved in this evaluation included: 1) TSS-normalize effluent monitoring data; 2) evaluation of initial outfall mixing in a near-field model; and 3) utilization of the WASP model with current data for far-field analysis. More details on the modeling effort are available in Whatcom Waterway Final RI/FS (Anchor Environmental/Hart Crowser, 2000). The modeling process predicts the current G-P Outfall discharge will not cause mercury sediment contamination to SQS levels in Bellingham Bay. Furthermore, the dynamic model showed that existing sediments within the immediate outfall area were predicted to recover to below the mercury SQS chemical criteria prior to 1999. Recent (1999) sampling data confirmed model predictions and demonstrated that the sediments within the vicinity of the G-P outfall comply with SQS cleanup criteria for mercury (Anchor Environmental, 2000A, Appendix A-5). In addition, the G-P chlor-alkali plant (the mercury discharge source) has been closed and pulping operations have terminated, which will improve the discharge quality from the outfall.

Sampling conducted in 1999 showed for the first time concentrations of 4-methylphenol above SQS chemical criteria at 8 stations in the vicinity of the G-P outfall. Biological confirmatory tests were run on the samples from the three highest-concentration stations in the station cluster. All biological tests passed SQS biological screening criteria. Therefore, the confirmatory biological testing procedures under SMS do not qualify this station cluster as a contaminated sediment site and demonstrates compliance with the Sediment Management Standards SQS criteria through the principal of biological override (Appendix A-4) (Anchor Environmental, 2000A). This has not been identified as a trend of contamination from G-P and is likely associated with historic deposits of wood debris in the vicinity of the outfall. The assumption regarding the association between wood waste and 4-methylphenol distribution will be confirmed by further monitoring of the G-P discharge and receiving water sediments under their current NPDES permit. In addition, since G-P has closed their chlor-alkali facility and ceased the pulping operations at the plant, the contaminant discharge rate associated with current discharge to the cluster area is not likely to result in a cleanup site in the future.

Grid Cell Number H5C1- Harris Avenue Shipyard

An expanded site investigation has been completed at the Harris Avenue Shipyard. This information will be used to complete a RI/FS for the site, which will define the cleanup boundaries and derive protective standards for cleanup. Since PCBs are the primary contaminants of concern, human health criteria must be considered for the final cleanup goals.

Grid Cell Number H4D9- Cornwall Avenue Landfill

The Cornwall Avenue Landfill was used for the disposal of municipal solid waste between 1953 and 1965. In 1996, the Port of Bellingham, City of Bellingham, and Washington State Department of Natural Resources performed an expanded site investigation and determined the landfill is actively eroding into Bellingham Bay. The investigation revealed that the nearshore sediments are composed mostly of solid waste debris and contain elevated levels of metals and organics. A focussed RI/FS for Cornwall Avenue Landfill has been completed for the site.

Sediment Recontamination Modeling Analysis

The Bellingham Bay contaminated sediment TMDL draws from two modeling efforts to assess ongoing source inputs and sediment recontamination potential.

As mentioned previously, modeling was conducted as part of the Whatcom Waterway remedial investigation for the G-P outfall site. The objective of this analysis was to determine if ongoing contaminant discharges from G-P were being delivered to Bellingham Bay in quantities significant enough to cause violation of state Sediment Quality Standards. The recontamination evaluation utilized the EPA code WASP5 (a 3-dimensional far-field contaminant transport model) and a near-field dilution zone mixing model. The models were used to perform mass balance and mass transfer calculations for contaminants in the water column and sediments. The models incorporate mixing and chemical partitioning phenomena and include local currents, tidal dispersion, sedimentation and resuspension. A detailed discussion can be found in Chapter 8 of Anchor Environmental/Hart Crowser, 2000.

This modeling work provides the primary tool used in this TMDL to define the Waste Load Allocation for the Georgia Pacific facility.

The second modeling effort was designed as a screening and evaluation tool for other potential ongoing sources in Bellingham Bay in order to identify, plan, and prioritize source control activities. In this analysis, sediment concentrations resulting from identified Bellingham Bay sources were estimated using a model that incorporated receiving water dispersion and sedimentation processes (Anchor Environmental 1999). The model conservatively evaluated sediment recontamination potential using measured flows and maximum concentrations from each source and the gross sedimentation rate measured in Inner Bellingham Bay. Local background concentrations of chemicals in incoming sediments were also used as inputs. The results of this recontamination modeling indicates that for all sources for which input data are available, SQS chemical criteria are not likely to be exceeded beyond short distances from the shoreline discharge location (tens of feet). A summary of this analysis is provided in Appendix A-6.

This analysis predicts that sediment quality impairment or recontamination from existing sources is relatively localized near a potential source and should not hinder the large-scale sediment remediation plans. In fact, the total area of the Whatcom Waterway site that may be affected by ongoing discharges is less than 1 acre, or 0.5%, of the 140 acre area exceeding the SQS criteria.

Although the areal extent of potential recontamination is small, source control concerns are carried forward in the cleanup process and through other source control venues. This is discussed in more detail in the Summary Implementation Strategy under "Source Control Activities".

Discharge Sources

In addition to the sediment quality investigations in Bellingham Bay, the Pilot Project has compiled and evaluated a considerable amount of information on water quality and potential pollution sources (Pacific International, et al, 1999 and Anchor Environmental, 1999). Through these efforts, available information on point source, surface water, groundwater, and other non-point sources of sediment contamination and potential near-field water quality concerns were compiled and evaluated. This evaluation found no specific ongoing discharge sources for mercury, phenol, 4-mehtylphenol, wood debris, or other sediment contaminants.

Table 5 below provides a tabular summary discussion on the facilities that have a direct release to Inner Bellingham Bay. The details of the discharge sources by each grid cell location is presented in Appendix A-7. The detailed discussion of potential sources in Bellingham Bay was collected from facility and project managers at the Department of Ecology and from the "Bellingham Bay Demonstration Pilot Sediment Site and Source Control Documentation Report" (Anchor Environmental, 1999). Source locations are depicted in Figure 2.

Table 5- Discharge Sources in Inner Bellingham Bay.

Sources in Bellingham Bay	Summary Discussion
NPDES Permittees	
Bornstein Seafoods	All process wastewater is treated and discharged to the sanitary sewer. Control of stormwater releases from the Bornstein facility is being performed under Ecology's NPDES program.
Bellingham Marine Industries	Surface sediment sample collected within the vicinity of the site do not exceed SQS biological effects criteria.
C Street Stormwater and Combined Sewer Overflow (CSO)	The C-street CSO is regulated under the NPDES permit for the Bellingham Post Point Wastewater Treatment Plant (Ecology, 2000). Department of Ecology records show that there has not been a CSO discharge event in the past 10 years.
Georgia-Pacific Outfall	Sampling data confirmed that the sediments at the G-P outfall comply with SQS criteria for mercury. G-P NPDES permit requires compliance and sediment monitoring.
Harris Avenue Shipyard	All process wastewater is collected and treated prior to discharge to the sanitary sewer. The facility is planing to collect industrial stormwater run off, provide treatment and discharge it to the sanitary sewer.
Urban Stormwater Runoff (includes primary storm drains and all other flow)	*Technical studies do not currently identify city stormwater sources as an on-going contributor to the sediment contamination problems in Bellingham Bay. This was demonstrated in the "Final Data Compilation and Analysis", Pacific International Engineering and Anchor Environmental, 1999; and "Sediment Source Control Documentation Report", Anchor Environmental, 1999.*
Upland Remediation Sites	
Roeder Avenue Landfill	Ecology is overseeing upland cleanup and redevelopment work under the Voluntary Cleanup Program.
G-P Log Pond	Ecology is currently overseeing upland cleanup activities, which include isolation of the log pond from the bay.
Boulevard Park	Surface sediment samples collected adjacent to the site do not exceed SQS biological effects criteria.
Chevron Bulk Fuels Facility	Surface sediment samples collected within the vicinity of the site did not exceed SQS biological effects criteria. Independent remedial actions have been implemented at the site.
R.G. Haley	Surface sediment samples collected in the vicinity of the site do not exceed SQS chemical criteria. Emergency actions have been taken to control seepage from the site under Ecology oversight.
Cornwall Avenue Landfill	Control of seepage and erosion is occurring through emergency actions. The source control and cleanup work are being addressed under Ecology's Voluntary Cleanup Program.

Loading Capacity

Identification of the loading capacity is an important step in developing TMDLs. The loading capacity is the amount of pollutant a water body can receive and still meet water quality standards. By definition, a TMDL is the sum of the allocations. An allocation is defined as the portion of a receiving water's loading capacity that is assigned to a particular source. EPA defines the loading capacity as "the greatest amount of loading that a water can receive without violating water quality standards."

The loading capacity for this TMDL is the combination of the waste load and load allocations for the existing dischargers, which will fully meet the requirements of the Sediment Management Standards for sediment quality. Historic contaminant loadings to sediments in Inner Bellingham Bay have been responsible for the 303(d) listings. Cleanup activities and source control to prevent sediment recontamination will be implemented to achieve compliance with the state Sediment Management Standards with the goal of maintaining sediment quality that satisfies SQS criteria.

The loading capacity throughout Inner Bellingham Bay is the mass loading (mg/kg) from historic and ongoing sources that maintains compliance with the state Sediment Management Standards. The loading capacity will be achieved through sediment remediation activities and setting load and/or wasteload allocations for sources, where necessary, to achieve SMS compliance.

For many 303(d) listed parameters in Bellingham Bay, natural attenuation and recent source control activities has resulted in compliance with the loading capacity (meeting SMS). The SQS criteria for these parameters in sediment is not currently exceeded from historic contamination or ongoing sources. For this reason, all the parameters in areas meeting the standards should be removed from the 303(d) list in the next listing cycle. Table 6 provides an inventory of the 303(d) listed parameters recommended for de-listing based on analysis of the recent sediment data.

For Whatcom Waterway, mercury, phenol, 4-methylphenol, sediment bioassay, and wood debris remain as parameters requiring action. The sediment cleanup will remediate the historical contaminant loadings that were responsible for the 303(d) listing. Future recontamination from these parameters have not been identified as a potential from ongoing sources in Inner Bellingham Bay. The loading capacity is therefore designed as the mass loading that maintains compliance with the state Sediment Quality Standards Criteria for mercury, phenol, 4-methylphenol, sediment bioassay, and wood debris (mercury: 1.2 mg/kg; phenol: 420 μg/kg; 4-methylphenol: 670μg/kg; wood debris: <50% by volume; sediment bioassay: “no adverse effects on biological resources”). The mass loading from any source or combination of sources is not to exceed the SQS criteria.

For upland sources, sediment cleanup is designed to remediate the historical contaminant loading responsible for the 303(d) listing. On-going impacts to sediments are controlled through source control activities, namely, upland isolation and remediation. Current sources of sediment contamination have not been identified in the bay. All activities are designed to provide

assurance against recontamination and to maintain compliance with the state Sediment Management Standards with the goal of maintaining sediment quality that satisfies SQS criteria.

Appendix A-8 provides more detail on the loading capacity definition for each 303(d) listed grid cell.

Table 6- 303(d) listed parameters recommended for de-listing based on analysis of recent data used in the development of the Bellingham Bay TMDL.

WBID	Grid cell #	Cleanup site name	De-listed Parameters Proposed
WA-01-0050	**H4E9**	Whatcom and I&J Waterways	2,4-Dimethylphenol 2-Methylnaphthalene Acenapthene Anthracene Arsenic Benz(a)anthracene Benzo(a)pyrene Benzo(b,k)fluoranthenes Bis(2-ethylhexyl)phthalate Chrysene Copper Dibenz(a,h)anthracene Dibenzofuran Fluoranthene Fluorene Indeno(1,2,3-cd)pyrene Pentachlorophenol Phenanthrene Pyrene Zinc
	H5D1	G-P Outfall	Mercury

Load and Waste Load Allocations

The objective of the Bellingham Bay Contaminated Sediment TMDL is to meet Washington State's Sediment Management Standards in Bellingham Bay. The wasteload allocations in Bellingham Bay can be described in terms of "Load Reduction", meaning the physical removal and/or isolation of historic contaminated sediments, and the "Waste Load Allocation" (WLA) or "Load Allocation" (LA) to each existing point or nonpoint source, respectively. There are no non-point discharge sources in Bellingham Bay, therefore, no load allocations apply. Historic sediment contamination is the reason for the sediment quality impairment and subsequent 303(d) listing in Inner Bellingham Bay. The Load Reduction is achieved through the implementation of the cleanup strategies that will bring all areas of the Bay in compliance with the Sediment Management Standards. The Wasteload for each source is the required discharge load that ensures the standards are met at any outfall or upland source. In other words, Waste Load Allocations for each potential source is the discharge concentration or loading at which sediments will not be recontaminated above applicable standards.

Georgia Pacific (Grid Cell Number H5D1)

Waste Load Allocations apply to point sources in Bellingham Bay. One point source that requires a Waste Load Allocation is the G-P outfall. Sampling results from 1999 demonstrate that this area no longer exceeds SQS criteria for mercury (Anchor Environmental, 2000A). The recent data also confirm model predictions of source control and natural recovery. Further discharge controls have been implemented at G-P, including the closure of the chlor-alkali plant, which will only improve the discharge quality from the G-P outfall. For the purposes of this TMDL, a Waste Load Allocation to G-P for mercury should remain consistent with the input parameters selected in the WASP modeling exercise and the effluent limitation calculated for the NPDES permit. The WASP analysis showed a mass loading of 0.043 kg/day mercury would be protective of sediment quality. This mass loading for the model input was derived from the actual sampling record 1995 to 1997 treating all non-detect values as at the detection limit of 0.2 μg/L (The average mass loading using one-half detection for non-detectable data was 0.033 kg/day). During that same discharge period, the mercury average concentration in the discharge was 0.24 μg/L.

The current average permit limit of 0.03 lbs/day (0.014 kg/day) (Ecology, 2001) is below the mass loading from the model results for the chlor-alkali plant effluent. Final closure and remediation of the chlor-alkali plant is expected to eliminate the discharge of mercury entirely from the G-P outfall. The effluent limitation is more restrictive than the allowable mercury release determined in the WASP model. The current permit limit of **0.014 kg/day will be the WLA** for G-P in this TMDL, which provides a margin of safety of about 0.03 kg/day. Due to process changes at the G-P facility, future permits will reflect reduced industrial activities and may result in lowering the WLA for mercury to zero.

Other Discharges

The sediment contamination in Bellingham Bay is due to historic releases. All current sources discharging to Inner Bellingham Bay have gone through a multiphase process of evaluation to assess compliance with the state's Sediment Management Standards. No ongoing sources have

been documented as currently contributing to the sediment quality impairments in Inner Bellingham Bay. Therefore, wasteload Allocations are not necessarily required for the remaining discharging sources. **Where the discharge from any facility is not currently, nor expected to, result in sediment contamination to the SQS criteria, a WLA is not calculated**. If a WLA were provided up to the SQS level, Ecology would in effect be allowing a greater mass loading of sediment contaminants than is currently released from these facilities. **Where upland sources are or should be controlled or eliminated, WLAs are not established.**

The following describes the applicable WLAs for each 303(d)-listed grid cell in Bellingham Bay:

Grid Cell Number H4F9- I&J Waterway

- Bornstein Seafoods- no WLA is given.
- Roeder Avenue Landfill- WLAs are not established for the 303(d) listed parameters. The previous impact to sediments from this source have been effectively controlled to result in no discharge of contaminants to criteria levels.

Grid Cells numbers H4F9, H4E8, H4E9, H4D9, H5D0, H5E0- Whatcom Waterway

- Bellingham Marine Industries- no WLA is given.
- G-P Log Pond- a WLA is not established for mercury since the discharge source is effectively eliminated.
- "C" Street Stormwater and Combined Sewer Overflow (CSO)- 4-methylphenol in nearshore sediments within the outfall area may be more closely tied to historical deposits of woody debris and not to CSO discharges. Nonetheless, the WLA for this source is the discharge level that does not exceed a level of 670μg/kg for 4-methylphenol and 420 μg/kg for phenol in receiving water sediments.
- Boulevard Park- WLAs are not established for the 303(d) listed parameters.
- Chevron Bulk Fuels Facility- WLAs are not established for the 303(d) listed parameters.
- R.G. Haley- WLAs are not established for the 303(d) listed parameters.

Grid Cell Number H4D9- Cornwall Avenue Landfill

WLAs are not established for the 303(d) listed parameters (mercury, phenol, 4-methylphenol, PCBs, and wood waste). The impact to sediments from this source is effectively controlled to result in no discharge of contaminants adversely affecting sediments.

Grid Cell Number H5C1- Harris Avenue Shipyard

Discharge sources from the shipyard are currently effectively controlled through NPDES Permit No. WA-003134-8 (Ecology, 1994. Harris Avenue Shipyard was formerly known as "Maritime Contractors, Inc."). The current stormwater discharges from this facility have not been documented to result in levels that cause exceedances of SQS levels for the 303(d) listed parameters. Under the next NPDES permit, Ecology plans to require the collection and treatment of all industrial stormwater prior to discharge to the sanitary sewer system. The shipyard's NPDES permit is and will continue to require meeting local limitations established for the protection of the Bellingham Post Point Treatment Plant for the discharge to the sanitary sewer. Limitations for the sanitary sewer discharge are currently established for copper, lead, zinc, and arsenic. After the facility completes the project to tie all industrial stormwater sources to the sanitary sewer system, the WLAs for the discharge to surface water for these metals will be zero.

Bay-wide Sources

City of Bellingham Stormwater- no WLAs are calculated. The stormwater program and monitoring of city stormwater and in-water sediments is discussed in the "Summary Implementation Strategy" below.

The goal of this TMDL is to maintain compliance with the chemical and biological criteria for sediment quality in the SMS rule. This goal will be enforceable through: 1) the individual and general NPDES permits in the Bay; 2) the implementation of the BMPs identified in the stormwater programs of the City and Port of Bellingham; and 3) the sediment and upland remediation activities under MTCA.

Narrative effluent limitations may be used in NPDES permits, such as specific BMPs, to define compliance with the State Sediment Management Standards as a permit condition. The use of narrative effluent limitations for stormwater is consistent with written EPA policy (EPA, 1996). Furthermore, the Sediment Quality Standards provide a monitoring trigger, or action level, for surface sediments in the Bay. If monitoring demonstrates that the Bay does not comply with the standards in the future, additional source investigation and control and/or remediation activities will be required.

Compliance with the sediment standards will be assured through the development and state oversight of local stormwater pollution prevention programs, NPDES permits, remediation activities, and sediment monitoring in Bellingham Bay. This is discussed in more detail in the Summary Implementation Strategy section.

Monitoring Plan Developed Under this Approach

Monitoring provides a measure as to whether the control activities achieve the expected load reductions to maintain compliance with the Sediment Management Standards. Compliance monitoring is a required component of remedial actions under the MTCA rule. Discharge monitoring is also a requirement in individual NPDES permits. The monitoring approach in this TMDL will be consistent with the monitoring plans for all the individual cleanup and source control strategies in Bellingham Bay.

Sediment monitoring in Bellingham Bay is designed to: 1) measure contaminants in the surface sediments where they exists; 2) evaluate the effectiveness of control actions (e.g. sediment and upland remediation, stormwater BMPs, etc.); and 3) determine the need for additional pollutant controls through a process of adaptive management. More details on the monitoring approach are given below under "Summary Implementation Strategy".

Margin of Safety

The statute requires that a margin of safety be identified to account for uncertainty when establishing a TMDL. The margin of safety can be explicit in the form of an allocation, or implicit in the use of conservative assumptions in the analysis. Several conservative assumptions and critical conditions used in the analysis and modeling of the Bellingham Bay Contaminated Sediments TMDL provide an inherent margin of safety as required by the statute.

In most cases for this TMDL, the margin of safety is not strictly calculated or allocated. Rather, the margin of safety is **implicit** due to the conservative assumptions that have been used throughout the analyses.

Conservative assumptions that have been used include:

- Delineating cleanup footprints beyond the cleanup boundaries defined strictly by the data;
- Using upper-bound (worst case) flows and concentrations in recontamination modeling analyses for potential sources;
- Using high seafood consumption rates and assuming all mercury is in a bio-available form for the bioaccumulation assessment in the Whatcom Waterway RI/FS Study (Anchor Environmental/Hart Crowser, 2000);
- Conservative assumptions in the G-P outfall WASP model including:
  - Input values for mercury assumed all non-detectable data to be at the full detection value;
  - High-end literature and empirical values were taken for the mercury partitioning coefficient;
  - Conservative dispersion coefficients were used to predict a more concentrated plume at the outfall; and
  - Ambient mercury concentrations were assumed to be the highest value sampled in background locations.

The margin of safety for the G-P outfall wasteload allocation is **explicitly** calculated based on the difference between the permitted discharge and the allowable discharge calculated from mathematical modeling and sampling. The actual mass loading for mercury from the G-P Outfall and established in the NPDES permit is expected to be about a third of the mass loading allowed from the WASP modeling effort. The calculated margin of safety is 0.03 kg/day.

Summary Implementation Strategy

Overview

The Bellingham Bay Demonstration Pilot Work Group was established to address the need for sediment cleanup and to expedite remedial actions. The Pilot Work Group brought together a cooperative partnership of agencies, tribes, local government, and businesses to develop an approach to source control, sediment cleanup and associated habitat restoration in Bellingham Bay. The Pilot Work Group developed a Comprehensive Strategy that considered contaminated sediments, sources of pollution, habitat restoration, and land-use from a baywide perspective.

The Bellingham Bay Comprehensive Strategy developed by the Pilot Work Group includes the cleanup actions and source controls measures that comprise the TMDL implementation strategy. An Environmental Impact Statement (EIS) was prepared to describe the approach and evaluate the potential environmental impacts of implementing the strategy (Anchor 2000B). The final EIS for the Comprehensive Strategy was issued in October 2000.

Implementation Plan Development

The Bellingham Bay Demonstration Pilot Project is an initiative of the Cooperative Sediment Management Program designed to meet the challenge of coordinating navigation needs with contaminated sediment and habitat management issues in Bellingham Bay. The participants involved in the Pilot Project include:

- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife
- U.S. Environmental Protection Agency
- National Marine Fisheries Service
- Washington State Department of Ecology
- Washington State Department of Natural Resources
- Washington State Department of Transportation
- Washington State Department of Fish and Wildlife
- Puget Sound Water Quality Action Team
- City of Bellingham
- Port of Bellingham
- Whatcom County Health Department
- Lummi Nation
- Nooksack Tribe
- Georgia-Pacific West, Inc.

The Department of Ecology provided grant dollars for local government to help fund the Pilot Project. The Port of Bellingham and Ecology carry out the day-to-day management of the project. In the Comprehensive Strategy, the Pilot Work Group identifies a range of near-term remedial action alternatives that address high priority sediment cleanup/source control sites (Anchor 1999B). The high-priority sites identified in the Comprehensive Strategy include all the 303(d) listed areas of Inner Bellingham Bay. The cleanup and source control activities associated with a particular priority site are conducted by the individual parties responsible for the contamination. The Department of Ecology oversees, regulates and enforces the cleanup processes through the authority under the Model Toxics Control Act (Chapter 173-340 WAC).

The approaches used to meet the load allocations include the sediment cleanup projects, associated source control activities, and NPDES permits, where appropriate. The success of the

TMDL implementation will be assessed through meeting milestone dates for cleanup as well as through monitoring plans.

Implementation Activities

Implementation activities planned as part of the remediation and source control process in Bellingham Bay will attain compliance with Sediment Management Standards. Based on monitoring and evaluation, adaptive management principles will be used to track and target future activities in the Bay to assure compliance with Sediment Management Standards.

Implementation activities for each 303(d) listed grid cell in Inner Bellingham Bay are provided below.

Grid Cells numbers H4F9, H4E8, H4E9, H4D9, H5D0, H5E0- Whatcom Waterway

Sediment Remediation

Georgia- Pacific, with oversight from Ecology, has conducted an RI/FS in accordance with a MTCA Agreed Order. The Whatcom Waterway Final RI/FS (Anchor Environmental/Hart Crowser, 2000) includes technical information and evaluates a range of potential remedial actions for the Whatcom Waterway site. In addition, the waterway is a high priority site as defined in the Bellingham Bay Comprehensive Strategy. The Comprehensive Strategy Final EIS (Anchor Environmental, 2000) identifies and evaluates a range of potential near-term remedial action alternatives that address several high priority sites including the Whatcom Waterway site.

Both the RI/FS and the final EIS will inform Ecology's preparation of a draft Cleanup Action Plan (CAP) that is issued for public review. The CAP will be implemented through a MTCA Consent Decree with Ecology and a draft is scheduled to be available in 2001.

The proposed cleanup strategies include treatment, removal, and in-water containment of contaminated sediment to meet the SQS criteria throughout the Whatcom Waterway site. In areas where containment through capping is proposed as the remedial action, clean capping material would meet or exceed standards for quality established by the Puget Sound Dredged Disposal Analysis (PSDDA) program. The PSDDA process created the Dredged Material Management Program (DMMP) to manage dredged material activities. This includes the development of evaluation procedures to characterize the suitability of sediments for disposal and capping. The DMMP provides screening level (SL), bioaccumulation trigger (BT) and maximum level (ML) guideline chemistry values for 62 chemicals or classes of chemicals in marine sediments (Appendix A-9). The screening levels are at least as stringent as the SQS criteria in the state's Sediment Management Standards, and represent concentrations below which adverse biological effects are considered to be unlikely.

Ecology expects that the actual cleanup of the Whatcom Waterway site will begin in 2002 and continue until 2004-2005.

Upland Remediation

- G-P Log Pond
  G-P and Ecology are currently evaluating additional source control and cleanup actions to ensure that sediments within the Log Pond remain below SQS chemical criteria following the

cleanup action under MTCA.

- R.G. Haley
  Soil and groundwater at this upland contaminated site contain concentrations of pentachlorophenol and PAHs that exceed water quality and sediment protection criteria, respectively. Groundwater seeps from the site to the Bay were recently discovered. Emergency actions to control seepage from the site were in place by fall 2000. Following emergency activities, an RI/FS will be conducted under Ecology's VCP.

NPDES Permits

- "C" Street stormwater and CSO
  The C Street CSO is regulated under the Bellingham Post Point NPDES Permit (No. WA-002374-4). The CSO is designed to meet, and has met, the state standard of not more than one discharge event per year. Department of Ecology records show that there has not been a single CSO event in at least the past 10 years. The C Street stormwater discharge will be identified as an outfall of concern in the development of the City of Bellingham Comprehensive Stormwater Program and under the NPDES general stormwater program. The Puget Sound Water Quality Plan contains minimum elements that the city of Bellingham will include in its Comprehensive Stormwater Program by June 30, 2000. Bellingham is also a "Phase II" city in the federal stormwater NPDES permitting program, which will require stormwater programs meeting the federal requirements to be in place by March 2003. Through the Department of Ecology's stormwater program review and approval process, source control activities and potential sediment cap sampling in the vicinity of the "C" Street outfall will become components of the city's stormwater program.

Grid Cell Number H4F9- I&J Waterway

NPDES Permits

- Bornstein Seafoods
  Bornstein Seafoods carries a State Waste Discharge Permit (ST7304) for the discharge of screened seafood processing wastewater to the Bellingham Post Point WWTP. They have a Baseline General Permit for Industrial Stormwater (SO3-000679). The Washington State Department of Ecology administers both permits. Although, Bornstein Seafoods is not identified as an ongoing source of contaminated sediments, water quality investigations will be conducted as part of Ecology's permit management activities and the TMDL implementation.

Upland Remediation

- Roeder Avenue Landfill
  The Port of Bellingham is currently conducting an RI/FS at the site under Ecology's VCP. Cleanup activities will occur under a MTCA order or decree in 2001/2002.

Grid Cell Number H5D1- Georgia-Pacific Outfall

NPDES Permit

- Georgia Pacific
  NPDES Permit No. WA-000109-1 includes effluent limitations for mercury, a mercury

source evaluation sampling plan, as well as sediment monitoring requirements in Bellingham Bay. The current NPDES permit (Ecology, 2001) contains effluent mass limitations that satisfies the WLA in this TMDL (see the discussion in the "Load and Waste Load Allocations" section above). The permit is the mechanism for enforcement of the WLA for this TMDL.

The NPDES permit also requires further sediment evaluation beginning with sediment monitoring within one year of the Department of Ecology's approval of the sampling plan. G-P conducted baseline sediment sampling in 1999. Another round of sediment sampling will be performed within approximately 5 years to characterize sediment in the vicinity of the G-P outfall after sediments have responded to the closure of the chlor-alkali facility. The NPDES permit will also require G-P to evaluate potential 4-methylphenol sources in the outfall area surface sediments.

Grid Cell Number H5C1- Harris Avenue Shipyard

Sediment Remediation

The Port of Bellingham is currently conducting an RI/FS of the sediment component of the site under the Department of Ecology's Voluntary Cleanup Program (VCP) to address all the parameters on the 303(d) list (PCBs, Phenol, and metals). In addition, the Harris Avenue Shipyard is a high priority site as defined in the Bellingham Bay Comprehensive Strategy EIS. The RI/FS, and the EIS will inform Ecology's development of a draft Cleanup Action Plan (CAP) for public review. Implementation of the CAP will be under a MTCA consent decree with Ecology.

The RI/FS was complete in 2001. The consent decree and Cleanup Action Plan are expected to be complete in 2001 with the final cleanup complete in 2004. The cleanup action will bring sediments in compliance with sediment quality criteria in the state's Sediment Management Standards.

NPDES Permit

The NPDES permit (No. WA-003134-8) for the shipyard operations is designed to control shipyard activities to prevent sediment recontamination. The sediment contamination in the Bay is due to historic releases, and the current discharge from the shipyard does not pose a threat to sediment recontamination. The shipyard is inspected regularly by Ecology. Best Management Practices are in place to eliminate releases to the Bay during dry dock operations. Under the next NPDES permit all stormwater runoff from the site will collected and treated prior to discharge to the sanitary sewer. The NPDES permit also requires extensive sampling, chemical and biological testing, and sediment monitoring in Bellingham Bay. The next NPDES permit is scheduled to be issued for Harrison Avenue Shipyard in the winter of 2002. Conditions and monitoring requirements for stormwater and sediment in the NPDES permit will be reviewed in the context of this TMDL upon renewal.

Grid Cell Number H4D9- Cornwall Avenue Landfill

Sediment Remediation

The Port of Bellingham in conjunction with the City of Bellingham and Washington State DNR has completed a Remedial Investigation and Feasibility Study (Landau, 2000) of this site under Ecology's Voluntary Cleanup Program. In addition, the Cornwall Avenue Landfill site is identified as a high-priority in the Bellingham Bay Comprehensive Strategy EIS. The RI/FS and

the EIS will inform Ecology's development of a draft Cleanup Action Plan for public review. The CAP will be implemented under a consent decree with Ecology.

The consent decree and Cleanup Action Plan are expected to be complete in 2001 with the final cleanup complete in 2004-2005. The cleanup action will bring sediments in compliance with sediment quality criteria in the state's Sediment Management Standards.

Bay-wide Activities

As part of developing the Bellingham Bay Comprehensive Strategy, all potential sources discharging to Bellingham Bay have gone through a multiphase process of evaluation for sediment recontamination potential. In this process, the evaluation tools included:

- Sediment quality screening and characterization in the receiving environment to determine the presence of SQS excursions at all sources;
- Contaminant transport analysis using the maximum predicted loading at each source to determine the potential for sediment recontamination after the cleanup process is complete;
- Source control evaluation based on the recontamination potential for each source.

The source control evaluation utilized a tiered approach by placing each potential source in one of three categories. The categories are in order of potential detrimental impact, and each category is assigned an appropriate monitoring scheme:

1. No potential to recontaminate sediments - the area will be monitored through existing programs;
2. Potential to recontaminate sediments, but the source can be adequately controlled to remove that potential to recontaminate – these sources will be controlled through the remedial design and a sediment monitoring program will be put in place;
3. Potential to recontaminate a small area after full implementation of source control- this will not hinder the cleanup strategy for the Bay. These will be controlled to AKART standards and will be monitored to confirm if there is an impact to sediments. Further source controls may be applied, and a Sediment Impact Zone (WAC 173-204-415) of limited area will be requested only as a last resort. A long term monitoring program consistent with SIZ requirements will be put in place.

The source control categories will be implemented on a case-by-case basis for all ground and surface water sources in the Bay through upland remedial actions, individual or general permits, or local stormwater management programs. The summary list of sources in Bellingham Bay, their water quality concerns, and planned control mechanisms are listed in Appendix A-7.

City of Bellingham NPDES Stormwater General Permit and Comprehensive Stormwater Program

The technical studies developed as part of the remedial activities in Bellingham Bay did not identify city stormwater sources as an on-going contributor to the sediment contamination problems in Bellingham Bay. Nonetheless, the city is participating in the Bellingham Bay Source Control Action Team that will track on-going source control programs and activities in Bellingham Bay to ensure there are not gaps that could result in sediment contamination or recontamination.

The City of Bellingham originally developed a local stormwater program and submitted it to the Department of Ecology in 1999. It included an extensive source cleanup program, which incorporated vactor waste activities, and a comprehensive plan. After review of the program, Ecology recommended that the city concentrate on improvements in following two areas: 1) coordinate the stormwater program with the planned sediment cleanup in Bellingham Bay; and 2) improve the stormwater plan requirements for redevelopment. Many of the City of Bellingham's storm drains discharge to Bellingham Bay. City has been implementing their comprehensive stormwater program with existing resources and is pursuing local funding sources to implement a more extensive program in 2001.

The Puget Sound Water Quality Management Plan (PSWQMP) also requires all cities and counties to adopt and implement a basic stormwater program. The content of Bellingham's Comprehensive Program is consistent with PSWQMP and includes:

1. Adoption of local Stormwater Ordinances which-
    - Control off site water quality and quantity effects
    - Require the use of BMPs for source control and treatment
    - Protect Beneficial Receiving water uses
    - Control erosion and sedimentation from new construction and redevelopment projects
    - Provides for local enforcement of these stormwater controls
2. Development and enforcement of operation and maintenance programs
3. Adoption of the Stormwater Technical Manual
4. Public education programs for citizens, businesses, and industries
5. Adoption of comprehensive land use plans
6. Identification and ranking of significant pollutant sources
7. Investigation and correction of illicit discharges into stormwater systems
8. Programs for the proper O&M of stormwater conveyance and treatment systems
9. A water quality response program to investigate complaints
10. Source of adequate local funding for the SW program
11. Local watershed coordination agreements
12. Ordinances requiring implementation of stormwater controls for new development and re-development
13. Inspection, compliance and enforcement program
14. Implementation schedule

The stormwater program requirements for the City of Bellingham under the PSWQMP Comprehensive program are substantively the same as the requirements under the Phase I Municipal NPDES stormwater permits. The City of Bellingham will be covered under the Phase II municipalities stormwater NPDES permit in 2003. However, the requirements under the city's current comprehensive program exceed the minimum control measures required under the Phase II permits.

Under the Phase II NPDES general municipal stormwater permit, the city's comprehensive program will contain components consistent with the implementation of this contaminated sediment TMDL. The Department of Ecology will review Bellingham's stormwater program and may require stormwater/sediment monitoring and source control activities aligned with MTCA monitoring and source control requirements for the various cleanup sites in Inner Bellingham Bay.

Specifically, to minimize the potential for sediment recontamination in the Bay, Ecology recommends the following TMDL implementation strategy activities be incorporated in future NPDES stormwater permit and programmatic reviews:

1. Identify all city stormwater outfall discharges into the areas subject to sediment remediation in Bellingham Bay.
2. Develop an enhanced BMP program for the drainage areas associated with the stormwater outfalls identified above. This may include BMPs such as: increased frequency of catch basin cleaning; system maintenance; catch basin sediment monitoring; and other activities that affect the quality of receiving water sediments.
3. Develop a sediment sampling and analysis plan for these or selected representative outfalls within 12 months after the issuance of the NPDES Phase 2 stormwater permit. This shall include the outfall identification and recommendations for in-water sediment and/or catch basin sediment sample locations and frequency, as necessary.

Along with bay-wide source control efforts, the stormwater program conditions for parameters of concern in the Bay are designed to assure that stormwater does not recontaminate sediment areas that have been remediated. If stormwater sources are identified as having an impact on local sediments in the receiving water, the compliance and enforcement components of the program can be used to target specific source control efforts. Ecology's oversight of the stormwater program provides assurance that source control activities will be carried out and be consistent with this TMDL.

Port of Bellingham Stormwater Program

The Port of Bellingham leads environmental protection efforts at its properties around Bellingham Bay. As part of this role, the Port recently created a Stormwater Master Plan for Squalicum Harbor (David Evans, 2000). The Plan conforms to the City of Bellingham's stormwater requirements as well as the Department of Ecology's Puget Sound Stormwater Technical Manual for all development and redevelopment activities in the Harbor. The Stormwater Master Plan includes a series of pollution prevention operational and structural BMPs and treatment alternatives to reduce or eliminate adverse impacts from Port activities on stormwater and receiving waters. The planned efforts for Squalicum Harbor and Marina is intended to provide a model for Port source control activities throughout Bellingham Bay.

The Port also carries three baseline general stormwater NPDES permits for facilities that drain to or otherwise potentially impact Bellingham Bay. One general permit is for the Bellingham Airport. The Port also has coverage for the maintenance shop near the shipping terminal on Whatcom Waterway and for the Alaska ferry terminal in Fairhaven. Data for these facilities covered under the general permit does not show they are a source of sediment contamination. The Port has developed stormwater pollution prevention plans and programs in conformance with Bellingham's and Ecology's stormwater requirements.

Other stormwater sources

There are no current discharge sources in Inner Bellingham Bay identified as likely to cause sediment contamination. Nonetheless, the tiered analysis (described in "Source Control Activities" above) was applied to all sources. If in the future a stormwater source is identified as a concern, the response will be implemented through agreements or requirements made under

MTCA and/or the City of Bellingham NPDES stormwater general permit and Comprehensive Stormwater Program.

Meeting Standards

In summary, the planned activities outlined in Inner Bellingham Bay Contaminated Sediment TMDL Submittal are designed to bring all the 303(d)-listed sediments into compliance with state sediment standards in the years 2004-2005. Meeting state sediment standards satisfies state Water Quality Standards under Chapter 173-201A, and in turn meets the requirements of section 303(d) of the Federal Clean Water Act.

Public Involvement

Public Activities regarding the Bellingham Bay Demonstration Pilot Project to date include:

- November 1997 – a public information fair was held to introduce the Bellingham Bay Demonstration Pilot Project.
- June/July 1998 – a 30-day public comment period regarding the SEPA scoping for the project and a public meeting were held.
- July/September 1999 – a 60-day public comment period for the Bellingham Bay Comprehensive Strategy Draft Environmental Impact Statement and a public meeting were held.
- June 2000 – public information meeting was held to update the public on the project
- All Pilot Workgroup meetings have been open to the public. Beginning September 2000, Ecology increased public outreach efforts to increase public participation in the Workgroup meetings

Ecology also conducted various community outreach activities throughout the life of the project. Examples include briefings to the city council, neighborhood associations, the Port commission, the chamber of commerce, and local environmental groups.

The Whatcom Waterway site and the Cornwall Avenue Landfill cleanup sites have also had public involvement opportunities:

- July/September 1999 – a 60-day public comment period on the Whatcom Waterway RI/FS
- August/September 1999 - a 30-day public comment period on the Cornwall Avenue Landfill RI/FS

Future public involvement activities will be conducted as part of implementing the Bellingham Bay Comprehensive Strategy. In addition, for each individual cleanup site, Ecology will prepare draft orders or decrees, and associated draft cleanup action plans for public review. The public review periods are typically 30 days, and Ecology will likely conduct a public meeting for each site.

Public review is also a required under the NPDES program. Established review processes will be followed during the re-issuance of all NPDES permit as well as for municipal and industrial stormwater permits in Bellingham Bay.

Future public involvement activities will include reference to the contaminated sediment TMDL for Bellingham Bay. A public meeting specifically addressing this TMDL will be conducted independently or in conjunction with other Bellingham Bay public outreach efforts.

Monitoring Strategy

Discharge and sediment monitoring will assess compliance with the Sediment Management Standards. Monitoring is a required element of a cleanup design for contaminated sediments. For each individual cleanup site, a Cleanup Action Plan (CAP) is developed that contains provisions for monitoring. The implementation of an Ecology-approved CAP, including monitoring, is mandated through a consent decree. In the CAP development process, Ecology determines the sediment monitoring schedule, frequency, parameters, and locations, as well as source monitoring, and additional site specific monitoring needs. The draft consent decree and draft CAP are also subject to public review and comment. Post remediation monitoring is designed to ensure activities are successful in maintaining long-term compliance with the state's Sediment Management Standards. Ecology will use monitoring data and SQS criteria to trigger further source control actions or remediation as necessary.

In addition, the Department of Ecology enforces the monitoring requirements of individual and general NPDES permits. Permits in Bellingham Bay will be reviewed for consistency with this TMDL upon re-issuance.

Reasonable Assurance

Reasonable assurance is defined as a demonstration that the WLAs for point sources, or load reductions for historic sediment releases, derived in the TMDL will be implemented. For point source, assurances can be demonstrated by enforceable NPDES permits, which include effluent limits based on WLAs and/or include specific procedures and mechanisms that ensure the sources will be monitored and controlled. For load reductions, remediation activities are required to bring contaminated sediments into compliance with standards. The reasonable assurance standard requires the procedures apply to the pollutants for which the TMDL is established, be implemented expeditiously, and be supported by adequate funding.

The many activities related to implementation of the Bellingham Bay Comprehensive Strategy and the issuance of NPDES permits provide the reasonable assurance that the requirements for this contaminated sediment TMDL will occur.

Cleanup Actions

The contaminated sediment and upland cleanup sites in Bellingham Bay are carried out under the Department of Ecology's regulatory authority. While Ecology prefers to remediate contaminated sites through cooperative means, the enforcement provisions in the Model Toxics Control Act Cleanup Regulations (Chapter 173-340 WAC) ultimately assure cleanup and monitoring of the contaminated areas in the Bay. Ecology imposes an enforceable schedule for cleanup actions at each site. The expected schedule for each sediment remediation cleanup site in the Bay is given above under "Cleanup sites".

The cleanup actions are coupled with monitoring to assure the remedial actions have been adequately implemented and potential sources adequately controlled. Not only is this a legal requirement, but also there is a strong economic and environmental incentive to monitor and maintain the sediment quality standards in the long-term after remediation (capping, dredging, etc.) is complete.

NPDES Permits

Individual and general permits will be reviewed for consistency with this TMDL and linked to pollutant-specific wasteload allocations or sediment monitoring and BMPs as appropriate.

Ecology also provides reasonable assurance for stormwater impacts through the oversight of the City's stormwater management program. Through linkage with the TMDL and long term monitoring efforts, Ecology can identify potential areas of concern and potential problem stormwater outfalls. Ecology can then oversee the city's source control efforts in problem areas.

Adaptive Management

"Adaptive management" is often defined as the reliance on scientific methods to test the results of actions taken, thereby allowing the management and related policies to be changed promptly and appropriately. Adaptive management logically requires focus on the elements with the greatest uncertainty or risks.

Sediment cleanup techniques have been widely used and proven successful at many contaminated sediment cleanup sites. Potential sources of sediment contamination must be identified in conjunction with cleanup projects. However, the variability of sources, particularly stormwater, necessitates targeted follow-up long-term monitoring to measure the future success of the cleanup and source control activities.

The TMDL process accommodates the ability to track and refine activities, assumptions and processes in the implementation phase. This TMDL for Inner Bellingham Bay contaminated sediments allows for future changes in loading capacities and implementation tactics in the event that monitoring demonstrates the necessity for change in order to attain and maintain compliance with Sediment Management Standards.

Furthermore, the Department of Ecology performs a cyclical watershed scoping process for the whole state on a five-year cycle. Every 5 years, Ecology examines all the TMDLs in the Nooksak basin to assess the effectiveness of management activities and to institute changes as necessary. This TMDL evaluation process is a comprehensive review and is conducted in addition to the on-going evaluation that occurs as part of the sediment remediation and source control processes that proceeds under the Model Toxics Control Act and the NPDES programs.

Funding Sources

At each cleanup site, the liable parties are responsible to fund the remediation activities required to bring their respective sites into full compliance with the Sediment Management Standards. Where responsible parties do not fully fund remediation activities the Department of Ecology maintains the legal authority to carry out remediation activities and subsequently recover the cleanup costs from liable parties.

NPDES permit holders are required to fund the activities necessary to maintain compliance with their respective permits and state water quality regulations.

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Figures

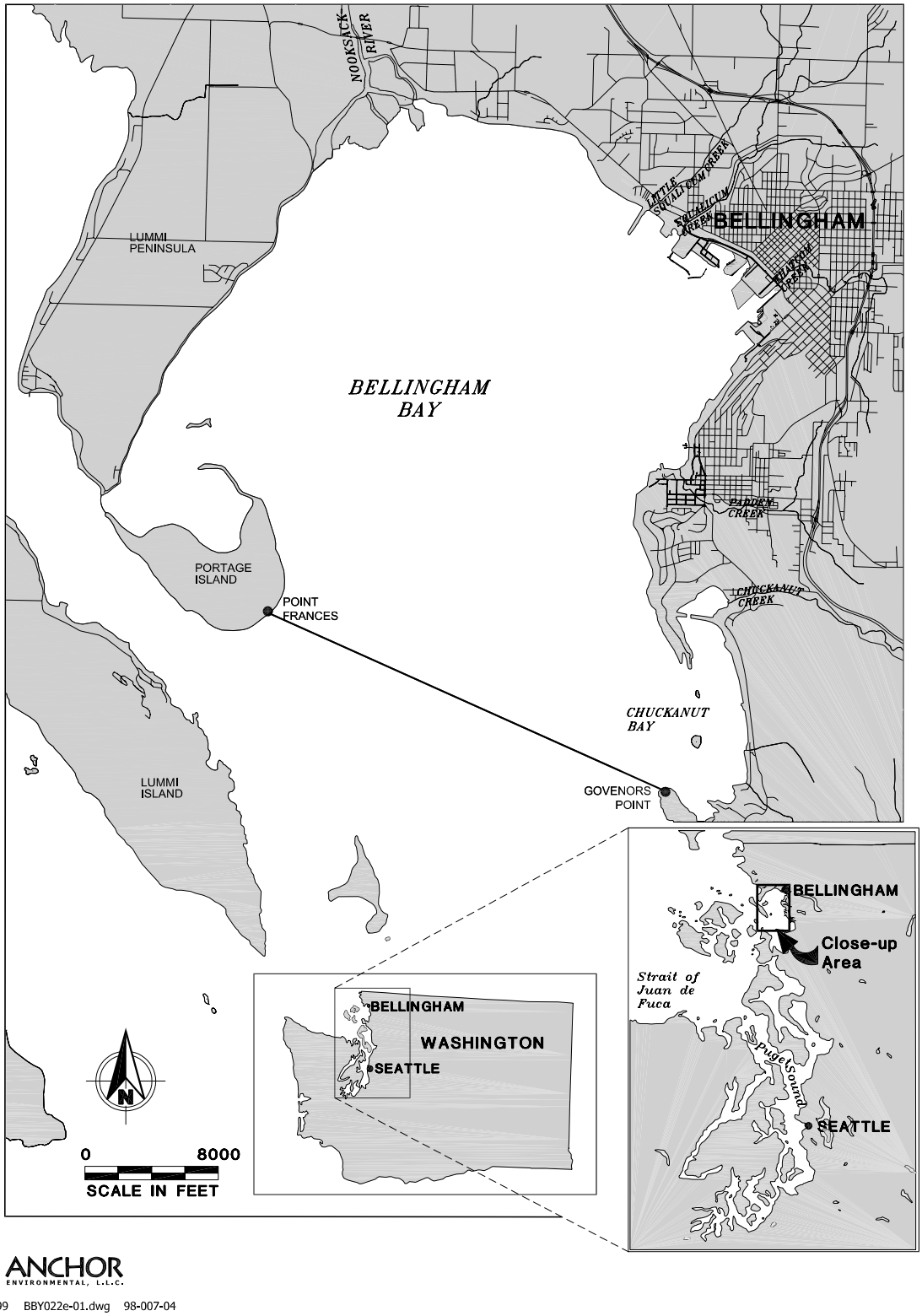

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Figure 1: Bellingham Bay Vicinity Map

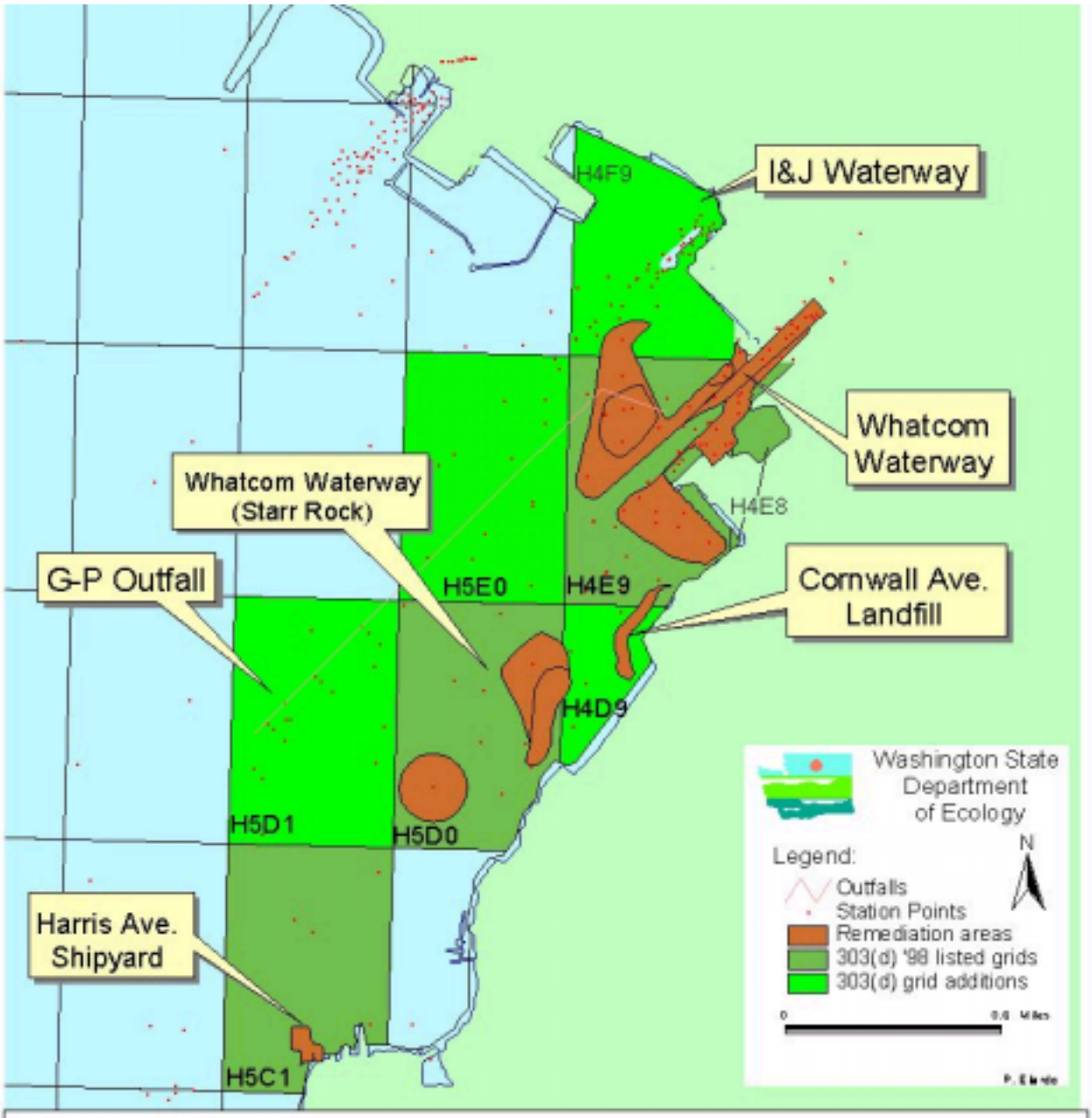


FIGURE 3: Inner Bellingham Bay 303(d) grids, sediment sites, and outfall location

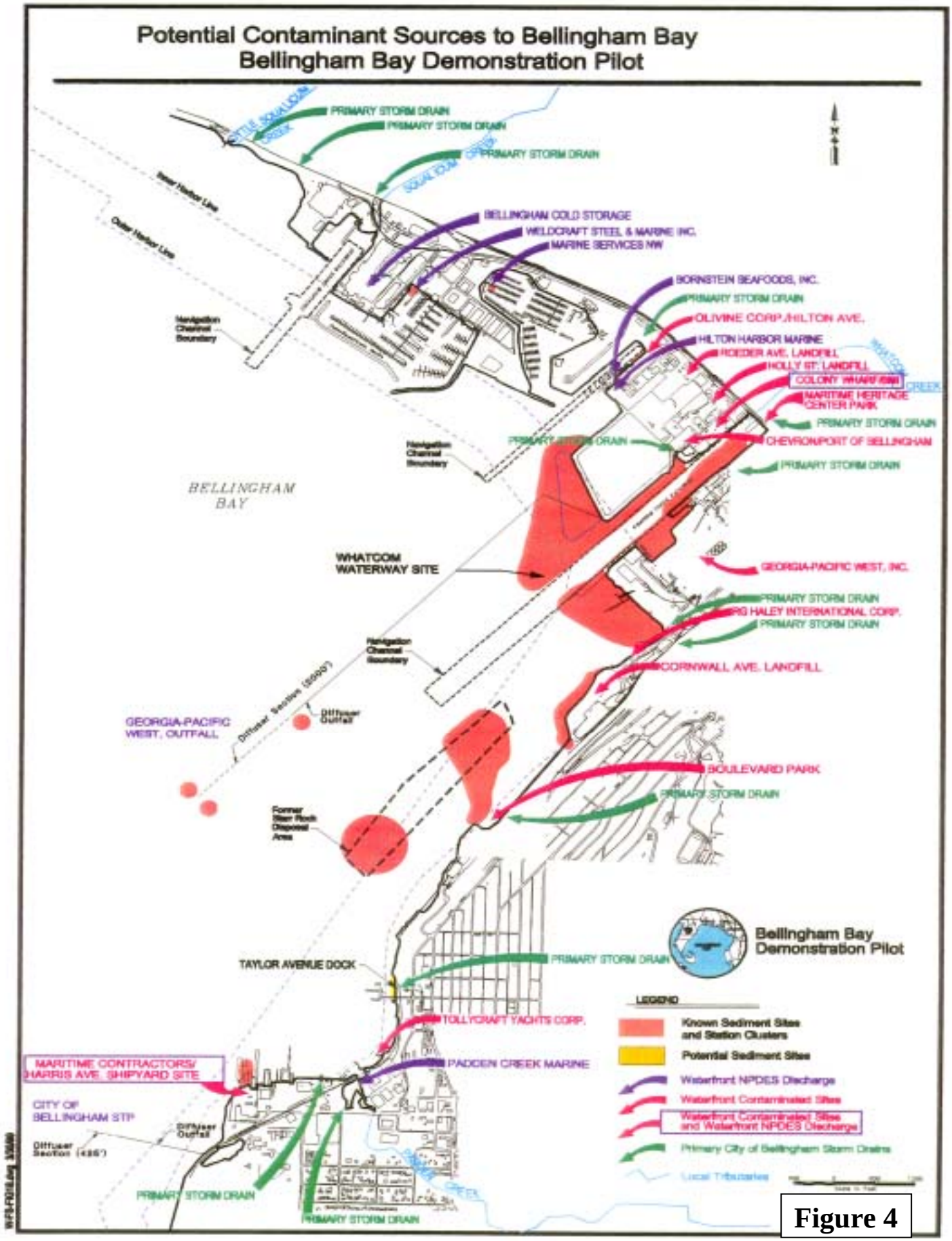

Potential Contaminant Sources to Bellingham Bay
Bellingham Bay Demonstration Pilot
PRIMARY STORM DRAIN
PRIMARY STORM DRAIN
PRIMARY STORM DRAIN
BELLINGHAM COLD STORAGE
WELDCRAFT STEEL & MARINE INC.
MARINE SERVICES NW
BORNSTEIN SEAFOODS, INC.
PRIMARY STORM DRAIN
OLIVINE CORP./HILTON AVE.
HILTON HARBOR MARINE
ROEDER AVE. LANDFILL
HOLLY ST. LANDFILL
COLONY WHARF (SW)
MARITIME HERITAGE CENTER PARK
PRIMARY STORM DRAIN
CHEVRON/PORT OF BELLINGHAM
PRIMARY STORM DRAIN
Navigation Channel Boundary
BELLINGHAM BAY
WHATCOM WATERWAY SITE
GEORGIA-PACIFIC WEST, INC.
PRIMARY STORM DRAIN
RG HALEY INTERNATIONAL CORP.
PRIMARY STORM DRAIN
CORNWALL AVE. LANDFILL
Navigation Channel Boundary
Diffuser Section (2500')
Diffuser Outfall
GEORGIA-PACIFIC WEST, OUTFALL
BOULEVARD PARK
PRIMARY STORM DRAIN
Former Wet Rock Disposal Area
Bellingham Bay Demonstration Pilot
TAYLOR AVENUE DOCK
PRIMARY STORM DRAIN
LEGEND
TOLLYCRAFT YACHTS CORP.
Known Sediment Sites and Station Clusters
Potential Sediment Sites
MARITIME CONTRACTORS/ HARRIS AVE. SHIPYARD SITE
PADDEN CREEK MARINE
Waterfront NPDES Discharge
Waterfront Contaminated Sites
Waterfront Contaminated Sites and Waterfront NPDES Discharge
CITY OF BELLINGHAM STP
Diffuser Outfall
Diffuser Section (435')
Primary City of Bellingham Storm Drains
Local Tributaries
PRIMARY STORM DRAIN
PRIMARY STORM DRAIN

Figure 4

Sampling Location Plan

Whatcom Waterway Area

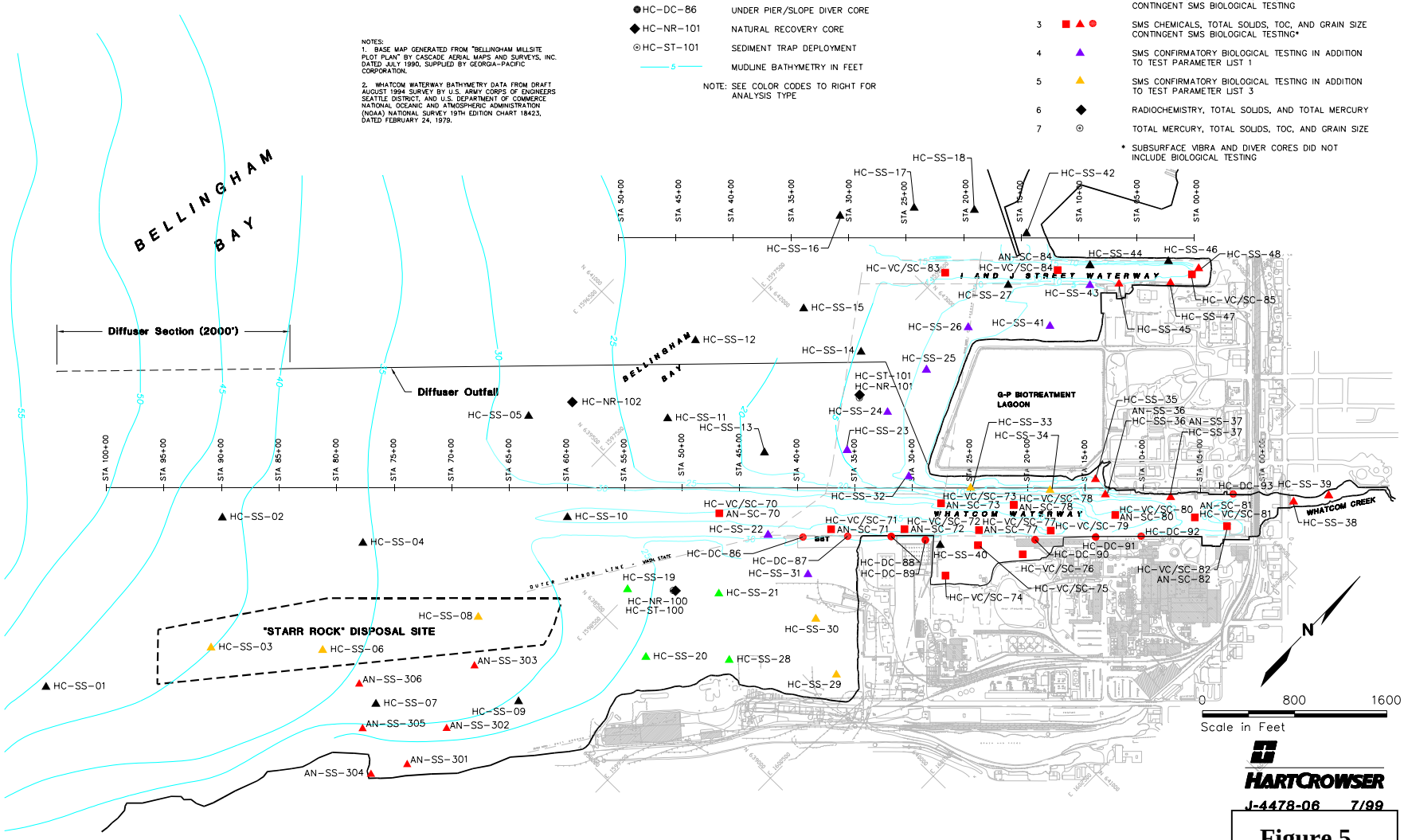
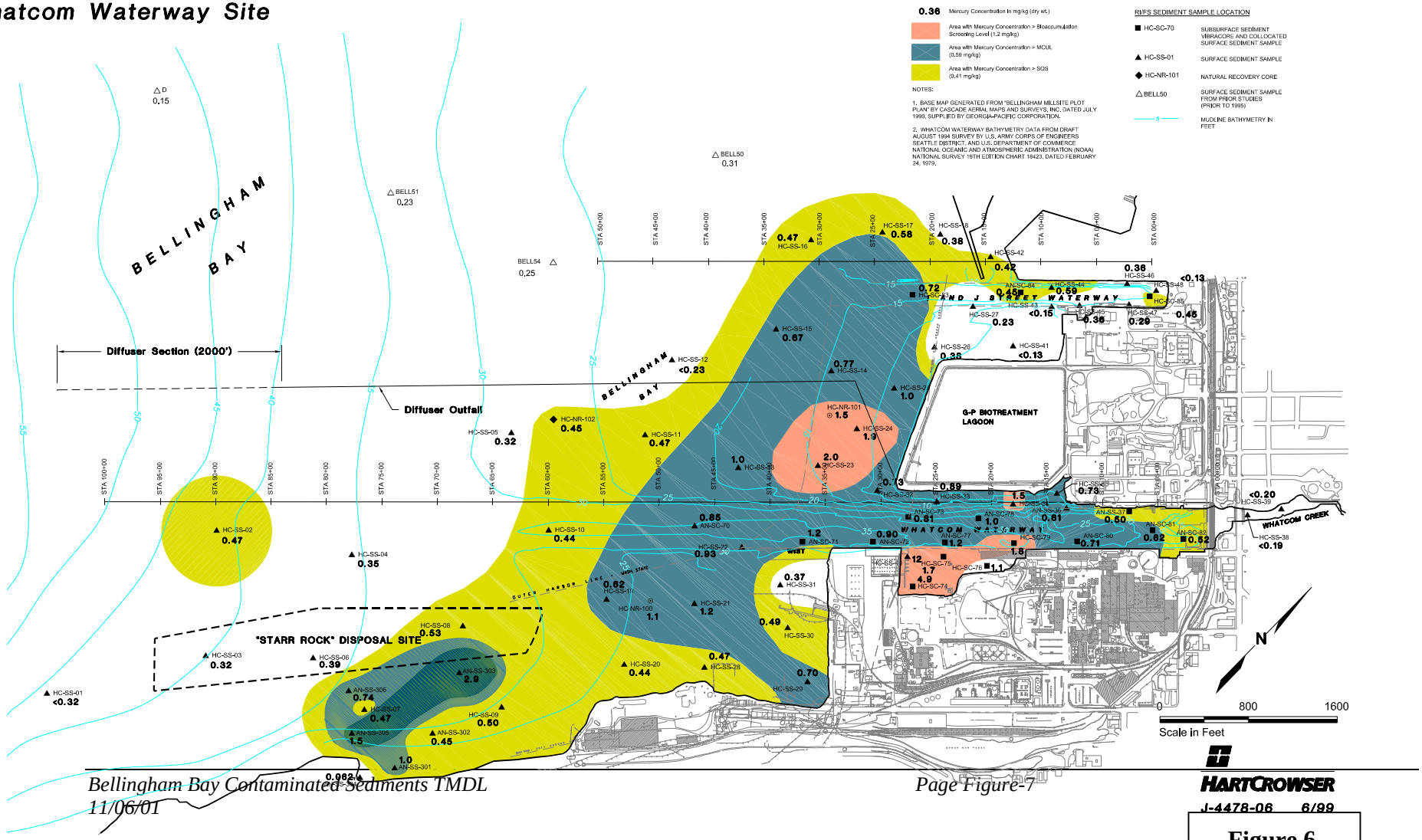


Figure 5

Surface (0 to 10 cm) Sediment Mercury Concentrations

Whatcom Waterway Site

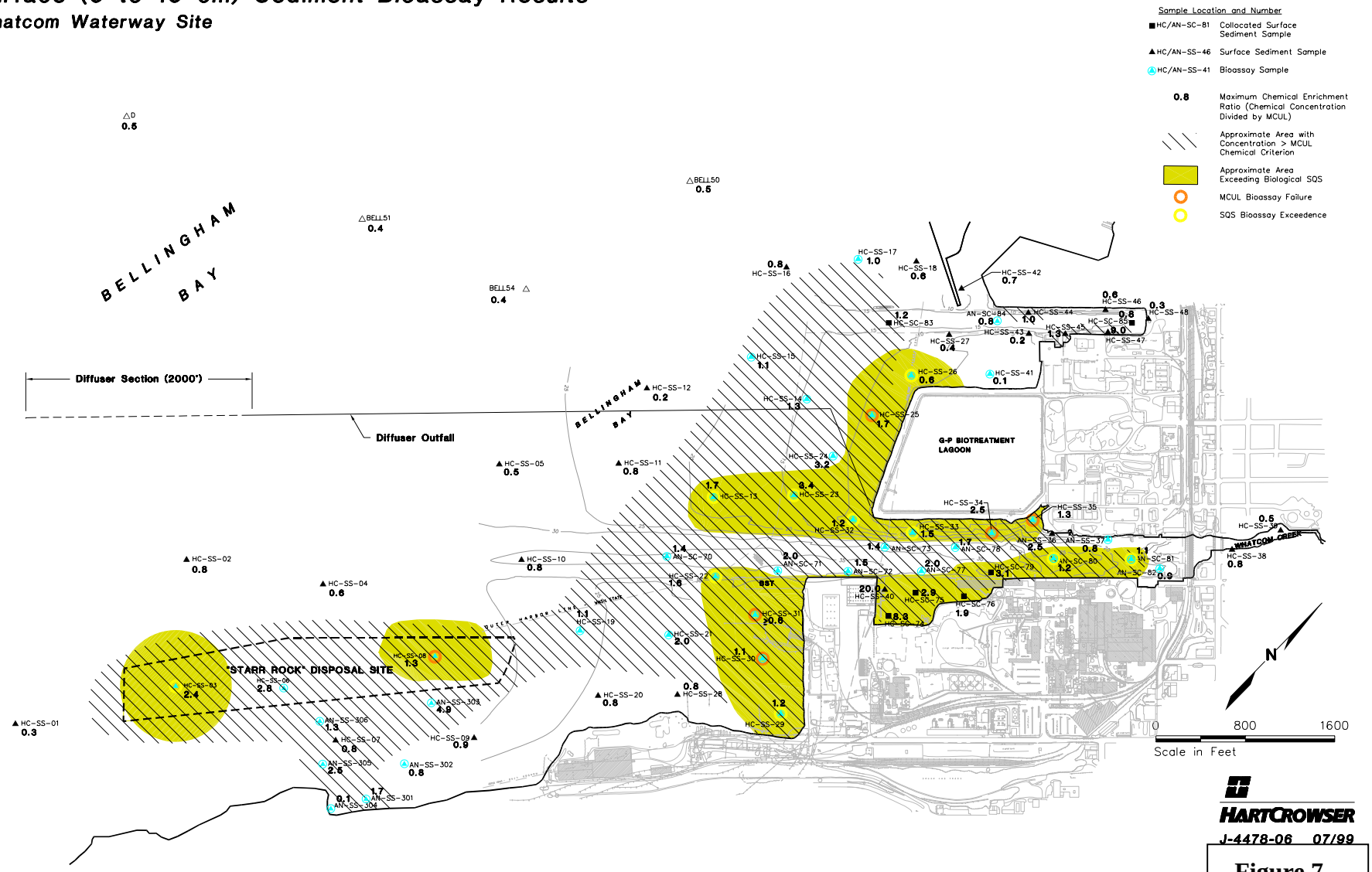


HARTCROWSER J-4478-06 6/99

Figure 6

Surface (0 to 10 cm) Sediment Bioassay Results

Whatcom Waterway Site



07/15/99 1=800 98-007-04
BBY1024-01.DWG

HARTCROWSER
J-4478-06 07/99

Figure 7

Extent of Sediments Exceeding Bioaccumulation Screening Level

Whatcom Waterway Site

Figure 8

Appendix A- Supplemental Information

A-1: Chapter 173-204 WAC Marine Sediment Quality Standards (SQS), Puget Sound Cleanup Screening Level (CSL), and Minimum Cleanup Levels (MCUL) - Chemical Criteria

A-2: Complete 303(d) Contaminated Sediment Listings for Inner Bellingham Bay

A-3: Inner Bellingham Bay 1996-1998 303(d) sediment listings comparison

A-4: I&J Waterway Chemical and Biological Testing Results

A-5: Georgia Pacific Outfall, September 1999 Sediment Sampling Results

A-6: Estimated Maximum Impact/Mixing Zones near Identified Sources of Potential Sediment Quality Concern in Bellingham Bay.

A-7: Review of Discharge Sources in Bellingham Bay

A-8: Loading Capacity Discussion for Each 303(d) Listed Grid Cell

A-9: 1998 DMMP Screening Level (SL), Bioaccumulation Trigger (BT) and Maximum Level (ML) Guideline Chemistry Values (Dry Weight Normalized)

Appendix A-1

Chapter 173-204 WAC Marine Sediment Quality Standards (SQS), Puget Sound Cleanup Screening Level (CSL), and Minimum Cleanup Levels (MCUL) - Chemical Criteria

CHEMICAL PARAMETER	SQS	CSL and MCUL
	MG/KG DRY WEIGHT (PARTS PER MILLION(PPM) DRY)	MG/KG DRY WEIGHT (PARTS PER MILLION (PPM) DRY)
ARSENIC	57	93
CADMIUM	5.1	6.7
CHROMIUM	260	270
COPPER	390	390
LEAD	450	530
MERCURY	0.41	0.59
SILVER	6.1	6.1
ZINC	410	960
	MG/KG ORGANIC CARBON (PPM CARBON)	MG/KG ORGANIC CARBON (PPM CARBON)
LPAH	370	780
NAPHTHALENE	99	170
ACENAPHTHYLENE	66	66
ACENAPHTHENE	16	57
FLUORENE	23	79
PHENANTHRENE	100	480
ANTHRACENE	220	1200
2-METHYLNAPHTHALENE	38	64
HPAH	960	5300
FLUORANTHENE	160	1200
PYRENE	1,000	1400
BENZ(A)ANTHRACENE	110	270
CHRYSENE	110	460
TOTAL BENZOFLUORANTHENES	230	450
BENZO(A)PYRENE	99	210
INDENO (1,2,3,-C,D) PYRENE	34	88
DIBENZO (A,H) ANTHRACENE	12	33
BENZO(G,H,I)PERYLENE	31	78
1,2-DICHLOROBENZENE	2.3	2.3
1,4-DICHLOROBENZENE	3.1	9
1,2,4-TRICHLOROBENZENE	0.81	1.8
HEXACHLOROBENZENE	0.38	2.3
DIMETHYL PHTHALATE	53	53
DIETHYL PHTHALATE	61	110
DI-N-BUTYL PHTHALATE	220	1700
BUTYL BENZYL PHTHALATE	4.9	64
BIS (2-ETHYLHEXYL) PHTHALATE	47	78
DI-N-OCTYL PHTHALATE	58	4500
DIBENZOFURAN	15	58
HEXACHLOROBUTADIENE	3.9	6.2
N-NITROSODIPHENYLAMINE	11	11
TOTAL PCB'S	12	65
	UG/KG DRY WEIGHT (PARTS PER BILLION (PPB) DRY)	UG/KG DRY WEIGHT (PARTS PER BILLION (PPB) DRY)
PHENOL	420	1200
2-METHYLPHENOL	63	63
4-METHYLPHENOL	670	670
2,4-DIMETHYL PHENOL	29	29

PENTACHLOROPHENOL	360	690
BENZYL ALCOHOL	57	73
BENZOIC ACID	650	650

Appendix A-2

Complete 303(d) Contaminated Sediment Listings for Inner Bellingham Bay

Water number: 390KRD
Water body ID Number: WA-01-0050

Water grid cell number	Cell Lat.	Cell Lon.	Parameter	BASIS	MEDIUM	Action Needed
48122H5D0	48.735	122.505	Mercury	Georgia-Pacific Outfall site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL
48122H5C1	48.725	122.515	Total PCBs	Harris Avenue Shipyard site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL
48122H5C1	48.725	122.515	Phenol	Harris Avenue Shipyard site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL
48122H5C1	48.725	122.515	Zinc	Harris Avenue Shipyard site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL
48122H5C1	48.725	122.515	Copper	Harris Avenue Shipyard site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL
48122H5C1	48.725	122.515	Mercury	Harris Avenue Shipyard site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL
48122H5C1	48.725	122.515	Arsenic	Harris Avenue Shipyard site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL
48122H5C1	48.725	122.515	Lead	Harris Avenue Shipyard site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL
48122H4E9	48.745	122.495	2,4-Dimethylphenol	Whatcom and I&J waterways site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL
48122H4E9	48.745	122.495	2-Methylnaphthalene	Whatcom and I&J waterways site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL
48122H4E9	48.745	122.495	Acenaphthene	Whatcom and I&J waterways site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL
48122H4E9	48.745	122.495	Anthracene	Whatcom and I&J waterways site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL
48122H4E9	48.745	122.495	Arsenic	Whatcom and I&J waterways site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL
48122H4E9	48.745	122.495	Benz(a)anthracene	Whatcom and I&J waterways site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL
48122H4E9	48.745	122.495	Benzo(a)pyrene	Whatcom and I&J waterways site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL

Appendix A-2 (continued)

Complete 303(d) Contaminated Sediment Listings for Inner Bellingham Bay

Water grid cell number	Cell Lat.	Cell Lon.	Parameter	BASIS	MEDIUM	Action Needed
48122H4E9	48.745	122.495	Benzo(b,k)fluoranthenes	Whatcom and I&J waterways site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL
48122H4E9	48.745	122.495	Benzo(ghi)perylene	Whatcom and I&J waterways site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL
48122H4E9	48.745	122.495	Bis(2-ethylhexyl) phthalate	Whatcom and I&J waterways site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL
48122H4E9	48.745	122.495	Chrysene	Whatcom and I&J waterways site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL
48122H4E9	48.745	122.495	Copper	Whatcom and I&J waterways site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL
48122H4E9	48.745	122.495	Dibenz(a,h)anthracene	Whatcom and I&J waterways site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL
48122H4E9	48.745	122.495	Dibenzofuran	Whatcom and I&J waterways site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL
48122H4E9	48.745	122.495	Fluoranthene	Whatcom and I&J waterways site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL
48122H4E9	48.745	122.495	Fluorene	Whatcom and I&J waterways site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL
48122H4E9	48.745	122.495	Indeno(1,2,3-cd)pyrene	Whatcom and I&J waterways site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL
48122H4E9	48.745	122.495	Mercury	Whatcom and I&J waterways site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL
48122H4E9	48.745	122.495	Pentachlorophenol	Whatcom and I&J waterways site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL
48122H4E9	48.745	122.495	Phenanthrene	Whatcom and I&J waterways site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL
48122H4E9	48.745	122.495	Pyrene	Whatcom and I&J waterways site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL
48122H4E9	48.745	122.495	Zinc	Whatcom and I&J waterways site exceeds sediment quality standards in 1996 Sediment Management Standards Site List.	Sediment	TMDL
48122H4E8	48.745	122.485	Sediment bioassay	Confirmatory designation (added to the state's 303(d) list by EPA)	Sediment	TMDL

Appendix A-3

Inner Bellingham Bay
1996-1998 303(d) sediment listings comparison
WA-01-0050
390KRD

WB name	grid cell #	LAT	LON	PARAMETER	1998 LIST?	96list?
Whatcom and	48122H4E8	48.745	122.485	Sediment Bioassay	Yes- EPA add	Yes
I&J Waterways	48122H4E9	48.745	122.495	2,4-Dimethylphenol	Yes	Yes
	48122H4E9	48.745	122.495	2-Methylnaphthalene	Yes	Yes
	48122H4E9	48.745	122.495	Acenaphthene	Yes	Yes
	48122H4E9	48.745	122.495	Anthracene	Yes	Yes
	48122H4E9	48.745	122.495	Arsenic	Yes	Yes
	48122H4E9	48.745	122.495	Benz(a)anthracene	Yes	Yes
	48122H4E9	48.745	122.495	Benzo(a)pyrene	Yes	Yes
	48122H4E9	48.745	122.495	Benzo(b,k)fluoranthenes	Yes	Yes
	48122H4E9	48.745	122.495	Benzo(ghi)perylene	Yes	Yes
	48122H4E9	48.745	122.495	Bis(2-ethylhexyl) phthalate	Yes	Yes
	48122H4E9	48.745	122.495	Chrysene	Yes	Yes
	48122H4E9	48.745	122.495	Copper	Yes	Yes
	48122H4E9	48.745	122.495	Dibenz(a,h)anthracene	Yes	Yes
	48122H4E9	48.745	122.495	Dibenzofuran	Yes	Yes
	48122H4E9	48.745	122.495	Fluoranthene	Yes	Yes
	48122H4E9	48.745	122.495	Fluorene	Yes	Yes
	48122H4E9	48.745	122.495	Indeno(1,2,3-cd)pyrene	Yes	Yes
	48122H4E9	48.745	122.495	Mercury	Yes	Yes
	48122H4E9	48.745	122.495	Pentachlorophenol	Yes	Yes
	48122H4E9	48.745	122.495	Phenanthrene	Yes	Yes
	48122H4E9	48.745	122.495	Pyrene	Yes	Yes
	48122H4E9	48.745	122.495	Zinc	Yes	Yes
Harris Ave	48122H5C1	48.725	122.515	Total PCBs	Yes	No
Shipyard	48122H5C1	48.725	122.515	Phenol	Yes	No
	48122H5C1	48.725	122.515	Zinc	Yes	No
	48122H5C1	48.725	122.515	Copper	Yes	No
	48122H5C1	48.725	122.515	Mercury	Yes	No
	48122H5C1	48.725	122.515	Arsenic	Yes	No
	48122H5C1	48.725	122.515	Lead	Yes	No
G-P Outfall	48122H5D1	48.735	122.505	Mercury	Yes	Yes

Whatcom WW	48122H5E0	48.745	122.505	Mercury	No	Yes

Appendix A-4

I&J Waterway Chemical and Biological Testing Results

Table A-4.1 - I&J Waterway Surface Sediment Sample Results

Sample-ID	Date	Arsenic (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Zinc (mg/kg)
HC-SS-15	9/96						0.67[b]	
HC-SS-16	9/96						0.47[a]	
HC-SS-17	9/96						0.58[a]	
HC-SS-18	9/96						0.38	
HC-SS-27	9/96						0.23	
HC-SS-41	9/96	3	0.7U	10E	10	4.2U	0.13U	20
HC-SS-41(dup)	9/96	2.6	0.66U	9.5E	8.6	3.9U	0.13U	19
HC-SS-42	9/96						0.42[a]	
HC-SS-43	9/96						0.15U	
HC-SS-44	9/96						0.59[a]	
HC-SS-45[c]	9/96	11E	1.6	71	73	19	0.36	130
HC-SS-46	9/96						0.36	
HC-SS-48[c]	9/96	3.2E	0.59U	17	16	11	0.13U	51
HC-SC-83[c]	9/96	12E	1.3U	69	55	14	0.72[b]	97
HC-SC-84[c]	9/96	12E	1.3	71	62	15	0.5[a]	110
AN-SC-84[c]	10/98		1U				0.45[a]	106
HC-VC-94-C1[c]	7/97	11	1.1	58	44	15	1.3[b]	83
HC-VC-95-C1[c]	7/97	5.8	0.85U	41	39	12	0.68[b]	69

[a] exceeds SQS numeric criteria
[b] exceeds CSL numeric criteria
[c] additional organic sampling results at these stations can be found in Anchor Environmental/Hart Crowser, 1999, Appendices B and L.
Data qualifiers "U" means the analyte was not detected and reported as the sample quantitation limit; and "E" means the analyte is an estimated value between the detection and quantitation limit.

Table A-4.2 - I&J Waterway Biological Testing Results

Sample-ID	Date	screening level (basis)	*E. estuarius*	*D. excentricus*	*N. arenaceodentata*	*Mytilus edulis*
HC-SS-15	9/96	SQS (SMS)	Pass		Pass	Pass
		CSL (SMS)	Pass		Pass	Pass
HC-SS-17	9/96	SQS (SMS)	Pass		Pass	Pass
		CSL (SMS)	Pass		Pass	Pass
HC-SS-41	9/96	SQS (SMS)	Pass		Pass	Pass
		CSL (SMS)	Pass		Pass	Pass
HC-VC-94-C1	7/97	one-hit (PSDDA)	Pass	Pass	Pass	
		two-hit (PSDDA)	Pass	Pass	Pass	
HC-VC-95-C1	7/97	one-hit (PSDDA)	Pass	Pass	Pass	
		two-hit (PSDDA)	Pass	Pass	Pass	
AN-SC-84	9/96	SQS (SMS)	Pass		Pass	Pass
		CSL (SMS)	Pass		Pass	Pass

(Anchor Environmental/Hart Crowser, 1999)

Appendix A-5

Georgia Pacific Outfall, September 1999 Sediment Sampling Results

[redacted]	Sample Stations		
Parameter	**SS-A2**	**SS-B1**	**SS-B2**
Mercury (mg/kg)	1.4	0.52	0.27
4-Methylphenol (ug/kg)			
1 week after sampling	6,000	840	1,700
5 weeks after (Neanthes start)	7,400	2,000	5,600
9 weeks after (Neanthes end)	5,200	970	2,000
Amphipod Bioassay			
Unpurged	Pass	Exceeded SQS	Pass
Purged (to remove high NH3)	**Pass**	**Pass**	**Pass**
Mytilus Larvae Bioassay	**Pass**	**Pass**	**Pass**
Neanthes Growth Bioassay	**Pass**	**Pass**	**Pass**

(Anchor Environmental, 2000)

Appendix A-6

Estimated Maximum Impact/Mixing Zones near Identified Sources of Potential Sediment Quality Concern in Bellingham Bay

			Water Quality			Sediment Quality				
Identified Source	Parameters of Potential Concern	Max Measured Concentration (ug/L)	Water Quality Criterion (ug/L)	Measured Peak Flow (m^3/sec)	Estimated Max Impact/Mix Zone Radius (feet)	Measured Peak Flow (m^3/sec)	Suspended Sediment Conc. (mg/L)	Ave Particulate Conc, (mg/kg dry wt)	Sediment Quality Std. (mg/kg dry wt)	Est. Max Impact/Mix Zone Radius (feet)
Bellingham Marine	Dissolved Copper	6.7	2.5	0.0003	**< 1**	0.0001	-	-	-	**-**
Stormwater Runoff	Total Copper	1,100	-	-	**-**	0.0001	290	-	390	**30**
	Total Mercury	0.2	0.025	0.0003	**< 1**	0.0001	290	-	0.41	**20**
Bornstein Seafoods	Total Arsenic	350	36	0.0003	**2**	0.0001	-	-	57	**40**
Area Drainage Outfall	Diss/Tot Cadmium	32	8	0.0003	**< 1**	0.0001	-	-	5.1	**40**
	Diss/Tot Copper	1,600	2.5	0.0003	**30**	0.0001	-	-	390	**30**
	Diss/Tot Silver	28	1.2	0.0003	**10**	0.0001	-	-	6.1	**40**
	Diss/Tot Zinc	830	77	0.0003	**2**	0.0001	-	-	410	**20**
"C' Street Outfall	Dissolved Copper	34	2.5	0.050	**7**	0.029	-	-	-	**-**
City Stormwater and CSO	Particulate Phenol	0.02	-	0.050	**-**	0.029	38	0.66	0.42	**70**
	Particulate 4-Methylphenol	0.08	-	0.050	**-**	0.029	38	2.0	0.67	**100**
Cornwall Landfill	Dissolved Copper	12	2.5	0.002	**1**	0.002	-	-	390	**10**
Seepage and	Dissolved Lead	9.9	5.8	0.002	**< 1**	0.002	-	-	450	**10**
Shoreline Erosion	Fec. Colif. (#/100 ml)	230	14	0.002	**1**	0.002	-	-	-	-
	Solid Waste	-	-	N/A	**-**	N/A	-	-	50% by vol.	**?** [(c)]
G-P Log Pond (groundwater)	Total Mercury	9.4	0.025	0.00004	**10**	0.00004	-	-	0.41	**60**
G-P Outfall	Particulate Mercury	0.29	0.025	1.6	**10**	1.6	96	3.0	0.41	**0** [(d)]
(wastewater)	(historic releases)									

Appendix A-6 (continued)

Estimated Maximum Impact/Mixing Zones near Identified Sources of Potential Sediment Quality Concern in Bellingham Bay

			Water Quality			Sediment Quality				
Identified Source	Parameters of Potential Concern	Max Measured Concentration (ug/L)	Water Quality Criterion (ug/L)	Measured Peak Flow (m^3/sec)	Estimated Max Impact/Mix Zone Radius (feet)	Measured Peak Flow (m^3/sec)	Suspended Sediment Conc. (mg/L)	Ave Particulate Conc, (mg/kg dry wt)	Sediment Quality Std. (mg/kg dry wt)	Est. Max Impact/Mix Zone Radius (feet)
Harris Ave. Shipyard	*Source control within this area is being addressed as part of the ongoing Harris Avenue Shipyard Site independent MTCA action*									
R.G. Haley	Dissolved Copper	33	2.5	0.030	**8**	0.019	-	-	-	**-**
City Stormwater Runoff	Particulate Phenol	0.02	-	0.030	**-**	0.019	32	0.66	0.42	**50**
	Particulate 4-Methylphenol	0.06	-	0.030	**-**	0.019	32	2.0	0.67	**80**
Roeder Avenue Landfill	*Source control within this area is being addressed as part of the ongoing Roeder Avenue Landfill Site independent MTCA action*									

Anchor Environmental, 1999.

Appendix A-7
Review of Discharge Sources in Bellingham Bay

The following is a review of available information on point source, groundwater, and other non-point sources that may affect sediments or carry potential near-field water quality concerns in Inner Bellingham Bay. The detailed discussion of potential sources in Bellingham Bay was collected from facility and project managers at the Department of Ecology and from the "Bellingham Bay Demonstration Pilot Sediment Site and Source Control Documentation Report" (Anchor Environmental, 1999). Source locations are depicted in Figure 2. A summary of the active discharge permits administered by ecology in the larger Bellingham Bay watershed is given in Table A-7.

Grid Cell Number H4F9- I&J Waterway

- **Bornstein Seafoods**. All process wastewater from this facility is treated and discharged to the sanitary sewer. Stormwater runoff samples collected from the site have contained concentrations of metals that exceeded water quality criteria (Anchor Environmental/Hart Crowser, 2000). However, a surface sediment sample collected within the vicinity of the site (HC-SS-45) did not exceed SQS chemical criteria for metals. Bis(2-ethylhexyl) phthalate has been also detected in sediments near the Bornstein Seafoods outfall, however, this is most likely related to historic releases from the former Olivine facility and/or other upland sources and not from the active Seafood operation. Control of releases from the Bornstein facility is being performed under Ecology's NPDES program.

- **Roeder Avenue Landfill.** This historic municipal landfill is located between Whatcom and I&J Waterways. Groundwater quality monitoring performed at locations adjacent to the landfill detected levels of chromium above marine water quality criteria migrating towards Bellingham Bay. However, surface sediment samples collected within the vicinity of the site (HC-SS-45 and -47) did not exceed SQS chemical criteria for chromium, indicating that if sediment contamination exists, it may be localized. Releases from the Roeder Avenue site are being addressed through an integrated upland cleanup and redevelopment plan. Ecology is overseeing the work under Ecology's Voluntary Cleanup Program.

Grid Cells numbers H4F9, H4E8, H4E9, H4D9, H5D0, H5E0- Whatcom Waterway

- **Bellingham Marine Industries** (grid cell H4E8). A stormwater sample collected from this site contained concentrations of metals that exceeded water quality protection criteria (Anchor Environmental/Hart Crowser, 2000). However, no sediment contamination problems have been found as a surface sediment sample collected within the vicinity of the site (AN-SS-37) did not exceed SQS biological effects criteria.

- **G-P Log Pond.** A potential source for localized recontamination in Whatcom Waterway was ground water seepage containing mercury from the upland area adjacent to the G-P log pond. Low level concentrations have been detected in upland soil and groundwater and shoreline seepage may contain similar or lower concentrations due to tidal mixing and chemical attenuation (Anchor Environmental, 1999). Ecology is currently overseeing upland cleanup activities, which include isolation of the log pond from the bay. Furthermore, source control and cleanup actions will be implemented to ensure that sediments within the Log Pond remain below SQS chemical criteria following the cleanup action under MTCA.

- **"C" Street Stormwater and Combined Sewer Overflow (CSO).** The C-street CSO is regulated under the NPDES permit for the Bellingham Post Point Wastewater Treatment Plant. Department of Ecology records show that there has not been a CSO discharge event in the past 10 years. However, wet and dry season water samples collected from the C-street CSO site area contained concentrations of copper that exceeded water quality protection criteria. Particulate fraction analysis of the sediment in the CSO conveyance system (not in the discharge) showed phenol and 4-methylphenol at concentrations above the CSL chemical criteria. A surface sediment sample collected within the vicinity of the site (sample station HC-SS-35) exceeded the CSL chemical criteria for mercury and phenol as well as the CSL biological effects criteria (Anchor Environmental/Hart Crowser, 2000). Localized biological toxicity and the accumulations of phenol and 4-methylphenol in nearshore sediments within the outfall area may be partly attributable to stormwater sources, but also appear to be closely tied to historical deposits of woody debris and discontinued mercury discharges. The contaminated sediments in the C Street CSO outfall area will be remediated as part of the Whatcom Waterway remediation. Further analysis of source control for this outfall is discussed in the Summary Implementation Strategy section below.

- **Wood Waste and Woody Debris.** Accumulations of bark and associated woody debris near the G-P Log Pond and in other areas of the Whatcom Waterway are likely associated with historical practices (Anchor Environmental/Hart Crowser, 2000). Although relatively limited log rafting operations continue in some areas of the Whatcom Waterway site today, historically there was more extensive log rafting throughout the Inner Bellingham Bay. In addition, historical discharges of pulp and other materials from the G-P facility are now controlled by a variety of improved handling, collection, and wastewater treatment processes, all of which are regulated under G-P's existing NPDES permit.

- **Boulevard Park.** Subsurface soil and groundwater at this upland cleanup site contain elevated concentrations of metals, petroleum hydrocarbons, and polynuclear aromatic hydrocarbons (PAHs) associated with historical manufactured gas production. However, surface sediment samples collected adjacent to the site (AN-SS-301 and -304) did not exceed SQS biological effects criteria.

- **Chevron Bulk Fuels Facility.** This is an upland cleanup site where elevated concentrations of petroleum hydrocarbons have been detected in soil and groundwater at the former Chevron Bulk Fuels facility. However, surface sediment samples collected within the vicinity of the site (AN-SS-36 and -37) did not exceed SQS biological effects criteria. Independent remedial actions have been implemented at the site, including soil removal and operation of a subsurface product recovery and groundwater extraction/treatment system.

- **R.G. Haley.** Soil and groundwater at this upland contaminated site contain concentrations of pentachlorophenol, dioxins and PAHs that exceed cleanup criteria.. Groundwater seeps from the site to the Bay were recently discovered that might be adversely impacting sediments. In addition, wet and dry season stormwater runoff samples collected from the site contained concentrations of copper that exceeded water quality criteria (Anchor Environmental/Hart Crowser, 2000). However, a surface sediment sample collected in the vicinity of the site (HC-SS-29) did not exceed SQS chemical criteria for these chemicals, indicating that sediment contamination, if it exists, may be localized. The current site owner is taking emergency actions to control seepage from the site under Ecology oversight. Once the discharge is terminated a broader investigation and cleanup of the site will occur that

includes an evaluation of sediments. This work will occur under a MTCA Agreed Order with Ecology.

Grid Cell Number H5D1- Georgia-Pacific Outfall

- **Georgia-Pacific Outfall.** Water quality at the outfall mixing zone boundary is monitored and evaluated by Ecology under an NPDES permit. Based on effluent dispersion modeling, water quality criteria are achieved within approximately 10 feet of the outfall. Sampling and analysis of the G-P effluent discharge was undertaken as part of the Whatcom Waterway RI/FS (Anchor Environmental/Hart Crowser, 2000). Based on detailed modeling analysis, the G-P outfall has not been identified as an ongoing source of mercury to sediments in Bellingham Bay. Sampling data from 1999 confirmed that the sediments at the G-P outfall comply with SQS criteria for mercury (Anchor Environmental, 2000A). Further discharge controls have been implemented at G-P, including the closure of the chlor-alkali plant (the mercury discharge source), which will improve the discharge quality from the outfall. Under the G-P NPDES permit, compliance monitoring of the effluent discharge and of sediments around the outfall will be conducted.

Grid Cell Number H5C1- Harris Avenue Shipyard

- **Harris Avenue Shipyard.** Nearshore sediments in this area exceed SQS chemical criteria for metals, PCBs, and semivolatile organic compounds. Historical releases are responsible for sediment contamination. As discussed previously, the site cleanup and integrated source control actions are being addressed as a component of the Near-term Remedial Action Alternatives in the Bellingham Bay Comprehensive Strategy and by the Port of Bellingham's RI/FS. The NPDES permit for the shipyard operations controls current shipyard activities to protect water quality and prevent sediment recontamination. At this facility, all process wastewater and wash water is collected and treated prior to discharge to the sanitary sewer. Furthermore, the facility is currently working with the Department of Ecology to develop plans to collect industrial stormwater run off from all work areas at the facility, provide treatment and discharge it to the sanitary sewer.

Grid Cell Number H4D9- Cornwall Avenue Landfill

- **Cornwall Avenue Landfill.** Groundwater and shoreline seepage samples collected in this area have contained concentrations of metals and fecal coliform above the water quality criteria. Nearshore sediments in this area also exceed SQS chemical criteria for mercury, PCBs, and wood waste (sample stations HC-SS-20 and 28). Erosion of solid waste from the exposed landfill shoreline has been an ongoing source of sediment contamination. Control of seepage and erosion releases is occurring through emergency actions and is a component of the Near-term Remedial Action Alternatives in the Bellingham Bay Comprehensive Strategy. The source control and cleanup work are being addressed by the Port of Bellingham's concurrent focused Remedial Investigation and Feasibility Study under Ecology's Voluntary Cleanup Program.

Bay-wide Discharges

- **Urban Stormwater Runoff.** Direct sampling of surface water runoff from Bellingham storm drains shows concentrations of dissolved metals that exceed freshwater and marine ambient water quality criteria (Anchor Environmental/Hart Crowser, 2000). The highest concentrations of metals including copper, lead and zinc have been reported during "first flush" storm events, preceded by extended dry periods. Similarly elevated metals concentrations in urban runoff have been documented throughout Puget Sound and appear to

be the result of normal vehicle releases. Although metal concentrations in stormwater runoff may exceed marine water quality criteria at the point of discharge, no near-field adverse effects have been documented in water or sediment within the nearshore areas of Bellingham Bay.

In addition to metals in the water column, accumulated particulate matter present within the City's stormwater runoff conveyance system has periodically contained concentrations of phenol and 4-methylphenol above the SQS chemical criteria. However, sediment samples collected immediately adjacent to storm drain outfalls in Bellingham Bay do not exceed SQS criteria as demonstrated by confirmatory bioassays (Anchor Environmental/Hart Crowser, 2000).

Moreover, the overall distribution of phenol and 4-methylphenol in Bellingham Bay, and particularly within Whatcom Waterway, are likely associated with the historical deposits of woody debris and not due to stormwater discharges. Both phenol and 4-methylphenol are known degradation products of natural wood products and an accumulation of these compounds in regional sediments is frequently associated with woody debris deposits. Overall, the pattern of sediment phenol and 4-methylphenol concentration in Bellingham Bay seems to match with the distribution of woody debris (Anchor Environmental/Hart Crowser, 2000). Whatever the case, wood debris will be remediated in Inner Bellingham Bay to meet state standards and source control efforts will be conducted to identify if any currently unknown source of 4-methylphenol exists.

In conclusion, the technical studies developed as part of the remedial activities in Bellingham Bay did not identify city stormwater sources as an on-going contributor to the sediment contamination problems in Bellingham Bay. It is believed that the municipal stormwater sources do not pose a reasonable potential to contaminated or recontaminated sediments in the bay.

Ecology currently regulates certain industrial stormwater discharges to Bellingham Bay under the Baseline Stormwater General Permit for Industrial Facilities. Urban stormwater runoff includes piped and ditched conveyance as well as sheet flow releases and is regulated through the Municipal stormwater permits. Bellingham is required to develop a stormwater program in compliance with the Puget Sound Stormwater Management Manual. The City also will be covered under the Phase II NPDES stormwater program. The city's stormwater program is discussed further in the *Summary Implementation Strategy*.

- **Atmospheric mercury.** Part per trillion mercury analysis performed at the Whatcom Waterway site as part of the remedial investigation included water column, sediment trap and *in situ* sediment. Mercury concentrations in the water column were far below WQ standards and conservative partitioning calculations indicate that the water column is not a source of sediment recontamination.

Table A-7
Summary of Active Discharge Permits Administered by Ecology in the Larger Bellingham Bay Watershed
(excluding surface water and groundwater discharges to the Nooksack River system)

Facility Name	NPDES Permit No.	Permit Type
NPDES Permits:		
Bellingham Wastewater Treatment Plant	WA0023744C	Municipal
Brooks Manufacturing	WA0030805B	Industrial Stormwater
Georgia-Pacific West	WA000109-1	Industrial Wastewater
Maritime Contractors/Harris Avenue Shipyard	WA0031348B	Industrial Stormwater
Oeser Co.	WA0030813B	Industrial Stormwater
Tilbury Cement	WA0001198B	Industrial Stormwater
WDFW Bellingham Hatchery	WA0031500A	Fish Hatchery
General Permits - Boatyards:		
B&J Fiberglass	WAG030058A	Industrial Stormwater
Boatyard at Colony Wharf	WAG030006A	Industrial Stormwater
Hilton Harbor Marina	WAG030024A	Industrial Stormwater
Marine Services Northwest	WAD030029A	Industrial Stormwater
Padden Creek Marine	WAG030033A	Industrial Stormwater
Weldcraft Steel and Marine	WAG030051A	Industrial Stormwater
General Permits - Sand and Gravel:		
Pacific Concrete	WAG503028A	Stormwater
General Permits - Stormwater:		
Bellingham Cold Storage	SO300596/7B	Stormwater
Bellingham Pole and Timber	SO3001568B	Stormwater
Bornstein Seafoods	SO3000679B	Stormwater
Cornwall Warehouse	SO3000115B	Stormwater
State Wastewater Discharge Permits to POTW :		
Bellingham Cold Storage	WA0002143B	Industrial
Bornstein Seafoods	ST0007304C	Industrial
New West Fisheries	ST0007345A	Industrial
Olivine Corp	ST0007383A	Industrial

Appendix A-8

Loading Capacity Discussion for Each 303(D) Listed Grid Cell

For each 303(d) listed water grid specifically, the loading capacity is viewed as follows:

Water grid cell # H4F9 - I&J Waterway
The loading capacity (meeting SMS) is not currently exceeded from historic contamination or ongoing sources for any sediment quality parameter. For this reason, all the parameters associated with the I&J Waterway should be removed from the 303(d) list in the next listing cycle.

Water grid cell # H5D1- Georgia Pacific Outfall
Due to natural attenuation and recent source control activities, the loading capacity (meeting SMS) is not currently exceeded from historic contamination or ongoing sources for mercury. Recent sampling for mercury demonstrates compliance with SQS criteria (Anchor Environmental 2000A). For this reason, grid cell # H5D1 should be removed from the 303(d) list for mercury. A wasteload allocation is assigned to Georgia Pacific for discharges into Bellingham Bay to assure sediment standards for mercury are not violated in the future.

Water grid cells # H4F9, H4E8, H4E9, H4D9, H5D0, H5E0- Whatcom Waterway
For Whatcom Waterway, due to natural attenuation and recent source control activities, the loading capacity (meeting SMS) is not currently exceeded from historic contamination or ongoing sources for 2,4-dimethylphenol, 2-methylnaphthalene, acenapthene, anthracene, arsenic, benz(a)anthracene, benzo(a)pyrene, benzo(b.k)fluoranthenes, benzo(ghi)perylene, bis(2-ethylhexyl)phthalate, chrysene, copper, dibenz(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, pentachlorophenol, phenanthrene, phenol, pyrene, and zinc. This information should be used as a basis to de-listed these parameters from the 303(d) list.

The remaining parameters include mercury, phenol, 4-methylphenol, sediment bioassay, and wood debris. The sediment cleanup will remediate the historical contaminant loadings that were responsible for the 303(d) listing. Recontamination from mercury, phenol, 4-methylphenol, biotoxicity, and wood debris have not been identified as a potential from ongoing sources in Inner Bellingham Bay. Source control and monitoring activities will nonetheless be designed to provide assurance against recontamination and maintain compliance with the state Sediment Management Standards with the goal of maintaining sediment quality that satisfies SQS criteria. The loading capacity is therefore designed as the mass loading that maintains compliance with the state Sediment Quality Standards Criteria for mercury, phenol, 4-methylphenol, sediment bioassay, and wood debris. The SQS criteria for Inner Bellingham Bay are: mercury: 1.2 mg/kg; phenol: 420 μg/kg; 4-methylphenol: 670μg/kg; wood debris: <50% by volume; sediment bioassay: “no adverse effects on biological resources”. The mass loading from any source or combination of sources is not to exceed these criteria.

Water grid cell # H4D9 - Cornwall Avenue Landfill
Sediment cleanup is designed to remediate the historical contaminant loading responsible for the 303(d) listing. On-going impacts to sediments have not been identified, and source control activities will provide assurance against recontamination and maintain compliance with the state Sediment Management Standards with the goal of maintaining sediment quality that satisfies SQS criteria. The loading capacity is the mass load that maintains compliance with the state Sediment Management Standards.

Water grid cell # H5C1- Harris Avenue Shipyard

Sediment cleanup will remediate the historical contaminant loading responsible for the 303(d) listing and source control activities will prevent recontamination and maintain compliance with the state Sediment Management Standards with the goal of maintaining SQS criteria. The loading capacity, defined as the mass-based discharge that maintains compliance with standards, will be achieved through the remediation activities. The current discharge from the shipyard is controlled and does not pose a threat to sediment recontamination.

Table 6 (page 24 of text) provides a summary of the parameters and associated grid cells recommended for de-listing from the 303(d) list in the next listing cycle based on analysis of data used in the development of the Bellingham Bay TMDL.

Appendix A-9

1998 DMMP Screening Level (SL), Bioaccumulation Trigger (BT) and Maximum Level (ML) Guideline Chemistry Values (Dry Weight Normalized) [1]

CHEMICAL	CAS[2] NUMBER	SCREEING LEVEL	BIOACCUM TRIGGER	MAXIMUM LEVEL
METALS (mg/kg)				
Antimony	7440-36-0	150	150 [3]	200
Arsenic	7440-38-2	57	507.1	700
Cadmium	7440-43-9	5.1	---	14
Chromium	7440-47-3	---	---	---
Copper	7440-50-8	390	---	1,300
Lead	7439-92-1	450	---	1,200
Mercury	7439-97-6	0.41	1.5	2.3
Nickel	7440-02-0	140	370 [4]	370
Silver	7440-22-4	6.1	6.1 [3]	8.4
Zinc	7440-66-6	410	---	3,800
ORGANOMETALLIC COMPOUNDS (ug/L)				
Tributyltin[5] (interstitial water)	56573-85-4			
ORGANICS (ug/kg)				
Total LPAH	---	**5,200**	---	**29,000**
Naphthalene	91-20-3	2,100	---	2,400
Acenaphthylene	208-96-8	560	---	1,300
Acenaphthene	83-32-9	500	---	2,000
Fluorene	86-73-7	540	---	3,600
Phenanthrene	85-01-8	1,500	---	21,000
Anthracene	120-12-7	960	---	13,000
2-Methylnaphthalene	91-57-6	670	---	1,900
Total HPAH	---	**12,000**	---	**69,000**
Fluoranthene	206-44-0	1,700	4,600	30,000
Pyrene	129-00-0	2,600	---	16,000
Benz(a)anthracene	56-55-3	1,300	---	5,100
Chrysene	218-01-9	1,400	---	21,000
Benzofluoranthenes (b+k)	205-99-2 207-08-9	3,200	---	9,900
Benzo(a)pyrene	50-32-8	1,600	3,600 [4]	3,600
Indeno(1,2,3,-c,d)pyrene	193-39-5	600	---	4,400
Dibenzo(a,h)anthracene	53-70-3	230	---	1,900
Benzo(g,h,i)perylene	191-24-2	670	---	3,200
Chlorinated Hydrocarbons				
1,3-Dichlorobenzene	541-73-1	170	1,241	---
1,4-Dichlorobenzene	106-46-7	110	120 [4]	120
1,2-Dichlorobenzene	95-50-1	35	37	110
1,2,4-Trichlorobenzene	120-82-1	31	---	64
Hexachlorobenzene (HCB)	118-74-1	22	168	230

Appendix A-9 (continued)
1998 DMMP Screening Level (SL), Bioaccumulation Trigger (BT) and Maximum Level (ML)
Guideline Chemistry Values (Dry Weight Normalized) [1]

CHEMICAL	CAS[2] NUMBER	SCREEING LEVEL	BIOACCUM TRIGGER	MAXIMUM LEVEL
ORGANICS, cont. (ug/kg)				
Phthalates				
Dimethyl phthalate	131-11-3	1,400	1,400 [3]	---
Diethyl phthalate	84-66-3	1,200	---	---
Di-*n*-Butyl phthalate	84-74-2	5,100	10,220	---
Butyl benzyl phthalate	85-68-7	970	---	---
Bis(2-Ethylhexyl)phthalate	117-81-7	8,300	13,870	---
Di-*n*-Octyl phthalate	117-84-0	6,200	---	---
Phenols				
Phenol	108-95-2	420	876	1,200
2-Methylphenol	95-48-7	63	---	77
4-Methylphenol	106-44-5	670	---	3,600
2,4-Dimethylphenol	105-67-9	29	---	210
Pentachlorophenol	87-86-5	400	504	690
Miscellaneous Extractables				
Benzyl alcohol	100-51-6	57	---	870
Benzoic acid	65-85-0	650	---	760
Dibenzofuran	132-64-9	540	---	1,700
Hexachloroethane	67-72-1	1,400	10,220	14,000
Hexachlorobutadiene	87-68-3	29	212	270
N-Nitrosodiphenylamine	86-30-6	28	130 [4]	130
Volatile Organics				
Trichloroethene	79-01-6	160	1,168	1,600
Tetrachloroethene	127-18-4	57	102	210
Ethylbenzene	100-41-4	10	27	50
Total Xylenes (sum of o-, m-, p-)	95-47-6 108-38-3 106-42-3	40	---	160
Pesticides				
Total DDT (sum of 4,4'-DDD, 4,4'-DDE and 4,4'-DDT)	72-54-8 72-55-9 50-29-3	6.9	50	69
Aldrin	309-00-2	10	37	---
alpha-Chlordane	12789-03-6	10	37	---
Dieldrin	60-57-1	10	37	---
Heptachlor	76-44-8	10	37	---
Gamma-BHC (Lindane)	58-89-9	10	---	---
Total PCBs	---	130	38 [6]	3,100

Notes:
(1) Guidelines for non-ionic chemicals are likely to be carbon-normalized in a future edition of the users manual.
(2) Chemical Abstract Service Registry Number.
(3) BT adjusted to new SL for antimony, silver and dimethylphthalalte
(4) BT adjusted to new ML for nickel, benzo(a)pyrene, 1,4-dichlorobenzene and N-nitrosodiphenylamine.
(5) See *Testing, Reporting, and Evaluation of Tributyltin Data in PSSDA and SMS Programs* at *http://www.nws.usace.army.mil/dmmo/8tharm/tbt96.htm*
(6) This value is normalized to total organic carbon, and is expressed in mg/kg (TOC normalized

Appendix B- Public Participation Materials

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Water Cleanup Plans

Inner Bellingham Bay Contaminated Sediment TMDL Review Draft

Introduction

The Washington Department of Ecology (Ecology) is seeking public comment on a water cleanup plan for sediments in Inner Bellingham Bay. Water cleanup plans are called total maximum daily load (TMDL) studies in the federal Clean Water Act. The Bellingham Bay water cleanup plan is one of the first of its kind in the nation; few others have used as broad a range of regulatory programs to clean up toxic pollution of marine sediments.

Background

Located in the most northern part of Puget Sound, 42-square-mile Bellingham Bay receives drainage from a 1,000-square-mile land base that includes the Nooksack River and Squalicum, Little Squalicum, Baker, Whatcom and Padden creeks.

Bellingham Bay fulfills many activities that require a high level of environmental quality, including commercial and recreational fishing and shellfishing. It provides valuable habitat for wild Chinook and other types of endangered salmon, as well as for numerous marine mammals and waterfowl. Bellingham Bay is also an essential feature of navigation, water-dependent commerce and recreation in northern Puget Sound.

Like many urban bays in the country, contaminated marine sediments are a legacy of past industrial practices that can pose a present threat to marine life and to public health. Most of the activity that affects Bellingham Bay occurs in or near the city of Bellingham. However, the bay is also affected by pollution sources located in watersheds that drain to the bay.

Contaminants in Bellingham Bay

A decade ago, scientists confirmed 25 toxic substances present in Bellingham Bay sediments that failed environmental standards. From cleanup and pollution prevention efforts carried out by businesses and government, and natural cleansing processes during the past decade, many areas of the bay are now considered safe to humans and aquatic life. However, ongoing sampling shows that remaining sediment contaminants of concern are within three Bellingham Bay areas – Whatcom Waterway, Cornwall Avenue Landfill, and the Harris Avenue Shipyard. Sediments in pockets of these three areas contain one or more of the following pollutants or conditions that fail environmental standards:

Mercury and other metals – Naturally occurring in the environment, but also used in, or a by-product of, manufacturing and mining processes. Many vehicle-use and maintenance activities produce heavy metal by-products.

June 2001

polychlorinated biphenyls (PCBs) - Complex compounds with different chlorine content. PCBs were used in the manufacture of electrical equipment; also used in paints, adhesives, metals coatings and plastics until 1976, when it's use was banned; a by-product of combustion.

Phenols - A large group of chemicals, including **4-methylphenol**, used in a variety of manufacturing processes and a major ingredient of such wood preservatives as creosote and pentachlorophenol.

Wood waste – Measured in the volume of wood-waste along key shoreline areas.

Sediment "bioassay" - Tests of fish and shellfish to determine whether contaminants such as mercury are accumulating in tissue.

Cleaning up polluted sediments

Under the federal Clean Water Act, a "total maximum daily load" (TMDL) analysis must be developed for waterbodies that fail environmental standards. A TMDL study determines how much pollution a waterbody can receive and still remain healthy.

The cleanup plan for Bellingham Bay builds on the Bellingham Bay Comprehensive Strategy developed by the Bellingham Bay Demonstration Pilot Work Group. The Bellingham Bay water cleanup plan is designed to:

- Identify the portions of Bellingham Bay that are on the state's 303 (d) list of impaired waterbodies due to sediment contamination;
- Summarize the degree of sediment contamination;
- Review the standards and regulatory procedures for improving sediment quality;
- Provide information on the technical analysis and modeling approach used for sediment remediation and source control;
- Identify facilities and stormwater sources that discharge directly into Bellingham Bay;
- Identify sediment cleanup and other pollution reductions needed (wasteload allocations); and
- Document the implementation strategy for achieving environmental compliance with Washington's sediment management standards.

The Bellingham Bay Comprehensive Strategy was developed by U.S. Fish & Wildlife Department, Environmental Protection Agency and Army Corps of Engineers; Washington State departments of Ecology, Natural Resources, Fish & Wildlife, Transportation and Puget Sound Water Quality Action Team; Lummi Nation and Nooksack Tribe; Whatcom County Health and Human Services, Port of Bellingham and City of Bellingham.

Public comment sought on Bellingham Bay sediments cleanup plan

Comments on the proposed Bellingham Bay TMDL will be accepted through **July 20, 2001**. The TMDL study and recommendations can be accessed at www.ecy.wa.gov/biblio/0110036.html or reviewed at the Bellingham Library or Ecology's Bellingham Office, 1204 Railroad Ave. Comments should be mailed to Pam Elardo, P.E., Department of Ecology, NW Regional Office, 3190 - 160th Ave. SE, Bellevue, WA 98008-5452. Comments may also be emailed to pam.elardo@metrokc.gov

Public meeting June 21

Ecology engineers will describe the water cleanup plan as part of a public meeting Thursday, June 21 at the Bellingham Cruise Terminal. Beginning at 5 p.m., status reports from the bay cleanup and restoration committees will be provided. At 6:30, information on the proposed Bellingham Bay TMDL will be presented. Following the presentations, scientists who've been working on the overall Bellingham Bay Comprehensive Strategy will be on hand until 8 p.m. to talk individually with citizens.

For more information

Bellingham Bay TMDL – Pam Elardo – (206) 263-3699
Bellingham Bay Comprehensive Strategy – Lucy Pebles McInerney – (425) 649-7272

Ecology is an equal opportunity agency. If you have special accommodation needs, please call Carmen Gilmore at Ecology's Bellingham Office, (360) 738-6250, or TDD at (425) 649-4259.

Appendix C- Comments Received and Responses

Comment letter-
Robyn du Pré
ReSources
Bellingham, WA

ReSources
For Sustainable Communities

1155 N. State Street, Suite 623 • Bellingham, WA 98225 • (360) 733-8307 • *fax* (360) 715-8434 • *email* resource@nas.com • *website* www.re-sources.org

16 July, 2001

Pam Elardo
Washington State Department of Ecology
Water Quality Program
P.O. Box 47600
Olympia, WA 98504-7600

Dear Ms. Elardo:

I have reviewed the Bellingham Bay Contaminated Sediments Total Maximum Daily Load Submittal Report and would like to offer the following comments and questions.

Generally, I would like to comment that this report does not contain any new information. This certainly may be acceptable, since so much information has been generated regarding sediment contamination in the bay, however, much of the detail one might expect in a document such as a TMDL is included by reference only. Some of the reports for these data are cited, and some are not. This is frustrating for the citizen reviewer, who must then seek out source documents to fully understand the report. For example, there is no data about concentrations of contaminants in biological organisms nor data on stormwater sampling in and near the bay. There are statements such as "4-methylphenol in nearshore sediments within the outfall area *appear* to be more closely tied to historical deposits…" –page 28. As a critical reader, I ask, what does "appear" mean? What data support this conclusion?

As well, there were many comments in this document assuring the reader that contamination would be dealt with by the Pilot remediation, but not specifics about how these activities would be carried out or what the impacts of activities such as dredging might be on sediment and biological quality. This document does not question what sediment quality might be under various scenarios presented in the Pilot EIS. For example, if a no action alternative were chosen, would that not affect the conclusions of the TMDL? If a Confined Aquatic Disposal unit were constructed in the bay, how might this affect the sediment quality and biological integrity at the site? Would the contaminated sediments in the CAD not be considered sediments any longer? What about the potential of contaminant transport out of a CAD unit, via bio-turbation, CAD failure from wave action or seismic

activity, or perhaps the foraging of grey whales that have occasionally visited the bay? How do these issues affect the "margin of safety" that is employed in a TMDL?

I would also like to comment on language about monitoring. This document states in several places that "monitoring provides assurance that the control measures achieve the expected load reductions." (page 29). I must point out that monitoring does no such thing. Monitoring only gives us data; it is not a control of any sort. To make statements that monitoring will assure adequate control is misleading. Monitoring can only tell us if the chosen controls are working or not.

Page 2: Waste Load Allocations:
It should be noted that this TMDL is not based on current conditions regarding the Georgia Pacific Facility. In addition to the closure of the chlor-alkalai facility, the company has now closed all of its pulping and chemical operations. Given this new information and the radically reduced volume and toxicity of the mill's discharge, shouldn't the mill be given a WLA of zero for mercury and other contaminants of concern?

Page 7: Sediment Impact Zones: WAC 173-204-410 1. b. states that it shall be the goal of Ecology to "eliminate the existence of all such zones whenever practicable." Given this clear statement, why is it that this TMDL is predicated upon the use of SIZs, particularly in an embayment that is the subject of a cleanup? Shouldn't the goal be to ensure zero impacts to our sediments once dredging and remediation is complete?

Page 21: Grid Cell Number H5D1-Georgia Pacific Outfall: In the second paragraph of this section, it is stated that it is likely that the GP outfall is not associated with 4 methylphenol contamination. If that is the case, then what "future discharge controls" are being referred to at the end of this paragraph, that will ensure us that there will not be re-contamination?

Page 23: Discharge Sources: Table 5 states that "technical studies do not identify city stormwater as an on-going contributor to the sediment contamination." Which technical studies are being referred to? There does not appear to be any stormwater sampling data included in this report. Nor is there, from what I know of the City's stormwater sampling program, any trend data that would tell us that this statement is true. Given the constituents of urban stormwater and the somewhat unpredictable nature of the contaminants therein, it is difficult to make such an assumption without high quality, long term data, which I do not believe exists.

Further, I question the assumption that all of the 4 methylphenol contamination in the bay comes from historic deposits of woody debris. This contaminant is commonly found in stormwater. Has adequate sampling been conducted to support this assumption?

Lastly, why is there such a strong focus on the C Street stormdrain? While this drain is certainly an important potential source of contaminants, the Potential Contaminant Sources map (Figure 4), shows 12 primary stormdrains discharging to the inner bay. Why are these not discussed?

Page 27: Waste Load Allocations: The introduction to this section states that there "are no non-point discharge sources in Bellingham Bay." I question this statement. What about all of the boats in Squalicum Harbor? I believe that there is sediment contamination in the harbor, most likely from bottom paint. Would not these boats qualify as non-point sources? What about stormwater run-off that enters the bay directly, rather than traveling through the city's stormdrain system? Does this qualify as city stormwater of non-point pollution?

Page28: Grid Cell H4FF9 – I & J Waterway: It is stated that Bornstein will not receive an MLA. New sampling data has indicated, however a hotspot of bis (2-ehylyhexyl) phthalate near this location. Discussion in the Bellingham Bay Pilot Source Control Workgroup indicated that Bornstein may use this chemical on site. Would it not be prudent to further explore this issue and perhaps give Bornstein an MLA, with a phase out to zero for this chemical?

Page 28-29: Grid Cell Nmber H5C1-Harris Avenue Shipyard: This section states that because this facility will be discharging to the STP, that the WLAs for metals will be zero. While it is great that there will be no allocation given for metals, I am concerned that this will simply pass the metals contamination on to the STP outfall. This site is out of the TMDL project area, but I believe that the issue bears scrutiny lest we sacrifice one area in order to clean another.

Page 39: Public Involvement: This section states that all Pilot Work Group Meetings since September 2000 have been open to the public. I believe that the work group has been legally required to have all of its meetings open to the public, not just those of the past year. The Pilot Team has merely made more of an effort to make it convenient for the public to attend by holding its meetings in Bellingham since that time.

Thank you for the opportunity to comment on this TMDL submittal report. If you have questions out these comments, please contact me.

Sincerely,

Robyn du Pré
North Sound Bay Keeper

Response to Robyn du Pré:

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

Northwest Regional Office, 3190 - 160th Ave S.E. • Bellevue, Washington 98008-5452 • (425) 649-7000

August 23, 2001

Ms. Robyn du Pré
North Sound Bay Keeper
ReSources
1155 N. State Street, Suite 623
Bellingham, WA 98225

Dear Ms. du Pré:

RE: Comments on the Review Draft - Bellingham Bay Contaminated Sediments Total Maximum Daily Load

I want to thank you for your thoughtful comments on the public review draft of the Bellingham Bay Contaminated Sediments Total Maximum Daily Load (TMDL). Your comments impart valuable insights and concerns that contribute greatly to the quality and clarity of the final TMDL document.

The following paragraphs provide a point-by-point response to your comments included in your letter dated July 16, 2001.

General comment, information used:
The TMDL Submittal Report is not a technical study in itself, but it does analyze the existing data and information to satisfy the TMDL requirements. The TMDL submittal report puts forth an overview of the regulatory tools that will be used to achieve SMS compliance. We attempted to include all the relevant information and data in the submittal report that we thought necessary to understand how it is applied to the TMDL process. The final TMDL submittal report will include more clarity on references and data citations where applicable.

General comment, 4-methylphenol:
The word "appear" means we are uncertain. The Whatcom Waterway RI/FS and the compilation and evaluation of existing sources of contamination performed by the Bellingham Bay Demonstration Pilot, indicate a potential correlation between the distribution of 4-methylphenol and woody debris, as well as a potential correlation with storm drain discharges. In any event, areas with high percentages of woody debris will be remediated and the storm drains addressed to ensure recontamination of the sediments will not occur.

General comment, remedial alternatives:
The Model Toxics Control Act (MTCA) mandates that the contaminated sediments in Inner Bellingham Bay be addressed. In other words, the selection of "no action" is not possible, as it would be a violation of state laws and regulations. The sediment quality impairments identified on the 303(d) list are based on exceedance of the state's Sediment Management Standards (SMS), which are predicated on the potential for contaminated sediments to adversely affect biological and ecological resources. Compliance with the SMS will be achieved through MTCA and NPDES activities in Bellingham Bay. Regardless of the ultimate remedial options chosen, the Bay must achieve SMS compliance, and this will be verified through monitoring activities. If monitoring shows actual or potential exceedances of SMS, corrective actions will be taken to assure that compliance continues. As each sediment remediation project moves forward, there will be opportunities for public input on the details of each approach.

General comment, monitoring:
It is true that monitoring itself does not provide assurance of compliance, but it does provide a measure as to whether remedial actions are effective. This distinction will be clarified in the final document.

Page 2, Wasteload Allocations:
The TMDL submittal report utilizes the current NPDES permit for the Georgia Pacific-West facility. The effluent limitations under the permit are currently in compliance with the WLA for the facility. More detail is given on page 27 of the submittal report, which states that the WLA for G-P may be revised to zero based on the recent closure of industrial processes at the plant. Ecology will perform the analysis of future effluent limitations for G-P upon modification of the G-P NPDES permit. Regardless, the TMDL analysis demonstrates that the current NPDES permit is consistent with the protection of sediments.

Page 7, Sediment Impact Zones:
It is true that the goal of the SMS is to eliminate the existence of SIZs where practicable. Nonetheless, SIZs remain a tool to be used under SMS if absolutely necessary. The TMDL submittal report is not predicated upon the use of SIZs since none are proposed.. However, it is important to note that if an SIZ is absolutely necessary for compliance with SMS, they are allowable under our state regulation. Furthermore, granting an SIZ does not signify a violation of SMS or the criteria therein. I will add clarity to the final report on this matter. The regulatory citation you pointed out will be included as well as explanatory text about the limitations on use of SIZs for compliance.

Page 21, Georgia Pacific:
The inclusion of "future discharge controls" in this part of the text is an artifact of the original rough draft of this document. The earlier draft was composed prior to G-P closure of the chlor-alkali facility. "Future" controls referred to the anticipated plant changes at the time it was written. This will be corrected in the final TMDL submittal document.

Page 23, discharge sources:
Existing source data for Bellingham Bay was compiled and evaluated in the following Bellingham Bay Demonstration Pilot documents: "Final Data Compilation and Analysis," dated March 17, 2000, by Pacific International Engineering and Anchor Environmental, and "Sediment Site and Source Control Documentation Report," dated July 30, 1999, by Anchor Environmental. Based on the information in these reports, storm drains are not identified as an on-going source of sediment contamination. Even so, storm drains must be addressed as part of remedial activities as well as NPDES permitting to ensure that they do not re-contaminate remediated sediments. The final draft of the TMDL submittal report will be clearer on the available stormwater data and associated references.

As stated previously, we do not know with certainty that the source of 4-methylphenol comes from the woody debris deposits. This uncertainty will be stated more clearly and consistently throughout the document. Remedial actions will address woody debris and subsequent monitoring will be conducted to measure SMS compliance for 4-methylphenol and all contaminants of concerns.

Finally, the primary storm drains in Figure 4 are referred to collectively throughout the submittal report under the heading of "Urban Stormwater Runoff."

Page 27, Waste Load Allocation:
Your are correct that boats contributing contamination to the Bay would be considered a non-point source. However, the identified sediment contamination in the harbor has been associated with historic boat repair activities, not with the general presence of boats. Currently, active boat repair facilities are considered point source in nature and are subject to the NPDES permitting system.

City stormwater that does not travel through the piped conveyance system (e.g., sheet and ditch flows) is still considered a point source and covered under the city's NPDES permit program. This type of stormwater would be grouped with the stormwater outfalls under the "urban stormwater runoff" heading.

Page 28, I&J Waterway:
Your point about Bornstein Seafoods and recent sampling data illustrates some of the temporal issues related to developing a TMDL submittal based upon an aging 303(d) list. Bis(2-ethylhexyl)phthalate was not discussed in the TMDL document because it is not on the 1998 303(d) list. However, Bornstein Seafoods and the Port of Bellingham are currently investigating the potential source of this contamination and will report their findings to Ecology. Any required controls will be incorporated into the facilities NPDES permit. Ecology's intent is to have this source controlled and the contaminated sediments addressed so that this area does not make future 303(d) lists, thereby not subject to TMDL review.

Page 28-29, Harris Avenue Shipyard:
The Bellingham Post Point Wastewater Treatment Plant is protected from the discharge of metals to their facility through applying effluent limitations for discharges to the sanitary sewer, known as "local limits." The current permit for the Harris Avenue Shipyard (formerly, Maritime Contractors, Inc.) contains local limits for metals for the discharge of treated hydroblast wastewater to the sanitary sewer. The revised permit for the shipyard will contain a similar set of limits for metals in stormwater. The local limits are approved by Ecology after evaluating the capacity of the wastewater treatment plant, including the plant's ability to maintain compliance with their effluent limitations for metals assigned to the treatment plant final discharge.

Page 39, Public Involvement:
You point is correct. The language in the final report will read, "All Pilot Workgroup meetings have been open to the public. Beginning September 2000, Ecology increased public outreach efforts to increase public participation in the Workgroup meetings."

Thank you again for your comments on the Review Draft of Bellingham Bay Contaminated Sediments TMDL Submittal Report. We appreciate your time and effort in providing this valuable input to the TMDL development process.

Sincerely,

Pam Elardo, P.E.
TMDL Project Manager

PE:ct

cc: Lucy McInerney, Washington State Department of Ecology

Comment email-
Steve E. Parker,
KingPriest Industrial Construction, Inc.
Ferndale, WA

-----Original Message-----
From: Steve E. Parker [mailto:steve@kingpriest.net]
Sent: Thursday, June 21, 2001 3:17 PM
To: pam.elardo@metrokc.gov
Cc: steve@masterd.net
Subject: Bellingham Bay cleanup and neighboring watersheds.

Pam

I was reading the report put out by the Department of Ecology as a news release on June 15, 2001. The topic of "Bellingham bay's cleanup and the progress" is a really big issue here in Bellingham. I currently live in the neighboring town of Ferndale,Wa and I am very interested in our present and future watershed and Bay.

I own a Construction Company and I have installed Westmar Wash Basins to many auto detailing companies, auto body shops, and rental companies. We currently have a contract with Enterprise Rent-a-car and install, maintain, and service for this company all over the Puget Sound Area. The wash basin that we install is similar to a oil water separator. The difference is the set up. Oil water separators have no filtration set up in the units, it
collects the water and sediments (soap,oil,chemicals) and allows them tosettle at the bottom of the unit while the water runs into the Sanitary Sewer. To me, that is just fixing part of the problem. What about the chemicals that don't settle. They just end up in our Sanitary department and create larger pollution problem that we'll have to deal with later. Why don't we deal with it now and stop creating more problems. Are unit operates similar to the standard oil water separator but it has a filtration system. It allows the sediments to settle and then it goes thru a oil skimmer and then it passes thru a pillow filter with MaxFloKlear. Then the water is pumped or gravity fed to sanitary services, but as filtered water. A recycling process can also be used to conserve on water. That's killing two birds with one stone. What happen to the enforcement of the 4-D law which prohibits the run off of soaps, oils, and chemicals into the storm drain? I have seen enforcement in the greater Seattle area, but not locally. We have done many jobs down in the Seattle area and have been told about the pressure to install units like ours at businesses applicable. Even

warnings given and fines to enforce the issue. The issue of our water supplies and watershed is very important to me and several other people, and
the animals we protect by keeping our water clean. So my question is, why doesn't the county enforce this issue? Who enforces this issue? Why doesn't the government lead by example and start placing these units in their vehicle maintenance areas?

please send back a response to this email. Your time and expertise is greatly appreciated.

Thank you,
Steve Parker
cell # is : (360)815-5664 Office # is : (360) 933-0825 fax # is : (360)933-0825 Email : steve@masterd.net

Email Response to Steve Parker:

-----Original Message-----
From: Elardo, Pam
Sent: Friday, August 17, 2001 11:43 AM
To: 'steve@kingpriest.net'
Subject: RE: Bellingham Bay cleanup and neighboring watersheds.

Mr. Parker:

I appreciate your comments on the Water Cleanup Plan for Inner Bellingham Bay. I also appreciate your presence at the June 21st public meeting and our ensuing discussion.

The equipment you describe for auto washing may be a valuable component of any industry's or city's stormwater management program. It sounds like you have had notable success with your product in numerous areas around Puget Sound. However, we cannot legally advocate for a particular vendor in our program.

The Department of Ecology does have stormwater inspectors on staff to address many of the problems you identify in your letter. We work with industries and other facilities to comply with water quality laws and regulations. We also issue enforcement actions, when appropriate.

In addition, Ecology oversees local stormwater programs. We have been involved with the City of Bellingham's program, and this involvement will increase as they will be covered under the Phase II NPDES stormwater permit.

Your suggestion to place wastewater treatment units at government maintenance areas would be evaluated by the city or county stormwater program or at regulated industries or commercial facilities.

The city's stormwater program does contain inspection and enforcement components through the Environmental Division in the Public Works Department. Ecology is currently working with the city and Whatcom County to clarify their roles with respect to illegal discharges to the storm sewer system.

If you know of any specific spills or pressing water quality problems, I suggest you contact our Bellingham Field Office at (360)-738-6250.

Thank you for taking the time to comment on the Bellingham Bay Water Cleanup Plan.

Comment letter-
Donald Burpee
Enviro-Drain, Inc.
Snohomish, WA

Reduces Pollution Runoff at the Source

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RECEIVED
JUL 16 2001
DEPT OF ECOLOGY

Pam Elardo
3190 160th Ave S.E.
Bellevue, WA. 98008

July 12, 2001

Re: Bellingham Bay Clean-up

Enviro-Drain Inc. has tested, developed and patented a stormwater filter system that fits in existing stormwater catch basins. These filter systems come in one, two or three tray models. As the polluted water passes through our filter, the pollution is removed by different size screens and filter mediums depending on the type of pollution that is being targeted. The Enviro Drain stormwater filter insert is designed to exceed the "Best Management Practices" advised by the National Pollution Discharge Elimination System (NPDES) regulations. Our Salmon Saver™ filters are made from 100% stainless steel, are an everlasting investment for a **permanent solution**, and are easy to maintain. Making Enviro-Drain more versatile and cost effective than any other types of filter.

The Salmon Saver™ collects and suspends:

grass leaves antifreeze rock sticks butts dirt oil paper paint silt solvent fertilizer alkali steam-cleaning waste gas pesticides grease bark soap

Enviro-Drain's are protecting our waters and our customers across the nation:

□**King County Road Dept., Seattle, WA.** □**US Coast Guard, Elliot Bay, WA.** □**DFW Airport, Dallas**
□**Port of Edmonds, Edmonds, WA.** □**Kenworth Truck Co., Seattle, WA.**
□**Broadmoor Country Club, Seattle, WA.** □**International Golf Club, Bolton, MA**
(US & Canadian Patented)

We would like an opportunity to discuss the many benefits and applications of the Enviro-Drain Stormwater filter.

Please feel free to contact us at: (800) 820-1953. Visit our web site at: enviro-drain.com

Thank you,

Donald Burpee
Enviro-Drain®, Inc.

Response to Donald Burpee:

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

Northwest Regional Office, 3190 - 160th Ave S.E. • Bellevue, Washington 98008-5452 • (425) 649-7000

August 23, 2001

Mr. Donald Burpee
Enviro-Drain, Inc.
P.O. Box 1930
Snohomish, WA 98291-1930

Dear Mr. Burpee:

RE: Comments on Bellingham Bay Cleanup

I appreciate your comments on the Water Cleanup Plan for Inner Bellingham Bay.

The equipment you describe for stormwater catch basins may be a valuable component of any industry's or city's stormwater management program. It sounds like you have had notable success with your product in numerous areas around Puget Sound.

Your suggestion to use your treatment units could be evaluated by the city or county stormwater program or at regulated industries or commercial facilities. However, we cannot legally advocate for a particular vendor in our program.

Thank you for taking the time to comment on the Bellingham Bay Water Cleanup Plan.

Sincerely,

Pam Elardo, P.E.
Department of Ecology
Water Quality Program

PE:ct

Comment letter-
Darin Cramer
Washington State Department of Natural Resources
Olympia, WA

WASHINGTON STATE DEPARTMENT OF
Natural Resources

JENNIFER M. BELCHER
Commissioner of Public Lands

December 20, 2000

Pam Elardo, P.E.
Department of Ecology/King County Department of Natural Resources
201 South Jackson St. KSC-NR-0503
Seattle, WA 98104-3855

Subject: Comments regarding the Inner Bellingham Bay Contaminated Sediments Total Maximum Daily Load – Review Draft.

Dear Ms. Elardo:

Thank you for providing DNR with a copy of the Review Draft of the Inner Bellingham Bay TMDL. As you know, DNR has been very active in the Bellingham Bay Pilot Project over the last several years, and it is within this context that we are providing comments. Comments are generally divided into three areas: programmatic, technical, and formatting.

Programmatic Comments

A TMDL is designed to set an allowable load for a contaminant, and allocate this load out to specific point (Waste Load Allocations-WLA's) and non-point (Load Allocations-LA's) sources. In this first version of a contaminated sediment TMDL, Ecology appears to be taking the approach that so long as a water body is being addressed via the cleanup laws (CERCLA or MTCA), then it should be removed from the impaired water bodies list. While this concept seems to be a better way to more quickly deal with our impaired water bodies, DNR is concerned that it may not result in meeting CWA requirements. Therefore, DNR has reservations about Ecology relying on the Bellingham Bay Pilot Project to satisfy the TMDL requirements of the CWA. Furthermore, the proposal of piggybacking on the cleanup effort, even if it works perfectly, is not necessarily going to be appropriate at other cleanup sites in Puget Sound. The Bellingham Bay Pilot project was to come up with a list of lessons learned to apply to other sites in Puget Sound. Does the de-listing proposal rely on this happening? What if we are unable to arrive at good, negotiated agreements elsewhere? How will the de-listing proposal work then?

There are two primary areas of the TMDL that we believe are deficient for meeting the criteria of an approvable TMDL. First, the TMDL fails to identify a specific load, or to set WLA's, other than for mercury from G-P, or LA's. Instead, this TMDL defines the loading capacity as being compliant with the state Sediment Management Standards (SMS). This is equivalent to a TMDL for fecal coliform within a riverine system saying that a load for the river won't be set, instead reduction will implemented until the water quality standard is met - an approach that EPA and the courts have not accepted.

1111 WASHINGTON ST SE ▮ PO BOX 47000 ▮ OLYMPIA, WA 98504-7000
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EPA guidance does allow for the use of targets, or surrogate measures, and this TMDL does propose using Load Reduction in this manner. However, the load, WLA and LA need to be quantifiable values in order to comply with the CWA, EPA guidance and the MOA between Ecology and EPA that was part of the settlement agreement between the 303(d) plaintiffs and EPA. The total amount of load needing reduction, and the respective contribution necessary from specific sources in the form of WLA's and LA's to meet this reduction, needs to be identified. Without these values being specified, there are no specific values or loads to be incorporated into individual NPDES permits, especially the stormwater phase II permit(s), no targets for nonpoint sources, and no source specific measures for determining compliance over time with the TMDL as required by the CWA, EPA guidance and the MOA. The only measure of compliance is the general monitoring of sediments for compliance with the SMS.

This brings us to the second area of concern - compliance with the MOA requirement for a Summary Implementation Strategy (SIS) that provides reasonable assurance that the controls necessary to meet the WLA's and LA's will be implemented. In general, without specific WLA's and LA's, we don't see how reasonable assurance can be provided. As you know, the Bellingham Bay Pilot Team Letter of Agreement and Agreement between Liable Parities has not yet been finalized – and the draft Letter of Agreement is not specific in the area of source control. Therefore, reasonable assurance that appropriate measures will be taken to meet the target identified in this TMDL (reductions that will result in compliance with the SMS) isn't available, much less the reasonable assurance that controls for meeting specific WLA's and LA's would be implemented.

What's more, the TMDL relies heavily on two other actions that are not yet finalized and hence should not be considered as providing reasonable assurance that either the reductions necessary to achieve compliance with the SMS as proposed in the TMDL, or the controls necessary to meet specific WLA's and LA's that should be but aren't identified in the TMDL, will be achieved. The MTCA Consent Decree for the Cleanup Action Plan isn't anticipated until at least early 2001, and the NPDES stormwater permit(s) aren't anticipated as being in place until March 2003.

The issue of reasonable assurance relating to the MTCA Consent Decree and the various permitting actions wouldn't be as much of a concern if specific WLA's and LA's reductions had been identified for each of the sources within each of the grid cells, and these reductions then specifically identified as needing to be addressed in either the consent decree and/or the permitting actions. Because there are administrative procedures that provide the basis of appeal if the specific WLA's and LA's are not included in these actions, one could argue that reasonable assurance would exist that these reductions would be implemented. That is not possible if specific WLA's and LA's for each source have not been identified. Only the WLA for G-P is consistent with the CWA section 303(d), EPA guidance and MOA requirements and, because it can be administratively implemented at a defined value through the NPDES permit process, provides reasonable assurance it will be achieved.

Cleanups typically do not focus on, and do not comprehensively satisfy CWA issues. De-listing water bodies simply because they are being addressed under cleanups does not mean that CWA issues automatically will be addressed. For example, DNR has had great difficulty in getting EPA and Ecology to authentically ensure that ongoing sources of contamination are stemmed in Commencement Bay and in Bellingham Bay before agreeing to cleanups. In order to get our water bodies truly cleaned up and healthy, sediment cleanup efforts must be integrated seamlessly with clean water efforts, and standards need to be harmonized. The concept that if a water body is being addressed under cleanup provisions, it should be de-listed, and, therefore, the CWA authorities of EPA and Ecology need not bother with it, ironically enough, might actually result in ensuring that the integration never happens.

Technical Comments

1. Groundwater contributions to sediment recontamination are not very well addressed in the draft TMDL document. This contributor of recontamination is often poorly understood and under assessed in modeling efforts and on a site-by-site investigative basis. One of the write-ups on a grid cell discusses potential concern for ground water seeps picking up contamination from the site and dispersing them to sediments. However, very little discussion is included on this issue in other grid cells or in the document as a stand alone topic.

2. The section on Sediment Recontamination Modeling Analysis points out that two modeling efforts were conducted to assess ongoing point source inputs and sediment recontamination potential. Perhaps some additional detail could be provided on the modeling assumptions and outcomes apart from those in the Appendix.

3. The TMDL document should provide a discussion/analyses in a stand-alone section on "source control". Such discussion of the environmental and structural longevity of Caps and CAD's can only serve to show that an analysis was completed and informs the reader that thought was placed in this area. In addition, it will also show that considerations of practicability (economic and technical feasibility) were paramount to prompt delivery of some type of source control. Dealing with this issue up front in the TMDL will only help in the future with regard to how the decision frameworks for source control methodologies were established. The TMDL is thereby strengthened and becomes a direct, honest and 'rationale comprehensive' document.

4. The use of Caps and CAD's however, does have major concerns in that they may be prone to breaches over time from various human, recreational, industrial and transportation activities (as demonstrated recently at Eagle Harbor). In addition, breach risks from water movement (currents, ground water, sediment movement, erosion, surface water movement) and tectonic/earthquake activity also contribute to the eventual loss of structural integrity of a Cap/CAD and its performance in isolating contaminant movement for periods longer than a decade. Use of clean material resources for caps/CAD'S that potentially could be directed to other beneficial uses is also a negative drawback to such containment features.

5. The Draft TMDL documents notes that twenty-five toxic substances and sediment bioassay failures are responsible for the 303-(d) listings in Inner Bellingham Bay and that only ten parameters are currently in exceedence of the sediment quality standards. It may be useful to point out in the document how many parameters were previously in exceedence of the sediment water quality standards in the past, if this has indeed changed over time. So, the phrasing would read under the "Applicable Criteria" Section on page 5, " Recent data has revealed that there are only 10 parameters currently in exceedance of the sediment quality standards versus "x number" in the past. This clarification lets the reader/user know that Inner Bellingham Bay has had "snap shots" through time and potential varying concentration levels in chemical parameters.

6. Pg. 13 (Paragraph 1): It is not clear why the grid cell numbers: H4F9, H4D9 and H5D0 were not added previously. Perhaps some brief explanation can be provided on how sediment impaired areas were eventually included/added.

Formatting Comments

Stating the purpose, the problem, the form and function of the Draft TMDL in an executive summary at the very beginning would be helpful. Although the document has a background section, it is still missing a high impact and notable opening. Suggestions could be as follows:

The Inner Bellingham Bay TMDL designed to:

- Identify standards and performance expectations for how water bodies will not be further impaired
- Serve as a document which identifies and lists the impaired water bodies in Inner Bellingham Bay
- List the quantities and types of contaminated sediment and their classification units
- Summarizes the degree of sediment contamination, and
- Lists the current progress and future committed benchmarks on contaminant assessment, source control and remediation.

How the Executive summary is written is very important because it draws a conceptual map for the reader. Finally, it is important in this document to identify the expectations of the TMDL. This is never completely or more fully discussed. Yet, this is the element that is most important to the whole environmental recovery process.

Additionally, the beginning part of the document should orient the reader/user very briefly to the various water components of Inner Bellingham Bay. For example, it could state, " there are 3 key physiographic areas of Inner Bellingham Bay. These include the Whatcom Waterway, I & J Waterway, and various outfall areas. …". It is not clear to reader/user in a verbal context the important focus areas of the Bay. Although, it lists in table form later in the document, along with the various grids, it does not orient the reader upfront in a broader conceptual layout, the principal areas of concern.

Page 9: Place a bold subheading informing the reader that the following nine steps are for the "Screening and Evaluation of Contaminated Sediment Sites Under MTCA". This would emphasize the important chronology and process of MTCA listing for the reader/user.

Page 17: The important summary line on the sediment toxicity found in the Whatcom Waterway is important and should be copied into an opening executive summary:

- 16 locations exceeded the SQS. Sixty percent of the samples collected from 40 site locations were determined to be non-toxic meaning that these samples did not exceed the SQS minor biological effect criteria.

Page 18: Another summary line or key bullet to add to the executive summary:

- Tissue mercury concentrations within the Whatcom Waterway Area are currently elevated as much as three times above the regional background levels, however, they still remain below conservative benchmark concentrations calculated to protect tribal fishers and sensitive wildlife that may consume relatively large amounts of seafood.

Finally, source control strategies should be itemized as well, including the various types of stormwater programs, permits and regulatory changes to be implemented, and their respective benchmark/implementation dates. These issues should be contained in a stand-alone section without having to go into individual Strategy Implementation paragraphs to find them.

Thank you for providing DNR with the opportunity to comment on this draft TMDL. We appreciate Ecology's efforts, and look forward to continued coordination in the development of a final TMDL for Inner Bellingham Bay.

Sincerely,

Darin D. Cramer
Project Manager-Environmental Planner
Aquatic Resources Division

CC: Bellingham Bay Pilot Team
John Malek, EPA

Maria Peeler, DNR
Paul Silver, DNR
Chuck Turley, DNR
Tamara Allen, DNR
John Bower, DNR
Steve Saunders, DNR
Bruce Wishart, People for Puget Sound
Robyn DuPre, ReSources

Response to Darin Cramer:

STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

Northwest Regional Office • 3190 160th Avenue SE • Bellevue, Washington 98008-5452 • (425) 649-7000

May 21, 2001

Mr. Darin Cramer
Project Manager - Environmental Planner
Washington State Department of Natural Resources
Aquatic Resources Division
1111 Washington Street SE
P.O. Box 47000
Olympia, WA 98504-7000

Dear Mr. Cramer:

Thank you for your December 20, 2000, comment letter on the Review Draft of the Inner Bellingham Bay Contaminated Sediment Total Maximum Daily Load (TMDL). I appreciate your and DNR's involvement in the Bellingham Bay Demonstration Pilot Work Group over the past several years. Your comments and insights have been valuable in revising the Inner Bellingham Bay draft TMDL.

The following is a response to your comment letter. Sometime after the date of this letter, you should receive a revised version of the draft TMDL document.

Programmatic Comments

Cleanup Activities:

Ecology is not taking the stand that if MTCA (or CERCLA) is active in a contaminated sediment area, then the waterbody should be removed from the 303(d) list of impaired waters. Since our state sediment standards are federally recognized water quality standards, Ecology does intend to apply the full requirements of the Clean Water Act in addressing contaminated sediments on the 303(d) list. Furthermore, EPA has explicitly rejected the notion that MTCA/CERCLA cleanup actions alone constitute compliance with TMDL requirements.

We also agree that while some of the concepts used to develop this contaminated sediment TMDL for Inner Bellingham Bay will be transferable to other 303(d) listed contaminated sediment areas, by no means are we developing a "boiler plate" that can be used in a cookie-cutter approach elsewhere. Bellingham Bay has many unique qualities that make it an ideal first case to explore the concepts behind developing a TMDL for contaminated sediments. The work of the Bellingham Bay Demonstration Pilot Work Group over the past several years has provided a huge body of data and details to make Bellingham Bay the logical place to start. Other sediment cleanup/303(d) listed areas will obviously not be as well developed as Bellingham Bay. We will likely be engaged in these other areas earlier in the process--developing the TMDL needs as the cleanup concepts unfold.

Wasteload Allocations:

As you know, the contaminated sediments in Bellingham Bay have been documented as primarily due to historic sources. No ongoing sources have been identified as a significant contributor to sediment contamination in the study area. In fact, an extensive source control evaluation (Anchor Environmental, 1999) was carried out in order for the Pilot Work Group to determine if any ongoing discharge would thwart planned remediation activities.

Since no ongoing sources have been documented as currently contributing to the sediment quality impairments in Inner Bellingham Bay, wasteload allocations are not calculated for the discharging sources. In other words, where the discharge from any facility is not currently, nor expected to, result in sediment contamination to the SQS criteria, a WLA is not provided. If a WLA were provided up to the SQS level, Ecology would in effect be allowing a greater mass loading of sediment contaminants than is currently released from these discharges.

We did identify only one WLA, for Georgia Pacific West Inc., in the review draft of the Bellingham Bay sediment TMDL. Subsequent revisions have included some specific numeric WLA targets in sediment for other point source dischargers. These WLAs are based on the Sediment Quality Criteria in the state's SMS rule, or they are given as zero where we expect a source to be entirely eliminated. A key to the success of this TMDL is the development and implementation of a sediment monitoring program that will be created under Ecology's Toxic Cleanup Program and integrated into NPDES permits as necessary. Since there are no non-point dischargers by definition in Bellingham Bay, Load Allocations will not be identified in the revised TMDL.

Be assured that we understand this situation of no identified ongoing sources to be unique to Bellingham Bay. In other areas, we will be dealing explicitly with ongoing contaminant sources that will require AKART evaluations, sediment impact zone analysis, and potentially numeric wasteload allocations.

Reasonable Assurance:

Since the Review Draft of the Inner Bellingham Bay contaminated sediment TMDL, the Letter of Agreement between the Bellingham Bay Demonstration Pilot Work Group members has been finalized and is in the process of being signed by all parties. This letter is an agreement to implement the Comprehensive Strategy and addresses sediment cleanup and source control activities in the Bay. Even without that Letter of Agreement, under MTCA, Ecology would pursue enforcement actions to achieve sediment compliance in Bellingham Bay.

The revised TMDL draft will include more specific WLA targets to be incorporated in subsequent NPDES permits. The TMDL also recommends that the MTCA-driven monitoring strategy be incorporated into the stormwater Phase 2 permit for Bellingham. The sediment monitoring strategy has yet to be developed, however, this TMDL requires that Ecology's stormwater program reviewers in the Water Quality Program include monitoring plans consistent with the Cleanup Actions Plans for the various areas in the Bay.

Technical Comments

1. Potential groundwater sources that may adversely effect the sediment quality have been well-addressed in the TMDL draft. The array of potential upland contaminated areas are discussed in detail under the heading "Discharge Sources" and additional information can be found from the various reference citations. Although the detailed dynamics of groundwater contaminant transport is not currently fully understood, the work done in Bellingham Bay does document the potential contributors from groundwater and provides a solid implementation plan for containment and remediation.

2. The sediment modeling was conducted as part of the Whatcom Waterway remedial investigation for the G-P outfall site and for discharge sources in Bellingham Bay and is incorporated into the TMDL by reference. Additional information can be found in the cited references. Throughout the development of the TMDL, we assessed which information to include and which to leave as reference material. Originally, we thought adding more modeling detail would not be appropriate in the TMDL document. We will reconsider this for the final TMDL submittal.

3. We do not believe that the TMDL is an appropriate place to discuss the structural integrity of CADs and caps. Under the MTCA process, Ecology has not yet selected the remedial actions to address sediment contamination in Bellingham Bay, and the actions that are ultimately selected must comply with the Sediment Management Standards in perpetuity. If caps and CADs, and their associated monitoring, are part of the remedy ultimately selected, structural integrity concerns can be directed to Ecology through the public comment period on the draft Cleanup Action Plan.

4. See response number 3. above.

5. The revised TMDL document draft will include the revision on the current parameters of concern as opposed to the previous parameters.

6. Explaining why grid cells were previously excluded is not an easy task. In some cases, Ecology located areas impaired by contaminated sediments by locating only the centroid of the cleanup site on the open water grid system. In others, there simply were errors in location. The Bellingham Bay TMDL also includes a new area, Cornwall Avenue Landfill, where data did not exist in time for evaluation on the 1998 303(d) list.

Formatting Comments

Thank you for your comments on formatting the TMDL documents. We do not intend to create an executive summary for this document, but rather are planning on developing a "Focus Sheet" that serves the same function. All final TMDLs developed by the Department of Ecology are accompanied by a Focus Sheet that does provide the "form and function" of the complete document. Your detailed suggestions for the executive summary will be useful in developing the fact sheet for the Bellingham Bay contaminated sediment TMDL.

Your suggestions on additional clarification in the introductory pages and body of the document will be made in the next revision.

Thanks again for reviewing and commenting on the Inner Bellingham Bay Contaminated Sediment TMDL Review Draft. Your effort clearly will help improve the next TMDL revision. Ecology is planning to issue the public review draft for the TMDL in early June 2001. We hope to hold a public meeting on the TMDL sometime this summer. I expect to have many interactions with your agency and other interested parties before the TMDL is finalized.

If you have any questions or further comments, you may reach me by telephone at (206) 263-3699, or email pam.elardo@metrokc.gov.

Sincerely,

Pam Elardo, P. E.
Department of Ecology
Water Quality Program

PE:ct

cc: Lucy Pebles, Washington State Department of Ecology
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