FRASER RIVER ACTION PLAN

# Burrard Inlet

## Technical Summary Report

DOE-FRAP 1998-02

OCTOBER 1998

Environmental Protection Branch

Pacific and Yukon Region

## ACKNOWLEDGEMENTS

This document is based on a draft report researched and written by Marian Adair, Adair Consultants Ltd. for Environment Canada. Lisa Walls, Environment Canada (EC) supervised the preparation and editing of the report with assistance from Marielou Verge, EC. Mike Nassichuk, EC and Sharon Peters from the Burrard Inlet Environmental Action Program/Fraser River Estuary Management Program (BIEAP/FREMP) provided valuable editorial reviews. The following people gave generously of their time in responding to requests for up-to-date information and editorial input on sections of the report: John Jordan, Vancouver Port Corporation, Karen Kelm, BIEAP/FREMP, Janice Boyd, EC and Bob Shepherd, EC.

Editing and layout services for this report were provided by Polestar Communications. Cover design was provided by Iris Communications Inc.

## COMMENTS

This report contains a synthesis of many studies funded in part or in total by Environment Canada under the Fraser River Action Plan and by the other Burrard Inlet Environmental Action Program funding partners. To the knowledge of Environment Canada, and the other contributors to this report, the information contained herein is technically accurate. The reader is encouraged to advise Environment Canada, Pacific and Yukon Region, of any errors or omissions noted in the report.

Send your comments to:

Fraser River Action Plan
c/o Pollution Prevention and Assessment Division
Environmental Protection Branch
Environment Canada
Pacific and Yukon Region
224 West Esplanade
North Vancouver, B.C. V7M 3H7

Photo Credit:

Cover: L. Walls; Environment Canada

Back Cover: L. Walls, G. Mitchell

# EXECUTIVE SUMMARY

Burrard Inlet is an important marine system of considerable ecological and economic importance. Signs of environmental degradation in 1989 led to the establishment of the Burrard Inlet Environmental Action Program (BIEAP) in 1991. BIEAP was initiated by five government agencies — Environment Canada, the Department of Fisheries and Oceans, the BC Ministry of Environment, Lands and Parks, the Vancouver Port Corporation and the Greater Vancouver Regional District — and now operates in co-ordination with a similar program for the Fraser River, the Fraser River Estuary Management Program (FREMP). Given the close links between FRAP's deliverables for Burrard Inlet and the BIEAP objectives, BIEAP served as a useful mechanism for implementing activities that focused on these deliverables.

There were numerous accomplishments realized in addressing the 10 FRAP deliverables for Burrard inlet including:

**Burrard Environmental Review Committee (BERC).** BERC provides a uniform, effective and timely process for proponents to submit applications for development along the inlet, and for the partner agencies to review and reply to the applications. The process also provides for public scrutiny and comment. All participants appear to benefit from improvements over previous independent approval processes.

**Public involvement and information.** BIEAP initiated a number of public information strategies including a newsletter, videos, and an Internet site. Through the *Adopt A Shoreline* project, BIEAP supported volunteer initiatives to preserve and protect the inlet environment. The *Voices for Choices* program educates Grade 12 students about the complexity of balancing the environment and the economy in the inlet through in-class activities and a boat tour.

**Industrial discharges and contaminant loadings.** Improvements in the quality of certain industrial discharges (e.g., metal levels) were realized and codes of practice have been developed which provide new tools to prevent or reduce contaminant releases. FRAP and BIEAP are actively promoting select codes to improve the adoption of best environment practices by inlet users. A number of FRAP initiatives such as research studies and public education campaigns will contribute to the reduction of contaminant loading from urban stormwater runoff.

**Land and water use planning.** Good progress was made toward the development and implementation of land use classification criteria and a strategy to protect existing habitats with the collection of habitat inventory information for subtidal, intertidal, riparian and backshore areas of the inlet. An Inlet Management Plan proposed for the inlet would achieve the FRAP deliverable of a sustainable development plan for Burrard Inlet.

# SOMMAIRE

Le bras Burrard est un important système marin qui présente un intérêt considérable sur les plans écologique et économique. Des signes de dégradation du milieu décelés en 1989 ont donné lieu à l'établissement du plan d'action environnemental pour le bras Burrard (PAEBB) en 1991. Le PAEBB a été mis en place par cinq organismes gouvernementaux, soit Environnement Canada, le département des Pêches et des Océans, le ministère de l'Environnement, des Terres et des Parcs de la Colombie-Britannique, la Société du port de Vancouver et le District régional de Vancouver; sa mise en oeuvre est maintenant coordonnée avec celle d'un programme semblable pour le fleuve Fraser, le Programme de gestion de l'estuaire du Fraser (PGEF). Compte tenu des liens étroits entre les objectifs du Plan d'action du Fraser (PAF) qui s'appliquent au bras Burrard et les objectifs du PAEBB, le long ce dernier a constitué un mécanisme utile pour la mise en oeuvre des activités basées sur les objectifs du PAF.

De nombreuses réalisations ont été accomplies pour ce qui est des 10 objectifs du PAF qui s'appliquent au bras Burrard, notamment les suivantes:

**Comité d'examen environnemental de Burrard (CEEB)** - Le CCEB fournit un mécanisme uniforme et efficace aux promoteurs qui présentent des demandes relatives à des travaux d'aménagement du bras et aux organismes partenaires qui examinent ces demandes et y répondent. Ce mécanisme prévoit aussi la tenue d'un examen public et la formulation de commentaires par le public. Tous les participants semblent bénéficier des améliorations par rapport aux processus antérieurs d'approbation qui étaient indépendants et non coordonnés.

**Information et participation du public** - Les responsables du PAEBB ont mis en oeuvre diverses stratégies d'information du public dont un bulletin, des vidéos et un site internet. Par l'entreprise du projet *Adopt A Shoreline*, le PAEBB appuie les initiatives bénévoles visant à préserver et à protéger l'environnement du bras. Le programme *Voices for Choices* renseigne les élèves de la 12$^{e}$ année sur le bras par le biais d'activités en classe et d'une excursion en bateau.

**Rejets industriels et charges de contaminants** - On a amélioré la qualité de certains effluents industriels (la teneur en métaux, par exemple) et adopté des codes de pratiques qui fournissent de nouveaux outils pour prévenir ou réduire les rejets de contaminants. Le PAF, le PAEBB et le PGEF préconisent l'utilisation de codes de pratique pour améliorer l'adoption de pratiques environnementales optimales par les usagers du bras Burrard. Plusieurs initiatives du PAF comme des projets de recherche et des campagnes de sensibilisation du public contribueront à réduire les charges de contaminants dans les eaux pluviales urbaines.

**Aménagement du territoire et utilisation des ressources en eau** - Des progrès ont été réalisés au chapitre de l'établissement et de l'application de critères de classification de l'utilisation du sol et d'une stratégie visant à protéger les habitats grâce à la collecte de données d'inventaire pour les zones infratidales, intertidales, riveraines et supralittorales du bras. Un Plan de gestion du bras Burrard garantira la mise en oeuvre d'un plan de développement durable du bras, qui constitue l'un des objectif du PAF.

# CONTENTS

# BURRARD INLET TECHNICAL SUMMARY REPORT

## 1.0 INTRODUCTION

### 1.1 Burrard Inlet

Burrard Inlet is an important geographical feature of the southwest coast of British Columbia. The inlet is a marine environment with significant fresh water influences from rivers, streams and stormwater run-off. Indian Arm, at the northwest end of the inlet, is a fjord with deep water, steep sides and a shallow lip at the entrance. There is little human settlement in the northern part of Indian Arm. The rest of Burrard Inlet has an urban landscape with shorelines that have been intensely developed for industrial, commercial, residential and recreational use.

For the purposes of this report, the boundaries of Burrard Inlet include the 190 kilometres of marine foreshore and all of the tidal waters east of a line drawn between the southernmost point of Point Atkinson and the westernmost point of Point Grey, including English Bay, False Creek and all of Indian Arm and Port Moody Arm, and extending to the upstream tidal influence of all watercourses feeding into Burrard Inlet. (See Figure 1 for map of Burrard Inlet.)

First Nations have lived in the inlet area for thousands of years. The surrounding forested land of the inlet and other ecosystems of the lower mainland provided plentiful resources for the hunting and gathering lifestyles of the aboriginal peoples. The Spanish explorer Lt. Jose Maria Narvaez explored the mouth of the Fraser River, Burrard Inlet and Indian Arm in 1791. A year later, Captain George Vancouver explored and charted Burrard Inlet and adjacent waters. The inlet is one of the finest natural deep-water harbours in the world (Davis, 1997).

From the mid-1800s, European settlement flourished in many areas surrounding the inlet. The inlet could accommodate ocean-going vessels, and the flat topography of much of the surrounding land allowed for urban and industrial development. The first industrial plant on Burrard Inlet was Pioneer Sawmills, built on the north shore in 1863. A year later, the harbour's first export cargo was a shipment of lumber from this North Vancouver sawmill to Australia.

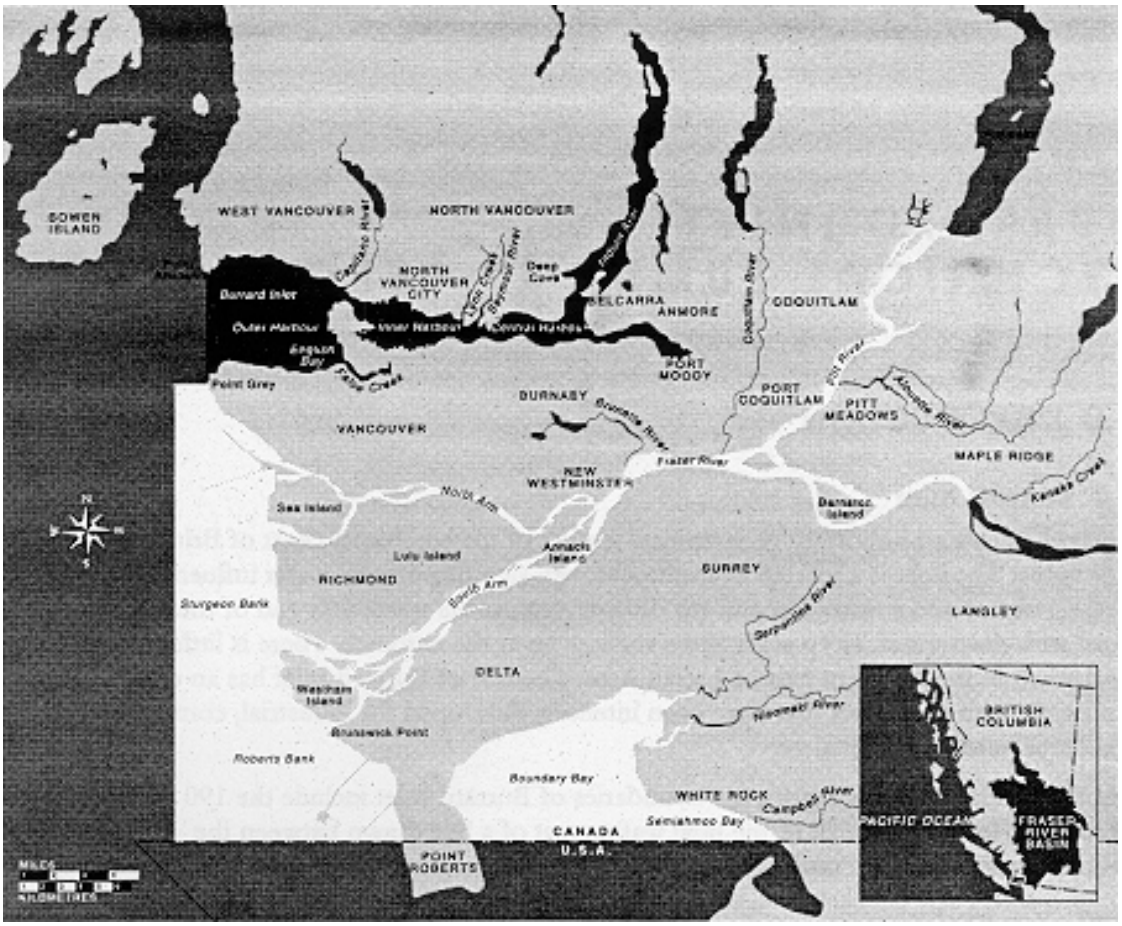



***Figure 1 Burrard Inlet***

Today, over 1.8 million people live in the lower mainland, with the area's population projected to reach three million people by 2021. Seven municipalities border the inlet: West Vancouver, the City and District of North Vancouver, the Village of Belcarra, Port Moody, Burnaby and Vancouver. The Vancouver Port Corporation, the major landowner along the inlet's shores, administers 160 kilometres of port shoreline. The Port of Vancouver is Canada's largest port, with 72 million tonnes of cargo handled annually, and is the top export port on the North American west coast. The economic activity generated by the port facilities and industrial operations makes a significant contribution to the regional, provincial and national economies (Davis, 1997).

Burrard Inlet supports a wide diversity and large numbers of waterbirds, fish and other aquatic fauna and flora. Juvenile salmon entering Burrard Inlet from local streams such as Noons, Mossom and Schoolhouse creeks number in the tens of millions annually. Hundreds of thousands of adult pink salmon return each year to spawn in Indian River at the head of Indian Arm. The inlet also provides habitat for birds, with over 10,000 diving and dabbling ducks using the inlet on a seasonal basis (BIEAP and FREMP, 1997).

Population growth, human activity and industry have caused stresses on the inlet through the discharge of wastes (including sewage, industrial wastes and urban runoff), the loss of habitat from shoreline development and the removal of natural resources.

## 1.2 The Fraser River Action Plan

The Fraser River Action Plan (FRAP) was announced in June 1991 as part of Canada's Green Plan to:

- restore natural productivity,
- reduce and clean up pollution, and
- develop a management program for the Fraser River Basin based on the principles of sustainable development.

Initially, Environment Canada committed $50 million to FRAP in a six-year program. Federal budget cuts beginning in 1993 resulted in Environment Canada's FRAP budget being reduced to $40 million. In 1995, Environment Canada revised its commitment into a seven-year program and further defined its goals in 48 deliverables. (See Appendix A for a complete list.) One of Environment Canada's FRAP commitments was to achieve 10 of the 48 deliverables related to Burrard Inlet through a partnership with the other four parties to the Burrard Inlet Environmental Action Program (BIEAP).

The 10 FRAP deliverables related to Burrard Inlet are:

In partnership with the other four parties to the Burrard Inlet Environmental Action Program Agreement:

29. *Establish a sustainable development plan for the inlet.*
30. *Develop and implement a long term, integrated, focused monitoring program to identify existing and emerging environmental problems and evaluate the effectiveness of abatement actions.*
31. *Establish water quality objectives for contaminants of concern as a guide for abatement actions.*
32. *Develop and maintain an inventory of all contaminant sources and loadings in the inlet.*
33. *Reduce environmentally disruptive industrial discharges by 30% to meet environmental quality objectives.*
34. *Reduce contaminant loadings from combined sewer overflows by 30% to meet environmental quality objectives.*
35. *Reduce contaminant load from urban runoff by 30% to meet environmental quality objectives.*
36. *Develop and implement a dredge material management plan and sediment remediation strategy for dredging and disposal of contaminated sediments as part of site remediation and maintenance programs.*
37. *Develop and implement land use classification criteria and strategy to protect existing habitats.*
38. *Develop and maintain an environmental review process for expanded and new development projects proposed for the inlet.*

## 1.3 Burrard Inlet Environmental Action Program

Environment Canada identified signs of environmental degradation in Burrard Inlet in 1989 (Goyette and Boyd, 1989). Reports of high levels of contamination in bottom sediments and a moderate to high incidence of precancerous lesions and tumours in bottom fish led to the preparation of the *Burrard Inlet Environmental Improvements: Draft Action Plan* in 1990, co-ordinated by the Greater Vancouver Regional District (GVRD, 1990). The Action Plan described the key contaminant issues in the inlet and recommended 14 specific action items to improve conditions. Five agencies — Environment Canada, the Department of Fisheries and Oceans (DFO), the BC Ministry of Environment, Lands and Parks (BC MELP), the Vancouver Port Corporation (VPC) and the Greater Vancouver Regional District (GVRD) — initiated the Burrard Inlet Environmental Action Program (BIEAP) in 1991 in response to the 1990 Action Plan.

The five agencies agreed to a five-year program to establish a management framework to coordinate activities to protect and enhance the environmental quality of Burrard Inlet.

The BIEAP agreement had four primary objectives:

- to reduce existing contaminant discharges to Burrard Inlet;
- to control future discharges to limit the potential for future impacts;
- to control habitat degradation; and
- to provide, where appropriate, remedial measures to existing impacts.

Although not listed as a primary objective, both the *Burrard Inlet Environmental Improvements: Draft Action Plan* and the BIEAP Agreement stated that public involvement and information were critical components of the initiative.

Significantly fewer staff resources were available to BIEAP than those proposed in the 1990 GVRD Action Plan. Accordingly, in 1993, the BIEAP Strategic Plan focused the program. The primary objectives remained the same but the five-year targets were reduced. Rather than immediately setting goals to reduce pollution, BIEAP set a first priority on gathering scientific evidence to focus action on the most urgent rather than the most obvious needs. This involved investigating and reporting on the contamination levels and locations of significantly impacted areas to identify discharges that should be reduced and areas that required remediation. The investigation efforts also examined an appropriate balance between habitat needs and other functions in the inlet.

Key strategies evolving from the primary objectives were:

- abatement;
- remediation;
- land and water use planning;
- the Burrard Environmental Review Committee; and
- public involvement and information.

Together with a parallel program for the Fraser estuary, BIEAP entered a new phase on April 1, 1996. BIEAP now operates through Memoranda of Understanding (MOUs), providing ongoing, co-ordinated management of the estuary and the inlet. (See Appendices B and C for copies of the 1991 BIEAP Agreement and the 1996 MOUs.)

## 1.4 Purpose and Scope of this Technical Summary Report

This report documents the rationale for and results of the various activities that FRAP participated in related to Burrard Inlet. It describes the work approach, activities and findings of BIEAP activities relevant to the 10 FRAP deliverables listed above.

Because of the similarity between FRAP's pollution prevention objectives and the BIEAP objectives, some activities encompassed the geographic areas of both Burrard Inlet and all or parts of the Fraser River watershed. This report, therefore, also refers to FRAP projects that were not specifically conducted through BIEAP. A technical summary report containing greater detail on the pollution abatement deliverables of FRAP is published separately (Environment Canada, 1988).

# 2.0 PROGRESS TOWARD THE FRAP DELIVERABLES

## 2.1 Inlet Management Plan

### 2.1.1 Objective

This activity directly relates to FRAP deliverable:

*29. Establish a sustainable development plan for the inlet.*

BIEAP's priority action for 1997-98 was the development of an Inlet Management Plan.

### 2.1.2 Activities

The BIEAP Management Committee established an Inlet Management Plan Steering Committee to oversee the preparation of a management plan for Burrard Inlet. The plan will provide a framework to establish ecosystem-based management in Burrard Inlet. The Management Committee uses the following working definition of the ecosystem approach.

> A geographically comprehensive approach to environmental planning and management which recognizes the interrelated nature of environmental media, and that humans are a key component of ecological systems; it places equal emphasis on concerns related to the environment, the economy and the community (CCME, 1996).

The Steering Committee is using a performance management and effectiveness reporting model to develop the plan and has reached consensus on a vision, mission, goals and a set of guiding principles. A review of current planning initiatives involving Burrard Inlet (*e.g.*, Port 2020, the GVRD's Livable Region Strategic Plan, and municipal planning activities) has been conducted to take advantage of plan elements already in place.

The next steps toward the drafting and review of the Plan include:

- completing a stakeholder analysis;
- developing a targeted public consultation strategy and program for preparing the plan;
- confirming the goals and performance measures in consultation with inlet stakeholders; and
- developing strategies and initiatives for each goal.

The process of completing and implementing the Inlet Management Plan will achieve the FRAP deliverable of establishing a sustainable development plan for the inlet. It will also provide the context for all stakeholders with decision-making abilities in the inlet to contribute to the other FRAP deliverables more effectively.

## 2.2 Abatement

### 2.2.1 Objectives

The FRAP deliverables related to abatement action are:

*32. Develop and maintain an inventory of all contaminant sources and loadings in the inlet.*

33. *Reduce environmentally disruptive industrial discharges by 30% to meet environmental quality objectives.*
34. *Reduce contaminant loadings from combined sewer overflows by 30% to meet environmental quality objectives.*
35. *Reduce contaminant load from urban runoff by 30% to meet environmental quality objectives.*

### 2.2.2 Activities

To meet these objectives, BIEAP has taken the following approach:

- Determine the contaminant load from the discharges entering Burrard Inlet.
    - Inventory the point source discharges to Burrard Inlet.
    - Estimate contaminant loadings from the discharges.
- Determine the fate and effect of contaminant discharges to the system.
    - Model the fate of contaminant discharges in Burrard Inlet.
    - Link the fate of contaminant discharges to identified environmental impact areas.
    - Identify priority discharges for abatement based on contaminant loadings, fate and effects.
- Determine the source controls that can effectively reduce existing contaminant discharges.
    - Inventory codes of practice for Burrard Inlet industries.
    - Develop and improve relevant codes of practice for Burrard Inlet.
    - Recommend source control options for priority contaminant discharges.

The following sections discuss the abatement activities completed through BIEAP and other applicable FRAP initiatives as they apply to each of the FRAP deliverables for Burrard Inlet.

*32. Develop and maintain an inventory of all contaminant sources and loadings in the Inlet*

The BIEAP report *Burrard Inlet Point Source Discharge Inventory* fulfills part of this deliverable (Bion Research Inc., 1997), and is an initial step toward the achievement of BIEAP's abatement strategy. Most point source discharges (*e.g.*, BC MELP-permitted municipal and industrial discharges, combined sewer overflows (CSOs), stormwater outfalls and tributary streams) are enumerated and located on six sub-basin maps. The inventory also includes some data on potential non-point contaminant sources such as marinas, anchorages, ship repair facilities, loading terminals, fueling docks and barges, fish processing plants and aquaculture sites. The report gives a 'snapshot' of data on discharges to the inlet as of June 1996.

In addition, FRAP participated in a number of CSO and stormwater characterization studies for the Clark Drive, Westridge and Crowe Street facilities, which provided information on actual contaminant loadings from these sources.

The inventory project (Bion Research Inc., 1997) provides an initial basis for calculating relative contaminant loadings to the inlet. Actual loadings data are not currently available for most discharges. Estimates were derived from maximum allowable permit levels, literature

values for similar discharge types, modeled values and other assumptions that were made in the report, *Modeling the Fate of Contaminant Discharges in Burrard Inlet* (EVS Environmental Consultants *et al.*, 1996).

*33. Reduce environmentally disruptive industrial discharges by 30% to meet environmental quality objectives*

Significant progress has been made toward this deliverable. With the information from the *Burrard Inlet Point Source Discharge Inventory*, changes to point source discharges since 1990 were estimated. Several industrial effluent discharges to the inlet have decreased since BIEAP's inception as a result of improved treatment, process or production changes and plant closures. One report estimates the following reductions from point source effluent discharges in Burrard Inlet, including the Lions Gate sewage treatment plant (STP):

### *Table 1 Estimated Contaminant Reduction (%) between 1990 and 1996*

| | **Industrial Sources *** | **Lions Gate STP **** |
|---|---|---|
| Suspended Solids | | 55 |
| PAHs | | 55 |
| Copper | 75 | 40 |
| Lead | 75 | 40 |
| Zinc | 80 | 40 |

**Source:** Castor Consultants Ltd. *et al.*, 1997

* Percentage reductions in industrial contaminant releases are derived from changes in BC MELP permit limits.

**Lions Gate STP contaminant reductions were estimated by the GVRD, based on the elimination of sludge from the plant's discharge to Burrard Inlet in 1992. (GVRD, 1990)

The evaluation found that in general the maximum discharge levels allowable under BC MELP permit limits have dropped dramatically. In comparison to 1990 permitted levels, industrial discharges of certain metals (copper, lead and zinc) have been reduced by two to 10 orders of magnitude. Some industries have increased their permitted discharge levels for flow or specific parameters, although the increase may result from rationalizing waste streams and reducing the number of discharge pipes. While indicating the general direction and potential magnitude of change, comparing permit requirements does not reflect actual changes in discharge qualities and quantities to Burrard Inlet.

Existing legislation provides adequate mechanisms to deal with major industrial point source discharges to Burrard Inlet. However, in recent years, recognition of the cumulative effect of non-point discharges and the compatibility between environmental and economic objectives has emerged. Proactive pollution prevention strategies rather than reactive treatment methods are needed to effectively reduce existing discharges, encourage efficiency and control future discharges at source. Approaches developed through BIEAP and other FRAP initiatives have led to progress by business owners and operators in reducing industrial discharges. These approaches include guidelines, codes of practice and best management practices (BMPs), along with promoting development of pollution prevention plans.

Activities conducted by FRAP, BIEAP and the other partners to reduce industrial discharges include:

**BIEAP's development and implementation of BMPs for dry bulk terminals and ship/boat building and repair**

Determining available codes of practice relevant to industries in Burrard Inlet, and developing codes where needed, provided initial guidance for reducing existing and future contaminant discharges. BIEAP's Best Management Practices Action Team (BMPAT) produced an inventory of codes of practice or best management practices (BMP) documents that could be applied to operations around Burrard Inlet to prevent or reduce the release of contaminants into adjacent waters. BMPs for dry bulk handling and ship/boat building and repair facilities were required, so BIEAP initiated two projects to develop them. (See the *Inventory of Codes of Practice/Regulations,* BIEAP, July 1992; *Guide for Best Management Practices for British Columbia Dry Bulk Terminals,* Westmar Environmental Consultants Ltd., 1993.)

**FRAP's preparation of pollution prevention plans, guidelines and BMPs for many industrial sectors relevant to Burrard Inlet**

A document, *Water Quality and Stormwater Contaminants in the Brunette River Watershed, B.C., 1994-1995* (Westwater Research, 1997), sets out BMPs for source control and treatment of pollutants in stormwater runoff for 19 industrial sectors.

In addition to the two BMPs developed in conjunction with BIEAP, FRAP was involved in the development of BMPs and codes of practice for other industry sectors that are relevant to Burrard Inlet. These include ready-mix concrete plants, fish processing plants, car and truck washes, and marinas and small boatyards (Envirochem Special Projects Inc., 1997; UMA Engineering, 1992; PCA Consultants Ltd. 1995 and 1996; NovaTec, 1994 and 1995).

**FRAP and BIEAP's promotion of BMPs and codes of practice**

In addition to passive promotion of the published BMPs and codes of practice, FRAP and BIEAP are currently working with a marketing consultant to determine and execute the most effective strategy to convince the key individuals at each facility to implement the relevant BMPs in the ship/boatbuilding and repair sector and the marina/small boatyard sector.

**FRAP's annual inspections and reporting**

Since 1993, Environment Canada's Inspections Section has undertaken inspections for compliance with the best practices in four sectors: ready-mix concrete, dry bulk terminals, fish processing, and ship/boat building and repair. Inspectors visited several, but not all, of the facilities within each sector. They used checklists of best practices to audit each area of operations within each sector and to calculate percentage implementation figures. For the sector that included Burrard Inlet, grain terminals achieved 68 per cent implementation, compared to 48 per cent for Fraser Basin grain terminals. The FRAP grain terminals inspector suggested a relatively minor change in operating practices (improvements in yard maintenance and housekeeping procedures for cleaning up spilled grain), which reduced biochemical oxygen demand (BOD) and total suspended solids (TSS) discharges by 95 per cent and 89 per cent, respectively, from 1995 to 1996.

**BIEAP's other partner audit/inspection activities**

The Vancouver Port Corporation conducted environmental audits in 1990, 1991 and 1996. Port audits are triggered by a change in land use, acquisition, sale or tenancy. Although the frequency of provincial inspections has decreased by 20 per cent since 1990 due to recent budget restrictions, site audits are conducted by BC MELP when wastewater discharge permits are amended. The GVRD's sewer use bylaw (1990) has increased the control of industrial discharges to sewer systems; as a result, the City of Vancouver increased its enforcement staff from four to seven. A list of industrial dischargers in non-compliance has also been recently initiated by the City of Vancouver.

*34. Reduce contaminant loadings from combined sewer overflows (CSOs) by 30% to meet environmental quality objectives*

This deliverable has been met through the 30 to 40 per cent reduction in CSO volume discharging to the inlet and an estimated 30 to 40 per cent reduction in the level of contaminants.

Environment Canada's involvement in the GVRD's Stage 2 Liquid Waste Management Plan (LWMP) contributes to reducing combined sewer outfalls. An inventory of combined sewer outfalls within the Fraser Basin and Burrard Inlet identified 53 combined sewer outfalls, all within the GVRD (UMA Engineering, 1992). The GVRD has recently completed operational improvements to the Burrard Inlet combined sewer outfalls system, including the large GVRD Clark Drive combined sewer outfall. Discharge volumes were reduced by increasing system storage capacities and directing more flow to the Iona Island sewage treatment plant. These improvements (at a cost of approximately $3 million) are estimated to have reduced combined sewer outfall discharge volumes in the inlet by 30 to 40 per cent, and to have reduced suspended solids, PAHs, copper, lead, and zinc by 30 to 40 per cent (Castor Consultants Ltd. *et al.*, 1997).

These improvements were deemed a priority given that the existing receiving water quality has been designated as poor and that combined sewer outfalls were a significant source of contaminants. The GVRD's fate and effects study of the three Clark Drive combined sewer outfall discharges, in which FRAP participated, noted that concentrations of several trace metals and PAHs exceeded B.C. Environment Burrard Inlet Objectives (B.C. Environment, 1990) and federal sediment quality guidelines (Environment Canada, 1995), with potential adverse effects on sediment-dwelling organisms, in sediments close to the discharges. Adverse effects in the benthic environment were confirmed by the results of sediment bioassays and benthic invertebrate community analysis (Seaconsult Marine Research Ltd. and EVS Environment Consultants, 1996).

Through the Stage 2 LWMP process, the GVRD is currently establishing a basis for determining requirements for further reductions in combined sewer outfall contaminant discharges. The City of Vancouver is 35 years into a 100-year program of separating domestic and storm water sewers, which is leading to further reductions in contaminant loadings to the inlet.

*35. Reduce contaminant load from urban runoff by 30% to meet environmental quality objectives*

The following initiatives undertaken by FRAP, BIEAP and other partners contribute to the reduction of contaminant loading from urban runoff to Burrard Inlet:

**Public education**

In cooperation with DFO, the GVRD and the Fraser Basin Management Program, Environment Canada co-ordinated a public awareness campaign on non-point sources of pollution in the Fraser River Basin, including Burrard Inlet. The campaign focused on lawn care practices, car maintenance and alternative household products. Posters were distributed to libraries, community centers and non-governmental organizations, and television ads ran on English and French channels. Bus shelter ads were posted in the lower mainland, and posters and fact sheets were distributed at conferences and shows such as the B.C. Water and Waste Association and the B.C. Home and Garden Show.

Environment Canada, DFO and the Westwater Research Center at the University of British Columbia participated in the development of *Current Trends*, which was published in the fall of 1997. Urban runoff is one focus of this publication, which describes the impacts of urban and agricultural development on water quality and aquatic habitat and tells individuals how to reduce impacts.

Municipalities have generally co-ordinated storm drain marking programs on behalf of DFO. Over the last two years, volunteers have marked over 2,000 drains using a fish template. This program has been very successful in heightening community awareness.

The B.C. Ministry of Environment, Lands and Parks developed a non-point source public awareness campaign, *Clean Water, It starts with you,* which includes brochures, posters and a video.

**Research studies**

FRAP contributed funds to the following reports, which will provide information to develop appropriate stormwater and urban runoff management plans in the Burrard Inlet watershed:

- *Urban Runoff Quantification and Contaminant Loadings in the Fraser Basin and Burrard Inlet* (Stanley Associates Engineering Ltd., 1992).

  This planning level assessment of surface water contaminant loadings identified the contaminants of concern in urban runoff and quantified them based on information documented in the literature.

- *Water Quality and Stormwater Contaminants in the Brunette River Watershed, B.C., 1994-1995* (Westwater Research, 1997).

  This report determined contaminant loading rates from base flow, stormwater, street runoff and leaf leachate in the Brunette River system.

**Best management practices**

FRAP also developed documents outlining best management practices (BMPs) that reduce contamination from urban runoff. The publications include *Greening Your BC Golf Courses — A Guide to Environmental Management* (UMA Engineering Ltd., 1996), a user-friendly report intended to guide golf course managers in using environmental best management practices in the design and management of golf courses and the *Stormwater Best Management Practices (BMPs) for Selected Industrial Sectors in the Lower Fraser Basin* which sets out runoff control measures and BMPs for 19 industrial sectors (PCA Consultants Ltd., 1995).

**Inventory**

BIEAP collected some data on potential non-point sources, such as marinas, anchorages, ship repair facilities, loading terminals, fueling docks and barges, fish processing plants and aquaculture sites. The data are included in the *Burrard Inlet Point Source Discharge Inventory*.

**GVRD Liquid Waste Management Plan**

Environment Canada participates in the GVRD Liquid Waste Management Plan, including the Stormwater Management Task Group, which guides the development of a regional stormwater management plan.

**Other Partners Initiatives**

Municipal, regional, and provincial governments have recognized the significance of urban runoff pollution and are working on a number of fronts to address it.

The BIEAP progress evaluation of the 1990 Action Plan lists initiatives undertaken by stakeholders in the inlet since 1990 that contribute to pollution reduction from urban runoff (Castor Consultants Ltd. *et al.*, 1997). These initiatives were completed independent of BIEAP.

- Automobiles contribute significantly to contaminants in urban runoff. As part of the Livable Region strategy, the GVRD completed Transport 2021, intended among other objectives to encourage energy-efficient options for transportation of people and goods. The City of Vancouver is in the process of completing a City Plan and a supporting Transportation Plan, which include new bicycle routes as well as corridor routes such as Greenways (a city-wide network of green paths for pedestrians and cyclists) and Blueways (an advisory group that examines water bodies around Vancouver and recommends waterfront and water related policies for the City).
- The 1992 B.C. *Return of Used Lubricating Oil Regulation* requires retailers of oil to provide recycling services for oil and simplifies oil recycling for consumers. This initiative encourages consumers to recycle their used oil instead of discarding it in a storm drain.
- The B.C. special waste regulations, as amended in October 1992, prohibit the application of waste oil to roads to control dust.

## 2.3 Remediation

### 2.3.1 Objective

The FRAP deliverables related to remediation action programs are:

30. *Develop and implement a long term, integrated, focused monitoring program to identify existing and emerging environmental problems and evaluate the effectiveness of abatement actions.*
31. *Establish water quality objectives for contaminants of concern as a guide for abatement actions.*
36. *Develop and implement a dredge material management plan and sediment remediation strategy for dredging and disposal of contaminated sediments as part of site remediation and maintenance programs.*

### 2.3.2 Activities

To remediate existing impacts in Burrard Inlet, BIEAP has taken the following approach:

- Determine what environmental impacts are observed in Burrard Inlet.
    - Inventory and evaluate environmental monitoring programs in Burrard Inlet.
    - Identify environmental impact areas by integrating available data.
    - Develop and recommend a cost-effective, integrated monitoring program to measure ecosystem response to overall abatement/remediation actions.
    - Adopt environmental objectives for Burrard Inlet.
- Determine the environmental impact areas that require remediation (*i.e.*, that will not recover by reducing existing contaminant discharges).
    - Determine net sediment transport (deposition/erosion areas) in Burrard Inlet.
    - Determine sedimentation rates in depositional areas to estimate natural recovery rate by reducing contaminant discharges at source.
    - Identify environmental impact areas (using environmental objectives) that are not expected to recover by natural processes and require remediation or cleanup.
- Determine what remediation options can be applied to existing environmental impact areas.
    - Identify dredged material management needs and options in Burrard Inlet.
    - Identify feasible options for managing contaminated sediments in Burrard Inlet
    - Identify available sediment remediation technologies.

The remediation activities completed through BIEAP, as well as other applicable FRAP initiatives that moved toward the objectives of the relevant FRAP deliverables, are discussed below.

*30. Develop and implement a long term, integrated, focused monitoring program to identify existing and emerging environmental problems and evaluate the effectiveness of abatement actions*

A long-term monitoring program requires a common understanding and definition of what constitutes an effect or environmental impact, and standard protocols to produce comparable data for trend assessment.

The BIEAP Environmental Quality Objectives and Monitoring Action Team (EQOMAT) established the basis for an integrated monitoring program using existing data to identify environmental impact areas and evaluate the effectiveness of past monitoring efforts. In 1992, an inventory and evaluation of the current status of monitoring programs carried out between 1985 and 1991 was conducted (ENTECH Environmental Consultants Ltd., 1992). The survey covered water and sediment chemistry, bioassays and microbiology, biological studies (tissue chemistry, population and habitat studies) and physical oceanography. It included information on the station location, data source, parameter measure, monitoring frequency, general acceptability of method and other quality assurance considerations. A total of 80 discrete monitoring programs were described.

A subsequent study interpreted the data sets identified in the monitoring program inventory and earlier relevant data sets to identify existing and potential environmental impacts in Burrard Inlet from available data (Burd, 1998). Cross-linked databases of biocontaminants, sediment contaminants, hydrology, biotoxicity, taxa and stations were developed to connect the various sets of data. Initial evaluation of the data showed that only limited data on biological effects had been collected concurrently with physical and chemical data. To improve this data deficiency, EQOMAT collected sediments to measure toxicity (bioassay tests), benthic community structure and several physical and chemical parameters in October 1995 (Boyd et al. 1998). B.C. Ministry of Environment *Burrard Inlet Water Quality Objectives* (B.C. Environment, 1990) and interim sediment quality assessment values (Environment Canada, 1995) were among the chemical benchmarks used to assess potential impacts in Burrard Inlet.

The database compiled in this study represents the most complete set of receiving environment data for Burrard Inlet. This database provides a sound basis for an effective environmental effects monitoring program by identifying potential environmental impact areas and by selecting relevant environmental quality objectives for Burrard Inlet on the basis of past monitoring efforts.

In 1996 and 1997, BIEAP and FREMP investigated and reported on monitoring and research activities in both Burrard Inlet and the Fraser River Estuary. The 1997 inventory identified 24 projects in Burrard Inlet. While the 1997 monitoring and research activity appears to be roughly equivalent to that in 1996, it is significantly below levels observed three to five years ago.

BIEAP and FREMP also hosted a technical seminar on environmental quality of the Fraser River Estuary and Burrard Inlet in November 1996. The seminar content focused on contaminants, monitoring and management. Abstracts and discussion summaries, reported in *Environmental Quality of the Fraser River Estuary and Burrard Inlet* (BIEAP/FREMP, January, 1997), document the status and findings of monitoring and assessments undertaken in the inlet and estuary since 1991. The seminar included presentation of key findings from the BIEAP studies of Burrard Inlet by government scientists and academics. Subsequent discussion sessions investigated the use of criteria and objectives in environmental quality management and the need for future contaminant monitoring.

Although EQOMAT has done significant work to provide the foundations for developing an integrated monitoring program, adopting a common set of environmental objectives for the inlet as a basis for identifying impacts is an ongoing challenge for the BIEAP partners. A shift in focus to pollution prevention is reducing the need for expensive environmental monitoring information.

It is anticipated that development of common ecosystem goals, and strategies and initiatives to achieve each goal, through the Inlet Management Plan process, may provide a common approach for environmental quality monitoring. The common approach, together with the information already compiled by EQOMAT, should allow the process of developing an integrated monitoring program to proceed.

*31. Establish water quality objectives for contaminants of concern as a guide for abatement actions*

In 1990, BC MELP produced the Coquitlam-Pitt River Area Burrard Inlet Water Quality Assessment and Objectives (B.C. Environment, 1990). EQOMAT has compiled the basic information that could be used to develop additional and refine exisiting objectives for

Burrard Inlet (EVS Environmental Consultants, et al., 1996; Bion Research Inc., 1997; Burd, 1998).

A 1990 action plan reported on precancerous liver lesions in English sole in Burrard Inlet and Burrard Inlet sediments contaminated by polycyclic aromatic hydrocarbons (PAHs). (See GVRD, 1990). The prevalence of precancerous liver lesions in English sole has been linked to PAH contamination in sediments from both natural and anthropogenic sources. The action plan identified the prime anthropogenic sources of PAHs as urban runoff, refinery effluents and creosoted timbers and pilings. Given the association between PAHs, industrial sources and urban stormwater runoff, PAHs are one of the principal contaminants of concern in the region. An evaluation of progress made on Burrard Inlet environmental improvements (Castor Consultants Ltd. *et al.*, 1997) concluded that very little additional information about PAHs has been collected since 1990, with the exception of two reports:

- *Sediment Quality in Burrard Inlet Comparing Various Chemical and Biological Benchmarks* is a sediment comparison study including PAH analyses (Boyd *et al.* 1998);
- *Burrard Inlet Sediment Core Contaminant Profiles* provides an historical record of selected contaminants in four areas of Burrard Inlet (Boyd *et al.*, 1997).

A third study initiated in 1997 through a partnership among Environment Canada, DFO and BIEAP uses an extensive database of PAH sediment concentrations recently collected for the Fraser system, including Burrard Inlet and the Strait of Georgia. The study used identical analytical techniques to re-analyze sediment samples collected during separate projects, offering a unique opportunity for a regional-scale synthesis. In addition to gaining more knowledge from the data already collected, the analysis offers two specific benefits. The context provided by the samples collected from the upper reaches of the Fraser River system and the Strait of Georgia will permit identification of source signatures for the PAHs observed in the inlet. The study could also validate a technique for determining the site-specific sources of PAHs and provide more useful information for environmental quality management decisions.

*36. Develop and implement a dredge material management plan and sediment remediation strategy for dredging and disposal of contaminated sediments as part of site remediation and maintenance programs*

Dredging is required to maintain an active port, and practical options to dispose of dredge material are required. Given that some sediments and dredge materials are contaminated, a consistent approach to the assessment, remediation and use of contaminated sediments is essential to prescribing appropriate abatement and remediation activities. This will not only allow BIEAP partners to choose priority abatement or remediation strategies, but also inform proponents about the requirements for shoreline projects that may disturb or dredge inlet sediments.

The BIEAP Dredge Material Management Action Team (DMMAT) conducted several studies to support development of a dredge material management plan, including information on

remediation technologies. The dredge material management study summarized commercial dredging requirements in Burrard Inlet from 1991 to 1996, identified disposal options based the current legislation applicable to Burrard Inlet and provided potential contaminant levels from previously documented information (Sandwell Inc. *et al.*, 1992). A supporting report, *Dredged Material Management Options, Burrard Inlet*, compared the advantages and disadvantages of each relevant disposal option based on regulatory, financial and technical considerations

(Sandwell Inc. *et al.*, 1994). The report also evaluated potential sites for confined aquatic disposal (CAD).

Two sediment transport studies, in Vancouver harbour and outer Burrard Inlet, examined the present patterns of sediment transport in the inlet, including the identification of areas of erosion, stability and deposition (McLaren, 1994 and 1995). These studies, together with the study that interpreted environmental impacts in Burrard Inlet using available data (Burd, 1998), support the objective of developing a dredge material management plan and sediment remediation strategy by identifying those areas in the inlet where sediment-bound contaminants may accumulate. A recent study of sediment core contaminant profiles from some of the areas identified will provide a basis for assessing historical contaminant trends and will determine the potential for natural sediments to isolate contaminated sediments (Boyd, *et al.* 1997).

Two barriers prevent consensus on a sediment remediation strategy:

- the inability to establish an acceptable definition of sediment contamination; and
- the lack of practical disposal options for sediments that are considered contaminated under existing standards.

Currently there are limited practical means of disposing of sediment that exceeds existing quality objectives. DMMAT considered confined aquatic disposal (CAD); however, sediment quality guidelines and possibly revisions to the *Canadian Environmental Protection Act* (CEPA) are required if the use of CAD is to be further considered.

## 2.4 Land and Water Use Planning

### 2.4.1 Objective

The FRAP deliverable related to the BIEAP land and water use planning programs is:

*37. Develop and implement land use classification criteria and strategy to protect existing habitats.*

### 2.4.2 Activities

Significant progress is being made toward this deliverable. Before acting to control degradation of inlet habitat, BIEAP needed information about the habitat features and values and the use of the inlet by wildlife and aquatic biota. The Habitat Management Action Team (HMAT) and two volunteer-based programs gathered information about aquatic habitat and the use of the inlet by birds.

**Habitat mapping**

BIEAP's HMAT conducted two types of habitat mapping programs between 1992 and 1996. The first method used transect studies with scuba divers mapping habitat along transect lines perpendicular to the shoreline. They recorded detailed inventories of substrate, flora and fauna present in intertidal and subtidal zones on a total of 55 transects in 1992 and 1993.

The second method used computer technology and an underwater sled designed specifically for the Burrard Inlet project to map an outline of the entire shoreline at two depths (five and ten metres). The diver of the sled reported habitat information from a list of approximately 20 types of biota and substrate to a computer technician on the tow-boat. Using state-of-the-art software and a Global Positioning System, the diving team reported the most accurate habitat mapping information of its type in the world. Digitally stored data is accurate to within one metre, and can produce maps at a variety of scales. During 1995-96, all of the subtidal area in Burrard Inlet was inventoried and digitized by the Vancouver Port Corporation.

In the summer of 1996, the above technique was used to map the intertidal, riparian and backshore areas and to ground truth the transect and general foreshore features mapped in 1992. The study produced digital habitat inventory information in a consistent form for subtidal, intertidal, riparian and backshore areas of Burrard Inlet. The habitat inventory provides a readily accessible tool to review proposed industrial and other projects in the inlet.

**Habitat classification**

Gathering habitat inventory and use information will allow the development of a land use classification system to protect existing habitats. For Burrard Inlet, the next step is the development of a classification system based on habitat sensitivities that can be used to refine existing land and water use designations. A classification system is currently being developed through a partnership between the University of British Columbia, DFO and BIEAP.

**Exotic species**

The introduction of exotic species can damage local habitats and endanger local species. DFO investigated the implications of exotic biota present in the ballast water of ships arriving at Vancouver harbour and other B.C. ports (Levings and Piercey, 1996). The Vancouver Port Corporation introduced a Directive, voluntary in March, 1997 and mandatory as of January, 1998, requiring ships to perform a midocean ballast exchange to minimize the risk of introducing non-indigenous marine species into B.C. waters.

**Bird surveys**

Burrard Inlet is an important waterfowl wintering area and home to regionally significant species such as osprey and purple martin. Activities within Burrard Inlet can have adverse effects on these species and their habitats unless their movements and habitat requirements are known. Bird surveys in Burrard Inlet collect data to assess habitat requirements, species diversity, seasonal abundance and movements of birds. They also involve the public in data collection.

Bird surveys originated from a proposal by the Vancouver Natural History Society under BIEAP's *Adopt A Shoreline* program. The Canadian Wildlife Service designed a data recording system so that a team of supervised volunteers could collect useful data that could be input into a Geographical Information System (GIS). Although volunteer surveys are not new, these bird surveys are an international first because the information can be readily used by the scientific community. Volunteers have conducted spring, summer, autumn and winter

bird surveys from 1993 to 1998, with 60 to 80 people contributing over 500 volunteer hours for each event. Their observations are entered into a database, which is available for water and land use planning. The Canadian Wildlife Service, originators of the data recording system, completed two reports analyzing bird data collected from 1993 to 1995 (Breault and Watts, 1996).

The surveys found that the central harbour between the Lions Gate and Second Narrows bridges has the greatest abundance and diversity of birds. More than 100 bird species have been observed in Burrard Inlet during the BIEAP volunteer surveys, with the greatest number of species (40 to 50) occurring during the time of peak movement among spring and autumn migrants.

**Quadrat studies**

Through two of its programs, which involved the public in habitat preservation and protection activities, BIEAP produced data with potential use in land and water use planning. Quadrat Studies, a methodology originating with the Georgia Straight Alliance, were applied in flora and fauna inventories at eight sites in the rocky intertidal areas of Burrard Inlet. Inlet-wide bird surveys, designed by the Canadian Wildlife Service and implemented through the Vancouver Natural History Society volunteer birders, record bird species and numbers for an accurate picture of bird use during specific seasons. Both programs produce data designed to be included in the BIEAP GIS managed by VPC.

**Habitat Protection**

Although BIEAP has not developed a specific wetland strategy, work is underway to develop a habitat classification system that can be used to refine land and water use designations on and adjacent to sensitive habitats (*e.g.*, Port 2010, the Vancouver Port Corporation's land use management plan). This will provide a basis for protecting specific habitats such as wetlands in the inlet.

Government agencies have worked together to protect wetlands and other habitat in Burrard Inlet since 1980. In 1992, VPC leased approximately 23 hectares of waterfront land, know as Maplewood Mudflats, to Environment Canada to build the Pacific Environmental Science Centre and manage the remainder as wetland habitat. Wild Bird Trust of BC currently operates the site on behalf of Environment Canada as a wildlife sanctuary.

Another example of how government agencies working in partnership can use their mandates to protect significant habitat areas was the 1995 announcement by the Greater Vancouver Regional District to create a Class A provincial park in Indian Arm, through the Lower Mainland Nature Legacy Program. In January 1998 the Burrard Band and the provincial government agreed to jointly manage the 9,300-hectare wilderness park encompassing the watershed area of Indian Arm northeast of Deep Cove.

**Port 2010, Vancouver Port Corporation**

In 1989, Vancouver Port Corporation began a land and water use plan, "Port 2010," for the parts of Burrard Inlet which falls under VPC jurisdiction: the harbour between Lions Gate and Second Narrows bridges, Indian Arm and Port Moody Arm. The final stage of Port 2010 was delivered in 1994, after extensive public and municipal consultation. VPC

subsequently expanded the plan designations to include English Bay and False Creek for complete coverage of the BIEAP jurisdiction.

## 2.5 Burrard Environmental Review Committee (BERC)

### 2.5.1 Objective

The FRAP deliverable related to BERC is:

*38. Develop and maintain an environmental review process for expanded and new development projects proposed for the inlet.*

### 2.5.2 Activities

The Burrard Environmental Review Committee (BERC) was formed in December 1991 with representation from Environment Canada (which chairs the committee[1]), DFO, BC MELP, the Canadian Coast Guard (CCG), and VPC.

When proponents make an application, BERC considers all environmental comments for each application, compiles a co-ordinated set of recommendations, and forwards them, together with any other information (*e.g.*, public comments) received regarding the application, to the lead agency (usually VPC or CCG), which issues a decision statement. The flow chart in Figure 2 (following page) illustrates the review process and the role of BERC.

The BIEAP office serves as the central source of information related to applications made through the review process, and maintains a file for each application with all submitted information, comments received and decisions made.

A project review referral log provides a quick reference to the stage an application has reached in the project review process. The log is available for public inspection at the BIEAP office and is accessible at any time through the BIEAP and FREMP Internet site (http://www.bieapfremp.org), which also contains an e-mail comment form. Completed project review files are open for public inspection at the BIEAP office.

[1] The BERC was under review at the time of writing, which could lead to changes in the committee structure.

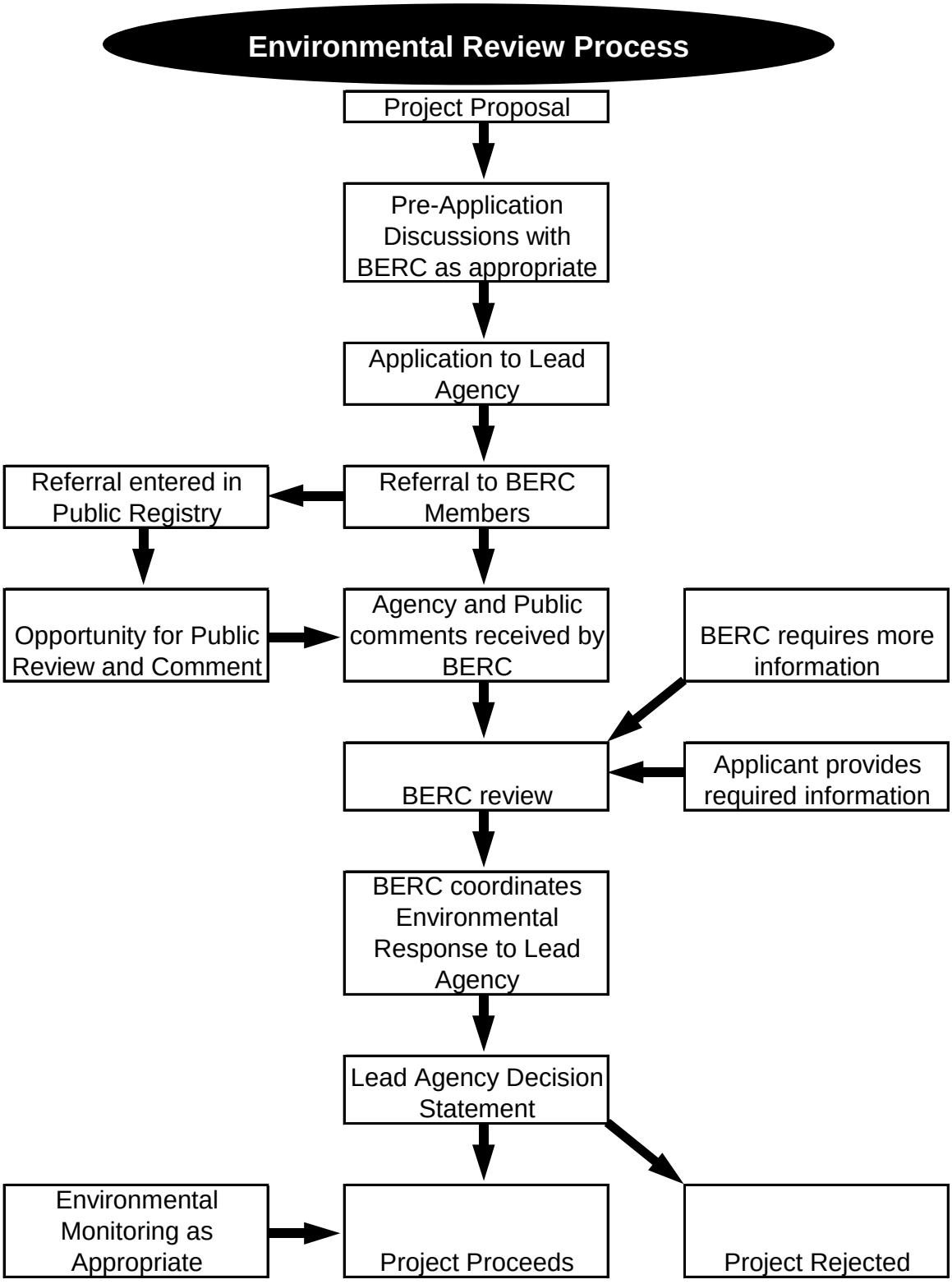



***Figure 2 BERC Environmental Review Process***

Since 1991, BERC has reviewed over 500 project applications.

***Table 2 Number of projects reviewed by BERC since 1991***

| Year | Project applications |
|---|---|
| 1991 | 3 * |
| 1992 | 75 |
| 1993 | 98 |
| 1994 | 67 |
| 1995 | 91 |
| 1996 | 100 |
| 1997 | 105 |

* Month of December only

The number of projects reviewed by BERC has increased in the last few years, reflecting a high level of development activity along the Burrard Inlet foreshore. BERC has responded to this activity by producing the Shoreline Development Guidelines, which summarize the environmental criteria related to major projects involving substantial alteration of the Burrard Inlet foreshore. These guidelines provide guidance to prospective developers and form a valuable reference for the reviewing agencies.

BERC's co-ordinated approach to project review is generally considered to be an improvement over the previous mechanisms. The benefits include the following:

- Participating agencies benefit from reduced review periods, increases in the level of shared information, more comprehensive reviews, and better decisions.
- Applicants benefit from consistent and timely decisions based on scientific criteria, and the opportunity for pre-application discussions with BERC about a proposed project to gain direction prior to spending time and resources on a full application.
- The public can now scrutinize projects by reviewing the project review referral log or project file information.

Since 1991, the review process has become more efficient, decreasing the turnaround time for application decisions. The mean time for an application review has dropped from over 35 days in the early 1990s to about 20 days in 1996. In the spring of 1997, BIEAP issued an applicant questionnaire to all individuals who had projects reviewed by BERC during 1996, to determine their level of satisfaction with the project review process. Responses were received from 38 per cent of those solicited and results were generally positive, with over 70 per cent expressing high levels of satisfaction.

## 2.6 Public Involvement and Information

### 2.6.1 Objective

Of the FRAP sustainability deliverables, two refer to involving and informing the public.

2. *Involve 5% of the basin's population in the planning and decision making process to create the Blueprint for Sustainability.*
3. *Expose 40% of the basin's population to the principles of sustainable development.*

Public involvement has been a key strategy in BIEAP since its inception. The 1993 BIEAP Strategic Plan identified specific objectives to inform, educate and involve the public.

### 2.6.2 Activities

Some of BIEAP's more tangible results have originated through public involvement programs. BIEAP initiated a number of public information strategies, including:

- A newsletter. *Burrard News,* was published three times a year until 1996.
- Videos. BIEAP produced three videos: *Burrard Inlet Quadrat Studies, Voices for Choices, and Subtidal Mapping in Burrard Inlet.*
- Internet site. In 1995-96, Environment Canada's web site, the Green Lane, offered BIEAP the opportunity to establish an Internet site. When BIEAP became linked with FREMP, an independent home page for both programs was set up.

In consultation with Burrard Inlet volunteers, a public stewardship program called *Adopt a Shoreline* was developed in 1993. The premise of the program was to support existing volunteer initiatives rather than starting separate activities. *Adopt a Shoreline* paid expenses incurred in accepted preservation and protection projects for the inlet. Two projects, intertidal quadrat studies and inlet-wide bird surveys, became so popular with the public that they evolved to regular programs administered through the BIEAP office. (These projects are described under Land and Water Use Planning.) Other activities, including cleanups and educational initiatives, were sponsored through the *Adopt a Shoreline* program.

*Voices for Choices,* established in 1994, supports the FRAP sustainability objective to expose the population to the principles of sustainable development and meets the educational objectives of BIEAP. The program shows Grade 12 Geography students how decisions affecting the ecosystem are made in the working world and promotes critical thinking skills by asking them to make their own opinions about appropriate actions. The complete program includes information kits for students and lesson plans for teachers, an in-class presentation from a BIEAP representative, and a boat tour on which students consult with a variety of stakeholders, including industry representatives, BIEAP partners, other government agencies, special interest groups and First Nations. *Voices for Choices* was piloted in May 1994. In May 1996, 20 schools participated in the program, involving 44 class presentations and 1,200 students, with the support of over 200 stakeholders for the boat tours.

# 3.0 CONCLUSIONS AND RECOMMENDATIONS

## 3.1 Conclusions

Ten of the FRAP deliverables relate to Burrard Inlet. Environment Canada's partnership with the other four parties to BIEAP has provided a mechanism to protect and improve the environmental quality of Burrard Inlet. The BIEAP partnership and other FRAP initiatives have moved toward the reduction of pollution in Burrard Inlet and the development of a management system for the inlet based on the principles of sustainability.

The issues identified at the outset of BIEAP relate to human activity, including continued population growth and industrial development, the discharge of wastes (including sewage, industrial discharges and urban runoff), the loss of habitat from shoreline development and the removal of natural resources.

One of the more tangible components of BIEAP is the public stewardship activities fostered through the *Adopt a Shoreline* initiative. These include the intertidal quadrat studies, bird surveys and the educational program *Voices for Choices*. The newsletter, *Burrard News,* conveyed information about the program and identified opportunities for the public to participate in it. An Internet site gives the public access to general information about BIEAP and to a project referral log that is updated weekly.

Progress has been made toward the 10 FRAP deliverables related to Burrard Inlet.

*29. Establish a sustainable development plan for the inlet.*

A process to complete an Inlet Management Plan has been initiated. When the Inlet Management Plan has been completed and implemented, this deliverable will have been achieved. Activities carried out under FRAP also support the sustainability of the inlet. The action teams established during the first phase of BIEAP facilitated co-operation among BIEAP partners and broadened perspectives of all participants on how to manage the inlet with an ecosystem-based approach. However, actions to protect and improve environmental quality in the inlet are in large part the responsibility of other levels of government and private interests. Influences beyond FRAP, such as financial incentives and improved regulatory frameworks may be required. An Inlet Management Plan will provide a context for *all* stakeholders with decision-making abilities in the BIEAP area to protect and improve the environmental quality of the inlet using their own mandates and legislative support.

*30. Develop and implement a long term, integrated, focused monitoring program to identify existing and emerging environmental problems and evaluate the effectiveness of abatement actions.*

A long-term monitoring program requires a common definition of what constitutes an effect or environmental impact, and standard protocols to produce comparable data for trend assessment. BIEAP has established the basis for developing an integrated monitoring program and for selecting relevant environmental quality objectives for Burrard Inlet by compiling existing data to identify potential environmental impact areas and by evaluating the effectiveness of past monitoring efforts. The database represents the most complete set of receiving environment data for Burrard Inlet compiled to date.

Developing common ecosystem goals through the Inlet Management Plan process and developing strategies and initiatives toward each goal will provide a common approach for environmental quality monitoring among the partners. This common approach, together with

the information already compiled through BIEAP, should allow the process of developing an integrated monitoring program to proceed.

*31. Establish water quality objectives for contaminants of concern as a guide for abatement actions.*

Although consensus has not been reached on common objectives for Burrard Inlet, the necessary information base has been compiled.

Plans for renewed efforts to adopt environmental quality objectives for Burrard Inlet and the Fraser estuary are underway. The common approach established through the process to develop the Inlet Management Plan, together with the information already compiled though BIEAP, should allow BIEAP to set objectives toward common environmental quality objectives for Burrard Inlet.

*32. Develop and maintain an inventory of all contaminant sources and loadings in the inlet.*

The *Burrard Inlet Point Source Discharge Inventory* fulfills part of this deliverable, and is an initial step toward achieving BIEAP's abatement strategy. The inventory project provided an initial basis for calculating relative contaminant loadings to the inlet. However, actual loading data are not currently available for most discharges. The BIEAP Management Committee is considering activities the partner agencies could undertake to improve estimates of contaminant loadings from point source discharges to Burrard Inlet.

*33. Reduce environmentally disruptive industrial discharges by 30% to meet environmental quality objectives.*

Discharges have been reduced significantly, and in general this target has been attained. Major improvements have been made in some industrial discharges with respect to metal concentrations. In comparison to 1990 permitted levels, industrial discharges of certain metals (copper, lead and zinc) have been reduced by 75 to 80 per cent. However, while permit requirements indicate the general direction and potential magnitude of change, they do not necessarily reflect actual changes in discharge qualities and quantities to Burrard Inlet. Sludge discharge from the Lions Gates Sewage Treatment Plant outfall ceased in 1992, eliminating an estimated 50 per cent of the suspended solids and PAH discharges, and 40 per cent of the metal discharges. FRAP has developed and promoted a number of codes of practice to provide new tools to prevent or reduce contaminant release at source.

*34. Reduce contaminant loadings from combined sewer overflows by 30% to meet environmental quality objectives.*

This deliverable has been met through the 30 to 40 per cent reduction in the volume of combined sewer overflows discharging to the inlet and an estimated 30 to 40 per cent reduction in the level of contaminants.

*35. Reduce contaminant load from urban runoff by 30% to meet environmental quality objectives.*

A number of initiatives undertaken by FRAP will contribute to reducing contaminant loading from urban runoff to Burrard Inlet, including public education campaigns, research studies, best management practices, and participation on the Greater Vancouver Regional District's Liquid Waste Management Plan Stormwater Management Task Group.

*36. Develop and implement a dredge material management plan and sediment remediation strategy for dredging and disposal of contaminated sediments as part of site remediation and maintenance programs.*

In the absence of site-specific sediment objectives, it is not possible to complete a dredge material management plan for Burrard Inlet. Although interim sediment objectives have been

developed, their application is of concern to some. The inability to establish an acceptable definition of sediment contamination, along with the lack of practical disposal options for those sediments that are considered contaminated under existing regulatory standards, prevent consensus on a sediment remediation strategy. The establishment of sediment quality guidelines and possible revisions to the *Canadian Environmental Protection Act* are required if the use of confined aquatic disposal is to be further considered.

*37. Develop and implement land use classification criteria and strategy to protect existing habitats.*

Significant progress is being made toward land use classification. Habitat inventory information has been collected for subtidal, intertidal, riparian and backshore areas of Burrard Inlet. Although BIEAP has not developed a specific wetland strategy, the current work to develop a habitat classification including information on sensitive habitats will provide an overall basis for protecting specific habitats such as wetlands in the inlet.

*38. Develop and maintain an environmental review process for expanded and new development projects proposed for the inlet.*

This deliverable has been successfully met with the co-ordinated project review process established and fully operational since December 1991.

Since 1991, BERC has reviewed over 500 project applications. The public can review the project referral log at any time through the BIEAP Internet site, which also contains an e-mail comment form. The log and complete project review files are also open for public inspection at the BIEAP office. BERC has decreased the turnaround time for application decisions.

## 3.2 Recommendations

1. The Inlet Management Plan under development by BIEAP should be completed and implemented.
2. Subject to the goals established through the Inlet Management Plan, the need for an integrated monitoring program should be further considered and implemented to address data or other information needs.
3. The co-ordinated project review process should continue with ongoing monitoring of process efficiencies and effectiveness, including post-project monitoring to verify that the conditions of approval are being implemented.
4. Sediment quality guidelines should be developed for the inlet in order to provide guidance to proponents of development projects and regulatory agencies.

# 4.0 BIBLIOGRAPHY

## 4.1 BIEAP Publications — Reports and Brochures/Pamphlets

BIEAP. 1992. *Inventory of Codes of Practice/Regulations*, July 1992 (update October 1995) (BMPAT)

BIEAP. 1993. *Strategic Plan.* Burrard Inlet Environmental Action Program, North Vancouver, B.C.

BIEAP. 1996. *Burrard Inlet Environmental Action Program (BIEAP) Annual Report April 1, 1995 - March 31, 1996*. Burrard Inlet Environmental Action Program, North Vancouver, B.C.

BIEAP. 1996. *Burrard Inlet Environmental Action Program (BIEAP) Progress in the First Five Years (1991 - 1996)* DRAFT. Burrard Inlet Environmental Action Program, North Vancouver, B.C.

BIEAP/FREMP. 1997. *BIEAP and FREMP Annual Reports April 1, 1996 to March 31, 1997.* Burrard Inlet Environmental Action Program and Fraser River Estuary Management Program, Burnaby B.C.

BIEAP/FREMP. 1997. *Environmental Quality of the Fraser River Estuary and Burrard Inlet, January 1997.* Burrard Inlet Environmental Action Program and Fraser River Estuary Management Program, Burnaby B.C.

BIEAP/FREMP. 1997. *Voices for Choices A Geography 12 Field Trip.* Burrard Inlet Environmental Action Program and Fraser River Estuary Management Program, Burnaby B.C.

Bion Research Inc. 1997. *Burrard Inlet Point Source Discharge Inventory.* Prepared for the Burrard Inlet Environmental Action Program, Burnaby, B.C.

Boyd, J., R. Macdonald, D. Paton, K. Hutton, J. Baumann, S. Bertold, and B. Moore. 1997. *Burrard Inlet Sediment Core Contaminant Profiles.* Prepared for the Burrard Inlet Environmental Action Program (BIEAP) by the BIEAP Environmental Quality Objectives and Monitoring Action Team (EQOMAT), Burnaby, B.C.

Boyd, J., J. Baumann, K. Hutton, S. Bertold, and B. Moore. 1998. *Sediment Quality in Burrard Inlet Comparing Various Chemical and Biological Benchmarks.* Prepared for the Burrard Inlet Environmental Action Program (BIEAP) by the BIEAP Environmental Quality Objectives and Monitoring Action Team (EQOMAT), Burnaby, B.C.

Breault, A. and P. Watts. 1996. *Bird Survey Project: Survey Results, March 1996*. Burrard Inlet Environmental Action Program. North Vancouver, B.C.

Breault, A. and P. Watts. 1996. *Bird Survey Project: Seasonal and Spatial Trends in the Distribution and Abundance of Water Birds in Burrard Inlet, November 1996*. Burrard Inlet Environmental Action Program. North Vancouver, B.C.

Burd, B.J. 1998. *Environmental Impacts in Burrard Inlet: An Interpretation of Available Data.* Prepared for the Burrard Inlet Environmental Action Program (BIEAP) and revised by the BIEAP Environmental Quality Objectives and Monitoring Action Team (EQOMAT), Burnaby, B.C.

Castor Consultants Ltd, and EVS Environment Consultants. 1997. *An Evaluation of the Progress Made on the Burrard Inlet Environmental Improvements Draft Action Plan January 1990* DRAFT. Prepared for BIEAP. Burrard Inlet Environmental Action Program, North Vancouver, B.C.

ENTECH Environmental Consultants Ltd. 1992. *Inventory and Evaluation of Environmental Monitoring Programs in Burrard Inlet: 1985 to 1991.* (2 volumes). Prepared for the Chair of the Environmental Quality Objectives and Monitoring Action Team. Burrard Inlet Environmental Action Program. Vancouver, B.C.

EVS Environmental Consultants, Sea Science, and Frank Gobas Environmental Consulting. 1996. *Modeling the Fate of Contaminant Discharges in Burrard Inlet.* Prepared for the Burrard Inlet Environmental Action Program. North Vancouver, B.C.

McLaren, P. 1994. *Sediment Transport in Vancouver Harbour: Implications to the Fate of Contaminated Sediments and/or Dredged Material Disposal.* Prepared for the Burrard Inlet Environmental Action Program, North Vancouver, B.C.

McLaren, P. 1995. *The Sediment Transport Regime of Outer Burrard Inlet: Vancouver Harbour: Environmental Implications.* Prepared for the Burrard Inlet Environmental Action Program, North Vancouver, B.C.

Sandwell Inc. and Castor Consultants Ltd. 1992. *Dredged Material Management Study, Burrard Inlet.* Prepared for the Dredge Material Management Action Team (DMMAT) of BIEAP, Vancouver, B.C.

Sandwell Inc. and Castor Consultants Ltd. 1994. *Dredged Material Management Options, Burrard Inlet, Final Report.* Prepared for the Dredge Material Management Action Team (DMMAT) of the Burrard Inlet Environmental Action Program, North Vancouver, B.C.

Westmar Environmental Consultants Ltd. 1993. *Guide for Best Management Practices for British Columbia Dry Bulk Terminals.* Prepared for the Burrard Inlet Environmental Action Program, Vancouver, B.C.

## 4.2 Other Publications

B.C. Environment. 1990. *Coquitlam-Pitt River Area Burrard Inlet Water Quality Assessment and Objectives.* B.C. Ministry of Environment, Water Management Branch, Victoria, B.C. Approved July 18, 1990. (Nijman, R. and L. Swain. 1990)

CCME. 1996. *A Framework for Developing Goals, Objectives and Indicators of Ecosystem Health: Tools for Ecosystem Based Management*

*Current Trends.* 1997. Newspaper with pull-out poster.

Davis, C. 1997. *The Greater Vancouver Book: an urban encyclopedia.* Pub. by The Linkman Press, Surrey, B.C.

Enkon Environmental Limited. 1997. *Evaluating the Environmental Impacts of Dredging Burnaby Lake.* DOE-FRAP 1997-11

Envirochem Special Projects Inc. 1997. *Technical Pollution Prevention Guide for Ready-Mixed Concrete Operations in the Lower Fraser Basin.* DOE FRAP 1997-13

Environment Canada. 1995. *Interim Sediment Quality Guidelines.* Environment Canada Guidelines Division, Soil and Sediment Quality Section, Ottawa, Ontario. September 1995.

Environment Canada. 1998. *Fraser River Action Plan – Pollution Abatement Technical Summary Report.* DOE FRAP 1998-01

Goyette, D., D. Brand and M. Thomas, 1988. *Prevalence of Idiopathic Liver Lesions in English Sole and Epidermal Abnormalities in Flatfish from Vancouver Harbour, British Columbia, 1986*. Environment Canada Regional Program Report 97-09

Goyette, D. and J. Boyd. 1989. *Distribution and Environmental Impact of Selected Benthic Contaminants in Vancouver Harbour, B.C. 1985 - 1987*. Environment Canada Regional Program Report 89 - 02

Greater Vancouver Regional District. 1990. *Burrard Inlet Environmental Improvements: Action Plan*. June 1990

Levings, C.D. and G.E. Piercey. 1996. *Preliminary Analyses of Biota in Ballast Water Collected in Ships Arriving at British Columbia Ports from the Western North Pacific.* Presented at the 5th Annual Pices Meeting, Nanaimo, B.C. Fisheries and Oceans, Science Branch, West Vancouver Laboratory, West Vancouver, B.C.

NovaTec. 1994. *Guide for Best Management Practices for Process Water Management at Fish Processing Plants in BC*. DOE FRAP 1994-20

NovaTec. 1995. *Guide for the Development of Pollution Prevention Plans for Fish Processing Plants in BC*. DOE FRAP 1995-23

PCA Consultants Ltd. 1995. *Stormwater Best Management Practices ( BMPs) for Selected Industrial Sectors in the Lower Fraser Basin.* DOE FRAP 1997-03

PCA Consultants Ltd. 1996. *Technical Pollution Prevention Guide for Dry Bulk Terminals in the Lower Fraser Basin.* DOE FRAP 1996-19

Stanley Associates Engineering Ltd. 1992. *Urban Runoff Quantification and Contaminant Loadings in the Fraser Basin and Burrard Inlet.* A report to Environment Canada Fraser River Action Plan. DOE FRAP 1993-19

Seaconsult Marine Research Ltd. and EVS Environment Consultants. 1996. *Determining the Fate and Effects of Clark Drive Combined Sewer Overflow Discharges to Burrard Inlet Final Report.* Prepared for the Greater Vancouver Regional District. Burnaby, B.C.

UMA Engineering Ltd., 1992. *Combined Sewer Overflow Inventory for Fraser River and Burrard Inlet.* DOE FRAP 1993-21

UMA Engineering Ltd. 1995. *Chemical Use and Pollution Prevention Practices for Commercial Car and Truck Wash Facilities.* DOE FRAP 1995-06

UMA Engineering Ltd. 1996. *Greening your BC Golf Courses — A Guide to Environmental Management.* DOE FRAP 1996-26

Vancouver Port Corporation June, 1994. *Port 2010 Port Land Use Management Plan.* Vancouver Port Corporation.

Westwater Research. 1997. *Water Quality and Stormwater Contaminants in the Brunette River Watershed, B.C 1994-1995.* DOE FRAP 1997-04

# APPENDICES

**Appendix A:**
**Fraser River Action Plan 48 Deliverables**

**Appendix B:**
**1991 BIEAP Agreement**

**Appendix C:**
**1996 MOU Respecting the Co-ordinated Management of BIEAP and FREMP**

**Appendix D:**
**Glossary of Acronyms**

# APPENDIX A:

# FRASER RIVER ACTION PLAN 48 DELIVERABLES

## FRASER RIVER ACTION PLAN 48 DELIVERABLES

### Sustainability

**Develop a management program for sustainable development in the Fraser River Basin in partnership with the provincial and local governments and other basin stakeholders.**

1. Prepare a "blueprint" for sustainable development.
2. Involve 5% of the basin's population in the planning and decision making process to create the Blueprint for Sustainability.
3. Expose 40% of the basin's population to the principles of sustainable development.

### Pollution Prevention

**Arrest and reverse the existing environmental contamination and degradation of the Fraser River ecosystem by developing targets and strategies to reduce pollution and by virtually eliminating the discharge of persistent toxic substances in the Fraser River.**

4. Provide decision makers with a knowledge of non-market values produced by a healthy environment/ ecosystem.
5. For both public and private sectors, integrate environmental concerns in the planning and decision making process.
6. Through our partners, initiate the use of economic instruments in the basin.

7. Provide decision makers with knowledge of the cost effectiveness of various pollution abatement and habitat enhancement alternatives.
8. Develop and maintain an inventory of major pollution sources and loadings in the basin.
9. Reduce environmentally disruptive industrial effluent discharges by 30% to meet environmental quality objectives.
10. Reduce contaminant loadings from combined sewer overflows and untreated sewage discharges by 30% to meet environmental quality objectives.
11. Reduce the contaminant load from inadequately treated sewage discharges by 30% to meet environmental quality objectives.
12. Implement a strategy to reduce the loading of nutrients, bacteria and agrochemicals from agricultural operations to ground and surface waters by 30% to meet environmental quality objectives.
13. Implement a strategy to reduce the contaminant loading from urban runoff by 30% to meet environmental quality objectives.
14. Establish a Groundwater Protection Strategy which includes the remediation of high priority sites.
15. Clean up 70% of contaminated federal waste sites to CCME standards.
16. Develop and maintain a toxics air emission inventory for major industrial sectors.
17. Reduce the release of persistent toxic substances pursuant to the Canadian Environmental Protection Act and identified as priority from inventories and environmental data to the extent allowed by best practicable technology.
18. Provide new knowledge for environmental quality assessments and the development of objectives.
19. Measure and report on the condition of the basin.
20. Develop water quality objectives and criteria for contaminants of concern in the four main sub-regions of the basin.
21. Provide a provisional framework for developing ecosystem objectives.
22. Initiate a pilot project for ecosystem objectives.
23. Assess water quality relative to water quality objectives.
24. Assess contamination from major pollution sources.
25. Assess and report on the effectiveness of selected pollution abatements relative to the environment.
26. Achieve 90% compliance with environmental legislation in cooperation with provincial and federal enforcement agencies
    - Annually conduct approximately 180 inspections at federally regulated sectors discharging/ impacting in the basin, and initiate 8 - 10 investigations per year;
    - Prosecute violators having continuous or significant non-compliance;

- Participate in the development of compliance strategies, which include punitive and other instruments (e.g. economic incentives).

27. Target enforcement programs to assist in achieving the pollution abatement goals and environmental quality objectives of the program.
28. Establish an enforcement field office in Prince George and implement a pilot project for delivery of coordinated, effective and efficient enforcement programs in the basin.

*In partnership with the other 4 parties to the Burrard Inlet Environmental Action Program Agreement:*

29. Establish a sustainable development plan for the Inlet.
30. Develop and implement a long term, integrated, focused monitoring program to identify existing and emerging environmental problems and evaluate the effectiveness of abatement actions.
31. Establish water quality objectives for contaminants of concern as a guide for abatement actions.
32. Develop and maintain an inventory of all contaminant sources and loadings in the inlet.
33. Reduce environmentally disruptive industrial discharges by 30% to meet environmental quality objectives.
34. Reduce contaminant loadings from combined sewer overflows by 30% to meet environmental quality objectives.
35. Reduce contaminant load from urban runoff by 30% to meet environmental quality objectives.
36. Develop and implement a dredge material management plan and sediment remediation strategy for dredging and disposal of contaminated sediments as part of site remediation and maintenance programs.
37. Develop and implement land use classification criteria and strategy to protect existing habitats.
38. Develop and maintain an environmental review process for expanded and new development projects proposed for the Inlet.

## Habitat Restoration and Conservation

**Restore the productivity of the natural environment by restoring and enhancing environmental quality and the natural productive capacity of the Fraser River ecosystem.**

39. Directly protect 15 ha. of estuary land.
40. Track and protect additional habitat in the lower Fraser uplands through cooperative stewardship initiatives and publish two maps and two technical reports.
41. Retain 1200 ha. of farmland, annually, as seasonal bird habitat, and control crop damage.
42. Complete (at least) six interior wetlands demonstration projects

- Protect 100 ha. at Salmon Arm in Year 2.

43. Deliver annually, and report on, coordination/ extension liaison function with ranchers to
    - Improve ranchers' understanding of wetland values;
    - Reduce the impact of grazing on wetlands;
    - Increase wetland productivity for wildlife on private lands.
44. Map and analyze critical interior habitats and report on forest fragmentation/ biodiversity.
45. Develop procedures to protect critical forest habitats
    - Produce (up to) four operational level pamphlets on selected forest habitat management issues;
    - Produce a technical report on managing for cavity nesters.
46. Jointly develop guidelines for the protection of riparian zones after holding a workshop and publishing proceedings.
47. Integrate wildlife values into forest management policies through participation on PAS, CORE, IRPC, Inter-Ministry Biodiversity Group, and RIC.
48. Demonstrate methods to maintain forest bird diversity
    - Produce a report on integration of Shuswap bird data with other biodiversity attributes;
    - Complete identification of bird groups with common habitat dependency.

# APPENDIX B:

# 1991 BIEAP AGREEMENT

**AGREEMENT RESPECTING AN**
**ENVIRONMENTAL ACTION PROGRAM FOR BURRARD INLET**

THIS AGREEMENT made the day of

BETWEEN: THE GOVERNMENT OF CANADA
represented by the Minister of the Environment (herein referred to as "DOE")

of the FIRST PART

AND: THE GOVERNMENT OF CANADA
represented by the Minister of Fisheries and Oceans (herein referred to as "DFO")

of the SECOND PART

AND: THE GOVERNMENT OF THE PROVINCE OF BRITISH COLUMBIA
represented by the Minister of Environment (herein referred to as "MOE")

of the THIRD PART

AND: THE VANCOUVER PORT CORPORATION
a local Port Corporation established pursuant to Section 25(1) of the Canada Ports Corporation Act, an agent of Her Majesty in Right of Canada, and having an office at 1900 Granville Square, 200 Granville Street, Vancouver, British Columbia V6C 2P9 (herein referred to as "VPC")

of the FOURTH PART

AND: THE GREATER VANCOUVER SEWERAGE AND DRAINAGE DISTRICT
incorporated by an Act of the Legislature of the Province of British Columbia and having an office at 4330 Kingsway, Burnaby, British Columbia V5H 4G8 (herein referred to as "GVS & DD")

of the FIFTH PART

AND WHEREAS the Parties to this Agreement wish to improve and protect the Environmental Quality of Burrard Inlet;

AND WHEREAS continued current activities and future development in Burrard Inlet and its Drainage Basin, without recognition of the environmental consequences, will continue to affect adversely the water, sediments, biological resources and supporting habitats of the Inlet;

AND WHEREAS expansion of Canada's trade with the world via the Port of Vancouver will require increasing use and expansion of the facilities in Burrard Inlet for the trans-shipment of goods;

AND WHEREAS expansion of the economy of Canada and British Columbia will require development of industrial, commercial and residential facilities within the Drainage Basin tributary to Burrard Inlet;

AND WHEREAS it is essential to provide the opportunity and capability for industry to function and to expand to meet the growing needs of the community and of Canada;

AND WHEREAS in response to public and agency concerns related to the Environmental Quality in Burrard Inlet, an Action Plan to prevent further adverse effects on the Inlet, and to undertake appropriate remedial actions, was developed by the Greater Vancouver Sewerage and Drainage District with technical support from the Governments of Canada and British Columbia and from Westwater Research Centre at the University of British Columbia;

AND WHEREAS the Parties are committed to the principle of Environmentally Sustainable Development, and wish to achieve it through Integrated Resource Management;

AND WHEREAS the Action Plan has been reviewed by representatives of the Parties to this Agreement and accepted as a basis for implementing a co-ordinated Joint Action Program to protect and improve the Environmental Quality of Burrard Inlet;

AND WHEREAS the Parties to this Agreement have a mutual interest in examining the water quality of the Burrard Inlet Drainage Basin and protecting the marine environment;

AND WHEREAS the Governor in Council by Order in Council P.C. 1991-2/212 dated the 24TH day June of has authorized the Minister of the Environment and the Minister of Fisheries and Oceans to execute this Agreement on behalf of Canada;

AND WHEREAS the Lieutenant Governor in Council by Order in Council No. 1843 dated the 28th day of November has authorized the Minister of Environment to execute this Agreement on behalf of British Columbia;

AND WHEREAS Vancouver Port Corporation has resolved to execute this Agreement by formal resolution dated 26 June 1990;

AND WHEREAS the Greater Vancouver Sewerage and Drainage District has resolved to execute this Agreement by formal resolution dated ; May 1/91

**NOW THEREFORE:**

1. The Parties agree to proceed with the implementation of coordinated measures to protect and improve the Environmental Quality of Burrard Inlet as hereinafter described;

   And in furtherance of that agreement, and in consideration of the mutual covenants & agreements the Parties hereto covenant and agree as follows:

**DEFINITIONS**

2. (a) "Action Plan" means that document titled: "Burrard Inlet Environmental Improvements, Action Plan", dated June 1990, which was prepared by the GVS & DD with assistance from a Technical Advisory Committee;

   (b) "Activity Plan" means a plan as described in SECTION 9 of this Agreement, which is developed to implement the Joint Action Program;

   (c) "Burrard Inlet" or "Inlet" means the tidal waters and their inundated area east of a line between the southernmost point of Point Atkinson and the westernmost point of Point Grey, including False Creek, Indian Arm and Port Moody Arm;

   (d) "Burrard Inlet Drainage Basin" or "Drainage Basin" means all those lands whose waters naturally drain into streams emptying into Burrard Inlet, and those lands whose waters are artificially diverted into Burrard Inlet by storm sewers, sanitary sewers or combined storm and sanitary sewers;

(e) "Corporate Boards" or "Boards" means the Board of Directors of the Vancouver Port Corporation and the Administration Board of the Greater Vancouver Sewerage and Drainage District.

(f) "Eligible Costs" means those costs which are described in SECTION 27 of this Agreement and which are shared by the Parties in accordance with SECTIONS 25 to 32 of this Agreement;

(g) "Environmental Quality" means the quality of the water, sediment and biota and includes the quality of the non-aquatic habitat and atmospheric precipitation which affect the water, sediment and biota;

(h) "Environmentally Sustainable Development" means development which meets the needs of the present generation without compromising the ability of future generations to meet their own needs;

(i) "Fiscal Year" means the period beginning 1 April each year and ending 31 March the following year;

(j) "Implementation Committee" means the body to be constituted under SUBSECTION 14(a) of this Agreement;

(k) "Integrated Resource Management" means a holistic management process whereby all interests and kinds of natural resources receive appropriate consideration through consultation between federal, provincial, and local management agencies, private sector interests and the public, to plan for the future use of natural resources including the land, water, fish, wildlife and other natural resources, in ways that reduce conflicts to a minimum;

(l) "Joint Action Program" means the coordinated program of management and administration for Burrard Inlet and its Drainage Basin, set out in SECTION 7, and includes activities, policies and organizational arrangements, implemented by the Parties to accomplish the recommended actions listed in the Action Plan and other agreed activities as may be determined during the term of this Agreement;

(m) "Lead Agency" means an agency assuming leadership over the implementation of an activity under the Joint Action Program;

(n) "Ministers" means the Minister of the Environment for Canada, the Minister of Fisheries and Oceans for Canada and the Minister of Environment for British Columbia;

(o) "Parties" means DOE, DFO, MOE, VPC and GVS & DD;

(p) "Program Coordinator" means the person, appointed by the Steering Committee pursuant to SECTION 20 of this Agreement, to establish and manage the Program Coordinator's Office and to carry out certain tasks and duties in connection with the Joint Action Program;

(q) "Program Coordinator's Office" means the office to be established under SUBSECTION 14(b) of this Agreement;

**PURPOSE OF THE AGREEMENT**

3. The purpose of this Agreement is to establish a management framework to facilitate, through a Joint Action Program, the coordination of activities intended to protect and improve the Environmental Quality of Burrard Inlet.

**GUIDELINES**

4. The Parties will foster cooperation and dialogue and will coordinate action among government, industry and the general public toward achieving the means of accommodating a growing population and economy, while improving and maintaining the quality and productivity of the Inlet's natural environment.

5. The Parties will work with other organizations and individuals to implement the Joint Action Program and, will use their best efforts to:

   (a) facilitate Environmentally Sustainable Development in the Inlet and its Drainage Basin;

   (b) improve and maintain Environmental Quality in Burrard Inlet to ensure preservation of fisheries and wildlife and to provide for water contact recreation where it is appropriate;

   (c) maintain, and where practical improve the productivity of fish and wildlife habitat;

   (d) enhance the quality and variety of sites with identified recreational attributes.

6. The Parties, in implementing the Joint Action Program, will:

   (a) recognize the importance of Burrard Inlet as a major economic and environmental resource in all planning and management activities, and encourage compatibility between both foreshore and upland land uses and developments and the preservation of Environmental Quality in Burrard Inlet.

   (b) encourage the use of existing regulatory authorities of the Parties to prevent pollution and to ensure that the person responsible for pollution be responsible for its cleanup or cleanup costs;

   (c) develop consensus by ensuring broad consultation between all participating agencies, providing avenues for active public participation, and maintaining program flexibility.

**JOINT ACTION PROGRAM**

7. The Joint Action Program to be implemented under this Agreement consists of the coordinated program of management and administration defined in SUBSECTION 2(m) of this Agreement. The Program will be implemented in phases to allow for adjustments as required through experience and program evaluation.

8. The primary objectives of the Joint Action Program are to:

   (a) reduce existing contaminant discharges to Burrard Inlet;

   (b) control future discharges to limit the potential for future impacts;

   (c) control habitat degradation;

   (d) provide, where appropriate, remedial measures for existing impacts.

9. Activity Plans will be developed annually for the Joint Action Program. These plans will include the cost-shared activities funded jointly by the Parties from funds identified in SUBSECTION 26(a) and the co-ordinated activities funded and implemented either individually or jointly by one or more of the Parties but which are not cost-shared under SUBSECTION 26(a). These plans will:

(a) identify priorities for cost-shared and coordinated activities to be undertaken in the coming fiscal year;

(b) identify the lead and support roles and responsibilities for all tasks to be undertaken;

(c) identify the Party or Parties responsible for funding each of the coordinated tasks and specify provisions and costs for cost-shared tasks;

(d) identify requirements for public involvement associated with specific tasks and for the Program as a whole;

(e) identify tasks, studies and any cost-shared budget assigned by the Steering Committee to inter-agency action teams, as described in SECTION 18 of this Agreement;

(f) be approved annually by the Steering Committee.

STEERING COMMITTEE

10. The Parties to this Agreement shall form a Steering Committee with one representative appointed by each of DOE, DFO, MOE, VPC and GVS & DD.

11. The representative for DOE and the representative for MOE shall co-chair the Steering Committee.

12. The members of the Steering Committee shall appoint alternates to represent them at meetings which they cannot attend.

13. The Steering Committee shall be responsible for the administration of the Agreement and for determining the manner in which cost-shared funds allocated under the Agreement will be spent. Steering Committee decisions will be made on the basis of consensus.

14. The Steering Committee will:

(a) be responsible for appointing an Implementation Committee and formulating terms of reference for its guidance; each Steering Committee member will appoint one member to the Implementation Committee;

(b) appoint a Program Coordinator and provide for establishment of a Program Coordinator's Office;

(c) provide general direction for the operations and activities of the Program Coordinator's Office;

(d) establish priorities for the Joint Action Program and approve the annual Activity Plans and cost-shared budget;

(e) ensure that the public are informed and involved in the activities of the Joint Action Program;

(f) prepare and submit an annual report to the Ministers and to the Chairpersons of the Boards on or before 30 June of each year identifying the accomplishments of the past fiscal year and the commitments by agencies to the Joint Action Program for the coming fiscal year.

(g) discuss the annual report at a public meeting before the report is submitted to the Ministers and to the Chairpersons of the Boards.

**IMPLEMENTATION COMMITTEE**

15. The Implementation Committee will be comprised of members of the agencies represented on the Steering Committee.

16. The Implementation Committee will be responsible to the Steering Committee; the chairman of the Implementation Committee will be chosen by the Steering Committee.

17. The primary responsibilities of the Implementation Committee are to:

    (a) oversee development of the annual Activity Plans and budget for consideration by the Steering Committee;

    (b) oversee implementation of the approved annual Activity Plans;

    (c) provide a forum for collective consideration of mutual concerns and issues under the Joint Action Program;

    (d) facilitate cooperation and coordination of improved management, including;

        (1) a system for improving the quality and availability of information provided to the public regarding Burrard Inlet;

        (2) a clearly defined process for involving the public in implementation activities under the Joint Action Program;

        (3) a system for assisting in the application and evaluation of management policies and programs:

    (e) direct the operations and activities of the Program Coordinator and his office:

18. The Implementation Committee may form action teams with appropriate membership to perform specific tasks or studies or provide expert advice on specific subjects.

19. The Implementation Committee will be supported in its activities by the Program Coordinator and the resources of the Program Coordinator's Office.

**PROGRAM COORDINATOR**

20. A Program Coordinator, accountable to the Implementation Committee, will be appointed by the Steering Committee.

21. The Program Coordinator will establish a Program Coordinator's Office to provide continuing support to the Joint Action Program in accordance with directions from the Implementation Committee. The Program Coordinator's Office will be funded by contributions from the Parties in accordance with the provisions of this Agreement.

22. The Program Coordinator will:

    (a) manage the Program Coordinator's Office and expenditures being made under the approved annual cost-shared budget;

    (b) provide coordination support to the Joint Action Program and facilitate its implementation through communication, cooperation and promotion;

    (c) function as a resource for the Implementation Committee;

(d) meet with member, and other agencies to review progress and coordinate activities;

(e) prepare an annual progress report and propose an annual Activity Plan and cost-shared budget for the following year for approval by the Steering Committee;

(f) coordinate public involvement activities in accordance with the provisions of the Agreement.

**PUBLIC INVOLVEMENT**

23. The Joint Action Program will provide for active public involvement in the planning of activities during the term of this Agreement. The coordination of these public involvement activities will be provided by the Program Coordinator as directed by the Implementation Committee.

24. Public involvement activities will include the publication of newsletters and annual reports, public meetings to present results and discuss future activities and budgets, and participation of the public in planning and implementing the Program.

**FINANCES**

25. Each Party's obligation under this Agreement is subject to sufficient funds being appropriated and allocated by the respective Government or Corporate Board for the purposes of this Agreement.

26. (a) The costs to be shared under this Agreement are the Eligible Costs described in Section 27. Total Eligible Costs to be shared up to 31 March 1996 shall not exceed $2,000,000.00. Annual Eligible Costs shall be shared equally by the Parties.

(b) An annual cost-shared budget and an annual Activity Plan for each fiscal year shall be prepared by the Program Coordinator, under the direction of the Implementation Committee and in communication with the lead agencies, for approval by the Steering Committee and submitted to the Parties for approval no later than 1 September preceding the beginning of each fiscal year.

(c) Expenditures, authorized jointly by representatives of the Parties to this Agreement and made before the starting date specified in SUBSECTION 33(a), and which the Steering Committee agrees are in the category of Eligible Costs under this Agreement, will be charged to the approved budget of the Program Coordinator's Office in the 1991-92 fiscal year.

27. Eligible Costs, referred to in SUBSECTION 26(a), which are shared under this Agreement include the Program Coordinator's Office salaries and benefits, computer time, publishing costs, consultants' fees, office space and equipment, mailing and other normal office expenses, public meetings and activities associated with public consultation, and related services, all as determined by the Steering Committee.

28. There is no financial obligation arising from this Agreement, except as outlined in SUBSECTION 26(a), to be shared by the Parties. In the case of tasks agreed to in annual Activity Plans, each Party shall fund the tasks that are to be carried out by the Party unless there is a specific provision for cost-sharing.

29. Each Party shall bear the entire costs of the salary and travel expenses of its members on the Steering Committee and the Implementation Committee and of employees assigned to tasks or activities being carried out under the Joint Action Program and such costs shall not be included in calculating the Eligible Costs referred to in SECTION 26.

30. The DOE shall with respect to Eligible Costs that are to be shared by the Parties under this Agreement:

    (a) pay such costs as they come due; and

    (b) when the cost is incurred by one of the other Parties, reimburse that Party on submission of a claim in accordance with mutually agreed procedures.

31. Each of the other Parties will, on a monthly or other regular basis, as determined in consultation with DOE, and on receipt of claims from DOE, reimburse DOE for that Party's share of Eligible Costs incurred by DOE. Claims shall be for Eligible Costs actually incurred and paid.

32. (a) DOE shall maintain adequate documentation and records of the Eligible Costs related to the Programs Coordinator's Office that are to be shared by the Parties and shall, on request, make available such documentation and records for examination by auditors of any of the other Parties.

    (b) An audit of expenditures in relation to SECTION 30 of this Agreement shall be made by an auditor, appointed by the Steering Committee and acting on behalf of all Parties, for the year ending the last day of each fiscal year of this Agreement.

    (c) Any discrepancy disclosed by audit between the amount paid and the amount payable by a Party shall be promptly adjusted.

    (d) Final claims by the Parties for Eligible Costs incurred under this Agreement will be made to DOE within six (6) calendar months after the termination date of the Agreement. DOE will make a final claim to each of the other Parties for the proportionate shares of the final costs within twelve (12) calendar months of the termination date of this Agreement.

**DURATION**

33. (a) This Agreement shall take effect on the date of the last signature of this Agreement. It will, except as provided in SUBSECTION (b), continue in force until 31 March 1996, whereupon the Agreement may be renewed for a further term, as mutually agreed upon by the Parties.

    (b) Any Party to this Agreement may terminate its involvement in this Agreement prior to the date described in SUBSECTION (a), provided that the Party formally notifies the other Parties of its intent to withdraw from the Agreement and that such notification is received at least one fiscal year prior to the intended date of withdrawal.

**AMENDMENTS**

34. This Agreement may be amended by written agreement between the Parties except that in the case of MOE the prior approval of the Lieutenant Governor in Council will be obtained. The Agreement to that effect shall be signed by the Ministers of DOE, DFO and MOE, and by the Chairperson of the VPC and GVS & DD Boards.

35. Notwithstanding SECTION 34, SECTION 26 and SUBSECTION 33(a) may be amended only with the approval of the Governor-in-Council for Canada, the Lieutenant Governor-in-Council for British Columbia, and the Boards of VPC and GVS & DD.

**NOTICE**

36. Any notice required or permitted to be given under the provisions of this Agreement shall be in writing, and sent by mail or by other acceptable form of communication to the address of the Party's representative on the Steering Committee. Notice shall be sufficently served if personally delivered to the Party to whom it is given or mailed.

**REFERENCES**

37. Every reference to the Parties in this Agreement will include any person designated to act for or on their respective behalf with regard to any provision or provisions of this Agreement, except for SECTION 34 of this Agreement.

**MISCELLANEOUS**

38. This Agreement and any activity conducted under it shall be without prejudice to any proprietary right or interest of the Parties.

39. No member of the Parliament of Canada or the Legislative Assembly of British Columbia or member of the Board of VPC or GVS & DD will hold, enjoy or be admitted to any share, part or benefit from this Agreement or any agreement, contract or benefit arising therefrom.

40. This Agreement will be governed by and construed in accordance with the applicable laws in force in British Columbia.

41. Any dispute between the Parties hereto on any question of law or fact arising from this Agreement will be settled by a court of competent jurisdiction.

42. The headings appearing in this Agreement have been inserted for reference and as a matter of convenience and in no way define, limit or enlarge the scope of any provision of the Agreement.

43. In this Agreement, wherever the singular or masculine is used, it will be construed as if the plural or feminine or body corporate, as the case may be, had been used where the context or the Parties hereto so require.

44. The Parties hereto agree to cooperate on the release of any announcements concerning the undertaking of this Agreement or any related agreements, and to provide due credit and recognition to the Parties involved.

45. This Agreement shall not interfere in any way with the legislative jurisdiction of any of the Parties, nor with the exercise by any Party or its officials of any right, power or obligation under any law, order or regulation.

IN WITNESS WHEREOF the Parties hereto executed this Agreement the day and year first above written.

SIGNED on behalf of the Government of Canada by the Minister of the Environment in the presence of:

(Witness)

Minister of the Environment (for Canada)

SIGNED on behalf of the Government of Canada by the Minister of Fisheries and Oceans in the presence of:

(Witness)

Minister of Fisheries and Oceans (for Canada)

SIGNED on behalf of the Government of British Columbia by the Minister of Environment in the presence of:

(Witness)

Minister of Environment (for British Columbia)

The Corporate Seal of the Vancouver Port Corporation was hereunto affixed in the Presence of:

C/S

(Chairperson)

(Secretary)

The Corporate Seal of the Greater Vancouver Sewerage and Drainage District was hereunto affixed in the presence of:

C/S

(Chairperson)

(Secretary)

# APPENDIX C:

# 1996 MOU RESPECTING THE CO-ORDINATED MANAGEMENT OF BIEAP AND FREMP

# MEMORANDUM OF UNDERSTANDING

## RESPECTING THE COORDINATED MANAGEMENT OF THE BURRARD INLET ENVIRONMENTAL ACTION PROGRAM (BIEAP) AND THE FRASER RIVER ESTUARY MANAGEMENT PROGRAM (FREMP)

---

## 1. PURPOSE

This memorandum sets out the understanding and structure through which the BIEAP and the FREMP will be coordinated.

## 2. BACKGROUND

Through the end of March 1996, the FREMP and the BIEAP (the Programs) operated independently and under separate agreements. Over time, it became apparent that some aspects of both Programs were common and required a common approach. Also, the areas covered by each agreement were contiguous and issues in one area affected the other.

As a result, the Parties to each agreement resolved to implement a structure which would provide for the effective coordination of the Programs while, at the same time, providing for the distinct needs and priorities of the two individual areas.

The individual memoranda of understanding for the BIEAP and the FREMP are attached to this memorandum as Appendix A and B, respectively.

## 3. MANAGEMENT STRUCTURE

### 3.1 General

The management structure set out in Appendix C will carry on, beyond the end of March 1996, the activities presently covered by the Programs. There will be a common framework that deals with overall planning, management and policy direction for both the Burrard Inlet and the Fraser Estuary. There will also be separate operational Plans consisting of a 5 year Business Plan and a year to year Work Plan to deal with specific requirements and priorities of the Fraser Estuary and Burrard Inlet.

There is general consensus amongst the Parties that both of the current programs are management programs with action components. However, while many issues are common to both areas, the methodologies for dealing with them and their relative priority may differ between the two areas. Therefore, the management structure will provide opportunities for dealing with the common as well as the distinct factors between the two areas.

There is also consensus that "made in the Inlet/Estuary" approaches to policy and its application can enhance progress on the Programs. Therefore, the new structure provides a framework for addressing policy issues in a manner which facilitates measurable progress on achieving the goals and objectives set for the Fraser Estuary and Burrard Inlet.

The FREMP/BIEAP business falls into two broad categories. First, there is policy development, overall priority setting, and strategic management. Second, there are those operational issues which require coordinated decision making. The new structure provides for both categories.

In terms of policy development, priority setting and strategic management, matters include:

- influencing the development and application of regulatory policy within the management areas and within areas outside the management areas where linkages are required to meet the objectives of the Programs
- setting priorities
- maintaining a high level commitment and sufficient resources
- setting goals and objectives and monitoring progress towards their achievement
- providing the interface between the Programs and the Boards/Agencies of the respective Parties

In terms of operational issues, examples include:

- the project review processes
- day-to-day management of the budgets
- coordination of individual Action Programs to meet specified goals and objectives
- providing technical support and input on policy issues
- managing public involvement.

## 3.4 Funding

The financial arrangements for each Program are set out in the individual Memoranda of Understanding (see Appendices A & B). The Fraser River Harbour Commission will act as banker for both Programs. Also, for consistency, preference will be given to appointing the same auditors for both Programs.

**IN WITNESS WHEREOF** the Parties hereto have executed this Memorandum.

Signed on behalf of Environment Canada
in the presence of:

Witness

Environment Canada
Date:

Signed on behalf of Fisheries and Oceans
in the presence of:

Witness

Fisheries and Oceans
Date:

Signed on behalf of the Ministry of
Environment, Lands and Parks
in the presence of:

Witness

Ministry of Environment, Lands and Parks
Date:

Signed on behalf of the Greater Vancouver
Regional District in the presence of:

Witness

Greater Vancouver Regional District
Date:

Signed on behalf of the Fraser River Harbour
Commission in the presence of:

Witness

Fraser River Harbour Commission
Date: Jan 25/96.

Signed on behalf of the North Fraser Harbour Commission in the presence of: )

Witness

North Fraser Harbour Commission
Date:

Signed on behalf of the Vancouver Port Corporation in the presence of: )

Witness

Vancouver Port Corporation
Date:

# APPENDIX A

## MEMORANDUM OF UNDERSTANDING RESPECTING THE BURRARD INLET ENVIRONMENTAL ACTION PROGRAM

made this day of AD 1996

BETWEEN:

THE GOVERNMENT OF CANADA
represented by the Department of the Environment

(hereinafter called "DOE")

OF THE FIRST PART,

AND:

THE GOVERNMENT OF CANADA
represented by the Department of Fisheries and Oceans,
Habitat and Enhancement Branch

(hereinafter called "DFO")

OF THE SECOND PART,

AND:

THE GOVERNMENT OF THE PROVINCE OF BRITISH COLUMBIA
represented by the Ministry of Environment, Lands and Parks

(hereinafter called "MOELP")

OF THE THIRD PART,

AND:

VANCOUVER PORT CORPORATION
established pursuant to Section 25(1) of the *Canada Ports Corporation Act*, having an office at
1900 - 200 Granville Street, Vancouver,
British Columbia V6C 2P9

(hereinafter called "VPC")

OF THE FOURTH PART,

AND:

THE GREATER VANCOUVER REGIONAL DISTRICT
incorporated by an Act of the Legislature of the Province of British Columbia and having an office at 4330 Kingsway,
Burnaby, British Columbia V5H 4G8

(hereinafter called "GVRD")

OF THE FIFTH PART.

**WHEREAS:**

A. The Parties to this Memorandum wish to improve and protect the Environmental Quality of Burrard Inlet;

B. Burrard Inlet supports important fish and wildlife habitats;

C. Burrard Inlet has the potential to support enhanced outdoor recreational opportunities in the public interest;

D. The expansion of Canada's and British Columbia's international trade and economies will require increasing use and expansion of industrial and commercial facilities in and abutting Burrard Inlet;

E. It is essential to provide the opportunity and capability for industry to function and to expand to meet the growing needs of the community of Canada;

F. The Parties are committed to the principle of Sustainability, and wish to achieve it through the continuation of a coordinated joint action program known as the Burrard Inlet Environmental Action Program (the "Program").

**NOW THEREFORE:**

1. The Parties agree to continue the implementation of coordinated measures to protect and improve the environmental quality of Burrard Inlet within the context of sustainability **AND FURTHER** agree as follows:

**DEFINITIONS**

2. a) "Burrard Inlet" or "Inlet" means the tidal waters and their inundated area east of a line between the southernmost point of Point Atkinson and the westernmost point of Point Grey, including False Creek, Indian Arm and Port Moody Arm;

b) "Consensus" means lack of dissent among the Party representatives;

c) "Environmental Quality" means the quality of the marine, land and air environments;

d) "Fiscal Year" means the period beginning April 1 each year and ending March 31 the following year;

e) "Sustainability" means the point at which economic, environmental and social/cultural activities meet the needs of the present generation without compromising the ability of future generations to meet their own needs.

## PURPOSE OF THE MEMORANDUM

3. The purpose of this Memorandum is to establish a management framework to facilitate, through a joint action program, the coordination of activities intended to protect and improve the Environmental Quality of Burrard Inlet within the context of Sustainability.

## PRIMARY OBJECTIVES

4. The primary objectives of the Program are to:

   a) reduce the existing contaminant discharges to Burrard Inlet;

   b) control future discharges to Burrard Inlet to limit the potential for adverse impacts to the environment;

   c) pursue the protection and enhancement of habitat values to the overall net benefit of the environment within Burrard Inlet; and

   d) identify, where appropriate, measures to remediate existing impacts within Burrard Inlet.

5. The Parties will coordinate:

   a) water and land use planning;

   b) environmental management;

   c) project review; and

   d) public communication, education and participation.

## GUIDING PRINCIPLES

6. The Parties will foster cooperation, dialogue and coordinated action among government, industry, First Nations, special interests and the general public in support of accommodating a growing population and economy, while maintaining and where practical improving the quality and productivity of the Inlet's natural environment.

7. The Parties recognize that the primary responsibility for management of the Burrard Inlet rests with those agencies that currently have management authority. While it is not intended to fetter these responsibilities, the Parties, through cooperation and consensus, commit to seek "made in the Burrard Inlet" solutions.

8. The Parties will work together to facilitate sustainability by:

   a) providing the opportunity for economic activity to meet national, regional and local objectives;

   b) maintaining and where practical improving Environmental Quality in Burrard Inlet to ensure preservation of fisheries and wildlife and to provide recreational opportunity where it is appropriate;

   c) maintaining and where practical improving the productivity of fish and wildlife habitats; and

   d) identifying and where practical enhancing the quality and variety of recreational sites.

9. The Parties, in implementing the Program, will:

   a) recognize the importance of Burrard Inlet as a major economic and environmental resource in all planning and management activities, and encourage compatibility between both foreshore and upland uses and developments and the preservation of Environmental Quality in Burrard Inlet;

   b) support the principle of persons directly responsible for pollution being responsible for its cleanup or cleanup costs;

   c) develop consensus by ensuring broad consultation between all Parties and proponents and while so doing providing avenues for active public participation, and maintaining program flexibility.

## MANAGEMENT COMMITTEE

10. The Parties to this Memorandum shall form a Management Committee with one representative appointed by each of DOE, DFO, MOELP, VPC and GVRD.

11. The representatives shall annually elect a Chair and Vice Chair of the Management Committee for a term of one year each and the Chair shall be rotated through the Parties.

12. The representatives shall appoint alternates to represent them at meetings which they cannot attend and shall employ their best efforts to ensure each Party is represented at all Management Committee meetings.

13. The Management Committee shall be responsible for managing the Program and directing and overseeing the administration of the annual Work Plans, pursuant to the five-year Business Plans. This includes allocation and determination of the manner in which funding will be spent. Management Committee decisions respecting this paragraph will be made on the basis of consensus.

14. The Management Committee's authorities, which may be delegated, will include:

a) appointing appropriate administrative staffing for the Program and providing for establishment of appropriate staff accommodation;

b) providing general direction for the operations and activities of the Program;

c) establishing priorities for the Program and approving the Five Year Business Plan and the annual Work Plan, their budgets and any changes thereto;

d) supporting, where practical and appropriate, the public being informed and involved in the activities of the Program;

e) preparing and submitting an annual report to the Parties on or before 30 June of each year identifying the accomplishments of the past fiscal year;

f) will issue the annual report for public consumption;

g) facilitating cooperation and coordination of improved management, including;

i) improving the quality and availability of information provided to the public regarding the Program; and

ii) a clearly defined process for involving the public in implementing the Program; and

h) evaluating staff and contractor performance.

i) forming action teams or sub-committees with appropriate membership to perform specific tasks or studies or provide expert advice on specific subjects and the Management Committee will ensure the timely performance of deliverables by such teams or sub-committees.

15. The Management Committee may be supported in its activities by staff or contractors who will be responsible to that Committee.

## PUBLIC INVOLVEMENT

16. Public involvement activities will include the issuance of publications, the holding of public meetings and the participation of the public in Program activities.

## FINANCES

17. A Budget, based on an annual Work Plan, shall be prepared for each Fiscal Year under the direction of the Management Committee, for approval by the Parties, not later than October 1, in the year prior.

18. Cost of the Program will be determined annually with the approval of the annual Work Plan.

19. The total cost of the Program is not to exceed two million dollars in a five year period.

20. Records of income and expenses for the Program will be kept in a manner acceptable to the Program auditors.

21. The parties agree to appoint the Fraser River Harbour Commission as banker for the Program and the Commission will issue invoices quarterly, in advance, based on a yearly contribution of up to eighty thousand dollars per Party.

22. Invoices are due and payable on receipt. The invoices shall be paid within thirty (30) days, calculated from the date the invoice is received. Invoices unpaid after forty five (45) days shall be referred to the Parties for resolution. Where applicable, simple interest will accrue at the Bank Rate plus one and one quarter percent on any amount which is overdue from the day such amount became overdue until the day prior to the date of payment.

23. The Fraser River Harbour Commission will maintain adequate documentation and records as banker and shall, upon request, make available such documentation and records for examination by auditors of any of the other Parties.

24. Each Party's obligation under this Memorandum is subject to sufficient funds being available by each party and allocated by the respective Parties. If sufficient funds are unavailable, the other Parties must be advised by January 30 in the Fiscal Year prior to the funds being required.

25. When any Party advises that some or all of its funds for contribution are unavailable, then that Party will cease to be represented on the Management Committee, unless otherwise agreed to by the other remaining Parties. In that event, the Management Committee may decide the Parties will either:

a) increase contributions to make up the shortfall; or

b) reduce the budget to reflect the shortfall.

26. The banker may make contributions on behalf of the Party, subject to:

a) the Party providing the banker with an agreement satisfactory to the banker to reimburse the banker in the year following; and

b) the Party agreeing to pay a mutually agreed upon rate of interest to the banker.

27. Where a Party has withdrawn from this Memorandum they shall request reinstatement by notifying all of the remaining Parties no later than September 1, in the year prior.

28. Where there is a change in the number of Parties to the Memorandum, or external funding is acquired, the base contribution, referred to in Section 21 of this Memorandum, may be adjusted, with the unanimous consent of the Parties, to reflect higher or lower contributions by the Parties.

29. Each Party shall bear the entire costs of the salary and travel expenses of its members on the Management Committee, any sub-committee or task force and of employees assigned to tasks or activities carried out under this Program and this Memorandum.

30. The Management Committee will name an Audit Committee and auditor annually.

## DURATION

31. This Memorandum shall take effect April 1, 1996. It will, except where otherwise provided in this Memorandum, continue in force until terminated upon the mutual agreement of all of the Parties that remain involved in this Memorandum.

32. Any Party to this Memorandum may terminate its involvement, provided that the Party formally notifies the other Parties of its intent to withdraw from the Memorandum and that such notification is received at least one full fiscal year prior to the intended date of withdrawal.

## AMENDMENTS

33. This Memorandum may be amended by written agreement between all of the Parties administrative senior representatives within the Province of British Columbia.

## NOTICE

34. Any notice required or permitted to be given under the provisions of this Memorandum shall be in writing, and sent by mail or by other acceptable form of communication to the address of the Party's representative on the Management Committee. Notice shall be sufficiently served if personally delivered to the Party to whom it is given or mailed.

## REFERENCES

35. Every reference to the Parties in this Memorandum will include any person designated to act for or on their respective behalf with regard to any provisions of this Memorandum.

## MISCELLANEOUS

36. This Memorandum and any activity conducted under it shall be without prejudice to any proprietary right or interest of the Parties.

37. The Parties hereto agree to consistently pursue optimizing the efficiency and effectiveness of the Action Plan.

38. In this Memorandum, wherever the singular or masculine is used it will be construed as if the plural or feminine or body corporate, as the case may be, had been used where the context or the Parties hereto so require.

39. This Memorandum shall not interfere in any way with the legislative jurisdiction of any of the Parties, nor with the exercise by any Party or its officials of any right, power or obligation under any law, order or regulation.

40. The provisions contained herein are an expression of understanding and not to be construed as legally binding on the Parties.

**IN WITNESS WHEREOF** the Parties hereto have executed this Memorandum.

Signed on behalf of Environment Canada
in the presence of: )

Witness

Environment Canada
Date:

Signed on behalf of Fisheries and Oceans
in the presence of: )

Witness

Fisheries and Oceans
Date:

Signed on behalf of the Ministry of
Environment, Lands and Parks
in the presence of: )

Witness

Ministry of Environment Lands and Parks
Date:

Signed on behalf of the Greater Vancouver
Regional District in the presence of: )

Witness

Greater Vancouver Regional District
Date:

Signed on behalf of the Vancouver Port
Corporation in the presence of: )

Witness

Vancouver Port Corporation
Date:

# APPENDIX B

## MEMORANDUM OF UNDERSTANDING RESPECTING THE FRASER RIVER ESTUARY MANAGEMENT PROGRAM

made this day of AD 1996

**BETWEEN:**

THE GOVERNMENT OF CANADA
represented by the Department of Environment

(hereinafter called "DOE")

AND:

THE GOVERNMENT OF CANADA
represented by the Department of Fisheries and Oceans
Habitat and Enhancement Branch
(hereinafter called "DFO")

AND:

THE GOVERNMENT OF THE PROVINCE OF BRITISH COLUMBIA
represented by the Ministry of Environment, Lands and Parks

(hereinafter called "MOELP")

AND:

THE GREATER VANCOUVER REGIONAL DISTRICT
incorporated by an Act of the Legislature of the Province of British Columbia and having an office at 4330 Kingsway, Burnaby, British Columbia V5H 4G8

(hereinafter called "GVRD")

AND:

FRASER RIVER HARBOUR COMMISSION
a body corporate established pursuant to the *Harbour Commissions Act*, R.S. 1985 c. H-1, and having a place of business at 500 - 713 Columbia Street, New Westminster, British Columbia V3M 1B2.

(hereinafter called "FRHC")

AND:

NORTH FRASER HARBOUR COMMISSION
a body corporate established pursuant to the *Harbour Commissions Act*, R.S. 1985 c. H-1, and having a place of business at 2020 Airport Road, Richmond, British Columbia V7B 1C6.

(hereinafter called "NFHC")

WHEREAS:

A. The Fraser River is noted as being one of the principal salmon producing rivers in North America and supports major commercial, recreational, and First Nations salmon fisheries;

B. The Fraser River Estuary supports extensive wildlife populations, being an internationally important staging area along the Pacific migratory bird flyway;

C. The Fraser River estuary contains important infrastructure, supporting substantial economic activity. The expansion of Canada's and British Columbia's international trade and economies will require increasing use and expansion of industrial and commercial facilities in the Estuary;

D. It is essential to provide the opportunity and capability for industry to function and to expand to meet the growing needs of the community of Canada;

E. Continuing urban and industrial expansion of Metropolitan Vancouver is impinging extensively on the health and productivity of the Estuary;

F. There is a public desire and expectation to preserve green areas, and to provide and enhance outdoor recreational opportunities.

G. Human activities, conducted without recognition of environmental potentials, could severely constrain the natural productivity of the Fraser River Estuary;

H. The Parties to the Memorandum have developed the vision of a "Living Working River", which recognizes that human activities can function in harmony with the Estuary's natural systems;

I. A shared and clear vision for the future will help reduce conflicts over use of the Estuary and will ensure resource users are working in the same direction, toward sustainability.

J. The Parties believe that cooperation, dialogue and consensus will lead to more effective resource management;

NOW THEREFORE:

1. The Parties agree to continue implementing, on an ongoing basis, coordinated measures to protect and improve environmental quality, to provide economic development opportunities, and to sustain quality of life in and around the Fraser River Estuary, AND FURTHER agree as follows:

DEFINITIONS:

2. As follows:

a) "Consensus" means a lack of dissent among the Party representatives;

b) "Estuary Management Plan" means the vision, goals and action programs contained in the document entitled "*A Living Working River*";

c) "Environmental Quality" means the quality of the aquatic, land and air environment;

d) "Fraser River Estuary" or "Estuary" means in general, the land and water outside the dikes and between Kanaka Creek and the outlet of Pitt Lake in the East, the estuary drop-off in the West, Point Grey to the North, and the international boundary to the South, including Boundary Bay and Semiahmoo Bay;

e) "Fiscal year" means the period beginning April 1 each year and ending March 31, the following year;

f) "Sustainability" means the point at which economic, environmental and social/cultural activities meet the needs of the present generation without compromising the ability of future generations to meet their own needs.

## PURPOSE OF THIS MEMORANDUM:

3. The purpose of this Memorandum is to establish a management framework to facilitate the implementation of the actions contained in the Estuary Management Plan and the coordination of activities intended to achieve sustainability;

## PRIMARY OBJECTIVES

4. The primary objectives of the Program are to:

a) conserve and enhance the environmental quality of the river and estuary to sustain healthy fish, wildlife, plants and people;

b) respect and further the estuary's role as the social, cultural, recreational and economic heart of the region;

c) encourage human activities and economic development that protect and enhance the environmental quality of the estuary.

5. The Parties, in implementing the Estuary Management Plan will coordinate;

a) water and land use planning;

b) environmental quality management;

c) project review; and

d) public communication, education and participation.

## GUIDING PRINCIPLES:

6. The Parties will foster cooperation and dialogue and coordinate action among government, industry, First Nations, special interests and the general public toward efficient and cost effective resource management of a living working Fraser River Estuary, in an environmentally sustainable fashion.

7. The Parties recognize that the primary responsibility for management of the Estuary rests with those agencies that currently have management authority. While it is not intended to fetter these responsibilities, the Parties, through cooperation and consensus, commit to seek "made in the Estuary" solutions.

8. The Parties, in the implementation of the Estuary Management Plan will strive to;

   a) keep the estuary healthy;

   b) conserve and enhance the natural habitat;

   c) encourage multiple uses within the estuary;

   d) promote integrated decision making;

   e) establish and maintain informed management processes;

   f) promote and employ consensus based decision making;

   g) provide equitable access to the estuary;

   h) establish and maintain accountable management processes;

   i) develop active partnerships with the public in management activities.

9. The Parties, in working together to facilitate sustainabilty, will;

   a) recognize the importance of the estuary as a major economic and environmental resource, and will encourage compatibility between both foreshore and upland uses and development, and the preservation of environmental quality in the estuary;

   b) provide the opportunity for economic activity to meet national, regional and local objectives;

   c) support the principle of persons directly responsible for pollution being responsible for its cleanup or cleanup costs;

   d) ensure broad consultation between all Parties and proponents, and while so doing provide avenues for active public participation and maintain program flexibility.

## MANAGEMENT COMMITTEE

10. The Parties to this Memorandum shall form a Management Committee with one representative appointed by each of DOE, DFO, MOELP, GVRD, FRHC and NFHC.

11. The representatives shall annually elect a Chair and Vice-chair of the Management Committee, for a term of one year each. These offices shall be rotated through the Parties.

12. The representatives shall appoint alternatives to represent them at meetings that they cannot attend and shall employ their best efforts to ensure each Party is represented at all Management Committee meetings.

13. The Management Committee shall be responsible for managing the Program and for directing and overseeing the administration of the annual Work Plans, pursuant to the five-year Business Plans. This includes allocation and determination of the manner in which funding will be spent. Management Committee decisions respecting this paragraph will be made on the basis of consensus.

14. The Management Committee's authorities, which may be delegated, will include:

a) appointing appropriate administrative staffing for the Program and providing for establishment of appropriate staff accommodation;

b) providing general direction for the operations and activities of the Program;

c) supporting, where practical and appropriate, the public being informed and involved in the activities of the Program;

d) establishing priorities for the Program and approving the five year Business Plans and annual Work Plans, their budgets and changes thereto;

e) preparing and submitting an annual report for the Program to the Parties, on or before June 30 of each year, identifying the accomplishments of the past fiscal year;

f) will issue the annual report for public consumption;

g) facilitate cooperation and coordination of improved management, including;

i) improving the quality and availability of information provided to the public regarding the Program;

ii) involving the public in implementing the Program;

h) evaluating staff and contractor performance.

i) perform specific tasks or studies or provide expert advice on specific subjects. The Management Committee will ensure the timely performance of deliverables by such teams or sub-committees.

15. The Management Committee may be supported in its activities by staff or contractors who will be responsible to that committee.

## PUBLIC INVOLVEMENT

16. Public involvement activities will include the issuance of publications, the holding of public meetings and the participation of the public in Program activities.

## FINANCES

17. A Budget, based on an annual Work Plan, shall be prepared for each fiscal year under the direction of the Management Committee, for approval by the Parties, not later than October 1, in the year prior.

18. Cost of the program will be determined annually with the approval of the annual Work Plan.

19. The total cost of the Program is not to exceed three million dollars in a five year period.

20. Records of income and expenses for the Program will be kept in a manner acceptable to the Program auditors.

21. The Fraser River Harbour Commission will act as a banker for the Program and will issue invoices quarterly, in advance, based on a yearly contribution of up to one hundred thousand dollars per Party.

22. Invoices are due and payable on receipt. The invoices shall be paid within thirty (30) days, calculated from the date the invoice is received. Invoices unpaid after forty five (45) days shall be referred to the Parties for resolution. Where applicable, simple interest will accrue at the Bank Rate plus one and one quarter percent on any amount which is overdue from the day such amount became overdue until the day prior to the date of payment.

23. The Fraser River Harbour Commission will maintain adequate documentation and records as banker and shall, upon request, make available such documentation and records for examination by auditors of any of the other Parties.

24. Each Party's obligation under this Memorandum is subject to sufficient funds being available by each Party and allocated by the respective Parties. If sufficient funds are unavailable, the other Parties must be advised by January 30 in the fiscal year prior to the funds being required.

25. When any Party advises that some or all of its funds for contribution are unavailable, then that Party will cease to be represented on the Management Committee, unless otherwise agreed to by the other remaining Parties. In that event, the Management Committee may decide that the Parties will either:

    a) increase contributions to make up the shortfall; or

    b) reduce the budget to reflect the shortfall.

26. The banker may make contributions on behalf of the Party, subject to:

    a) the Party providing the banker with an agreement satisfactory to the banker to reimburse the banker in the year following; and

    b) the Party agreeing to pay a mutually agreed upon rate of interest to the banker.

27. Where a Party has withdrawn funding from this Memorandum they shall request re-instatement by notifying the other Parties no later than September 1, in the year prior.

28. Where there is a change in the number of Parties to the Memorandum, or external funding is acquired, the base contribution, referred to in Section 21 of this Memorandum, may be adjusted, with the unanimous consent of the Parties, to reflect higher or lower contributions by the Parties.

29. Each Party shall bear the entire costs of the salary and travel expenses of its members on the Management Committee, any sub-committee or task force and of employees assigned to tasks or activities carried out under this program and this Memorandum.

30. The Management Committee will name an Audit Committee and Auditor annually.

## DURATION

31. This Memorandum shall take effect April 1, 1996. It will, except as where otherwise provided in this Memorandum, continue in force until terminated upon the mutual agreement of all of the Parties that remain involved in this Memorandum.

32. Any Party to this Memorandum may terminate its involvement, provided that the Party formally notifies the other Parties of its intent to withdraw from the Memorandum and that such notification is received at least one full fiscal year prior to the intended date of withdrawal.

## AMENDMENT

33. This Memorandum may be amended by written agreement between all of the Party principals.

## NOTICE

34. Any notice required or permitted to be given under the provisions of this Memorandum shall be in writing, and sent by mail or by other acceptable form of communication to the address of the Party's representative on the Management Committee. Notice shall be deemed to be sufficiently served if personally delivered to the Party to whom it is given or mailed.

## REFERENCES

35. Every reference to the Parties in this Memorandum will include any person designated to act for or on behalf with regard to any provisions of this Memorandum.

## MISCELLANEOUS

36. This Memorandum and any activity conducted under it shall be without prejudice to any proprietary right or interest of the Parties.

37. The Parties hereto agree to consistently pursue optimizing the efficiency and effectiveness of the Program.

38. In this Memorandum, wherever the singular or masculine is used it will be construed as if the plural or feminine or body corporate, as the case may be, had been used where the context or the Parties hereto so require.

39. This Memorandum shall not interfere in any way with the legislative jurisdiction of any of the Parties, nor with the exercise by any Party or its officials of any right, power or obligation under any law, order or regulation.

40. The provisions contained herein are an expression of understanding and not to be construed as legally binding on the Parties.

**IN WITNESS WHEREOF** the Parties hereto have executed this Memorandum.

Signed on behalf of Environment Canada
in the presence of: )
)
)

Witness

Environment Canada
Date:

Signed on behalf of Fisheries and Oceans
in the presence of: )
)
)

Witness

Fisheries and Oceans
Date:

Signed on behalf of the Ministry of
Environment, Lands and Parks
in the presence of: )
)
)

Witness

J. O'Riordan
Ministry of Environment, Lands and Parks
Date:

Signed on behalf of the Greater Vancouver
Regional District in the presence of: )
)
)

Witness

Greater Vancouver Regional District
Date:

Signed on behalf of the Fraser River Harbour
Commission in the presence of: )
)
)

Witness

Fraser River Harbour Commission
Date: Jan 25/96.

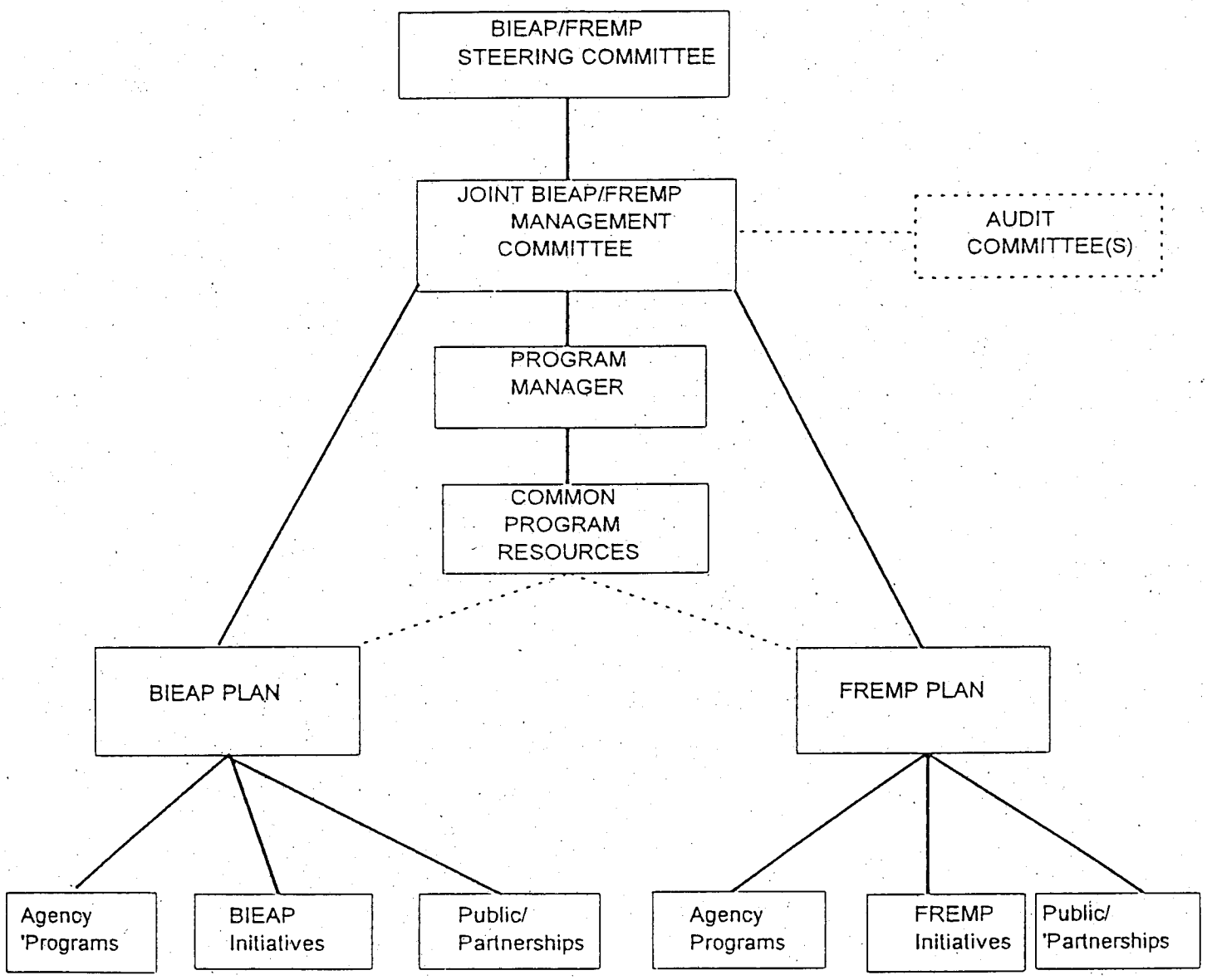
Signed on behalf of the North Fraser Harbour
Commission in the presence of: )
)
)

Witness

North Fraser Harbour Commission
Date:

# APPENDIX C

## PROPOSED BIEAP/FREMP STRUCTURE - 1996 AND BEYOND



# APPENDIX D: GLOSSARY OF ACRONYMS

**B.C. MELP** — B.C. Ministry of Environment, Lands and Parks

**BERC** — Burrard Environmental Review Committee

**BIEAP** — Burrard Inlet Environmental Action Plan

**BMP** — best management practice

**BMPAT** — Best Management Practice Action Team

**BOD** — biochemical oxygen demand

**CAD** — confined aquatic disposal

**CCG** — Canadian Coast Guard

**CEPA** — Canadian Environmental Protection Act

**CSO** — combined sewer outfall

**DFO** — Department of Fisheries and Oceans

**DMMAT** — Dredge Material Management Action Team

**EQOMAT** — Environmental Equality Objectives and Monitoring Action Team

**FRAP** — Fraser River Action Plan

**FREMP** — Fraser River Environmental Management Plan

**GIS** — geographical information system

**GPS** — global positioning system

**GVRD** — Greater Vancouver Regional District

**HMAT** — Habitat Management Action Team

**LWMP** — Liquid Waste Management Plan

**MOU** — memorandum of understanding

**PAH** — polycyclic aromatic hydrocarbons

**STP** — sewage treatment plant

**TSS** — total suspended solids

**VPC** — Vancouver Port Corporation