Technical Report

səlilwət Water Quality Report Series

Coordinated Monitoring

Tsleil-Waututh Nation

səlilwətaɬ

This Report supplements the səlilwət / Burrard Inlet Water Quality Objectives, Burrard Inlet Action Plan and Cumulative Effects Management Initiative.

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SUMMARY

Numerous agencies across səlilwət (Burrard Inlet) conduct water quality monitoring with varying methodology and sampling frequency, and for distinct purposes. Developing a coordinated monitoring approach for səlilwət (Burrard Inlet) could provide multiple benefits. Coordinated monitoring of water quality in səlilwət would involve the collection, analysis and use of data from multiple sources to track and improve the performance towards the goal of attaining the səlilwət / Burrard Inlet Water Quality Objectives. Many examples exist regionally, nationally, and internationally that serve as models for the design of a coordinated monitoring program. Some of the most relevant examples are summarized in Appendix A of this report.

Tsleil-Waututh Nation (TWN) has been a leader in convening diverse agencies that have stewardship responsibilities in səlilwət. Through conversations with these agencies, several key and desired aspects of a coordinated monitoring program for səlilwət have been identified, including underlying values and principles, data and reporting needs, structural elements and potential funding sources. The work to date by TWN and the Province of BC in updating the səlilwət / Burrard Inlet Water Quality Objectives (WQOs) serves as a strong foundation from which such a program can be developed. Appendix B of this report contains a proposed master plan for coordinated monitoring in səlilwət.

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ACRONYMS

BC	British Columbia
BIEAP	Burrard Inlet Environmental Action Program
CCME	Canadian Council of Ministers of the Environment
CMP	Coordinated Monitoring Program
CRD	Capital Regional District
DFO	Fisheries and Oceans Canada
ECCC	Environment and Climate Change Canada
ENV	BC Ministry of Environment and Climate Change Strategy
IDZ	Initial Dilution Zone
LWCBMN	Lake Winnipeg Community-Based Monitoring Network
LWMP	Liquid Waste Management Plan
NGO	Non-governmental organization
PSEMP	Puget Sound Ecosystem Monitoring Program
TWN	Tsleil-Waututh Nation
U.S.	United States
WQOs	Water Quality Objectives

1. AN IDENTIFIED NEED SUPPORTED BY TSLEIL-WAUTUTH NATION

Tsleil-Waututh Nation (TWN) has been a leader in convening diverse agencies that hold stewardship responsibilities in səlilwət (Burrard Inlet). Since the closure of the Burrard Inlet Environmental Action Program (BIEAP) in 2013, there has been a vacuum in the coordination of environmental monitoring and programming in səlilwət. TWN has addressed some of that need through their own environmental programming.

The difficulties experienced during the data analyses carried out while updating the səlilwət / Burrard Inlet Water Quality Objectives (WQOs), due to incompatible datasets from disparate monitoring efforts, has emphasized the need for improved coordination. In addition, various new funding initiatives and monitoring interests have led to a resurgence of work in and around the Inlet. The overlaps between jurisdictions with respect to water quality, and recent and ongoing water quality monitoring initiatives are tabulated in Appendix C. Historical and current water quality monitoring initiatives, and their sampling locations, in səlilwət are presented on a map in Appendix D.

In 2019, these circumstances prompted TWN to gather the main agencies responsible for water quality monitoring in the Inlet with the intent of exploring options for monitoring coordination. Multiple meetings of this ad hoc monitoring coordination working group over subsequent years, facilitated by TWN, demonstrated that representatives of these agencies saw value and were interested in collaboration. The following sections of this report are based on the preparatory materials, content and results of those meetings.

2. BENEFITS OF A COORDINATED APPROACH TO MONITORING IN səlilwət

A coordinated monitoring approach would involve the collection, analysis and use of data from multiple sources to track and improve the performance towards the goal of attaining the səlilwət / Burrard Inlet Water Quality Objectives. Some of the benefits of coordinated monitoring include, but are not limited to the following:

- Holistic tracking of progress towards water quality improvements and the attainment of the səlilwət / Burrard Inlet Water Quality Objectives
- Providing accessible, timely and accurate monitoring data, with consistent formatting, to support various projects
- Data sharing (with appropriate controls) and use of data for more than one purpose
- Enhancing collaboration, communication and learning
- Increasing the accountability and transparency of each program
- Providing reliable data
- Efficiently using resources and funding
- Avoiding duplication
- Sharing resources (e.g., boat time, sampling equipment, data platforms)
- Informing decision making and adaptive management

- Drawing linkages between programs, for example to identify sources that can explain ambient data.
- Generating collective evidence and support for investments in source controls, improved regulations, water quality improvements, establishment of appropriate lab detection limits, etc.

3. EXISTING MODELS AND GUIDANCE

The Canadian Council of Ministers of the Environment (CCME) has developed a guidance document for designing water quality monitoring programs. The generic components of this guidance, which are the basic steps for designing a monitoring program, are illustrated in Figure 1 (CCME 2015). These components answer the questions of *why, what, where, when* and *how* to monitor, with details as follows:

1. **Monitoring objectives**: *Why?* Setting clear and specific objectives for the program, which are based on water quality issues and management goals;
2. **Monitoring program design**: *What? Where? When?* Identifying the type of monitoring that is required (i.e., baseline, surveillance, compliance, or investigative program). Determine the monitoring sites, frequency/timing, and parameters to be analyzed.
3. **Sampling and laboratory analyses and procedures**: *How?* Standardizing sampling protocol, laboratory analysis methods and detection limits.
4. **Data analysis and interpretation**: Developing a data management and reporting system, and quality assurance measures. This ensures accuracy, comparability and completeness of the data collected by the program.
5. **Reporting and follow-up**: Evaluating the effectiveness and efficiency of the program by assessing its performance against the objectives of the program.

There are several successful examples of coordinated water quality monitoring initiatives involving multiple agencies within British Columbia (BC) and in other parts of North America. These models can provide guidance and inspiration for the səlilwət context. Some of these initiatives are described in Appendix A.

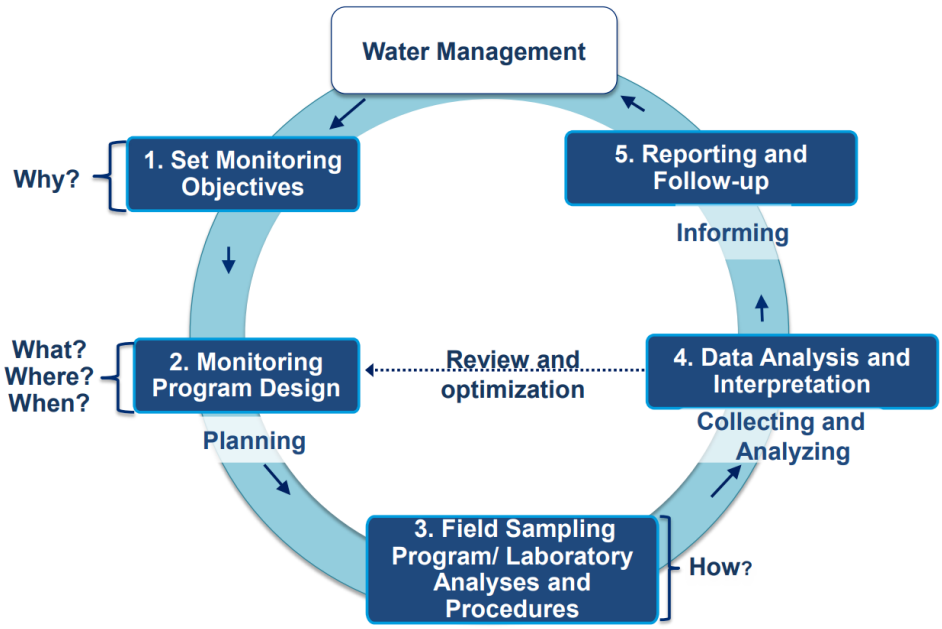

Figure 1. Generic water quality monitoring program design considerations (from CCME 2015)

4. DESIGNING A COORDINATED WATER QUALITY MONITORING PROGRAM FOR səlilwət

The following sections propose components of a coordinated water quality monitoring program for səlilwət, based on the conceptual model of water quality inputs and values and tailored to the local context. The components include values and principles; a conceptual model; data management, analysis and reporting considerations; structural elements; and financing.

4.1 Values and principles guiding water quality monitoring coordination in səlilwət

The vision and values that guide the WQOs for səlilwət (**Error! Reference source not found.**, from Rao et al. 2019) can also guide water quality monitoring coordination in səlilwət. The overall vision is to increase the benefits of səlilwət to all in the region by reducing stressors and improving water quality while balancing ecological, social, economic, health and First Nation cultural values. The values are: shellfish and finfish consumption by humans; marine aquatic life; wildlife; cultural and recreational practices; and institutional water uses.

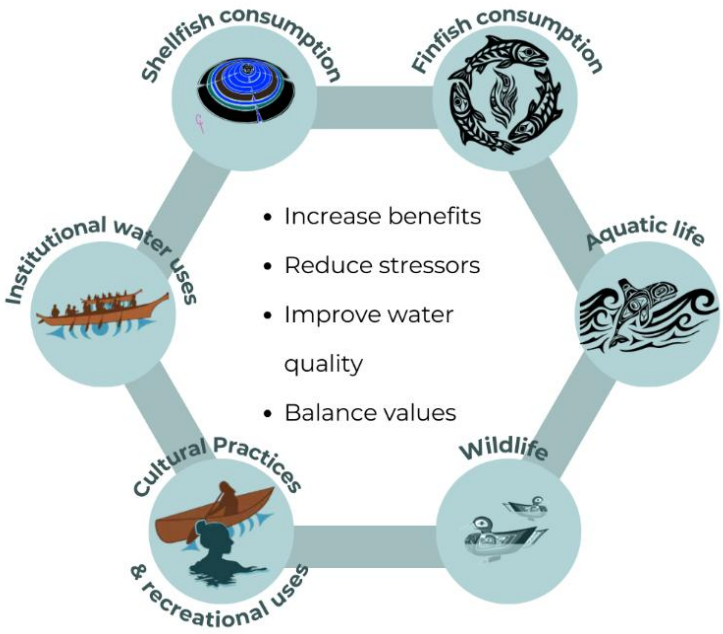

Figure 2. Vision and values for səlilwət / Burrard Inlet Water Quality Objectives and water quality monitoring coordination. Canoe, fish/orca, and clam/duck Illustrations by Tsleil-Waututh artists Olivia George, Chris Overes and Candace Thomas, respectively.

Further to this, representatives of agencies responsible for water quality monitoring in səlilwət identified several **principles** to guide coordinated monitoring, which can be synthesized as follows:

- A whole system approach;
- Long-term program with adequate financial and other resources;
- Increased collaboration, communication and efficiency;
- Consistency and comparability of methods and approaches (e.g. with respect to parameter selection, frequency and timing and site selection);
- Consolidation of existing information;
- Transparent and publicly available information (including metadata and sources);
- Real time reporting;
- Allows for an identification of point and non-point sources; and
- Adaptive monitoring.

4.2 səlilwət conceptual model

As part of developing a robust coordinated monitoring program, a conceptual model has been developed (Figure 3) to provide a representation of the processes and interactions that affect source, transport, and fate of contaminants in səlilwət. The values outlined above are also included in this conceptual model to highlight the impacts of contamination. This model can help address some of the questions in the program design model (Figure 1), by providing a common framework, and identifying the key components, stressors and vulnerabilities within səlilwət.

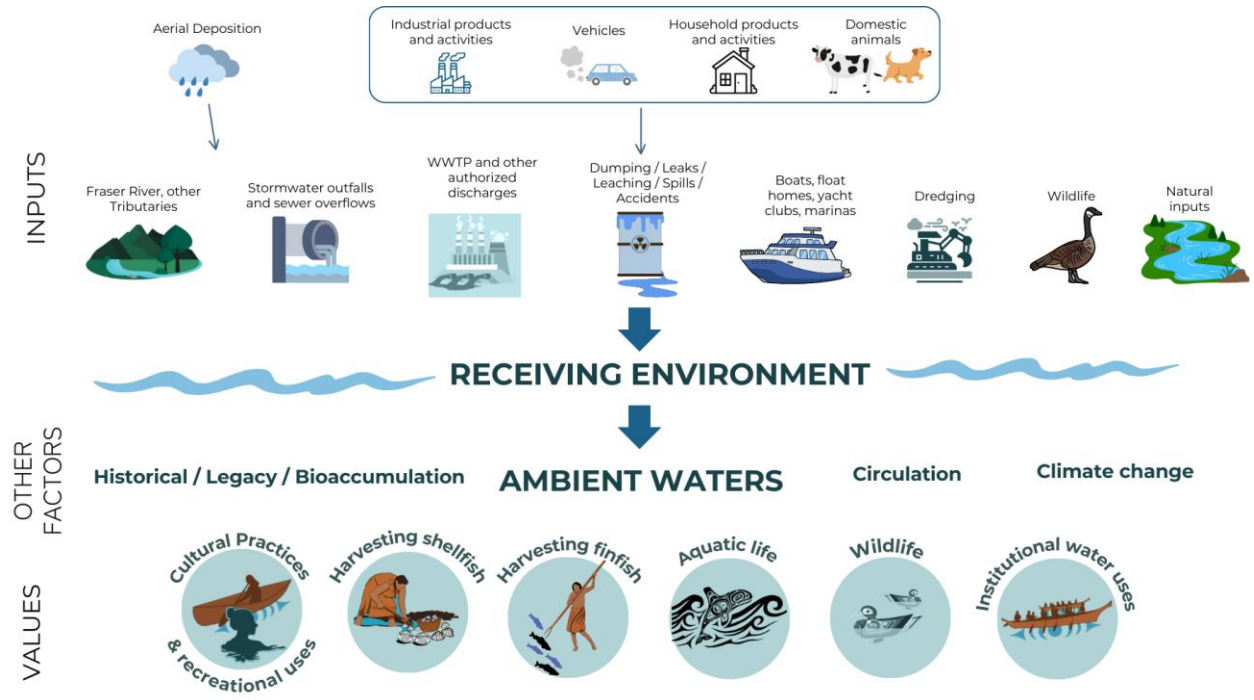

Figure 3. səlilwət conceptual model of water quality inputs and values. Canoe/harvesting, orca and duck art by Tsleil-Waututh artists Olivia George, Chris Overes and Candace Thomas, respectively.

4.3 Data management, analysis and reporting

Data management, analysis and reporting are essential components of coordinated monitoring, as they ensure the quality, accessibility, and usability of the data collected. Collaboration and coordination can also help to improve the design, implementation, and evaluation of monitoring programs by increasing efficiency, avoiding duplication and ensuring consistency. The outcome of this is accurate, consistent and timely data which, among other things, helps evaluate the attainment of the Water Quality Objectives. During Initial meetings, representatives of agencies responsible for water quality monitoring in səlilwət identified the following key elements as being critical for a successful coordinated monitoring program:

- **Consistency and quality:**
  - Standardized data and metadata collection template, laboratory and field methods.
  - Direct upload capabilities with consistent fields and formats that enable fool-proof automation[1].
  - Quality control methods to ensure the data answer the right questions and can be trusted.
- **Access to information:**

[1] The Province of BC's Environmental Monitoring Data System (EnMoDS) could be used for this purpose: https://www2.gov.bc.ca/gov/content/environment/research-monitoring-reporting/monitoring/environmental-monitoring-data-system (Accessed August 2025)

- Consistent access to uploaded data on a central site.
- Leveraging existing programs' communications networks to obtain and disseminate data.
- Provision, by data custodians and experts, of contextual information, metadata and assumptions that can help interpret the data, understand the reasons behind its collection, as well as its limitations.
- User friendly web-based dashboard and means (e.g. pre-loaded code) for viewers to run their own analyses and visuals, while minimizing risk of misinterpretation.
- Provision of technical and non-technical reports prepared by an agreed-upon author.

- **Funding:**
  - To support data analysis and database management (see Section 4.5).

4.4 Structural elements

There are many possible models for the structure of a coordinated water quality monitoring program, as shown by the examples from other regions provided in Appendix A. A key element for səlilwət, suggested by monitoring agency representatives, is the establishment of a small coordinating and technical body, for example a central committee led by a First Nation or non-governmental organization (NGO). This would ensure consistency that is not subject to the cyclical or siloed nature of other jurisdictions. A proposed organizational structure is provided as Figure 4.

4.5 Financing

Various financing systems are possible for coordinated monitoring initiatives. These include the following, some of which have been implemented as part of coordinated monitoring programs in other regions (see Appendix A):

- Coordination, combination, and maximization of existing monitoring program budgets.
- Coordination of efforts to leverage supplementary funding, e.g., government and other grants.
- Equal financial contributions from each large agency involved.
- Contributions built into licenses, permits and other authorizations.
- A polluter pays program.
- Dedication of a portion of the region's tax base.

5. PROPOSED səlilwət COORDINATED MONITORING MASTER PLAN

A master plan proposing a coordinated monitoring framework for səlilwət has been drafted for consideration (Appendix B). The plan draws from existing initiatives from other jurisdictions and articulates goals, objectives, expectations, initial research questions, knowledge gaps and opportunities.

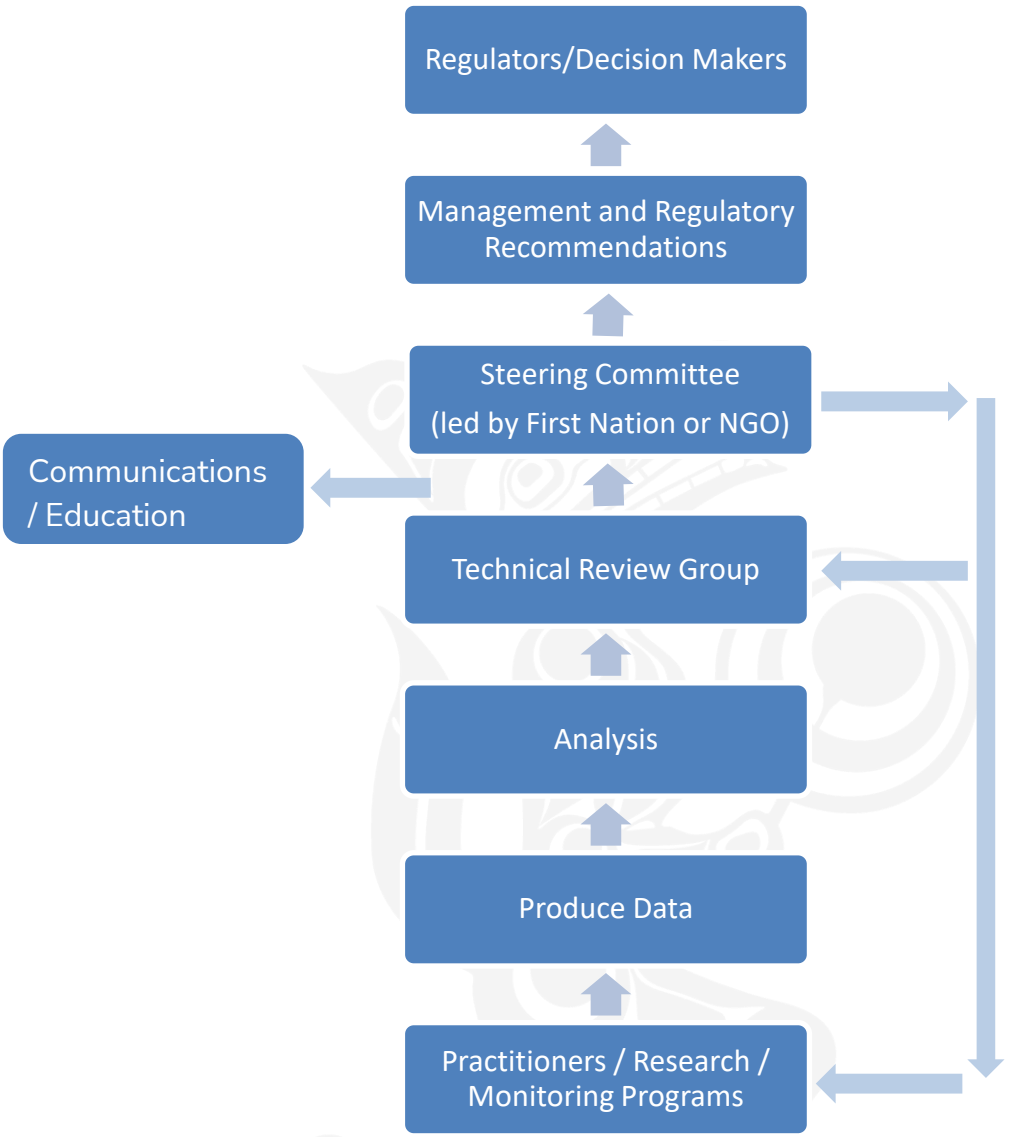

Figure 4. Sample organizational structure for səlilwət water quality coordinated monitoring

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APPENDIX A: EXAMPLES OF COORDINATED MONITORING PROGRAMS IN OTHER REGIONS

Boundary Bay Ambient Monitoring Program

The Boundary Bay Ambient Monitoring Program is an example of a coordinated monitoring program that involves multiple partners and funding resources. These include Metro Vancouver, Ministry of Environment, City of Surrey, and other municipalities such as White Rock and Delta. The program has established a set of objectives, indicators and targets to measure its progress and performance. Some of these objectives are as follows (Hightower, 2018):

- Establishing baseline conditions and trends of water quality/ecological indicators.
- Identifying sources and loads of contaminants/nutrients entering the Bay.
- Assess the compliance of water quality and relevant guidelines.
- Evaluate the effects of wastewater discharges, stormwater, agricultural and urban impacts on water quality/ecological health.

The program also has a robust monitoring and evaluation framework to assess its interactions with the water system and its effects on outputs and outcomes. The program reports its findings and recommendations to the stakeholders and the public on an annual basis.

Capital Regional District Integrated Watershed Management Program

The Capital Regional District (CRD) operates under a similar regulatory context to səlilwət. The objectives of its Integrated Watershed Management Program are to:

- Plan, promote and co-ordinate a program for management of stormwater quality and surface water resources in cooperation with the participating municipalities, communities and local governments to:
    - Limit the impacts of stormwater runoff on the environment and public health and well being
    - Protect freshwater and near-shore marine ecosystems and resources; and
    - Promote education about water quality issues and develop educational material (CRD 2021).

In this program, the CRD provides a service for municipalities, six First Nations and electoral agencies via a series of by-laws that dedicate a portion of the tax base (0.005%) to the program. The effort is run by CRD's Environmental Services Committee (CRD 2021).

Okanagan Lake Collaborative Monitoring

This coordinated initiative involves BC ENV, the City of Kelowna, and two district governments. It includes a seasonal water quality sampling program with an objective to assess WQO attainment and trends. Annual reports and data (including capabilities to conduct summary

statistics and visualizations) are posted online. The program is funded through contributions from licensees and permittees (ENV 2021).

Lake Winnipeg Community-Based Monitoring Network

The Lake Winnipeg Community-Based Monitoring Network (LWCBMN) is a program that involves citizen volunteers and watershed partners in collecting water samples across Manitoba to measure the amount of phosphorus in the water (Lake Winnipeg Foundation, 2023). The program aims to identify phosphorus hotspots, which are areas that contribute more phosphorus to the lake than other areas, and to support actions that can reduce phosphorus loading and improve the health of Lake Winnipeg (Lake Winnipeg Foundation, 2023). The program is supported by Lake Winnipeg Foundation's Science Advisory Council, which provides scientific guidance and oversight. The program also works with various partners, such as conservation districts, land managers, decision-makers, federal and provincial agencies, hydroelectric companies, and other organizations that have responsibility or interest in monitoring water quality and ecological health in the Lake Winnipeg watershed.

The LWCBMN produces annual reports that summarize the data collected and provide an assessment of the water quality and ecological status of Lake Winnipeg and its tributaries.

Puget Sound Ecosystem Monitoring Program

The Puget Sound Ecosystem Monitoring Program (PSEMP) has been operating since the 1980s. Its mission is to create and support a collaborative, inclusive, and transparent approach to regional monitoring and assessment that builds upon and facilitates communication among the many monitoring programs and efforts operating in Puget Sound. Its main goal is to assess progress toward the recovery of the health of Puget Sound (Puget Sound Partnership 2020).

The program's objectives are to:

- Increase collaboration across monitoring programs by creating and maintaining forums for open communication, data sharing, synthesis, and effectiveness assessment;
- Support adaptive management of recovery efforts by facilitating dialogue among PSEMP participants, planners, managers, and decision-makers; and
- Improve communication within and beyond the monitoring and assessment community to improve access to credible information to guide recovery decisions (Puget Sound Partnership 2020).

The program evaluates water quality management plan effectiveness, improves decision-making, identifies long term trends, and avoids duplication of effort. Participants include 17 Indigenous Tribes, Washington State agencies such as the Departments of Environment and Fish and Wildlife, 12 counties, 112 cities, local coordinating groups, private organizations, special purpose districts, and federal agencies such as the U.S. Fish and Wildlife Service. Its structure is illustrated in Figure 5. An annual Puget Sound report is produced, as is a report on 'vital signs' based on a series of indicators. The data are not open, but are available by request. It is funded through government grants and contributions (Puget Sound Partnership 2020).

Figure 5. Puget Sound Environmental Monitoring Program structure (from Puget Sound Partnership 2020)

Regional Monitoring Program for Water Quality in San Francisco Bay

A regional water quality monitoring program has been underway in San Fransisco Bay since 1993. It is guided by a formal program charter that explains its governance. Its governance structure is illustrated in Figure 6. It is funded through contributions from licensees and permittees. The program produces technical and non-technical reports in alternate years (SFEI 2018).

The program's goals are:

- To collect data and communicate information about water quality in San Francisco Bay in support of management decisions; and
- Replace individual receiving water monitoring requirements for dischargers and dredgers with a comprehensive Regional Monitoring Program (SFEI 2018).

It operates with the following guiding principles:

- Develop sound scientific information on water quality in the Bay;
- Prioritize funding decisions through collaborative discussions;
- Conduct decision-making in a transparent manner that consistently represents the diversity of participant interests;
- Utilize external science advisors for guidance and peer review;
- Maintain and make publicly available the data collected by the program;
- Enhance public awareness and support by regularly communicating the status and trends of water quality in the Bay; and
- Coordinate with other monitoring and scientific studies in the Bay-Delta region to ensure efficiency (SFEI 2018).

The program involves regulated dischargers such as industries, local governments, and the San Francisco Estuary Institute (a non-governmental organization). The program includes both regular and issue-specific monitoring. Products include an annual report, sophisticated data display and download tools. Results are presented to the public at an annual meeting (SFEI 2018).

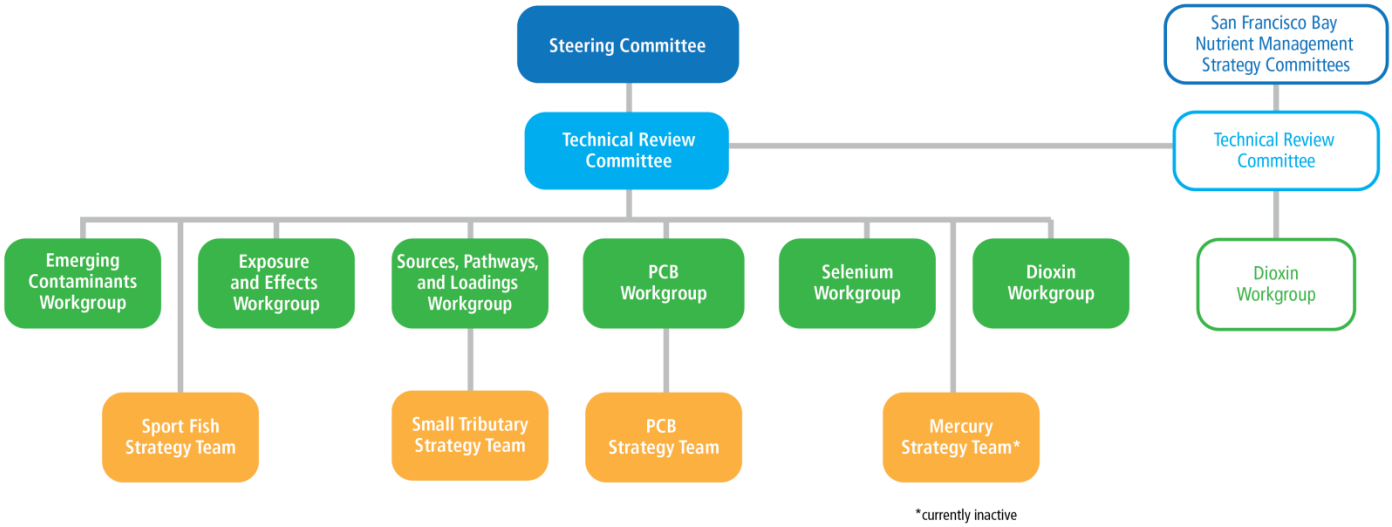


Figure 6. Governance structure for the Regional Monitoring Program for Water Quality in San Francisco Bay (SFEI 2018)

Chesapeake Bay Program

Since 1983, there has existed a regional partnership that builds and adopts policies that support Chesapeake Bay restoration. It is a formalized organization of multiple agencies: state, federal, academic, and local watershed organizations. Its governance structure is illustrated in Figure 7. Beyond monitoring coordination, it is aimed at improving water quality in the bay. Its three priorities are toxic pollution, nutrient over-enrichment and dwindling underwater bay grasses. The initiative has a public data sharing strategy and website. It is funded by a variety of sources (Chesapeake Bay Program 2021).

The water quality and biological monitoring components of this program are coordinated by a monitoring subcommittee, which allows for Bay-wide assessments of conditions, trend analysis, and modeling. The objectives of the water quality monitoring program are to:

- Characterize current conditions;
- Identify long-term trends; and
- Improve understanding of processes that control water quality (Chesapeake Bay Program 2021).

Figure 7. Chesapeake Bay Program organizational structure and leadership (from Chesapeake Bay Program 2021)

APPENDIX B: PROPOSED səlilwət / BURRARD INLET COORDINATED MONITORING PROGRAM: PROPOSAL FOR DISCUSSION

(Prepared by Patrick Lilley, KWL)

A səlilwət / Burrard Inlet Coordinated Monitoring Program (CMP) is proposed as an innovative, collaborative regional water quality monitoring program to support the protection and management of environmental health in səlilwət and the attainment of the səlilwət / Burrard Inlet Water Quality Objectives.

Program Purpose

To collect data on water quality, including water, sediment, and tissue quality, in səlilwət / Burrard Inlet. The data will support management decisions that aim to protect public health, First Nations' cultural values, and the environment, and to improve the health of the səlilwət ecosystem.

Rationale

Multiple organizations currently monitor environmental quality in the Inlet for a wide variety of objectives. Some existing monitoring programs are detached and narrowly focussed on specific discharges, pollutants, jurisdictions, geographic areas, or regulatory requirements. Monitoring by some organizations or dischargers may not reflect current science or best practices, and the data collected may not be appropriately analyzed or widely shared.

By coordinating data collection, managers can prioritize monitoring efforts more effectively and understand the source pathways, spatial patterns, and long-term trends of contamination. A coordinated monitoring program will ensure the use of the best available science, enable a more comprehensive assessment of conditions, and focus on the most important questions facing managers. A coordinated monitoring program will also make more efficient use of the available resources and funds for monitoring. Moreover, it will be critical to evaluate the effectiveness of significant investments to control water pollution that are likely to be made in the coming years.

The program is proposed to be modelled after similar successful coordinated monitoring initiatives in Puget Sound, San Francisco Bay, Chesapeake Bay, and the Great Lakes.

Regulatory and Legal Context

səlilwət /Burrard Inlet falls within the traditional territories of Musqueam, Squamish and Tsleil-Waututh Nations. Tsleil-Waututh Nation has a long-held legal obligation to steward the water, land, air, and resources in səlilwət. This obligation is based on ancestral laws, traditions, and relationships with the land and the water. This stewardship responsibility includes restoring conditions that provide the environmental, cultural, spiritual, and economic foundation for our communities to thrive.

In British Columbia, the provincial *Environmental Management Act* regulates the release of waste into the environment. This stipulates that waste from certain industrial activities or

certain types of waste effluent require written authorization to be released into the environment. This includes processed wastewater, effluent, sewage, and stormwater. Typically, waste discharge authorizations include mandated monitoring and reporting to the province.

Municipalities can develop community-specific solutions for wastewater management that meet or exceed existing regulations through liquid waste management plans (LWMPs) for municipal sewage and stormwater. The Minister of Environment and Climate Change Strategy approves the final plans only after adequate consultation. At the time of writing (2024-25) Metro Vancouver is updating its Liquid Waste Management Plan.

The pollution prevention provisions of the federal *Fisheries Act* prohibit the deposit of harmful substances into waters where fish live. The provisions apply to everyone, including all levels of government (federal, provincial, municipal, Indigenous), private sector operators, and the public. Environment and Climate Change Canada (ECCC) is the main department in charge of administering and enforcing these provisions[2]. Therefore, both ECCC and Fisheries and Oceans Canada are interested in understanding how pollution affects marine waters like in səlilwət.

The *Canadian Environmental Protection Act* authorizes the Minister of the Environment to establish environmental monitoring stations, collect and publish data on environmental quality in Canada, conduct research and studies on pollution control and environmental contamination, formulate pollution prevention plans, and publish information on pollution prevention plans, and on the quality and state of the Canadian environment.

Program Objectives

The following program objectives are proposed:

- Develop shared goals for monitoring for səlilwət in support of key management priorities;
- Identify key themes for targeted studies and research;
- Develop standardized field and laboratory methods and protocols;
- Enable resource sharing for field and lab activities;
- Improve data sharing and increase Inlet-wide public access to səlilwət information;
- Ensure efficient use of resources and avoid duplication of effort;
- Provide a forum for discussion of contamination issues facing the Inlet; and
- Establish a climate of cooperation for water quality improvement.

Potential Program Partners

The səlilwət / Burrard Inlet CMP is proposed to be a collaborative effort involving Tsleil-Waututh Nation, Squamish Nation, Musqueam Nation, the Governments of BC and Canada, non-governmental organizations, and the regulated discharger community, including Metro Vancouver, municipalities, and private dischargers.

[2] See https://www.canada.ca/en/environment-climate-change/services/managing-pollution/fisheries-act-registry/frequently-asked-questions.html (Accessed August 2025)

Potential partners could include the following:

- *First Nations:* Tsleil-Waututh Nation, Squamish Nation, Musqueam Nation.
- *Provincial:* BC Ministry of Environment & Parks, BC Ministry of Water, Land and Resource Stewardship.
- *Federal:* Environment and Climate Change Canada, Fisheries and Oceans Canada, Transport Canada, Vancouver Fraser Port Authority.
- *Regional:* Greater Vancouver Sewerage & Drainage District (Metro Vancouver).
- *Municipal:* City of Vancouver, City of Burnaby, City of Coquitlam, City of North Vancouver, District of North Vancouver, District of West Vancouver, City of Port Moody, Village of Belcarra, Village of Anmore, University Endowment Lands.
- *Industry:* Waste Discharge Authorization holders, other industries under codes of practice
- *Non-governmental organizations, academics, researchers:* as relevant

Governance

Governance of the coordinated monitoring program will help establish and maintain the roles, responsibilities, structure and process that support and oversee planning, implementation and evaluation of the program. The following is a proposed governance structure:

1. Steering Committee:
    a. Decision-making body overseeing program implementation
    b. Provides management direction, determine the overall budget, allocates program funds, and tracks progress.
    c. Guided by Program Charter or Memorandum of Understanding
2. Leadership & Review Committee:
    a. Formal stakeholder body, structured to represent the Program participants.
    b. Provides guidance.
    c. Representation from First Nations, regulatory agencies, dischargers, and non-governmental organizations.
3. Working Groups:
    a. Established to support the work of the program in specific priority areas.
    b. To consist of Indigenous and western scientists, technical experts, and managers as required.

These structures would draw from the existing səlilwət / Burrard Inlet Water Quality Objectives Implementation Team, Water Quality Roundtable, Technical Working Group, and Coordinated Monitoring Working Group.

Funding and Administrative Support

Financial and administrative support for the program should be stable in the long-term and could be provided via fees, taxes, and partner contributions. Work plans and budgets would be developed annually. Stable funding would allow the program to develop long-term plans. The program may also wish to pursue grant funding for specific studies and initiatives.

Priorities for Work Planning

Potential priorities include the following:

- Developing shared methods and laboratory protocols, for example by applying the guidance from Rieberger et al. (in prep.)
- Developing shared monitoring priorities
- Comparing the monitoring recommendations from the WQO technical reports with existing/previous monitoring locations (Appendix D) to identify where existing monitoring could be augmented, and where additional monitoring is needed.
- Annual coordinated planning of existing monitoring programs
- Designating or developing a single data and information portal to house səlilwət environmental quality data and information[3]
- Identifying sources, pathways, and loadings of key contaminants
- Developing a Data Management Plan
- Developing a water quality map
- Developing a long-term Coordinated Monitoring Plan
- Prioritizing research studies needed to fill knowledge gaps
- Establishing an annual conference

[3] The Province of BC's Environmental Monitoring Data System could be used for this purpose: https://www2.gov.bc.ca/gov/content/environment/research-monitoring-reporting/monitoring/environmental-monitoring-data-system (Accessed August 2025)

APPENDIX C: JURISDICTIONAL COVERAGE AND WATER QUALITY MONITORING PROGRAMS IN səlilwət

Table 1. Jurisdictional coverage related to the protection of the Water Values for səlilwət and its tributaries

Water Value	First Nations	Government of Canada	Province of BC	Metro Vancouver	Health Authorities
Aquatic life	✓	✓	✓	✓	
Wildlife	✓	✓	✓		
Human consumption of aquatic species	✓	✓			✓
Primary and secondary contact activities	✓	✓	✓	✓	✓
First Nation cultural practices	✓				✓
Drinking water	✓	✓	✓ (Source Protection)	✓	✓
Groundwater / subsurface water quality	✓		✓		
Watershed integrity	✓		✓	✓	
Human safety	✓	✓			✓
Institutional water uses	✓		✓	✓	

Table 2. Current and recent water quality monitoring programs in səlilwət, and their objectives

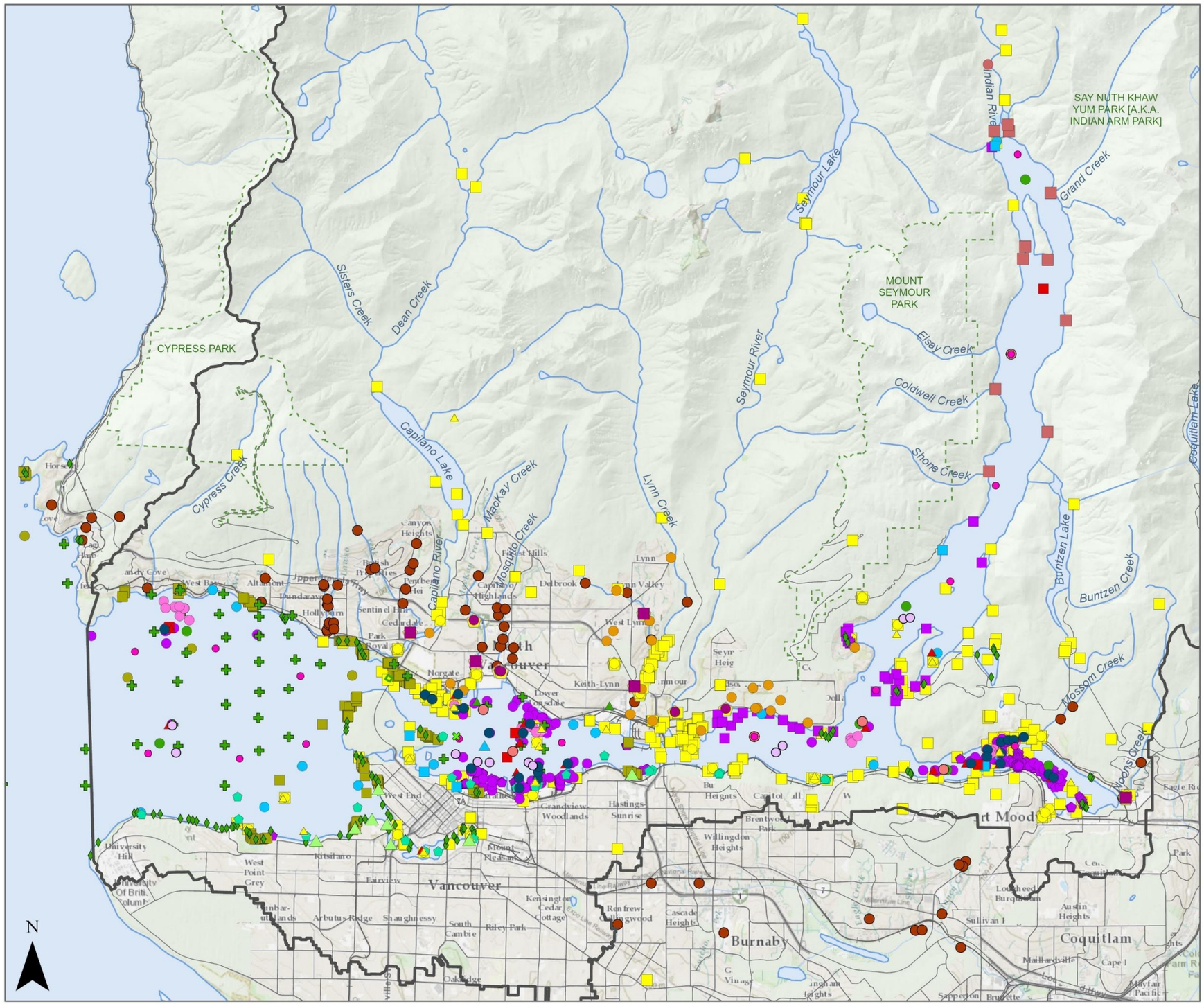
Water Quality Monitoring Program	Objectives
BC ENV Attainment Monitoring (2019-2020 sediment sampling)	• Assess whether WQOs are being attained • Inform Authorizations or Compliance files or workplans, and potential updates to WQOs • Provide data to inform the səlilwət / Burrard Inlet WQOs update project • Share data results and assessment with South Coast Authorizations section to evaluate potential receiving environment impacts from *Environmental Management Act* authorized sites
City of Vancouver	• Temporary, investigative sampling programs targeted towards assessing specific projects.
DFO – Oceans Protection Plan, Coastal Environmental Baseline Program	• Collect comprehensive data to characterize the current state of the ecosystem in and around the Port of Vancouver

Water Quality Monitoring Program	Objectives
ECCC - Disposal at Sea	• Maintain access to suitable disposal sites • Assess permit decisions • Review the adequacy of controls • Identify research and development needs
ECCC – Shellfish Sanitation	• Assess whether water quality is adequate for shellfish harvesting and consumption, and monitor changes in water quality from year to year
Swim Drink Fish (formerly the Fraser Riverkeeper Society)	• Collect recreational water quality samples year-round with citizen science volunteers • Measure physical water quality parameters • Collect environmental observations on recreational water users, pollution, wildlife, and weather • Share results and those from health authorities on theswimguide.org and on the Swim Guide app • Share results via Open Portal and Datastream
Metro Vancouver – Environmental Monitoring Programs associated with its discharges	• Assess attainment of guidelines • Assessment of potential environmental effects
Metro Vancouver – recreational	• Protect human health by determining if beach water quality complies with the Canadian Recreational Water Quality Guidelines
Ocean Wise – Pollution Tracker (program is no longer active)	• Long-term, integrated, marine pollution monitoring • Spatial and temporal trend analysis of contaminant concentrations. • Collection of data for a wide range of contaminants to inform source identification, emerging risks to sea life, and the effectiveness of regulations and best practices. • In the case of an oil spill, data can also be used to help discern the origin of hydrocarbons and distinguish a spill • Indication of the state of habitat quality, and enable best practices related to vessel operations, land-based activities and dredging/disposal operations.
Ocean Wise – harbour seals (program is no longer active)	• Health parameters and gene expression affected by contaminants.

Water Quality Monitoring Program	Objectives
Tsleil-Waututh Nation – Cumulative Effects Monitoring Initiative physical oceanography surveys	• Assess cumulative effects by first better understanding current environmental conditions • Use this information to assess future developments, changes and restoration work to ultimately allow more wild food to be harvested from the inlet for TWN.
Tsleil-Waututh Nation – Vancouver Fraser Port Authority ECHO underwater noise monitoring	• Characterize the underwater noise levels in səlilwət and assess how they vary by location and over time. • Evaluate the underwater noise emissions of different sources in the Inlet.
Vancouver Fraser Port Authority Ecosystem Monitoring Program	• Develop an integrated ecosystem monitoring program that combines data from four indicators: water quality, plankton abundance and diversity, sediment quality and benthic invertebrate diversity to track improvement or decline in ecosystem health.

APPENDIX D: CURRENT AND PREVIOUS WATER QUALITY MONITORING SITES IN səlilwətaɬ

- Burrard Inlet Catchment (Study Area) (See Map 1a)
- Active Combined Sewer Overflow Monitoring (AECOM 2012, MV, COB, COV 2018)
- Coliform Monitoring Site (ECCC 1990-2017)
- Disposal at Sea Monitoring Site (ECCC 2009-2017)
- Sediment and Biota Sampling Site (ECCC 1985-1987)
- Benthic Infaunal Survey Site (DFO 1987)
- Sediment Core Profile Site (EQOMAT 1994)
- Sediment Quality Sampling Site (EQOMAT 1995)
- Sediment Benthic Invert and Fish Sampling (PICES 1999)
- Attainment Monitoring Site (ENV 1970s-2010)
- EMS Monitoring Site (ENV 1975-2017)
- Sediment Monitoring Site (ENV 2019-2020)
- Freshwater Tributary Monitoring Site (ENV 2023)
- Burrard Inlet Ambient Monitoring Program (MV 2007-ongoing)
- Sanitary Sewer Overflow Monitoring (MV 2017)
- Lions Gate WWTP Initial Dilution Zone Boundary Monitoring (MV 2017)
- Lions Gate WWTP Outfall Sediment Effects Survey (MV 2012)
- Recreational Water Quality Monitoring (MV 2017)
- Marathassa Spill Monitoring Site (Prawn Tissue) (CCG 2016)
- Marathassa Spill Monitoring Site (Animal Tissue, Sediment, Water Quality) (CCG 2015-2016)
- Aquatic Health Monitoring Site (DNV 2015)
- Pollution Tracker Caged Mussel Site (OW 2017)
- Urban Microplastics (OW, UBC)
- Pollution Tracker Site (OW 2017)
- False Creek Water Monitoring Program (SDF 2022-2023)
- VFPA Environmental Monitoring Program Sites
- Oceanographic Survey Locations (TWN)
- Underwater Noise Monitoring (VFPA, TWN, ONC)
- Shellfish Monitoring Sites Fresh
- Shellfish Monitoring Sites Marine
- 6PPD-Quinone Monitoring Sites (DFO 2021-2023)
- 6PPD-Quinone and Flow Monitoring Sites (DFO 2023-ongoing)
- Community Stream Monitoring Project (DFO ongoing)
- Seafloor Observatory (TWN, ONC ongoing)



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Data sources for Project: AECOM, Province of BC (BC), BC Hydro, Canadian Coast Guard (CCG), City of Burnaby (COB), City of Coquitlam (COC), Coastal and Ocean Resources-ShoreZone (COR), City of Vancouver (COV), City of Port Moody (CPM), Fisheries and Oceans Canada (DFO), District of North Vancouver (DNV), District of West Vancouver (DWV), Environment and Climate Change Canada (ECCC), BC Ministry of Environment and Climate Change Strategy (ENV), Burrard Inlet Environmental Action Program Environmental Quality Objectives and Monitoring Action Team (EQOMAT), BC Ministry of Forests, Lands and Natural Resources Operations & Rural Development (FLNRO), Government of Canada (GOC), Islands Trust (IT), Kerr Wood Leidal (KWL), Metro Vancouver (MV), Ocean Networks Canada (ONC), Ocean Wise (OW), Pacific WildLife Foundation & Bird Studies Canada (PWFBSC), North Pacific Marine Science Organization (PICES), R. de Graaf/Sea Watch Society, Seacology (SC), SeaChange Marine Conservation Society (SCMCS), Swim Drink Fish (SDF), Tsleil-Waututh Nation (TWN), Vancouver Coastal Health (VCH), Vancouver Fraser Port Authority (VFPA), University of British Columbia (UBC).

Projection: NAD 1983 UTM Zone 10N | Map Scale: 1:125,000

Map produced March 2024 by the Tsleil-Waututh Nation