Burrard Inlet Action Plan

TSLEIL-WAUTUTH NATION
PEOPLE of the INLET

KERR WOOD LEIDAL
consulting engineers

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KEY POINTS:

6 Priority Actions Proposed *by the* Tsleil-Waututh Nation

To improve the environmental health and integrity of Burrard Inlet by 2025, the Tsleil-Waututh Nation proposes six priority actions:

1. Update Water Quality Objectives for Burrard Inlet
2. Install Scientific Instruments to Monitor Water Quality in Burrard Inlet
3. Characterize and Reduce Pollution from Stormwater Runoff
4. Map Nearshore Habitats and Forage Fish Spawning Beaches
5. Conserve Critical Nearshore Habitat Complexes
6. Recover Shellfish Beds

Burrard Inlet Action Plan: *A Tsleil-Waututh Perspective*

The Tsleil-Waututh Nation (TWN) asked Kerr Wood Leidal Associates Ltd. (KWL) to draft the *Burrard Inlet Action Plan: A Tsleil-Waututh Perspective* ("Action Plan") as a way to update older environmental reviews of the inlet and foster development of a wider consensus on strategic environmental stewardship actions to implement in the near-term.[i] Its development in 2015 relied on interviews with numerous experts, scientists, and resource managers[ii] to get their insights on current environmental conditions and issues.

The contributions of interviewees provided a foundation for the draft Action Plan. The plan is intended to encourage further discussion and should be considered a draft work product of TWN and KWL. It has not been endorsed yet by any of the participants.

A future consensus version of the Action Plan is envisioned as a key guidance document for a new science-based, First Nations-led initiative to improve the health and integrity of Burrard Inlet by 2025. The intent is to bring the inlet back into compliance with First Nation laws and environmental stewardship obligations, while maintaining a working port and conserving its resources for the enjoyment of all residents and visitors to metropolitan Vancouver.

The purpose of the draft Action Plan was to:

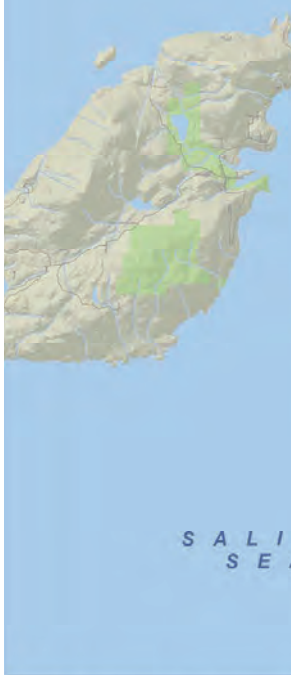
- Summarize scientific knowledge about Burrard Inlet
- Identify priority issues related to environmental degradation
- Identify important environmental knowledge gaps
- Foster development of a shared vision for environmental stewardship
- Identify near-term actions to improve the health and integrity of the inlet

The full version of the draft Action Plan is available on the TWN website. A summary is presented here.

Maplewood Flats

Background

Feature	Area (ha)
Outer Harbour	5600
False Creek	77
Inner Harbour	1540
Central Harbour	890
Port Moody Arm	560
Indian Arm	2670
Tsleil-Waututh Nation Reserve	201



Burrard Inlet is a saltwater body located in the heart of the metropolitan Vancouver region. Fed by mountain streams and strong tidal currents, the inlet provides valuable habitat for birds, fish, and wildlife. The inlet's productivity and abundance also made it a destination for successive waves of human settlement with associated urban, industrial, and port development. Today, over two million lower mainland residents, along with visitors from across the world, depend on the inlet's economy and enjoy the recreational and scenic opportunities it offers. Conservation of Burrard Inlet for future generations requires greater emphasis on environmental stewardship while recognizing the inlet is a working port.

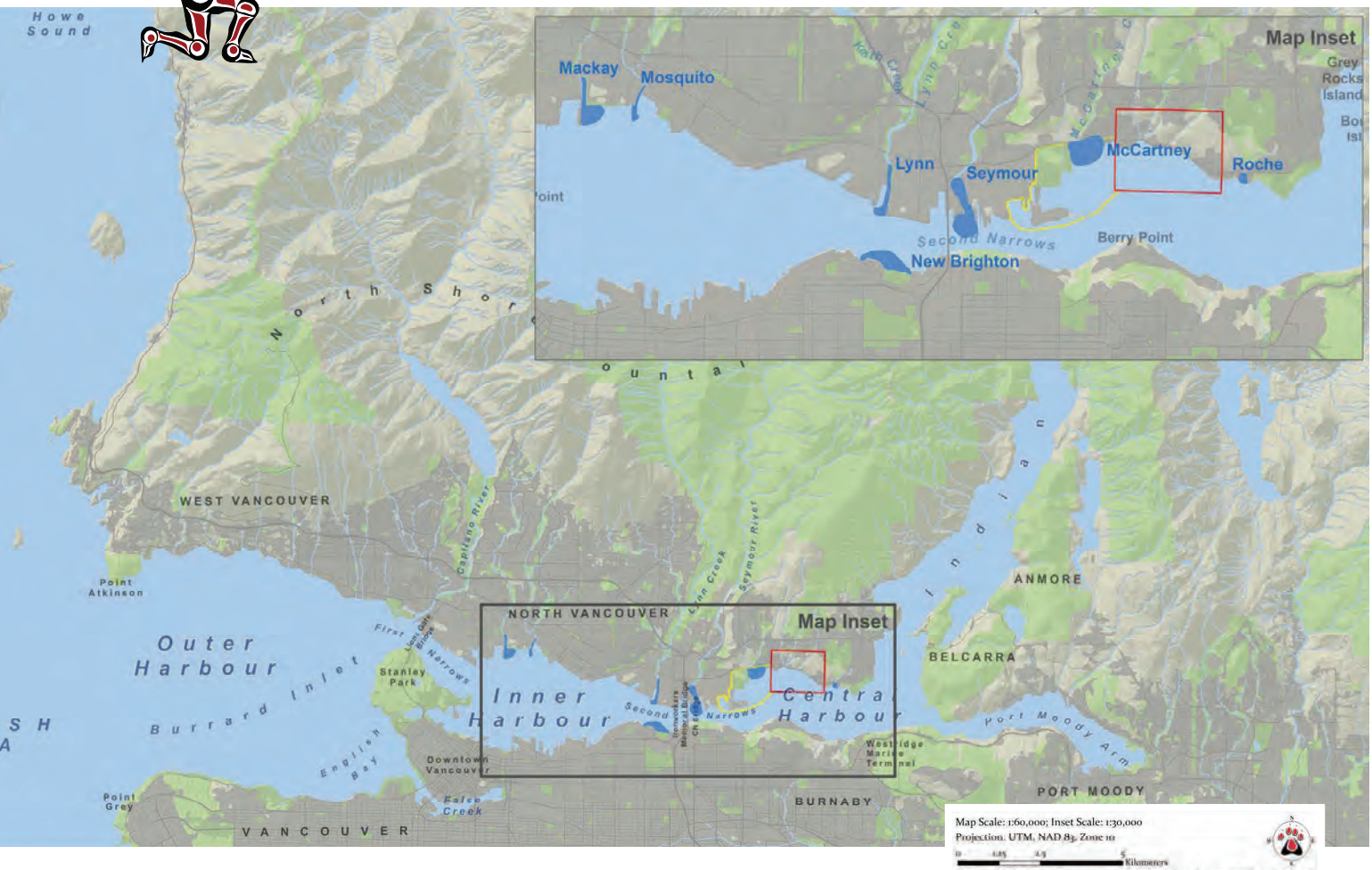
In accordance with Coast Salish protocol, the Tsleil-Waututh people have lived along the shores of Burrard Inlet since time out of mind. The name *Tsleil-Waututh* means *People of the Inlet* in their hən̓q̓əmin̓əm̓ language. Their ancestors, who numbered in the many thousands, maintained villages around Burrard Inlet, and intensively used all of the natural resources there (and elsewhere), especially marine and intertidal resources. Their subsistence economy is confirmed in the archaeological record. It was largely based on abundant salmon, herring, clams, birds, plus upland cedar forests.

TWN, like their Musqueam and Squamish relatives, has a long-held legal obligation to protect, defend, and steward the water, land, air, and resources in Burrard Inlet. This stewardship obligation, handed down from their ancestors, includes the responsibility to protect or restore conditions that provide the environmental, cultural, spiritual, and economic foundation for their community to thrive.

By 1972 with the closure of shellfish harvest in Burrard Inlet due to pollution, the cumulative environmental effects of urban, industrial, and port development had exceeded what is allowable under TWN law. Most elements of the TWN subsistence economy have been eliminated, depleted, contaminated, or otherwise made unavailable for harvest. Looking forward, the TWN objective is to improve environmental conditions to increase access to resources in the inlet.

Photo courtesy of Sunrays Collection

Burrard Inlet Sub-Basins, Maplewood Flats, and Small Estuaries



Map Scale: 1:60,000; Inset Scale: 1:30,000
Projection: UTM, NAD 83, Zone 10

0 1.25 2.5 5 Kilometers

This map is a living document and is intended to be amended and refined over time. It is not an expression of the location of Tsleil-Waututh aboriginal title. The data used to produce this map originate from many sources and are presented without prejudice. This map is the property of the Tsleil-Waututh Nation and may not be reproduced without written permission.

Sources of spatial data for this map include Tsleil-Waututh Nation, BC Government, Government of Canada, Metro Vancouver.

Map produced December 2015 by the Tsleil-Waututh Nation.

Legend

- Developed Area
- Parks & Protected Area
- Restored Estuary
- Maplewood Flats
- Tsleil-Waututh Nation Reserve

Environmental Conditions in Burrard Inlet

The assessment of environmental conditions and trends in Burrard Inlet concluded:

- Long-term changes in water quality parameters, such as water temperature, salinity, dissolved oxygen, turbidity, and acidity are of concern. The extent to which these changes are human-caused is largely unknown.
- Polluted water and contaminated sediment are broadly affecting environmental quality and key species, limiting human uses of Burrard Inlet. Levels of some pollutants or contaminants are unsafe at select locations.
- Sources of contamination are diverse and not well characterized for most pollutants. They include industrial discharges, occasional sewer overflows, the Lion's Gate Waste Water Treatment Plant, legacy contamination from past industrial activity, stormwater runoff,[iii] and spills of crude oil or other hazardous substances.
- Salmon, forage fish, shellfish, birds, and marine mammal populations have all declined from historic levels. While recovery in some salmon and bird species has been observed, others are still declining. Commonly identified threats include loss of habitat and prey species, disease, human disturbance, pollution, and climate change.
- Thirty-seven invasive, non-native species have been identified in Burrard Inlet and its marine shoreline. Little is known about many of the marine species and their potential impacts.
- Over 93% of the historic estuaries in Burrard Inlet have been lost due to development. Localized losses of other important nearshore habitats such as eelgrass meadows, kelp forests, and productive beaches have also been observed, although these declines and their causes are not well-documented.
- Approximately half of Burrard Inlet's shorelines have been altered and 53 kilometres of natural shoreline habitat lost. Shoreline alteration is highest in the Inner Harbour and lowest in Indian Arm.
- Climate change is predicted to raise sea level and change yearly flow patterns, particularly in the Fraser River. Both could have significant detrimental effects in Burrard Inlet.
- New issues of concern include more recent sources of persistent organic pollutants, pharmaceuticals, personal care products, micro plastics, and underwater noise pollution.

Knowledge Gaps in Burrard Inlet

The assessment concluded that there is insufficient, up-to-date data from Burrard Inlet to inform strategic environmental stewardship planning. Furthermore, existing research and monitoring efforts are not coordinated and information is not widely shared. Priority knowledge gaps include:

- Up-to-date data on physical water quality parameters
- Locations of contamination hotspots
- Locations of important nearshore habitat types
- Information about forage fish populations, and juvenile salmon migration routes and survival
- Locations, sources, and effects of emerging pollutants
- Potential impacts of climate change

TWN Environmental Stewardship Vision for Burrard Inlet

Tsleil-Waututh Nation envisions a productive, resilient, and diverse Burrard Inlet environment where:

- Healthy, wild marine foods are abundant and can be harvested sustainably and eaten safely
- Water and sediment are clean especially in places where cultural, spiritual, ceremonial, or recreational activities take place
- Important habitats are plentiful, productive, and connected
- High levels of biodiversity and healthy populations of key species are viable and persistent

Photo courtesy of Sunrays Collection

Proposed Near-Term Actions in Burrard Inlet

A primary objective of the draft Action Plan is to initiate a robust discussion of environmental issues and strategic solutions to advance Burrard Inlet stewardship. This discussion must include the Musqueam, Squamish, and Tsleil-Waututh Nations, and the larger metropolitan Vancouver community—lower mainland residents, all levels of government, non-governmental organizations, and local scientists and experts.

It is important from the TWN perspective, though, that this initiative go beyond discussion—it must lead to a cost effective action plan that can achieve near-term, measurable benefits for the health and integrity of Burrard Inlet.

It is in this spirit that the TWN proposes the following actions as a starting point for a wider discussion and consensus-building:

PRIORITY 1: *Update Water Quality Objectives for Burrard Inlet*

The current water quality objectives for Burrard Inlet were created in 1990 by the BC Ministry of Environment as provisional ones. They were developed to protect aquatic life, wildlife, and human recreation from pollution in the inlet, but the assessment found them to be outdated. These objectives are a very important component of environmental stewardship because they define what can be considered clean, safe, or within the range of natural conditions. They set a level of tolerance for pollution in Burrard Inlet. If water quality data fall outside the objectives, changes to environmental management practices may be warranted.

Updating the water quality objectives will require formation of a working group representing diverse interests. The working group can share and combine existing data, and prioritize issues and solutions. This will lay the groundwork for further efforts to reduce sources of pollution.

PRIORITY 2: *Install Scientific Instruments to Monitor Water Quality in Burrard Inlet*

Water quality data is essential for strategic environmental stewardship planning for the inlet. Lack of up-to-date data was an important knowledge gap identified in the assessment. Scientific instruments that continuously monitor water quality are deployed in the Strait of Georgia and elsewhere in the Salish Sea, but not in Burrard Inlet. A priority should be placed on installing permanent instrument arrays at one or more key locations in the inlet to provide data necessary for strategic planning.

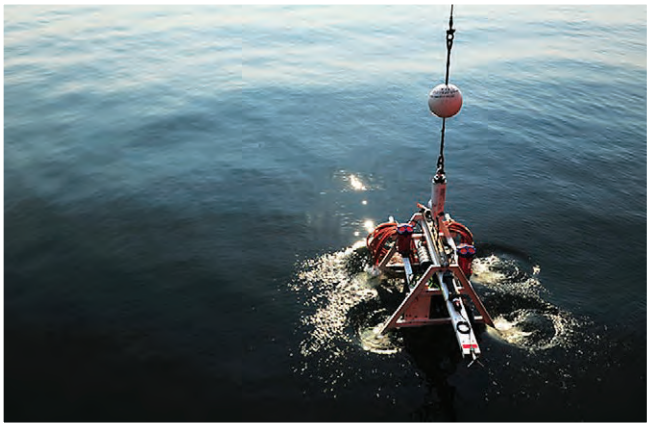
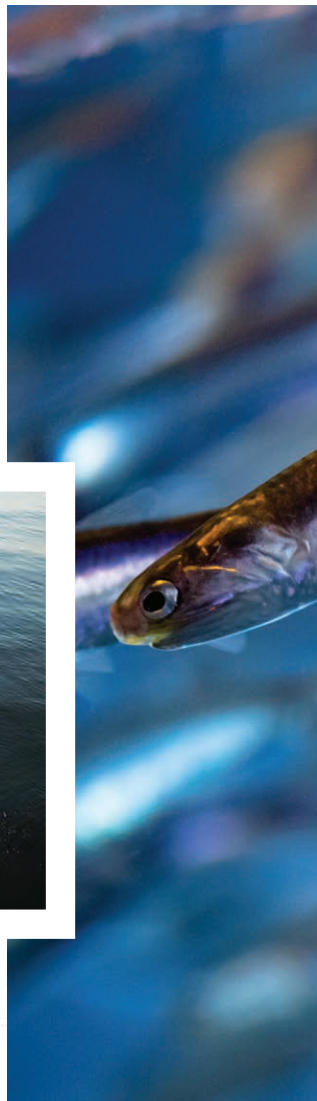


Photo courtesy of Ocean Networks Canada



PRIORITY 3:
Characterize and Reduce Pollution from Stormwater Runoff—Pilot Project on TWN Reserve

Stormwater runoff is likely the largest source of pollution to Burrard Inlet, but it is one of the most challenging to manage. It is best addressed on a catchment-by-catchment basis consistent with the region's Integrated Stormwater Management Planning initiatives.

Since the TWN Reserve in North Vancouver is one important location for cultural, spiritual, and ceremonial activities, a focus there will advance the nation's vision. The effort will bring cutting-edge strategies, practices, and technologies to bear on both quantity and quality of water in streams originating upland, running through the reserve, and discharging into Burrard Inlet. The lessons learned through this pilot project can be applied elsewhere around the inlet.

PRIORITY 4:
Map Nearshore Habitats and Forage Fish Spawning Beaches

The loss of habitat in Burrard Inlet has been identified as a primary driver of declines in key species of fish, birds, mammals, and many others. Nearshore habitats, in particular small estuaries, eelgrass meadows, kelp forests, and productive beaches, have been extensively lost to urban, industrial, and port development.

In addition, forage fish are an extremely important component of the food web in Burrard Inlet. They are the essential link between plankton (very small, drifting marine organisms) and larger predators including fish, birds, and mammals. The decline of forage fish in the inlet started over one hundred years ago and continues to persist.

Locations of important nearshore habitats and forage fish spawning beaches represent two very important knowledge gaps identified in this assessment. Strategic environmental stewardship planning cannot proceed without updating maps of these habitat locations.

PRIORITY 5:
Conserve Critical Nearshore Habitat Complexes — Pilot Project at Maplewood Flats

As identified in Priority 4, the loss of nearshore habitat is a primary driver of environmental degradation and species declines. Development of a pilot project focused on reducing threats and improving environmental conditions at one of the larger nearshore habitat complexes should be a priority action.

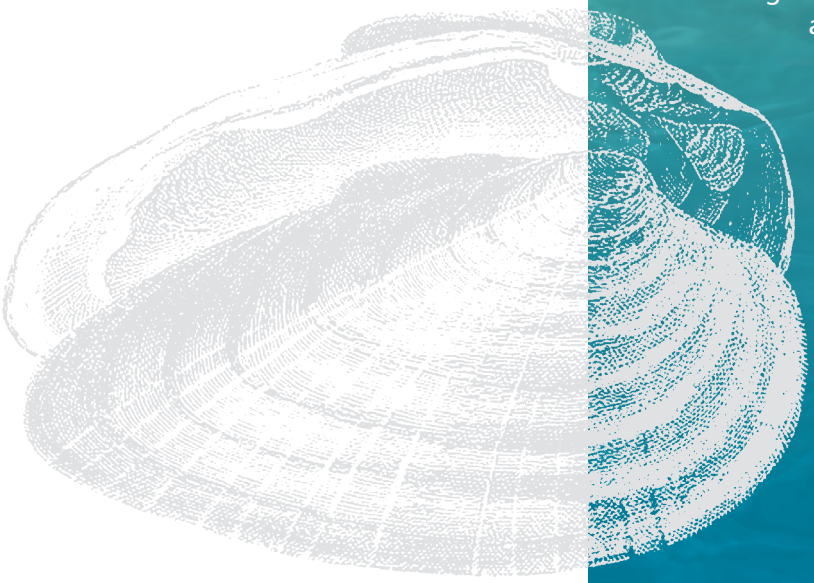
Projects are already underway in some smaller stream estuaries around Burrard Inlet. Environmental restoration has been completed or is underway on the north shore of the Inner and Central Harbours at the mouths of Mackay Creek, Mosquito Creek, Lynn Creek, Seymour River, and Roche Creek. On the south shore, restoration planning is underway for Renfrew Creek in New Brighton Park. Together these projects will create a series of habitat islands for migrating salmon, forage fish, and many other species that use estuary habitat in the inlet.

Maplewood Flats is one of the largest intertidal habitat complexes as yet unaddressed in Burrard Inlet. The area has been used by TWN members since time out of mind. It is home to Wild Bird Trust, a non-governmental organization. A pilot project there can improve conditions by addressing numerous environmental issues including creosote piles, sediment contamination, substrate embeddedness, wood waste, depleted bivalve populations, and invasive species. It can also include restoration of another small estuary at the mouth of McCartney Creek and eelgrass in a former log pond.

PRIORITY 6:
Recover Shellfish Beds — Pilot Project in Indian Arm

Being able to once again safely harvest traditional wild foods in Burrard Inlet, particularly bivalves like clams, is deeply important to the Tsleil-Waututh Nation. Its achievement will represent an important milestone in the environmental recovery of the inlet.

Shellfish health begins upland with controlling sources of pollution, particularly pathogens. Significant progress on this issue has been achieved in a portion of Indian Arm. Additional investigation and correction of any sources of pollution there will ensure that progress to date is sustained and expanded. The lessons learned through this pilot project can be applied elsewhere around the inlet.



This report was produced with support from the Bullitt Foundation and Natural Resources Canada. Its contents do not necessarily reflect the opinions of the foundation or the Government of Canada.

i STRATEGIC ENVIRONMENTAL STEWARDSHIP PLANNING—What is meant by strategic environmental stewardship planning? It is a collaborative process that uses a holistic, watershed approach as a coordinating framework to identify and address the highest priority environmental issues. It begins with an understanding of ecological processes and the extent to which they have been altered. It moves on to identify areas where these processes can be most effectively restored or protected. The success of implementation is evaluated by defining and tracking a suite of measurable environmental benefits. Adaptive management principles are applied as necessary.

Strategic environmental stewardship planning requires all involved governments to think beyond their individual mandates and regulatory programs, and to collaborate on improving the overall health and integrity of Burrard Inlet.

ii COLLABORATORS — Ernest (Iggy) George Sr. and Michael George, *TWN;* Matt Foy, Sandie Hollick-Kenyon, Colin Levings, (emeritus), Doug Hay, (emeritus), and Tom Therriault, *Fisheries and Oceans Canada;* Janice Boyd, *Environment Canada;* Liz Freyman, Diane Sutherland, and Deb Epps, *BC Ministry of Environment;* Chris Harley, *University of British Columbia;* Leah Bendell and John Clague, *Simon Fraser University;* Ken Ashley, *Rivers Institute, British Columbia Institute of Technology;* Peter Ross, *Coastal Ocean Research Institute, Vancouver Aquarium;* Rob Butler, *Pacific Wildlife Foundation;* Nikki Wright, *SeaChange Marine Conservation Society;* Ramona De Graaf, *BC Shore Spawners Alliance;* Michelle Gaudry, *Georgia Strait Alliance;* John Matsen, *Squamish River Streamkeepers;* Ian Collings, *Teranis Consulting;* Hugh McConnell, *Consensus Infrastructure Solutions (former GVRD);* Robyn Worcester, *Urban Ecology Consulting* (former Stanley Park Ecology Society)

iii STORMWATER RUNOFF — Non-point stormwater runoff occurs when rain or snowmelt flows over the ground. Impervious surfaces like driveways, sidewalks, parking lots, and streets prevent stormwater runoff from naturally soaking into the ground. As it flows into a stormwater collection system or directly into a water body, it can pick up debris, chemicals, dirt, and other contaminants creating a source of pollution.

In Puget Sound, Washington State Department of Ecology studies have identified that the largest source of pollutants is not from regulated, point source discharges (e.g., industrial discharge pipes), but from non-point stormwater runoff carrying contaminates from products used every day by local residents. Burrard Inlet is likely similar.

Burrard Inlet Action Plan:
A Tsleil-Waututh Perspective

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