Setting a New Standard

Merging Western and Indigenous Science to Apply the Burrard Inlet Water Quality Objectives to Contaminated Sites

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Treaty, Lands and Resources Department
Tsleil-Waututh Nation

Contents

səlilwətaɬ and səlilwət

Colonial impacts on səlilwət

səlilwətaɬ stewardship and the səlilwət / Burrard Inlet Water Quality Objectives

Everyone's role in developing and implementing solutions

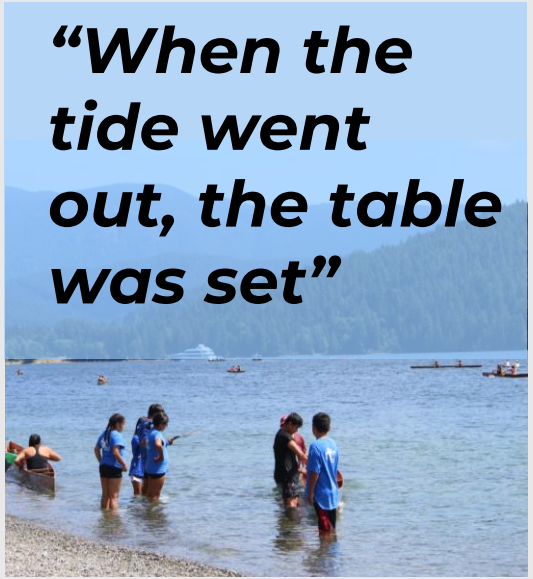
Tsleil-Waututh Nation

PEOPLE OF THE INLET


Data SIO, NOAA, U.S. Navy, NGA, GEBCO

Tsleil-Waututh: People of the Inlet

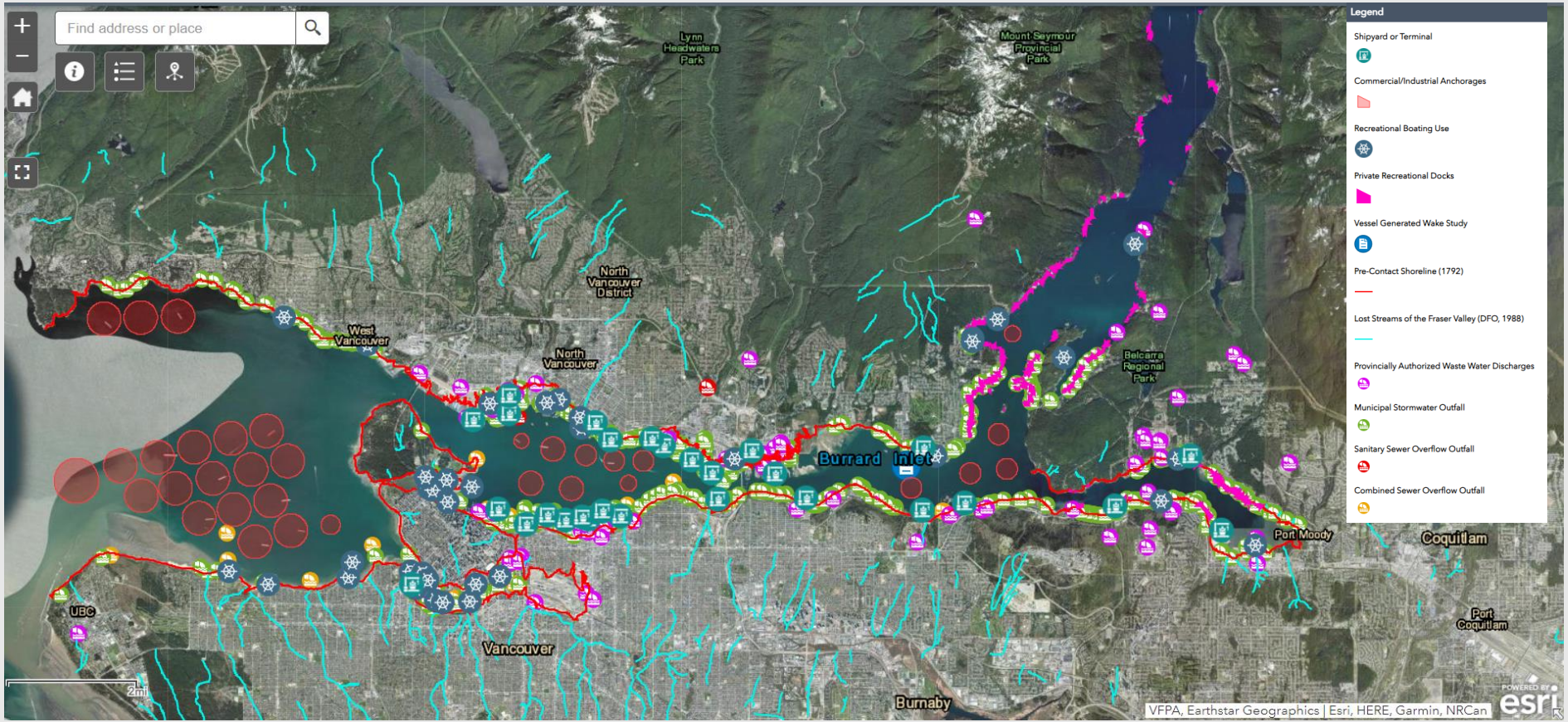
Tsleil-Waututh: People of the Inlet



Tsleil-Waututh: People of the Inlet

Cumulative Effects

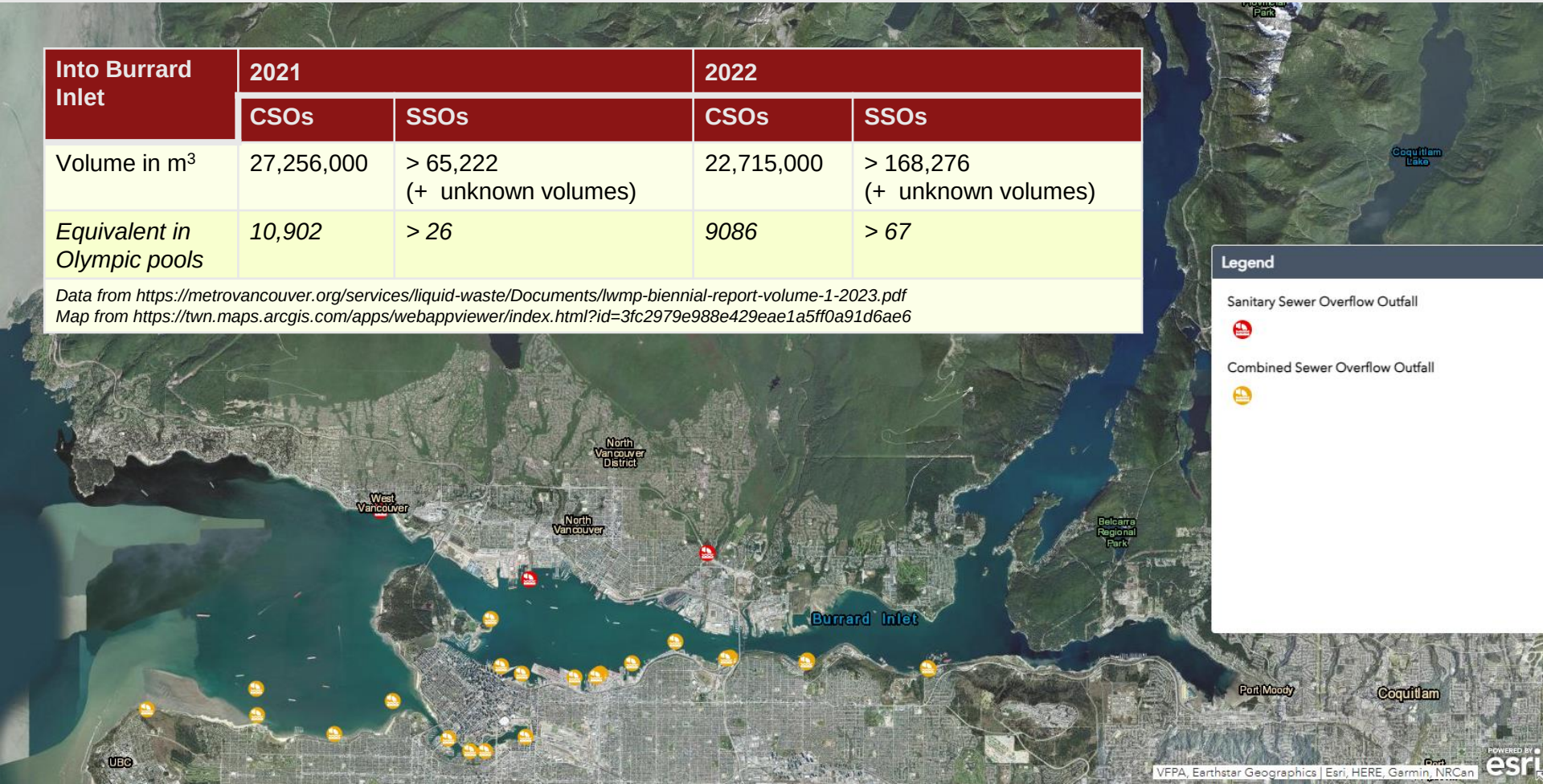
https://twn.maps.arcgis.com/apps/webappviewer/index.html?id=3fc2979e988e429eae1a5ff0a91d6ae6



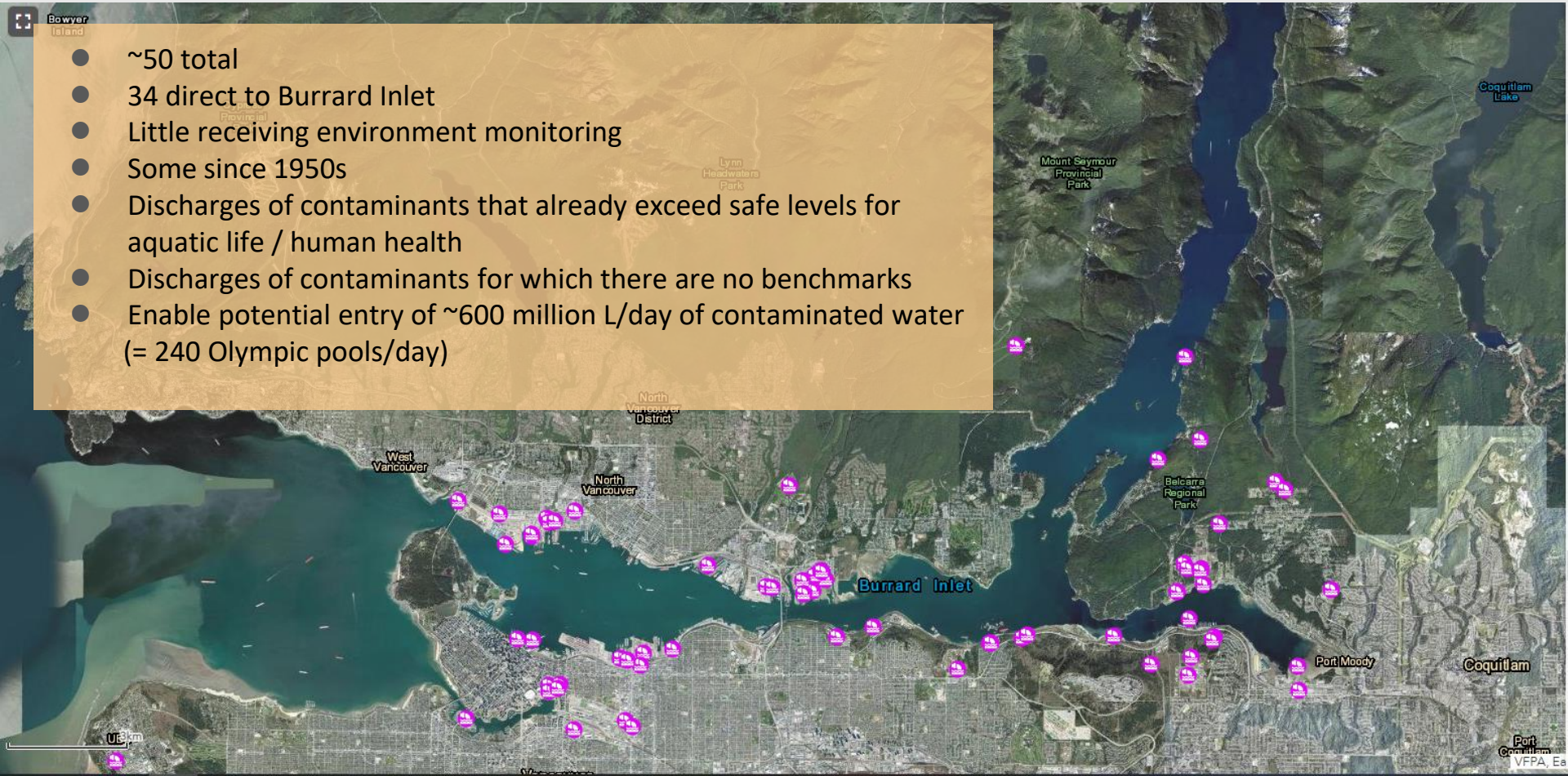
Combined and Sanitary Sewer Overflows

Into Burrard Inlet	2021		2022	
	CSOs	SSOs	CSOs	SSOs
Volume in m^3	27,256,000	> 65,222 (+ unknown volumes)	22,715,000	> 168,276 (+ unknown volumes)
Equivalent in Olympic pools	*10,902*	*> 26*	*9086*	*> 67*

Data from https://metrovancouver.org/services/liquid-waste/Documents/lwmp-biennial-report-volume-1-2023.pdf
Map from https://twn.maps.arcgis.com/apps/webappviewer/index.html?id=3fc2979e988e429eae1a5ff0a91d6ae6



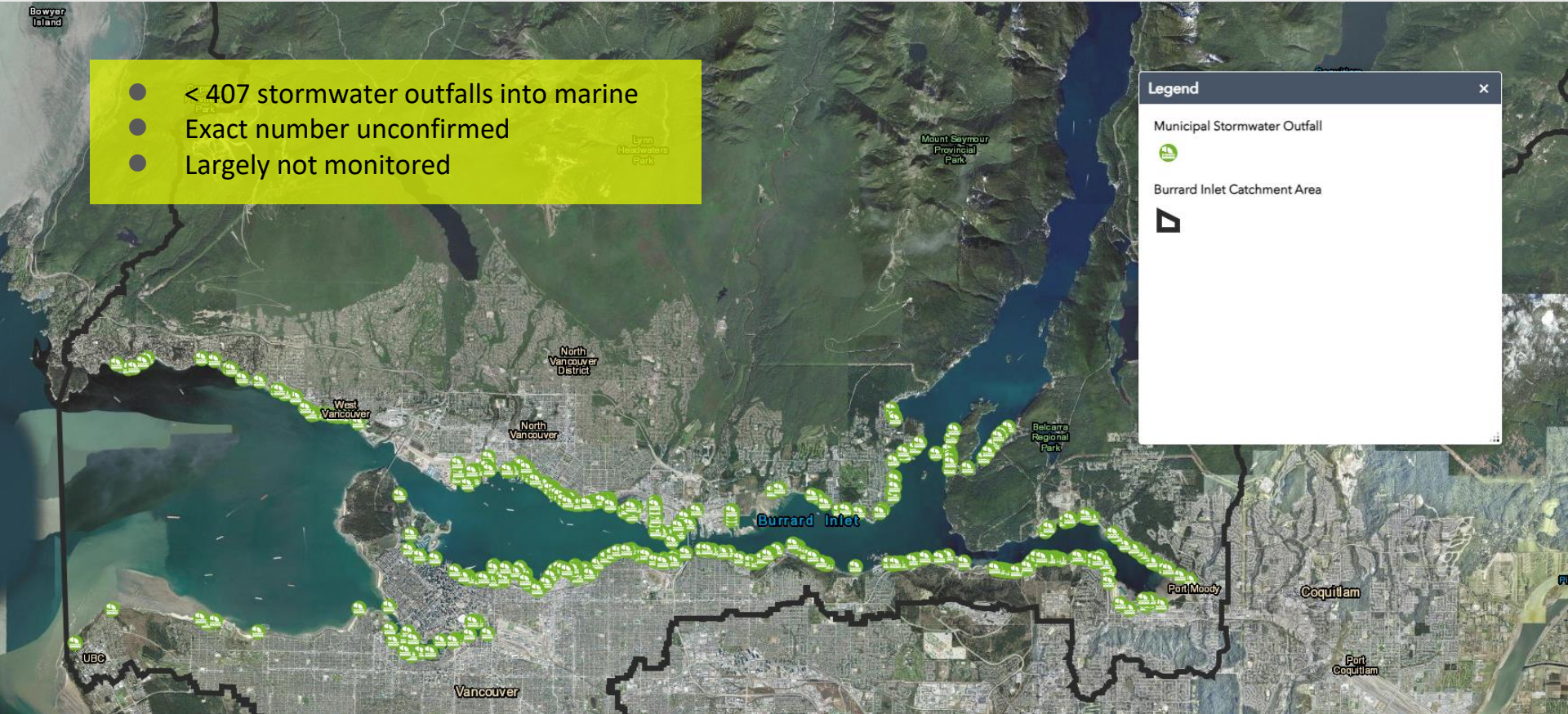
BC-Authorized Discharges



- ~50 total
- 34 direct to Burrard Inlet
- Little receiving environment monitoring
- Some since 1950s
- Discharges of contaminants that already exceed safe levels for aquatic life / human health
- Discharges of contaminants for which there are no benchmarks
- Enable potential entry of ~600 million L/day of contaminated water (= 240 Olympic pools/day)

Stormwater Outfalls

- < 407 stormwater outfalls into marine
- Exact number unconfirmed
- Largely not monitored



4600 Contaminated Sites

Contaminated Sites Map

Contaminated Sites (Provincial)
- Active
- No further action needed
- Unknown

Contaminated Sites (Federal)
- Active
- Suspected

Environmental Remediation Sites *Limited Info*

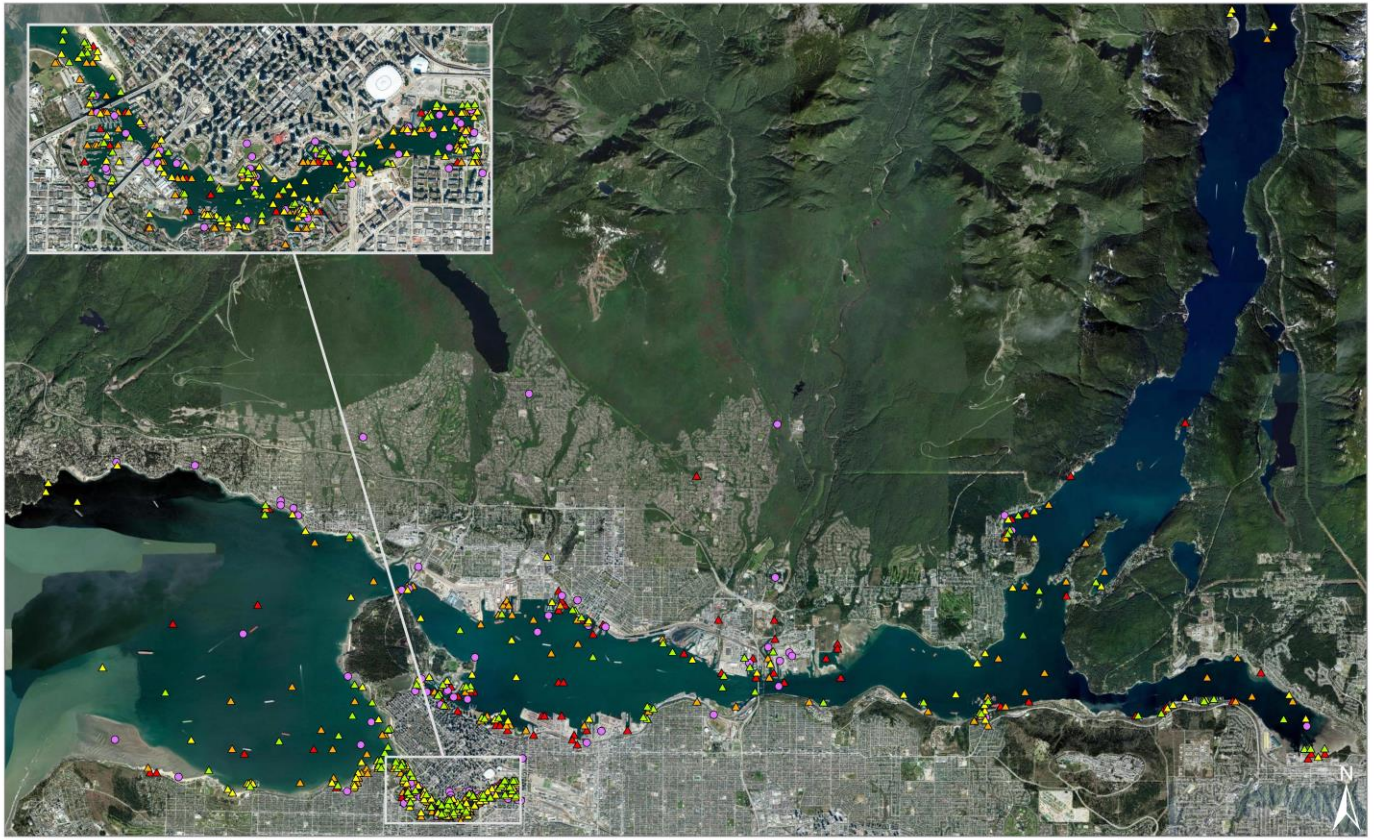
Contaminated Sites (Port)

Projection: NAD 1983 UTM Zone 10N | Map Scale: 1:95,000

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.

Data sources for Project: Province of BC (BC), Government of Canada (GOC), Vancouver Fraser Port Authority (VFPA).

Map produced January 2024 by the Tsleil-Waututh Nation



TSLEIL-WAUTUTH NATION

Reported Marine Pollution and Incidents Within Burrard Inlet 2020-2023

Reported Marine Pollution and Incidents (#)

- Canadian Coast Guard 2023 (127)
- Canadian Coast Guard 2022 (183)
- Province of British Columbia 2022 (109)
- Canadian Coast Guard 2021 (182)
- Canadian Coast Guard 2020 (107)

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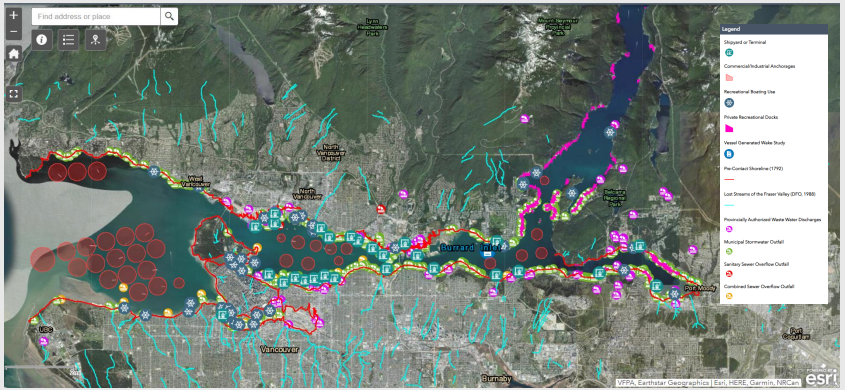
Map Produced January 2024 by Tsleil-Waututh Nation | Map Scale: 1:55,000
Overview Map Scale: 1:800,000; Projection: NAD 1983 UTM Zone 10N
Data sources: Canadian Coast Guard, Tsleil-Waututh Nation, Province of BC, Government of Canada.

0 1.25 2.5 5 Kilometers

Contaminants in Burrard Inlet



700

Contaminants detected in Burrard Inlet between 1971 and 2016

> 600

Contamination direct entry points

> 56

Contaminants exceeded benchmarks for water, sediment and/or tissue

27

Of the contaminants with exceedances included in BC wastewater discharges (2019)

https://twnsacredtrust.ca/wp-content/uploads/2022/03/20220210_Contaminants-impacts-on-TWN_Formatted.pdf

Burrard Inlet Action Plan

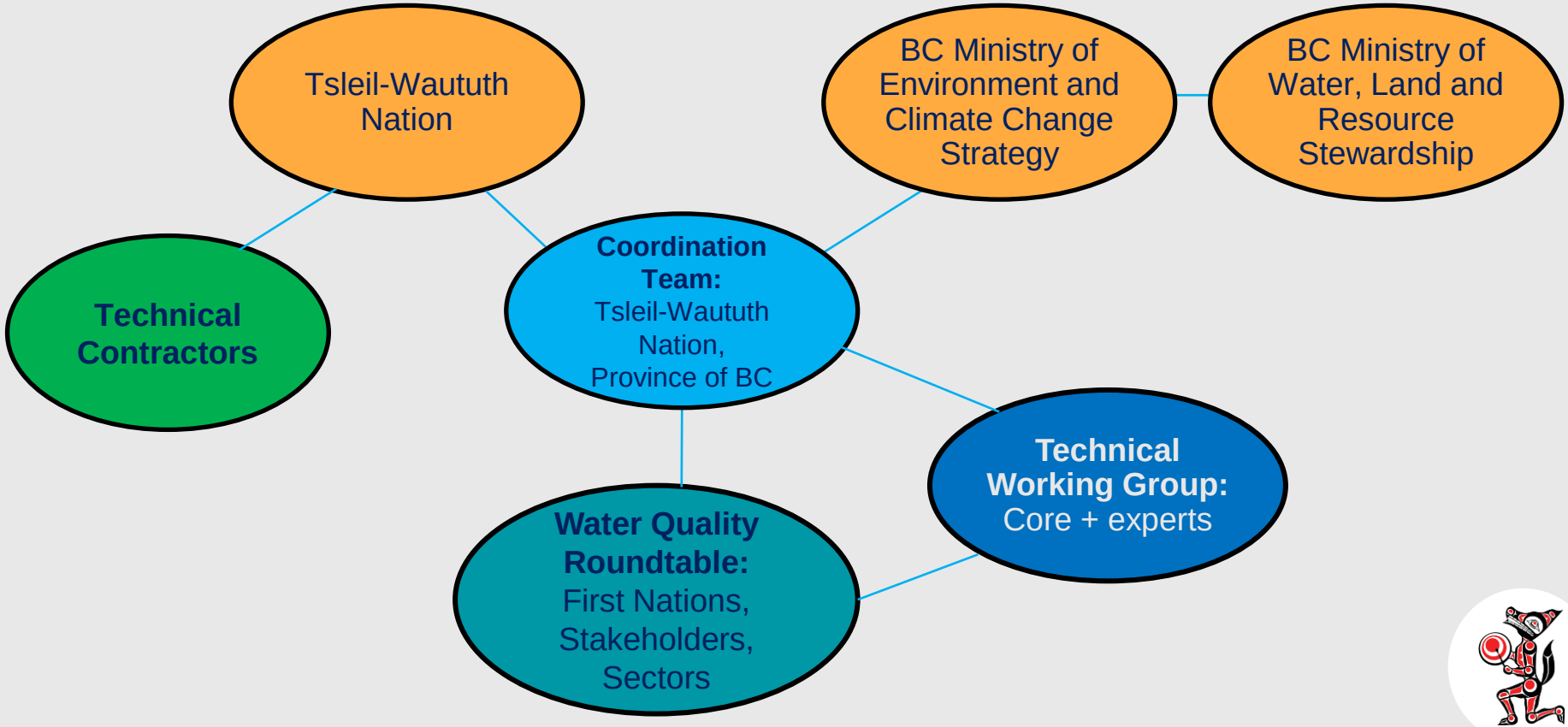
A science-based, First Nations-led initiative to improve the health of the Burrard Inlet ecosystem by 2025

***** BIAP update in progress *****

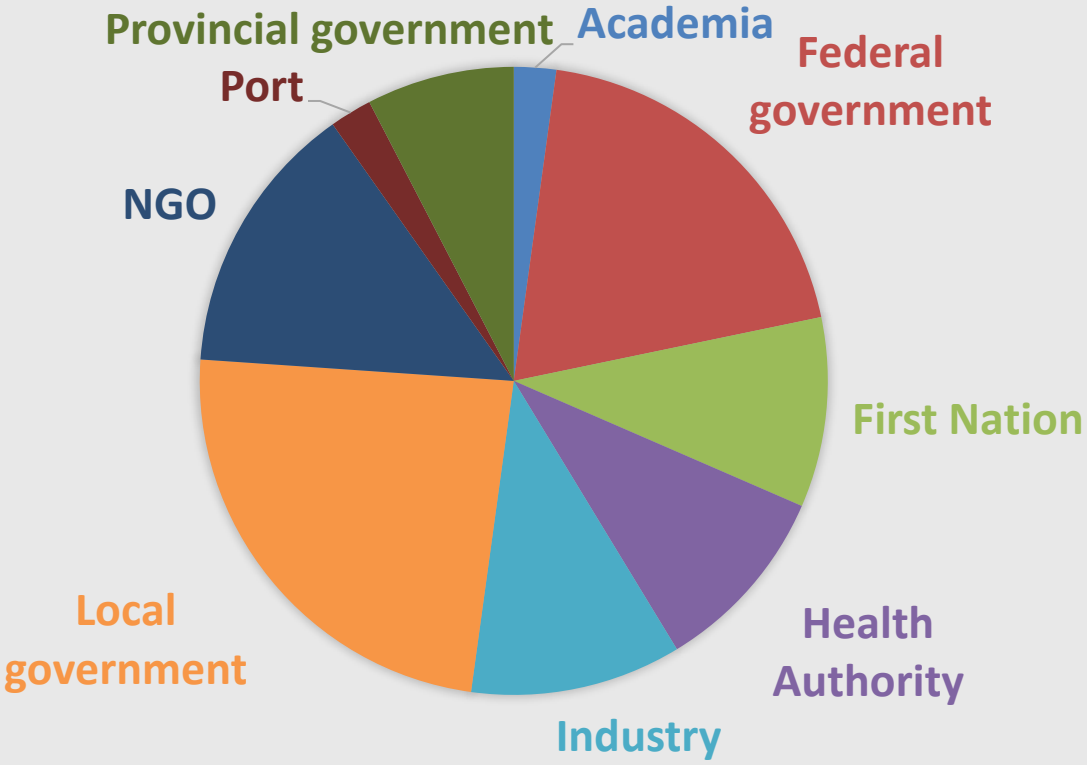
Goal A:
Improve water quality and reduce contamination

Strategy A-1:
Review and update water quality objectives for Burrard Inlet

Collaborative Decision-Making



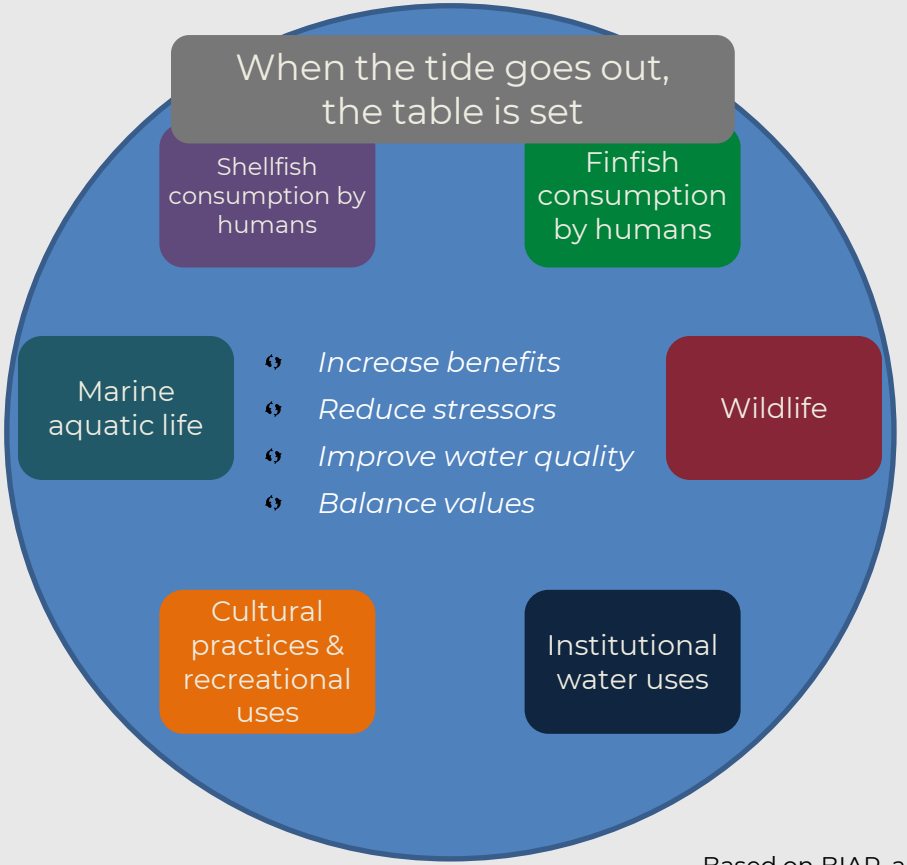
Burrard Inlet Water Quality Roundtable



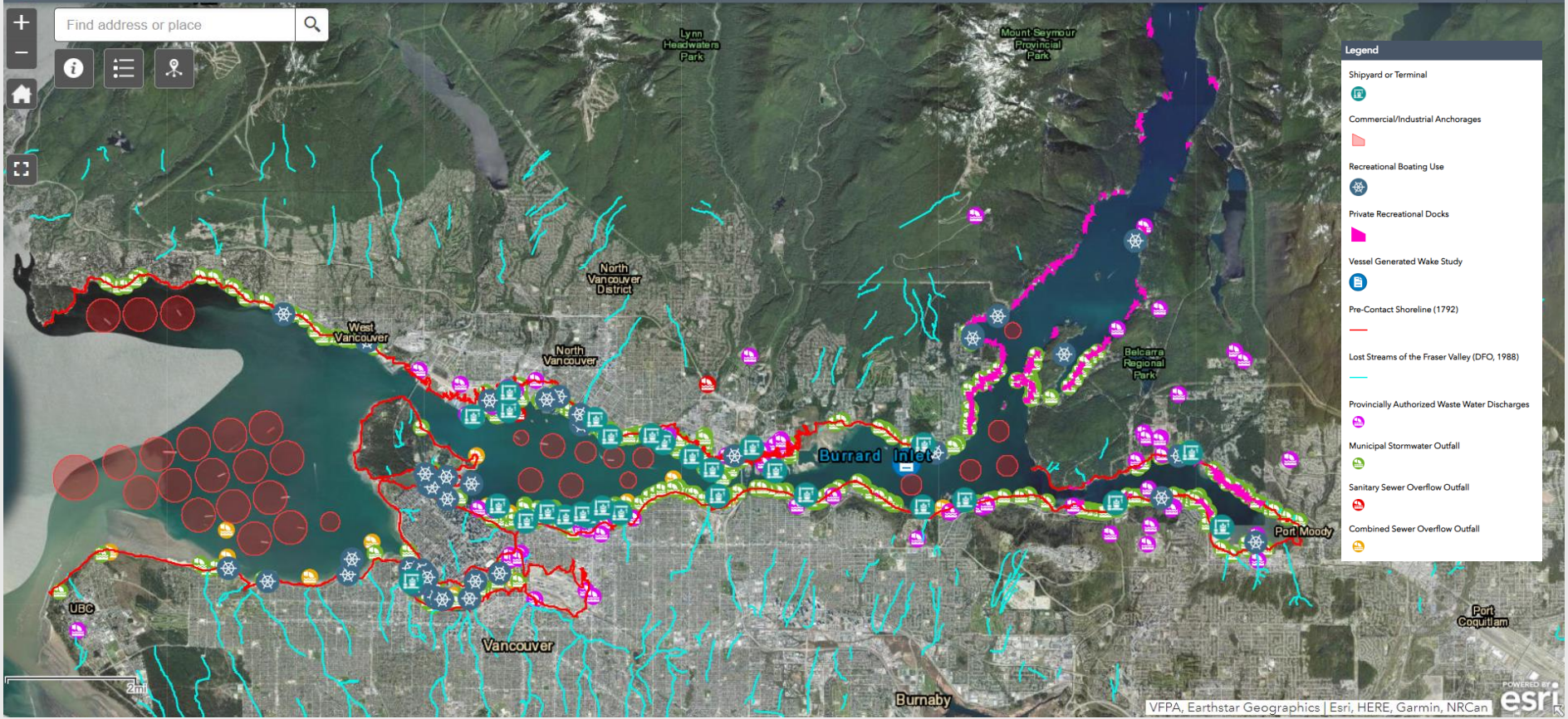
Roundtable: > 90 members

Info list: 160 members

Burrard Inlet Water Quality Vision and Values

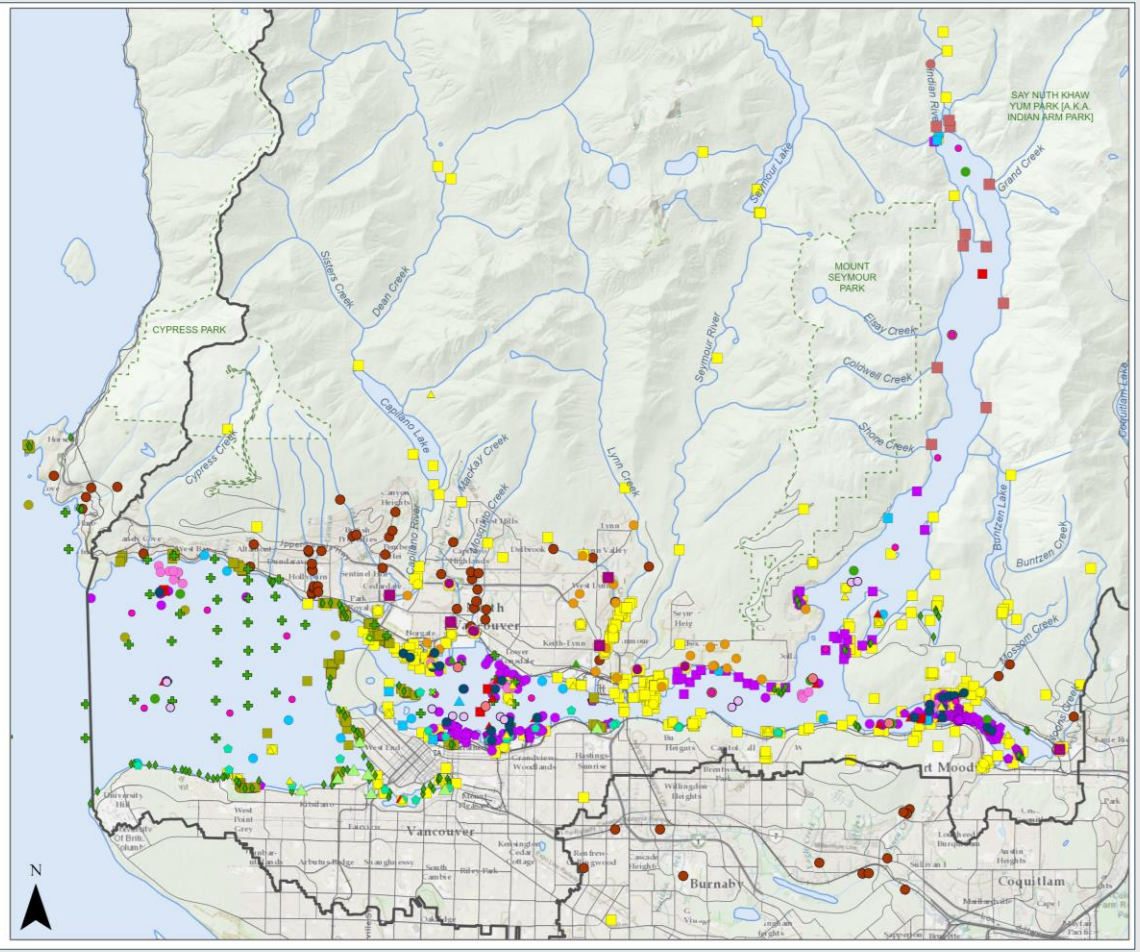


Based on BIAP, adapted by Roundtable


Find address or place
Lynn Headwaters Park
Mount Seymour Provincial Park
North Vancouver District
West Vancouver
North Vancouver
Belcarra Regional Park
Burrard Inlet
Port Moody
UBC
Vancouver
Burnaby
Port Coquitlam
2mi
Legend
Shipyard or Terminal
Commercial/Industrial Anchorages
Recreational Boating Use
Private Recreational Docks
Vessel Generated Wake Study
Pre-Contact Shoreline (1792)
Lost Streams of the Fraser Valley (DFO, 1988)
Provincially Authorized Waste Water Discharges
Municipal Stormwater Outfall
Sanitary Sewer Overflow Outfall
Combined Sewer Overflow Outfall
VFPA, Earthstar Geographics | Esri, HERE, Garmin, NRCan
POWERED BY esri

Map 5: Water Quality Monitoring Sites

- 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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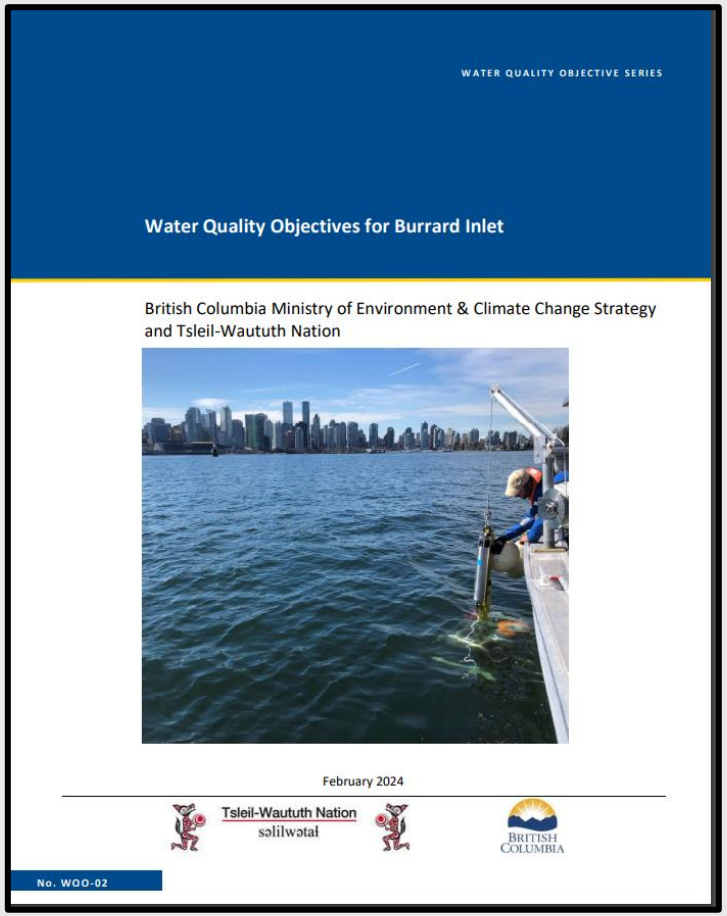
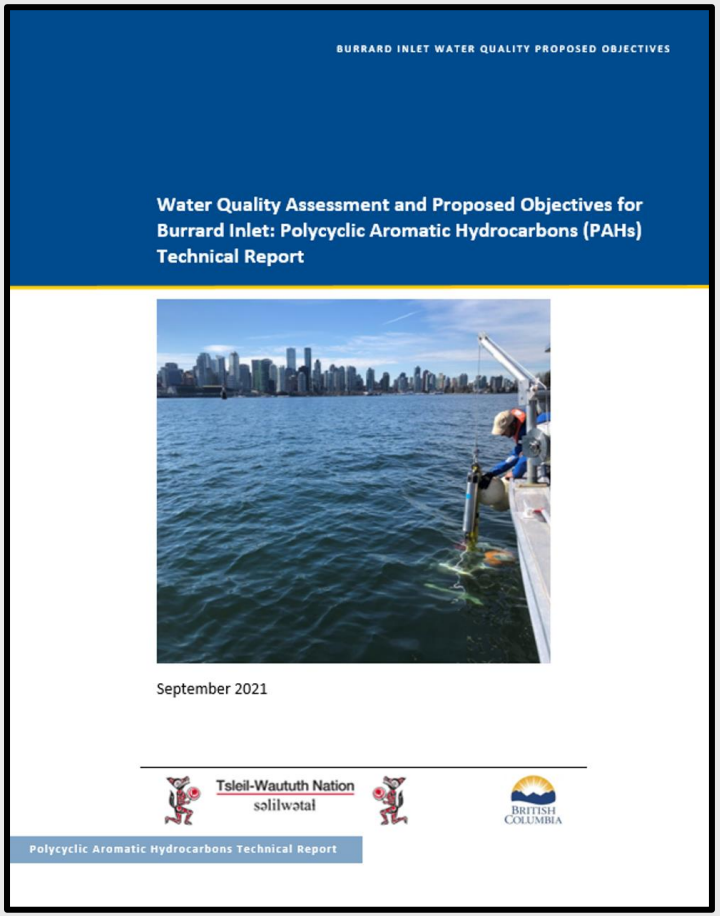
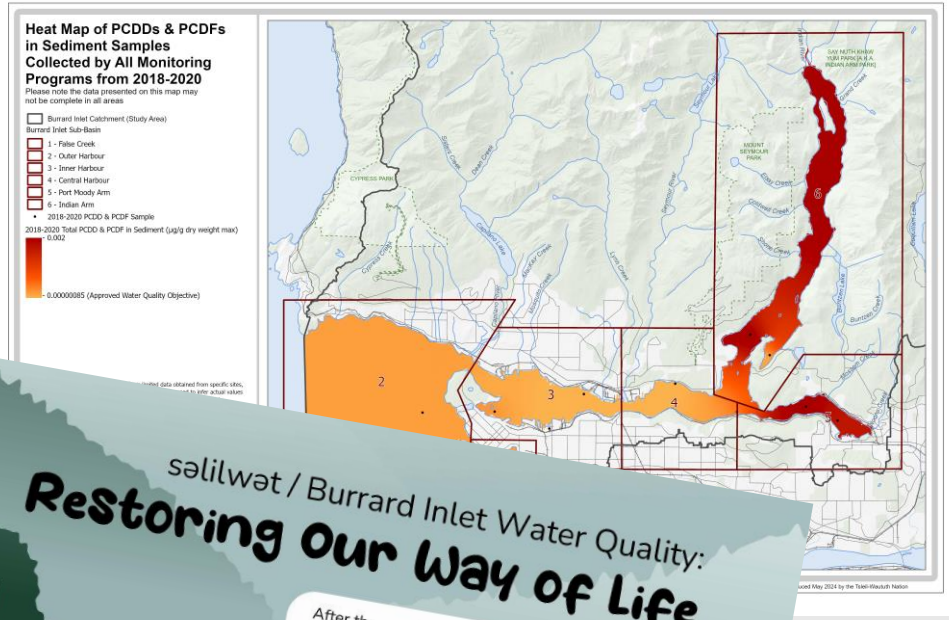
Data sources for Project: AECOM, Province of BC (BC), BC Hydro, Canadian Coast Guard (CCG), City of Burnaby (COB), City of Coquitlam (COC), Coastal and Ocean Resources-ShoreZone (COR), City of Vancouver (COV), City of Port Moody (CPM), Fisheries and Oceans Canada (DFO), District of North Vancouver (DNV), 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).

Policy & Technical Reports





Communications



Groundbreaking Work

- **First** BC-First Nation co-approved water quality policy
- **Founded** on Indigenous values
- **Protects** collectively-identified water values
- **Merges** Indigenous and western science
- **Tissue** objectives to protect Indigenous seafood consumers
- **Convened** multiple sectors: input and review
- **Holistic** Burrard Inlet basin-wide scale

Policy is the Means, Not the End

Goal:
= attain WQOs
= restore + protect values
= eat clams

Implementation by all is key

menti.com

NEWS

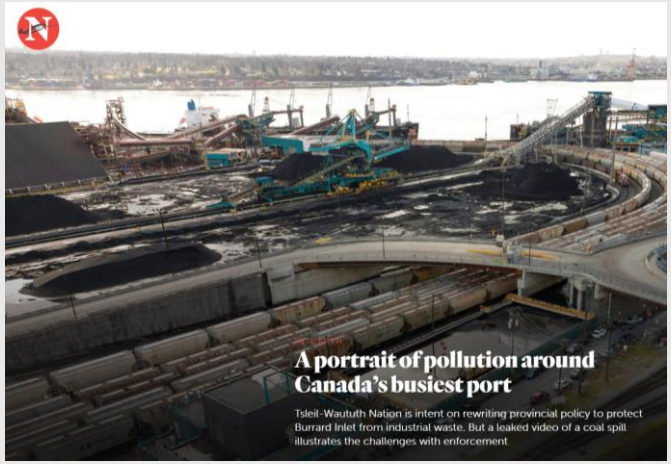
What dinner in Burrard Inlet looked like 500 years ago

Tsleil-Waututh Nation hopes to use data on its ancestors' diet to restore habitat and heal the heavily industrialized Burrard Inlet

By Steph Kwetásel'wet Wood
Photography by Kayla MacInnis
Aug. 7, 2024 8 min. read

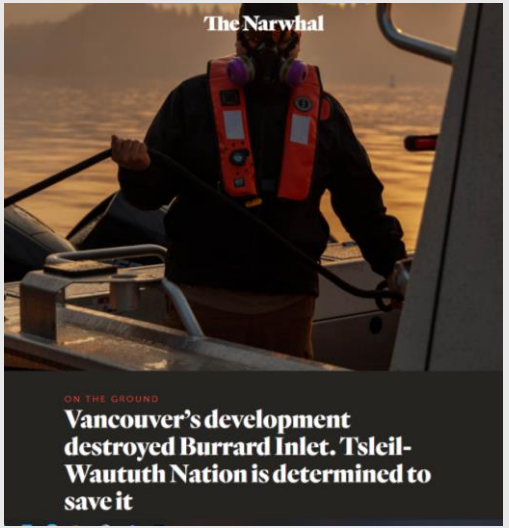
When Tsleil-Waututh families sat down for dinner 500 years ago, what was on the menu? Thanks to new research, the First Nation has detailed data on what their ancestors were eating before colonization — and what their lands and waters might provide again in the future.

Tsleil-Waututh Nation Knowledge Keepers worked with researchers to reconstruct the average diet of their ancestors.



A portrait of pollution around Canada's busiest port

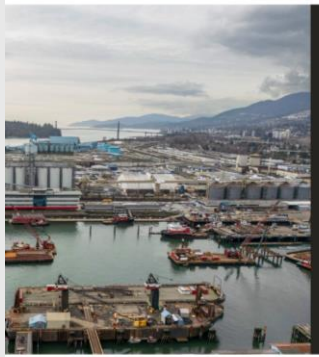
Tsleil-Waututh Nation is intent on rewriting provincial policy to protect Burrard Inlet from industrial waste. But a leaked video of a coal spill illustrates the challenges with enforcement



ON THE GROUND

Vancouver's development destroyed Burrard Inlet. Tsleil-Waututh Nation is determined to save it

The Narwhal



EXPLAINER

Mapping Burrard Inlet's legal polluters

These 21 facilities hold provincial authorizations to release polluted effluent, challenging efforts to bring the Lower Mainland waterway back to life

By Ainslie Cruickshank
May 23, 2024 1 min. read

Centuries of colonization, urbanization and industrial activity have severely polluted Burrard Inlet, the waterway that offers protected harbour off the shores of Vancouver and other Lower Mainland municipalities.

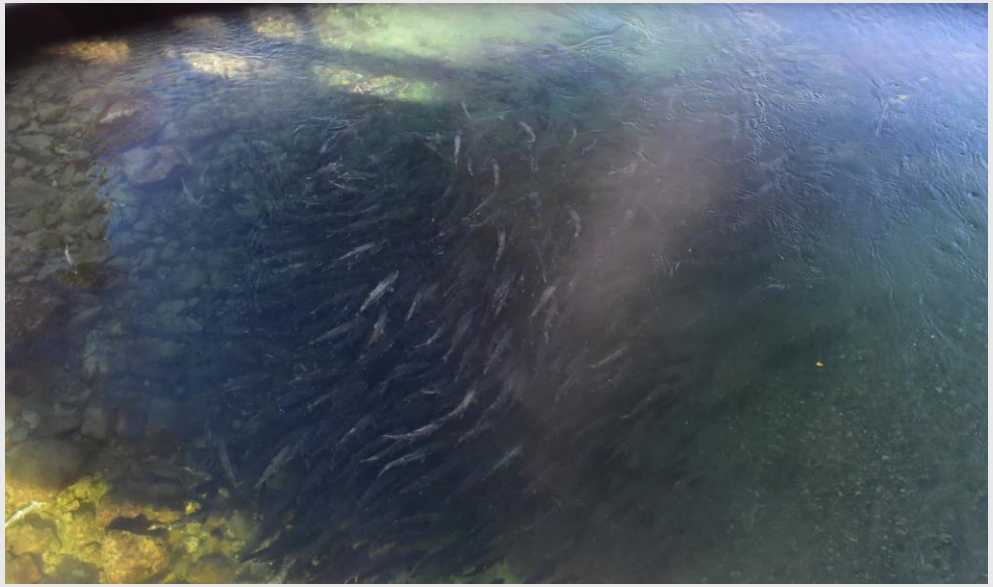
These waters nourished Tsleil-Waututh Nation (səlilwətaɬ) for millennia, before they

Digging through reports and authorizations, The Narwhal has compiled the locations and permissions of 21 facilities allowed to release polluted effluent into Burrard Inlet.

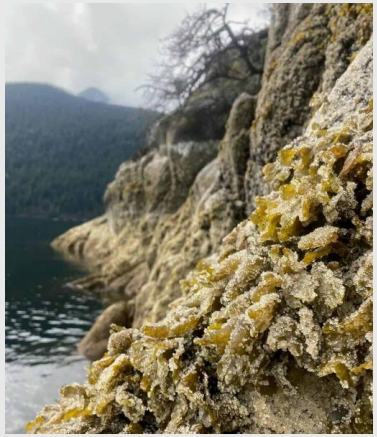
thenarwhal.ca

twnation.ca/stormwater

TWN Stewardship



A Recovering Ecosystem



hay ce:p ḏə

Thank you all

arao@twnation.ca

INPUTS

Aerial Deposition

Industrial Products and Activities

Vehicles

Household Products and Activities

Domestic Animals

Fraser River, Other Tributaries

Stormwater Outfalls

Combined Sewer Overflows

Sanitary Sewer Overflows

Wastewater Treatment Plant

Other BC Authorized Discharges

Septic Systems

Dumping / Leaks / Leaching / Spills / Accidents

Boats, Float Homes, Yacht Clubs, Marinas

Dredging

Wildlife

Natural Inputs

RECEIVING ENVIRONMENT

OTHER FACTORS

Historical / Legacy / Bioaccumulation

Circulation

Climate change

VALUES

Primary Contact

Harvesting Shellfish

Harvesting Finfish

Aquatic Life

Wildlife

Institutional Uses

When do you make decisions that affect water quality?

EVERYDAY

Advising clients on pollution abatement measures and supporting development of new technologies to eliminate source of chemicals

Anytime we let water down the drain

Working on contaminated sites and remediation projects

All the time, but my best opportunities are when in discussions with First Nations and local governments.

At home in my yard, in my purchases and at work making regulatory decisions.

When discharging wastewater

Everyday

When do you make decisions that affect water quality?

Everyday

When determining applicable standards for reporting

Washing your hands!

every day, when using cleaning products, when driving on the road

Disposal of unused medications

when I purchase something that goes down the drain

Choosing transportation means

Everyday

When do you make decisions that affect water quality?

How you commute/travel

When I make decisions about consumer products that end up in our wastewater.

Working with Industry in the Inlet, permitting, developing protection plans, monitoring construction

municipal design

Every time you use water or release substances into the environment

How much water we use.

weekly

Every day. In our personal care product use, the meds and vitamins I ingest, the cleaning products I use.

When do you make decisions that affect water quality?

Water waste is going to impact what contaminant concentrations are entering the water body as runoff.

On a daily basis as a consumer and user of products

When I buy relevant products (detergent, soaps, etc.). Water usage habits to use less and not when raining if possible.

Assessments of reports and recommendations to a decision maker.

Disposal of chemicals

Avoiding harmful substance releases

commute type- car vs bike

Daily

When do you make decisions that affect water quality?

How dispose of chemicals or personal care products

Day to day activities, work habits,

At home activities

Every day

every day, all day when I use any water. - washing, cleaning products. Even driving and understanding the impacts to surface water of road runoff.

What is 1 opportunity you have to better protect water values?

reduce my input to source

Ensure applicable guides are applied

Water Conservation

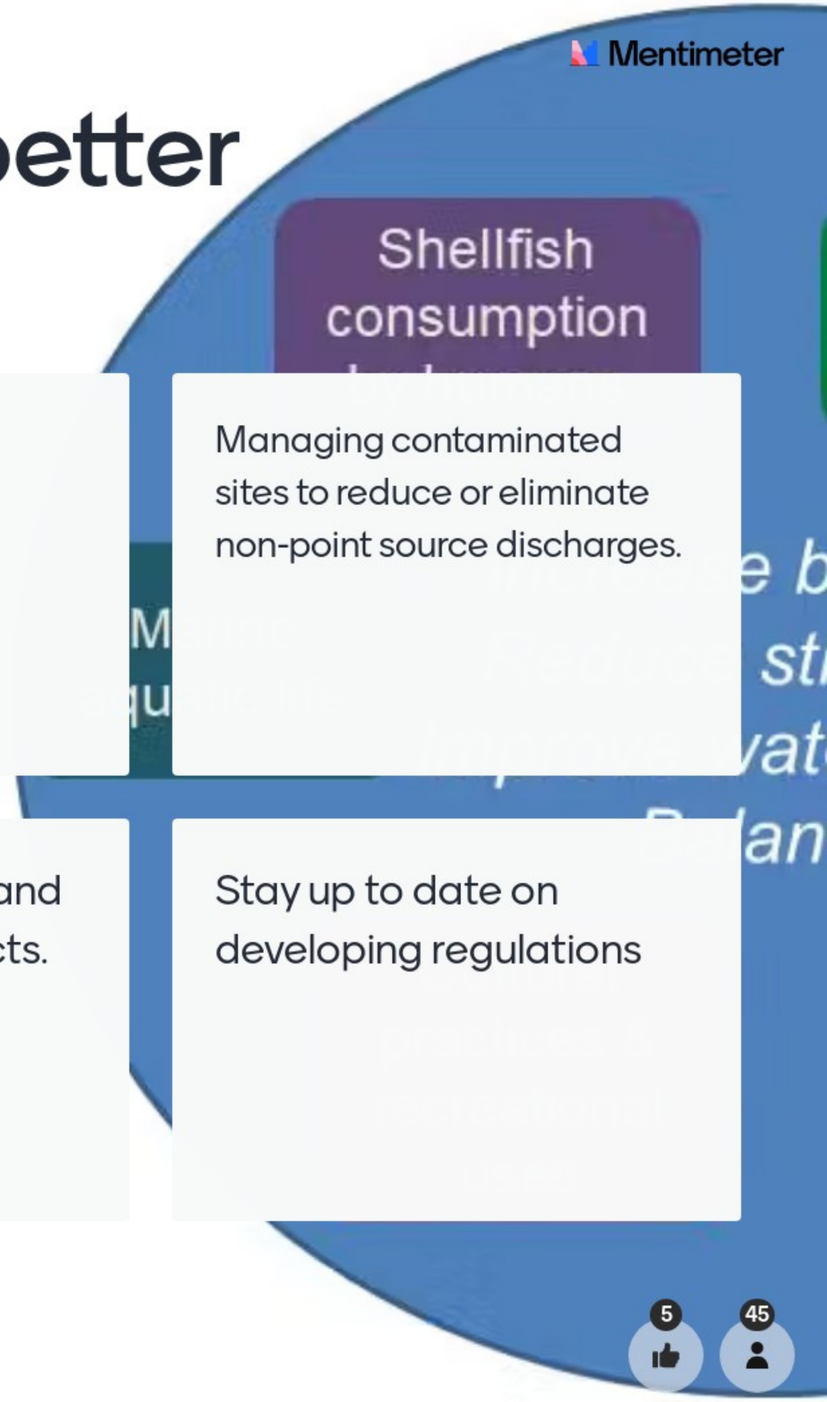
Managing contaminated sites to reduce or eliminate non-point source discharges.

personal care products

Think holistically about water discharges

Purchasing cleaning and personal care products.

Stay up to date on developing regulations



What is 1 opportunity you have to better protect water values?

Use less water

Contribute to data/science/knowledge generation that enables solutions

Vote for politicians with the knowledge and motivation to protect them!

Not consume products that have contaminants of concern that end up in our wastewater and subsequently the ocean.

Being mindful of what you are pouring down the storm water drains.

purchasing decisions

Limiting household and personal water use

Be careful with cleaning products and what they contain when using them.

What is 1 opportunity you have to better protect water values?

More effective consideration of cumulative effects

Speak to local representatives about local issues

Teaching my kids about protecting water

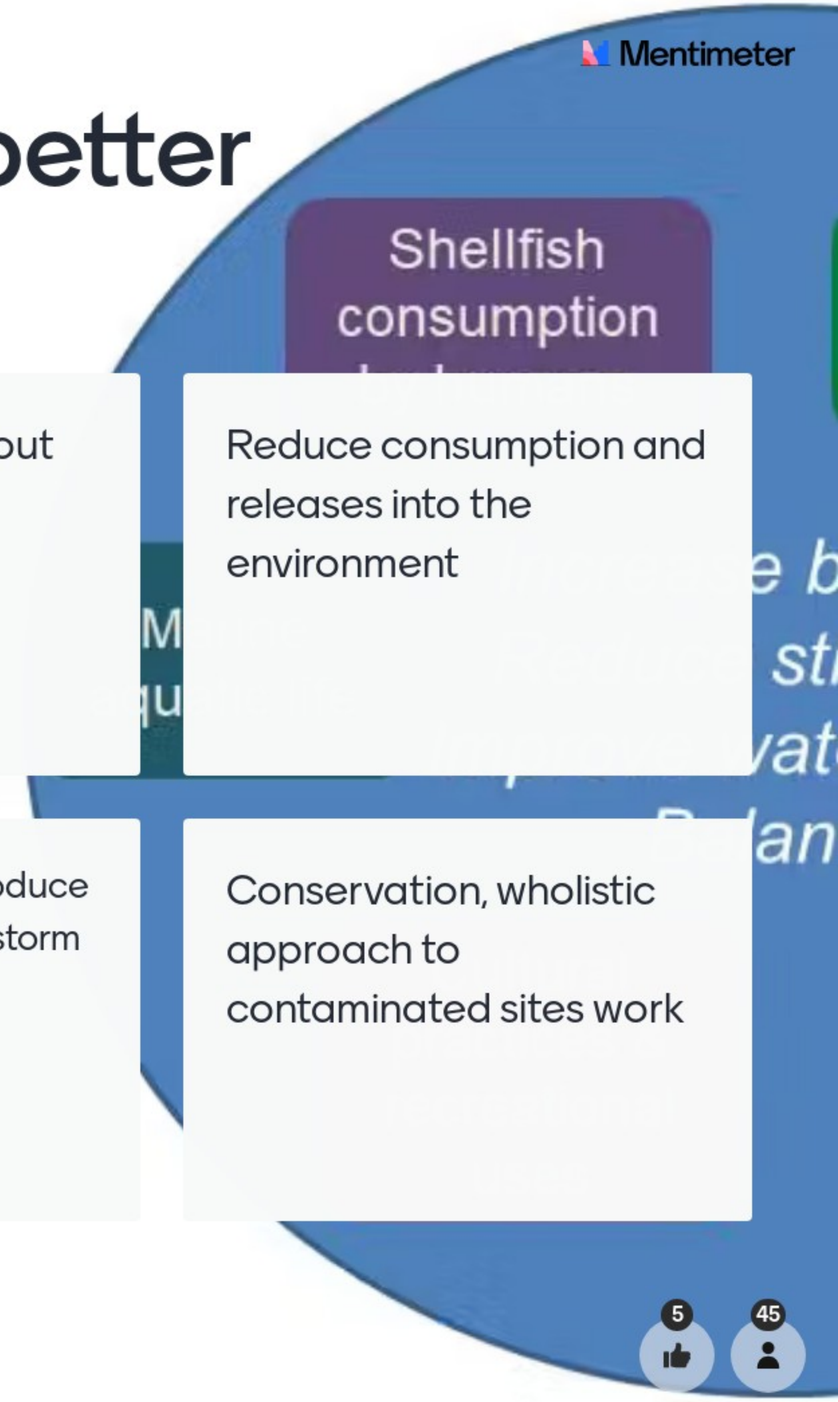
Reduce consumption and releases into the environment

choose cleaning products that are safe for aquatic environments

Establishing a baseline and monitoring

do not intentionally introduce contamination into the storm system.

Conservation, wholistic approach to contaminated sites work



What is 1 opportunity you have to better protect water values?

vote for representatives that prioritize water values

Better develop and implement environmental management plans when working with construction groups in the Inlet

Working directly with industry and regulators to implement WQO's/WQG's

Be aware of the waste products I am producing

Increase awareness of sources of contamination for me would be a starting point

When I purchase consumer products that interface with the water system: detergent, soaps, clothing, etc. When I make water use decisions: timing of showers, dishwasher, or washer usage.

Continue to be a great steward of the environment and world.

Raise more awareness

What is 1 opportunity you have to better protect water values?

Mentimeter

Educating "lay-people" on the significant impacts of taking the extra step for waste mitigation in nature

Report observed issues/potential offences.

Choice of cleaning products, personal care products, how to dispose of unused medications

Be responsible with water use. Preferentially use eco friendly products and modes of transportation

Search and use local and organically produced food to limit pollution from transportation and use of pesticides

Limit water wastage at home- shorter showers, no lawn watering.Maintain dense and diverse vegetation at residence to retain water and slow flow of water through watershed

Talk to my community and family about the impact different every day life products and driving can have on water quality throughout the world.

Make decisions that ensure sites are cleaned up to appropriate standards, including the protection of groundwater.

5

45

What is 1 opportunity you have to better protect water values?

Cleaner discharge

Try to have awareness when making decisions, aiming to make positive impact to water quality

Sustainable farming practices in agriculture

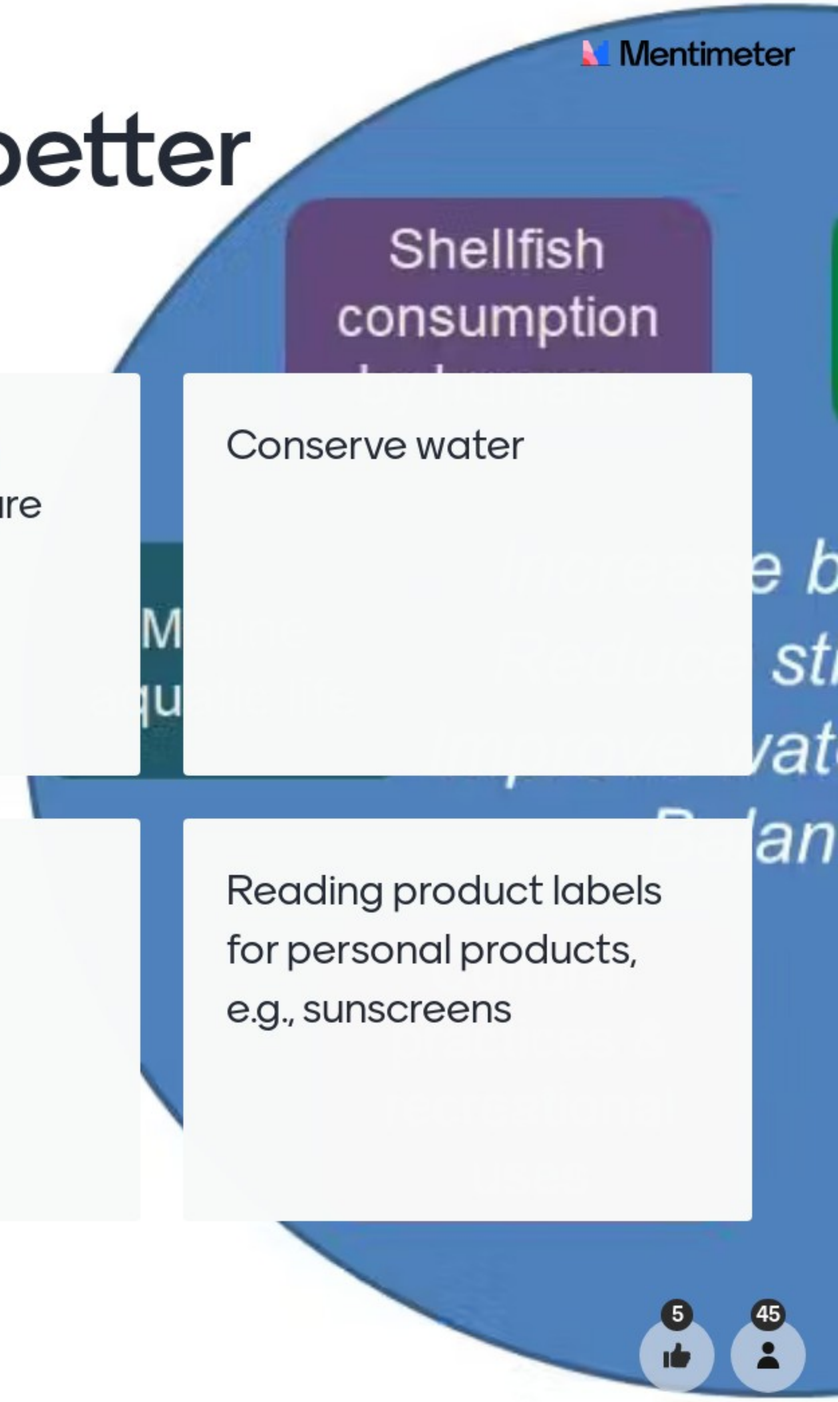
Conserve water

Considering cumulative effects in contaminated sites evaluation

Being mindful of what you are pouring down the drain

Education to next generation

Reading product labels for personal products, e.g., sunscreens



What is 1 opportunity you have to better protect water values?

Educating lay-people

For human health

Smart consumer decisions

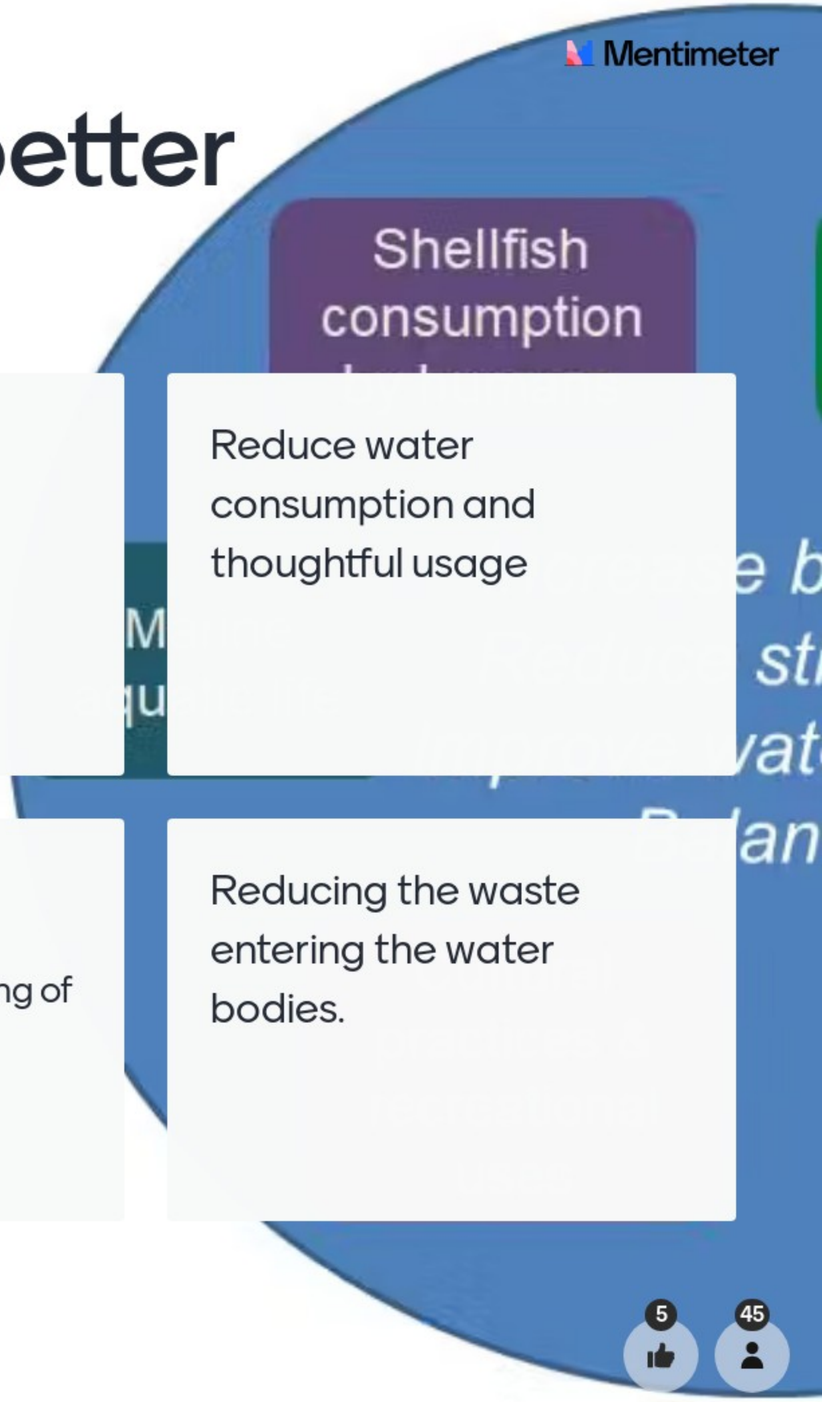
Reduce water consumption and thoughtful usage

Education, sharing and capacity building

Up to date with regulations and get clients to know and use the burrard inlet water quality objectives

lessen my chemical use (doing better). educate clients regarding disposing of substances to ground.

Reducing the waste entering the water bodies.



What other opportunities do you see to improve water quality in Burrard Inlet? Please be specific.

Consideration of cumulative effects

Electrify ocean vessels to prevent petroleum based emissions

Increased education and awareness of current shellfish quality

Better evaluate cumulative effects for contaminated sites impacts to the Inlet water quality

Support new source control programs in the region.

Sediment remediation

increased ballast water testing for stationary ships

Looking at cummulative effects on projects

What other opportunities do you see to improve water quality in Burrard Inlet? Please be specific.

Better understand based sources of land based pollution

More collaboration, coordination between sampling groups. Monitoring outflow and source inputs

Discharge guidance to developers aiming to reduce/ elimanate contamination

Limit and introduce restrictions on use of motor operated vessels that use fuels

Community-led waste management education in public places

Less sea traffic

Seven generation stewardship of resources

Support source control

What other opportunities do you see to improve water quality in Burrard Inlet? Please be specific.

Re-opening and re-evaluating grandfather/OLD discharge permits

Collecting the data is the first step. Converting those data to information and ultimately changing policies will be the kicker.

Could there be green and sustainable btechnologies for treatment of urban runoff in hotspot areas

Increase education to general public

Approve and implement the healthy waters plan

Polluter's pay pollution

Better source control

Making sure to communicate with recreational boat users and kayak shops to reduce contamination.

What other opportunities do you see to improve water quality in Burrard Inlet? Please be specific.

as a practicioner, in collaborating with other parties that are interested in achieveing this goal and seeing how to best support this initiative.as an individual, talking to my community

Source control - consider cumulative effects more seriously rather than treating each source as if it's the only one. Hold polluters accountable

Better record tracking of below ground infrastructure

Monitoring of the catcent area.

Increased monitoring of storm water runoff.

Regulate unregulated contaminants

Reducing the pollution entering the burrard inlet through daily functionality.

Work with urban planners and engineers on green infrastructure

What other opportunities do you see to improve water quality in Burrard Inlet? Please be specific.

Re-wilding streams

use wastewater tracers to determine spills and find the source to enforce compliance

The catchment area mapping is incredible and an absolute feat. Being able to monitor that network and develop retaining filter systems where possible/required. Identify critical or high risk discharg

Better storm water management with green infrastructure, eh. Rain gardens, permeable pavements, bioswales,Separate storm water from sewage

challenge the trans mountain pipeline expansion as it poses various risks to the inlet

Recommend policy maker to have holistic approach in terms of approving discharge or future development.

Reduce marine litter and controlling industrial pollution with strict enforcement

Restoring natural habitats with shoreline restoration