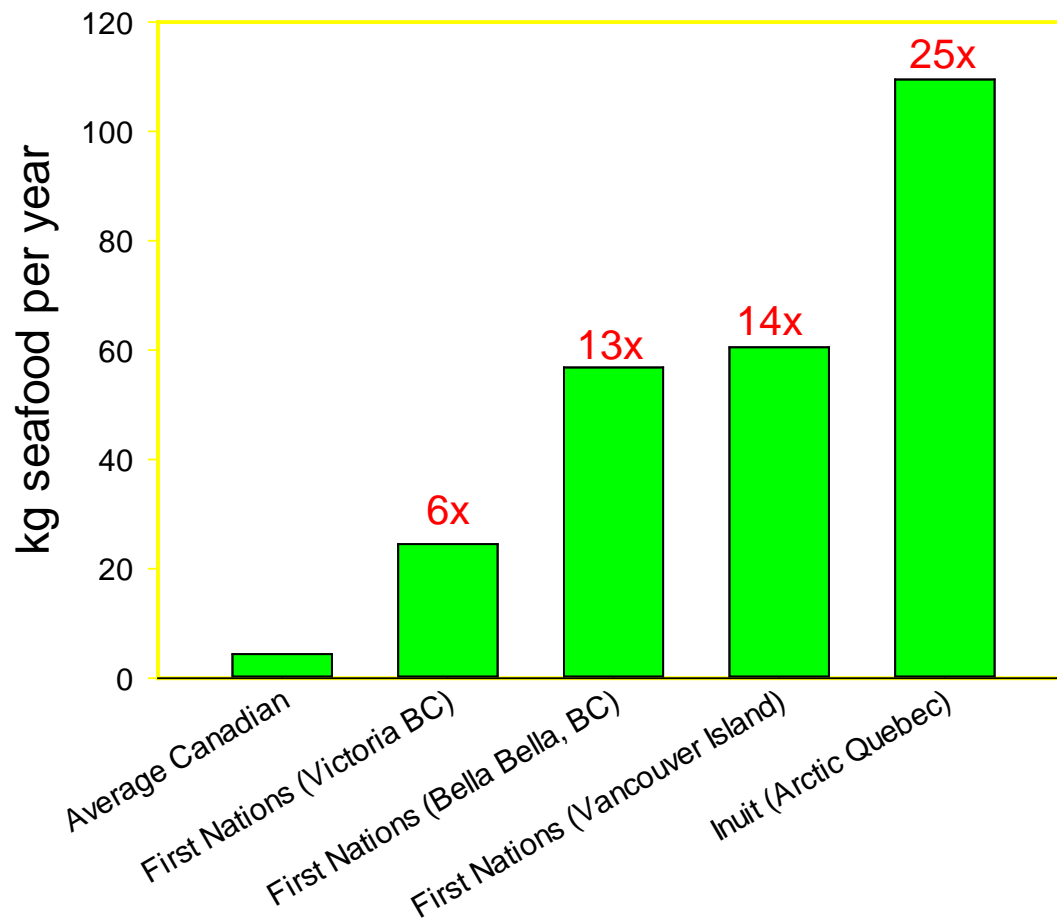


Storm water, urban runoff and coastal pollution

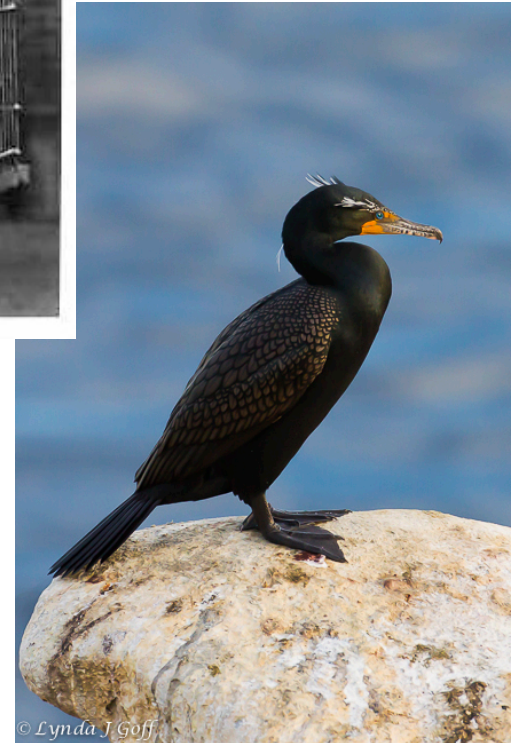
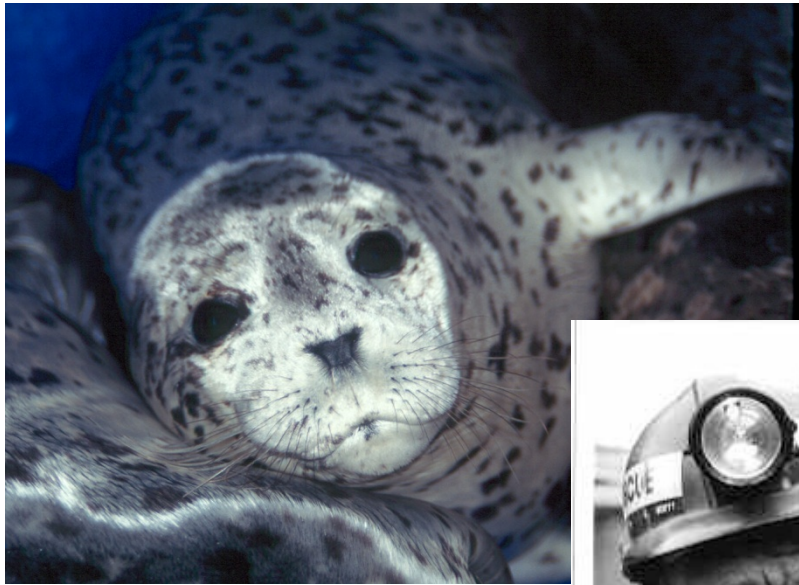


Peter S. Ross, Kelsey Delisle and Marie Noel
Ocean Wise Conservation Association

Ocean pollution is a bigger problem for First Nations communities - Indigenous foods

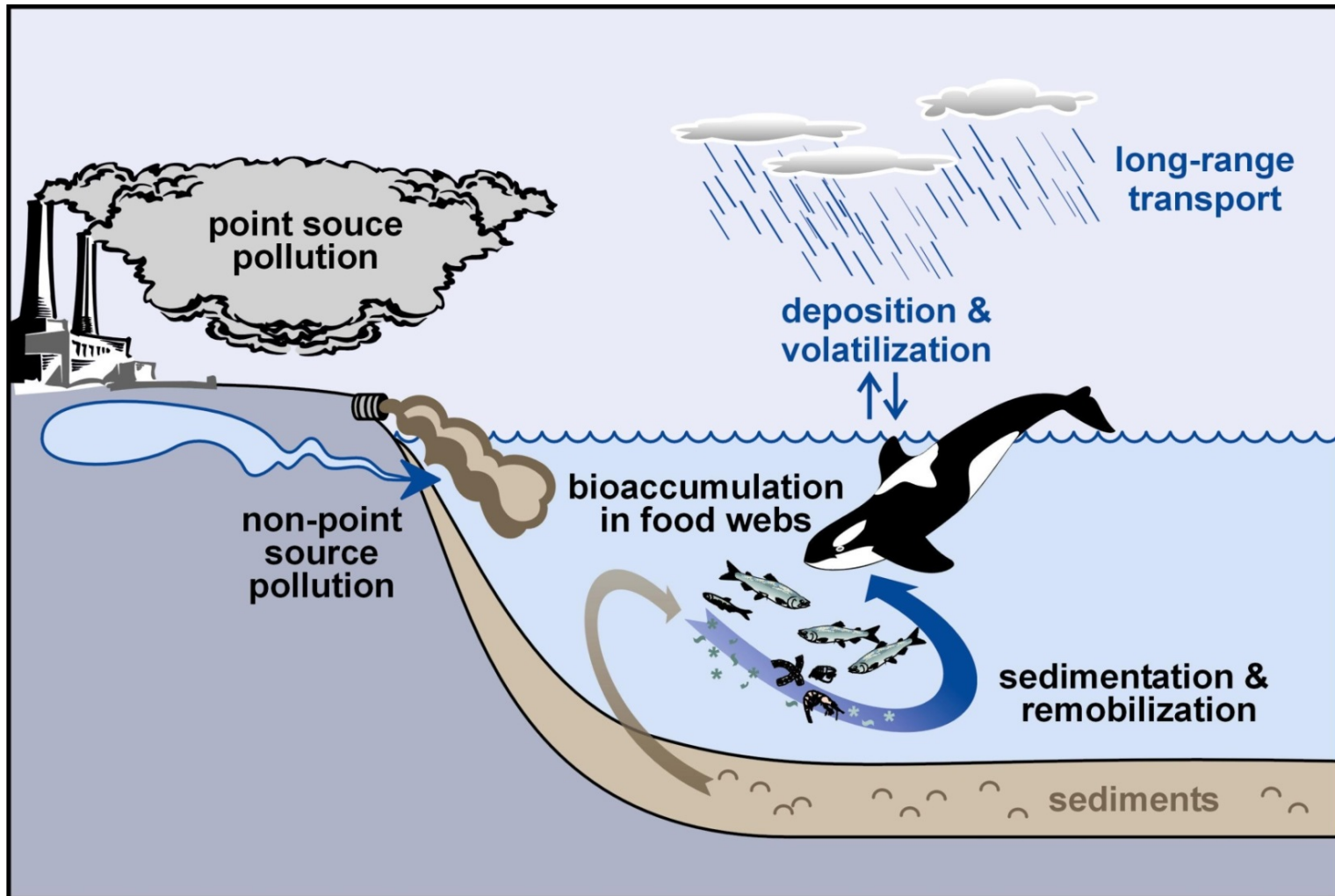


(Connacher 1993; Mos et al 2004; P.S. Ross unpublished; Dewailly et al 1994)



© Lynda J. Goff

Killer whales are the ultimate canary: vulnerable to the accumulation of persistent contaminants



Ocean pollution is daunting

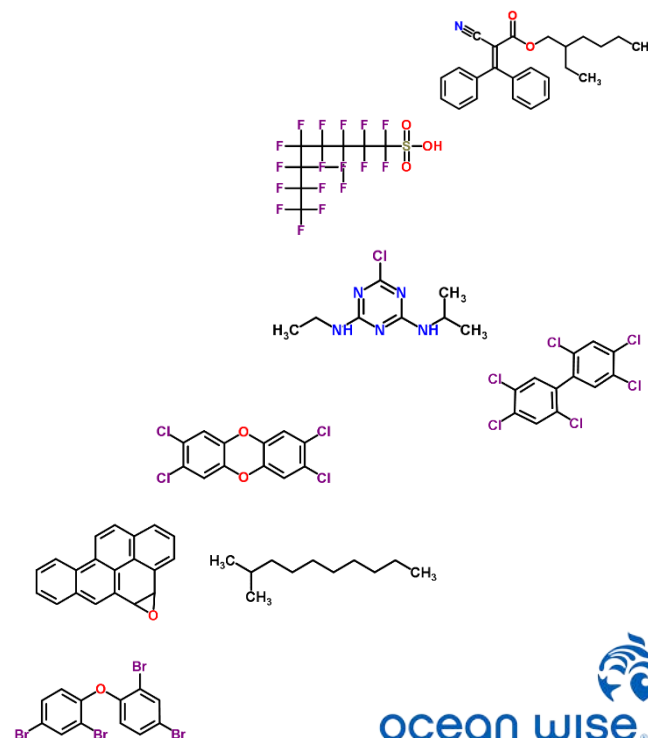
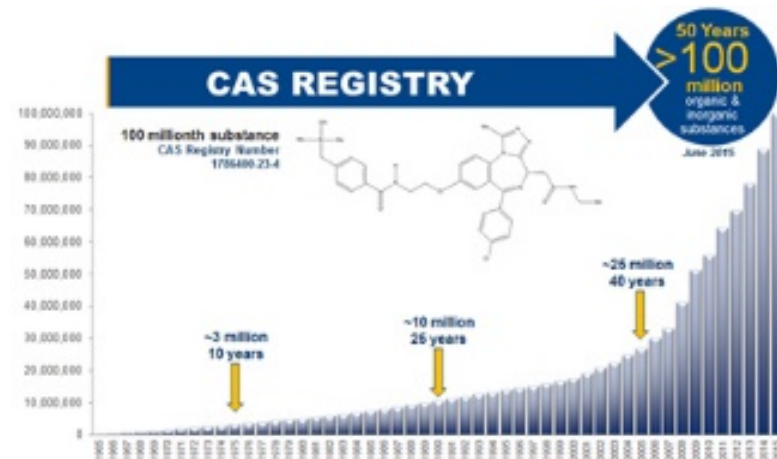
100 million chemicals registered
(CAS, 2015);

Over 250,000 chemicals on the
global marketplace, with 1,000 new
chemicals every year;

Wide variety of properties;

Different species at risk;

Range of emission histories.



Simple ocean pollution questions

Where is it coming from?

Where is it going?

Is it harmful?

How polluted is our ocean?

PollutionTracker, a new monitoring program for coastal British Columbia, Canada, is helping us answer this question. We are documenting the levels and trends of hundreds of contaminants of concern in mussels and nearshore ocean sediments.

Explore *PollutionTracker*

Our *PollutionTracker* program helps to identify:

- New pollutants
- Hotspots & sources
- Responses to source control
- Trends over time
- Fisheries closures
- Species at Risk & Critical habitat
- Dredge & disposal practices

Indian Arm 1

Samples collected on December 2, 2015

Sediment

Mussels

How this site compares

We collected nearshore ocean sediment from 51 coastal B.C. locations. Contaminants measured in sediment from this site are ranked relative to levels measured at all other sites. A rank of 1 indicates the most contaminated site coast-wide. An overall average site ranking is shown below.



Priority contaminants of concern

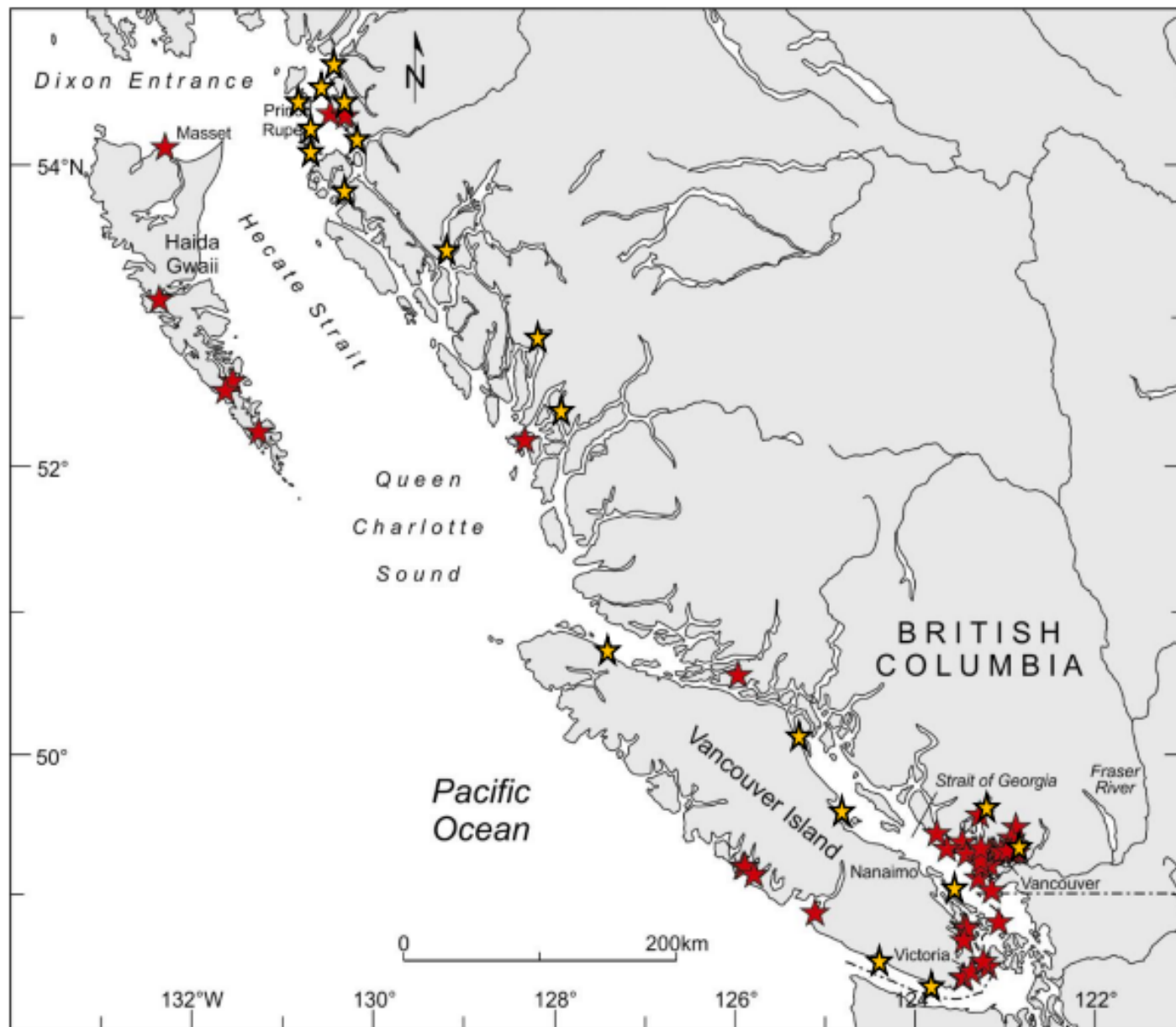


Sampling for *PollutionTracker*

- Nearshore subtidal sediment
- Mussels (*Mytilus sp.*)
- These provide insight into the 'state of the coastal environment'



PollutionTracker Sites

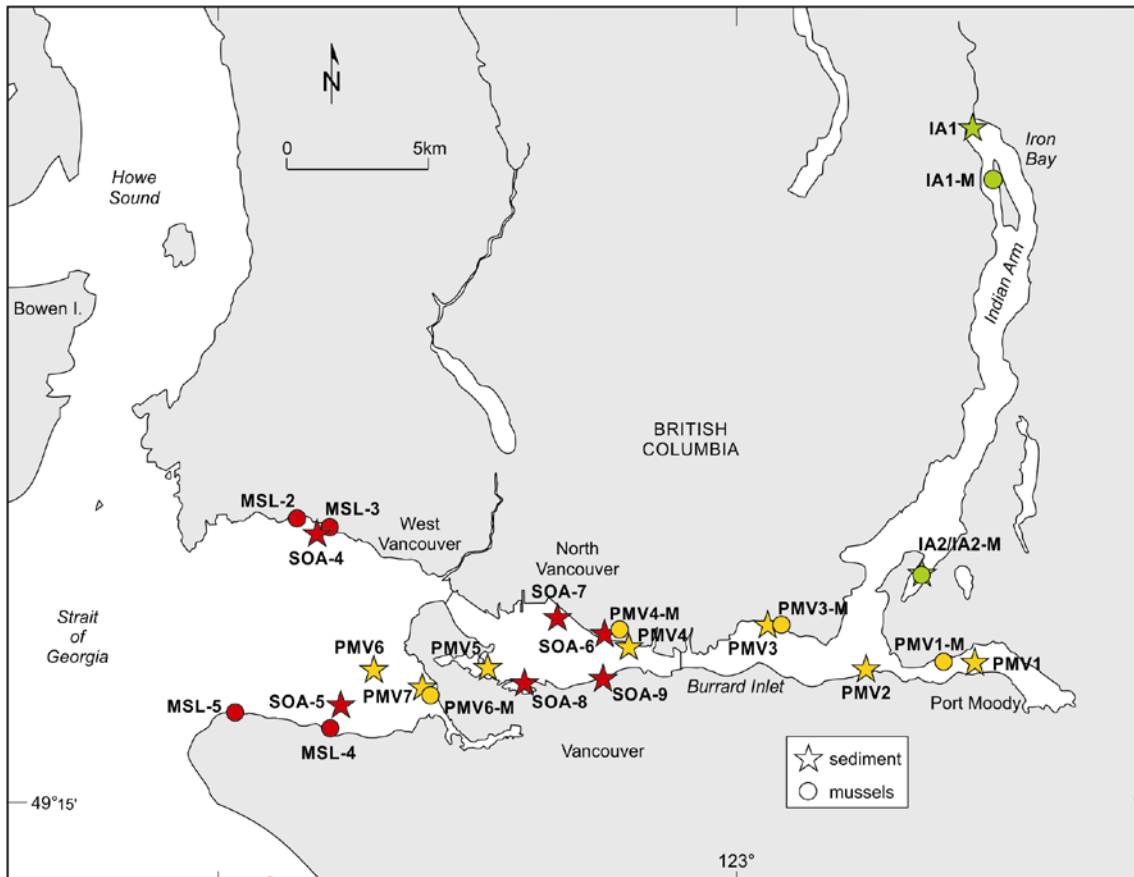


★ Phase 1

★ Phase 2

PollutionTracker - Burrard Inlet Sites

- Phase 1 sampled in 2015/2016 and Phase 2 in 2018/2019



Partners

★ Tsleil-Waututh Nation

★ Vancouver Fraser
Port Authority
(PMV4 = Neptune
Terminals in Phase 2)

★ Metro Vancouver

Contaminants in Burrard Inlet

Metals

- Cadmium, lead, mercury in sediment > CCME ISQGs
- Mercury in sediment > CCME PEL

Pesticides

- Legacy pesticides detected throughout Burrard Inlet (DDT, HCB)
- Current use pesticides (permethrin, alachlor, trifluralin, pendimethalin)

Fire and heat resistant chemicals

- PCBs, PBDEs, HBCD

Organotins - TBT, stabilizers in PVC products

Perfluorinated Compounds - stain, water repellants

PPCPs – antibacterial agent triclocarban (only detected PPCP of 13 analyzed; analyzing for up to 90 PPCPs during Phase 2)

Point source and non point source contaminants:

Ocean pollution research informs solutions



URBAN



HOME & GARDEN



SHIPPING



INDUSTRY



AGRICULTURE & FORESTRY



Thank you (In-Kind Support)

Association of Denman Island Marine Stewards

Comox Valley Project Watershed Society

Council of the Haida Nation

Gitga'at Nation

Gwaii Haanas National Park Reserve, National Marine Conservation Area
Reserve and Haida Heritage Site (Parks Canada)

Heiltsuk Nation

K'ómoks First Nation

Lax Kw'alaams Band

Metlakatla First Nation

Nuu-chah-nulth Tribal Council

Saturna Island Marine Research and Education Society

Tlowitsis Nation

Thank you to the entire *PollutionTracker* team

Staff: Marie Noel, Catherine Wong, Anna Posacka, Katerina Vassilenko, Anahita Etemadifar, Stephen Chastain, Mathew Watkins, Stephanie Wang.



NORTH GROWTH
FOUNDATION



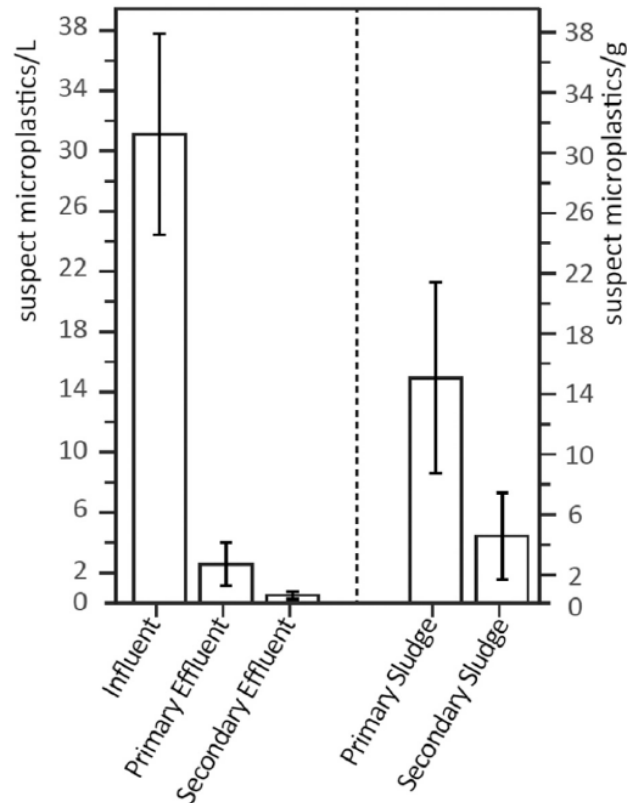
THE W. GARFIELD WESTON
FOUNDATION



The
McLean
Foundation



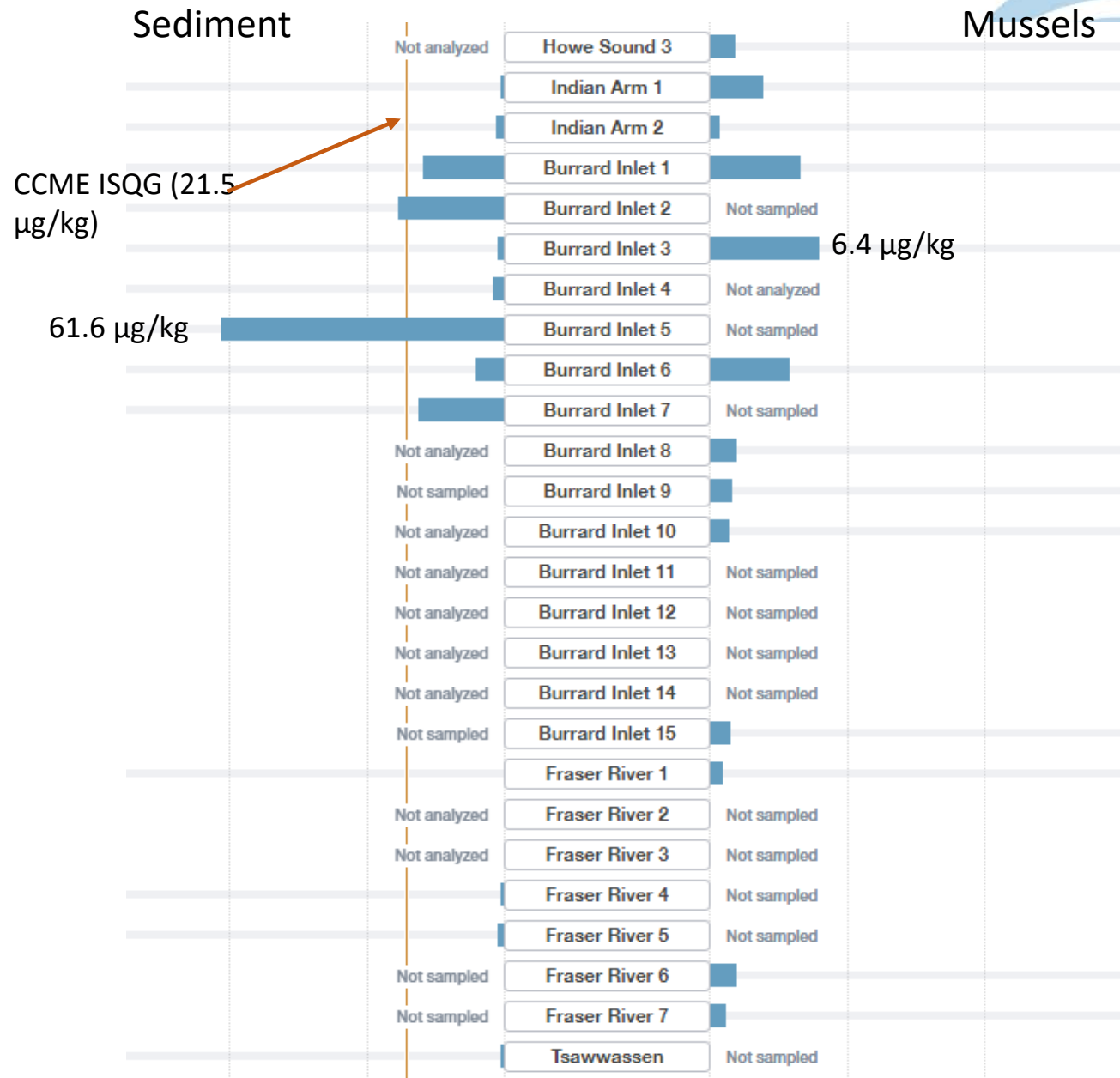
1.8 trillion synthetic microparticles enter the largest WWTP in Vancouver every year



- 71% are fibers
- Fibres were dominated by polyester and Rayon
- 30 billion enter the ocean
- 99% are retained in WWTP
- These are redistributed as agriculture, forestry & mining fertilizers

Fig. 3. Average counts for suspected MPs identified by stereomicroscopy in wastewater sample matrices at the wastewater treatment plant. The majority of suspected MPs are retained in the solids stream with $< 0.5 \pm 0.2$ MP/L exiting the plant in the secondary effluent. Counts are reported as MP/L \pm SD in liquid matrices and MP/g \pm SD in solid matrices. Liquid samples were taken from influent ($n = 5$), primary effluent ($n = 6$) and secondary effluent ($n = 6$) and solid samples were taken from primary ($n = 6$) and secondary sludge ($n = 6$).

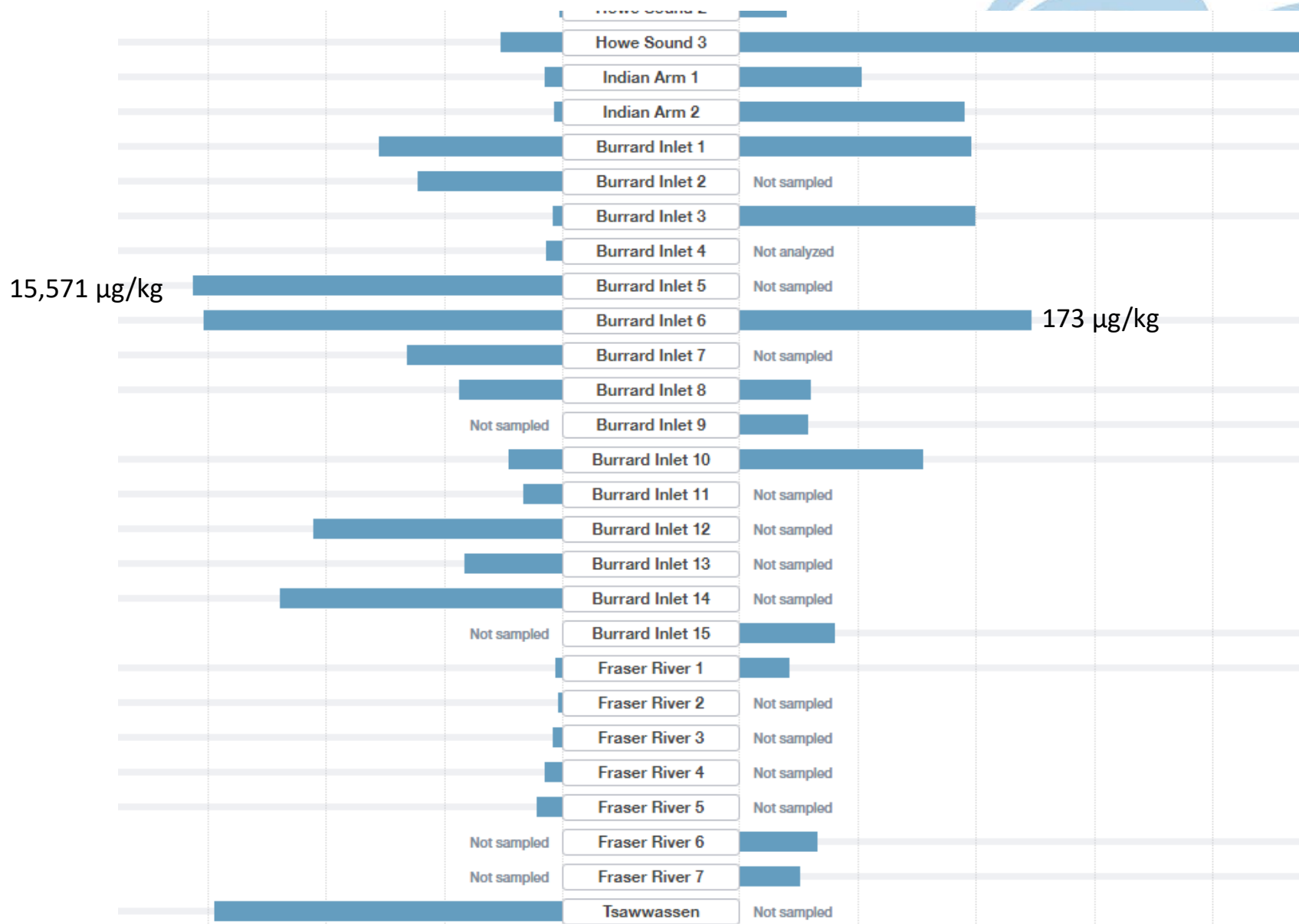
Contaminant Levels - PCBs



Contaminant Levels - PAHs

Sediment

Mussels



Progress revealed: Harbour seals as 'canaries' reveal lower PCBs and PBDEs following regulations

