Capital Regional District

625 Fisgard St.,
Victoria, BC V8W 1R7

Notice of Meeting and Meeting Agenda
Environmental Services Committee

Wednesday, November 20, 2024 **1:30 PM** **6th Floor Boardroom**
625 Fisgard St.
Victoria, BC V8W 1R7

B. Desjardins (Chair), S. Tobias (Vice Chair), J. Brownoff, J. Caradonna, G. Holman, D. Kobayashi, D. Murdock, M. Tait, D. Thompson, A. Wickheim, C. McNeil-Smith (Board Chair, ex-officio)

The Capital Regional District strives to be a place where inclusion is paramount and all people are treated with dignity. We pledge to make our meetings a place where all feel welcome and respected.

1. Territorial Acknowledgement

2. Approval of Agenda

3. Adoption of Minutes

3.1. 24-1184 Minutes of the October 16, 2024 Environmental Services Committee Meeting

Recommendation: That the minutes of the Environmental Services Committee meeting of October 16, 2024 be adopted as circulated.

Attachments: Minutes - October 16, 2024

4. Chair's Remarks

5. Presentations/Delegations

5.1. Presentations

5.1.1. 24-1154 Presentation: Healthy Waters in the Tod Creek Watershed (2023-25): A Preliminary Report - Peter Ross, Raincoast Conservation Foundation

Attachments: Presentation: Healthy Waters in the Tod Creek Watershed - Peter Ross

5.2. Delegations

The public are welcome to attend CRD Board meetings in-person.

Delegations will have the option to participate electronically. Please complete the online application at www.crd.bc.ca/address no later than 4:30 pm two days before the meeting and staff will respond with details.

Alternatively, you may email your comments on an agenda item to the CRD Board at crdboard@crd.bc.ca.

5.2.1. 24-1242 Delegation - Philippe Lucas; Representing Biosolid Free BC: Re: Agenda Item 6.1. Healthy Waters Project for Tod Creek on the Saanich Peninsula - November Update

6. Committee Business

6.1. 24-1153 Healthy Waters Project for Tod Creek on the Saanich Peninsula - November Update

Recommendation: There is no recommendation. This report is for information only.

Attachments: Staff Report: Healthy Waters Project for Tod Creek - November Update

Appendix A: Raincoast Healthy Waters: Prelim. Watershed Report - Tod Creek

6.2. 24-1180 Solid Waste Market Research and Engagement Study

Recommendation: There is no recommendation. This report is for information only.

Attachments: Staff Report: Solid Waste Market Research and Engagement Study

Appendix A: Solid Waste Market Research & Engagement Study - Malatest

6.3. 24-1185 Solid Waste Management Plan - Three-Year Cycle

Recommendation: There is no recommendation. This report is for information only.

Attachments: Staff Report: Solid Waste Management Plan - Three-Year Cycle

6.4. 24-1181 Hartland Landfill Tipping Fee and Regulation Bylaw No. 3881 Amendment and Adoption of Bylaw Nos. 4636 and 4646

Recommendation: The Environmental Services Committee recommends to the Capital Regional District Board:
1. That Bylaw No. 4636, "Hartland Landfill Tipping Fee and Regulation Bylaw No. 6, 2013, Amendment Bylaw No. 6, 2024", be read a first, second and third time; and
2. That Bylaw No. 4636 be adopted.
3. That Bylaw No. 4646, "Capital Regional District Ticket Information Authorization Bylaw, 1990, Amendment Bylaw No. 80, 2024", be read a first, second and third time; and
4. That Bylaw No. 4646 be adopted.

Attachments: Staff Report: Hartland Bylaw No. 3881 Amendment & Bylaws 4636 & 4646

Appendix A: Staff Report to CRD Board - May 10, 2023

Appendix B: Bylaw No. 4636

Appendix C: Bylaw No. 4646

Appendix D: Bylaw No. 3881 - Redlined Consolidation

Appendix E: Bylaw No. 1857 - Redlined Schedule 19

6.5. 24-1189 Award of Contract ERM2024-007 - Hauling and Processing of Kitchen Scraps

Recommendation: The Environmental Services Committee recommends to the Capital Regional District Board:
That Contract ERM2024-007, Hauling and Processing of Kitchen Scraps, be awarded to Convertus Canada Ltd. from March 1, 2025 to February 28, 2030, at the rate of $130 per tonne and an estimated cost of $1,560,000 per year, plus GST.

Attachments: Staff Report: Award of Contract - Hauling & Processing of Kitchen Scraps

6.6. 24-1152 Vancouver Island and Coastal Communities Climate Summit - Summary Report

Recommendation: There is no recommendation. This report is for information only.

Attachments: Staff Report: VICC Climate Summit - Summary Report

Appendix A: VICC 2024 Virtual Climate Summit Report (Sept 2024)

7. Notice(s) of Motion

8. New Business

9. Adjournment

The next meeting will be held in 2025.

To ensure quorum, please advise Jessica Dorman (jdorman@crd.bc.ca) if you or your alternate cannot attend.

Making a difference...together

Capital Regional District

625 Fisgard St.,
Victoria, BC V8W 1R7

Meeting Minutes

Environmental Services Committee

Wednesday, October 16, 2024 **1:30 PM** **6th Floor Boardroom**
625 Fisgard St.
Victoria, BC V8W 1R7

PRESENT:
Directors: B. Desjardins (Chair), S. Tobias (Vice Chair) (EP), J. Brownoff (EP), J. Caradonna, G. Holman (EP), D. Kobayashi (EP), M. Tait (EP), D. Thompson, M. Westhaver (EP) (for D. Murdock), A. Wickheim (EP)

Staff: T. Robbins, Chief Administrative Officer; R. Smith, Acting General Manager, Parks, Recreation and Environmental Services; G. Harris, Senior Manager, Environmental Protection; T. Watkins, Acting Senior Manager, Environmental Resource Management; M. Lagoa, Deputy Corporate Officer; J. Dorman, Committee Clerk (Recorder)

EP - Electronic Participation

Regrets: Directors D. Murdock, C. Plant

The meeting was called to order at 1:32 pm.

1. Territorial Acknowledgement

Chair Desjardins provided a Territorial Acknowledgement.

2. Approval of Agenda

MOVED by Director Thompson, SECONDED by Director Caradonna,
That the agenda for the October 16, 2024 Environmental Services Committee meeting be approved.

MOVED by Director Caradonna, SECONDED by Director Thompson,
That the main motion be amended to add the words "and that a late delegation, Terry Michell be permitted to speak" after "be approved".
CARRIED

The question was called on the main motion as amended.
That the agenda for the October 16, 2024 Environmental Services Committee meeting be approved and that a late delegation, Terry Michell be permitted to speak.
CARRIED

3. Adoption of Minutes

3.1. 24-1006 Minutes of the July 17, 2024 and September 25, 2024 Environmental Services Committee Meetings

MOVED by Director Caradonna, SECONDED by Director Thompson,
That the minutes of the Environmental Services Committee meetings of July 17, 2024 and September 25, 2024 be adopted as circulated.
CARRIED

4. Chair's Remarks

Chair Desjardins spoke about the transition to a new board chair and the work the committee has completed over the past couple years.

5. Presentations/Delegations

There were no presentations.

5.1 Delegations

5.1.1. 24-1050 Delegation - Robin Tunnicliffe; Representing Peninsula and Area Agriculture Commission: Re: Agenda Item 6.2. Regional Canada Goose Management Service - Activities Update

R. Tunnicliffe spoke to Item 6.2.

5.1.2. 24-1066 Delegation - Terry Michell; Representing Michell's Farm Ltd.: Re: Agenda Item 6.2. Regional Canada Goose Management Service - Activities Update

T. Michell spoke to Item 6.2.

6. Committee Business

6.1. 24-943 Regulating Curbside Organics Collection

T. Watkins spoke to Item 6.1.

Discussion ensued on the following:
- waste composition studies
- reduction trends and limitations
- mandatory organics separation
- targeted education and school programs
- composition study and cost analysis

MOVED by Director Caradonna, SECONDED by Director Thompson,
The Environmental Services Committee recommends to the Capital Regional District Board:
That staff continue implementing the organics diversion strategy as currently outlined in the 2021 Solid Waste Management Plan.
CARRIED

Motion Arising:
MOVED by Director Caradonna, SECONDED by Director Thompson,
That staff report back on options to expedite organics diversion targets, including potential cost and benefit of mandatory separation.
DEFEATED
Opposed: Kobayashi, Tait, Tobias, Westhaver, Wickheim

6.2. 24-960 Regional Canada Goose Management Service - Activities Update

G. Harris spoke to Item 6.2.

Discussion ensued on the following:
- harvesting and egg addling resources
- environmental implications
- trends and methodology for population control
- support and responsibility of Provincial Government

MOVED by Director Thompson, SECONDED by Director Holman,
The Environmental Services Committee recommends to the Capital Regional District Board:
That staff be directed to develop increased service levels for consideration in the 2026 service planning process.
CARRIED

6.3. 24-1025 Previous Minutes of Other CRD Committees and Commissions for Information

The following minutes were received for information:
a) Climate Action Inter-Municipal Task Force - September 27, 2024

7. Notice(s) of Motion

7.1. 24-1021 Motion with Notice: Recycle BC Soft Plastics Multi-family Residences Pilot Program (Director Caradonna)

Director Caradonna spoke to Item 7.1.

Discussion ensued on the following:
- private haulers and collected materials
- industry product stewardship
- soft plastics ban
- senior government directives

MOVED by Director Caradonna, SECONDED by Director Thompson,
The Environmental Services Committee recommends to the Capital Regional District Board:
Given that RecycleBC has opted to expand a pilot program to undertake home-based collection of soft plastics at select multi-family residences across the region;
That CRD staff report back on the potential to partner with RecycleBC on this program, and to report more generally on the costs, implications, and potential benefits of the CRD incorporating home-based collection of soft plastics into the CRD's recycling program over time.
CARRIED

Motion Arising:
MOVED by Director Desjardins, SECONDED by Director Caradonna,
That staff provide a report on which private haulers do collect soft plastics from multi-family buildings.
CARRIED

8. New Business

There was no new business.

9. Adjournment

MOVED by Director Thompson, SECONDED by Director Caradonna,
That the October 16, 2024 Environmental Services Committee meeting be adjourned at 2:52 pm.
CARRIED

_____
CHAIR

_____
RECORDER

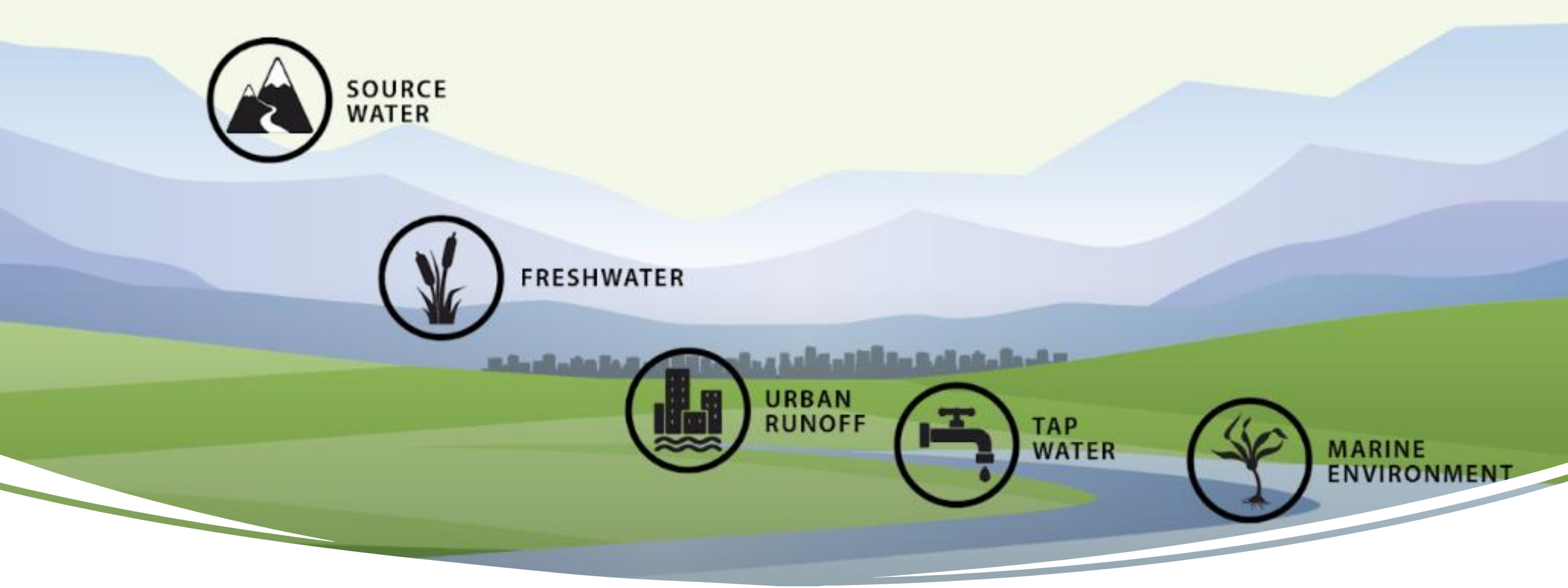
November 20, 2024

Healthy Waters in the Tod Creek watershed (2023-25): *a preliminary report*

Peter S. Ross
Senior Scientist &
Healthy Waters Director

Investigate. Inform. Inspire.
RAINCOAST
CONSERVATION FOUNDATION

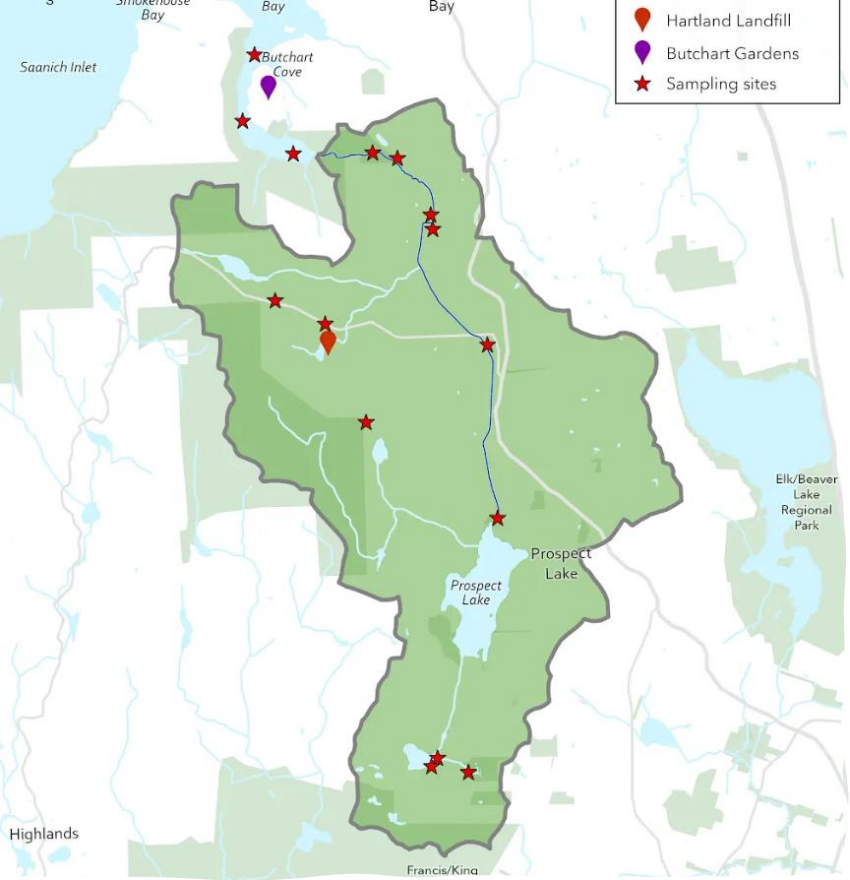

RAINCOAST
CONSERVATION FOUNDATION
Healthy Waters Program
Healthy waters for salmon, whales, and people.



The simplified Raincoast Healthy Waters sampling formula to track pollutants in watershed

A '*Healthy Waters*' initiative at Tod Creek (2023-25)

- CRD is supporting a partnership that includes Tsartlip First Nation and the W̱SÁNEĆ Leadership Council;
- Training and capacity building are central to this project;
- Concerns about Hartland landfill influences exist;
- This project will provide an indication of *any activities* in the watershed that degrade water quality in Tod Creek.



The Tod Creek watershed

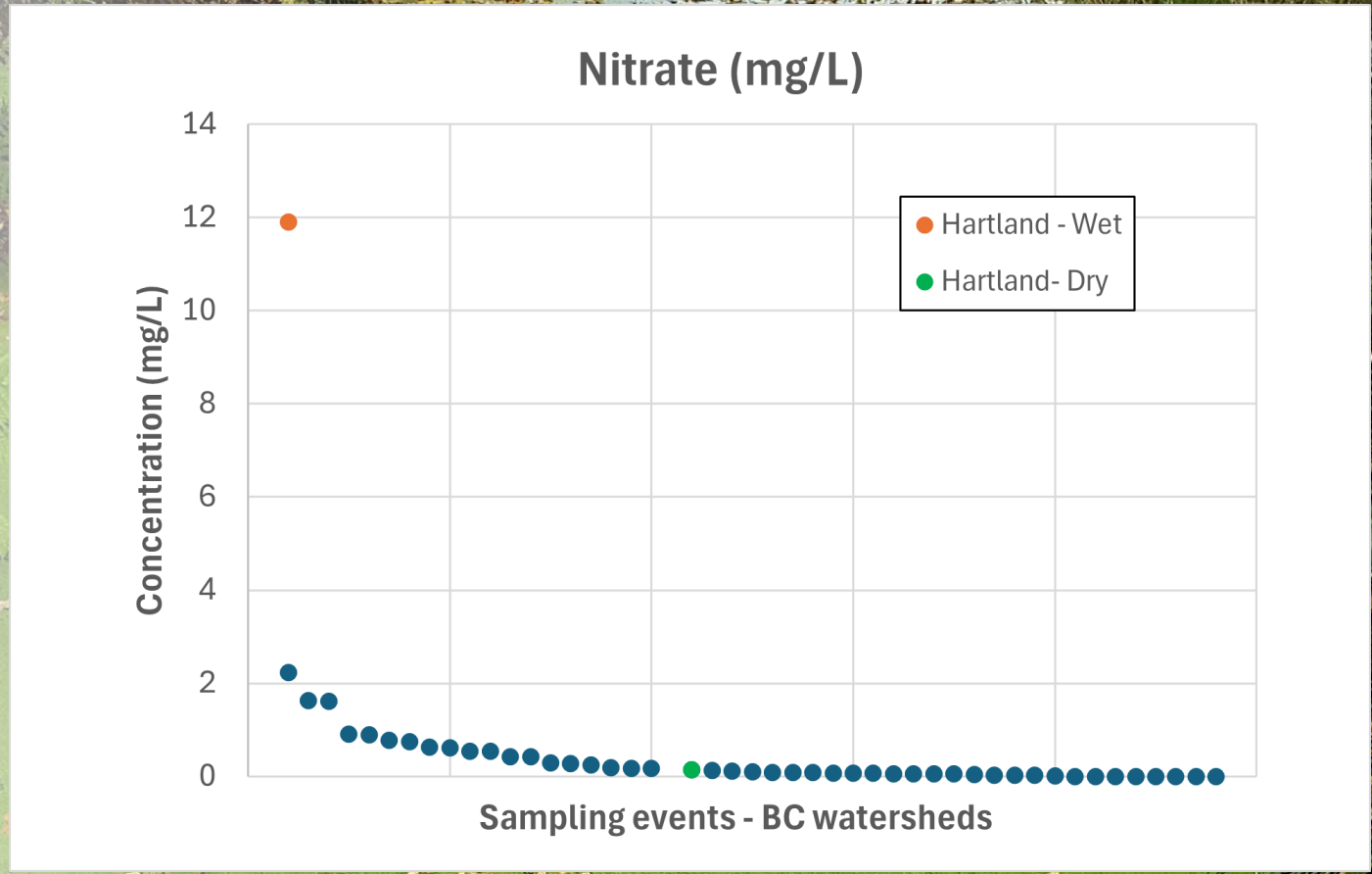
- One of several ‘Healthy Waters’ projects;
- From Maltby Lake to Tod Inlet;
- The smallest watershed 24 $km^{2;}$
- Two sampling visits to date (Dec 13, 2023 & August 9, 2024);
- Hartland landfill drainage served as an extra sample.

Early findings from Wet season: nutrients

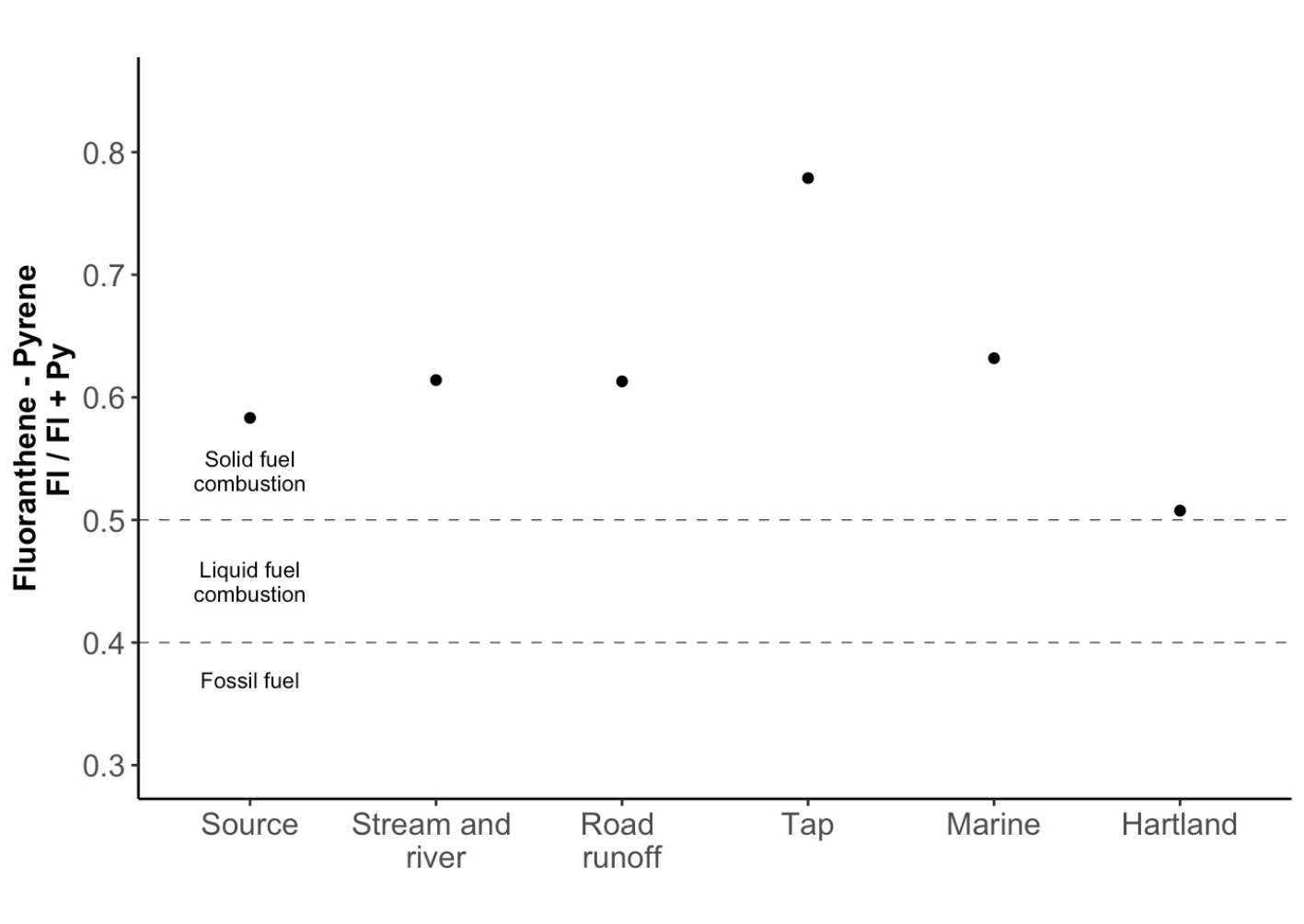
Excess amounts of Nitrate, Nitrite, Ammonia and/or Phosphate from agriculture and wastewater can reduce dissolved oxygen and cause fish kills.

Levels of nitrate and biological oxygen demand (BOD) were high in Hartland samples during wet season.

Early dry season results suggest much lower levels.



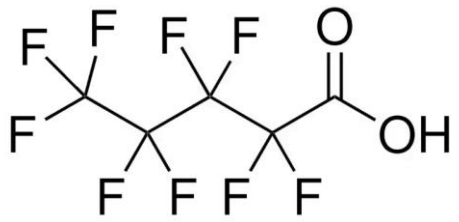
Early findings from Wet season: Hydrocarbons



A complex group of thousands of compounds found in coal, petroleum and plant materials, and as by-products of combustion process; Many are toxic and carcinogenic.

PAHs likely due to wood combustion as a source (forest fire smoke?)

Early findings from Wet season: PFAS (‘forever chemicals’)



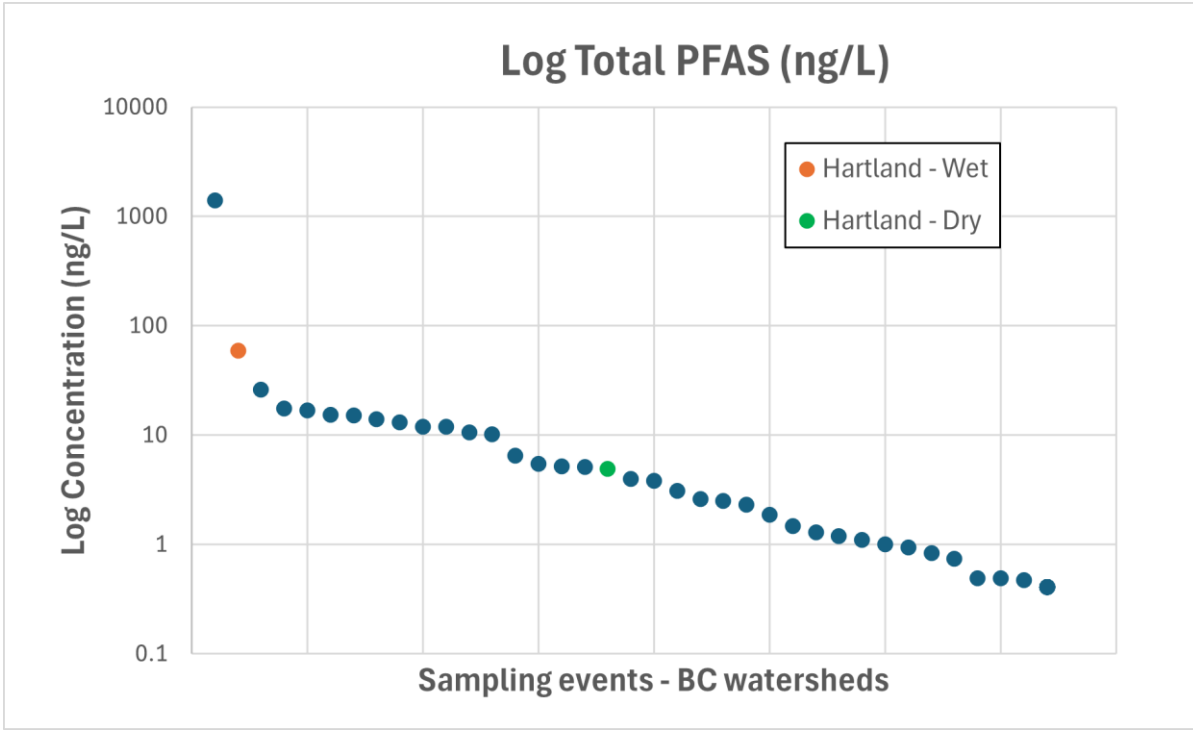
A wide range of products and formulations used in consumer products and firefighting foams; endocrine disrupting in fish and mammals.

Levels of PFAS (per- and polyfluoroalkyl substances) were high in Hartland drainage samples in wet season but lower in dry season.

Top PFAS was PFPeA (Perfluoropentanoic acid), from grease-proof coatings on food packaging and household products, or a breakdown product of larger PFAS compounds.

~15,000 substances; PFOS, PFOA and long-chained PFAS banned in Canada since 2008/2016.

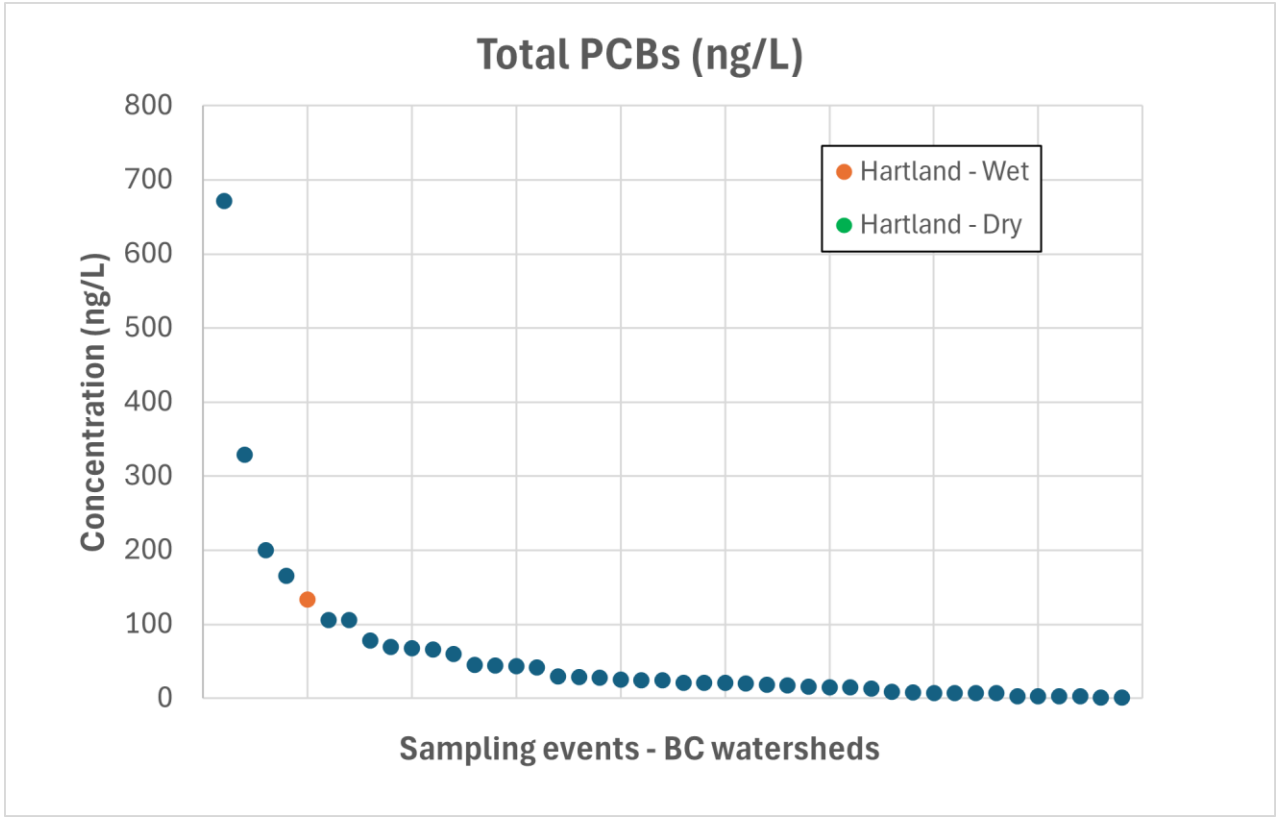
No exceedances of current EQGs – but few are available.



Early findings from Wet season: PCBs

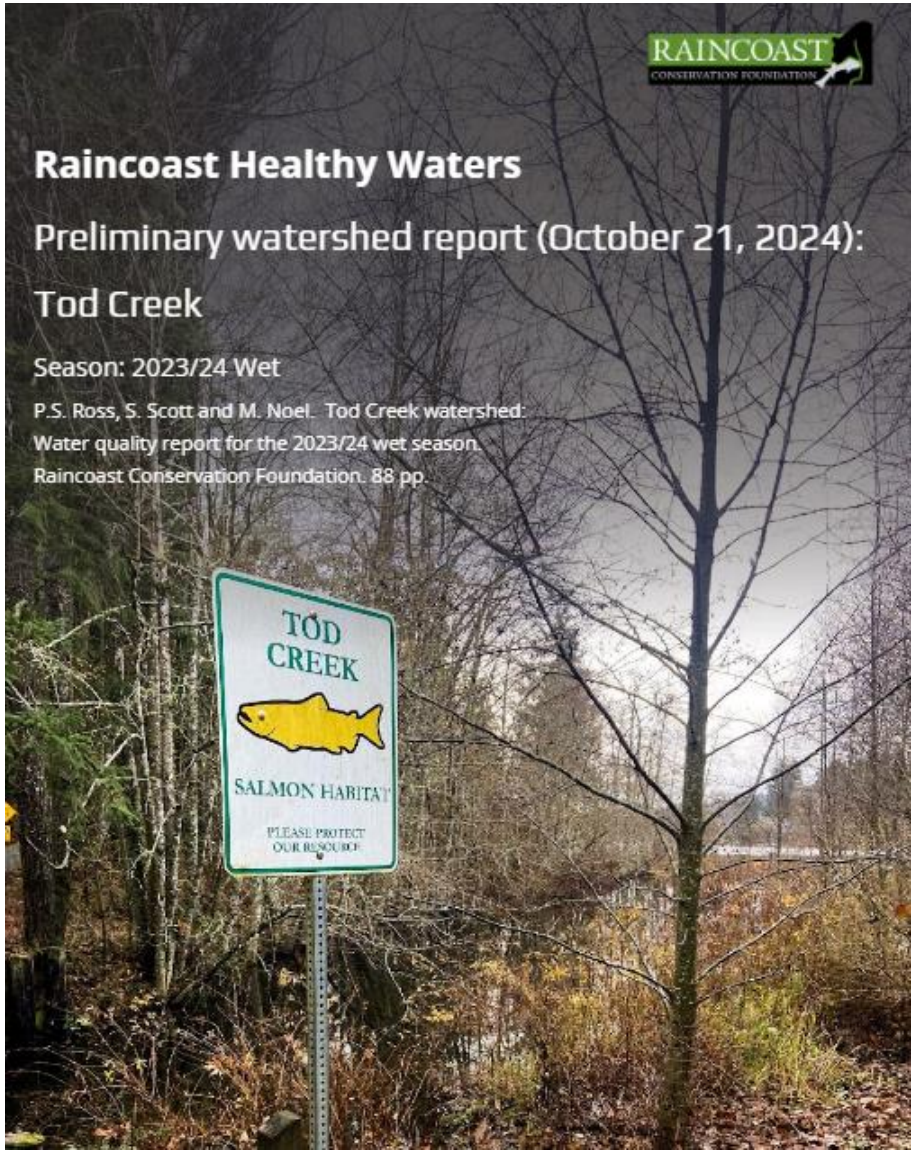
Heat resistant compounds used widely in electrical equipment 1929-1977.

High levels in wet season, but low in dry season.



Early messages

- Some contaminants to watch: nutrients, PCBs, PAHs and PFAS;
- Some good news: BPs, APEs, pesticides and pharmaceuticals;
- Differences exist between wet and dry seasons – more data coming;
- Agriculture, septic, riparian zone, roads, air pollution and Hartland influencing Tod Creek;
- The Raincoast-CRD-Tsartlip-WSANEC Leadership Council team continue to build understanding and capacity.



This preliminary report will be built upon with more analysis

- Water samples in dry (August) and wet (November) seasons in 2024, and dry again in 2025;
- Sediments from Tod Creek forthcoming;
- Sampling and analysis of biosolids;
- ‘Seasonal reports’ for each sampling event, and a summary report at the end of the study.

Lessons to be learned: Tod Creek data will be compared across many BC watersheds

Thank you to the Capital Regional District (Victoria), Tsartlip First Nation, WSANEC Leadership Council, and the Friends of Tod Creek for support and assistance with this project

OMRR Technical Working Group 2024 report

"Key Message 4 –Identifying and Managing CECs Requires a Strategy:

- To improve our understanding, the 2022 TWG strongly recommended putting more confidence in field-based studies"
- Discussed "CECs, including per- and polyfluoroalkyl substances (PFAS) and microplastics"

Making a difference...together

EEP 24-66

REPORT TO ENVIRONMENTAL SERVICES COMMITTEE
MEETING OF WEDNESDAY, NOVEMBER 20, 2024

SUBJECT **Healthy Waters Project for Tod Creek on the Saanich Peninsula – November Update**

ISSUE SUMMARY

To provide the Environmental Services Committee with an update on the Healthy Waters project for Tod Creek and a summary of the draft preliminary report upon its release to the public.

BACKGROUND

On May 10, 2023, the Environmental Services Committee approved $250,000 in funding for a project proposed by the Raincoast Conservation Foundation (RCF) to monitor the Tod Creek Watershed. The objectives of this project are "to conduct a risk-based evaluation of contaminants of concern in the Tod Creek watershed in support of healthy fish habitat" and "to document possible sources of contaminants of concern in the Tod Creek watershed, including Hartland Landfill and local land use."

The RCF initiated sampling in December 2023, and results from the first of four sampling events were presented to CRD staff in June 2024 in a draft report. Several CRD staff reviewed the report and provided feedback to RCF. The CRD received a second version of the report in July 2024. RCF has expressed its interest in releasing this report to the public at the November 20, 2024 Environmental Services Committee meeting.

IMPLICATIONS

Environmental Implications

The RCF's primary objectives are to provide a baseline summary of contaminants in a watershed for comparison to other watersheds across coastal BC; to provide a high-level summary of general contaminant levels as they relate to pathways from various land uses; and to assess risk to fish health.

The report (Appendix A) summarizes preliminary water quality data from the first of four sampling events, with some limited data from the second event also included. More data and quality assurance/ quality control (QA/QC) information are required to properly understand the data, but the preliminary findings indicate that Tod Creek Watershed is relatively healthy based on the following results:

- Only two parameters exceeded water quality guidelines for protection of aquatic life. Guidelines are conservative screening tools used prior to any detailed risk assessment.
- Some substances were higher at the Hartland site; however, these substances did not appear to impact water quality throughout the watershed.
- Preliminary comparisons to other watersheds indicate that Tod Creek's water quality appears to be in the same range as other coastal watersheds for most substances.
- Finally, tap water samples collected from pooled CRD drinking water and well water (outside of the Tod Creek Watershed) had no exceedances of drinking water quality guidelines.

The report highlights three findings from the Hartland site (nitrate, polychlorinated biphenyls [PCBs] and per- and polyfluoroalkyl substances [PFAS]) for further study.

Results from this site are not representative of landfill leachate, but likely related to runoff from roads, parking lots, aggregate storage areas, construction and other industrial activities occurring within the landfill property. The 2023-2024 environmental monitoring report, completed by an external consultant, confirms that landfill leachate is contained and controlled within the site property and that the source of the nitrate is blast residue from recent aggregate quarrying and stockpiling.

Quarrying activities have historically taken place at the Hartland Landfill to create airspace for refuse. The aggregate generated is beneficially used for operational and capital projects across the site. Investigations have determined that the source of nitrate is blast residue run-off from aggregate stockpile reserved for future operational use. Staff are actively implementing a site-wide aggregate management plan to mitigate and prevent further impacts. This plan includes hydraulic containment systems, strategic depletion of stockpiles, and enhanced monitoring to evaluate the effectiveness of these measures.

PCBs were detected in the wet season sample above the BC aquatic life guideline (0.133 versus 0.100 ng/L). However, for comparison, PCBs were measured at a higher concentration in a Whistler background site, which highlights the need for more data collection, QA/QC oversight and comparison to other watersheds to put these findings in perspective.

The total PFAS measurement from the wet season was reported to be higher at the Hartland site compared to other locations in Tod Creek and most other watersheds assessed by RCF, but was well below available, but limited, water quality guidelines.

CONCLUSION

The Raincoast Conservation Foundation has conducted the first two of four water quality sampling events and provided a preliminary report of the findings. The report indicates that water quality in the Tod Creek Watershed is good, relative to available guidelines, background measurements, and other watersheds. The report highlights the known issue of elevated nitrates associated with aggregate storage on the Hartland site. Further collection, analysis, and reporting of water quality in the Tod Creek Watershed will be undertaken in two subsequent sampling events. A final report is expected in 2026.

RECOMMENDATION

There is no recommendation. This report is for information only.

Submitted by:	Glenn Harris, Ph.D., R.P.Bio., Acting General Manager Parks, Recreation & Environmental Services
Concurrence:	Ted Robbins, B. Sc., C. Tech., Chief Administrative Officer

ATTACHMENT

Appendix A: Raincoast Healthy Waters – Preliminary Watershed Report – Tod Creek (October 28, 2024)

APPENDIX A

RAINCOAST CONSERVATION FOUNDATION

Raincoast Healthy Waters

Preliminary watershed report (October 28, 2024): Tod Creek

Season: 2023/24 Wet

P.S. Ross, S. Scott and M. Noel. Tod Creek watershed: Water quality report for the 2023/24 wet season. Raincoast Conservation Foundation. 88 pp.

Table of Contents

Executive summary

Water is essential for life, and steps are needed to understand, protect and restore its health in fish habitat throughout British Columbia. The Raincoast Healthy Waters program was launched in 2023 to establish community-oriented water pollution monitoring in select BC watersheds. Two Healthy Waters sampling events take place every year in each watershed: the dry season (summer), and the wet season (winter). This report highlights results from one sampling event: the first wet (winter) season sampling, carried out with the support and participation of the Capital Regional District (CRD) and Tsartlip First Nation. Briefly, the Healthy Waters team sampled the Tod Creek watershed on December 13, 2023. The team worked with CRD, Tsartlip First Nation and community volunteers to first determine basic water properties (temperature, conductivity, pH, dissolved oxygen and turbidity) in situ. Water samples were collected from six water categories, including source water (3 samples), stream and river water (3 samples), road runoff (3 samples), tap water (10 samples - 9 from the Sooke supply and 1 from groundwater were pooled into a single composite sample) and marine water (3 samples), alongside surface water samples collected in the areas surrounding the Hartland landfill (3 samples). Samples were then pooled into a single composite sample for each of the six water categories and analysed for coliform, metals, nutrients, physical parameters, pesticides, polycyclic aromatic hydrocarbons (PAHs), pharmaceuticals and personal care products (PPCPs), polychlorinated biphenyls (PCBs), alkylphenol ethoxylates, bisphenols, per- and poly-fluoroalkyl substances (PFAS), sucralose and 6-PPD Quinone. This initial sampling with a limited number of samples suggests that, overall, Tod Creek water quality was **relatively good.** Additional sampling and analysis planned will provide additional insight into any sources or activities that may be impacting the health of this valued watershed.

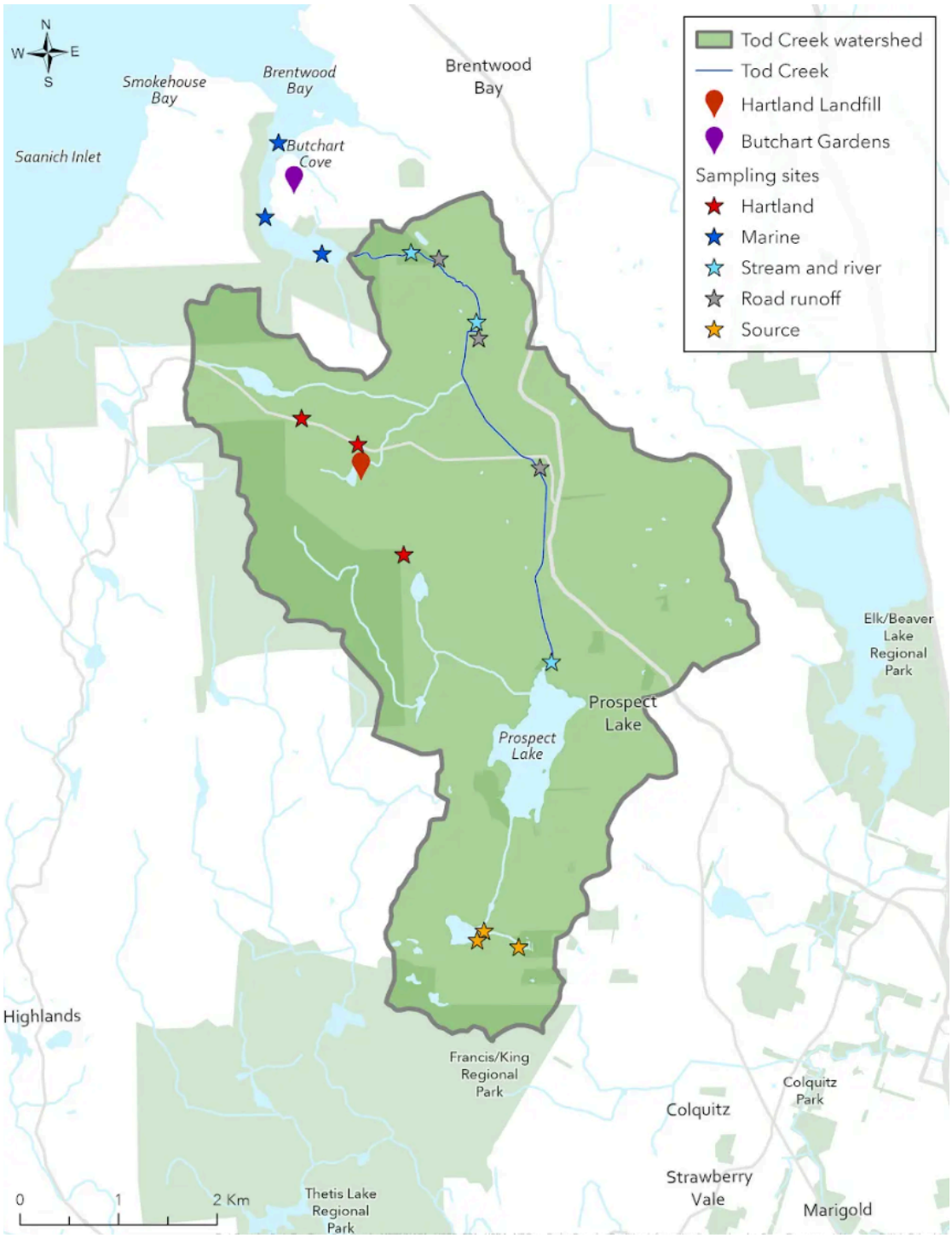
Key findings

- This preliminary assessment of water quality in Tod Creek reflects the first of several site visits; our understanding of water quality in the Tod Creek watershed will grow with additional sampling over the coming two years (2024-26).
- Our study design was not designed to explicitly address the performance of Hartland Landfill, but rather to provide an integrated 'snapshot' of water quality in six categories of water in the Tod Creek watershed, including source, stream & river, road runoff, tap, marine and Hartland drainage.
- The Hartland drainage water sample had the highest wet season concentrations of nutrients, per- and polyfluoroalkyl substances (PFAS), and 6PPD-Quinone among water categories analysed. Some of these may be attributed to quarry activities and

aggregate storage, with CRD working to address concerns that had been previously noted. Additional influences from vehicular and machine operations in the landfill may contribute to some of the water quality issues noted here, with further sampling helping to confirm and build on observations.

- Stream and river water had the highest concentration of coliform bacteria and pesticides; further sampling and analysis may provide insight into the extent to which local agriculture and septic systems may be impacting water quality in Tod Creek.
- Alongside marine water, the stream and river sample had the highest concentration of metals and pharmaceuticals and personal care products (PPCPs); some of the metals are from natural sources. In addition, historical cement factory operations, vessel discharges in Tod Inlet, and land-based septic systems likely explain some of these observations.
- The pooled tap water sample had the highest concentrations of polycyclic aromatic hydrocarbons (PAHs) but were within safe limits established by Health Canada; alkylphenol ethoxylates (APEs) were also detected but were at levels considered safe.
- Source water, and road runoff water were less contaminated than the other water categories in the wet season.
- Overall, the Tod Creek watershed had relatively good water quality in the wet season:
    - There were 8 exceedances of Canadian Environmental Quality Guidelines for the protection of aquatic life (the Hartland water sample exceeded both the CCME and BC long-term guidelines for nitrate concentration, five out of six water samples (all except the tap sample) exceeded the CCME Long Term Guideline for the protection of aquatic life of 0.1 mg/L, and the Hartland water sample exceeded the BC WQG of 100 pg/L for Total PCBs).
    - There were 0 exceedances of Health Canada Drinking Water Quality Guidelines.

Figure 1: The Tod Creek Watershed



The Tod Creek watershed runs north from Prospect Lake, along West Saanich Road down to Tod Inlet, and covers an area of 24 km^2. Sampling sites (detailed in Table 1 below) were distributed throughout the watershed in order to capture a wide spatial range for our assessment of the health of fish habitat (Map by Brooke Gerle / Raincoast Conservation Foundation).

Acknowledgements

We acknowledge the financial support of the Capital Regional District (Victoria). We thank Glenn Harris, Chris Lowe, Barri Rudolph and Peter Kickham for feedback before and during sampling. We thank Joni Olsen at the W̱SÁNEĆ Leadership Council (WLC) and William Morris at Tsartlip First Nation for their support and guidance. We acknowledge the expert analytical support of Pam MacKenzie and Richard Grace at SGS-AXYS, and Xiangjun Liao and Andrew Ross at Fisheries and Oceans Canada. We thank Alex Harris and Sherwin Arnott for report design. Photo credits: Sam Scott and Peter Ross. Photo of Franklyn Sampson in Tod Inlet.

Sampling team

- Raincoast Healthy Waters: Sam Scott and Peter Ross
- Winona Pugh, Francis Pugh and Carmel Thomson (Friends of Tod Creek)
- Tsartlip First Nation: Franklyn Sampson, Will Morris
- CRD Stormwater Quality Staff: Barri Rudolph
- CRD Hartland Landfill Staff: Dan Lyons and Jason Wolting

General introduction

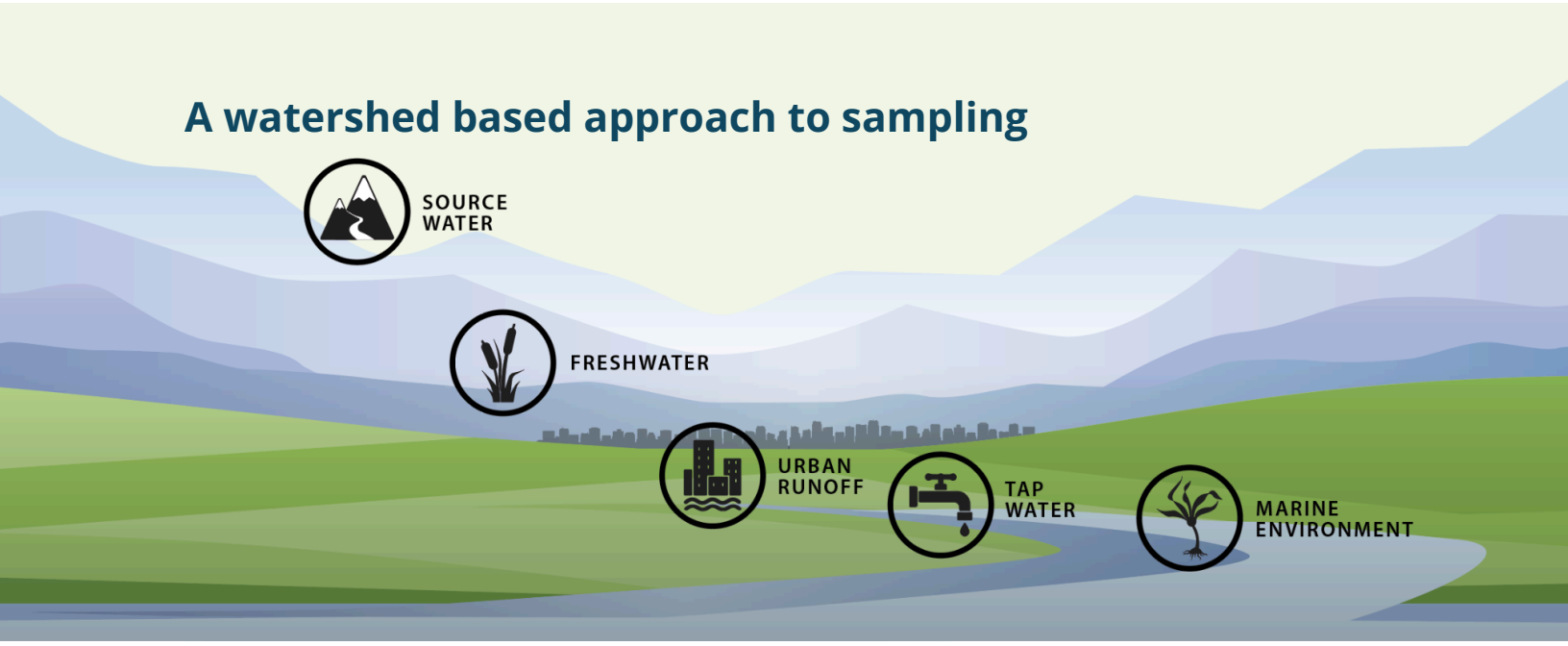
Background

Raincoast's Healthy Waters Program (https://www.raincoast.org/waters/) delivers high-resolution, community-oriented water quality analysis to watersheds across southern British Columbia. The goal of Healthy Waters is to empower communities with the understanding of the status of water quality in their watersheds, to allow for local advocacy regarding both point and nonpoint source pollution.

The Capital Regional District (CRD) serves approximately 440,000 people from 13 municipalities and three electoral areas on southern Vancouver Island and the Gulf Islands. The traditional territories of many First Nations span portions of the region and 11 of those Nations hold reserve lands throughout the capital region.

Community and Indigenous concerns expressed about possible threats to water quality in Tod Creek sparked interest in this project, but Tod Creek is at the receiving end of numerous activities and potential contaminant sources. Of note is that local agriculture, the Heals Rifle Range as a federal contaminated site, domestic septic fields, the Hartland Landfill operation, and other sectors also are likely to influence water quality in Tod Creek. Findings from this and future sampling events will provide insight into the potential for each of these sectors to explain any degradation of water quality - an important element of protection and restoration.

Tsartlip First Nation is one of two current members of the W̱SÁNEĆ Leadership Council (WLC); the second is Tseycum First Nation. The Tsartlip reserve is situated in Brentwood Bay, BC. The WLC was formed to create a unified entity responsible for representing the common interests of the W̱SÁNEĆ Nations. The W̱SÁNEĆ Peoples have been responsible for stewardship of the land since time immemorial.



Healthy Waters

We collect samples from five different categories of water in each of our partner watersheds for our Healthy Waters program: source water, upstream of human impacts, down to the marine environment. Our Tod Creek partnership entails additional sampling from Hartland landfill drainage.

Source water serves as an upstream reference sample, allowing us to determine which contaminants are being introduced as water traces its path down through the watershed.

Stream and river samples allow us to investigate the quality of fish habitat directly, by collecting samples from streams, creeks, and rivers used by salmon and other fish species (either currently or historically).

Road runoff serves as an impacted sample category of current concern, as many contaminants, including PAHs, metals, surfactants and chemicals such as 6PPD quinone can be washed off roadways and into fish habitat during rain events.

We include **tap water** samples in our analysis as a way to bring our homes into the conversation - we borrow water from the environment in the form of municipal or well water, and generally return it to aquatic habitats in a more-degraded state in the form of storm and sewage effluent (treated or untreated).

Marine water samples provide insight into those contaminants that may degrade fish and whale habitat in the ocean, and enable an understanding of the contribution of land-based pollutants from the adjacent watershed to the marine environment.

A sixth composite sample from the **Hartland** Landfill drainage was also included in this project.

Collectively, the lessons learned from our partnering watersheds will contribute to a greater understanding of threats to water quality across British Columbia, and ultimately what policy changes can be implemented to preserve the quality of water for the future of salmon, whales, and people.

Methods

Field sampling

A total of 15 surface water samples were collected from locations in the Tod Creek watershed on December 13, 2023 by the Raincoast Healthy Waters team along with representatives of CRD Hartland Landfill staff, Tsartlip First Nation, and Friends of Tod Creek following the *Raincoast Healthy Waters – Standard Operating Procedure (SOP) for water sample collection* (Appendix 1). An additional 10 samples of tap water were obtained from homes and businesses within the Tsartlip First Nation Reserve (which represent a combination of municipal and well water sources) on February 6, 2024.

A portable water properties meter (YSI-ProDSS) was deployed to measure temperature, pH, conductivity, dissolved oxygen and turbidity in situ following the *Raincoast Healthy Waters – Standard Operating Procedure (SOP) for in situ determination of basic water properties* (Appendix 2). A VTSYIQI water velocity meter was used to take three spot measurements from the shoreline where the samples were collected.

Samples were submitted to four service labs for additional analyses: ALS Environmental, SGS-AXYS, Fisheries and Oceans Canada, and the Raincoast Conservation Genetics Lab. Contaminant analytes were determined in water samples according to established protocols (see Table 2).

Table 1: Sampling sites in the Tod Creek watershed

Site Number	Water Type	Site Name	Lat/Long
1	Source	Maltby Lake - Carmel's Dock	N 48.496813, W 123.449331
2	Source	Trevlac Pond	N 48.495230, W 123.444669
3	Source	Maltby Lake - A Frame Dock	N 48.495974, W 123.450316
4	River	Tod Creek @ Prospect Lake	N 48.521186, W 123.438774
5	River	Tod Creek @ Gowland Tod	N 48.559102, W 123.455963
6	River	Tod Creek @ Durrance Bridge	N 48.552520. W 123.447359
7	Runoff	Wallace Drive Ditch	N 48.551040, W 123.447130
8	Runoff	Ditch @ Wallace and Garden	N 48.558439, W 123.452182
9	Runoff	Tod Creek @ Farmington	N 48.538990, W 123.439361
10	Marine	Tod Inlet 1	N 48.559291, W 123.468188
11	Marine	Tod Inlet 2	N 48.562825, W 123.475803
12	Marine	Tod Inlet 3	N 48.569584, W 123.473602
13	Hartland	South Hartland Drainage Ck	N 48.531494, W 123.458465
14	Hartland	Willis Point Roadside ditch	N 48.544298, W 123.471783
15	Hartland	Creek in Hartland Proper	N 48.541726, W 123.464216
16	Tap	Tap 10	Various - 9 CRD water and 1 well

Water samples were collected from 15 field sites in the Tod Creek watershed, as well as 10 homes within the Tsartlip First Nation Reserve. These were then pooled into composite samples and submitted for analysis, or retained for specialised analyses.

Water quality analyses

Table 2: List of analytes, service lab, analytical methods, instruments, and number of samples submitted

Analyte	Laboratory	Analytical Method	Instruments	No. samples analysed
Tier 1				
Temperature (℃)	in situ		YSI ProDSS	12
Dissolved Oxygen (%, mg/L)	in situ	optical sensor	YSI ProDSS	12
Turbidity (FNU)	in situ		YSI ProDSS	12
Conductivity (uS/cm)	in situ		YSI ProDSS	12
pH	in situ		YSI ProDSS	12
Tier 2				
Total Suspended Solids (TSS)	ALS Environmental	APHA 2540 D (mod)	gravimetry	5
Total Dissolved Solids (TDS)	ALS Environmental	APHA 2540 C (mod)	gravimetry	5
Hardness	ALS Environmental	APHA 2340B	calculated	5
Total Organic Carbon (TOC)	ALS Environmental	APHA 5310 B (mod)	combustion	5
Chemical Oxygen Demand (COD)	ALS Environmental	APHA 5220 D (mod)	colorimetry	5
Biological Oxygen Demand (BOD)	ALS Environmental	APHA 5210 B (mod)	dissolved oxygen meter	5
Nitrate	ALS Environmental	EPA 300.1 (mod)	ion chromatography	5
Ammonia	ALS Environmental	Method Fialab 100, 2018	fluorometry	5
Phosphate	ALS Environmental	APHA 4500-P F (mod)	colorimetry	5

Total Metals	ALS Environmental	EPA 200.2/6020B (mod)	Collision/Reaction Cell ICPMS	5
Total coliform	ALS Environmental	APHA 9223 (mod)	MPN	5
Fecal coliform	ALS Environmental	APHA 9223 (mod)	MPN	5
E. coli	ALS Environmental	APHA 9223 (mod)	MPN	5
MST (in Development)	RCF Conservation Genetics Lab (PSEC)	In development		5
Tier 3				
Polycyclic Aromatic Hydrocarbons (PAHs)	SGS Axys Analytical	EPA 8270/ EPA 1625	GC-MS	5
Multiresidue Pesticides	SGS Axys Analytical	EPA 1699 (mod)	HRMS	5
Pharmaceuticals and Personal Care Products (PPCPs)	SGS Axys Analytical	EPA 1694	HPLC/MS/MS	5
Per and Poly-fluoroalkyl substances (PFAS)	SGS Axys Analytical	EPA 1633 Draft	LC-MS/MS	5
Polychlorinated biphenyls (PCBs)	SGS Axys Analytical	SGS AXYS METHOD MLA-210 Rev 01	GC-MS/MS	5
Alkylphenol Ethoxylates (APEs)	SGS Axys Analytical	SGS AXYS METHOD MLA-004 Rev 07	GC-MS	5
Bisphenols	SGS Axys Analytical	SGS AXYS METHOD MLA-113 Rev 01	LC-MS/MS	5
Sucralose	SGS Axys Analytical	MLA-116	LC-MS/MS	5
6PPD-quinone	DFO Institute of Ocean Science		LCMS	5

Data handling

In some cases, contaminants were not detected in our water samples and concentrations were therefore considered to be 0 for the calculations of totals.

With each batch of samples, analytical laboratories ran blank samples (e.g. samples that go through the same laboratory processes as our environmental samples) that should, in theory, not contain any contaminants. However, in some cases, blank samples contained low concentrations of contaminants. These levels in blanks were subtracted from the concentrations measured in each of our environmental samples ('blank correction').

Environmental Quality Guidelines

We interpreted contaminant concentrations using three sets of Canadian environmental quality guidelines (EQGs): provincial (British Columbia (BC)), federal, and those developed by the Canadian Council of the Ministers of the Environment (CCME). The latter CCME guidelines are derived in consultation with the environment ministers from the federal, provincial and territorial governments. Relevant EQGs and DWQGs are summarized in Appendix 3.

The British Columbia Ministry of Environment and Climate Change Strategy (BC MoECCS) has developed Water Quality Guidelines (WQGs) that are considered as protective for different water uses. We apply WQGs for the protection of stream and rivers aquatic life (source, stream and rivers and Road runoff samples) and marine aquatic life (marine water samples). All approved BC WQGs can be found on the BC MoECCS website.

Federal Environmental Quality Guidelines (FEQGs) are developed to support emerging federal environmental quality monitoring, risk assessment and risk management activities, and are derived to complement those developed by the CCME. They are only available for a limited number of chemicals captured in this list of EQGs (Government of Canada, 2024).

In addition, Working Water Quality Guidelines (WWQGs) are available for some contaminants for which a completed WQG is not yet available and are obtained from various Canadian provincial and federal jurisdictions (primarily the Canadian Council of the Ministers of the Environment (CCME)). WWQGs can be found on the CCME website.

It is important to note that exceeding a WQG/EQG or WWQG does not imply that unacceptable risk exists but rather that the potential for adverse effects is increased (BC MoECCCS, 2023). Conversely, WQGs may not fully capture the sensitivity of all species to different contaminants, such that adverse effects may occur in some species even at levels below a WQG. WQGs, therefore, serve as a benchmark based on best available evidence, and are subject to change as new evidence emerges.

Drinking Water Quality Guidelines

Guidelines are available to protect human health from different contaminants in drinking water. These have been developed at the federal level by Health Canada in collaboration with the Federal-Provincial-Territorial Committee on Drinking Water (CDW) and other federal government departments (Health Canada, 2022). Guidelines for Canadian Drinking

Water Quality are developed specifically for contaminants that meet all of the following criteria (Health Canada, 2022):

- Exposure to the contaminant could lead to adverse health effects in humans;
- The contaminant is frequently detected or could be expected to be found in a large number of drinking water supplies throughout Canada; and,
- The contaminant is detected, or could be expected to be detected, in drinking water at a level that is of possible human health significance.

In BC, the First Nations Health Authority (FNHA) oversees drinking water safety on reserves, where Chief and Council are responsible for drinking water infrastructure and monitoring. Monitoring of drinking water relies on meeting the Health Canada DWQGs. Drinking water quality guidelines can be found on the Health Canada website.

Table 3: Analyte classes and number of available Environmental (or Water) Quality Guidelines (EQGs or WQGs) and Drinking Water Quality Guidelines (DWGs)

Analyte Class	Number of Analytes Measured	Drinking WQGs	Federal EQGs	BC WQGs	CCME EQGs
Basic Water Properties	5	1	0	4	5
Coliform	3	2	0	0	0
Nutrients	4	3	0	4	4
Metals	37	20	4	20	17
PAHs	76	1	0	10	10
Pesticides	62	6	0	10	7
PPCPs	141	0	1	1	0
PFAS	40	2	1	1	0
PCBs	209	0	0	5	0
Alkylphenols	4	0	0	0	0
Bisphenols	6	0	1	1	0
Sucralose	1	0	0	0	0
6PPD-Quinone	1	0	0	0	0
Total	*587*	*35*	*7*	*56*	*43*

We applied three sets of EQGs and one set of DWQGs to our water quality data: The Federal government's *Federal Environmental Quality Guidelines* (FEQGs), the BC Government's Approved *Water Quality Guidelines* (BC WQGs), and the Canadian Council of Ministers of the Environment's (CCME) *Canadian Environmental Quality Guidelines* (CCME CEQGs); and Health Canada's Drinking Water Quality Guidelines. . These guidelines were all designed to protect aquatic life and human health.

International Guidelines and emerging PFAS concerns

There exist several thousand PFAS compounds, but only two are regulated in Canada: PFOA and PFOS, which were banned in 2011. Given the increasing concern over the presence, persistence and toxicity of per- and poly-fluoroalkyl substances (PFAS), Health Canada has developed screening values for a number of PFAS compounds (Appendix 4). These are considered as approved guidelines for drinking water quality, and are based on risk assessment approaches that are similar to formal guidelines (Health Canada, 2023). They therefore serve as guidance when evaluating the risk of PFAS exposure from tap water consumption and are considered in the present report.

Given the limited guidance afforded by Canadian guidelines for the rapidly emerging PFAS concerns, we have included guidelines derived internationally (USA, European Union and WHO).

Table 4: Environmental Quality Guidelines for PFAS (USA and Canada)

Compound	Guideline (mg/L)	Issuing Agency	Notes
PFOS	0.0068	Canadian FEQG	EQG - PFOA under development
PFOS	3	US EPA	DRAFT EQG - Acute
PFOS	0.0084	US EPA	DRAFT EQG - Chronic
PFOA	49	US EPA	DRAFT EQG - Acute
PFOA	0.094	US EPA	DRAFT EQG - Chronic

Very few Environmental Quality Guidelines are available for PFAS. A Canadian Federal EQG was set for PFOS, while a guideline value for PFOA is currently in development.

Table 5: Drinking Water Quality Guidelines for PFAS

Compound	Guideline (ng/L)	Issuing Agency
PFOS	600	Health Canada
PFOS	4	US EPA
PFOA	200	Health Canada
PFOA	4	US EPA
PFHxS	10	US EPA
PFNA	10	US EPA
HFPO-DA	10	US EPA
Total PFAS	500	EU - Drinking Water Directive

Any "guidelines" which used other language, or which were not enforceable (recommended limits, etc.) were omitted from this table. Most available guidelines address the two PFAS compounds of greatest concern to human health: PFOA and PFOS.

Water properties

Capsule

Basic water properties provided elementary information on the quality of fish habitat in the Tod Creek watershed. Source water sites were found to have the lowest temperature. The highest dissolved oxygen (% and mg/L) was measured in the Hartland sites. Source sites were found to have the lowest dissolved oxygen (% and mg/L). The highest conductivity and turbidity among non-marine samples was measured in the Hartland sites, which may reflect a combination of road runoff and Hartland operations.

Introduction

Water properties including temperature (℃), dissolved oxygen, conductivity, pH, and turbidity are commonly measured as a preliminary method of assessing the quality of fish habitat. Temperature and dissolved oxygen are of particular significance to fish - as increased temperatures and low dissolved oxygen are often associated with summertime fish kills. Conductivity and turbidity measurements can act as proxies for total dissolved solids (TDS) and total suspended solids (TSS) respectively. These parameters can be relevant as increased TDS and TSS in a body of water can indicate contamination from road salt or flushing of disturbed sediments into the waterway. Unusual conductivity measurements suggest the need for more in-depth analysis for contaminants.

Methods

A YSI ProDSS was used to take three measurements at each site of the following parameters: temperature (°C), dissolved oxygen (mg/L and %), specific conductivity (uS/cm), pH, and turbidity (FNU). A VTSYIQI water velocity meter was used to take three spot measurements from the shoreline where the samples were collected.

Results

Table 6: Average water property results for five categories of water sampled in the Tod Creek watershed (WET Season)

Analyte	Source (n=3)	Stream and river (n=3)	Road runoff (n=3)	Marine (n=3)	Hartland (n=3)
Temperature (℃)	5.8 ± 0.1 (5.6-6.1)	6.4 ± 0.11 (6.1-6.8)	7.3 ± 0.44 (5.8-8.9)	6.9 ± 0.09 (6.6-7.4)	9.0 ± 0.02 (9.0-9.2)
DO %	71 ± 2.27 (59.1-79.5)	78.2 ± 2.17 (69.4-90.4)	86.5 ± 2.82 (72.6-94.2)	90.6 ± 0.58 (88.1-94.1)	90.1 ± 1.23 (84.2-96.5)
DO (mg/L)	8.79 ± 0.288 (7.42-9.83)	9.85 ± 0.277 (8.59-11.2)	10.3 ± 0.283 (9.05-11.3)	10.0 ± 0.109 (9.59-10.6)	10.3 ± 0.113 (9.71-10.6)
pH	7.31 ± 0.130 (6.78-8.02)	7.33 ± 0.088 (7.03-7.84)	7.45 ± 0.081 (7.07-7.79)	7.65 ± 0.009 (7.61-7.69)	7.39 ± 0.150 (6.79-7.72)
Conductivity (uS/cm)	102 ± 3.96 (93.5-123)	143 ± 6.96 (115-164)	198 ± 19.4 (138-271)	23,500 ±1250 (19,100-28,900)	421 ± 53.0 (288-630)
Turbidity (FNU)	1.33 ± 0.149 (1.06-2.12)	2.3 ± 0.32 (1.2-4.2)	3.1 ± 0.32 (2.21-4.34)	2.2 ± 0.03 (2.05-2.40)	4.3 ± 0.59 (2.1-6.2)
Flow (m/s)	NA	0.224 ± 0.006 (0.212-0.232)	0.065 ± 0.016 (0.035-0.089)	NA	0.045 ± 0.045 (0.045-0.045)

Data represent the mean +/- Standard Error of the Mean (SEM), with the Range in parentheses (min-max). DO = Dissolved Oxygen. uS/cm = MicroSiemens per cm. FNU = Formazin Nephelometric Units. We did not collect water properties data on the tap water samples collected due to logistical difficulties in securing samples from individual homes and delivering them to our partner labs on time.

Conclusions

- Water, temperature, pH, and dissolved oxygen were all in acceptable ranges when evaluated against Environmental Quality Guidelines designed to protect aquatic life.
- Turbidity could not be assessed in relation to Environmental Quality Guidelines as it requires knowledge of background turbidity, but it was higher in those water categories that were downstream of source water.
- Conductivity was highest - as expected with naturally occurring ions and metals - in the marine sample, but was also elevated in the Hartland drainage samples when

compared to the other freshwater categories. This could be due to a combination of road runoff with deicing activities as well as Hartland operations.

Coliform bacteria

Capsule

Coliform bacteria in water indicate a potential threat to human health. The highest concentration of total coliform was detected in the road runoff sample. The highest concentration of fecal coliform and E. coli were detected in the stream and river sample. No coliform bacteria were detected in the pooled tap water sample. Relative low counts in the surface water samples may reflect human, pet or wild animal sources. Future Microbial Source Tracking results will be useful in identifying the host species for this observation. There were no exceedances of Water Quality Guidelines designed for recreational use of water for E. coli.

Introduction

Coliform bacteria have historically been used to gauge water quality with respect to implications for human recreational use and drinking water consumption. Most recently, the spotlight has been on counts (MPN of CFU) of the gram-negative coliform bacteria species *Escherichia coli* as an indicator of recent contamination with wastewater, and to determine the risk to human health posed by consumption and recreational use of waterways. There are no Environmental Quality Guidelines for coliform bacteria, reflecting the general idea that these potentially pathogenic bacteria are not likely to present a risk to aquatic life. Further work to measure Enterococci bacteria in future marine water samples will strengthen the evaluation of microbial contamination in water.

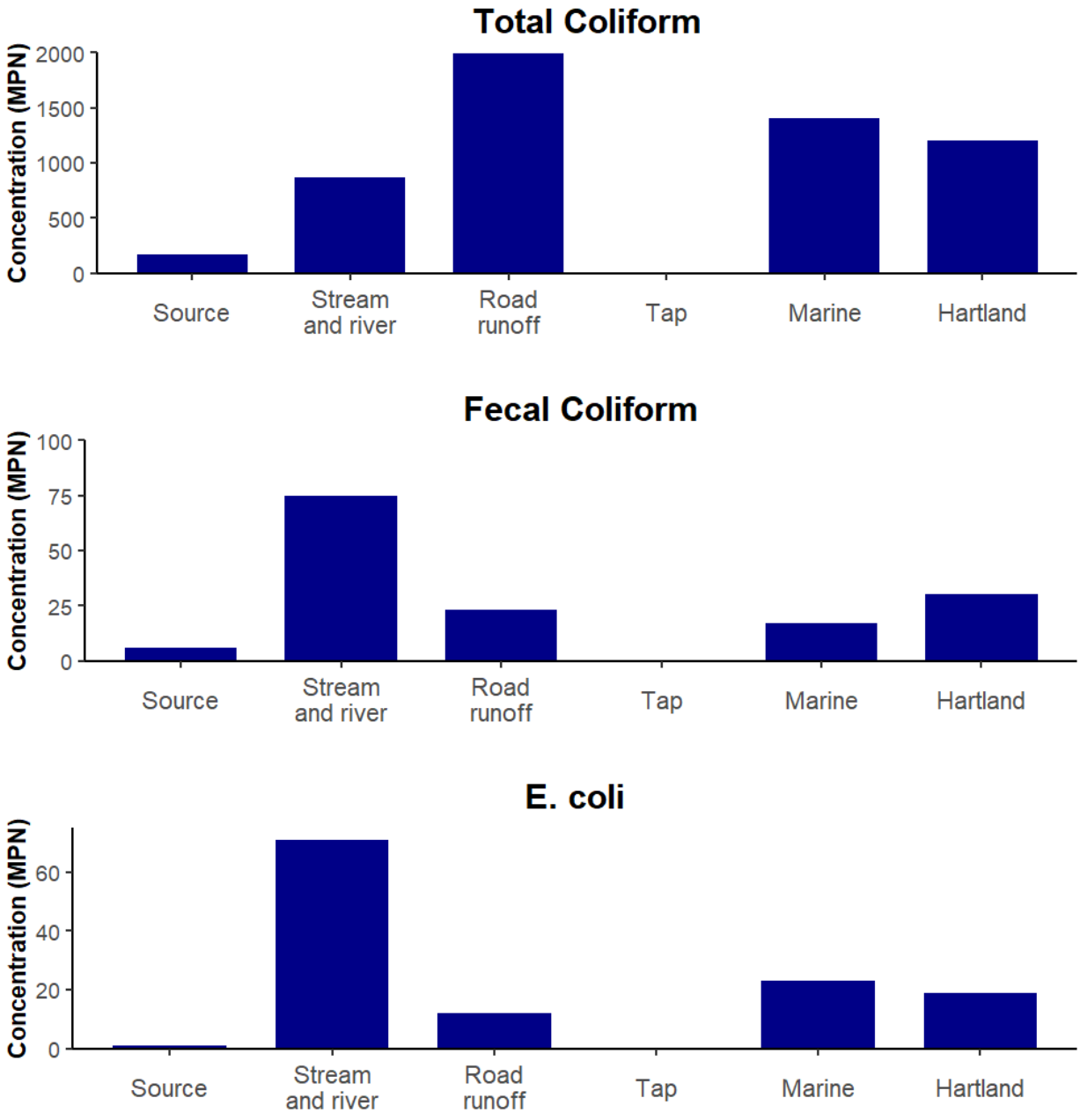
Results

Table 7: Concentration (MPN/100mL) of coliform bacteria in six water categories in the Tod Creek watershed (WET Season)

Analyte	**Source** (n=1)	**Stream and river** (n=1)	**Road runoff** (n=1)	**Tap** (n=1)	**Marine** (n=1)	**Hartland** (n=1)
Coliform, Total	172	866	1990	0	1410	1200
Coliform, Fecal	6	75	23	0	17	30
E. coli	1	71	12	0	23	19

The highest concentration of total coliform were detected in the road runoff sample, while the highest concentrations of fecal coliform and E. coli were detected in the stream and river sample.

Figure 2: Coliform concentration (MPN/100mL) in six water categories in the Tod Creek watershed (WET Season)



The highest concentration of total coliform bacteria was detected in the road runoff sample, while the highest concentrations of fecal coliform and E. coli were both detected in the stream and river sample. No coliform bacteria were detected in the tap water sample.

Conclusions

- Total E. coli concentrations for the five water categories were ranked from highest to lowest as follows: stream and river > marine > Hartland > road runoff > source > tap.

- E. coli values in all water samples were well below Recreational Use Guidelines set by Health Canada (>235 CFU/100ml).

- the inherent variability of coliform measurements in environmental samples (over time, place and among analyses) underscore the value in generating larger sample sizes or a modified approach to study design.

- No coliform were detected in the pooled tap water sample, indicating that there is no pathogenic risk to drinking water safety in the homes tested.

Nutrients and physical parameters

Capsule

Excess nutrients from fertilizers, wastewater and other human activities can readily degrade fish habitat by increasing plant and algal growth and causing a reduction in dissolved oxygen. Nitrate concentrations in the Hartland drainage sample exceeded the long-term Environmental Quality Guideline for the protection of aquatic life, but not the short-term acute Guideline.

Introduction

Nutrients such as nitrogen and phosphorus compounds can be naturally occurring, and are critical for the health and growth of plants and animals. However, nutrients from fertilizers and wastewater that are released into a body of water can put it at risk of eutrophication - a process which is characterized by an overgrowth of plants and algae and resulting in oxygen depletion. Eutrophication poses a significant risk to aquatic life, as low oxygen levels create an inhospitable environment for the survival of fish - in particular salmonids who require relatively high levels of dissolved oxygen for survival and reproduction.

In addition, some nutrients such as total ammonia are considered to be acutely toxic to freshwater fish species at concentrations that vary with the temperature and pH of the water.

Results

Table 8: Average concentrations (mg/L) of physical and chemical properties in each water category for the Tod Creek watersheds (WET Season)

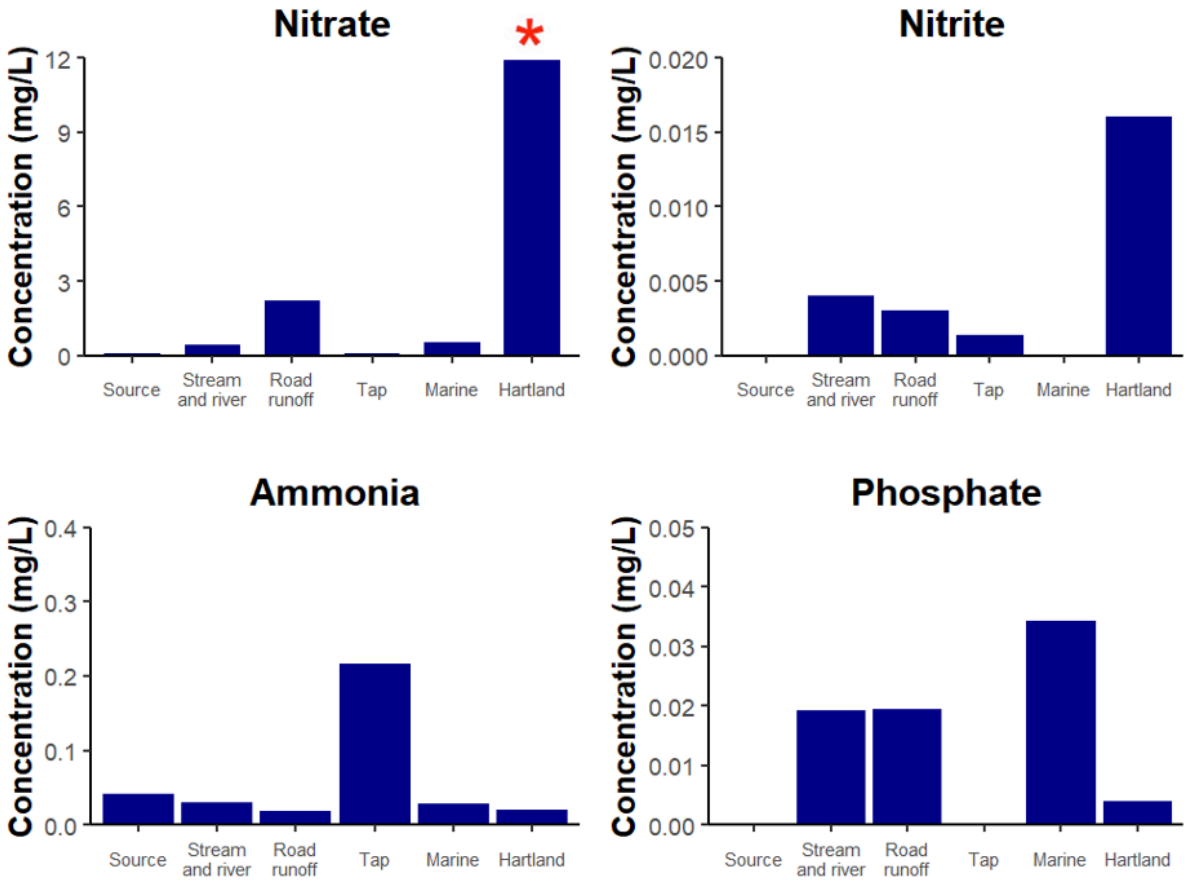
Analyte	**Source** (n=1)	**Stream and river** (n=1)	**Road runoff** (n=1)	**Tap** (n=1)	**Marine** (n=1)	**Hartland** (n=1)
Hardness, Total (as CaCO3)	32	53.5	73.1	17.8	1550	194
Carbon, Total Organic	12	7.92	9.36	2.11	5.03	8.7
Solids, Total Dissolved	80	94	125	40	8090	369
Solids, Total Suspended	0	0	0	0	7.4	0
Biological Oxygen Demand (BOD)	8.3	5	6.8	0	0	27.8

Table 9: Average nutrient concentrations (mg/L) in each water category for the Tod Creek watersheds (WET Season)

Analyte	**Source** (n=1)	**Stream and river** (n=1)	**Road runoff** (n=1)	**Tap** (n=1)	**Marine** (n=1)	**Hartland** (n=1)
Ammonia, total (as N)	0.0413	0.0292	0.0187	0.216	0.0278	0.0194
Nitrate (as N)	0.0646	0.422	2.23	0.0614	0.536	**11.9**
Nitrate + Nitrite (as N)	0.0646	0.426	2.23	0.0628	0.536	11.9
Nitrogen, total	0.424	0.803	2.4	0.441	0.754	11.6
Nitrite (as N)	0	0.004	0.003	0.0014	0	0.0161
Phosphate, ortho-, dissolved (as P)	0	0.0193	0.0195	0	0.0343	0.0039

Water samples were analyzed for the following nutrients: total nitrogen, nitrate (NO^{-3}), ammonia (NH_3), phosphate (PO_4^3) and nitrite (NO^{-2}). The Hartland drainage water sample had a nitrate (NO^{-3}) concentration that exceeded the BC WQG long-term chronic guideline of 3.0, but did not exceed the short-term acute (32.8 mg/L), or CCME guideline for the protection of aquatic life (550 mg/L) for the protection of aquatic life. n=1 is a composite of 3 sample locations of the same water type.

Figure *3*: Mean Nutrie*nt concentrat*ions (mg/L) in five water categories in the *Tod Creek* watershed (*WET* Season)



Nitrate (NO^{-3}) and ammonia (NH_3) were the most commonly detected nutrients in water samples from the Tod Creek watershed, each present in all six samples. The highest concentration (11.9 mg/L) of nitrate (NO^{-3}) was detected in the Hartland drainage sample which exceeded the CCME long-term exposure guideline for the protection of aquatic life (3.0 mg/L). Ammonia (NH_3) was detected at the highest concentration in the tap water sample. Phosphate (PO_4^{3}) and nitrite (NO^{-2}) were detected in four out of the six samples, with the highest concentrations being in marine and Hartland samples respectively.

Conclusions

- The nitrate concentrations ranked from highest to lowest in the six water samples were as follows: Hartland > road runoff > marine > stream and river > source > tap.
- Nitrate and ammonia were the most frequently detected nutrients in samples across the Tod Creek watershed.

- The Hartland sample had the highest concentrations of nitrate (NO^{-3}) and nitrite (NO^{-2}).
- Tap water had the highest concentration of ammonia (NH_3).
- The nitrate concentration in the Hartland water sample (11.9 mg/L) exceeded the CCME Guideline for long-term exposure of 3.0 mg/L (NO^{-3} as N) by almost 4x.
- None exceed the CCME Guidelines except the nitrate concentration in the Hartland water sample (11.9 mg/L) exceeded the CCME Guideline for long-term exposure of 3.0 mg/L (NO^{-3} as N) by almost 4x.
- Nitrate exceeds the BCWQG long term chronic (3.0 mg/L), but does not exceed the short term BVWQG of 32.8 or the CCME guideline of 550 mg/L.

Metals

Capsule

Metals can be present in water due to both natural and anthropogenic inputs. Sixteen metals were detected in all of the water samples collected in the Tod Creek watershed. Aside from the marine sample, total metal concentrations were highest in the Hartland water sample, consistent with our observation of higher levels of conductivity. Aluminum concentrations exceeded Environmental Quality Guidelines in all water samples except tap water.

Introduction

Metals are present in aquatic environments as a result of both natural and anthropogenic sources, with baseline levels reflecting the unique geology of the area surrounding a body of water. Anthropogenic sources of metal contamination in waterways may originate from industrial effluent, municipal wastewater, agricultural practices, and urban runoff.

Many metals are capable of impacting the health of aquatic life, with some representing a priority concern in fish habitat, including Zinc and Copper.

Results

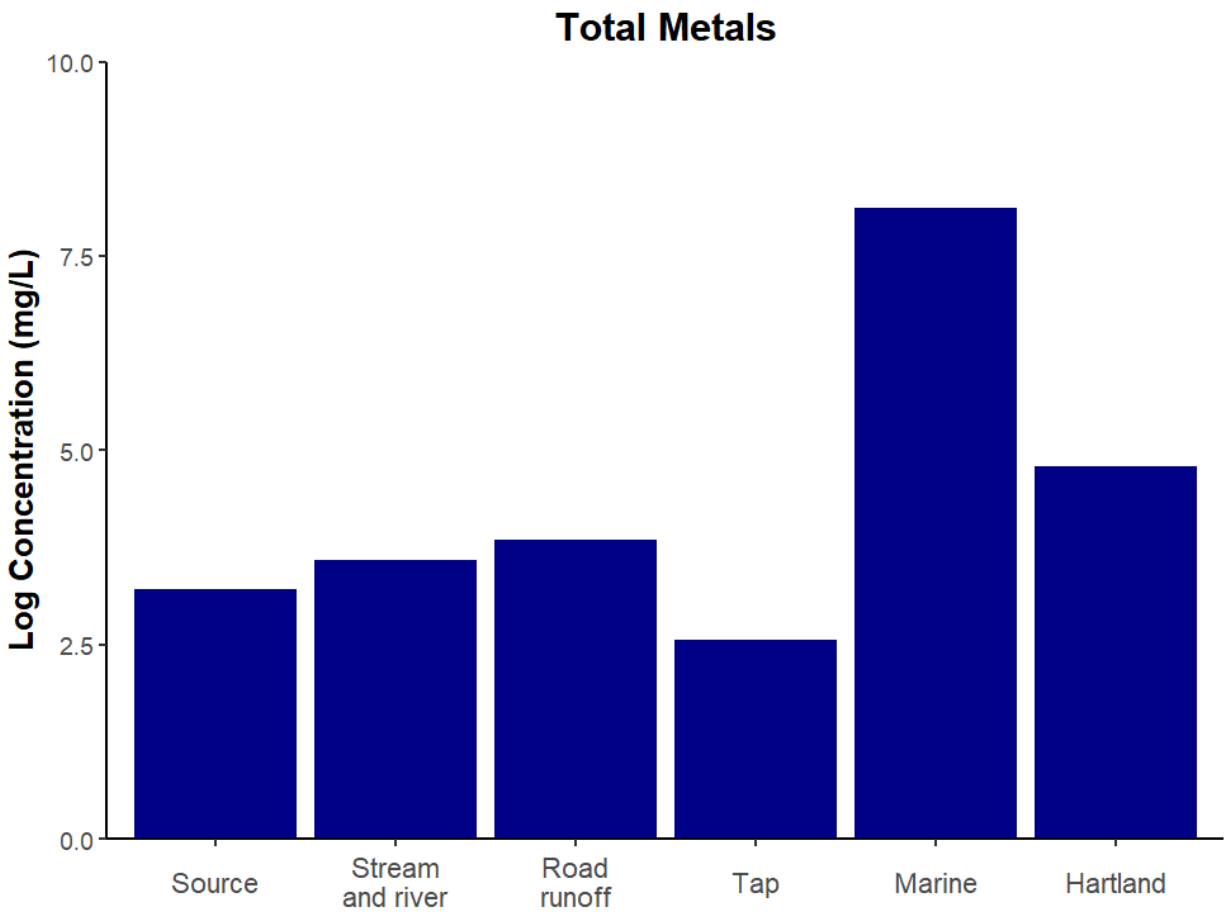
Table 10: Total concentrations (mg/L) of the 16 metals that were detected in all six water categories in the Tod Creek watershed (WET Season)

Analyte	**Source** (n=1)	**Stream and river** (n=1)	**Road runoff** (n=1)	**Tap** (n=1)	**Marine** (n=1)	**Hartland** (n=1)
Aluminum	**0.11**	**0.10**	**0.19**	0.02	**0.14**	**0.11**
Barium	0.00536	0.00585	0.00883	0.00348	0.00839	0.00838
Boron	0.023	0.025	0.024	0.012	1.04	0.082
Calcium	9.14	15.5	21.7	5.22	101	63.5
Iron	0.251	0.159	0.162	0.029	0.165	0.148
Magnesium	2.24	3.59	4.6	1.17	315	8.67
Manganese	0.017	0.0118	0.00719	0.00257	0.0113	0.0153
Molybdenum	0.000211	0.00025	0.00022	0.00008	0.00279	0.00112
Potassium	0.45	1.0	1.2	0.14	99	1.0
Silicon	3.11	4.07	5.64	2.3	4.3	7.81
Sodium	8.14	7.56	9.98	3.89	2620	9.58

Strontium	0.0354	0.0528	0.0741	0.0186	1.82	0.173
Copper	0.00108	0.00182	0.00329	0.0993	0	0.00363
Lead	0.000077	0.000122	0.000098	0.00031	0	0.000054
Sulfur	1.43	3.61	3.75	0	232	30
Titanium	0.0031	0.00419	0.0083	0	0.00608	0.00458
Total Metals	25	36	47	13	3400	120

***Bold** indicates a concentration that is at or exceeds Environmental Quality Guidelines. Tap water did not exceed the Health Canada Drinking Water Quality Guideline.

Figure 4: Total metal concentrations (mg/L) in six water categories in the Tod Creek watersheds (WET Season)



Total metal concentrations are shown with a logarithmic transformation to allow for visualization of the data. The marine sample - as expected - had the highest concentration of total metals among all samples, while the Hartland sample had the highest concentration of total metals among the non-marine categories.

Table 11: Concentrations (mg/L) of lead detected in all six water categories in the Tod Creek watersheds (WET Season)

Analyte	**Source** (n=1)	**Stream and river** (n=1)	**Road runoff** (n=1)	**Tap** (n=1)	**Marine** (n=1)	**Hartland** (n=1)
Lead (mg/L)	0.000077	0.000122	0.000098	0.00031	0	0.000054

Lead can be a concern when found in drinking water. No water samples exceeded DWGs or EQGs available for lead.

Conclusions

- Total metal concentrations in the six water categories from highest to lowest are as follows: marine > Hartland > road runoff > stream and river > source > tap.
- The aluminum concentrations in all surface water samples were above the CCME Long Term Guideline for the protection of aquatic life (0.1 mg/L), possibly due to naturally-occurring levels of this metal.
- Lead was detected in all of the water samples apart from the marine water sample. There were no lead exceedances of EQGs or DWQGs.

Polycyclic Aromatic Hydrocarbons (PAHs)

Capsule

Low levels of polycyclic aromatic hydrocarbons (PAHs) were detected in all six water samples, with the highest concentrations observed in the tap water sample, and the lowest in the stream and river sample. Naphthalene was consistently detected at the highest concentrations in all samples. PAH profiles suggested that the combustion of wood and/or plant material contributed to the contamination of all samples, possibly a reflection of wildfire smoke. WQGs are only available for 10 PAHs, but no exceedances were observed for any samples. Finally, the tap water sample did not exceed the one PAH guideline (BaP) available for drinking water.

Introduction

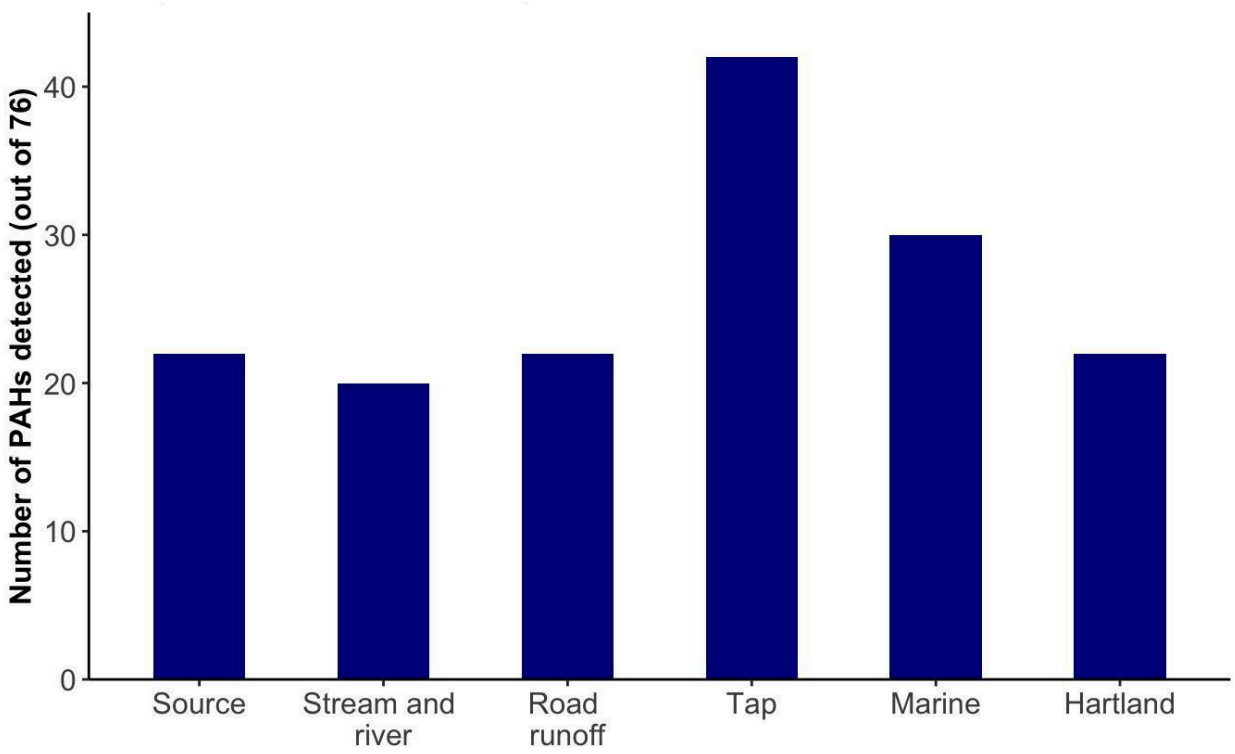
Polycyclic aromatic hydrocarbons (PAHs) are a complex group of compounds found in coal, petroleum and plant materials. They can enter waterways in the form of liquid petroleum products (gasoline, diesel, oil) or via the incomplete combustion of coal, oil, gas, wood garbage or other organic substances. They can occur naturally or as a result of human activities (anthropogenic). In Canada, forest fires are the single most important natural source of PAHs, while anthropogenic sources include residential wood heating, aluminum smelters, creosote-treated products, spills of petroleum products and metallurgical and coking plants, and household activities (Government of Canada, ECCC and Health Canada, 1994; Marvin et al., 2021).

Hydrocarbons can enter aquatic ecosystems either directly through oil spills or discharges from vessels (Morales-Caselles et al., 2017) or indirectly through atmospheric deposition, runoff and discharge from wastewater treatment plants. Depending on their molecular size, PAHs vary in toxicity and have been classified as toxic under the Canadian Environmental Protection Act (CEPA).

Results

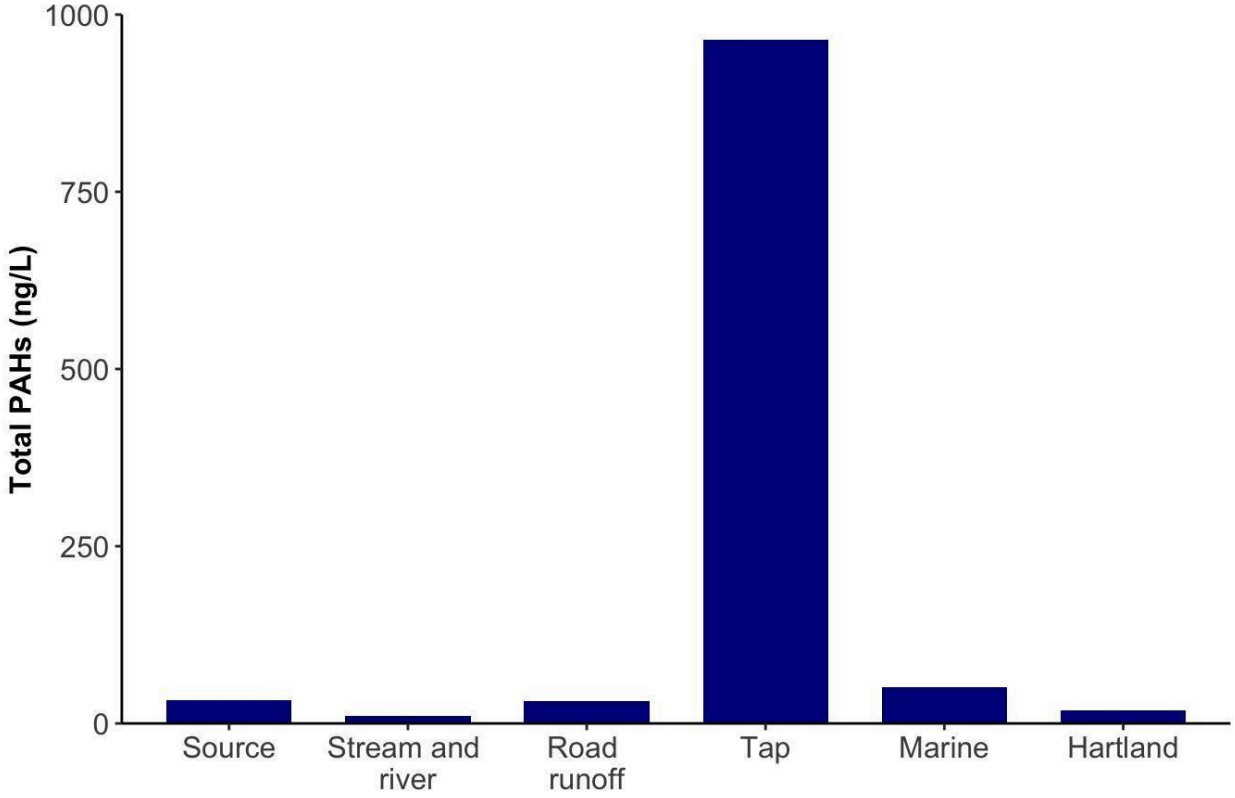
We measured 76 different parent and alkylated PAHs in the six water samples collected in the Tod Creek watersheds during the wet season.

Figure 5: Number of PAHs detected in water samples from the Tod Creek watershed (WET Season)



PAHs were detected in all six water categories. The number of PAHs detected ranged from 20 (stream and river) to 42 (tap) with an average of 26.3 ± 3.4.

Figure 6: Total PAH concentrations in water samples from the Tod Creek watershed (WET Season)



Total PAH levels ranged between 11.2 (stream and river) and 963.9 ng/L (tap) with an average across all water categories of 185 ± 156 ng/L.

The top 6 PAHs with the highest concentrations contributed between 60% (landfill) and 85% (Road runoff) of total PAH concentrations (Table 12). The PAH composition for these top 6 was variable across water categories with only naphthalene being consistently detected with the highest concentrations in all samples. C2-Biphenyls were present in the top 6 of all samples except stream and river water and tap.

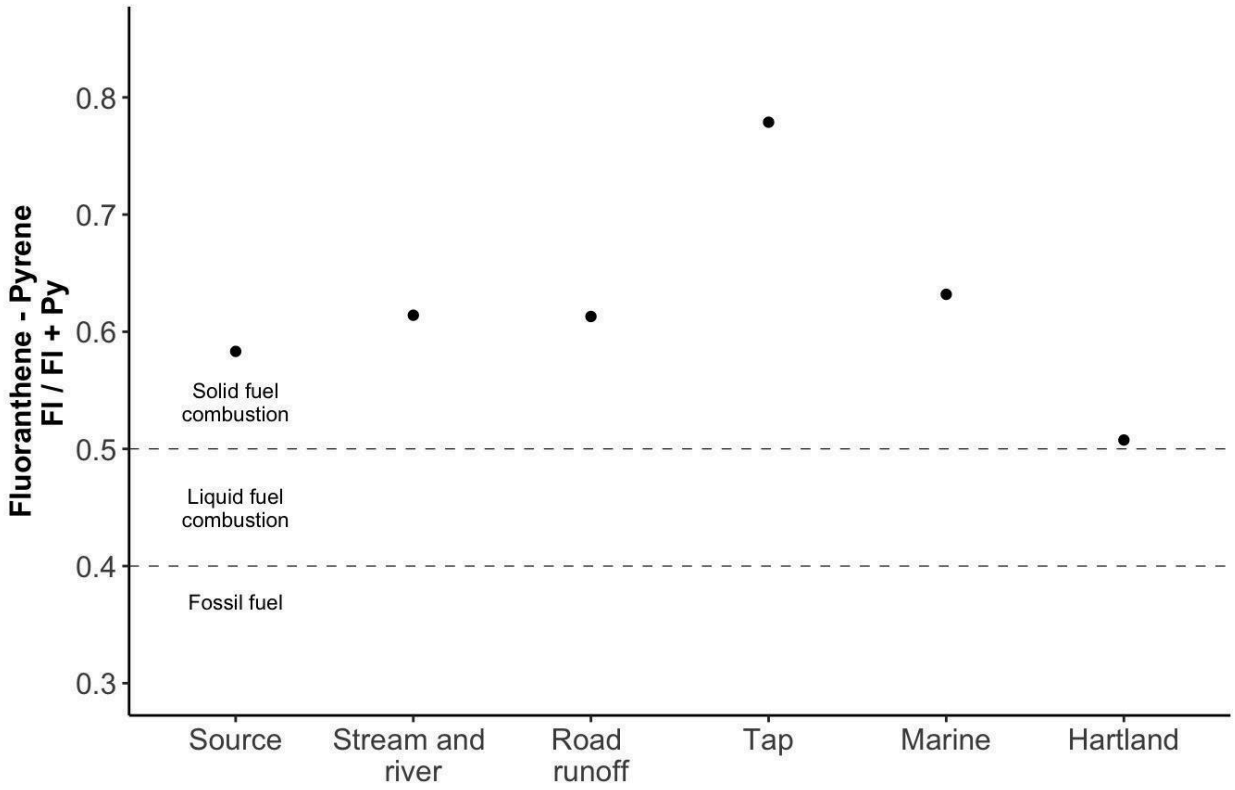
Table 12: Top 6 PAHs with the highest concentrations in each water sample from the Tod Creek watersheds (WET Season)

Source	Stream and river	Road runoff	Tap	Marine	Hartland
C2-Biphenyls (15.4)	Naphthalene (2.6)	C2-Biphenyls (18)	Naphthalene (244.9)	C2-Biphenyls (11)	C2-Biphenyls (4.5)

	C1-Biphenyls (2.9)	Phenanthrene (1.2)	C1-Biphenyls (3.2)	Phenanthrene (205.3)	Naphthalene (6.1)	Naphthalene (1.7)
	Naphthalene (2.3)	C1-Naphthalene (0.98)	Naphthalene (2.7)	Acenaphthene (96.6)	C1-Naphthalenes (5.3)	C4-Phenanthrenes (1.6)
	Retene (2.2)	Acenaphthene (0.90)	C2-Dibenzothiophenes (1.1)	C1-Naphthalenes (85.6)	2-Methylnaphthalene (3.3)	Acenaphthene (1.2)
	C4-Phenanthrenes (1.6)	1-Methylnaphthalene (0.63)	C1-Naphthalenes (1.1)	2-Methylnaphthalene (52.2)	Phenanthrene (3.1)	C2-Naphthalenes (1.0)
	Phenanthrene (1.4)	Retene (0.63)	Phenanthrene (0.64)	Fluoranthene (44.5)	C2-Naphthalenes (2.8)	C1-Biphenyls (1.0)
Total concentrations of top 6 (% of total PAHs)	25.9 (78%)	6.9 (62%)	26.7 (85%)	727.9 (75%)	31.6 (61%)	10.9 (60%)

Ratios of certain PAHs can be used to evaluate sources. Given that only a limited number of PAHs were detected in the water samples, the Fluoranthene - Pyrene ratio was the only one that could be calculated reliably for all samples.

Figure 7: PAH profiles from wood combustion and fuels in water samples from the Tod Creek watershed (WET Season)



All samples had Fl/Py ratios higher than 0.5, suggesting the contribution of combustion of solid fuel such as wood, plant material or coal as the source of PAHs.

Conclusions

- PAH concentrations were ranked as follows from highest to lowest: tap > marine > source > road runoff > Hartland > stream and river.

- Total PAH concentrations in Tod Creek watershed water samples ranged from 11.2 to 963.9 ng/L.

- Fluoranthene - Pyrene ratios revealed that PAHs in all samples originated primarily from the combustion of solid fuel such as wood or plant material. This is consistent with wood burning for heating homes, and wildfires, as being major sources of PAHs in Canada (Berthiaume et al., 2021). In addition, biomass burning in Asia has been

shown to deliver PAHs to Canada through air masses traveling across the Pacific Ocean (Berthiaume et al., 2021).

- All the water samples were well below the BC WQGs available for individual PAHs (naphthalene, acenaphthene, fluorene, anthracene, phenanthrene, fluoranthene, pyrene, chrysene, benzo-a-pyrene and benzo-a-anthracene).
- The only DWQG for PAHs was for benzo-a-pyrene (40 ng/L); BaP was not detected in the tap water sample.
- Background PAH concentrations were higher than those measured in the Hartland samples.

Pesticides

Capsule

A limited number of pesticides were detected in all six water samples, with the highest concentrations in the stream and river water sample, and the lowest in the tap water sample. All the pesticides detected are banned in Canada. Alpha- endosulfan, hexachlorobenzene and chlorpyriphos were detected in the majority of samples. Out of the pesticides detected in environmental samples, WQGs were only available for endosulfan and chlorpyriphos, but no exceedances for these pesticides were observed. There were no DWGs for hexachlorobenzene and alpha-HCH, the two pesticides detected in tap water.

Introduction

Pesticides have been developed to control, destroy or inhibit the activities of pests. They have a wide range of applications in agriculture such as insecticide to prevent crop damage and fungicides to prevent plant disease but also in forestry, industry as well as in our own backyards for lawn care or weed and insect control. In Canada, all pesticides used, sold or imported are regulated by Health Canada's Pest Management Agency (PMRA) (Health Canada, 2007).

While pesticides are mostly applied on terrestrial habitats, they can reach aquatic environments through overspray or drift during application, surface runoff, and through long range atmospheric transport and deposition. It is estimated that 10% of pesticides applied to soil reach non-target areas, leading to their widespread presence in surface waters worldwide (Schulz, 2004; Anderson et al., 2022).

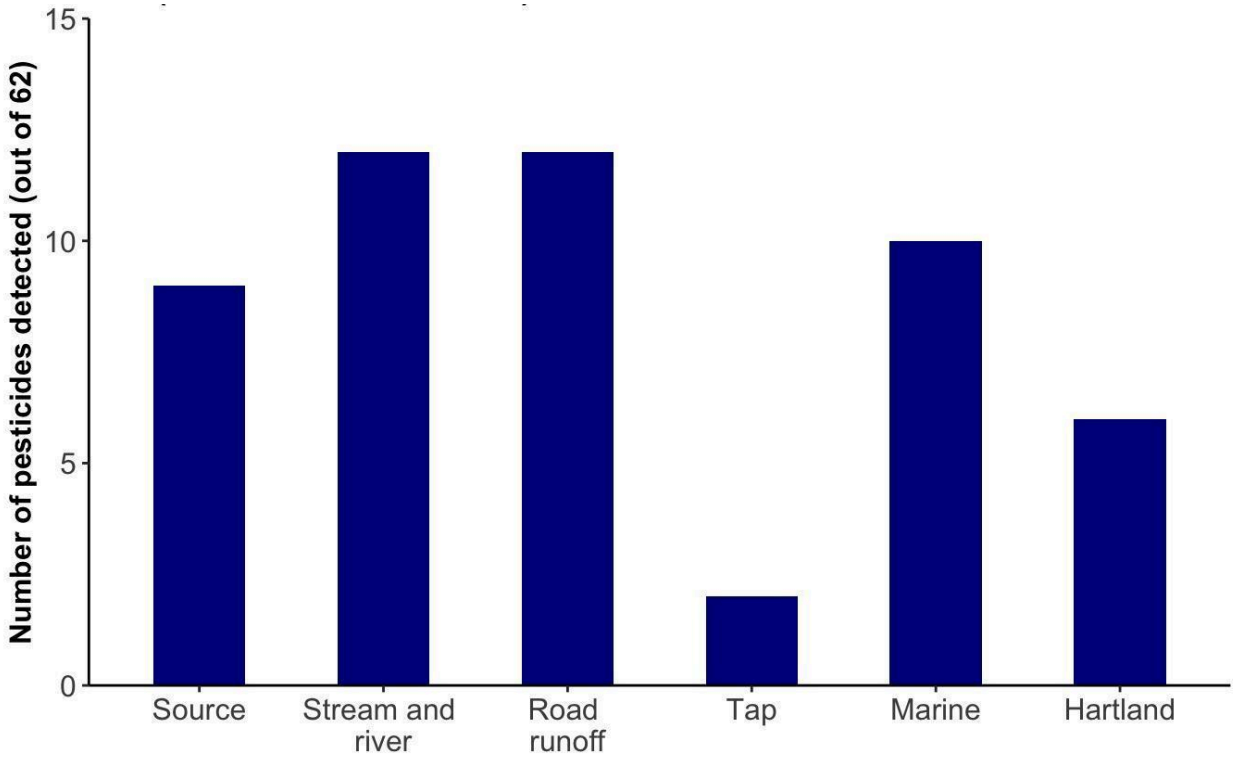
Organochlorine pesticides (OCP) were heavily used from the 1940s to the 1980s, but have been restricted due to their persistence, toxicity and potential for bioaccumulation. Current-use pesticides (CUPs) were subsequently favoured as an alternative to OCPs, and have been widely applied in recent decades (Ding et al., 2023). These tend to be more water-soluble and may be more mobile in fish habitat (Harris et al., 2008).

Results

We measured 62 different pesticides, including both legacy and CUPs in the six water samples collected within the Tod Creek watershed during the wet season. Stream and river,

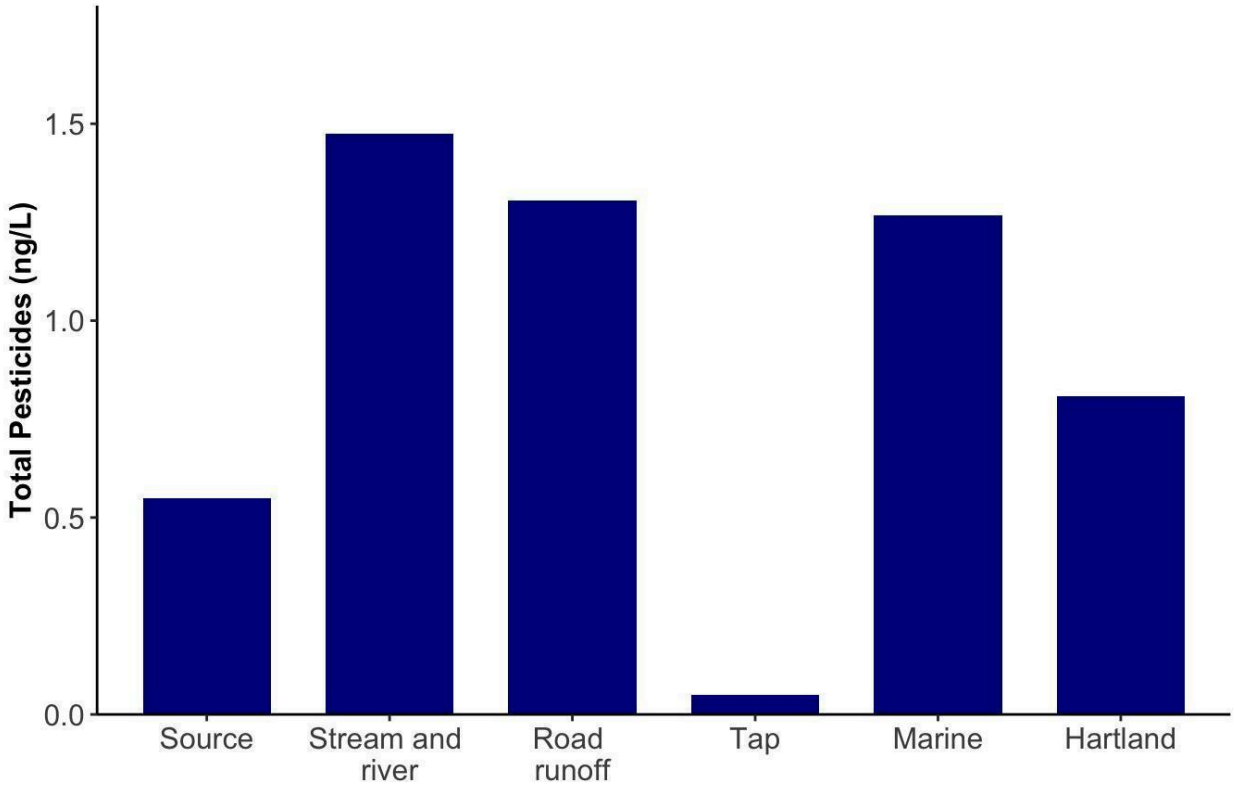
and road runoff had the highest number of detected pesticides as well as the highest total concentrations.

Figure 8: Number of pesticides detected in water sampled in the Tod Creek watershed (WET Season)



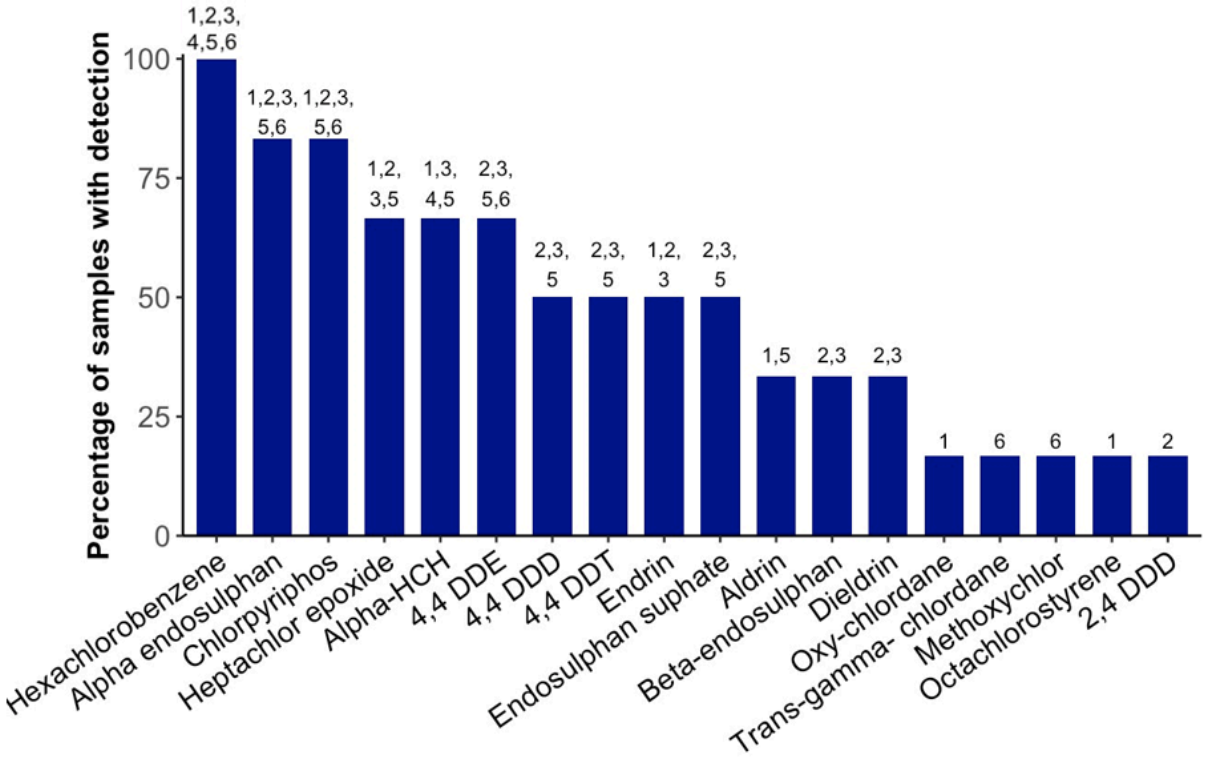
The number of pesticides detected ranged from 2 (tap) to 12 (stream and river and road runoff) with an average of 8.5 ± 1.6.

Figure 9: Total pesticide concentrations in water sampled in the Tod Creek watersheds (WET Season).



Total pesticide levels ranged from 0.05 (tap) to 1.5 ng/L (stream and river), with an average across all water categories of 0.91 ± 0.22 ng/L.

Figure 10: Most frequently detected pesticides in water categories sampled in the Tod Creek watershed (WET Season)



Numbers refer to water categories (1: Source; 2: Stream and river, 3: Road runoff, 4: Tap; 5: Marine; 6: Hartland). For example, the Hartland landfill water sample had detectable concentrations of Alpha-endosulfan, hexachlorobenzene, chlorpyriphos, 4,4' DDE, methoxychlor and trans-gamma-chlordane. Tap water had detectable levels of hexachlorobenzene and alpha-HCH.

All the pesticides detected were legacy chemicals that were no longer in use at the time of sampling. Hexachlorobenzene (100% of samples), alpha- endosulfan (83% of samples) and chlorpyriphos (83% of samples) were detected in the majority of samples.

Hexachlorobenzene is a fungicide to treat seeds of food crops. While it is banned in Canada and most other countries, it can be produced unintentionally as a by-product of the manufacture of certain industrial chemicals (Government of Canada, 2017).

Endosulfan is a restricted-use insecticide and acaracide used to control a broad range of insect and arthropod pests on a wide variety of food, feed and ornamental crops (Health Canada, 2011). The commercial mixture contains both alpha- and beta- endosulfan.

Endosulfan has been banned in Canada since 2016 and is banned or restricted in most other countries (ECCC, 2023).

Chlorpyrifos is an organophosphate insecticide used in agricultural and ornamental production, forestry and mosquito control. Any use of chlorpyrifos pesticides has been prohibited since December 2023 (Health Canada, 2023).

Conclusions

- Pesticide concentrations in the Tod Creek watershed were ranked as follows from highest to lowest: stream and river > road runoff > marine > Hartland > source > tap.
- Total pesticide concentrations ranged from 0.05 to 1.5 ng/L.
- All pesticides detected are no longer in use in Canada. Their detection likely reflects historical use nearby as well as deposition following long-range atmospheric transport. Interestingly, hexachlorobenzene and endosulfan were the most abundant pesticides detected in air samples collected from four mountains across British Columbia, including Grouse Mountain in North Vancouver (Ding et al., 2023).
- Endosulfan and chlorpyriphos were the only pesticides detected that had EQGs, and no samples exceeded these Guidelines.
- Hexachlorobenzene and alpha-HCH were the only pesticides detected in tap water and no DWGs were available for these pesticides.

Pharmaceuticals and Personal Care Products

Capsule

Pharmaceuticals and Personal Care Products (PPCPs) are a category of contaminants that can enter the environment via wastewater, and are typically not removed during treatment. DEET and cocaine were detected in all six water samples. Metformin, penicillin, benzoylecgonine and cotinine were detected in five out of six water samples. Caffeine and theophylline were detected in four out of five water samples. PPCP concentrations were relatively low throughout all samples.

Introduction

Pharmaceuticals and Personal Care Products (PPCPs) comprise a wide range of products and chemical formulations. The common link among these compounds is their use in human health, veterinary health and personal care. Many PPCPs are introduced into the environment via wastewater streams, and are not reliably removed during treatment at wastewater treatment plants (WWTPs).

DEET (N,N-diethyl-meta-toluamide) is a widely used insect repellent. Cocaine is a recreational drug, with its metabolic product benzoylecgonine. Metformin is a drug commonly prescribed for the treatment of diabetes and pre-diabetes, and functions to lower the blood glucose levels of users. Caffeine is a plant-derived stimulant found in widely-consumed beverages. Penicillin is a well-known antibiotic used to treat bacterial infections. Cotinine is the breakdown product of nicotine. Cotinine is the breakdown product of nicotine. Theophylline is an asthma/pulmonary medication. Onsite sewage treatment systems (septic) can also be a significant source.

Caffeine has been used as an indicator of human wastewater in the environment - as it is relatively stable and persistent in surface waters, but sucralose is increasingly used in its place.

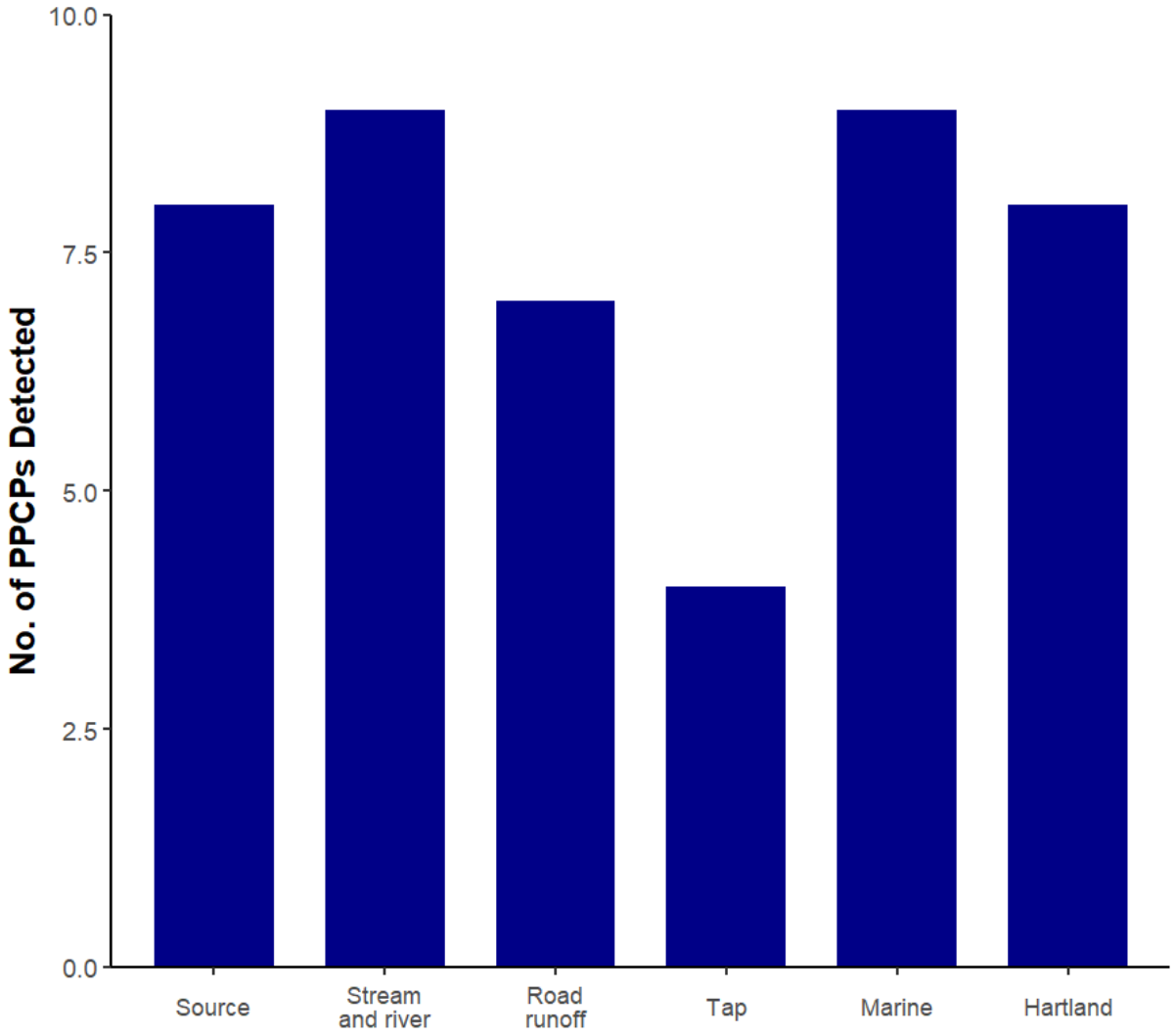
Results

Table 13: PPCP concentrations (ng/L) for all analytes detected in each water category for the Tod Creek watershed (WET Season)

Analyte	Source	Stream and river	Road runoff	Tap	Marine	Hartland
2-Hydroxy-ibuprofen	0	5.47	0	0	0	0
Cefotaxime	6.76	0	0	0	0	0
Penicillin G	0	0	0	39.78	3.79	3.79
Caffeine	0	16.7	9.04	0	14.3	10.5
Carbamazepine	0	0.614	0	0	0.715	1.52
Sulfamethizole	1.24	0	0	0	0	0
Cotinine	0.464	1.58	0.677	0	1.06	0.4
Metformin	1.49	4.33	2.91	0	9.58	2.59
Benzoylecgonine	0	0.547	0.375	1.32	0.518	0.485
Cocaine	0.389	0.262	0.258	4.54	0.186	0.309
DEET	1.98	2.93	1.22	6.9	1.13	37.94
10-hydroxy-amitriptyline	0.227	0	0	0	0	0
Theophylline	7.65	14.6	7.6	0	11	0
Total PPCP Concentration	**20.2**	**47.0**	**22.1**	**52.5**	**42.3**	**57.5**
Total number of PPCPs detected	*8*	*9*	*7*	*4*	*9*	*8*

A total of thirteen different PPCPs were detected in water samples collected in the Tod Creek watershed. The highest concentration was detected in the Hartland water sample. The greatest number of different PPCPs were detected in the stream and river, and marine samples.

Figure 11: The number of PPCPs detected in each of six water samples from the Tod Creek watershed (WET Season)



Stream and river, and marine samples had the greatest number of PPCPs detected among water categories. The tap sample had the lowest number of compounds detected, but highest concentrations.

Conclusions

- Relatively low levels of PPCPs were detected in water samples in the Tod Creek watershed.
- PPCP concentrations in water samples ranged from highest to lowest as follows: Hartland > tap > stream and river > marine > road runoff > source.
- There are no EQGs available in Canada for any of the PPCPs we detected in water samples for the Tod Creek watershed.
- The only PPCP for which there is an Environmental Quality Guideline is Ethinylestradiol (EE), which is used widely as one of the hormonal components of birth control - as it has been shown to negatively impact both reproductive and immune function in some fish species. We did not detect EE in any of the samples collected from the Tod Creek watershed.
- Future sampling will complement findings here and contribute to a better understanding of the modest number of PPCPs detected in the various water categories in Tod Creek.

Per- and poly-fluoroalkyl substances (PFAS)

Capsule

Per- and poly-fluoroalkyl substances (PFAS) were detected in all Tod Creek watershed samples, with the highest concentrations observed in the Hartland drainage sample and the lowest in tap water. Perfluorooctanesulfonic acid (PFOS) and Perfluorooctanoic Acid (PFOA) were detected in all samples except tap water, reflecting legacy use as these chemicals were banned in Canada in 2009 and 2016, respectively. Perfluoro-octanesulfonamide (PFOSA) was the only PFAS detected in tap water. None of the samples exceeded the few environmental quality guidelines available (PFOS) or Canadian and international guidelines or other regulatory values for drinking water. New guidelines for PFAS are in development, such that this interpretation may change for this class of contaminant.

Introduction

Per- and poly-fluoroalkyl substances (PFAS) are large group (~15,000 compounds) of human-made substances that are widely used in a variety of products such as food packaging, non-stick cookware, clothing, cosmetics but also firefighting foams, lubricants and oil/water repellents. They are extremely stable and therefore persistent in the environment, which has led to the use of the term “forever chemicals”.

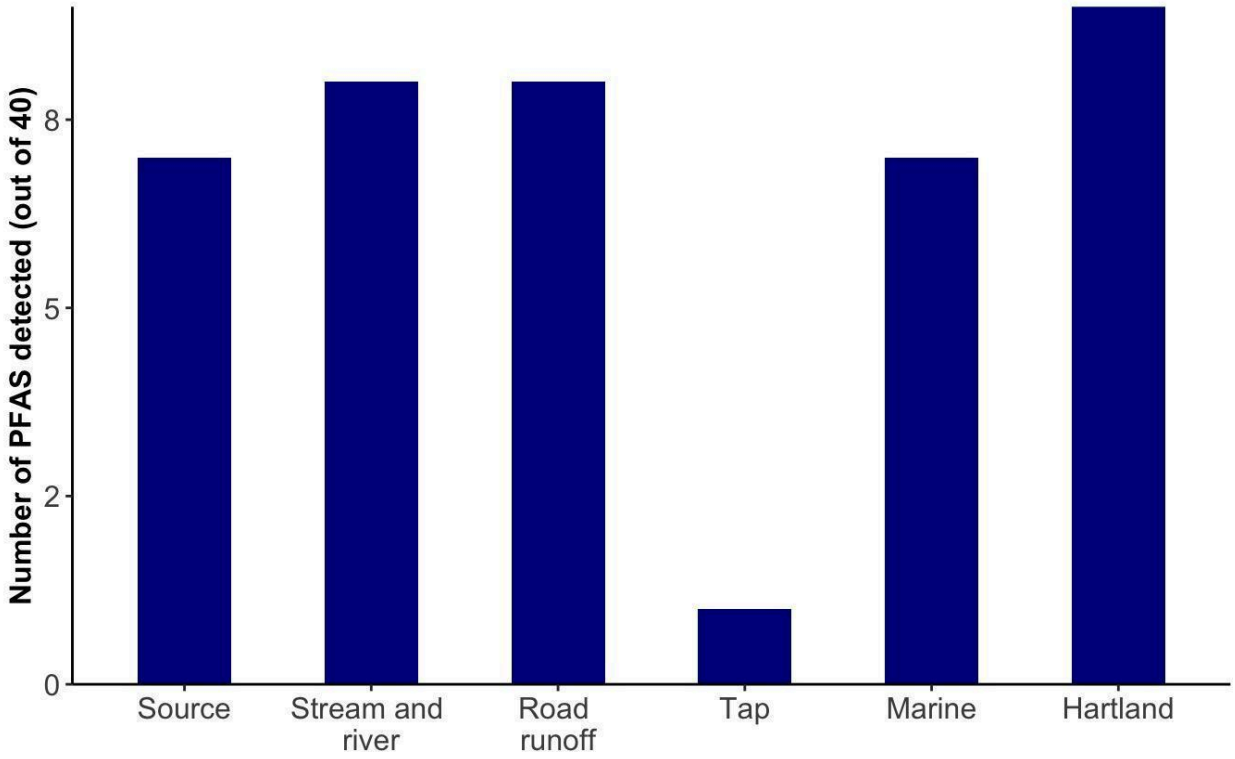
PFAS can be released in the environment at point sources such as manufacturing plants, or where firefighting foams have been used such as airports and military installations. PFAS can also be released through consumer use and disposal of PFAS-containing products. PFAS has been found in all environmental compartments (ECCC and Health Canada, 2023).

Evidence of adverse effects on the environment and human health has led Canada to prohibit the manufacture, use, sale, offer for sale and import of a limited number of PFAS including perfluorooctanesulfonic acid (PFOS), perfluorooctanoic Acid (PFOA), long-chain perfluorocarboxylic acids and their salts and precursors under the *Prohibition of Certain Toxic Substances Regulations* and the *Canadian Environmental Protection Act* (CEPA) (ECCC and Health Canada, 2023b).

Results

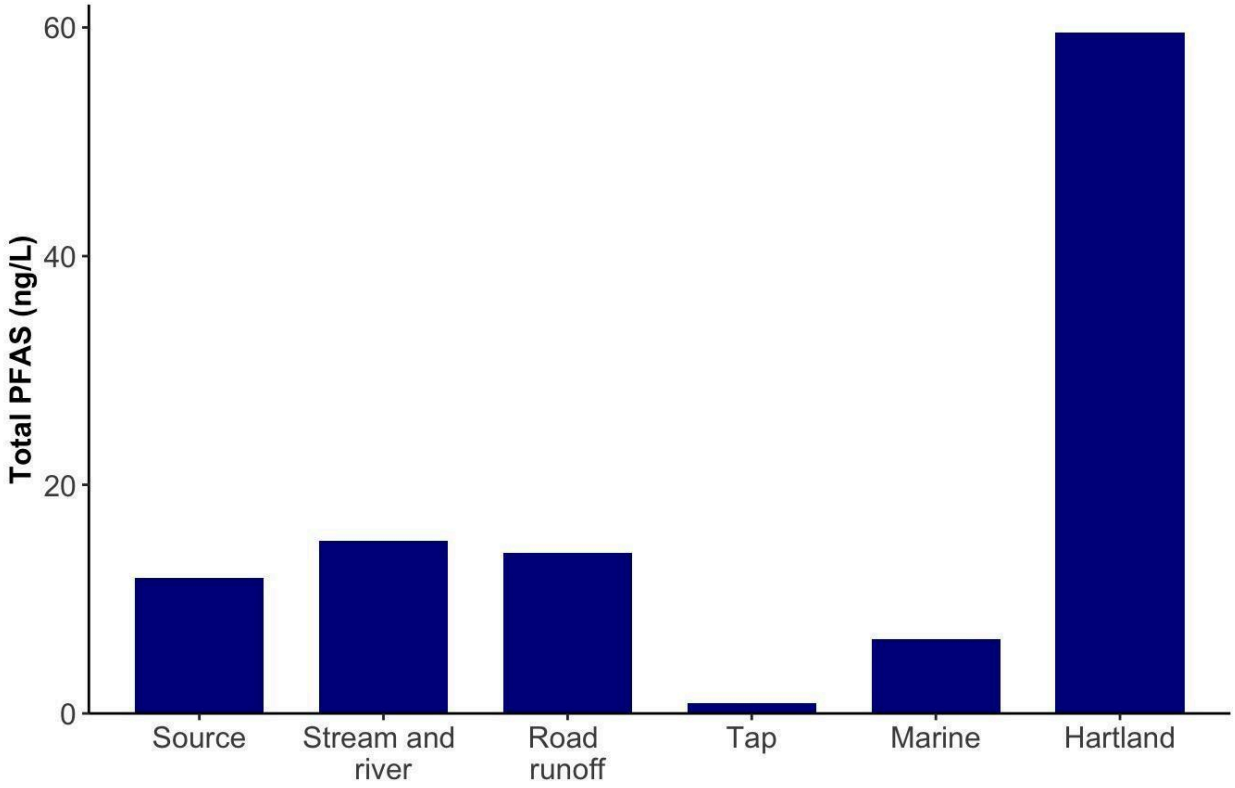
We analysed up to 40 different PFAS in the six water samples collected within the Tod Creek watershed during the wet season.

Figure 12: Number of PFAS substances detected in water samples from the Tod Creek watershed (WET Season)



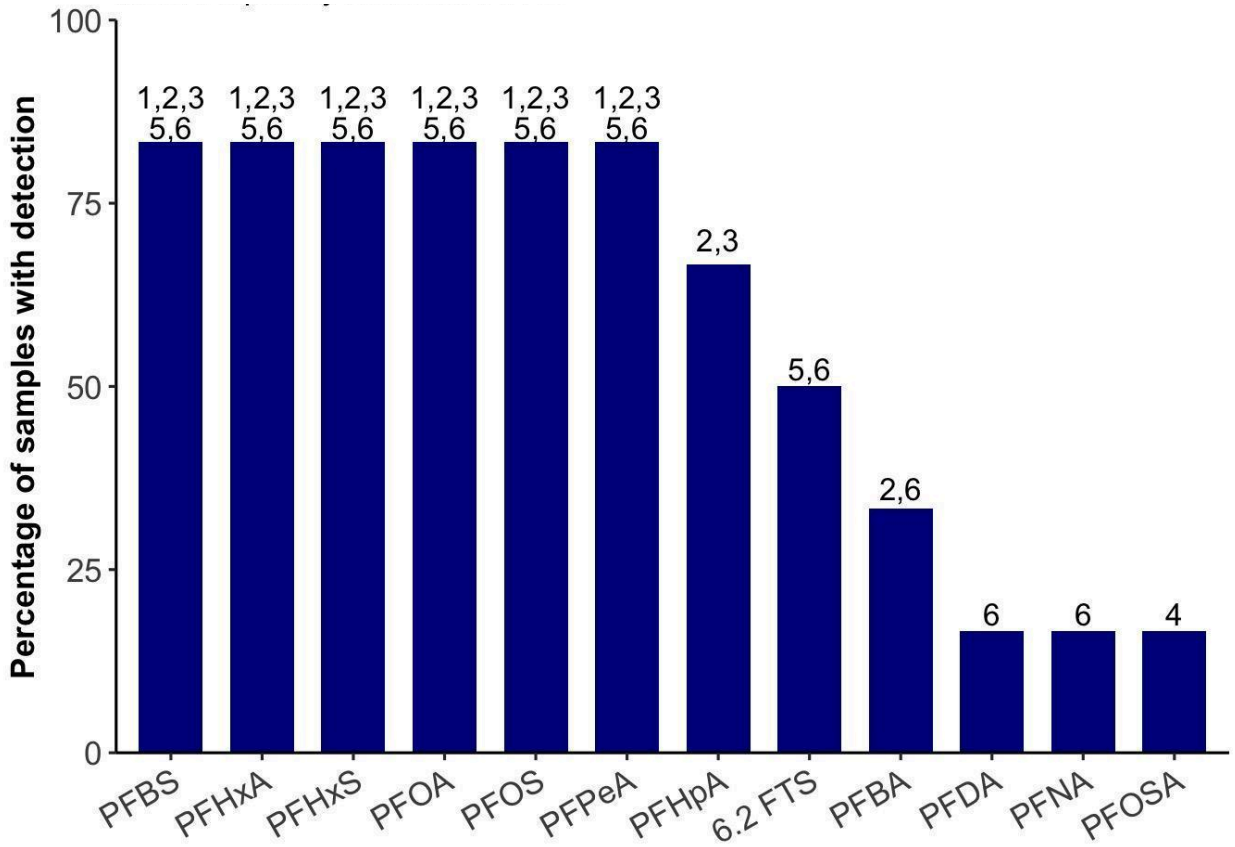
PFAS were detected in all six water categories. The number of PFAS detected ranged from 1 (tap) to 9 (Hartland) with an average of 6.7 ± 1.2.

Figure 13: Total PFAS concentrations in water sampled in the Tod Creek watershed (WET Season)



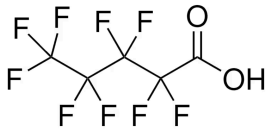
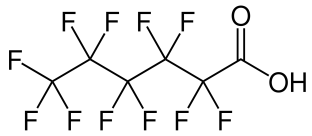
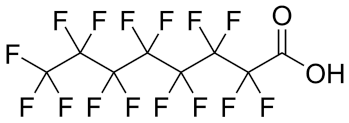
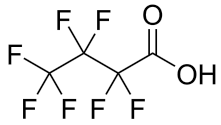
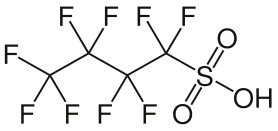
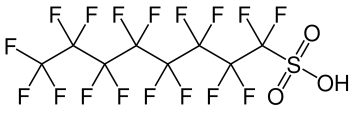
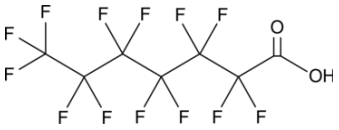
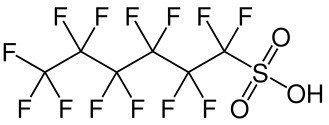
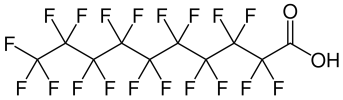
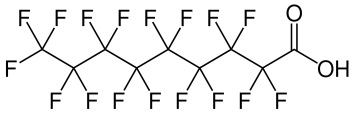
Total PFAS levels ranged between 0.94 (tap) and 59.5 ng/L (Hartland), with an average across all sample categories of 18.0 ± 8.6 ng/L.

Figure 14: Most frequently detected PFAS in water sampled in the Tod Creek watershed (WET Season)



Numbers refer to the water category (1: Source, 2: Stream and river, 3: Road runoff, 4: Tap, 5: Marine, 6: Hartland). While Perfluorobutanesulfonic acid (PFBS), Perfluorohexanoic Acid (PFHxA), Perfluorohexanesulfonic acid (PFHxS), Perfluorooctanoic Acid (PFOA), Perfluorooctanesulfonic acid (PFOS) and Perfluoropentanoic acid (PFPeA) were detected in all samples except tap water, Perfluorooctanesulfonamide (PFOSA) was the only PFAS detected in tap water.

Table 14: Individual PFAS compounds detected in the Hartland water sample and their concentrations (from highest to lowest) during the WET Season

Individual PFAS	Concentrations (ng/L)	Notes	Structure
PFPeA	12.5	Used as stain- and grease-proof coatings on food packaging and household products. Also a breakdown product of larger PFAS.	
PFHxA	11.6	Used as stain- and grease-proof coatings on food packaging and household products. Also a breakdown product of larger PFAS.	
PFOA	10.5	Used in industrial and household applications. Was banned in Canada in 2012 and added to the *List of Toxic Substances* in 2013. (Health Canada, 2012) Also a breakdown product of larger PFAS.	
PFBA	8.28	Used in stain- and grease-proof coatings on food packaging and household products, and photographic film. (US EPA, 2022)	
PFBS	5.12	Introduced as a replacement for PFOS after PFOS was voluntarily phased out in 2002.	
PFOS	4.96	Used primarily as a dirt-, oil-, water-repellant in papers and fabrics, as well as in fire fighting foams. Voluntarily phased-out globally in 2000. Added to the *List of Toxic Substances* in 2006.	
PFHpA	2.88	Breakdown product - Short-chain alternative to legacy PFAS compounds following their phase-out.	
PFHxS	2.4	Initially used as a replacement for PFOS after its use was restricted following the Stockholm Convention in 2004. Also a by-product during the production of PFOS.	
PFDA	0.67		
PFNA	0.605	Suspected to be a breakdown product of longer-chain PFAS compounds. No guidelines available.	

Perfluoropentanoic acid (PFPeA), perfluorohexanoic acid (PFHxA) and perfluorooctanoic acid (PFOA) were the top three PFAS compounds detected in the Hartland water sample.

Conclusions

- PFAS concentrations for the wet season were ranked as follows from highest to lowest: Hartland > stream and river > road runoff > source > marine > tap.

- Total PFAS levels in all water samples collected from the Tod Creek watershed ranged from 0.94 to 59.5 ng/L.

- PFAS concentrations were in the lower range of PFAS levels (0 - 138 ng/L) reported for 29 ambient surface freshwater sites across Canada between 2013 and 2020 (ECCC and Health Canada, 2023).

- Not surprisingly, the Hartland water sample had relatively low concentrations of PFAS (59.5 ng/L) when compared to total PFAS (320 - 9,400 ng/L) measured elsewhere in leachate (which may be expected to be relatively high) at 12 large landfills across Canada between 2009 and 2011 (Gewurtz et al., 2013, Government of Canada, 2013).

- All water samples were below the available EQGs (PFOS: Federal Environmental Quality Guideline (FEQG) = 6.8 ug/L; BC Working Water Quality Guideline (WWGG) = 3.4 ug/L).

- PFOSA was the only PFAS detected in tap water; there is no Canadian drinking water guideline for this compound.

- The total PFAS concentration in the drinking water sample was:

    - below the Health Canada ‘proposed objective’ for drinking water (30 ng/L).

    - below The European Union Water Directive drinking water quality guideline (500 ng/L) and the limit of 100 ng/L for the sum of 20 individual PFAS.

    - below the new US maximum contaminant level - the highest level allowed in drinking water (4 ng/L).

Polychlorinated Biphenyls (PCBs)

Capsule

Despite having been banned in Canada in 1977, industrial PCBs continue to be found in the environment, reflecting their stability and persistence. PCBs were detected in all six water samples, with the highest concentration observed in the composite Hartland sample and the lowest in the composite source sample. The tap water sample had the 'lightest' PCB signature with the 'heaviest' reported for the marine and Hartland samples. One sample (landfill) exceeded the Water Quality Guideline (WQG) for the protection of aquatic life for total PCBs.

Introduction

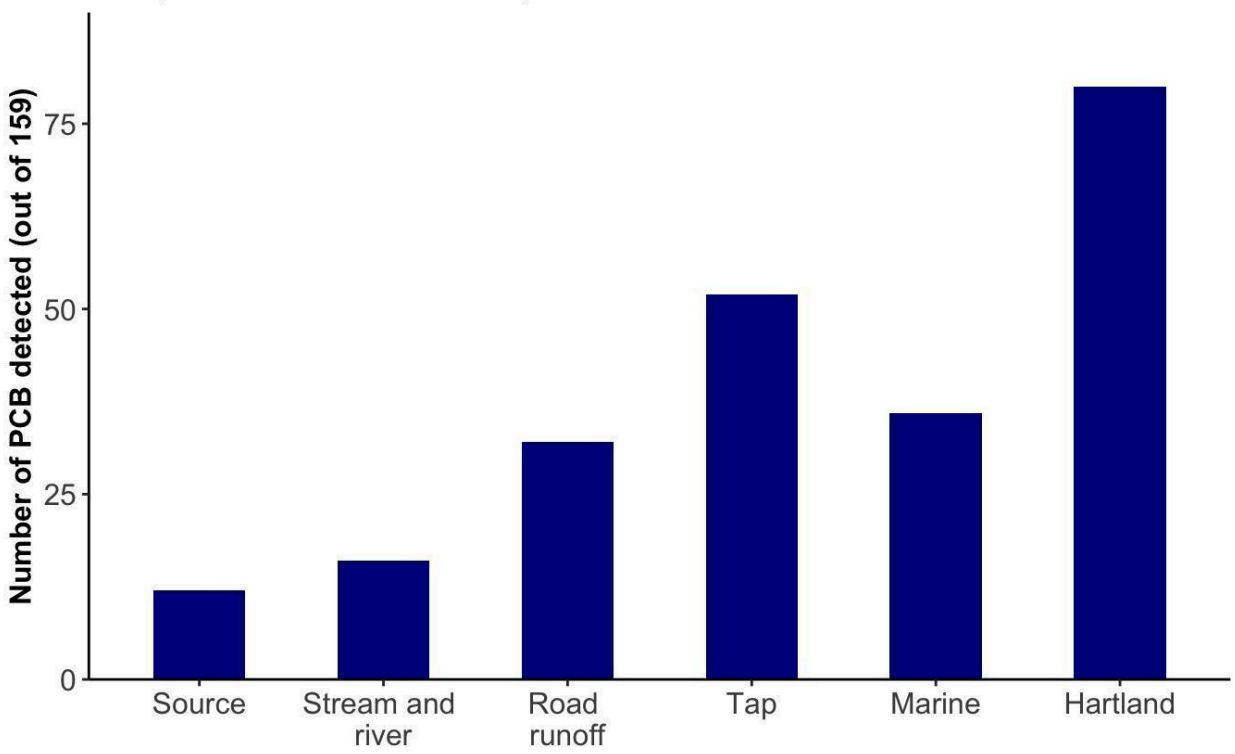
Polychlorinated biphenyls (PCBs) comprise 209 congeners that are structurally related but have differing degrees of chlorination. The commercial production of PCBs began in 1929, after which they were heavily used in electrical and hydraulic equipment, as well as in paint additives, sealing and caulking compounds and inks. Due to their adverse health effects, the production of PCBs was banned in the late 1970s (Othman et al., 2022). PCBs are among the first 12 Persistent Organic Pollutants (POPs) - often referred to as the "dirty dozen" - defined by the Stockholm Convention, an international treaty aimed at eliminating or restricting the production and use of POPs.

PCBs were never produced in Canada, and are currently specified on the List of Toxic Substances under the Canadian Environmental Protection Act (Health Canada, 2010). Despite their ban, PCBs continue to pose a threat due to their persistence in the environment and their release from products that were manufactured before the ban and/or were improperly disposed of (Othman et al., 2022). In British Columbia (BC), PCBs remain the number one contaminant of concern in marine food webs with the iconic killer whales being among some of the most-PCB contaminated marine mammals in the world (Ross et al., 2000).

Results

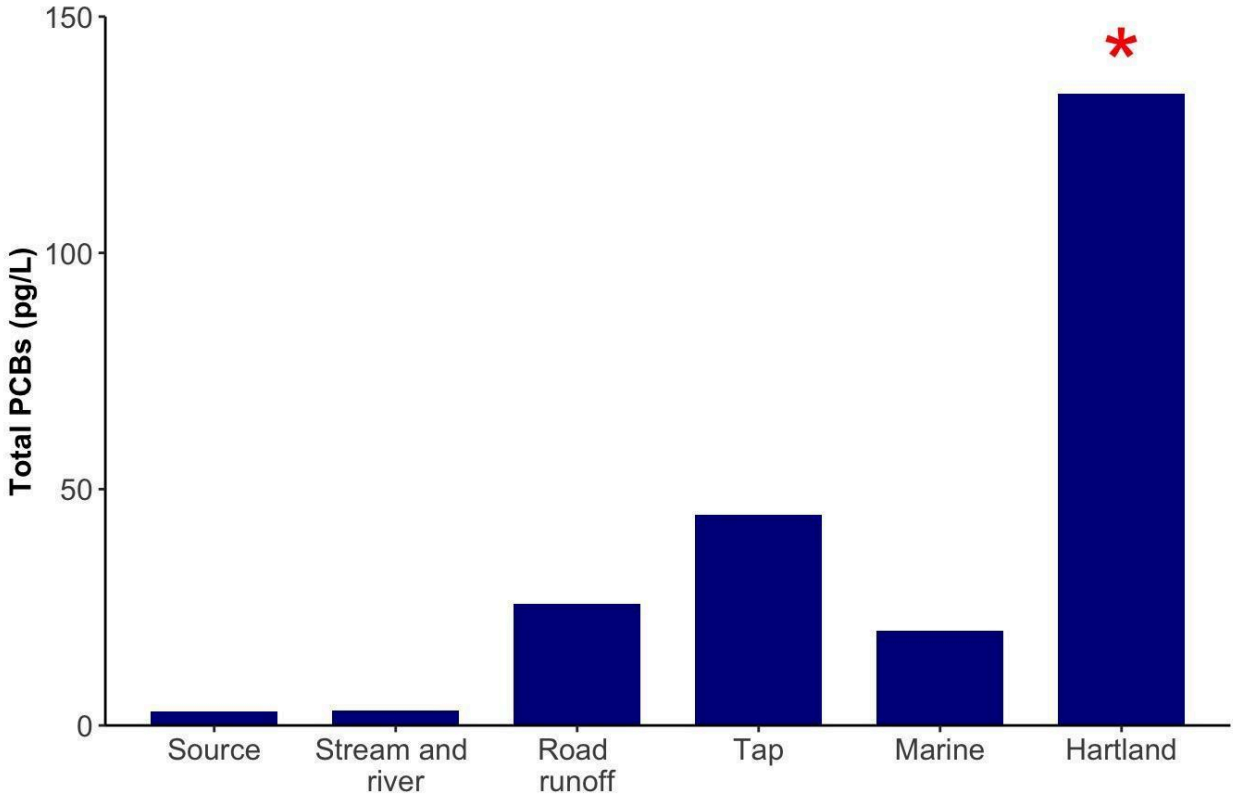
We measured 159 out of a total 209 PCB congeners in the six water samples collected within the Tod Creek watershed during the wet season. Concentrations of the top six PCBs detected in the six water samples collected from the Tod Creek watershed can be found in Appendix 5.

Figure 15: Number of PCB detections in water sampled from the Tod Creek watershed (WET Season)



PCBs were detected in all six water categories. The number of PCBs detected ranged from 12 (source) to 80 (landfill) with an average of 38.0 ± 10.3.

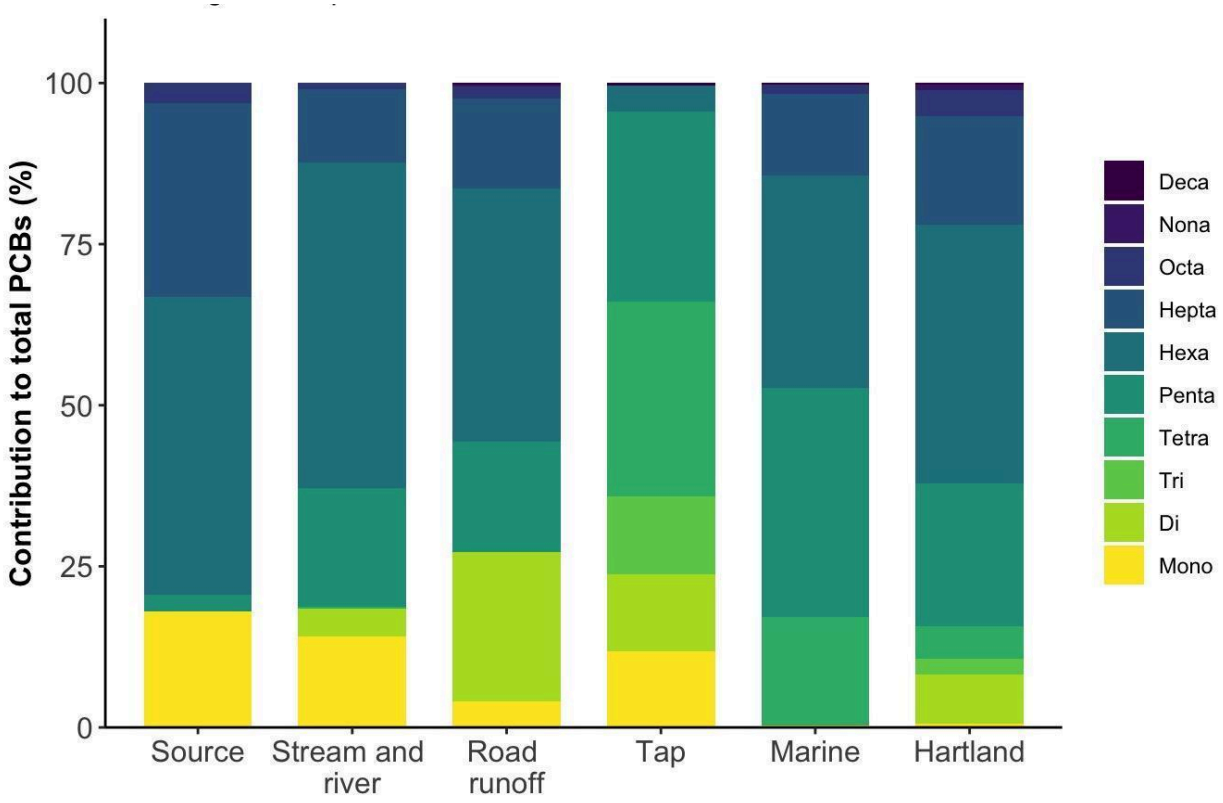
Figure 16: Total PCB concentrations in water sampled from the Tod Creek watershed (WET Season)



Total PCB levels ranged from 3.1 (source) to 133.7 pg/L (Hartland), with an average across all water categories of 38.4 ± 20.1 pg/L. (* indicates that the landfill sample exceeded the BC WQG of 100 pg/L).

The 209 individual PCBs have different degrees of chlorination, with each individual PCB containing between 1 and 10 chlorine atoms in their structure. PCBs can be categorized by their degree of chlorination into homologue groups. For example, all PCBs with one chlorine will fall into the mono-chlorinated homologue group and all PCBs with five chlorines will fall into the penta-chlorinated PCBs. In general, the more chlorines bound to a biphenyl ring, the 'heavier' the PCB molecule is. Heavier PCBs tend to not travel far from their sources, whereas lighter PCBs are more volatile and can undergo long-range transport. PCBs are strongly lipophilic - fat-soluble - such that they have a tendency to bind to organic particles and fatty tissues, rather than dissolve in water.

Figure 17: Homologue group contribution to total PCBs in water sampled from the Tod Creek watershed (WET Season)



The lighter colours represent 'lighter' PCB homologue groups, such that the tap water sample had the 'lightest' PCB signature while the marine and Hartland samples had the 'heaviest' PCB signatures. The source, stream and river and road runoff samples had similar homologue group signatures.

Conclusions

- PCB concentrations were ranked as follows from highest to lowest: Hartland > tap > road runoff > marine > stream and river > source.

- PCB concentrations ranged from 3.1 to 133.7 pg/L. In a recent study of urban-influenced and background stream and rivers samples collected in the northwestern part of Lake Ontario, Zhang et al. (2020) identified PCBs as the dominant compound class measured with levels ranging from 10 pg/L in remote areas to 4,100 pg/L in urban areas.

- The PCB levels reported here were in the range reported northwest of Lake Ontario. In their study of air samples in coastal British Columbia, Noël et al. (2004) also observed uniform background levels for this legacy compound.

- Water Quality Guidelines were available for four individual PCBs (PCB-77, -105, -126 and -169), as well as total PCBs.

    - There were no exceedances for any of the individual PCBs.

    - The Hartland water sample exceeded the WQG for the protection of stream and rivers aquatic life for total PCBs (100 pg/L).

- There are no guidelines for PCBs in drinking water in Canada. The US Environmental Protection Agency's enforceable Maximum Contaminant Level (MCL) for PCBs in public water systems is 500,000 pg/L (EPA, 2001), well above the 44.6 pg/L reported in the current tap water sample.

Alkylphenol Ethoxylates

Capsule

Alkylphenol ethoxylates (APEs) are industrial grade surfactants that have been found in wastewater and industrial discharges. APEs were detected in all six of the Tod Creek water samples. Further sampling will confirm this initial detection of APEs in tap water (146.9 ng/L) and stream and river water (13.1 ng/L).

Introduction

Alkylphenol ethoxylates are non-ionic surfactants used in industrial and consumer applications. APEs and their breakdown products are considered estrogenic and can disrupt reproductive development in fish.

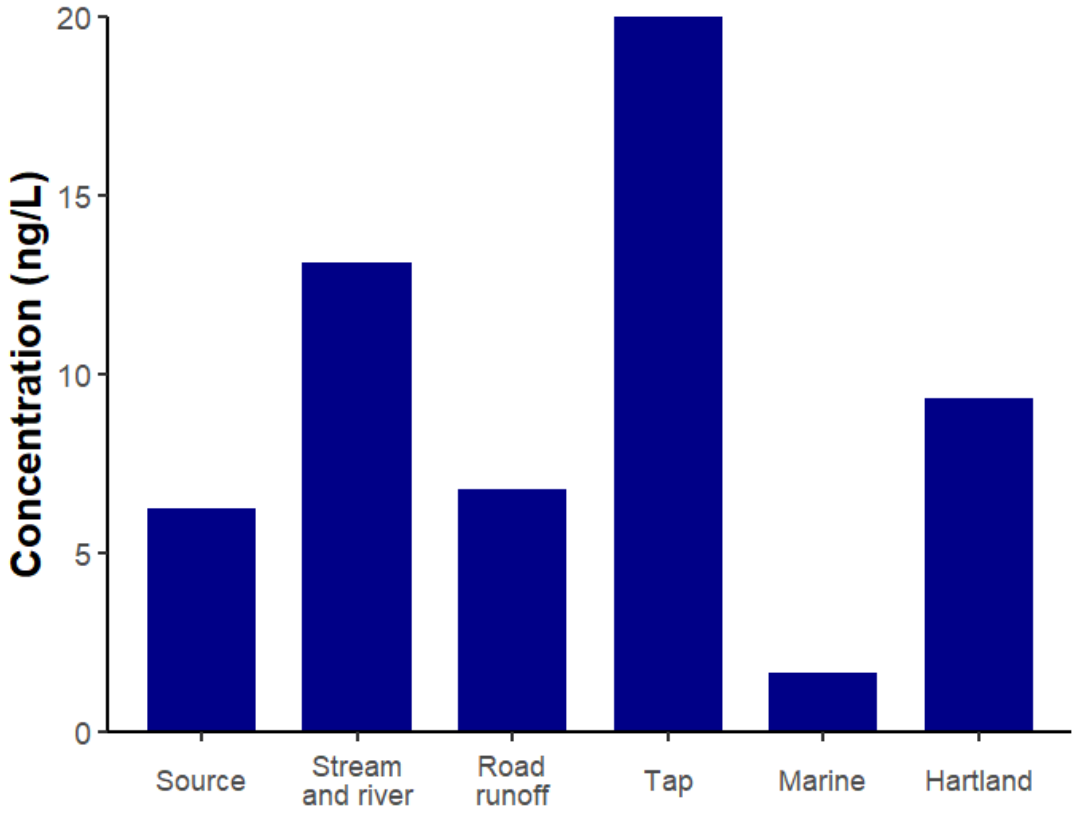
Results

Table 15: Alkylphenol concentration (ng/L) for six water samples from the Tod Creek watershed (WET Season)

Analyte	**Source** (n=1)	**Stream and river** (n=1)	**Road runoff** (n=1)	**Tap** (n=1)	**Marine** (n=1)	**Hartland** (n=1)
4-Nonylphenols	6.25	13.1	6.76	145.6	1.66	9.32
4-Nonylphenol monoethoxylates	0	0	0	0	0	0
4-Nonylphenol diethoxylates	0	0	0	0	0	0
4-n-Octylphenol	0.735	0	0	1.32	0	0
Total Alkylphenols	6.99	13.1	6.76	146.9	1.66	9.32

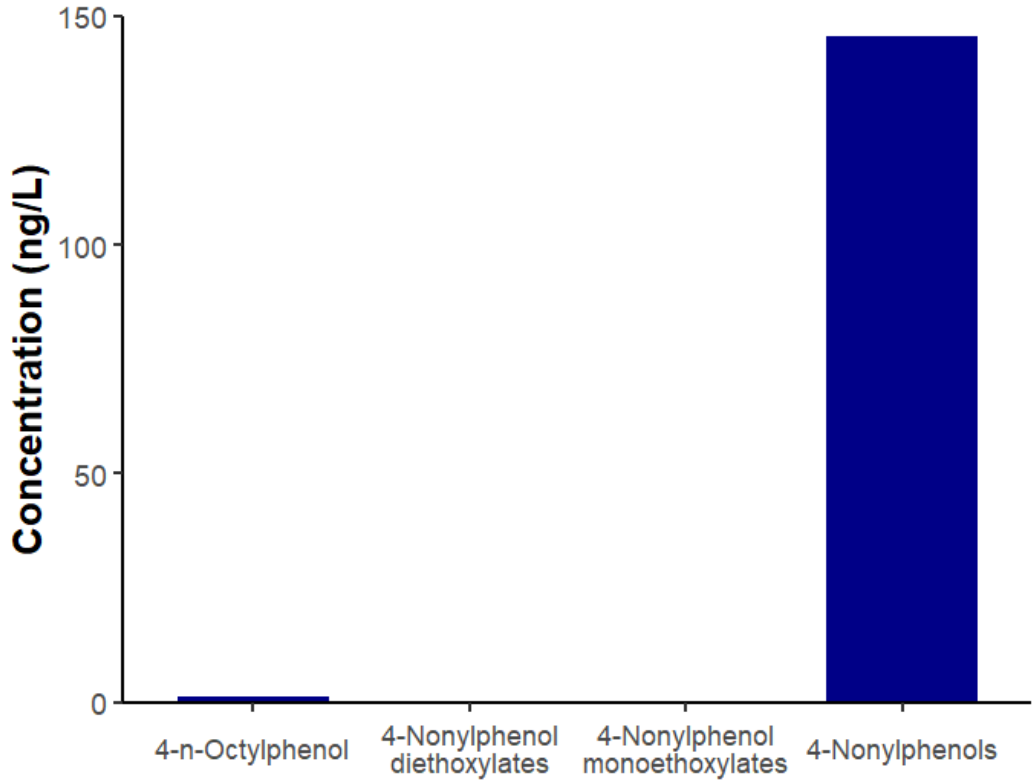
4-Nonylphenols were detected in all water samples. 4-n-Octylphenol was detected in the Source and tap water samples. Tap water had the highest total concentration of APEs, dominated by 4-Nonylphenols.

Figure 18: Alkylphenol concentrations (ng/L) for six water samples from the Tod Creek watershed (WET Season)



APEs were detected in all of the six water samples that were analyzed. The highest concentration was detected in the tap sample, the second highest concentration was detected in the stream and river sample. The lowest concentration was detected in the marine water sample.

Figure 19: Total alkylphenol concentrations (ng/L) by analyte for samples from the Tod Creek watershed (WET Season)



4-Nonylphenol was the most abundant APE detected in the Tod Creek water samples. There was also a small amount of 4-n-Octylphenol detected.

Conclusions

- Total APE concentration for the six water samples in the Tod Creek watershed was ranked from highest to lowest as follows: tap > stream and river > Hartland > source > road runoff > marine.
- APEs were detected in all water samples.
- The concentrations are well below the long-term CCME guideline for the protection of freshwater aquatic life for nonylphenol and its ethoxylates of 1,000 ng/L.
- There are no Health Canada Drinking Water Guidelines for APEs.
- The concentration of APEs in the tap water sample (146.9 ng/L) is well below the State of Minnesota guidance value of 20,000 ng/L for NPs.

Bisphenols

Capsule

Bisphenols are plastic additives with widely reported estrogenic (endocrine disrupting) properties. We did not detect any of the bisphenol compounds that were analyzed in water samples from the Tod Creek watershed in the Wet (winter) season.

Introduction

Bisphenols are used widely in the manufacturing sector, and are primarily used in the production of plastics and resins. Both single and multi-use plastic containers are frequently produced using bisphenol compounds, the most popular of which is Bisphenol A (BPA). Bisphenols are endocrine-disrupting chemicals that have been found to negatively impact reproductive systems in fish, amphibians, and mammals including humans (Marlatt, *et al.* (2022)).

BPA has come under intense regulatory scrutiny in recent years. The widespread use of these chemicals in food packaging, beverage containers, and in water delivery systems has caused widespread low-level exposure among the general population.

Results

Table 16: Concentration (ng/L) of bisphenols in six water samples from the Tod Creek watershed (WET Season)

Analyte	**Source** (n=1)	**Stream and river** (n=1)	**Road runoff** (n=1)	**Tap** (n=1)	**Marine** (n=1)	**Hartland** (n=1)
Bisphenol E (BPE)	0	0	0	0	0	0
Bisphenol F (BPF)	0	0	0	0	0	0
Bisphenol A (BPA)	0	0	0	0	0	0
Bisphenol AF (BPAF)	0	0	0	0	0	0
Bisphenol B (BPB)	0	0	0	0	0	0
Bisphenol S (BPS)	0	0	0	0	0	0
Total bisphenols	0	0	0	0	0	0

Conclusions

- We did not detect any of the six bisphenol compounds that were analyzed for in the six samples collected from the Tod Creek watershed.

Sucralose

Capsule

Sucralose is a popular artificial sweetener (trade name '*Splenda*') used in foods and beverages. Because it survives the wastewater treatment process, sucralose has become a useful tracer of domestic wastewater. Sucralose was detected in five out of six water samples collected within the Tod Creek watershed, indicating a possible influx of human wastewater from septic or sewage networks. It was detected at the highest concentration in the road runoff sample, followed by the stream and river sample.

Introduction

Sucralose (*Splenda*) is an artificial sweetener used in the production of sugar-free food and beverage products. Its popularity and its resistance to breakdown during the wastewater treatment process have led to its adoption as a useful tracer of human wastewater infiltration.

Sucralose is not fully metabolized by the human body following consumption, and is not removed during the wastewater treatment process. Therefore, its detection in environmental samples indicates the presence of treated or untreated sewage.

Results

Table 17: Sucralose concentration (ng/L) in six categories of water from the Tod Creek watershed

Analyte	Source	Stream and river	Road runoff	Tap	Marine	Hartland
Sucralose (ng/L)	23.3	180	477	0	96.4	38.3

Sucralose was detected in the highest concentration in the road runoff sample. The second highest concentration was detected in the stream and river sample.

Conclusions

- Sucralose concentrations in water samples from highest to lowest are as follows: road runoff > stream and river > marine > Hartland > source > tap.
- The highest concentration of the artificial sweetener sucralose was detected in the road runoff sample, possibly indicative of residential septic seepage or failures in the area.
- There was no sucralose detected in the tap water sample.

- There are no current Canadian Environmental Quality Guidelines available for sucralose.
- There are no current Health Canada Drinking Water Guidelines available for sucralose.

6PPD-Quinone

Capsule

The breakdown product of a UV-stabilizing chemical in vehicle tires (6PPD-Quinone) has been associated with significant and repeated instances of coho salmon mortality events in Washington State and in British Columbia. 6PPD-quinone was detected in all water samples that were collected in the Tod Creek watershed.

Introduction

6PPD is an anti-ozonant chemical that is added to automotive tire rubber during the manufacturing process in order to extend the life of tires. When 6PPD comes into contact with air, it oxidizes and becomes 6PPD-quinone - a transformation product that in recent years was discovered to be lethal to Coho salmon (*Onchorhynchus kitsutch*) at low concentrations (Tian et al., 2021). It is the causative agent of what has been deemed Urban Runoff Mortality Syndrome (URMS) - which has seen mortality rates of up to 90 percent. Research is being conducted to assess the risk to other fish species.

Results

Table 18: 6PPD- quinone concentration (ng/L) in six categories of water from the Tod Creek watersheds

Analyte	**Source** (n=1)	**Stream and river** (n=1)	**Road runoff** (n=1)	**Tap** (n=1)	**Marine** (n=1)	**Hartland** (n=1)
6PPDq (ng/L)	0.04	0.11	0.10	0.19	0.13	0.30

Low levels of 6PPD-Quinone were detected in water samples from the Tod Creek watershed.

Conclusions

- Total 6PPD-q concentrations for the six water samples was ranked from highest to lowest as follows: Hartland > tap > marine > stream and river > road runoff > source.
- The concentrations of 6PPD-q were low in all samples, but are understood to increase during rainfall-associated runoff events.

- The 0.30 ng/L concentration of 6PPD- detected in the road runoff sample is much lower than the Lethal Concentration at which 50% of individuals die (LC50) for Coho salmon of 41 ng/L (Lo et al., 2023).
- There are no current Canadian Environmental Quality Guidelines available for 6PPD quinone.
- There are no current Health Canada Drinking Water Guidelines available for 6PPD quinone.

Wet season water quality summary

This report encapsulates a single wet season water sampling event comprising pooled samples in six water categories: source water, stream & river water, road runoff, tap water, marine water and Hartland drainage water. These initial results suggest that Tod Creek waters are in relatively good condition, but follow-up study is warranted to confirm or correct initial observations of some contaminants of concern in the watershed (summary data in Appendix 6). Findings herein will be built upon by additional seasonal water sampling in 2024 and 2025, and an analysis of sediment and biosolid matrices. Collectively, these findings will provide an integrated evaluation of the contaminants, activities and sectors that are influencing water quality in the Tod Creek watershed. This may, in turn, provide guidance on mitigation, stewardship and restoration initiatives that protect and restore fish habitat throughout Tod Creek.

List of acronyms

Abbreviation	Meaning
APE	Alkylphenol ethoxylates
BC EMA	British Columbia Environmental Management Act
CCME	Canadian Council of Ministers of the Environment
CEC	Contaminants of Emerging Concern
CEPA	Canadian Environmental Protection Act
CUP	Current-use pesticide
DO	Dissolved oxygen
DRIPA	Declaration on the Rights of Indigenous Peoples Act
ECCC	Environment and Climate Change Canada
MOE	Ministry of Environment
MST	Microbial Source Tracking
NP	Nonylphenol
PAH	Polycyclic aromatic hydrocarbons
PCB	Polychlorinated biphenyls
PFAS	Polyfluoroalkyl substances
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctane sulfonate
POP	Persistent organic pollutant
PPCP	Pharmaceutical and personal care products
PVC	Polyvinyl chloride
TDS	Total dissolved solids

TOC	Total organic carbon
TSS	Total suspended solids
TWP	Tire wear particle
WQGs	Water Quality Guidelines
WQI	Water Quality Index
WWTP	Wastewater treatment plant

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Appendix

Appendix 1: Healthy Waters - Standard Operating Procedure (SOP) for water sample collection

RAINCOAST
CONSERVATION FOUNDATION

Healthy Waters – Standard Operating Procedure (SOP) for water sample collection

Purpose: The collection of water samples for lab analysis is an important step in assessing the potential impacts to water quality in our partner watersheds. This Standard Operating Procedure (SOP) outlines the steps to collect water samples for lab submission and analyses in support of the Raincoast Healthy Waters program. This SOP should follow in situ measurements of water quality properties using a YSI ProDSS (detailed in *Healthy Waters – SOP for in situ determination of water properties*).

Required Equipment

- Clean sampling wand
- Sampling bottles (suitably cleaned in advance and typically provided by service lab for a specific analysis)
- Labels with sample ID, date, sample custodian
- Large containers for pooling of samples (cleaning methodology detailed in *Healthy Waters – Bottle cleaning procedure*)
- Coolers
- Ice packs (frozen)
- Nitrile gloves
- Data sheets
- Pencils

Step 1: Record site details

Upon arrival at a sampling site, record the following on your Data Sheet:

Data Sheet Healthy Waters			
Date:			
Watershed:			
Weather:			
Air Temperature:			
Name (recorder):			
Name (YSI):			
Name (others):			
Site Name:		**Dominant vegetation (circle):**	**Riparian Zone (circle):**
Time Sampled:		conifers	natural
GPS Location:		hardwood trees	disturbed - agriculture
Water Source Type:	source streams/rivers road runoff marine tap	shrubs/grasses	disturbed- forestry
Width (Stream/River):		agricultural	disturbed - roadway
Depth:		other:	other:

Step 2: Describe riparian zone

Circle the site characteristics for the surrounding vegetation and riparian zone under "Dominant Vegetation" and "Riparian Zone". If none of the labels apply, circle "other" and describe the conditions.

Step 3: Record sample IDs

Record the sample ID for each on the datasheet in the space provided, using the following format:

XXX-MMDD-##(a)

XXX - a three-letter code specific to the watershed.

MMDD- record the four digit month and year.

- Sample number (1-5 (5 buckets)) 01 = source water; 02 = freshwater; 03 = road runoff; 04 = tap; 05 = marine) - Where discrete samples are being submitted for each individual site, use a letter (e.g. a,b,c,d) to differentiate samples. Where necessary, additional water categories can be included by adding additional numbers.

Step 4: Collect the water samples

Using a sampling wand with attached 600ml cup, reach out towards the middle of the body of water to be sampled and fill the cup with a shallow scoop of water. Rinse twice in this way, without disturbing sediments. Continue by collecting water in approximately the same location until all sampling containers are full. The person responsible for opening and closing bottles should wear a pair of nitrile gloves. If sampling from inside a boat, sample as far away from the boat's engine as possible - turning it off when possible to reduce the risk of sample contamination.

For tap/well water

1. Turn the tap on and allow water to run for 3 seconds.
2. Fill a clean sample bottle with tap water till approximately ¼ full and stop filling.
3. Allow tap to run for an additional 3 seconds.

4. Repeat until the sampling container is full.

For pooled samples

Use a 4L amber glass bottle to collect samples from each of the sites to be pooled (volume per site to depend on the number of sites being sampled) in most cases, fill each of four large pooling containers 1/3 at each of three sampling sites to ensure that there is enough total volume (minimum of 10L for all analytes) to subdivide into lab bottles.

Once sample collection is complete, pooled samples should be aliquoted into lab bottles for submission, carefully using nitrile gloves to avoid contamination of samples.

Samples should be placed into a cooler containing ice packs as quickly as possible - as many parameters require the sample to be kept at a temperature of 4°C prior to analysis.

Sample bottles must be returned to the correct partner lab within required holding times (see Lab holding times). Tier 2 analytes to be analyzed at ALS Environmental, Tier 3 analytes to be analyzed at SGS Axys Analytical Labs.

Completed datasheets

Confirm that field datasheets have been completed and make a backup copy using a phone camera or scanner. Upload completed datasheets to the Watershed partnership folder on the Raincoast Google Drive.

Lab-specific holding times (in water)

Tier 2 - ALS Environmental

Coliform: 24-30 hours

BOD/COD: 3 days

TSS/TDS: 7 days

Nutrients: 28 days

TOC: 28 days

Metals: 180 days

Tier 3 - SGS Axys Analytical

PAHs: 7 days (unpreserved - 14 days if preserved with sodium azide)

PPCPs (including sucralose and BPAs): 7 days

A/Ps: 14 days (unpreserved)

MRES Pesticides: not defined

PFAS: 90 days

PCBs: 1 year

References

Canadian Council of Ministers of the Environment (2011) procedures Manual for Water Quality Sampling in Canada
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Government of the Northwest Territories. NWT-Wide Community-Based Water Quality Monitoring Program- procedures for Collecting Water Quality Samples.
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Appendix 2: Healthy Waters - Standard Operating Procedure for for in situ determination of basic water properties

Healthy Waters – Standard Operating Procedure (SOP) for in situ determination of basic water properties

Purpose: The use of handheld instruments to determine basic water properties is the first step to understanding fish habitat and the threats to its quality. This Standard Operating Procedure (SOP) outlines the steps to deploying a YSI ProDSS meter during water sampling events in support of the Raincoast Healthy Waters program. This SOP represents a necessary first step when one is collecting samples for later analysis in dedicated laboratories (detailed in ***Healthy Waters – Water sample collection SOP***).

*Calibrate the YSI ProDSS 24 hours prior to the sampling date

Required Equipment

- YSI ProDSS (or other water quality meter capable of measuring parameters)
- Nitrile gloves
- Clean bucket
- Data sheets
- Pencils

Step 1: Record site details

Upon arrival at a sampling site, record the following on your Data Sheet:

Data Sheet Healthy Waters			
Date:			
Watershed:			
Weather:			
Air Temperature:			
Name (recorder):			
Name (YSI):			
Name (others):			
Site Name:		**Dominant vegetation (circle):**	**Riparian Zone (circle):**
Time Sampled:		conifers	natural
GPS Location:		hardwood trees	disturbed - agriculture
Water Source Type:	source streams/rivers road runoff marine tap	shrubs/grasses	disturbed- forestry
Width (Stream/River):		agricultural	disturbed - roadway
Depth:		other:	other:

Step 2: Describe riparian zone

Circle the site characteristics for the surrounding vegetation and riparian zone under "Dominant Vegetation" and "Riparian Zone". If none of the labels apply, circle "other" and describe the conditions.

Step 3a: Measure Tier 1 water properties at the site

To take a measurement with the YSI ProDSS directly in a body of water (ie. stream, pond, ditch, river etc.) perform the following procedure:

1. Review instrument manual (YSI (Revision H) *ProDIGITAL User Manual*. Xylem, Inc.).

10. Confirm that all data have been recorded on the data sheet and then make a copy for safekeeping (take a picture with phone camera or scan).

11. Upload field data sheets to Watershed partner folder on Raincoast Google Drive.

Step 3b: Measure Tier 1 water properties ex situ

To take a measurement with the YSI ProDSS where the probe cannot be submerged in the water (ie. municipal manhole access, well-water, tap water, small stream etc.) perform the following procedure:

1. Take a water sample from the desired water source using a clean bucket (if bucket has been used for previous water samples rinse three times with water from a new site before taking YSI measurements)

   For Tap/Well Water:

   - Turn the tap on and allow water to run for 3 seconds.
   - Fill clean bucket with tap water till approximately ¼ full and stop filling.
   - Allow tap to run for an additional 3 seconds.
   - Repeat until the bucket is full.

2. Turn the YSI ProDSS on.

3. Remove the light blue – protective calibration cup from the device by unscrewing it. Make sure to leave the black probe guard covering the sensors ON while sampling.

4. Rinse the YSI ProDSS probes with a small amount of sample water.

5. Submerge the YSI probe guard in the collected sample water – ensuring that all probes are fully submerged.

6. Allow the parameters to stabilize for approximately 1 minute – parameters are considered "stable" when there is no change in each value for 30 seconds. Gently stir the probe continuously while the values stabilize to ensure an accurate DO reading.

7. Once the parameters stabilize, record the following parameters in the Healthy Waters datasheet provided:

    - Temperature (°C)
    - pH
    - DO (both mg/L and %DO)
    - Turbidity (FNU)
    - Specific conductance (uS/cm)

8. Remove the probe from the water. Rinse probes and probe guard thoroughly with clean water, and replace the calibration cup. Always ensure that there is a small amount of clean water in the calibration cup to prevent the sensors from drying out.

9. Confirm that all data have been recorded on the data sheet and then make a copy for safekeeping (take a picture with phone camera or scan).

10. Upload field data sheets to Watershed partner folder on Raincoast Google Drive.

References

YSI (Revision H) ProDIGITAL User Manual. Xylem, Inc. Accessed 25/07/23. <https://www.ysi.com/file%20library/documents/manuals/prodigital-user-manual-english.pdf>

Canadian Council of Ministers of the Environment (2011) procedures Manual for Water Quality Sampling in Canada https://beta-static.fishersci.com/content/dam/fishersci/en_CA/documents/brochures-and-catalogs/catalogs/ccme-procedures-manual-water-quality-sampling.pdf

Government of the Northwest Territories. NWT-Wide Community-Based Water Quality Monitoring Program- procedures for Collecting Water Quality Samples. https://nwtdiscoveryportal.enr.gov.nt.ca/geoportaldocuments/FINAL%20CBM%20procedures%20for%20Collecting%20Water%20Quality%20Samples.pdf

Appendix 3: Environmental and Drinking water quality guidelines relevant for the present study. These guidelines were retrieved in May 2024.

Analyte Class	Federal EQGs[1]	BC WQGs		CCME EQGs[2]		Drinking WQGs
		Freshwater	Marine	Freshwater	Marine	
Basic Water Properties						
Temperature	-	19 (short-term)	+1°C per hour change from background	narrative	max change of +0.5°C per hour	-
pH	-	6.5-9.0	7.0-8.7	6.5-9.0	7.0-8.7	7.0-10.5
Dissolved oxygen	-	>8.0 (long-term) >5.0 (short-term)	-	6.5-9.5 mg/L	80 mg/L	-
Conductivity	-	-	-	-	-	-
Turbidity	-	-	-	narrative	narrative	≤ 1.0 NTU
Metals (mg/L)						
Aluminum	-	variable	-	0.005 if pH < 6.5	-	2.9
Lead	-	3 when ≤ 8 mg/L CaCO3 (short-term)	<140 ug/L	equation	-	0.005
Nutrients (mg/L)						
Nitrate (as N)	-	3.0 (long-term) 32.8 (short-term)	3.7 (long-term)	550	200 (long-term) 1500 (short-term)	10
Nitrite (as N)	-	table	0.02 when Cl- ≤ 2 (long-term) 0.06 when Cl- ≤ 2 - (short-term)	0.06	-	1.0
Ammonia (Total as N)	-	table	table	table	-	-
Phosphate	-	0.015 (long-term)	-	-	-	-
Coliform						
Total coliform	-	-	-	-	-	0
Fecal coliform	-	-	-	-	-	0
E. coli	-	-	-	-	-	0
PAHs (ug/L)						

Naphthalene	-	1	-	1.1	1.4	-
Acenaphthene	-	6	6	5.8	-	-
Fluorene	-	12	12	3	-	-
Anthracene	-	4	-	0.012	-	-
Phenanthrene	-	0.3	-	4.4	-	-
Fluoranthene	-	4	-	0.04	-	-
Pyrene	-	0.02	-	0.025	-	-
Chrysene	-	-	0.1	-	-	-
Benzo-a-anthracene	-	0.1	-	0.018	-	-
Benzo-a-pyrene	-	0.01	-	0.015	-	0.04
PCBs (ng/L)						
Total PCBs	-	0.1	-	-	-	-
PCB-105	-	0.09	-	-	-	-
PCB-169	-	0.06	-	-	-	-
PCB-77	-	0.04	-	-	-	-
PCB126	-	0.00025	-	-	-	-
Bisphenols (ug/L)						
BPA	1.4	-	-	-	-	-
Alkylphenols (ug/L)						
4-Nonylphenols	-	1 (long-term)	-	-	-	-
PFAS (ug/L)						
Perfluorooctane Sulfonate (PFOS)	6.8 (fresh)	3.4	-	-	-	0.6
Perfluorooctanic acid (PFOA)	-	-	-	-	-	0.2
Pesticides (ug/L)						
Atrazine	-	1.8[3]	-	1.8	-	5
Chlorothalonil	-	-	-	0.18	-	-
Cyanazine	-	2	-	-	-	-
Chlorpyrifos	-	0.02	0.002	-	-	90
Diazinon	-	0.0043	-	-	-	-
Dimethoate	-	-	-	6.2	-	20
Endosulfan	-	0.0007 (active ingredient)	-	0.06 (short-term) 0.003 (long-term)	0.09 (short-term) 0.002 (long-term)	-
Malathion	-	0.1	-	-	-	290
Metribuzin	-	1[3]	-	1.0	-	80

Permethrin	-	0.004[3]	-	0.004	0.001	-
Picloram	-	29	-	-	-	-
Simazine	-	10[3]	-	10	-	10

[1] Federal EQGs apply to both fresh and marine waters unless otherwise stated. [2] CCME EQGs are reported for long-term effects unless otherwise stated. [3] Represents CCME guidelines that the BC government has adopted as working water guidelines

Appendix 4: Health Canada Screening values for nine different PFAS compounds

Compound Name	**Acronym**	**Screening value (mg/L)**	**Screening value (ug/L)**
perfluorobutanoate	PFBA	0.03	30
perfluorobutane sulfonate	PFBS	0.015	15
perfluorohexanesulfonate	PFHxS	0.0006	0.6
perfluoropentanoate	PFPeA	0.0002	0.2
perfluorohexanoate	PFHxA	0.0002	0.2
perfluoroheptanoate	PFHpA	0.0002	0.2
perfluorononanoate	PFNA	0.00002	0.02
6:2 fluorotelomer sulfonate	6:2 FTS	0.0002	0.2
8:2 fluorotelomer sulfonate	8:2 FTS	0.0002	0.2

Adapted from https://www.canada.ca/en/services/health/publications/healthy-living/water-talk-drinking-water-screening-values-perfluoroalkylated-substances.html

Appendix 5: The top 6 PCBs in each water category sampled in the Tod Creek watershed and their concentrations (WET Season)

	Source	Stream and river	Road runoff	Tap	Marine	Hartland
	PCB-180+193 (0.59)	PCB-129+138+160+163 (0.78)	PCB-7 (5.9)	PCB-61+70+74+76 (4.6)	PCB-118 (3.3)	PCB-153+168 (19.4)
	PCB-129+138+160+163 (0.58)	PCB-118 (0.50)	PCB-153+168 (4.1)	PCB-52 (3.6)	PCB-153+168 (2.8)	PCB-129+138+160+163 (15.2)
	PCB-3 (0.55)	PCB-3 (0.45)	PCB-129+138+160+163 (3.4)	PCB-110+115 (3.3)	PCB-129+138+160+163 (2.3)	PCB-118 (12.2)
	PCB-153+168 (0.47)	PCB-153+168 (0.40)	PCB-118 (2.3)	PCB-93+95+98+100+102 (2.4)	PCB-66 (1.6)	PCB-180+193 (10.5)
	PCB-141 (0.29)	PCB-141 (0.35)	PCB-180+193 (2.1)	PCB-1 (2.3)	PCB-61+70+74+76 (1.4)	PCB-4 (9.5)
	PCB-174 (0.17)	PCB-180+193 (0.19)	PCB-3 (0.9)	PCB-90+101+119 (2.3)	PCB-180+193 (1.2)	PCB-156+157 (4.0)
Total concentrations of top 6 (% contribution to total PCBs)	2.6 (85%)	2.7 (83%)	19.1 (74%)	18.4 (41%)	12.6 (63%)	70.7 (53%)

Appendix 6: Total analyte concentrations in water sampled in the Tod Creek watersheds (WET Season)

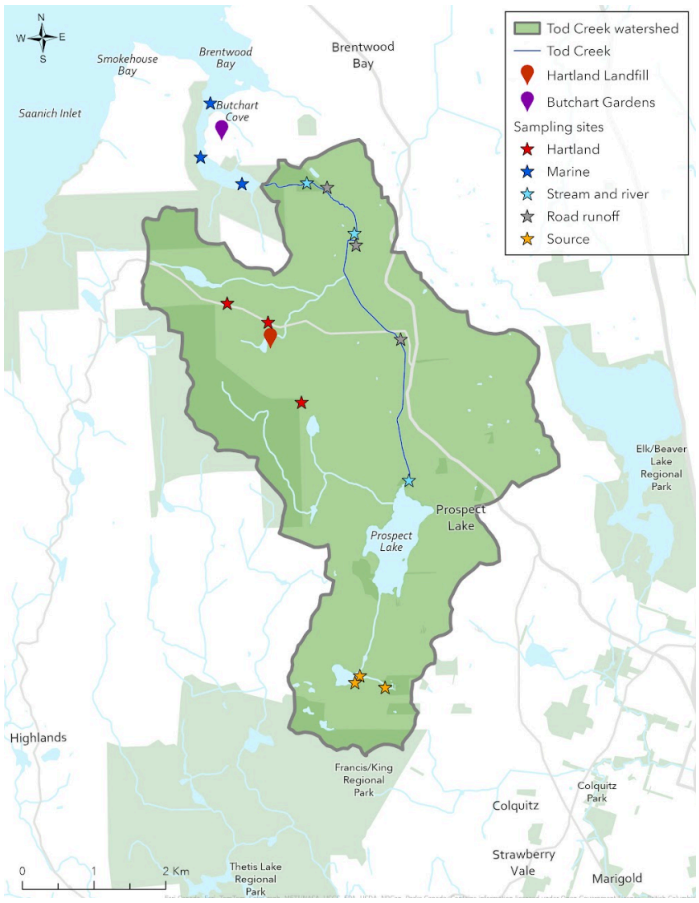
	Source	Stream and river	Road runoff	Tap	Marine	Hartland
E. coli (MPN)	1	**71**	12	0	23	19
Total NO^{-3} and PO_4^{3} (mg/L)	0.065	0.441	2.25	0.061	0.570	**11.9**
Metals (mg/L)	25	36	47	13	**3400**	120
Pesticides (ng/L)	0.55	**1.5**	1.3	0.05	1.3	0.81
PCBs (pg/L)	3.1	3.2	25.7	44.6	20.1	**133.7**
PAHs (ng/L)	32.9	11.2	31.3	**963.9**	51.4	18.1
PPCPs (ng/L)	3.60	107	268	197	**606**	73.4
PFAS (ng/L)	11.9	15.1	14.0	0.94	6.5	**59.5**
APEs (ng/L)	6.99	13.1	6.76	**146.9**	1.66	9.32
bisphenols (ng/L)	0	0	0	0	0	0
6-PPDq (ng/L)	0.04	0.11	0.10	0.19	0.13	**0.30**

Bold indicates the highest concentrations across water categories for each contaminant.

Healthy Waters field report: Dry season 2024 sample collection

Watershed: Tod Creek

Report date: October 28, 2024



In this report

Raincoast's Healthy Waters Program (https://www.raincoast.org/waters/) delivers high-resolution, community-oriented water quality analysis to watersheds across southern British Columbia. This preliminary report provides a summary of the Dry season water sampling in the Tod Creek watershed on August 9, 2024 and an update on analyses.

Summary

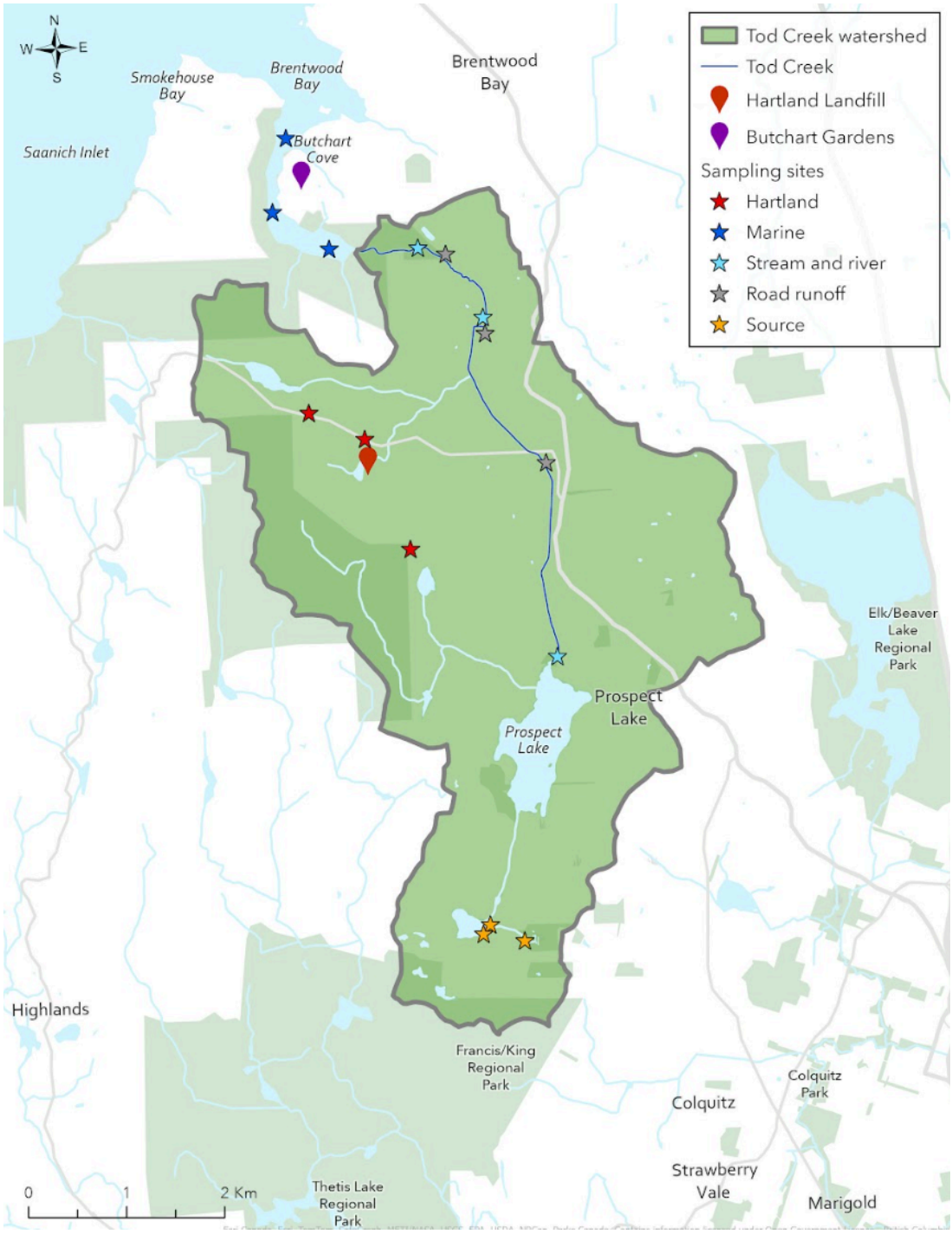
Water is essential for life, and steps are needed to understand, protect and restore its health in fish habitat throughout British Columbia. Here, a field team with members from Raincoast (Healthy Waters), Tsartlip First Nation, Friends of False Creek and the Capital Regional District determined basic water properties (temperature, conductivity, pH, dissolved oxygen and turbidity) in situ at Tod Creek on August 9, 2024. Water samples were collected at the same time from five water categories, including source water (3 samples), stream and river water (3 samples), road runoff (3 samples), landfill drainage (1 sample) and marine water (3 samples). An additional 10 samples of Tap water were obtained from buildings on the Tsartlip First Nation Reserve on October 9, 2024. Samples were then pooled by water category and were submitted to service labs for the determination of coliform, metals, nutrients and physical parameters, pesticides, polycyclic aromatic hydrocarbons (PAHs), pharmaceuticals and personal care products (PPCPs), polychlorinated biphenyls (PCBs), alkylphenol ethoxylates, bisphenols, per- and poly-fluoroalkyl substances (PFAS), sucralose and 6PPD-Quinone. We present here results of field water properties measurements, coliform, metals, nutrients and physical parameters.

The full suite of contaminant data will be shared in a comprehensive report available in early 2025.

Field team

- Raincoast Healthy Waters: Sam Scott and Peter S. Ross
- Friends of Tod Creek: Winona Pugh, Francis Pugh and Carmel Thomson
- Tsartlip First Nation: Franklyn Sampson
- Capital Regional District (CRD) Hartland Landfill Staff: Dan Lyons

Figure 1: The Tod Creek watershed



The Tod Creek watershed runs north from Prospect Lake, along West Saanich Road down to Tod Inlet, and covers an area of 24 km^2. Sampling sites were distributed throughout the watershed in order to capture a wide spatial range for our assessment of the health of fish habitat (Map by Brooke Gerle / Raincoast Conservation Foundation).

Field sampling

Table 1: Sampling sites in the Tod Creek watershed

Site Number	Water Type	Site Name	GPS
1	Source	Maltby Lake - Carmel's Dock	N 48.496813, W 123.449331
2	Source	Trevlac Pond	N 48.495230, W 123.444669
3	Source	Maltby Lake - A Frame Dock	N 48.495974, W 123.450316
4	River	Tod Creek @ Prospect Lake	N 48.521186, W 123.438774
5	River	Tod Creek @ Gowland Tod	N 48.559102, W 123.455963
6	River	Tod Creek @ Durrance Bridge	N 48.552520. W 123.447359
7	Runoff	Wallace Drive Ditch	N 48.551040, W 123.447130
8	Runoff	Ditch @ Wallace and Garden	N 48.558439, W 123.452182
9	Runoff	Tod Creek @ Farmington	N 48.538990, W 123.439361
10	Marine	Tod Inlet 1	N 48.559291, W 123.468188
11	Marine	Tod Inlet 2	N 48.562825, W 123.475803
12	Marine	Tod Inlet 3	N 48.569584, W 123.473602
13	Hartland	South Hartland Drainage Ck	N 48.531494, W 123.458465
16	Tap	Tap 10	Various

Water samples were collected from 13 field sites in the Tod Creek watershed, as well as 10 homes and businesses within the Tsartlip First Nation Reserve. These were then pooled into composite samples and submitted for analysis, or retained for specialised analyses.

Preliminary results

Table 2: Mean water properties for different water categories in the Tod Creek watershed in August 2024

Parameter	Source (n=9)	Stream and river (n=9)	Road Runoff (n=9)	Marine (n=9)	Hartland (n=9)
Temperature (℃)	22.6 ± 0.85 (19.0-24.4)	16.5 ± 0.56 (14.9-17.9)	18.3 ± 1.03 (15.9-22.4)	21.3 ± 0.13 (20.8-21.8)	NA
Dissolved Oxygen %	65.9 ± 14.0 (7.8-94.8)	26.5 ± 4.29 (11.0-36.3)	30.3 ± 4.18 (13.7-41.5)	140.6 ± 1.20 (134.2-144.4)	NA
Dissolved Oxygen (mg/L)	5.53 ± 1.15 (0.72-7.92)	2.57 ± 0.391 (1.12-3.44)	2.82 ± 0.365 (1.35-3.65)	10.6 ± 0.085 (10.1-10.9)	NA
pH	7.31 ± 0.132 (6.78-7.77)	7.31 ± 0.104 (7.04-7.77)	7.28 ± 0.090 (6.93-7.66)	8.24 ± 0.011 (8.20-8.28)	NA
Conductivity (uS/cm)	217.3 ± 113.0 (98.6-1120)	224.6 ± 35.21 (129.6-355.8)	466.3 ± 60.23 (321.9-704.0)	44160 ± 34.58 (44057-44399)	NA
Turbidity (FNU)	0.38 ± 0.36 (-0.32-2.56)	6.90 ± 2.37 (0.40-13.9)	6.90 ± 5.58 (8.88-47.8)	-0.051 ± 0.14 (-0.41-0.64)	NA

Average values for YSI ProDSS measurements for each water category illustrate some basic differences among field samples, with Road Runoff sites having relatively high mean conductivity among fresh water categories. Each site (Table 1) was measured three times with a YSI ProDSS, the values in this table represent averages of these for each category of water. NA - Not Applicable; Sample volume from the Hartland site was insufficient for measurement of water properties.

Table 3: Chemical and physical parameters (mg/L) for different water categories in the Tod Creek watershed in August 2024

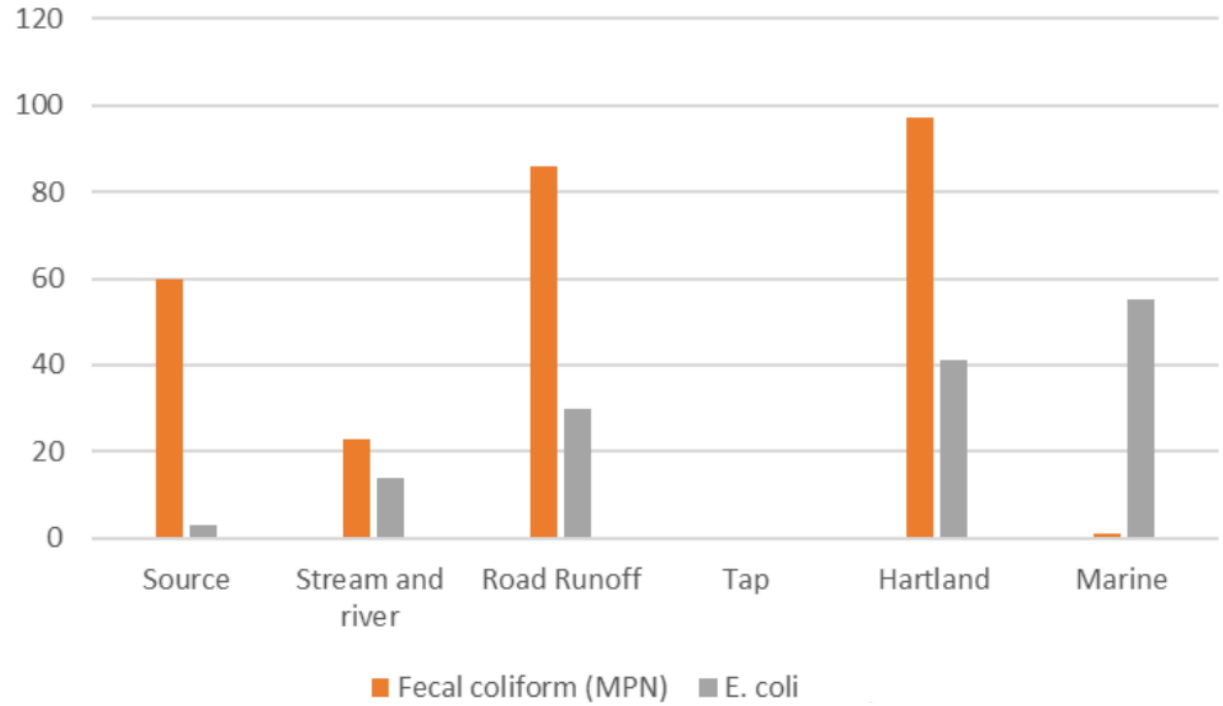
Parameter	Source (n=1)	Stream and river (n=1)	Road Runoff (n=1)	Tap (n=1)	Marine (n=1)	Hartland (n=1)
Hardness	38.8	108	184	pending	5430	200
Solids, total dissolved [TDS]	92	174	224	pending	35600	292
Solids, total suspended [TSS]	<3.0	15.3	84.3	pending	<3.0	118
Carbon, total organic [TOC]	8.95	12.4	15.6	pending	1.76	3.66
Biochemical oxygen demand [BOD]	<2.0	2.4	7.8	pending	<2.0	<2.0
Chemical oxygen demand [COD]	29	43	75	pending	772	72

Table 4: Mean coliform values for different water categories in the Tod Creek watershed in August 2024

Parameter	Source (n=1)	Stream and river (n=1)	Road Runoff (n=1)	Tap (n=1)	Marine (n=1)	Hartland (n=1)
Total coliform (MPN)	>2420	>2420	6870	0	158	4880
Fecal coliform (MPN)	60	23	86	0	<1	97
E. coli (MPN)	3	14	30	0	55	41

Moderate levels of fecal coliform and E. coli in Source, Freshwater and Road Runoff suggest low level bacterial contamination of fish habitat in the Tod Creek watershed, while tap water received a clean bill of health. Coliform samples were collected from each site (Table 1) before being pooled into a single sample for each water category which was then submitted to our partner lab for analysis.

Figure 2: Fecal coliform and E. coli counts for the five categories of water in Tod Creek watershed



Coliform counts were highest in the Hartland and Road runoff samples. No E. coli were found in the Tap water sample. Data are expressed as Most Probable Number (MPN) per 100 mL.

Table 5: Nutrient concentrations (mg/L) for different water categories in the Louis Creek watershed in August 2024

Parameter	Source (n=1)	Stream and river (n=1)	Road Runoff (n=1)	Tap (n=1)	Marine (n=1)	Hartland (n=1)
Ammonia, total (as N)	0.0161	0.0768	0.104	pending	<0.0050	0.0096
Nitrate (as N)	<0.0050	0.0301	<0.0050	pending	<0.500	0.151
Nitrate + Nitrite (as N)	<0.0051	0.0317	<0.0051	pending	<0.510	0.151
Nitrite (as N)	<0.0010	0.0016	<0.0010	pending	<0.100	<0.0010
Nitrogen, total	0.482	0.920	2.31	pending	0.073	1.28
Phosphate, ortho-, dissolved (as P)	<0.0010	0.0785	0.0358	pending	0.0118	0.0024

The stream and river sample was found to have the highest concentration of nitrite and phosphate, the road runoff sample had the highest concentration of ammonia and total nitrogen, and the Hartland sample had the highest concentrations of nitrate. None of the detected concentrations exceed environmental quality guideline values.

Table 6: Metal concentrations for different water categories in the Tod Creek watershed in August 2024

Parameter	Source (n=1)	Stream and river (n=1)	Road Runoff (n=1)	Tap (n=1)	Marine (n=1)	Hartland (n=1)
Aluminum, total	0.0189	0.124	0.549	Pending	<0.150	2.07
Antimony, total	<0.00010	<0.00010	<0.00010	Pending	<0.00500	0.00013
Arsenic, total	0.00023	0.00183	0.00168	Pending	<0.00500	0.00217
Barium, total	0.00497	0.0110	0.0368	Pending	0.00774	0.0201
Beryllium, total	<0.000020	<0.000020	<0.000020	Pending	<0.00100	0.000050
Bismuth, total	<0.000050	<0.000050	<0.000050	Pending	<0.00250	<0.000050
Boron, total	0.023	0.021	0.112	Pending	3.76	0.023
Cadmium, total	<0.0000050	<0.0000050	0.0000208	Pending	<0.000250	0.0000621
Calcium, total	11.1	32.0	52.4	Pending	359	67.8
Chromium, total	<0.00050	0.00096	0.00216	Pending	<0.0250	0.00337
Cobalt, total	0.00010	0.00159	0.00187	Pending	<0.00500	0.00244
Copper, total	0.00107	0.00127	0.00514	Pending	<0.0250	0.00554
Iron, total	0.408	2.28	9.41	Pending	<0.500	4.33
Lead, total	<0.000050	0.000140	0.000526	Pending	<0.00250	0.00131
Lithium, total	<0.0010	<0.0010	0.0012	Pending	0.158	0.0011
Magnesium, total	2.69	6.89	12.8	Pending	1100	7.36
Manganese, total	0.0250	1.33	1.10	Pending	<0.00500	1.32
Mercury, total	<0.0000050	<0.0000050	0.0000068	Pending	<0.0000050	0.0000142
Molybdenum, total	0.000164	0.000528	0.000422	Pending	0.00976	0.000741
Nickel, total	<0.00050	0.00160	0.00247	Pending	<0.0250	0.00302

Phosphorus, total	<0.050	0.275	0.976	Pending	<2.50	0.144
Potassium, total	0.209	1.14	3.70	Pending	332	1.36
Selenium, total	<0.000050	0.000110	0.000099	Pending	<0.00250	0.000296
Silicon, total	1.34	6.55	8.55	Pending	<5.00	9.04
Silver, total	<0.000010	<0.000010	<0.000010	Pending	<0.000500	0.000024
Sodium, total	6.67	9.91	22.1	Pending	8100	5.05
Strontium, total	0.0413	0.108	0.185	Pending	6.68	0.169
Sulfur, total	0.83	1.48	2.26	Pending	803	19.2
Thallium, total	<0.000010	<0.000010	<0.000010	Pending	<0.000500	0.000013
Tin, total	<0.00010	<0.00010	<0.00010	Pending	<0.00500	<0.00010
Titanium, total	0.00052	0.00452	0.0173	Pending	<0.0150	0.101
Uranium, total	<0.000010	0.000108	0.000091	Pending	0.00260	0.000339
Vanadium, total	<0.00050	0.00132	0.00393	Pending	<0.0250	0.00757
Zinc, total	<0.0030	<0.0030	0.0179	Pending	<0.150	0.0660
Zirconium, total	<0.00020	<0.00020	<0.00020	Pending	<0.0100	<0.00020
Total metals	*23.4*	*62.1*	*114*	*Pending*	*10700*	*118*

Next steps

- Access is provided for CRD, Tsartlip First Nation and the WLC to a shared Google Drive that contains raw field and laboratory data, watershed maps, reports, and Raincoast photos taken during sampling events. Photos taken by watershed partners can be uploaded to this folder.
- Quality Assurance/Quality Control has been carried out on the remaining Tier 2 analytes including: nutrients (total nitrogen, nitrate, nitrite, phosphate, ammonia), a full suite of metals (n=35), and various physical and chemical properties (including Total Suspended Solids, Total Dissolved Solids, Total Organic Carbon, Chemical Oxygen Demand and Biological Oxygen Demand).
- Tier 3 analyses are currently underway at SGS Axys including: pesticides (n=76), polychlorinated biphenyls (PCBs; n=209), hydrocarbons (n=76), bisphenols (n=6), alkylphenols (n=4), per- and polyfluorinated alkyl substances (PFAS; n=40), pharmaceuticals and personal care products (PPCPs; n=142) and Sucralose. The tire-related chemical 6PPD-Quinone is being determined by Fisheries and Oceans Canada.
- A comprehensive data report for combined Tier 1-2-3 analyses will be shared in early 2025.
- A website will be shared in 2025 that summarises high level findings for all watershed partners, allowing for a 'lessons learned' opportunity across communities.
- Questions or concerns? Please reach out to Peter (peter@raincoast.org) or Sam (sam@raincoast.org).

Making a difference...together

ERM 24-67

REPORT TO ENVIRONMENTAL SERVICES COMMITTEE
MEETING OF WEDNESDAY, NOVEMBER 20, 2024

SUBJECT **Solid Waste Market Research and Engagement Study**

ISSUE SUMMARY

To present the results of the 2024 Solid Waste Market Research and Engagement Study

BACKGROUND

In 2023, staff worked with the Solid Waste Advisory Committee to develop performance indicators and metrics to better enable the monitoring of progress towards meeting the Capital Regional District's (CRD) 2021 Solid Waste Management Plan (SWMP) goals and targets. Gaps in available data and metrics were identified leading to a proposed three-year cycle of studies designed to collect relevant metrics and compare progress throughout the life of the SWMP. The 2024 Solid Waste Market Research and Engagement Study is the first study to be completed under the new three-year cycle.

The 2024 Solid Waste Market Research and Engagement Study gathered information on – and measured public attitudes, knowledge of and behaviours toward – solid waste management, in relation to achieving Goal 3 of the SWMP*: Have informed citizens that participate effectively in proper waste management practices*. R.A. Malatest and Associates, Ltd. (Malatest) were contracted to conduct the study. The objectives of the study were to:

- establish a set of baseline data, identify key performance indicators (KPIs);
- evaluate the effectiveness of current CRD waste reduction and behaviour change strategies; and
- understand the public's attitudes, knowledge and behaviours in relation to the SWMP, the general waste system and available services within the capital region.

The intention is to use the KPIs identified in the report to monitor progress towards achieving Goal 3 of the SWMP on an annual basis and to conduct the full study once every three years to allow for comparisons between years.

The study was conducted from May to October 2024 using three surveys targeting residents, Hartland Public Drop-Off Depot users and businesses located in the capital region. These surveys were developed to assess behaviours, attitudes, programs, resources and communication strategies related to solid waste. Survey questions were designed to gauge effectiveness of existing policies and programs, as well as to gather insight into opportunities for improvement. Survey results, along with historical data, such as program participation, scale data, Infoline data and the solid waste stream composition study, were analyzed to develop the baseline assessment, identify gaps and generate recommendations.

Residential Survey Highlights

Over 1,000 residents were surveyed to assess behaviours and attitudes towards solid waste management themes such as reducing waste, knowledge of best practices and disposal habits. A few highlights and identified KPIs include:

- 74% of residents reported positive attitudes (i.e., agree or strongly agree) across five waste management behaviours, including reducing waste, supporting circular economy, composting, confidence in their waste disposal knowledge and supporting community initiatives.
- While most residents reported no barriers to disposing of general refuse, recycling and organic waste, significant barriers exist for "Other recycling" such as Styrofoam and soft plastics. These barriers include a lack of knowledge on where and how to dispose of these materials and difficulty in transporting to disposal sites.
- Virtual and online resources were most frequently used by respondents, with 56% reporting use of the CRD website and 31% reporting use of the Recycle CRD App.

Hartland Public Drop-Off Depot Survey Highlights

Over 100 surveys were completed by residents using the Hartland Public Drop-Off Depot. Results provide a snapshot of the types of materials being disposed by residents. A few highlights from survey responses include:

- Visits to dispose of general refuse have increased by about 5% annually, slightly higher than population growth.
- Visits related to recyclables have increased by an average of 20% annually, with a notable spike in 2022 following the introduction of the Express & Go drop-off for refundable beverage containers.
- Materials most commonly being brought for drop-off included metals (63%), plastic products (59%) and foam packaging (55%).

Business Survey Highlights

Over 200 business representatives were surveyed and asked about the types of waste their businesses produce, their disposal methods and ability to comply with local regulations. A few highlights and identified KPIs include:

- Most businesses produce paper (92%), plastic (75%) and organic waste (62%).
- When comparing the type of wastes generated with recycling options provided on site, we begin to see discrepancies in disposal methods. For example, 100% of businesses that produce paper also have bins on site for its collection, however, only 74% of businesses that produce soft plastic have collection methods in place.
- About half of the businesses experience challenges complying with local waste management regulations, citing limited disposal options (32%) and high costs (18%).
- Businesses prefer communications surrounding new regulations (73%), incentive programs (62%), and detailed guidelines for specific waste types (61%).

The full report is attached as Appendix A for information. Results from the 2024 Solid Waste Market Research and Engagement Study established a baseline assessment of how citizens interact with and understand current solid waste management systems, identified areas for improvement, and gauged the effectiveness of existing engagement activities. Additionally, it offered insights on how to refine communication strategies and programs, with an aim to significantly enhance waste reduction efforts (in both the short and long-term) across the capital region. When used in conjunction with results from future studies, such as a waste generator study and solid waste composition study, as well as regular operational data, results from the Market Research and Engagement Study will aid in the design and implementation of programs and initiatives focused on achieving SWMP target and goals.

CONCLUSION

The Capital Regional District commissioned Malatest to conduct the 2024 Solid Waste Market Research and Engagement Study. The study was designed to measure public attitudes, knowledge of and behaviours toward solid waste management, in relation to achieving Goal 3 of the SWMP. The study will be conducted on a three-year cycle and staff will use results in conjugation with other data inputs to monitor progress towards achieving targets set out in the SWMP and to inform the design of future programs, policies or initiatives.

RECOMMENDATION

There is no recommendation. This report is for information only.

Submitted by:	Tom Watkins B. Sc., Acting Senior Manager, Environmental Resource Management
Concurrence:	Glenn Harris, Ph.D., R.P.Bio., Acting General Manager, Parks, Recreation & Environmental Services
Concurrence:	Ted Robbins, B. Sc., C. Tech., Chief Administrative Officer

ATTACHMENT

Appendix A: Solid Waste Market Research and Engagement Study: Final Report – Malatast (October 2024)

MALATEST

CRD
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APPENDIX A

Solid Waste Market Research & Engagement Study

Final Report
October 2024

Prepared for: The Capital Regional District
Prepared by: R.A. Malatest & Associates Ltd.

EXECUTIVE SUMMARY

This report outlines the key insights from an evaluation of Goal 3 (to have informed citizens that participate effectively in proper waste management practices) of the CRD's 2021 Solid Waste Management Plan (SWMP). The evaluation examined behaviours, attitudes, programs, resources, and communication strategies. The analysis incorporated data from the Resident Survey, the Business Survey, the Hartland Public Drop off Depot Survey, and is supplemented by historical data from various sources. This evaluation aimed to establish baseline data of current waste management practices, identify areas for improvement, and gauge the effectiveness of existing engagement activities. Additionally, it offers actionable insights to refine communication strategies and programs in order to significantly enhance waste reduction efforts in both the short and long term.

This report is the first step in developing a foundational and ongoing framework for long-term evaluation of community participation and the impact of the CRD's solid waste management initiatives. Ultimately, the findings in this study serve as a baseline for future iterations of this study and other research activities to be compared to.

The table below presents the key performance indicators collected in 2024, establishing a baseline for future iterations of this study. Tracking these indicators over time will enable the CRD to assess the impact of its waste reduction programs and observe shifts in public attitudes, knowledge, and behaviours.

Key Performance Indicators (2024 Baseline)

KPI	Baseline (2024)
Residents reporting positive behaviours and attitudes toward waste management practices (see **Section 4**)	74%
Residents reporting no barriers to disposing of...	General refuse: 98% Recyclable materials: 96% Organics: 95% Other materials: 38%-64%
Businesses reporting no barriers to properly disposing of waste	53%
Residents disposing of plastic products as general refuse	26%

Behaviour & Attitudes (Resident Survey)

- **High Support for Community Initiatives and Circular Economy[1]:** Residents show strong agreement with behaviours supporting *Community Initiatives* (76%) and a *Circular Economy* (78%), both scoring 0.52 on a scale that ranges from -1 to 1.
- **Lower Confidence in Knowledge and Composting Behaviours[1]:** *Confidence in Knowledge* and *Composting* scored lower than other domains, at 0.40 (71% agreement) and 0.27 (61% agreement) respectively, indicating areas for educational improvement.
- **Single-Family Dwellings Lead in Positive Behaviours:** Residents of single-family homes exhibit the highest overall composite scores in waste management behaviours, particularly in *Confidence in Knowledge* and following practices that *Reduce Waste Generation*. This is attributed to structural advantages these residents have in terms of access to resources and services. Looking for differences across demographic groups may highlight where structural advantages exist or where certain groups could benefit from additional education or resources.
- **Barriers to Proper Disposal:** While most residents report no barriers in disposing of general refuse, recycling, and organic waste, significant barriers exist for "Other recycling" (e.g., Styrofoam, soft plastics) (64%) and "Other" materials (e.g., textiles, electronics) (38%). These barriers include a lack of knowledge on where and how to dispose of these materials and difficulty in transporting materials to disposal sites. By monitoring the percentage of residents reporting these barriers, the CRD can make informed decisions to prioritize resources and services that will support residents in knowing how to dispose of these other materials and increase the accessibility of disposal options.
- **Disposal of Certain Materials as General Refuse:** A wide range of materials and their frequency of disposal as general refuse were identified. Of these, textiles/clothing (46%) and plastic products (26%) are highlighted as having high frequency. By monitoring materials that could have better disposal methods (e.g., plastic products), the CRD can infer where additional resources or support are needed. In the case of textiles or clothing, it may be that residents are unaware that these are considered general refuse as there are limited opportunities to recycle textiles that cannot be reused.

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[1] Behaviours and attitudes towards solid waste management were assessed using a converted 5-point agreement scale ranging from -1 to 1 within 5 different domains. Positive values indicate favourable traits and values close to 0 indicate neutrality. Please refer to **Section 4.**

Programs & Resources (Resident Survey)

- **Preference for Virtual and Online Resources:** The CRD website (56%) and the Recycle CRD App (31%) are the most frequently used waste management resources among residents, suggesting fewer barriers to access and use.
- **Effectiveness of Resources:** Though not the most frequently used, resources provided by the Compost Education Centre (97% effective), the Recycle CRD App (96% effective), and Hartland Landfill Public Tours (94% effective) are perceived as being effective to highly effective in improving waste reduction knowledge among users. Both single-family and multi-family homes reflect similar benefits from these resources.
- **Limited Awareness of Programs:** A significant portion (30%) of residents have never accessed any of the waste management programs or resources listed in the survey, pointing to a need for increased outreach or different outreach strategies that may reach an audience that has not been previously engaged.

Hartland Public Drop-off Depot Survey

- **High Usage Among Residents:** 58% of residents report using the Hartland Public Drop-off Depot for disposing of recyclable materials (33%), garbage (25%), and other materials (33%).
- **Materials Disposed:** Materials commonly disposed at the depot include plastic products (63%), metal (59%), foam packaging (55%), electronic devices (54%), and household hazardous waste (53%).
- **Increase in Visits:** Since 2017, resident visits to dispose of general waste have increased by about 5% annually, slightly higher than population growth.
- **Significant Rise in Recycling Visits:** Visits related to recyclables have increased by an average of 20% annually, with a notable spike in 2022 following the introduction of the Express & Go drop-off option.

Business Survey Insights

- **Waste Types and Disposal Methods:** Most businesses produce paper (92%), plastic (75%), and organic waste (62%). Materials that businesses are less likely to produce tend to have fewer disposal methods available (e.g., electronics, wood and wood products).
- **Reliance on Third-Party Waste Collectors:** A majority (77%) of businesses contract third-party waste collectors and are largely satisfied with the reliability of these services (84%). Most of the businesses who reported not using a third-party waste collector were small (i.e., fewer than 10 employees).
- **Challenges with Local Regulations:** About half of the businesses experience challenges complying with local waste management regulations (47%), citing limited disposal options (32%) and high costs (18%).
- **Suggestions for CRD Support:** Businesses suggest increasing disposal options (60%), providing clearer guidelines (32%), and offering more training resources (22%) to aid compliance.
- **Lack of Impact Measurement:** A majority (61%) of businesses do not measure the impact of their waste management practices, despite having waste reduction goals (90%).

Informing a Communication Strategy

- **Primary Sources of Information:** Residents primarily rely on local government publications or websites (60%) and word of mouth (54%) for waste management information.
- **Preferred Communication Channels:** Websites and online platforms (56%), email (41%), and letter mail (36%) are the preferred methods for receiving information about waste management practices.
- **Content Preferences for Residents:** Practical information on disposing of waste that cannot be reused or recycled (74%) and how to recycle waste (68%) is more sought after than educational content.
- **Content Preferences for Businesses:** Businesses prioritize updates on new regulations (73%), incentive programs (62%), and detailed guidelines for specific waste types (61%).

Summary of Recommendations

Addressing Resident Gaps in Knowledge

Consider enhancing resources available to residents to target gaps in knowledge of solid waste management.

Addressing Barriers Related to Residents Solid Waste Management

Residents may benefit from strategies or tips for transporting materials, and greater awareness of options for private waste collection and disposal of large materials or those that are difficult to transport.

If possible, it may be worth considering how the CRD can continue to work with municipalities to offer services to folks in multi-family dwellings.

Engaging Residents in CRD Programs and Resources

Consider ways to engage residents of the Gulf Islands, such as by focusing on brand awareness. Increased visibility of CRD's impact may encourage program utilization, improving waste management.

Supporting Businesses

There may be an opportunity for the CRD to develop training resources that local businesses could tailor to meet their needs.

Informing a Communication Strategy for Businesses

Businesses in the CRD could benefit from detailed disposal guidelines by specific waste types, and updates on new or changing regulations.

Enhancing Future Evaluations

1. Consider focus groups or sub-surveys to explore specific areas in more detail (e.g., resident composting behaviours, needs of small businesses).

2. Consider refinement of tracking systems for Infoline email and phone inquiries.

Informing a Communication Strategy for Residents

Consider expanding the Rethink Waste Newsletter. Promote ways for residents to receive emails from the CRD with information and resources related to the CRD's solid waste management programs.

Newsletter content should include practical information on how to dispose of soft plastics, foam packaging, and electronics; tips for transporting materials, and lists of locations where various materials can be dropped off.

TABLE OF CONTENTS

1 PROJECT BACKGROUND

The Capital Regional District (CRD) encompasses thirteen municipalities and three electoral areas on southern Vancouver Island and the Gulf Islands and is responsible for service delivery to these areas on regional, sub-regional and local levels.

The Environmental Resource Management (ERM) division of the CRD is responsible for municipal solid waste management, including waste reduction, recycling programs and the operation of Hartland Landfill. Environmental resource management in the capital region is based on the 5R hierarchy of Reduction, Reuse, Recycling, Resource Recovery and Residuals Management, with the goal of extending the life of Hartland Landfill by minimizing waste disposal and maximizing diversion opportunities.

The 2021 Solid Waste Management Plan (SWMP), approved by the CRD Board in May 2021, and by the Province of British Columbia in July 2023, identifies the following goals:

1. Surpass the provincial per capita waste disposal target; and aspire to achieve a disposal rate of 125 kg/capita/year;
2. Extend the life of the Hartland Landfill to the year 2100 and beyond;
3. Have informed citizens that participate effectively in proper waste management practices; and
4. Ensure the CRD's solid waste services are financially sustainable.

The CRD identified a need for current information on public attitudes, knowledge of and behaviours toward solid waste reduction, in order to achieve Goal 3 of the SWMP. As such, the CRD commissioned R.A. Malatest and Associates Ltd. (Malatest) to conduct this Market Research and Engagement Study.

The objectives of the Market Research and Engagement Study were to evaluate the effectiveness of current CRD waste reduction and behaviour change strategies and to understand the public's attitudes, knowledge and behaviours in relation to the SWMP, and the general waste system and available services within the CRD. The data gathered as part of this study will serve as a baseline to monitor how public perception and engagement with CRD waste reduction programming and behaviour change initiatives evolve over time.

The data collected in this study was also used to develop key performance indicators to measure progress against Goal 3 of the SWMP. The key performance indicators will identify any challenges, limitations, or gaps within current CRD waste reduction and behaviour change initiatives and guide the development of future programming.

2 METHODOLOGY

2.1 Engagement Strategy

A Community Engagement Strategy was developed to help guide engagement with various stakeholders. The Engagement Strategy was provided to the CRD, along with other pertinent components of our outreach methodology and timeline, in a comprehensive Engagement Plan document.

Malatest completed several scoping research activities to develop a fulsome understanding of the parameters and objectives of the project. The scoping research activities also allow for subsequent stages of the research design to focus on additional and explanatory information that builds on the available information, and for any gaps in the data to be filled through other research activities.

2.1.1 Document Review

Malatest completed a review of background documents, which allowed us to understand what baseline data was already available, and to ensure that information was not duplicated in subsequent research activities. The CRD was able to provide Malatest researchers with the information necessary for the document review, which included:

- 2021 Solid Waste Management Plan;
- Solid Waste Management Plan (annual) Progress reports;
- 3Rs Education Program statistics (2013-2024);
- Examples of program communication, performance, and outreach materials;
- Feedback received through Infoline Inquiries;
- Analytics from Recollect Systems; and
- The Hartland Landfill scales data and Tonnage Reports.

2.1.2 Scoping Interviews

Malatest completed scoping interviews with key stakeholders from the CRD Environmental Resource Management (ERM) Division. The key stakeholder scoping interviews were conducted to identify the information needs of those involved. The information collected in the scoping interviews allowed for further development of the research design, data collection tools, and key performance indicators. Interviews were conducted in May 2024 via videoconference.

2.1.3 Focus Group with Members of the Solid Waste Advisory Committee

Malatest conducted a focus group session with members of the CRD's Solid Waste Advisory Committee (SWAC) on June 7th, 2024. The SWAC was established to provide input on solid waste management matters and consists of members from diverse backgrounds, interests, and geographical locations, representing a balance between technical and non-technical members as well as industry and public members.

Through this focus group, the Malatest research team gained insights into the values, expectations and needs of the SWAC. Additionally, this focus group offered Malatest researchers an opportunity to receive feedback on the proposed research design.

2.2 Survey Instruments

Three survey instruments were developed by Malatest, targeting three key demographics: residents of the CRD (**Appendix A**), Hartland Public Drop-off Depot users (**Appendix B**), and businesses located in the CRD (**Appendix C**).

The survey instruments were designed to ensure that the deliverables and outcomes were aligned with the project objectives, and that the data collected met the specific information needs and goals outlined by the CRD during the scoping research activities.

Table 2.1: Overview of Survey Instruments

Audience	Method	Target Completions	Final Completions	Sample
Residential	Survey	600-800	1,097	Address-based sampling
Businesses	Survey	200	205	Developed from businesses directories
Hartland Public Drop-off Depot	Survey	100	103	CRD Staff handing postcards out to residents with a link to the survey for them to complete at home. Posters containing survey invitations were also available throughout the drop-off areas.

2.2.1 Survey of CRD Residents

A survey of citizens whose primary residence[2] was located within the capital region was developed to collect data on key attitudes, knowledge, and behaviours related to their household's solid waste management practices.

Survey Sampling and Administration

The CRD Resident survey was administered from July 17th, 2024 to August 31st, 2024. The survey was distributed to citizens whose primary residence was located in the region. An address-based sampling approach was used, with mailing information comprising addresses, municipalities, postal codes, and when available, resident names and phone numbers. A proportional sampling approach of all municipalities and electoral areas within the CRD's jurisdiction ensured that survey completions were proportional to the region's population size.

Letters notifying residents of the survey and inviting them to participate either online or by phone were distributed by mail. Surveys were primarily completed online (n = 995), with some surveys completed by telephone (n = 102). To encourage survey completions, participants were offered the option to enter into a prize draw to win either one $100 e-gift card or one of two $50 e-gift cards. The total sample developed for the survey comprised 9,000 addresses.

To provide residents with information about the survey and the evaluation project, Malatest developed a website containing frequently asked questions and researcher contact information. A survey helpline was also established, which was used by residential respondents with additional questions or who required assistance in completing the survey with the support of a trained Malatest surveyor. While the survey had an expected target of between 600-800 completions, it ultimately surpassed that target. When weighted, the survey data are proportionally representative of the capital region in terms of region, age, gender, dwelling type, and household income. For more details on the weighting methodology used in this survey, please refer to **Section 2.3.1**.

Survey Completions

In total, 1,097 residents completed the survey, which represented a 12% overall response rate and 0.2% of the population (see **Table 2.1**).

[2] A primary residence is the place where an individual lives for a longer period in the calendar year than any other place (Government of British Columbia, 2024).

Table 2.2: Residential Survey Completions

Study Area	Survey Completions	Percentage of Survey Completions	Percentage of the CRD
Saanich	160	15%	25%
Victoria	149	14%	27%
Central Saanich	91	8%	4%
Sidney	77	7%	3%
Langford	72	7%	10%
Salt Spring/Gulf Islands	72	7%	6%
Colwood	70	6%	4%
View Royal/ Highlands	66	6%	3%
Esquimalt	65	6%	5%
North Saanich	63	6%	3%
Oak Bay	62	6%	4%
Sooke	60	5%	3%
Juan De Fuca	47	4%	1%
Metchosin	43	4%	1%
Total	1,097		

2.2.2 Hartland Public Drop-off Depot Survey

A survey tailored to the users of the Hartland Public Drop-off Depot was developed to collect data on key attitudes, knowledge, and behaviours related to solid waste management practices. Our approach to surveying is described in the sub-sections below.

Survey Administration

The Hartland Public Drop-off Depot Survey launched on July 24th, 2024 and closed on August 31st, 2024. The survey employed passive recruitment methods, comprising posters and postcards advertising the survey posted around multiple locations at the drop-off site.

To bolster completions, CRD outreach staff conducted recruitment at the Hartland Public Drop-off Depot, by distributing post cards and encouraging the public to complete the survey. In total, 103 surveys were received (see **Table 2.3**).

Table 2.3: Hartland Public Drop-off Depot Survey Completions

Completions	Partial Completions
103	6

2.2.3 Survey of CRD Businesses

A survey of businesses in the capital region was developed to collect data on key attitudes, knowledge, and behaviours related to solid waste management practices. Our approach to surveying is described in the sub-sections below.

Survey Sampling and Administration

The Business Survey was administered from July 17th, 2024 to August 16th, 2024. The survey was distributed to businesses operating in the region using a sample that was developed by searching business directories with the North American Industry Classification System (NAICS) codes found on Statistics Canada. It should be noted that this sample was not exhaustive of all businesses and stakeholders operating within the capital region. Malatest also accessed a variety of search engines to further supplement the sample. Survey completions are proportionate to the distribution of business sizes (i.e., number of employees) and industries within the region.

Malatest delivered emails notifying businesses of the survey and inviting them to participate either online or by phone with a trained Malatest surveyor. To bolster completions, Malatest surveyors conducted telephone outreach to businesses who had not responded to the initial invitation email between July 22nd, 2024 and August 15th, 2024 to ask that they complete the survey. Surveys were primarily completed by telephone (n = 148), with some surveys completed online (n = 57). The total sample developed for the Business Survey comprised 2,804 businesses.

Survey Completions

In total, 205 businesses fully completed the survey (**Table 2.3**).

Table 2.4: Business Survey Completions

Employee Range	Telephone	Web	All Completions	Partial Completions
1 to 9 employees	68	23	91	9
10 to 49 employees	53	28	81	11
50 to 199 employees	20	3	23	3
200+ employees	6	2	8	1
Other (preferred not to answer)	1	1	2	-
Total	148	57	205	24

2.3 Data Analysis

Quantitative survey data were analyzed primarily by generating summary statistics (e.g., frequencies, proportions). Where possible, data were stratified by demographic variables (e.g., region, age, dwelling type) to ensure that results reflect differences and similarities across various groups. We calculated proportions to summarize the data and present these as percentages. It is important to note that the percentages presented might not always add up to 100% due to rounding and the nature of multiple response questions which allow respondents to select more than one answer. Qualitative survey data was analyzed using a thematic approach where results are summarized and grouped by emerging themes.

2.3.1 Data Weighting

The CRD Resident survey aimed to gather opinions from a variety of residents; however, not everyone is equally likely to respond to surveys, and certain demographic groups, such as apartment residents, were less represented in the survey data. These survey data, when weighted and expanded, proportionally reflect the whole community. 2021 Census data was used to understand the actual makeup of the region and survey data were adjusted accordingly. By doing this, we can ensure that the results better match the true diversity of the CRD population and address some of the limitations outlined in **Section 2.4** below. We also measured the effect of our adjustments to confirm that they improved the survey's accuracy without skewing the data. The adjustments allowed us to confidently report on the opinions from different areas, even those that had fewer responses.

2.4 Limitations

Sampling Constraints

The surveys conducted represent a sub-sample of the CRD population. There were calculated efforts to ensure proportional representation across all municipalities and electoral areas by carefully following a stratified sampling plan. However, our design did not have the capacity to guarantee proportionate representation of other variables such as dwelling type or age groups. This limitation implies that certain demographic groups may be underrepresented in our sample. To mitigate this, strategies such as the weighting design in the Resident survey were employed. By applying appropriate weights based on Census data, we adjusted for underrepresented groups, which effectively allows us to extrapolate the findings to the majority of households in the capital region, as long as we interpret the results with caution.

Typical Variance Associated with Survey Data

As with any survey-based research, there is inherent variability and potential for error. Factors such as population variance, sampling error, non-response bias, and measurement inaccuracies (i.e., respondents' interpretation of the questions) can affect the reliability of the results.

Social Desirability

Participants may have provided responses they believe are socially acceptable rather than their true feelings or behaviours. This social desirability bias can lead to over-reporting of positive behaviours (e.g., recycling) and underreporting of negative behaviours (e.g., improper disposal of materials). Such bias can affect the validity of self-reported measures and should be taken into account when analyzing the data.

Inability of Respondents to Report on Unrecognized Challenges and Barriers

For a few specific questions, respondents may be unaware of certain challenges or barriers affecting their solid waste management practices. This unawareness limits the depth of insights into underlying issues influencing behaviour. Consequently, for these particular questions (i.e., Q4 and Q8 in **Appendix A**), the data may not fully capture all factors contributing to waste management practices within the region, especially those challenges that respondents themselves do not recognize or understand. It's important to note that this limitation is confined to a small subset of questions and does not significantly impact the overall findings of the study.

Self-Selection Bias

Participation in the surveys was voluntary, leading to potential self-selection bias. Individuals or businesses that chose to participate might have different attitudes or behaviours compared to those who did not. For example, those more interested or engaged in environmental issues may be overrepresented.

3 EVALUATION FRAMEWORK

The focus of this evaluation framework is on Goal #3 of the SWMP: *To have informed citizens that participate effectively in proper waste management practices*. The evaluation framework was developed to identify data sources and key performance indicators that can be tracked over time; and aims to provide insight into the CRD's progress towards their goal of having informed citizens that participate effectively in proper waste management practices. Data collected in 2024 primarily serves a baseline to compare to in the future. This study is expected to follow a 3 year cycle, and will allow for a longitudinal comparison of the key performance indicators.

The Evaluation Framework for this study has been developed to address several key objectives:

- Allow for comparison between years to determine whether the CRD's waste reduction programs are effective;
- Identify and address challenges, limitation, and gaps within each program area;
- Help the CRD to better understand the public's attitudes, knowledge, and behaviours in relation to the CRD's waste reduction programming; and,
- Determine the effectiveness of waste reduction programming by monitoring how attitudes, knowledge, and behaviours evolve over time.

3.1 Data Sources

The evaluation framework relies on several data sources, including survey data and administrative data. The CRD Resident Survey (**Section 2.2.1**) and Hartland Public Drop-off Depot Survey (**Section 2.2.2**) provide insight into resident behaviours, attitudes, and knowledge related to solid waste management and the CRD's waste reduction programming and goals. The CRD Business Survey (**Section 2.2.3**) for local businesses complements the Resident Survey to provide an understanding of areas of success and challenges for commercial business operators in the region.

Select administrative data was also available to support the evaluation. These data sources include **historical Hartland tonnage data**, **CRD Solid Waste Stream Composition Study**, **CRD website analytics**, and **CRD community and school 3Rs Program participation data**.

For future evaluation cycles, the CRD may consider adding focus groups with residents to better understand areas of success and challenges related to the CRD's waste reduction programs and goals, including a more in-depth understanding of the barriers and challenges residents face when trying to comply with local regulations and best practices.

3.2 Key Performance Indicators

The Evaluation Matrix (see **Appendix D**) provides a summary of the key evaluation areas, associated data sources, and key performance indicators. While the matrix identifies a number of performance indicators, several key indicators are highlighted below.

1. CRD Resident Survey

- **The percentage of residents reporting positive behaviours and attitudes toward waste management practices**. This is composed of the five key areas listed below and is complemented by domain composite scores.
  - Reduce waste generation
  - Support for a circular economy
  - Support for community initiatives
  - Composting
  - Confidence in knowledge
- **The percentage of residents reporting no barriers** to disposing of various recyclable materials, organics, and general refuse.
- **The percentage of residents disposing of recyclables or other materials as general refuse**.

2. CRD Business Survey:

- **Discrepancy between waste produced vs bins/disposal options provided** (identified as a percentage).
- **The percentage of businesses challenges** complying with local waste management regulations.
  - Suggestions from businesses regarding how the CRD can support the business in complying with local regulations

4 FINDINGS: **BEHAVIOUR & ATTITUDES**

The following section summarizes findings related to behaviours and attitudes towards solid waste management and reduction as reported by the CRD Resident Survey respondents. Behaviours and attitudes were measured using a 5-point agreement scale ranging from strongly disagree (1) to strongly agree (5). Respondents would rate the waste management or reduction actions that they, or members of their household do, on this 5-point scale, which was then converted to a score that ranges from -1 to 1. Positive numbers on this scale indicate a positive valence towards these domains, meaning that as the scores approach 1, they reflect the most ideal behaviours or attitudes. Conversely, values closer to 0 can be interpreted as neutral attitudes or behaviours, indicating neither strong agreement nor disagreement with the statements. This scoring system helps address social desirability biases, as participants are often reluctant to show low levels of agreement. By interpreting higher positive values as stronger agreement and more desirable actions, and values near zero as neutrality, we can better understand the participants' true attitudes while mitigating the impact of their tendency to present themselves favourably.

Measuring agreement in this manner also allows for comparison of behaviours and attitudes across different topics, as well as the calculation of a composite index, which is a single figure that can be used for longitudinal comparisons during future iterations of the study. This framework of assessing behaviour and attitudes can also be used to identify areas of opportunity within demographic variables (e.g., resident's region or dwelling type).

4.1 Behaviour Domains

The survey assessed five domains of behaviours and attitudes:

- **Reduce waste generation:** The extent to which households work to minimize or reduce the waste they produce, such as avoiding single-use items and purchasing only what they need (e.g., avoiding single-use items and careful purchase considerations).
- **Support for a circular economy:** The extent to which households seek opportunities to repurpose or reuse materials or extend the life of items by donating unwanted household items (e.g., actively seeking opportunities to repurpose or reuse materials, frequent visits to second-hand stores or efforts to donate unwanted items).
- **Support for community initiatives:** The extent to which households endorse community initiatives aimed at reducing waste (e.g., eagerness to participate in community waste initiatives).
- **Composting:** The extent to which households participate in composting their organic or kitchen scraps (e.g., active participation in organics diversion at home).
- **Confidence in knowledge:** The level of confidence households expressed in their knowledge of how to recycle various materials (e.g., confidence in recycling various materials, knowledge of proper disposal of hazardous waste).

Across survey questions, **74% of respondents reported positive behaviours and attitudes towards waste management**. When converted to composite scores, the highest scoring domains were *Support for Community Initiatives,* followed closely by *Support for a Circular Economy*, which both feature composite scores of 0.52. The domain of *Reducing Waste Generation* followed with a score of 0.47. The lowest scoring areas were *Confidence in Knowledge* of recommended waste management behaviours, which scored 0.40, and participation in *Composting*, which had a composite score of 0.27

Table 4.1 provides a detailed breakdown of each survey element measured to analyze the behaviours and attitudes of residents in the capital region. It illustrates the distribution of response percentages across the agreement scale and their corresponding composite scores. Notably, the percentage of respondents with neutral attitudes can be viewed as a potential audience for targeted education and engagement efforts. These individuals may be more easily persuaded to improve their waste management behaviours, as they haven't formed strong opinions either way.

Table 4.1: Behaviours and Attitudes Reported by Residents

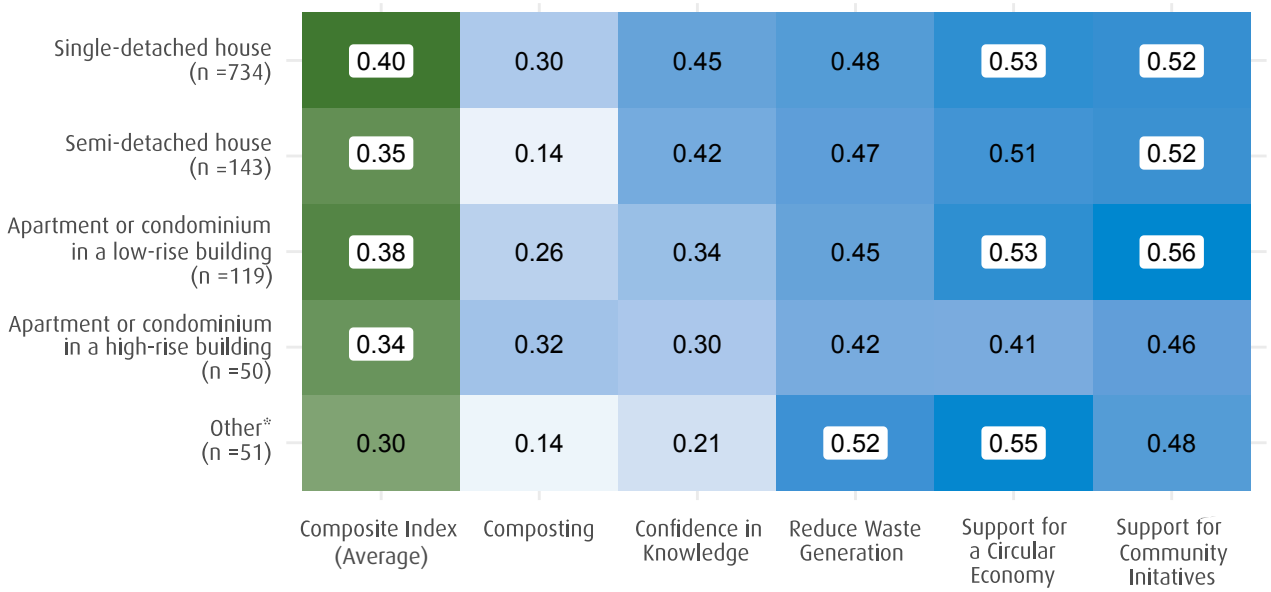
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Composite Score (n=1028)
Composting						**0.27**
My household participates in composting organic waste at home	14%	17%	8%	23%	38%	0.27
Confidence in Knowledge						**0.40**
My household feels confident in our knowledge of how to properly dispose of hazardous waste	5%	12%	20%	39%	23%	0.31
My household feels confident in our knowledge of the best practices for recycling a variety of materials	2%	4%	16%	54%	25%	0.48
Reduce Waste Generation						**0.47**
My household adopts practices that reduce waste generation	2%	6%	20%	45%	28%	0.45
My household eats all the food we buy and we only put unavoidable food waste in the compost	3%	9%	11%	45%	33%	0.48
Support for Community Initiatives						**0.52**
My household is eager to participate in community initiatives aimed at reducing waste	1%	3%	20%	42%	34%	0.52
Support for a Circular Economy						**0.52**
My household makes conscious efforts to donate unwanted household items	1%	1%	4%	41%	52%	0.71
My household seeks opportunities to repurpose or reuse materials from products we have purchased	2%	5%	21%	45%	26%	0.44
My household visits second-hand stores and/or repair shops to extend the life of items	4%	12%	14%	41%	29%	0.4

Source: Resident Survey (Q8)

Some differences in attitudes and behaviours were observed by dwelling type (as shown in **Figure 4.1**). We see that residents of single-family dwellings demonstrate the highest overall composite score, with the highest domains being *Support for a Circular Economy* (0.53) followed closely by *Support for Community Initiatives* (0.52).

Other dwellings with high overall composite scores include apartments or condominiums in low-rise buildings (fewer than 5 storeys). Apartments or condominiums in both high- and low-rise buildings demonstrate low scores in their confidence regarding waste management knowledge (0.30 and 0.34 respectively) in relation to other dwelling types.

Figure 4.1: Composite Scores Across Dwelling Types



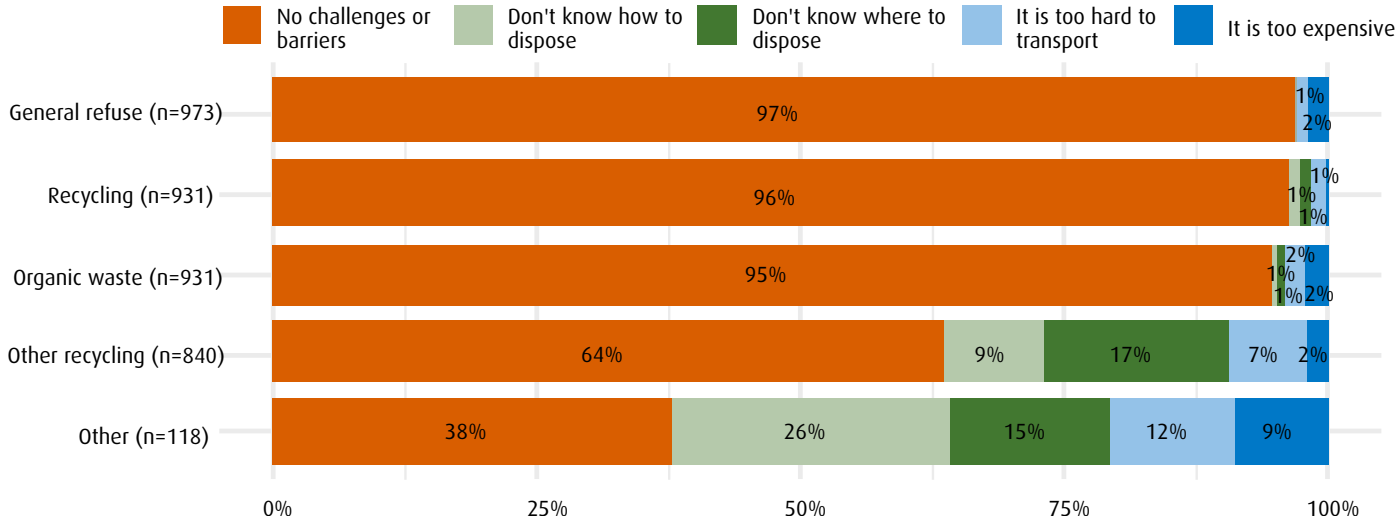
Source: Resident Survey (Q8)

*Includes: "A secondary suite in a house", "Mobile home / movable dwelling", and "Other"

4.2 Barriers

Overall, most residents reported that they do not face any barriers in the disposal of general refuse, recycling, and organic waste, at 97%, 96%, and 95% respectively. Given the high proportion of residents reporting no barriers, it is likely that this will remain stable over time. "Other recycling" which encompassed materials such as Styrofoam and soft plastics, and "Other" which included materials such as textiles, electronics, and wood waste, are the waste categories where respondents reported encountering the most barriers. Reported barriers associated with "Other recycling" include not knowing where to dispose of these materials (17%), not knowing how to dispose of these materials (9%), and difficulty transporting the materials (7%). Similarly, reported barriers associated with "Other" materials include not knowing how (26%) or where (15%) to dispose of waste materials, as well as difficulty in transporting (12%) and prohibitive costs (9%) associated with the disposal of these materials.

Figure 4.2: Main Barriers in Disposing of Waste

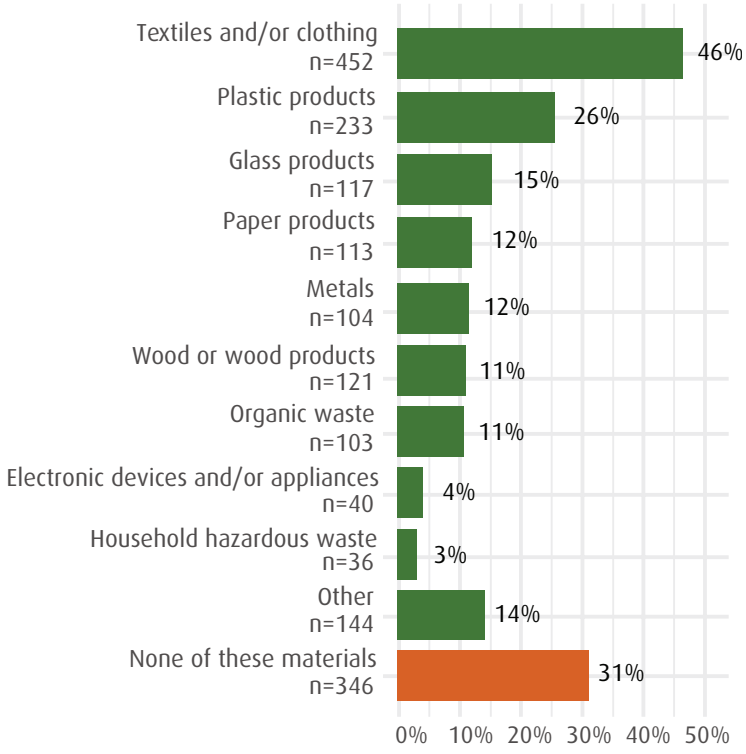


Source: Resident Survey (Q4)

4.3 Disposal Habits

The following items are those which respondents regularly dispose of as general refuse. Items demonstrating a high disposal rate signal opportunities for further engagement on proper or alternative disposal methods. In cases where a better disposal option is available (e.g., soft plastics), residents may benefit from education and information on where to dispose of these materials. **Figure 4.3** shows that textiles and clothing are the materials most commonly disposed of as general refuse (46%) followed by plastic products (26%). It should be noted that the survey did not provide a definition of what constitutes "plastic products," and therefore, this term should be interpreted broadly to potentially include items such as plastic bags, packaging materials, plastic containers, disposable cutlery, and other single-use plastics. Additionally, "Other" materials frequently mentioned by respondents included contaminated waste, and mixed packaging.

Figure 4.3: Items Disposed as General Refuse by Residents



Source: Resident Survey (Q5)

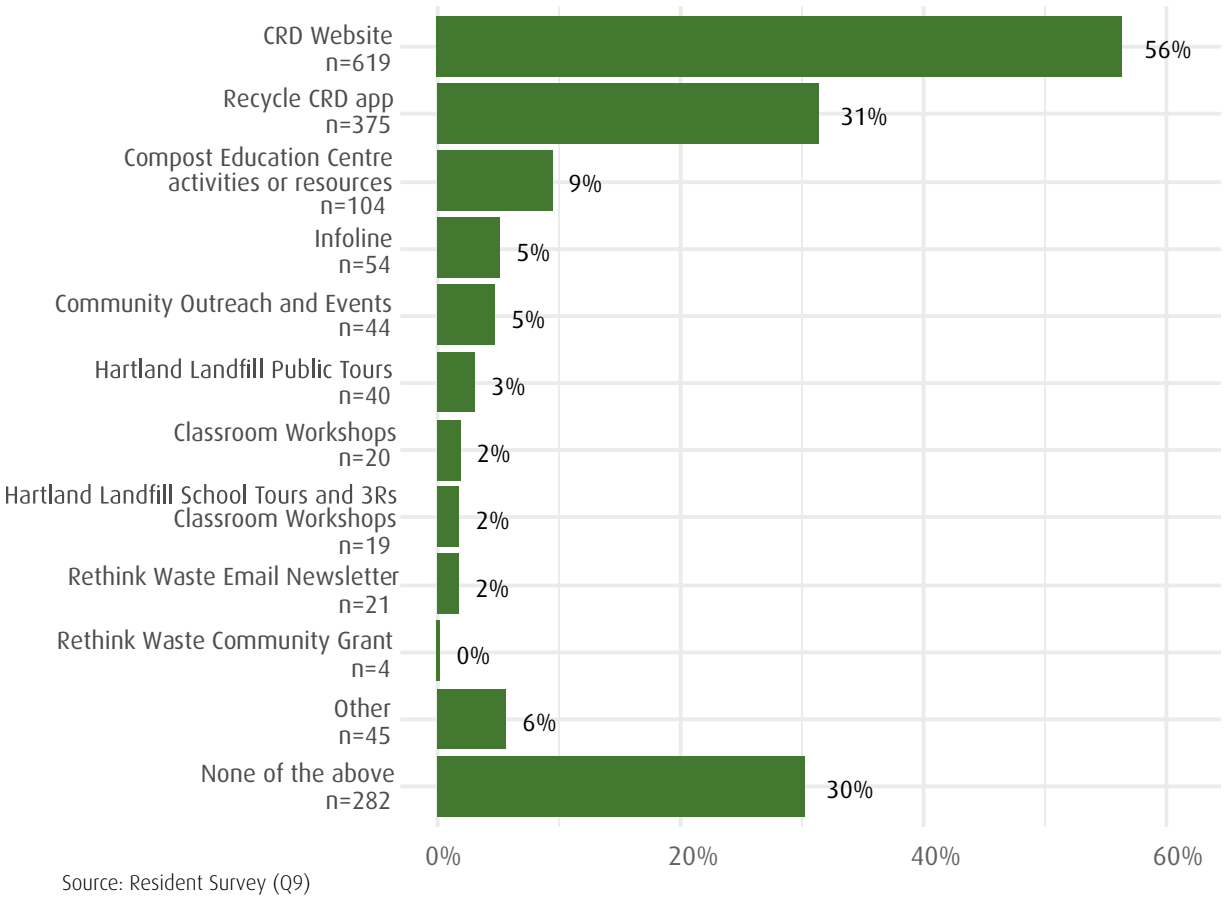
5 FINDINGS: **PROGRAMS & RESOURCES**

This section of the report explores the various programs and resources available for waste management in the capital region, as utilized by residents. It focuses on the accessibility and effectiveness of these resources, providing insights into how residents interact with these services. This analysis offers a snapshot of the current landscape of waste management educational tools and can be utilized in further research. Furthermore, it evaluates the perceived impact of these resources on enhancing residents' knowledge about waste reduction strategies.

5.1 Resources Accessed by Residents

Virtual and online waste management programs or resources currently offered by the CRD are the most frequently used among residents. More than half of respondents reported that they have used the CRD Website (56%), and about one-third (31%) reported using the Recycle CRD App. This may indicate that virtual or online waste management programs or resources pose significantly fewer barriers related to access and use. Resources and activities available through the Compost Education Centre are the third most commonly reported resource to be accessed by CRD residents (9%), however, participation in these and other in-person resources are much lower than virtual or online tools. It is worth noting that 30% of residents who completed the survey reported never having accessed any of the listed programs and resources. Other resources included local government portals, neighbourhood committees, and employers.

Figure 5.1: Resources Accessed by Residents

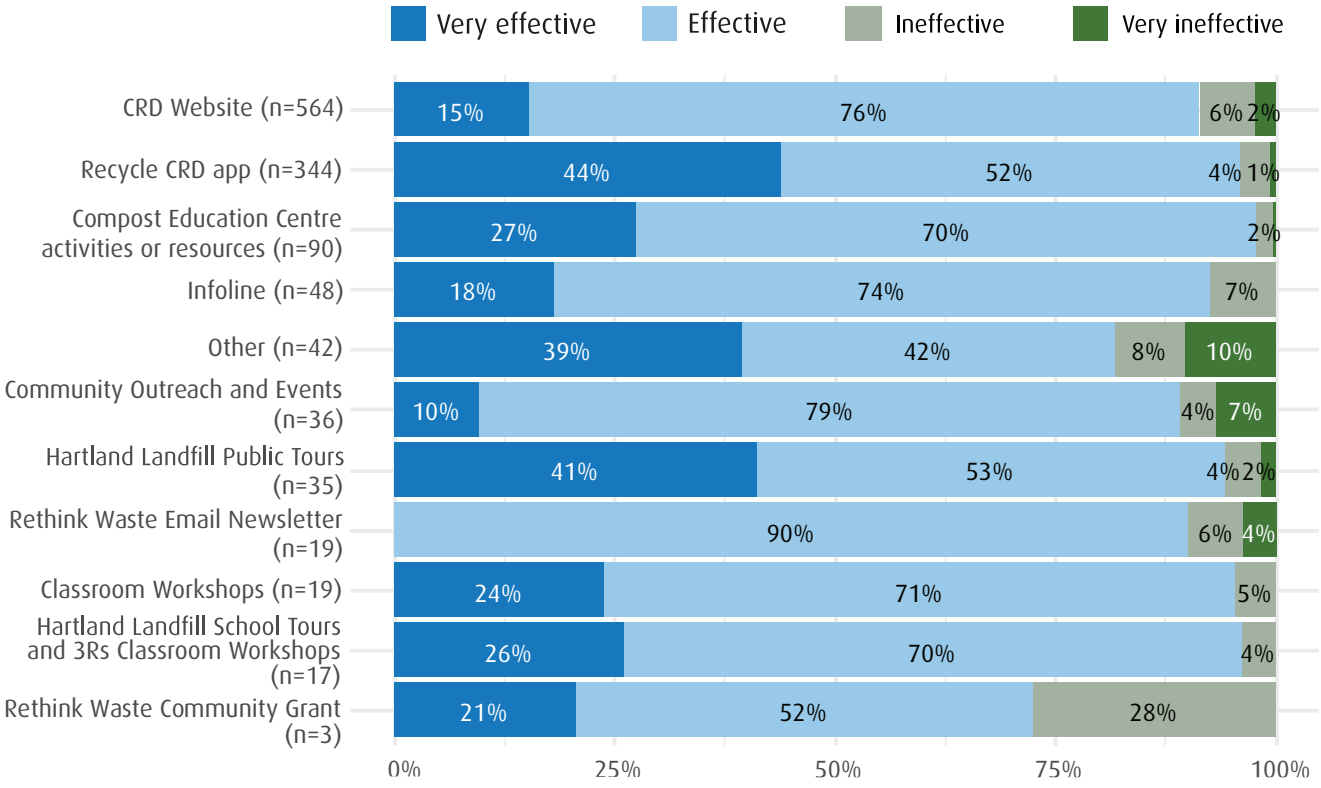


Source: Resident Survey (Q9)

Overall, most resources were deemed effective by respondents who had reported using them. Resources that respondents most frequently identified as being effective include the resources provided by the Compost Education Centre (97%), and the Recycle CRD App (96%); these items are the second and third most common reportedly used waste management programs or resources currently offered by the CRD. Hartland Landfill Public

Tours were also identified as being very effective (94%), although the number of respondents who indicated having accessed this resource is substantially lower.

Figure 5.2: Effectiveness of Resources in Increasing Knowledge



Source: Resident Survey (Q11)

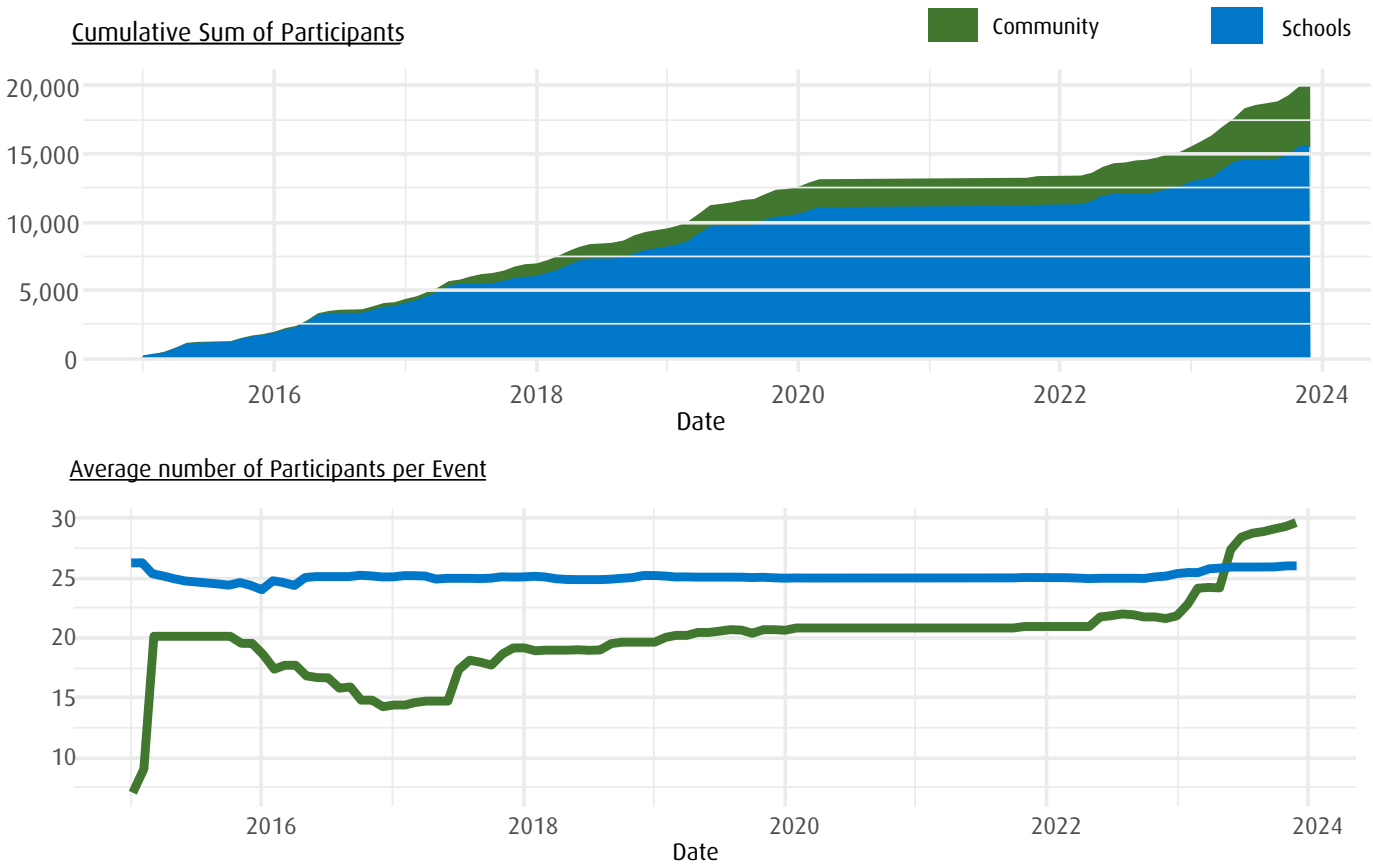
5.2 Historical Performance of 3R Programs

The CRD's 3Rs Program, which includes interactive school and community workshops and landfill tours, have been tracked using historical data to discern key performance trends. Since 2015, these programs have engaged over 20,000 participants, representing approximately 5% of the CRD population[3] (see **Figure 5.3**). It's important to note, however, that this figure may include repeated participants.

In 2023, there was a significant increase in requests for 3R community and school programming, likely due to people seeking activities outside of their home following the COVID-19 pandemic. During this time, there was also a shift in the CRD's strategy to lead more 3R booth events and keep a clear record of the number of participants and other interactions.

[3] Source: Statistics Canada 2021 Census of Canada

Figure 5.3: Historical Attendance of 3R Programs



Source: CRD 3R Program Data

5.3 Other Resources & Trends

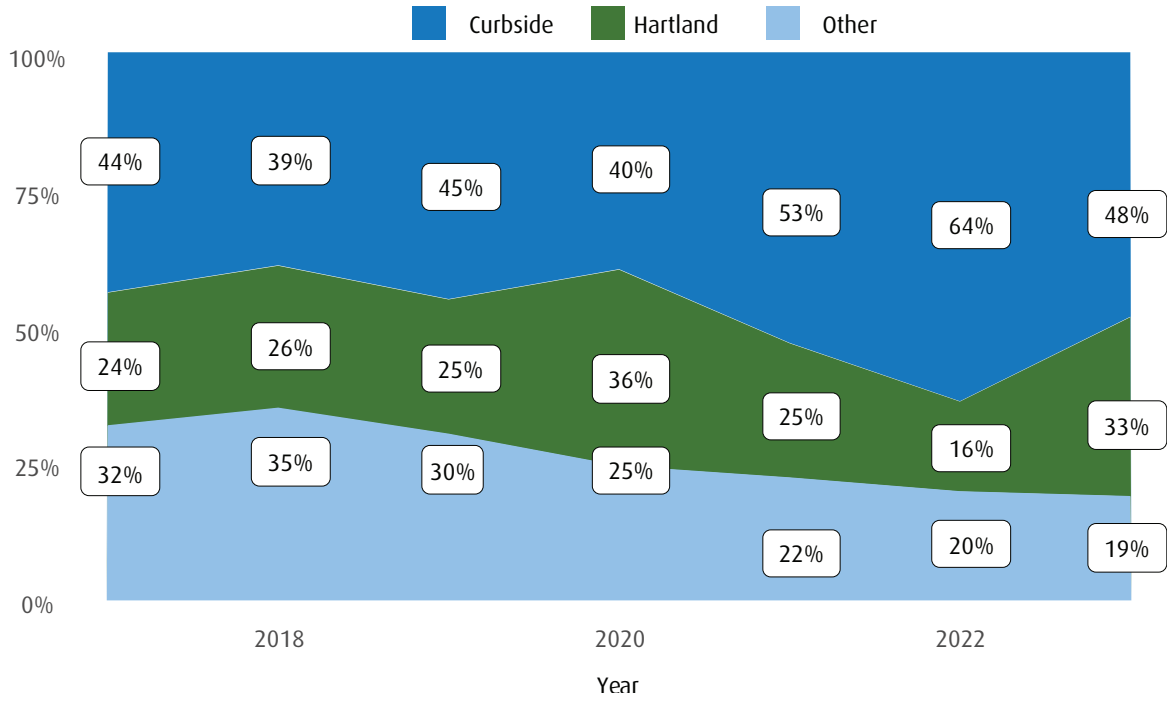
The CRD hosts an Infoline and MyRecyclopedia website that residents can consult with questions about solid waste management. Examining user patterns to identify common questions can provide insight as to where CRD residents encounter barriers or have gaps in knowledge about how and where to properly dispose of different materials.

Infoline

The composition of Infoline inquiries has remained relatively stable over recent years, demonstrating a consistent pattern in the types of questions received. Inquiries concerning the curbside program consistently represent approximately 50% of all queries. These frequently involve questions about oversized bins, sorting and preparation advice for new residents, inquiries regarding the fate of disposed paper, and requests for curbside pickup of specific materials like plastic bags. Additionally, about 30% of the inquiries relate to

Hartland, where common questions focus on recycling processes, methods for disposing of household waste, and addressing complaints. The remaining 20% of inquiries fall into the "Other" category, which typically includes questions about kitchen scraps, composting, app reminders, service requests, and issues related to abandoned waste. This breakdown highlights the community's engagement with and reliance on these essential waste management services.

Figure 5.4: Percentage of Infoline Inquiries by Topic

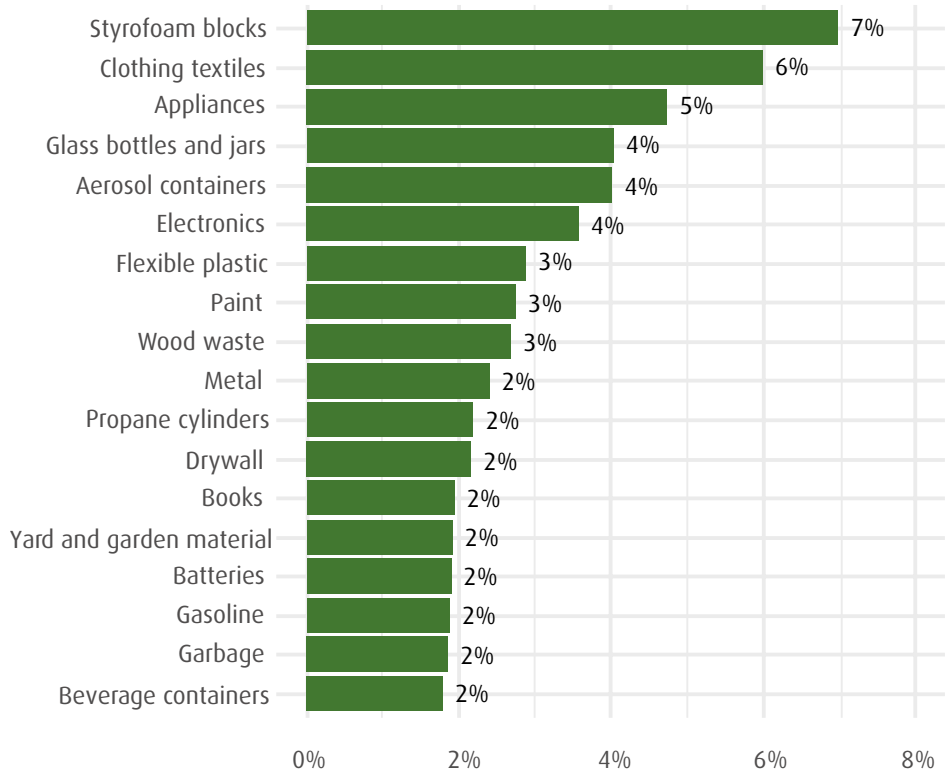


Source: CRD Infoline Records

MyRecyclopedia (Web Analytics)

MyRecyclopedia is a platform that guides users on how to reuse or recycle various materials and provides information on facility drop-offs. Web analytics reveal that Styrofoam blocks are the most frequently searched items, capturing 7% of total inquiries, indicating a significant public interest in recycling options for this material. Following closely, clothing/textiles and household appliances are also highly sought after, with 6% and 5% of searches respectively, highlighting the community's commitment to sustainable handling of these items. This data can help prioritize resources and tailor public education efforts to address the materials that users are most concerned about, and potentially track changes in consumer-searching behaviour across time.

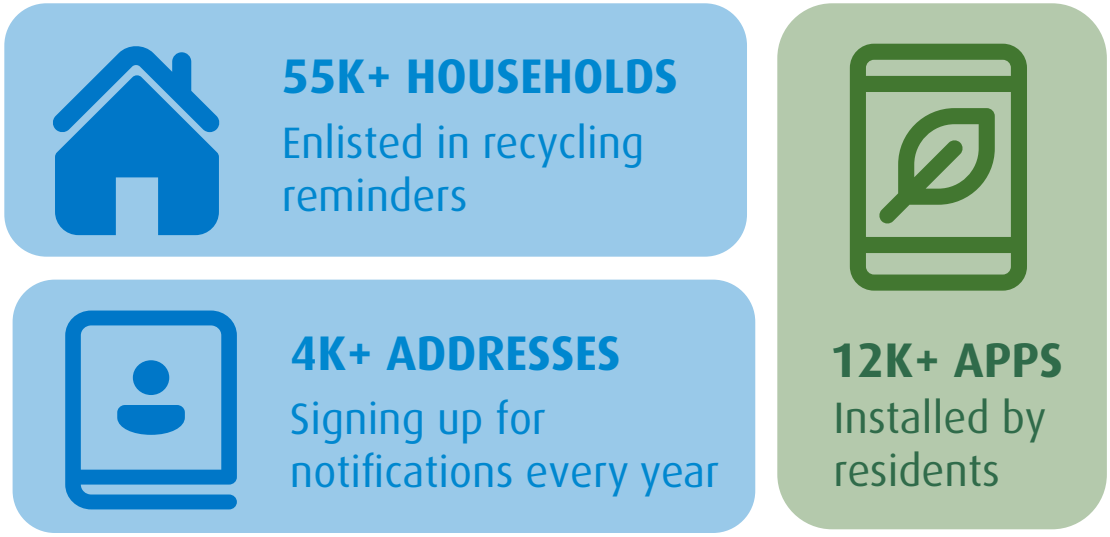
Figure 5.5: Percentage of Total Inquiries Regarding Materials in MyRecyclopedia



Source: MyRecyclopedia Analytics

Reminders Through ReCollect Systems (CRD Recycle App & Website)

The ReCollect services cater to residents on the curbside program with smartphones by offering a convenient way to receive reminders about their collection day. Currently, it is estimated that 60% of single-family dwellings in the capital region have enlisted in these reminder services.



Source: ReCollect Systems Analytics

6 FINDINGS: **HARTLAND PUBLIC DROP-OFF DEPOT**

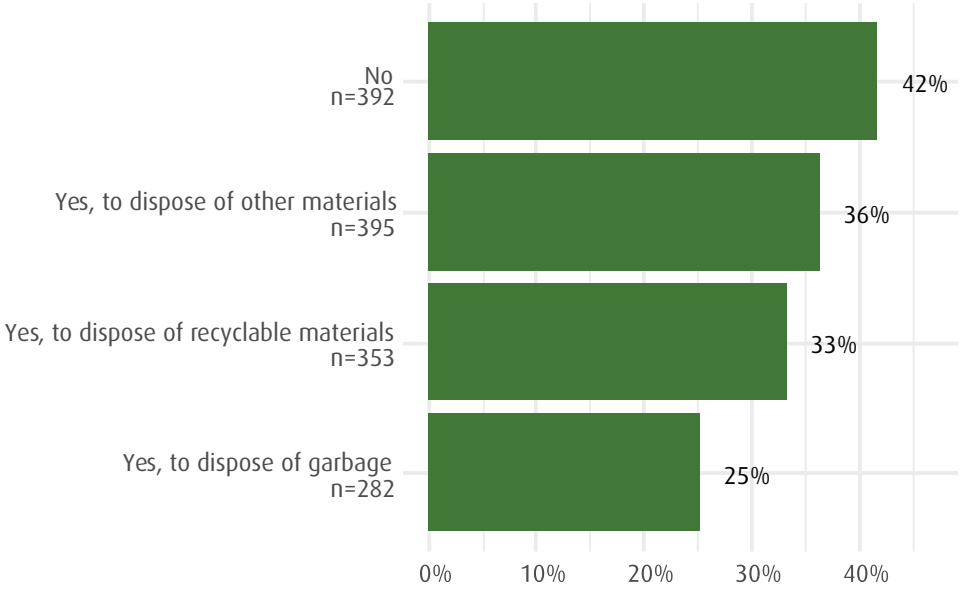
This section summarizes findings from the Hartland Public Drop off Depot Survey and highlights trends in Historical Hartland Tonnage data.

6.1 Usage of the Hartland Public Drop-off Depot

Most capital region residents surveyed (58%) report using the Hartland Public Drop-off Depot to dispose of recyclable materials (33%), garbage (25%), or other materials like household waste or electronics (33%) (see **Figure 6.1**). Results from the Hartland Public Drop-off Depot Survey provide a snapshot of what types of materials residents are disposing of (see **Figure 6.2**). Depot users most commonly reported disposing of metal (63%) and plastic products (59%), followed by foam packaging (55%), electronic devices (54%), household hazardous waste (53%), and paper products (50%)[4].

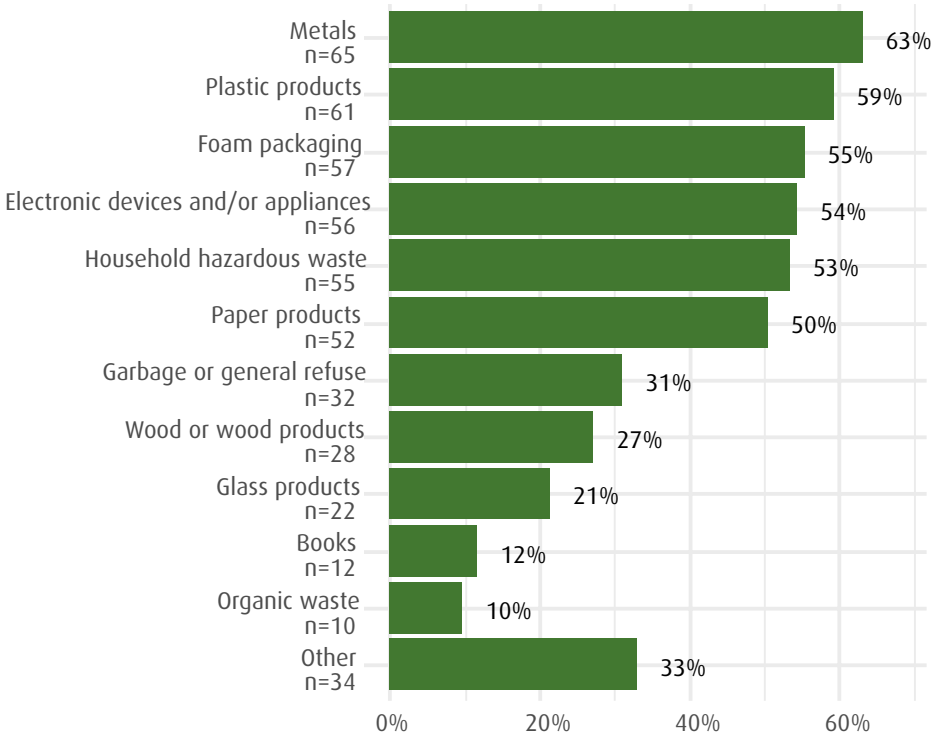
[4] It should be noted that the volume or quantity of materials was not captured in this survey. Because of this, percentages will not align with the 2022 Solid Waste Stream Composition Study.

Figure 6.1: Usage of the Hartland Public Drop-off Depot



Source: Resident Survey (Q16)

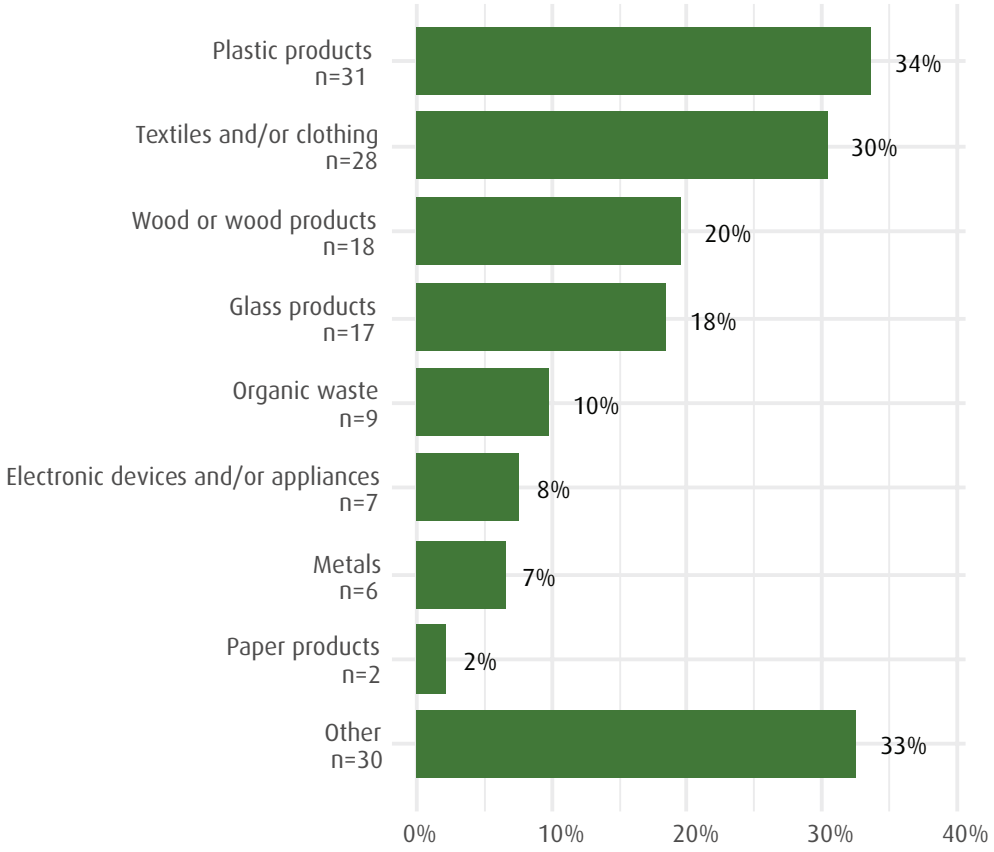
Figure 6.2: Materials Dropped-off at Hartland Public Drop-off Depot



Source: Hartland Public Drop-off Depot Survey (Q3)

Figure 6.3 shows that, similar to what residents reported on the CRD Resident Survey, Depot users were unsure of how to dispose of some plastic products (34%) (i.e., soft plastics) and textiles or clothing (30%). Other materials (33%) often included Styrofoam, construction waste, and various kinds of plastic.

Figure 6.3: Materials that Hartland Public Drop-off Depot Users Do Not Know How to Recycle



Source: Hartland Public Drop-off Depot Survey (Q4)

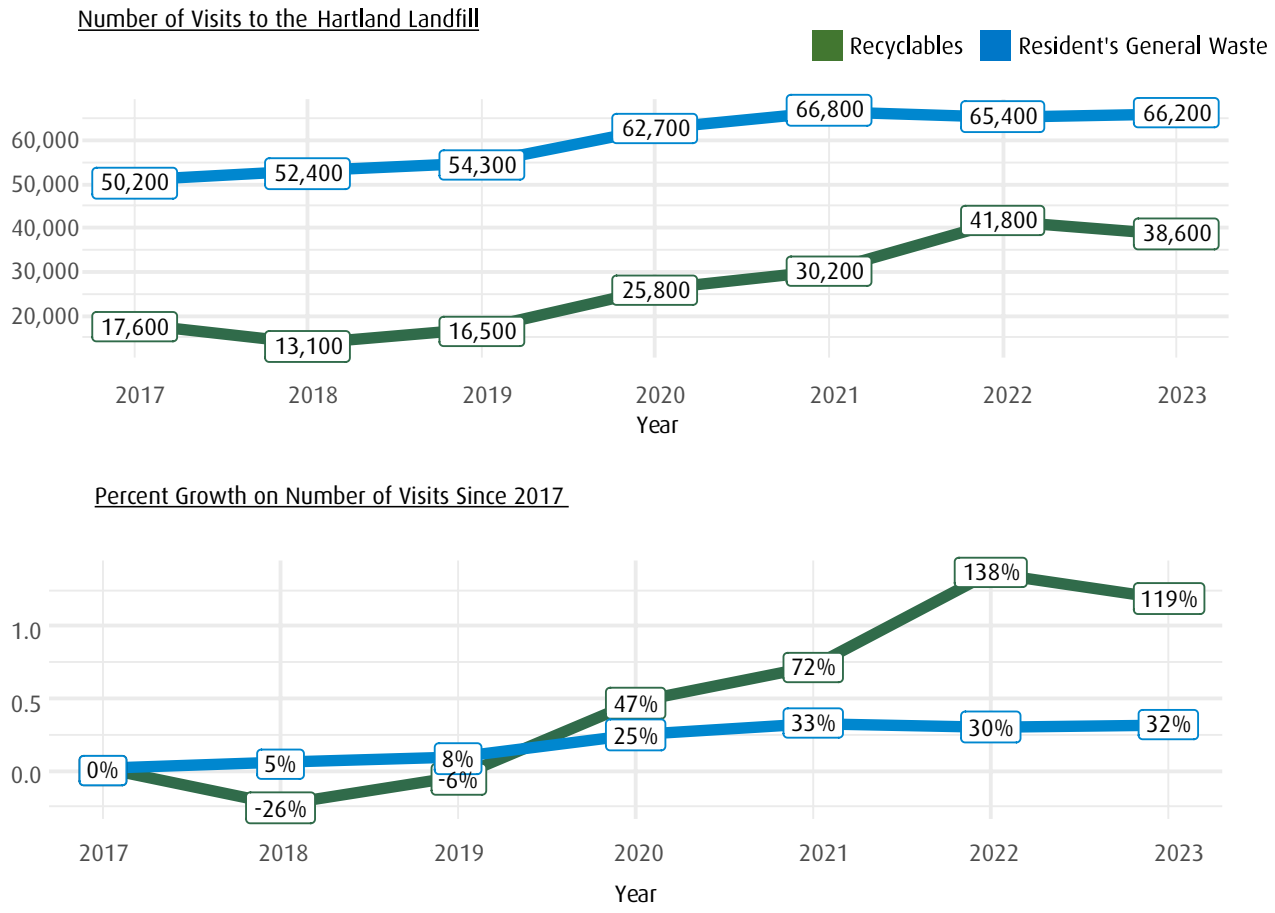
6.2 Historical Tonnage Data

Historical Hartland tonnage data were reviewed to determine the average number of trips by residents of the region (i.e., excluding commercial customers) to drop off recyclables or general refuse. To ensure we did not capture any commercial customers who might not have a registered account, only visits with a net weight of less than 1,000 kg were recorded for the disposal of general refuse. It is important to note that due to the way visits were recorded, by transaction, there may be instances where the same visit is counted twice if a resident used both the landfill and dropped off recyclables. However, this method still allows us to measure how the number of visits to each part of the facility has changed over time.

Since 2017, the average number of visits made by residents to dispose of general waste has grown about 5% each year. This figure is just slightly higher than the average population growth (about 3% per year as per the population estimates made by BC Stats) suggesting that the increase in visits to the landfill can largely be explained by the growing population.

As shown in **Figure 6.4**, there was a significant increase in the number of residents visiting Hartland to drop off recyclables. The number of visits that were related to recyclables increased on average by 20% each year (since 2017). A notable spike in visits was observed in 2022 when the Express & Go drop off option was introduced.

Figure 6.4: Historical Visits and Tonnage Data



Source: Hartland Landfill Scale Data

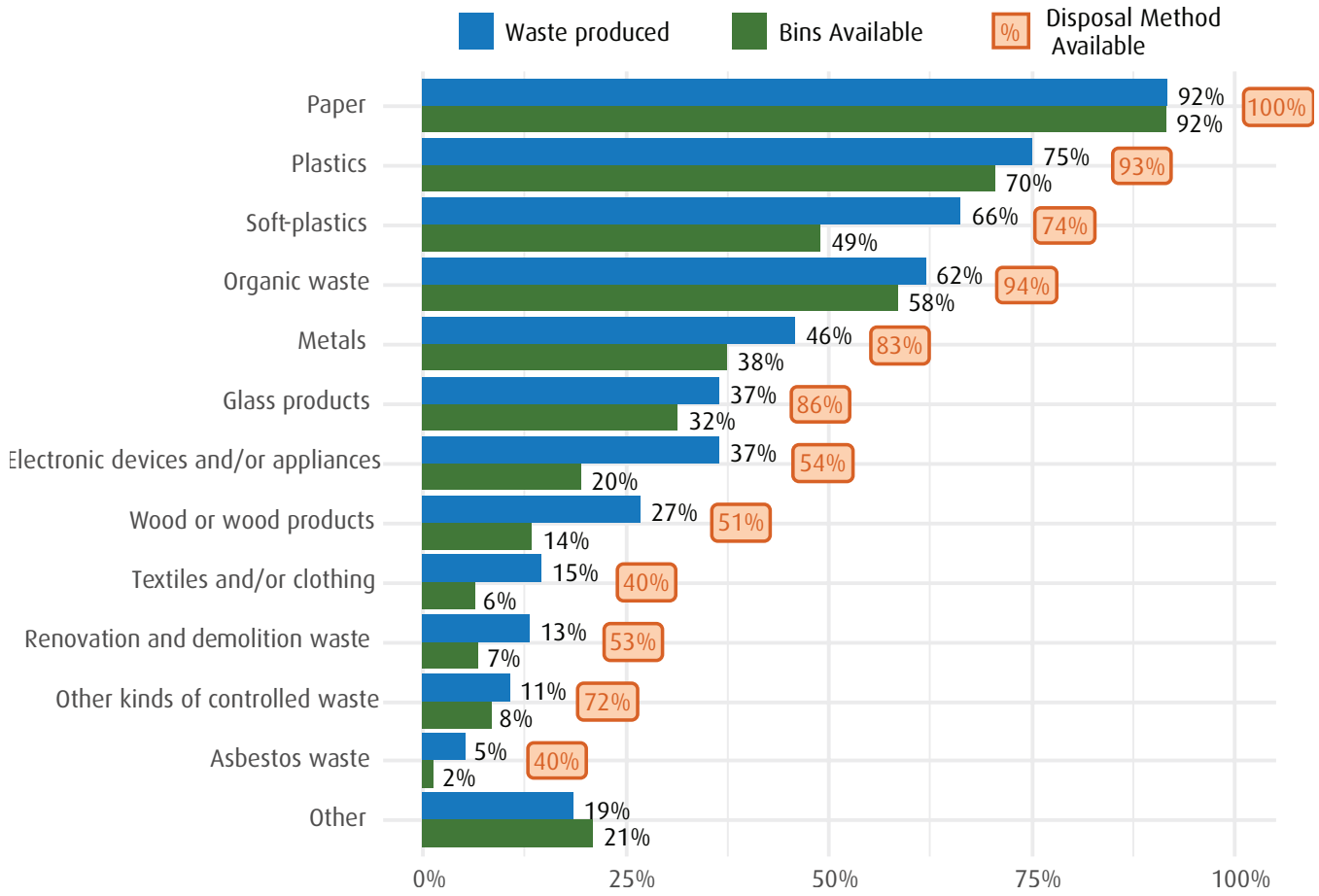
7 FINDINGS: **BUSINESS SURVEY INSIGHTS**

This section summarizes key findings from the CRD Business Survey. Results include a summary of various types of waste produced by businesses and whether businesses have a method to dispose of those materials, barriers and challenges complying with local regulations, as well as an assessment of business goals and staff training related to solid waste management.

7.1 Waste Produced and Disposal Options

Businesses across the capital region are responsible for establishing their own waste management practices. Most businesses report producing a variety of different types of waste (see **Figure 7.1**). Most commonly, businesses reported regularly having paper (92%), plastic (75%), soft plastic (66%), and organic waste (62%) to dispose of. Over 90% of businesses that reported producing these types of waste also reported having a designated disposal bin or method, except for soft plastic waste, where we see that only 74% of businesses have a disposal process for these materials. Other materials that are produced by fewer businesses but were less likely to have a designated disposal process include electronic devices, wood or wood products, textiles, and renovation or demolition waste. Other kinds of waste mentioned by participants mostly included different kinds of hazardous materials.

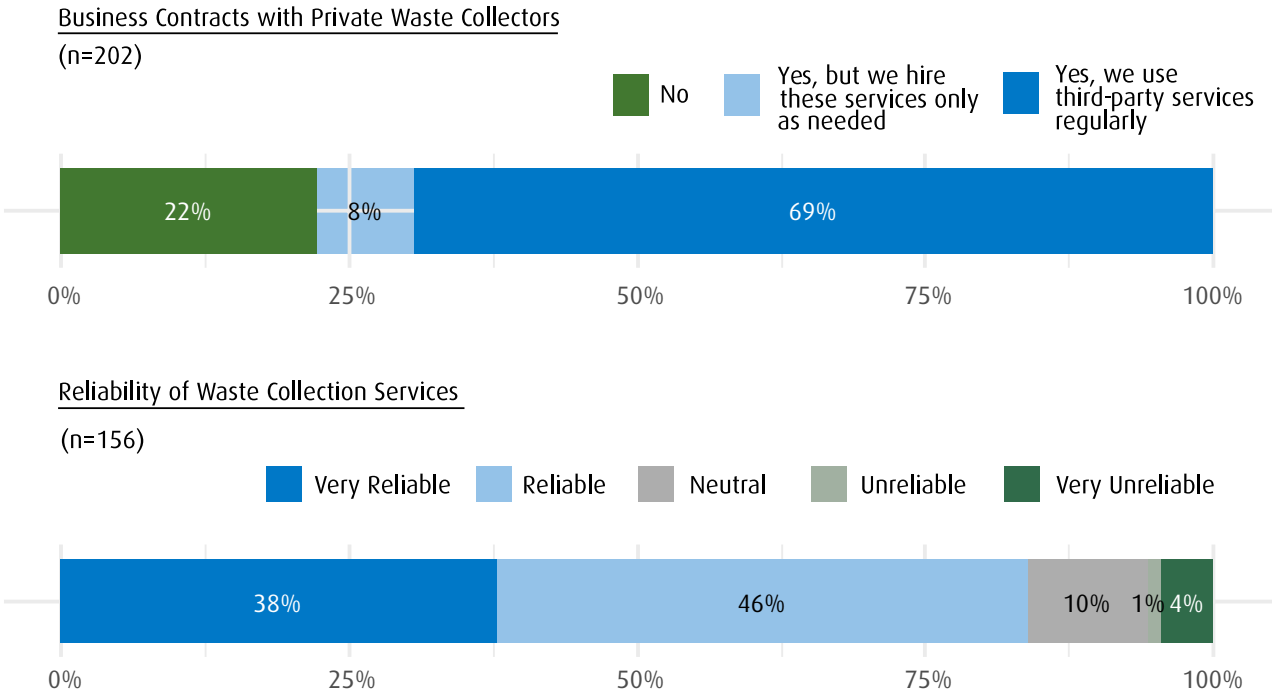
Figure 7.1: Waste Produced by Businesses & Bins Provided to Staff and Customers



Source: Business Survey (Q5; Q6)

Most businesses (77%) reported that they contract private waste collectors to haul waste from their business to an appropriate drop off location, and that they are satisfied with the reliability of those services (**Figure 7.2**). Businesses that did not report using a private waste collection service tended to be service or administration oriented and were smaller in size (fewer than 10 employees) compared to businesses that reported using a private waste collection service. These businesses were also less likely to use the Hartland Public Drop-off Depot. It is unclear what these businesses are doing to dispose of their waste.

Figure 7.2: Attitudes Towards Private Waste Collectors

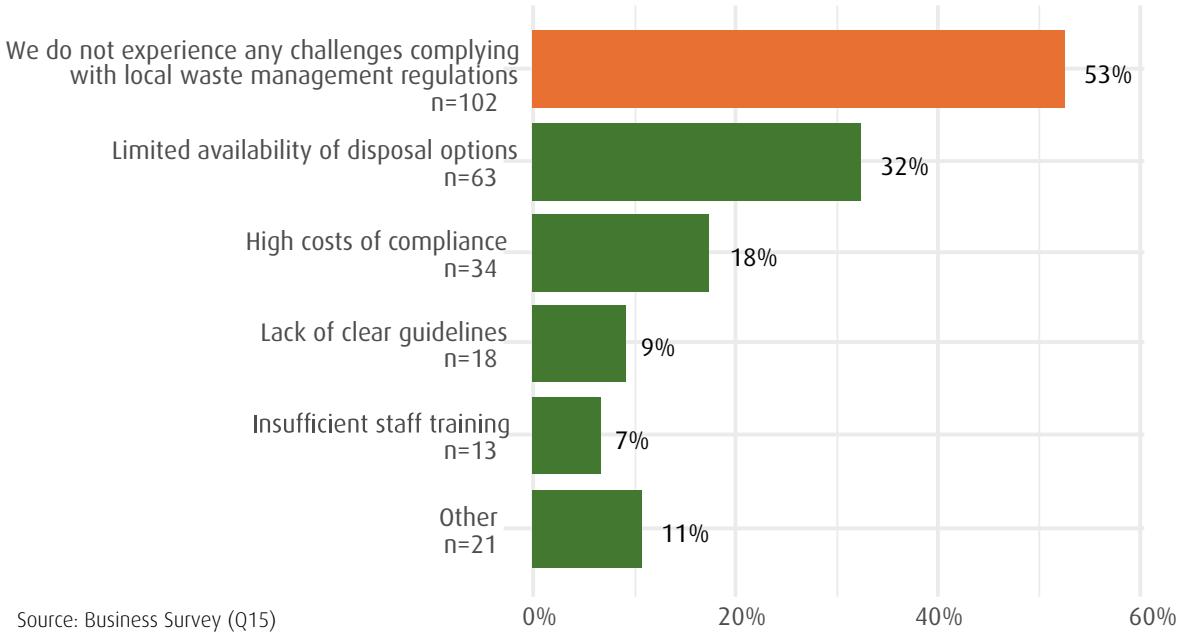


Source: Business Survey (Q13; Q12)

7.2 Local Regulations

Approximately half of businesses in the region report no challenges complying with local waste management regulations. The most commonly reported challenges include a limited number of disposal options (32%) followed by the high-cost of disposal options that comply with local regulations (18%). **Figure 7.3** summarizes additional barriers reported by smaller proportion of businesses. Other challenges included illegal dumping, tourists being confused with local regulations, and changing guidelines.

Figure 7.3: Challenges in Following Local Waste Management Regulations

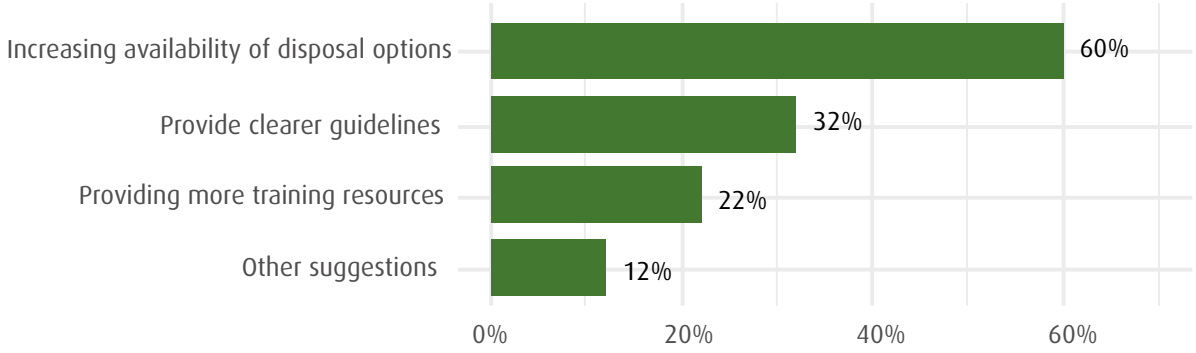


Source: Business Survey (Q15)

7.3 CRD Support & Suggestions

Businesses suggested that the CRD could help support them to comply with local regulations by working to increase the availability of disposal options (60%), providing clearer guidelines (32%), and providing more training resources to help businesses understand how to comply with local regulations (22%). Other suggestions included allowing businesses to opt-in to curbside recycling and garbage and organics/kitchen waste collection provided to residents of the region, and providing incentives to help offset the cost of disposal (e.g., tax credits or grants).

Figure 7.4: Supports Businesses Would Like to Receive From the CRD

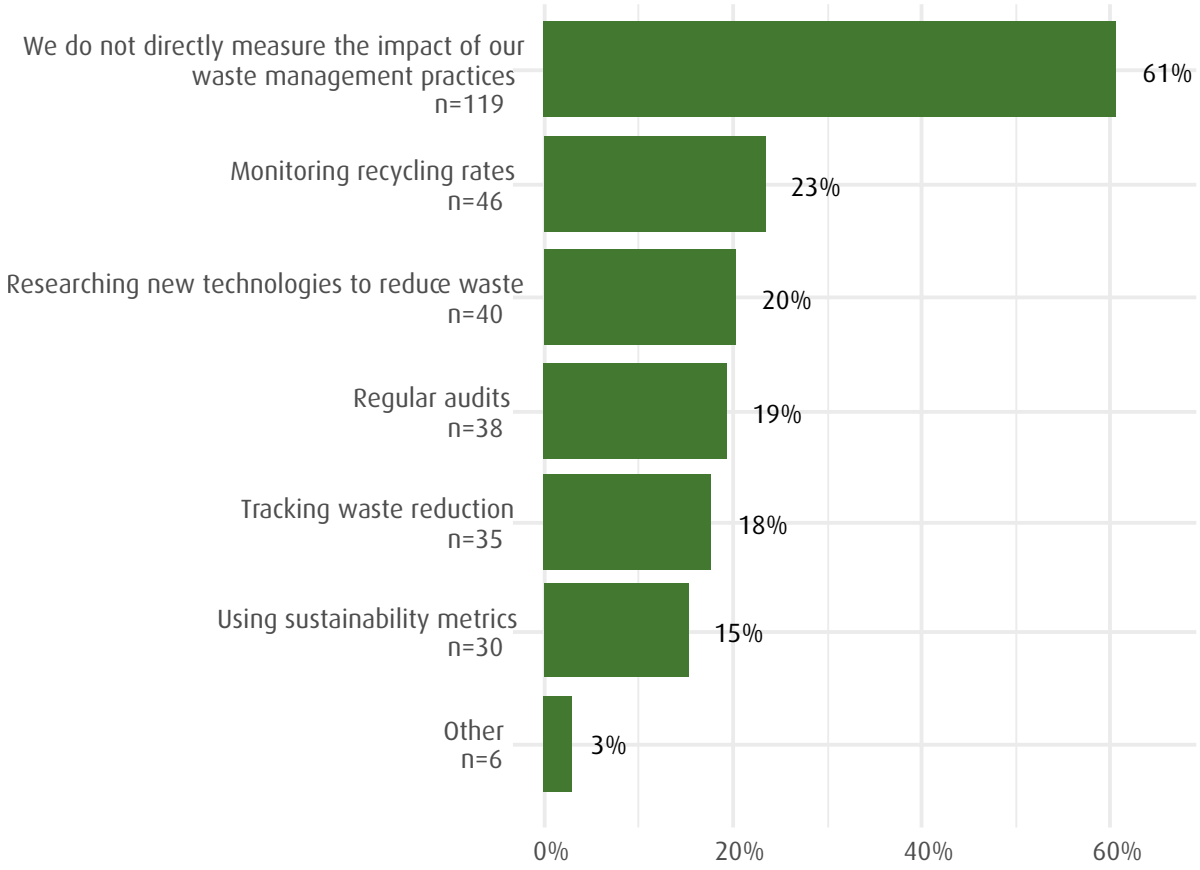


Source: Business Survey (Q16)

7.4 Goals, Training, and Staff Engagement

A majority of businesses reported not measuring the impact of their waste management practices (61%) despite also having goals related to waste reduction. Small proportions of businesses reported monitoring their recycling rates, researching new technology to reduce waste, or conducting regular audits of their waste management procedures (see **Figure 7.5**).

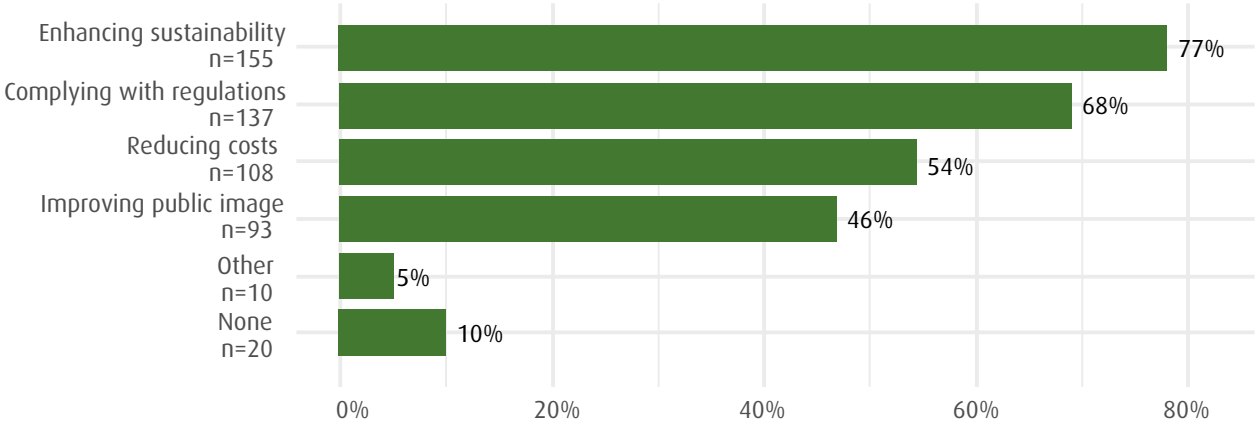
Figure 7.5: Measures for Impact of Waste Reduction Practices



Source: Business Survey (Q8')

When asked about their waste reduction goals (**Figure 7.6**), most businesses agreed that they have goals to reduce the amount of waste produced to enhance sustainability (77%) and comply with local regulations (68%). Over half of businesses reported that their waste reduction goals were related to reducing costs associated with waste management or disposal and slightly under half reported a desire to improve their public image.

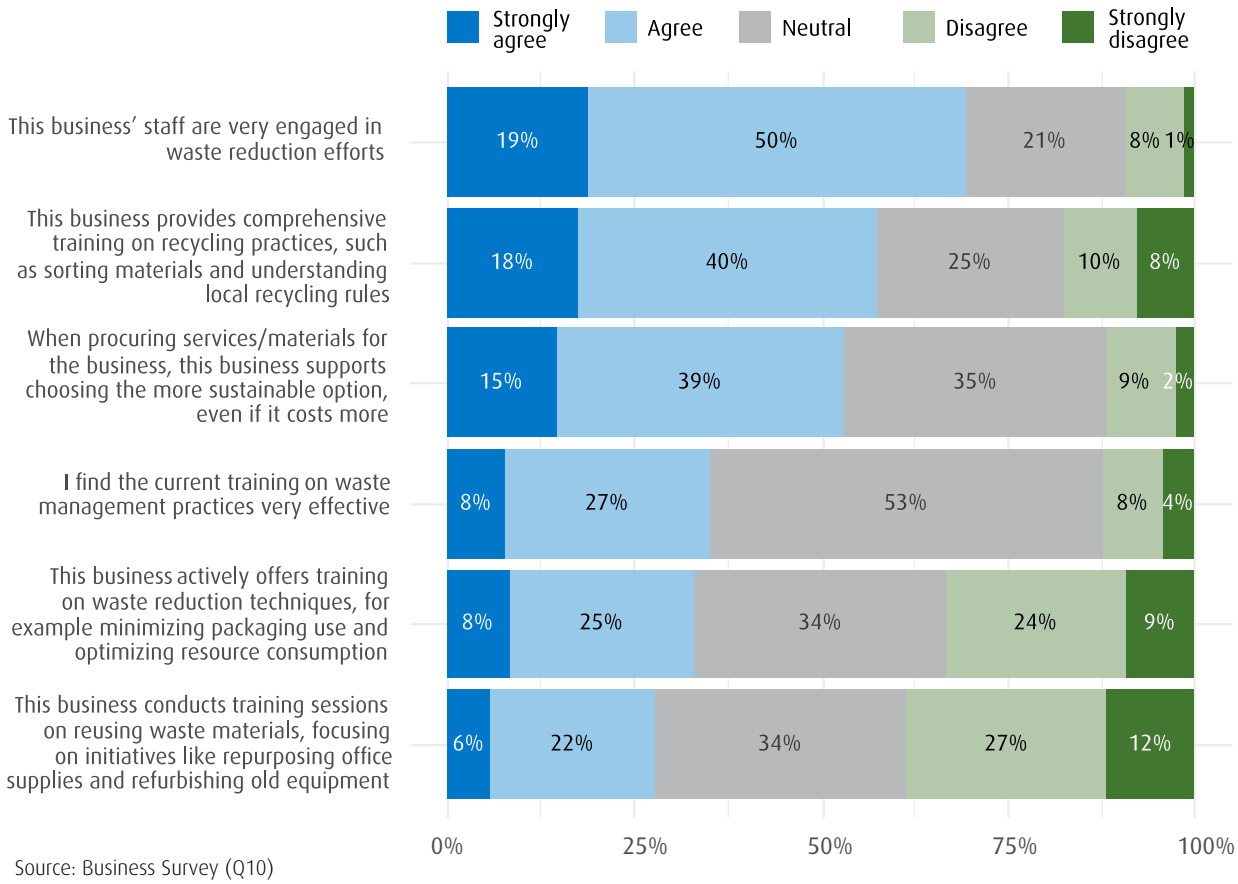
Figure 7.6: Businesses Waste Reduction Goals



Source: Business Survey (Q7)

As shown in **Figure 7.7**, businesses were likely to report having staff that were engaged in waste reduction efforts (69%) but were unlikely to have current training on waste management practices that they considered to be effective (35%). It is interesting to note that about one-quarter of businesses requested training materials to help understand how to comply with local regulations when asked what support the CRD could provide.

Figure 7.7: Attitudes Towards Staff Training & Equipment



Source: Business Survey (Q10)

8 FINDINGS: **INFORMING A COMMUNICATION STRATEGY**

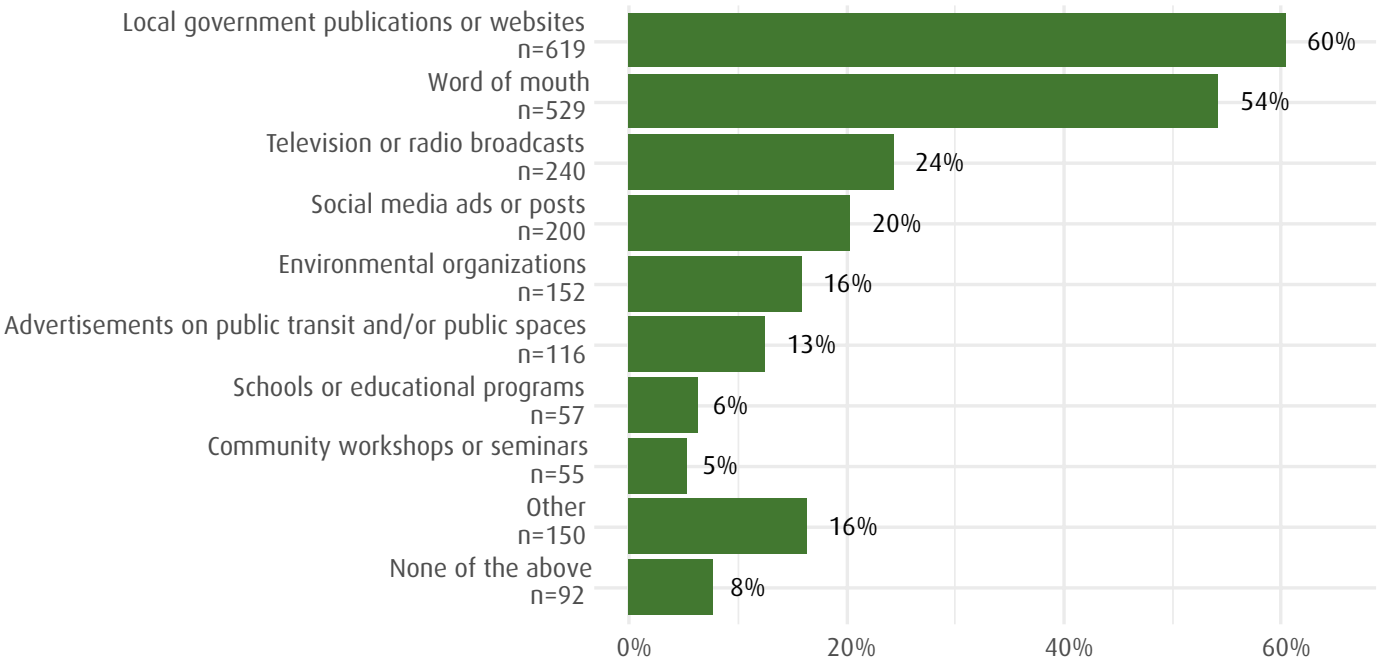
This section of the report addresses findings related to developing an effective communication strategy for waste management in the capital region. It investigates the main sources from which residents obtain their waste management information and analyzes the content preferences of various audiences. The insights from this analysis can be directly leveraged to create targeted and engaging messages that connect effectively with different demographic groups, thereby enhancing the overall effectiveness of the CRD's communication strategies.

MALATEST

8.1 Sources of Information

Residents reported that local government publications or websites are their primary sources of information for best practices regarding reducing, reusing, and recycling waste, with 60% utilizing these resources, closely followed by word of mouth at 54%. Traditional media, television or radio broadcasts, and modern platforms like social media ads also play significant roles, with usage rates of 24% and 20%, respectively. Environmental organizations and public transit advertisements are less frequently used sources. Schools and community workshops are minimally utilized, at 6% and 5% respectively, reflecting their focused yet limited reach. Moreover, 8% of respondents did not use any of the listed sources, which may indicate either alternative channels or a lack of engagement (see **Figure 8.1**).

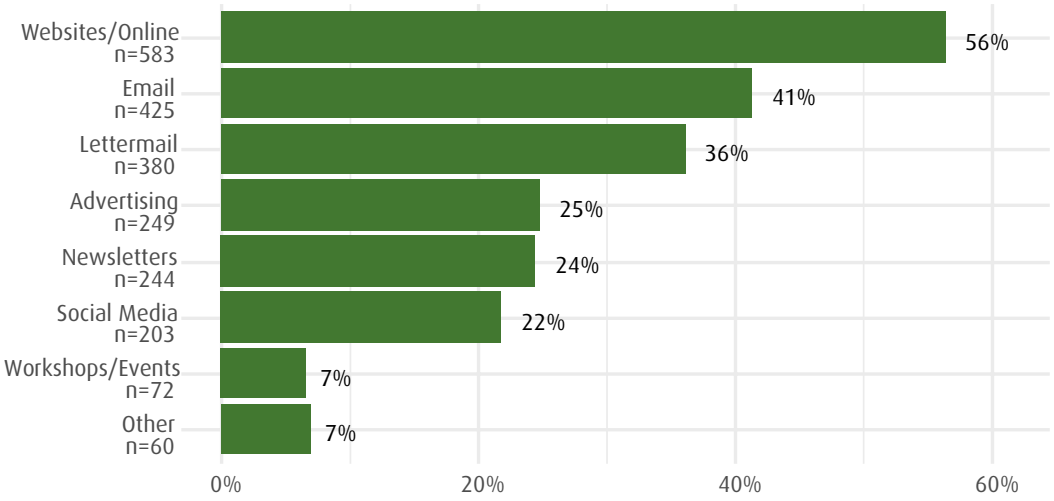
Figure 8.1: Past Sources of Information



Source: Resident Survey (Q13)

Figure 8.2 shows CRD residents' preferences for receiving information about waste management practices, with websites and online platforms leading at 56%, followed by email at 41%. Letter mail remains a relatively popular method, requested by 36% of respondents across all age groups. Advertising and newsletters also play substantial roles, preferred by 25% and 24% of individuals, respectively. Social media is another key channel, chosen by 22% of the population. Workshops and other unspecified methods are less favoured, each noted by 7% of respondents, suggesting their more specialized or limited appeal.

Figure 8.2: Preferred Mediums of Information

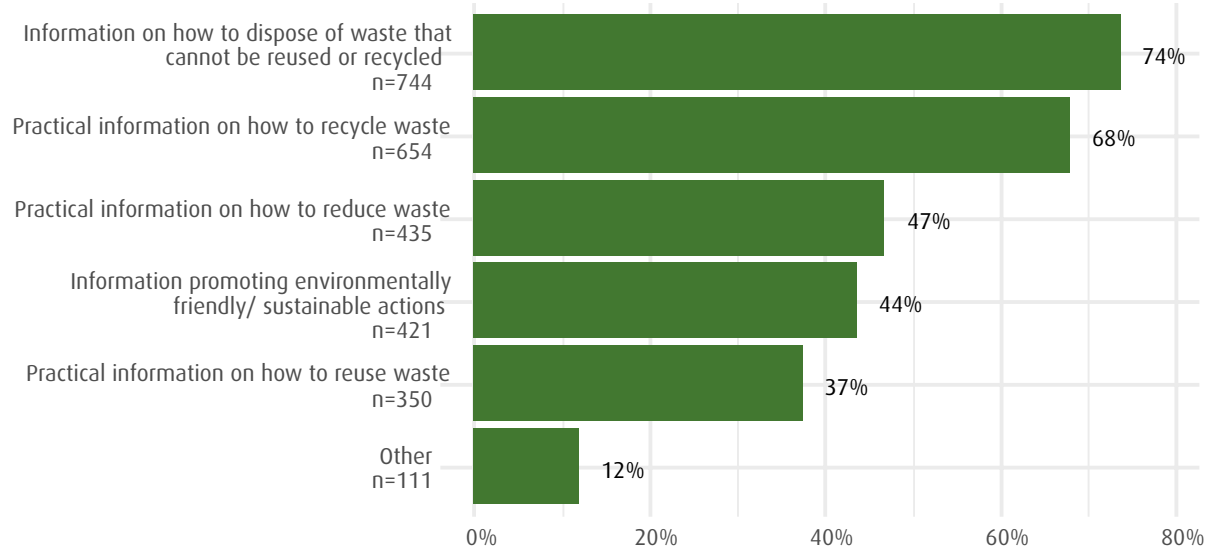


Source: Resident Survey (Q17)

8.2 Content for Residents

Residents expressed a stronger preference for practical content related to waste management over purely educational materials (**Figure 8.3**). Information on how to dispose of waste that cannot be reused or recycled was most sought after, with 74% of individuals showing interest. Similarly, 68% are keen on practical information on how to recycle waste. There is still a significant interest in reducing waste and reusing materials, as seen from 47% and 37% of the surveyed residents expressing interest. The demand for content promoting environmentally friendly or sustainable actions is also considerable and just slightly lower at 44%. Some of the 'Other' responses captured residents' interest in learning more about the Hartland Landfill.

Figure 8.3: Content Citizens are Most Interested in Seeing

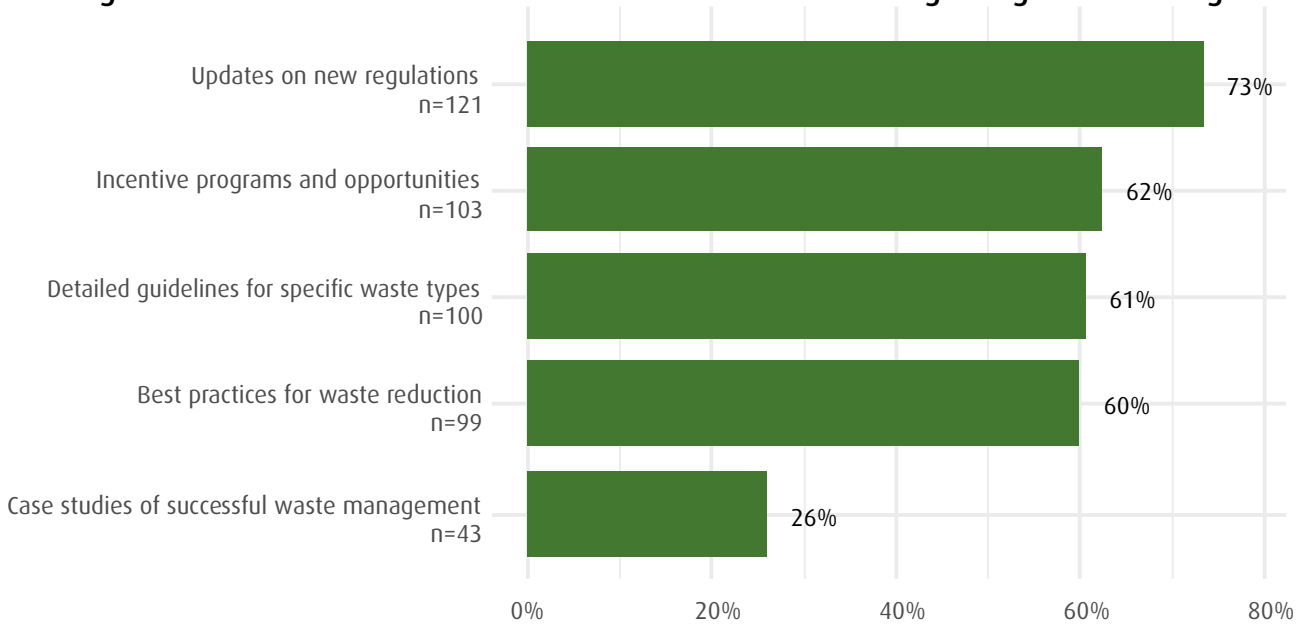


Source: Resident Survey (Q15)

8.3 Content for Businesses

Businesses indicated distinct preferences for content that aids in managing their waste more effectively (see **Figure 8.4**). Updates on new regulations are the most sought-after information, with 73% of businesses emphasizing its importance, indicating a high demand for staying compliant and informed on legal changes. Incentive programs and opportunities attract considerable interest from 62% of businesses, highlighting a proactive approach to leveraging benefits for better waste management. Detailed guidelines for specific waste types are also important, with 61% of businesses seeking such information, which suggests a need for clear, actionable steps tailored to different kinds of waste. Best practices for waste reduction are valued by 60% of businesses, underscoring a general commitment to sustainability. However, case studies of successful waste management are less in demand, with only 26% of businesses showing interest, possibly due to a preference for direct, practical guidance over anecdotal evidence.

Figure 8.4: Content Businesses Would Find the Most Useful Regarding Waste Management



Source: Business Survey (Q19)

9 SUMMARY OF FINDINGS & RECOMMENDATIONS

This section summarizes key findings related to capital region residents' behaviours and attitudes around solid waste management, their use of resources, and use of the Hartland Public Drop off Depot; key insights from the CRD Business Survey; and communication preferences of both residents and businesses.

The table below summarizes the key performance indicators gathered from the 2024 data collection activities, which serve as a baseline for future iterations of this study. By tracking these indicators over time, the CRD will be able to evaluate the effectiveness of its waste reduction programs and monitor changes in public attitudes, knowledge, and behaviours.

Key Performance Indicators (2024 Baseline)

KPI	Baseline (2024)
Residents reporting positive behaviours and attitudes toward waste management practices (see **Section 4**)	74%
Residents reporting no barriers to disposing of...	General refuse: 98% Recyclable materials: 96% Organics: 95% Other materials: 38%-64%
Businesses reporting no barriers to properly disposing of waste	53%
Residents disposing of plastic products as general refuse	26%

9.1 Summary of Findings

Behaviour & Attitudes (Resident Survey)

Capital region residents demonstrate strong support for community waste initiatives and a circular economy, showing high levels of endorsements for associated behaviours and attitudes. Despite this, there is a notable gap in confidence regarding proper waste management knowledge and behaviours related to composting. Single-family dwellings exhibit more positive waste management behaviours and attitudes, likely due to better access to resources and services. This finding is unsurprising given the structural advantages provided to single-family homes, most notably curbside garbage and recycling pick up. While barriers to disposing of typical household waste are generally low, significant challenges remain in recycling less common materials like foam packaging, soft plastics, and electronics, primarily due to insufficient knowledge of disposal methods and transportation issues. Plastic products, in particular, were reported to be improperly disposed of more often than other materials.

Programs & Resources (Resident Survey)

Residents of the capital region show a strong preference for virtual and online resources for waste management, with the CRD website and the Recycle CRD App being the most frequently utilized, indicating ease of access and use. These resources, along with the resources given by the Compost Education Centre and the Hartland Landfill Public Tours, are perceived as highly effective in enhancing waste reduction knowledge among users, benefiting both single-family and multi-family dwellings alike. Despite the availability and effectiveness of these resources, a significant portion of residents have not engaged with these programs.

Hartland Public Drop-off Depot

CRD residents frequently use the Hartland Public Drop-off Depot, primarily for disposing of recyclable materials, garbage, and other types of waste. The depot sees a high number of residents dropping off metal, plastic products, foam packaging, electronic devices, household hazardous waste, and paper products. Since 2017, there has been a consistent annual increase in resident visits to dispose of general waste, with these visits growing slightly more than the population itself. Moreover, visits for recycling have seen a significant rise each year, particularly after the introduction of the Express & Go drop-off option in 2022.

Business Survey Insights

Most businesses reported producing waste in the form of paper, plastic, and organic materials, with proper disposal methods generally available. However, businesses were less likely to have a disposal method for materials such as electronics, wood or wood products, and textiles. A large proportion of these businesses rely on private waste collectors, with a high level of satisfaction reported regarding the reliability of these services.

Business Survey Insights Cont.

Despite this, about half of the businesses encounter challenges in complying with local waste management regulations, with a substantial amount also noting limited disposal options and high costs associated with compliance. In response, businesses reported high agreeance with various forms of support such as: increasing disposal options, providing clearer guidelines, and offering enhanced training resources to support compliance efforts. Despite setting waste reduction goals, the majority of businesses who participated in this study do not measure the impact of their waste management practices, highlighting a gap in monitoring and evaluating the effectiveness of their environmental strategies.

Informing a Communication Strategy

Residents in the capital region primarily gather waste management information from local government publications or websites and word of mouth, reflecting a strong reliance on official sources and community communication. The preferred methods for receiving this information include websites, online platforms, email, and letter mail, illustrating a broad spectrum of ways to pursue public engagement. Residents particularly seem to value practical information on how to properly dispose of waste, indicating a preference for actionable guidance over purely educational content. Similarly, businesses expressed interest in receiving updates about new regulations, incentive programs, and specific guidelines for different types of waste, highlighting their preference for practical information.

9.2 Recommendations

The findings summarized above have yielded a number of recommendations. The CRD may consider these recommendations when planning next steps and potential engagement initiatives that support progress towards Goal 3 of the SWMP: have informed citizens that participate effectively in proper waste management practices considering stakeholders' capabilities, motivations and resources required.

1 Addressing CRD Resident Gaps in Knowledge

The CRD may consider enhancing resources available to residents to target gaps in knowledge of solid waste management. Survey findings revealed some gaps in resident knowledge, such as: best practices and proper disposal methods for recyclable materials and strategies for reducing waste generation.

2 Addressing Barriers Related to Residents Solid Waste Management

Residents may benefit from strategies or tips for transporting materials, and greater awareness of options for private waste collection and disposal of large materials or those that are difficult to transport. Residents reported significant barriers to disposing of materials like foam/Styrofoam, soft plastics, and electronics. These barriers included a lack of knowledge on where and how to dispose of these materials and highlighted some difficulty in transporting materials to disposal sites. Additionally, these materials also align with those that residents reported throwing in the garbage because they did now know how or were unable to dispose of properly.

If possible, it may be worth considering how the CRD can continue to work with municipalities to offer services to residents of multi-family dwellings. Compared to residents with curbside pick-up options, residents in apartment buildings and those in municipalities/regions without access to curbside pick-up may benefit from additional, targeted information about how to properly dispose of materials, like kitchen scraps or recycling.

3 Engaging Residents in CRD Programs and Resources

To enhance engagement with CRD programs and resources in the Southern Gulf Islands, a strategic focus on brand awareness is recommended. The CRD allocates significant funding to local initiatives such as Gulf Islands depots, repair cafes, and non-profit events. By highlighting the CRD's contributions, residents may better recognize and engage with its resources, addressing the current issue where about 30% of residents have not accessed any of the waste management programs or resources listed in the Resident Survey. Targeted communication campaigns, joint branding with local partners, and island-specific workshops may improve the reach and awareness of these resources. Increasing brand visibility and showcasing the CRD's impact on local sustainability may help residents feel more connected to and more likely to utilize CRD programs, ultimately leading to better waste management practices across the Southern Gulf Islands.

4 Informing a Communication Strategy for Residents

The CRD may wish to consider expanding the Rethink Waste Newsletter and to promote ways for residents to receive emails from the CRD with information and resources related to the CRD's solid waste management programs. CRD residents, regardless of region or age expressed a desire for communication online (i.e., through the CRD's website) or by emails or letter mail. Newsletters were deemed to be effective resources by most residents – these could be distributed email or letter mail, and also compiled online so residents have access regardless of whether they are on a CRD mailing list. A significant number of residents expressed a preference for receiving information through letter mail. While this can be an effective way to reach a broad audience, it is important to consider the costs and environmental implications of sending physical mail, especially when the message pertains to waste reduction and management.

4 Informing a Communication Strategy for Residents

Desired content was similar across age groups and regions, with most residents requesting practical information on how to dispose of waste that cannot be recycled or reused, and practical information on how to recycle materials. Based on barriers reported and materials that residents reported disposing of as general refuse, the CRD may consider information or education campaigns related to proper disposal of soft plastics, foam/Styrofoam, and electronics; tips for transporting materials, and lists of locations where various materials can be dropped off or disposed of.

5 Support for Businesses

There may be an opportunity for the CRD to develop training resources that local businesses could tailor to meet their needs. Such resources could be provided online so that businesses can easily access and download the materials. Training materials could also encompass clear guidelines and outline disposal options for businesses. Most businesses reported a desire to reduce waste and comply with local waste management regulations, but very few had adequate training resources for employees.

It was noted in this report that small businesses were less likely to report using a private waste collection service and less likely to use Hartland Public Drop-off Depot compared to larger businesses. It is unclear what these smaller businesses are doing in terms of solid waste management. Smaller businesses were also more likely to report challenges related to cost and limited availability of disposal options. As such, there may be opportunity for small business to work together and collectively high private waste collection services to reduce costs and concerns related to storing waste until pick-up.

Additional supports that the CRD may consider include allowing businesses to opt-in to curbside pick-up if available in their jurisdictions, and incentive programs to help businesses manage the cost associated with solid waste management.

6 Informing a Communication Strategy for Businesses

Businesses in the region could benefit from practical information on solid waste management practices in the form of detailed guidelines by specific waste types to help manage waste for effectively and efficiently. The CRD may also consider a procedure to communicate updates on new or changing regulations.

7 Enhancing Future Evaluations

In future evaluations of Goal 3 of the SWMP, the CRD may consider focus groups or sub-surveys to explore specific areas in more detail (e.g., resident composting behaviours, needs of small businesses). Focus groups allow an opportunity to hear directly from a small proportion of residents in-depth about a specific topic and would provide an opportunity to follow-up on survey findings (e.g., to more fully understand why residents are reporting certain barriers).

Additionally, the CRD may consider strategies for enhancing secondary data that can be used to support program monitoring and evaluation. Such strategies may include refinement of tracking systems for infoline inquiries. The current recording system contains 893 uniquely coded categories since 2020 among phone and email inquiries, and many of them are repeated instances but with spelling and wording variations. A system that allows for data validation so that themes can be accurately recorded would be recommended. For example, by using a tag system where phone attendants can categorize calls rather than an open field. This would also allow for capturing multiple categories within a single inquiry, which is often necessary.

Continuous review of readily available data (website analytics) may help the CRD to pick-up on any shifts of resident behaviour trends (view searches). The evaluation matrix should be revised and updated as more data becomes available.

APPENDIX A: CRD RESIDENT SURVEY

SCREENING QUESTIONS

1A. Are you over the age of 15? If not, could you please pass this survey to someone in your household who is?

- ☐ Yes
- ☐ No

1B. Please confirm that your principal residence is located within the CRD.

- ☐ Yes
- ☐ No

[IF (Q1A == No) OR (Q1B== No)]

Non-Qualifier Script

Thank you for your interest in this survey. It appears this survey will not be relevant to you. Out of respect for your time, we will end the survey here.

If you have any questions or concerns about this study, please contact Emilio Velazquez at Malatest.

Emilio Velazquez, Research Analyst

R.A. Malatest & Associates Ltd.

SWMPengagement@malatest.com

1-877-276-8800

2. Which of the following best describes the type of residence you live in?

- ☐ Single-detached house (e.g., laneway houses and detached garden suite)
- ☐ Semi-detached house (e.g., townhouse, row house, or side-by-side)
- ☐ A secondary suite in a house (e.g., basement apartment or upstairs apartment)
- ☐ Apartment or condominium in a high-rise building (5 or more storeys)
- ☐ Apartment or condominium in a low-rise building (fewer than 5 storeys)
- ☐ Mobile home / movable dwelling
- ☐ Other, please specify: _____ [100 characters]

BEHAVIOUR & ATTITUDES

3. When answering these questions, please think about the behaviours that you, some, or all the members of your household do. Household members can be a spouse, dependents, or other individuals who normally live with you.

	More than once per week	Once a week	Once every two weeks	Every two weeks or more	I am not sure	Prefer not to answer
3A. Recyclable items (e.g., cardboard, plastic, tin)						
3B. Returnable items (e.g., drink containers)						
3C. Organic waste (e.g., food scraps or yard and garden materials)						
3D. Hazardous waste						
3E. General refuse (i.e., garbage)						
3F. Other. Please specify: _____ [500 characters]						

4. Does your household experience any barriers or challenges when disposing any of the following materials? Please select all that apply.

	No challenges or barriers.	Don't know how to dispose	Don't know where to dispose	It is too hard to transport	It is too expensive	Other, please explain	Prefer not to answer
4A. Recycling (e.g., paper, plastic, tin, glass)							
4B. Other recycling (e.g., soft plastics, Styrofoam)							
4C. Organic waste (e.g., food scraps or yard and garden materials)							
4D. General refuse (i.e., garbage)							

	No challenges or barriers.	Don't know how to dispose	Don't know where to dispose	It is too hard to transport	It is too expensive	Other, please explain	Prefer not to answer
4E. Other. Please specify: _____ [500 characters]							

5. Does your household put any of the following materials in the garbage?
   - ☐ Paper products
   - ☐ Plastic products
   - ☐ Metals
   - ☐ Wood or wood products
   - ☐ Organic waste
   - ☐ Electronic devices and/or appliances
   - ☐ Glass products
   - ☐ Textiles and/or clothing
   - ☐ Household hazardous waste
   - ☐ Other, please specify: _____ [500 characters]
   - ☐ Prefer not to answer

6. Has your household ever used the Hartland Public Drop-off Depot/Landfill to dispose waste? Please select all that apply
   - ☐ Yes, to dispose of garbage
   - ☐ Yes, to dispose of recyclable materials
   - ☐ Yes, to dispose of other materials. Please specify: _____ [500 characters]
   - ☐ No
   - ☐ Don't know/prefer not to answer

[IF Q6 == Yes, to dispose of garbage]

6A_1. What was the main reason for disposing garbage at the Hartland Public Drop-off Depot/Landfill?

- ☐ Convenience of waste disposal
- ☐ No curbside pickup
- ☐ I don't know where else to dispose of waste
- ☐ Main waste disposal method was unavailable or overfilled
- ☐ Following regulation for disposing of renovation debris, asbestos, and/or a controlled substance
- ☐ Other, please specify: _____ [500 characters]
- ☐ Don't know/prefer not to answer

[IF Q6 == Yes, to dispose of recyclable materials]

6A_2. What was the main reason for recycling materials at the Hartland Public Drop-off Depot/Landfill?

- ☐ Convenience of waste disposal
- ☐ No curbside pickup
- ☐ I don't know where else to dispose of waste
- ☐ Main waste disposal method was unavailable or overfilled
- ☐ Other, please specify: _____ [500 characters]
- ☐ Don't know/prefer not to answer

[IF Q6 == Yes, to dispose of other materials]

6A_3. What was the main reason for disposing of other materials at the Hartland Public Drop-off Depot/Landfill?

- ☐ Convenience of waste disposal
- ☐ No curbside pickup
- ☐ I don't know where else to dispose of this waste
- ☐ Main waste disposal method was unavailable or overfilled
- ☐ Other, please specify: _____ [500 characters]
- ☐ Don't know/prefer not to answer

[IF Q6 == No]

6B. Why has your household never used the Hartland Public Drop-off Depot/Landfill to dispose waste?

- ☐ Open-end response _____ [1,000 characters]
- ☐ Don't know/prefer not to answer

7. Which of these materials does your household know how to recycle?

- ☐ Paper products
- ☐ Plastic products
- ☐ Metals
- ☐ Wood or wood products
- ☐ Organic waste
- ☐ Electronic devices and/or appliances
- ☐ Glass products
- ☐ Textiles and/or clothing
- ☐ Household hazardous waste
- ☐ Other, please specify: _____ [500 characters]
- ☐ Prefer not to answer

8. Please select your level of agreement to the following statements

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
8A. My household adopts practices that reduce waste generation (e.g., purchasing in bulk, avoiding single-use items)					
8B. My household eats all the food we buy and we only put unavoidable food waste (eggs shells, coffee grounds, vegetable peelings) in the compost Note for hover-link: More can be found at Love Food Hate Waste Canada					
8C. My household participates in composting organic waste at home.					
8D. My household seeks opportunities to repurpose or reuse materials from products we have purchased.					

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
8E. My household visits second-hand stores and/or repair shops to extend the life of items.					
8F. My household makes conscious efforts to donate unwanted household items.					
8G. My household feels confident in our knowledge of the best practices for recycling a variety of materials.					
8H. My household feels confident in our knowledge of how to properly dispose of hazardous waste.					
8I. My household is eager to participate in community initiatives aimed at reducing waste.					

ENGAGEMENT

9. Have you accessed any of the following waste management programs or resources currently offered by the CRD? Please select all that apply. _

   ☐ CRD Website

   ☐ Infoline

   ☐ Compost Education Centre activities or resources

   ☐ Classroom Workshops

   ☐ Community Outreach and Events

   ☐ Rethink Waste Community Grant

   ☐ Hartland Landfill Public Tours

   ☐ Hartland Landfill School Tours and 3Rs Classroom Workshops

   ☐ Recycle CRD app (curbside collection reminders)

   ☐ Rethink Waste Email Newsletter

   ☐ Other, please specify: _____ [500 characters]

   ☐ None of the above

10. When did you last access this program/resource?

	In the last 4 weeks	1 month – 6 months ago	6 months to a year ago	1 – 5 years ago	5 + years ago
[Populate from Q9 answers]					

11. How effective was this program/resource at improving your knowledge of Waste Reduction strategies?

	Very effective	Effective	Ineffective	Very ineffective	Not applicable
[Populate from Q9 answers]					

12. After accessing this program/resource, I am more confident in … (Please select all that apply)

	The proper disposal of organic waste	The proper disposal of recyclable waste (e.g., sorting plastic, paper, tin, or glass)	Using recycling depots effectively	The proper disposal of hazardous household materials
[Populate from Q9 answers]				

COMMUNICATIONS

13. Where does your household learn about best practices for recycling/reducing/reusing solid waste? (Select all that apply)

- ☐ Local government publications or websites
- ☐ Community workshops or seminars
- ☐ Schools or educational programs
- ☐ Social media ads or posts (e.g., Instagram or Facebook)
- ☐ Environmental organizations
- ☐ Word of mouth (e.g., friends or family)
- ☐ Television or radio broadcasts
- ☐ Advertisements on public transit and/or public spaces
- ☐ None of the above
- ☐ Other (please specify): _____ [500 characters]

[IF Q13 ≠ (`Word of mouth (e.g., friends or family) `, `None of the above`)]

13B. Was the content from the CRD? If so, what was it about? Select all that apply

- ☐ Practices that reduce waste generation (e.g., purchasing in bulk, avoiding single-use items)
- ☐ Practices that reduce food waste
- ☐ Composting organic waste at home
- ☐ Repurposing or reusing materials from products
- ☐ Visiting second-hand stores and/or repair shops to extend the life of items
- ☐ Donating unwanted household items
- ☐ Recycling a variety of materials
- ☐ How to properly sort recyclable materials for curb-side pick up
- ☐ Properly disposing of hazardous waste
- ☐ Other. Please explain: _____ [500 characters]
- ☐ The content was not from the CRD
- ☐ Unsure / I don't remember
- ☐ Prefer not to answer

14. How often do you see information from the CRD about best practices in waste management?

Note: Information from the CRD about waste management can include promotional advertisements like newsletters, posters, pamphlets, and social media posts, or in-person events and information booths.

- ☐ At least once a month
- ☐ At least once per year
- ☐ I have seen content before, but not on a regular basis
- ☐ I have never seen content from the CRD regarding best practices in waste management

15. What kind of content are you most interested in seeing from the CRD in the future? (Select all that apply)

- ☐ Practical information on how to reduce waste
- ☐ Practical information on how to reuse waste
- ☐ Practical information on how to recycle waste
- ☐ Information promoting environmentally friendly/ sustainable actions
- ☐ Information on how to dispose of waste that cannot be reused or recycled
- ☐ Other, please specify: _____ [500 characters]

16. What kind of waste management information from the CRD do you find most useful? (Select all that apply)
    - ☐ Detailed guidelines for specific waste types
    - ☐ Updates on new regulations and bylaws
    - ☐ Best practices for waste reduction, reuse, and recycling
    - ☐ Case studies of successful waste management
    - ☐ Incentive programs and opportunities
    - ☐ Other, please specify: _____ [500 characters]

17. What are your preferred ways to get information about waste management practices? (Select all that apply)
    - ☐ Lettermail (e.g., flyers)
    - ☐ Advertising (e.g., newspaper, radio, website)
    - ☐ Email
    - ☐ Websites/Online
    - ☐ Social Media
    - ☐ Workshops/Events
    - ☐ Newsletters
    - ☐ Other, please specify: _____ [500 characters]

HOUSEHOLD DEMOGRAPHICS

18. Do you rent or own your place of residence?
    - ☐ Rent
    - ☐ Own
    - ☐ Prefer not to answer

19. How many people live in your household?
    - ☐ ___ Total # adults (18+)
    - ☐ ____ Total # children (under the age of 18)
    - ☐ Prefer not to answer

20. Which of the following best describes your household's total income last year? (Please consider all sources of income for all household members, before taxes)

    Your answers will remain entirely confidential. Click here to see our Privacy Statement.

- ☐ $0 to less than $25,000
- ☐ $25,000 to less than $50,000
- ☐ $50,000 to less than $75,000
- ☐ $75,000 to less than $100,000
- ☐ $100,000 to less than $150,000
- ☐ $150,000 or more
- ☐ Prefer not to answer

PERSON DEMOGRAPHICS

21. Which of the following apply to you? Select all that apply.

- ☐ Work full-time (30 or more hours per week)
- ☐ Work part-time (less than 30 hours per week)
- ☐ Volunteer (not for pay)
- ☐ Student full-time
- ☐ Student part-time
- ☐ Unemployed
- ☐ Looking after home/family
- ☐ Retired
- ☐ Other, specify: _____ [100 characters]

22. What is your age?

- ☐ 15 to 25
- ☐ 26 to 35
- ☐ 36 to 45
- ☐ 46 to 55
- ☐ 56 to 65
- ☐ Over 65
- ☐ Prefer not to answer

23. How do you identify?

- ☐ Woman
- ☐ Man
- ☐ I do not identity as either a man nor a woman (including non-binary, polygender, genderqueer, agender, bigender, and others)
- ☐ Two-spirit
- ☐ Other cultural genders
- ☐ Not listed here
- ☐ Prefer not to answer

END

FLWUP. Would you be interested in participating in follow-up cycles of this study?

- ☐ Yes
- ☐ No

[IF FLWUP == Yes]

FLWUPA. Please provide your contact information. This information will be kept confidential and will only be used to invite you to participate in future cycles of this study.

Name: _____ [100 characters]

Email address:_____ [100 characters]

PRIZED. Prize Draw: Participants in this survey are eligible to enter a prize draw for one of three e-gift cards (one $100 e-gift card and two $50 e-gift cards) from a variety of retailers. Would you like to enter the draw?

- ☐ Yes
- ☐ No

[IF PRIZED == Yes]

PRIZEDA. An email address is required to receive a gift card. Your contact information will be kept confidential and will be used only to contact you in the event your name is selected in the prize draw. If you cannot provide an email address, we will attempt to contact you by phone.

Name: _____ [100 characters]

Phone: _____ [100 characters]

Email:_____ [100 characters]

[SURVEY END]

Thank you for participating in the Solid Waste Management Plan: Market Research and Engagement Study. Your feedback is appreciated.

APPENDIX B: HARTLAND DEPOT & PUBLIC DROP-OFF SURVEY

BEHAVIOUR

1. What is your main reason for visiting the Hartland Public Drop-off Depot today?
    - ☐ It is convenient to throw away my waste here
    - ☐ Had too much waste for my main disposal method(s)
    - ☐ Don't know where else I could throw away my waste
    - ☐ My main disposal method was not available (e.g., out of order or overfilled, missed my recycling day)
    - ☐ I am following the proper regulations for disposing of waste (e.g., throwing away hazardous waste or materials that are not generally picked up by recycling services)
    - ☐ Other, please specify _____ [500 characters]
    - ☐ Prefer not to answer

2. How often do you visit this drop-off site?
    - ☐ Multiple times a day
    - ☐ Once a day
    - ☐ Few times a week
    - ☐ Once a week
    - ☐ Few times a month
    - ☐ Few times a year
    - ☐ Once a year
    - ☐ Less than once a year
    - ☐ This is my first time visiting the Hartland Drop-off Depot
    - ☐ Prefer not to answer

3. What materials did you drop-off today? Please select all that apply.
    - ☐ Paper products (e.g., newspapers, magazines, cardboard)
    - ☐ Plastic products (e.g., bottles, containers, plastic wrap)
    - ☐ Foam packaging (e.g., styrofoam blocks, foam peanuts)
    - ☐ Metals (e.g., aluminum cans, metal lids, copper wires)
    - ☐ Books (e.g., used textbooks, novels, children's books)

- ☐ Mattresses and box springs (e.g., used, worn out or damaged mattresses)
- ☐ Wood or wood products (e.g., timber, plywood, wooden furniture)
- ☐ Organic waste (e.g., food scraps, yard trimmings, compostable materials)
- ☐ Electronic devices and/or appliances (e.g., mobile phones, refrigerators, microwaves)
- ☐ Glass products (e.g., bottles, jars, broken glass)
- ☐ Textiles and/or clothing (e.g., unwanted clothes, fabric scraps, linens)

  Text to be displayed on hover-link: The Hartland Depot accepts textiles only if they are in reusable condition. Textiles not suitable for reuse should be categorized as garbage.
- ☐ Household hazardous waste (e.g. pesticides, paint, propane tanks, batteries, motor oil)
- ☐ Renovation waste (e.g., drywall, tiles, plumbing fixtures)
- ☐ Garbage or general refuse (e.g., non-recyclable waste, mixed trash)
- ☐ Other, please specify: _____ [500 characters]
- ☐ Prefer not to answer

4. Which of these materials do you want to reuse or recycle but can't? For example, you don't know how to, or there aren't enough places to do it. Please select all that apply.

- ☐ Paper products
- ☐ Plastic products
- ☐ Metals
- ☐ Wood or wood products
- ☐ Organic waste
- ☐ Electronic devices and/or appliances
- ☐ Glass products
- ☐ Textiles and/or clothing
- ☐ Other, please specify: _____ [500 characters]
- ☐ Prefer not to answer

[IF Q4 ≠ `Prefer not to answer`]

Q4A. Why can't you reuse or recycle these materials?

- ☐ Don't know how
- ☐ Service isn't offered at a convenient drop-off location
- ☐ Too expensive to recycle at depot location
- ☐ Other, please specify _____[500 characters]

5. Where did you first learn about the services offered at Hartland Landfill?
   - ☐ Advertisements (e.g., flyers, posters, social media)
   - ☐ Web search
   - ☐ Community workshops/events
   - ☐ CRD programming (e.g., Infoline, Hartland Landfill tours, MyRecyclopedia.ca)
   - ☐ Word of mouth (e.g., from friends or family)
   - ☐ Other, please specify: _____ [500 characters]

6. How satisfied are you with the services that are being offered at this drop-off site?
   - ☐ Very satisfied
   - ☐ Satisfied
   - ☐ Neutral
   - ☐ Unsatisfied
   - ☐ Very unsatisfied

[IF Q6 == `Unsatisfied` OR `Very Unsatisfied`]

6a. Why were you not satisfied with the services offered at Hartland Public Drop-off Depot?

- ☐ _____ [1,000 characters]
- ☐ Prefer not to answer

7. In your opinion, should Hartland Landfill's extended hours on Saturdays (from 2pm to 5pm) become permanent?

   Text to be displayed on hover-link: The CRD is seeking feedback on its one-year Hartland Landfill Expanded Hours Pilot. Beginning Saturday, June 15, 2024, Hartland will be open from 7 am to 5 pm on Saturdays for both residential and commercial customers.

   - ☐ Yes
   - ☐ No
   - ☐ Not sure/Undecided

8. Please share any additional comments or feedback regarding your experience at the Hartland Landfill.

   Your opinion is your personal information. Please do not include any information which identifies you or others in your response.

   - ☐ Open-ended responses [1,000 characters]
   - ☐ no comment

DEMOGRAPHICS

9. Which of the following best describes your primary residence?

Within the Capital Regional District:

- ☐ Victoria
- ☐ Saanich
- ☐ Langford
- ☐ Esquimalt
- ☐ Oak Bay
- ☐ Colwood
- ☐ Central Saanich
- ☐ Sooke
- ☐ Sidney
- ☐ Salt Spring Islands or Southern Gulf Islands
- ☐ North Saanich
- ☐ View Royal
- ☐ Juan de Fuca
- ☐ Metchosin
- ☐ Highlands

Outside the Capital Regional District

- ☐ Please specify _____ [100 characters]

☐ Prefer not to answer

[SURVEY END]

Thank you for participating in the Solid Waste Management Plan: Market Research and Engagement Study. Your feedback is appreciated.

APPENDIX C: CRD BUSINESS SURVEY

BUSINESS CHARACTERISTICS

1. How many people does this business employ (approximately)?
   - ☐ 1 to 9 employees
   - ☐ 10 to 49 employees
   - ☐ 50 to 199 employees
   - ☐ 200 plus employees
   - ☐ Prefer not to answer

2. Which of the following best describes the operations of this business?
   - ☐ Resource Extraction and Utilities
     - Agriculture, forestry, fishing and hunting; Mining, quarrying, and oil and gas extraction; Utilities
   - ☐ Industrial and Construction Sectors
     - Manufacturing; Construction
   - ☐ Trade
     - Wholesale trade; Retail trade
   - ☐ Services and Administration
     - Transportation and warehousing; Information and cultural industries; Professional, scientific, and technical services; Management of companies and enterprises; Administrative and support, waste management and remediation services; Educational services; Health care and social assistance; Arts, entertainment and recreation; Other services (except public administration); Public administration; Finance and insurance; Real estate and rental and leasing
   - ☐ Accommodation and food services

[IF Q2 == `Services and Administration`]

2A. Please specify which industry this business specializes in.

- ☐ Transportation and warehousing
- ☐ Information and cultural industries
- ☐ Professional, scientific, and technical services
- ☐ Management of companies and enterprises
- ☐ Administrative and support, waste management and remediation services
- ☐ Educational services
- ☐ Health care and social assistance

- ☐ Arts, entertainment, and recreation
- ☐ Other services (except public administration)
- ☐ Public administration
- ☐ Finance and insurance
- ☐ Real estate and rental and leasing
- ☐ Other, please specify [100 characters]
- ☐ Prefer not to answer

3. Where is this business located, or, what areas does this business operate in? (select all that apply)

Within the Capital Regional District:

- ☐ Victoria
- ☐ Saanich
- ☐ Langford
- ☐ Esquimalt
- ☐ Oak Bay
- ☐ Colwood
- ☐ Central Saanich
- ☐ Sooke
- ☐ Sidney
- ☐ Salt Spring Islands or Southern Gulf Islands
- ☐ North Saanich
- ☐ View Royal
- ☐ Juan de Fuca
- ☐ Metchosin
- ☐ Highlands

Other

- ☐ Please specify _____ [100 characters]

☐ Prefer not to answer

4. How many sites/franchises does this business operate within the CRD?

- ☐ 1 site
- ☐ 2-5 sites
- ☐ More than 5 sites
- ☐ Prefer not to answer

INVOLVEMENT IN SUSTAINABLE WASTE MANAGEMENT PRACTICES

5. What types of waste does this business produce? (Select all that apply)
   - ☐ Paper
   - ☐ Plastics
   - ☐ Soft-plastics
   - ☐ Metals
   - ☐ Wood or wood products
   - ☐ Organic waste
   - ☐ Electronic devices and/or appliances
   - ☐ Glass products
   - ☐ Textiles and/or clothing
   - ☐ Renovation and Demolition Waste
   - ☐ Asbestos Waste
   - ☐ Other kinds of controlled waste
   - ☐ Other, please specify: _____ [500 characters]
   - ☐ Prefer not to answer

6. Which type of waste receptacles/bins does this business provide staff/customers? (Select all that apply)
   - ☐ Paper
   - ☐ Plastics
   - ☐ Soft-plastics
   - ☐ Metals
   - ☐ Wood or wood products
   - ☐ Organic waste
   - ☐ Electronic devices and/or appliances
   - ☐ Glass products
   - ☐ Textiles and/or clothing
   - ☐ Renovation and Demolition Waste
   - ☐ Asbestos Waste
   - ☐ Other kinds of controlled waste
   - ☐ Other, please specify: _____ [500 characters]
   - ☐ Prefer not to answer

7. What are this business's primary goals for reducing waste production? (Select all that apply)
   - ☐ Reducing costs
   - ☐ Enhancing sustainability
   - ☐ Complying with regulations
   - ☐ Improving public image
   - ☐ Other (please specify) [500 characters]
   - ☐ None
   - ☐ Prefer not to answer

8. What methods does this business use to measure the impact of its waste management practices? (Select all that apply)
   - ☐ Regular audits
   - ☐ Researching new technologies to reduce waste
   - ☐ Tracking waste reduction
   - ☐ Monitoring recycling rates
   - ☐ Using sustainability metrics
   - ☐ We do not directly measure the impact of our waste management practices
   - ☐ Other (please specify) [500 characters]
   - ☐ Prefer not to answer

9. Which technologies does this business currently use to manage waste? (Select all that apply)
   - ☐ Waste tracking systems
   - ☐ Compaction technology
   - ☐ Recycling sorting systems
   - ☐ None
   - ☐ Other (please specify) [500 characters]
   - ☐ Prefer not to answer

STAFF TRAINING AND ENGAGEMENT

10. Please select your level of agreement to the following statements

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
10A. This business provides comprehensive training on recycling practices, such as sorting materials and understanding local recycling rules.					
10B. This business actively offers training on waste reduction techniques, for example minimizing packaging use and optimizing resource consumption					
10C. This business conducts training sessions on reusing waste materials, focusing on initiatives like repurposing office supplies and refurbishing old equipment.					
10D. I find the current training on waste management practices very effective.					
10E. This business' staff are very engaged in waste reduction efforts.					
10F. When procuring services/materials for the business, this business supports choosing the more sustainable option, even if it costs more.					

11. What format would you prefer for additional training resources? (Select all that apply)

- ☐ In-person workshops
- ☐ Online webinars
- ☐ Training manuals
- ☐ Interactive online courses
- ☐ Onsite training sessions
- ☐ Other (please specify) [[500 characters]]
- ☐ Prefer not to answer

SERVICES

12. How reliable are the waste collection services available to this business?
    - ☐ Very Reliable
    - ☐ Reliable
    - ☐ Neutral
    - ☐ Unreliable
    - ☐ Very Unreliable
    - ☐ Prefer not to answer

13. Does this business rely on any private waste collector for its waste management needs?
    - ☐ Yes, we use third-party services regularly.
    - ☐ Yes, but we hire these services only as needed.
    - ☐ No
    - ☐ Prefer not to answer

[IF Q13 = ('Yes, we use third-party services regularly' , 'Yes, but we hire these services only as needed']

13B. What is the name of the private collector services this business uses?
- ☐ Open text-box [100 characters]
- ☐ Prefer not to answer

14. How often does this business use the Hartland Landfill for waste disposal?
    - ☐ About once a week
    - ☐ About once a month
    - ☐ About once a quarter
    - ☐ About once a year
    - ☐ Less frequently than once a year
    - ☐ Never
    - ☐ Prefer not to answer

[IF Q14 ≠ Never]

14B. How satisfied is this business with the services provided at the Hartland Landfill?

- ☐ Very Satisfied
- ☐ Satisfied
- ☐ Neutral
- ☐ Dissatisfied
- ☐ Very Dissatisfied
- ☐ Prefer not to answer

15. What challenges does this business face in following local waste management goals or regulations? (Select all that apply)
    - ☐ We do not experience any challenges complying with local waste management regulations
    - ☐ Lack of clear guidelines
    - ☐ High costs of compliance
    - ☐ Limited availability of disposal options
    - ☐ Insufficient staff training
    - ☐ Other (please specify) [500 characters]
    - ☐ Prefer not to answer

16. How can the CRD support this business in meeting local waste management goals or regulations? (Select all that apply)
    - ☐ Providing clearer guidelines
    - ☐ Increasing availability of disposal options
    - ☐ Providing more training resources
    - ☐ Other (please specify) [500 characters]
    - ☐ Prefer not to answer

17. What suggestions do you have for improving waste collection services to better meet this business' needs? (Open-ended)
    - ☐ Open textbox [1000 characters]
    - ☐ Prefer not to answer

COMMUNICATION PREFERENCES

18. What kind of information would this business be most interested in receiving from the CRD?
    - ☐ Practical knowledge in how to reduce, recycle or reuse waste
    - ☐ Information that promotes environmental consciousness on waste
    - ☐ Information on how waste gets processed by the CRD
    - ☐ Other, please specify [500 characters]
    - ☐ Prefer not to answer

19. What additional information would this business find useful regarding waste management? (Select all that apply)
    - ☐ Detailed guidelines for specific waste types
    - ☐ Updates on new regulations
    - ☐ Best practices for waste reduction
    - ☐ Case studies of successful waste management
    - ☐ Incentive programs and opportunities
    - ☐ Prefer not to answer

20. What is this business' preferred method for receiving information about waste management regulations and practices? (Select all that apply)
    - ☐ Letter mail
    - ☐ Email
    - ☐ Websites/online
    - ☐ Workshops/Events
    - ☐ Newsletters
    - ☐ Prefer not to answer

21. How often would this business like to receive updates or content on waste management regulations and practices?
    - ☐ Weekly
    - ☐ Monthly
    - ☐ Quarterly
    - ☐ Annually
    - ☐ Only as when there are changes in regulations
    - ☐ Prefer not to answer

22. How clear and helpful is the current communication from the CRD regarding waste management?
    - ☐ Very clear and helpful
    - ☐ Clear and helpful
    - ☐ Neutral
    - ☐ Unclear and unhelpful
    - ☐ Very unclear and unhelpful
    - ☐ Prefer not to answer

[SURVEY END]

Thank you for participating in the Solid Waste Management Plan: Market Research and Engagement Study. Your feedback is appreciated.

APPENDIX D: EVALUATION MATRIX

To meet the objectives of Goal 3 of the Solid Waste Management Plan (SWMP), the Capital Regional District (CRD) requires up-to-date information on public attitudes, knowledge, and behaviours towards solid waste reduction. This data is essential for ensuring that citizens are well-informed and can engage effectively in proper waste disposal and management practices.

The purpose of the following Evaluation Matrix is to outline a systematic approach for comparing data across different years to assess the effectiveness of the CRD's waste reduction programs. Additionally, it aims to identify and address any challenges, limitations, or gaps within each program area. By understanding public attitudes, knowledge, and behaviours in relation to the CRD's waste reduction programming and behaviour change initiatives, the study will enhance the CRD's ability to manage waste more effectively within the capital region.

The objectives of the Evaluation Matrix are inline with the purpose of this study, and are as follows:

1. Evaluate the effectiveness of the current CRD waste reduction programming and behaviour change initiatives.
2. Develop baseline information for ongoing monitoring and comparison.
3. Enhance understanding of the knowledge held by residential, industrial, commercial, and institutional communities regarding the SWMP, general waste systems, and available services.
4. Provide insights to inform existing programs and guide the development of future programming.

Resident Survey | Business Survey | Administrative Data

Intermediate Goal	Topic Area	Survey Question or Administrative Data Source		Indicators	Baseline (2024)
Gain a better understanding of behaviours and attitudes across the population	Waste Disposal Frequency	Q3. Disposal frequency.		% of households regularly (once every two weeks or more often) sorting and disposing of various materials	– Recyclable items (94%) – Food/organic waste (94%) – Returnable items (62%) – General refuse (89%) – Hazardous waste (13%)
	Barriers	Q4. Barriers to disposing of various materials.		Percentage of households facing no barriers Percentages describing the most frequent barriers	– General refuse (97%) – Recycling (96%) – Organic waste (95%) – Other recycling (64%) – Other (38%)
		Q5. Items disposed of as general refuse.		Most common materials being disposed of as general refuse	– Plastic products (26%) – Textiles (46%) – None of these materials (31%)
		CRD Waste Composition Study		% waste composition of various materials that could be diverted from the landfill (e.g., paper, glass, textiles).	– Organics (23% - 25%) – Paper (17% - 20%) – Plastics (15 – 17%)
				% diversion potential from single-family and multi-family dwellings.	– Compost (33% - 34%) – Recycling (10% - 12%) – Depot/Drop off (18% - 19%) – Garbage (36% - 38%)
	Behaviours and Attitudes (Composite Index: overall measure of agreement with statements supporting desirable attitudes and behaviours. Ranges from -1 to +1, higher scores indicating higher levels of agreement.)	Reduce waste generation	Q8. My household adopts practices that reduce waste generation.	Percentage of households agreeing	– 73%
			Q8. My household eats all the food we buy and we only put unavoidable food waste in the compost.	Percentage of households agreeing	– 78%
			Composite score.		– 0.47

Intermediate Goal	Topic Area	Survey Question or Administrative Data Source		Indicators	Baseline (2024)
Gain a better understanding of behaviours and attitudes across the population	Behaviours and Attitudes (Composite Index: overall measure of agreement with statements supporting desirable attitudes and behaviours. Ranges from -1 to +1, higher scores indicating higher levels of agreement.)	Composting	Q8. My household participates in composting organic waste.	Percentage of households agreeing	– 61%
			Composite score.		– 0.27
		Support for a circular economy	Q8. My household seeks opportunities to repurpose or reuse materials.	Percentage of households agreeing	– 71%
			Q8. My household visits second-hand stores and/or repair shops to extend the life of items.	Percentage of households agreeing	– 70%
			Q8. My household makes a conscious effort to donate unwanted household items.	Percentage of households agreeing	– 93%
			Composite score.		– 0.52
		Support for community initiatives	Q8. My household is eager to participate in community initiatives aimed at reducing waste.	Percentage of households agreeing	– 76%
			Composite score.		– 0.52
		Confidence in knowledge	Q8. My household feels confident in our knowledge of the best practices for recycling a variety of materials.	Percentage of households agreeing	– 79%
			Q8. My household feels confident in our knowledge of how to properly dispose of hazardous waste.	Percentage of households agreeing	– 62%
			Composite score.		– 0.40
		Overall composite score.			– 0.38
		The percentage of residents reporting positive behaviours and attitudes toward waste management practices.			– 74%
Gain a better understanding of the usage of public services	Hartland Landfill	Q6. Use of Hartland Landfill.		Percentage of households who use the Hartland Landfill	– To dispose of garbage (25%) – To dispose of recyclables (33%) – To dispose of other materials (36%)

Intermediate Goal	Topic Area	Survey Question or Administrative Data Source	Indicators	Baseline (2024)
Gain a better understanding of the usage of public services	Hartland Landfill	Historical tonnage data.	Number of visits per year * Monitor yearly to track progress during non-evaluation years	– Recyclables (66,200) – Garbage (38,600)
	Recycling Facilities	Q7. Knowledge of how to recycle or dispose of various materials.	Percentages describing familiarity/understanding of best recycling practices for common household waste products	– Paper (98%) – Plastic (94%) – Metals (79%) – Organics (92%) – Electronic devices or appliances (85%) – Glass (87%) – Textiles (43%) – Household hazardous waste (59%)
Gain a better understanding of the role of programs/ resources -Recycling Depots -MyRecyclopedia.ca -Infoline -Compost Education Centre activities or resources -Hartland Landfill School Workshops or tours -School Outreach Programs -Community Outreach and Events -Other Public Education Campaigns	Historical Performance	Feedback from program participants.	Summary of recommendations or areas of improvement suggested by participants * Monitor yearly to track progress during non-evaluation years	
		Q9. Resources accessed by CRD residents.	Percent of respondents who have accessed each resource	– CRD website (56%) – Recycle CRD app (31%) – Compost Education Centre (9%) – None (30%)
	Effect of Programs/ Resources	Q11. Effectiveness of resources in increasing knowledge.	Percentage agreeing	– CRD website (91%) – Recycle CRD app (96%) – Compost Education Centre (97%)
		Q12. Effectiveness of resource in increasing confidence in how to dispose of materials properly (organics or recyclables).	Percentage agreeing	– CRD website (40%) – Recycle CRD app (36%) – Compost Education Centre (75%)
		Infoline Inquiries and Feedback Forms.	Frequency of inquiries by key topic area * Monitor yearly to track progress during non-evaluation years	– Curb side recycling (50%) – Hartland (30%)

Intermediate Goal	Topic Area	Survey Question or Administrative Data Source	Indicators	Baseline (2024)
Gain a better understanding of the role of programs/ resources -Recycling Depots -MyRecyclopedia.ca -Infoline -Compost Education Centre activities or resources -Hartland Landfill School Workshops or tours -School Outreach Programs -Community Outreach and Events -Other Public Education Campaigns	Reach of Programs and CRD Resources	Historical outreach program performance.	Average number of attendees per event, per year * Monitor yearly to track progress during non-evaluation years	– 25-30 per event
		CRD Website analytics.	MyRecyclopedia – most common inquiries * Monitor yearly to track progress during non-evaluation years	– Styrofoam (7%) – Textiles (6%) – Appliances (5%)
			ReCollect System user data	– 25% of private dwellings in the region enlisted
		Q14. Frequency of citizens receiving information on SWM from the CRD.	% reporting they see CRD content at least once per month and once per year	– 9%
			% reporting they have never seen this from the CRD	– 18%
Gain a better understanding of current staff training practices across businesses in the CRD	Training on 3Rs	Q10. Business provides training on proper recycling practices.	Percent agreeing	– 58%
		Q10. Business provides training on waste reduction techniques.	Percent agreeing	– 32%
		Q10. Business conducts training sessions related to reusing or repurposing waste.	Percent agreeing	– 28%
	Training Effectiveness	Q10. Effectiveness of training.	Percent agreeing training is effective	– 35%
		Q10. Level of staff engagement.	Percent agreeing engaged is high	– 69%
	Training Formats	Q11. Preferred training resources format.	Percent indicating preference for various formats	– In-person workshops (15%) – Onsite training (23%) – Online courses (35%) – Online webinars (44%) – Training manuals (35%)

Intermediate Goal	Topic Area	Survey Question or Administrative Data Source	Indicators	Baseline (2024)
Gain a better understanding of the status of sustainable waste management practices across businesses in the CRD	Disposal Methods	Q5. Types of waste produced. Q6. Disposal method provided by type of waste.	Percent of businesses with disposal method	– Paper (100%) – Plastics (93%) – Soft plastics (74%) – Organics (94%) – Metal (83%) – Glass (86%) – Other materials (40% - 54%)
	Goal tracking on Sustainable Waste Management	Q7. Business waste reduction goals.	Percent indicating their business has waste reduction goals	– Reducing costs (54%) – Enhancing sustainability (77%) – Complying with regulations (68%) – Improving public image (46%) – No goals (10%)
	Impact Measurement	Q8 Assessment of impact of waste management procedures/goals.	Percent indicating that they monitor impact of waste management procedures	– Do not measure impact (61%) – Monitoring recycling rates (23%) – Researching new technologies to reduce waste (20%) – Regular audits (19%) – Tracking waste rates/ reduction (18%) – Using sustainability metrics (15%)
	Technologies	Q9. Technologies used to manage waste.	Percent reporting use of various technologies	– Waste tracking systems (8%) – Compaction technology (4%) – Recycling sorting systems (63%) – None (34%)

Intermediate Goal	Topic Area	Survey Question or Administrative Data Source	Indicators	Baseline (2024)
Gain understanding of the experience of businesses receiving waste management services	Waste Collection Services	Q13. Use of private collection service.	Percent using private collection services	– 78%
		Q12. Reliability of services.	Percent indicating reliable services	– 83%
		Q14. Businesses use of Hartland Landfill.	Percent using or not using Hartland	– Weekly (9%) – Monthly (8%) – Quarterly (8%) – Once per year or less (28%) – Never (43%)
		Q14. Satisfaction with Services provided at Hartland.	Percent satisfied	– 63%
	Challenges	Q15. Challenges following local SWM regulations.	Percent describing the challenges in complying with local waste management regulations	– High cost (18%) – Limited disposal options (32%) – Lack of clear guidelines (9%) – Insufficient staff training (7%) – No challenges (53%)
	Opportunities	Q16. Support the CRD could provide.	Percent indicating areas of support for businesses	– Providing clearer guidelines (32%) – Increasing availability of disposal options (60%) – Providing more training resources (22%)
Communication Practices	Feedback On Current Communication Practices	Q22. Satisfaction with communication from CRD.	% reporting very clear or clear and helpful	– 33%

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ERM 24-69

REPORT TO ENVIRONMENTAL SERVICES COMMITTEE
MEETING OF WEDNESDAY, NOVEMBER 20, 2024

SUBJECT **Solid Waste Management Plan – Three-Year Cycle**

ISSUE SUMMARY

To provide an overview of the Capital Regional District's (CRD) Solid Waste Management Plan (SWMP) three-year study cycle.

BACKGROUND

In the spring of 2023, Environmental Resource Management staff worked with the Solid Waste Advisory Committee to develop performance indicators and metrics to better enable monitoring of progress towards meeting the CRD's 2021 SWMP goals and targets. Gaps in available data and metrics were identified, leading to a proposed three-year cycle of studies designed to document and collect relevant metrics and allow for comparison throughout the life of the SWMP. The solid waste market research study, waste generator study and solid waste stream composition study were identified as key opportunities to gather data and monitor progress toward the SWMP goals and targets. Data from these three studies will be used in conjunction with regular solid waste operational data (e.g., Hartland tonnage, scale data, Infoline data, etc.) to inform policy and initiative design to address goals and targets outlined in the SWMP.

The first study completed under the new three-year cycle was the Solid Waste Market Research and Engagement Study, which was conducted in 2024. The study was designed to help determine the effectiveness of the CRD's waste reduction programs and to identify challenges, limitations, or gaps in relation to the public's knowledge and behaviours towards the CRD's solid waste programs and initiatives.

The second study to be completed is the waste generator study. This study is scheduled to take place in 2025 and will help the CRD gather data on where waste is generated and gain insights into any patterns of waste generation. The study will consider waste generated through residential, business, industry and/or community sources before it arrives at Hartland Landfill.

The third and final study to be completed is the solid waste stream composition study, scheduled for 2026. Waste composition studies provide valuable benchmark data and analysis assessing the composition of waste being landfilled at Hartland. In the past, the waste composition study was completed every five years; however, in consultation with the Solid Waste Advisory Committee, the CRD has committed to completing waste composition studies as part of the three-year cycle.

The budget for yearly studies was accounted for and approved during the five-year budget planning cycle that occurred in 2023. The addition of new and more frequent studies will provide more data and allow for more effective measuring and monitoring of progress towards achieving the SWMP targets and goals.

CONCLUSION

In 2023, gaps in available data and metrics were identified, which led to establishing a three-year cycle of studies: the solid waste market research study, waste generator study and solid waste stream composition study to be completed over the life of the Solid Waste Management Plan (SWMP). The intention is to provide valuable data and analysis for evaluating and monitoring progress of the Capital Regional District's programming toward meeting the SWMP goals and targets. Staff will share results of each study as they are completed and include highlights annually in the Solid Waste Management Plan Progress Report.

RECOMMENDATION

There is no recommendation. This report is for information only.

Submitted by:	Tom Watkins B. Sc., Acting Senior Manager, Environmental Resource Management
Concurrence:	Glenn Harris, Ph.D., R.P.Bio., Acting General Manager, Parks, Recreation & Environmental Services
Concurrence:	Ted Robbins, B. Sc., C. Tech., Chief Administrative Officer

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ERM 24-68

REPORT TO ENVIRONMENTAL SERVICES COMMITTEE
MEETING OF WEDNESDAY, NOVEMBER 20, 2024

SUBJECT **Hartland Landfill Tipping Fee and Regulation Bylaw No. 3881 Amendment and Adoption of Bylaw Nos. 4636 and 4646**

ISSUE SUMMARY

To present increases to the tipping fees for the disposal of controlled waste and asbestos at the Hartland Landfill that align with the January 2024 increases to the tipping fees for general refuse and clean renovation and demolition waste. Also presented for Board consideration are increases to the bylaw fines for improper disposal that align with increases to the fines for improperly deposited recyclable material, which were implemented in Phase 1 of the material diversion strategy. Lastly, an increase to the general refuse tipping fee is proposed to keep pace with inflation.

BACKGROUND

In alignment with the Solid Waste Management Plan, on May 10, 2023, the CRD Board endorsed new policies to come into effect in 2024 that would incentivize the diversion of various materials from the Hartland Landfill. The 2024 policy changes included:

- a ban on the disposal of wood and asphalt shingles as general refuse;
- a 36% increase to the disposal cost for general refuse and clean renovation and demolition waste (from $110/tonne to $150/tonne);
- reduced rates for divertible, source separated loads of clean wood at $80/tonne and for treated wood and asphalt shingles at $110/tonne and;
- an increase in fine rates for the improper disposal of recyclable and divertible materials to discourage the improper disposal of the newly banned materials.

A copy of the May 10, 2023 staff report is attached as Appendix A for information. The 2024 policy changes at Hartland Landfill did not include changes to the disposal fees for controlled waste and asbestos, nor to the fine rates for their improper disposal, and these rates should be increased in order to:

- align their rates and fines with those for general refuse;
- recover the higher costs of responsibly managing these materials; and
- signal to landfill users the inherent threat to human and environmental health that these materials pose.

Included in the 2024 Board approved five-year Environmental Resource Management budget was a $5 per tonne per year annual increase to the general refuse tipping fee rate, beginning in 2025 with an increase from $150/tonne to $155/tonne and this change is reflected in the bylaw. The general refuse tipping fee in the Cowichan Valley Regional District (CVRD) has increased from $192/tonne in 2023 to $204/tonne in 2024 and the newly proposed rate reduces the gap and helps discourage the illegal importation of waste to Hartland from the CVRD.

Increased fine rates for the improper disposal of controlled waste are proposed to align these rates with those for the improper disposal of recyclables. Additionally, a new fine rate of $1,000

per infraction is being requested for the improper disposal of asbestos to reflect the serious risk to staff safety that its improper disposal represents. Lastly, increases are proposed to the fines for failure to follow site regulations, which provides bylaw enforcement officers the option to issue a larger ticket for more egregious offences and for the deposit of recyclables that are managed by Extended Producer Responsibility programs. This approach aligns with other fines for improper recycling.

Accordingly, staff have prepared an amending bylaw, Bylaw No. 4636, to amend Bylaw No. 3881, "Hartland Landfill Tipping Fee and Regulation Bylaw No. 6, 2013" (Appendix B) and Bylaw No. 4646, to amend Schedule 19 of Bylaw No. 1857, "Capital Regional District Ticket Information Authorization Bylaw, 1990, Amendment Bylaw No. 80, 2024" (attached as Appendix C). Appendix D and Appendix E provide a 'redline' version of the proposed bylaw amendments.

While preparing the amending bylaw, staff discovered a clerical error and an outdated definition in Bylaw No. 3881; corrections to these items have been included in the redlined version of proposed Bylaw No. 4636.

ALTERNATIVES

Alternative 1
The Environmental Services Committee recommends to the Capital Regional District Board:
1. That Bylaw No. 4636, "Hartland Landfill Tipping Fee and Regulation Bylaw No. 6, 2013, Amendment Bylaw No. 6, 2024", be read a first, second and third time; and
2. That Bylaw No. 4636 be adopted.
3. That Bylaw No. 4646, "Capital Regional District Ticket Information Authorization Bylaw, 1990, Amendment Bylaw No. 80, 2024", be read a first, second and third time; and
4. That Bylaw No. 4646 be adopted.

Alternative 2
That this report be referred back to staff for additional information.

IMPLICATIONS

Financial Implications

The proposed bylaw amendments to the Hartland Landfill Tipping Fee and Regulation Bylaw will increase the disposal fees for sludge from $121 to $165/tonne, and from $157 to $214/tonne for asbestos and controlled waste, and increase the rate for general refuse and clean renovation and demolition waste from $150 to $155/tonne. Based on historical tonnages, it is anticipated that these changes will increase annual tipping fee revenues by an estimated $689,000.

CONCLUSION

In 2023, the Board endorsed new policies for Hartland Landfill that increased the tipping fee for general refuse and included fines for improper disposal of banned recyclable materials. These policies did not include changes to the tipping fee or fine rates for controlled waste, which are now needed in order to align with the changes already implemented. Staff will return to the Environmental Services Committee on a regular basis with an implementation update, and recommend any adjustments, as necessary.

RECOMMENDATION

The Environmental Services Committee recommends to the Capital Regional District Board:

1. That Bylaw No. 4636, "Hartland Landfill Tipping Fee and Regulation Bylaw No. 6, 2013, Amendment Bylaw No. 6, 2024", be read a first, second and third time; and
2. That Bylaw No. 4636 be adopted.
3. That Bylaw No. 4646, "Capital Regional District Ticket Information Authorization Bylaw, 1990, Amendment Bylaw No. 80, 2024", be read a first, second and third time; and
4. That Bylaw No. 4646 be adopted.

Submitted by:	Tom Watkins, B.Sc., Acting Senior Manager, Environmental Resource Management
Concurrence:	Glenn Harris, Ph.D., R.P.Bio., Acting General Manager, Parks, Recreation & Environmental Services
Concurrence:	Kristen Morley, J.D., General Manager, Corporate Services & Corporate Officer
Concurrence:	Ted Robbins, B. Sc., C. Tech., Chief Administrative Officer

ATTACHMENTS

Appendix A: Staff Report: Proposed Hartland Bylaw Amendments – Material Stream Diversion – Presented at CRD Board Meeting (May 10, 2023)
Appendix B: Bylaw No. 4636, "Hartland Landfill Tipping Fee and Regulation Bylaw No. 6, 2013, Amendment Bylaw No. 6, 2024"
Appendix C: Bylaw No. 4646, "Capital Regional District Ticket Information Authorization Bylaw, 1990, Amendment Bylaw No. 80, 2024"
Appendix D: Bylaw No. 3881, "Hartland Tipping Fee and Regulation Bylaw No. 6, 2024", Redlined Consolidation
Appendix E: Bylaw No. 1857, "Capital Regional District Ticket Information Authorization Bylaw, 1990", Redlined Schedule 19

Making a difference...together

ERM 23-18

REPORT TO ENVIRONMENTAL SERVICES COMMITTEE
MEETING OF WEDNESDAY, APRIL 19, 2023

SUBJECT **Proposed Hartland Bylaw Amendments – Material Stream Diversion**

ISSUE SUMMARY

To seek direction on the implementation of new material stream diversion strategies for Hartland Landfill, in alignment with the Solid Waste Management Plan (SWMP).

BACKGROUND

The SWMP, approved by the Capital Regional District (CRD) Board in May 2021, targets an annual disposal rate of 250 kg per capita by 2031, a reduction of more than one-third from current levels. Other goals include extending the landfill to 2100 and beyond, and engaging and informing citizens while ensuring solid waste services are financially sustainable in support of zero waste and a circular economy.

In response to this direction, the CRD has retained a technical advisor and issued a Request for Expressions of Interest (RFEOI) to understand the processing and marketing capacity for a range of divertible materials. The technical advisor reviewed results of the RFEOI, the CRD's 2022 Solid Waste Stream Composition Study and analyzed the CRD's current system compared to available data from neighbouring jurisdictions. Results of this analysis are included as Appendix A. Based on this work, staff recommend a series of policy changes and corresponding bylaw amendments summarized below.

ALTERNATIVES

Alternative 1

The Environmental Services Committee recommends to the Capital Regional District Board:

1. That the Hartland Landfill Tipping Fee and Regulation Bylaw No. 3881 be amended and come into effect January 1, 2024 to:
    a) Ban wood waste (clean, treated and salvageable), carpet and underlay and asphalt shingles from Hartland's active face, and classify these materials as mandatory recyclable;
    b) Modernize the tipping fee schedule to align with the proposed tipping fee schedule (Appendix B), including increasing the general refuse tipping fee to $150/tonne, and introduce a new 'double charge' category for loads of unsorted renovation and demolition materials that contain mandatory recyclables (including wood waste) to motivate source-separation of these materials;
    c) Introduce hauler incentive rates to promote multi-stream collection, incent voluntary self-reported waste collection data sharing, and minimize the financial impact of increases to the general refuse tipping fees;

2. That the Ticket Information Authorization Bylaw No. 1857 be amended and come into effect January 1, 2024 to:
   a) increase fine rates for various offences;
   b) introduce a graduated ticket structure with higher fines for more egregious infractions and/or repeated infractions from a designated source or waste hauler;
   c) allow for denial of service for chronic repeat offenders;

3. That service levels be adjusted to enhance enforcement capacity resources to implement the new waste diversion policies, to be reflected in the 2024 preliminary budget; and

4. That staff return with the amended bylaws for Board approval in the fall.

Alternative 2

The Environmental Services Committee recommends to the Capital Regional District Board:
That staff bring back alternative policy based on committee direction.

IMPLICATIONS

Environmental & Climate Implications

Implementation of the proposed recommendations has the potential to divert up to 40,500 tonnes of waste per year from Hartland's active face (equivalent to 22% of all waste received at Hartland in 2022), complementing other current and future CRD waste reduction and diversion programs and initiatives, in support of meeting the 2031 waste disposal target of 250 kg per capita. Solid waste contributed approximately 3.7% of the CRD's greenhouse gas emissions (2020 CRD Community Greenhouse Gas Emissions Inventory Report). Implementing the strategies of the SWMP to reuse, recycle or recover materials will encourage diversion from the landfill, reducing the landfill's contribution to greenhouse gas emissions.

Financial Implications

The Hartland general refuse tipping fee has remained between $107 and $110/tonne since 2011, significantly lower than neighbouring jurisdictions (Cowichan Valley Regional District - $192/tonne; Comox Valley Regional District - $145/tonne; and Regional District of Nanaimo - $145/tonne, as of April 2023).

Under the policy framework recommended by the CRD's technical advisor (Appendix A), the Hartland tipping fee schedule would be modernized to promote diversion of material from the landfill, and provide better alignment with neighbouring jurisdictions and market conditions. The full proposed tipping fee schedule is included as Appendix B. Key changes recommended by staff are summarized below.

Rate Category	Current Rate (per tonne)	Proposed Rate (per tonne)	Description
General Refuse	$110	$150	General refuse rate is increased to align with neighbouring jurisdictions, and fund increased processing costs for mandatory recyclable materials.

Rate Category	Current Rate (per tonne)	Proposed Rate (per tonne)	Description
2024* General Refuse Hauler Incentive Rate	N/A	$125	Private and municipal haulers are eligible for a reduced rate if they have programs in place to ensure that organics and recyclable materials aren't going into the general refuse stream and voluntarily self-report waste collection data. This time-limited rate will minimize the financial impact of the general refuse rate increase.
2025* General Refuse Hauler Incentive Rate	N/A	$135	Private and municipal haulers are eligible for a reduced incentive rate if they have programs in place to ensure that organics and recyclable materials aren't going into the general refuse stream and voluntarily self-report waste collection data. This time-limited rate will minimize the financial impact of the general refuse rate increase.
Mandatory Recyclables: treated wood, asphalt shingles, carpet and underlay	N/A	$110	These materials are currently accepted as general refuse at $110/tonne. Under the proposed fee structure, source-separated mandatory recyclable materials will be accepted at $110/tonne to incent source separation of these materials. When these materials arrive at Hartland under the mandatory recyclable category, they will be reused, recycled or recovered through contracts with the private sector.
Mandatory Recyclables: clean wood	N/A	$80	These materials are currently accepted as general refuse at $110/tonne. They include wood products that are untreated, unstained and unpainted, such as dimensional lumber, pallets, crating, wood fencing, wood shingles and wooden doors
Mandatory Recyclables: salvageable wood	N/A	$0	Salvageable wood will be processed off-site for reuse and accepted at the Hartland depot free of charge.
Clean Renovation and Demolition Waste	$110	$150	Renovation and demolition material is currently accepted at the general refuse rate of $110. Clean renovation and demolition, that does not include mandatory recyclable materials, will be accepted at the new general refuse rate of $150/tonne.
Unsorted Renovation and Demolition Waste (double charge)	$110	$300	Renovation and demolition material that includes mandatory recyclable materials (wood, asphalt shingles and carpet and backing) will be subject to a 'double charge' rate of $300/tonne. The rate will help offset the increased processing costs for mandatory recyclable materials and incent source separation of these materials in support of the Solid Waste Management Plan targets.

* Incentive rates beyond 2025 will be evaluated by the CRD Board and may be extended.

Potential financial impacts are challenging to predict prior to observing actual market response based on the new tipping fee schedule and will ultimately depend on the volume of waste received at Hartland. CRD staff have analyzed the potential financial impact of the proposed Hartland tipping fee schedule under a range of scenarios and in all cases the proposed fee schedule sufficiently addresses risk to quantity and total revenue while still ensuring the landfill remains financially viable.

Staff recommend monitoring the effect of policies on solid waste tonnage and revenue over time and returning to the committee on a quarterly basis for information and/or any recommended policy modifications, as needed, to align with the market conditions and ensure financial sustainability of the solid waste system. If the policies do not achieve the desired diversion, or if waste appears to be migrating out of the region, staff will return to the committee for consideration of flow control policies.

Service Delivery Implications

Appendix A also evaluates Ticket Information Authorization Bylaw No. 1857. Based on this analysis, staff recommend revisions to Schedule 19 of the bylaw. Proposed amendments for additional enforcement measures include:

- increased fine rates from $50-$200 to $100-$500 for various offences
- a graduated ticket structure with higher fines for more egregious infractions and/or repeated infractions from a designated source or waste hauler
- denial of service for chronic repeat offenders

Implementation of the new policies may require improvements and updates to scale house data collection and equipment, and additional staff will be required to support site operations and bylaw enforcement. Depending on how traffic flow at the site is modified to accommodate drop off of mandatory recyclables, residential quantities of all materials in this classification may need to be accepted at a flat rate, or no charge, at the Hartland depot. If the proposed policies are approved by the Board, the additional resource requirements will be identified through the 2024 budget process, and funded through tipping fee revenues. Staff will also issue a Request for Proposals for the processing of newly-banned materials.

As a consequence of the increased tipping fees for general refuse and mixed material streams, and fines for non-compliance under certain volume scenarios, additional revenue may be generated with the potential to support new and enhanced waste diversion and reduction programs, infrastructure and initiatives that align with the SWMP. These could include investments into recycling depots and infrastructure, enhancements to the rethink waste grant program, and support for increasing diversion from the industrial, commercial and institutional sector. Staff will monitor the effect of policies, and if additional revenues are generated, will recommend programming aligned with the SWMP in future budget years.

Results of the 2022 Solid Waste Stream Composition Study indicate that organic waste makes up the second-largest category of waste being received at Hartland Landfill (16.7%), second only to wood and wood products (18.9%). Addressing organic waste will be critical to meeting the SWMP target. While this report indirectly addresses organic waste through the proposed hauler incentives for multi-stream collection and enhanced enforcement capabilities, it does not directly address organic waste. Staff will return to committee in the future with proposed policies to address organic waste, in line with the SWMP.

In July 2022, the Board endorsed an increase to the tipping fee for international high-risk cruise ship waste to $500 per tonne, effective January 1, 2024. The fee increase for high-risk waste may incentivize the cruise ship industry to find alternative disposal methods, as well as enhance recycling and waste diversion efforts.

Social Implications

The CRD's technical advisor has indicated that modernization of Hartland's tipping fee schedule is necessary to incent diversion to achieve the targets within the SWMP and to fund the increased costs associated with processing source-separated mandatory recyclable materials. By bringing the new tipping fee schedule into effect January 1, 2024, Hartland customers will have time to prepare for the changes. A communications plan and education campaign will be initiated to educate Hartland customers of the new tipping fee schedule. As the new rates roll out, customers will first be provided with a warning before being issued a ticket or double charge.

To minimize the short-term impact of rate increases on the public, it is proposed that a hauler incentive reduced rate would be available, at a minimum, for the first two years. This rate would be eligible to private and municipal haulers that have programs in place to require multi-stream collection (e.g., curbside collection of organics and recyclables, in addition to general refuse) and voluntarily self-report waste collection data. The incentive program will be available for waste coming from the single-family, multi-family and industrial, commercial and industrial sectors, and will be designed to allow customers to obtain multi-stream collection from more than one hauler, and to recognize backyard composting as a form of multi-stream collection.

CONCLUSION

Capital Regional District staff are working to advance the goals and strategies of the Solid Waste Management Plan. Working with a technical advisor, staff have identified a series of proposed policy changes and corresponding bylaw amendments to incent diversion of materials from Hartland Landfill that could be otherwise recycled, reused or recovered. Recommended changes include modernizing the Hartland tipping fee schedule, classifying wood waste, carpet and asphalt shingles as mandatory recyclable materials and enhancing bylaw enforcement capacity and capability. If directed, staff will amend the Hartland Landfill Tipping Fee and Regulation Bylaw No. 3881. The policy changes are expected to divert up to 40,500 tonnes of waste per year from Hartland's active face.

RECOMMENDATION

The Environmental Services Committee recommends to the Capital Regional District Board:

1. That the Hartland Landfill Tipping Fee and Regulation Bylaw No. 3881 be amended and come into effect January 1, 2024 to:
    a) Ban wood waste (clean, treated and salvageable), carpet and underlay and asphalt shingles from Hartland's active face, and classify these materials as mandatory recyclable;
    b) Modernize the tipping fee schedule to align with the proposed tipping fee schedule (Appendix B), including increasing the general refuse tipping fee to $150/tonne, and introduce a new 'double charge' category for loads of unsorted renovation and demolition materials that contain mandatory recyclables (including wood waste) to motivate source-separation of these materials;
    c) Introduce hauler incentive rates to promote multi-stream collection, incent voluntary self-reported waste collection data sharing, and minimize the financial impact of increases to the general refuse tipping fees;

2. That the Ticket Information Authorization Bylaw No. 1857 be amended and come into effect January 1, 2024 to:
   a) increase fine rates for various offences;
   b) introduce a graduated ticket structure with higher fines for more egregious infractions and/or repeated infractions from a designated source or waste hauler;
   c) allow for denial of service for chronic repeat offenders;

3. That service levels be adjusted to enhance enforcement capacity resources to implement the new waste diversion policies, to be reflected in the 2024 preliminary budget; and

4. That staff return with the amended bylaws for Board approval in the fall.

Submitted by:	Russ Smith, Senior Manager, Environmental Resource Management
Concurrence:	Larisa Hutcheson, P. Eng., General Manager, Parks & Environmental Services
Concurrence:	Ted Robbins, B. Sc., C. Tech., Chief Administrative Officer

ATTACHMENTS

Appendix A: Waste Diversion Framework Memo – GHD (April 4, 2023)
Appendix B: Proposed Hartland Landfill Tipping Fee Schedule

APPENDIX B

CAPITAL REGIONAL DISTRICT
BYLAW NO. 4636

****

A BYLAW TO AMEND HARTLAND LANDFILL TIPPING FEE AND REGULATION BYLAW NO. 6, 2013 (BYLAW NO. 3881)

****

WHEREAS:

A. Under Bylaw No. 3881, "Hartland Landfill Tipping Fee and Regulation Bylaw No. 6, 2013", the Regional Board established fees and regulations for the operations of the Hartland Landfill;

B. The Board wishes to amend Bylaw No. 3881 to modernize the disposal cost for general refuse and clean renovation and demolition waste, and to apply the same percent increase to the disposal cost for controlled waste and asbestos as was applied to the general refuse and clean renovation and demolition waste rates in Phase 1 of the material stream diversion strategy; and

C. The Board wishes to amend Bylaw No. 3881 to make housekeeping edits to the definitions of "knotweed" and "manager" for clarity.

NOW THEREFORE, the Capital Regional District Board in open meeting assembled hereby enacts as follows:

1. Subject to section 2 of this bylaw, Bylaw No. 3881, "Hartland Landfill Tipping Fee and Regulation Bylaw No. 6, 2013", is hereby amended as follows:

   a) in section 1, by replacing the definition of "Knotweed" with the following definition:

      "**Knotweed**" means Japanese knotweed (*Follopia japonica*), Himalayan knotweed (*Persicaria wallichi*), giant knotweed (*Fallopia sachalinensis*), and bohemian knotweed (*Fallopian x bohemica*) plants including stems, seeds, and rhizome fragments.

   b) in section 1, by replacing the definition of "Manager" with the following definition:

      "**Manager**" means the General Manager of Parks, Recreation & Environmental Services of the Capital Regional District or his or her authorized agent.

   c) in Schedule "C", by deleting the following row from the table in section 1:

Asbestos Containing Material	As directed by CRD staff	$157		$20

   and replacing it with the following row:

Asbestos Containing Material	As directed by CRD staff	$214		$20

   d) in Schedule "C", by deleting the following rows from the table in section 1:

Clean Renovation and Demolition Waste (effective January 1, 2024)	Public Drop Off Area	$150	$10 bin fee	

Clean Renovation and Demolition Waste (effective January 1, 2024)	As directed by CRD staff	$150		$10
Refuse	Active Face	$150		$10
Refuse	Public Drop Off Area	$150	$10 bin fee	

and replacing them with the following rows:

Clean Renovation and Demolition Waste	Public Drop Off Area	$155	$10 bin fee	
Clean Renovation and Demolition Waste	As directed by CRD staff	$155		$10
Refuse	Active Face	$155		$10
Refuse	Public Drop Off Area	$155	$10 bin fee	

e) in Schedule "E", for the Controlled Wastes listed below, by deleting the "$157 per tonne" Disposal Fee and inserting a "$214 per tonne" Disposal Fee, as follows:

Controlled Waste	Disposal Fee
Animal Fecal Waste	$214 per tonne
Catch Basin Waste	$214 per tonne
Condemned or Spoiled Foods	$214 per tonne
Contaminated Soil	$214 per tonne
Fibre Optic Cable	$214 per tonne
Food Processing Wastes	$214 per tonne
Health Hazard Waste	$214 per tonne
Miscellaneous Controlled Waste	$214 per tonne
Pumpings from septage treatment facilities containing residual sludge	$214 per tonne
Pumpings from sewage treatment plants, pump stations and sewer lines	$214 per tonne
Screenings from sewage treatment plants, septage treatment facilities and pump stations	$214 per tonne
Slurries which may contain non-hazardous solids, soil, sand, gravel, fibres, fats, oils and grease or mineral oil and grease	$214 per tonne
Soot and Ash	$214 per tonne
Spent charcoal from water purification plants and odour filters	$214 per tonne
Surface Coating Waste	$214 per tonne
Vehicle Washing Facility Waste	$214 per tonne
Vermiculite Insulation	$214 per tonne

f) in Schedule "E", for the Controlled Wastes listed below, by deleting the "$121 per tonne" Disposal Fee and inserting a "$165 per tonne" Disposal Fee, as follows:

Controlled Waste	Disposal Fee
Waste Sludge from sewage treatment plants containing no more than 80% total moisture	$165 per tonne

2. The amendment provided in subsection 1(d) shall be made effective January 1, 2025.

3. This bylaw may be cited for all purposes as “Hartland Landfill Tipping Fee and Regulation Bylaw No. 6, 2013, Amendment Bylaw No. 6, 2024”.

READ A FIRST TIME THIS	th	day of	2024
READ A SECOND TIME THIS	th	day of	2024
READ A THIRD TIME THIS	th	day of	2024
ADOPTED THIS	th	day of	2024

CHAIR

CORPORATE OFFICER

APPENDIX C

CAPITAL REGIONAL DISTRICT
BYLAW NO. 4646

****

A BYLAW TO AMEND BYLAW NO. 1857, CAPITAL REGIONAL DISTRICT TICKET INFORMATION AUTHORIZATION BYLAW, 1990

****

WHEREAS:

A. Under Bylaw No. 1857, "Capital Regional District Ticket Information Authorization Bylaw, 1990," the Regional Board established fine rates for solid waste offences at Hartland Landfill; and

B. The Board wishes to amend Bylaw No. 1857, Schedule 19, to modernize the fine rates and introduce a single fine rate of $500 per infraction for offence numbers 2 (fail to follow site regulations), 4 (deposit of prohibited waste), 5 (deposit of hazardous waste), 7 (deposit of controlled waste), and 12 (deposit of EPR material), and a fine of $1,000 per infraction for offence number 6 (improper disposal of asbestos);

NOW THEREFORE, the Capital Regional District Board in open meeting assembled hereby enacts as follows:

1. Bylaw No. 1857, "Capital Regional District Ticket Information Authorization Bylaw, 1990", is hereby amended by substituting Schedule 19 in its entirety with the Schedule 19 attached to this bylaw.

2. This bylaw may be cited for all purposes as "Capital Regional District Ticket Information Authorization Bylaw, 1990, Amendment Bylaw No. 80, 2024".

READ A FIRST TIME THIS	th	day of	2024
READ A SECOND TIME THIS	th	day of	2024
READ A THIRD TIME THIS	th	day of	2024
ADOPTED THIS	th	day of	2024

CHAIR

CORPORATE OFFICER

SCHEDULE 19 TO BYLAW NO. 1857

HARTLAND LANDFILL TIPPING FEE AND REGULATION BYLAW NO. 6, 2013

	WORDS OR EXPRESSIONS DESIGNATING OFFENCE	SECTION	FINE	EARLY PAYMENT*
1.	Disobey Site Regulations	2.1	$100.00	
2.	Fail to follow Site Regulations	2.2	$500.00	$375.00
3.	Non-district waste	2.3	$500.00	$375.00
4.	Deposit Prohibited waste	2.5	$500.00	$375.00
5.	Deposit Hazardous waste	2.8	$500.00	$375.00
6.	Improper disposal asbestos	2.11	$1,000.00	$750.00
7.	Deposit controlled waste	2.12	$500.00	$375.00
8.	Deposit recyclable material	2.14	$500.00	$375.00
9.	Improper deposit mandatory recyclable	2.15	$200.00	$150.00
10.	Improper deposit voluntary recyclable	2.16	$200.00	$150.00
11.	Improper deposit weeds	2.18	$50.00	
12.	Deposit EPR material	2.19	$500.00	$375.00
13.	Improper deposit EPR material	2.20	$200.00	$150.00
14.	Deposit HHW by commercial hauler	2.21	$200.00	
15.	Deposit HHW	2.22	$100.00	
16.	Improper deposit of HHW	2.23	$50.00	
17.	Deposit Contaminated Demo Waste	2.25	$300.00	$225.00
18.	Improper Deposit Sorted Demo Waste	2.26	$200.00	$150.00
19.	Improper deposit kitchen scraps	2.27	$200.00	
20.	Fail to source separate solid waste	2.28	$500.00	$375.00
21.	Fail to pay fee	3.1	$300.00	
22.	Deposit while charge unpaid	3.2 (b)	$100.00	
23.	Uncovered/unsecured load	Sch. B, Reg. 2.1	$100.00	
24.	Load not ready for disposal	Sch. B, Reg. 2.3	$100.00	
25.	Drive off designated roads	Sch. B, Reg. 3.1	$100.00	
26.	Fail to obey signs	Sch. B, Reg. 3.2	$100.00	
27.	Fail to follow directions	Sch. B, Reg. 3.3	$100.00	
28.	Scavenging	Sch. B, Reg. 3.5	$100.00	
29.	Loitering on site	Sch. B, Reg. 3.6	$100.00	
30.	Vehicle washing	Sch. B, Reg. 3.7	$100.00	
31.	Disorderly conduct	Sch. B, Reg. 3.8	$100.00	
32.	Overweight vehicle	Sch. B, Reg. 3.9	$100.00	
33.	Children at site	Sch. B, Reg. 4.2	$50.00	
34.	Pets at site	Sch. B, Reg. 4.3	$50.00	
35.	Smoking at disposal site	Sch. B, Reg. 4.4	$100.00	
36.	Use electronic device while driving	Sch. B, Reg. 4.7	$100.00	
37.	No protective equipment	Sch. B, Reg. 4.8	$50.00	
38.	Unauthorized videotaping or photography on site	Sch. B. Reg 3.12	$100.00	

*Early Payment: Fine if Paid on or Before the 30th day from the date on which the ticket is served.

APPENDIX D

Making a difference...together

BYLAW NO. 3881

HARTLAND LANDFILL TIPPING FEE AND REGULATION BYLAW NO. 6, 2013

Consolidated for Public Convenience

(This bylaw is for reference purposes only)

ORIGINALLY ADOPTED APRIL 10, 2013

(Consolidated in November 2024 with Amending Bylaws 3917, 4100, 4420, 4497, 4610, and 4636. Please note that Bylaw 4636 contains certain amendments that take effect January 1, 2025.)

For reference to original bylaws or further details, please contact the Capital Regional District,
Legislative Services Department, 625 Fisgard St., PO Box 1000, Victoria BC V8W 2S6
T: (250) 360-3127, F: (250) 360-3130, Email: legserv@crd.bc.ca, Web: www.crd.bc.ca

Amending Bylaws Consolidated

Bylaw No.	Adopted	Purpose
4636	TBD	To modernize the disposal cost for general refuse and clean renovation and demolition waste, and to apply the same percent increase to the disposal cost for controlled waste and asbestos as was applied to the general refuse and clean renovation and demolition waste rates in Phase 1 of the material stream diversion strategy.
4610	June 12, 2024	To amend the bans on carpet and underlay and salvaged wood and to amend the tipping fee rate on refuse, weeds (not source-separated), and commercial load of uncontaminated demolition waste.
4497	December 13, 2023	To amend the tipping fee rates; to update the definitions; to enact bans on asphalt roofing shingles, carpet and underlay, and wood waste; to make bylaw housekeeping edits; and, to update bylaw enforcement language.
4420	June 9, 2021	To address the Kitchen Scraps tipping fee by replacing Schedule C.
4100	May 8, 2016	To address tipping fees for asbestos containing material, kitchen scraps and to make bylaw housekeeping changes.
3917	Jan. 14, 2015	To enact a kitchen scraps ban, the stewardship program for packaging and printed paper (PPP) and to amend the tipping fee rate.

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CAPITAL REGIONAL DISTRICT

BYLAW NO. 3881

****

A BYLAW FOR THE PURPOSE OF ESTABLISHING A TIPPING FEE AND REGULATIONS FOR SOLID WASTE DISPOSAL AT HARTLAND LANDFILL

****

WHEREAS:

A. By Supplementary Letters Patent, dated 04 October 1973, the Capital Regional District was granted the function of Refuse Disposal under Division X of its Letters Patent;

B. The Capital Regional District has by bylaw, converted the function of Solid Waste Disposal to a local service for all of the Regional District;

C. The Capital Regional District is empowered to establish a scale of fees payable for depositing Solid Waste and Recyclable Materials at a Disposal Site;

D. The Regional Board of the Capital Regional District deems it advisable to enact regulations pertaining to Solid Waste and Recyclable Materials and to establish fees for depositing Solid Waste and Recyclable Materials.

NOW THEREFORE the Regional Board of the Capital Regional District in open meeting assembled enacts as follows:

SECTION 1 – DEFINITIONS

Note: Defined terms are capitalized in this bylaw.

In this Bylaw, unless the context otherwise requires:

"**Active Face**" means that area of the Disposal Site where active landfilling of Solid Waste takes place.

"**Aggregate**" means inert granular fill material.

"**Animal Fecal Waste**" means animal feces collected by a commercial business or generated at a site where animals are kept for commercial purposes, including, but not limited to, boarding kennels, animal shelters, stables, and similar operations.

"Asbestos Containing Material" means waste containing any amount of asbestos including waste asbestos as defined in the bylaw.

(Bylaw 4100)

"**Asbestos Cement**" means shingles, tiles, siding, board or pipe containing asbestos material tightly bound within a solid matrix not easily crumbled by hand but which is easily crumbled and friable by equipment during landfill Disposal.

"**Asphalt**" means recyclable asphaltic concrete originating from roadways, driveways, parking areas and other paved surfaces.

"Asphalt Roofing Shingles" means roofing shingles composed of a felt mat saturated with asphalt, with small rock granules added, but does not include tar and gravel roofing.

(Bylaw 4497)

"**Biomedical Waste**" means waste as defined in the Hazardous Waste Regulation as Biomedical Waste.

"**Bulky Waste**" means individual articles of Refuse with a volume greater than one-and-a-half (1.5) cubic metres or greater than two and a half (2.5) metres in length.

"CRD" means Capital Regional District.

"Carpet and underlay" means flooring material made of woven wool, silk, cotton or synthetic fibers and foam padding underlayment where tack stripping material has been removed.

(Bylaw 4497)

"**Catch Basin Waste**" means the contents of catch basins or similar devices that detain and pre-treat stormwater to allow solids to settle and oily materials to float to the surface and be retained in the device while treated stormwater is discharged.

"Clean Renovation and Demolition Waste" means material that results from the construction, renovation or demolition of all or part of a building or structure that does not contain Surface Coating Waste, Asbestos Containing Material, Hazardous Waste, Prohibited Waste, Mandatory Recyclable Materials, or an Extended Producer Responsibility product.

(Bylaw 4497)

"**Clean Soil**" means soil, sediment or fill material which contains the substances specified in Schedule D, Column IV of the Contaminated Sites Regulation but in quantities less than those specified.

"Clean Wood Waste" means wood products such as dimensional lumber, pallets, crating, and salvaged wood waste:

1) that is untreated, unstained, unpainted, and
2) that does not include any antisapstain, coating, glues, or resins.

(Bylaw 4497)

"Commercial Hauler" means a person whose business collects and receives for a fee Refuse, Voluntary Recyclable Material, Mandatory Recyclable Material, Extended Producer Responsibility Products, or Weeds for Disposal, or a person whose business generates Voluntary Recyclable Material, Mandatory Recyclable Material, Extended Producer Responsibility Products, and who delivers those materials for Disposal at the Disposal Site.

(Bylaw 4497)

"**Commercial Load**" means Uncontaminated Demolition Waste to be Disposed of at the Disposal Site brought into the Disposal Site in a Vehicle which with the Uncontaminated Demolition Waste has a gross vehicle weight greater than 5,500 kg.

"**Concrete**" means a hardened mixture of cement with sand and gravel.

"**Condemned or Spoiled Foods**" means food confiscated or quarantined, or designated as international high risk waste, by the Canadian Food Inspection Agency or the Canadian Border Service Agency and spoiled food from a commercial operation or spoiled food greater than 50 kilograms from a domestic residence.

"Contaminated Demolition Waste" means material that results from the demolition of all or part of a building that contains Hazardous Waste, Prohibited Waste, Mandatory Recyclable Materials or an Extended Producer Responsibility Product.

"**Contaminated Gypsum Board or Wallboard**" means Gypsum Board or Wallboard that is contaminated by oil, tar, fungus, mould, has been burned, or had other materials affixed to it.

"**Contaminated Sites Regulation**" means the Contaminated Sites Regulation, B.C. Regulation 395/96,

enacted under the *Environmental Management Act.*

"**Contaminated Soil**" means soil or sediment or fill material containing substances in quantities or concentrations equal to or greater than those specified in Schedule E, Column IV of the Contaminated Sites Regulation but which is not a Hazardous Waste under the Hazardous Waste Regulation.

"Contaminated Wood Waste" means wood products such as wood contaminated with asphalt shingles, wood painted with lead based paint, creosote wood products, pressure treated wood, or laminate flooring that is not Hazardous Waste due to the proportion of surface coatings or preservatives.

"**Controlled Waste**" means a material, substance or object listed in Schedule "E" which may be Disposed of if special handling and Disposal techniques are used to avoid creating health hazards, nuisances or environmental pollution excluding Hazardous Waste under the Hazardous Waste Regulation.

"**Corrugated Cardboard**" means recyclable paper that consists of a fluted corrugated sheet and one or more flat linerboards including pizza boxes free of food residue, but excluding materials which are impregnated with blood, grease, oil, chemicals, food residue, wax; or have polyethylene, polystyrene, foil or other non-paper liners; or are contaminated with a material which will render the Corrugated Cardboard Unmarketable.

"**Dead Animal**" means the carcass or part of the carcass of an animal excluding Hazardous Waste under the Hazardous Waste Regulation and Specified Risk Material.

"Designated Location" means the location at the Disposal Site designated by the Manager and identified as the location for Disposal of specific types of Solid Waste.

"**Dispose**"; "**Disposal**" means leaving Solid Waste at the Disposal Site for the purpose of landfilling, composting, or recycling.

"**Disposal Site**" means the Hartland Landfill site, more particularly described in Schedule "A".

"**Environmental Management Act**" means the *Environmental Management Act* SBC 2003 c.53.

"**Extended Producer Responsibility Product**" means any material defined as a product in a "product category" listed in the Recycling Regulation for which a "product plan" as defined in the regulation has been "approved" and is operating.

"**Fibre Optic Cable**" means a cable consisting of a bundle of glass or plastic threadlike fibres used for the transmission of information by light impulses wrapped in layers of treated paper and plastic or metal cladding.

"Food Processing Waste" means waste, residues, byproducts or waste treatment residuals from commercial food manufacturing or packaging operations.

"Glass" means clear or coloured food and beverage containers made of glass but does not include plate glass, window glass, laminated glass, or safety glass.

"**Gypsum Board or Wallboard**" means a panel used for interior walls and ceilings made up of a liner typically made of paper with a core of gypsum plaster and additives.

"Hauler Incentive Rate" means a reduced tipping rate available for private and municipal haulers who conform to the requirements of the hauler incentive program. *(Bylaw 4497)*

"**Hazardous Waste**" means any chemical compound, mixture, substance, or article defined as a Hazardous Waste in the Hazardous Waste Regulation.

"**Hazardous Waste Regulation**" means Hazardous Waste Regulation, BC Reg. 63/88 enacted under the *Environmental Management Act*.

"**Health Hazard Waste**" means a gaseous, liquid or solid material, substance or object which, because of its inherent nature and quantity, may be a health hazard and includes, but is not limited to: infectious wastes that originate from foreign countries, including, without limiting the generality of the foregoing, waste confiscated at customs stations or received from ships or planes and which is not a Biomedical Waste.

"Household Hazardous Waste" means a class of Hazardous Waste that results from any of the following involving anything in a "product category" as defined in the Recycling Regulation:

(a) a domestic activity at a residence;
(b) personal use; or
(c) a person's use in relation to his or her own residence.

"**Ignitable**" means substances liable to spontaneous combustion or substances that on contact with water emit flammable gases having the properties of:

(a) flammable gas;
(b) flammable liquid; or
(c) flammable solids,

and as defined in the Hazardous Waste Regulation.

"Industrial Commercial Institutional" includes any industrial or commercial operations of any size including manufacturing, processing and packing and small businesses with one or more employees such as retail stores, offices, strip malls, vacation facilities, hotels, motels and resorts and institutional operations such as schools, student residences, correctional facilities, churches, community buildings, hospitals, licensed care facilities and hospices, but does not include residential premises.

(Bylaw 3917)

"International High Risk Cruise Ship Waste" means any item, material, or load originating from a Cruise Ship that is identified as High Risk Material by Canadian Border Services Agency and/or the Canadian Food Inspection Agency.

(Bylaw 4497)

"International Waste" means any item, material, or load that is defined as International Waste under the International Waste Directive or as identified by the Canadian Food Inspection Agency and/or the Canadian Border Services Agency.

(Bylaw 4497)

"**Invasive Species Plants**" means plants set out in the Schedule to the Spheres of Concurrent Jurisdiction – Environment and Wildlife Regulation, B.C. Reg. 144/2004.

"Kitchen Scraps" means compostable waste generated by residential, business, institutional and commercial sources such as fruits, vegetables, meat, meat by-products, dairy products, baked goods, cereal, grains, pasta, bones, egg shells, coffee grounds and filters, tea bags, nuts and shells, houseplants and cut and dried flowers, and soiled paper products such as paper towels, tissues, food packaging, plates and cups but does not include Controlled Waste. *(Bylaw 3917)*

"Kitchen Scraps Transfer Station" means a facility at Hartland landfill designated for receipt and the transfer of **Kitchen Scraps** to another location. *(Bylaw 3917)*

~~**"Knotweed"** means Japanese knotweed (follopia japonica), himalayan knotweed (persicaria wallichi), giant knotweed (fallopian sachalinensis), bohemian knotweed (fallopian x bohemica) plants including stems, seeds and rhizome fragments.~~

"**Knotweed**" means Japanese knotweed (*Follopia japonica*), Himalayan knotweed (*Persicaria wallichi*), giant knotweed (*Fallopia sachalinensis*), and bohemian knotweed (*Fallopian x bohemica*) plants including stems, seeds, and rhizome fragments.

(Bylaw 4636)

"**Lead Acid Battery**" means an electro-chemical cell contained in a plastic case consisting of lead and lead oxide plates and containing a mixture of acids which is used to supply an electric power source.

"**Load**" means Solid Waste which arrives at the Disposal Site in a Vehicle.

~~"**Manager**" means the General Manager of the Environmental Sustainability department of the Capital Regional District or his or her authorized agent.~~

"**Manager**" means the General Manager of Parks, Recreation & Environmental Services of the Capital Regional District or his or her authorized agent.

(Bylaw 4636)

"Mandatory Recyclable Material" means a Recyclable Material listed in Schedule "F".

"**Marketable**" means Recyclable Material which can be disposed of through an existing Capital Regional District program or a commercial market for recycling.

"Miscellaneous Controlled Waste" means a material, substance or object that the Manager considers to be an environmental or health and safety hazard and should be Disposed of as Controlled Waste but excludes Hazardous Waste under the Hazardous Waste Regulation.

"**Mixed Paper**" includes, but is not limited to, newspaper and inserts; office paper, including white and coloured ledger paper, computer paper, photocopy paper, writing pads, business forms, phone message notes, file folders, reports, envelopes, non-thermal fax paper, no carbon required (NCR) paper, calculator tape, 'post-it' type notes, business cards, paper index cards; boxboard, including paper egg cartons, laundry and cereal boxes; junk mail; gift wrapping and packing paper; magazines; catalogues; directories**;** calendars; postcards; shredded paper; cardboard storage boxes; cardboard storage; cardboard moving boxes; paper gift boxes; paper bags; paper lunch bags; paper pinata; paper gift bags; paper part hat; paper party décor; but excluding paperback and hardcover books; waxed paper; carbon paper; and other paper which are impregnated with blood, grease, oil, chemicals, food residue or have polyethylene, polystyrene, foil or other non-paper liners or attachments or are contaminated with a material which will render the paper fibres Unmarketable. *(Bylaw 4497)*

"**Non-EPR**" means a material that is not in the specific form or category set out in the Extended Producer Responsibility Product list in Schedule "G".

(Bylaw 3917)

"Non-EPR Rigid Plastics" means rigid plastic items, such as children's toys, lawn chairs, and car seats that are not an Extended Producer Responsibility Product.

(Bylaw 4497)

"**Noxious Weeds**" means weeds designated within the Provincial and Regional Noxious Weeds Lists of the Weed Control Regulation.

"Out-of-Region Waste" means municipal solid waste that is originating from outside the boundaries of the Capital Regional District but is not International Waste.

(Bylaw 4497)

"**PCB**" means any monochlorinated, dichlorinated or polychlorinated biphenyl or any mixture that contains one or more of these.

"Printed Paper and Packaging" means the materials listed in Schedule "G" of this Bylaw under the heading **Printed Paper and Packaging originating from residential premises**.

(Bylaw 3917)

"**Prohibited Waste**" means a gaseous, liquid, or solid material, substance or object as listed in Schedule "D".

"**Propane Tank**" means a refillable or non-refillable metal container rated at a capacity of less than 46 kg (100 lbs.) which is used to contain flammable hydrocarbon gases used as fuel.

"**Public Drop Off Area**" means that area of the Disposal Site containing Designated Locations for the Disposal of Small Loads of Refuse, Voluntary Recyclable Material, Mandatory Recyclable Material, Extended Producer Responsibility Products, Weeds, or Household Hazardous Waste.

"Pumpings" means liquid and semi-solid materials collected by a vactor truck or pump and transported by vactor truck, tanker truck or other container to the Disposal Site.

"**Radioactive Waste**" means waste containing a prescribed substance as defined in the *Atomic Energy Control Act* (Canada) in sufficient quantity or concentration to require a licence for possession or use under that Act and regulations made under that Act.

"**Reactive**" means a gaseous, liquid or solid material, substance or object which is:

(a) explosive, oxidizing or so unstable that it readily undergoes violent change in the presence of air or water;
(b) generates toxic gases, vapours, or fumes by itself or when mixed with water; or
(c) polymerized in whole or in part by chemical action and causes damage by generating heat or increasing in volume,

and as defined in the Hazardous Waste Regulation.

"**Recyclable Material**" means Solid Waste that has been sorted by material, substance or object and that satisfies at least one of the following criteria:

(a) is organic material from residential, commercial, or institutional sources and is capable of being composted, at a site;
(b) is Marketable;
(c) is being used in the manufacture of a product that has an established market or is being processed as an intermediate stage of an existing manufacturing process; or
(d) has been identified as a Recyclable Material in the solid waste management plan, and includes Mandatory Recyclable Material and Voluntary Recyclable Material.

"**Recycling Regulation**" means the Recycling Waste Regulation BC 449/2004 enacted under the *Environmental Management Act*.

"**Refuse**" means discarded or abandoned materials, substances or objects but does not include Controlled Waste, Prohibited Waste, Kitchen Scraps, Hazardous Waste, Mandatory Recyclable Materials and Extended Producer Responsibility Products**.**

(Bylaw 3917)

"**Regional Board**" means the Board of the Capital Regional District.

"**Residential Premises**" includes houses, apartments, condominiums, townhomes, and other premises in which persons reside but does not include institutional or commercial accommodations.

(Bylaw 3917)

"**Rubble**" means gravel, brick, Concrete block, refractory material, road asphalt or rock, or a combination

of any or all of these.

(Bylaw 3917)

"Salvaged Wood Waste" means Clean Wood Waste:

1) that is dimensional lumber greater than 4 feet in length; and
2) that may or may not contain nails.

(Bylaw 4497)

"**Scrap Metal**" means ferrous and non-ferrous metallic materials, including, but not limited to, sheet metal, siding, roofing, rebar, flashings, pipes, window frames, doors, furnaces, duct work, wire, cable, bathtubs, fencing, bicycle frames, automotive body parts, machinery, garbage cans, metal furniture, tire rims.

"**Screenings**" means the material and debris captured by screens used in the treatment or processing of sewage or septage.

"**Sharps**" means needles and syringes, from domestic sources.

"**Site Regulations**" means regulations set out in Schedule "B" that regulate the conduct of a person using the Disposal Site.

"Small Appliances" means small electronic or electrical appliances as defined in the Recycling Regulation.

"**Small Load**" means Solid Waste to be Disposed of at the Disposal Site brought onto the Disposal Site in a Vehicle which, with the Solid Waste, has a gross vehicle weight of no more than 5,500 kgs.

"**Solid Waste**" means Refuse, Voluntary Recyclable Materials, Mandatory Recyclable Materials, Extended Producer Responsibility Products, Weeds, Kitchen Scraps, Hazardous Waste as permitted in this bylaw and Controlled Waste, but excludes Prohibited Waste. *(Bylaw 3917)*

"**Soot and Ash**" means black carbonaceous residue of wood, coal, oil and other fossil fuels originating in chimney linings, boilers, furnaces and other burners, residuals from burning fossil fuels, and includes material collected from duct cleaning and chimney cleaning.

"**Source-separated**" means materials, substances or objects that are separated by means of a barrier or containers into separate distinguishable accumulations of the same kind of materials, substances, or objects.

"Specified Risk Material" means any waste containing the Specified Risk Material as defined in the federal Fertilizers Regulations (C.R.C., c. 666), as amended from time to time, including material from the skull, brain, trigeminal ganglia, eyes, tonsils, spinal cord and dorsal root ganglia of cattle aged 30 months or older, or material from the distal ileum of cattle of all ages.

"**Stumps and Branches**" means wood material, substances or objects which have not been processed or manufactured and includes stumps, tree trunks and branches greater than 75 mm (3 in.) in diameter.

"Surface Coating Waste" means stucco, plaster, brick, or other unconsolidated or similar material coated with lead based paint that may present a respiratory hazard due to the presence of lead particulate and also includes paint chips, hull coatings and spent sandblast media generated from scraping, power washing or sandblasting from, but not limited to, ships, boats, cars, buildings, bridges and storage tanks. *(Bylaw 4100)*

"**Tires**" means the outer pneumatic rubber covering of wheels of passenger vehicles, light service trucks and motorcycles with an inner diameter of less than 42 centimetres.

"Treated Wood and Wood Products" means engineered wood products or pressure treated, stained, or painted wood and wooden furniture that may or may not contain nails or other metal fasteners. *(Bylaw 4497)*

"**Treasurer**" means the Director of Finance of the Capital Regional District or her or his authorized agent.

"Uncontaminated Demolition Waste" means material that results from the demolition of all or part of a building or a structure that does not contain Surface Coating Waste, Hazardous Waste, Prohibited Waste, Mandatory Recyclable Materials, or an Extended Producer Responsibility Product. *(Bylaw 4497)*

"**Unmarketable**" means Recyclable Materials which cannot be Disposed of through an existing Capital Regional District recycling program or a commercial market due to contamination.

"**Used Oil Filter**" means a spent cylindrical metal container housing a filter element which is used on a motor vehicle to remove impurities from its engine lubricating oil.

"**Vehicle**" means a Vehicle, as defined in the *Motor Vehicle Act,* R.S.B.C. 1996, c.318.

"Vehicle Washing Facility Waste" means Pumpings from sumps which collect effluent from vehicle washing facilities, but not from facilities used for maintenance or lubrication or automobile components or where solvents or sand blasting are employed for removal of paint, grease or oil.

"Vermiculite Insulation" means a mineral which expands greatly when heated and creates pockets of air that was used as an insulation material. *(Bylaw 4100)*

"**Visitor**" means a person who arrives at the Disposal Site for purposes other than to Dispose of Solid Waste.

"Voluntary Recyclable Material" means a Recyclable Material Listed in Schedule "F".

"**Waste Asbestos**" means waste containing friable asbestos fibres or asbestos dust and as defined in the Hazardous Waste Regulation and includes Asbestos Cement.

"Waste Sludge" means the residual material resulting from chemical treatment, coagulation, flocculation, sedimentation, floatation or biological treatment of wastewater.

"Weed Control Regulation" means the *Weed Control Regulation* BC Reg 66/85 under the *Weed Control Act*.

"**Weeds**" means Invasive Species Plants and Noxious Weeds as defined in this bylaw and other plants with similar properties but excludes Knotweed.
"White Goods" means ~~a~~ppliances such as refrigerators, stoves, freezers, metal dishwashers, water coolers and air conditioners.

"**Yard and Garden Material**" means organic materials, substances or objects including, but not necessarily limited to, grass, lawn and hedge clippings, grass sod, flowers, leaves, vegetable stalks, shrubs, and shrub and tree branches less than 75 mm (3 inches) in diameter, but does not include:

(a) Invasive Species Plants
(b) Noxious Weeds
(c) plants or growing media that may have been identified by the Canadian Food Inspection Agency from time to time as infectious or potentially infectious and of which notice has been sent to the Capital Regional District or publicized by the Canadian Food Inspection Agency; or
(d) plant or tree material in municipal street sweepings.

SECTION 2 - CONDITIONS

2.1 No person shall Dispose of Solid Waste at the Disposal Site except in accordance with this Bylaw and the Site Regulations.

2.2 All persons attending the Disposal Site shall act in accordance with this Bylaw and Site Regulations.

2.3 No person shall Dispose of Solid Waste at the Disposal Site which originated outside the Capital Regional District.

2.4 Despite section 2.3, a person may Dispose of Solid Waste at the Disposal Site which originates outside the Capital Regional District if it is Waste Asbestos or Contaminated Gypsum Board or Wallboard.

2.5 Subject to 2.6 and 2.7, no person shall dispose of Prohibited Waste at the Disposal Site.

2.6 Despite section 2.5 and 2.8, a person may dispose of Asbestos Containing Material in accordance with Section 2.11, and Contaminated Gypsum Board or Wallboard, liquids, Sharps, or Vermiculite Insulation as Controlled Waste in accordance with section 2.12.

(Bylaw 4100)

2.7 Despite section 2.5, a person may dispose of light ballasts that may contain PCB as an Extended Producer Responsibility Product in accordance with section 2.20.

2.8 Subject to sections 2.9, 2.10, and 2.11, no person shall dispose of a Hazardous Waste at the Disposal Site.

2.9 Despite section 2.8, a person may Dispose of Household Hazardous Waste at a Designated Location in the Public Drop Off Area if it is:

(a) a Small Load; and
(b) Source-separated.

2.10 Despite section 2.8, a person may Dispose of an Extended Producer Responsibility Product listed in Schedule “G” that is a Hazardous Waste at a Designated Location in the Public Drop Off Area if it is:

(a) a Small Load; and
(b) Source-separated.

2.11 Despite section 2.8, a person may Dispose of Asbestos Containing Material at a Designated Location provided that:

(a) The disposal of Waste Asbestos is manifested as required by the British Columbia Ministry of Environment and Transport Canada;
(b) the Disposal is in accordance with the Occupational Health and Safety Regulation BC Reg 296/97 enacted pursuant to the Workers Compensation Act;
(c) the Disposal of Waste Asbestos is in accordance with the Hazardous Waste Regulation.
(d) the Disposal of Waste Asbestos is in accordance with the Transportation of Dangerous Goods Regulation.
(e) documentation has been submitted upon request of the Manager to confirm the presence of Asbestos Containing Material in the load.
(f) an appointment for Disposal is made with Capital Regional District staff a minimum of twenty-four (24) hours prior to Disposal, regular appointment hours for Asbestos Containing Material are Monday to Friday 9 a.m. to 2:30 p.m. excluding statutory holidays.

(Bylaw 4100)

2.12 No person shall Dispose of a Controlled Waste at the Disposal Site other than at a Designated Location and provided that:

(a) the person who is to Dispose of the Controlled Waste has made an application to the Manager for permission:
  (i) on a Controlled Waste permit application form provided by the Manager; and
  (ii) the application is received a minimum of 30 days prior to the requested Disposal date
(b) the Manager has issued a Controlled Waste permit for the waste including any terms and conditions of Disposal;
(c) the Controlled Waste has been inspected and accepted by designated Capital Regional District staff prior to being Disposed of;
(d) the Controlled Waste is one type and from no more than one source unless the Manager gives written permission otherwise in the Controlled Waste permit;
(e) an appointment for Disposal is made with Capital Regional District staff a minimum of twenty-four (24) hours prior to Disposal of Controlled Waste, regular controlled waste appointment hours are Monday to Friday 9 a.m. to 2:30 p.m. excluding statutory holidays;
(f) the person who is to Dispose of the Controlled Waste has submitted a Declaration By Waste Carrier form provided by the Manager prior to Disposal;
(g) if the terms and conditions of the Controlled Waste permit are not met, or the Declaration By Waste Carrier form is not complete, Capital Regional District staff may refuse to allow Disposal;
(h) the Controlled Waste is not Marketable;
(i) the Disposal is conducted so as to minimize health and safety risks associated with the Disposal of the Controlled Waste; and
(j) the amount of Controlled Waste does not exceed the operational capacity of the Disposal Site including, without limitation, the Disposal is consistent with the provisions of the Solid Waste Management Plan or Operating Plan as amended from time to time.

2.13 Despite subsection 2.12(a)(ii) and 2.12(e), in cases of an emergency or hardship the Manager may permit the Disposal of Controlled Waste before the 30 day application period expires and without a minimum of twenty-four (24) hours' notice and outside regular appointment hours.

2.14 No person shall dispose of Mandatory Recyclable Material at the Active Face.

2.15 No person shall Dispose of Mandatory Recyclable Material at the Disposal Site other than at a Designated Location in the Public Drop Off Area provided that it is:

(a) a Small Load; and
(b) Source-separated.

2.16 A person may Dispose of Voluntary Recyclable Material at the Active Face as Refuse or at the Disposal Site at a Designated Location in the Public Drop Off Area provided that it is:

(a) a Small Load; and
(b) Source-separated.

(Bylaw 3917)

2.17 A person may Dispose of Weeds at the Active Face provided they are:

(a) Source-separated; or
(b) if not Source-separated, as refuse.

2.18 A person may Dispose of Weeds at a Designated Location in the Public Drop Off Area provided they are in:

(a) a Small Load and Source-separated; or
(b) if not Source-separated, as refuse.

2.19 No person shall Dispose of an Extended Producer Responsibility Product at the Active Face.

2.20 No person shall Dispose of an Extended Producer Responsibility Product other than those listed in Schedule “G” and other than at a Designated Location in the Public Drop Off Area provided that it: *(Bylaw 3917)*

(a) is a Small Load; and
(b) is Source-separated.

2.21 No Commercial Hauler shall Dispose of Household Hazardous Waste at the Disposal Site.

2.22 No person shall dispose of Household Hazardous Waste at the Active Face.

2.23 No person shall Dispose of Household Hazardous Waste at the Disposal Site except at a Designated Location in the Public Drop Off Area and provided that it is:

(a) a Small Load; and
(b) Source-separated.

2.24 A person may Dispose of Refuse at the Active Face or in Small Loads at a Designated Location in the Public Drop Off Area.

2.25 No person shall Deposit Contaminated Demolition Waste at the Disposal Site.

2.26 No person shall Deposit Uncontaminated Demolition Waste at the Disposal Site other than:

(a) as a Controlled Waste in accordance section 2.12 and provided that it is a Commercial Load; or,
(b) at the Public Drop Off Area and provided it is a Small Load and Source-separated.

2.27 Effective January 1, 2015, no person shall deposit Kitchen Scraps at the Disposal Site except at the Kitchen Scraps Transfer Station and provided that they are Source-separated. *(Bylaw 3917)*

2.28 No person shall deposit Solid Waste at the Disposal Site that is not Source- separated when this Bylaw requires that it be Source-separated. *(Bylaw 3917)*

2.29 No person shall Deposit Vermiculite Insulation at the Disposal Site other than as a Controlled Waste in accordance with Section 2.12. *(Bylaw 4100)*

SECTION 3 - FEES

3.1 Every person depositing Solid Waste at the Disposal Site shall pay to the Capital Regional District the applicable fees in the amounts, and in accordance with the terms and conditions set out in Schedules “C", and "E".

3.2 Where a fee is not paid within the time specified in Schedule “C” for its payment, the person liable to pay such fee shall:

(a) pay interest on the fee at the rate set out in Schedule “C” from the date the fee was due to the date of payment; and
(b) not Dispose of any Solid Waste on or at the Disposal Site until such fee with interest owing has been paid in full.

SECTION 4 - VIOLATIONS & PENALTIES

4.1 A person who contravenes, violates or fails to comply with any provision of this Bylaw, or who suffers or permits any act or thing to be done in contravention or violation of this Bylaw, or who fails to do anything required by this Bylaw, commits an offence and shall be liable, upon conviction, to a fine of not more than $2,000, the costs of prosecution and any other penalty or order imposed pursuant to the *Local Government Act* or the *Offence Act* (British Columbia). Each day that an offence against this Bylaw continues or exists shall be deemed to be a separate and distinct offence.

4.2 The penalties imposed under Section 4.1 shall be in addition to and not in substitution for any other penalty or remedy imposed by this Bylaw or any other statute, law, or regulation.

SECTION 5 - SEVERANCE

5.1 If a section, subsection, sentence, clause or phrase of this Bylaw is for any reason held to be invalid by the decision of a Court in competent jurisdiction, such decision shall not affect the validity of the remaining portions of this Bylaw.

5.2 Schedules “A,” “B,” “C,” “D”, “E”, “F” and “G” are attached to and form part of this Bylaw.

SECTION 6 - REPEAL

6.1 Hartland Tipping Fee and Regulation Bylaw No. 5, 2003 is hereby repealed except insofar as it repeals any other bylaw.

SECTION 7 - TITLE

7.1 This Bylaw may be cited as “Hartland Landfill Tipping Fee and Regulation Bylaw No. 6, 2013”

READ A FIRST TIME THIS	13th	DAY OF	March	2013
READ A SECOND TIME THIS	13th	DAY OF	March	2013
READ A THIRD TIME THIS	13th	DAY OF	March	2013
ADOPTED THIS	10th	DAY OF	April	2013

Original signed by Alastair Bryson
CHAIR

Original signed by Sonia Santarossa
CORPORATE OFFICER

SCHEDULE "A"

DISPOSAL SITE

CAPITAL REGIONAL DISTRICT
BYLAW NO. 3881

DISPOSAL SITE means the Hartland Landfill site, more particularly described as:

PID: 023-851-457
Lot 1, Sections 54, 55 and 65, Highland District, Plan VIP64898

SCHEDULE "B"

SITE REGULATIONS

CAPITAL REGIONAL DISTRICT
BYLAW NO. 3881

PURPOSE:

To ensure a safe and orderly environment for the staff and public at the Disposal Site.

POLICY:

These Site Regulations shall be observed by a person while on the Disposal Site.

REGULATIONS:

1. **VEHICLES**

1.1 Capital Regional District staff may refuse to allow a Vehicle to enter the Disposal Site or require a Vehicle to leave the Disposal Site if:

(a) the Vehicle's Load exceeds the permitted weight limits set out in the regulations passed pursuant to the *Motor Vehicle Act*, or the *Commercial Transport Act*; or
(b) the Vehicle is noisy due to improper or poor muffling and braking systems; or
(c) the Load is poorly secured so as to be noisy or dangerous.
(d) the Vehicle is in unsafe conditions due to excessive tire wear, broken mirrors, or inadequate door restraint system.
(e) the Vehicle is owned, leased, operated, licensed, utilized, or otherwise associated with a person that is restricted from accessing, has been refused entry to, or has been prohibited re-entry to, the Disposal Site, whether under this bylaw or the *Trespass Act,* RSBC 2018 c 3.

(Bylaw 4497)

2. **LOADS**

2.1 All Loads of Solid Waste entering the Disposal Site shall be covered and secured. A cover shall be a tarpaulin or other overlay that is used to confine the load to the vehicle.

2.2 Despite Section 2.1, the following items are permitted at the disposal site without covers:

(a) stumps - chained on flat bed or within confines of truck box;
(b) Bulky Wastes strapped on flat beds or within confines of truck box.

2.3 A person must ensure that all Loads are ready for Disposal, including being Source-separated, before the Disposal Site closes for the day; otherwise they will not be permitted to Dispose of the Load. *(Bylaw 3917)*

3. **DISPOSAL SITE**

3.1 No person while driving a Vehicle at the Disposal Site shall drive their Vehicle on any part of the Disposal Site other than on the roads and paved areas designated by the Capital Regional District.

3.2 No person while driving a Vehicle on the Disposal Site shall exceed the speed limits posted at the Disposal Site; or fail to obey posted signs.

3.3 No person delivering Solid Waste to the Disposal Site shall Dispose of Solid Waste except in such a place and in such a manner as directed by the Capital Regional District staff or the landfill contractor.

3.4 All Solid Waste Disposed of at the Disposal Site shall become the property of the Capital Regional District.

3.5 No person shall remove Solid Waste from the Disposal Site except with written approval of the Manager.

3.6 No person shall loiter at the Disposal Site. Vehicles must proceed directly to the Designated Location and then leave the Disposal Site as soon as possible after Disposal.

3.7 No person shall use the wheel wash facility unless their Vehicle was used to attend the active face. No person shall wash out the interior of truck boxes or wash the exterior of a Vehicle other than the wheels and wheel wells at the Wheel Wash Facility.

3.8 No person shall act with conduct that is disorderly or offensive including but not limited to excessive and loud use of offensive language or drunkenness.

3.9 No person shall enter the Disposal Site where the Vehicle Load exceeds the permitted weight limits set out in the regulations passed pursuant to the *Motor Vehicle Act*, or the *Commercial Transport Act*.

3.10 No person shall obstruct, intimidate, interfere, or harass Capital Regional District staff or officers who are performing their duties.

(Bylaw 4497)

3.11 Clean wood, treated wood, and asphalt shingles must be source separated prior to arriving to Hartland landfill.

(Bylaw 4497, 4610)

3.12 No person shall record audio and/or video or take photographs at the Disposal Site without the permission of the manager.

(Bylaw 4497)

4. SAFETY

4.1 Any person entering the Disposal Site does so at their own risk. The Capital Regional District accepts no responsibility or liability for damage or injury to person or to property.

4.2 Children are not permitted at the Disposal Site except when they are either inside a Vehicle or attending an event or education program supervised by CRD staff.

4.3 Pets or livestock are not permitted at the Disposal Site except when they are inside a Vehicle.

4.4 Smoking is not permitted at the Disposal Site.

4.5 All visitors to the Disposal Site must check in at the site office and complete the appropriate waiver forms.

4.6 Any person delivering Solid Waste to the Disposal Site shall Dispose of the waste in a manner that conforms with WorkSafe BC Board regulations.

4.7 No person shall use electronic devices as defined in the *Motor Vehicle Act* while driving a Vehicle at the Disposal Site except in a manner permitted by the *Motor Vehicle Act*.

4.8 No person shall attend the Active Face without personal protective equipment as required by WorkSafe BC Board regulations including but not limited to steel toed boots and a high visibility vest.

5. GENERAL

5.1 Every person who contravenes these regulations, fails to obey orders or directions given by Capital Regional District staff or fails to comply with the posted notices and signs on the Disposal Site may be refused or prohibited re-entry onto the Disposal Site.

5.2 Where a person has unpaid fines or amounts owing to the Capital Regional District resulting from violation of this bylaw, and any such amounts are outstanding for more than 45 days from the date of conviction or deemed conviction, Capital Regional District staff may refuse access or prohibit re-entry to the Disposal Site until such amounts are paid. Where the person operates a waste disposal, hauling, or other commercial waste generating business or is associated with such a business, this refusal may be extended to those entities or vehicles owned, leased, or operated by those entities, which in the opinion of Capital Regional District staff, are affiliated, associated, controlled, owned-by in part or in whole, conducting business on behalf of, or otherwise related to that person, corporately or by degree of co-sanguinity or family relationship, despite those persons not having unpaid fine amounts, amounts owing, or separate legal personality.

(Bylaw 4497)

5.3 The Manager is authorized to enforce all site rules, regulations, and bylaws at Hartland Landfill. They may also prohibit or restrict a person(s) who contravenes this Bylaw from attending the Hartland Landfill.

(Bylaw 4497)

5.4 A person is entitled to a 25% reduction in monetary penalty resulting from violation of this bylaw if fines or fees are paid within 30 days from issue.

(Bylaw 4497)

SCHEDULE "C"

TIPPING FEES

CAPITAL REGIONAL DISTRICT
BYLAW NO. 3881

(Bylaw 4497, 4610, 4636)

FEES

1. The fees for depositing solid waste at the Disposal Site are:

Waste Type	Disposal Site Designated Location	Tipping Fee (per tonne)	Other Fees	Minimum Tipping Fee
~~Asbestos Containing Material~~	~~As directed by CRD staff~~	~~$157~~		~~$20~~
Asbestos Containing Material	As directed by CRD staff	$214		$20
Asphalt Roofing Shingles (effective July 1, 2024)	Public Drop Off Area	$110	$10 bin fee	
Asphalt Roofing Shingles (effective July 1, 2024)	As directed by CRD staff	$110		$10
Bicycle tires and tubes	Public Drop Off Area	No fee	$6 recycling area entry fee	No fee
Bulky Waste	Active Face	$254		$10
~~Clean Renovation and Demolition Waste (effective January 1, 2024)~~	~~Public Drop Off Area~~	~~$150~~	~~$10 bin fee~~	
Clean Renovation and Demolition Waste	Public Drop Off Area	$155	$10 bin fee	
~~Clean Renovation and Demolition Waste (effective January 1, 2024)~~	~~As directed by CRD staff~~	~~$150~~		~~$10~~
Clean Renovation and Demolition Waste	As directed by CRD staff	$155		$10
Clean Wood Waste (effective January 1, 2024)	Public Drop off Area	$80	$10 bin fee	
Clean Wood Waste (effective January 1, 2024)	As directed by CRD staff	$80		$10
Controlled Waste	As directed by CRD staff	As listed in Schedule "E"		$20
Cooking oil and grease	Public Drop Off Area	No fee		No fee

Extended Producer Responsibility Product listed in Schedule “G” (excluding tires on rims)	Public Drop Off Area	No fee		No fee
Extended Producer Responsibility Product listed in Schedule “G” tires on rims	Public Drop Off Area	No fee	$6 recycling area entry fee	No fee
Hauler Incentive Rates (effective January 1, 2024)		$125		
Hauler Incentive Rates (effective January 1, 2025)		$135		
Household Hazardous Waste	Public Drop Off Area	No fee		No fee
International Low Risk Waste	As directed by CRD staff	$135		
Kitchen Scraps until December 31, 2021	Kitchen Scraps Transfer Station	$120		
Kitchen Scraps effective January 1, 2022	Kitchen Scraps Transfer Station	$140		
Mattresses and boxsprings	Public Drop Off Area	$110	$10 bin fee	
Propane tanks and fire extinguishers	Public Drop Off Area	No fee		No fee
Recyclable Material excluding Scrap Metal, mattresses and boxsprings, Yard and Garden Material and Clean Wood Waste (by non-commercial hauler)	Public Drop Off Area	No fee	$6 recycling area entry fee	No fee
Recyclable Material excluding Scrap Metal, mattresses and boxsprings, Yard and Garden Material and Clean Wood Waste (by Commercial Hauler)	Public Drop Off Area	No fee	$26 recycling area entry fee	No fee
~~Refuse~~	~~Active Face~~	~~$150~~		~~$10~~

Refuse	Active Face	$155		$10
~~Refuse~~	~~Public Drop Off Area~~	~~$150~~	~~$10 bin fee~~	
Refuse	Public Drop Off Area	$155	$10 bin fee	
Scrap Metal	Public Drop Off Area	No fee	No fee	
Stumps and Branches	As directed by CRD staff	$110		$10
Treated Wood and Wood Products (effective July 1, 2024)	As directed by CRD staff	$110	$10 bin fee	
Waste Asbestos which originates outside the CRD	As directed by CRD staff	$500		$20
Weeds (Source separated)	Active Face	$59		$10
Weeds (not Source –separated in Refuse)	Active Face	$150		$10
Weeds (not Source –separated in Refuse)	Public Drop Off Area	$150	$10 bin fee	
Weeds (Source separated)	Public Drop Off Area	$59		$10
Yard and Garden Materials	As directed by CRD staff	$59		$10

Uncovered or unsecured loads	All fees applicable to the Load are doubled			

GENERAL

2. Per tonne fees are based on weight as measured on the scale, based on the difference in weight between the loaded weight and the weight of the empty Vehicle.
3. Where a dollar amount per tonne is indicated, it is to be interpreted as allowing a proportionate fee for a portion of a tonne in 10 kg increments.
4. All fees shall be rounded up or down to the nearest quarter of a dollar.
5. In the event that the weigh scales provided at the Disposal Site are not operational, or in the event of traffic congestion, or at the discretion of the Manger, weights shall be as estimated based on volume by the Manager or Capital Regional District staff.
6. If a person disposes a Load containing Source-separated Recyclable Materials, Extended Producer Responsibility Products, Yard and Garden Material, Household Hazardous Waste, or other Refuse at the Public Drop Off Area and chooses not to weigh out after disposal of each class of material, they are subject to pay a tipping fee for Refuse for the entire Load.
7. All fees payable under this Bylaw shall be paid to the Capital Regional District in cash, by cheque, debit, or credit card at the time the disposal is made.
8. Notwithstanding Section 7, any person disposing Solid Waste, except Recyclable Materials, at the Disposal Site on a regular basis may apply to the Capital Regional District for credit, and, if the treasurer is satisfied of the credit worthiness of the person, he or she may grant credit to the person, in which case payment of the fee imposed under Section 1 shall be made and the credit extended on the following conditions.

   (a) the person receiving credit shall pay to the Capital Regional District all fees in full within thirty (30) days of the last day of the month for which an invoice has been submitted. The Capital Regional District will invoice monthly for Solid Waste disposed during the preceding month. The invoice amount will be based on the total quantity of Solid Waste delivered during the month and the posted disposal rates in effect at the time of delivery;

   (b) late payment(s) will be subject to an interest penalty fee of 1.5% per month;

   (c) the Capital Regional District reserves the right to cancel, upon five (5) days' notice, the credit offered herein for late payment, non-payment, or other justified cause as judged solely by the treasurer;

   (d) if the person receiving credit fails to pay to the Capital Regional District all fees in full within thirty (30) days of the last day of the month in which an invoice has been issued, the Capital Regional District may withhold monies equivalent to those fees, plus interest, that are owed by the Capital Regional District to the person receiving credit under a separate contract, agreement, or offer between the Capital Regional District and the person receiving credit; and

   (e) the Capital Regional District reserves the right to refuse access to the Disposal Site to a person receiving credit until outstanding fees are paid.

SCHEDULE "D"

PROHIBITED WASTE

CAPITAL REGIONAL DISTRICT
BYLAW NO. 3881

(Bylaw 4497, 4610)

Prohibited Waste
Aggregate
Asphalt Roofing Shingles, except as permitted in this Bylaw
Asbestos Containing Material, except as permitted in this bylaw
Asphalt and Rubble
Biomedical Waste
Clean Soil
Concrete
Contaminated Demolition Waste
Gypsum Board or Wallboard, except as permitted in this bylaw
Ignitable Waste
Kitchen Scraps, except as permitted in this Bylaw
Liquids, except as permitted in this Bylaw
Motor vehicle bodies and farm implements
Radioactive Waste
Reactive wastes
Sharps, except as permitted in this Bylaw
Specified Risk Material
Vermiculite Insulation, except as permitted in this Bylaw
Waste that is on fire or smouldering
Waste containing PCBs, except as permitted in this bylaw
Wood Waste, except as permitted in this Bylaw

SCHEDULE "E"

CONTROLLED WASTE

CAPITAL REGIONAL DISTRICT
BYLAW NO. 3881

(Bylaw 4497, 4610, 4636)

The fees for disposing of Controlled Waste in the Disposal Site are:

Controlled Waste	Disposal Fee
Animal Fecal Waste	~~$157 per tonne~~ $214 per tonne
Catch Basin Waste	~~$157 per tonne~~ $214 per tonne
Commercial Load of Uncontaminated Demolition Waste	$150 per tonne
Condemned or Spoiled Foods	~~$157 per tonne~~ $214 per tonne
Contaminated Gypsum Board or Wallboard	$311 per tonne
Contaminated Gypsum Board or Wallboard originating outside the CRD effective January 1, 2017	$500 per tonne
Contaminated Soil	~~$157 per tonne~~ $214 per tonne
Dead Animal	$254 per tonne
Fibre Optic Cable	~~$157 per tonne~~ $214 per tonne
Food Processing Wastes	~~$157 per tonne~~ $214 per tonne
Health Hazard Waste	~~$157 per tonne~~ $214 per tonne
International High Risk Cruise Ship Waste	$500 per tonne
Knotweed	$59 per tonne
Miscellaneous Controlled Waste	~~$157 per tonne~~ $214 per tonne
Pumpings from septage treatment facilities containing residual sludge	~~$157 per tonne~~ $214 per tonne
Pumpings from sewage treatment plants, pump stations and sewer lines	~~$157 per tonne~~ $214 per tonne
Screenings from sewage treatment plants, septage treatment facilities and pump stations	~~$157 per tonne~~ $214 per tonne
Sharps	$254 per tonne
Slurries which may contain non-hazardous solids, soil, sand, gravel, fibres, fats, oils and grease or mineral oil and grease	~~$157 per tonne~~ $214 per tonne
Soot and Ash	~~$157 per tonne~~ $214 per tonne
Spent charcoal from water purification plants and odour filters	~~$157 per tonne~~ $214 per tonne
Surface Coating Waste	~~$157 per tonne~~

	$214 per tonne
Vehicle Washing Facility Waste	~~$157 per tonne~~ $214 per tonne
Vermiculite Insulation	~~$157 per tonne~~ $214 per tonne
Waste Sludge from sewage treatment plants containing no more than 80% total moisture	~~$121 per tonne~~ $165 per tonne

SCHEDULE "F"

RECYCLABLE MATERIALS
RECEIVED AT HARTLAND LANDFILL AT A DESIGNATED LOCATION AT THE PUBLIC DROP OFF AREA (SMALL SOURCE SEPARATED LOADS)

CAPITAL REGIONAL DISTRICT
BYLAW NO. 3881

(Bylaw 4497, 4610)

Mandatory Recyclable Material
EPR Products
Clean Wood Waste (Effective January 1, 2024)
Asphalt Roofing Shingles (Effective July 1, 2024)
Treated Wood and Wood Products (Effective July 1, 2024)
Non-EPR Corrugated Cardboard
Propane Tanks and fire extinguishers
White Goods
Non-EPR Mixed Paper
Scrap Metal
Yard and Garden Material
Voluntary Recyclable Material
Books (textbooks, novels, soft and hardcover books)
Non-EPR Film plastic
Non-EPR Glass containers
Large rigid plastics
Mattresses and boxsprings
Rigid plastic containers
Non-EPR Polystyrene
Non-EPR Polycoated containers
Bicycle tubes and tires

SCHEDULE "G"

(Bylaw 4497)

EXTENDED PRODUCER RESPONSIBILITY PRODUCTS RECEIVED AT HARTLAND LANDFILL AT A DESIGNATED LOCATION AT THE PUBLIC DROP OFF AREA (SMALL SOURCE SEPARATED LOADS)

CAPITAL REGIONAL DISTRICT
BYLAW NO. 3881

Product Category	Materials Accepted at Hartland
Beverage container	• ready-to-serve beverage containers made of aluminium, glass, paper, plastic and/or steel
Solvent and flammable liquids, Gasoline, Pesticide, Lubricating oil, oil filter, Paint product, Lead acid battery, antifreeze	• flammables, • gasoline and pesticides • lubricating oil and empty oil containers • used oil filters • paint • lead acid batteries • antifreeze
Electronic and electrical	• display products and accessories (TV, monitor, remote) • desktop computers and accessories (CPU, keyboard, mouse, cable) • portable computers and accessories (laptop, netbook, tablet) • printing, scanning and multifunction devices (printer, fax machine, scanner) • audio products and accessories (radio, record player/stereo, walkie talkie, MP3, earphones) • video products and accessories (camera, video console, VCR/DVD/PVR) • video gaming systems and accessories (game console, controller, joystick, cable) • non-cellular telephones and answering machines • aftermarket vehicle audio and video systems (speaker, vehicle display, GPS) • electronic musical instruments (guitar, drum set, keyboard) • IT and Telecom devices (router, Ethernet switch, telecom bridge, cash register • medical monitoring and control devices (thermometer, blood pressure device, stethoscope, microscope) • small appliances and power tools (kitchen countertop, personal care, floor cleaning, weight measurement, garment care, air treatment, time measurement, sports and leisure, power tools, sewing and textile, exercise machines) • residential lights (fluorescent tubes and bulbs (CFLs), halogen and

	incandescent lamps, light emitting diode (LED) lamps, light ballasts (that may contain PCB), High Intensity Discharge (HID) and other mercury containing lamps) • residential light fixtures and products (bike lights, ceiling fixtures, chandeliers, flashlights, floor lamps, light strings, outdoor fixtures, recessed/pot lights) • batteries for use in electronic and electrical products listed in this section including primary and rechargeable batteries
Tire	• automotive tires (unrimmed)
Printed Paper and Packaging from Residential Premises but not from **Industrial Commercial Institutional** operations	• Cardboard storage box • Cardboard storage • Cardboard moving boxes • Paper gift boxes • Paper bag • Paper lunch bag • Paper pinata • Paper gift bag • Paper party hat • Paper party décor • Newspapers • Newspaper Inserts • Magazines • Catalogues • Telephone Directories • Other Printed Media • Residential Printed Paper • Miscellaneous Printed Paper • Old Corrugated Cardboard • Paper cup (hot) (Polycoated liner) • Paper Cup (hot) (biodegradable liner) • Paper Cup (cold) (waxed) • Paper Cup (cold) (2-sided Polycoated) • Polycoated Milk Cartons • Aseptic Containers • Multi-laminated Paper Packaging • Old Boxboard (OBB) • Wet Strength Boxboard • Moulded Pulp • Kraft Papers • Polycoated Boxboard • High-density polyethylene Films • Low-density polyethylene / Linear Low-density polyethylene Films • Polystyrene Clamshells Expanded polystyrene • Polystyrene Trays/Plates Expanded polystyrene • Polystyrene Meat Trays Expanded polystyrene • Polystyrene Hot Drink Cups Expanded polystyrene • Polystyrene Cushion Packaging Expanded polystyrene • Polyethylene terephthalate Bottles (non-beverage) • Polyethylene terephthalate Jars

	• Polyethylene terephthalate Clamshells • Polyethylene terephthalate Trays • Polyethylene terephthalate Tubs & Lids • Polyethylene terephthalate Cold Drink Cups • High-density polyethylene Bottles (non-beverage) • High-density polyethylene Jars • High-density polyethylene Pails • High-density polyethylene Trays • High-density polyethylene Tubs & Lids • High-density polyethylene Planter Pots • Polyvinyl chloride Bottles • Polyvinyl chloride Jars • Polyvinyl chloride Trays • Polyvinyl chloride Tubs & Lids • Low-density polyethylene Bottles (non-Beverage) • Low-density polyethylene Jars • Low-density polyethylene Tubs & Jars • Polypropylene Bottles (non-beverage) • Polypropylene Jars • Polypropylene Clamshells • Polypropylene Trays • Polypropylene Tubs & Lids • Polypropylene Cold Drink Cups • Polypropylene Planter Pots • Polystyrene Bottles (non-beverage) • Polystyrene Clamshells (rigid) • Polystyrene Trays (rigid) • Polystyrene Tubs & Lids (rigid) • Polystyrene Tubs & Lids (high impact) • Polystyrene Cold Drink Cups (rigid) • Polystyrene Planter Pots • Other[1] Plastic Bottles (non-beverage) • Other Plastic Jars • Other Plastic Clamshells • Other Plastic Trays • Other Plastic Tubs & Lids • Other Plastic Cold Drink • Other Plastic Planter Pots • Steel Cans (non-beverage) • Steel Aerosol Cans • Spiral Would Cans (steel ends) • Aluminum Cans (non-beverage) • Aluminum Aerosol Cans • Aluminum Foil and Foil Containers • Bimetal Containers/Aerosols

[1] 'Other' plastic packaging is typically: manufactured from a combination of recycled resins; manufactured with a barrier layer; or, lacking a resin code mark.

	• Clear Glass Bottles and Jars (non-beverage) • Coloured Glass Bottles and Jars (non-beverage)

APPENDIX E

SCHEDULE 19 TO BYLAW NO. 1857

(Bylaws 2163, 2281, 2359, 3140, 3899, 4003, 4567, 4646)

HARTLAND LANDFILL TIPPING FEE AND REGULATION BYLAW NO. 6, 2013

WORDS OR EXPRESSIONS DESIGNATING OFFENCE	SECTION	FINE	EARLY PAYMENT
1. Disobey Site Regulations	2.1	$100.00	
~~2. Fail to follow Site Regulations~~	~~2.2~~	~~$100.00~~	
2. Fail to follow Site Regulations	2.2	$500.00	$375.00
3. Non-district waste	2.3	$500.00	$375.00
~~4. Deposit Prohibited waste~~	~~2.5~~	~~$200.00~~	
4. Deposit Prohibited waste	2.5	$500.00	$375.00
~~5. Deposit Hazardous waste~~	~~2.8~~	~~$100.00~~	
5. Deposit Hazardous waste	2.8	$500.00	$375.00
~~6. Improper disposal asbestos~~	~~2.11~~	~~$200.00~~	
6. Improper disposal asbestos	2.11	$1,000.00	$750.00
~~7. Deposit controlled waste~~	~~2.12~~	~~$300.00~~	
7. Deposit controlled waste	2.12	$500.00	$375.00
8. Deposit recyclable material	2.14	$500.00	$375.00
9. Improper deposit mandatory recyclable	2.15	$200.00	$150.00
10. Improper deposit voluntary recyclable	2.16	$200.00	$150.00
11. Improper deposit weeds	2.18	$50.00	
~~12. Deposit EPR material~~	~~2.19~~	~~$200.00~~	
12. Deposit EPR material	2.19	$500.00	$375.00
13. Improper deposit EPR material	2.20	$200.00	$150.00
14. Deposit HHW by commercial hauler	2.21	$200.00	
15. Deposit HHW	2.22	$100.00	
16. Improper deposit of HHW	2.23	$50.00	
17. Deposit Contaminated Demo Waste	2.25	$300.00	$225.00
18. Improper Deposit Sorted Demo Waste	2.26	$200.00	$150.00
19. Improper deposit kitchen scraps	2.27	$200.00	
20. Fail to source separate solid waste	2.28	$500.00	$375.00
21. Fail to pay fee	3.1	$300.00	
22. Deposit while charge unpaid	3.2 (b)	$100.00	
23. Uncovered/unsecured load	Sch. B, Reg. 2.1	$100.00	
24. Load not ready for disposal	Sch. B, Reg. 2.3	$100.00	
25. Drive off designated roads	Sch. B, Reg. 3.1	$100.00	
26. Fail to obey signs	Sch. B, Reg. 3.2	$100.00	
27. Fail to follow directions	Sch. B, Reg. 3.3	$100.00	
28. Scavenging	Sch. B, Reg. 3.5	$100.00	
29. Loitering on site	Sch. B, Reg. 3.6	$100.00	
30. Vehicle washing	Sch. B, Reg. 3.7	$100.00	
31. Disorderly conduct	Sch. B, Reg. 3.8	$100.00	
32. Overweight vehicle	Sch. B, Reg. 3.9	$100.00	
33. Children at site	Sch. B, Reg. 4.2	$50.00	
34. Pets at site	Sch. B, Reg. 4.3	$50.00	
35. Smoking at disposal site	Sch. B, Reg. 4.4	$100.00	
36. Use electronic device while driving	Sch. B, Reg. 4.7	$100.00	

37. No protective equipment	Sch. B, Reg. 4.8	$50.00
38. Unauthorized videotaping or photography on site	Sch. B. Reg 3.12	$100.00

*Early Payment: Fine if Paid on or Before the 30th day from the date on which the ticket is served.

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ERM 24-70

REPORT TO ENVIRONMENTAL SERVICES COMMITTEE
MEETING OF WEDNESDAY, NOVEMBER 20, 2024

SUBJECT **Award of Contract ERM2024-007 – Hauling and Processing of Kitchen Scraps**

ISSUE SUMMARY

To recommend award of Contract ERM2024-007 for the hauling and processing of kitchen scraps.

BACKGROUND

The current kitchen scraps hauling and processing contract expires February 28, 2025 and a new contract needs to be awarded to ensure continuity of service. A public tender for the provision of the service for five years, from March 1, 2025 to February 28, 2030, closed on November 12, 2024, and two bids were received, as follows:

Name of Firm Tendering	Estimated Annual Tonnage	Rate Per Tonne	Estimated Annual Cost (excluding GST)	Proposed Processing Facilities
Convertus Canada Ltd.	12,000	$130.00	$1,560,000.00	Convertus Nanaimo Advanced Composting Facility
DL Bins. Ltd.	12,000	$147.50	$1,770,000.00	Fisher Road Recycling Net Zero Waste Eastgate

The rate offered by Convertus Canada Ltd. for Contract ERM2024-007 is about 6% less than what is being paid under the current hauling and processing contract and will reduce costs by approximately $103,000 annually.

The tender has been reviewed and it complies with the instructions to tenderers. Convertus Canada Ltd. is qualified to undertake the contract and the proposed processing facility is licensed.

The Capital Regional District (CRD) operates a kitchen scraps transfer station at Hartland Landfill, which requires transport to a final processing facility. Between 2019 and 2021, the CRD investigated establishing an in-region organics processing facility. Through those investigations, it was determined that the CRD and municipalities did not control sufficient tonnages of organic waste to validate the business case of building a dedicated CRD organics processing facility.

ALTERNATIVES

Alternative 1
The Environmental Services Committee recommends to the Capital Regional District Board:
That Contract ERM2024-007, Hauling and Processing of Kitchen Scraps, be awarded to Convertus Canada Ltd. from March 1, 2025 to February 28, 2030, at the rate of $130 per tonne and an estimated cost of $1,560,000 per year, plus GST.

Alternative 2
The Environmental Services Committee recommends to the Capital Regional District Board:
That Contract ERM2024-007, Hauling and Processing of Kitchen Scraps, not be awarded and that staff be provided with alternative direction.

IMPLICATIONS

Environmental Implications

The diversion of kitchen scraps saves landfill air space and reduces greenhouse gas emissions by reducing landfill gas generation at Hartland Landfill. The finished compost produced from kitchen scraps can also help reduce the use of fossil fuel-based fertilizers when used in agriculture. Alternative 1 will help facilitate the diversion of kitchen scraps by maintaining a kitchen scraps diversion option to both public and private haulers using Hartland Landfill.

Economic Implications

The $130.00 per tonne rate of the new contract is about 6% less than the previous contract rate of $138.60 per tonne. This represents an estimated annual savings of $103,000 for the 2025 budget, which was prepared using the previous contract's rate. The rates paid to the contractor would be subject to an annual 2.0% inflationary adjustment beginning in January 2026, meaning the per tonne fee would rise to $132.06 in 2026, to $135.25 in 2027, to $137.96 for 2028, to $140.72 for 2029 and $143.53 for the two months of 2030 that the contract is in effect. This represents an average per tonne fee of approximately $136.68 over the term of the contract. Hartland Landfill's tipping fee for kitchen scraps is currently $140 per tonne.

CONCLUSION

The current kitchen scraps hauling and processing contract is set to expire on February 28, 2025, and a new contract is required to ensure continuity of service. A five-year tender for the service closed on November 12, 2024, and two bids were received. Convertus Canada Ltd. submitted a bid of $130 per tonne with an annual 2.0% inflationary adjustment. The tender has been reviewed and it complies with the tender requirements and Convertus Canada Ltd., is qualified to undertake the contract work.

RECOMMENDATION

The Environmental Services Committee recommends to the Capital Regional District Board:
That Contract ERM2024-007, Hauling and Processing of Kitchen Scraps, be awarded to Convertus Canada Ltd. from March 1, 2025 to February 28, 2030, at the rate of $130 per tonne and an estimated cost of $1,560,000 per year, plus GST.

Submitted by:	Tom Watkins B. Sc., Acting Senior Manager, Environmental Resource Management
Concurrence:	Glenn Harris, Ph.D., R.P.Bio., Acting General Manager, Parks, Recreation & Environmental Services
Concurrence:	Ted Robbins, B. Sc., C. Tech., Chief Administrative Officer

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ECA 24-65

REPORT TO ENVIRONMENTAL SERVICES COMMITTEE
MEETING OF WEDNESDAY, NOVEMBER 20, 2024

SUBJECT **Vancouver Island and Coastal Communities Climate Summit – Summary Report**

ISSUE SUMMARY

To provide the summary report from the Vancouver Island & Coastal Communities (VICC) 2024 Virtual Climate Summit.

BACKGROUND

The VICC Climate Leadership Steering Committee is composed of elected officials appointed by regional districts across Vancouver Island and surrounding coastal communities. Director Dave Thompson serves as the appointed representative from the Capital Regional District (CRD) on this committee.

The mission of the VICC Climate Leadership Steering Committee is to connect elected officials and staff from diverse VICC communities, empowering them to accelerate their climate action goals through best practice sharing, collaboration, and advocacy with other levels of government. The CRD also administers two inter-municipal climate action committees within the capital region—one for staff and one for elected officials—both with similar mandates.

In response to a request from the VICC Steering Committee, and following direction from the Board in fall 2023, the CRD Climate Action service contributed $31,500 to support VICC initiatives through 2024. Other regional districts and the Islands Trust also provided funding. This funding enabled the Community Energy Association to act as a secretariat and coordinate priority projects, including the Vancouver Island & Coastal Communities 2024 Virtual Climate Summit, held over two days in May 2024.

Invitations to the summit were extended to local government elected officials, staff and partner organizations both within and outside the capital region. CRD Climate Action staff presented on the first day, while Director Thompson presented on the second day. A synopsis of the event, including summaries of presentations, key themes and priority actions, is provided in Appendix A. The VICC Climate Leadership Steering Committee plans to make this an annual event.

CONCLUSION

The Vancouver Island and Coastal Communities Climate Leadership Steering Committee, comprised of elected officials from across Vancouver Island and nearby coastal areas, aims to empower local governments to tackle climate change through collaboration, knowledge exchange and advocacy. In May 2024, the Committee hosted the Vancouver Island and Coastal Communities 2024 Virtual Climate Summit, where local government elected officials and staff attended. A report has been shared to provide a summary of key themes and priority actions.

RECOMMENDATION

There is no recommendation. This report is for information only.

Submitted by:	Nikki Elliott, MPA, Manager, Climate Action Programs
Concurrence:	Russ Smith, Acting General Manager, Parks, Recreation & Environmental Services
Concurrence:	Ted Robbins, B. Sc., C. Tech., Chief Administrative Officer

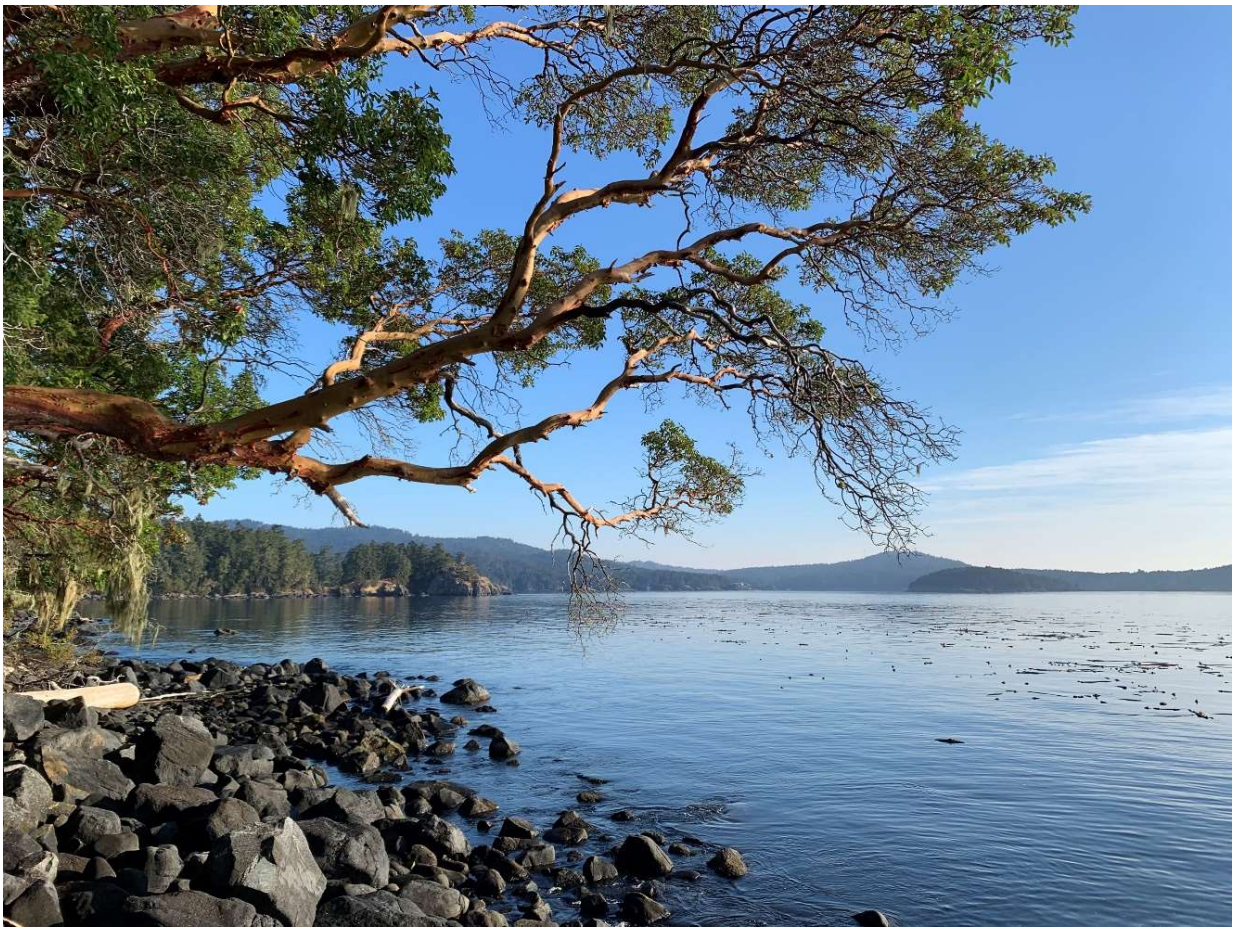
ATTACHMENT

Appendix A: Vancouver Island and Coastal Communities 2024 Virtual Climate Summit Report (September 2024)

APPENDIX A

Vancouver Island & Coastal Communities (VICC) 2024 Virtual Climate Summit

Summary Report from May 6, 2024, and May 13, 2024 Climate Summit where VICC Elected Officials and Local Government Staff convened to share progress updates and learnings



We respectfully acknowledge that the Vancouver Island and Coastal Communities Region is located upon the traditional unceded territories of many different Indigenous peoples, and we are grateful for their stewardship of these lands since time immemorial.

The Vancouver Island and Coastal Communities Climate Leadership (VICC-CL) Steering Committee has been facilitated by the Community Energy Association (CEA) since 2022 as the Secretariat. This Summit Report has been created by CEA staff with direction from the VICC-CL Steering Committee.

Summary Report September 2024

Executive Summary

The 2024 VICC Virtual Climate Summit brought together local government staff and elected officials from the Vancouver Island & Coastal Community (VICC) region to support accelerating climate action by showcasing local and regional initiatives, building capacity and relationships, and identifying collaboration opportunities and advocacy priorities.

The event was well attended, and feedback from participants was overwhelmingly positive:

A key focus of the event was to share information and identify collaboration and advocacy opportunities on the themes of **Land & Water Resiliency, Food Security, Sustainable Transportation,** and **Buildings**. The opportunities identified through discussions will be used to prioritize actions for the remainder of 2024 and beyond.

Introduction

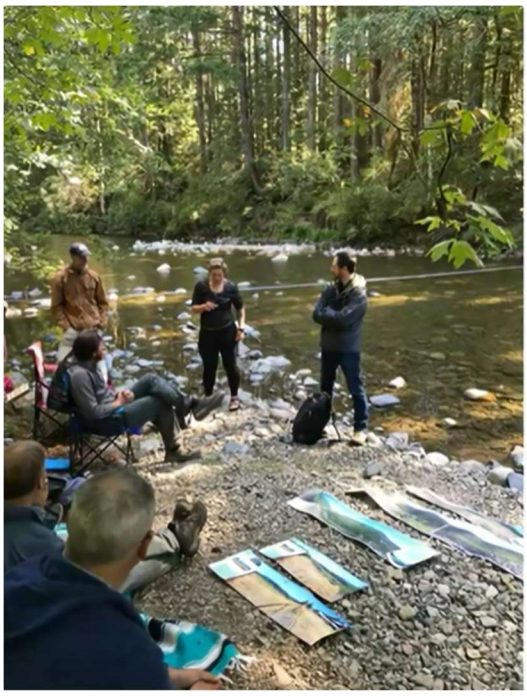
Local government staff and elected officials from the Vancouver Island & Coastal Community (VICC) region were invited to participate in an online Climate Summit, hosted virtually on Zoom over the mornings of May 6th and May 13th, 2024. The goal of the 2024 VICC Virtual Climate Summit was to support accelerating climate action in the Vancouver Island and Coastal Communities region by showcasing local and regional initiatives, building capacity and relationships, and identifying collaboration opportunities and advocacy priorities.

The **objectives of the Summit** included:

- Sharing information across jurisdictions about what different municipalities and regional districts in the VICC region can do, and are doing, to effectively address climate change
- Building local government capacity through sharing of knowledge and best practices
- Providing a venue for relationship building
- Promoting understanding of the benefits of regional climate action and build support for regional climate initiatives
- Identifying opportunities to collaborate regionally on climate action initiatives
- Identifying regional priorities for advocacy

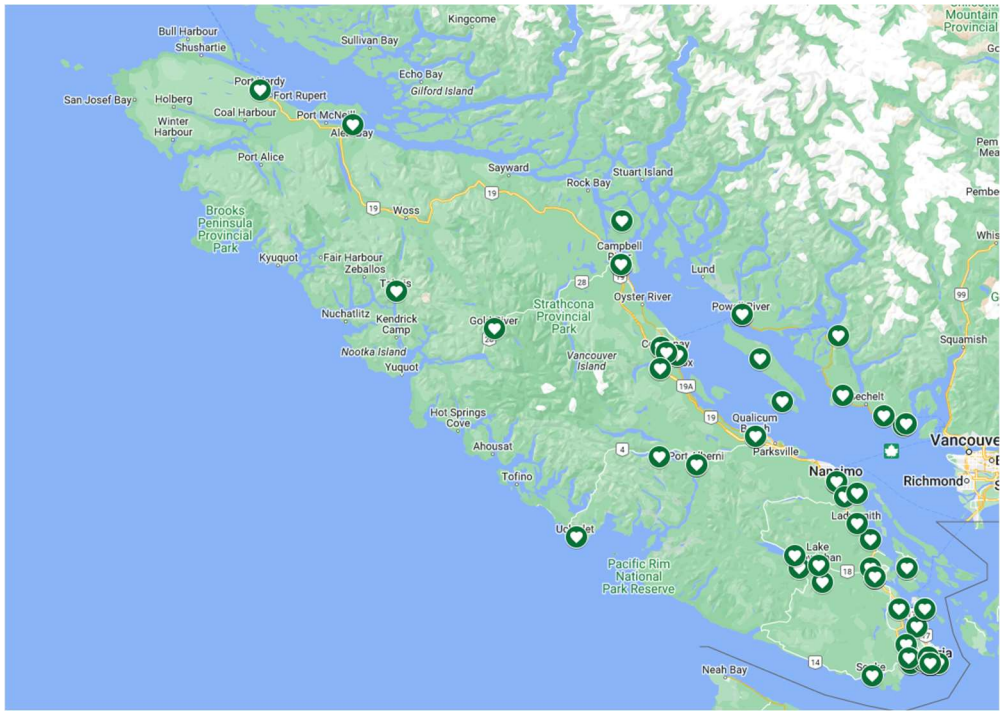
The climate summit was hosted by the VICC Climate Leadership Steering Committee and facilitated by the Community Energy Association (CEA), with funding support from member regional districts.

Moving forward, the VICC Steering Committee intends to make the climate summit an annual event and will continue to work with CEA to follow up on regional collaboration opportunities.



Participation

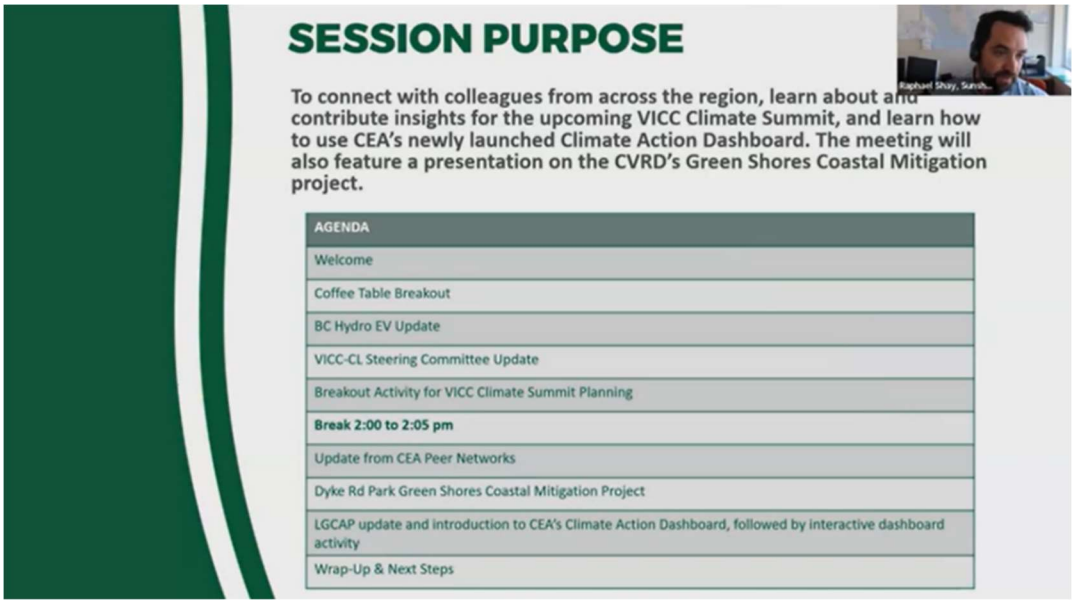
The two-day online summit attracted over 100 registrants, with 73 attendees on the first day and 63 on the second day. Attendees included a mix of staff and elected officials from across the region, as well as representatives from regional partner organizations including the Climate Action Secretariat, the University of Victoria, and Vancouver Island Health Authority. Registered attendees represented 36 communities from across the region.



Map: Communities represented by attendees at the Summit

About CEA and the VICC Climate Leadership Steering Committee:

The **Community Energy Association (CEA)** accelerates bold action by local governments and Indigenous communities related to climate and energy. CEA grew from a committee established by the Government of BC and the Union of BC Municipalities in the 1990s and was incorporated as a non-profit in 2003. CEA facilitates several peer networks for local government staff and elected officials across BC and Alberta. In early 2023, CEA launched the **Vancouver Island and Coastal Communities Climate Action Network (VICC-CAN)**, a regional peer network that connects and supports local government staff from across the region in their climate action work.



Since 2022, CEA has supported the **VICC Climate Leadership Steering Committee** in a Secretariat role. The Steering Committee is made up of elected officials appointed by their regional districts from across Vancouver Island, the Gulf Islands, the Sunshine Coast, and the qathet Region. The Committee was formed in 2019 to work together to support regional collaboration on climate action in the VICC region. The group was originally led by three Vancouver Island Mayors and has most recently been co-chaired by Councillor Ben Geselbracht, Councillor Will Cole-Hamilton, and Mayor Michelle Staples.

Steering Committee Mission:

To connect local elected officials and staff from diverse communities in the VICC region and empower them to accelerate their work on climate change and meet their goals by sharing best practices, collaborating on problem solving and advocating to other orders of government.

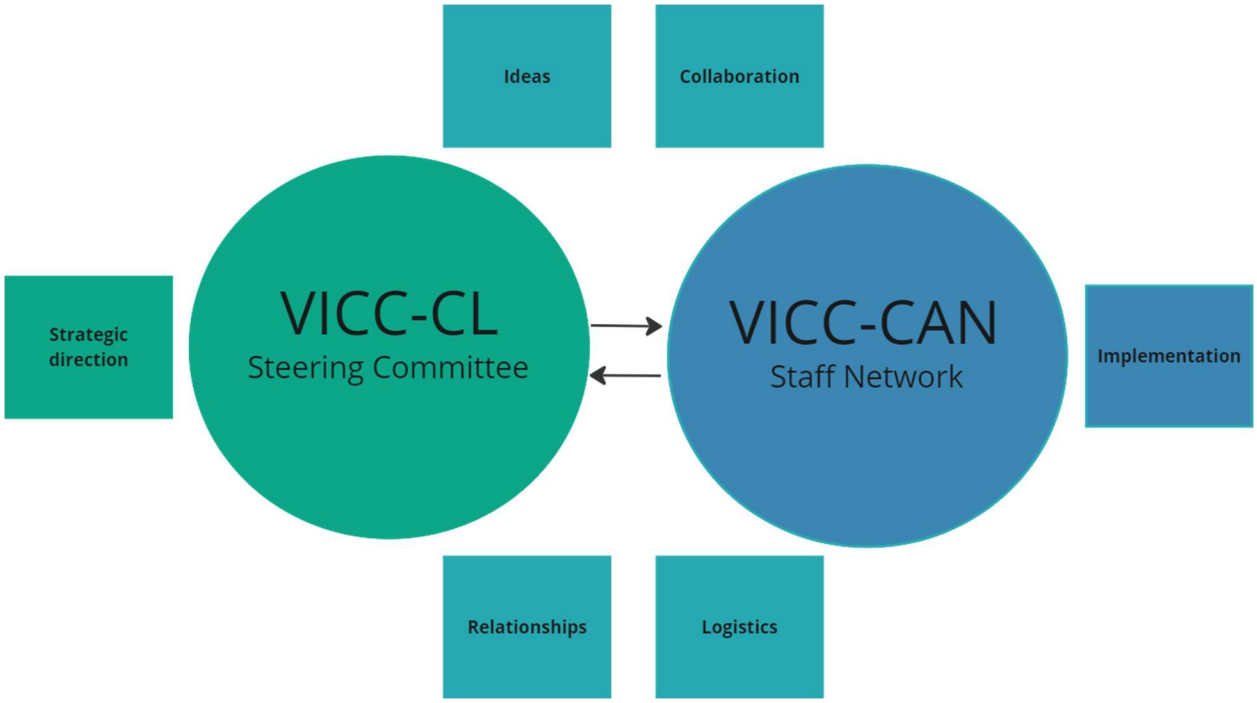
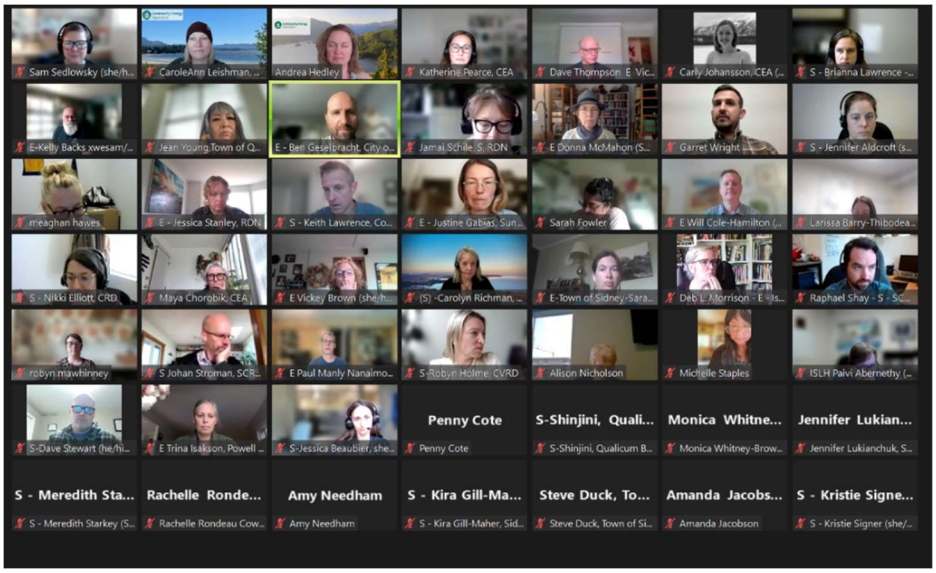


Figure: Diagram representing the relationship between the VICC Climate Leadership Steering Committee and the VICC-CAN staff network

CEA liaises between both groups as secretariat to both the steering committee of elected officials and the VICC-CAN staff network. Through this role, CEA facilitates relationship building and deeper connection between passionate elected officials from across the region and the work happening on the ground in communities, all with an overarching goal of supporting and accelerating collaborative climate action.



Summary of the Event:

This virtual event offered a unique opportunity to bring staff and local elected officials from across the VICC region together to learn, collaborate, and discuss climate action solutions. Being hosted virtually and spread across two mornings supported inclusivity and accessibility of the event.

Day One – May 6, 2024

The first day of the summit focused on providing strong framing to ground discussion and answer, **"Where are we now?",** featuring presentations from regional district staff on climate action highlights and challenges from their respective regions.

Key Components of Day One:

1. Welcoming remarks and introduction to the summit from VICC Climate Leadership Committee co-chair and Mayor of Duncan Michelle Staples and VICC Climate Leadership Committee co-chair and Nanaimo City Councillor Ben Geselbracht. Representatives from key regional partner organizations, including the Province of BC's Climate Action Secretariat, Vancouver Island Health Authority's Healthy Environments program, and University of Victoria researchers offered introductions and spoke to collaborative opportunities.

2. Fireside chat between Allison Ashcroft, Director of Sustainability, Municipal Finance Authority (MFA) and Maya Chorobik, Director of Climate Leadership, Community Energy Association (CEA), highlighting how local climate action has evolved over the past decade and providing key insights into regional collaboration opportunities between local government staff and elected officials. Some of the key themes touched on included the importance of climate action co-benefits, opportunities to align policy regionally (e.g. Zero Carbon Step Code), the importance of data and planning, and the need for effective impact measurement. (For more information about MFA's suite of pooled investments for local governments including several Fossil Fuel Free Funds, and a Carbon Light Fund, contact MFA directly.)

3. Regional District panel presentations by local government staff. The presentations highlighted regional climate action projects and progress, as well as challenges and keys to success moving forward. Some of the common challenges shared included: funding and human resource capacity constraints, competing priorities, finding alignment across local governments, siloed work structures, and the need for coordination. Some key needs for successful climate action going forward that were highlighted by staff presenters included: prioritizing and resourcing implementation, aligning with Provincial Ministries including Ministry of Transportation & Infrastructure (MOTI), need for more transit funding, supportive leadership, consistent and reliable funding, internal capacity, coordination/relationships, and clear climate-focused mandates and polices.

    a. **Strathcona Regional District** presented on their success with Disaster Risk Reduction Climate Adaptation Grants and Watershed Restoration Projects in Partnership with First Nations which were funded by UBCM grant funding. They acknowledged the struggles

with implementation on climate action due to being a small regional district yet geographically large with low population municipalities and electoral areas. They do not have a climate action strategy yet nor do they have a dedicated staff person to work on climate action or apply for grants. They have identified several education opportunities on climate action and risk reduction. Challenges identified as human resource capacity within the organization and project partners. Staff are having to wear many hats and are not able to specialize in areas related to climate action, decarbonization and resiliency work. Keys to success would be prioritizing climate action at the elected and staff levels; partnerships with community organizations and First Nations are key to successful outcomes; and resourcing the implementation of climate actions plans and projects is critical.

b. **Comox Valley Regional District** presented an overview of what they have accomplished recently, mostly through their Regional Growth Strategy Service, including a Community-wide Greenhouse Gas Emissions Inventory (2023); a Corporate Energy & Emissions Plan (2023); a Residential Emissions Reduction Action Plan (2023); a Coastal Flood Adaptation Strategy; the Dyke Road Park Green Shores Demonstration Project; a Home Energy Navigator Program; Municipal Top-up Program & Fuel-Switching Rebates; the Comox Valley Local Government Climate Action Working Group; a Regional Climate Action Strategy; Corporate Decarbonization work; and Active Transportation Projects; all of these achievements showing the benefit of having dedicated staff working on climate action, decarbonization, and resiliency projects. It was also mentioned that challenges arise with implementing projects when Provincial Ministries are not aligned with Regional policies, priorities and timelines and the Province downloading climate responsibility onto local governments to implement large capital projects leaves local governments overloaded.

c. **qathet Regional District** presented their new Resource Recovery Centre Project for recycling, solid waste and organics transfer that is in final stages of completion remediating a former landfill and incinerator site into a Resource Recovery Centre. 6,000 new trees were planted; they built 1000 sq m of Hügelkultur Berms for repurposing clean woody debris onsite; repurposed discarded asphalt, and concrete onsite for trails and road subgrade; trees harvested onsite were milled locally and used in the new buildings; discarded metal was repurposed onsite for functional art pieces, signage, fencing, and bridges; two large wetland areas were saved from destruction, cleaned, and remediated; installed a natural asset solution for mitigating stormwater runoff instead of a hardscape engineered stormwater solution which saved the project $700,000. Challenges presented were the complexities of getting all government partners aligned at every step of the way and meeting timelines. A direct benefit from this project will be the reduction of the amount of regional waste transported 770 km to landfill in Washington State; the co-benefits from this project include animals and vegetation returning to the site; an Active Transportation Network trail connecting to a City-wide network system in development; energy efficient buildings onsite; EV charging and electric vehicle equipment onsite; and modelling best practices for responsible waste diversion.

d. **Sunshine Coast Regional District (SCRD)** presented about an adaptation project for their water supply, the Grantham Well Field Project, a priority since the SCRD has exceeded the worst-case scenario for summer precipitation for 2050 already in eight of the last twelve years with extreme drought. This project will reduce their water supply deficit by 50%. Another project presented are their waste diversion projects: the creation of curbside organics collection and landfill biocover feasibility study phase 2 which will reduce carbon emissions and save money once implemented. Challenges to progress identified are lack of market readiness, and lack of the level of service required to adopt some key implementation. SCRD has adopted an ambitious Transit Future Action Plan but identified challenges collaborating with the Ministry of Transportation & Infrastructure for projects in smaller communities and rural areas to be able to achieve a substantial mode shift.

e. **Regional District of Nanaimo** presented about progress they have been making in the region on building decarbonization through climate-adapted home retrofits with their Home Energy Navigator Program as a regional offer, and in new buildings, the communities within the region collaborated on consultation on Zero Carbon Step Code and BC Energy Step Code which allowed for the sharing of resources and consistency in messaging across the region. The City of Nanaimo has led the way by adopting the Zero Carbon Step Code before mandatory Provincial implementation that can help inform smaller communities on best practices going forward. The RDN is working on a Board Climate Policy that will help clarify responsibilities and levels of service relative to climate change to manage both liability and clarify local governments' role in climate change. It was identified that increasing competing priorities for local governments without the necessary funding being attached means that some priorities fall off the table as staff are stretched beyond their capacity. Keys to success would be regional transportation plans aligning with Provincial climate policy; ambitious transit funding; and reliable, flexible, low barrier funding that aligns with the scale of climate action needed. It was acknowledged that the Local Government Climate Action Program Funding (LGCAP) is being provided to local governments and treaty First Nations but that it does not meet the level of funding required to achieve the necessary decarbonization goals nor assist with community resiliency at the scale required.

f. **Cowichan Valley Regional District** presented the risks to their 18 watersheds and the embedded ecosystems within. Concerns about the water supply stress risk, water quality and floods, as well as wildfire, extreme heat, coastal sea level rise, and landslides are just a few of the climate impacts they are assessing and preparing for. They have developed a Climate Change Adaptation Strategy which has informed a series of vulnerability and risk assessments and a staged approach leading to an implementation plan and a GHG mitigation strategy developed on a regional basis. Regional highlights include the development of a CVRD Modernized OCP and Municipal Partner OCP updates; asset management planning policy review to include natural assets; a Hazard Risk & Vulnerability Assessment; Drinking Water & Watershed Protection Program; Flood Management Planning; Cowichan Adapts Communication Program; and the Regional Airshed Protection Strategy. Challenges include coordinating numerous actions and entities; capacity to deliver; information sharing to stay current; and the need for stable

sources of funding for ongoing program delivery. Keys to success: continue to build upon the work of the Regional Adaptation Advisory Group to support information sharing; continue to work with local First Nations on the development of collaborative climate adaptation initiatives; and strengthen relationships with subject matter experts at the local level.

g. **Capital Regional District** presented their updated climate strategy and how they support all the regional partners in the municipalities within the region. Regional highlights include CRD has the benefit of having created a Regional Climate Action Service which is fairly unique for regional districts and allows them to support inter-municipal/agency coordination, data collection, modelling & analysis, community programs, policy support, capacity building & education. Having a robust Climate Action Department allows them to advocate, convene, support, and implement strong climate action programs and projects. Challenges they are facing have been the rapidly changing climate impacts, a growing region, varying authorities with competing mandates, capacity and lack of necessary funding. The current grant funding structure means that the same local governments are competing year over year for the same pot of money and there is not enough to go around to accomplish what is needed at the scale that is required. Keys to success are having supportive leadership at the elected level; consistent funding & internal capacity is always needed; coordination and relationships are essential; clear climate-focused mandates and policies must be put in place to be successful.

"Climate and environment exist beyond jurisdictional boundaries. Collaborative work is the future for measurable and lasting climate action."

~ Summit Presenter

Day Two – May 13, 2024

The focus of the second day of the summit was on **"Where do we want to go and how do we get there?"** Four key themes were introduced – **Land & Water Resiliency, Food Security, Sustainable Transportation**, and **Buildings**. Following presentations from VICC Steering Committee members, attendees broke into groups on each topic to discuss opportunities for alignment and collaboration.

Key Components of Day Two:

1. Welcoming remarks and introduction to the summit from VICC Climate Leadership Committee co-chair and Mayor of Duncan Michelle Staples and VICC Climate Leadership Committee co-chair and Courtenay City Councillor Will Cole-Hamilton.

2. Keynote presentation by Andrea Reimer on power and three things to know about effective staff/elected relationships. The presentation touched on the important separation between the staff operational level and the elected official role of governance and oversight, the adaptive cycle as a conceptual framework for understanding how organizations remain resilient in the face of challenges, and power literacy. On power, Andrea described the power we each have and

said, “If you can’t fundamentally change the way you understand your power, you can’t fundamentally change the way you’re making public policy.”

3. Panel presentations by VICC Climate Leadership Steering Committee members on regional collaboration and advocacy opportunities on the themes of **Land & Water Resiliency, Food Security, Sustainable Transportation,** and **Buildings**. The presentations were followed by breakout discussions on the four theme topics. Attendees self-selected theme topics and engaged in discussions about action steps that can be taken independently or collectively, and other emerging priorities.

Thematic Discussion Outcomes:

Theme 1: Land & Water Resiliency

Diverse and fragmented watersheds and water related mandates present a governance challenge. The Province has primary jurisdiction for much of the land use regulations that affect water, pointing to needs for collective advocacy. There are successful models of collaborative local watershed governance co-managed with First Nations including the Cowichan Watershed Board. Other needs related to land and water resiliency include addressing impacts from privately managed forestry land, supporting agricultural water needs, and encouraging residential water conservation.

Key Takeaways:

- Advocate to upper tiers of government wisely and strategically. It is recommended to build support and understanding within the local government council or board and community as well as developing a full understanding of the legislation prior to engaging in advocacy.
- Collaborate with partner Regional Districts, Municipalities, and Indigenous Communities through the Association of Vancouver Island and Coastal Communities (AVICC) and other organizations to advocate for increased regulation, oversight and enforcement on forestry management practices affecting watersheds and water sustainability in general.
- There are opportunities to collaborate with the Vancouver Island Health Authority on studies and data needs related to climate, health, and water.
- Education and communication are critical. Regionally pooled resources and shared materials could be created to support community awareness, education, and literacy on the issues pertaining to water and the types of development and decisions and actions that will affect water sustainability.
- We can learn to think differently about resources and how they are managed from Indigenous Nations.

Links and Reports Shared:

- https://islandstrust.bc.ca/programs/freshwater-sustainability/
- RDN Drinking Water and Watershed protection: https://www.rdn.bc.ca/drinking-water-and-watershed-protection
- RDN example of simple messaging on watersheds: https://youtu.be/l8O5Hy4UzJg?si=3e9Oqqg-8g5Q9cXW
- Tla'amin Watershed Protection Plan: https://youtu.be/W9c5oachoDY?si=t7egM-vQ56X2EPzt
- Strategic plan example: https://www.rdn.bc.ca/sites/default/files/inline-files/RDN-Strat-Plan-DF01-WEB.pdf

Theme 2: Food Security

Food security on Vancouver Island and the Sunshine Coast is closely connected to water, with water scarcity during drought periods affecting the sustainability of farms. To support food security, there is a need to prioritize agricultural water usage. Data is needed to better understand and measure water supplies and usage. Different governance approaches, including watershed committees and plans could support better management of water. Water conservation and advocacy related to water usage is also critical. Food security is also connected to transportation, particularly in rural and remote areas. Some communities such as Tahsis are addressing challenges by implementing programs like the Good Food Box that support food security while reducing GHG emissions and providing other co-benefits.

Key Takeaways:

- There is a key connection between food security and water management. Watershed based governance models could support water conservation and preservation of water supplies for agricultural usage. A collaborative advocacy opportunity involves working with the provincial government to advocate for a watershed-based model.
- Encouraging water conservation is an important step local governments can take to support farmers and ensure adequate water is reserved for agricultural usage. Approaches at the community level can include residential water metering, providing education to residents, and providing incentives. Water can be conserved by reducing watering of turf in areas including boulevards, small parks, and golf courses, although this needs to be balanced with maintaining natural assets.
- Local governments should review their bylaws and policies to ensure that they support residents growing their own food. Some existing bylaws can inadvertently be used to restrict opportunities for food growing in neighborhoods.
- Farmers are experts on what they need. Local governments should engage more with them to understand current practices and data needs. There are opportunities to build on existing initiatives such as the Agricultural Adaptation Plan for Vancouver Island produced in 2020.

Links and Reports Shared:

- Vancouver Island Agricultural Adaptation Plan 2020: https://www.bcclimatechangeadaptation.ca/library/vancouver-island-adaptation-strategies-plan/

Theme 3: Sustainable Transportation

Transportation is a major source of GHG emissions, accounting for around 50% of GHG emissions in most communities. The Clean BC Roadmap calls for reducing transportation related GHGs by 27-30% by 2030. Local governments can influence reducing transportation emissions in several ways, through promoting transit and active transportation, and supporting the uptake of EVs and E-bikes. There are opportunities for collaboration and partnerships to fill transportation gaps, but there are also many challenges, especially related to active transportation and transit needs outside of municipalities.

Key Takeaways:

- Systems Change: The group emphasized the need for advocating for provincial-level changes to focus on moving people and freight rather than just motor vehicles. This includes policy, budget, and data shifts to facilitate a mode shift towards active transportation and transit. This requires a system shift at regional and provincial levels. Currently budgetary processes, policies, and jurisdictional divisions constrain the ability of local governments to enact the level of change required.
- Coordinated advocacy is needed to support a system shift. This could start with a provincial interagency working group. Advocacy efforts need to be coordinated at multiple decision-making levels to effect change.
- There is strong support for creating broader, coordinated active transportation networks across regions. This includes safe routes to schools and better connections between communities, with a push for active transportation to be considered in all major road projects.
- Advocacy should include calls for updating outdated legislation such as the Motor Vehicle Act and pushing for mode shift targets that consider both urban and rural needs.
- We need to use languages and lenses that resonate with the government and electorate such as focusing on urgent issues such security, safety, and equity. Emphasizing co-benefits rather than solely GHG emission reduction can resonate with a broader audience.
- There is a need for more active transportation data. The CRD's Ecocounter data tracking programs for cyclists and pedestrians is an example of a successful initiative that could be replicated.

Links and Reports Shared:

- Island Coastal Inter-Community Transportation Study: https://islandcoastaltrust.ca/wp-content/uploads/2023/08/Transportation-What-We-Heard-Report.pdf
- Planning Together BC: https://www2.gov.bc.ca/assets/gov/driving-and-transportation/transportation-infrastructure/planning/planningtogetherbc/documents/planning_together_bc-framework-2023.pdf
- Cyclist and pedestrian count program platform for the CRD area: CRD - Regional Cyclist and Pedestrian Count Program (eco-counter.com)
- Active Transportation Grants: https://communityclimatefunding.gov.bc.ca/

Theme 4: Buildings

Buildings are responsible for 40-60% of community GHG emissions for local governments in BC. The Province of BC has set ambitious targets for GHG reductions from buildings (59-64% by 2030). Adopting higher buildings standards including higher steps of the BC Energy Step Code and Zero Carbon Step Code (ZCSC) are important ways for local governments to reduce building emissions in new buildings. A number of local governments on Vancouver Island have moved forward with ZCSC and there is interest in other communities to accelerate adoption; however, there are challenges related to addressing misinformation in the community related to the affordability and reliability of zero carbon options. Addressing emissions of existing buildings is also critical. Many local governments across the province have endorsed moving forward a provincial Property Assessed Clean Energy (PACE) program to support residential retrofits.

Key Takeaways:

- There is a major opportunity for sharing lessons learned from early adopters of Zero Carbon Step Code (ZCSC), including an identified need for good communication about the differences between the Energy Step Code and ZCSC to counter pushback and misinformation. Regional coordination and alignment can support local governments to adopt ZCSC. Collective support related to public communication is a good alignment opportunity.
- A collaboration opportunity related to decentralized energy generation and localized distribution capacity challenges could involve coming together for an inter-regional working group with BC Hydro.
- Shared advocacy to the provincial government could focus on supporting retrofitting of existing buildings through promoting the adoption of a provincial Property Assessed Clean Energy (PACE) program. Some municipalities are exploring alternative finance levers that could be implemented at the local scale in the absence of PACE and these learnings could be shared with others.
- Several local governments in the region have established or are in the process of exploring various retrofit support programs and can share lessons learned.
- There are equity concerns related to building related programs, for example, many programs exclude rental buildings and homes in First Nations territories since programs are based on ownership. Other gaps and challenges related to buildings related to contractor capacity, DIY culture, and contractors that are not program qualified.

Links and Reports Shared:

- Highest Efficiency Equipment Standards: https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/electricity-alternative-energy/energy-efficiency/highest_efficiency_equipment_standards_-_consultation.pdf
- CRD Home Energy Navigator Program: https://homeenergynav.ca/
- Nanaimo home energy retrofit financing feasibility study: https://www.nanaimo.ca/docs/social-culture-environment/sustainability/atta_feasibilitystudy_homeenergyretrofitfinancingfeasibilitystudy_rpt_c240422.pdf

Next Steps

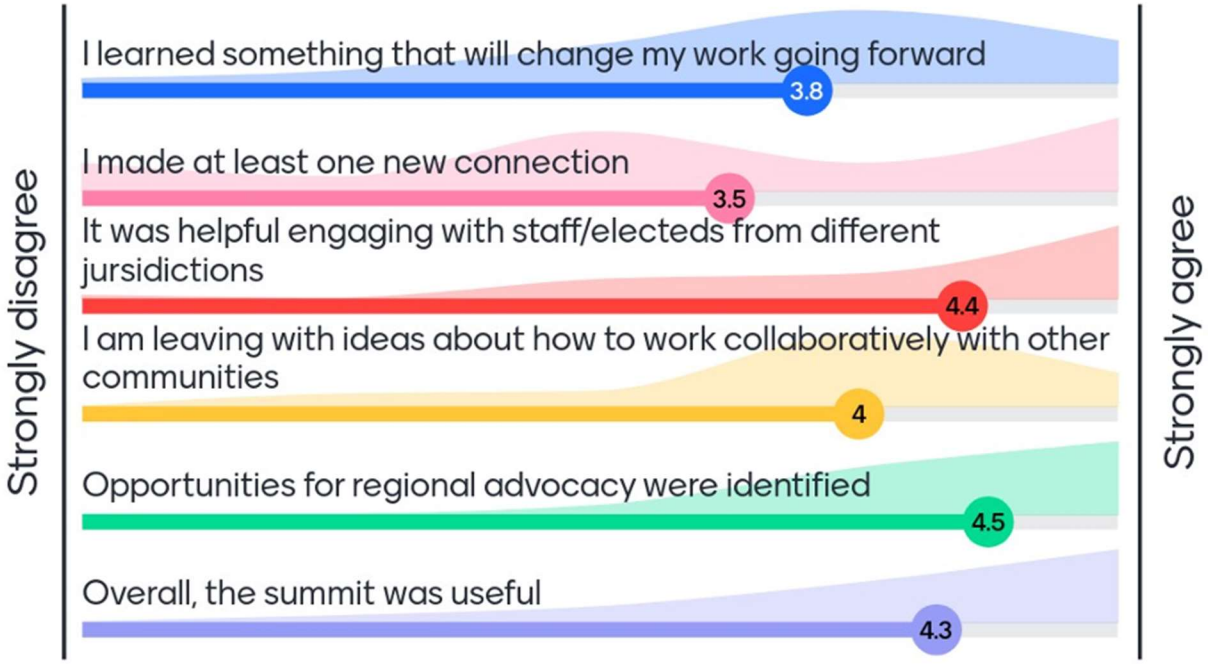
- The VICC Climate Leadership Steering Committee has reviewed the outcomes of the summit and will continue to determine collaborative priority actions for the remainder of 2024 and beyond.
- The Steering Committee intends to make the VICC Climate Summit an annual event and will continue to work with CEA and the existing staff network to follow up on regional collaboration opportunities.
- The committee will review the existing structure and funding model and seek funding to continue for another two-year period.

Priority Actions from each theme identified from the Climate Summit (not in a prioritized order):

Issue	Theme Area	What type of Action
Adoption of provincial Property Assessed Clean Energy (PACE) Program	Buildings	Advocacy
Share lessons learned on retrofit support programs	Buildings	Information sharing
Share learnings about finance levers to support retrofits	Buildings	Information sharing
Share lessons learned on Zero Carbon Step Code (ZCSC)	Buildings	Information sharing
Align ZCSC communications regionally	Buildings	Collaborate
Inter-regional working group with BC Hydro on energy generation	Buildings	Collaborate
Increase transit funding & support for inter-community transit	Transportation	Advocacy
Coordinate interagency working group to advocate for system shift	Transportation	Advocacy
MOTI change including better active transportation support in rural areas	Transportation	Advocacy
Share data and learnings about data tracking programs for active transportation	Transportation	Collaborate
Shared learning about co-benefits and using language that resonates with key audiences	Transportation	Collaborate
Increased funding to protect critical watershed lands in Esquimalt & Nanaimo (E&N) Land Grant	Land & water resiliency	Advocacy
Increased regulation, oversight and enforcement on forestry management practices affecting watersheds	Land & water resiliency	Advocacy
Shared comms materials related to water sustainability	Land & water resiliency	Collaborate
Work with health authorities on studies/data needs	Land & water resiliency	Collaborate
Increase internal and community understanding of issues and related legislation	Land & water resiliency	Information sharing
Learn: how can we learn about resource management from Indigenous practices?	Land & water resiliency	Information sharing
Share learnings & resources related to water conservation and initiatives to improve food security within RD's	Food security	Collaborate
Advocate for watershed based governance model to support food security	Food security	Advocacy
Share learnings to support duplication of Tahsis food program in other communities	Food security	Information sharing
Review bylaws and policies that support residential food production	Food security	Information sharing
Engage with farmers & build on existing initiatives (Agricultural Adaptation Plan)	Food security	Collaborate

Engagement Results

At the close of the summit, participants were asked for their feedback about the event. The feedback was overwhelmingly positive, with most participants indicating that they found it helpful engaging with staff and elected officials from different regions and that they had gained new ideas about working collaboratively with other communities.



Participant quotes:

“There is genuine interest in regional collaboration in climate action and amazing work already underway that I am excited to be a part of.”

“Climate change is an emergency, and we need to treat it like one.”

“There are more allies and more support than I realized, and we are poised to move forward together.”

“Collaboration is key! Working together will amplify and strengthen our advocacy efforts, as well as increase staff capacity – no need to reinvent the wheel, others may already have solutions.”

“Between us all, there are more tools, resources, and opportunities than I had realized.”

“I’m taking away new information and new strategies for addressing climate change in my region.”

“It was refreshing to speak so openly between staff and electeds outside of the internal organizational constraints.”

“There is a need to have regional collaboration to be able to tackle these large challenges.”

Speakers

VICC Climate Leadership Steering Committee Co-Chairs 2022 - 2024:

Michelle Staples (Duncan/Cowichan Valley Regional District)

Ben Geselbracht (Nanaimo/Regional District of Nanaimo)

Will Cole-Hamilton (Courtenay/ Comox Valley Regional District)

Day One Fireside Chat:

Maya Chorobik, Director of Climate Leadership, Community Energy Association (CEA) leads CEA's Climate Leadership programming with elected officials, designer of peer networks, information systems, and strategic collaboration across local, regional, and provincial levels.

Allison Ashcroft, Director of Sustainability, Municipal Finance Authority is responsible for expanding MFA's strategy and processes for managing sustainability and climate-related risk and opportunities. In her previous role as Managing Director of the Canadian Urban Sustainability Practitioners (CUSP), Allison assisted sustainability practitioners in Canada's large and leading cities with the pivot from climate action and sustainability planning to implementation.

Regional Partners:

Yaheli Klein, Senior Policy Analyst, Climate Action Secretariat, Province of BC

Dr. Paivi Abernethy, Manager, Healthy Environments, Island Health

Dr. Tamara Krawchenko, Assistant Professor, School of Public Administration, UVic

Dr. Katya Rhodes, Assistant Professor, School of Public Administration, UVic

Dr. Kara Shaw, Associate Professor, School of Environmental Studies, UVic

Regional District staff (Day One Snapshot Presentations):

Renee LaBoucane, Manager, Strategic Initiatives, Strathcona Regional District

Monica Whitney-Brown, Long Range Planner, Comox Valley Regional District

Arnold Schwabe, Manager of Asset Management & Strategic Initiatives, qathet Regional District

Raph Shay, Manager, Sustainable Development, Sunshine Coast Regional District

Jessica Beaubier, Climate Change and Resilience Coordinator, Nanaimo Regional District

Amy Needham, Sustainability Planner, Alberni-Clayoquot Regional District

Keith Lawrence, Senior Environmental Analyst, Cowichan Regional District

Nikki Elliott, Manager, Climate Action Programs, Capital Regional District

Day Two Keynote speaker:

Andrea Reimer served four terms in local government including three terms on Vancouver City Council and Metro Vancouver Regional District where she championed bold climate action, green cities, and social justice initiatives. In 2018 she left government and was awarded the Loeb Fellowship at Harvard's Graduate School of Design in recognition of her achievements while in office. Today she teaches about power as an Adjunct Professor of Practice at UBC's School of Public Policy and Global Affairs, and Simon Fraser University. Andrea supports courageous leaders willing to act boldly on the biggest challenges of our times through her consultancy firm Tawâw Strategies.

VICC Climate Leadership Members (Day Two Regional Collaboration Panel):

Alison Nicholson, Comox Valley Regional District

Deb Morrison, Islands Trust

Justine Gabias, Sunshine Coast Regional District

Sarah Fowler, Strathcona Regional District

Dave Thompson, Capital Regional District

Donna McMahon, Sunshine Coast Regional District

Ben Geselbracht, Regional District of Nanaimo

Will Cole-Hamilton, Comox Valley Regional District

The Vancouver Island and Coastal Communities Climate Leadership (VICC-CL) Steering Committee has been facilitated by the Community Energy Association (CEA) since 2022 as the Secretariat. This Summit Report has been created by CEA staff with direction from the VICC-CL Steering Committee.

Community Energy Association