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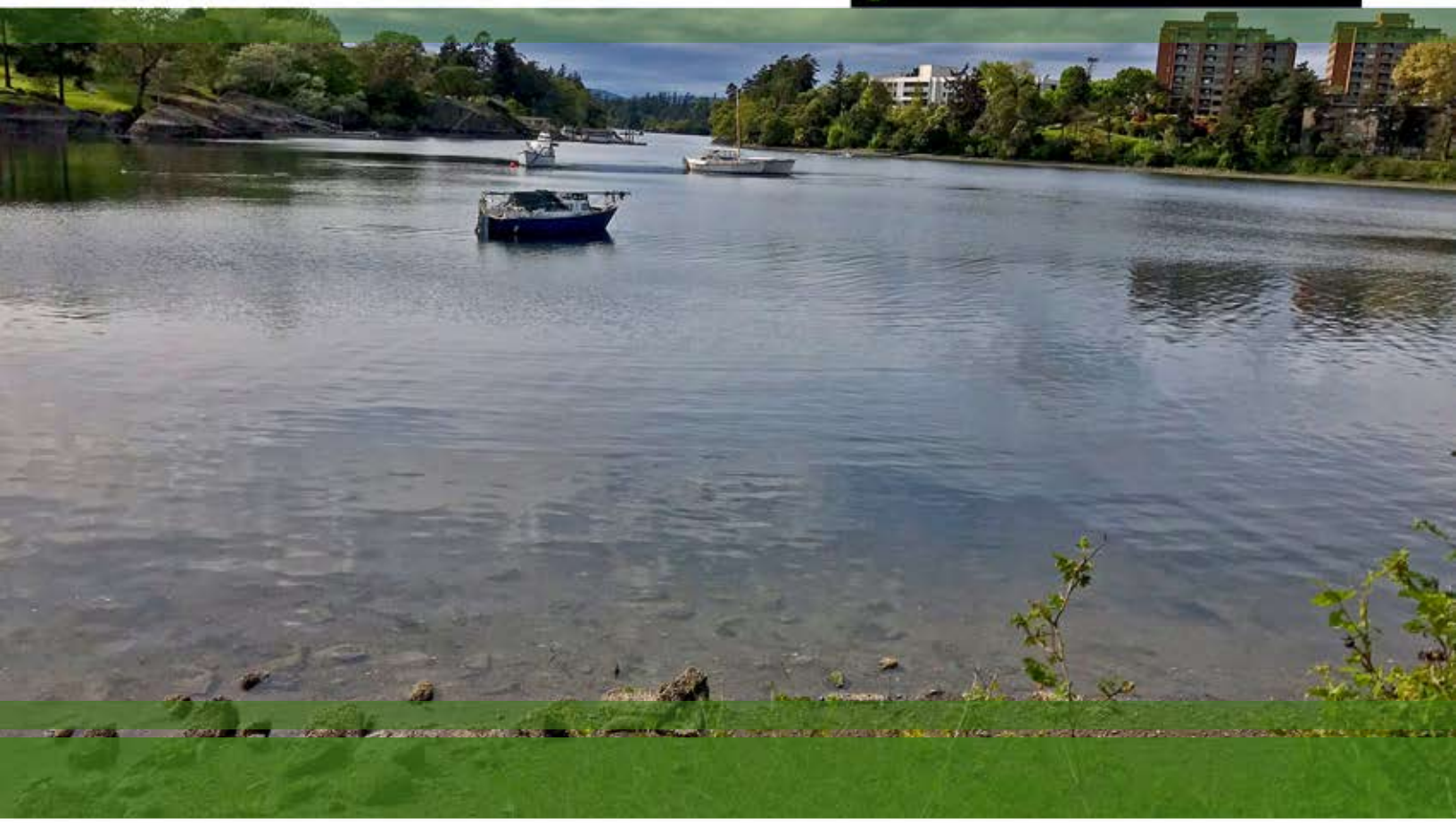

Cleaning up CRD Waterways and Beaches

Update of *Reinventing Rainwater Management*

An ELC Clinic report prepared for:
Veins of Life Watershed Society

Law Student: Anisa Nadji
Articled Student: Andrea Lesperance
Supervisors: Erin Gray and Calvin Sandborn, QC

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The content of this report is legal information and should not be relied on as legal advice.

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I. CONTEXT

The Veins of Life Watershed Society has initiated clean ups and restoration plans in the Victoria Harbour and the Gorge waterway since 1995. It has worked with multiple municipalities in order to encourage contaminant source control measures, encourage the modernization of sewage and stormwater infrastructure and advocate for education programs. Its efforts have been most effective with the municipalities of Esquimalt, Victoria, View Royal, the Highlands and Saanich, and has led to significant cleanup of the Gorge and Harbour. This report is a follow-up to the influential report done by the UVic Environmental Law Centre for the Society in 2010.

II. INTRODUCTION

Rainwater is a major source of pollution and problem for the health of our water bodies.[1] Urban stormwater runoff, which originates from rainwater, results in a significant amount of pollution; indeed, the United States Environmental Protection Agency cites stormwater runoff as the *principal contributor to water quality impairment of waterbodies nationwide*.[2] Stormwater plays a similar role in Canada.

Urban stormwater runoff is the result of many contributing factors. The way in which clean rainwater becomes harmful stormwater runoff is a multi-step process: chemicals, pollutants and toxins on urban landscapes resulting from various human activities (such as driving and construction) are transported by rainwater into the sewer system.[3] When rainwater hits the ground, instead of naturally being absorbed and filtered by natural soil and vegetation, an increase in impervious surfaces (in the form of paved streets, sidewalks and roofs) reduces the ability of the environment to absorb and filter. Therefore, the rain runs across these impervious landscapes and collects pollutants such as gasoline, oils, grease, antifreeze, solvents, pesticides, herbicides, fertilizers, paint chips, heavy metals, PCBs, PAHs, road salt, and detergents. Ultimately, this polluted stormwater runoff enters our storm sewer systems and eventually reaches our water bodies.[4]

Pollutants in water bodies pose numerous risks to the health of humans and marine wildlife. These are outlined below in Part II, sections 1-2. These harmful pollutants are introduced in a number of ways, including:

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[1] Gordon McGuire et al., "Re-inventing Rainwater: A Strategy to Protect Health and Restore Nature in the Capital Region" (24 February 2010), online: *University of Victoria Environmental Law Centre* <http://www.elc.uvic.ca/wordpress/wp-content/uploads/2014/12/Re-Inventing-Rainwater-Management_2010Feb.pdf> [*2010 ELC Report*].

[2] National Research Council, "Urban Stormwater Management in the United States" (15 October 2008), at vii, online: US EPA <https://www3.epa.gov/npdes/pubs/nrc_stormwaterreport.pdf>.

[3] *2010 ELC Report*, *supra* note 1 at p. 16.

[4] *Ibid.*

1. Outdated stormwater infrastructure: Sanitary sewage can overflow into the stormwater sewer. This can occur when sanitary sewer and stormwater sewer pipes are placed in proximity to each other, when old pipes leak, when pipes are mistakenly cross-connected, etc. -- and it can result in fecal coliform entering water bodies. This can lead to serious human health problems like gastrointestinal issues and other infections, such as E. coli, salmonella, hepatitis, polio, tapeworms and rotavirus.[5]

2. Toxins carried through stormwater: Toxins are introduced into stormwater from urban landscape runoff, as well as from cross connections from outdated stormwater infrastructure, as mentioned above. These toxins threaten the health of wildlife. For example, PCBs in stormwater runoff have been found to be a huge threat to the survival of Orcas. These toxins have also resulted in the closure of shellfish beds, and threaten the health of Burrard Inlet fish, salmon fish streams - just to name a few.[6]

3. Velocity of stormwater: Stormwater travels through the sewer pipes at a high velocity, which erodes the stream banks, silts water, and changes meandering streams into drainage ditches. This is exacerbated by the elevated temperature and toxicity of stormwater, which further decimate fish populations.[7] Mismanaged storm water is arguably the main reason why so many of our urban fish streams have been damaged and destroyed.

III. STORMWATER IN THE CAPITAL REGION

Veins of Life Watershed Society has informed us that several federal departments including Environment and Climate Change Canada, Transport Canada, and Fisheries and Oceans Canada have urged the Capital Regional District (CRD) municipalities to implement solutions for the mismanagement of rainwater; however, most of the municipalities have done little to address the issue.[8]

In 2010, the University of Victoria Environmental Law Centre produced the report *Re-inventing Rainwater Management in the Capital Region* (the 2010 ELC Report) with the Veins of Life Watershed Society.[9] The 2010 ELC Report outlined stormwater mismanagement in the Capital Region and recommended strategies to address the problem. The recommendations were:

1. Reform the policies and legislation of all governments in the region to ensure the implementation of Low Impact Development (LID) across the landscape.

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[5] *Ibid* at p. 17.
[6] *Ibid* at p. 18.
[7] *Ibid* at p. 18.
[8] *Ibid* at p. 10.
[9] *Ibid.*

2. Form collaborative partnerships with stewardship groups, developers, homeowners, planners, engineers and other experts, and all levels of government to implement LID across the landscape

3. Shift drainage system financing from property taxes to Rainwater Utility charges, with fees based on actual use to motivate residents to manage rainwater onsite and reduce use of storm sewers.

4. Use Rainwater Utility charges to finance necessary infrastructure upgrades, comprehensive LID programs, and a new Regional Rainwater Strategy and Commission.

5. Ensure the implementation and enforcement of the CRD Model Storm Sewer and Watercourse Protection Bylaw across the entire Capital Region.

6. Establish a Capital Regional District Rainwater Commission to undertake an integrated watershed management approach for managing regional rainwater.

7. Base this integrated management approach on an environmental protection perspective for maintaining a healthy hydrologic cycle and a liquid waste management perspective.

8. Create a long-term, comprehensive Regional Integrated Watershed Management Plan that is incorporated into the Regional Growth Strategy, the implementation of which would be a commitment by each municipality through its regional context statement and bylaw amendments.

9. Base the Plan on the overarching provincial goals for rainwater management:
    - Volume Reduction (Put water back into the ground);
    - Water Quality (Preserve or improve the water); and
    - Rate Control/Detention (Hold back the water).

10. Commit to the mandatory targets in the Plan.

11. The proposed Rainwater Commission take steps to ensure that:
    - Stringent performance-based regulations are established across all watersheds of the Region;
    - A comprehensive set of financial motivations encourage the implementation of LID across the Region; and
    - Local governments adjust Development Cost Charges to create incentives for LID.

12. The proposed Rainwater Commission work with all CRD municipalities to implement LID practices in their own buildings and streets and encourage the implementation of LID Demonstration Projects.

13. The proposed Rainwater Commission work with Local Governments to ensure that obsolete stormwater infrastructure is upgraded by taking the following steps:
    - Identify the infrastructure problems by restoring and enhancing the stormwater monitoring program;
    - Repair and replace obsolete infrastructure by a set date;
    - Accelerate replacement of Oak Bay's Combined Sewer System; and
    - Install state-of-the-art "end-of-pipe" stormwater treatment where needed and appropriate, guided by a careful inventory of problematic outfalls that require such measures. However, priority should be given to upstream preventative LID measures.

14. The proposed Rainwater Commission launch an intensive educational strategy for residents, developers, businesses, stewardship groups, schools, and others who can improve rainwater management.

15. The proposed Rainwater Commission provide resources and support to local stewardship groups to promote watershed restoration and protection.

16. The proposed Rainwater Commission collaborate with community groups and educational institutes to conduct more extensive water quality monitoring.

17. The proposed Rainwater Commission publish a biennial "State of the Watershed" Report. Among other things, this Report should include:
    - A report card on the health of each of the watersheds in the Capital Region;
    - Documentation of total impervious cover in the Capital Region and of the trends in effective impervious cover for each municipality;
    - Targets for reducing total impervious cover, mitigating existing impervious cover, replacing obsolete infrastructure, installing end-of-pipe treatments, etc.;
    - Goals for re-opening shellfish harvesting area and re-establishing urban salmon streams;
    - Data currently compiled for the Stormwater Quality Annual Reports; and
    - Data regarding stormwater discharge into key fresh waters in addition to currently monitored sites.

There has been some progress on implementing some recommendations in the 2010 ELC Report. First, there has been an increase of rain gardens created around the Capital Region as well as other LID practices (examples include Fisherman's Warf rain garden, Dockside Green, the University of Victoria Medical Sciences Building and McKenzie entrance, Ecole Victor Brodeur and the BC Cancer Centre).[10]

[10] Capital Regional District, "Rainwater Management Tour" (accessed 30 April 2019), online: <https://www.crd.bc.ca/education/green-stormwater-infrastructure/rainwater-management>.

Second, the City of Victoria implemented another key recommendation: in 2016 Victoria established a Stormwater Utility charge on property owners in the City. This charge is based on a property's total impervious area and the length of its street frontage, and is therefore tied to a property's impact to the stormwater system. The Stormwater Utility charge is used to fund the upgrading of the outdated stormwater systems – and to create a powerful incentive for property owners to reduce the impact of impervious surfaces and resulting stormwater problems on their properties.[11]

Third, some municipalities have implemented the CRD's *Model Storm Sewer and Watercourse Protection Bylaw* (Model Bylaw).[12] These municipalities are: Victoria, the Town of View Royal, the District of Saanich and those on the Saanich Peninsula (the Districts of Central Saanich, North Saanich, and the Town of Sidney).[13]

Although the implementation of some of the 2010 ELC Report's recommendations, as described above, is a step toward improved stormwater management, there are still many strategies that have yet to be implemented by all the municipalities, and most importantly there is no integrated approach to address the stormwater issue across water bodies. As stormwater continues to be a serious environmental and public health problem, municipalities must take stronger action and must do so on an urgent basis.

There is no doubt that the Capital Regional District needs to do far more to deal with the stormwater problem. The compelling information below demonstrates the ongoing and urgent need for stormwater reform – and the continuing overwhelming effect of stormwater on human life and wildlife.

1. Public Health – High Health Concern Ratings Continue

In 2017 the CRD assessed 167 stormwater discharges for *E. Coli.* These discharges were in the following jurisdictions: the City of Colwood, Township of Esquimalt, City of Langford, District of Oak Bay, Saanich, Victoria, View Royal, Esquimalt First Nation, Songhees First Nation and Department of National Defence.[14]

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[11] City of Victoria, "Stormwater Utility" (accessed 14 May 2019), online: <https://www.victoria.ca/EN/main/residents/water-sewer-stormwater/stormwater/stormwater-utility.html>.

[12] Capital Regional District, DRAFT *Model Bylaw, A bylaw to regulate discharges to the municipal stormwater drainage system (*4 January 2007), online: <https://www.crd.bc.ca/docs/default-source/es-watersheds-pdf/model-storm-water-watercourse-protection-bylaw.pdf?sfvrsn=499a8fc9_4> [*Model Bylaw*].

[13] Though some of the municipalities adopted the Model Bylaw with some changes, these changes are minor and do not weaken the bylaw from a stormwater management perspective. Interview of Dale Green, Capital Regional District, by Calvin Sandborn and Anisa Nadji (21 February 2019) [*Dale Green*].

[14] Capital Regional District, "Core Area Stormwater Quality 2017 Annual Report" (2017), online: <https://www.crd.bc.ca/docs/default-source/crd-document-library/annual-reports/environmental-protection/integrated-

In these 167 stormwater discharges, 96 (58%) were found to have one or more *E. Coli* count greater than 200 colony-forming units.[15] The CRD considers this level of contamination to indicate "sources of sewage or animal waste with potential to cause adverse effects for public health from primary recreational activities (e.g. swimming, diving)".[16] The number of discharges with high public health concern ratings has fluctuated throughout the years: as of 2017, there were 31 high-rated discharges, which was a decrease from 1993 (49 discharges), but an increase from 2004 (28 discharges).[17] It should be noted that while some previously high-rated discharges have lowered recently, some low-rated discharges have increased.[18] Clearly, this is a complex issue with many contributing factors.

Explanatory Note: The CRD bases the level of public health concern on potential for human contact and contamination levels. The following parameters are used to assess the public health concern level:

- Fecal coliform concentrations in the stormwater discharge;
- Discharge flow;
- Location of the discharge; and
- Public use of the shoreline.[19]

The rating is determined by using the total of the fecal coliform rating and the shoreline use rating. A rating of 2 or 3 is considered "low," 4 is considered "moderate," and 5 or 6 is considered "high."[20]

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watershed-management/core-area/2017-core-area-stormwater-quality-annual-report.pdf?sfvrsn=72d1f3ca_2> [*CRD Core Area Annual Report*].

[15] *Ibid* at p. 1.

[16] *Ibid.*

[17] *Ibid* at p. 4.

[18] *Ibid.*

[19] Capital Regional District, "Core Area Stormwater Report 2017 Supplemental Data" (2017), at Appendix G "CRD Public Health and Environmental Concern Rating System" at p .1, online: <https://www.crd.bc.ca/docs/default-source/crd-document-library/annual-reports/environmental-protection/integrated-watershed-management/core-area/2017-core-area-stormwater-report-supplemental-data.pdf?sfvrsn=f558f1ca_2> [*CRD Core Area 2017 Supplemental Data*].

[20] *Ibid* at Appendix B "Core Stormwater Public Health Ratings" at p. 5.

Table 1. Fecal Coliform Rating Criteria and Public Shoreline Use Rating Criteria

Fecal Coliform Rating		Public Shoreline Use Rating	
Rating	**Criteria**	**Rating**	**Criteria**
1	No flow measured or FC count consistently under 200 CFU/100 mL	1	Low contact (e.g., inaccessible, beach walking)
2	FC count between 200 and 5,000 CFU/100 mL	2	Secondary contact (e.g., kayaking)
3	FC count greater than 5,000 CFU/100 mL	3	Primary contact (e.g., swimming, scuba diving)

Source: ***CRD Core Area 2017 Stormwater Quality Supplemental Data Report***, core area[21]

2. Environmental Health: Chemical Contaminants – 45% of Samples Show High or Moderate Environmental Concern Ratings

In 2017 the CRD collected 31 sediment samples from stormwater collection systems.[22] Of those samples collected, eight were found to have a moderate environmental concern rating (26% of samples), while six were found to have a high environmental concern rating (19% of samples).[23]

Table 2. Criteria for Determining the Contaminant Rating

Contaminant Rating	Criteria for Determining the Contaminant Rating
Low	Sum of the individual ratios of Cn/MSQG (TEU) is less than 1.0
Moderate	Sum of the individual ratios of Cn/MSQG (TEU) is greater than or equal to 1.0, but no individual parameter exceeds, or is equal to, a value of 0.75
High	The ratio Cn/MSQG is greater than, or equal to, 0.75 for any single parameter

Source: ***CRD Core Area 2017 Stormwater Quality Supplemental Data Report***, core area[24]

[21] *Ibid* at Appendix G, "CRD Public Health and Environmental Concern Rating System" at p 1.
[22] *CRD Core Area Annual report*, *supra* note 14 at p. 2.
[23] Environmental concern rating is assessed based on the contaminant rating of discharge sediments, which is measured by finding the ratio between sediment concentration of eight metals and two groups of organics (Cn/MSQC). *CRD Core Area 2017 Supplemental Data*, *supra* note 19 at Appendix G, "CRD Public Health and Environmental Concern Rating System" p. 1.
[24] *Ibid* at Appendix G, "CRD Public Health and Environmental Concern Rating System" p. 2.

3. Watercourse Monitoring

The CRD monitors various creeks twice per year in order to assess water quality and watershed health. In 2017 the CRD monitored the following three creeks more extensively,[25] and found:

Coloquitz Creek:

- The concentrations of copper, aluminum, zinc, phosphorus and suspended solids could "result in adverse effects for aquatic life;"[26] and
- Elevated level of bacteria revealed sewage contamination.[27]

Colwood Creek:

- The water quality at the mouth of the creek was good; however, the water quality upstream was worse.[28]

Tod Creek:

- The water quality at the mouth of the creek was good overall, but the water quality upstream was "unlikely to be able to support aquatic life."[29]

4. Creek Water Quality – Creeks with Poor or Moderate Water Quality

The CRD categorized the creeks by overall water quality as follows:

- Poor: Bowker Creek, Ceclina Creek, upstream Todd Creek
- Moderate: Bee Creek, Coloquitz Creek, Colwood Creek, Douglas Creek, Hospital Creek, Noble Creek and Selleck Creek
- Good: Craigflower Creek, Mill Stream and Goldstream River, Tod Creek Mouth[30]

Benthic invertebrates live in healthy streams, and for this reason their presence can be a good indicator of stream health. The CRD has collected data on the presence of benthic invertebrates in the major creeks and found that *downstream locations in Cecelia Creek, Coloquitz Creek, Bee Creek and Bowker Creek are not in good health.*[31]

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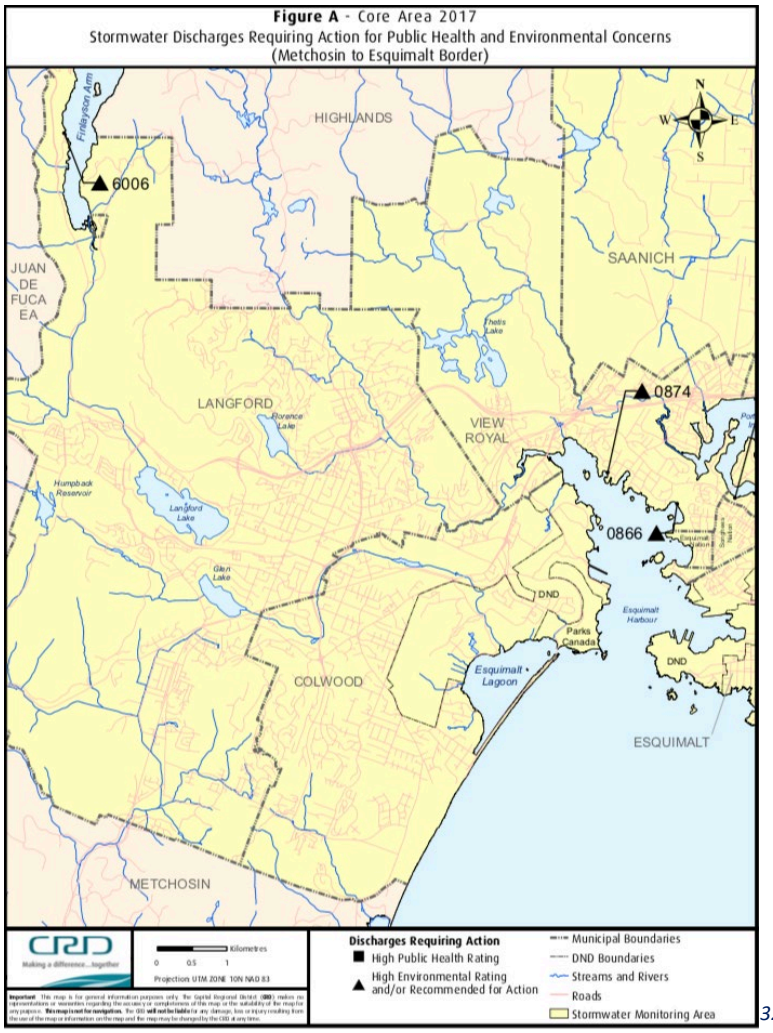
[25] *CRD Core Area Annual Report, supra* note 14 at p. 9.
[26] *CRD Core Area Annual report*, *supra* note 14 at p. 9.
[27] *Ibid.*
[28] *Ibid.*
[29] *Ibid.*
[30] *Ibid* at p. 10.
[31] *Ibid.*

The recent data shows that indicators of risks to environmental and public health continue to fluctuate, as new contaminants are introduced into discharge areas that have previously been categorized as low-rated for public or environmental health concerns. This inconsistency and fluctuating contaminant inputs clearly demonstrate that more must be done to prioritize stormwater management.



[32]

Source: CRD Core Area 2017 ***Stormwater Quality Annual Report***[33]
Note: that this map shows areas of the CRD most heavily impacted by stormwater.

[32] *Ibid* at p. 5.
[33] *Ibid.*

[34]

Source: CRD Core Area 2017 ***Stormwater Quality Annual Report***[35]
Note: that this map shows areas of the CRD most heavily impacted by stormwater.

[34] *Ibid* at p. 6.
[35] *Ibid.*

5. Victoria Harbour Contaminants – Highest Levels of Many Contaminants out of All Coastal Sites Sampled

According to Ocean Wise "Pollution Tracker,"[36] Victoria Harbour contains a large number of contaminants.[37] For many of these contaminants, Victoria Harbour has the highest level of the 51 coastal locations sampled.[38]

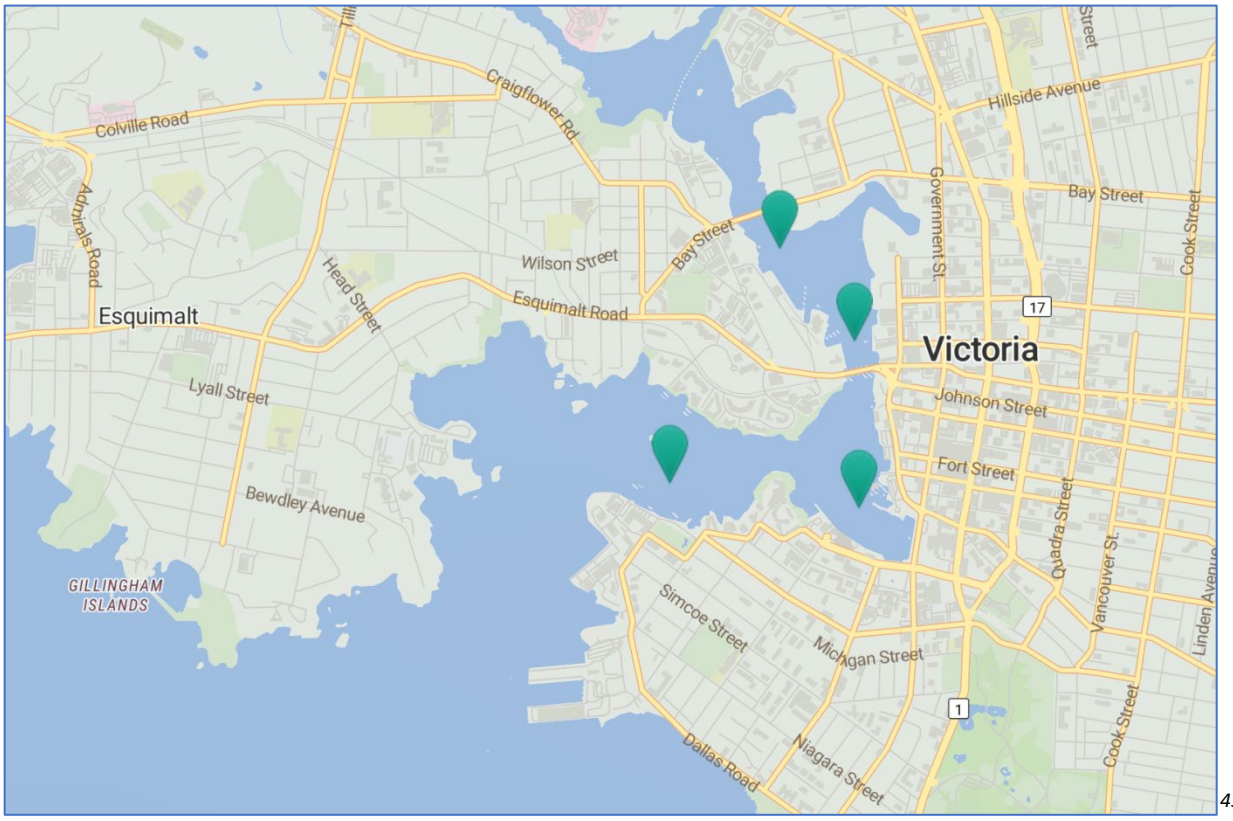
Four different areas of the Victoria Harbour are sampled by Ocean Wise; in three of four, Victoria Harbour was ranked highest of all sampled locations for the contaminants listed below:[39]

- *Victoria Harbour 1*: Alkylphenols, PCCD/Fs, TBBPA;[40]
- *Victoria Harbour 2:* Organotins, PCBs;[41]
- *Victoria Harbour 3:* HBCD, PBDEs;[42] and
- *Victoria Harbour 4:* No contaminants are ranked highest, but several contaminants are ranked second and third highest.[43]

These contaminants are all highly toxic and dangerous for human health as well as marine and terrestrial wildlife.[44] A number of these contaminants arrive in these waterways via stormwater runoff.

[36] Ocean Wise, "Pollution Tracker" (2017), online: *Pollution Tracker* <pollutiontracker.org> [*Pollution Tracker*].
[37] *Ibid.*
[38] *Ibid.*
[39] *Ibid.*
[40] *Ibid.*
[41] *Ibid.*
[42] *Ibid.*
[43] *Ibid.*
[44] *Ibid.*

Table 3. Victoria Harbour Sample Areas



[45]

Credit: www.pollutiontracker.org [46]

i. Alkylphenols

Victoria Harbour area 1 is the most contaminated site coast-wide for Alkylphenols (APs).[47] APs are used as surfactants in many agents such as detergents, wetting agents, and dispersing agents.[48] They are used in construction, metal processing, the oil and gas industry, the pesticide industry, and other industries.[49]

[45] *Ibid.*
[46] *Ibid.*
[47] *Ibid.*
[48] *Ibid.*
[49] C Garrett & PS Ross, "Recovering resident killer whales: A guide to contaminant sources, mitigation, and regulations in British Columbia" (Sidney, BC: Fisheries and Oceans Canada, Canadian Technical Report of Fisheries and Aquatic Sciences 2894, 2010), online: *Fisheries and Oceans Canada* <http://www.dfo-mpo.gc.ca/Library/341729.pdf > [*Recovering Resident Killer Whales*].

APs enter the waterways through stormwater runoff, sewer overflows and wastewater discharge and are immensely toxic to marine life.[50] Most widely used APs are Nonphenol (NP) and Nonylphenol ethoxylates (NPEs). NP and NPEs are endocrine disruptors and thus upset regular hormonal processes.[51] For example, from 1976-1981 NPs were part of an insecticide formulation that was sprayed in the Atlantic provinces and was later found to be responsible for the decrease in salmon in the Atlantic.[52]

ii. PCDDs

Other contaminants for which the Victoria Harbour area 1 has the highest contamination levels are polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs).[53] These compounds are created as a by-product of industrial practices, including the production of pesticides, combustion or waste products, wood treatment, pulp and paper production and even vehicle use. [54]

These compounds have been linked to immune disorders, reproduction disorders and cancer in humans.[55] High concentrations of such compounds may also be a contributing factor to the decline in salmon stocks.[56] Mammals exposed to PCDDs can be affected in many ways including reproductive issues, fetal abnormalities, immune suppression, and increased death rates.[57]

iii. TBBPA

Victoria Harbour area 1 is also ranked most contaminated for tetrabromobisphenol A (TBBPA).[58] TBBPA is a brominated flame retardant, used in electronic equipment, vehicle parts and other appliances.[59] Brominated flame retardants are toxic to wildlife, including aquatic and terrestrial organisms. They affect their development, reproduction and survival.[60] For example, in

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[50] *Pollution Tracker, supra* note 36.
[51] *Pollution Tracker, supra* note 36; A Soares *et al*., "Nonylphenol in the environment: a critical review on occurrence, fate, toxicity and treatment in wastewaters." (2008) 34:7 Environ. Int. 1033-1049; Environment Canada and "*Canadian Environmental Protection Act, 1999*, Priority Substances List Assessment Report, Nonylphenol and its Ethoxylates" (April 2001), at p. 14, online: <https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/hecs-sesc/pdf/pubs/contaminants/psl2-lsp2/nonylphenol/nonylphenol-eng.pdf>.
[52] *Pollution Tracker*, supra note 36, "Alkylphenols" (accessed 30 April 2019), online: http://pollutiontracker.org/contaminants/alkylphenols/; Fairchild *et al*. "Pollutants in river run-off from forest spraying and effects on Atlantic salmon. Presentation" (2010) in Burt MDB & Wells PG, eds, *Threats to the health of the Bay of Fundy: potential problems posed by pollutants*, BoFEP Technical Report No. 5.
[53] *Pollution Tracker, supra* note 36.
[54] *Ibid.*
[55] K Srogi, "Levels and congener distributions of PCDDs, PCDFs and dioxin-like PCBs in environmental and human samples: A review" (2008) 6:1 Environm Chem Lett 1-28; World Health Organization "Exposure to dioxins and dioxin-like substances: A major public health concern" (2010) at p. 3, online: <https://www.who.int/ipcs/features/dioxins.pdf>.
[56] *Pollution Tracker, supra* note 36, "PCDD/Fs" (accessed 14 May 2019), online: <http://pollutiontracker.org/pcdd-fs/>.
[57] *Recovering Resident Killer Whales, supra* note 49.
[58] *Pollution Tracker, supra* note 36.
[59] *Ibid.*
[60] Environment Canada, "Screening Assessment Report" (November 2013) at p. 18, online: <http://www.ec.gc.ca/ese-ees/BEE093E4-8387-4790-A9CD-C753B3E5BFAD/FSAR_TBBPA_EN.pdf>.

zebrafish embryos, TBBPA exposure has resulted in hemorrhage, malformations, decreased heart rate and death.[61]

iv. Organotins

Organotins are found at their highest concentrations of all 51 sampled locations in Victoria Harbour area 2. Organotins are used as stabilizers in PVC plastic products and are also used as pesticides.[62] The most toxic of these synthetic organometallic compounds are tributylin (TBT) and triphenyltin (TPT).[63]

Organotins enter the ocean through wastewater, as well as though industrial waste and landfill waste, all of which can be collected by rainwater, and end up in stormwater.[64] Organotins are especially dangerous because they can dissolve in water and attach to organic material,[65] which results in them surviving for months or even years. TBTs in particular are toxic to many species and disrupt the endocrine process of invertebrates.[66] They also have a particularly strong effect on molluscs: they can cause imposex, where females develop male sex organs.[67] This effect impacts the survival of the species as females can become unable to reproduce at normal rates and can even become sterile, affecting the entire specie population.[68] TPTs also have detrimental effects on fish, and cause malformations such as impaired swimming ability, eye deformities and other behaviour issues.[69]

v. PCBs

Polychlorinated biphenyls (PCBs) are also highly toxic and are also found at their highest concentrations in Victoria Harbour area 2.[70] Prior to 1970, PBCs were legal for import, sale and manufacturing and were generally found in electronic equipment and in many other processes

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[61] *Pollution Tracker*, *supra* note 36, "TBBPA" (accessed 14 May 2019), online: http://pollutiontracker.org/contaminants/tbbpa/; Jessica M. McCormicker *et al*., "Embryonic exposure to tetrabromobisphenol A and its metabolites, bisphenol A and tetrabromobisphenol A dimethyl ether disrupts normal zebrafish (*Danio rerio*) development and matrix metalloproteinase expression" (2010) 100:1 Aquat Toxicol 255-262.

[62] Canadian Council of Ministers of the Environment, "Canadian water quality guidelines for the protection of aquatic life: Organotins – Tributyltin, triphenyltin, and tricyclohexyltin" (1999) at p. 1, online: <http://ceqg-rcqe.ccme.ca/download/en/200>.

[63] Jones Bernardes Graceli *et al*., "Organotins: A review of their reproductive toxicity, biochemistry, and environmental fate" (2013) 36:1 Reproductive Toxicol 40-52.

[64] *Pollution Tracker, supra* note 36.

[65] Environment and Climate Change Canada "Priority Substances of Interest in the Georgia Basin. Profiles and background information on current toxics issues" (2004) online: <http://ec.gc.ca/pabg-gbap/default.asp?lang=En&n=5D36F0CE-1>; Blanca Antizar-Ladislao et al. "Environmental levels, toxicity and human exposure to tributyltin (TBT)-contaminated marine environment – A review" (2008) 34:1 Environ Int 292-308 [*Environmental levels, toxicity and human exposure to tributyltin*].

[66] *Pollution Tracker, supra* note 36.

[67] *Environmental levels, toxicity and human exposure to tributyltin, supra* note 65.

[68] Gil Rilov et al., "Unregulated use of TBT-based antifouling paints in Israel (eastern Mediterranean): High contamination and imposex levels in two species of marine gastropods" (2000) 192 Mar Ecol Prog Ser 229-238.

[69] Lijao Wu et al., "Developmental toxicity of organotin compounds in animals" (2014) 1 Front Mar Sci.

[70] *Pollution Tracker, supra* note 36.

such as the manufacturing of plastics and paper.[71] Use of old electronic equipment containing PCBs is authorized until "the end of the equipment's service life".[72]

PCBs can enter our waterways through wastewater discharge.[73] They threaten the health of marine life and consequently the health of humans who consume said marine life.[74] PCBs have been found to disrupt the endocrine process, which, as mentioned above, can result in developmental, reproduction and hormonal issues.[75] PCBs have been linked to an increased risk of developing infectious diseases and cancer in marine mammals. Orcas are considered to be the most PCB-contaminated marine mammals worldwide.[76] In humans, acute exposure to PCBs can lead to immunological and neurobehavioral effects.[77]

vi. HBCD

Victoria area 3 is the most contaminated site for hexabromocyclododecane (HBCD) in all the 51 locations sampled.[78] HBCD is a flame retardant used in foams, upholsteries and drapes.[79] The main way that it reaches marine waterways is through landfill runoff. [80] HBCD can affect immune function, thyroid function, neurological systems as well as reproductive function in various organisms.[81] In addition, its exposure has led to developmental neurotoxicity in mice, as well increased liver weight and thyroid function in rats.[82] The United States Environmental Protection Agency states that chemically induced effects on thyroid function in other animals must be considered relevant in relation to humans, and as such similar effects may be seen in humans with such chemical exposure.[83]

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[71] *Ibid.*
[72] U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, "Toxicological Profile for Polychlorinated Biphenyls (PCBs)" (November 2000), online: <https://www.atsdr.cdc.gov/toxprofiles/tp17.pdf> [*Toxicological Profile for Polychlorinated Biphenyls (PCBs)*].
[73] *Pollution Tracker, supra* note 36.
[74] *Ibid.*
[75] *Recovering resident killer whales, supra* note 49.
[76] Peter S Ross, "Fireproof killer whales: Flame retardant chemicals and the conservation imperative in the charismatic icon of British Columbia" (2006) 63:1 Can. J. Fish. Aquat. Sci. 224-234.
[77] *Toxicological Profile for Polychlorinated Biphenyls (PCBs), supra* note 72.
[78] *Pollution Tracker, supra* note 36.
[79] Environment Canada & Health Canada, "Screening Assessment Report on Hexabromocyclododecane," (November 2011) online: <https://www.ec.gc.ca/ese-ees/7882C148-8AE4-4BA4-8555-668C49F91500/HBCD%20-%20FSAR%20-%20EN.pdf>.
[80] Cynthia A de Wit, Dorte Herzke, Katrin Vorkamp, "Brominated flame retardants in the Arctic environment – trends and new candidates" (2010) 408:1 Sci Total Environ 2885-2918.
[81] *Ibid*; Robert J Letcher et al., "Exposure and effects assessment of persistent organohalogen contaminants in arctic wildlife and fish" (2010) 408:15 Sci Total Environ 2995-3043.
[82] Per Eriksson et al., "Impaired behaviour, learning and memory, in adult mice neonatally exposed to hexabromocyclododecane (HBCDD)" (2006) 21:1 Environ Toxicol and Pharmacol 317-322.
[83] Leo T.M. van der Ven et al., "A 28-Day Oral Toxicity Study Enhanced to Detect Endocrine Effects of Hexabromocyclododecane in Wistar Rats" (2006) 94:2 Toxicol Sci 281-292.

vii. PBDEs

Victoria area 3 also is the most contaminated site for polybrominated diphenyl ethers (PBDEs).[84] PBDEs are another type of flame retardant. They can enter waterbodies through landfill runoff and wastewater treatment plants.[85] PBDEs are endocrine disruptors that can lead to developmental complications in reproduction, immune systems and neurological systems.[86] Studies have shown that PBDEs are transferred from seal and whale mothers to their children in utero, and through lactation.[87]

As mentioned, though those listed are the contaminants that were found in the highest concentrations in the Victoria Harbour compared to all other sampling regions, there were also many contaminants that were found in their second-highest concentrations in the Victoria Harbour areas:

- *Victoria Harbour 1*: HBCD, Lead, Organotins, PBDEs, PPCPs.
- *Victoria Harbour 2:* PBDEs.
- *Victoria Harbour 3:* Alkylphenols, PCDD/Fs.
- *Victoria Harbour 4:* PCBs, PCDD/Fs.[88]

Other contaminants are also recorded at varying levels in the Victoria Harbour, including: HBCD, lead, organotins, PBDEs, PPCPs, legacy pesticides[89], PAHs, PCBs, PFCs, cadmium and mercury. These contaminants should also be considered a serious matter of concern.[90]

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[84] *Pollution Tracker, supra* note 36.
[85] *Ibid.*
[86] Eric Akortia et al., "A review of sources, levels, and toxicity of polybrominated diphenyl ethers (PBDEs) and their transformation and transport in various environmental compartments" (2016) 24:1 Environ Rev 253-273.
[87] Héloise Frouin "Transfer of PBDEs and chlorinated POPs from mother to pup during lactation in harp seals *Phoca groenlandica*" (2012) 417-418 Sci Total Environ 98-107.
[88] *Pollution Tracker, supra* note 36.
[89] Legacy pesticides are organochlorine pesticides; they were previously used in agriculture and in pest control. They enter waterbodies thorough waste water discharge. These pesticides have toxic effects on humans and other organisms. *Ibid.*
[90] *Ibid.*

6. Stormwater in the News

Stormwater Overflows, Pollution and Flooding in the News

"…every time it rains after a dry period, it's as if a giant toilet flushes animal feces, fertilizers, pesticides, oils, road salts, heavy metals and other contaminants into municipal stormwater systems, which in turn send torrents of polluted water directly into watersheds."

George Le Masurier, Watershed Sentinel[91]

Heavy rainfall events continue to cause the CRD to issue public advisories to avoid beaches and water bodies in Greater Victoria due to sewage overflows from stormwater flooding. From November 2018 to February 2019, there were four wastewater discharge advisories in the CRD.[92] In 2017 the Gorge Swim Fest was cancelled due to water contamination, caused by cross contamination between sewage pipes and stormwater pipes that feed into the Gorge Creek.[93]

Matthew McCrank, the senior manager of infrastructure operations with the CRD has commented that the infiltration of stormwater into the sanitary sewer system "is a common problem around the region."[94] The system is not designed to anticipate heavy rain events and the CRD's wastewater pipes are not all sealed off, which means stormwater can enter the wastewater system.[95] Some municipalities continue to drain stormwater through their wastewater systems.[96]

Increasing residential and commercial development without implementing effective drainage systems can cause flooding. In 2017 a farm owner launched a law suit against the District of Central Saanich for

[91] George Le Masurier, "Sponge Cities: Can innovations stop surface runoff from killing our waters?" *Watershed Sentinel* (2019 February 14), online: <https://watershedsentinel.ca/articles/sponge-cities/>.
[92] There were wastewater discharge advisories on November 4, December 11 and December 28, 2018, and January 23, 2019. "Heavy rain causes wastewater discharge into areas of Saanich and Oak Bay" *CHEK News* (2018 November 4), online: <https://www.cheknews.ca/heavy-rain-causes-wastewater-discharge-into-areas-of-saanich-and-oak-bay-505412/>; "Storm causes wastewater overflows along Greater Victoria shorelines" *CTV Vancouver Island* (2018 December 11), online: <https://vancouverisland.ctvnews.ca/storm-causes-wastewater-overflows-along-greater-victoria-shorelines-1.4214111>; "Heavy rains cause sewage overflows at Victoria area beaches" *Times Colonist* (2018 December 28), online: <https://www.timescolonist.com/news/local/heavy-rains-cause-sewage-overflows-at-victoria-area-beaches-1.23566593>; "Wastewater discharge advisory for shorelines in Saanich and Oak Bay following heavy rain, CRD" *CHEK News* (2019 January 23), online: <https://www.cheknews.ca/wastewater-discharge-advisory-for-shorelines-in-saanich-and-oak-bay-following-heavy-rain-crd-527678/>; Capital Regional District, "Resolved Alerts," Alerts and Notices, online: <https://www.crd.bc.ca/about/alerts-notices>.
[93] "Source of Gorge Creek water contamination located" *CBC News* (2017 October 25), online: <https://www.cbc.ca/news/canada/british-columbia/esquimalt-water-contimanation-located-1.4370155>.
[94] Travis Paterson, "Heavy rains force sewage overflows on beaches across Greater Victoria" *Sooke New Mirror* (2019 January 4), online: <https://www.sookenewsmirror.com/news/heavy-rains-force-sewage-overflows-on-beaches-across-greater-victoria/>.
[95] *Ibid.*
[96] *Ibid.*

poor land use management, because ten acres of their prime agricultural land could no longer be farmed due to increased flooding over the last ten years.[97]

Oil Tank Leaks in the News

"Unknown to [homeowners], they might have a leak in their tank. During the first heavy rainfall, that creates a spill that typically enters our creeks and waterways through our storm drainage system."

Keili Bartlett, Oak Bay News[98]

Harley Machielse, Director of Engineering for the District of Saanich, has commented that Saanich usually has five home oil tank spills a year.[99] Between 2012 and 2017, there were 21 oil spills from above ground oil tanks in Saanich.[100]

Old decommissioned oil tanks are usually emptied and left in the ground. Saanich has implemented a new bylaw that no longer allows old oil tanks to be buried, but rather requires them to be removed.[101] Unfortunately, this bylaw does not address existing old oil tanks that are buried around the municipality.[102] Decommissioned tanks can still cause contamination as they may fill with water and slowly leak into surrounding soil.

Many homeowners are not aware that they may have old oil tanks buried on their property, nor are they aware of the environmental destruction these tanks can cause.[103] For example, in 2012 an old buried oil tank spilled from a property in Saanich, through a storm drain, and into the Gorge Waterway. An environmental remediation team had to remove the tank plus 80 kilograms of "sludge", 1,900 litres of oily water, and over 12 tonnes of contaminated soil.[104] The homeowners were not aware that there was an old buried oil tank on their property.

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[97] Carla Wilson, "Lawsuit focuses on farmland flooding in Central Saanich" *Times Colonist* (2017 July 23), online: <https://www.timescolonist.com/news/local/lawsuit-focuses-on-farmland-flooding-in-central-saanich-1.21315704>.
[98] Keili Bartlett, "Your unused oil tank could cost you" *Oak Bay News* (2018 October 11), online: <https://www.oakbaynews.com/news/your-unused-oil-tank-could-cost-you/>.
[99] *Ibid.*
[100] Wolf Depner, "Saanich aims to help homeowners dump their oil tanks for heat pumps" *Victoria News* (2019 March 1), online: <https://www.vicnews.com/news/saanich-aims-to-help-homeowners-dump-their-oil-tanks-for-heat-pumps/>.
[101] Bill Cleverley, "Saanich will no longer allow burying old oil tanks" *Times Colonist* (2014 May 1), online: <https://www.timescolonist.com/news/local/saanich-will-no-longer-allow-burying-old-oil-tanks-1.1018120>.
[102] *Ibid.*
[103] Kendall Hanson, "Nanaimo couple's retirement plans on hold after leaking oil tank discovered" *CHEK News* (2018 October 31), online: <https://www.cheknews.ca/nanaimo-couples-retirement-plans-on-hold-after-leaking-oil-tank-discovered-504228/>.
[104] Louise Dickson, "Former homeowners must pay for oil tank leak in Saanich" *Times Colonist* (2015 February 21), online: <https://www.timescolonist.com/news/local/former-homeowners-must-pay-for-oil-tank-leak-in-saanich-1.1770366>.

IV. 2019 FOLLOW-UP RECOMMENDATIONS

Section II described how some of the 2010 ELC Report recommendations have been implemented by some Capital Region municipalities; however, many have yet to be implemented at all and none has been implemented throughout all 13 Capital Region municipalities. The following recommendations must be implemented in order to adequately address the stormwater management issues described in the previous section:

RECOMMENDATION #1: ENSURE THE IMPLEMENTATION AND ENFORCEMENT OF THE CRD MODEL STORM SEWER AND WATERCOURSE PROTECTION BYLAW ACROSS THE ENTIRE CAPITAL REGION

The CRD has produced the Model Bylaw for all of Greater Victoria. As discussed in the 2010 ELC Report, this type of bylaw is important for stormwater management, as it regulates and addresses the *source* of contaminants in stormwater by banning the discharge of contaminants into storm sewers. The Model Bylaw regulates what can and cannot be put in the drains by specific industries.[105]

Of the 13 municipalities in the CRD, only six are now governed by provisions of the Model Bylaw. These include: Victoria and View Royal, which adopted the Model Bylaw with some changes;[106], Saanich, which already had in place a Watercourse and Drainage Bylaw that addresses the topics in the Model Bylaw, though is weaker in some regards, and especially so in its penalty provision[107], and the Saanich Peninsula municipalities (Central Saanich, Sidney and North Saanich), which all are now covered by the CRD's recent *Storm Sewer and Watercourse Protection Bylaw for the Saanich Peninsula*, (a modified version of the Model Bylaw).[108] The changes mentioned have not substantively weakened the bylaws when compared with the Model Bylaw,[109] other than Saanich, which should consider whether to strengthen aspects of its bylaw.[110] The municipalities that have not adopted the Model Bylaw, or any version of it, are:

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[105] *2010 ELC Report, supra* note 1 at 77-78.
[106] City of Victoria, Bylaw No. 14-071, *Sanitary and Sewer and Stormwater Utilities Bylaw* (2015 March 13); Town of View Royal, Bylaw No. 902, *Storm Water Regulation Bylaw* (2015 July7).
[107] District of Saanich, Bylaw No. 7501, *Watercourse and Drainage Regulation Bylaw, 1996,* online: <https://www.saanich.ca/assets/Local~Government/Documents/Bylaws~and~Policies/watercourse-and-drainage-regulation-bylaw-1996-no-7501.pdf>.
[108] CRD Bylaw No. 4168, *Storm Sewer and Watercourse Protection Bylaw for the Saanich Peninsula*, online: <https://www.crd.bc.ca/education/stormwater-wastewater-septic/at-work/stormwater/peninsula-stormwater-bylaw>.
[109] *Dale Green, supra* note 13.
[110] For example, the Model Bylaw prohibits the discharge of "business waste" (defined as "waste which is produced on a commercial, industrial or institutional property"—with some exemptions if regulated by a code of practice, etc.), whereas the Saanich bylaw does not contain this prohibition. As another example, the Model Bylaw exempts uncontaminated water from its discharge prohibition, provided it does not contain chlorine or chloramine; whereas the Saanich bylaw does not include the chlorine/chloramine prohibition. In a similar vein, the Model Bylaw requires permitted waste from street, hydrant and water main flushing to be dechlorinated; whereas the Saanich bylaw does not require this dechlorination.

Langford, Oak Bay, Esquimalt, Colwood, the District of Sooke, the District of Metchosin and the District of Highlands.

It is imperative that the remaining seven municipalities adopt the Model Bylaw. As watersheds cross municipal boundaries, there must be uniform adoption across the Capital Region to ensure that activities that discharge contaminants are not prohibited in one part of a water body, but allowed in another. Uneven adoption also results in confusion and inconvenience for businesses that operate in more than one municipality.[111]

RECOMMENDATION #2: UPDATE THE CRD MODEL STORM SEWER AND WATERCOURSE PROTECTION BYLAW TO ADDRESS CURRENTLY EXEMPTED PRACTICES

The Model Bylaw is a good first step, but it should be improved. Currently it exempts from its prohibitions the discharge of water from firefighting activities[112] and other potentially toxin-carrying activities, including waste from landscaping maintenance, non-commercial car washing (commercial car washing is included in the activities for which waste discharge is prohibited), building washing and driveway washing.[113] However, these activities can still result in harmful runoff; for example, products used in firefighter activities often contain ingredients that are toxic to wildlife including fish and other aquatic organisms.[114] In addition, car washing detergents can contain harmful compounds and car washing can result in automobile fluid—such as oil, anti-freeze and transmission fluid—flowing into storm drains.

The CRD should amend the Model Bylaw to consider how the current exemptions, including firefighting and non-commercial car washing, may be better regulated to prevent contaminating storm water. One way to do so is with the use of Best management practices. Best management practices in relation to rainwater management are created to slow, store, infiltrate, evaporate and detain runoff from impervious surfaces.[115] They allow rainwater to be absorbed by the earth rather than directed into storm sewers. For example, a Code of Practice for commercial vehicle wash operations is included as a Schedule to the CRD's Sewer Use Bylaw, which is a source control bylaw for sewers operated by the CRD.[116] Though firefighting

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[111] *2010 ELC Report, supra* note 1 at p. 77.
[112] *Model Bylaw*, *supra* note 12 at s. 2(3).
[113] *Ibid* at s. 2(2).
[114] Thomas Cortina, "Environmental impact of foam" *IFSEC Global* (2008 April 29), online: <https://www.ifsecglobal.com/uncategorized/environmental-impact-of-foam/>; see also U.S. Forest Service, "Wildland Fire Chemical Products Toxicity and Environmental Concerns General Information" (1998 July 9), online: <https://www.fs.fed.us/rm/fire/documents/envissu.pdf>.
[115] District of Saanich, "Stormwater Management" online: <https://www.saanich.ca/EN/main/community/sustainable-saanich/environmental-planning/stormwater-management.html>.
[116] Capital Regional District, Bylaw No. 2922 (Consolidated) *A Bylaw to Regulate the Discharge of Waste into Sewers Connected to a Sewage Facility Operated by the Capital Regional District* (2016 November 10), at Schedule N, online: <https://www.crd.bc.ca/docs/default-source/crd-document-library/bylaws/liquidwasteseptagesewersourcecontrolandstormwater/2922---capital-regional-district-sewer-use-bylaw-no-5-2001B.pdf?sfvrsn=0>; see also Capital Regional District "Environmental Regulations & Best Management Practices, Vehicle

may be considered separately from other activities, as it is an emergency response, reasonable regulations are possible. An industry news publication suggests a number of measures to aid collecting foam solutions used in firefighting after use including: blocking storm drains; and damming, diking or diverting the foam/water solution until it can be disposed of properly. The publication also discusses less toxic foams that are available for firefighting training.[117]

RECOMMENDATION #3: IMPLEMENT RAINWATER UTILITY CHARGE; USE TO FINANCE DRAINAGE SYSTEM, UPDATED INFRASTRUCTURE AND A COMMISSION

The 2010 ELC Report recommended the implementation of a Rainwater Utility charge. A Rainwater Utility charge is a local public service charge that is determined based on characteristics of a property. This charge takes into consideration impervious area on the property and street frontage, which contribute to stormwater runoff.

The Rainwater Utility charge program includes financial incentives for property owners to take steps to reduce runoff. For example, creating rain gardens or using permeable pavement. The Rainwater Utility charge program is based on the user-pay principle.[118] When rainwater services are funded by property taxes, the amount of tax paid is calculated based on property value assessment; however, with a Rainwater Utility charge, payment is related to how much the property contributes to the stormwater problem. For this reason, it is a more fair system – and creates a powerful incentive to reduce impervious surfaces and impacts of the property on the stormwater problem. Another deficiency with stormwater charges being included in property taxes is that stormwater may have to compete for funding with popular budget items, such as parks, and may not receive the funding it requires.[119]

An important purpose for the Rainwater Utility charge is that its funds can go towards updating old stormwater infrastructure – which is of vital importance in order to prevent sewer-stormwater contamination. [120]

In addition, Rainwater Utility charges apply to tax exempt entities (such as hospitals, churches, and governments). Under a regime in which property taxes fund rainwater management, as these entities do not pay property taxes, they would not be contributing to rainwater management funds no matter how much they contribute to the need for these services.[121]

Wash Operations in the Capital Region" (revised March 2007), online: <https://www.crd.bc.ca/docs/default-source/source-control-pdf/bmp-vehicle-wash.pdf?sfvrsn=cb1f88c9_2>.

[117] Robert Avsec, "How safe is firefighting foam?" FireRescue1 (2016 October 17), online: <https://www.firerescue1.com/firefighter-safety/articles/135612018-How-safe-is-firefighting-foam/>.

[118] *Ibid.*

[119] Interview of Jas Paul, Assistant Director of Engineering, City of Victoria, by Calvin Sandborn (2019 March 13). [*Jas Paul*]

[120] *2010 ELC Report*, *supra* note 1at p. 69.

[121] *2010 ELC Report*, *supra* note 1 at p. 69.

The Rainwater Utility charge is consistent with the "polluter pays principle," a principle that is entrenched in Canadian environmental law.[122] This principle "assigns polluters the responsibility for remedying contamination for which they are responsible and imposes on them the direct and immediate costs of pollution."[123] It ensures clean actors benefit and polluters pay. This results in a certain level of accountability for property owners.

As mentioned, Victoria is the only municipality in the Capital Region that has implemented a Rainwater Utility charge. It initiated the program in 2016 and the charge is determined using four factors: (1) the property's impervious area; (2) the street type and length of the property's street frontage (to account for street cleaning costs); (3) an intensity code (this denotes the impact of the property on rainwater management system and is determined by BC Assessment based on property type); and (4) whether a property must have a code of practice (or a program that cleans stormwater prior to leaving their property).[124]

As part of its Rainwater Utility charge program, Victoria also has a Rainwater Rewards Program, which awards rebates and credits for sustainable rainwater management practices on one's property.[125] Credits of 10-50% can be applied to your Rainwater Utility bill.[126] Other rebates are available for the installation LID techniques, which, as mentioned above, include rain gardens, permeable sidewalks, and planting along sidewalks.[127]

The current City of Victoria budget for stormwater management is $2-3 million per year, with an increase of 2% annually.[128] As of the date of this report, Victoria's program had obtained enough funds to fund both stormwater capital improvements and maintenance.[129] Under its program, the costs for capital improvements of obsolete infrastructure and stormwater maintenance are calculated, a capital improvement plan is created, and the cost for the improvement plan is built right into the Rainwater Utility charge that is charged to property owners.[130]

The Rainwater Utility charge is greatly beneficial to fund stormwater management and to encourage behaviour to reduce the toll on stormwater systems. Overall, it is a more fair system. We recommend that all 12 of the remaining municipalities adopt a Rainwater Utility charge.

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[122] *Imperial Oil Ltd. v. Quebec (Minister of the Environment)*, 2003 SCC 58 at para 23.
[123] *Ibid* at para 24.
[124] *City of Victoria, Stormwater Utility, supra* note 11.
[125] *Ibid.*
[126] *Ibid.*
[127] *Ibid.*
[128] *Ibid.*
[129] *Jas Paul, supra* note 1199.
[130] *Ibid.*

RECOMMENDATION #4: FIX AND UPGRADE OBSOLETE STORMWATER INFRASTRUCTURE

As mentioned above, one of the major problems in rainwater management is the cross contamination of sanitary sewage with stormwater. This cross contamination is a result of outdated and broken drainage systems, which allow sewage to overflow from the sanitary system into the stormwater system. This results in fecal coliform being deposited into our water bodies.[131]

These water bodies are wildlife habitat and also serve as recreational spaces for humans. The contamination from sanitary sewers can result in severe health problems for both the humans and wildlife that spend time in these water bodies.[132]

The CRD has linked these public health concerns to aging infrastructure; mainly in Esquimalt, Oak Bay and Victoria.[133] Though Oak Bay has taken initial steps to address its combined sewer system, it has yet to be fully fixed[134]and the other two municipalities have yet to update their outdated sewage system that fail to fully separate stormwater from sanitary sewage.[135]

This recommendation ties in with the recommendation to implement a Rainwater Utility charge; part of the funds incurred from that program can be budgeted for infrastructure updates, which are essential to prevent cross contamination between sanitary and stormwater systems.

Another way to fund these updates is through the provincial Infrastructure Planning Grant Program, which supports local governments in creating sustainable community infrastructure.[136] These grants can cover up to $10,000 of developments and improvements for sustainable infrastructure.[137]

All 13 of the Capital Region municipalities must ensure their stormwater and sanitary infrastructure is sound and upgrade where necessary.

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[131] *2010 ELC Report, supra* note 1 at p. 21.
[132] *Ibid*.
[133] *Ibid* at p. 20.
[134] Bill Cleverley, "Oak Bay Oks $21.5-million sewer upgrade for Uplands" *Times Colonist* (2016 October 13) online: <https://www.timescolonist.com/news/local/oak-bay-oks-21-5-million-sewer-upgrade-for-uplands-1.2364110>.
[135] *Dale Green, supra* note 13.
[136] *Government of British Columbia,* "Infrastructure Planning Grant Program", online: <https://www2.gov.bc.ca/gov/content/governments/local-governments/grants-transfers/grants/infrastructure-planning-grant-program>.
[137] *Ibid.*

RECOMMENDATION #5: ENFORCE THE DEPOSIT OF DELETERIOUS SUBSTANCES INTO WATERWAYS AS A VIOLATION OF THE FEDERAL *FISHERIES ACT*

Although the federal government has yet to enforce sections 35(1) and 36(3) of the *Fisheries Act*[138] in relation to a CRD municipality's mismanagement of stormwater, the Capital Region municipalities may technically be in breach of the provisions.

As of the date of publication of this report, [139] section 35(1) of the *Fisheries Act* provides:

> 35(1) No person shall carry on any work or undertaking that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery.

The first element of the offence is the presence of "a work or undertaking." The federal Crown can argue that stormwater infrastructure is a work or undertaking as storm sewer pipes are "public works" under *Local Government Act*,[140] section 639. In addition, the *Community Charter* defines "service" as: "in relation to a municipality, an activity, work or facility undertaken or provided by or on behalf of the municipality."[141] A service by a municipality involves the provision and maintenance of sewage system. This supports an argument that owning a sewage system constitutes a "work or undertaking" under section 35(1) of the *Fisheries Act.*[142]

"Serious harm" is defined as "the death of fish or any permanent alteration to, or destruction of, fish habitat."[143] As described in Part I, stormwater can destroy fish habitat by carrying toxic contaminants, as well as by its velocity eroding salmon streams.[144] Since improper stormwater management can result in serious harm to fish, the s. 35(1) prohibition should be enforced against those who improperly own and operate stormwater or sewage systems.

Section 36(3) of the *Fisheries Act* provides:

> 36(3) Subject to subsection (4), no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any

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[138] *Fisheries Act,* RSC 1985, c. F-14, online: <https://laws-lois.justice.gc.ca/eng/acts/f-14/>.
[139] Note that as of March 25, 2019 Bill C-68, *An Act to amend the Fisheries Act and other Acts in consequence* has been passed by the House of Commons and has been referred to the Standing Senate Committee on Fisheries and Oceans. Bill C-68 would provide full habitat protection by reintroducing a prohibition on works, undertakings, or activities that result in the "harmful alteration, disruption or destruction of fish habitat" (HADD). Bill C-68, *An Act to amend the Fisheries Act and other Acts in consequence,* 1st Sess, 42nd Parl (as passed by the House of Commons as of 20 June 2018) at s. 22(1).
[140] *Local Government Act,* RSBC 2015, c 1 [*Local Government Act*].
[141] *Community Charter*, SBC 2003, c. 26, at s. 1.
[142] Katrina Andres & Calvin Sandborn, "Submission to Saanich Environmental Advisory Committee" UVic *Environmental Law Centre* (December 2011) [*Submission to Saanich Environmental Advisory Committee*].
[143] Note that fish habitat includes adjacent land and vegetation. *R v. Larsen* (2013), 2013 Carswell BC 1067 (B.C. Prov. Ct.); affirmed (2014), 2014 CarswellBC 3277 (BCSC).
[144] *2010 ELC Report, supra note* 1 at p. 18.

conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water.

There are three elements to this offence: (1) depositing or permitting the deposit of, (2) a deleterious substance;[145] (3) in water frequented by fish or where the substance may enter such water.

As discussed above, the aging and obsolete infrastructure (in particular in Esquimalt, Oak Bay and Victoria) is allowing contaminated water to enter water bodies. In addition, seven municipalities have not adopted the Model Bylaw, which works to prevent contaminants in our stormwater system. These are ways in which many of the municipalities are satisfying the first and second elements of section 36(3).

It is well known that many of the waterways that are affected negatively by stormwater contain marine wildlife, including fish. These waterways include: Bowker Creek, Douglas Creek, Swan Lake, Hagan Creek, Colquitz Creek, Reay Creek, the Gorge, Victoria Harbour, Sook Inlet, and Saanich Inlet. Therefore, the third element of section 36(3) is also satisfied.

Section 36(3) is a strict liability offence; once the three elements of the offence are proven, the burden of proof then turns to the municipalities to raise a defence. [146] The municipalities would need to show that they have employed due diligence in preventing the deposit of deleterious substances in these waterways.[147] As most of the municipalities have not adopted basic rainwater management practices, this would be a difficult task. For example, Esquimalt, Oak Bay and Victoria still lack adequate infrastructure and there are seven municipalities that have not adopted the Model Bylaw. This is in spite of being made aware of the ELC's 2010 Report and its full suite of recommendations.

In summary, despite calls for actions, most of the Capital Region municipalities have routinely failed to comprehensively address stormwater management. If prosecuted under sections 35(1) or 36(3) of the *Fisheries Act*, these municipalities may not be able to prove a defence of due diligence. Prosecution for violations of the *Fisheries Act* can result in up to $500,000 in fines as well as imprisonment.[148, 149]

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[145] "Deleterious substance" is defined broadly. *St. Brieux (Town) v. Canada (Minister of Fisheries & Oceans)* (2010), 2010 CarswellNat 2953 (F. C.); *R. v. Zellstoff Celgar Ltd. Partnership* (2012), 2012 CarswellBC 435 (B.C. Prov. Ct). Also see: *R. v. Williams Operating Corp* (2008), 2008 CarswellOnt 5646 (Ont S.C.J). However, note that there are limits; as log debris was found not to be a deleterious substances. *R. v. MacMillan Bloedel Ltd* (1982), 3 F.P.R. 332 (B.C. Prov. Ct).

[146] *R. v. Downie Street Sawmills Ltd.* (1979) 3 F.P.R. 315 (depositing deleterious substance being strict liability offence; defence of due care and diligence available).

[147] *Submission to Saanich Environmental Advisory Committee, supra* note 142.

[148] *Fisheries Act, supra* note 138.

[149] *R v. Rio Tinto Alcan Inc.*, 2017 BCCA 440 at para 3.

RECOMMENDATION #6: CREATE AN OVERARCHING RESIDENTIAL OIL TANK REGULATION

Many homes in the Capital Region are still heated with oil tanks. Residential oil tanks are prone to leaking, which results in oil entering the stormwater system and ending up in water bodies.[150] Leaks can occur due to the oil tank having corroded from condensation, from the tank getting pierced or corroded during plumbing maintenance, or even from delivery companies attempting to fill oil tanks that are not actually present.[151]

Home heating oil is very toxic and has the ability to kill fish and other marine life once it enters water bodies.[152] Importantly, small quantities of oil can pollute large areas; for example, one cup of oil could pollute a volume as large as an Olympic pool.[153]

While there is some legislation that addresses this problem, it tends to be more punitive than preventative. Measures must be taken to *prevent* oil spills, not punish those responsible for oil spills after the fact.

As the ELC recommended in a 2012 report on the problem of oil tanks, the Province and local governments should legislate the following:

- Mandatory physical requirements for home heating oil tanks and equipment, including requiring tanks to be double-walled or made of fiberglass, requiring reinforced plumbing and making containment apparatuses mandatory, etc. CCME Code standards should be considered.
- Requirements for tank system replacement and upgrades, including maximum time limits on the length of time a tank can stay installed on a property;
- A requirement that tank systems be registered – and establishment of government-issued identification tag systems that confirm tanks and systems are in good shape and not obsolete. Delivery of fuel to tanks without a valid tag should be prohibited;
- Mandatory regular inspection systems, including authorization of inspectors to enter private property for that purpose;
- Require every installer of home heating systems to ensure that the old oil tank has been properly decommissioned before installing a new system.
- Require proper decommissioning of any tanks that no longer meet certification or if unused for a prescribed period. This will require setting up mechanisms to identify where all tanks are (including access to oil delivery company records and offering of public insurance to homeowners who self-identify old tanks).

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[150] Trevor Johnson & Naomi Kovak, "Preventing Home Heating Oil Spills in British Columbia" (November 2012) at p. 4, online: <http://www.elc.uvic.ca/wordpress/wp-content/uploads/2014/08/2012-02-01-PreventingHomeHeatingOilSpillsinBC_Nov2012.pdf>.
[151] *Ibid* at p. 6.
[152] *Ibid*.
[153] *Ibid*.

- Governments should consider legislating absolute liability for oil companies for any subsequent spills from a tank they fill – and a requirement that the company carry liability insurance for that liability;
- Subsidies to homeowners to change to cleaner home heating options;
- A public insurance fund paid for by surcharge on fuel to pay for spills from the property of those homeowners who have self-identified as having a tank.

RECOMMENDATION #7: CREATE AN INTEGRATED WATERSHED MANAGEMENT PLAN AND CRD RAINWATER COMMISSION

Currently the Capital Region does not have an integrated watershed management plan. As many streams and creeks extend past the boundaries of one or more municipality, an integrated watershed management plan would address the fragmented jurisdiction in the CRD—as well as seek to rehabilitate water bodies and improve the functioning of stormwater systems.

The municipalities have the jurisdiction to put such a plan in place. The *Local Government Act* section 311 and part 13, and the *Environmental Management Act* section 24, provides local governments with the authority to create regional growth strategies and agreements on interjurisdictional watercourses and liquid waste management plans. In addition, the goals of the regional growth strategy, per section 428 of the *Local Government Act*, include the reduction of pollution, the protection of quality and quantity of ground and surface water, and the protection of environmentally sensitive areas.

An integrated watershed management plan regulates both human activities and natural processes on a watershed by watershed basis. It also considers economic and social issues.[154]

The 2010 ELC Report recommends creating a 25-year integrated watershed management plan that would define regional and watershed-specific targets.[155] The plan would base its goals on provincial goals for rainwater management, including:

- Volume reduction (putting water back into the ground);
- Water Quality (preserving and improving the water); and
- Rate Control/Detention (holding back the water).[156]

In order to achieve these goals, an integrated watershed management plan must include best management practices, LID practices and green infrastructure developments. Each municipality would need to commit to implementing the plan through its regional context statement and bylaw amendments.

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[154] Conservation Ontario, "Integrated Watershed Management Fact Sheet" (2012), online: <conservationontario.ca>.
[155] *2010 ELC Report, supra* note 1 at p. 82.
[156] *Ibid* at p. 10.

In addition, the implementation of this plan would require reforms to allow water governance authorities to manage along watershed boundaries rather than within political boundaries.[157] This is important as many watersheds span two or more municipalities.[158]

Implementing an integrated watershed management plan would also require establishing a CRD Rainwater Commission (Commission) to advance the goals of the integrated watershed management plan. The Commission would ensure the creation of stringent-performance based regulations and that these were implemented across all water body jurisdictions. The Commission would be a source of support to local municipalities in their implementation of the integrated watershed management plan.[159]

In order to further ensure and enforce the integrated watershed management plan, we recommend a provincial Watershed Authority to oversee the work of the Commission. Such an authority should be established by legislation, have a clear mandate, have an accountable governance structure, and have transparent roles and responsibilities.[160]

Bowker Creek Urban Watershed Renewal Initiative

One local example of integrated watershed management is the Bowker Creek Urban Watershed Renewal Initiative (BCI). The BCI is a collaboration among governmental agencies, landowners, the CRD, residents and community organizations.[161]

The BCI used two main documents to guide their strategy: 1) the Bowker Creek Watershed Management Plan and 2) The Bowker Creek Blueprint: A 100-year plan.[162] The Bowker Creek Watershed Management Plan outlines specific goals and objectives as well as actions to achieve these goals. The Bowker Creek Blueprint is an updated document that further reinforces the Management Plan and establishes a long-term strategy.

The CRD and the municipalities of Saanich, Oak Bay and Victoria approved the Bowker Creek Watershed Management Plan. A steering committee was established to spearhead the initiative in 2004. The BCI coordinates the responsibilities of the municipalities, agencies and interested parties in this plan, which includes educating the public, monitoring progress towards its goals, and applying for grants.[163]

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[157] Deborah Curran & Maya Stano "Submission for the Water Act Modernization Process" UVic *Environmental Law Centre* (March 2011) at p. 19 [*Water Act Modernization Process Report*].
[158] *Ibid*.
[159] *2010 ELC Report, supra* note 1 at p. 79.
[160] *Water Act Modernization Process Report, supra* note 157 at p. 3-11.
[161] *Capital Regional District,* "Bowker Creek Initiative" online: <https://www.crd.bc.ca/bowker-creek-initiative>.
[162] *Ibid.*
[163] *Ibid.*

It is essential to have an integrated management plan that incorporates all stakeholders – this is the only way in which an interjurisdictional waterbody can fundamentally be rehabilitated.[164]

Other BC municipalities have also adopted integrated management plans. One example is the City of Port Coquitlam, which has adopted an integrated watershed management plan for Hyde Creek and is in the process of adopting another integrated watershed management plan for Maple Creek.[165]

In addition, the City of Coquitlam requires integrated stormwater management plans for all new neighbourhoods.[166]

In order to have a cohesive functioning and healthy rainwater management system, a long-term regional watershed management plan must be implemented into the regional growth strategy and it is essential that each municipality implements it through their regional context statement per Part 13 and section 446 of the *Local Government Act*, and through amendments to municipal bylaws.

RECOMMENDATION #8: ENGAGE IN EDUCATIONAL INITIATIVES

In order to successfully redesign rainwater management, education is imperative: many of the activities that result in stormwater pollution occur because of a lack of education.

As mentioned above, the Commission may be a source of education on rainwater management for the community. The Commission could work with a variety of groups in educating the public on rainwater management. It may consider collaborating with educational institutions, the BC Water & Waste Association, governmental agencies and others.[167] It could create educational resources for local governments, who are in the best position to incorporate the latest rainwater management techniques as they are responsible for approving zoning and issuing development permits.

An example of stormwater educational material is the CRD's recent *Green Stormwater Infrastructure Common Design Guidelines*,[168] which offers a wide range of design guidelines to build LID facilities. The target audience is local governments, developers and contractors, as they are most involved with infrastructure design.[169]

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[164] *Ibid.*
[165] *City of Port Coquitlam*, "Watershed Planning" (2017) online: <https://www.portcoquitlam.ca/city-services/environmental-services/watershed-planning>.
[166] Interview of Deborah Curran - Executive Director, UVic Environmental Law Clinic (2019 March 3).
[167] 2010 ELC Report, *supra* note 1.
[168] *Dale Green, supra* note 13.
[169] *Ibid.*

An educational initiative that is needed across all municipalities is in relation to residential oil tanks. As outlined above, residential oil tanks are the cause of severe environmental damage. Some municipalities have spread educational messaging surrounding the removal and abandonment of oil tanks, but little else has been done to date.

Education is an essential component of rainwater management; it allows land owners and land users to improve their own practices, and also bolsters public buy in for governmental action on rainwater management.

RECOMMENDATION #9: ENFORCE EXISTING BYLAWS AND COMMIT TO ENFORCING NEW BYLAWS

As mentioned, Victoria, Saanich, the Saanich Peninsula and View Royal have implemented a version of the Model Bylaw. As discussed in recommendation 1, above, the remaining Capital Region municipalities should enact similar bylaws.

In order for these bylaws to be effective at reducing toxins entering the stormwater systems, they must be properly enforced. Each municipality must commit to allocating resources toward enforcing these bylaws.

Under the Model Bylaw, pursuant to section 5, "[t]he Manager, an employee of the municipality authorized by the Manager, or a bylaw enforcement officer" are responsible for bylaw enforcement and as such the municipalities must ensure that these roles are filled and that a sufficient portion of their work hours are allocated to enforcement of the stormwater bylaws.[170]

RECOMMENDATION #10: INTENSIFY MONITORING

Extensive monitoring of every major water body across the Capital Region is essential to ensure the actions taken are achieving their stated goals. As noted above, without proper monitoring it is impossible to ascertain: the source of the pollution; if any practices are improving pollution levels; and whether the water bodies are safe for wildlife and for human use.

The Commission, once established, would have the role of creating a monitoring program so this program could extend to all the water bodies within the Capital Region.

RECOMMENDATION #11: AMEND SUBDIVISION BYLAWS TO REQUIRE NO NET INCREASE IN RUNOFF FOLLOWING DEVELOPMENT

[170] *Model Bylaw, supra* note 12.

Saanich has included in its subdivision bylaw a requirement that there be no net increase in runoff after development.[171] The bylaw requires that new developments produce drainage systems that: "reduce the rate of post development site runoff to predevelopment levels; improve the quality of site drainage water; and minimize erosion and retain sediments."[172] Metchosin also prohibits developments that "will result in… an increase in runoff rates or volumes of rain water leaving the lot, site, or area of land based on pre-development levels."[173]

Local governments have the jurisdiction, pursuant to section 506 of the *Local Government Act*,[174] to regulate the design standards for works and services upon subdivision. Therefore, all of the Capital Region municipalities should amend their subdivision bylaws to regulate stormwater-related issues such as drainage collection, drainage disposal, sewage collection or sewage disposal systems.[175]

We urge the remaining 11 municipalities to implement bylaws that require no net increase in runoff after development.

RECOMMENDATION #12: IMPOSE AND STRATEGICALLY WAIVE OR REDUCE DEVELOPMENT COST CHARGES

The 13 Capital Region municipalities should carefully consider ways in which the imposition and strategic waiver of Development Cost Charges (DCCs) could be used to improve rainwater management. Such Charges are levied by local governments on new developments to account for the increased need for transportation, utilities, park infrastructure and other services related to the new development. [176]

The Capital Region municipalities should consider ways in which imposition of DCCs on new developments could be used to fund necessary stormwater infrastructure – and ways in which strategic waiver of DCCs could encourage green Low Impact Development.

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[171] District of Saanich, "Schedule H to Bylaw 7452 *Subdivision Bylaw*" (February 2004), at s. 3.5.1, online: <https://www.saanich.ca/assets/Community/Documents/essewerdrain.pdf>.
[172] *2010 ELC Report, supra* note 1 at p. 87.
[173] District of Metchosin, Bylaw No. 467, *A bylaw for the Protection and management of rainwater* (2004 October 4) at s. 2.2.2(7), online: <https://metchosin.civicweb.net/document/276>.
[174] *Local Government Act, supra* note 140.
[175] *2010 ELC Report, supra* note 1 at p. 87.
[176] *City of Coquitlam* "Development Cost Charge 2018 Update," (2018) online: <https://www.coquitlam.ca/planning-and-development/resources/fees/development-cost-charges-update>.

V. CONCLUSION

In conclusion, it is essential that the following recommendations be implemented by all 13 Capital Region municipalities in order to create a cohesive and impactful management plan throughout the Capital Region.

1. **ENSURE THE IMPLEMENTATION AND ENFORCEMENT OF THE CRD MODEL STORM SEWER AND WATERCOURSE PROTECTION BYLAW ACROSS THE ENTIRE CAPITAL REGION**

2. **UPDATE THE CRD MODEL STORM SEWER AND WATERCOURSE PROTECTION BYLAW TO ADDRESS CURRENTLY EXEMPTED PRACTICES**

3. **IMPLEMENT RAINWATER UTILITY CHARGE; USE TO FINANCE DRAINAGE SYSTEM, UPDATED INFRASTRUCTURE AND A COMMISSION**

4. **FIX AND UPGRADE OBSOLETE STORMWATER INFRASTRUCTURE**

5. **STRESS THAT THE DEPOSIT OF DELETERIOUS SUBSTANCES INTO WATERWAYS IS A VIOLATION OF THE FEDERAL *FISHERIES ACT***

6. **CREATE AN OVERARCHING RESIDENTIAL OIL TANK REGULATION**

7. **CREATE AN INTEGRATED WATERSHED MANAGEMENT PLAN AND CRD RAINWATER COMMISSION**

8. **ENGAGE IN EDUCATIONAL INITIATIVES**

9. **ENFORCE EXISTING BYLAWS AND COMMIT TO ENFORCING NEW BYLAWS**

10. **INTENSIFY MONITORING**

11. **AMEND SUBDIVISION BYLAWS TO ALLOW FOR NO NET INCREASE IN RUNOFF AFTER DEVELOPMENT**

12. **IMPOSE AND STRATEGICALLY WAIVE OR REDUCE DEVELOPMENT COST CHARGES**