

Regional Source Control Program

2018 Report

Capital Regional District | Parks & Environmental Services, Environmental Protection



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REGIONAL SOURCE CONTROL PROGRAM 2018 REPORT

EXECUTIVE SUMMARY

Introduction

The Capital Regional District (CRD) Regional Source Control Program's (RSCP) goals are to protect sewage collection and treatment facilities, public health and safety, and the marine receiving environment by reducing the amount of contaminants that industries, businesses, institutions and households discharge into the CRD's sanitary sewer systems. Source control is widely accepted as a cost-effective and essential first step in sewage treatment in all major urban areas throughout North America.

The program regulates approximately 2,000 businesses through industrial wastewater discharge permits, authorizations and 11 sector-specific codes of practice (CoP).

This report meets the CRD's commitments in the Core Area Liquid Waste Management Plan (LWMP) and Saanich Peninsula LWMP to prepare an annual report on the RSCP for submission to the BC Ministry of Environment and Climate Change Strategy (ENV) and presents a summary of program activities and accomplishments for the period January-December 2018, and provides a brief account of initiatives planned for 2019. **2018 Program Activities**

The RSCP continued to apply a "sector-by-sector" approach to CoP inspections, focusing on the dry cleaning, dental, automotive, vehicle wash and food services sectors. Overall compliance rates for CoP, permitted industrial facilities and facilities operating under authorizations were 93% in 2018.

The main activities and accomplishments of the program in 2018 are outlined below.

Industrial, Commercial and Institutional Liquid Waste Regulation

- Sector-by-sector inspections included the dry cleaning, dental, automotive, vehicle wash and food services sectors.
- 1,129 CoP inspections conducted at 944 businesses.
- 517 food services operations were inspected, with 162 follow-up visits for compliance and/or further support.
- 23 dry cleaning, 114 dental, 132 automotive (mechanical) repair, and 68 vehicle wash operation inspections were conducted.
- All permit inspections scheduled at the beginning of 2018 were completed within the year.
- Nine new permits were issued (total of 42 active) and eight new authorizations were issued (total of 94 active).

Monitoring

- Monitoring targets set for 2018 were achieved.
- On average, there were two scheduled audit monitoring events per permit.
- The program focused on the fermentation sector, with follow-up compliance monitoring also conducted at one dry cleaning facility, which had exceedances in 2016.

Enforcement

- 14 tickets were issued under the CRD Ticket Information Authorization Bylaw, all to food services operations. Two tickets were waived upon installation of the required treatment works, one was waived upon completion of the required maintenance, and three were waived upon closure of the restaurant.

Contaminants Management

- Staff continued to conduct research into emerging contaminant characterization of fermentation, planning a project to collect additional data from microbreweries.
- Staff continued to promote the BC Medications Return Program in response to a request from Saanich Peninsula Wastewater Committee to explore areas to increase protection of dewatered sludge and biosolids.
- Staff commissioned a study by Royal Roads University (RRU) Environmental Science students to research alternative dry cleaning treatment processes and methods used within the CRD.

Contaminant Reductions

- For the 10th consecutive year, Ganges Wastewater Treatment Plant mixed liquor results met the Class A criteria for all metals, including mercury. Saanich Peninsula Wastewater Treatment Plant dewatered sludge monitoring was started in 2013 and all results up to and including 2018 have also met the Class A criteria for metals.

Significant Incident Response

- There were five significant incidents formally reported, all involving fats, oils and grease (FOG) build-ups.

Residential Outreach

- The Clean Green 2.0 Campaign promoted the reduction of household hazardous waste to public sanitary sewer and private septic systems. Staff continued to promote engagement and behaviour change tools for the campaign, which focuses on environmentally-safe alternatives to household cleaners.
- Staff continued to work with the Island Health Authority and the Health Products Stewardship Association to launch a new campaign to increase public awareness and participation in the BC Medication Return Program. This campaign, and past initiative, maintains the region's high rate of proper disposal per capita. Approximately 11.3 tonnes of medications were collected in the region, the highest rate of return in BC.

Business Outreach

- Inspectors continued to deliver program outreach material to local businesses, including RSCP sector-based posters and guidebooks.
- Staff continue to maintain and, when necessary, update sector-based posters, guidebooks and webpages.

Initiatives

Program staff undertook the following initiatives:

- Participated in an e-bike pilot, as part of the CRD Corporate Climate Action Strategy. The first phase of the pilot was completed in conjunction with a University of Victoria graduate student who analyzed trip data to determine the greenhouse gas savings of using e-bikes for RSCP inspections.
- Worked with municipal staff to resolve various FOG blockages in sewers.
- Commissioned a study by RRU Environmental Science students to research alternative methods of dry cleaning within the CRD.
- Collaborated with municipal business licensing staff to share new business information for review against permitting requirements.

- Co-hosted Source Control Community of Practice meetings, with facilitation by the BC Water & Wastewater Association.

Program Planning and Development

- The program hired a consultant to review the CRD Sewer Use (Bylaw No. 2922) and suggest improvements since the last amendment in 2006. Staff will revise the Sewer Use Bylaw, which is anticipated to launch in late 2020.

Performance Measures

- The percentage of businesses with a rating of “overall compliance” was 93%.
- For the 10th consecutive year, the percentage of mixed liquor and dewatered sludge samples that met Class A standards for metals was 100%.

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REGIONAL SOURCE CONTROL PROGRAM 2018 REPORT

1.0 INTRODUCTION

Source control is a waste management strategy aimed at reducing the amount of contaminants that industries, businesses, institutions and households discharge to sewers. In 1993, the Capital Regional District (CRD) committed to the development and implementation of a region-wide source control program and adoption of a Sewer Use Bylaw (Bylaw No. 2922) under the *BC Environmental Management Act*. The bylaw is the main regulatory instrument for source control in sanitary sewer systems, creating a level playing field for businesses and institutions throughout the CRD. The program also develops fact sheets, provides technical guidance and promotes best management practices (BMP).

The goals and objectives of the CRD's Regional Source Control Program (RSCP) (the program) are documented in the *Saanich Peninsula Liquid Waste Management Plan* (1996) and the *Core Area Liquid Waste Management Plan* (2000). The most recent independent review of the program was completed in June 2015 (KWL 2015) and the next review will be undertaken in 2020.

Source control is a key component of effective wastewater treatment and is an integral part of the core area wastewater treatment strategy moving forward. The current program meets or exceeds Canadian best practices for source control and the CRD is a nationally recognized leader in this field.

The program goals are as follows:

- protect the marine receiving environment adjacent to the CRD's sewage outfalls
- protect sewage facilities belonging to the CRD and its member municipalities
- protect the health and safety of sewage workers and the general public
- protect the quality of sewage sludge and biosolids
- protect treatment plants against upsets
- consistently apply the program for all users of CRD sewage facilities

This report meets the CRD's commitments in the Core Area Liquid Waste Management Plan (LWMP) and Saanich Peninsula LWMP to prepare an annual report on the RSCP for submission to the BC Ministry of Environment and Climate Change Strategy (ENV) and presents a summary of program activities and accomplishments for the period January-December 2018, and provides a brief account of initiatives planned for 2019.

The information in this report is used by CRD staff to evaluate the performance and future direction of source control program activities and by municipal staff to understand trends in discharge of contaminants from residential and business sources.

2.0 BACKGROUND

2.1 Policies and Procedures

The following policies and procedures are used to provide guidance and ensure fair and consistent application of the CRD Sewer Use Bylaw and associated enforcement, cost recovery and monitoring activities.

2.1.1 Policies Approved by the CRD Board

- Regional Source Control Program Enforcement Policy
- Regional Source Control Program Fees and Charges Policy
- Sewer Use Bylaw Process of Review
- Regional Source Control Program Code of Practice Management Policy – Food Services

2.1.2 Operating Procedures

- Sampling and Analysis Procedure Manual
- Analytical Result Reporting Procedure
- Non-domestic Waste Discharge Reporting Procedure
- Significant Incident Reporting Procedure
- Procedure for Managing Contaminated Water Produced During Firefighting Operations in the CRD

The policies and procedures are periodically updated to reflect changes within the program.

2.2 Sewage Collection Areas and Sewage Facilities

The CRD Sewer Use Bylaw applies to any discharge of non-domestic waste into a sewer that is connected to a sewage facility operated by the CRD. The RSCP is designed to ensure that the bylaw and its associated policies and procedures are applied consistently within the separate collection areas for these sewage facilities.

The CRD owns and operates eight wastewater treatment plants, as shown in Table 1. Four of these plants—Macaulay Point, Clover Point, Saanich Peninsula and Ganges—receive significant industrial, commercial or institutional wastewater flows, while the remaining four are small plants receiving mostly residential flows.

The sewage flows into each treatment plant are reported in the annual compliance monitoring reports for CRD sewage outfalls. Estimated annual sewage flows contributed by each participating area, over the period October 1, 2017-September 30, 2018, are listed in Table 2.

Table 1 CRD Treatment Plants and Sewage Collection Areas – 2018

CRD Sewage Treatment Plant	Sewage Collection Areas
Macaulay Point	Victoria (west), Esquimalt, Saanich (west), View Royal, Colwood, Langford, Department of National Defence (DND), Esquimalt First Nation, Songhees First Nation
Clover Point	Victoria (east), Oak Bay, Saanich (east)
Saanich Peninsula	Sidney, Central Saanich, North Saanich, Pauquachin First Nation, Tseycum First Nation, Institute of Ocean Sciences
Ganges	Township of Ganges (Salt Spring Island Electoral Area)
Maliview	Maliview area (Salt Spring Island Electoral Area)
Schooner Way	Buck Lake area (Southern Gulf Islands Electoral Area)
Canon Crescent	Magic Lake Estates (Southern Gulf Islands Electoral Area)
Port Renfrew	Port Renfrew (Juan de Fuca Electoral Area)

Table 2 Annual Sewage Flows 2017-2018

Participant	Estimated Annual Flow (m ³ /year)*	Percentage of Total Flows
Saanich	9,531,756	26.69
Oak Bay	3,082,297	8.63
Victoria	12,632,568	35.38
Esquimalt	2,108,753	5.91
View Royal	818,009	2.29
Colwood	1,168,081	3.27
Langford	2,431,450	6.81
Sidney	1,344,648	3.77
Central Saanich	1,369,775	3.84
North Saanich	491,135	1.38
Esquimalt First Nation	21,577	0.06
Songhees First Nation	203,960	0.57
Pauquachin First Nation	28,457	0.08
Tseycum First Nation	11,136	0.00
Institute of Ocean Sciences	6,003	0.02
Department of National Defence	162,035	0.45
Ganges Sewer	162,701	0.46
Maliview Sewer	17,100	0.05
Magic Lakes Estates Sewer	95,262	0.27
Port Renfrew Sewer	19,630	0.05
Total Flow	35,706,333	100%

Note:

*For the period October 1, 2017-September 30, 2018

3.0 REGIONAL SOURCE CONTROL ACTIVITIES AND ACCOMPLISHMENTS – 2018

RSCP activities and accomplishments in 2018 are discussed under the following broad groups of activities:

- industrial, commercial and institutional liquid waste regulation
- enforcement
- contaminants management
- contaminant reductions
- significant incident reporting
- outreach
- data management
- revenue and expenditures
- planning and development
- performance measures

3.1 Industrial, Commercial and Institutional Liquid Waste Regulation

3.1.1 Regulatory Background

The Sewer Use Bylaw (CRD Bylaw No. 2922) serves as the main regulatory instrument for source control within CRD sanitary sewer systems. The bylaw specifies the various regulatory conditions under which facilities must operate if they discharge non-domestic waste into a sanitary sewer. The regulatory conditions for businesses include operation under waste discharge permits, authorizations or sector-specific CoP. Under the RSCP Enforcement Policy, staff make reasonable efforts to resolve issues through cooperative measures. Where education proves ineffective, punitive measures are available including tickets under the Bylaw.

Following adoption of the Sewer Use Bylaw in August 1994, the RSCP focused primarily on identifying, inspecting, assessing and permitting larger industrial facilities, and preparing authorizations for smaller commercial and institutional dischargers operating within the CRD. This process was largely completed over the period 1995-1998. Waste discharge permits require ongoing management, inspection and periodic amendment to accommodate changes in site-specific processes, practices and discharge conditions. New businesses continue to be assessed for operation under permits or authorizations each year. For further information on permits and authorizations see sections 3.1.2 and 3.1.3.

In 1998, the focus of the program shifted toward development, adoption and implementation of CoP, each as a separate schedule in the Sewer Use Bylaw, which regulate discharges from larger numbers of smaller commercial and institutional facilities operating in the CRD. The first regulatory CoP, considered unique in North America, were adopted in 1999 and inspections and enforcement for these codes commenced the following year. By the end of 2003, 11 CoP had been adopted. All codes were developed using extensive stakeholder involvement to help ensure their practicality and acceptance within each sector. For further information on CoP, see Section 3.1.4.

The Sewer Use Bylaw and its associated policies and procedures have been amended periodically during the first 12 years of the program, largely to accommodate adoption of CoP, but also to add new restricted waste limits and a structure for cost recovery. In 2018, staff continued the process of assessing and reviewing the Sewer Use Bylaw to ensure it continues to provide an adequate level of protection. Updates to the bylaw are expected in late 2020.

3.1.2 Waste Discharge Permits

Waste discharge permits are site-specific regulatory documents, issued to businesses or institutions under the CRD Sewer Use Bylaw, that outline requirements for wastewater pre-treatment, effluent quality, monitoring and reporting. Waste discharge permits are issued to facilities or operations that discharge significant non-domestic wastewater flows (greater than 10 m³/day) or wastewater containing high loads of restricted wastes or specified chemical contaminants into the sanitary sewer. Table 3 provides a summary of waste discharge permit activity in 2018.

Table 3 Summary of Waste Discharge Permit Activity in 2018

Waste Discharge Permit Activity	2018
Permits active (at year end)	42
New permits issued	9
Permits closed	3
Permits amended	6
Permit site inspections (including evaluations for new permits)	88

At the end of 2018, there were 42 active waste discharge permits being managed by RSCP staff. The majority of these permits were ongoing, with no expiry date. Six new temporary permits were issued: three for short-term discharges of cruise ship grey and black wastewater to sanitary sewer; and three for excavation dewatering that were still active at the end of 2018, but will be closed in 2019.

Permit management activity includes reviewing discharger self-monitoring reports on a monthly or quarterly basis, preparation of compliance letters, meetings and regular phone contact with permittees and site inspections. Permit managers are also responsible for comparing CRD audit sampling data to permittee self-monitoring data and submitting permit fee billing information to CRD Finance.

All permit inspections scheduled at the beginning of 2018 were completed within the year. Throughout 2018, inspection staff continued their permit confirmation process, which is an on-going activity. This includes conducting investigations into potential new non-domestic waste discharge permits or authorizations in known “hot spots” within the region (e.g., industrial parks), or those identified through municipal engineering department contacts or business licensing staff.

3.1.3 Authorizations

Letters of authorization are issued under the Sewer Use Bylaw in cases where overall contaminant loads to sanitary sewer are low or where discharges are predicted to have a minimal impact on collection and treatment systems and/or the receiving environment. Authorizations contain site-specific discharge requirements and best management practices designed to decrease the impact of the discharge or limit the potential for illegal discharges. They are normally issued without expiry dates. Some authorizations have self-monitoring and/or reporting requirements.

Authorizations are commonly issued to regulate unusual discharges or discharges from small groups of similar operations, such as ship and boat waste facilities, funeral homes, and sani-dumps. They can also be issued to businesses where a CoP is either planned or under development, or where requirements differ from those specified in a code (e.g., an alternative treatment technology, such as an automatic grease recovery device in a food services business rather than a grease interceptor).

Inspections are carried out on a periodic basis with an emphasis on those authorizations, which had previously been regulated under permits or those, which include operations discharging priority contaminants. Table 4 summarizes authorization activity in 2018.

In 2016, all of the recreation facilities that were previously regulated under the Code of Practice for Recreation Facility Operations were moved to authorization. This move was due to the high variety of discharge practices occurring, and this code will, therefore, be repealed from Sewer Use Bylaw No. 2922 in the next amendment.

Table 4 Summary of Authorization Activity in 2018

Authorization Activity	2018
Authorizations active (at year end)	94
New authorizations issued	8
Authorizations closed or transferred to codes or permits	8
Authorizations amended	4
Authorization site inspections (including evaluations for new authorizations)	81

At the end of 2018, there were 94 active waste discharge authorizations being managed. The majority of these were ongoing, with no expiry date. Eight new authorizations were issued over the year: four for short-term discharges of wastewater created during the installation of cure-in-place lining for municipal water pipelines, one food service operation with alternative treatment works, one recreation facility, one vehicle wash operation with undersized treatment works, and one heavy equipment wash treatment facility.

3.1.4 Codes of Practice

3.1.4.1 Background

The CRD has made commitments in the Core Area LWMP and Saanich Peninsula LWMP to the development and implementation of CoP to regulate non-domestic waste discharges from commercial and institutional sectors to the CRD's sanitary sewers. The RSCP defines CoP as "regulatory documents containing mandatory sanitary sewer discharge standards for specific industrial, institutional or commercial sectors". Table 5 lists the 11 CoP in effect. All the facilities under the recreation code have been issued authorizations and the code will be removed in the upcoming Bylaw amendment.

CoP include mandatory requirements for waste treatment, inspection, maintenance and record keeping for businesses and institutions discharging non-domestic wastes to sanitary sewer. They are believed to be among the first of their type to be adopted in North America. RSCP staff have prepared plain language guidebooks for each code sector explaining the applicable regulations and providing best management practices to help businesses achieve compliance and improve environmental performance. These guidebooks are also accessible through the program's webpage.

Table 5 Summary of RSCP Codes of Practice (Bylaw No. 2922)

Code of Practice	Adoption Date
Food Services Operations	November 24, 1999 ¹
Dry Cleaning Operations	November 24, 1999 ²
Photographic Imaging Operations	November 24, 1999
Dental Operations	November 22, 2000
Automotive Repair Operations	December 12, 2001 ²
Vehicle Wash Operations	December 12, 2001 ²
Carpet Cleaning Operations	December 11, 2002
Fermentation Operations	December 11, 2002
Printing Operations	December 11, 2002
Laboratory Operations	December 10, 2003
Recreation Facility Operations	December 10, 2003

Notes:

¹Code amended December 2001 and March 2003

²Code amended December 2003

3.1.4.2 Code of Practice Inspection Summary – 2018

In 2018, the CRD continued to emphasize customer service and support as part of CoP inspections, in addition to ensuring compliance with the CoP requirements. This involves making every effort to educate regulated operations, provide guidance, and in some cases feedback through lab analysis of effluent quality, sometimes at the cost of multiple visits to the same establishment.

Five full-time equivalent inspectors conduct the CoP inspections, in addition to managing the permits and authorizations. During front-line interactions with businesses, the inspectors can also provide auditing and reporting services for other CRD programs, technical services for other Parks & Environmental Services projects or programs, as required, and participate in the development and implementation of outreach initiatives.

Table 6 provides a summary of CoP inspection activity in 2018. The sector estimates shown in the table are the numbers of active operations estimated within each sector at the beginning of each year. The total number of site inspections (1,129 in 2018) includes first (or primary) inspections within an inspection cycle and repeat (or follow-up) inspections to confirm compliance status of 944 businesses.

Table 6 Summary of Code of Practice Activity in 2018

Code of Practice (Est. Sector Size – 2018)	% of Sector Inspected in 2018
Automotive Repair (192)	69%
Carpet Cleaning (44)	9%
Dental (117)	97%
Dry Cleaning (11)	100%
Fermentation (18)	78%
Food Services (1323)	39%
Laboratory (26)	23%
Photographic Imaging (52)	100%
Printing (21)	48%
Recreation Facility (0*)	N/A
Vehicle Wash (37)	100%

Notes:

*All existing recreation facilities previously regulated under CoP were moved to individual authorizations in 2016.

The “sector-by-sector” review process includes inspecting all the businesses due for an inspection in each sector for baseline compliance, reviewing the CoP for any necessary amendments or updates, and updating data for new and/or newly sewered facilities. Sectors of focus in 2018 were automotive (mechanical) repair, vehicle wash, fermentation, and food services. Other sectors were visited only for “follow-up” inspections.

Each inspector in the inspection team is assigned a geographic area, and inspects the majority of the codes in their area. Some codes are part of a sector sweep or more detailed investigation, which may be conducted by one ‘code expert’, for example carpet cleaning and fermentation. The businesses inspected were comprised of those within the existing Cross Connection and Regional Source Control Information Management System database, and also facilities identified through an online search, drive-through of the area, cross-referencing the Cross Connection Control Program database, BC Assessment code query, and new municipal business licenses.

Starting in 2016, dischargers operating treatment works on site were inspected annually or biennially: automotive (annually), dental (initially biennially, then annually starting in 2017) and dry cleaning sectors (annually starting in 2018). This change was based on risk associated with priority contaminants. The non-discharging businesses in these sectors (i.e., sending business waste for off-site treatment or operating as a storefront) are inspected every three to five years.

Expanding on the work characterizing distillery wastewater in 2016, a review of the remainder of the sub-sectors of the fermentation sector was completed in 2018. A review of those findings and a plan to collect additional data to better characterize wastewater strength from microbreweries operating under the CoP was created.

The CRD sponsored a student project with the Royal Roads University (RRU) Environmental Science Program to investigate alternative dry cleaning treatment processes and methods. The research built upon a study conducted the previous year and showed that wet cleaning was the most sustainable alternative.

Rigorous food service inspections are performed every year, due the sector’s large size (1,323 regulated businesses) and potential to impact sewer infrastructure through grease blockages. 517 food service businesses were inspected, with 162 repeat inspections required to address non-compliance issues. The majority of those repeat inspections focused on assisting the facility to comply with regulatory requirements, such as proper maintenance of existing grease interceptors (GIs).

A sector sweep of the hotel, motel and bed and breakfast facilities was conducted to ensure consistency of the application of the code across the CRD. Non-compliant hotels and motels were identified and followed up with to ensure treatment works and maintenance practices were in place. A recommendation for the management of bed and breakfast facilities was made and will be incorporated into the upcoming bylaw amendment.

In 2017, a consultant was hired to do a hazard assessment of GIs located in crawl spaces and small basements throughout the CRD. Sites were categorized and low or moderate hazards, and staff were trained in proper WorkSafeBC procedures for entry of confined spaces. In 2018, staff continued to identify GIs located in confined spaces for future hazard assessment.

3.1.5 Coordinated Inspections

3.1.5.1 Coordinated Significant Incident Responses

There were five significant incidents formally reported in 2018. All were involving build-up of fats, oils and greases (FOG) build-up. Further details of each incident can be found in Table 10.

3.1.6 Monitoring

Staff carried out the following types of monitoring in 2018: permit compliance, authorization compliance, CoP and key manhole monitoring. All wastewater samples collected in 2018 were analyzed by a contract laboratory using standard analytical procedures specified in the RSCP Sampling and Analysis Procedure Manual. Monitoring of dewatered sludge produced at the Saanich Peninsula Waste Water Treatment Plant (SPWWTP) commenced in March 2013. Table 7 provides a summary of monitoring activity in 2018.

Table 7 Summary of RSCP Monitoring Activity in 2018

Monitoring Events	2018
Permit compliance	59
Authorization compliance	31
Code of Practice	25
Key manhole	40
SPWWTP influent	8
SPWWTP dewatered sludge	12
Ganges influent	1
Ganges mixed liquor	10

3.1.6.1 Permit Compliance Monitoring

Businesses operating under waste discharge permits are required to carry out self-monitoring of their wastewater for a range of parameters on a specified regular basis. This data is normally submitted to staff on a monthly or quarterly basis for compliance assessment. An important component of the program is the collection and analysis of audit samples from each permitted site twice per year. This is done to verify compliance and confirm that the self-monitoring data being submitted are representative of discharges from each permitted site. Staff normally collect these samples throughout the year, following a pre-arranged schedule. Additional sampling events are carried out, as necessary, on suspected problem discharges from permitted sites.

The average number of scheduled audit events per permit in 2018 was two. The goal of collecting audit samples from each permitted site twice per year was achieved at all but one permit site. Sampling at this site was not achieved, due to unusually low flows and lack of volume for sampling. One permit site was sampled four times, due to their enforcement status as discharger under review (DUR).

Staff responsible for managing a specific permit review the data submitted by the permittee. If a significant difference is detected between permittee self-monitoring results and CRD audit results, the permittee is contacted and an investigation into the discrepancy is initiated. The majority of all audit results obtained in 2018 were not significantly different from self-monitoring results reported from the same site. This indicated that most of the self-monitoring results being submitted by permittees had been collected and analyzed in an appropriate manner, as required by each permit.

Since CRD audit monitoring is carried out in accordance with strict quality assurance procedures, it provides reliable information when calculating characteristic contaminant levels or loads for a particular industry or business type. This information is useful for planning purposes in specified collection areas.

3.1.6.2 Authorization Compliance Monitoring

Thirty businesses operating under authorizations were monitored in 2018, 19 of which have self-monitoring requirements. Three follow-up visits were conducted at two business with initially high sample results. The CRD monitoring provides, at minimum, an annual check on the quality of effluent being discharged by businesses known to have reported restricted waste generation or handling on site. The results of this monitoring indicated that discharges from authorizations in 2018 were generally in compliance with Sewer Use Bylaw restricted waste limits.

3.1.6.3 Code of Practice Monitoring

A sector-focused approach to CoP monitoring was implemented in January 2012. The approach involves focusing on fewer sectors per year, but inspecting and sampling the entire sector, where possible. This focused monitoring is coordinated with inspections, in order to address any compliance issues, which may influence monitoring results.

The new monitoring approach generates a comprehensive overview of the composition of the wastewater within each sector and provides information on the effectiveness of specified treatment works reducing contaminant loads. The data generated also assists businesses in meeting the restricted waste criteria defined in the CRD Sewer Use Bylaw (Bylaw No. 2922).

There are no wastewater self-monitoring and reporting requirements for businesses operating under CoP. Compliance with a CoP is usually achieved by installing the required, properly-sized treatment works, regular maintenance of the treatment works and record keeping.

Three of the 11 regulated sectors were monitored in 2018: automotive and mechanical repair, vehicle wash and dry cleaning. Follow-up inspections and monitoring were also conducted at two automotive repair facilities and one dry cleaning facility that had exceedances in the first round of sampling in 2018, as recommended in the *Regional Source Control Program 2016 Annual Report*.

FERMENTATION

In 2018, staff initiated a review of the fermentation CoP where 21 sites were inspected and six were sampled. For most permitted facilities, years of monthly data was available, while only one or two sets of sample results were available for each microbrewery. Additional data on microbreweries will be collected in 2019 and 2020, ideally through authorizations to develop a more representative picture of wastewater strength and volumes.

Prior to authorizing the discharge from microbreweries, it was decided that a pilot study be conducted to determine the feasibility of flow monitoring at those facilities. Flow monitoring is a crucial component of calculating loadings from this sub-sector. The continuation of the review of the fermentation sector is discussed in greater detail in Section 3.3.

AUTOMOTIVE REPAIR

In 2018, staff undertook a sampling sweep of the automotive repair sector. Staff collected 13 samples from 10 automotive repair facilities and analyzed for conventional contaminants [pH, chemical oxygen demand (COD), mineral oil and grease (MOG), total suspended solids (TSS)], organic contaminants [benzenes, toluene, ethylbenzene and xylene (BTEX) and polynuclear aromatic hydrocarbons (PAH)], and inorganic contaminants (metals, including mercury). Scheduled sampling at two additional facilities were not successful; one facility was decommissioned and the other was determined to be a dry shop. The results are summarized below:

Conventional Contaminants

- pH: three sites had pH below the bylaw limit of 5.5 (4.61, 5.14 and 5.33).
- COD: four facilities met the COD bylaw limit of 1,000 mg/L (ranging from 301 mg/L to 828 mg/L). The highest non-compliant COD result was 13,100 mg/L.
- MOG: two of the facilities exceeded the bylaw limit of 50 mg/L for MOG, with values of 77 mg/L and 470 mg/L.
- TSS: one site exceeded the bylaw limit of 350 mg/L, with a result of 730 mg/L.

Organic Contaminants

- Analysis of volatile organic compounds (benzenes, toluene, ethylbenzene and xylene – BTEX) showed all samples within the bylaw limit for benzene of 0.1 mg/L and only two slight exceedances of the ethylbenzene limit of 0.2 mg/L. The bylaw toluene limit of 0.2 mg/L was exceeded in approximately half of the samples, and most samples exceeded the limit of xylenes.
- Two exceedances of PAH.

Inorganic Contaminants

- Copper, iron and zinc are historic contaminants of concern in the automotive repair sector. While zinc and iron have shown decreasing trends, copper concentration have been on the rise.

Sampling from Automotive Repair CoP facilities has been conducted every one to three years since 2005, with regular follow-ups of non-compliant sites. This sector will be sampled fully over a three- to five-year cycle, in order to get a better picture of sector compliance and effectiveness of treatment works.

VEHICLE WASH

In 2018, staff sampled three facilities operating under the Code of Practice for Vehicle Wash Operations. Only one exceedance of the 1 mg/L bylaw limit for copper was reported for copper at 1.48 mg/L.

DRY CLEANING

COD and perchloroethylene (PERC) are parameters of concerns for facilities operating under the Code of Practice for Dry Cleaning Operations.

In 2018, staff sampled five dry cleaning facilities, including one facility using a PERC-alternative dry cleaning solution. Two of the sites were re-sampled to follow up on exceedances; they both managed to rectify treatment work issues and meet bylaw limits for COD and PERC. The facility using a PERC-alternative dry cleaning solution was in compliance for COD and PERC. Overall compliance rate in 2018 was 37.5%, based on a total of eight samples and three exceedances for each of COD and PERC.

Due to the small size of the sector and the high rate of non-compliance, staff will continue frequent inspection, sampling and follow-up with each discharger in 2019, to ensure treatment works are maintained and operating effectively.

3.1.6.4 Key Manhole Monitoring

Key manhole monitoring is carried out to monitor for contaminants originating from sources within wide sanitary sewer collection areas. This includes monitoring at two residential sites and two DND sites within the Macaulay and Clover points collection areas. It also includes one residential site and one Victoria International Airport site within the SPWWTP collection area. In addition to the data discussed in this report, the program was enhanced in late 2018 to capture a wider range of parameters at more locations on a four-year cycle in order to better understand trends in contaminants from various land use types and collect data to evaluate program efforts against the operational needs of the McLoughlin Point Wastewater Treatment Plant (WTP), which will be commissioned in 2020, as well as the other CRD treatment facilities across the region.

RESIDENTIAL SITES

Residential (or domestic) key manhole monitoring has been carried out by CRD staff since 1996. This sampling has provided information on background levels of typical contaminants found in residential wastewater and the data has been used to predict contaminant loads from domestic sources for planning purposes.

The 2018 residential sampling program included sampling events at Dean Park (North Saanich), Harling Point pump station (Oak Bay) and Lang Cove pump station (Esquimalt) in January, April, July and October. All events included sampling and analysis for a wide range of parameters, including priority contaminants. There was one exceedance of Sewer Use Bylaw restricted waste limits at the Harling Point pump station. In April, there was a TSS result of 636 mg/L.

DND SITES

In 2018, staff sampled a key manhole at the Lang Cove pump station, serving the DND Dockyard area in January, April, July and October, and at the DND Colwood pump station in March and October. In 2018, there were four exceedances of Sewer Use Bylaw restricted waste limits. At DND Dockyard, TSS was in exceedance of the limits in April and July, with results of 820 mg/L and 444 mg/L, respectively. Chloride was also in exceedance of the limits at DND Dockyard in July, with a result of 2,400 mg/L. DND Colwood had one exceedance of total polycyclic aromatic hydrocarbon (PAH) with a result of 0.11 mg/L in April.

SPWWTP COLLECTION AREA SITES

Monitoring at the Airport #5 site was continued and samples were collected in March and October. All parameters were within Sewer Use Bylaw restricted waste limits.

3.1.6.5 SPWWTP Influent and Dewatered Sludge Monitoring

Monthly grab samples (for metals analysis) and four composites (for metals and priority pollutant analysis) of SPWWTP influent were collected annually by CRD staff in past years. Monthly grab sampling was discontinued in June 2007, following a consultant's review of the plant's influent/effluent sampling program. The monthly grab samples were replaced by quarterly triplicate composite sampling (on three consecutive days) beginning in April 2008. This triplicate composite sampling is conducted by CRD staff in January, April, July and October.

Golder Associates Ltd., (2013), recommended that SPWWTP monitoring could be reduced to biannual triplicate 24-hour composite sampling, with single 24-hour composites collected in the remaining two quarters. As a result, there were two triplicate influent sampling events carried out by CRD staff at SPWWTP in 2018, those scheduled in January and July. Single 24-hour composite samples were collected in April and October.

Twelve composite dewatered sludge samples were collected by CRD staff for analysis in 2018. Daily samples were combined into weekly composites, which were submitted for moisture, metals and weak acid dissociable (WAD) cyanide analysis on a monthly basis, with a field duplicate submitted in February and September.

3.1.6.6 GWWTP Influent and Mixed Liquor Monitoring

As in past years, a single (grab or composite) sample of influent was collected at the Ganges Waste Water Treatment Plant (GWWTP). The 24-hour composite sample collected in July 2018 was submitted for priority pollutant analysis.

In 2018, 12 mixed liquor (treatment plant wastewater mixed with activated sludge) samples were collected for analysis. Grab samples were collected on a monthly basis (with a field replicate taken in February and September). Samples were submitted for moisture and metals analysis.

The data are used to identify contaminants of concern, provide ongoing information on contaminant variability, loads and trends at the treatment plants, and provide input to planning initiatives.

3.2 Enforcement

The CRD has adopted a stepwise approach to enforcement of the Sewer Use Bylaw, as outlined in the RSCP Enforcement Policy. This enforcement policy classifies offences, outlines enforcement steps and includes use of cooperative measures, such as increased communication, education and monitoring, to resolve issues of non-compliance. The policy was originally approved by the CRD Board in February 1997, and was last amended in November 2006.

The CRD Ticket Information Authorization Bylaw contains fines (tickets) that have been set for specific offences under the Sewer Use Bylaw and its associated Code of Practice. These fines were last amended in January 2018.

Enforcement activities are directed at ensuring or restoring discharger compliance with the terms and conditions of the Sewer Use Bylaw, waste discharge permits, authorizations and CoP. Enforcement action is applied in an escalating manner that is reasonable, fair, consistent and impartial. Warnings, tickets, orders and fines are issued, as necessary, in cases of continuing non-compliance.

3.2.1 Operations Regulated By Waste Discharge Permit

Of the 42 active waste discharge permits in place at the end of 2018, 28 sites were in “full compliance” with their permits and the Sewer Use Bylaw. One permit was at “staff assessment”, two sites were classified as a DUR and 12 sites were considered to be “in progress”, but still in compliance with their permits under the enforcement policy. The enforcement levels and numbers of permits at each level are summarized in Table 8.

Table 8 Summary of Waste Discharge Permit Compliance – 2018

Enforcement Level	Number of Permits
Full Compliance	28
Step 1	9
Step 2	2
Step 3	1
Discharger Under Review (non-compliant)	2

Above Step 3, a significant escalation of enforcement action occurs, including notification of compliance status by letter, increased inspection or monitoring frequency, staff assessment of treatment works or procedures and scheduling of meetings to discuss remedial actions. Commitments and requirements agreed to at these meetings are confirmed in a follow-up letter to the permittee. Further non-compliance incidents can result in elevation from staff assessment to DUR status. Dischargers at the DUR level or above are considered to be non-compliant with their permits.

Operations having DUR status must prepare and submit a detailed compliance plan for approval by the deputy sewage control manager. A 90-day period is allowed for the preparation of this plan. This period allows a discharger to hire a consultant to help determine appropriate actions to achieve compliance. Progress meetings are held with the discharger after 30 and 60 days to measure progress, fully communicate the intent of any requirements and clarify any outstanding issues. A compliance plan, once approved by the deputy sewage control manager, becomes a compliance program that usually forms part of the discharger's waste discharge permit through an amendment.

If no acceptable compliance plan is received within the 90-day period, an order may be issued under the *Environmental Management Act* to set conditions for discharge, or a lawyer's letter is issued. Failure to comply with an order or a lawyer's letter will result in consideration of legal action.

One permit site classified above Step 3 was subject to assessment by RSCP staff and two permit sites were classified as DUR in 2018. These sites included:

- A septage disposal facility was escalated to DUR level for sulfide exceedances in 2015 and remained until October 2018. The permittee submitted a detailed compliance plan in late 2017, which was accepted by CRD staff. Treatment was increased in December 2017 and results improved. Following a period of monitoring to confirm the effectiveness of the changes, the facility's permit was amended in October 2018 and they were restored to compliant status. However, due to COD exceedances they were escalated to DUR level again in November 2018. Staff are still working with the permittee to determine the cause of those exceedances and develop an acceptable compliance plan.
- A microbrewery had ongoing issues with failing to report in 2017 and was classified as DUR in 2018. Since the permit was issued in April 2016, there were repeated issues of missing self-monitoring samples and reports. Through the enforcement of this offense, staff became aware that the bylaw did not include specific penalties related to sampling and reporting for permits and authorizations. Bylaw No. 2922 was amended in January 2018 to address this (with the addition of sections 3.6 and 3.7). The Ticket Information Authorization Bylaw was also amended to include associated fines of \$1,000 for permits and \$500 for authorizations. Following warnings and subsequent meetings, the facility agreed to comply.
- A permitted brewing facility was escalated to Step 3 levels for pH, BOD and COD issues. A written report was submitted with plans to improve operating and maintenance practices in October 2018. pH and COD values decreased in early 2019, but BOD levels remained high. CRD staff continue to work with the facility on an acceptable compliance plan to decrease wastewater strength.

No charges were laid against waste discharge permit holders under the Sewer Use Bylaw during 2018.

3.2.2 Operations Regulated by Authorization

A small group of the total number of authorizations issued is scheduled for inspection each year, based on the types of contaminants regulated, the contaminant levels, discharge volumes and the overall impact of discharges from these operations. Discharges from authorizations are considered to have a relatively minor impact in comparison to discharges from permitted facilities.

There were 81 inspections carried out at sites operating under authorizations in 2018. At the end of 2018, 86 of 94 inspected businesses were in full compliance with their authorizations, three were at a Step 1, and five were at Step 2.

The overall compliance level for the total 94 authorizations active at the end of 2018 was 88%.

3.2.3 Operations Regulated by Codes of Practice

The stepwise approach to achieve compliance is applied to all CoP sectors in a similar way to dischargers operating under permits or authorizations, as outlined in the enforcement policy. Dischargers are classified as being in "full compliance" if they have been inspected and no unsatisfactory issues are identified. Dischargers having committed offences, up to and including Step 3 are classified as being "in progress" and those at the DUR level and above are classified as being in "non-compliance" with the code. A summary of the CoP enforcement results for inspections carried out from the implementation date of each code to 2018 is presented in Table 9.

Table 9 Code of Practice Enforcement Summary

Code of Practice	% Full Compliance ¹ (%)	% Not Assessed ² (%)	% In Progress ³ (%)	% Non-Compliance ⁴ (DUR) (%)
Automotive Repair	92	3	8	0
Carpet Cleaning	93	7	7	0
Dental	92	2	9	0
Dry Cleaning	91	0	9	0
Fermentation	89	11	11	0
Food Services	91	4	9	0.2
Laboratory	54	27	46	0
Photographic Imaging	98	2	2	0
Printing	100	0	0	0
Vehicle Wash	68	14	32	0

Notes:

¹Percentage of active operations, regulated within the sector and in compliance with all requirements of the code at the last inspection – including sites with required treatment works and those using off site waste management.

²Percentage of active operations, regulated within the sector classified as not assessed, typically those identified through business license sharing agreements near the end of the year.

³Percentage of active operations, regulated within the sector classified as not yet assessed, Step 1, 2 or 3 of the enforcement policy at the last inspection date.

⁴Percentage of active operations, regulated within the sector classified as DUR at the last inspection date.

Most CoP enforcement actions to date have been associated with implementation of the food services code, which regulates one of the largest business sectors in the CRD. This sector has been very cooperative during application of the escalating approach to enforcement, and approximately 4% of food services operations inspected were considered to be “in progress”, with 0.2% being classified as DUR. The main non-compliance issues continue to be failure to maintain GIs and failure to install a properly-sized GI.

There were 14 tickets issued by the CRD to food services operations in 2018, six were waived upon installation of the required treatment works (a filing fee was paid), improvement of maintenance practices or closure of the restaurant; seven were paid, and one remained outstanding.

The automotive (mechanical) sector had 8% of the facilities “in progress” in 2018, which equates to 15 of the 192 regulated facilities. In 2015, a ‘sector-by-sector’ approach expanded the definition of automotive to include all types of mechanical repair. Approximately 3% of the sector includes facilities identified as possible dischargers under the code, but are still awaiting confirmation. These were primarily identified through the municipal business license sharing process.

The dental sector had 9% of the sector “in progress” or 10 out of 117 facilities. A decision was made in 2016 to increase inspections of the small number of dischargers in this sector, to ensure proper amalgam management. About half of the facilities lack of compliance was due to a lack of records and half was due to a need for maintenance of treatment works.

The dry cleaning sector compliance improved from 71% to 91% of the facilities compliant from last year to this year. As with the dental sector, inspections of the small number of dischargers in this sector are now completed annually to ensure proper PERC management and/or disposal. In 2017, the CRD commissioned a RRU student project to investigate best practices for PERC treatment. The study highlighted the importance of following the manufacturer’s recommendations for maintenance and media replacement.

The vehicle wash sector had 32% of the facilities “in progress” in 2018, which equates to 12 of the 37 regulated facilities. The majority of compliance issues were because of a lack of records.

In 2018, 89% of facilities regulated under RSCP CoP, permits and authorizations achieved overall compliance.

3.3 Contaminants Management

Contaminants management builds on the program's successful regulatory approach to make reductions in specific priority contaminants that have proven difficult to control or treat. This involves a focus towards avoidance, elimination or substitution of polluting products, processes or materials. Contaminants management projects initiated or completed in 2018 are outlined below.

3.3.1 Contaminant Characterization of Microbreweries in the Fermentation Sector

The number of alcohol distillery businesses in BC is rising, in part, due to significant transformation in provincial liquor laws in 2013, enabling businesses to operate under a craft designation. The growth rate of new craft distillery operations in BC between 2012 and 2015 was 182% (or 60% annually).

CRD-regulated breweries have recently been observed integrating distillery equipment into their existing production operations. In addition, the region is seeing a growing presence of stand-alone craft distillery enterprises. The distillation sector was reviewed in 2016, and a review of the remainder of the sector was conducted in 2017, as part of a project to evaluate regulation based on contaminant loadings and more consistent requirements across sub-sectors.

At the time of the review, there were 26 fermentation facilities, five of which are regulated under permit, 13 u-brews that use pre-fabricated kits and concentrates, and eight microbreweries under the Code of Practice for Fermentation Operations. Two new microbreweries have begun operation over the past year.

The fermentation industry has been well documented to produce large wastewater volumes with relatively high concentrations of COD, BOD, TSS and low pH.

A review of historical monitoring data of the permitted breweries showed BOD and COD results ranging from 500-1,250 mg/L and 800-2,000 mg/L, respectively. TSS ranged between approximately 25-100 mg/L. Annual wastewater flows were 7,000-15,000 m³.

Sampling data from 2015 and 2017 for six of the eight microbreweries was summarized, and results showed BOD and COD results ranging from approximately 2,500-20,000 mg/L and 4,000-36,000 mg/L, respectively. TSS ranged between approximately 100-1,700 mg/L. Annual wastewater flows were estimated at 300-2,250 m³.

While the flows were much higher for permitted facilities, wastewater strength was significantly lower than for microbreweries. It was acknowledged that for some permitted facilities, years of monthly data was available, while only one or two samples were collected for each microbrewery. It was recommended that additional data on microbreweries be collected ideally through authorizations to develop a more representative picture of wastewater strength and volumes.

Prior to authorizing the microbreweries, a pilot study to collect additional data, as well as install flow monitoring devices, was initiated in 2018. Flow monitoring is a crucial component of calculating loadings from this sub-sector. The project will collect data through the fall and winter of 2019/2020. The project is expected to be completed in mid-2020.

3.3.2 Investigation of Alternative Dry Cleaning Treatment Processes and Methods

In 2017, the CRD commissioned a study by RRU Environmental Science students to research the effectiveness of treatment works used in the dry cleaning sector within the CRD. Building off that study, the CRD commissioned a study in 2018 comparing sustainable dry cleaning methods to the traditional use of PERC.

Six different dry cleaning processes, including PERC, wet cleaning, hydrocarbon, liquid carbon dioxide (CO₂), glycol ethers and liquid silicone were explored. Five operations within the CRD were observed to understand their practices and disposal methods.

A ranking matrix was tabulated, which was based on material and operational costs, ease of use, efficacy, waste management, environmental concerns, health effects, legislation and availability for each alternative process. Wet cleaning had the highest score in the ranking matrix making it the most sustainable alternative dry cleaning process to PERC.

There is currently one wet cleaning facility and one hydrocarbon-based facility, as well as seven PERC-based dry cleaners discharging in the CRD. The hydrocarbon-based facility was sampled by CRD staff and while PERC was detectable, levels were found to be compliant with the dry cleaning code. The wet cleaner uses biodegradable products and does not discharge wastes regulated by the code nor the bylaw.

The report recommended a detailed business plan for a typical business using PERC to transition to a wet cleaning operation.

3.4 Contaminant Reductions

3.4.1 Marine Outfall Contaminant Reductions

One of the main objectives of the RSCP is protection of the marine receiving environment. A specific goal associated with this objective, included in both the Core Area LWMP and Saanich Peninsula LWMP, is “to maintain or reduce effluent contaminant loadings to the receiving environment”.

3.4.1.1 Core Area Outfall Effluent

CRD staff regularly monitor effluent quality at the Macaulay and Clover points outfalls for a wide range of substances. The most recent effluent trend analysis was undertaken in 2017. This report provided a statistical assessment of wastewater trends at Clover and Macaulay points outfalls over the period 1990-2015. The findings of this report for Clover and Macaulay points over the 25-year period of record included the following:

A total of 91 routine analysis parameters were assessed as “frequently detected” for effluent trend analyses. Significant trends in detection frequency over time were observed for approximately 20% of the frequently detected parameters. Among the significant trends, increases in detection frequency were generally observed for metals and conventional parameters, and decreases were generally observed for organic parameters. Increased detection frequency over time appears to be related to improved analytical methods (reduced detection limits for several parameters) rather than to systematic increases in concentrations. However, some elevated detection limits were observed in recent years for organic parameters (e.g., di-n-butyl phthalate).

Approximately 70% of the frequently detected routine analysis parameters and 27% of the frequently detected high-resolution analysis parameters had significantly different concentrations between the two outfalls. For the majority of these parameters, concentrations measured in the Macaulay Point outfall were greater than those measured in the Clover Point outfall. However, the higher flows of wastewater at Clover Point, relative to Macaulay Point, outweighed the concentration differences and resulted in higher constituent loadings (discharged mass per unit time) at Clover Point.

Statistically significant temporal trends in concentrations were identified for approximately 90% of the frequently detected standard analysis parameters and 39% of the frequently detected high-resolution analysis parameters in the wastewater streams of the Macaulay and Clover points outfalls. The total concentrations of cadmium, chromium, copper, lead, mercury, nickel and zinc all exhibited significant negative trends over the time period assessed. Priority substances generally exhibited significant negative trends (or no significant trend), with the exception of two PAHs (acenaphthene and fluoranthene) that exhibited annual percent changes ranging from +2.6% to +3.1%.

Statistically significant trends in loadings over time were observed in approximately 85% of the frequently detected standard analysis parameters. Statistically significant trends in loadings over time were observed in 50% of the frequently detected high-resolution analysis parameters. Temporal trends in loadings were similar to those in concentrations among contaminant groups, reflecting a tendency toward reductions over time.

Overall, the trend results for priority substances evaluated in previous Golder studies (Golder, 2006, 2009, 2013b) were confirmed in the current assessment. Few discrepancies were observed between the current assessment and the previous two Golder trend assessments (Golder 2009a, 2013); the changes observed in the most recent evaluation were toward additional evidence of stable or decreasing concentrations and loadings of substances in the wastewater stream.

Of the high-resolution parameters, statistically significant decreases in concentrations over time were observed for nonylphenols (-24% to -36%), polybrominated diphenyl ethers (PBDE, -5.3% to -10.1%), and several organochlorine pesticides (annual percent change ranged from -2.9% for alpha chlordane to -18.5% for lindane). Of the organochlorine pesticides, only beta-endosulfan increased with time (+5.3%). Polychlorinated biphenyl (PCB) did not exhibit statistically significant trends in concentrations over time.

These results are used to assess opportunities to reduce input of these contaminants to the sewage system.

Further information about core area effluent quality in 2018 can be found in the *Macaulay and Clover Points Wastewater and Marine Environment Program 2018 Report* available on the CRD website in December 2019.

3.4.1.2 Saanich Peninsula Wastewater Treatment Plant Influent and Effluent

Influent and effluent data has been collected at the SPWWTP, since the plant commenced operation in 2000. The first summary of trends in these data was reported in Hatfield Consultants Ltd, 2005. Golder Associates Ltd., 2009a included a statistical assessment of wastewater influent and effluent trends at the SPWWTP over the period 2000-2008. Golder Associates Ltd., 2017 provided an update of trends to 2015. The findings of this report over the 14-year period of record at the SPWWTP included the following:

Trends in influent and effluent composition were similar for most of the frequently detected parameters. Significant temporal trends were identified for approximately 60% of the frequently detected parameters in the wastewater composite samples. Trends were generally negative (decreasing) for priority substances and for most of the metals. WAD cyanide, manganese and total PAH increased in either influent or effluent or in effluent only. Similarly, some metals (barium, calcium, dissolved copper, dissolved iron and potassium), as well as diethyl phthalate, increased in either both wastewater streams or in effluent only. The number of significant trends in the current assessment was similar to the previous trend assessment (approximately 66%; Golder, 2013). Results from this study are discussed with the Marine Monitoring Program to assess opportunities to reduce input of these contaminants that are increasing to the Saanich Peninsula treatment plant system.

Further information about SPWWTP influent and effluent quality in 2018 can be found in the *Saanich Peninsula Treatment Plant Wastewater and Marine Environment Program 2018 Report* available on the CRD website in December 2019.

3.4.2 Sludge and Mixed Liquor Contaminant Reductions

Another important objective of the RSCP is the protection of sewage treatment plant sludge and mixed liquor quality.

Lime and heat-treated biosolids produced at the SPWWTP were monitored for a range of metals and other substances on a regular basis, since the plant was commissioned in 2000. This monitoring ended in April 2011 following CRD Board direction to cease land application of biosolids. Monitoring of dewatered sludge produced at the SPWWTP commenced in March 2013 and continued in 2018. Monitoring of the mixed liquor produced at the smaller GWWTP began in 1994 and continued in 2018.

3.4.2.1 Saanich Peninsula Wastewater Treatment Plant Sludge

Following CRD Board direction to cease land application of biosolids, SPWWTP produced only dewatered sludge after April 7, 2011. This sludge was not sampled or analyzed prior to disposal at Hartland Landfill as a controlled waste throughout the period April 2011 to February 2013.

A SPWWTP dewatered sludge monitoring plan was developed and implemented in March 2013. The dewatered sludge is not a biosolids product, as defined by the *Organic Matter Recycling Regulation*. The sludge is sampled and is assessed using the Class A Biosolids quality criteria for comparison purposes to evaluate overall metal concentrations and end-product quality. This monitoring is not intended to characterize the material as a biosolids product.

The results for metals and WAD cyanide in SPWWTP dewatered sludge are presented in Figure 1. Mercury levels have been consistently well below the maximum acceptable concentration for Class A Biosolids (MAC) in the last five years of production.

WAD cyanide, first monitored in 2013 to confirm increasing trends in SPWWTP influent, showed peaks in March and July 2018. Silver results were elevated in two samples in 2017, but back to normal in 2018. No cause could be determined and a check of influent and effluent samples taken at different times during the year by the Marine Monitoring Program showed no indications of elevated silver in the liquid stream. There is, however, no criterion for these two parameters in biosolids to use as a benchmark for evaluating the impact of these observations.

Cadmium and molybdenum levels in SPWWTP dewatered sludge generally continued at levels similar to biosolids in the last few years of production. Results were all below the respective biosolids criteria. The levels of the electroplating metals, chromium and nickel, appear to be closely correlated with one another, possibly suggesting a common source on the Peninsula, where there are two electroplating operations under permit.

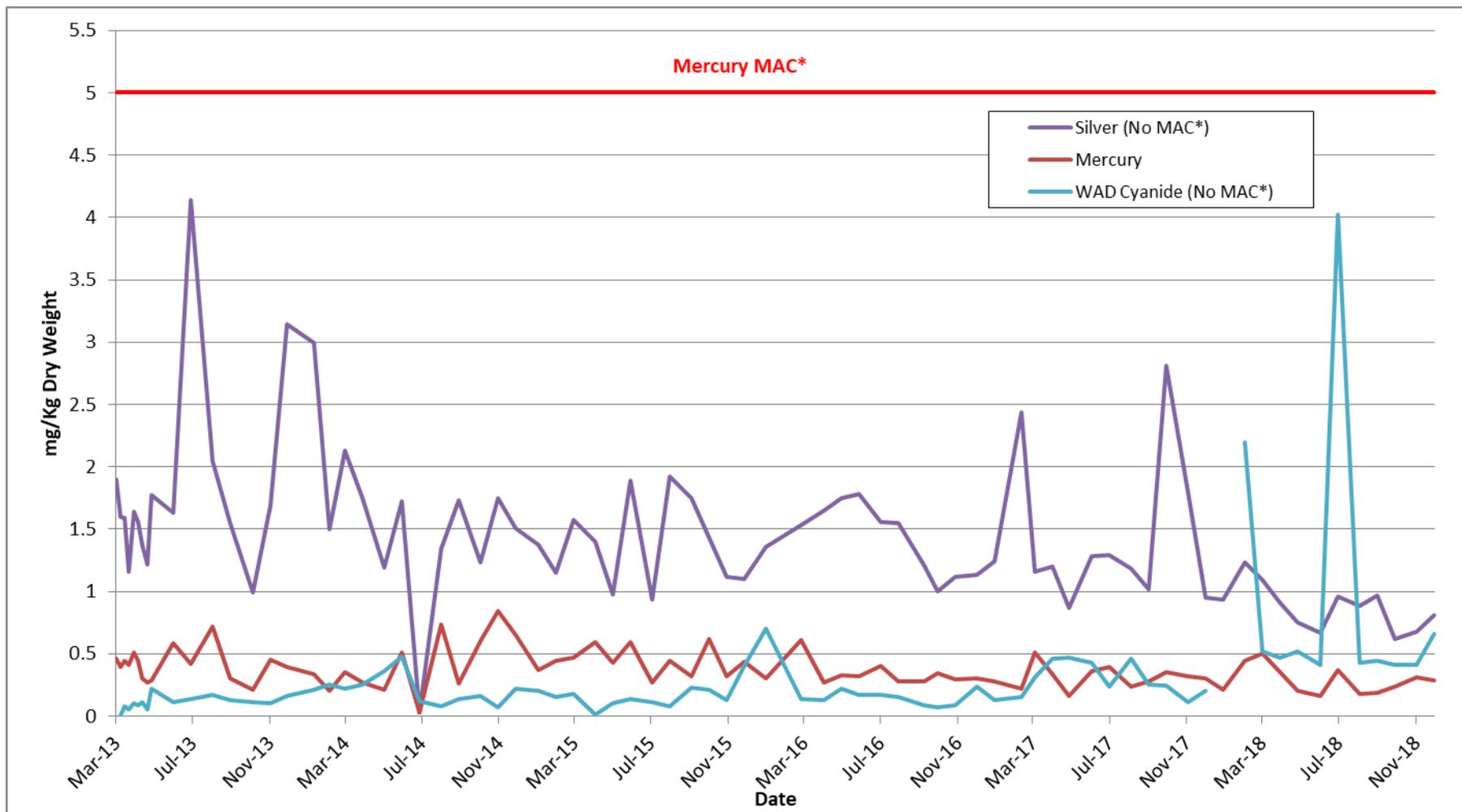
3.4.2.2 Ganges Wastewater Treatment Plant Mixed Liquor

The GWWTP process produces a mixed liquor product, not a biosolids product, as defined by the *Organic Matter Recycling Regulation*. The mixed liquor is sampled and is assessed using the Class A Biosolids quality criteria for comparison purposes to evaluate overall metal concentrations and end-product quality. This monitoring is not intended to characterize the material as a biosolids product. The GWWTP mixed liquor has met Class A quality criteria for all parameters except mercury (and occasionally molybdenum, once for cadmium), since monitoring began in 1994.

Mercury and silver levels in Ganges mixed liquor show an overall trend is toward lower levels for both metals (see Figure 3). Implementation of the dental and photo imaging CoP is thought to be the main reason for the reductions in mercury and silver concentrations at the GWWTP. Continued enforcement of the CoP, and a shift to digital imaging, is likely contributing to the continued lower levels of these metals.

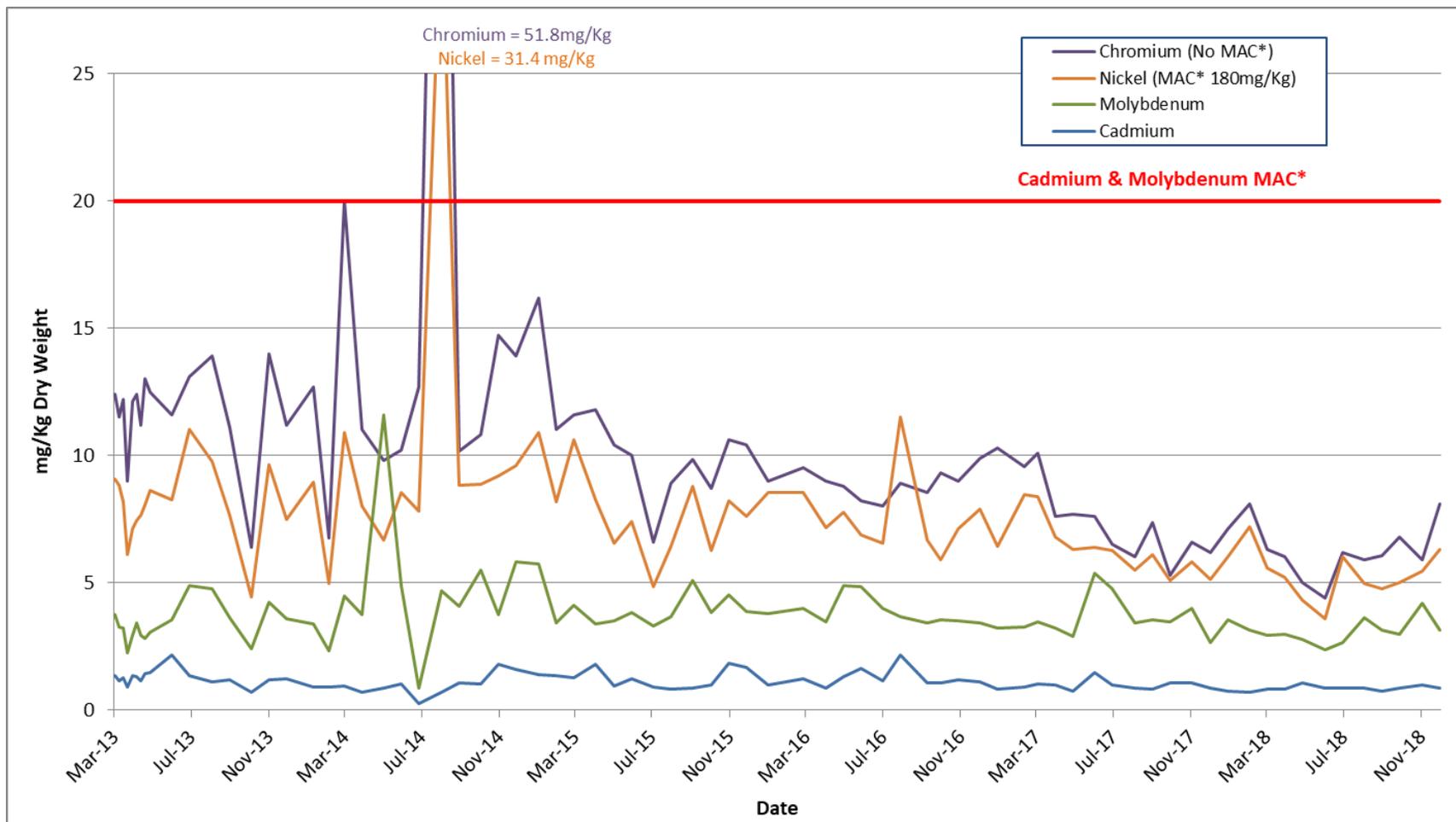
Figure 4 illustrates the decrease in historic levels of cadmium and molybdenum in GWWTP mixed liquor over time. Prior to 2008, molybdenum levels were high and variable, sometimes exceeding the Class A criterion. This may have been due to the use of molybdate corrosion inhibitors in heating and cooling systems within the collection area. More recent levels suggest that there may have been a change to molybdate-free products in at least some situations.

Figure 1 Mercury, Silver and Cyanide in SPWWTP Dewatered Sludge (2013-2018)



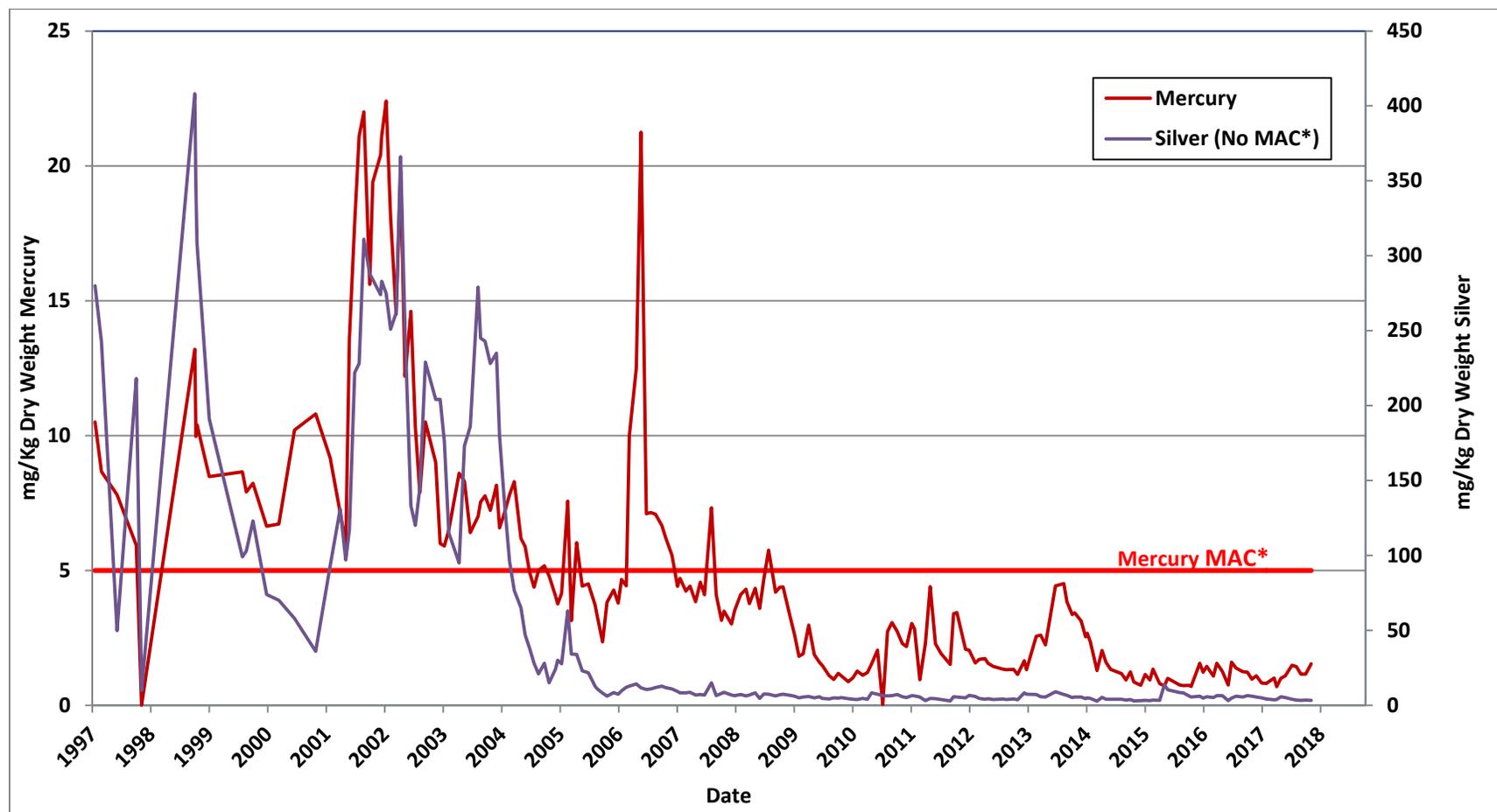
*MAC = Maximum Acceptable Concentration for Class A Biosolids

Figure 2 Chromium, Nickel, Cadmium and Molybdenum in SPWWTP Dewatered Sludge (2013-2018)



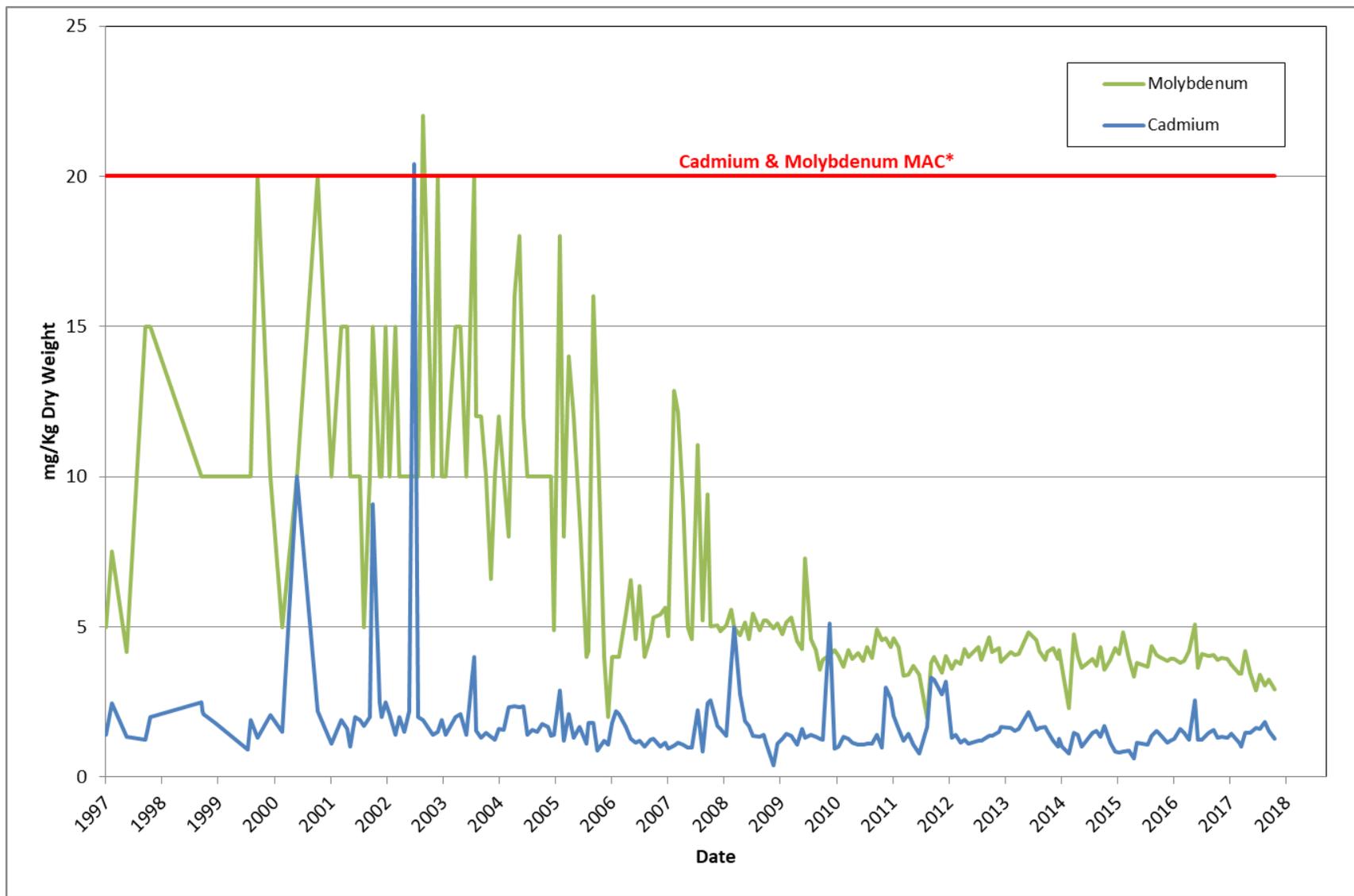
*MAC = Maximum Acceptable Concentration for Class A Biosolids

Figure 3 Mercury and Silver in GWWTP Mixed Liquor (1999-2018)



*MAC = Maximum Acceptable Concentration for Class A Biosolids

Figure 4 Cadmium and Molybdenum in GWWTP Mixed Liquor (1999-2018)



*MAC = Maximum Acceptable Concentration for Class A Biosolids

Table 10 Summary of Reported Sewer System Incidents (2018)

Contaminant	Nature of Incident	Potential Impact	Incident Follow-up
Fats, Oils and Grease	City of Victoria staff reported FOG buildup in a sewer lateral downstream of one downtown restaurant – January 2018	Grease blockages can lead to overflows in municipal sewer pipes and mains – maintenance and health concerns	CRD staff followed up with inspections of the facility location, as well as food service facilities nearby. No non-compliance issues were identified. The accumulation was likely due to a high density of multi-unit residential housing in the area.
	A member of the public reported a lack of grease interceptor at a City of Victoria restaurant – February 2018		Inspection records showed a GI was already in place, but under a floor panel. CRD staff followed up to confirm good maintenance and record keeping practices were in place.
	City of Victoria staff reported FOG buildup in a sewer lateral downstream of one downtown restaurant – February 2018		CRD staff followed up with inspections of the facility location. No non-compliance issues were identified.
	Central Saanich staff reported FOG buildup in a sewer lateral downstream of two Keating Cross Road restaurants – March 2018		CRD staff followed up with inspections of the facility location, as well as a permitted food production facility nearby. No non-compliance issues were identified at the restaurants and additional audit samples collected from the permitted facility showed total oil and grease levels in compliance.
	City of Victoria staff reported FOG buildup in a sewer lateral downstream of one downtown restaurant – April 2018		CRD staff carried out an inspection of the food service facility and found one fixture not connected and a history of excess grease levels. The restaurant is under new ownership and subsequent inspections confirmed connection of the fixture and compliant levels.

3.5 Significant Incident Reporting

CRD and municipal engineering department staff communicate periodically regarding sanitary sewer wastewater quality problems, suspicious discharges or significant incidents leading to contamination of the CRD's collection and treatment systems. A *Significant Incident Report Form* was initially developed in 2000 to record operational problems within all trunk sewers and treatment plants operated by the CRD. The report form and response procedure was reviewed in 2013 following an incident involving a spill of Bunker "C" fuel oil into the CRD's Lang Cove pump station, and a new significant incident response procedure was developed by CRD staff for implementation in 2014. Staff develop detailed sewer catchment area maps as needed to support potential investigations.

Table 10 provides a summary of incidents reported in 2018 that impacted, or had the potential to impact, the environment, sewerage works, sewage treatment facilities or public health and safety. Notes on incident follow-up were summarized from CRD significant incident reports, municipal grease reports, complaint forms, memos, emails, conversation records and other notes on file. There were no incidents reported that affected the operation of CRD sewage treatment plants in 2018.

3.6 Outreach and Partnerships Initiatives

Program staff continued to develop and maintain program-specific outreach and education messaging throughout 2018. Where appropriate, source control messaging was also integrated with other initiatives, campaigns and community outreach events held throughout the year, across the region. New campaigns are under development for launch in 2020 to promote source control actions in order to protect wastewater quality and operation of existing sewage infrastructure and the new McLoughlin Point WTP.

Key source control initiatives and campaigns for 2018 are summarized below under separate sections for residential and business outreach, education and the CRD website.

3.6.1 Residential Outreach

In 2018, CRD staff focused on addressing survey results that indicated that 92% of the public believe that source control practices will not be relevant with wastewater treatment. The same survey showed that "Clean Green" was the most recognized Source Control campaign. To leverage the success of "Clean Green" new outreach tools and prompts were created for *Clean Green 2.0*. This included highlighting the tagline "What you put down the drain matters". The campaign promoted the proper disposal of household hazardous waste and the use of alternative cleaners that have less impact on the sewer system and the receiving environment. Three YouTube videos were created and used for social media. Engagement tools, including five new recipes for alternative cleaners, were created and included a revised Clean Green "Cook Book". 3,000 Clean Green "Cook Books" were distributed throughout the region at nine Clean Green-specific outreach events, six Clean Green-featured community events and over 20 general community events.

The capital region, through continued presence and past initiatives, maintained a high medication return rate in 2018 and approximately 11.3 tonnes of medications were collected in the region.



Figure 5 Clean Green Display

3.6.2 Business Outreach

Inspectors continued to be the front line staff delivering outreach messaging to local businesses. Outreach included distribution of sector-based posters and guidebooks. These tools are updated periodically based on feedback from businesses and results of inspections. In addition, inspectors worked with business owners to highlight the benefits associated with protection against cross connections (protection of public health), water conservation (potential cost savings), solid waste diversion best management practices and other CRD initiatives.

CRD program staff redeveloped, created and launched new business and sector-specific webpages for the CRD website in 2018 and this work will continue through 2019

3.6.3 Partnerships Initiatives

Since its inception, the CRD has worked with many agencies to expand program reach and effectiveness, improve services and resolve problems of mutual concern. These agencies have included BC ENV, federal agencies, such as the DND and Public Works and Government Services Canada, regional districts, municipalities, Island Health and local academic institutions.

In 2018, there were continued collaborative efforts between RSCP staff, other CRD environmental programs and external partners to provide augmented inspection services and superior customer service, and to promote high environmental performance within businesses.

Some examples of both internal and external collaborative partnerships initiatives undertaken in 2018 are outlined below.

3.6.4 2018 Collaborations

In 2018, CRD staff undertook the following collaborative activities:

- Staff worked with the CRD Climate Action Program to create a Standard Operating Procedure and pilot the use of e-bikes on inspections.
- The CRD commissioned a study by RRU Environmental Science students to build on research and undertake an investigation of alternative dry cleaning treatment processes and methods within the CRD.
- Continued to leverage the CRD's standing as one of the oldest and most comprehensive source control programs in Canada to share information and promote the development of source control programs throughout BC and Alberta, while co-hosting the Source Control Community of Practice in partnership with the BC Water and Waste Association.
- Continued to work with Island Health staff and other CRD program staff, including Cross Connection Control and Onsite Wastewater Management, to share information, maintaining the strong partnership between RSCP and Island Health inspectors.
- Continued the Business Licensing Municipal Working Group to share new businesses license information for CRD inspection and permitting purposes. Seven municipalities established information sharing procedures, and negotiations continue with three remaining municipalities.
- CRD staff continued to undertake odour monitoring in the Lang Cove catchment area to ascertain sulfide sources with a number of permits.

3.6.4.1 E-bikes Pilot Project

The CRD's Corporate Climate Action Strategy targets a reduction in greenhouse gas emissions to 33% below 2007 levels by 2020. An important part of this strategy is the Zero Fleet Initiative. The initiative includes piloting zero emissions transportation options, including electric bicycles (e-bikes) within CRD operations. The e-bike pilot will initially be focused within the Regional Source Control, Corporate Climate Action, Active Transportation and Climate Action programs.

The pilot was launched in February 2018 and staff were trained to use the three e-bikes for travel to inspections and meetings. Staff created a *Standard Operating Procedures* document to ensure the bikes are operated safely, and following CRD procedures. Staff also participated in ground-truthing and procurement of equipment necessary for inspections, such as lockable storage and personal protective equipment. The pilot also incorporated collaboration with a graduate student from the Institute for Integrated Energy Systems at the University of Victoria.

The e-bikes were equipped with data loggers and monitored and analyzed the accumulated data throughout the pilot to determine feasibility to extend the e-bike pilot project to other CRD operations. Data was collected from April to August 2018 and found that a total of 607 km were travelled over 92 total trips. The emissions intensity for four modes of transportation were compared over the length of the pilot. The e-bike generated 0.0009 kg CO₂e/km, whereas an electric car generated 0.002 CO₂e/km, which is a 95% reduction in greenhouse gases, even over a battery-powered electric vehicle. Over the course of the pilot, approximately 250 kg of CO₂ was saved by the deployment of e-bikes. Using e-bikes also resulted in an 80% reduction in capital and operating costs.

It was estimated that using an e-bike in the downtown core saved approximately two hours of inspection time per day, due to route and parking efficiencies. Arriving to businesses on an e-bike also sparked discussions around the CRD climate action initiatives, work efficiencies and the health benefits of cycling.

A review after one year of the pilot found the program had additional capacity for participants. Given support from the CRD's Environmental Protection Division's senior manager, aligned mandate, and the potential for e-bikes to be operationally appropriate to many CRD staff, the program has been expanded to allow additional staff to participate. The CRD Board Chair has also been added to the pilot.

3.6.4.2 Island Health Collaboration

Staff continued to work with Island Health Authority inspectors, sharing information on difficult food service establishments, planning co-inspections, where necessary, and dealing with food carts.

Island Health administrative staff continued their information sharing efforts in 2016, forwarding "Application for Food Facility" forms to the CRD. The forms provide contact and operating details for new food service businesses, enabling CRD staff to work with new applicants more proactively, and dramatically improving the accuracy of RSCP business data.

3.6.4.3 Collaboration with Academic Institutions

The CRD also developed various partnerships with educational institutions in 2018.

A CRD inspector presented a workshop to Camosun College Environmental Technology students, covering overviews of regional government, regional wastewater management and source control practices.

The CRD commissioned a study by RRU Environmental Science undergrads to research alternative dry cleaning processes used within the CRD.

3.6.4.4 Municipal Collaboration

Since 1999, municipal staff have been encouraged to issue Waste Discharge Assessment forms to persons applying for new building licenses or new sewer connections for businesses that have the potential to discharge non-domestic waste to sewer. Completed forms are forwarded by the municipality to the CRD for evaluation. In addition, businesses or plumbers contracted to perform upgrades at CoP operations directly contact CRD staff regarding CoP requirements. Letters copied to municipal plumbing or licensing contacts are sent directly to CoP operations outlining specific requirements and providing information.

In 2018, CRD staff worked with municipal staff to resolve various oil and grease blockages in sewers. Municipal staff continued to provide plumbing and building information, flow data and other information to CRD staff to assist in the preparation of permits, authorizations and CoP treatment works installations.

Additionally, CRD staff continued to attend Vancouver Island Plumbing Code Committee meetings. This is an opportunity to improve personal relationships with municipal plumbing inspectors, provide regulatory updates and problem solve with issues that affect both municipal and regional inspectors.

3.7 Performance Measures

Three program performance measures were developed over the period 2004-2006. These measures have been incorporated in RSCP program budgets since 2007 and were included in the scope of the five-year review undertaken in 2009. The performance measures are as follows:

- Percentage of regulated businesses with proper waste treatment installed. This measure is associated with the RSCP objective of consistent application of the program for all users of CRD sewage facilities.
- Percentage of priority contaminants showing no increase in loads to the core area environment. This measure is associated with the RSCP objective of protecting the marine environment adjacent to the CRD's sewage outfalls.
- Percentage of biosolids and sludge samples that meet Class A standards for metals. This measure is associated with the RSCP objective of protecting the quality of sewage sludge and biosolids.

“Overall Compliance”, was established in 2014 to replace “Percentage of regulated businesses with proper waste treatment installed”. The method of calculating each performance measure is described in Appendix 2.

Table 11 Results of RSCP Performance Measures (2005-2018)

Performance Measure	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Proper waste treatment ¹	80	85	87	93	95	96	97	90	97					
Overall Compliance ²										95	97	98	96	93
Priority Contaminants ³	92	--	--	78	--	--	94	--	--	--	--	92	--	--
Biosolids and Sludge ⁴	92	67	88	93	100	100	100	100	100	100	100	100	100	100

Notes:

¹Percentage of regulated businesses with proper waste treatment installed.

²Overall Compliance replaced “Proper waste treatment” as of 2014.

³Percentage of priority contaminants showing no increase in loads to the core area environment (preliminary result from draft report). Study performed every three-five years.

⁴Percentage of biosolids and sludge samples that meet Class A standards for metals.

“Proper waste treatment” was modified in 2014 to “Overall Compliance” as a better indicator of effective contaminants diversion. An enforcement status of “Compliant” or “Step 1” indicates proper treatment works or that an acceptable performance-based treatment arrangement has been made, though not necessarily compliant with what is prescribed in the CoP. Further, a “Compliant” or “Step 1” enforcement status assumes that the treatment works are being properly maintained. All treatment systems are rendered ineffective if they are not maintained, thus as a compliance indicator this is much more accurate in representing how well waste is being managed.

“Priority Contaminants” is based on the “yearly trend” in loads at both Macaulay and Clover points outfalls for 36 priority contaminants, as documented in the most recent trend assessment report (Golder Associates Ltd, 2017). Long-term analysis of effluent trends for the core area outfalls is only undertaken every three-five years. The most recent analysis, including data from 1990-2015, was received in 2017.

“Biosolids and Sludge” has shown some variability in the early years, largely due to the mixed liquor metals results from the GWWTP exceeding Class A criteria for biosolids. However, in 2018, for the ninth consecutive year, the GWWTP mixed liquor results met the Class A criteria for all metals, including mercury. SPWWTP dewatered sludge monitoring commenced in March 2013. All of these results also met the Class A criteria for metals. The combined results from the two plants provided an overall 100% rating for this performance measure in 2018.

4.0 CONCLUSION

This report meets the CRD's commitments in the Core Area LWMP and Saanich Peninsula LWMP to prepare an annual report on the RSCP for submission to ENV. The information in this report is used by CRD staff to evaluate the performance and future direction of source control program activities and by municipal staff to understand trends in discharge of contaminants from residential and business sources.

The CRD continued to work towards its goals to protect sewage collection and treatment facilities, public health and safety, and the marine receiving environment by reducing the amount of contaminants that industries, businesses, institutions and households discharge into the CRD's sanitary sewer systems. The program regulated approximately 2,000 businesses through industrial wastewater discharge permits, authorizations and sector-specific CoP.

A total of 1,129 CoP inspections were conducted over the year. Semi-annual inspections of the 42 active permits, and annual inspections of the 94 active industrial, commercial and institutional authorizations, were completed. Nine new short-term permits and eight new authorizations for a variety of business types and terms were issued. Five significant incidents reported in regional and municipal sewers were investigated in 2018, and 14 tickets were issued to non-compliant food services operations. The overall compliance rate, including facilities operating under CoP, authorization and permit was 93% in 2018.

GWWTWP mixed liquor results met the Class A Biosolids criteria for all metals, including mercury, for the 10th consecutive year. SPWWTP dewatered sludge results also met the Class A criteria for metals.

Monitoring targets set for 2018 were achieved. In addition, six facilities in the fermentation sector were sampled to support a sector review. The review assisted staff in characterization of fermentation wastewater, particularly for microbreweries with an eye towards contaminant loadings and consistent requirements across sub-sectors. To further improve the program's regulatory components, a consultant was retained to review the CRD Sewer Use Bylaw and suggest improvements. Staff will revise the Sewer Use Bylaw in late 2020.

The CRD also reduces inputs of contaminants into the sewer system with numerous non-regulatory tools, which leads to the reduction of contaminants to the environment. Significant activities throughout the year included:

- Refreshing the existing BC Medications Return Program and partnering with the Island Health Authority and the Health Products Stewardship Association to launch a new campaign to increase public awareness and participation in the program. Approximately 11.3 tonnes of medications were collected in the region, the highest rate of return in BC.
- Commissioning a study by RRU Environmental Science students to research the alternative methods of dry cleaning within the CRD.
- Promoting new engagement and behaviour change tools for the Clean Green 2.0 campaign, which focuses on environmentally-safe alternatives to household cleaners.
- Developing and co-hosting a Source Control symposium at the 45th Annual BC Water & Wastewater Association Conference & Trade Show in Victoria, BC.

In 2019, the program will be working on several initiatives including:

- Finalizing an internal review of the CRD Sewer Use Bylaw in advance of stakeholder engagement in 2020.
- Completing an enhanced key manhole study to capture a wide range of parameters in sewage at several locations in order to better understand trends in contaminants from various land use types and collect data to evaluate program efforts against the operational needs of the McLoughlin Point WTP, as well as the other CRD treatment facilities across the region.

- Evaluating emerging business sectors, such as microbreweries, in order to set appropriate regulations and discharge limits for their unique flow and waste strength characteristics.
- Continuing to update web and print resources for the education of businesses and residents.
- Delivering educational campaigns to promote source control actions in order to protect wastewater quality and operation of existing sewage infrastructure and the new McLoughlin Point WTP.

5.0 REFERENCES

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APPENDIX 1

RSCP Priority Contaminant List (2018)

TOTAL METALS
arsenic (As)
cadmium (Cd)
chromium (Cr)
cobalt (Co)
copper (Cu)
lead (Pb)
manganese (Mn)
mercury (Hg)
molybdenum (Mo)
nickel (Ni)
selenium (Se)
silver (Ag)
zinc (Zn)
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)
Total PAH
Low molecular weight PAH
naphthalene
acenaphthylene
acenaphthene
fluorene
phenanthrene
anthracene
fluoranthene
High molecular weight PAH
pyrene
benzo(a)anthracene
chrysene
benzo(b)fluoranthene
benzo(k)fluoranthene
benzo(a)pyrene
dibenzo(a,h)anthracene
indeno(1,2,3-cd)pyrene
benzo(g,h,i)perylene
Phthalates
bis(2 ethylhexyl)phthalate
di-n-butyl phthalate
MISCELLANEOUS
1,4-dichlorobenzene
Cyanide - weak acid dissociable (WAD)
Cyanide - strong acid dissociable (SAD)
phenol
total oil and grease

APPENDIX 2

Calculation Methods for RSCP Performance Measures

The following methods are used to calculate the four CRD performance measures referred to in Section 3.7.

RSCP Performance Measure #1:

“Percentage of regulated businesses with proper waste treatment installed”

As of 2014, this performance measure has now been replaced with “Overall Compliance”. “Number of regulated business with proper waste treatment installed” was, in earlier program years, a significant marker of program influence. As new CoP were being introduced to the region, it was important to measure how many (and how quickly) businesses were adopting proper wastewater treatment systems. It is the belief of CRD staff that a shift to “overall compliance” is now a better indicator of effective contaminants diversion, due to:

- **Consistent high compliance with proper treatment works installed:** Inspection history shows that, as a baseline, almost all regulated facilities are operating with proper waste treatment.
- **Performance-based compliance site-specific practices:** Alternative arrangements in practices or technologies, which might deviate from what is prescribed in a code, may be effectively treating the waste. For example, there are several automotive facilities with (technically) under-sized oil/water separators, who are supplementing their systems with oil coalescing plates, analyzing the wastewater effluent and being monitored through an authorization to ensure that the systems are not bypassing hydrocarbons or in excess of other restricted waste limits.
- **Treatment works maintenance:** The top enforcement issue amongst regulated facilities is proper maintenance of treatment works. All treatment work systems are rendered ineffective if they are not maintained; thus, as a compliance indicator, this is much more accurate representation of proper contaminants diversion. A facility not maintaining a system will receive a major infraction (Step 2) compliance status.
- **Working with facilities with inadequate or no treatment works:** On the rare occasion where a facility is found to have no treatment works on site, staff work swiftly with the business towards adopting an effective system. When there is resistance to working proactively with staff, enforcement actions escalate quickly, typically resulting in positive action from the facility. When inspected treatment works are viewed as ineffective¹, the inspector will work with the business to improve treatment performance through either an upgraded system that meets CRD requirements; authorizing modifications to the existing system to meet or beat base performance requirements; or assisting the business in modifying their practices to eliminate the need for on-site treatment works².

RSCP Performance Measure #2

“Percentage of priority contaminants showing no increase in loads to the core area environment”

This measure is associated with the CRD objective of protecting the marine environment adjacent to the CRD’s sewage outfalls.

The CRD has collected samples of wastewater from the Macaulay and Clover points outfalls since 1988. Wastewater samples have been analyzed for over 200 parameters, including priority substances and conventional parameters. Statistical analyses have been conducted periodically in the past to evaluate long-term trends in concentrations and loads of these substances in wastewater. The most recent trend

¹ (e.g., under capacity, in poor repair, or not undergone base standard certification)

² (e.g., an automotive shop disconnecting their floor drains and using off-site treatment services exclusively)

assessment (Golder Associates Ltd., 2018), utilizing data from the period 1990-2015, updates the previous assessment (Golder Associates Ltd., 2013).

In 2008, the CRD prepared a list of core area priority contaminants, based on information provided by Marine Monitoring Program and other sources. The following table shows the current list of 39 RSCP priority contaminants (Appendix 1 of this report). Most of these contaminants have been targeted for reduction by RSCP, either through regulation or outreach, or a combination of initiatives.

Performance measure #2 is based on the “yearly trend” in loads at both Macaulay and Clover points outfalls for the above 39 priority contaminants, as documented in the most recent trend analysis report. All RSCP priority contaminants showing either a decrease or “no significant trend” in loads at either Macaulay or Clover points outfalls are identified and reported as a percentage of the 39 listed priority contaminants. Note that trends for “total” metals, not “dissolved”, are used in the calculation. For polycyclic aromatic hydrocarbon (PAH), trends for individual PAH, low molecular weight PAH, high molecular weight PAH and total PAH are used in the calculation.

Performance Measure Calculation

The following table shows how performance measure #2 was calculated for 2005, 2008, 2011 and 2016, based on information provided in Golder Associates Ltd. Note: Only the contaminants for which a significant increasing trend was reported are shown – all other contaminants showed either a “significant decrease”, no “significant trend” (ns) or “could not be calculated” (nc).

RSCP Priority Contaminant	Yearly Trend Core Area Loads			
	(1990-2005)	(1990-2008)	(1990-2011)	(1990-2016)
TOTAL METALS				
arsenic (As)		Increase		
cadmium (Cd)				
cobalt (Co)			Increase (MAC)	
chromium (Cr)				
copper (Cu)				
lead (Pb)				
molybdenum (Mo)	Increase (CLO)	Increase (MAC)		
manganese (Mn)				
mercury (Hg)				
nickel (Ni)				
selenium (Se)		Increase		
silver (Ag)				
zinc (Zn)				
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)				
Low molecular weight PAH				
naphthalene				
acenaphthylene				
acenaphthene		Increase		Increase (MAC)
fluorene				Increase (MAC)
phenanthrene				
anthracene				
fluoranthene		Increase		
High molecular weight PAH	Increase	Increase		
pyrene				
benzo(a)anthracene				
chrysene				
benzo(b)fluoranthene				
benzo(k)fluoranthene				
benzo(a)pyrene				
dibenzo(a,h)anthracene				
indeno(1,2,3-cd)pyrene				
benzo(g,h,i)perylene				
Total PAH		Increase (MAC)		
Phthalates				
bis(2 ethylhexyl)phthalate	Increase	Increase (MAC)		
di-n-butyl phthalate				
Miscellaneous				
1,4-dichlorobenzene				
phenol				
total oil and grease				
Cyanide - WAD			Increase (CLO)	Increase (CLO + MAC)
Cyanide - SAD				
Total # Increase	3	8	2	3
Total # Decrease or "ns"	33	28	34	33
% of 36 Priority Contaminants	92%	78%	94%	92%

RSCP Performance Measure #3

“Percentage of biosolids and sludge samples that meet Class A standards for metals”

Performance measure #3 is linked to the CRD objective of protecting the quality of sewage sludge and biosolids.

Composite samples of biosolids produced at the SPWWTP were analyzed on a regular basis during periods of production from May 2000-April 2011. Samples were analyzed for metals, moisture, pH, nutrients and microorganisms. Analytical results for metals were assessed using Class A Biosolids standards as specified in Canadian Food Inspection Agency Trade memorandum T-4-93 Table II (see below).

Following CRD Board direction to cease land application of biosolids, SPWWTP has produced only dewatered sludge since April 2011. The dewatered sludge was landfilled as controlled waste throughout 2012, without routine sampling and analysis. Consequently, there was no 2012 SPWWTP dewatered sludge data available for input to this performance measure. SPWWTP dewatered sludge monitoring commenced in March 2013.

Class A Biosolids Standards, Maximum Acceptable Metal Concentrations*

Metal	Concentration (mg/Kg dry weight)
Arsenic	75
Cadmium	20
Cobalt	150
Mercury	5
Molybdenum	20
Nickel	180
Lead	500
Selenium	14
Zinc	1,850

*From: Canadian Food Inspection Agency Trade memorandum T-4-93 Table II

The GWWTP produces a mixed liquor product, and the SPWWTP produces dewatered sludge. Neither of these are biosolids products by definition. Grab samples of GWWTP mixed liquor are analyzed for metals and moisture on a monthly basis. Composite samples of SPWWTP dewatered sludge are submitted for metals cyanide and moisture analysis initially on a weekly, and finally on a monthly, basis. The results are assessed using the Class A Biosolids standards referred to above.

The performance measure is calculated using the ratio of the annual number of samples of both dewatered sludge and mixed liquor that were compliant with Class A standards and the total annual number of samples collected and analyzed – expressed as a percentage.

Performance Measure Calculation – 2018

The following table illustrates how performance measure #3 is calculated for 2018.

Treatment Plant	# Samples (2018)¹	# Compliant (2018)²
Ganges WWTP (Mixed Liquor)	12	12
Saanich Peninsula WWTP (Dewatered Sludge)	12	12
Totals	24	24
Percentage Compliant		100%

Notes:

¹the number of dates on which discrete samples were submitted for analysis.

²the number of samples with results that were fully compliant with Class A Biosolids standards for nine metals. Results for any field duplicates taken on the same date are averaged. If the standards are exceeded for one or more of the nine metals, a “failure” is recorded for the entire sample.

The overall percentage of biosolids and sludge samples that met Class A standards for metals in 2016 was 100%.

RSCP Performance Measure #4

“Overall compliance”

This new performance measure, replacing “Number of facilities with proper waste treatment” would include facilities regulated through permits, authorizations or CoP receiving either a “compliance” or “Step 1” inspection status. A “Step 1” compliance status is indicative of a “first infraction” e.g., a late permit report, or failure to keep records, as required. A single infraction does not have a significant impact on the program. Any facility without proper treatment works or not maintaining treatment works would be given a “Step 2” (first major infraction” or higher level of enforcement depending on the situation).

Performance Measure Calculation – 2018

The first step in estimating overall compliance is establishing the individual CoP sector size. All of the facilities within each CoP data set are assessed and screened on the following criteria:

- Repeat inspections removed
- “No Regulated Waste” Discharge Types removed
- “Not Connected to Regional Sewers” Discharge Types removed
- “Storm Drain Discharge” Discharge Types removed
- Facilities with no inspection dates removed
- “Unknown Discharge Type” Discharge Types removed
- “Closed Facilities” removed
- “Unknown Discharger Types” Discharge Types removed
- “Operating Under Another Regulatory type” Discharge Types removed
- “Operation Under Construction” Discharge Types removed
- Facilities operating under an authorization removed
- “Groundwater Discharger” Discharge Types removed

It should be noted that the screened facilities are not assumed to permanently exist in that state, and are re-visited for updates through “newly sewerer facility”, GIS mapping updates and/or site contact to determine if practices have changed. Sector sizes for permitted and authorized facilities are simply based on number of active permits/authorizations at that time.

Summary of Code of Practice/Permit/Authorization Sector Sizes in 2018

Code of Practice	Est. Sector Size (2018)
Automotive Repair	192
Carpet Cleaning	44
Dental	117
Dry Cleaning	11
Fermentation	18
Food Services	1,323
Laboratory	26
Photographic Imaging	52
Printing	21
Recreation Facility	na*
Vehicle Wash	37
Total CoP Operations	1,841
Total Active Permits	42
Total Active Authorizations	94
Total Regulated Facilities	1,977

Notes:

*Recreation facilities previously regulated under the CoP have all been transferred over to individual authorizations.

With the established CoP sector sizes and number of permitted/authorized facilities, number of “overall compliant” facilities within each data set are established using the last compliance status of 2018. Facilities with “Compliant” or “Step 1” status are considered “Overall compliant” i.e., minor infractions, but assumed treatment works and associated maintenance. Overall compliance since full implementation of CoP are presented in the following table.

Progress on Overall Compliance for 2018 since Adapting New Success Measures

CODES	SECTOR SIZE	# INSP 2018	% INSP	TOTAL COMP	COMP %	IN PROG	IN PROG %	STEP 1	# OVERALL COMPLIANT (COMPLIANT OR STEP 1)	% OVERALL COMPLIANT	;DUR	DUR %
Automotive	192	132	68.75%	177	92.19%	15	7.81%	4	181	94.27%	0	0.00%
Carpet	44	4	9.09%	41	93.18%	3	6.82%	0	41	93.18%	0	0.00%
Dental	117	114	97.44%	107	91.45%	10	8.55%	7	114	97.44%	0	0.00%
Dry Cleaning	11	23	100.00%	10	90.91%	1	9.09%	0	10	90.91%	0	0.00%
Fermentation	18	14	77.78%	16	88.89%	2	11.11%	0	16	88.89%	0	0.00%
Food	1,323	517	39.08%	1,198	90.55%	125	9.45%	37	1,235	93.35%	2	0.15%
Labs	26	6	23.08%	14	53.85%	12	46.15%	5	19	73.08%	0	0.00%
Photo	52	56	100.00%	51	98.08%	1	1.92%	0	51	98.08%	0	0.00%
Printing	21	10	47.62%	21	100.00%	0	0.00%	0	21	100.00%	0	0.00%
Recreation*	-	-	-	-	-	-	-	-	-	-	-	-
Vehicle Wash	37	68	100.00%	25	67.57%	12	32.43%	6	31	83.78%	0	0.00%
Total	1,841	944	51.28%	1,660	90.17%	181	9.83%	59	1,719	93.37%	2	0.15%
Authorizations	94	81	86.17%	82	87.23%	8	8.51%	3	84	89.36%	0	0.00%
Permits	42	88	100.00%	27	64.29%	15	35.71%	10	37	88.10%	0	0.00%
ALL TOTALS	1,977	1,113	56.30%	1,769	89.48%	204	10.32%	72	1,840	93.07%	2	0.10%

Notes:

*Recreation facilities previously regulated under the CoP have all been transferred over to individual authorizations.

APPENDIX 3

CRD Regulated Industrial Categories (Currently Operating under RSCP Permits or Authorizations)

BUSINESS TYPE	TYPICAL CONTAMINANTS OF CONCERN	TYPICAL PRE-TREATMENT INSTALLED
Breweries	solids, organics, pH	solids diversion, filtration, pH adjustment
Chemical Manufacturing	pH, toxic metals, solvents	process control, waste neutralization, off-site waste management
Food Processing	fats, oil and grease, solids, organics	solids separation, grease interceptor, neutralization, dissolved air floatation
Groundwater Remediation	mineral oil and grease, toxic metals, toxic organics, solids, sulphides	settling, filtration, sulphide reduction, adsorption
Hazardous Waste Treatment	mineral oil and grease, toxic organics, sulphides, solids, solvents	filtration, oil/water separation, chemical oxidation, aeration, precipitation, flocculation, adsorption, sulphide reduction
Hospitals	fats, oil and grease, solids, organics, solvents, pH	solids separation, grease interceptor, off-site waste management, absorption
Industrial Laundries	fats (and mineral) oil and grease, solids, organics	grease interceptor, filtration, oil skimmers
Metal Platers	toxic metals, cyanide, solvents, pH	process control, metals adsorption, off-site waste management
Organic Waste Treatment	fats, oil and grease, metals, solids, pH, sulphides	dewatering, grease interceptor, bio-reactors, sulphide reduction, dissolved air floatation
Recreation Facilities	pH, chloride, high volume	pH and chloride adjustment, attenuation
Ship Repair	mineral oil and grease, solvents, toxic metals, toxic organics, solids	settling, flocculation, filtration, electrocoagulation
Street Waste Treatment	fuel, toxic metals, mineral oil and grease, organics, solids	filtration, settling, oil/water separation
Transportation	mineral oil and grease, fuel, solids, de-icing fluid	neutralization, oil/water separation, dissolved air floatation
Wet-Cutting	suspended solids	solids separation, settling