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Report #ESP 08-71

REPORT TO CORE AREA LIQUID WASTE MANAGEMENT COMMITTEE
MEETING OF WEDNESDAY, 23 JULY 2008

SUBJECT **CORE AREA STORMWATER QUALITY ANNUAL REPORT – 2007**

PURPOSE

To present the results of the 2007 Core Area Stormwater Quality program and propose a refocus of program components.

BACKGROUND

As part of the Core Area Liquid Waste Management Plan (LWMP), the Capital Regional District (CRD) Stormwater, Harbours and Watersheds program (SHWP) coordinates the management of stormwater quality in cooperation with the seven core municipalities and First Nations. SHWP has been effective in drawing attention to and prioritizing problems associated with contaminated stormwater. This has allowed the municipalities, the Department of National Defence (DND) and First Nations to develop plans and carry out remedial actions to address these problems.

The results of the 2007 SHWP work in the core area are detailed in the report, *Stormwater Quality Annual Report, Core Area – 2007*. A copy of the executive summary is attached (Appendix A). Copies of the full report are available from the Environmental Services department. The 2007 report has been discussed with the jurisdictions involved.

The annual report covers five main activity areas: stormwater discharge surveys, stormwater source control, upstream investigations, nearshore marine investigations and special projects.

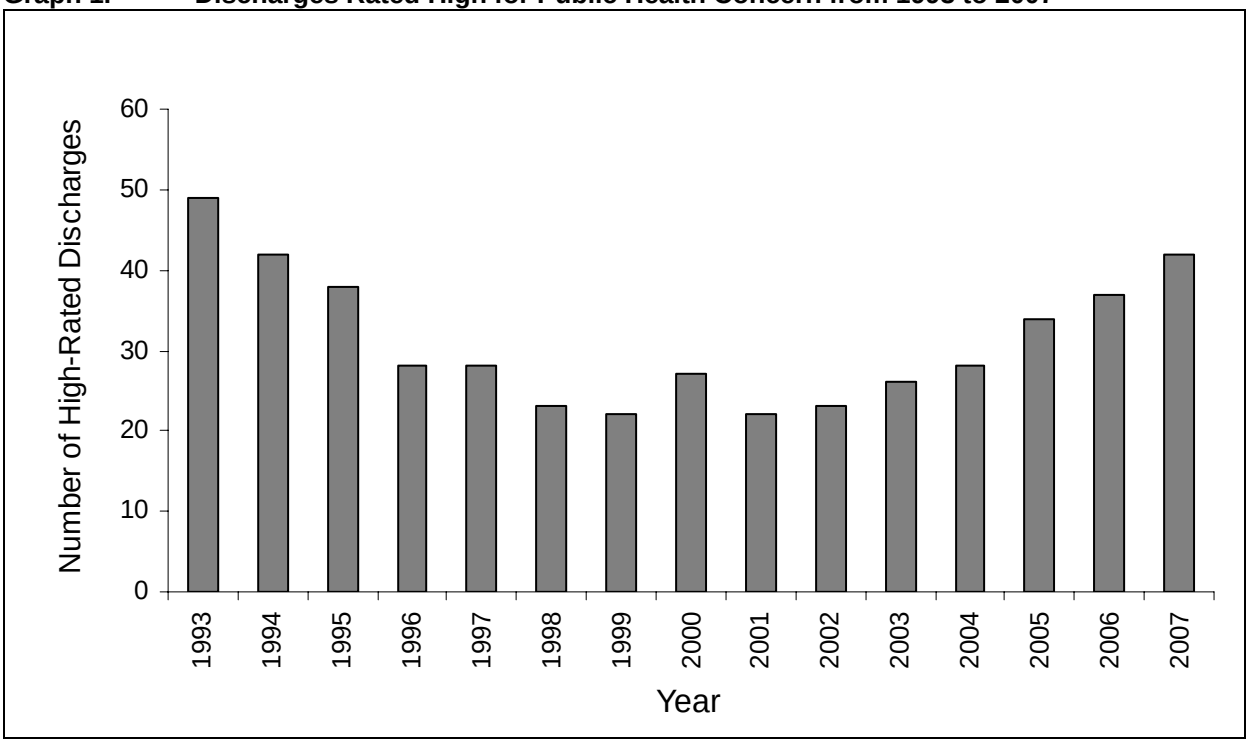
1. Stormwater Discharge Surveys

Public Health – Fecal Coliforms

From 1993 to 1999, the number of stormwater discharges assigned a high level of concern for public health dropped from 49 to 22. Little change was seen from 1999 to 2001 and, since then, the number of high priority discharges has been increasing (see Graph 1 on next page). In 2007, 41 stormwater discharges were assigned a high level of concern for public health and recommended for action (figures A and B in Appendix A show the location of these discharges). A change of approach is required from both the CRD and the municipalities to ensure that this increasing trend does not continue.

The recent increase in high ratings has occurred primarily in the three municipalities of Esquimalt, Oak Bay and Victoria (Appendix A, Table A). These increases do not indicate a lack of effort on the part of these municipalities to identify and repair problems (this municipal effort is described in Appendix B). What they do indicate is the larger infrastructure issues that these municipalities have to deal with. These municipalities have some of the oldest sewer and stormwater infrastructure in the region. Issues such as aging, collapsed and cracked pipes, old construction practices, such as inadequate separation of sewer and storm sewer pipes, and cross-connections all can cause sewage contamination of stormwater. The other four core area municipalities tend to have newer infrastructure and this is probably the cause of the lower numbers of high ratings in these areas.

Graph 1. Discharges Rated High for Public Health Concern from 1993 to 2007



To address the upward trend in high priority stormwater discharges, CRD Scientific Programs staff held discussions with the municipal engineers from the seven core municipalities in June 2008. This group developed a proposal to refocus the CRD's Stormwater Quality program.

The refocused program would include:

- Discontinuing the annual stormwater discharge sampling and rating from now until the end of 2010
- Dramatically increasing the effort and tools used to identify contaminant sources
- Working more closely with the municipalities to address the upward trend and contaminant sources
- Redirection of existing budget; no additional CRD funds would be required

<u>Environment – Chemical Contaminants</u>

Stormwater discharges are evaluated for environmental concerns based on the level of metals and organic contaminants identified in each flow. Discharges with high chemical contaminants are prioritized for action based on environmental factors including habitat sensitivity, discharge flow rate and the flushing characteristics of marine receiving waters. All chemical contaminant data from previous years are used in the prioritization because sampling at discharges consistently rated high for three years is discontinued until some form of remediation is implemented.

The 2007 chemical contaminant program sampled 32 discharges. Eleven of the 32 stormwater discharges received a high contaminant rating (the same as in 2006). Ten discharges received a moderate contaminant rating and eleven were rated low.

Based on the 2007 results and results from previous years, 22 discharges are recommended for action to determine the sources of contamination (up from 20 in 2006) now that repeated sampling has confirmed high contaminant levels at these locations. Figures A and B show the location of these 22 discharges, and Table B presents the jurisdictional distribution of discharges recommended for action

In the proposed refocusing of the Stormwater Quality program discussed above, some of the discharges rated for action in the chemical contaminant program will continue to receive attention to help municipalities locate and eliminate chemical contaminant sources.

2. **Stormwater Source Control**

In the LWMP, the CRD committed to conduct a Stormwater Source Control program in cooperation with the municipalities. The goal of the program is to reduce environmental contamination by controlling it at the source (the discharger becomes responsible for keeping contaminants out of stormwater flows).

In 2007, SHWP investigated obtaining authority for stormwater source control to develop options to better protect the environment from stormwater-carried chemical contamination. As an initial step to determine how such a program will function on a regional scale, SHWP is moving forward with this approach on the Saanich Peninsula. In the core area, SHWP will focus attention on the immediate issue of locating contaminant sources that are resulting in steadily increasing numbers of discharges rated high for public health concern. A stormwater source control program will be evaluated on the Saanich Peninsula over the next two years and SHWP will continue to discuss stormwater source control with the core area municipalities.

3. **Upstream Investigations**

Upstream investigations were carried out to identify sources of bacterial and chemical contamination in the catchment areas of 38 stormwater discharges. In 2007, sources of contamination were eliminated by municipal staff in one catchment area, one source was identified and repairs by the municipality are pending, six discharges had a source eliminated but there are more contaminant sources to be located and contaminant sources were narrowed down in another 17 catchment areas.

4. **Nearshore Marine Investigations**

Surface water samples were collected from Esquimalt Lagoon and Victoria and Esquimalt harbours in the winter and summer. This monitoring is used to provide information about some of the overall effects of stormwater discharges on these partially-enclosed waterbodies in the core area.

In 2007, fecal coliform levels in the centre of the three waterbodies were generally low, indicating that there was no overall effect from fecal coliform present in stormwater flows. However, water quality adjacent to stormwater discharges may be affected by the discharge flows.

5. **Special Projects**

In 2007, SHWP and other CRD staff were involved in a number of special projects to improve stormwater quality in the region. These are outlined in the annual report.

ALTERNATIVES

1. SHWP staff work with the Core Area municipalities to refocus the Stormwater Quality program to address the increasing number of stormwater discharges rated high for public health concern.

2. SHWP staff do not work with the Core Area municipalities to refocus the Stormwater Quality program, instead the program continues unchanged.

FINANCIAL IMPLICATIONS

The refocus of the program can be done by reallocating funds within the existing annual core area stormwater quality budget.

PUBLIC HEALTH / ENVIRONMENTAL IMPLICATIONS

Stormwater discharges that are contaminated with sewage and chemical compounds pose a public health risk on beaches and can cause environmental damage to our shorelines. The increasing trend in the number of discharges rated high for public health must be reversed to ensure clean beaches and lower the public health risk. The proposed refocus of the Stormwater Quality program is an important step towards this goal.

SUMMARY/CONCLUSIONS

In 2007, the upward trend in stormwater discharges rated high for public health concerns continued. A refocus of the Stormwater Quality program is proposed to reverse this trend. The refocused program will increase efforts to find sources of contamination and work with municipal partners to remediate problems. Other aspects of the program will also be evaluated in the program refocus.

RECOMMENDATIONS

That the Core Area Liquid Waste Management committee recommend that:

1. the Capital Regional District *Stormwater Quality Annual Report, Core Area – 2007*, dated May 2008, be received for information;

2. SHWP staff work with the Core Area municipalities to refocus the Stormwater Quality program to address the increasing number of stormwater discharges rated high for public health concern;

3. the report be forwarded to the jurisdictions involved for their consideration; and

4. a copy of the report be forwarded to the Ministry of Environment.

Laura A. Taylor, M.Sc.
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Dwayne Kalynchuk, PEng
General Manager, Environmental Services
Concurrence

COMMENTS

DG:cam
Attachments: 2

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STORMWATER QUALITY ANNUAL REPORT
CORE AREA – 2007

EXECUTIVE SUMMARY

INTRODUCTION

The Capital Regional District (CRD) Stormwater, Harbours and Watersheds Program (SHWP) plans, promotes and coordinates the management of stormwater quality in the Core Area Liquid Waste Management Plan (LWMP) area, in consultation with the municipalities, Department of National Defence (DND) and First Nations. The CRD does not have the authority to directly implement any mitigative programs. This continues to be the responsibility of the municipalities, DND and First Nations.

This 2007 annual report covers five main areas of activity:

1. **Stormwater Discharge Surveys** – carried out along the entire coastline of the core area to investigate the public health and environmental concern of stormwater discharges.

2. **Upstream Investigations** – undertaken to identify the sources of contaminants in stormwater.

3. **Nearshore Marine Investigations** – carried out in Esquimalt Lagoon and Esquimalt and Victoria harbours to determine the health of the waterbodies and monitor for change over time.

4. **Stormwater Source Control** – promoted through the creation of a Model Storm Sewer and Watercourse Protection Bylaw and associated codes of practice (COP) for business sectors that have the potential to impact stormwater quality.

5. **Special Projects** – to improve stormwater quality in the region.

This annual report has been discussed with the seven core area municipalities, the two First Nations and the DND.

RESULTS AND DISCUSSION

1. Stormwater Discharge Survey

The stormwater discharge survey covers the coastline between the Colwood/Metchosin border in the west and the Saanich/Central Saanich border in the east, including Esquimalt Lagoon, Esquimalt Harbour, Victoria Harbour, Gorge and Selkirk waters, Portage Inlet and the City of Langford coastline along Saanich Inlet.

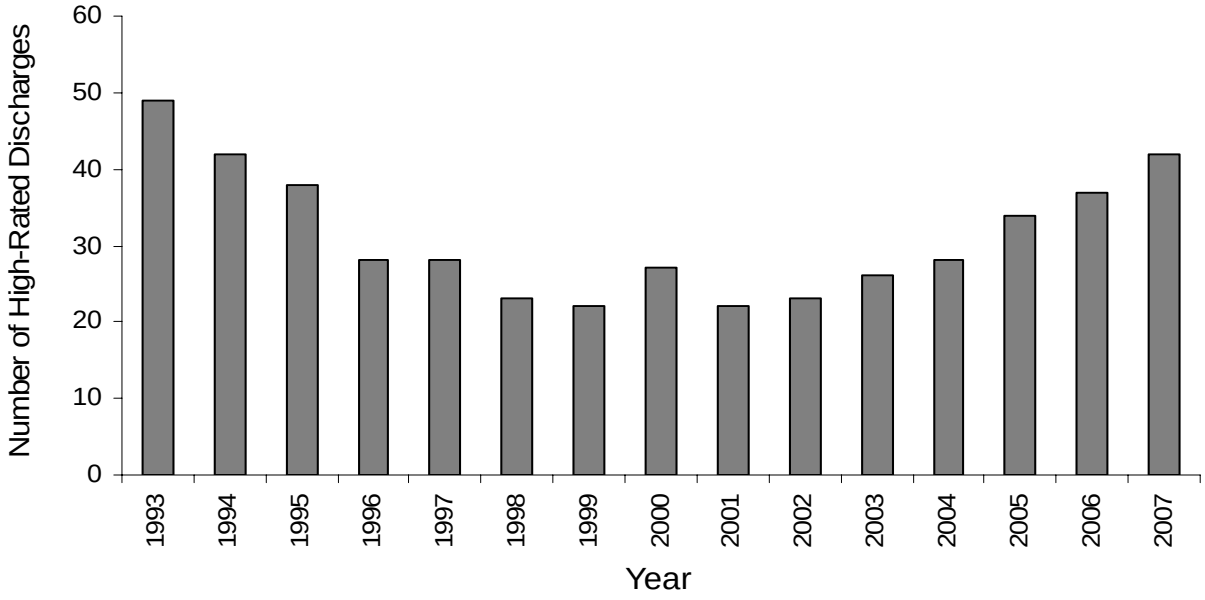
<u>Public Health – Fecal Coliforms</u>

Stormwater discharges are evaluated for public health concerns. This is done by sampling each discharge for fecal coliform bacteria and assigning a rating of high, moderate or low using the CRD's rating system. This allows the jurisdictions involved to better manage limited funds and undertake remedial measures where necessary.

In 2007, 175 stormwater discharges were rated for fecal coliform where flows allowed. Discharges were visited once during the winter and once during the summer to represent seasonal differences. Of the 175 discharges assessed, 41 were rated high for public health concern (refer to Table A, and Figures A and B), 87 were rated moderate and 47 were rated low.

From 1993 to 1999, the number of stormwater discharges assigned a high level of concern for public health dropped dramatically (from 49 to 22). Little change was seen from 1999 to 2001 and since then, the number of high priority discharges has been increasing (refer to Graph 1). In 2007, 41 of 175 stormwater discharges were assigned a high level of concern for public health and recommended for action (Figures A and B show the location of these discharges).

Graph 1. Discharges Rated High for Public Health Concern from 1993 to 2007



This 15-year pattern of the numbers of high priority discharges indicates that the municipalities and other jurisdictions have worked hard to reduce problem discharges and have addressed most of the stormwater discharges with obvious contaminant sources. The majority of the remaining discharges are difficult to address. The 2007 high priority stormwater discharges either have contaminant sources that are proving a challenge to identify or a new contaminant source has developed in the discharge. At the current levels of staffing and resources it is proving impossible to identify sources of contamination and the number of high-rated discharges is steadily increasing

The recent increase in high ratings has occurred primarily in the three municipalities of Esquimalt, Oak Bay and Victoria (Table A). These increases do not indicate a lack of effort on the part of these municipalities to identify and repair problems. What they do indicate is the larger infrastructure issues that these municipalities have to deal with. These municipalities have some of the oldest sewer and stormwater infrastructure in the region. Issues such as aging, collapsed and cracked pipes, old construction practices such as inadequate separation of sewer and storm sewer pipes, and cross-connections all can cause sewage contamination of stormwater. The other four core area municipalities tend to have newer infrastructure and this is probably the cause of the lower numbers of high ratings in those areas.

Table A. Number of Discharges with a High Public Health Concern Rating from 1993 to 2007

Area	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
City of Colwood	0	1	2	2	1	0	0	0	0	1	1	0	0	0	0
Town of View Royal	1	2	0	0	0	0	0	0	0	0	1	0	1	2	1
Township of Esquimalt	12	10	10	9	9	9	6	6	5	5	5	5	7	7	8
DND	0	1	0	1	2	1	1	1	0	0	0	0	0	0	0
District of Saanich	6	3	2	1	2	1	0	2	2	1	0	4	1	1	2
City of Victoria	22	18	17	12	10	9	11	13	9	8	13	14	14	15	15
City of Victoria private discharges[1]	*	*	*	*	*	*	*	*	*	*	*	*	2	3	5
District of Oak Bay	8	7	7	3	4	3	4	5	6	8	6	5	9	9	10
City of Langford[2]	-	-	-	-	-	0	0	0	0	0	0	0	0	0	0
Total	**49**	**42**	**38**	**28**	**28**	**23**	**22**	**27**	**22**	**23**	**26**	**28**	**34**	**37**	**41**

[1] Discharges that drain from private property do not fall under municipal jurisdiction. Starting in the 2006 report, discharges within the City of Victoria survey area that drain from private properties to the ocean are indicated separately. Other municipalities will be reported similarly in future annual reports.
[2] City of Langford stormwater discharges were sampled for the first time by the Stormwater Quality program in 1998.
* = Private discharges included in the City of Victoria totals.

To address the upward trend in high priority stormwater discharges, CRD Scientific Programs staff held discussions with the municipal engineers from the seven core municipalities in June 2008. This group developed a proposal to refocus the CRD's Stormwater Quality program.

The refocused program would include:

- discontinuing the annual stormwater discharge sampling and rating from now until the end of 2010
- increasing the effort put into identifying contaminant sources
- working more closely with the municipalities to address the upward trend
- redirection of existing budget; no additional CRD funds would be required

This focused program of investigation will allow staff to apply significantly more time and resources on upstream investigations. In agreement with the municipalities, SHWP will scale back or suspend other components of the Stormwater Quality program and direct those resources towards investigative efforts at no additional cost to the municipalities. The rating of stormwater discharges and detailed annual reporting of the sampling program in the core area will be suspended for two years to free up some of these resources. As a result of suspending the rating and reporting for two years, the next Stormwater Quality Annual Report will be produced in 2012.

The timeline for these SHWP tasks is:

2008 current stormwater sampling program stopped and planning begins
2009 no annual report produced, intensive efforts are focussed on locating sources of contamination in high-rated discharges
2010 no annual report produced, intensive efforts are continued to locate sources of contamination in high-rated discharges
2011 the annual sampling program is restarted to survey stormwater discharges and determine public health ratings
2012 annual stormwater program reporting starts

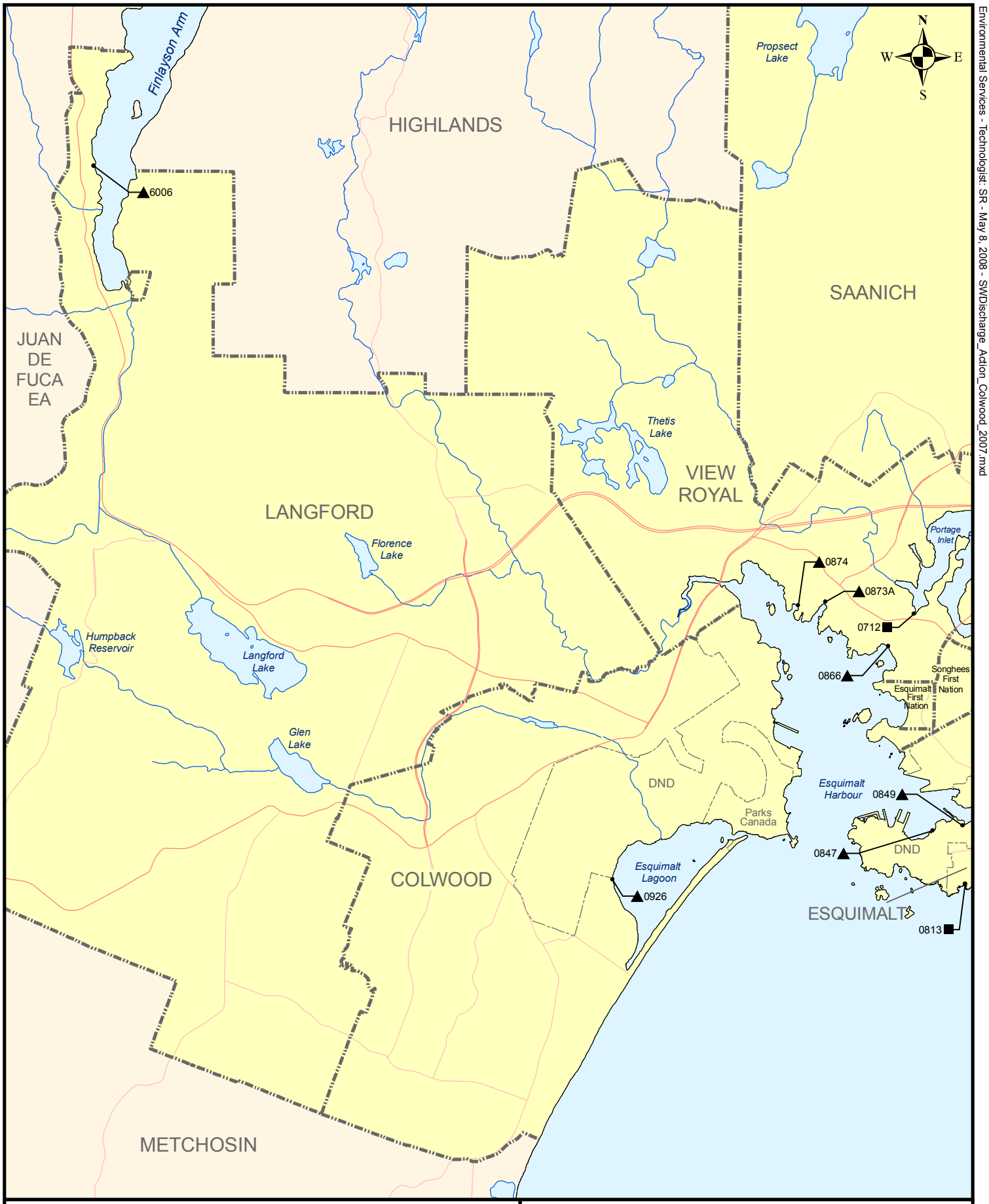


Figure A Core Area - 2007
Stormwater Discharges Requiring Action
for Public Health and Environmental Concerns
(Metchosin to Esquimalt Border)

CRD
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0 0.5 1 2
Kilometers

UTM Zone10N
NAD83

Discharges Requiring Action
- High Public Health Rating
- High Environmental Rating and Recommended for Action
- Creeks and Rivers
- Municipal Boundaries
- DND Boundaries
- Major Roads
- Stormwater Monitoring Area
- High Env Contaminant

Environmental Services - Technologist: SR - May 8, 2008 - SWDischarge_Action_Colwood_2007.mxd

Figure B Core Area - 2007
Stormwater Discharges Requiring Action
for Public Health and Environmental Concerns
(Esquimalt to Central Saanich Border)

CRD
Making a difference...together

0 0.5 1 2
Kilometers

UTM Zone10N
NAD83

Discharges Requiring Action
- High Public Health Rating
- High Environmental Rating and Recommended for Action
- Creeks and Rivers
- Municipal Boundaries
- DND Boundaries
- Major Roads
- Stormwater Monitoring Area

Environmental Services - Technologist: SR - May 8, 2008 - SWDischarge_Action_Victoria_2006.mxd

Environment – Chemical Contaminants

Stormwater discharges are evaluated for environmental concerns based on the level of metals and organic contaminants identified in sediment from each flow. Discharges with high chemical contaminants are then prioritized for action based on environmental factors, including habitat sensitivity, discharge flow rate and the flushing characteristics of marine receiving waters. This prioritization is undertaken in consultation with the appropriate jurisdictions and may result in a detailed investigation to locate the sources of contamination. All chemical contaminant data from previous years were considered because sampling is discontinued at discharges consistently rated high for three years until some form of remediation is implemented. This allows limited funds to be reallocated for sampling other discharges while continuing to report the need for action in each annual report.

The 2007 sediment sampling program focused effort on 32 discharges in order to undertake upstream sampling in an attempt to locate sources of contaminants. These stormwater discharges were sampled for polycyclic aromatic hydrocarbons and metals and were assessed for environmental concern. Eleven of the 32 stormwater discharges received a high contaminant rating. Ten discharges received a moderate contaminant rating and eleven were rated low.

Based on the 2007 results and results from previous years, 22 discharges are recommended for action to determine the sources of contamination (up from 20 in 2006) now that repeated sampling has confirmed high contaminant levels at these locations. Figures A and B show the location of these 22 discharges and Table B presents the jurisdictional distribution of discharges recommended for action.

Table B. Discharges Recommended for Action Due to Elevated Chemical Contaminant Levels

Jurisdiction	Number of Discharges Requiring Action
City of Colwood	1
City of Langford	1
City of Victoria	9
DND	3
District of Oak Bay	2
District of Saanich	1
Parks Canada	0
Township of Esquimalt	2
Town of View Royal	3
Total	**22**

Sediments associated with stormwater discharges have been collected and analysed for chemical contaminants since 1993. To date, monitoring for environmental concern has been successful in defining problem areas. However, a review of the sampling program was started in 2006 and, if required, the program will be redesigned to measure the effectiveness of the municipal and SHWP source control initiatives.

2. Upstream Investigations

Upstream investigations by municipal staff, VIHA and SHWP were undertaken in the catchment areas of 38 stormwater discharges. These investigations included both biological and chemical contaminant sampling. As a result of these investigations, the source of contamination was eliminated in three catchments although investigations continue in one catchment to locate a second potential source. Additional findings are shown in Table C. SHWP staff continue to work cooperatively with municipal staff, senior government and stakeholders to identify and reduce/eliminate contaminants at the source.

Table C. Results of Upstream Investigations in 2007

Status	Number of Discharges
Source eliminated	1
One source eliminated – investigating another source	6
Source location narrowed down – municipalities repairing	1
Source location narrowed down	17
No sources identified, contaminant levels have decreased over time	2
No sources identified, contaminant levels remain high	11
Total	**38**

3. Nearshore Marine Investigations

Summer and winter surface water fecal coliform monitoring of Esquimalt Lagoon and Esquimalt and Victoria harbours was carried out to provide a general indication of fecal coliform levels and track changes in these waterbodies over time. In 2007, fecal coliform levels in the centre of the three waterbodies were generally low, indicating that there was no overall effect from fecal coliform present in stormwater flows. However, water quality adjacent to stormwater discharges may be affected by the discharge flows.

In 2007, no samples exceeded the SHWP guideline of 200 FC/100 mL. Two sampling locations in 2006 (near Selkirk Trestle and Bay Street Bridge) showed elevated levels of fecal coliform (1,400 and 1,300 FC/100mL respectively). At both of these stations, high levels were absent in follow-up sampling on the same day and other samples taken at later dates in 2006. Investigations in the area indicated that the source of bacteria was likely from birds. In 2007, low values were again confirmed and the one set of high values in 2006 is no longer a concern. All other monitoring stations sampled in 2007 showed fecal coliform results consistent with previous years and known distribution of birds.

4. Stormwater Source Control

At the 22 November 2006 meeting, the CRD Core Area Liquid Waste Management committee approved an action plan prepared by staff in response to the recommendations in the Society of Environmental Toxicology and Chemistry (SETAC) review and of Jacques Whitford Limited in the audit of the LWMP. One of the recommended actions was to "initiate discussions with municipalities to identify needed changes to CRD or municipal authority to ensure stormwater protection and improvement". This recommendation came from the SETAC report's comment that the CRD appeared to be responsible for stormwater quality management but lacked the authority to enforce stormwater bylaws.

In 2007, SHWP investigated obtaining authority for stormwater source control in order to develop options to better protect the environment from stormwater-carried chemical contamination. As an initial step to determine how such a program will function on a regional scale, SHWP is moving forward with this approach on the Saanich Peninsula. In the core area, SHWP will focus attention on the immediate issue of locating contaminant sources that are resulting in steadily increasing numbers of discharges rated high for public health concern. A stormwater source control program will be evaluated on the Saanich Peninsula over the next two years and SHWP will continue to discuss stormwater source control with the core area municipalities.

Model Stormwater Bylaw

In the LWMP, the CRD committed to coordinating a Stormwater Source Control program in cooperation with municipal partners. This program, initiated in 2001, is now primarily focused on the promotion of the Model Storm Sewer and Watercourse Protection Bylaw and associated COP. This regulatory framework is specifically targeted at activities that have the potential to impact stormwater quality.

In 2004, the province enacted the Community Charter. This, combined with a desire to produce a more streamlined version of the bylaw, resulted in a new draft of the model bylaw in the spring of 2006. The model bylaw is now ready for adoption and enforcement by the municipalities.

Codes of Practice

The bylaw was designed to allow the incorporation of stormwater COP that set out municipal regulatory requirements under which various business sectors will be required to operate to prevent the pollution of stormwater.

The six COP, which have been completed and are ready for adoption, are as follows:

1. Code of Practice for Automotive and Parking Lot Operations
2. Code of Practice for Construction and Development Activities
3. Code of Practice for Streets and Roads
4. Code of Practice for Recreation Facilities
5. Code of Practice for Recycling Facilities
6. Code of Practice for Outdoor Storage Yards

Best Management Practices

A best management practice (BMP) is a voluntary strategy for preventing stormwater pollution and often uses the same methods and strategies as in a code of practice but without the regulatory mechanism for compliance.

Two sector-specific BMP, which have been completed and are ready for region-wide use, are as follows:

1. Painting without Pollution
2. Power Washing without Pollution

It is hoped that municipalities will actively promote these BMP by making these information sheets available to those involved in these two activities.

Outreach and Promotion Component

SHWP staff worked with representatives of the Bylaw Working group and municipal staff to update the bylaw and COP, discuss mechanisms for municipal adoption of the regulations and to plan future work related to regulatory tools for the protection of stormwater. Staff also hosted an information session for municipalities on the Riparian Areas Regulation.

The Stormwater, Harbours and Watersheds newsletter is produced to highlight watershed-related activities in the region and to promote activities that reduce stormwater contamination. SHWP staff continues to provide assistance to the municipalities, as required, with the adoption and implementation of the model bylaw and COP.

5. Special Projects

In 2007, SHWP staff was involved with a number of special projects to improve stormwater quality in the region. These included the continued development of the Natural Areas and Harbours atlases, watershed management planning, working cooperatively with the Regional Source Control program and educational initiatives.

RECOMMENDATION

In 2007, the upward trend in stormwater discharges rated high for public health concerns continued. A refocus of the Stormwater Quality program is proposed to reverse this trend. The program will increase efforts to find sources of contamination and work with municipal partners to remediate problems. Based on the information provided in this report it is recommended that SHWP staff work with the core area municipalities to modify the Stormwater Quality program to address the increasing number of stormwater discharges rated high for public health concern.

ACTIVITIES IN ESQUIMALT, OAK BAY AND VICTORIA TO FIND AND REMEDIATE SOURCES OF STORMWATER CONTAMINATION

TOWNSHIP OF ESQUIMALT

Stormwater drainage in the Township of Esquimalt (Esquimalt) consists almost entirely of piped systems. All properties within Esquimalt are serviced by sewage collection systems.

Esquimalt continues to be involved with stormwater quality issues. The main reasons for the high percentage of stormwater discharges with high fecal coliform concentrations are combined manholes with storm drains and sanitary sewer pipes, direct cross connections of sewage pipes to the stormwater system and exfiltration from an aging sewage system infiltrating into the stormwater system.

Stormwater Protection - Activities

Prompt Spill Response - Esquimalt will react to oil or chemical spills when brought to their attention or they will notify the Provincial Emergency program.

Correction of Stormwater Infrastructure Problems - When operations and maintenance activities uncover cross connections or exfiltration and infiltration problems, they are rectified, subject to budget.

Sewer Upgrade Program - The Sewer Upgrade program began in 2004 with a system-wide evaluation of the sewer system, manholes and lift stations. In 2005, a contract for sewer main relining, grouting and point repairs of the worst line was completed. A similar program is scheduled for 2006 to 2008. It is anticipated that stormwater quality will be improved by repairing sewer pipes which are in the worst structural condition.

Kinsmen Gorge Park Creek Restoration Project - The Kinsmen Gorge Park Creek Restoration project, funded through the Canada - British Columbia Infrastructure program, was completed in 2005. Restoration of the creek included returning the creek to its original alignment and the use of phyto-remediation in the channel to treat stormwater flows from over 400 acres prior to discharging to the Gorge Waterway.

Stormwater Protection - Regulatory Tools

Bylaws – In 1998, Esquimalt adopted a stormwater quality bylaw that is a modification of the CRD draft model bylaw. In addition, Esquimalt has a 1981 bylaw that requires property owners to connect their buildings and structures to the appropriate sewer or drain connections. The principal intent of the bylaw was to minimize flooding; however, this bylaw also limits the possibility of cross connections between the two collection systems and minimizes the likelihood of stormwater flows containing unacceptable substances from gaining entry to storm drains.

Official Community Plan - The Esquimalt OCP, dated December 1996, was updated in early 2007. It includes policies on stormwater quality and other environmental issues. The following is a list of some of these policies:

- Sanitary sewer systems and source pollution details policies regarding on-going upgrading and correction of sewage pollution at its source to prevent it from entering a storm drain system or watercourse.
- Installation of oil traps and the preservation or rehabilitation of native shoreline habitat will be recommended when considering proposals to redevelop private or public lands adjacent to any waterbody.

- The Gorge Waterway has a policy, and adjacent lands are now designated as a development permit area and the use of landfill, pesticides or herbicides is strongly discouraged.
- The OCP also states that “Regional regulations to control and regulate storm drains will be enacted by Township bylaw to reduce the potential for accidental or negligent pollution into the storm drain systems".

Plumbing Permits - Esquimalt requires that all connections to the sewage collection system or the storm drain system be made under a valid plumbing permit and that all connections be visually inspected by staff before backfilling.

Addressing Discharges Rated High For Public Health Concern

Esquimalt will consider high-rated discharges when planning other public works such as the sewage collection system upgrade. Upstream investigations were undertaken within four catchment areas and the area of contamination continues to be narrowed down. Esquimalt has initiated dye testing in the catchment areas of concern. Further investigations will be undertaken in 2008.

Esquimalt staff has begun relining sewer lines in order to reduce cross contamination between sanitary sewer and stormwater systems. It is anticipated that sources of contamination will be eliminated for several of the discharges as this work is completed. Esquimalt has placed the highest priority on remediating discharges draining to the Gorge Waterway. The West Bay area and outer coast area were given lower priority. However, relining planned in the catchment areas of discharges rated high for public health concerns will be a priority for 2008.

DISTRICT OF OAK BAY

The stormwater collection systems for the District of Oak Bay (Oak Bay) consist almost entirely of piped systems. All of Oak Bay is serviced by sewage collection systems.

Stormwater Protection - Activities

Video Inspection of Infrastructure - In 1999, Oak Bay purchased their own video camera equipment for inspecting sanitary sewer lines and storm drains to rectify major problems identified by this program.

Storm Drain Rehabilitation Program - Oak Bay funds a storm drain rehabilitation program with a primary goal of addressing increasing storm drain capacity. However, many problems such as inflow and infiltration from the sanitary system to the storm drain system are being rectified as well.

Storm Drain Evaluation Program - Oak Bay has instituted a storm drain evaluation program that addresses stormwater discharges with high levels of fecal coliform concentrations. Staff intends to focus initially on discharges identified as high priority in the CRD Stormwater Quality Annual reports. Summer students have been hired to assist Oak Bay with all engineering activities, including cross connection issues.

Bowker Creek Watershed Management Plan - Oak Bay is currently involved with the Bowker Creek Watershed Management plan and is participating in the master drainage planning process for Bowker Creek.

Cross Connection Repairs - Oak Bay requires that all sanitary sewer cross connections to the storm sewer system on public or private property be corrected.

Stormwater Protection - Regulatory Tools

Sewer Connection Permits - All connections to the sanitary collection system are done under a valid service permit. All connections are visually inspected and recorded by Oak Bay staff.

Bylaws - In 1996, Oak Bay council adopted a bylaw to address stormwater quality issues and another to govern and regulate discharges to sanitary sewers. These bylaws set out guidelines and prohibit a wide variety of restricted wastes from discharge to the sanitary sewer, combined sewer and storm drain systems.

Addressing Discharges Rated High For Public Health Concern

Ten stormwater discharges along the Oak Bay coastline were rated with a high level of public health concern in 2007. Most of the catchment areas for these discharges have been the subject of ongoing investigation by Oak Bay and/or CRD staff over the last few years.

CITY OF VICTORIA

The stormwater collection systems for the City of Victoria (Victoria) consist almost entirely of piped systems. All of Victoria is serviced by sewage collection systems.

Stormwater Protection - Activities

Stormwater and Sanitary System Positions – Victoria has:

- a full-time position to address stormwater quality and environmental issues
- restructured their Water and Environment Engineering section to accommodate a full time position to address inflow and infiltration in the sanitary system (2003)
- hired auxiliary staff since 1996 to carry out upstream investigations into the catchment areas of stormwater systems identified as having fecal coliform contamination. This work will be continued in 2008

Inventoried Infrastructure - In 2007, Victoria staff completed work to inventory all combined manholes and sewer and storm drain interconnections.

Stormwater Quality Management Plan - To manage these commitments Victoria continues to follow its Stormwater Quality Management plan. The plan was completed in October 2002 and included the following components:

- to locate sources of environmental pollution and coordinate remedial or abatement strategies
- to develop guidelines to address water sediment quality issues
- to develop partnerships with community associations and government agencies
- to provide public education
- to provide customer service
- to adopt the CRD Enhanced Model Storm Sewer and Watercourse Bylaw

Cross Connection Identifications - In 1989, Victoria initiated a South Coast Storm Drain program to identify and correct cross connections between sanitary sewer and storm drains. Prior to 1993, swimming in many of the south coast beaches in Victoria was considered a health hazard by the regional health officer. Since 1993, the south coast beaches have maintained levels below the Stormwater Quality program guideline (200 FC/100 mL) and have been open for swimming. Victoria has expanded this

program to include a labour intensive annual program for identifying and promptly repairing cross connections identified by dye testing and solids trapping. As cross connections are on private property, the property owner is required to rectify it within 30 days under the plumbing code. Problems found on public property (e.g., broken pipes, cross filtration) and remedial work is undertaken by Victoria. Contracted consultant works will be used in 2008 to identify and recommend remedial action for removal of fecal contaminant sources in the Barnard Park catchment area.

Cecelia Creek Investigations - Victoria's portion of Cecelia Creek catchment area continues to be investigated by staff for fecal coliform sources. Investigations to find the sources were conducted in 2007 and will continue in 2008. In 2005, Victoria staff concentrated effort to identify and address cross filtration issues through closed circuit television viewing and associated remedial work.

Bowker Creek Watershed Management Plan - Victoria is currently involved with the Bowker Creek Watershed Management plan and is participating in the master drainage planning process for Bowker Creek.

Disposal of Low Flows - Three of the catchment areas between Ogden Point and Gonzales Bay are pumped into the sanitary system during low flow, dry weather conditions. Larger flows are discharged out extended stormwater outfalls as required.

Extending Points of Discharge - In 1998, Victoria filled part of the northeast coastline of Ross Bay with riprap to protect the seawall from waves. This work included extending four stormwater discharges to below the low water line. Moving the discharges offshore reduced public health risk.

GIS Mapping - In 1999, Victoria digitally mapped its storm sewer drainage basins and is now pursuing GIS mapping and identification of all underground infrastructure. This information will provide better estimates of flow in priority catchment areas. Detailed mapping in combination with the CRD Regional Source Control program (RSCP) information on business types, discharges and locations could also provide information on stormwater contaminant sources.

Stormwater Protection - Regulatory Tools

Official Community Plan - Victoria's existing OCP (1996) states the following objectives:

- "to improve water quality in offshore and inland waters including the outer, inner and working harbour reaches"
- Victoria, the CRD and the federal government should cooperate to improve the water quality in Juan de Fuca Strait and Victoria Harbour
- Victoria council has recommended a proposed amendment to the BC Local Governments Act that environmental policies be given the same stature as social planning to address local environmental issues

CRD Model Storm Sewer and Watercourse Bylaw - In 2001, Victoria was the first municipality to adopt the CRD Model Storm Sewer and Watercourse Bylaw. In 2005, Victoria amended its bylaw to include an enhanced Schedule A: prohibited wastes section and five codes of practice. The main aspects of these bylaws are to:

- prohibit the discharge of contaminants to storm drains and watercourses
- requires that prior approval to be obtained prior to work in a municipal drainage system
- designate streamside protection areas and require prior approval for work within these areas
- allow ticketing for offences
- prevent the obstruction of storm sewers and watercourses
- establish authority to administer the bylaw
- allow codes of practices to be appended to the bylaw
- require businesses to operate in compliance with the codes of practice

Plumbing Bylaw - All connections to Victoria's sewer and storm drain collection systems are required to be completed under a valid plumbing permit and inspected by staff. Victoria is planning to rewrite its plumbing bylaw in the near future.

Addressing Discharges Rated High For Public Health Concern

There were 15 discharges rated high for public health concern in 2007. Victoria continues to work towards identifying the sources of contamination for these discharges. Five more high-rated discharges are within Victoria but drain from private property to the marine environment. Victoria has no authority to remediate these discharges but Victoria staff, in cooperation with SHWP, work with the property owners to resolve the problem. Generally, those discharges on the south coast that are rated high will be given a higher priority due to higher levels of public use.