

# STORMWATER QUALITY ANNUAL REPORT DISTRICT OF SOOKE – 2007

## EXECUTIVE SUMMARY

### INTRODUCTION

The Capital Regional District (CRD) Stormwater, Harbours and Watersheds program (SHWP), in cooperation with the District of Sooke, work to limit the impact of contaminated stormwater runoff on the environment and to protect public health. This annual report provides the results of work completed in 2007 as part of the program.

The District of Sooke has a growing population of approximately 11,000 residents and varied land uses (i.e., residential, commercial, agricultural and institutional). Tourism, property development and expansion of businesses and industry are increasing and have the potential to impact stormwater quality and freshwater and marine aquatic life.

In January 2006, a sewage collection system and secondary wastewater treatment plant was completed. Since then, the majority of residential properties and businesses have connected to the collection system.

The 2007 annual report covers five main areas of activity:

1. **Stormwater Discharge Surveys** – Surveys were carried out along the entire coastline of the District of Sooke to investigate the level of public health and environmental concern associated with stormwater discharges.
2. **Upstream Investigations** – Investigations were undertaken to identify sources of observed contamination in stormwater.
3. **Marine Surface Water Monitoring** – Measurement of fecal coliform bacteria was undertaken in Sooke Inlet, Harbour and Basin.
4. **Monitoring of Significant Watercourses** – Water quality monitoring was undertaken for 14 significant watercourses that flow onto the District of Sooke coastline and into the marine environment.
5. **Special Projects** – SHWP staff was involved in a number of special projects to improve stormwater quality in the region. Brief summaries are included in the report.

The findings of this annual report have been discussed with District of Sooke staff.

### RESULTS AND DISCUSSION

#### 1) Stormwater Discharge Surveys

In 2007, the survey area included discharges along the entire coastline of the District of Sooke, including areas recently acquired as part of the 2005 and 2006 jurisdictional expansions. The discharges were assessed for public health and environmental concern.

##### Public Health—Fecal Coliforms

The SHWP evaluates stormwater discharges for public health concerns by rating each discharge. The public health concern rating (high, moderate or low) is based on the concentration of fecal coliform bacteria (used to indicate the presence of sewage) in the stormwater and the potential for human contact with the stormwater. Rating allows the District of Sooke to better manage limited funds and undertake remedial measures where necessary.

Each year SHWP staff visit the following stormwater discharges during wet weather (January through March) and dry weather (June through September) to represent seasonal differences:

- discharges between Cooper Cove (discharge 2035) and Whiffin Spit (discharge 2075)
- discharges with elevated fecal coliform levels (greater than 500 FC/100 mL during the previous year)
- discharges with high or moderate levels of public health concern identified the previous year
- significant creeks and streams
- approximately 20% of the discharges previously rated low, to monitor for change

In 2007, a total of 80 stormwater discharges along the District of Sooke coastline were assessed for public health concern. The following public health concern ratings were assigned:

- two discharges were rated high (2001E [7090 East Sooke Road] and 2042A [Alderbrook Creek])
- seven discharges were rated moderate (2035, 2039, 2051, 2055, 2059, 2062, 2081B)
- 71 discharges were rated low

The number of high-rated discharges went up from zero in 2006 to two in 2007; however, one of these discharges was also rated high in 2005 (2042A). Sheep are likely a source of fecal coliform bacteria at the other high-rated discharge (2001E). Neither discharge is within the newly-sewered area.

Compared to two thresholds (500 FC/100 mL and 2,000 FC/100 mL), 13 discharges had at least one fecal coliform count greater than 500 FC/100 mL. Five discharges had at least one count greater than 2,000 FC/100 mL. Two of the discharges with fecal coliform counts that exceed 2,000 FC/100 mL are within the sewer area (2051 [near 6647 Sooke Road] and 2054 [southwest of Murray Road]); however, upstream properties had not connected to the sewer collection system at the time of sampling in 2007. Discharges rated high or moderate for public health concern, and those that exceeded the thresholds, are shown in Figure A.

Data suggests that fecal coliform levels have been reduced since the sewage treatment plant and conveyance system became active after January 2006. Results of the comparison of the discharges within the sewer area (discharges 2047 [15m north of Dover St.] to 2060 [50m south of Sooke Harbour Marina]) that exceeded the thresholds in 2005 to those in 2007 are as follows:

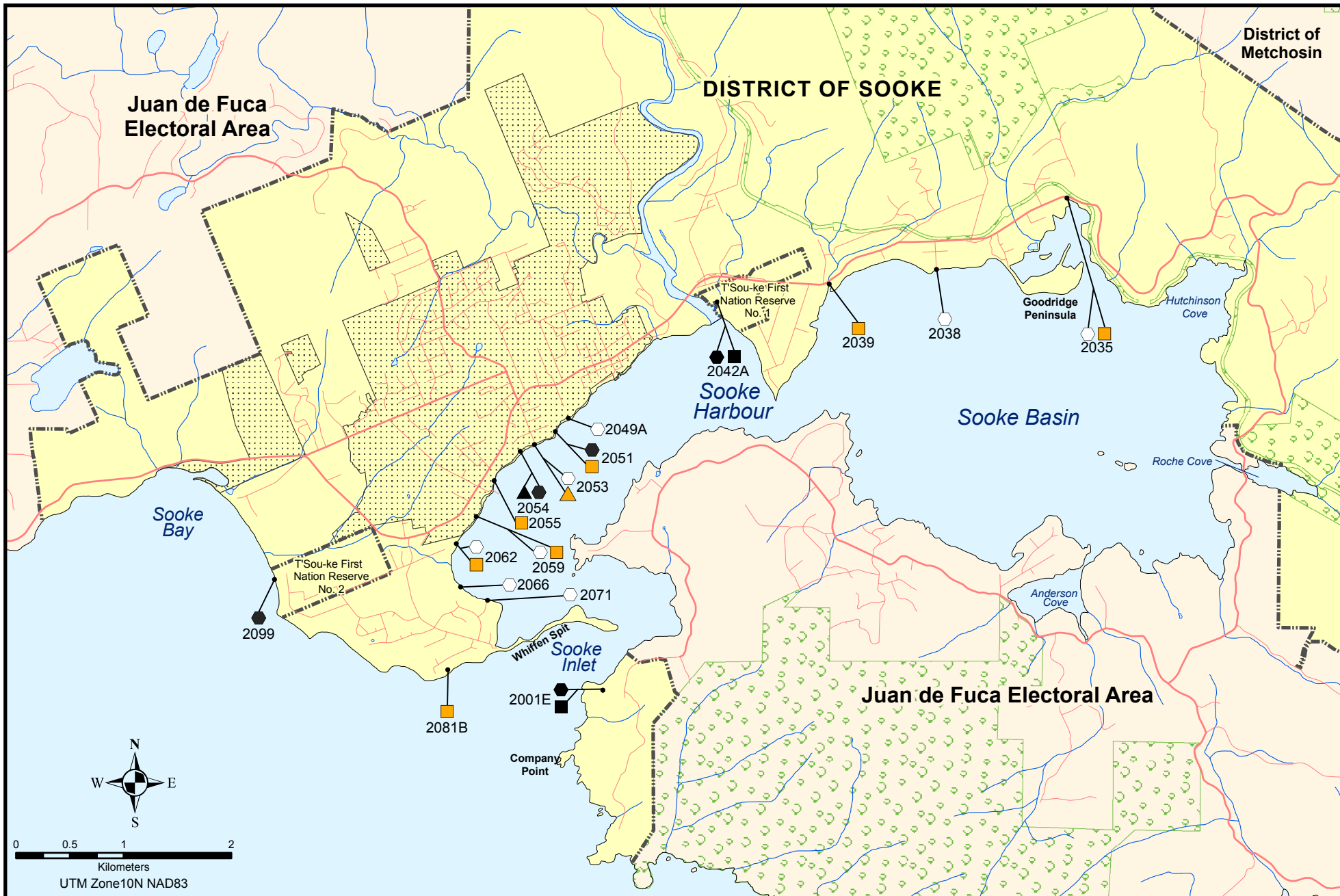
- The number of discharges with greater than 500 FC/100mL decreased from nine in 2005 to five in 2007.
- The number of discharges with greater than 2000 FC/100mL decreased from eight in 2005 to two in 2007; both of these (2051 [near 6647 Sooke Road] and 2054 [southwest of Murray Road]) are downstream of properties that had not connected to the sewer collection system at the time of sampling.

Investigations will be undertaken in 2008 to narrow down sources of high fecal coliform concentrations identified in 2007. Bacterial Source Tracking (BST) analysis will continue to be used to aid in identification of sources (human or animal) responsible for fecal coliform contamination. This will allow investigative efforts to be focused in the appropriate direction.

In 2008, sampling will be completed at 71 discharges, as follows:

- discharges assigned high and moderate public health concern ratings in 2007
- 30 of those assigned a low public health concern rating in 2007
- 32 remaining discharges between Cooper Cove and Whiffin Spit

Sampling will also include all the significant watercourses regardless of rating.



0 0.5 1 2  
Kilometers  
UTM Zone10N NAD83

**Figure A**  
District of Sooke 2007  
Stormwater Discharges of Concern

- |                                  |                              |                         |                     |
|----------------------------------|------------------------------|-------------------------|---------------------|
| ■ High Public Health Concern     | ○ Stormwater Flow Thresholds | — Major Roads           | □ District of Sooke |
| ■ Moderate Public Health Concern | ○ 500 - 1999 FC/100 ml       | — Minor Roads           |                     |
| ▲ High Environmental Concern     | ● ≥2000 FC/100 ml            | ~ Streams and Rivers    |                     |
| ▲ Moderate Environmental Concern | --- Municipal Boundaries     | ■ Major Parks           |                     |
|                                  |                              | ■ Sewer Specified Areas |                     |



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## Environmental—Chemical Contaminants

Stormwater discharges were evaluated for environmental concerns. A chemical contaminant rating is based on the levels of metals and two groups of hydrocarbons in stormwater discharge sediment compared to the CRD Marine Sediment Quality Guidelines (MSQG). Discharges with a confirmed high contaminant rating (two consecutive years) require action, beginning with a detailed investigation to locate the source of contamination.

In 2007, samples were collected from three stormwater discharges to assess the level of environmental concern. Three of the samples (2053, 2054 and 2061) were collected from the point of discharge to the marine receiving environment and one sample (2053-1) was collected in the upstream catchment area of discharge 2053. Chemical contaminant ratings were as follows:

- high for two samples (2053-1 [upstream on Murray Road] and 2054 [southwest of Murray Road])
- moderate for one sample (2053 [foot of Murray Road])
- low for one sample (2061 [south of Sooke Harbour Marina])

Station 2054 was rated high due to elevated HPAH and LPAH concentrations. Station 2053-1 was rated high in 2007 and 2004 due to silver, and in 2006 due to silver and zinc. Silver and zinc contamination was not observed at the downstream discharge station (2053). It is uncertain whether the present contamination is due to a historical source; however, it does not appear to be entering the marine environment. This area has now been sewered and it was expected that contamination would be diverted to the sewage treatment plant. The District of Sooke is addressing silver from photofinishers and medical, dental and veterinarian clinics through their sewer discharge bylaw. Additional sampling will be undertaken in 2008 to narrow down areas of contamination and monitor for change.

Some sources of stormwater contamination will likely be addressed through the proposed District of Sooke Stormwater Management Plan, presently under development. However, continued monitoring is required to assist with contaminant identification and reduction. SHWP staff will continue to work with District of Sooke staff to identify and remediate all forms of stormwater contamination.

Locations of discharges rated with high and moderate levels of environmental concern are shown on Figure A.

### **2) Upstream Investigations**

SHWP staff continues to work towards identifying sources of fecal coliform contamination so that they can be eliminated. Upstream investigations may be undertaken if the following occurs:

- a discharge has a fecal coliform count greater than 500 FC/100 mL
- seasonal trends are observed in fecal coliform data that are associated with failing septic tanks and fields
- large amounts of vegetation are observed in discharge flows
- municipal staff and public express concerns regarding odours and visual signs of stormwater contamination

In 2007, a source investigation was undertaken for one discharge (2035 -Cooper Cove). This discharge is not located within the sewer specified area. Although the investigation did not identify the fecal coliform source, three BST analyses have indicated that the bacteria are not of human origin.

Discharges 2051 (near 6647 Sooke Rd) and 2054 (southwest of Murray Road) had fecal coliform counts greater than 2,000 FC/100 mL. However, these discharges are located in the District of Sooke sewer specified area and therefore, were not investigated upstream. As not all properties had been connected to the sewage system in 2007, monitoring of these discharges will continue in 2008 to determine whether the installation of sewers has remediated the sources of contamination. If counts remain high, upstream investigations will be undertaken to identify the sources.

In 2007, Vancouver Island Health Authority (VIHA) staff, responding to SHWP and public concerns of failing septic tanks and fields within the District of Sooke, found three properties requiring repairs or alterations to the onsite sewage treatment systems. Most of these systems were located in areas which drain to stormwater discharges where high fecal coliform contamination has been previously identified. Repairs, alterations or connection to the municipal sewage collection system have been completed for all three properties. SHWP staff will continue to monitor watercourses downstream of these properties to ensure all repairs, alterations or connections have been effective.

### **3) Marine Surface Water Monitoring**

In 2007, the marine surface water sampling program continued in Sooke Inlet, Harbour and Basin to provide an indication of nearshore fecal coliform levels and to track changes over time. Shellfish beds in Sooke Basin and Harbour are presently closed to recreational shellfish harvesting, likely due, in part, to contaminated stormwater discharges.

Samples were collected from the 28 nearshore and centerline monitoring stations. Many of the stations are located in proximity to stormwater flows, shellfish beds or environmentally sensitive areas.

Widespread nearshore marine contamination was not found and average fecal coliform counts were low. (i.e., geometric means for all three water bodies were 1.9 FC/100mL in winter and 2.4 FC/100mL in summer). In addition, there were no exceedences of the SHWP guideline for primary contact (200 FC/100 mL) during winter or summer sampling and no exceedences of Environment Canada's shellfish harvesting standard (14 FC/100 mL) in winter.

However, elevated fecal coliform levels in stormwater flows did appear to result in localized contamination of the marine environment. Five stations (stations 20, 22, 23, 24 and 25) exceeded the shellfish harvesting standard in summer of 2007. These stations are located near the more populated area of Sooke and BST results have identified humans as a source of the bacteria at three stations (20, 22 and 23). Contamination at Station 20 is likely due to failing onsite sewage disposal (this area is not sewered) and its proximity to the Sooke River (which is a high-flow discharge that carries flows from a large catchment area). Station 23 is located downstream of discharge 2051 (near 6647 Sooke Rd.). In 2007, there were high fecal coliform counts (2,500 to 26,000 FC/100mL) at this discharge. Properties in the catchment area of 2051 are within the District of Sooke's Sewer Specified Area; however, not all properties were connected to the sewer system at the time of sampling and are likely the source of elevated bacteria. Fecal coliform sources at Stations 24 and 25 have not been confirmed; however, due to the location (near the heavily-populated area of Sooke and an area frequently used by birds), the source of elevated fecal coliforms is likely due to humans or birds.

Nearshore marine surface water sampling and investigations to identify sources of contamination will continue in 2008. Also, as part of collaboration with the BC Ministry of Environment (MOE), SHWP staff will be collecting additional data in summer 2008 to assist the MOE in establishing water quality objectives for Sooke Harbour and Basin.

### **4) Monitoring of Major Watercourses**

In 2007, 14 watercourses that flow into the ocean along the District of Sooke coastline were monitored to assess the health of the watercourse and to monitor for changes over time. Water quality measurements of fecal coliform bacteria, temperature, pH, dissolved oxygen, specific conductance, turbidity, phosphorus and nitrate-nitrogen were taken in the winter and summer seasons.

Of the 14 watercourses, seven cross jurisdictional boundaries and were sampled at the point of discharge and at jurisdictional boundaries (Wildwood, Veitch and Ayum creeks, Alderbrook, Broom Hill and Kemp streams and Sooke River) and seven reside solely within the District of Sooke (Gillespie and Lannon creeks, Throup, Ella and Wright Road streams and Grouse and Nott brooks) and were sampled only at the point of discharge to the marine environment.

Monitoring results indicate water quality in District of Sooke watercourses is generally good. None of the 2007 measurements of pH, dissolved oxygen, turbidity and nitrate-nitrogen were outside the accepted guidelines for protection of aquatic life; however, exceedences of guidelines did occur for fecal coliforms and phosphorus.

In 2007, fecal coliform measurements in 13 of 41 samples exceeded the BC guideline for shellfish harvesting of 14 FC/100 mL. As shellfish harvesting does not occur in these watercourses, but in the marine environment, the guideline is used as a conservative benchmark. Two of the thirteen samples also exceeded the SHWP guideline (200 FC/100 mL) intended for protection of humans through direct contact. These occurred in Alderbrook Stream (8,300 FC/100 mL) and Saseenos Creek (400 FC/100 mL).

Phosphorus sources include sewage, fertilizers, toothpaste, detergents, pesticides and natural processes. In 2007, four measurements were above the CCME trigger range of 0.035 to 0.1 mg/L. The four exceedences were measured in Ayum Creek (0.12mg/L), Veitch Creek (0.49 mg/L in winter and 2 mg/L in summer) and Wildwood Creek (0.20 mg/L).

In addition, the summer temperature in the Sooke River (2043-1) was slightly elevated at the point of discharge (19.4°C compared to the guideline of 19°C).

Monitoring of significant watercourses will continue to be updated as changes in land use occur and other relevant information becomes available. Continued sampling is required to properly assess water quality in these watercourses. With an applied stormwater management plan, these creeks can be protected into the future.

## **5) Special Projects**

During the past several years, the SHWP has undertaken a number of special projects related to reducing or eliminating contaminants in watercourses and improving stormwater quality in the region. This section discusses some of the projects that could be used by the District of Sooke to protect stormwater quality.

### Natural Areas Atlas

The web-based atlas of natural areas in the CRD continues to be enhanced. The atlas is a comprehensive informational tool of natural areas (e.g., significant watercourses) for anyone interested or involved in land use planning and stewardship, including District of Sooke staff. The atlas can be used to promote well-informed and responsible land use decisions in the District of Sooke. This will, in turn, have a positive effect on the protection and restoration of natural areas in the District of Sooke. The Natural Areas Atlas can be viewed at: <http://www.crd.bc.ca/maps/natural/atlas.htm>. For more information contact atlas staff at [atlas@crd.bc.ca](mailto:atlas@crd.bc.ca).

### Source Control

A CRD bylaw for the protection of storm drains and watercourses has been prepared by the SHWP. As of 2007, version 13B of the model stormwater bylaw and six sector-specific Codes of Practice (COP) have been made available to all member municipalities for optional adoption or to be built into existing municipal regulations. The COP set out municipal requirements under which various business sectors will be required to operate to prevent the pollution of stormwater. These codes include:

1. Automotive and Parking Lot Operations
2. Construction and Development Activities
3. Recreation Facilities
4. Streets and Roads
5. Recycling Operations
6. Outdoor Storage Yard Operations

SHWP staff will work with District of Sooke staff as required to assist with the implementation of the bylaw and the codes of practice. For more information send a message to [stormwater@crd.bc.ca](mailto:stormwater@crd.bc.ca).

## Technical Assistance

The SHWP provides technical expertise and assistance to municipalities in the area of stormwater source control. Information on structural pollution prevention technologies, federal and provincial initiatives that involve stormwater quality, and changing environmental guidelines and regulations are some of the broad topics where the program provides advice to municipalities. The BWG provides a forum for the continued exchange of information relevant to stormwater source control. Guest speakers, such as governmental or business representatives, are arranged by the SHWP to address areas of concern or to provide information to the BWG.

## Shellfish Closures

Currently shellfish beds in Sooke Inlet, Harbour and Basin are closed for recreational harvesting due to bacterial contamination. Shellfish can be harvested for depuration in areas with a permit from the Canadian Food Inspection Agency or Department of Fisheries and Oceans Canada (DFO). Stormwater flows are the major pathway of contaminants from land to the marine environment. SHWP works toward reducing pollution, through discharge and nearshore marine sampling and upstream investigations to identify the sources of this contamination. This work, combined with the construction of the District of Sooke community sewer system, may eventually lead to the opening of shellfish beds in these waterbodies.

## **RECOMMENDATIONS**

### **Public Health Concerns**

The following recommendations are based on the results of the fecal coliform sampling:

1. that the Stormwater, Harbours and Watersheds program continues sampling stormwater discharges and creeks along the District of Sooke coastline to monitor for fecal coliform levels;
2. that the Stormwater, Harbours and Watersheds program continues working with the District of Sooke and Vancouver Island Health Authority staff to identify the sources of elevated fecal coliform concentrations in stormwater; and
3. that the Stormwater, Harbours and Watersheds program continues monitoring surface fecal coliform levels in Sooke Inlet, Harbour and Basin to track changes in these water bodies over time.

### **Environmental Concerns**

The following recommendations are based on the results of the chemical contaminants survey:

1. that the Stormwater, Harbours and Watersheds program staff work with the District of Sooke to determine the sources of chemical contamination;
2. that sampling and analysis be discontinued at discharges where low contaminant levels have been confirmed;
3. that Stormwater, Harbours and Watersheds program staff evaluate the effectiveness of the current sediment sampling program and make changes as required to protect watercourses and the nearshore marine environment; and
4. that the Stormwater, Harbours and Watersheds program staff continue monitoring significant watercourses to assess water quality and to monitor for change over time.

### **Stormwater Source Control**

1. that Stormwater, Harbours and Watersheds program staff continue to develop, as required, the regulatory framework of bylaws, codes of practice and best management practices for the protection of stormwater quality and
2. that the District of Sooke considers adopting the model storm sewer and watercourse protection bylaw, associated codes of practice and best management practices.

### **General**

1. that the Stormwater Quality program continues working with community groups and others to promote the protection of stormwater quality.