

STORMWATER QUALITY REPORT SALT SPRING ISLAND ELECTORAL AREA – 2007-2008

EXECUTIVE SUMMARY

INTRODUCTION

In 2007 and 2008, the Capital Regional District (CRD) Stormwater, Harbours and Watersheds program (SHWP) provided services to the Salt Spring Island (SSI) Electoral Area (EA). The program works, in consultation with the EA director, to limit the impacts of contaminated stormwater runoff on potable water supplies and the marine environment through:

1. **Water quality monitoring:** SHWP staff continued to monitor stormwater flows entering and exiting St. Mary Lake and Lake Weston and surface water in St. Mary Lake. In addition, for the first time on SSI, stormwater discharges were sampled in Fulford and Ganges harbours.
2. **Contaminant source identification:** SHWP staff continued to investigate potential sources of contamination through visual inspection, upstream sampling and bacterial source tracking (BST).
3. **Source control:** SHWP staff continued to promote protection of stormwater quality by preventing contaminants from entering stormwater. SHWP assists with the development and implementation of watershed management plans and the appropriate implementation of the CRD stormwater protection bylaw and related codes of practice.
4. **Surveying and mapping:** SHWP staff surveyed, mapped and documented 70 stormdrain discharges in Fulford and Ganges harbours.
5. **Reporting:** SHWP presented the 2007 and 2008 SSI activities in this annual report and continued to make the SSI stormwater quality data available on the web-based Natural Areas Atlas.

The CRD SHWP is also active in the Southern Gulf Islands and Juan de Fuca electoral areas, in the seven core area municipalities, on the Saanich Peninsula and in the District of Sooke. Separate stormwater quality reports have been developed for all of these areas and are available upon request.

RESULTS AND DISCUSSION

Water Quality Monitoring Associated with Drinking Water Lakes

In 2007 and 2008, stormwater flows entering and exiting St. Mary Lake (14 flows) and Lake Weston (3 flows) were visited in winter and summer to identify potential threats to drinking water quality and aquatic life (Figure A shows the study areas). Monitoring parameters included fecal coliform, temperature, pH, dissolved oxygen, specific conductance, turbidity, nitrate-nitrogen, phosphorus and flow. Results were compared to the Guidelines for Canadian Drinking Water Quality (GCDWQ), the British Columbia Approved Water Quality Guidelines (BCAWQG) and the Stormwater, Harbours and Watersheds Program Guidelines (SHWPG).

Lack of precipitation limited sampling and therefore results are more reflective of dry conditions. Measurements indicate stormwater flows may be negatively impacting water quality in St. Mary Lake and Lake Weston. The 2007 and 2008 data show that the water quality parameters of most concern in stormwater entering St. Mary Lake and Lake Weston are fecal coliform, turbidity and phosphorous. Elevated temperature is also a concern in St. Mary Lake.

St. Mary Lake

The sampling sites with the most number of parameters in exceedence of guidelines in St. Mary Lake, were SML02 (entering the north end of the lake) and SML07 (exiting the lake).

In general, stormwater in 2007 and 2008 did not show substantial contamination from onsite sewage disposal or agricultural runoff. With the exception of SML02 and SML10, fecal coliform counts were below 200 FC/100

mL. Counts below 200 FC/100 mL in stormwater flows have typically been associated with fecal waste from wild animals and birds.

Lower fecal coliform levels in stormwater in 2007 and 2008 were reflected in St. Mary Lake surface water. In 2008, St. Mary Lake fecal coliform counts ranged from <1 to 1 FC/100mL, and no human bacteria (i.e. *E. coli*) was measured. Results are different from 2006 data. In 2006, fecal coliform counts in the lake were slightly higher (1 to 8 FC/100mL) and human bacteria was present in nine of the 10 samples. Although the 2008 data suggests that contamination from onsite sewage treatment systems may have lessened or is not present in the lake, the surface water results are based on one sampling event following a period of dry weather. Dry conditions may have resulted in less bacteria entering the lake through stormwater. It cannot be assumed that human fecal contamination is not entering the lake during other times of the year. More data is needed to assess the contribution of fecal coliform in the lake as a result of onsite sewage disposal and agriculture.

Elevated temperatures were observed in three stormwater flows (SML02, SML07, and SML10) in 2007 and 2008. Warmer water can stimulate algae growth and reduce oxygen levels thus, affecting taste of drinking water and having adverse effects on aquatic life. Higher temperatures are generally a result of increased impervious surfaces (e.g. roads and roofs) or a lack of overhead vegetation.

Elevated turbidity levels were observed in seven stormwater flows. Of particular concern are stations SML01, SML02, SML03 and SML12 which have had consistently high turbidity since 2005. Turbid flows are likely due to erosion from removal of natural vegetation. Adoption of Best Management Practices for construction and development would assist to minimize sedimentation and erosion within the catchment areas.

Phosphorus measurements exceeded the guideline in two flows entering the lake (SML06B and SML02). Onsite sewage treatment systems are a source of elevated phosphorus levels. However, elevated phosphorus levels were not always associated with sewage (i.e. fecal coliform counts). Other potential sources are fertilizers and sedimentation from land clearing.

Present and historical results from SML07 indicate that water leaving the lake has elevated levels of phosphorus. Much of this phosphorus is likely from internal loading from the sediment within the lake, however there are additional sources from stormwater inputs. It is anticipated that phosphorus levels will be lower in St. Mary Lake in 2009 due to installation of a hypolimnetic aerator in October 2008.

SHWP staff attempted to conduct source investigations upstream of two discharges with poor water quality at St. Mary Lake. However, water samples could not be collected during the visits due to lack of precipitation.

SHWP staff will continue sampling these flows in 2009 and 2010 to monitor for change. Investigations will be undertaken to narrow down sources of contamination where possible.

Lake Weston

The 2007 and 2008 data suggest that stormwater entering Lake Weston from LW02 is generally good while that entering the lake from LW01 has the potential to cause adverse effects on aquatic life and impair drinking water quality. LW01 had elevated levels of fecal coliforms in the summers of both years (340 FC/100 mL and 730 FC/100 mL) and phosphorus (0.22 and 3.30 mg/L) in summer and winter of 2007.

Data from flows at LW03 suggests that water exiting Lake Weston may not be of good quality for drinking. LW03 had slightly elevated levels of fecal coliforms in comparison to drinking water guidelines (30 FC/100 mL in 2007 and 10 FC/100 mL in 2008). In addition, phosphorus levels may be contributing to eutrophication of the lake (0.15 mg/L and 0.3 mg/L in winter and summer of 2007, respectively).

It is uncertain what effect stormwater is having on Lake Weston water quality and whether fecal bacteria are from a human source. More data is required to determine sources of contamination. SHWP staff will continue sampling these flows in 2009 and 2010.

Stormwater Quality Monitoring at Fulford and Ganges Harbour

In 2008, 10 stormwater discharges flowing into Ganges Harbour and two stormwater discharges flowing into Fulford Harbour were sampled for the first time. Fecal coliform counts were measured and compared to the SHWPG to identify contamination from sewage.

Fecal coliforms were not detected in 50% of the stormwater discharges. In remaining samples, concentrations were low (below the SHWPG [200 FC/100mL] and ranged from 10 to 100 FC/100 mL) with the exception of discharge 8420 (fecal coliform count was 1,400 FC/100 mL).

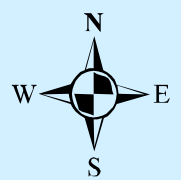
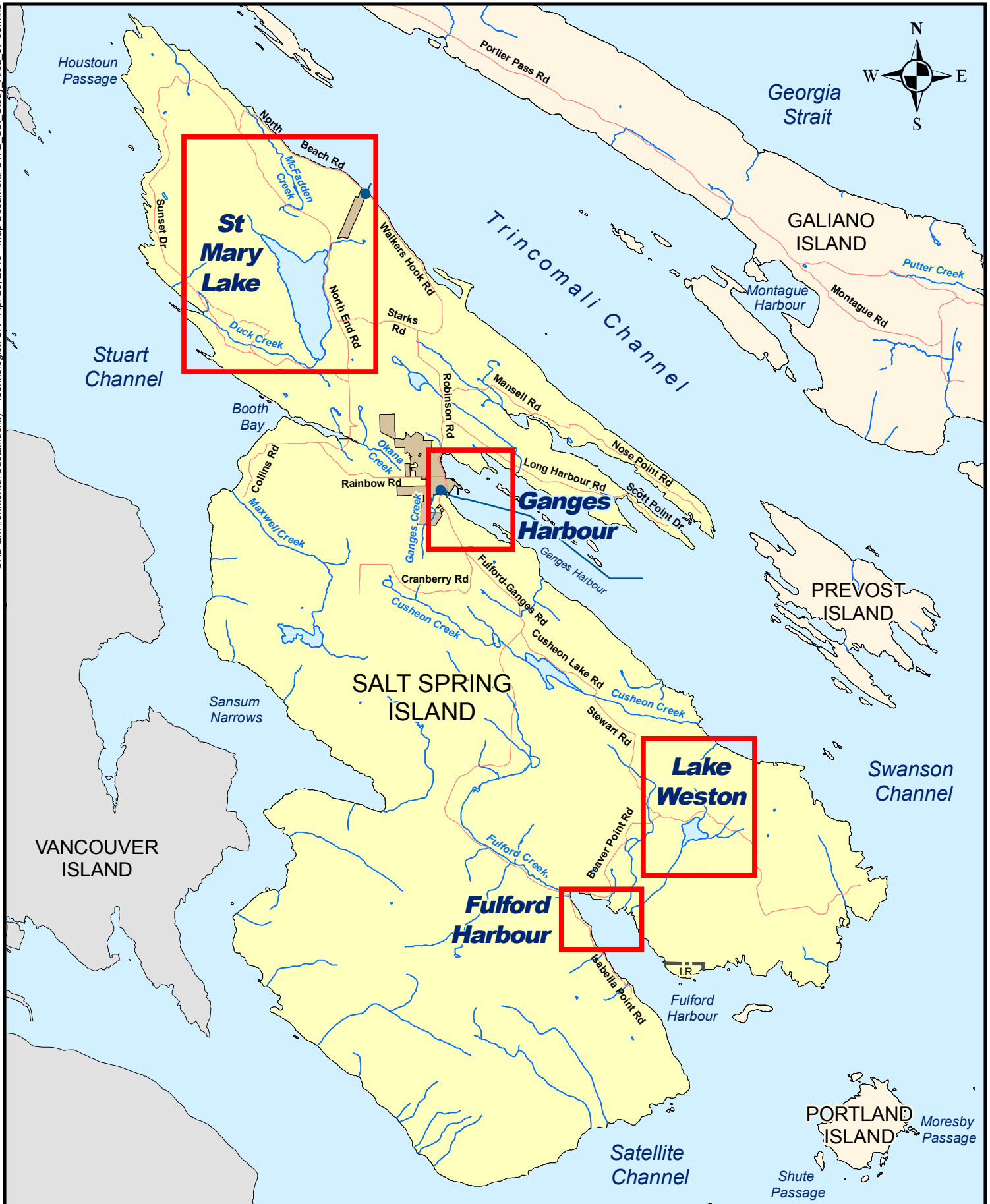
Discharge 8420, which flows into Ganges Harbour, had an elevated fecal coliform count and milky white and foamy discharges. Further investigations showed that fecal coliforms counts were elevated on March 26, 2008 (2,400 FC/100mL), but were low on September 18, 2008 (0 FC/100mL). The discharge was very turbid on March 12 and 26, 2008 (441 and 346 NTU, respectively). An investigation will be conducted in 2009 to assess sources of contamination.

In 2009, eleven discharges in Fulford Harbour and 15 discharges in Ganges Harbour will be assessed in both winter and summer months. The sampling program for the SSI EA will follow the same structure as SHWP carries out in other jurisdictions within the Capital Region.

Special Projects

During the past several years the SHWP has undertaken a number of special projects related to reducing contaminants in watercourses and improving stormwater quality in the region. These special projects include:

1. continued development of a web-based atlas of all natural areas in the CRD
2. promoting adoption of Model Storm Sewer and Watercourse Protection Bylaw (Version 13B) and six model stormwater codes of practice
3. promoting best management practices (strategies for preventing pollution) to the community and developing a newsletter outlining stormwater related activities
4. promoting the importance of reporting spills that can cause harm to public health and the environment to the Provincial Emergency program



0 0.5 1 2 Kilometres

Projection: UTM ZONE 10N NAD 83

Figure A Salt Spring Island 2007-2008 Survey Area

- Sewage Treatment and Outfall
- ~ Streams
- First Nations Boundary
- Major Roads
- Stormwater Monitoring Area
- Sewered Areas

The Capital Regional District does not warrant the accuracy within this map, nor will it accept responsibility for errors or omissions. The CRD reserves the right to alter or update the information without notice. Maps should not be used as navigation tools.

RECOMMENDATIONS

The following recommendations are based on activities undertaken in 2007 and 2008:

- 1 That Stormwater, Harbours and Watersheds program staff continue to monitor stormwater discharges around St. Mary Lake and Lake Weston for fecal coliform, temperature, pH, dissolved oxygen, specific conductance, turbidity, nitrate and phosphorus to identify contaminant levels.
- 2 That Stormwater, Harbours and Watersheds program staff works with the jurisdictions involved to protect stormwater quality on Salt Spring Island.
- 3 That Stormwater, Harbours and Watersheds program staff undertake investigations to identify sources of contamination when water quality measurements exceed guidelines for Canadian Drinking Water Quality and British Columbia Approved Water Quality Guidelines.
- 4 That Stormwater, Harbours and Watersheds program staff use bacterial source tracking to assist in identifying human-related activities which may be negatively affecting water quality in St. Mary Lake and Lake Weston.
- 5 That Stormwater, Harbours and Watersheds program staff assess stormwater discharges flowing into Fulford and Ganges harbours.
- 6 That Stormwater, Harbours and Watersheds program staff resample the St. Mary Lake monitoring stations for fecal coliform and bacterial source tracking analysis to verify 2008 results.
- 7 That Stormwater, Harbours and Watersheds program staff assist with the development and implementation of watershed management plans on Salt Spring Island.
- 8 That Stormwater, Harbours and Watersheds program staff assist in the appropriate implementation of the Model Storm Sewer and Watercourse Protection Bylaw and related codes of practice.
- 9 That Stormwater, Harbours and Watersheds program staff continue to promote stormwater protection on Salt Spring Island.
- 10 That Stormwater, Harbours and Watersheds program staff continue to present Salt Spring Island activity findings in a biennial report.
- 11 That Stormwater, Harbours and Watersheds program staff continue to present Salt Spring Island stormwater quality sampling data on the web-based Natural Areas Atlas.
- 12 That the Salt Spring Island Electoral Area considers the development of a public outreach program for onsite sewage system maintenance in the St. Mary Lake catchment area.