



Making a difference...together

**REPORT TO SAANICH PENINSULA WASTEWATER COMMISSION
MEETING OF THURSDAY, SEPTEMBER 20, 2012**

SUBJECT SAANICH PENINSULA STORMWATER QUALITY ANNUAL REPORT – 2011

ISSUE

To present the results of the 2011 Saanich Peninsula Stormwater Quality Program.

BACKGROUND

The Capital Regional District (CRD) Stormwater, Harbours and Watersheds Program (SHWP) promotes and coordinates the management of stormwater quality in cooperation and consultation with the participating municipalities of the District of Central Saanich, the District of North Saanich and the Town of Sidney, First Nations and other stakeholders. This work is a commitment in the Saanich Peninsula Liquid Waste Management Plan and is reported annually.

The results of the 2011 work are detailed in the *Saanich Peninsula Stormwater Quality Annual Report – 2011* prepared by SHWP staff. The executive summary, which includes recommendations for the 2012 program, is attached as Appendix A. The full report is available upon request and on the CRD website. The report has been discussed directly with the jurisdictions involved.

FINANCIAL IMPLICATIONS

Funding for this program is included in the Saanich Peninsula Stormwater Quality Program annual budget. The 2011 budget was \$59,970.

CONCLUSIONS

In 2011, SHWP staff continued to work cooperatively with participating municipalities and stakeholders to monitor stormwater quality, investigate upstream sources of contamination and move towards a CRD-led stormwater source control program for the Peninsula. Recommendations for the 2012 program are presented in the executive summary of the annual report.

RECOMMENDATIONS

That the Saanich Peninsula Wastewater Commission:

1. receive the executive summary of the *Saanich Peninsula Stormwater Quality Annual Report – 2011* for information;

2. endorse the program recommendations on pages vi and vii of the attached executive summary and encourage the jurisdictions involved to continue their stormwater quality improvement work; and
3. forward copies of the report *Saanich Peninsula Stormwater Quality Annual Report – 2011* to the participating municipalities of the District of Central Saanich, the District of North Saanich and the Town of Sidney.

Glenn Harris, Ph.D., R.P.Bio.
Senior Manager, Environmental Protection

Dan Telford, P.Eng.
Senior Manager, Environmental Engineering
Concurrence

DG:cam
Attachment: 1

SAANICH PENINSULA STORMWATER QUALITY ANNUAL REPORT – 2011

EXECUTIVE SUMMARY

INTRODUCTION

The Capital Regional District (CRD) Stormwater, Harbours and Watersheds Program (SHWP) works to promote and coordinate management of stormwater quality and surface water resources on the Saanich Peninsula. This program is a component of the Saanich Peninsula Liquid Waste Management Plan (LWMP) and is undertaken in cooperation and consultation with the participating municipalities: District of Central Saanich, District of North Saanich, and the Town of Sidney, and First Nations.

The 2011 annual report covers four main areas of activity:

1. Stormwater Discharge Assessments
2. Source Investigations
3. Watercourse Monitoring
4. Special Projects

Stormwater discharges are assessed along the Saanich Peninsula coastline. This assessment prioritizes stormwater discharges based on public health and environmental concern and strives to protect freshwater and nearshore marine ecosystems and resources. Source investigations are undertaken to identify causes of contamination in stormwater. SHWP staff are also involved in a number of special projects to improve stormwater quality on the Peninsula.

RESULTS AND DISCUSSION**1. Stormwater Discharge Assessments**

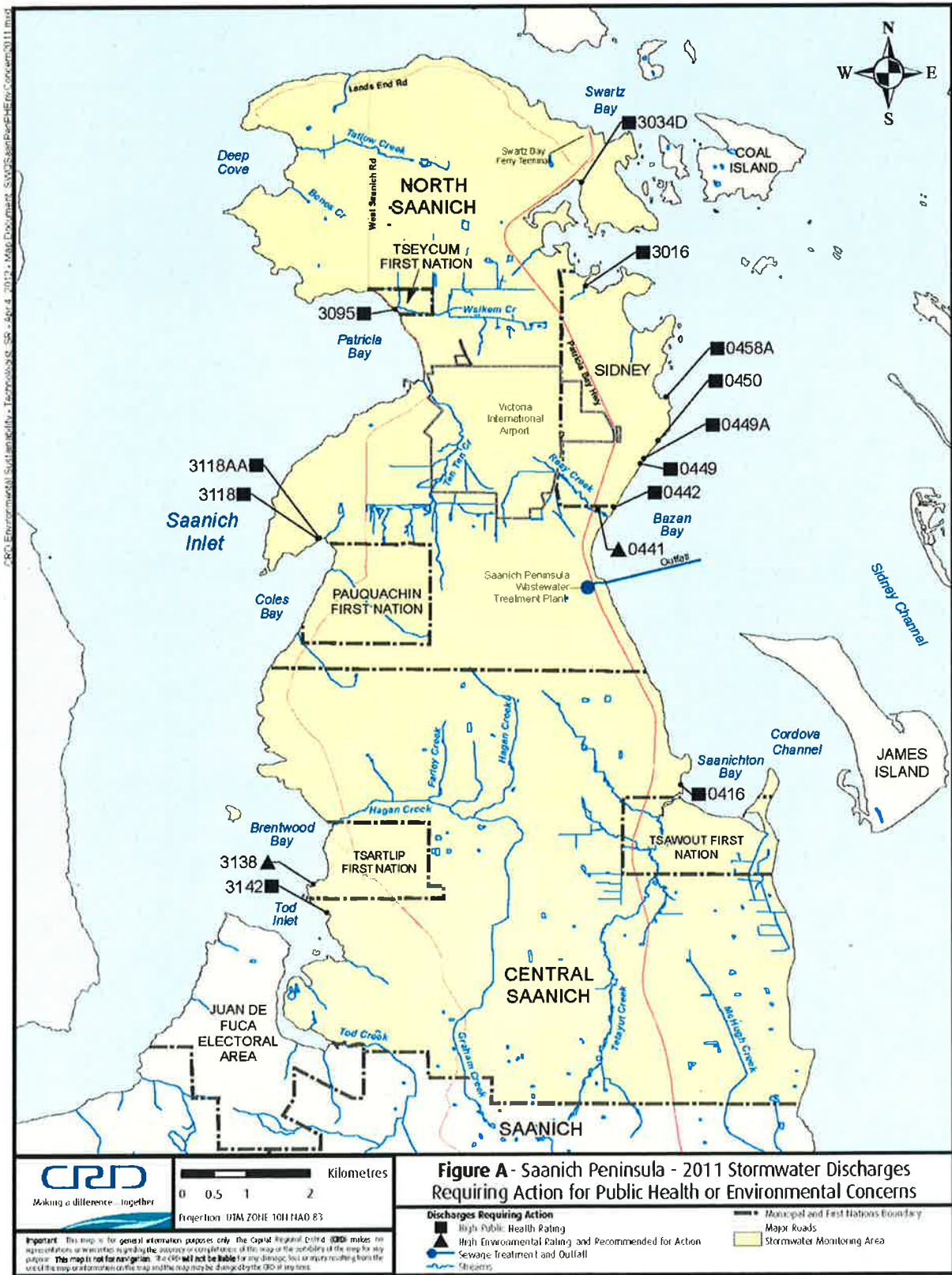
The study area covers the marine coastline from the Saanich-Central Saanich border on the east coast to the Central Saanich-Juan de Fuca electoral area border on the west coast of the Peninsula (Figure A).

Public Health: Fecal Coliforms

In 2011, 114 stormwater discharges were evaluated for public health concerns. Each sample is analyzed for fecal coliform bacteria during the winter and summer then rated based on level of contamination in the stormwater and potential for human contact using the following parameters:

- fecal coliform concentrations in stormwater discharges
- discharge flow
- location of the discharge (below or above the marine waterline)
- public use of the shoreline (such as swimming, fishing or walking on the beach)
- discharge ratings allow jurisdictions to prioritize remedial measures where they will have the greatest benefit.

Twelve of 114 assessed discharges were rated high for public health concern (Figure A) and five of these have been a concern for at least five years. Table A provides the jurisdictional distribution of high rated discharges in 2011. North Saanich and Sidney had the most high-rated discharges (four and five, respectively), while Central Saanich had two, and Tseycum First Nation, one.



The number of high-rated discharges went down considerably between 1999 (21) and 2002 (7), and has fluctuated between 11 and 13 high-rated discharges for the past five years. Six of the 2011 high-rated discharges have been of concern for a number of years and contamination remains in these discharges because the source is difficult to find, more than one source exists or mitigation is costly. Sources have been narrowed down in some of the high-rated discharges. Investigations will continue in others to determine the source of fecal coliform contamination.

Table A. Comparison of the Number Discharges Rated High for Public Health Concern

Jurisdiction	Number of Discharges Rated High											
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Central Saanich	1	0	2	1	3	2	0	1	1	1	1	2
North Saanich	6	5	4	4	10	10	7	2	5	5	6	4
Sidney	7	3	1	4	1	3	4	6	5	5	4	5
Pauquachin First Nation	0	0	0	0	0	0	0	0	0	0	0	0
Tsartlip First Nation	0	0	0	1	0	0	0	0	0	0	0	0
Tsawout First Nation	0	0	0	1	0	0	1	1	0	1	0	0
Tseycum First Nation	0	0	0	0	0	1	0	1	1	1	1	1
Total	14	8	7	11	14	16	12	11	12	13	12	12

Table B. Historical High Ratings for Discharges of High Public Health Concern in 2011

Discharge	Jurisdiction	Number of high ratings 2006-2011
416	Central Saanich	5
3142	Central Saanich	1
442	North Saanich	1
3118	North Saanich	2
3034D	North Saanich	1
3118AA	North Saanich	5
449	Sidney	4
450	Sidney	3
3016	Sidney	5
449A	Sidney	3
458A	Sidney	6
3095	Tseycum First Nation	5

Environment: Discharge Sampling for Chemical Contaminants

In 2011, sixteen stormwater discharges along the Saanich Peninsula coastline were evaluated for environmental concern according to the level of chemical contaminants identified in discharge sediment. In addition, 13 samples were collected upstream to narrow down sources of elevated contaminant concentrations. Contaminant ratings are determined by comparing the concentration of each contaminant (8 metals and 15 polycyclic aromatic hydrocarbons (PAH)) with the CRD marine sediment quality guidelines (MSQG), which are defined as the concentrations above which adverse effects may occur to marine life. Ratios of concentration to MSQG for each contaminant are summed to account for potential effects caused by combining the contaminants.

Discharges with consistently high ratings require corrective action, beginning with investigation of the source of contamination (usually initiated by SHWP staff). In consultation with jurisdictions involved, high-rated discharges are prioritized considering habitat sensitivity, discharge flow rate and flushing characteristics of the marine receiving environment.

Sampling is discontinued at discharges rated high for three consecutive years until corrective action is implemented. This allows limited funds to be reallocated for sampling other discharges. However, discharges that require action continue to be reported in each annual report.

In 2011, three discharges received a high contaminant rating (441 (Reay Creek), 3005 (Mermaid Canal, Sidney) and 3138 (Brentwood Bay, Tsartlip First Nation)). These high-rated discharges, plus three others (445, 449, 3016) are recommended for corrective action based on consecutive high ratings. Locations of these discharges are shown in Figure A.

Table C. Historical High Contaminant Ratings for Discharges Recommended for Corrective Action

Discharge	Location/Jurisdiction	Number of high ratings 2006-2011
441	Reay Creek – North Saanich	6
445	Foot of Frost Avenue – Sidney	1 (no sediment available to sample 2009-2011)
449	Tulista Park – Sidney	2
3005	Fifth Street – Sidney	5
3016	White Birch at Resthaven Drive	3
3138	Tsartlip boat launch– Tsartlip	1

SHWP and municipal efforts have narrowed down the potential locations of sources in these discharges. In recent years, corrective actions have been undertaken by Victoria Airport Authority (Reay Creek - practices put in place to decrease input of new contamination and removal of contaminated sediment and soil contamination in upstream sections) and Sidney (pipes in the catchment of 445 were upgraded). Efforts by The Butchart Gardens in 2009 resulted in removal of one discharge from this list (3153). SHWP staff will confirm contaminant levels and continue source investigations, in 2012.

It has become clear that narrowing down sources of contamination has not been very successful at eliminating some types of sources of contamination in stormwater sediment. In 2007, SHWP proposed creation of a CRD-led stormwater source control program. This is a method of reducing contaminant inputs to the stormwater system by working with businesses and residents to reduce or eliminate their contaminant discharge to stormwater through a balanced approach of education and enforcement.

In 2010, CRD staff began work on updating the model Stormwater Source Control bylaw to harmonize with the newly adopted Central Saanich Surface Water Bylaw. In 2011, the CRD Board moved to make

application to the Ministry of Environment to be granted the powers necessary to create stormwater source control service. That request is now with the Ministry for consideration.

2. Contaminant Source Investigations

Fecal Coliform

Investigations to identify contaminant sources were undertaken by SHWP and municipal staff in the catchment area of 11 stormwater discharges in 2011. Source investigations included assessment of the catchment area land use, upstream sampling and bacterial source tracking (BST; analysis of bacterial DNA to determine if humans or other animals are the source). Once the origin of a source is narrowed down, the jurisdiction is notified to further isolate it or undertake corrective actions. A summary of the findings of these investigations in 2011 follows:

- The source was narrowed down to the point where dye testing or pipe inspection is the next step at three discharges (3142, 426, 3016).
- At least two sources exist, and more upstream investigation is needed, for two discharges (416 and 3006).
- Indeterminate source at one discharge (3014).

Chemical Contaminants

In 2011, six catchment areas were sampled upstream (15 samples were collected) as part of an investigative program. Areas of contamination have been partially narrowed down, and investigation will continue in 2012. Quarterly samples were collected from two upstream stations in Reay Creek to monitor for change in contaminant levels over time. Cadmium and zinc are the contaminants of concern. Victoria Airport Authority removed contaminated sediment and surrounding soil from Reay Creek in 2007 and 2009, decreasing the input of these chemicals to the stream. However, since historical contamination still remains in the sediment, it is expected to be several years before the results of these remediation efforts are measurable.

3. Major Watercourse Monitoring

In 2011, water quality parameters were measured in eight creeks on the Saanich Peninsula (Hagen, Reay, Tetayut/Sandhill, Tatlow, Ten Ten, Tod, Tsawout and Wsikum) as part of a program to monitor the creeks for change, impacts from activities in the creeks and contamination from areas that drain to the creeks. Reay, Tetayut, Hagan and Tod Creek had the fewest exceedences of the water quality guidelines, while Wsikum had the most exceedences. The parameters of most concern were fecal coliform, turbidity and phosphorous. Elevated levels of these parameters are likely the result of higher levels of human settlement or agricultural practices.

In 2012, SHWP will work with municipal staff to locate sources of fecal coliform contamination. As part of the overall stormwater education initiative on the Peninsula, SHWP will also educate property owners about methods to reduce the amount of sediment and phosphorous leaving their properties and ultimately ending up in the creeks.

4. Special Projects

The CRD SHWP has undertaken a number of special projects related to reducing and eliminating contaminants in watercourses and improving stormwater quality in the region. Some of the projects could be used by the Saanich Peninsula municipalities and First Nations to protect stormwater quality within their jurisdiction. These are as follows:

Increase Communication between CRD and Municipal Planning Staff

SHWP staff worked cooperatively with municipal planning staff to discuss options for a Peninsula-wide stormwater source control program. SHWP staff also invited staff from the three Peninsula municipalities to training sessions and watershed management planning sessions.

Review Chemical Contaminants Sampling

SHWP staff are evaluating the effectiveness of the current chemical sampling program and are investigating new methods of obtaining samples and interpreting the results. A revised sampling protocol will help support stormwater source control activities by providing more useful contaminant information.

Review Watercourse Sampling

SHWP staff are evaluating the watercourse sample program with the aim of revising sample design to complete more intensive sampling of creeks over a longer sampling schedule. A revised design will provide data that can be more reliably compared to provincial water quality guidelines.

Tseycum Creek Source Investigations

Additional monitoring plus source investigations were undertaken along Tseycum Creek in 2010 because water quality guidelines have not been met in this creek for several years. Bacterial source tracking identified ruminants and pigs as the sources of high fecal coliform counts in Tseycum Creek. These results, combined with high phosphorus levels, which often come from fertilizers, point to agricultural land use as the source of elevated fecal coliform and phosphorus levels in Tseycum Creek.

RECOMMENDATIONS

Stormwater Discharge Surveys

1. Stormwater, Harbours and Watersheds Program staff will continue to sample all discharges with a high or moderate level of public health concern, and at selected low rated discharges, to confirm contaminant levels.
2. Discontinue annual sampling at the discharges rated low for public health concern, but ensure that they are sampled at least once every five years as part of a long-term strategy to monitor for future changes.
3. Continue sediment sampling and analysis at high rated discharges to confirm chemical contaminant levels as required.
4. Discontinue sediment sampling and analysis at discharges where low chemical contaminant levels have been confirmed.
5. Stormwater, Harbours and Watersheds Program staff will continue to evaluate the effectiveness of the current sediment sampling program and make changes as required to protect watercourses and the nearshore marine environment.

Upstream Investigations

1. Stormwater, Harbours and Watersheds Program staff will work with the jurisdictions involved to investigate and eliminate the sources of high fecal coliform concentrations for those discharges rated high for public health concern.
2. Stormwater, Harbours and Watersheds Program staff will work with the jurisdictions involved to determine the sources of contamination for the discharges with a confirmed rating of high environmental concern.

Reay Creek

1. Discontinue quarterly contaminant sampling in Reay Creek and resume regular annual sampling as in other creeks.

Special Projects

1. Stormwater, Harbours and Watersheds Program will continue to undertake special projects as necessary to improve stormwater quality on the Peninsula.

General

The following are also recommended:

1. Stormwater, Harbours and Watersheds Program staff, in cooperation with the Ministry of Environment, Environment Canada and community groups, will develop and promote education and best management practices for the protection of stormwater quality.
2. Where appropriate, municipalities and First Nations should investigate spills and other incidents that may lead to the contamination of storm drains, watercourses and the marine environment, and these incidents should be reported to the Provincial Emergency Program.