STORMWATER QUALITY REPORT
SOUTHERN GULF ISLANDS ELECTORAL AREA
2004–2006

EXECUTIVE SUMMARY

INTRODUCTION

In 1997, the Capital Regional District (CRD) Stormwater Quality program (SQP) was introduced to the Southern Gulf Islands (SGI) Electoral Area (EA). This program works to promote and coordinate the management of stormwater quality and surface water resources on the SGI. Program activities are undertaken in consultation with the SGI EA director and involve the monitoring of stormwater quality with the goal of protecting public health, the environment and freshwater and nearshore marine ecosystems and resources.

The authority to undertake this work is included in the *Southern Gulf Islands Stormwater Quality Management Extended Service Establishment Bylaw No. 1, 1996.* This bylaw allows the CRD to control pollution in stormwater runoff from land by investigating, monitoring and reporting on stormwater and sediment quality. It also allows the CRD to prioritize areas for investigation, carry out public education programs and coordinate stormwater quality management programs.

From 2004 to 2006, the SHWP continued to provide services to the SGI EA. This report covers five main areas of activity:

1. Stormwater flow surveys
2. Upstream Investigations
3. Bennett Bay Monitoring
4. Monitoring of Major Watercourses
5. Special projects

From 2004 to 2006, stormwater flow surveys were carried out along the more heavily settled portions of the SGI EA. Selected stormwater flows were sampled and analyzed for fecal coliform bacteria (an indicator of the presence of sewage) and chemical contaminant levels (metals and polycyclic aromatic hydrocarbons (PAHs)). Each flow sampled was then rated to determine the level of public health and environmental concern. Stormwater flows entering the potable water supplies of Magic and Buck lakes on North Pender Island and Money Lake on Saturna Island were also sampled and analyzed for fecal coliform to ensure the protection of public health. When elevated levels of contaminants are identified, upstream investigations are undertaken to confirm and eliminate the source.

Stormwater and marine nearshore surface water sampling was undertaken in the Bennett Bay area. This work was undertaken to provide information regarding the level of contamination entering the National Marine Park and any impact it may be having on the bay.

In 2003, the SGI stormwater program was further expanded to assess the water quality of selected creeks and streams. A monitoring program for these watercourses was initiated to assess fecal coliform, temperature, pH, dissolved oxygen specific conductance and turbidity levels. In 2005, monitoring was expanded to include nitrogen-nitrate and phosphorus measurements. These assessments help to determine the health of watercourses and whether water quality is getting better or worse over time.

SHWP staff was also involved in a number of special projects to improve stormwater quality in the region. Some of these projects are relevant to the SGI EA and brief summaries are included in the report. The findings of this report have been discussed with SGI EA Director Susan DeGryp.

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

RESULTS AND DISCUSSION

1) Stormwater Flow Surveys

From 2004 to 2006, the areas surveyed included portions of the coastlines and selected inland areas of North Pender, Saturna, Mayne and Galiano islands (refer to Figure A, B and C).

Public Health - Fecal Coliforms

The SHWP evaluates stormwater discharges for public health concerns. This is done by rating each discharge as high, moderate or low using a rating system developed by the SHWP. The rating of discharges allows the jurisdictions involved to better manage limited funds and undertake remedial measures where necessary. The level of public health concern is rated using fecal coliform concentrations (bacteria used to indicate the presence of sewage), flow and public use of the shoreline (the likelihood of people coming in contact with stormwater flows).

Each year SHWP staff sample the following:

- stormwater flows with a high or moderate level of public health concern from the previous years testing
- high flow creeks because of their exposure to contamination and the likelihood of people coming into direct contact
- approximately 20% of the stormwater discharges previously rated low as part of a longer term strategy to monitor for change
- all stormwater flows with fecal coliform counts equal to or greater than 500 fecal coliform per 100 millilitres (>500 FC/100 mL)

Discharges were visited once during wet weather (January to March) and once during dry weather (June to September) to represent seasonal differences. The following provides fecal coliform sampling results and a discussion of the findings for each flow visited between 2004 and 2006. All flows of concern (rated high or moderate) in 2004, 2005 and/or 2006 are shown on Figure A, B and/or C respectively:

North Pender Island

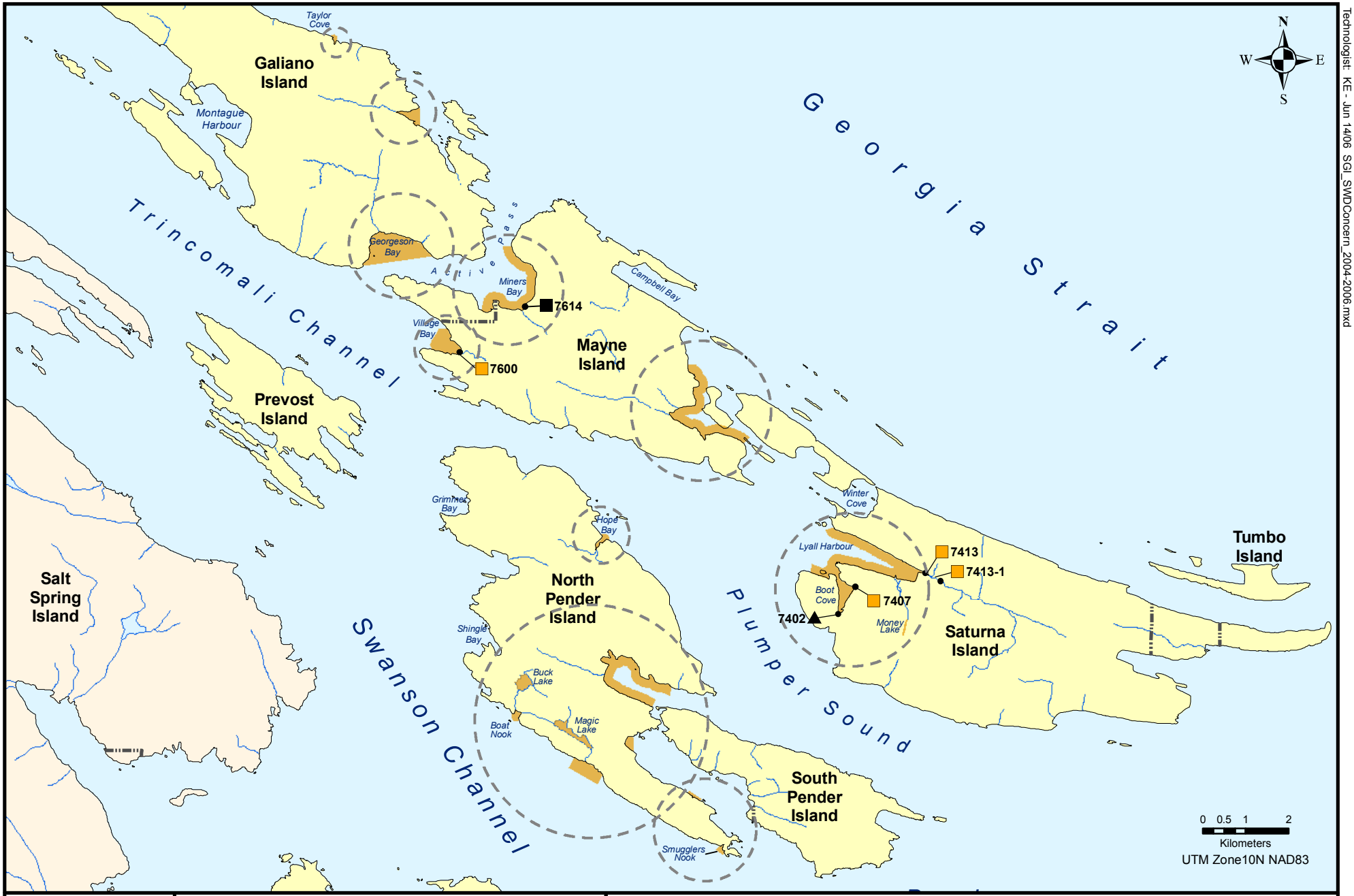
Of the 11 North Pender Island stormwater flows visited and sampled in 2004, all were rated low. None of these discharges pose a public health concern and therefore are not displayed on Figure A.

In 2005, 17 flows were monitored for public health concern. One of the 17 was rated high (7002A), one was rated moderate (7001A) and 15 were rated low.

In 2006, 11 stormwater flows on North Pender Island were visited, sampled where possible and analyzed for fecal coliform levels. Of the 11 flows sampled, one was rated high for public health concern (7001A) while 10 were rated low.

Saturna Island

Fifteen Saturna Island stormwater flows were sampled and analyzed for fecal coliform in 2004. One flow was sampled at two stations in 2004 (7413 and 7413-1) and both were rated moderate. Of the other 13 flows, one was rated moderate (7407) and 12 were rated low.

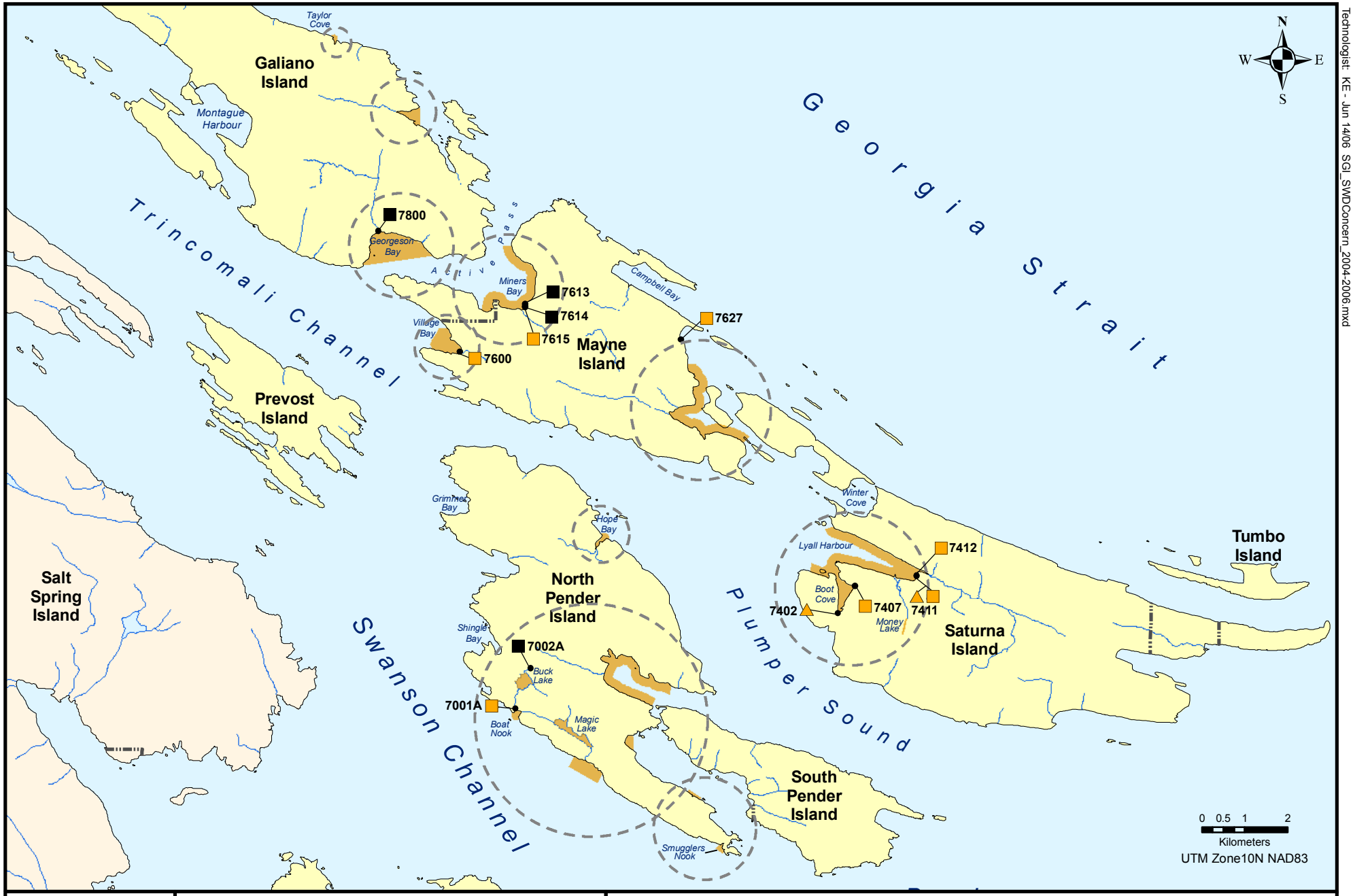


CAPITAL REGIONAL DISTRICT
Environmental Services

Figure A
Southern Gulf Islands 2004 Stormwater Discharges of Concern

- High Public Health Concern
- Moderate Public Health Concern
- High Environmental Concern
- Moderate Environmental Concern
- First Nations Reserve
- Streams and Rivers
- Major Lakes
- Survey Area
- Southern Gulf Islands Electoral Area
- CRD

Technologist: KE - Jun 14/06 SGI_SWDConcern_2004-2006.mxd

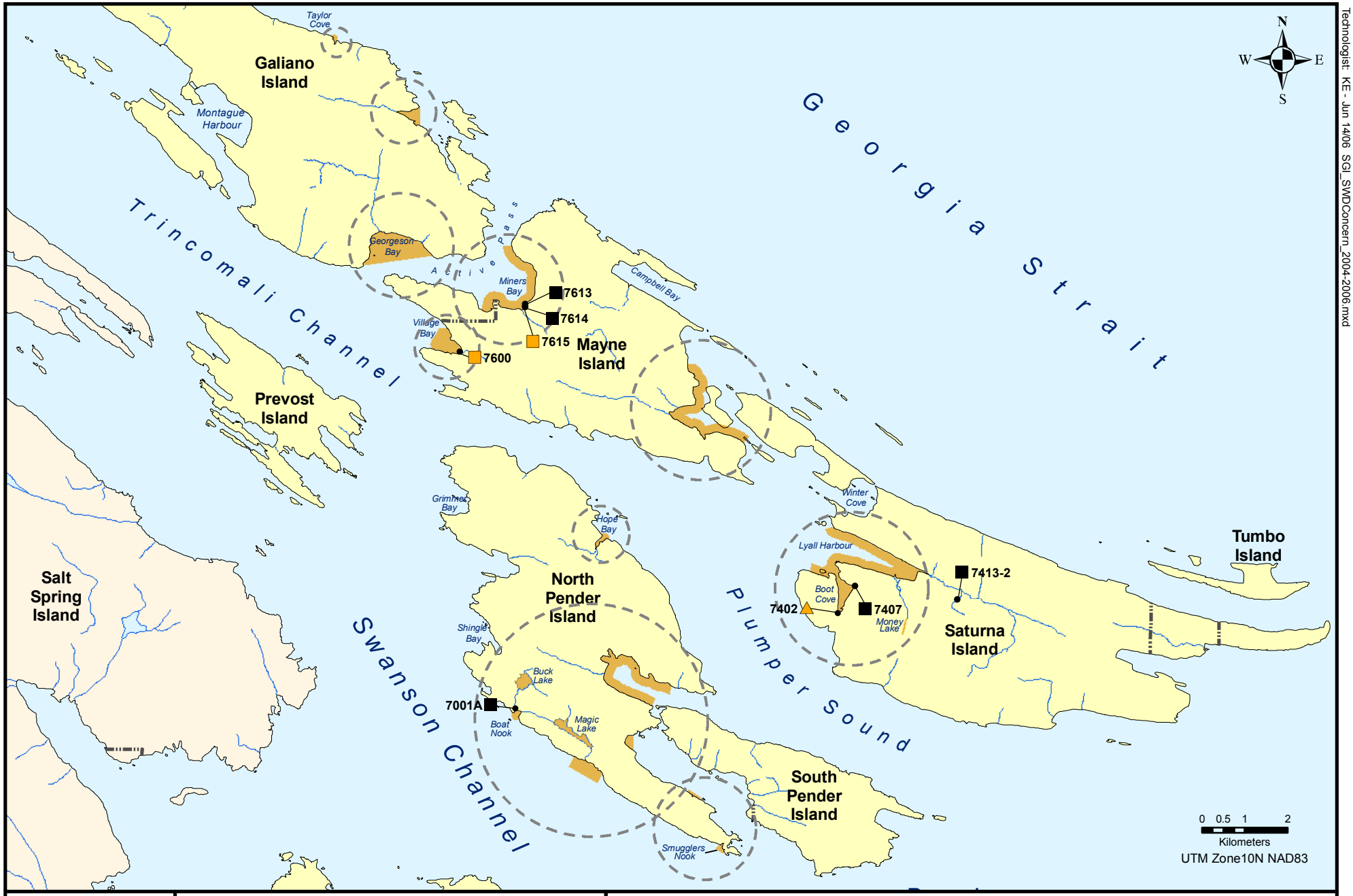


CAPITAL REGIONAL DISTRICT
Environmental Services

Figure B
Southern Gulf Islands 2005 Stormwater Discharges of Concern

- High Public Health Concern
- Moderate Public Health Concern
- High Environmental Concern
- Moderate Environmental Concern
- First Nations Reserve
- Streams and Rivers
- Major Lakes
- Survey Area
- Southern Gulf Islands Electoral Area
- CRD

Technologist: KE - Jun 14/06 SGI_SWDConcern_2004-2006.mxd



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CAPITAL REGIONAL DISTRICT
Environmental Services

Figure C
Southern Gulf Islands 2006
Stormwater Discharges of Concern

- High Public Health Concern
- Moderate Public Health Concern
- High Environmental Concern
- Moderate Environmental Concern
- First Nations Reserve
- Streams and Rivers
- Major Lakes
- Survey Area
- Southern Gulf Islands Electoral Area
- CRD

Eighteen stormwater flows were monitored on Saturna Island in 2005. Three of the 18 flows were rated moderate (7407, 7411 and 7412) and 15 flows were rated low.

Sixteen Saturna Island stormwater flows were monitored in 2006. Of these 16 flows, two were rated high (7407 and 7413-2) and 14 were rated low.

Mayne Island

In 2004, 20 stormwater flows were monitored on Mayne Island. Of these 20 flows, one was rated high (7614), one was rated moderate (7600) and 18 were rated low.

Fifteen Mayne Island stormwater flows were monitored in 2005. Of these 15 flows, two were rated high (7413 and 7414), three were rated moderate (7600, 7615 and 7627) and 10 were rated low.

Eight Mayne Island stormwater flows were monitored in 2006. Two of the eight flows were rated high (7613 and 7614), two were rated moderate (7600 and 7615) and four were rated low.

Galiano Island

Three stormwater flows were sampled on Galiano Island in 2004. Two of the flows received a low rating for public health concern while the other was not rated due to lack of access in the winter and no flows in the summer. None of these discharges pose a public health concern and therefore are not displayed on Figure A.

Two Galiano Island flows were sampled in 2005. One of these two flows was rated high (7800) for public health concern and the other was rated low.

In 2006, three flows were monitored on Galiano Island. All three flows were rated low and are not displayed on Figure C due to the lack of public health concern posed.

Environmental - Chemical Contaminants

Stormwater flows are evaluated for environmental concerns based on the level of metals and organic contaminants in sediments associated with the stormwater flows. Flows rated high in chemical contaminants are then prioritized for action on the basis of environmental factors, including habitat sensitivity, flow rate and the flushing characteristics of receiving waters. All flows which have a consistently high contaminant rating (two years of data), require some type of action beginning with a detailed investigation to locate the source of the contaminant(s).

From 2004 to 2006, sediment samples were collected from 16 Southern Gulf Islands stormwater flows and analyzed for eight metals and PAHs. The sediments were then assessed for environmental concern using the CRD's rating system. The flows chosen for sediment sampling and analysis were located near environmentally sensitive areas and/or near heavily settled areas where there is a greater risk of pollution. As well, sampling stations were chosen downstream of contaminated sites in order to monitor for the migration of contaminants offsite.

The following provides chemical contaminant sampling results and a discussion of the findings for each flow visited between 2004 and 2006:

North Pender Island

Six flows were monitored on North Pender Island for environmental concern between 2004 and 2006. Flow 7002, 7003, 7004, 7015, 7021 and 7022 were all rated low and all but flow 7015 are recommended for monitoring in 2011 now that low contaminant levels have been confirmed. Flow 7015 will be monitored in 2007 to confirm lower contaminant levels.

Saturna Island

Three flows were monitored on Saturna Island between 2004 and 2006. Flow 7402 was rated high in 2004 and moderate in 2005 and 2006. Flow 7407 was rated low in 2006 (as in 2002) and flow 7411 was rated low in 2005 and 2006. Flow 7402 will be monitored in 2007 to confirm contaminant levels while monitoring will be discontinued for three years for flows 7407 (2009) and flow 7411 (2011) now that contaminant levels have been confirmed.

Mayne Island

Between 2004 to 2006, five flows on Mayne Island were sampled for environmental concern. Flow 7600 was rated low in 2006, flow 7613 in 2004, flow 7625 and 7626 in 2005 and 2006 and 7628 in 2005. All but 7628 have had low contaminant levels confirmed and are scheduled for resampling in three years (7600, 7625 and 7626 in 2011 and 7613 in 2009). Flow 7628 will be resampled in 2007 to confirm low contaminant levels.

Galiano Island

Two Galiano Island flows (7800 and 7820) were sampled for chemical contaminants from 2004 to 2006. Flow 7800 was rated low for environmental concern in 2004 and flow 7820 was rated low in 2005. Monitoring for flows 7800 and 7820 will be discontinued for five years (2009 for flow 7800 and 2010 for flow 7820) now that contaminant levels have been confirmed.

2) Upstream Investigations

From 2004 to 2006, the SHWP continued to work towards identifying sources of fecal coliform contamination during upstream investigations. These efforts have been successful in identifying and often eliminating sources of elevated fecal coliform concentrations. Upstream investigations were undertaken based on the following criteria:

- trends in fecal coliform data from winter to summer that are often associated with failing septic tanks and fields
- large amounts of vegetation often found in flows contaminated with fecal coliform
- in response to public concerns regarding odours and visual signs of sewage contamination of stormwater

SHWP and Vancouver Island Health Authority (VIHA) staff undertook upstream sampling investigations within the catchment areas of 11 discharges between 2004 and 2006. The source(s) of elevated fecal coliform concentrations were identified in one catchment area, narrowed down in two and inconclusive in eight. Additional upstream investigations and/or dye-testing are required to determine the source(s) of contamination for the 10 catchment areas where sources were not identified.

SHWP staff also used Bacterial Source Tracking (BST) analysis to assist in upstream investigations. This relatively new technique has helped to confirm whether the sources of contamination are human-related or not. This has allowed staff to focus attention in the appropriate direction.

3) Bennett Bay Monitoring

In 2005, an investigation was initiated to identify the level of contaminants entering the Bennet Bay National Marine Park through stormwater flows. Four stormwater flows draining to Bennett Bay were identified and monitored for a number of different parameters to determine contaminant levels entering the bay. As well, six Bennett Bay marine nearshore stations were monitored to identify fecal coliform levels in the bay itself.

From 2005 to 2006, eight fecal coliform samples and four sets of measurements for temperature, pH, dissolved oxygen, specific conductance, turbidity, nitrate-nitrogen and phosphorus were collected from

the four stormwater flows entering Bennett Bay. In general, no obvious gross contamination in the four stormwater flows was identified.

Twenty-four marine nearshore surface water samples were collected from the six marine stations and three were above the provincial shellfish harvesting criteria while two were also above the SHWPG of 200 FC/100 mL. Station BBM3, BBM4 and BBM6 each had elevated fecal coliform counts during the summer of 2006. These stations will be monitored in 2007 and if fecal coliform counts are elevated, BST samples will be collected to determine the species responsible for the contamination.

4) Monitoring of Major Watercourses

Three SGI EA flows were monitored in 2004 to 2006 to protect aquatic life. These three watercourses are Buccaneer Creek (7004) on North Pender Island, Lyall Creek (flow 7413) on Saturna Island and Putter Creek (7820) on Galiano Island. These flows were monitored for fecal coliform, temperature, pH, dissolved oxygen, specific conductance, turbidity, nitrate-nitrogen and phosphorus and assessed using provincial aquatic life criteria (where applicable). This monitoring helps to determine:

- the ability of watercourses to sustain fish and other aquatic life
- the contribution of contaminants from each jurisdiction
- whether the health of watercourses is getting better or worse over time

The following are the 2004 to 2006 major watercourse monitoring results for the three SGI stormwater flows:

Seven of the 13 fecal coliform samples collected from the three watercourses were found to be above the provincial shellfish criteria of 14 FC/100 mL. Of the three creeks, Lyall Creek had the highest recorded fecal coliform counts. SHWP and VIHA staff continues to investigate possible sources of contamination identified in Lyall Creek in an upstream tributary.

All specific conductance and nitrate-nitrogen measurements were within acceptable levels for the protection of aquatic life.

Of the 13 temperature, pH, dissolved oxygen and turbidity measurements collected, one temperature and one turbidity measurement were above and one pH and one dissolved oxygen measurement were below the provincial criteria. A high temperature and a low dissolved oxygen measurement were collected from Buccaneer Creek during the summer of 2004 while high pH and turbidity measurements were collected from Lyall Creek and Putter Creek (respectively) during the winter of 2005.

Nine phosphorus measurements were collected from the three watercourses between 2004 and 2006. Three of these phosphorus measurements were above the Canadian Council of Ministers of the Environment (CCME) trigger range of 0.035 to 0.1 mg/L. These exceedences occurred in Lyall and Putter creeks during the winter of 2006 and Lyall Creek during the summer of 2006.

The Monitoring of Major Watercourses program will be updated as changes in land use and other relevant information comes to light. Continued sampling is required to properly assess water quality for these watercourses.

5) Special Projects

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

<u>CRD Enhanced Storm Sewer and Watercourse Bylaw</u>

An updated bylaw for the protection of storm drains and watercourses has been prepared by the SHWP. This bylaw is designed to allow the incorporation of stormwater codes of practice that set out regulatory

requirements under which various business sectors will be required to operate to prevent stormwater contamination. The bylaw has recently been updated to be compliant with the *Community Charter*. SHWP staff will work with SGI EA staff as required to assist with the implementation of the bylaw and the codes of practice, possibly as non-regulatory best management practices. For more information contact Dale Green at stormwater@crd.bc.ca.

Natural Areas Atlas

A web-based atlas of all natural areas in the CRD continues to be enhanced. The atlas is a comprehensive information tool of natural areas (i.e., significant watercourses) for anyone interested or involved in land use planning and stewardship, including the Islands Trust. The atlas can be used to promote well informed and responsible land use decisions in the SGI EA. This will in turn have a positive effect on the protection and restoration of natural areas in the SGI EA. The Natural Areas Atlas covers the entire SGI EA and can be viewed at www.naturalareasatlas.ca.

Education

Program activities from 2004 to 2006 included promotion of stormwater contaminant reduction through newsletters and information handouts. Other educational efforts included the collection and promotion of best management practices (strategies for preventing pollution) to the community. The SHWP also worked to promote the importance of reporting spills that can cause harm to public health and the environment to the Provincial Emergency Program.

RECOMMENDATIONS

Public Health Concerns

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

1. that Stormwater, Harbours and Watersheds program staff continues to sample stormwater discharges along the Southern Gulf Islands Electoral Area coastline to monitor for fecal coliform levels.

2. that Stormwater, Harbours and Watersheds program staff continues to work with the Southern Gulf Islands Electoral Area director and Vancouver Island Health Authority staff to identify the sources of elevated fecal coliform concentrations in stormwater.

Environmental Concerns

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

1. that Stormwater, Harbours and Watersheds program staff continues to monitor discharges to determine source(s) of chemical contamination.

2. that Stormwater, Harbours and Watersheds program staff discontinues monitoring discharges where low contaminant levels have been confirmed.

3. that Stormwater, Harbours and Watersheds program staff evaluates the effectiveness of the current sediment sampling program and make changes as required to protect watercourses and the nearshore marine environment.

4. that Stormwater, Harbours and Watersheds program staff continues 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 continues to develop (as required) the regulatory framework of bylaws, codes of practice and best management practices for the protection of stormwater quality.

2. that the Southern Gulf Islands Electoral Area considers adopting the Model Storm Sewer and Watercourse Protection Bylaw, associated codes of practice and best management practices.

General

1. that the Stormwater, Harbours and Watersheds program staff continues working with community groups and others to promote the protection of stormwater quality.