

Southern Gulf Islands Electoral Area

Stormwater Quality Report

2017-2018

Capital Regional District | Parks & Environmental Services, Environmental Protection



Prepared by
Stormwater Quality Program

Capital Regional District
625 Fisgard Street, Victoria, BC V8W 2S6
T: 250.360.3000 | F: 250.360.3079
www.crd.bc.ca

March 2020

**SOUTHERN GULF ISLANDS ELECTORAL AREA
STORMWATER QUALITY REPORT, 2017-2018**

Contents

BACKGROUND.....	1
THE CAPITAL REGIONAL DISTRICT’S ROLE	1
SAMPLE COLLECTION	1
PUBLIC HEALTH CONCERN	2
<i>Stormwater Discharge Assessments</i>	<i>2</i>
<i>Public Health Concern Ratings</i>	<i>2</i>
<i>Bacterial Source Investigations.....</i>	<i>3</i>
<i>Newly-Sampled Discharges</i>	<i>3</i>
MARINE MONITORING.....	8
<i>Bennett Bay, Mayne Island</i>	<i>8</i>
<i>Marine Sampling on Beaches with Public Access</i>	<i>9</i>
ENVIRONMENTAL CONCERN	10
<i>Stormwater Sediment</i>	<i>10</i>
<i>Watercourse Monitoring.....</i>	<i>11</i>
PUBLIC EDUCATION	12
2017 AND 2018 AT A GLANCE	12
OUTLOOK FOR 2019-2020.....	12

List of Figures

Figure 1	Southern Gulf Islands - Galiano Island 2017-2018 Stormwater Sampling Locations ..	4
Figure 2	Southern Gulf Islands – Mayne Island 2017-2018 Stormwater Sampling Locations ...	5
Figure 3	Southern Gulf Islands – Pender Islands 2017-2018 Stormwater Sampling Locations	6
Figure 4	Southern Gulf Islands – Saturna Island 2017-2018 Stormwater Sampling Locations .	7

SOUTHERN GULF ISLANDS ELECTORAL AREA STORMWATER QUALITY REPORT, 2017-2018

BACKGROUND

The Capital Regional District (CRD) Stormwater Quality Program works to identify and minimize impacts of stormwater runoff on environmental and public health in the Southern Gulf Islands Electoral Area (SGI EA). Program activities include monitoring water and sediment from storm drains, watercourses, potable water bodies and nearshore marine waters. When contamination is found, staff conduct investigations to find the sources.

The SGI EA is located within the CRD and is comprised of Galiano Island, Mayne Island, North and South Pender Islands and Saturna Island.

THE CAPITAL REGIONAL DISTRICT'S ROLE

The Southern Gulf Islands Stormwater Quality Management Extended Service Establishment Bylaw No. 1, 1996 allows the CRD to reduce and eliminate pollution in stormwater runoff by investigating, monitoring and reporting on stormwater and sediment quality; and, prioritize areas for investigation, carry out public education programs and coordinate stormwater quality management programs.

Sewage treatment in the study areas consists mostly of septic tanks and fields or small sewage treatment plants (with in-ground disposal). Malfunction of these systems has potential to contaminate stormwater discharges, potable water and the marine environment.

Authority to directly implement mitigative programs is the responsibility of Island Health Authority, First Nations and other government agencies, such as:

- Islands Trust
- Ministry of Transportation and Infrastructure
- Ministry of Environment & Climate Change Strategy (ENV)
- Ministry of Forests, Lands, Natural Resource Operations and Rural Development
- Fisheries and Oceans Canada

SAMPLE COLLECTION

CRD staff collects environmental quality data from stormwater discharges, creeks and the marine environment, and assigns public health and contaminant concern ratings. Each year, staff sample discharges with high or moderate public health concern and cycle through a selection of discharges with low public health concern over a five-year period.

CRD staff collect water and sediment samples from:

- stormwater entering the ocean from Galiano, Mayne, North Pender and Saturna islands
- stormwater entering potable water lakes on North Pender and Saturna islands
- watercourses on each island
- marine surface water in Bennett Bay on Mayne Island

PUBLIC HEALTH CONCERN

Stormwater Discharge Assessments

CRD staff sampled stormwater from 60 discharges (Figures 1 through 4) in 2017 and 2018 for measurement of *Escherichia coli* (E.coli). Of these, 34 were sampled both years. Staff assigned a public health concern rating to each discharge based on bacterial level and potential for public contact with the discharge.

In 2018, CRD staff also surveyed beach access areas on the islands and sampled 22 stormwater discharges that had not been sampled previously. More data is needed to rate these discharges for public health concern.



Stormwater discharges with bacterial contamination are assigned a higher public health concern rating when there is potential for public contact

Public Health Concern Ratings

Staff assigned two discharges a high public health concern rating. The high-rated discharges are 7600 (Deacon Creek) and 7614 (Miners Bay), both on Mayne Island (discussed below). A discharge rated high in previous years, 7613 (Miners Bay, Mayne Island) had decreased flows and lower bacterial counts and was assigned a moderate rating in 2018. No high-rated discharges were identified on the other islands.

Elevated bacterial counts were measured in eight of the 23 newly sampled stormwater flows on publicly accessible beaches. CRD staff will continue to collect data so that public health ratings can be assigned to these discharges.

Bacterial Source Investigations

CRD staff investigate discharges with elevated bacterial counts to determine the source of contamination through upstream sampling, dye-testing, caffeine and genetic analyses to measure if the bacteria or contamination source is from humans or animals. Three discharges have been recently investigated and are described below.

Discharges 7613 and 7614 flow onto the beach in Miners Bay, Mayne Island. Bacteria of human origin and caffeine in both discharges indicate that malfunctioning septic systems are a source of bacteria. In 2018, flow and bacterial levels were decreased in discharge 7613, indicating a change has happened in the catchment area. CRD and Island Health staff continue to investigate.

Discharge 7600 (Deacon Creek) flows into Village Bay, Mayne Island. Elevated caffeine and bacteria of human origin indicate a source of sewage in the creek. However, bacteria from wild and domestic birds were also measured. Potential sources include malfunctioning septic systems, poor agricultural practices and wildlife. CRD staff will continue investigations.



Discharge 7614, Miners Bay, Mayne Island



Deacon Creek, Discharge 7600, Mayne Island

Newly-Sampled Discharges

Elevated bacterial counts were measured in eight of the 22 stormwater flows that had not been sampled previously. Caffeine was detected in two of these, indicating that the source of bacteria is most likely from malfunctioning on-site sewage treatment systems. Staff will continue to monitor these discharges.

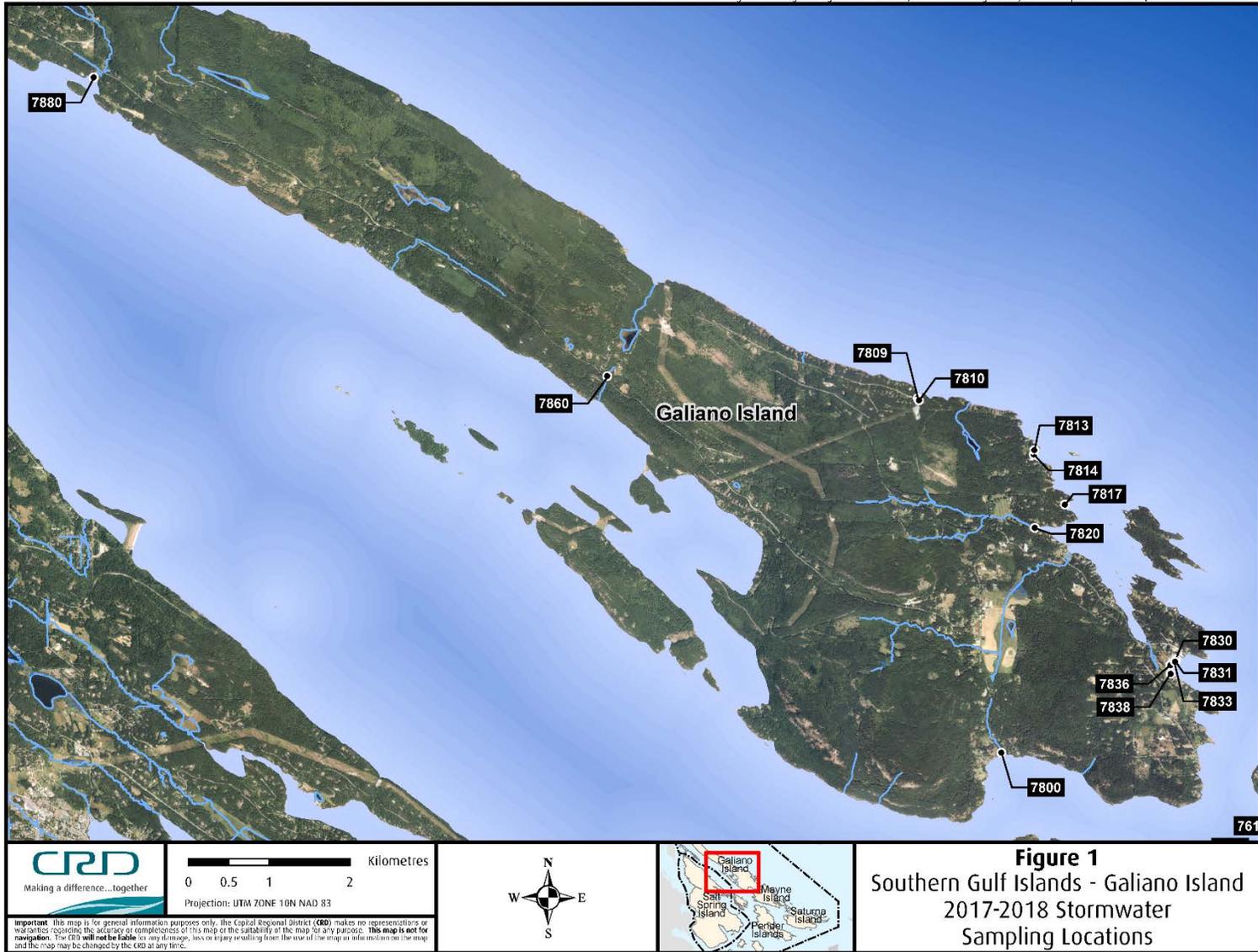


Figure 1 Southern Gulf Islands - Galiano Island 2017-2018 Stormwater Sampling Locations

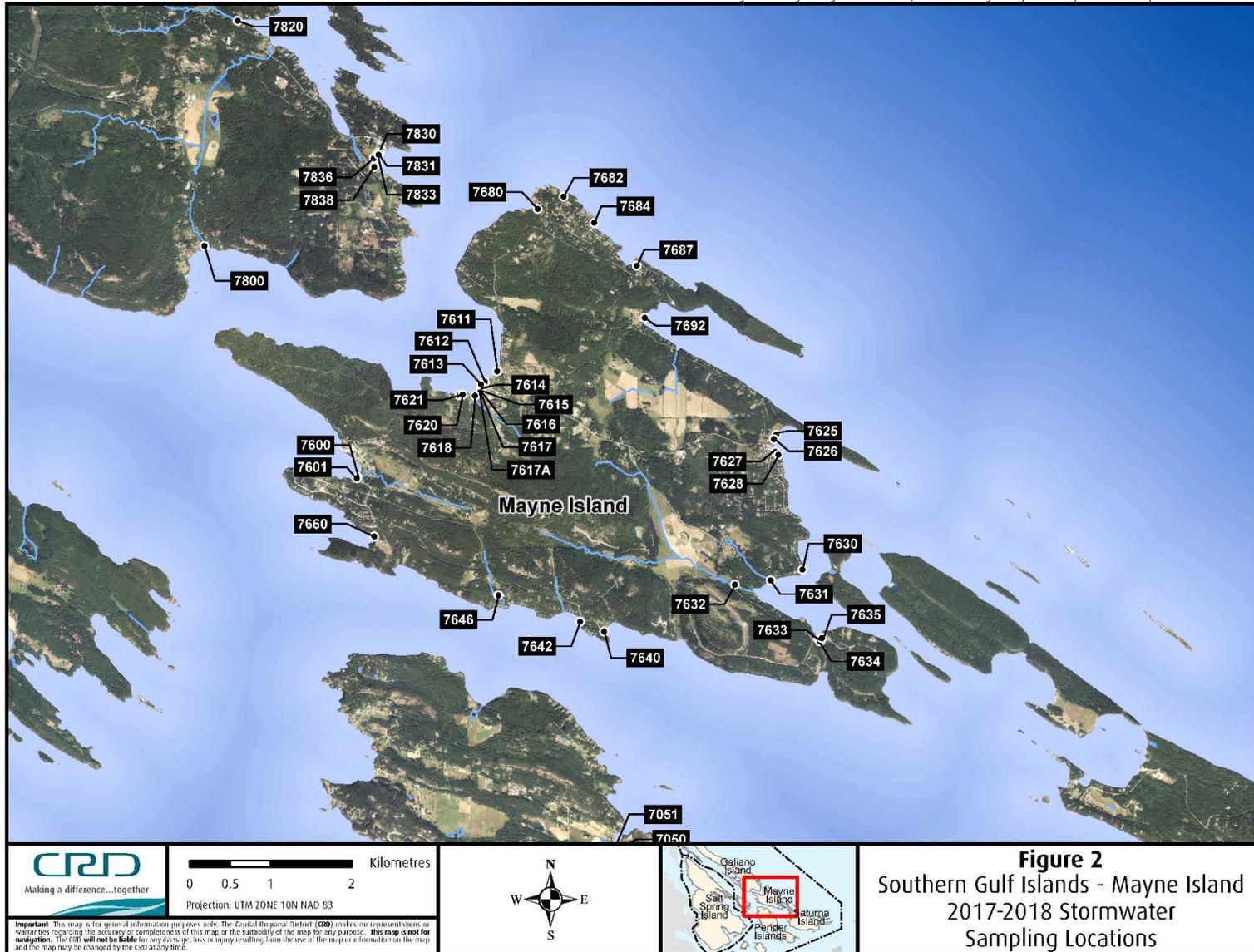


Figure 2 Southern Gulf Islands – Mayne Island 2017-2018 Stormwater Sampling Locations

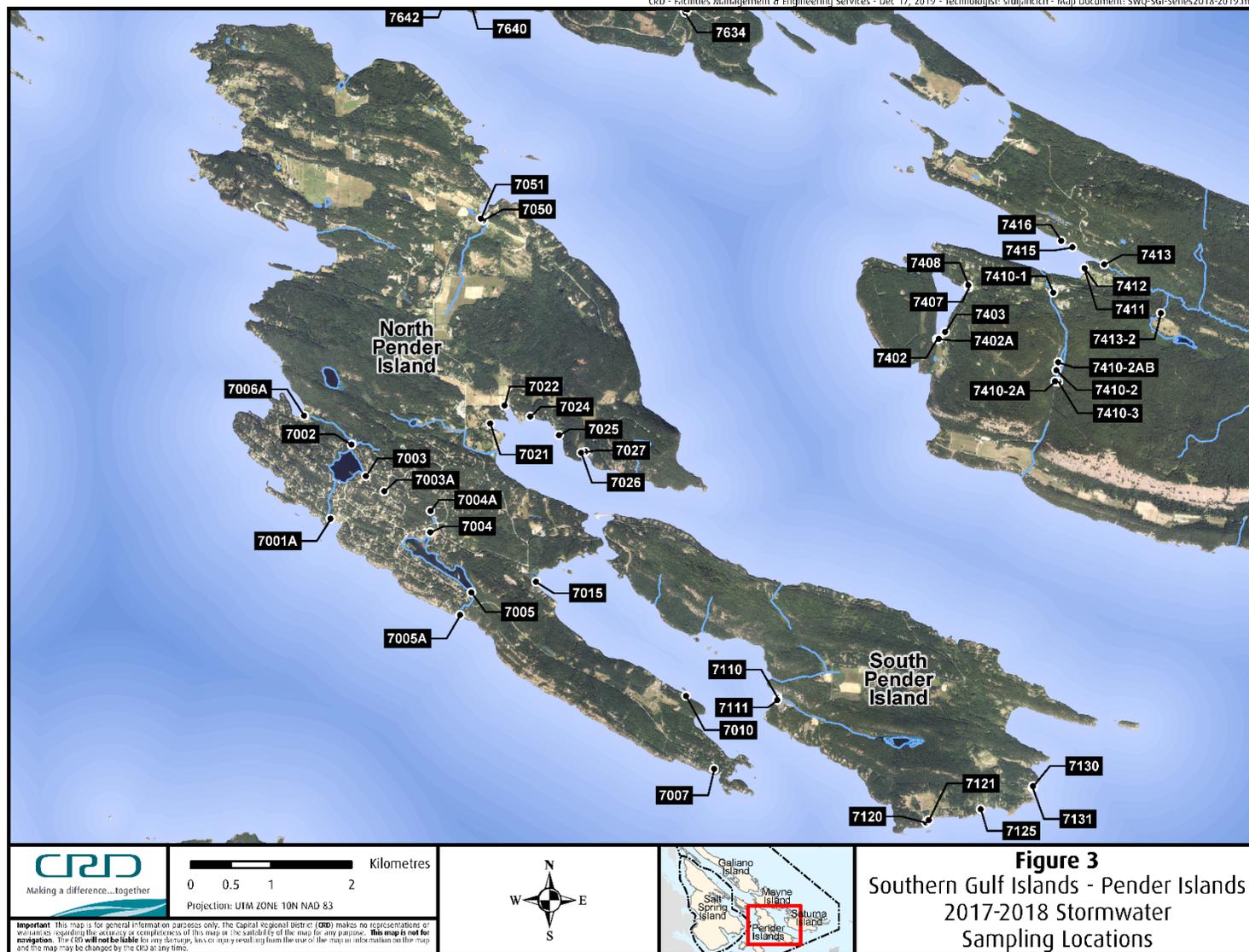


Figure 3 Southern Gulf Islands – Pender Islands 2017-2018 Stormwater Sampling Locations

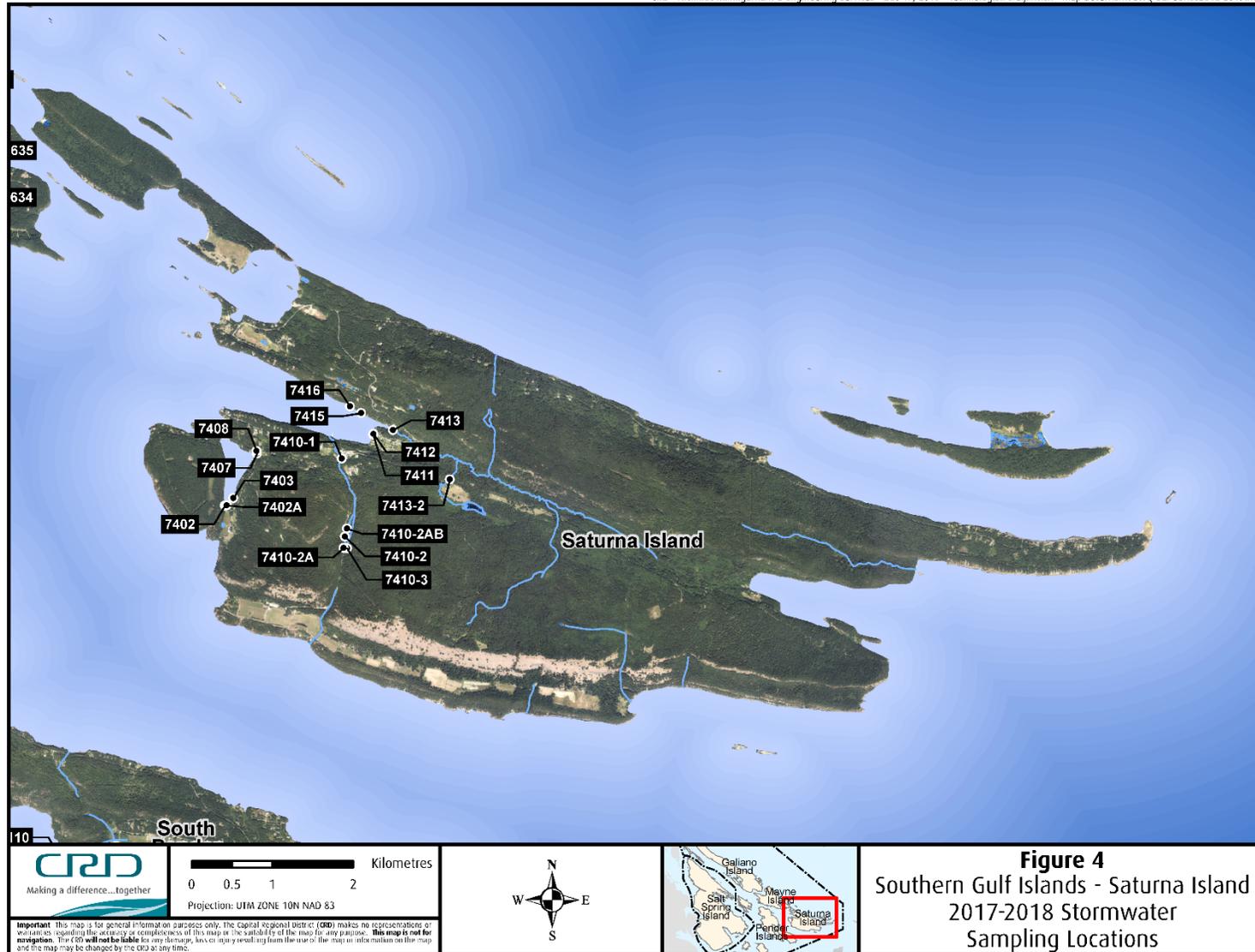


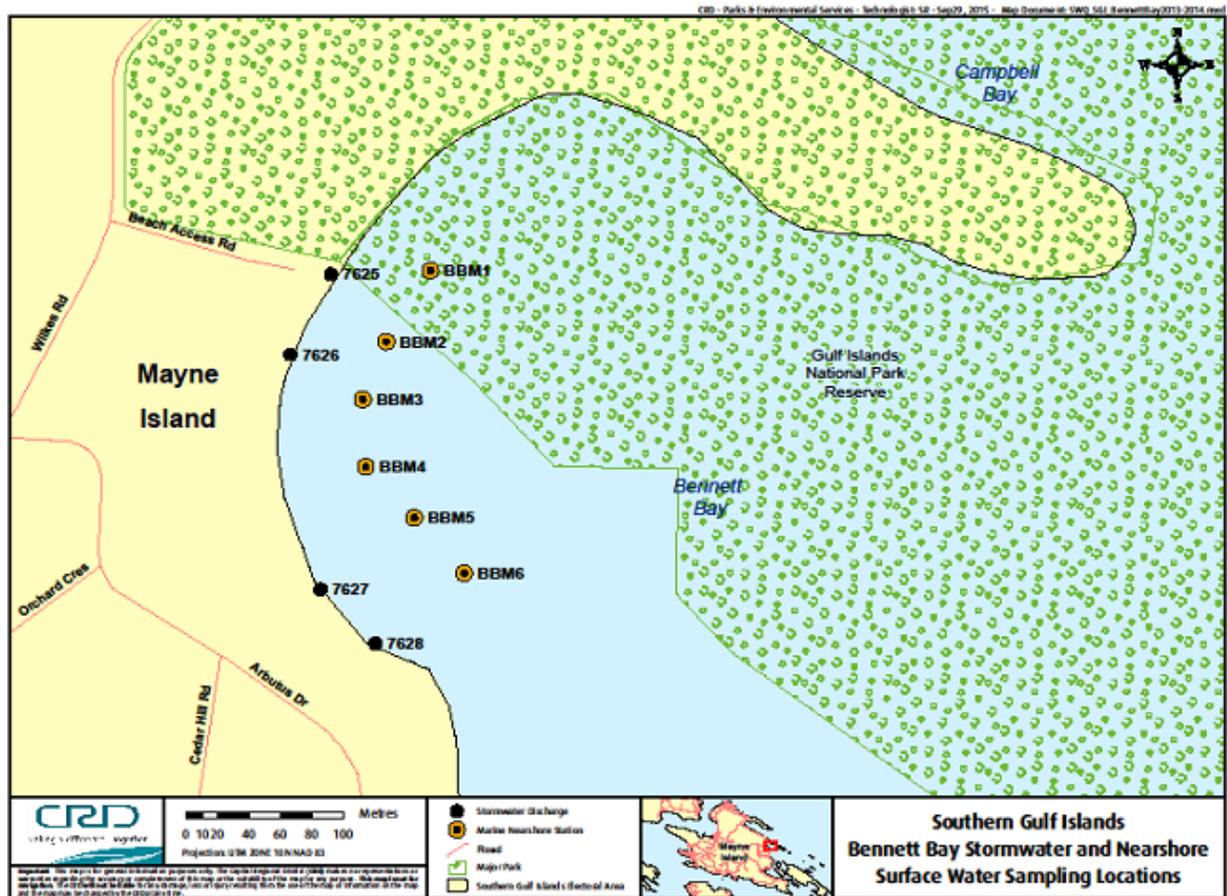
Figure 4 Southern Gulf Islands – Saturna Island 2017-2018 Stormwater Sampling Locations

MARINE MONITORING

Stormwater discharges are the major pathway for contaminants from the land to the marine environment. Sources of pollution can originate from residential, commercial, industrial and agricultural land uses, resulting in closure of shellfish beds for recreational harvesting. The CRD works towards reducing these sources of contamination.

Bennett Bay, Mayne Island

Bennett Bay is a National Marine Park. CRD staff initiated yearly monitoring of the bay in 2005 at the request of the CRD SGI EA director. Bacterial levels are measured at six nearshore marine stations and four stormwater discharges entering the bay.



Elevated enterococci bacteria counts have been measured intermittently in Bennett Bay for a number of years. As a result, CRD staff increased monitoring efforts, conducted source investigations, and worked with Island Health. Recent data indicates that bacterial levels are generally low and may be decreasing (32 out of 36 enterococci counts were below 10 CFU/100 mL). Some elevated counts were measured in 2017 with the highest being 490 CFU/100 mL, however, no elevated counts were measured in 2018. CRD staff will continue monitoring Bennett Bay and resume investigations, if bacterial levels increase.

Marine Sampling on Beaches with Public Access

Staff also sampled marine water in front of 22 stormwater discharges on publically-accessible beaches. Enterococci counts ranged from undetectable to 730 CFU/100 mL. Only three of the marine sites (adjacent to stormwater discharges 7640, 7684 and 7838; see Figures 1 and 2) had enterococci counts that were greater than 35 CFU/100 mL. A geomean of 35 CFU/100 mL or greater is considered a potential risk to public engaging in water activities, such as swimming). CRD staff will resample these marine locations to confirm the data and will continue to assess the impact of stormwater discharges on the marine environment.



Staff sampled the marine environment adjacent to 22 stormwater discharges on publically accessible beaches in 2018

ENVIRONMENTAL CONCERN

Stormwater Sediment

CRD staff collected sediment samples from 11 locations in 2017 and 2018 (five of these were sampled both years). Sediment was analyzed for eight metals (arsenic, cadmium, chromium, copper, lead, mercury, silver and zinc) and polycyclic aromatic hydrocarbons. Staff compared concentrations to sediment quality guidelines to assess potential impact on aquatic life and assign a contaminant rating.

Recent data resulted in mostly low and moderate contaminant ratings, however, two upstream locations (7800-2) in 2017 and (7613-2) in 2018 received a high rating. These high-rated discharges are discussed below:

Mayne: Discharge 7613 (Miners Bay) has received high ratings, based on intermittently elevated zinc levels since 2008. CRD staff conducted upstream investigations that suggest the source of zinc extends above 430 Village Bay. Elevated mercury was also measured upstream in 2015, but has been low in samples collected since. CRD staff will conduct more sampling to confirm mercury and zinc levels and to further narrow down the source of contamination.

Galiano: Discharge 7800 (Georgeson Creek) had elevated levels of zinc in one location upstream. As zinc has been low downstream and at the discharge, the zinc may be isolated to one area, however, CRD staff will confirm concentrations and the area of concern.



Stormwater sediment is sampled from pipes, streams, ditches or manholes

Watercourse Monitoring

CRD staff measure water quality in Buccaneer Creek (North Pender), Lyall Creek (Saturna), Putter and Georgeson creeks (Galiano) and Deacon Creek (Mayne) twice per year to assess potential impacts to fish and other aquatic life. In 2017, staff collected additional data on metal levels in water from Georgeson Creek, as previous data showed elevated lead in the sediment.

CRD staff compared water quality parameters [bacteria temperature, pH, dissolved oxygen, conductance, turbidity, nutrients and metals (Georgeson Creek only)] to ENV guidelines for protection of freshwater aquatic life.

CRD data indicates that water quality is fair in these streams. SGI streams are often dry in summer, so data is representative of wet conditions only. Turbidity and phosphorus are most often outside guidelines, however, phosphorus is elevated in all urban streams in the CRD. Elevated turbidity and phosphorus levels may impact drinking water quality and aquatic life. Potential sources include on-site sewage systems, poor agricultural practices and land clearing and development. CRD staff will continue to monitor and investigate sources. A summary of the water quality results is as follows:

Georgeson Creek

- Bacterial counts were low indicating that there is no longer a source of sewage in the creek.
- Metals were below BC guidelines for protection of aquatic life, with the exception of iron upstream of Bluff Road.
- Phosphorus was elevated

Lyall Creek

- Phosphorus continues to be elevated.

Buccaneer Creek

- Turbidity was slightly above the BC guidelines during the winter of 2018.
- Bacterial counts were low indicating that there is no longer a source of sewage in the creek.
- Phosphorus continues to be elevated.

Putter Creek

- No exceedances of water quality guidelines, with the exception of phosphorus.



PUBLIC EDUCATION

The CRD provides educational materials and workshops to promote healthy watersheds. The program promotes best management practices (for preventing pollution) and reporting of spills to Emergency Management BC (1-800-663-3456).



2017 AND 2018 AT A GLANCE

The majority of stormwater discharges and streams assessed were of low concern for public health and the environment. The CRD has identified some contamination in stormwater, creeks and the marine environment in the SGI EA, likely due to human activities on land (e.g. on-site sewage disposal, agricultural practices and development). It is anticipated that education and outreach will assist in mitigating some sources of contamination.



OUTLOOK FOR 2019-2020

CRD staff, in cooperation with the SGI EA director, will continue to monitor water and sediment quality of stormwater discharges, watercourses and the nearshore marine environment. Together, CRD staff, the SGI EA director, Island Health staff and the community will work towards identifying, reducing and eliminating sources of contamination.