Southern Gulf Islands Electoral Area Stormwater Quality Report 2019-2020

Capital Regional District | Parks & Environmental Services, Environmental Protection

Prepared by

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SOUTHERN GULF ISLANDS ELECTORAL AREA
STORMWATER QUALITY REPORT 2019-2020

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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, Mayne, North and South Pender and Saturna islands.

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

SAMPLE COLLECTION

CRD staff collect environmental quality data from stormwater discharges, creeks and the marine environment, and assign 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 to confirm ratings have not changed.

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 74 discharges (Figures 1-4) in 2019 and 2020 for measurement of *Escherichia coli* (*E.coli*), of these, 60 were sampled both years. Staff prioritized the discharges by assigning a public health concern rating to each discharge based on bacterial level and potential for public contact with the discharge.

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 five discharges a high public health concern rating. The high-rated discharges are all on Mayne Island and include 7600 (Deacon Creek) and four in Miners Bay 7613, 7614, 7621, 7623 (discussed below). No high-rated discharges were identified on the other islands.

Of the high-rated discharges, three have been of concern for many years due to on-site sewage treatment malfunctions (7613, 7614) or agriculture and on-site sewage treatment malfunctions (7600; Deacon Creek). CRD staff are investigating the sources of bacteria in discharges 7621 and 7623, which are newly-identified concerns. Bacteria from ruminant animals was measured in discharge 7623 and in 2021, staff measured lower bacterial counts in both discharges.

Bacterial Source Investigations

CRD staff investigate discharges of concern to determine the source of contamination through upstream sampling, dye testing, caffeine levels, and/or genetic analyses to determine if the bacteria is from humans or animals. Three discharges have been recently investigated with the source of contamination found in two (one has been repaired, the other has been passed onto Island Health) and one investigation indicated that business practices upstream of a stormwater discharge was not resulting in stormwater contamination. The results of the investigations are described below.

Discharge 7003 – Buck Lake, Pender Island

CRD staff responded to a request to assess whether a business was contaminating a stormwater flow entering Buck Lake. Total metals, polycyclic aromatic hydrocarbons, benzene, toluene, ethylene and xylene and *E.coli* were measured upstream and downstream of the business. Results indicated that contaminant concentrations were higher upstream of the business (residents indicated that the area upstream was a dumpsite historically) and no exceedances of drinking water criteria occurred with the exception of *E.coli* (63 CFU/100 mL). This level of *E.coli* would be considered a background level in similar streams in the CRD. Therefore, the business did not appear to be contaminating the stormwater discharge. CRD staff will continue to monitor water quality in this discharge as it enters Buck Lake and is part of the regular program.

Discharge 7833 – Galiano Island

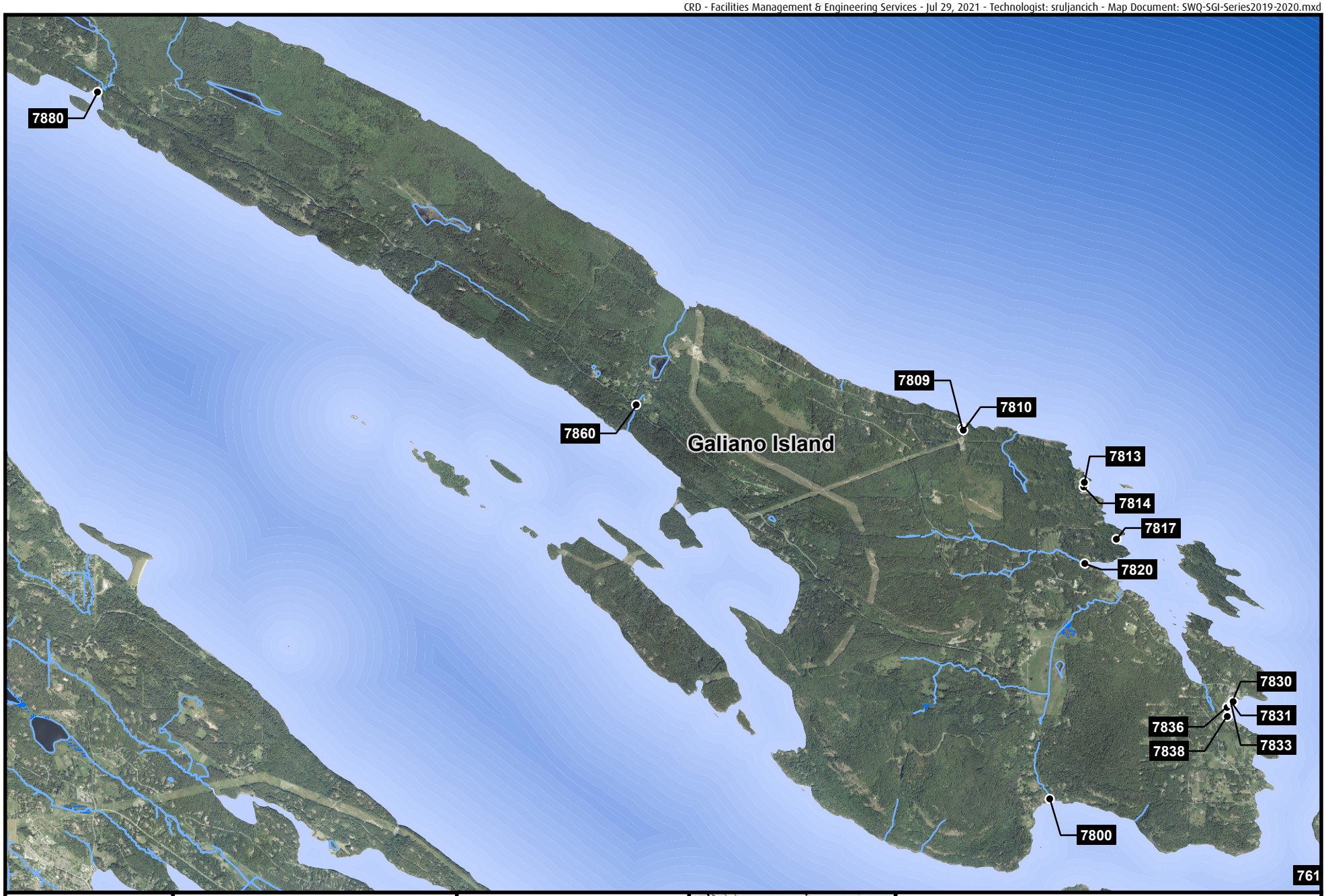
CRD staff observed an unusual discharge from discharge 7833 that included intermittently sudsy water, elevated bacteria and a bleach odour. CRD staff contacted the property owner of the Galliano Oceanfront Inn and Spa who determined that a laundry pipe that was misconnected to an overflow, rather than the treatment plant. The owner resolved the issue and CRD staff confirmed the contamination no longer exists, with subsequent monitoring.

Flow from discharge pipe 7833 at property 134 Madrona Drive.

Flow from discharge pipe 7833 showing the sudsy foam at the discharge.

South Bennett Bay, Mayne Island

CRD staff have been investigating a property on Arbutus Drive, due to odour complaints and possible vermin activity for three years. While staff have measured bacteria of human origin in the ocean, *E.coli* counts have been low in water leaving the property. However, samples collected in September 2020, during rainfall, had very elevated *E.coli* counts coming directly off the property of 20,000 CFU/100 mL on one end and 9,000 CFU/100 mL on the other end, indicating that the on-site sewage treatment is malfunctioning. These results have been passed onto Island Health for follow-up.



Making a difference...together

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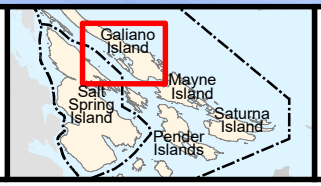
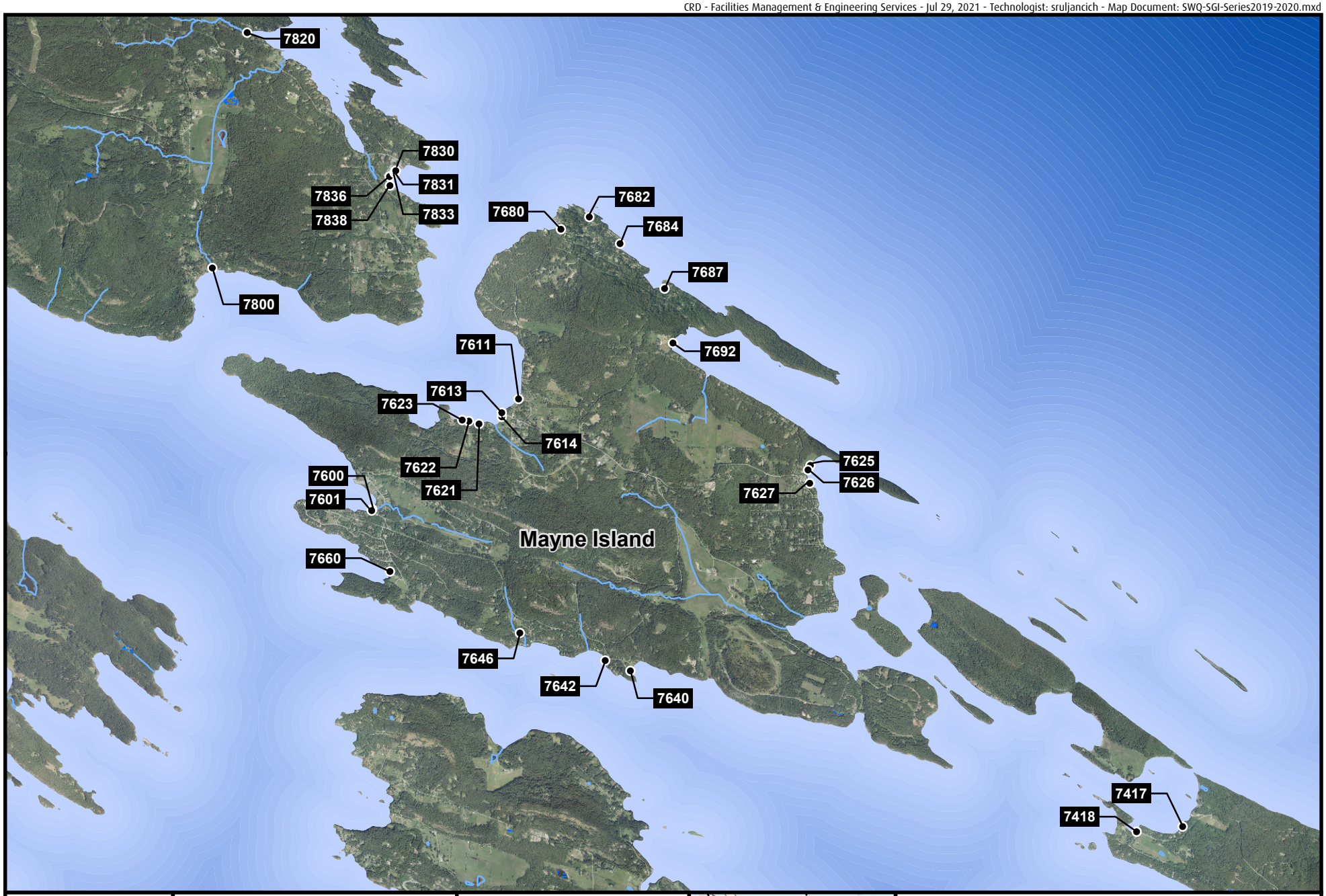


Figure 1
Southern Gulf Islands - Galiano Island
2019-2020 Stormwater
Sampling Locations



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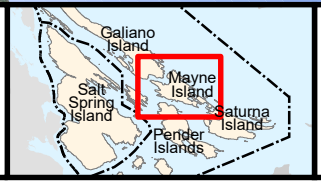

Figure 2
Southern Gulf Islands - Mayne Island
2019-2020 Stormwater
Sampling Locations

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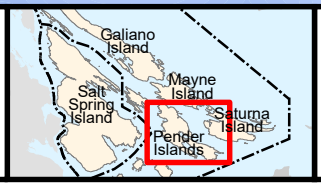

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Figure 3

Southern Gulf Islands - Pender Islands
2019-2020 Stormwater
Sampling Locations

Making a difference...together

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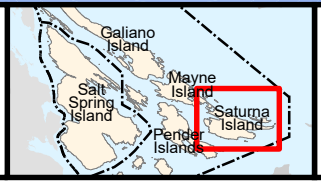


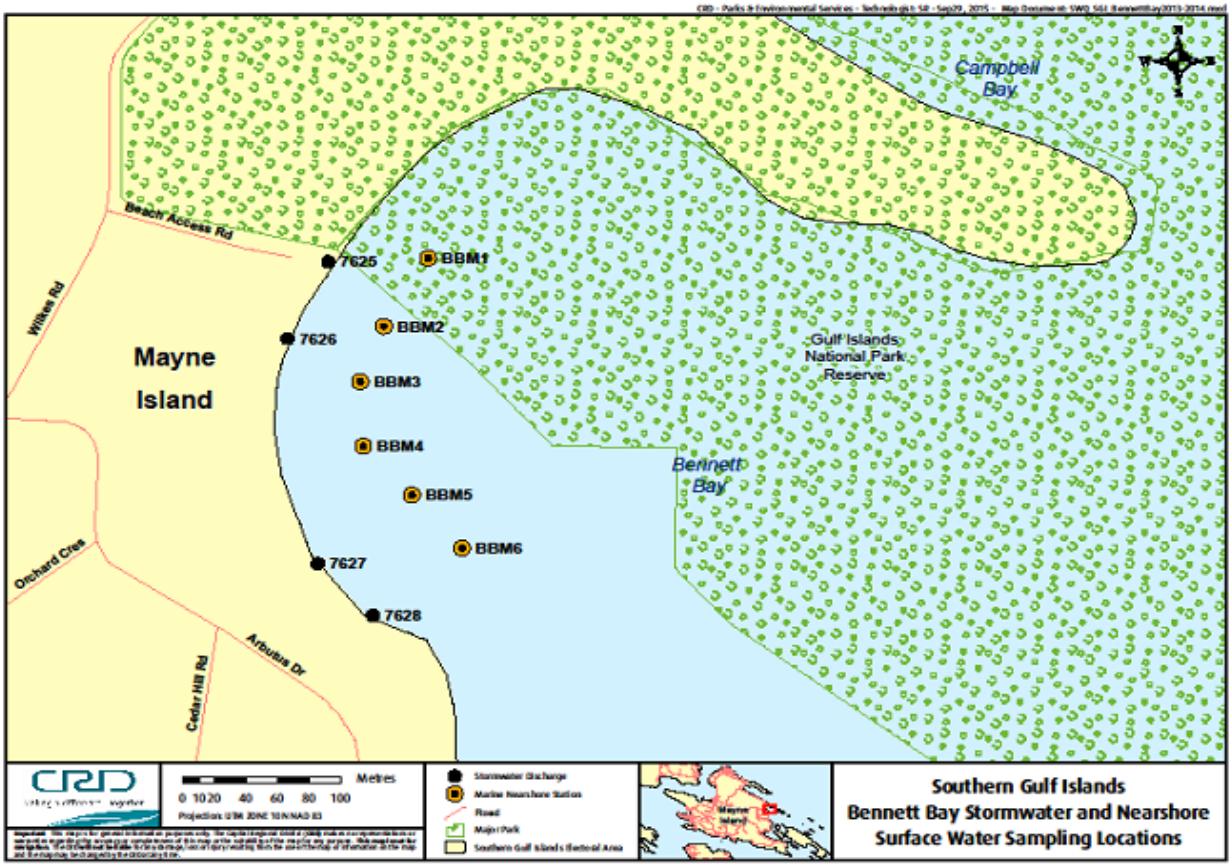
Figure 4
Southern Gulf Islands - Saturna Island
2019-2020 Stormwater
Sampling Locations

MARINE MONITORING

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

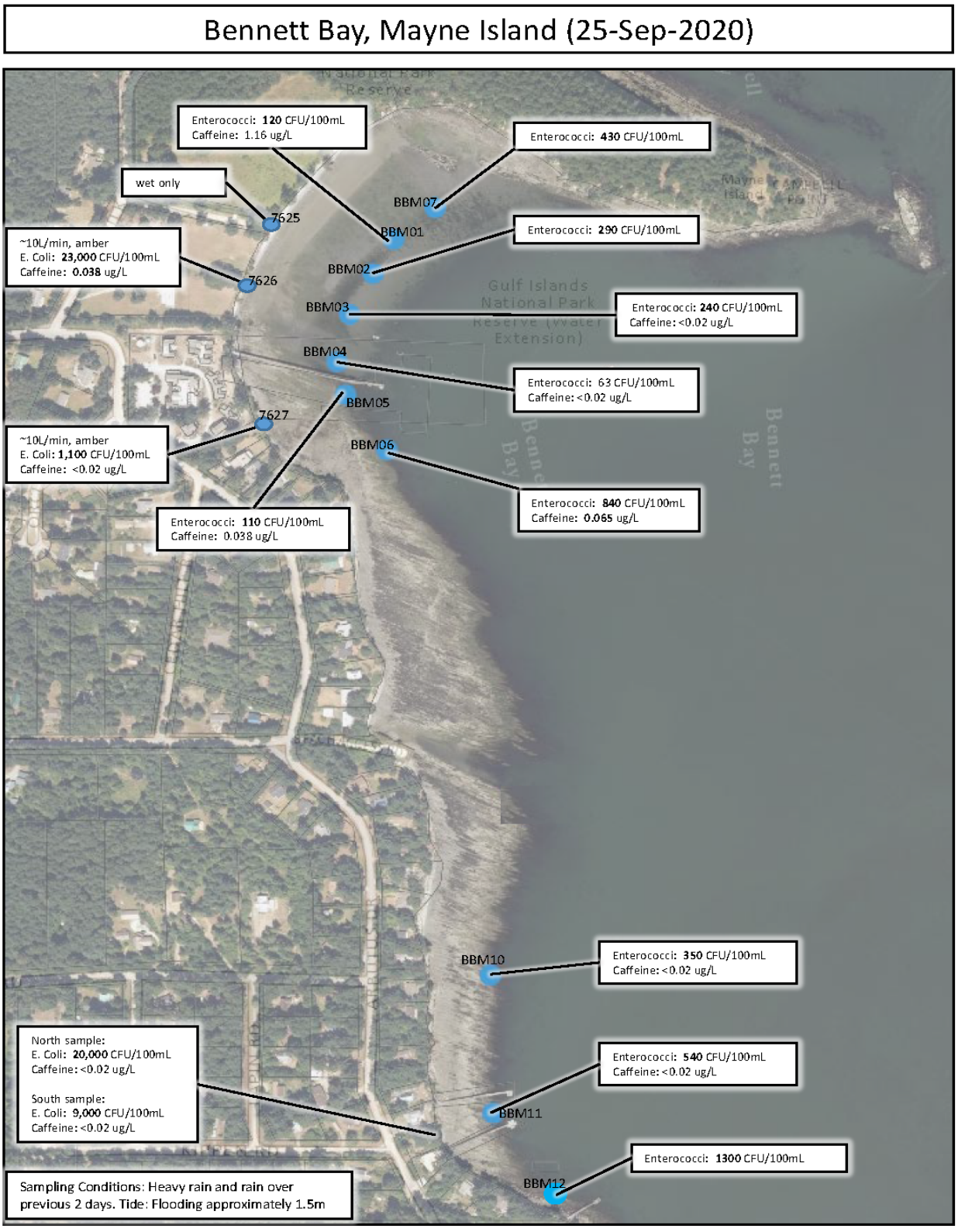
Bennett Bay, Mayne Island

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 routinely measured at six nearshore marine stations and four stormwater discharges entering the bay.



Elevated bacteria counts have been measured intermittently in Bennet Bay for a number of years. As a result, CRD staff increased monitoring efforts, conducted source investigations, and worked with Island Health. The 2019 and 2020 CRD data indicates that bacterial concentrations in Bennett Bay are generally low, but widespread elevated enterococci can be present during rainfall.

Enterococci counts were below 10 CFU/100 mL in all 38 samples collected from April 2019 and September 24, 2020; however, widespread elevated enterococci were present in marine and stormwater on September 25, 2020 during heavy rainfall throughout the bay (and other locations on the island). At this time, caffeine was detected in two stormwater discharges and one marine location and has been measured in this area in the past. This pattern indicates that on-site sewage treatment systems are likely becoming overwhelmed during heavy rain. CRD staff have shared the results with Island Health.



Results for bacterial sampling in Bennett Bay and south of Bennet Bay during heavy rainfall on September 25, 2020.

ENVIRONMENTAL CONCERN

Stormwater Sediment

CRD staff collected 23 sediment samples from 16 locations in 2019 and 2020. 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 all low and moderate contaminant ratings. Two upstream locations (7800-2 and 7613-2) that were rated high in previous years had lower contaminant levels and, therefore, received lower ratings; however, some elevated metals were still measured, as discussed below.

Mayne: Discharge 7613 (Miners Bay) has received high ratings, based on intermittently elevated zinc levels since 2008. Water testing shows that iron, phosphorus and zinc are also elevated upstream. CRD staff conducted upstream investigations that suggest the source of zinc extends above 430 Village Bay.

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 contamination appears be isolated to one area upstream of Bluff Road.

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 2020, staff collected additional data on metal levels in water from Georgeson Creek, as previous data were elevated.

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. Turbidity and phosphorus are most often outside guidelines; however, phosphorus is elevated in all urban streams in the CRD. Elevated turbidity and phosphorus may impact drinking water quality and aquatic life. Potential sources include on-site sewage systems, poor agricultural practices, 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 variable at the mouth (ranging from 8-660 CFU/100 mL), but were low upstream indicating there is potentially a source of sewage in the lower reaches of the creek.
- Metals were below BC guidelines for protection of aquatic life at the mouth, but iron and zinc were elevated upstream of Bluff Road.
- Phosphorus continues to be elevated

Lyall Creek

- Phosphorus continues to be elevated.

Buccaneer Creek

- Turbidity was slightly above the BC guidelines during the winters of 2019 and 2020.
- Bacterial counts remain low.
- Phosphorus continues to be elevated.

Putter Creek

- Turbidity was above the BC guidelines during the winter of 2020.
- Phosphorus continues to be elevated.

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).

2019 AND 2020 AT A GLANCE

The majority of SGI EA 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, likely due to human activities on land (e.g., malfunctioning on-site sewage systems, agricultural practices and development). It is anticipated that education and outreach will assist in mitigating some sources of contamination.

OUTLOOK FOR 2021-2022

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.