Southern Gulf Islands Electoral Area Stormwater Quality Program Report 2023-2024

Capital Regional District | Parks & Environmental Services, Environmental Protection

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December 2025

SOUTHERN GULF ISLANDS ELECTORAL AREA
STORMWATER QUALITY PROGRAM REPORT 2023-2024

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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). 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 (See Figures 1 to 4).

THE CAPITAL REGIONAL DISTRICT'S ROLE

The *Southern Gulf Islands Stormwater Quality Management Extended Service Establishment Bylaw No. 1, 1996* allows the CRD to work towards reducing and eliminating pollution in stormwater 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 implement mitigative programs is the responsibility of Island Health, First Nations and other government agencies, such as:

- Islands Trust
- BC Ministry of Transportation and Transit
- BC Ministry of Environment and Parks (ENV)
- 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 and South 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 visited 102 stormwater discharges to the ocean (Figures 1-4) in 2023 and 2024 to collect samples for measurement of *Escherichia coli* (*E. coli*). Each discharge was visited twice (once in each the dry and wet season).

Staff assessed the discharges by assigning a public health concern rating to each based on bacterial level and the potential for public contact with the discharge at the shoreline.

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

Public Health Concern Ratings

Based on data from 2023 and 2024, staff assigned the following public health concern ratings to the SGI stormwater discharges:

- 86 low ratings,
- 11 moderate ratings, and
- 5 **high** ratings.

One previously high-rated discharge in Miners Bay (7614) was assigned a low rating. This discharge was rated high for several years due to an onsite sewage system malfunction at an upstream business. The business has since closed, and bacteria levels have decreased.

Four of the high-rated discharges are on Mayne Island while one is located on South Pender Island. On Mayne Island, the high-rated discharges include Deacon Creek (7600) which has been high-rated several times in the past and three other discharges (7640, 7646 and 7660) which have not been high-rated before. These discharges are often dry but when sampled during or after rainfall, elevated bacteria were measured. The high-rated discharge on Pender Island was Greenburn Creek at Poet's Cove (discharge 7110) which has not been high-rated in the past.

Contaminant Source Investigations

CRD staff investigate discharges of concern to determine the source of contamination through the following activities:

- upstream sampling within the watershed or catchment to narrow down a source,
- dye testing to determine if a waterway is connected to an upstream source,
- caffeine testing as an indicator of the presence of sewage, and
- bacterial/microbial source tracking; genetic analyses to determine if bacteria are from humans or animals.

When CRD staff narrow down a source of bacterial contamination to a block or a handful of properties, and failure of an onsite sewage treatment system is suspected, CRD staff notify Island Health for a follow-up investigation.

In 2025 and 2026, CRD staff will investigate sources in catchments of the high-rated discharges.

In 2025 and 2026 CRD staff will continue to sample and investigate sources of bacteria in stormwater discharges in Poet's Cove.

Figure 1 Southern Gulf Islands – Galiano Island Stormwater Sampling Location

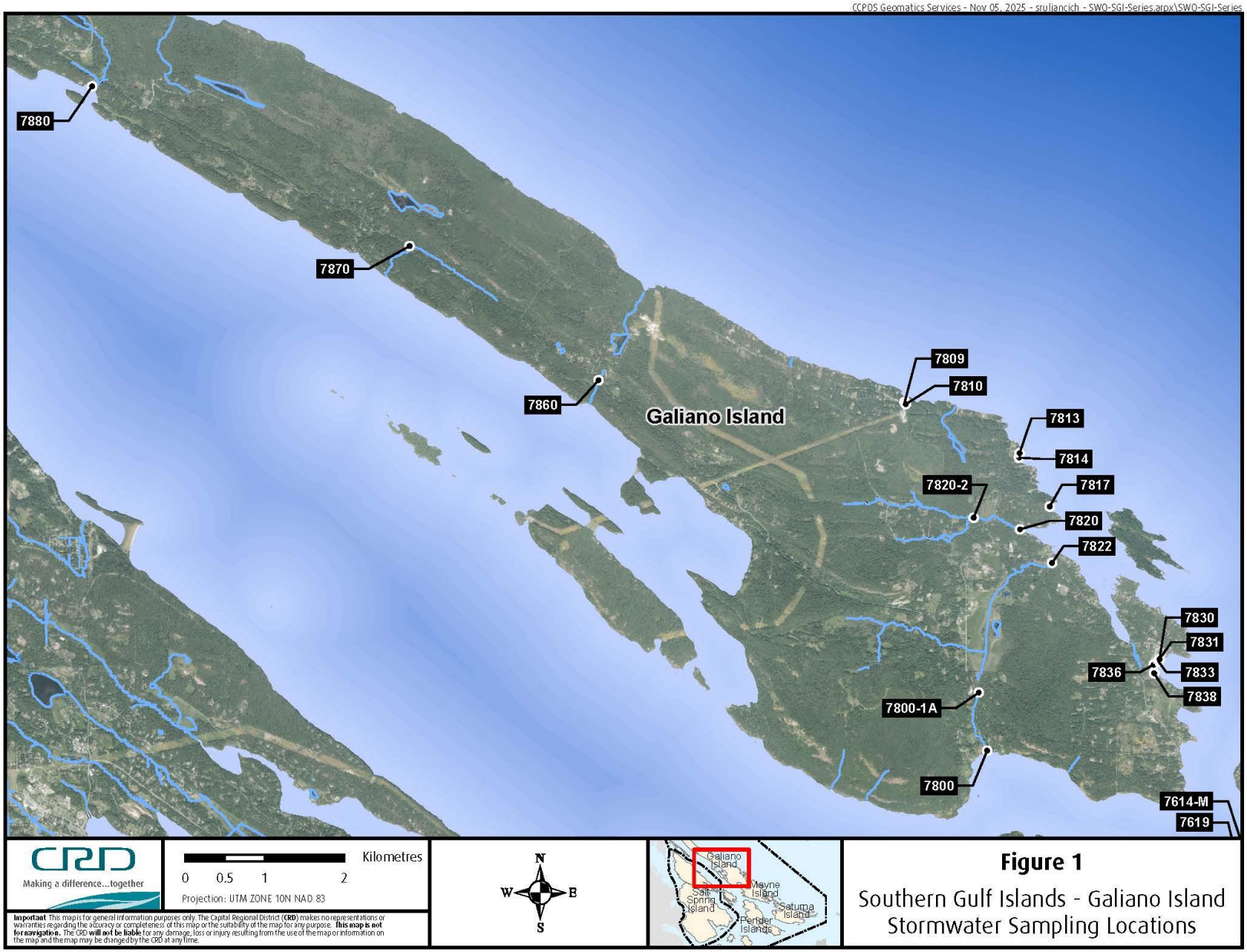


Figure 2 Southern Gulf Islands – Mayne Island Stormwater Sampling Locations

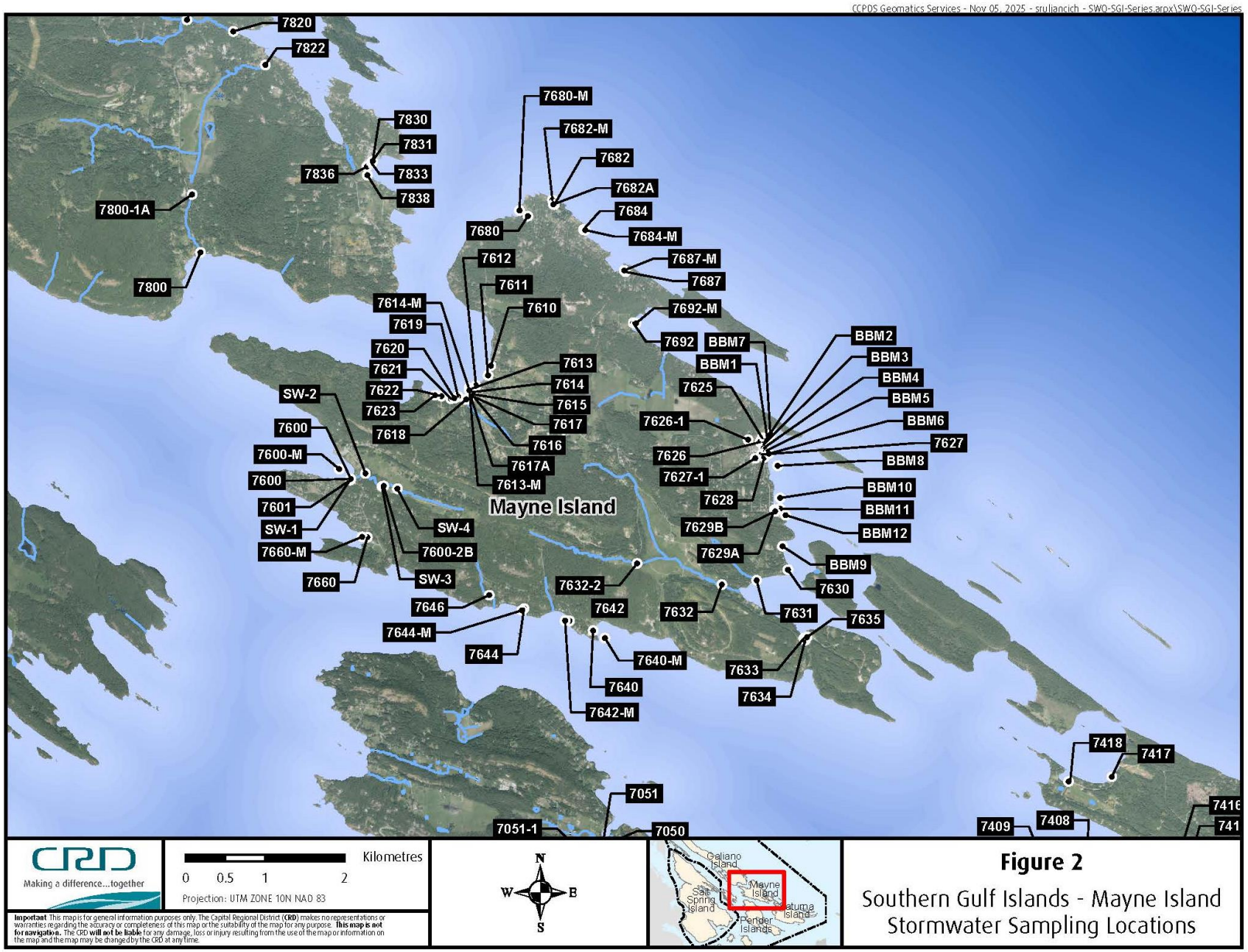


Figure 3 Southern Gulf Islands – Pender Islands Stormwater Sampling Locations

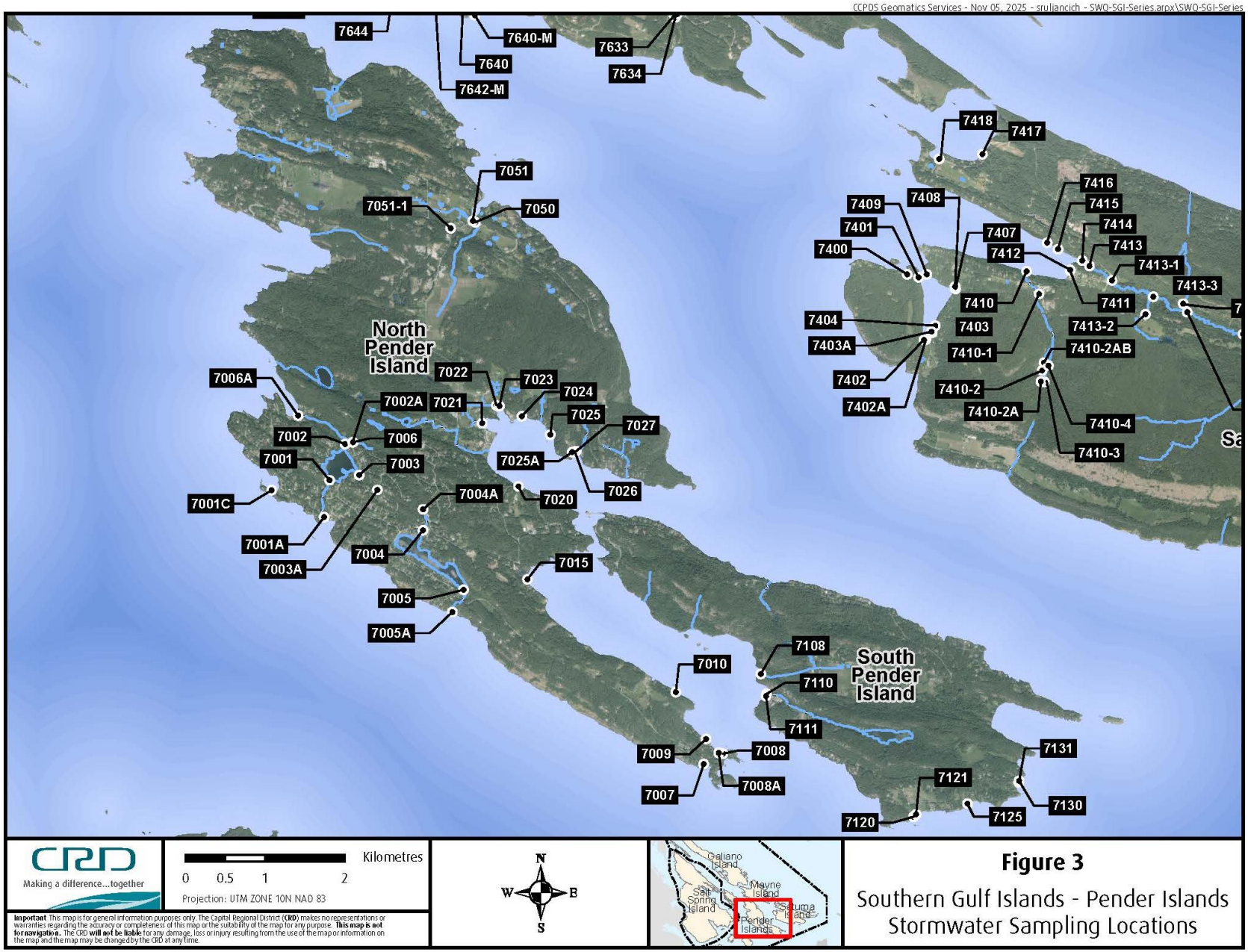
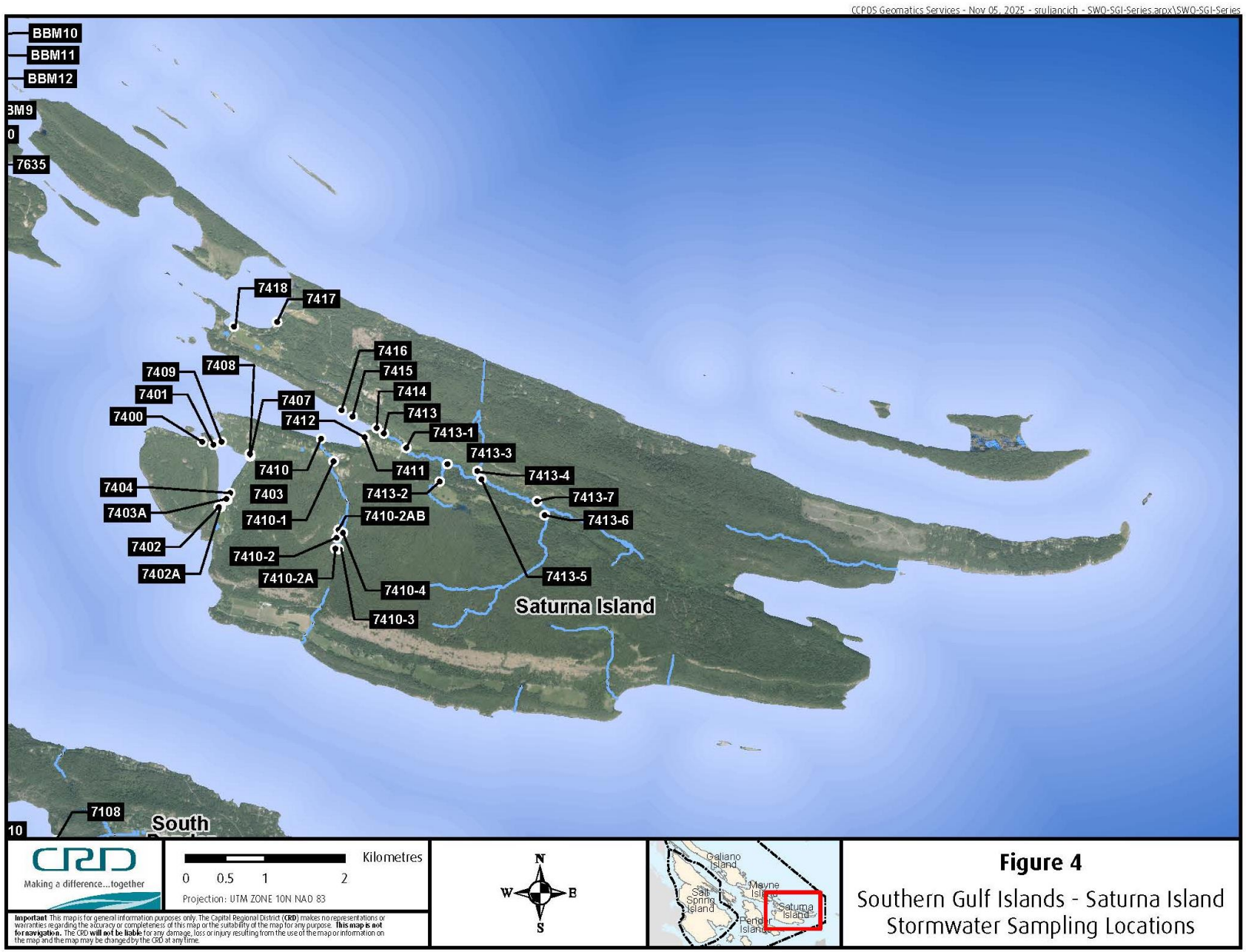


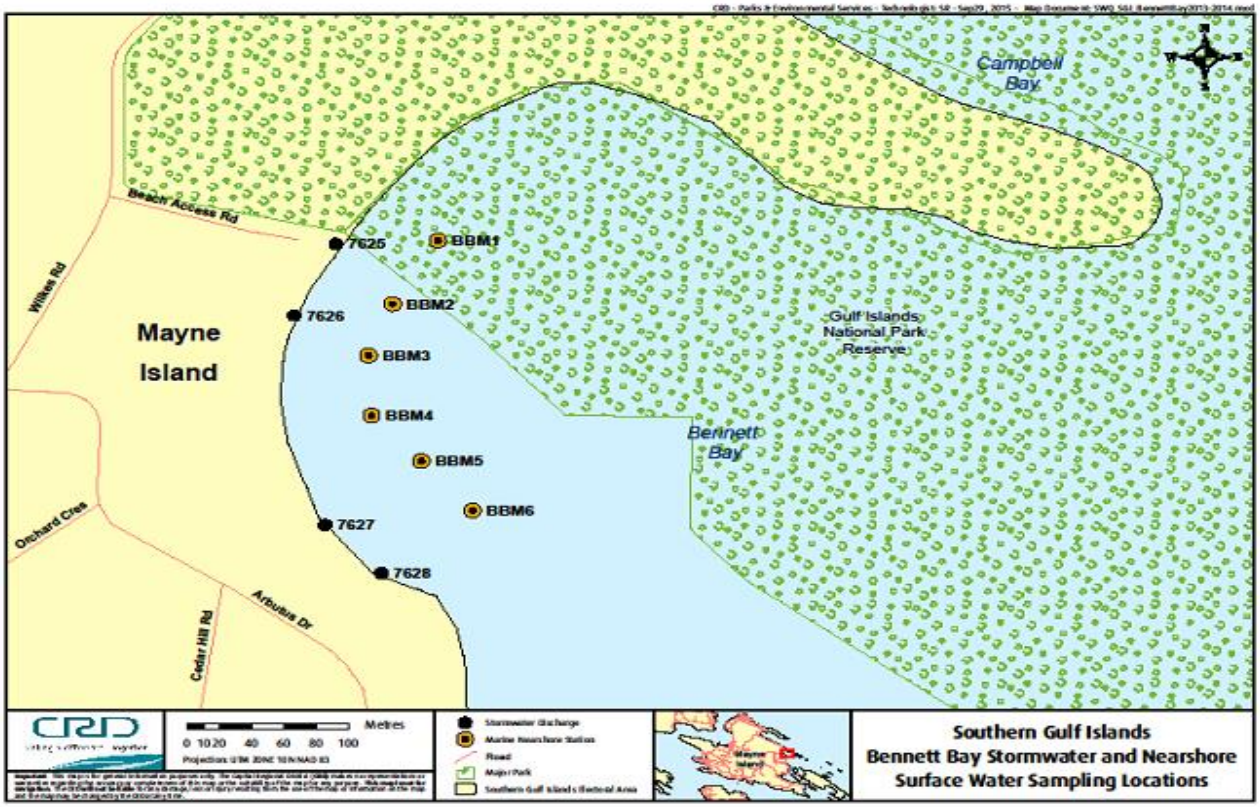
Figure 4 Southern Gulf Islands – Saturna Island Stormwater Sampling Locations



MARINE MONITORING

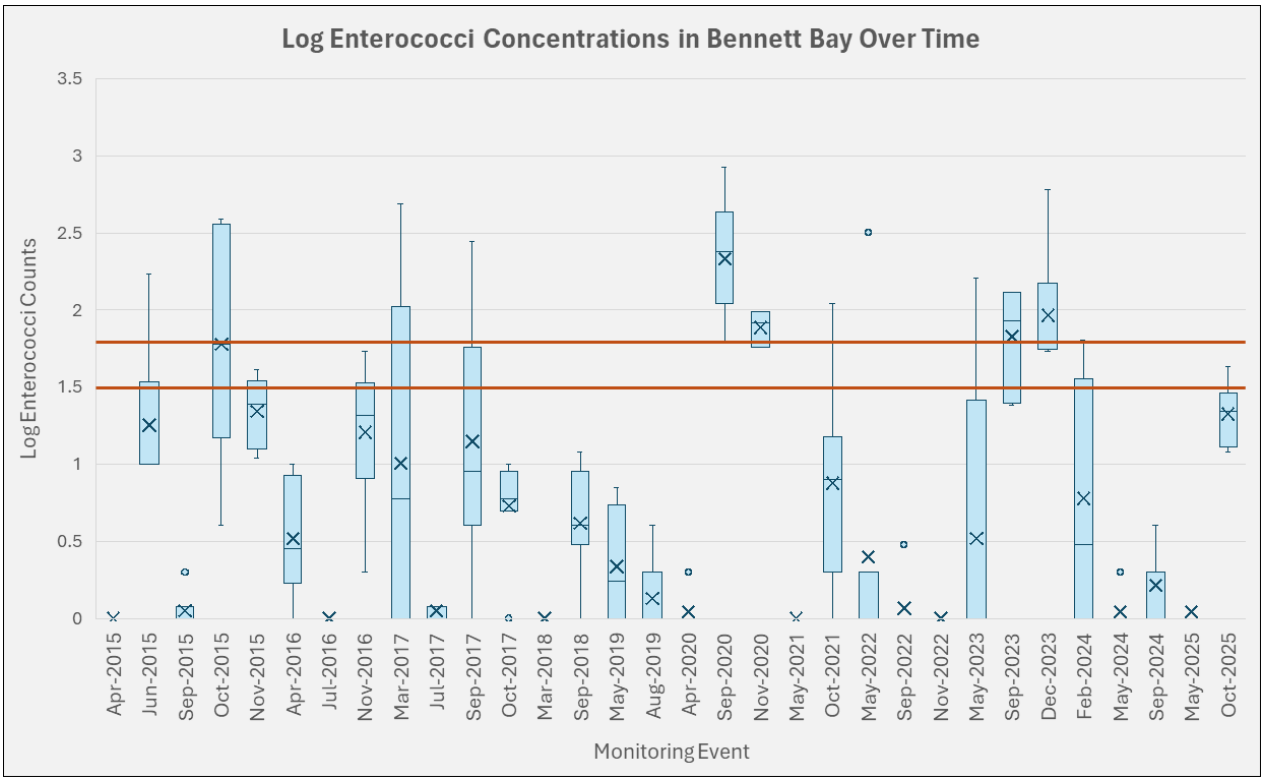
Bennett Bay, Mayne Island

Stormwater discharges are the major pathway for contaminants from land to the marine environment. Bennett Bay is partially within the National Marine Park Reserve. CRD staff initiated annual 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.



Stormwater and nearshore surface water sampling locations in Bennett Bay

Elevated bacterial counts have been measured intermittently in Bennet Bay for several years. As a result, CRD staff increased monitoring efforts, conducted source investigations, and worked with Island Health to identify sources. Data indicates that bacterial concentrations in Bennett Bay are generally low, but widespread elevated bacteria can be present during and following significant rainfall.



*Box plots showing distribution of log enterococci counts in Bennett Bay over time. Orange lines signify the log values of 1.54 and 1.85 which represent the geomean and maximum recreational guidelines of 35 and 70 CFU /100 mL. **X** is the sample mean, while the line in the box is the median. The upper and lower box edges show the first and third quartile (25% and 75% of the data) while the lines extending from the box show the smallest and largest numbers measured. Outliers are shown as dots beyond the lines extending from the box.*

Marine enterococci counts were highly variable between 2023 and 2024 (ranging from <1 to 600 CFU/100 mL). The highest concentrations were measured in 2023 at the end of September and early December following rainfall events and exceeded average and maximum safe levels for swimming (geomean of 35 and maximum of 70 CFU/100 mL). The 2024 and early 2025 measurements are below these guidelines.

Caffeine has been detected several times in the bay (13 out of 47 samples) and in surrounding storm drains, indicating that on-site sewage treatment systems are likely becoming overwhelmed during heavy rain. CRD staff have shared these results with Island Health.

ENVIRONMENTAL CONCERN

Stormwater Sediment

CRD staff collected nine sediment samples in 2023 and 2024 for analysis of 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.

Based on 2023 and 2024 data, no discharges were assigned a high rating, however discharge 7003 on North Pender was assigned a moderate contaminant rating. Two upstream locations (Georgeson Creek and Miners Bay catchment 7613) 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.

Hope Bay Stream photo by Sara Stallard

Pender: Staff assigned a moderate rating to discharge 7003 (creek inflow to Buck Lake) due to elevated copper and zinc concentrations in stream sediment. Previous CRD investigations in this discharge indicate that historical activities upstream may be a source of elevated metals. Water quality data indicates that metal concentrations are generally low in water but aluminum concentrations (128 to 3,860 µg/L) may adversely affect aquatic life in the creek.

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 Road.

Galiano: Discharge 7800 (Georgeson Creek) has elevated levels of arsenic and zinc upstream. As arsenic and zinc have been low downstream and at the discharge, the contamination appears to be isolated to one area upstream of Bluff Road. Upstream contamination is intermittent and likely due to historical practices.

Watercourse Monitoring

CRD staff measure water quality in Buccaneer and Money creeks (North Pender), Lyall Creek (Saturna), Putter and Georgeson creeks (Galiano) and Deacon Creek (Mayne) to assess potential impacts to fish and other aquatic life.

CRD staff compared water quality parameters (*E.coli*, temperature, pH, dissolved oxygen, specific conductance, turbidity, nutrients and total metals) to BC guidelines for protection of freshwater aquatic life.

Data indicates that water quality is fair in these streams. Temperature, dissolved oxygen and pH are generally within applicable water quality guidelines. Turbidity and phosphorus are most often outside guidelines. 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.

In 2023 and 2024 and previous years, phosphorus measurements were elevated above the Vancouver Island Objective in all streams assessed, however, any human activity in a watershed will result in phosphorus concentrations above the objective. Except for Buccaneer Creek, concentrations were similar to other CRD streams. A summary of the other water quality results from 2023 and 2024 follows:

Georgeson Creek

- Bacterial counts were lower at the mouth in 2023 and 2024 and continued to be low upstream.
- Metals were below BC guidelines for protection of aquatic life at the mouth.

Money Creek

- Iron continued to be above the BC guidelines and aluminum was elevated relative to other SGI streams.
- *E. coli* was occasionally elevated.

Lyall Creek

- Turbidity continues to be slightly elevated.
- Metals were low relative to guidelines and other creeks.

Buccaneer Creek

- Phosphorus, nitrate and temperature measurements were higher than other SGI streams.
- Turbidity continued to be elevated in wet and dry weather.
- Bacterial counts were lower than in previous years.
- Metals were low relative to guidelines and other creeks.

Putter Creek

- Turbidity was above guidelines during the summer and winter.
- Metal concentrations were low; however, lead was elevated relative to other SGI streams.

Deacon Creek

- Turbidity continued to be elevated in wet and dry weather.
- Bacterial concentrations continued to be elevated in summer.
- Total metal concentrations were highest in Deacon Creek relative to other SGI streams.

PUBLIC EDUCATION

The CRD provides coordinated residential and business education programs to reduce and prevent sources of pollution. Below is a summary of some of the CRD's outreach and educational activities in 2023 and 2024:

- updated the stormwater pages on the CRD website which provide resources for business and residents,
- conducted a multi-media campaign focused on preventing stormwater pollution and managing rainfall,
- hosted 11 free webinars and 26 community events including rainwater harvesting techniques, building a raingarden, planting native plants and more, and
- hosted two key line design workshops that help large property owners and the agricultural community manage and optimize rainfall.

The CRD also promotes reporting of spills to Emergency Management BC (1.800.663.3456).

2023 AND 2024 AT A GLANCE

Most 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 2025-2026

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.