

Southern Gulf Islands Electoral Area Stormwater Quality Report

2015–2016 Annual Report



CRD

Making a difference...together



Southern Gulf Islands Electoral Area Stormwater Quality Report, 2015–2016

The Capital Regional District (CRD) Integrated Watershed Management Program (IWMP) works to identify and minimize impacts of stormwater runoff on the environment 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.

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

- Islands Trust
- Ministry of Transportation and Infrastructure
- Ministry of Environment
- Ministry of Forests, Lands, Natural Resource Operations and Rural Development
- Fisheries and Oceans Canada

Sample Collection

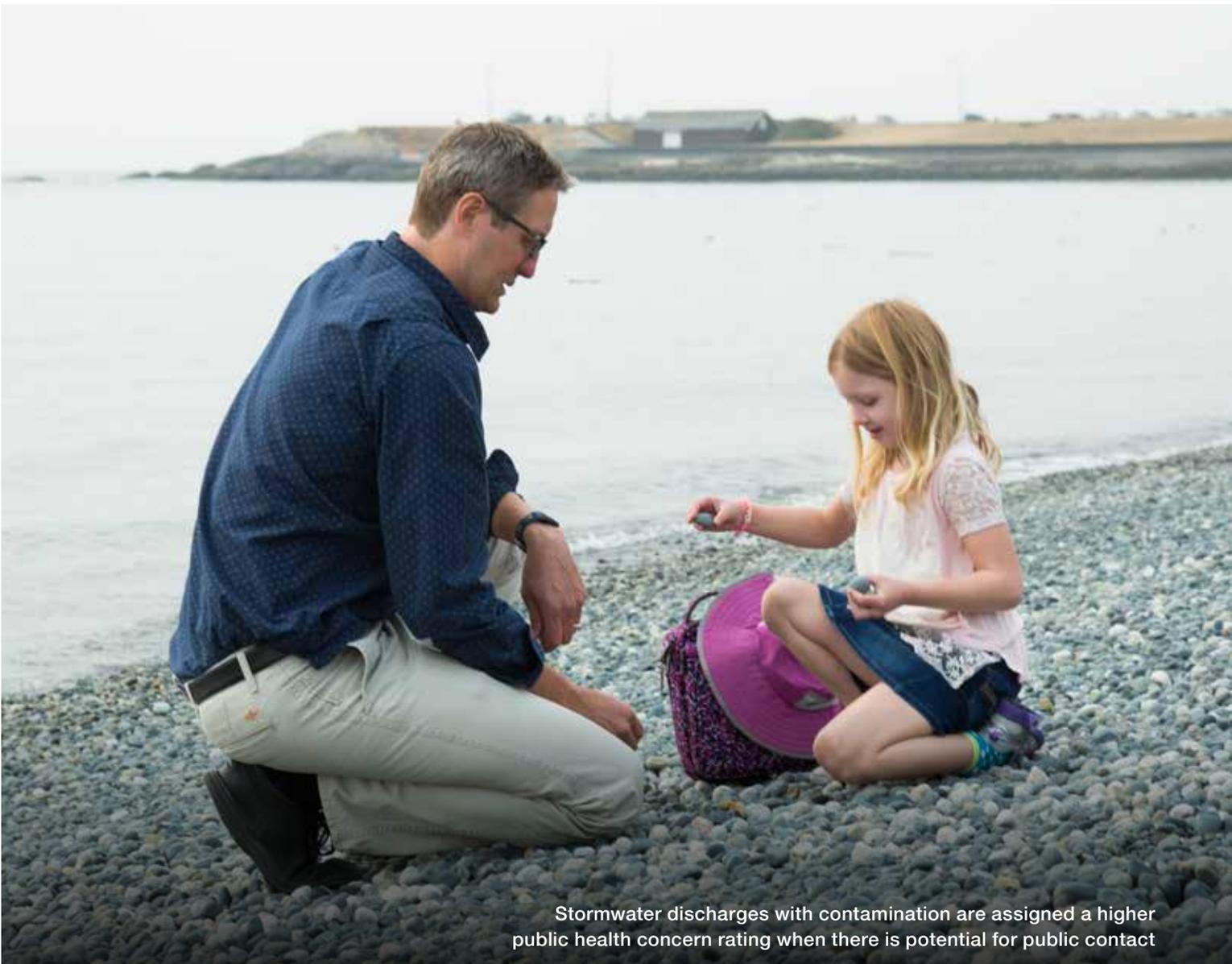
IWMP staff collect environmental quality data from stormwater discharges, creeks and the marine environment and assign public health and contaminant concern ratings. Each year, staff sample discharges with high or moderate public health concern and low public health concern (if sampling hasn't occurred for 5 years).

IWMP 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

Did you know...

The Integrated Watershed Management Program conducts similar programs in 11 CRD municipalities.



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

Public Health Concern (Stormwater Discharge Assessments)

Program staff sampled stormwater from 50 discharges in 2015 and 2016 for *Escherichia coli* (*E.coli*) or fecal coliform bacteria (32 of these were sampled both years). Staff assigned a public health concern rating to each discharge based on bacterial level and potential for the public to come in contact. Rating allows remedial effort to be focused on discharges that pose the most risk to public health.



Public Health Concern Data Summary

From this data, IWMP staff assigned 3 discharges on Mayne Island a high public health concern rating. The high-rated discharges are 7600 (Deacon Creek), 7613 and 7614 (Miners Bay) and are discussed further below.

Bacterial Source Investigation

IWMP staff investigate discharges with elevated bacterial counts to determine the source of contamination through upstream sampling, dye-testing, caffeine sampling and genetically determining if bacteria is from humans or animals.

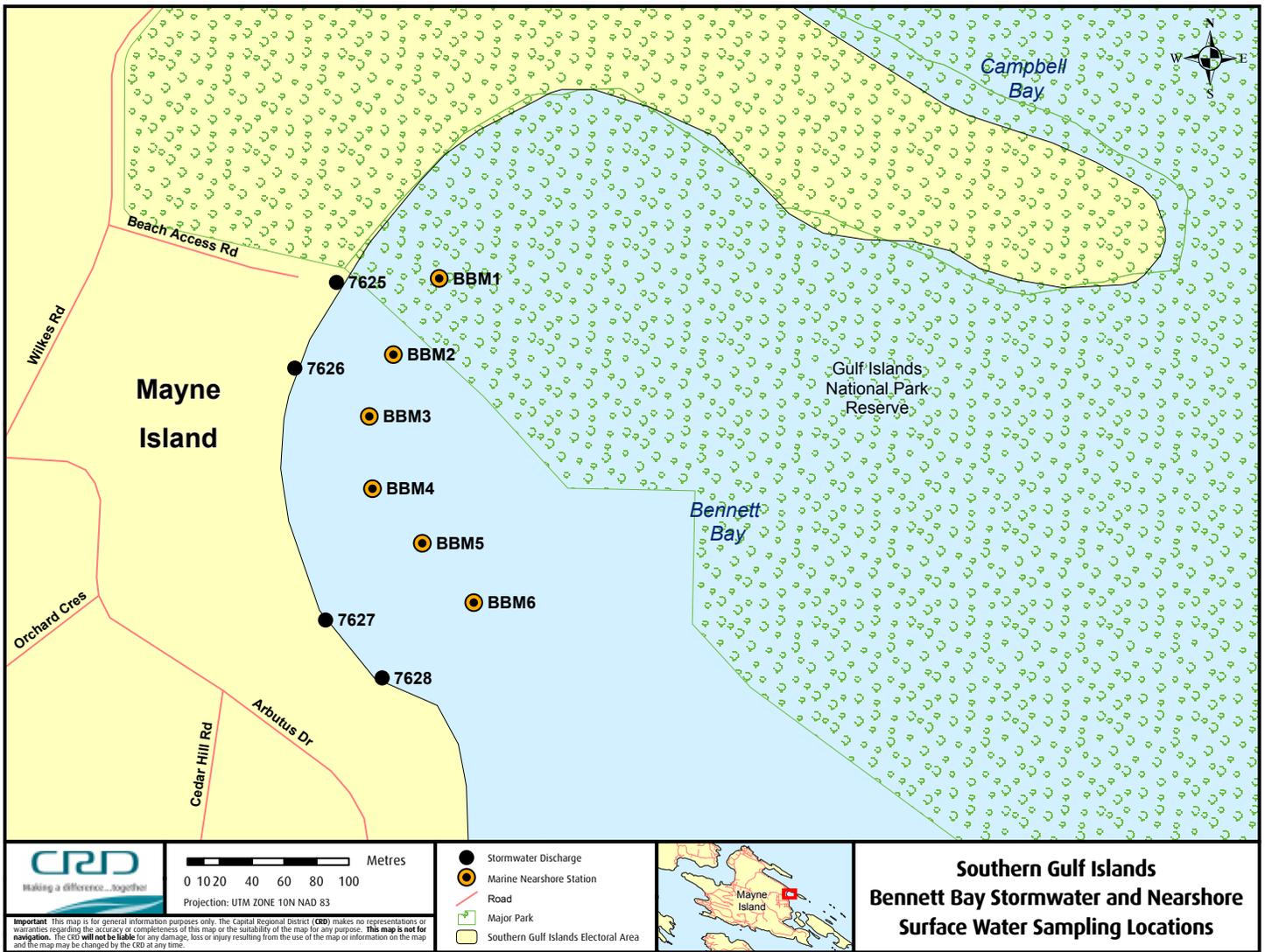
Discharges 7613 and 7614, Miners Bay, Mayne Island

- Discharges 7613 and 7614 (Miners Bay) have had elevated bacterial levels intermittently since 2003. Bacteria of human origin and caffeine have been measured in both discharges, likely indicating that malfunctioning septic systems are a source. IWMP and Island Health staff continue to conduct investigations.

Deacon Creek, Discharge 7600, Mayne Island

- Deacon Creek (Discharge 7600) flows into Village Bay. Staff measured elevated caffeine and bacterial levels in 2015 and 2016 indicating a source of sewage in the creek. Potential upstream sources include malfunctioning septic sewage systems, agricultural practices and wildlife. CRD staff have initiated investigations to narrow down the sources.





Marine Monitoring

Bennett Bay is part of the Gulf Islands National Park Reserve. CRD staff initiated yearly monitoring of the bay in 2005 at the request of the SGI EA Director to provide information about levels of contamination and potential impacts to the park. Bacterial levels are measured at 6 nearshore marine stations and 4 stormwater discharges entering the bay.

Did you know...

Stormwater discharges are a 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 beach safety advisories and shellfish harvesting closures. The IWMP works towards reducing these sources of contamination.



Bennett Bay, Mayne Island

Marine Water Quality Data Summary

Enterococci bacteria counts have been occasionally elevated for a number of years. As a result, program staff increased monitoring efforts and worked with Island Health to conduct source investigations and protect public health.

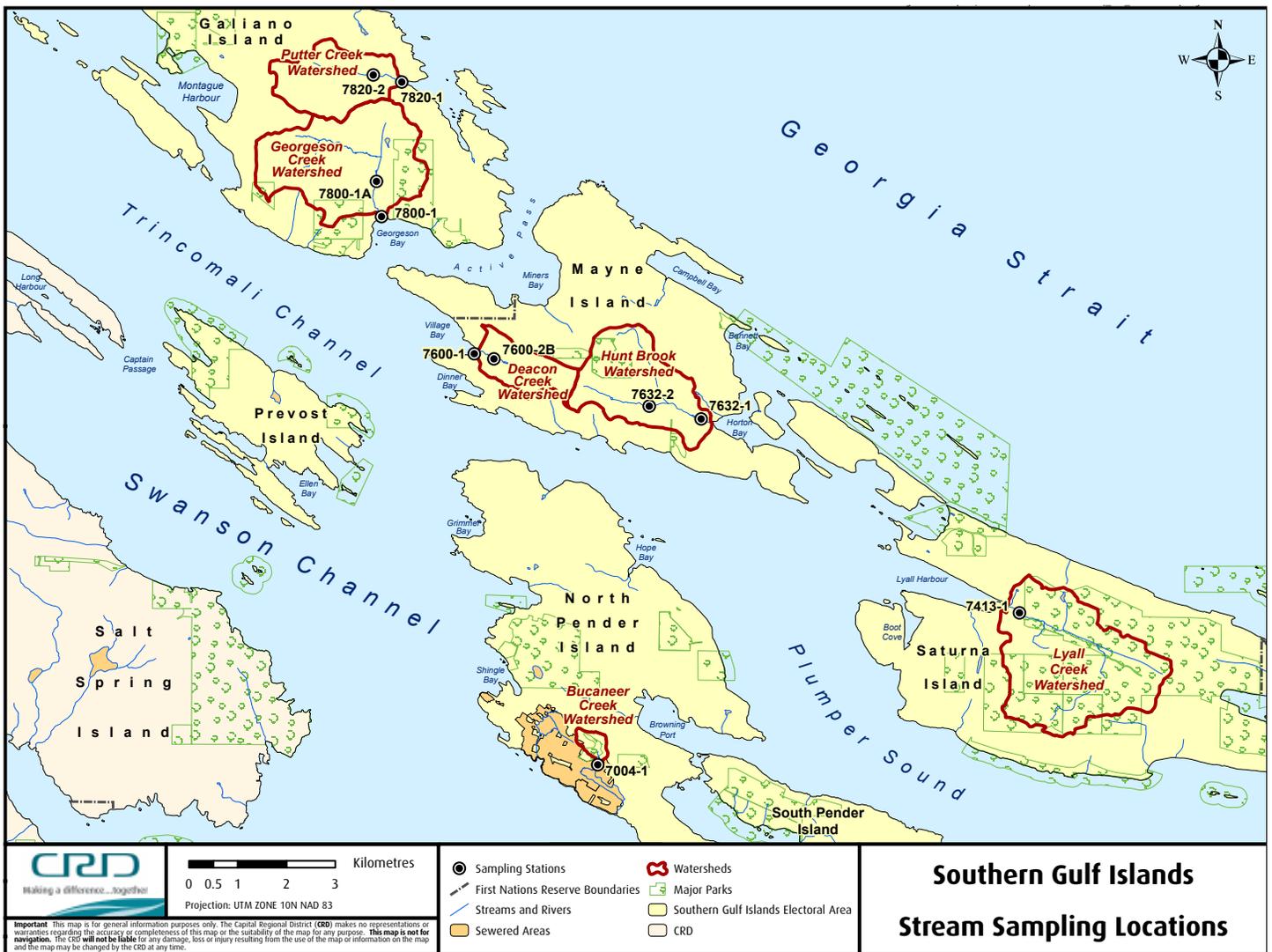
Data indicates that winter contamination levels have been reduced, as fewer enterococci counts were above public health criteria in 2016 than 2015 (only 1 measurement in 2016 versus 6 in 2015). Data from early 2017 indicates a similar trend. In addition, summer enterococci levels were low in 2015, 2016 and 2017 (ranged from not-detected to 2 CFU/100 mL). However, a source of contamination still exists.

Elevated bacteria in the marine environment appears to be from multiple sources. Bacteria from humans, ruminants (e.g., deer, cattle) and dogs have been measured. Caffeine was also detected, further suggesting a human source. Investigations in Bennett Bay and other areas on the island indicate septic sewage systems are a significant source, however narrowing down a particular system is challenging. Staff will continue monitoring and conducting source investigations.

Watercourse Monitoring

IWMP staff sample Buccaneer Creek (North Pender), Lyall Creek (Saturna) and Putter and Georgeson creeks (Galiano) twice per year (dry and wet season) to assess impacts to fish and other aquatic life. Staff also collected additional data on metal levels in water from Georgeson Creek as previous data showed elevated lead in the sediment.

In 2016, staff also compared water quality parameters (bacteria, temperature, pH, dissolved oxygen, conductance, turbidity, nutrients and metals [Georgeson Creek, only]) to BC Ministry of Environment guidelines for protection of freshwater aquatic life.





Stormwater sediment is sampled from streams, ditches or manholes.

Watercourse Data Summary

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

Georgeson Creek

- Turbidity was slightly above BC guidelines for protection of aquatic life in the winter.
- Bacterial counts were low in the creek suggesting that a previously identified source of sewage has been repaired.
- Metals were below BC guidelines for protection of aquatic life, with the exception of iron upstream of Bluff Road.

Lyll Creek

- Phosphorus has been elevated in the past, but the 2016 levels were higher than usual.

Buccaneer Creek

- Turbidity was above the BC guideline during the winter of both years.
- *E.coli* was elevated in 2015 (470 CFU/100 mL) but was not detected in 2016.
- Phosphorus continues to be elevated.

Putter Creek

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

Environmental Concern (Stormwater Sediment)

IWMP staff collected sediment samples from 8 locations in 2015 and 2016 (4 of these were sampled both years). Sediment was analyzed for 8 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 to aquatic life and assign a contaminant rating.

Data summary

Recent data resulted in mostly low contaminant ratings. However, 1 location in 2015 (7613-2) and 1 location (7810) in 2016 received a high rating. Discharges rated high in 2013 or 2014 were resampled in 2015 and 2016 and all had lower contaminant levels. High-rated discharges are discussed below:

Discharge 7613 (Miners Bay)

- Discharge 7613 (Miners Bay) received high ratings based on elevated zinc levels that have been measured intermittently since 2008. IWMP staff conducted upstream investigations that indicated the source of zinc extends upstream of 430 Village Bay Road. Elevated mercury was also measured upstream in 2015. Mercury has not previously been a contaminant of concern in this catchment and levels were below guidelines at the discharge to the marine environment. 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)

- Discharge 7800 (Georgeson Creek) had elevated levels of lead in 2012. Four subsequent samples displayed levels of lead that were below the aquatic life guidelines. This discharge is no longer of concern. However, CRD staff will continue to monitor for change.

Galiano: Discharge 7810

- Discharge 7810 was sampled twice in 2016. One sample had marginally elevated zinc, while the second sample did not. CRD staff will continue to monitor this discharge.

Did you know...

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.



Public Education

The IWMP provides educational materials and workshops to promote healthy watersheds. The program promotes Best Management Practices (for preventing pollution), reporting of spills to Emergency Management BC (1-800-663-3456) and conducts rainwater management workshops.



Photo: Hatchet & Seed



Photo: Hatchet & Seed



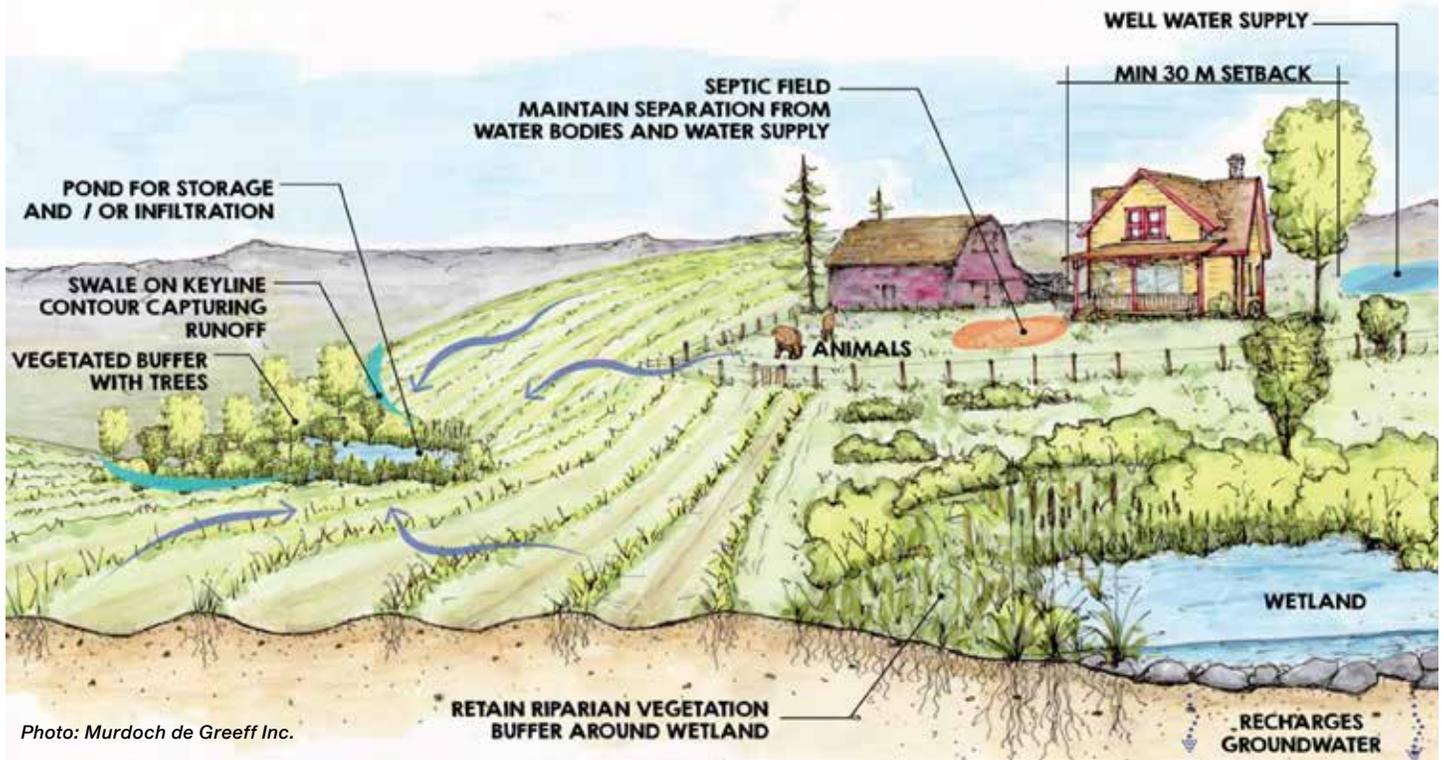


Photo: Murdoch de Greeff Inc.

Septic Savvy



The Septic Savvy workshop hosted in July 2016 on Mayne Island was well received—over 28 people attended and provided positive feedback. Attendees were offered financial incentive to assess the condition of their system. Of the

11 assessments completed, 1 system was operating as intended by design. Of the remaining 10 systems not operating as designed, 8 owners proceeded with repairs or improvements.

Keyline Water Management

In 2016, the IWMP hosted 3 well-attended Keyline Water Management workshops on Pender, Mayne and Galiano to address concerns about agricultural runoff into watercourses and the ocean. Tayler Krawczyk of Hatchet & Seed worked with local farmers to develop skills to implement improved rainwater management using natural landscape contours and farming techniques to slow, sink, spread and store rainwater, as well as build soil fertility. More workshops are planned for 2017.

CRD Watershed Warden— Badge Program and Lesson Plans



The CRD's Watershed Warden Program celebrates and rewards watershed stewardship actions taken by school-aged children that are fun and display leadership within our community. Children can earn a CRD Watershed Warden

Badge by participating in watershed education programs and a stewardship activity in their local CRD watershed. All watershed stewardship activities, small and large, will be awarded badges.

Check out www.crd.ba.ca/watersheds under Educational Resources for Online Applications or Mail-in-Letter information. You can also find locally focused K-7 Rainwater & Watershed Curriculum/Lesson Plans, short animated videos, illustrations, watershed maps and flow diagrams. Children will receive their reply and badge from Ollie the Otter 2-3 weeks from application date.



2015–2016 at a Glance

The majority of stormwater discharges and streams assessed were of low concern for public health and the environment. CRD IWMP has identified some contamination in stormwater, creeks and the marine environment in the Southern Gulf Islands EA likely due to human activities on land (e.g., septic sewage disposal, agricultural practices and development). It is anticipated that recent education and outreach (Septic Savvy and Keyline Design workshops) will assist in mitigating some sources of contamination.



Outlook for 2017–2018

IWMP 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, IWMP staff, the SGI EA Director, Island Health staff and the community will work towards identifying, reducing and eliminating sources of contamination.

