



# WATERSHEDNEWS

Stormwater, Harbours and Watersheds Program | Fall 2010: Issue 14



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## Who Are We?

The Stormwater, Harbours and Watersheds Program (SHWP) works with municipalities, electoral areas and the community to maintain healthy watersheds and protect the nearshore receiving environment.



**A**fter the dry days of summer, the fall rains are a welcome sight, replenishing our reservoirs and transforming our natural spaces, lawns and gardens back to being lush and green. Although, sometimes there is more green than we bargained for. Our wet winters are the perfect conditions for moss to thrive, and it does, on trees, rocks and the forest floor, but also on our lawns and roofs. Are you stumped on how to deal with your accidental green roof? Visit [www.crd.bc.ca/watersheds](http://www.crd.bc.ca/watersheds) for some watershed-friendly options.

**CRD**

Making a difference...together



A Shaw Ocean Discovery Centre staff member feeds some aquatic creatures.

## Learning fun for all ages at the Shaw Ocean Discovery Centre

Submitted by Robyn Waterman  
Marketing and Public Relations Manager at  
Shaw Ocean Discovery Centre

Go on a green journey from sea floor to seashore at the Shaw Ocean Discovery Centre in Sidney.

The non-profit Centre, which opened in June 2009, is a hands on/ hands wet aquarium and education facility located in the lower level of the Sidney Pier building. It was designed to showcase the amazing marine life of the Salish Sea – the inland sea encompassing the Strait of Georgia, Juan de Fuca Strait and Puget Sound – and to inspire all generations to explore and cherish a dynamic ecosystem.

Through 28 aquarium habitats, visitors will encounter magnificent and colourful marine life. See more than brown algae and silver salmon; see bright oranges,

greens, purples and reds. Some of the most peculiar-looking creatures previously only accessible to local divers live in the Centre. Have you heard of a decorated warbonnet, grunt sculpin or spaghetti worm? Time spent exploring the details of each habitat unveils these animals along with more well known species such as sea stars, rockfish, urchins and anemones.

Friendly, knowledgeable Oceaneers can be found in each gallery of the Centre, and they are eager to share the mysteries and marvels of the Salish Sea. Teachable moments abound – from kelp greenlings displaying their courtship behaviour, and predator-prey interactions, to seeing how a female octopus tends her 40,000 eggs. The latter is a rare opportunity in an aquarium setting. During the 6 – 9 month gestation period, visitors can learn about the life cycle of the giant Pacific octopus.

Another unique teachable moment is offered with the Centre's procurement of Northern abalone. Aquarists acquired the threatened species from the Bamfield Huu-ay-aht Community Abalone Project (BHCAP); a project established to re-populate wild abalone stocks. A species at risk since 2003, acquiring and displaying abalone required a strict and extensive permit process. However, the process was well worth the educational opportunity. Teaching the public about the plight of this species, in part due to illegal harvesting or poaching, is essential to its survival. Abalone are poached for both their edible muscular foot and the nacre of their shell used for jewellery. If visitors recognize and understand the conservation issues surrounding this species, they can help protect its population along our coastlines.

Another focus of the Centre is sustainability and conservation. Every decision made at the Centre considers the impact on the environment and the ocean. Green initiatives practiced at the Centre include the use of low-flow toilets and showerheads, as well as motion sensor taps and urinals. Providing a water fountain helps eliminate the use of plastic water bottles or paper cups. Full-time Oceaneers receive a bus pass subsidy and a bike rack at the entrance encourages green transport. The Ocean Store, an in-house gift shop, uses only recycled or reusable bags.

Behind the scenes, the Shaw Ocean Discovery Centre operates with environmentally conscious methods and materials. It takes a lot of energy to light the 10,000 square-foot Centre and maintain a water temperature of 10-12 degrees Celsius in all of its habitats. This is accomplished in the most energy efficient manner thanks to its location in the Green Key Eco-Rated Sidney Pier building. The entire building is heated and

cooled through state-of-the-art geo-thermal pumps that utilize excess heat from the ocean. Continuing with the theme of energy efficient operations, the Centre and all of its habitats are illuminated using either LED, fluorescent or low-energy incandescent light bulbs.

Sustainability is also demonstrated in the daily operations of animal care by feeding the marine animals Ocean Wise seafood and locally harvested algae paste. All cleaning products used are stamped with the Environmental Choice designation, the designated waste removal company captures all recyclables, and the staff room and workspaces are provided with compost stations.

Many visitors are unaware of their own everyday influence on the ocean. For a community surrounded by water, there is a strange disconnect between the land and the ocean. A recent partnership with the CRD sought to change this. The exhibit, Our Ocean is Our Home, demonstrated to the public connections between their homes and the ocean – connections that flow in both directions. For example, certain items we pour down the drain can affect the ocean's chemistry and the life that lives in it. And yet we are also dependant on the ocean's resources, such as fish or seaweed. The former feeds us and our pets; the latter contains an

ingredient that is used as an emulsifier in products such as ice cream and yogurt. From June through October, more than 45,000 visitors had the opportunity to experience this interactive exhibit and leave with some tools to help prevent their daily household activities from negatively affecting the ocean. Scoops for minimizing the amount of detergent used, bags to test the efficiency of showerheads, sustainable seafood guides and plenty of written material were available for take-away.

A regular feature of the Centre is the Take Action Station where visitors can learn about eco-friendly initiatives for the home and find information and links to local environmental organizations. This is also the place where they are encouraged to make a promise; a promise to make at least one positive change to help conserve the health of the local sea and global ocean. The Centre's habitats show clearly that the oceans are worth protecting.



An interpreter shares the magic of the touch tank with some children at the Centre.



## Water Pollution and Septic Systems: the Sleeping Giant

Submitted by Gail Pike  
Environmental Partnerships  
Capital Regional District

### Why should you care?

Well, for starters, there's dysentery, hepatitis, typhoid fever, cholera and gastroenteritis. Let's say something is wrong and your wastewater is surfacing on your dispersal area or drainfield. Surfacing wastewater would be that smelly brown stuff in patches on that flat area of your lawn. It could even just be a spongy wet patch. Your dog or cat steps or rolls in it, tracks it into your home, you give them a nice patting while making lunch, your toddler sucks on a toy that's been where your dog walked and it's diarrhea central at your place. Septic system wastewater contains many viruses and pathogens that can pollute wells, lakes and streams and cause serious threats to human health and the environment. That's why septic system plans have to be filed with the Vancouver Island Health Authority.

### How it works:

All of the water, solids, soaps, etc. from your sinks, tubs, showers, toilets, clothes washers and dishwashers go from your home to your septic tank. Ideally, the solids stay in your tank where it gets pumped out every 2 to 5 years. The partially treated effluent (liquid) goes to the pipes in your dispersal area. This effluent flows through

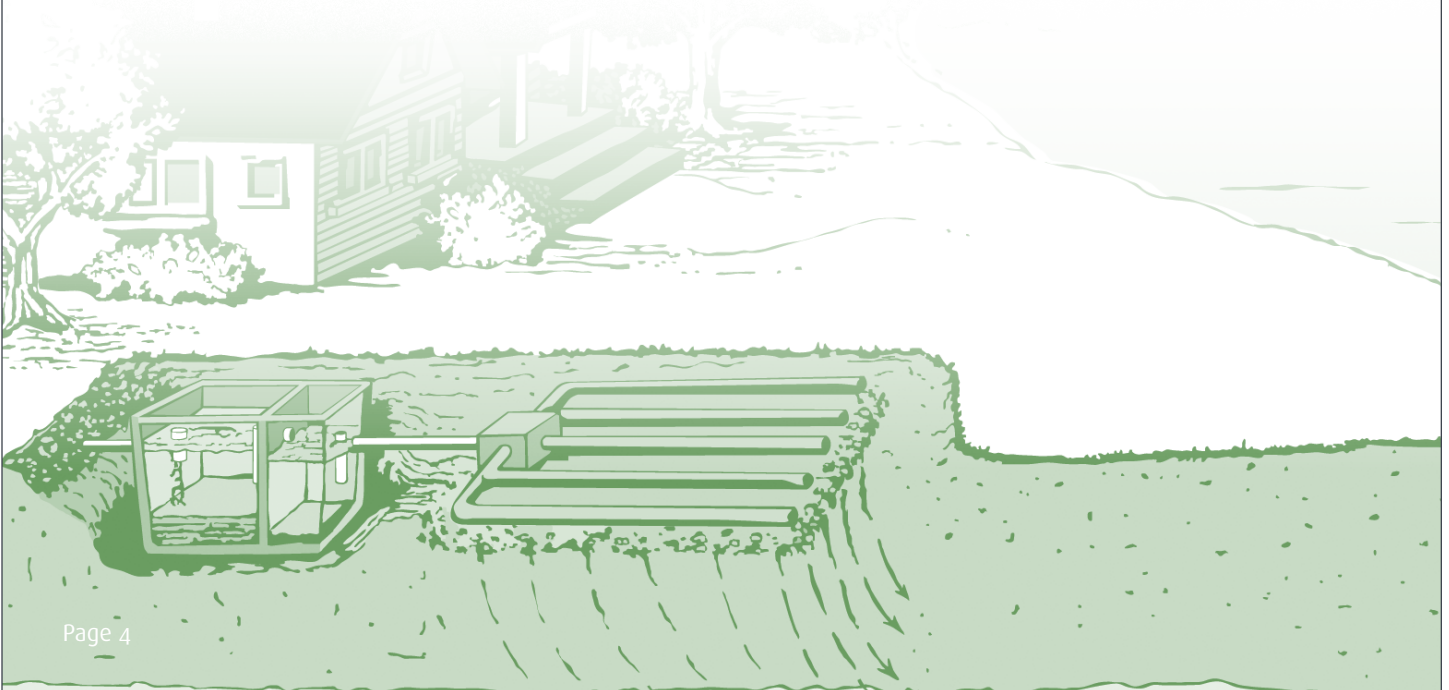
holes in the pipes down into the gravel and soil below where the final treatment occurs by filtration, digestion by beneficial microorganisms, and chemical binding. Once this treatment takes place it becomes clean water flowing under the ground to nearby creeks, ponds, lakes and the ocean. If you are on a well this water may join your drinking water; however wells should be at least 100 feet away from any part of a septic system.

Most folks come to the free CRD Septic Savvy workshops, information booths and website because they realize that a malfunctioning septic system can negatively impact human health and the environment, not to mention cost thousands of dollars to repair or replace, lower the property values and create liability issues. They realize that as owners of septic systems, which are mini wastewater treatment systems, they have a responsibility to prevent the spread of infectious diseases in humans and other creatures and to protect water. Prevention is the very best policy and the CRD Septic Savvy program can help you prevent any of these nasty things from happening.

A well cared for septic system is a perfectly safe and effective long term way to treat domestic wastewater, however we do hear from folks who proudly proclaim that they haven't pumped their tank out in 30 years and it only smells a little. Much as we would all love to flush and forget, we simply can't.

Pathogens from septic systems can contaminate wells, streams, lakes, ponds, ditches, the ocean and

Below is an illustration of a well designed and functioning onsite septic system.



groundwater. Aquatic creatures and plants can be affected. Swimming and eating fish from these waters can become unsafe. Pathogens can also become airborne, affecting humans, birds and other wildlife. Leaking tanks or faulty septic systems are one of the most common sources of groundwater contamination. Some estimates show that around 20 percent of septic systems are malfunctioning. Within the CRD that could mean 6000 systems sending untreated wastewater into the groundwater. Hazardous or toxic waste poured down the drain can destroy the biological system that breaks down wastewater and can leach or be carried into watercourses and drinking wells. We all depend on clean water.

Caring for and maintaining your septic system will protect the water systems, last for years and save you thousands of dollars. To attend a free 2 hour Septic Savvy workshop on how to care for your septic system, contact the CRD Hotline at 250.360.3030 or [hotline@crd.bc.ca](mailto:hotline@crd.bc.ca)

You'll find a wealth of information, including video clips, household information kits and much more at [www.crd.bc.ca/wastewater/septic/index.htm](http://www.crd.bc.ca/wastewater/septic/index.htm).



Pictured above is an onsite system being inspected.

## Prevention Dos and Don'ts

### Do:

- Consider attending a free 2 hour CRD Septic Savvy workshop
- Learn and record the location of your entire septic system, including the tank and dispersal area
- Pump out your septic tank every 2 to 5 years
- Have an Authorized Person\* inspect your system
- Have an annual maintenance plan with an Authorized Person\*
- Install an effluent filter
- Practice water conservation
- Use alternatives to toxic cleaners and chemicals

### Don't:

- Don't waste your money on septic tank 'starters' or additives
- Don't park on, drive on, or pave your dispersal area
- Don't plant anything but grass on your dispersal area
- Don't saturate the dispersal area. Divert downspouts and perimeter drains away from the dispersal area
- Don't use your toilet or sink as a trash can. Keep hairs, cigarette butts, cooking fats, and oils out of the system
- Don't attempt repairs or alterations yourself. Only an Authorized Person\* should work on your system

\*Authorized Persons are Registered Onsite Wastewater Practitioners or Professional Engineers and are the only people legally allowed to install or repair septic systems. For a list of ROWPs please go to <http://wastewater.asttbc.org/c/finder.php>

## Stormwater Quality Monitoring for Public Health and Environmental Concern

Submitted by Barri Rudolph  
Environmental Protection  
Capital Regional District

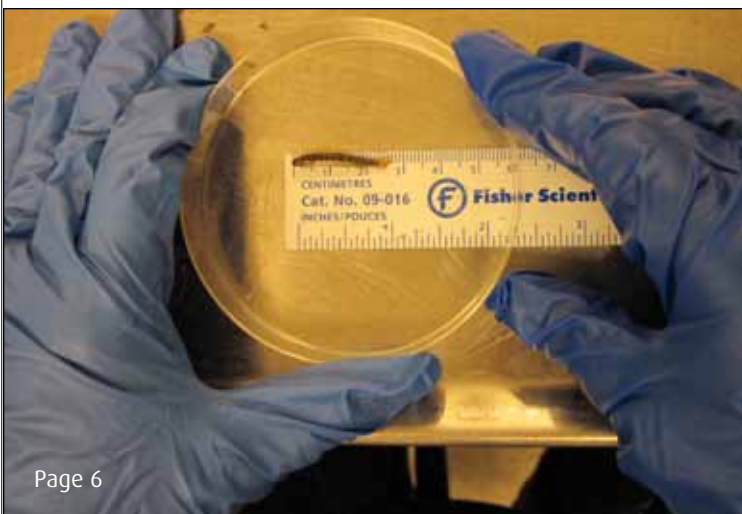
The CRD Stormwater, Harbours and Watersheds program (SHWP) assesses stormwater quality and impacts of stormwater contaminants on our streams and ocean, through environmental monitoring and source investigations.

The CRD measures fecal coliforms in stormwater discharges, watercourses and marine surface water throughout the Capital Region. This is an indicator of sewage and other fecal contamination. Metals and hydrocarbons in stormwater sediments are also measured and help the CRD to determine if contaminants are entering the ocean at levels that could harm fish and other aquatic life. Monitoring data is used to prioritize areas for environmental or public health concerns, and prioritized so that municipal staff can mitigate sources most effectively.

In addition, SWHP measures water quality in a number of streams twice each year to assess stream health and whether conditions are improving or degrading over time. Measurement of how much dissolved oxygen is present, how acidic the water is or how much suspended sediment is present can provide information as to whether a stream can support life. Nutrients are also measured and can help determine if development and land-clearing practices or inputs of sewage or fertilizers may be impacting aquatic life.

Although stream water quality measurements can provide information as to whether contaminants, nutrients and physical parameters (such as temperature and acidity) are at levels that can harm aquatic life, there are limitations to

**Measuring growth of cutthroat trout incubated in different areas of Colquitz Creek.**



**Eyed-stage cutthroat trout embryos being placed in hatchbox for incubation in Colquitz Creek.**

this type of monitoring - This type of monitoring only provides a snapshot of stream conditions and does not capture all the changes in water quality that can occur over longer periods of time. Rainfall can sporadically bring a rush of contaminants, fecal matter and nutrients into a stream especially after a period of dry weather. In addition, evaluation of individual water quality parameters (e.g., pH), does not provide information about the additive effect of certain substances and conditions occurring together.

As a result, the Stormwater, Harbours and Watersheds program has recently undertaken a pilot program to evaluate the actual ability of a stream to support developing trout by in-situ monitoring. Fish embryos are placed in mesh boxes in the stream gravel and allowed to develop through a sensitive life stage until they have hatched and grown into small fish (swim-up fry). As they are often incubated over a number of weeks, the developing fish are exposed to changing stream conditions often including a number of rainfall events. Once developed into swim-up fry, they are examined for survival, growth and normal development.

For more information about the stormwater quality monitoring program, or to see the stormwater quality annual reports, visit:

[www.crd.bc.ca/watersheds/monitoring](http://www.crd.bc.ca/watersheds/monitoring)

# What Causes Foam in Ocean, Streams and Lakes?

Submitted by Jody Watson  
Environmental Protection  
Capital Regional District

Foam often is seen accumulating against logs or on the banks of streams, or along the shores of lakes and marine areas on windy days. When it first appears, foam can be white, but generally turns brown over time. The development of foam occurs due to changes in the water surface tension and the physical introduction of air. There is a slight tension on the surface of water caused by the chemical attraction among water molecules. This tension is what allows some insects to move along the water surface and what causes water to “bead up” on your car during a rain storm. Certain molecules interact with the water reducing the surface tension. These molecules are called surface active agents or surfactants. Foam is produced as air, introduced in the turbulence of stream riffles, below waterfalls, or as waves break upon the shore, bubbles to the water surface.

## Human Sources

There are many natural and synthetic (human produced) surfactant molecules. Synthetically produced surfactants are an ingredient of most household cleaning products such as detergents, shampoos, toothpaste and cosmetics. Early detergents, developed after the Second World War, were non-biodegradable, that is they could not be broken down by bacteria. This resulted in large accumulations of persistent foam particularly below sewage treatment plants and other points where these surfactants were released into waterways. These early detergents also contained phosphorus which softened the water by binding with calcium and magnesium. However, this phosphorus also contributed to blooms or prolific growths of algae and other aquatic plants. Due to these problems, the chemical structure of synthetic surfactants was modified to a biodegradable form that contains sulfates instead of phosphates. The most widely used synthetic surfactants today are linear alkylbenzene sulfonates (LAS) listed on most products as sodium or ammonium laureth or lauryl sulfate.

## Natural Sources

Naturally produced organic surfactants are released from algae and plants when they die and begin to decompose but also in lesser amounts when living. These organic surfactants are part of a large variety of plant material that when dissolved in water is referred to as dissolved organic carbon (DOC). The breakdown of large algal blooms in ocean waters can lead to the accumulation of foam on beaches up to 3 feet deep. The primary source of DOC in lakes and streams is from the surrounding watershed soils. Bogs and wetlands deliver large amounts of DOC to streams and lakes because they are very productive and the breakdown of plant material within wetlands is slow. The presence of DOC in lakes and streams is why they are dark in color and often referred to as “brown-water streams.” Foam often is seen in our brown-water streams in the spring as snowmelt



Foam at the Esquimalt Lagoon.



Foam at the Gorge rapids.



## Treatment in Progress

With the rainy season upon us, please clean your catch basin to protect against flooding and to ensure this waste doesn't contaminate the environment.

By working together we can protect our environment.

For information on service providers, please visit [www.crd.bc.ca/tlwdirectory](http://www.crd.bc.ca/tlwdirectory)

## Foam article continued...

carries DOC to adjacent streams and lakes or during fall rain storms after the leaves have fallen and begun to decompose. In addition to causing foam, DOC provides energy and performs many additional functions important to aquatic ecosystems. Although natural, human activities that cause an increase in algae or aquatic plant growth like the introduction of nitrogen or phosphorus fertilizers can cause plant and algae blooms and an increase in foam production along with the removal of oxygen as these plants decompose. The foam is not toxic; however, removal of oxygen can cause fish kills.

### Determining Causes

Foam from plant produced surfactants will occur at many locations along a stream accumulating against the bank or on logs or other material in the stream. It may be white at first, but will turn brown over time as sediment particles build up in the foam. The foam will persist for some time gradually diminishing in size. Increases in foam abundance will often follow rainstorms that transport the surfactants to the stream or along lake shores on windy days. Foam from detergents and other synthetic surfactants generally will accumulate near the source and should not occur over large distances. The foam will be white and sweet smelling or scented. The foam will not persist, and will dissipate quickly once the source is removed. Foam accumulations from synthetic surfactants will generally not be related to rain storms or windy conditions on lakes.

## Links

CRD Environmental Sustainability - [www.crd.bc.ca/es](http://www.crd.bc.ca/es)

CRD Stormwater, Harbours and Watersheds Program - [www.crd.bc.ca/watersheds](http://www.crd.bc.ca/watersheds)

Shaw Ocean Discovery Centre - [www.oceandiscovery.ca](http://www.oceandiscovery.ca)

CRD Onsite Septic Systems - [www.crd.bc.ca/septic](http://www.crd.bc.ca/septic)

Harbours Atlas - [www.harboursatlas.ca](http://www.harboursatlas.ca)

Natural Areas Atlas - [www.naturalareasatlas.ca](http://www.naturalareasatlas.ca)

## Are you doing work to protect and restore watersheds in our region?

Contact the editor to submit your story for the next issue of Watershed News:

**625 Fisgard Street, PO Box 1000, Victoria BC V8W 2S6 - [stormwater@crd.bc.ca](mailto:stormwater@crd.bc.ca) or call 250.360.3256**