

WATERSCAPS BOWEN ISLAND

Water for our island community

Water in our lives: how we use it

Water — essential to life
Imagine life without water. Impossible! People, animals, plants — we all need water to survive.

Hidden water use
Water is used to produce the food we eat and the products we use. For example, a car uses hundreds of thousands of litres of water.

Where does all that water go?
We flush a third of the water we use down the toilet. In the summer, household use can jump 30%.

User pay!
Summer water use in Eagle Cliff dropped 70% when household meters were installed. When we have to pay for what we use, we tend to use less. Meters also identify leaks in the pipe system.

Necessity — the mother of conservation
By international standards, Canadians waste a lot of water. Cheap and seemingly unlimited supplies discourage conservation, but water districts on Bowen Island that suffer seasonal water shortages have become very efficient water users. How did they do it?

How we measure up!
Average daily water use (litres) by household:

Location	Average daily water use (litres)
St. John's	~100
Edmonton	~150
Calgary	~180
Winnipeg	~200
Regina	~220
Saskatoon	~250
Toronto	~280
Ottawa	~300
Montreal	~320
Quebec	~350
Vancouver	~380
Victoria	~400
Seattle	~420
Portland	~450
San Francisco	~480
Los Angeles	~500
Phoenix	~520
Las Vegas	~550
San Diego	~580
Denver	~600
Phoenix	~620
Los Angeles	~650
San Francisco	~680
Seattle	~700
Portland	~720
San Diego	~750
Denver	~780
Phoenix	~800
Las Vegas	~820
San Jose	~850
San Antonio	~880
San Jose	~900
San Antonio	~920
San Jose	~950
San Antonio	~980
San Jose	~1000

My! How our water use has changed
Average daily water use (litres) by household:

Year	Average daily water use (litres)
1920	~100
1930	~150
1940	~200
1950	~250
1960	~300
1970	~350
1980	~400
1990	~450
2000	~500

Eagle Cliff water use
Summer water use in Eagle Cliff dropped 70% when household meters were installed. When we have to pay for what we use, we tend to use less. Meters also identify leaks in the pipe system.

Hi, I'm Raindrop. Come with me and explore the story of water on Bowen Island.

We are a small island surrounded by salty ocean water, and so there are limits to our freshwater supply. Yet all life — people, other animals, and plants — rely utterly on a continued supply. So we need to answer important questions: Do we have enough water? Are we using it wisely? Are we protecting our drinking water supplies? Are we leaving enough for nature?

OUR DRINKING WATER PROTECT THE SOURCE

Watershed by Pauline Le Bel '2002

Water shed since the beginning: silver beads of life falling from the sky.

Living water shed for the love of greening things. Living Water cleaning, nourishing, healing.

Mother of all life forms yet fearless yielding to serpentine river bed; blessing fingers dipped in still ponds; accepting the scoop of a child's rubber pail.

Powerful Water changing everything in your path wearing smooth the hardest stone in your urgency to return to the sea in this never-ending prayer of renewal.

Island Waters precious vulnerable children of the salty womb we call you Grafton Honeycomb Josephine home of the red swimmer.

Restless Water singing the shore pebbles dancing the moon how we wish you slip away from us. In our carelessness we alter your flow we squander we poison your gift.

Clutching our hands when will we gaze upon the still mirror of your face and remember our watery beginnings the amniotic cradle of our Mothers?

Sacred Water when will we gaze upon the still mirror of your face and remember our watery beginnings the amniotic cradle of our Mothers?

When will we feel the oceans flowing through our veins, taste our salty tears? When will every water-loving cell in our body cry out: what do we do to you we do to ourselves?

Oh, Troubled Water one shining morning we will gather we will stand ready and willing to protect you to honour you.

Living with summer drought: ideas for conserving water

Why should we conserve water?
So we neighbours and ourselves don't run short. So we don't deplete our groundwater storage. So stream, lake, and wetland water levels aren't lowered unnecessarily, damaging that ecosystem. Because it saves us money. Because being wasteful is irresponsible.

Roof-top rainwater: the untapped resource
An average house roof on Bowen Island (125 square metres) will yield 180 000 litres or 35 000 gallons of water a year. Many homes on Bowen Island store rainwater in cisterns or tanks for use in the garden. Some even use rainwater for all their needs.

Possible water required
Washing and drying 10%
Toilet flushing 32%
Bathing and cleaning 26%
Drinking and cooking 4%
Garden watering 20%Laundry 10%Leakage 10%Total: 100%

Water meter
Installing a water meter is the best way to detect leaks. A leaking toilet can waste 400 litres (30 gallons) a day.

Thirsty lawns and gardens
Outdoor water use, primarily gardening, increases throughout the year by 20% during the summer. Lawns are incredibly thirsty, using four times as much as anything else in the garden, but the most not be. There are many beautiful gardens of native, drought-tolerant plants. Sprinklers can be replaced with drip systems.

Septic fields recharge groundwater storage
Most water used by households with septic fields returns to the groundwater system. We use the water, but we return it to the earth. This is a good management. In contrast, sewer systems export water to the ocean, depleting groundwater storage.

Water shortages? But this is a rainforest!

My water comes from Mount Baker!
There is no scientific evidence for beliefs that some of our springs or wells flow from Mount Baker or the north shore. All indications point to inland rainfall as the only source of Bowen Island's fresh water.

Are more droughts coming?
Scientists predict that in the future southwestern British Columbia will receive more winter rainfall, but longer and hotter summer dry seasons. How will the effect the supply of water on Bowen Island?

It all falls from the sky
Rainfall feeds Bowen Island's entire fresh water supply. Moisture from the Pacific Ocean is blown westwards and falls as rain. Rainwater flows into streams to be carried quickly to the sea (perhaps with a pause in wetlands or lakes) or seeps into the ground to join the shallow groundwater system. Shallow groundwater returns to the surface as springs, adding flow to streams. The shallow fresh groundwater is entirely surrounded by salty groundwater that underlies the seafloor.

Mystery stream supply
Some streams on Bowen Island flow year-round, even through the summer dry season. When it hasn't rained for weeks, where can the water be coming from?

Limited resupply!
Based on research in the San Juan Islands, it is estimated that only a small per cent of our annual rainfall, likely less than 15 cm, is recharged, becomes part of deep groundwater storage.

Doing the math: not much storage
Most rainwater returns to the atmosphere through plants and evaporation. Most of the rest is carried quickly to the sea by streams. Some stream water is stored for days to months in wetlands, ponds, lakes, and reservoirs. A small amount infiltrates the ground, evades capture by plant roots, and can be stored for months to centuries in the slow-moving groundwater system.

The clean water factory: forests, streams, and wetlands

The natural forest: a healthy green infrastructure
In contrast to forests, rain does not easily infiltrate bare soils exposed in disturbed areas. Instead, rainwater flows on the surface, eroding and carrying away fine sediment. During storms, streams flood quickly with muddy waters, eroding banks and filling channels with silt and sediment. Such floods are like a landslide, weakening havoc to stream life.

The modified landscape: a damaged green infrastructure
Construction of ditches has added many miles to our stream systems. Many small streams drain into ditches, and most ditches drain back into streams. So whatever goes into ditches, ends up in our streams!

Stream 'tornadoes'
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Green infrastructure?
Our forests, streams, lakes, and wetlands provide us with vital water and filtration services. Like roads, power lines, and water pipeline systems, they are essential infrastructure that we depend on. Just like these other services, our green infrastructure requires maintenance, repair, and investment.

Forests: most rainfall becomes shallow groundwater
Forests filter water, provide shade to cool waters during summer heat, provide banks that create pools and riffles, and provide wildlife travel corridors and habitat. They also provide walking trails for us.

Cleared land: most rainfall becomes surface runoff
Maintaining forests along our streams is essential to stream health. Forests filter water, provide shade to cool waters during summer heat, provide banks that create pools and riffles, and provide wildlife travel corridors and habitat. They also provide walking trails for us.

Forested corridors: vital to stream health
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Investing in greenways: our recent progress
Bowen Island's green infrastructure is in good condition. We invest in it by protecting it as parkland. Over the last several years, Bowen Island Municipality has negotiated green infrastructure protection with landowners seeking to develop near lands. A network of greenways has protected streams, wetlands, and lakes in the Josephine Lake area.

Water in our lives: how we get it

Diverse water sources
Unlike Vancouverites, whose water comes from a large local reservoir, Bowen Islanders get their water from diverse sources such as streams, wells, and streams.

Watersheds everywhere!
All the land area that drains into a stream system is called a watershed. Most areas of Bowen Island drain into some stream, so it is likely that you live in a watershed! A watershed supplies water to the part of a watershed upstream of a water-supply area. Many parts of Bowen Island are water-supply watershed areas. Do you live in one?

How-tech forests? They work for us
Our forests, streams, lakes, and wetlands provide an amazing service to us, clean water. They have evolved over millions of years of research and development. Forests act as a giant filter. Rain infiltrates the porous organic soils and percolates slowly to streams where it is gradually released as clear water. As a result, forest streams commonly run clear even during storms.

Forests slowly release rainfall to streams, limiting floods
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Rapid runoff from bare land causes erosion and floods
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Water stored underground in cracks and pores
Groundwater storage is like a bank account. The balance falls when withdrawals exceed deposits. Nature makes deposits through rainfall and withdrawals through leakage of groundwater to streams and the ocean. Our wells remove water withdrawals. If total withdrawals exceed deposits, we deplete our groundwater storage. Do we know if we are draining our account?

Protecting the balance
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Excessive pumping can reduce flow in streams
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Water table ups and downs through the seasons
The amount of water stored underground changes through the seasons. As winter and spring rains infiltrate the ground, stored groundwater increases and the water table rises. When the rains stop, the water table falls as groundwater leaks into streams and the ocean. Well pumping also removes water and lowers the water table. Excessive pumping of groundwater can result in long-term depletion of groundwater storage.

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Water stored underground: vital and vulnerable

How is your water protected?
Protecting water quality in source areas is our first line of defense. Beyond that, community water systems use disinfection (chlorination, ultraviolet radiation) to kill bacteria, viruses, and Giardia cysts, and filtration to remove turbidity that interferes with the disinfection process. Some homeowners with wells treat water to remove dissolved minerals such as calcium (hardness), iron, manganese, or arsenic.

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Ensuring a safe water supply
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