



Our Watersheds

Bonsall Creek

Courtesy of the Municipality of North Cowichan

At 3,663 hectares, the Bonsall Creek Watershed has a relatively small catchment area. Bonsall Creek winds through forestry and agricultural lands before draining into the waters of the Salish Sea. Although no major lakes are found on this landscape, the watershed contains a diversity of ecosystems, including: rare wetlands, and mature Coastal Hemlock forests. **40% of the watershed is designated as forestry lands.** With limited natural surface water storage, the Bonsall Creek watershed is **more susceptible to periods of drought and flood** than many of the other watersheds in the region. Life in the watershed depends heavily on both surface and groundwater. However, **expanding human populations** in the area place increasing stress on these **critical water sources** for **Halalt First Nation** and **rural communities.**



-  CVRD Watersheds
-  Bonsall Creek

Bonsall Creek at a glance:



930

people call the watershed home*



3,663

hectares in size



0

community water systems supplied by watershed



5

jurisdictions sharing land use authority



18%

less rain during summer months by 2050 †



0

homes and businesses served by community water systems



48

Diversion Licenses

issued for a variety of agricultural, domestic, & commercial uses



2

Monitoring Stations

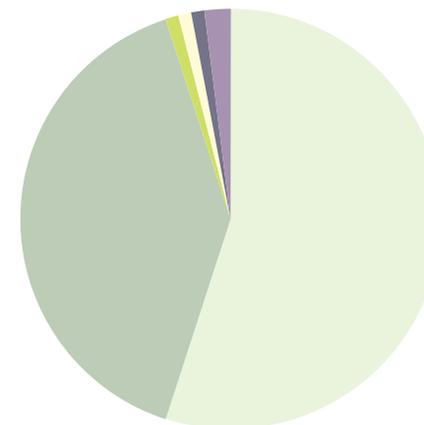
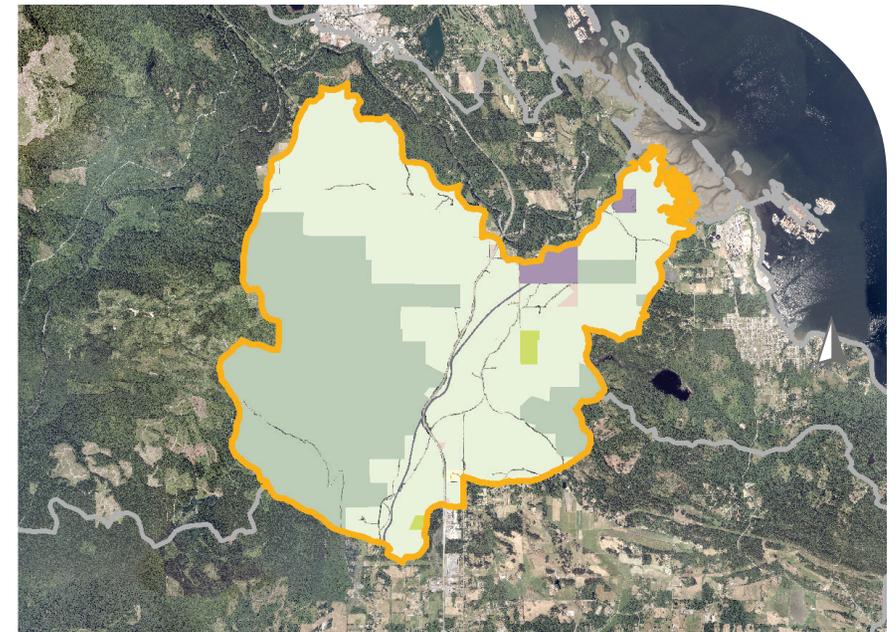
collecting water quality & quantity data



217

Groundwater Wells

drawing water for homes, businesses, industry & agriculture



- Residential
- First Nations Reserve
- Agriculture
- Forestry Lands
- Parks & Institutional
- Ecological Reserve
- Surface Water
- Commercial
- Industrial
- Other

*Estimate based on 2016 Population Census, Statistics Canada

† CVRD, (2017). Climate Projections for the Cowichan Valley Regional District

Land

Steep slopes and high summits of Big and Little Sicker shape much of the Bonsall Creek Watershed. One exception is the low lying area in the eastern portion of the watershed which provides [productive agriculture lands](#). The layers of sandstone and mud exposed throughout the Bonsall Creek area are features of the “Nanaimo Group”—a geologic formation spanning the southeast coast of Vancouver Island.

In general, soils in the lower watershed are well draining and shallow; mostly glacial deposits made up of gravelly, loamy sand or material derived from underlying rock formations. Less well-drained soils are found in flat low-lying areas which follow Bonsall and Westhouse creeks from Highway 1 down to the estuary.

Habitat

As a part of the Coastal Douglas-fir biogeoclimatic zone, the Bonsall Creek watershed is home to unique habitats where [Douglas-fir](#), [Garry oak](#) and [Arbutus](#) trees grow amongst rock outcrops and [diverse wetland ecosystems](#).

The watershed supports four at risk plant communities which favor various moisture and nutrient conditions—Red Alder/Slough Sedge, Douglas-fir/Alaska Onion grass, Douglas-fir/Dull Oregon-grape and Grand Fir/Dull Oregon-grape. These plant communities include some of the most rare and biologically diverse natural areas in B.C. The watershed is home to various plants and animals of concern, all of which are vulnerable to climate change and a growing population. Beyond such impressive habitat value,



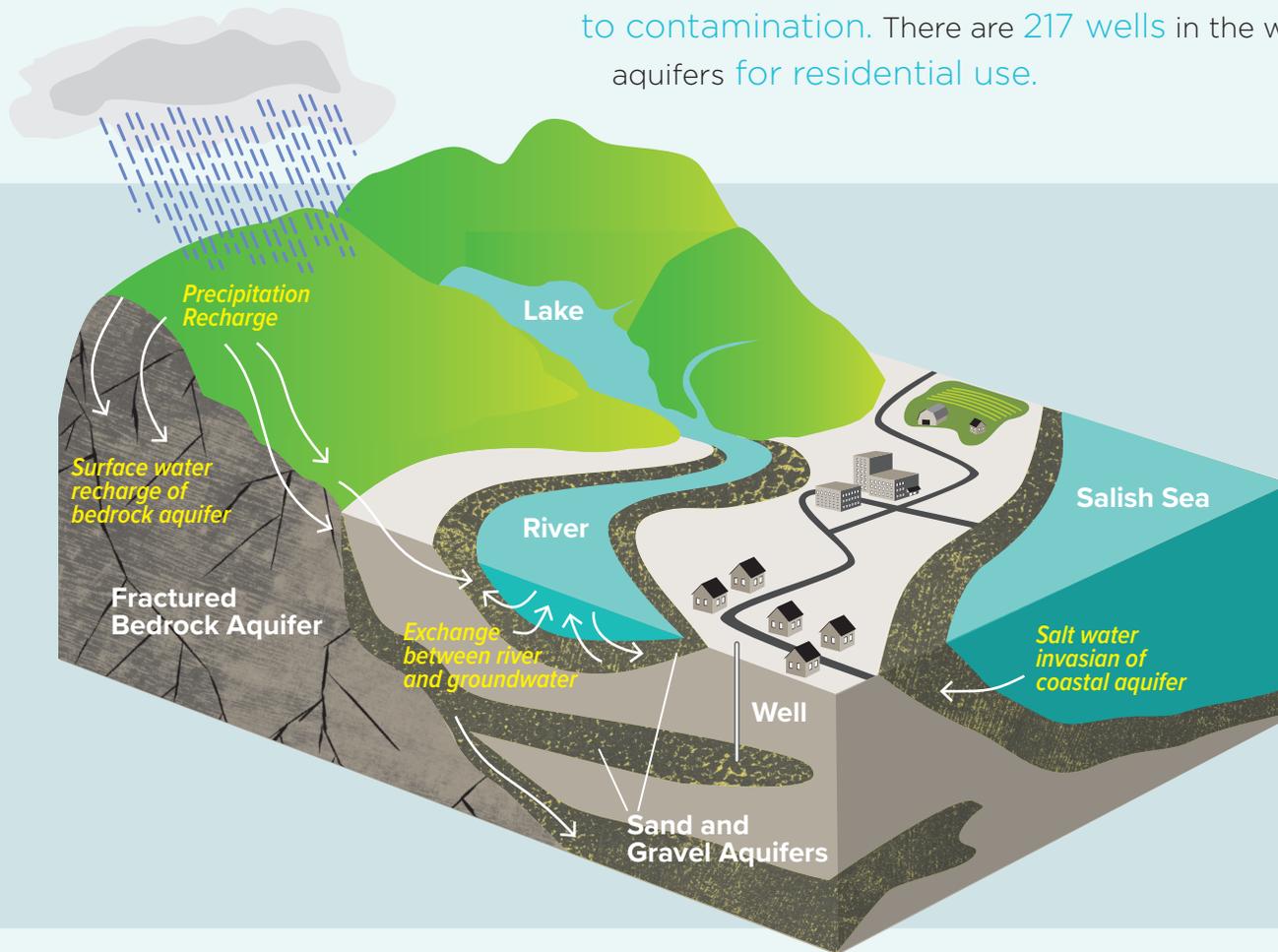
Coastal Douglas-fir Biogeoclimatic Zone

A “biogeoclimatic zone” is an area with similar patterns of vegetation and soils as a result of specific climate conditions. The Coastal Douglas-fir zone is at significant risk, with less than 1% of the original old forest remaining. Limited strategies are underway to protect older forest on the Crown portion of this zone, but much of the zone is private land.

natural spaces in the area provide a number of essential ecosystem services such as absorbing carbon and filtering pollutants from our water systems.

Water

Life in the Bonsall Creek watershed relies on water in the creeks, small lakes, wetlands and aquifers. Sollys Lake and a number of small wetlands support surface water storage in the watershed. There are [48 surface water diversion licenses](#) in the watershed. The dominant use of the diversions [is for agriculture](#). There are 3 mapped aquifers in the watershed. The most vulnerable of these is the Chemainus/Crofton aquifer, a sand and gravel deposit in the lower watershed extending from Highway 1 to the Chemainus/Bonsall Estuary. Compared to the other aquifers in the region, it has a low depth and is quicker to recharge. However, in the same way aquifers vary in their capacity and ability to recharge, they also differ in their ability to protect themselves from contamination. Sand and gravel aquifers allow water to permeate through more easily, making them more [vulnerable to contamination](#). There are [217 wells](#) in the watershed which draw from aquifers [for residential use](#).



What is an aquifer?

Aquifers are rock or soil that can contain groundwater. Sources of water that can become groundwater include:

1. recharge from rain or snow that soaks through an unsaturated zone
2. surface water bodies such as streams, lake and wetlands

The characteristics of the rock and soil determine the speed at which water passes into an aquifer, how much water can be stored within it and how vulnerable it is to contamination.

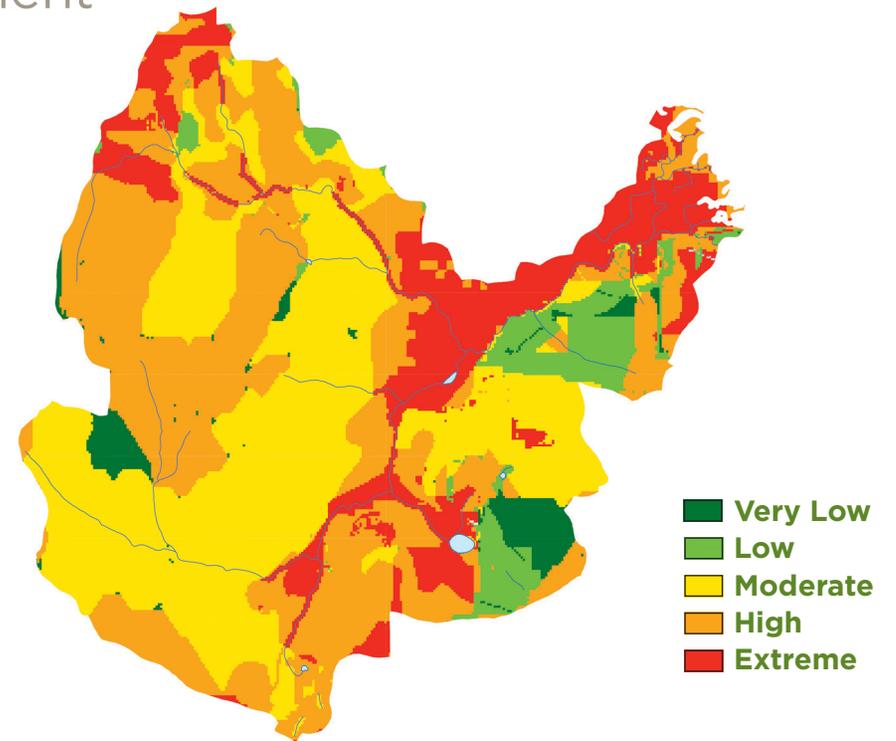


Courtesy of the Municipality of North Cowichan

Bonsall Creek: Combined Risk Assessment

Understanding Risk

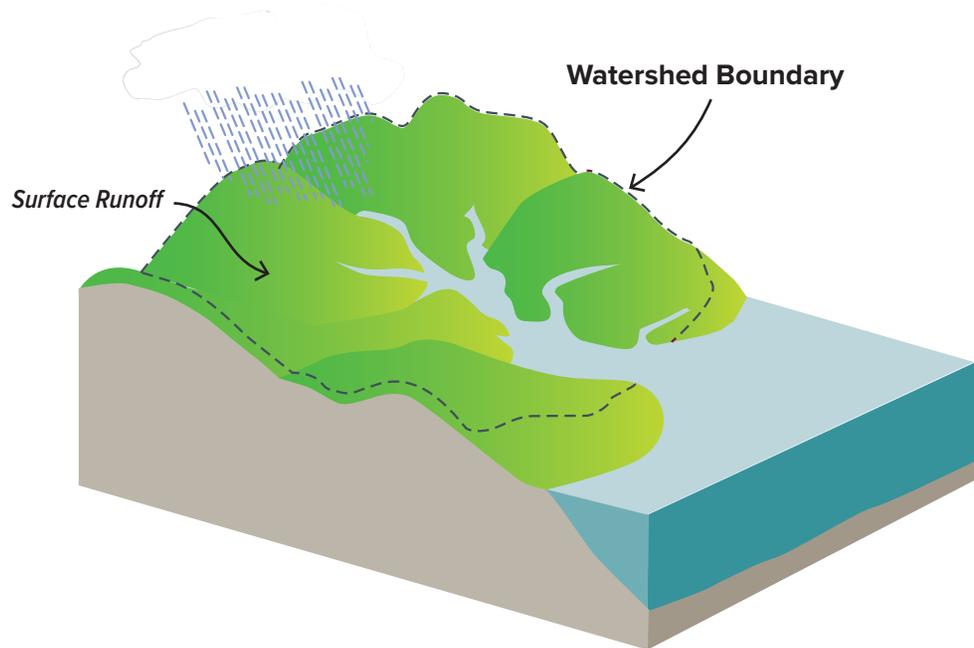
Making good decisions around development and resource use requires an understanding of risk. Risk is a product of the likelihood of a hazard occurring and its consequences. The map at right is based on 5 factors: groundwater contamination, surface water supply, stream water quality, slope failure and flood. Risk in the Bonsall Creek watershed is largely driven by ground and surface water contamination and surface water supply. Risk-mapping can inform land-use planning and stewardship.



Watershed Management Q&A

What is a watershed?

A watershed is an area of land that catches rain and snow and where water flows downward into a common river, stream, lake, or aquifer. All land is part of a watershed and we all live in a watershed.



What is watershed management?

Watershed management aims to preserve watershed health as a whole. This means connecting land-use planning with resource management in order to make decisions that meet community needs today and in the future. Inter-agency collaboration and community involvement are essential to this process.

What does this have to do with the CVRD?

Our engagement with residents of the Cowichan Region provided a clear message: the sustainability of our drinking water is a top priority when it comes to managing growth and change in the region. This message became official in the fall of 2018, when residents voted in favour of a new Drinking Water and Watershed Protection Service. This service will allow the CVRD to focus on protecting drinking water at its source in a number of ways, including developing watershed management plans, monitoring water quality and supply, and working closely with the community and other agencies to protect this precious resource and inform land use planning.

How is the region expected to change?

A temperate climate and an abundance of natural beauty make the Cowichan Region a highly desirable place to live; our population is growing steadily throughout the region, up 4% from 2011 to 2016. This growth is occurring in tandem with a changing climate where summertime drought and wintertime flooding are the new normal. Preparing for the changes ahead will require all levels of government, local authorities, and community members to work together in developing an integrated and cooperative approach to decision-making.

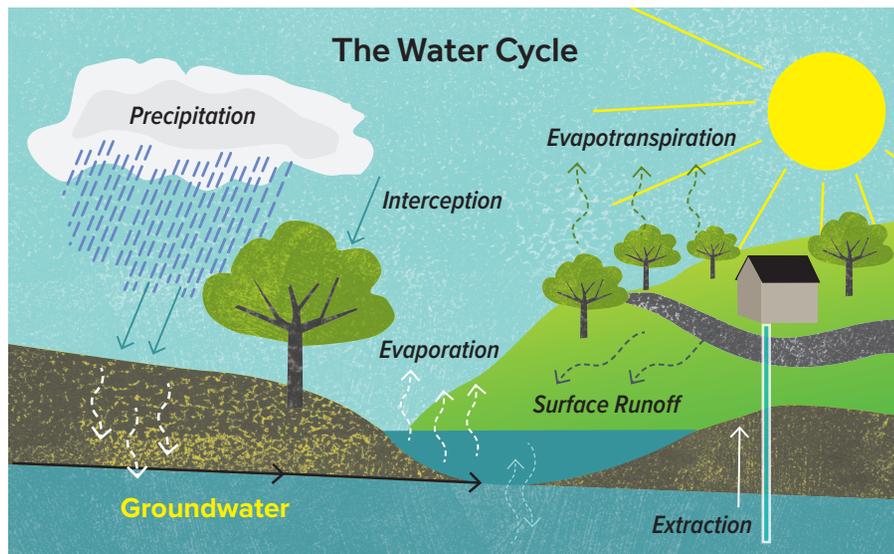
Watershed Management in action

Water Balance

To understand how our watersheds can sustain development, we need to first understand how much water is entering the watershed as rain and snow and how much water is needed to support natural processes. Then we can begin to understand how much there is for human uses. Water balance is about understanding how much water is entering the watershed (water in) and how much water is being used or leaving the watershed (water out).

Maintaining natural water balance is important because:

- **Too much water** can lead to erosion, slope destabilization and flood.
- **Without enough water** fish can't survive, vegetation dies, groundwater does not recharge and drinking water supplies diminish.



When natural areas are altered, we often lose the slow-release function of vegetation and soil. We disturb the natural balance of water when we pave surfaces, cut down trees, and divert watercourses. In the Bonsall Creek watershed, changes to the water balance have been driven by **residential, agricultural and forestry activities and extractions**. Climate Change impacts on precipitation will only increase the stress.

Community-informed Planning

The CVRD will be engaging with community members in the Bonsall Creek watershed to prioritize concerns related to watershed health and livability.



Water Quality & Availability



Integrated Development



Stream & Groundwater Protection



Flood Protection



Habitat Restoration & Enhancement

A Shared Resource

We can all help!

- Everyone can do their part to conserve water.
- Residents can construct rainwater catchment systems.
- Builders can choose low impact development options.
- Homeowners should ensure septic systems are functioning.
- Farmers & foresters can manage fertilizers & pesticides.



Our approach to watershed management will focus on:

- » Protecting water resources
- » Understanding the unique pressures and risk for each watershed
- » Protecting the ability of watersheds to supply sustainable water to meet ecological and community needs
- » Making land use decisions informed by watershed planning
- » Rainwater management to mimic natural hydrology
- » Integration of development with stormwater management

What does this process look like?

The CVRDs approach will be ongoing and adaptive:

