TIMES COLONIST

B.C.'s drought: Water will keep flowing in capital region thanks to planning

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Jul 7, 2024 9:56 AM

1 / 8 The crown jewels of the catchment area for the Capital Regional District's Regional Water Supply Service are the five stream-fed reservoirs including the largest, Sooke Lake that collectively hold 170-million cubic metres of water. DARREN STONE, TIMES COLONIST

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This story is part of a series exploring the wide-ranging impacts of persistent drought conditions and climate change seen across the province in recent years.

Behind steel gates and fences topped with barbed wire in a remote area northwest of Victoria lies an unspoiled parcel of land with a pristine lake at its centre, monitored by cameras and patrolled by humans.

The property, accessed via Shawnigan Lake and Sooke Lake roads, is the catchment area for the Capital Regional District's Regional Water Supply Service, which supplies about 412,000 people in the region.

It looks like a park, with rolling hills covered in a mix of Douglas fir, cedar, hemlock and arbutus trees, but the crown jewels are the five stream-fed reservoirs — including the largest, Sooke Lake — that collectively hold 170-million cubic metres of water. It's a huge amount, when you consider that one cubic metre is 1,000 litres.

You won't see any paddleboarders or picnickers here — the area is guarded and closed to the public, save for escorted tours provided by some of the 200 staff who work with the CRD's Integrated Water Services department.

A central dispatch keeps tabs on vehicles criss-crossing the narrow gravel-packed roads on the 20,500-hectare property, with drivers expected to update their locations on the radio at every kilometre mark.

Traffic consists mainly of full-size trucks that are off-road capable, due to the terrain and the requirement to operate in all seasons.

Far from the city and any other traffic, the only sounds here come from the forest.

Every year, the Integrated Water Services department offers free tours of the property to give residents a behind-the-scenes look at where the water flowing from taps in the region actually comes from. The five-hour tours, which took place in May and June this year, are popular, filling up quickly when they are announced in March.

The tours are an opportunity to show off the results of years of planning to ensure the region has abundant water and is prepared for the droughts brought on by climate change.

Even though weather projections suggest this summer will be one of the driest at Sooke Lake since 1896, the CRD is confident supply won't be affected.

That's in part because the regional district prepared for future growth by raising the height of the Sooke Lake Dam in 2003, almost doubling capacity in Sooke Lake. The move followed a drought in 2001 that was severe enough to lead to Stage 3 water restrictions in the region — the only time that has happened. Under Stage 3, outdoor water use is limited to hand-watering of trees, shrubs and vegetables one day a week.

At 8.3 kilometres long, the lake is the primary source of water in the area, holding 160.32 million cubic metres, or about 90 per cent of the total water storage in the system.

Conservation has also played a role.

In the capital region, 66 per cent of water use is by households, 21 per cent by industry, commercial operations and institutions, and three per cent by agriculture. Demand for water rises 44 per cent every summer, mostly due to outdoor watering.

A Stage 1 watering schedule is routinely imposed in the region between May 1 and Sept. 30 as a matter of policy, with watering of lawns restricted to twice a week under a CRD water conservation bylaw.

Although Canadians use more water per capita than other countries around the world, many in the capital region have embraced water conservation through measures such as letting lawns go brown in summer and planting less-water-hungry plants, driving down consumption from 559 litres per capita per day in 1998 to 337 litres in 2022 — among the lowest in the province for a major metropolitan area.

That's happened despite a population growth of between 1 and 1.5 per cent per year, said Kathy Haesevoets, an information technician with CRD Integrated Water Services, who notes that if consumption drops to 300 litres a day, the CRD could put off supplementing the Sooke Lake Reservoir with the backup plan — Leech River-area water — for 20 years.

Keeping the water pristine

Fort Victoria originally got its water, by horse and buggy, from a spring in Fernwood, a neighbourhood originally known as Springridge.

Elk/Beaver Lake became the growing city's water source in 1872. The two lakes, once separate, were joined with the damming of Colquitz Creek. Filter beds were installed in 1896 after residents complained of finding fish and tadpoles in their drinking water.

When residents turned on their taps in 1905, the water was flowing from reservoirs in the Goldstream area, which still has four surface-water reservoirs, with a volume of approximately 10 million cubic metres and a catchment area of 2,109 hectares.

The area is now a secondary water source. In an emergency, the Goldstream Water Supply Area has enough water to sustain the region for two months.

The Sooke Lake water system, the current primary source of water in the region, was constructed in 1915, with disinfection of the water beginning in 1944.

In anticipation of future demands, the CRD secured a licence in the 1980s to draw water from the Leech River. It built a tunnel linking the river to the Sooke Lake Reservoir in 1987, but it has never been used. According to the CRD Regional Water Supply 2022 master plan, the tunnel is expected to come into service by 2042.

In 2007 and 2010, the CRD purchased land from private forest land holders that forms the catchment area around the Leech River to ensure access to the water source and prevent any contamination from industrial or agricultural use. That property, which had been 95 per cent harvested, according to the CRD, has more than 400 kilometres of roads, and is currently undergoing restoration to remove old logging infrastructure, upgrade main roads and deactivate and rehabilitate excess roads.

The ability of the CRD to own and manage 98 per cent of the land that drains into the Sooke and Goldstream water supply reservoirs — the catchment area — makes the system unusual, as most municipalities rely on public lakes for their water.

The site conditions around Sooke Lake are ideal for use as a reservoir, with bedrock and soil that is thin, nutrient-poor and coarse and not useful for agriculture, which often results in fertilizer runoff that can generate algae blooms that are difficult to control and can be toxic.

To keep the area pristine, even visitors heeding the call of nature need to do so in designated outhouses along the route — relieving oneself in the forest is frowned upon. The facilities feature compost toilets that use a proprietary blend of wood shavings treated with bacteria to aid in decomposition, instead of chemicals.

There are no garbage bins on any part of the property, as visitors are expected to pack out anything they pack in.

Crews also control the Canada goose population, whose feces can contribute to algae growth or spread bacteria such as E. coli, by addling their eggs when nests are found.

Contractors are usually called once a year to remove beavers attempting to make a home on the property.

To ensure the water is safe for human consumption, it’s run through a three-step disinfection process that starts with the use of ultraviolet light to kill bacteria and parasites.

A low dose (1.5 to 2.5 mg/litre) of chlorine is added next, to kill viruses. Ammonia is added as a final step to prevent bacterial contamination as the water travels through the distribution system pipes.

The risk of wildfire

The tour of the reservoir area starts at the northeast end of the property, south of Shawnigan Lake, with a walk though a managed forest.

Under the cooling canopy of trees, the forest floor feels spongy and there is a musty, earthy smell in the air.

The majority of the forest is second-growth, but there is a small pocket of old-growth forest on the property, with the oldest tree estimated to be approximately 700 years old.

The threat of major fires is top of mind here, with parcels of land in certain areas designated as buffers to slow the spread of a wildfire, and a 30-member crew designated to fight any fires.

Staging areas have also been identified for fire-fighting equipment and water collection and contingency plans are in place for the event that a fire lasts for more than a few days.

“It’s all hands on deck when there is a fire,” said Haesevoets, adding the wildfire management plan categorizes risks based on terrain, species of trees and their proximity to the reservoirs.

Wildfires are a problem for many reasons, including the fact that they create a large volume of wood ash, some of which will fall in the lake or be washed into it by subsequent rainfall, along with loose soil, increasing the turbidity of the water.

Higher levels of suspended solids in the water can render UV disinfection ineffective. The wood ash is also a nutrient, making the water more susceptible to algae blooms.

To reduce the risk, crews thin out the trees to limit the amount of fuel a fire can consume, and promote resiliency in the trees left standing.

All of the fires in the watershed in recent history have been caused by lightning. The last major one was in 2021, and took seven water skimmers — amphibious water bombers — to help bring it under control. Firefighters were also on high alert when there was a large fire in nearby Shawnigan Lake in 2012.

Wildfire is a serious threat as climate change brings rising temperatures.

Haesevoets noted that average temperatures are expected to rise by up to 2.8 degrees by the year 2050, citing a regional climate projection by the Pacific Climate Impact Consortium at the University of Victoria.

The forecast is for three times the number of days with temperatures above 25 C in the same period, along with a 67 per cent reduction in days with below-freezing temperatures, she said.

High temperatures stress the trees, making them more vulnerable to insects and diseases, as well as fire. Milder winters, in turn, enable more eggs to survive, leading to further outbreaks in subsequent years.

Warmer temperatures are compounded by an expected drop in summer rainfall of almost 20 per cent by 2050.

Haesevoets noted that the combination of increased temperatures and lower precipitation poses a high risk to the forest, with this year's rainfall already only 84 per cent of average.

On the other hand, up to 10 per cent more rain is expected in the fall and winter as rain events intensify with climate change.

Future plans call for a second water intake in the deep section of Sooke Lake, upgrades to water transmission lines, a new storage tank and pump station and an overland transmission main line.

"We're in great shape, thanks in part to decisions made by our predecessors [starting] more than 100 years ago," said Haesevoets. "We would still have enough water — even if it did not rain for the next two years."

Toad patrol

The tour of the Sooke reservoir area was too early to catch the migration of the western toad (Anaxyrus boreas) when they leave the lake and make their way into forested areas.

To ensure their survival, plastic berms have been installed along the side of the road adjacent to the lake. The berms have openings at certain points, corralling the amphibians and giving them a route to the other side.

During the migration, which takes place in a three-week window between July and August, service vehicles slow to a crawl, with one of the two-person crew walking ahead to ensure the path is clear and pick up stragglers.

During the height of the migration, crews are assigned to scoop up the young toads from behind the berms to deliver them to safety on the other side.

Another amphibian — the American bullfrog — won't get the white-glove treatment, however. Crews will dispose of any of the invasive species found in the area.

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