



Making a difference...together

## **Facts and Figures**

### **Greater Victoria Water Supply Area**

**July 2023**

---

#### **Greater Victoria Water Supply Area**

The Greater Victoria Water Supply Area is made up of 20,600 hectares of land in the Sooke, Goldstream, Council, and Leech watersheds. These lands are owned by the Capital Regional District and managed by the Integrated Water Services Department.

Water for the Greater Victoria Drinking Water Supply System is currently provided from the Sooke, Goldstream and Council watersheds. Together these watersheds comprise 10,980 hectares.

Sooke Lake Reservoir is the primary water supply reservoir and has been in active use since 1915. Water from the Council watershed is used to supplement flows into Sooke Reservoir. The four reservoirs in the Goldstream watershed are used as a secondary water supply source. The Goldstream reservoirs were first used for water supply in 1905.

Prior to the end of commercial sustained yield forestry in 1993, approximately 45% of the Sooke and 80% of the Goldstream water supply areas were logged. These logged areas were replanted and the forests are now regenerating.

In 1999, an agreement with the Province of BC and a private forest company enabled the CRD to expand their ownership of existing water supply catchment lands, eliminate a public road and rail grade through the Water Supply Area, and enhance the existing closed watershed policy.

Approximately 98% of the land that drains directly into the Sooke and Goldstream water supply reservoirs is now owned and managed by the Capital Regional District.

#### **Leech River Watershed**

It is estimated that water from the Leech River will be needed to supplement the water in Sooke Lake Reservoir sometime in the next 50 years depending on population growth and the success of improving the efficiency of water use. Water from the Leech River will be brought to Sooke Reservoir using a diversion tunnel constructed in the 1980s. The inlet and outlet of the tunnel have yet to be constructed.

In December 2007 the CRD purchased 8,791 hectares of the Leech River watershed for 59 million dollars. This purchase secured approximately 88% of the watershed of the Leech River above the

---

diversion tunnel as well as some buffer lands outside the watershed.

In August 2010 the CRD took ownership of an additional 832 hectares of land within and adjacent to the Leech River watershed. This land was purchased for three million dollars from Western Forest Products as part of a larger purchase by the CRD that included a substantial acquisition of land for regional parks. This purchase protects an additional 384 hectares of the Leech River watershed, including Weeks Lake. The lands outside the watershed catchment area may be sold or traded in the future to secure lands more desirable for the protection of water quality.

With both of these purchases, approximately 92% of the watershed of the Leech River above the diversion tunnel is now owned by the CRD for water supply.

Almost all of the forest in the Leech River watershed has been logged at least once. The area has been re-forested and projects are underway to enhance the rehabilitation of the area and improve water quality.

### **Ecosystems and Species**

The majority of the Sooke and Goldstream portions of the Greater Victoria Water Supply Area is located within the dry subzones of the Coastal Western Hemlock (CWH) biogeoclimatic zone. Wetter upland areas are within one of the two moist maritime subzones in the CWH zone.

Most of the Leech River watershed is within the two moist maritime subzones of the Coastal Western Hemlock biogeoclimatic zone. These subzones get more rain and snow in the winter. About one third of this watershed is within one of the drier subzones of the CWH.

Forests throughout the Greater Victoria Water Supply Area are dominated by Douglas-fir, with minor components of western-red-cedar, western hemlock, white pine, alder, maple, and arbutus. Unlogged stands of forest greater than 140 years old are concentrated on ridge tops, steep slopes and higher elevations. The oldest trees recorded to date are 700 years old Douglas-fir on Horton Ridge. Most of these older forest stands appear to have regenerated after large-scale wildfires. Smaller scale disturbances such as wind throw, root rot, snow press and small fires, create small patches of younger trees in these older forest stands. Wetlands and bedrock outcrops are dotted throughout.

Fire is a natural process in the Douglas-fir forests of southeastern Vancouver Island. However, active fire suppression over the last 70 years, and dense plantings of conifers after forest harvesting has resulted in a build up of forest fuels. CRD Integrated Water Services has assessed the hazard and risk associated with these higher loadings of forest fuels and has been reducing the forest fuel hazard around key water supply facilities. Work is underway on a program to identify and enhance existing natural forest fuel breaks to protect the Sooke Lake Reservoir catchment.

A wide range of wildlife species is found in the Greater Victoria Water Supply Area. Most species are associated with forest communities and favour large contiguous areas of forest. Large mammal species include black bear, cougar, wolves, Roosevelt elk, and Columbia black-tailed deer.

The Greater Victoria Water Supply Area is also home or a breeding place for a number of species at risk such as the northern goshawk, marbled murrelet, western screech owl, northern pygmy owl, ermine and the Vancouver Island subspecies of the American water shrew.

## **Sooke Lake Reservoir**

Sooke Lake Reservoir is the primary water supply reservoir within the Greater Victoria Water Supply Area and provides about 90% of the total water storage. Sooke Lake Reservoir supplies almost 100 percent of the water used by area residents.

Sooke Lake Reservoir is a combination of a natural lake basin and reservoir created by flooding portions of the surrounding watershed. The reservoir was originally created by constructing a 3.7 metre dam on Sooke Lake between 1913 and 1915. On May 28<sup>th</sup>, 1915 a small ceremony on Sooke Dam marked the official opening of the Sooke Lake water supply. The officials turned the valves and the water, for the first time, flowed from Sooke Lake Reservoir, into the flowline and Humpback Reservoir, and into the pipes for the city.

In 1967, flashboards were added to the spillway and the water level was increased 1.2 m. The reservoir level was increased by 5.4 m in 1970 by building a larger dam behind the first, and again by 6 m in 2002 by doubling the size of the 1970 dam.

At its maximum level, Sooke Lake Reservoir is 8.3 kilometres long with a maximum width of 1.6 kilometres, a maximum depth of 75 metres and a total volume of 160.32 million cubic metres (35.3 billion gallons), of which 92.7 million cubic metres (20.4 billion gallons) is useable for water supply. When Sooke Lake Reservoir is at its maximum level, the depth of the water at the intake is about 16 metres.

The natural catchment area for Sooke Lake Reservoir is 6,720 hectares. Sooke Lake Reservoir also receives water from a 1,068 hectare portion of the Council Creek watershed through a diversion pipeline and channel.

In the winter, the inflow to Sooke Lake Reservoir from precipitation greatly exceeds outflow for water supply. This relationship begins to balance off in March or April and from then until the return of the winter rains, outflow exceeds inflow and the reservoir level declines. The rate of decline is a direct result of the amount of water use. Typically, the use of water in the Greater Victoria area results in a drop of four metres in the level of Sooke Reservoir by October before the fall rains begin.

Sooke Dam is 20 metres high and 530 metres long. The current reservoir spillway is 186.75 metres above sea level, six metres above the previous spillway level.

## **Rithet Creek**

Rithet Creek is the primary tributary for Sooke Lake Reservoir. It supplies about 25% of the water entering the reservoir. The drainage area of Rithet Creek is about 1,740 hectares. The 100-year peak flow is about 44.7 cubic metres per second or 850 million gallons per day.

Low flows in Rithet Creek are about 0.05 cubic metres per second (one million gallons per day) in June to September. These flows can drop considerably in the driest summers.

## **Head Tank**

The Head Tank contains valves that automatically adjust in response to water use to maintain a constant water pressure in the water pipeline and Kapoor Tunnel.

## **Kapoor Tunnel**

The Kapoor Tunnel runs underground for 8.8 kilometres connecting the Head Tank with the Goldstream Ultraviolet Treatment Plant. The tunnel is 2300 mm in diameter and runs underneath Old Wolf Lake and Mavis Lake on its way to the treatment plant. Construction of the tunnel began in 1960 and was completed in 1969.

## **Deception Reservoir**

Water from Deception Reservoir is used exclusively for water releases to the Sooke River as part of agreements with the T'Sou-ke First Nation and federal and provincial governments to protect ecological values downstream of the Sooke Dam. Deception Reservoir can hold up to 4,100,000 cubic metres (900 million gallons) of water. The dam on Deception Reservoir was constructed between 1979 and 1981. The new spillway was constructed in 2002.

## **Goldstream Reservoirs**

The Goldstream Water Supply Area provides a secondary water supply for the Greater Victoria Water Supply System. Goldstream Reservoir is a part of a chain of four reservoirs within a watershed of 2,109 hectares. The other reservoirs are Lubbe, Butchart and Japan Gulch. The storage capacity of these reservoirs is approximately 10 million cubic metres or 2.2 billion gallons.

There are 11 dams on the four reservoirs (Butchart, Lubbe, Goldstream and Japan Gulch) in the Goldstream Water Supply Area. These dams were built between 1892 and 1914 and upgraded to meet modern seismic standards in the mid-1990s.

CRD Integrated Water Services releases water from the Goldstream reservoirs to maintain minimum flows in the Goldstream River. This water release is at the request of the Fisheries and Oceans Canada to sustain the salmon fishery in the river and meet the water requirements of the Howard English Fish Hatchery.

## **Flowline**

Before the Kapoor Tunnel was constructed in 1969, water was supplied to Victoria from Sooke Lake Reservoir via a 44 km long, 1,110 mm (42 inch) diameter concrete flowline to Humpback Reservoir. Up until 2009, the northernmost 20 km of the flowline continued to supply water to the community of Sooke as part of its primary water supply system.

In 2009, the flowline was replaced by a new underground water main to Sooke. This water main runs 14.5 kilometers from the Head Tank near the Sooke Reservoir dam along the old CN rail alignment and road alignments to a disinfection facility on Sooke River Road.

## **Disinfection**

Due to the high quality of the water in the supply reservoirs, there is no need to filter the water before use. Instead water from the water supply reservoirs is disinfected using ultraviolet light followed by chlorine and then ammonia to form chloramine. These treatments provide protection against naturally occurring organisms that could affect human health, including bacteria, viruses and parasites. The chloramine provides a residual disinfectant as the water travels through the pipes in the water distribution system.

The primary water treatment plant is located near the Goldstream River in the southeast portion of the Greater Victoria Water Supply Area. The water piped to Sooke is disinfected at a treatment plant on Sooke River Road.