



Water Wise 2006-2021.

Key points:

- Water reduction of over **31.6 %** comparing average 2018-2021 Scout Island pump station flow rates to pre- 2006 levels (average of 2003, 2004, 2005) when the Water Wise education program first started. *These figures are adjusted to remove industrial influences.*
- Summer (May-Sept) water use declined slightly at 39.6 % of annual use for 2021. It should be noted that 2021 was a very dry summer with 111 mm of precipitation compared to 240.8 mm in 2020. *These figures do include industrial use; monthly industrial data for previous years is not always available to make accurate adjusted figure comparisons.*
- Adjusted 2021 flow rates were 576 137 675 imperial gallons. In 2020 flow rates were 413 944 000, the lowest since 2002. As mentioned above, 2021 was a very dry summer and 2020 was a very wet summer.
- The population in the City of Williams Lake was 11505 in 2021, an increase of 146 over 2019 and is now at its highest since 2002. The population has been slowly but steadily increasing since 2013.
- Weather data shows precipitation patterns are changing with trends indicating large swings between years in precipitation patterns. While 2019 and 2020 were wetter summers, from 2015 on we have had four of the driest summers since 2002.
- A total of 72 classes received Water Wise in the 2020/21 school year, reaching 1590 students, teachers and parents. *(This reflects Water Wise sessions; classes and students will be counted twice if they participated in more than one Water Wise activity through the year).*
- The Water Wise program also has educational radio ads that run through the summer, regular newspaper articles, cooperates with local garden centres to distribute Water Wise gardening info, an extensive social media reach and a presence at local community events.
- The Water Wise Bike Brigade program was started again in 2021. During the summer months, CCCS staff and summer students from the Potato House monitored summer watering behavior on a weekly basis. They provided education where appropriate, and left behind educational materials as necessary.

Summary: Water Wise was first introduced in the summer of 2006, and education programs began in the schools in the fall of 2006. We now have 14 complete years of water consumption data to assess patterns of water use in this time. The years 2007-2021 were used to assess efficacy (*2017 data is excluded, when the fires and evacuation of Williams Lake makes the flow rate data unrepresentative of residential use*). The data continues to show consistent and significant reductions in overall City water consumption since 2006.

There are many factors to consider when evaluating flow rate data. The primary influences on flow rate identified for this report are:

- fluctuating industrial water consumption
- variable precipitation patterns
- changing population levels

These variables could change water consumption significantly and would not be related to the education program.

Fluctuating Industrial Use:

To account for this, water flow rate figures were adjusted, to remove as much of the influence of primary industrial users as possible. These adjusted flow rates are as accurate as possible given the available information and more than sufficient to display trends.

Using these adjusted figures, the average water consumption from 2002-2005 was 768 505 000 imperial gallons. These years were averaged to more accurately show 'pre' Water Wise consumption. The average 2018-2021 flow rate was 545 014 635 imperial gallons. These three years were also used in order to reduce annual variation. **This represents a 31.6% decrease in consumption from pre 2006.**

Summer water flow rates (May, June, July, Aug) 2003-2005 averaged 44.9% of annual flow rates. Summer flow rates 2018-2021 averaged 38.6% of annual flow rates. *These figures are not adjusted for industrial use. 2018 and 2021 were both drier than average summers, 2019 and 2020 were wetter than average summers.*

Weather:

Climate data was investigated for the last 20 years using Environment Canada (EC) monthly records and precipitation patterns broken down both annually as well as on a summer basis (May-end of August).

2002-2006 average annual precipitation was 433.2mm. Average summer precipitation (May-Sept) was 170.2mm.

2007-2012 average annual precipitation was 456.29 mm. Averaged summer precipitation was 206.9 mm.

2018-2021 average annual precipitation was 512.93 mm. Average summer precipitation was 176.6 mm. (2021 summer precipitation was 111 mm).

2018-2021 average snowfall was 186.8 cm. 2002-2005 average snowfall was 153.13 cm.

Climate data shows a shift in precipitation trends over the last 20 years with big swings in precipitation between years. In the last seven years, we have had three of the driest summers since 2002 (2015, 2017 and 2018 and 2021), but also four of the wettest (2014, 2016 and 2019, 2020). This is quite visually apparent on

the graph at the end of the report. It should be kept in mind that using averages in precipitation is becoming less useful as we are seeing these bigger weather swings and gives no idea of the distribution patterns of rainfalls. Occasional intense downpours will affect lawn watering patterns differently than regular repeated gentle rains, even though the same quantity of rain may fall over the summer.

More relevant is overall summer water use, which for 2018-2021 was at 38.6% of total water use, representing a consistent reduction in summer water flow rates compared to 2002- 2006 levels of 45.4%, a pattern evident in dry as well as wet summers. This can most likely be attributed to reduced lawn watering in response to rising Water Wise awareness, but it should be also recognized that these figures have not removed the impact of industrial use.

Climate models tend to predict a slight overall reduction in quantities of annual precipitation in the Williams Lake area into the future. They consistently predict more of our annual precipitation will fall as rain rather than snow, with subsequent reduced spring snow packs and direct negative implications for aquifer recharge as well as earlier irrigation start-up. The Environment Canada precipitation data assessed for this report so far suggests large variations between years, making obvious trends difficult to assess. Looking at averages, the years 2017-2021 actually had higher average precipitation to the years 2002-2006 (433.16 mm 2002-2006, 473.28 mm 2017-2021); but as noted above, the most distinct pattern over the last several years is that we are seeing big swings between drier than average summers interspersed with wetter than average summers making it harder to predict a 'normal' Cariboo summer.

Population:

Population statistics were obtained from BC Statistics.

(<http://www.bcstats.gov.bc.ca/StatisticsBySubject/Demography/PopulationEstimates.aspx>).

BC stats figures show there were 11 611 residents in City limits in 2001, 11 048 in 2006, 11 164 in 2011, 11 215 in 2015, 11 292 in 2017, 11 359 in 2019 and 11505 in 2021, indicating a steady increase in overall population from a low in 2013. Graphs showing how population correlates with water use are presented at the end of this report.

Conclusion:

Given there are infinite different ways to analyze data, this report is approached as an overview, looking at trends and averages rather than focusing on specific details as there can be considerable monthly/annual variations, variables to account for and some gaps in data. The results continue to show marked reductions in water use that is being sustained through both summer and winter months compared to water use patterns pre- Water Wise, even in drier summers and with a higher population.

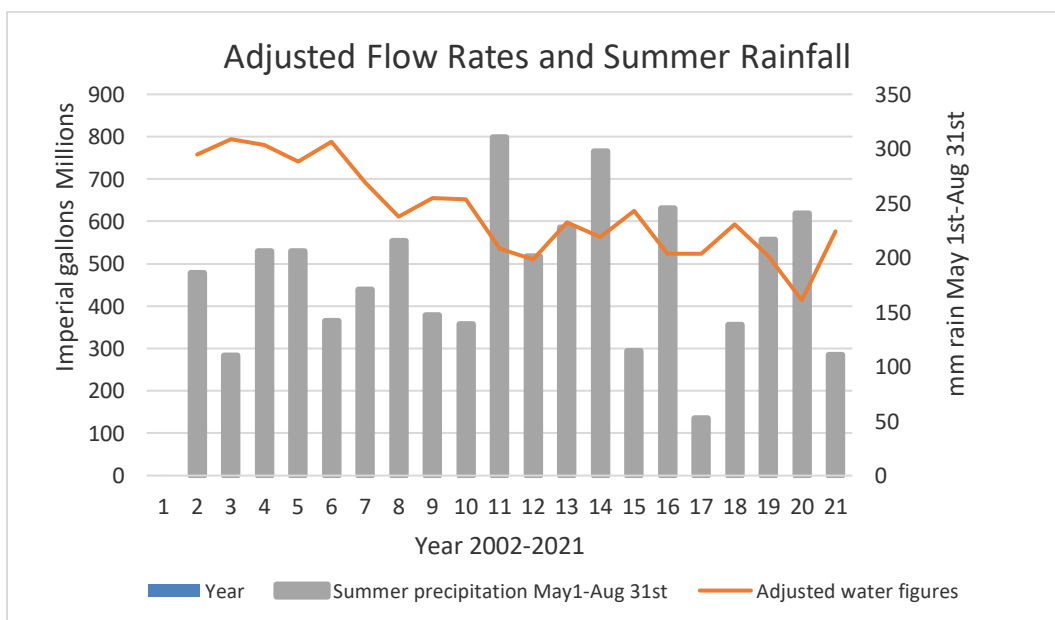
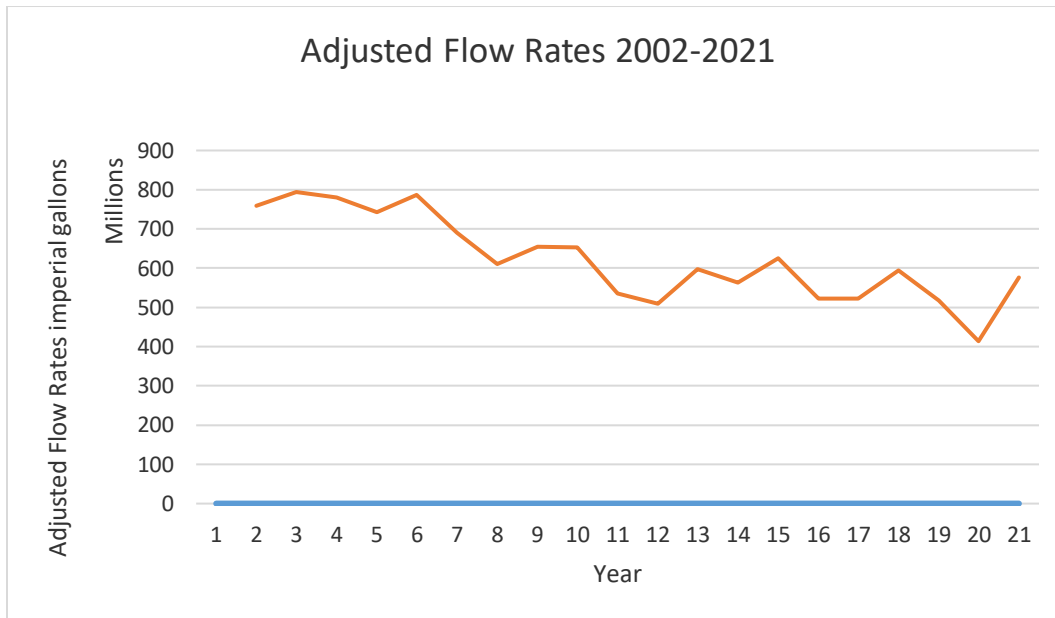
As previously mentioned, reduced snow packs and rapid spring melts are likely to affect the future recharge of the aquifer and earlier spring starts to lawn irrigation, making it more essential than ever that the City of Williams Lake continue to be 'Water Wise'. Apart from the direct benefits to preserving the City aquifer, reduced water consumption also saves considerable money in operating costs (electricity, infrastructure).

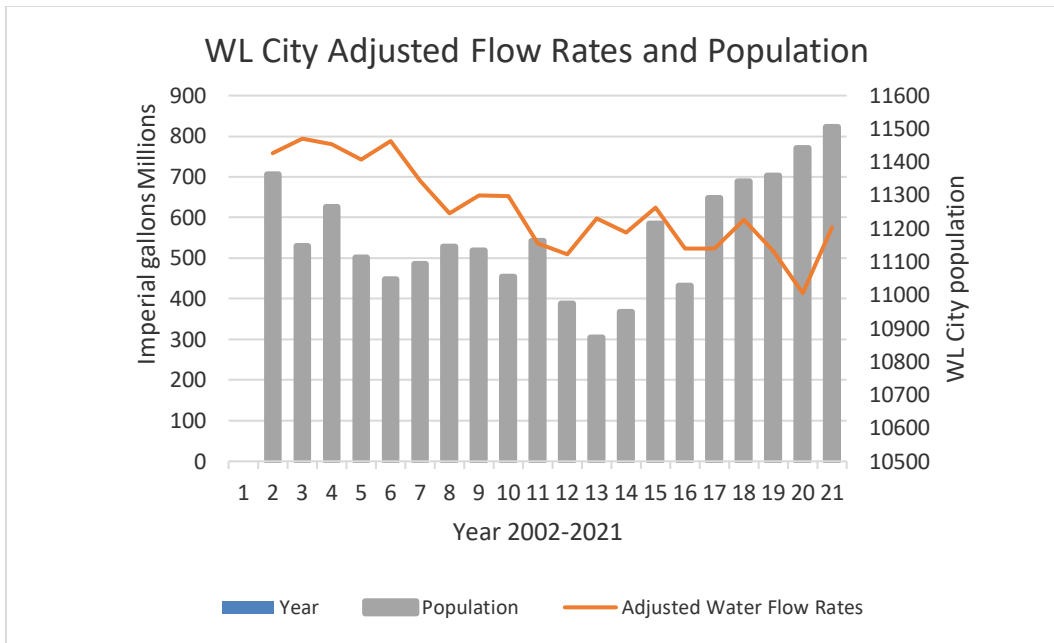
Public Education programs are sometimes hard to evaluate, as changing behavior patterns and 'ways of thinking' can take many years, without immediately apparent effects. Tying behavior to costs usually works faster; (such as installing water meters). In this case we see a considerable decline in water consumption

without meters and correlating with the onset of the education program. Ongoing and consistent education will help to sustain and continue this trend long term.

Please see graphs below. *Flow rate statistics for 2017 have been left at 2016 levels so that trends are still evident on the line graphs; population statistics for 2017 are accurate. Rainfall statistics for 2017 are as accurate as the data available; there are some missing data points from EC data in July 2017, but these should have no effect as there was no rainfall in that month.*

For more info on this report or the data used, please contact Jenny Howell, Cariboo Chilcotin Conservation Society (250) 398 - 7929 or jhowell@xplornet.ca.





Where are Williams Lake residents saving water? An alternate approach to Water Wise Stats:

Below are a few of the water saving tips recommended by Water Wise with some estimates of possible savings. These are very conservative estimates; if added up they only represent less than 2 % of the actual reduction in water use seen.

Turn it Off Campaign:

If 1/3 of the students/families got the message to turn off the tap when brushing teeth and shaving:

$$700 \text{ people} \times 800 \text{ litres per month} \times 12 = 6720000 \text{ litres saved per year (1480176 imp gallons)}$$

If ¼ of the people in WL reduced their shower time by 5 minutes (assuming standard shower head), that would save roughly 18000 litres per person per year each.

$$2803 \text{ people} \times 18000 = 50454000 \text{ litres per year saved (11113215 imp gallons)}$$

Installation of low flow toilets and low flow shower heads will also be having a high impact.

Healthy Lawns: If half of the people that picked up Healthy Lawn signs stopped watering their lawns for 10 weeks (and assuming they were previously watering minimally at 30 minutes once a week), water savings would be:

$$10 \text{ weeks} \times 30 \text{ minutes} \times 100 \text{ homeowners} = 30\,000 \times 19 \text{ litres a minute} = 570\,000 \text{ litres saved (approx. 125550 imp gallons)}$$

Xeriscape gardeners planting low water use plants will add to these savings.

Sweep Don't Hose

If 1/10 of the people asked to sweep not hose, actually do:

$$400 \text{ people} \times 3 \text{ times} \times 30 \text{ min} \times 19 \text{ litres} = 36,000 \times 19 / \text{min} = 684\,000 \text{ litres saved per year (150661 imp gallons)}$$