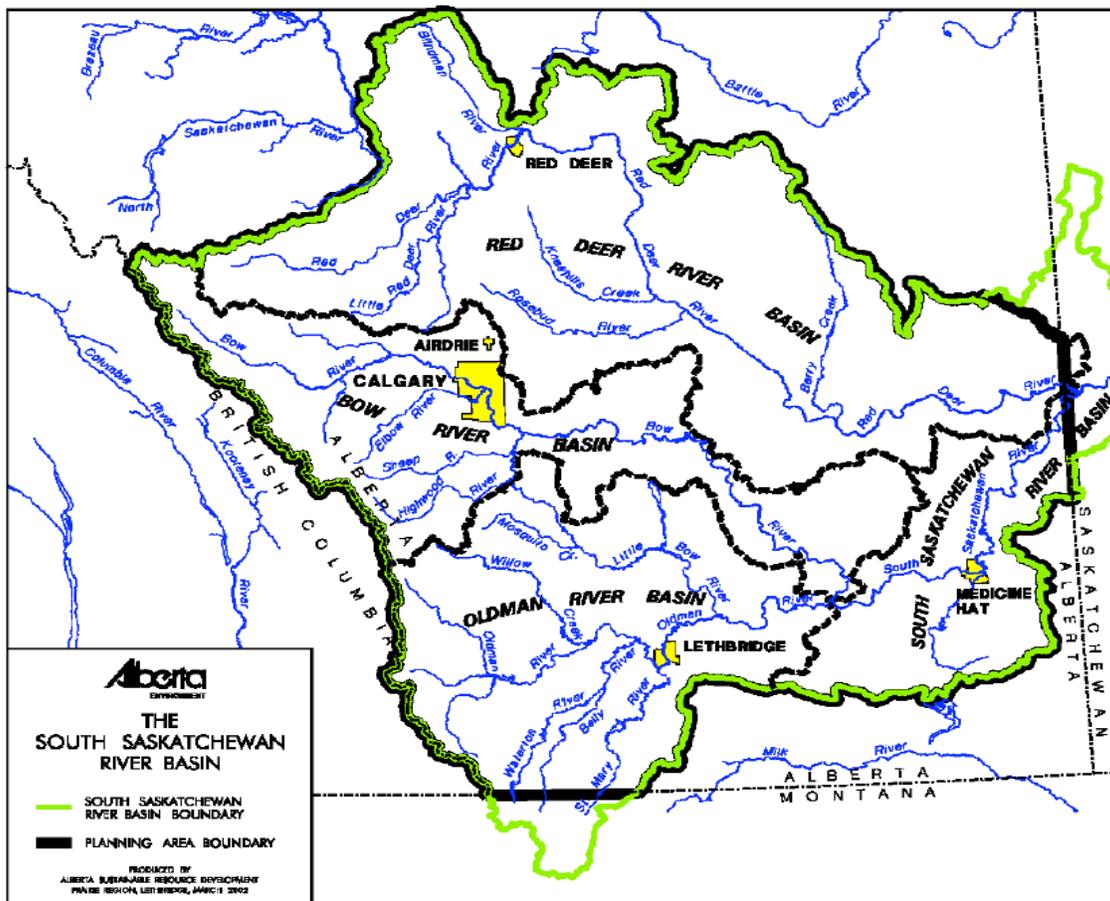


Assessment of Current and Future Pressures on Elbow River Water Supply and Demand

At the April 25, 2007 AGM, members raised concerns about how future trends in Elbow River flows may affect the security of the Wintergreen potable drinking water supply, especially in the context of the Co-op expanding service delivery to include the proposed Aspen residential development. This update relies primarily on information from Alberta Environment to clarify existing and future water supply and demand pressures on the Elbow River. The starting point for this update is the South Saskatchewan River Basin or SSRB.

The SSRB includes the Bow River sub-basin, and its tributaries - one of which is the Elbow River (Figure 1). The distribution of mean annual natural flows in the SSRB consists of: 43% Bow River sub-basin, 38% Oldman, 18% Red Deer and 0.7% Lower South Saskatchewan.

Figure 1: South Saskatchewan River Basin, showing the Bow River System and Elbow River Tributary



Historical monthly and annual average flow rate data for the Elbow River at Bragg Creek from 1935 to 2005 is available from Environment Canada (source: http://www.wsc.ec.gc.ca/hydat/H2O/index_e.cfm, type in Bragg Creek at "Station Name"). The data excludes annual average flows from 1935 to 1975 because of missing monthly flow rates. Annual average flow rate for the Elbow River at Bragg Creek is presented in Figure 2, and surprisingly shows a strong increased trend in flow rate over the period. If 2005, the flood year, is excluded the increased trend in flow rate remains but is reduced (Figure 3).

Figure 2: Annual Average Flow Rates, Elbow River at Bragg Creek

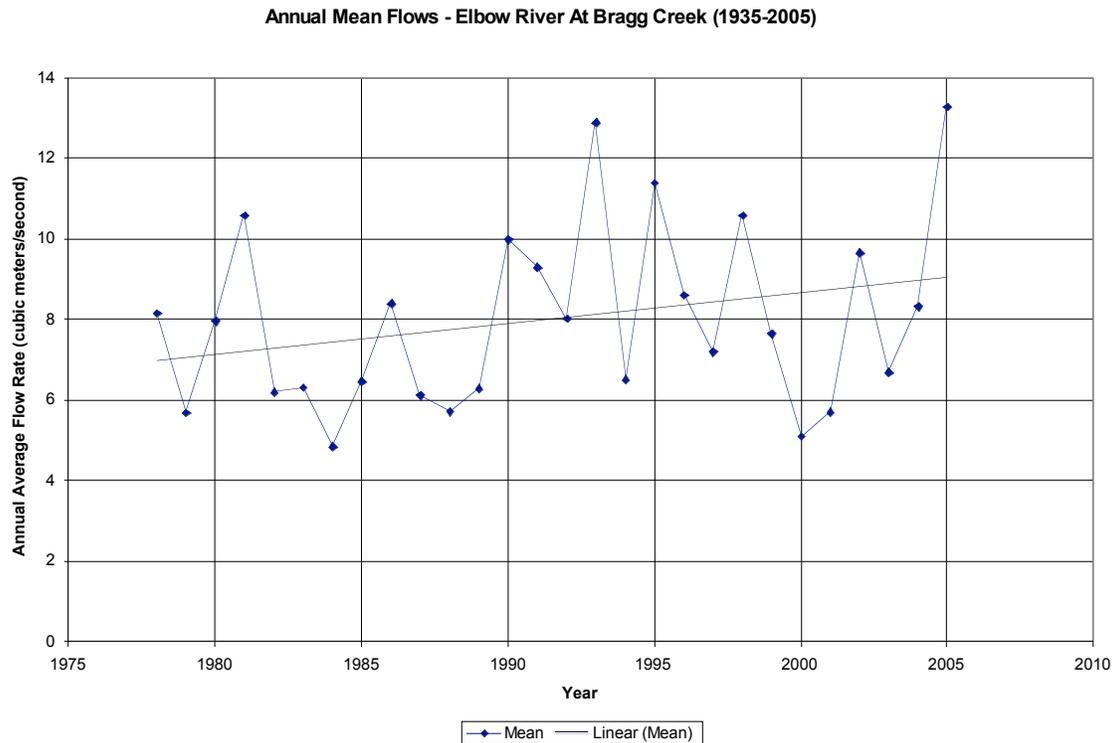


Figure 3: Annual Average Flow Rates, Elbow River at Bragg Creek – excluding the 2005 Flood Year (another recent flood year was 1993).

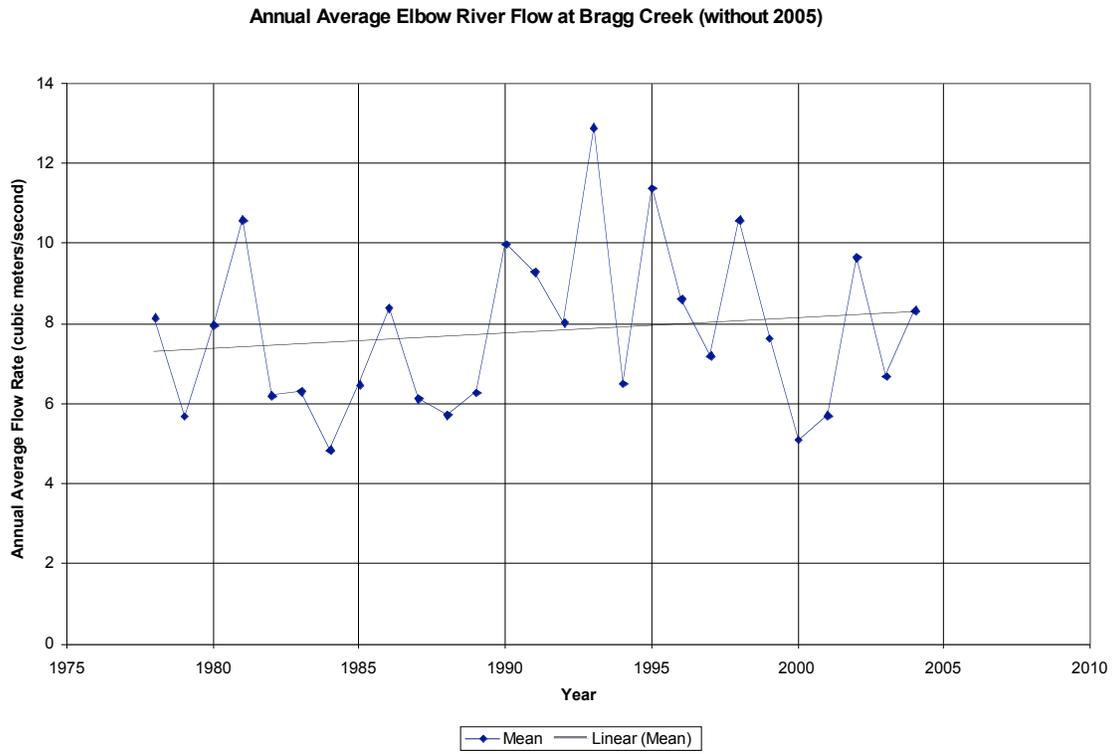


Figure 4 shows the Elbow River flow rate for June and July for the period 1935 to 2005. The trend during this period is relatively flat, showing no overall decrease in flow. If the 2005 flood year is excluded, a slight decreasing trend is suggested for June (Figure 5).

Figure 4: Historical June and July Flow Rates, including 2005 Flood.

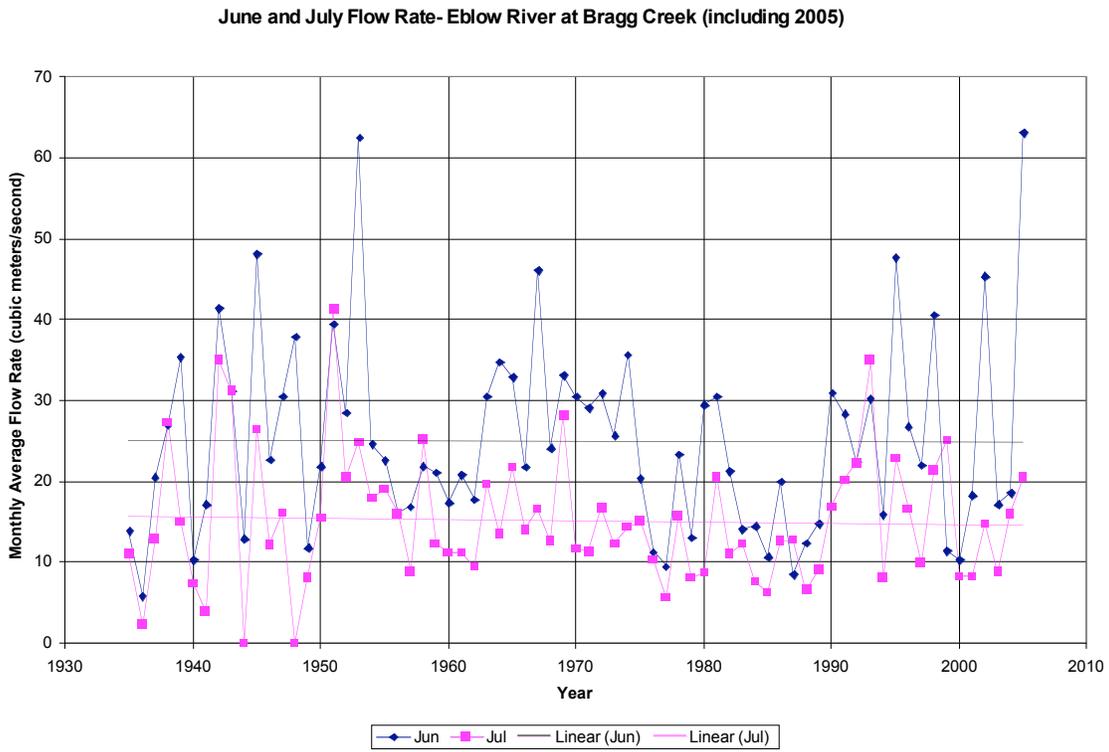
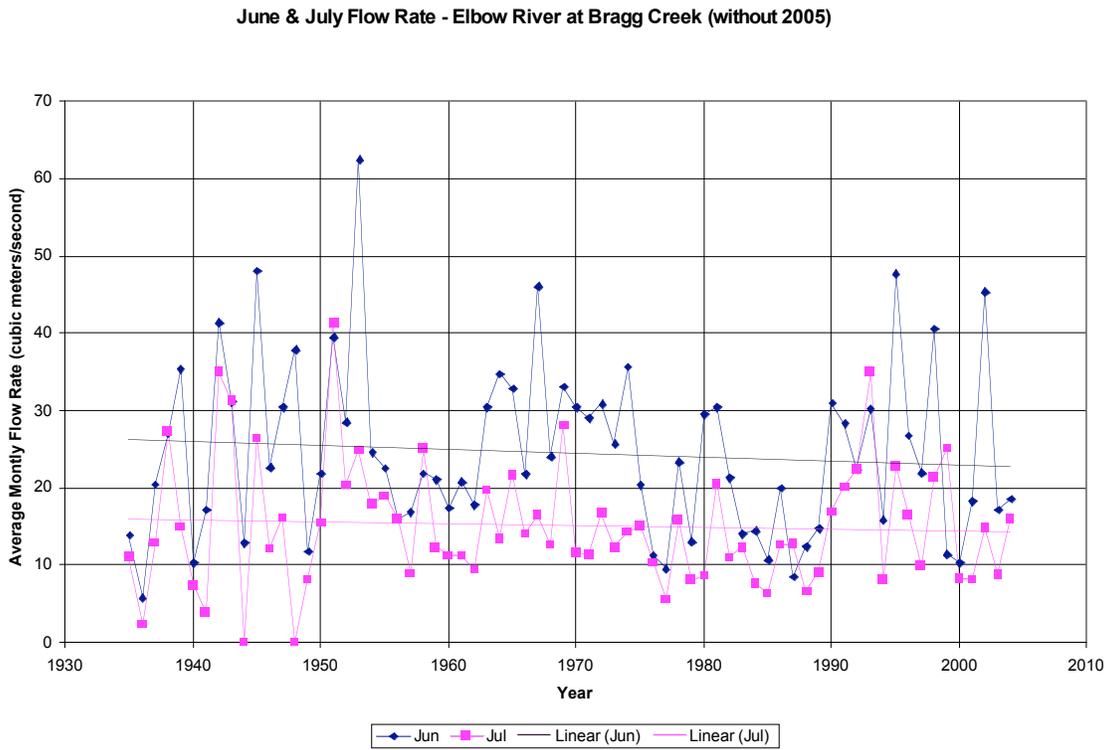


Figure 5: Historical June and July Flow Rates, excluding 2005 Flood.



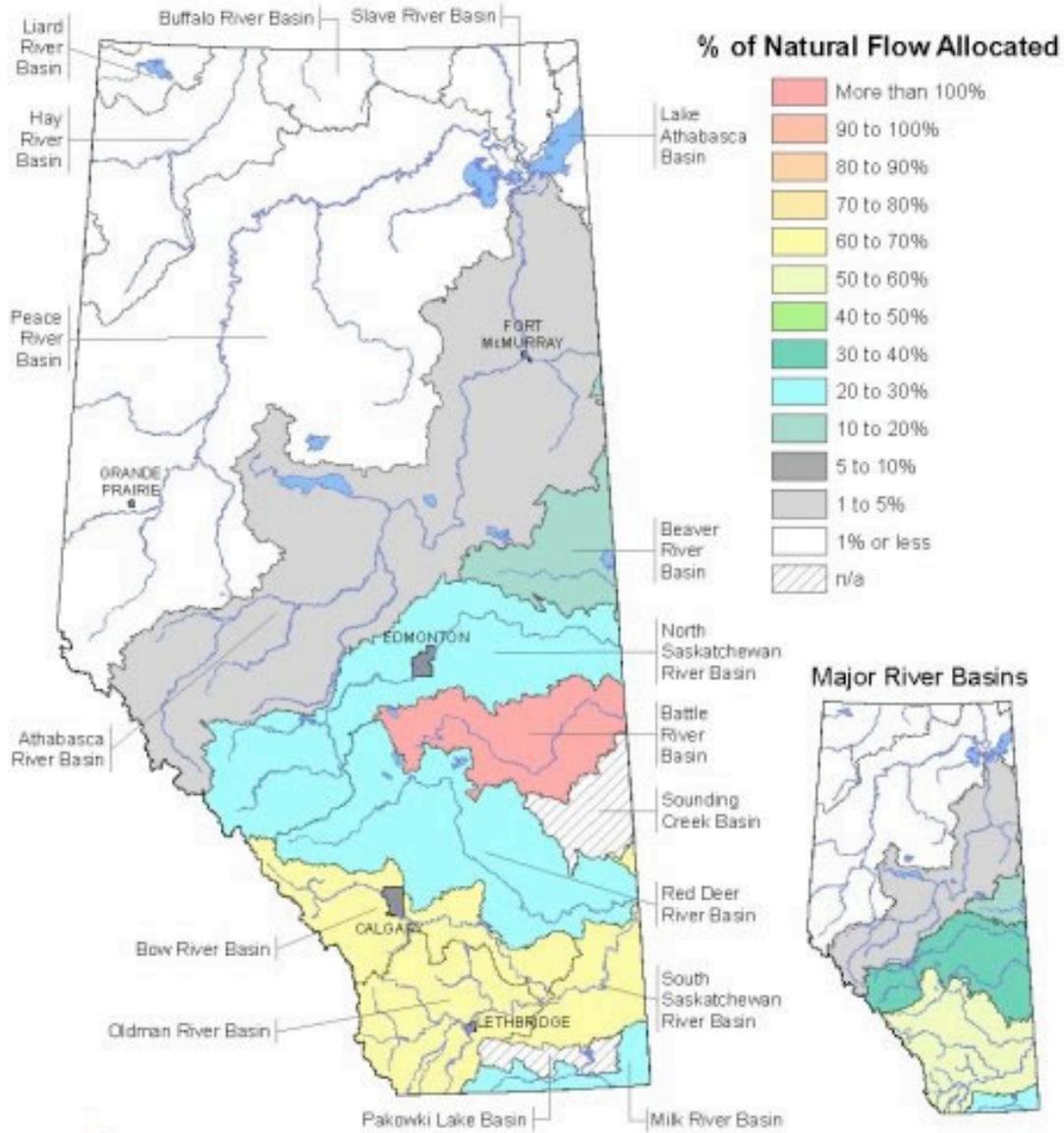
The allocation and assessment of current and future sustainability of water demand in the Bow River sub-basin, which includes the Elbow River, are not good. Figure 6 shows that in 2005, 60 to 70 % of the natural flow of the Bow River sub-basin, which includes the Elbow River tributary, have been allocated through river licenses issued by Alberta Environment.

Approximately 20,000 licences have been issued by Alberta Environment in the SSRB. Licenses are issued to municipalities, private companies, individuals and others through an application process seeking permission to use river water. This water may be used for drinking, irrigation, industrial processes and many other uses. A licence allocation sets out the maximum volume that can be used under the terms of the licence. The allocations presented in Figure 6 are based on these licenced maximums and not what is actually being withdrawn from the SSRB. In addition, water returned to river system is also not captured. For instance, The City of Calgary withdraws water from the Bow and Elbow River, and a significant portion of that water is returned to the Bow River as treated sewage effluent.

Alberta Environment rates water demand in the SSRB as very high, with allocations approaching 70% of natural flows upstream of the river's junction with the Red Deer River.

Figure 6: Allocations of SSRB as indicated by Bow, Oldman, Red Deer and South Saskatchewan Rivers sub-basins.

Allocations in 2005 by River Basin Compared to Average Natural Flow



Note that allocations do not represent actual water use - only the maximum amount that can be used under the terms of a license. For further explanation please refer to the text in the section "Why is it important?"

Alberta Environment in a June 2003 report, “South Saskatchewan River Basin Water Management Plan Phase Two: Background Studies” assessed the future sustainability of water demand pressures on the SSRB. In terms of the Bow River sub-basin, which includes the Elbow River, Alberta Environment writes the following:

- “In the Bow sub-basin, junior allocations and commitments have frequent, substantial deficits. Existing instream objectives are frequently not met above Bassano. They are always met below Bassano, but instream flows are frequently at the instream objective value of 11.33 m³/s (400 ft³/sec).” Instream objectives are flows that are to remain in a river via dam operations or as a restriction on licence holders. Although instream objectives are in place in all the SSRB rivers below the dams, some offer limited protection of the aquatic environment.
- New licences issued in the Bow River sub-basin have a significant risk of not getting water in drier years in the future. Note the emphasis on new licences.
- Instream flow needs for aquatic life and recreation on the Bow River downstream of major water withdrawals requires more flow than is presently available. With existing allocations, restoring flow to these reaches would be very difficult.
- Forecasting to 2046 suggests that the Bow River will have the largest non-irrigation water withdrawal accounting for 44% of the SSRB total and the largest volumetric increase in water withdrawal accounting for a 202% increase over 1996 levels.
- Municipal water use in the SSRB account for the majority of water withdrawals with the percent allocation declining from 49% in 1996 to 40% in 2046 as a result of water conservation measures.
- Industrial water use in the SSRB is expected to grow from 17% in 1996 to more than 28% in 2046.
- On a per capita basis, and due to water conservation and management initiatives, per capita withdrawals in the SSRB are expected to decrease from 659 m³/person/year in 1996 to 585 m³/person/year in 2046. Similarly, consumptive use is expected to decrease from 363 in 1996 to 331 m³/person/year in 2046. The population during this period is expected to grow by 245% to 3,180,000 by 2046. Consumptive use is the balance of water taken from a source that is not entirely or directly returned to that source. Current WWU water use is approximately 300 m³/household/year, which compares very favourably to the above consumptive target for 2046 of 331 m³/person/year.
- “Managing the SSRB to meet instream flow needs (IFNs) for the aquatic environment is not possible because of existing allocations. A 20 per cent reduction in water consumption provides a modest increase in instream flows but these are still substantially below the IFN values.” Instream Flow Need is a

scientifically determined amount of water, flow rate or water level. Instream needs / instream flow needs are the quantities of water and water quality conditions needed to sustain river processes and the associated ecosystems over the long term.

As a result of these concerns, Alberta Environment in August 2006 placed a moratorium on accepting and approving new water licence applications for the Bow River sub-basin. New water allocations remained available but only through transfers of existing water allocations.

The Wintergreen Water Co-op is obliged to consider all applications submitted by new users. Within the guidelines set by Alberta Environment, it would be considered advantageous to share any excess water capacity with others.

In the future if the amount of water in the Elbow River decreases, as some predict, or if water demand increases, then water conservation measures would become increasingly more important not only for us but for all users along the Elbow River and other river systems.

The Water Co-op is considering all aspects of this issue and will keep the residents advised as issues arise.

June 2007