

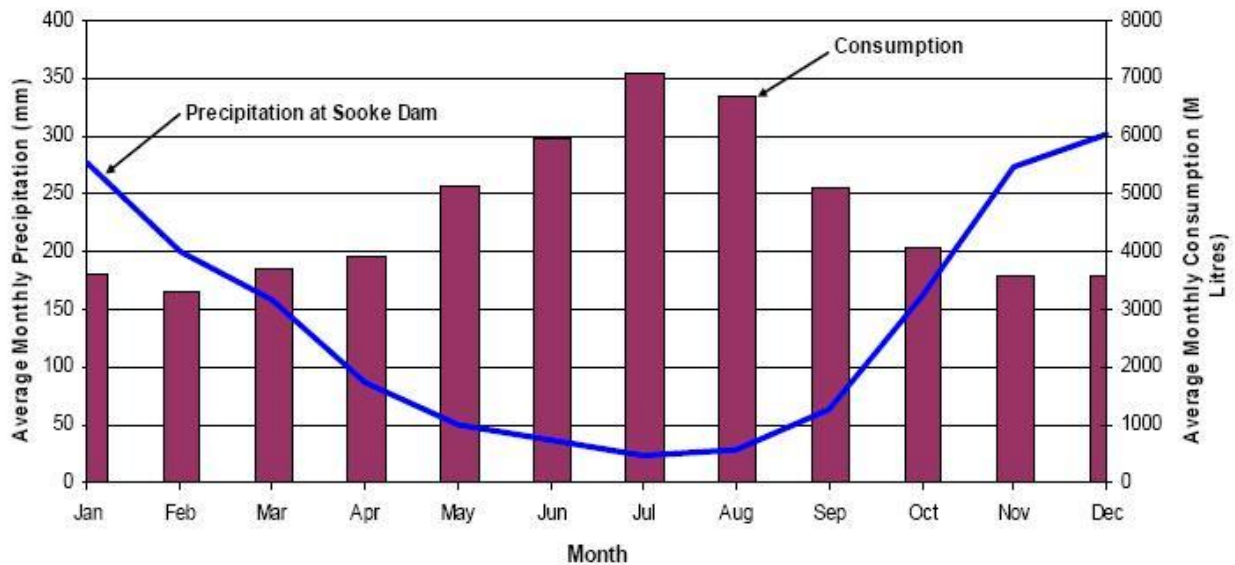
APPENDIX 13

Water Conservation & Regional Source Control Programs

Potable Water Conservation Efforts & Demand Side Management

The water supply for the Greater Victoria area is comprised of Sooke Reservoir, the Goldstream Reservoirs (Butchart, Lubbe, and Goldstream) plus supporting reservoirs like Fulton. Sooke Reservoir contains 90% of the available total storage capacity and the other sources are for back-up and emergency purposes. The basic principle of operation of the water supply is to collect precipitation runoff in the winter and store it for use during the summer and fall. Storage capacity in Sooke Reservoir is 92.7 Mm³ (20,400 mgal) while the Goldstream Reservoirs can store 9.8 Mm³ (2,150 mgal).

Figure 5: Average Monthly Precipitation and Consumption of Potable Water in CRD (CRDWATER 2008)



Summer water consumption is a key challenge for CRD. There is a mismatch between water supply and consumption in the region during the summer and winter months with a winter surplus of 1226 mm and a summer deficit of 138 mm (per CLIMATE 2007). In 2002 the CRD increased the level of the Sooke Reservoir by 6 metres which resulted in a 78% increase in storage capacity. This increase is forecast to meet regional demand beyond 2050 (per *Water Use and Conservation Update 2008*, CRD).

CRD's 2004 *Strategic Plan for Water Management*¹ outlines key goals for limitations on future expansion of supply of potable water facilities including:

- Expansion of demand management programs, or of supply capacity, should be based on growth in water demand not on population growth (since water demand is growing at a slower rate than population growth, and per capita consumption levels are falling for both indoor and outdoor water demand).
- Rainwater recycling programs may be economic for intensive agricultural users.
- While in 2004 when the report was commissioned, grey water reuse was deemed uneconomic, technically complex, requiring skilled operators to ensure that public health is not put at risk, the plan concluded opportunities should be sought by CRD to facilitate installation of grey water recycling systems in the future in both the residential

¹ The plan is available at the CRD website document library: www.crd.bc.ca/reports/water_/index.htm

and ICI sectors when the technology becomes more user friendly, reliable and cost effective.

As noted in the CRD planning document *Water Use and Conservation Update 2008* (section 6 – Integrated Resource Management):

“Treated wastewater effluent is a possible future water source for irrigation in Greater Victoria, potentially offsetting municipal water demand while reducing wastewater effluent discharges to the marine environment. The extent of wastewater effluent use depends upon several factors, including the proximity of wastewater treatment facilities to large landscape irrigation demands (e.g. playing fields, parks and golf courses), as well as sufficient indoor demands (e.g. toilet flushing and laundry) to make year-round use of the treatment facilities that are needed to produce reuse-quality effluent. Also, new developments that are designed to include treatment facilities and non-potable water distribution systems are more likely to be cost-effective applications of water reuse than retrofits of existing buildings and neighbourhoods.”

Water Conservation Efforts

CRD has implemented a staged restriction regime for residents during summer months focused on lawn watering limitations. Such plans do not impact wastewater treatment capacity plans since such water does not enter the collection system. CRD also manages community education and training programs in the areas of water conservation, lawn care, water leak repairs and other water saving strategies.

As documented by Associated Engineering/CH2M Hill in discussion paper 033-DP-2, it is estimated that if aggressive residential indoor water conservation programs were implemented then wastewater volumes could be reduced by 15% per-capita (assuming a 50% compliance rate). CRD staff estimate actual new incremental savings based upon current usage will only be 7%. CRD upgraded its building code for ultra low flow toilets and other water-saving plumbing fixtures in 2005. The Provincial building code was updated in September 2008.

Table 7: Possible Per-Capita Volume Reductions for Residential Indoor Water Conservation Efforts

(AE et al. 2008-2009, DP-033-2)

Usage Component	“Current” Usage	“Future” Usage	Comments
Toilets	5 flushes/day @ 12L/flush = 60L	5 flushes/day @ 6L/flush = 30 L	Replace typical 12 L/flush toilets with 6 L:/flush models
Clothes Washer	0.37 washes/day @ 155L/wash = 55L	0.37 washes/day @ 50 L/wash = 19L	Replace typical washing machine with CEE Tier 3 Washers (50L/wash)
Baths/Showers	45 L/day	45 L/day	Fixtures difficult to enforce so assume no change
Faucets	41 L/day	41 L/day	Fixtures difficult to enforce so assume no change
Dishwasher	4 L/day	4 L/day	Small usage so ignore
Leaks	16 L/day	16 L/day	
Subtotal	221 L/cap/day	155 L/cap/day	
Assume 50% Compliance	221 L/cap/day	155 L/cap/day	

Since water conservation programs were introduced by the CRD in the mid 1990s, the total annual water consumption per capita has decreased by about 8% as a result of increasing public awareness of water issues and the CRD's comprehensive demand management program which includes:

Residential Water Conservation Programs

As more than 70 per cent of the water supply is used for residential purposes, a number of residential water conservation programs are currently being implemented, including the following:

Rebates:

The CRD offers rebates to Greater Victoria homeowners from installing efficient toilets, showerheads, high efficiency washing machines, irrigation controllers and rain sensors.

School Programs:

The CRD in conjunction with educators has developed two school curricula supplements used in every public and most private schools in Greater Victoria at the Grade 2 and Grade 8-10 levels students about water conservation using video, audio and written materials supplied by the CRD.

Public Events:

Every year, CRD water conservation staff attend and distribute educational resources and program information at more than 60 public events, reaching more than 20,000 people annually.

Workshops

The CRD delivers workshops on native plants and irrigations system design and maintenance to homeowners.

Water Conservation Bylaw:

More than a quarter of the total annual water supply to Greater Victoria is used for irrigating lawns and gardens. The CRD's Water Conservation Bylaw establishes watering schedules and prohibits wasteful water uses.

Publications and Website:

Several fact sheets, manuals and brochures and a website (www.crd.bc.ca/water/conservation) have been developed to support the CRD water conservation programs.

Industrial, Commercial and Institutional (ICI) Water Conservation Programs

Nearly 30% of municipal water in Greater Victoria is used by ICI sectors. The following water conservation programs were developed to address the diverse needs of this sector:

Grants and Rebates:

Grants are provided annually to Greater Victoria schools for water conservation retrofits. Rebates are also available for replacing inefficient toilets and eliminating once-through cooling systems that waste large volumes of clean municipal water.

Audits and Technical Services:

The CRD offers free water use and efficiency audits to businesses, including access to specialized instruments and expertise.

Industry Education:

Water conservation education provided for businesses include specialized workshops, displays at trade shows, talks at industry events and various publications. Key program targets include food service facilities and landscape irrigation. The CRD has, in conjunction with the BC Irrigation Association, has developed an irrigation installer certification program allowing installers to obtain Level 1 and Level 2 certification.

In addition to the above CRD water conservation programs, some municipalities have implemented charging for sewer system costs based on metered water use (usually winter water use). This provides an additional incentive to reduce indoor water use.

I&I Versus Demand Management

If CRD implements aggressive residential water conservation programs then wastewater volumes could be reduced by 7% to 15%. However such reductions are small when compared to the benefits of reducing I&I. As noted elsewhere in this Business Case, storm water occasionally results in wastewater volumes over 200% of average daily rates during wet weather months, and peaking by as much as 400% has been experienced in the past. Capacity planning decisions for wastewater treatment within CRD are heavily influenced by I&I assumptions as well as the permitting flexibility CRD is allowed during wet weather flow periods.

Regional Source Control Programs

The CRD manages an extensive Regional Source Control Program (RSCP) to reduce the amount of contaminants that industries, businesses, institutions and households discharge into the region's sanitary sewer systems in order to protect sewage collection and treatment facilities, biosolids quality, public health and safety, and the receiving environment. The source control program is a key component of effective wastewater treatment and will form an integral part of the core area wastewater treatment strategy.

CRD's RSCP bylaw was approved in 1994 and implementation of a region-wide program began in 1995 with regulation of larger industries under a permit system, followed by adoption of the first regulatory codes of practice (COP) for commercial sectors in 1999. COP were developed, adopted and implemented by the end of 2005, to regulate discharges from approximately 2,200 businesses within 11 sectors.

The CRD has been tracking the performance of this legislation since 1990 and achievements include the following:

- Effluent trends for Clover and Macaulay Points over the period 1990 to 2008 include significant reducing trends in loads of metals, cyanide, organic compounds and oil and grease discharged to the environment at both outfalls.
- Studies also show continued reductions in priority metals loads (chromium, mercury, cadmium, lead, nickel, silver and zinc) ranging up to 26% decrease per year and significant reductions in loads of organic compounds, including 1,4-dichlorobenzene, tetrachloroethene (Perc), toluene and xylene ranging up to 18% decrease per year.

- Trends for metals levels in biosolids produced at the Saanich Peninsula wastewater treatment plant show significant decreases of such priority metals ranging up to 30% per year.
- Biosolids quality at Saanich Peninsula wastewater treatment plant continue to meet Class A criteria. Mercury concentrations in biosolids were maintained at a very low level, likely as a result of the continued implementation of the dental COP since 2001.

The “Medications Return Campaign”, a new initiative under CRD’s “Clean Water Begins at Home” residential outreach project, was launched in 2008 with goals of promoting awareness of the existing provincial medication return program and reducing the disposal of expired or unused pharmaceuticals into local sewers and solid waste streams. A follow-up survey showed that an estimated 745 kg of medications were collected and 57% of participating pharmacies registered an increase in the amount of medication returns.