Water Quality

Alberta GPI

Noteworthy:

- Total nutrient loadings in pulp mill effluent have decreased in northern areas due to technological upgrades and stricter laws.
- About 75% of Alberta's municipal population now has tertiary sewage treatment (see adjacent figure).
- Global climate change is predicted to negatively affect the province's water resources.
- Alberta's Water for Life Strategy has three goals: safe, secure drinking water supply; healthy aquatic ecosystems; reliable, quality water supplies for a sustainable economy.

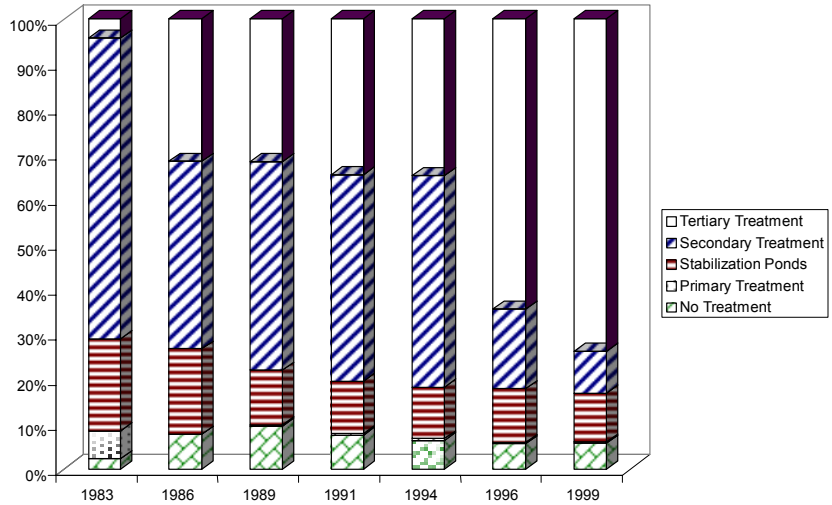
What is the state of Alberta's water quality?

Better sewage treatment has led to a general improvement in bacterial indices downstream of major urban centres. However, urban runoff still contains nutrients, metals and pesticides from commercial, industrial, vehicular and residential sources. There are also concerns about the impact of agriculture and the energy industry on the province's surface water and groundwater.

In terms of water resources, rivers flowing through dry areas of southern Alberta are being used to capacity. And global climate change is predicted to negatively affect the province's water resources. Many of Alberta's rivers originate in the Rocky Mountains, where increases in average annual temperature are already affecting glaciers; the Athabasca glacier has receded over 1.5 km in the last century and its volume is declining by more than 16 million cubic metres each year.

To respond to these and other issues, the Government of Alberta developed *Water for Life: Alberta's Strategy for Sustainability.* According to Water for Life: "Population growth, droughts and agricultural and industrial development are increasing demand and pressure on the province's water supplies, and the risk to the health and well-being of Albertans, our economy and our aquatic ecosystems." Alberta's Water for Life Strategy has three goals: safe, secure drinking water supply; healthy aquatic ecosystems; reliable, quality water supplies for a sustainable economy.

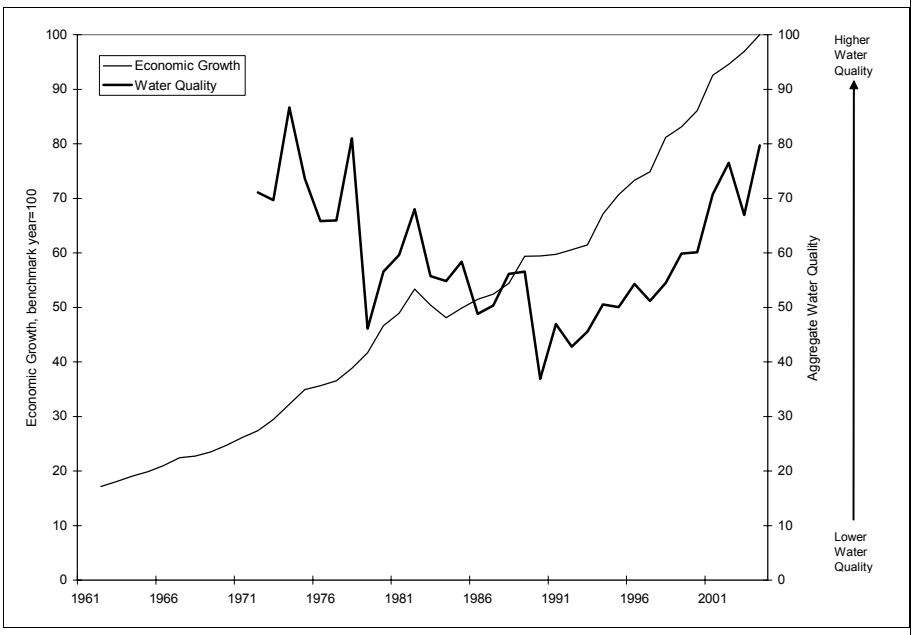
Percent of Alberta's Municipal Population with Primary, Secondary, and Tertiary Sewage Treatment, 1983 to 1999



Source: Data from Municipal Use Database, 1983,1986, 1989, 1991, 1994, 1996, 1999

So What?

Alberta Water Quality Index: Where are we today?



Although improvements have been made in sewage treatment for municipal areas, source control regulation is vital to curb contaminants entering surface waters from storm sewers. Metals, pesticides, and nutrients affect fish populations and freshwater ecosystems. Disease-carrying organisms, nutrients and pesticides found in runoff from conventional and intensive livestock operations and arable land can enter nearby surface waters. The potential for water contamination has grown as cattle numbers in Alberta have increased more than 50% in the last 25 years and the number of farm acres on which pesticides and fertilizers are used has tripled.

The presence of contaminants in the food chain is a concern for many people who traditionally rely on locally caught fish and wildlife. Additionally, water contamination affects water supplies, wildlife, tourism, and recreational activities. Total nutrient loadings in pulp mill effluent have decreased in northern areas due to technological upgrades and stricter laws.

Many people in rural areas are concerned about the possible contamination of their well water from oil and gas activities and agriculture. While the cumulative impacts of extensive livestock operations can affect water quality, there is increasing resistance to the location of intensive livestock operations as these are a more obvious focus for public concern. Presently, Alberta only has guidelines for the location and operation of intensive livestock operations and the government has delayed introducing more stringent legislation. Safeguards for surface water and groundwater are imperative and this requires strict regulation of any activity that could potentially cause contamination.

Ideally, we need to establish watershed accounting systems to track overall conditions in each watershed, similar to the Northern River Basins Study (completed in 1996) for each river basin. Comprehensive annual monitoring should include depletion rates and recharge rates. This is important for southern Alberta where resources are fully allocated, and for northeastern Alberta where periodic dry conditions occur.

The water quality index shown above reflects only surface water conditions in rivers as there are no data available for the creation of a groundwater index. To assess water quality, indices where the best year over the study period equals 100, were constructed based on data for: a) pulp effluent; b) percent of municipal population with tertiary sewage treatment; c) *Giardia* and *Cryptosporidium* cases; and d) long-term monitoring of dissolved oxygen, nitrogen, phosphorus and fecal coliforms along five major rivers. These indices were then averaged to create an overall water quality index. In 1971, the index was 71, and in 2003 the index had increased to almost 80. Most of the improvement is due to better treatment of effluent from pulp mills, and better sewage treatment in municipal areas.

The full costs of water quality decline and contaminants have not been fully assessed. Further study is needed to adequately assess the full costs for the province. A preliminary estimate of the annual environmental cost of Alberta's wastewater pollution in 1999 is $574,000. This cost is based on an extrapolation of the externalized cost per megalitre of wastewater used in the Australian GPI (AUS1990$2.20/megalitre; CDN1998$2.12).

According to the overall water quality index, 2003 scored 80.