

Linking Water Conservation to River Health in Alberta

By Cheryl Bradley



Ships Prow

40" x 48" acrylic on canvas

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Like many southern Albertans, I am committed to conserving water. I take short showers, turn the tap off while brushing my teeth and only do laundry when I can make a full load. Within the last few years my husband and I have transformed our yard from green lawn that needed to be watered and mowed regularly to a pleasing mix of flagstone walkways, native grass patches and mulched beds of shrubs and perennial forbs that require little if any watering. I conserve out of concern for water scarcity in this semi-arid prairie environment.

A landmark in Alberta's water allocation history occurred in 2002. Then Alberta Environment stopped accepting applications for new water allocations in the entire Oldman, Bow and South Saskatchewan River sub-basins. This decision marked a societal recognition that ecological limits had been reached or exceeded. This major step acknowledged that, in low flow years, new allocations

would create an unacceptable risk to fulfilling water licences within the basin and meeting water sharing agreements with Saskatchewan and Montana. In addition, no longer could a blind eye be turned to expert assessments that concluded that high withdrawals degraded reaches of the Bow River and the Oldman River and its southern tributaries (Waterton, Belly, and St. Mary rivers) below major dams and diversions.

As an ecologist, I believe healthy rivers contribute to a healthy and sustainable society and vice versa. History provides many examples of civilizations that declined or collapsed because human activities polluted water, accelerated erosion, caused soil salinization or drew too heavily from water sources that could not accommodate demand during prolonged drought. I act out of hope that the water I save and the stewardship

steps I take, however small, benefit my community and my southern Alberta watershed.

Of much greater potential benefit than my personal actions is the commitment to conservation planning in Alberta's *Water for Life* strategy (2003). All water-using sectors are to prepare conservation, efficiency, and productivity (CEP) plans with a target of 30 percent improvement in overall water efficiency and productivity from 2005 levels by 2015. The CEP plans are to contribute to the three *Water for Life* goals: clean drinking water, healthy aquatic ecosystems, and reliable, quality water supplies for a sustainable economy.

As of this summer, three sectors have completed the first phase of CEP plans – Irrigation, the Urban Municipalities, and Oil and Gas and Oilsands Mining. The completed plans have been presented to the Alberta Water Council, a 25-member partnership tasked with monitoring and stewarding implementation of Alberta's *Water for Life* strategy. The completed sector CEP plans can be found on the Alberta Water Council's website along with documents that provide guidance for CEP.

A review of the three completed plans reveals opportunities and intentions to increase water use efficiency (accomplishing a particular purpose with less water) and productivity (producing a unit of good or service with less water). There appears to be, however, a fundamental and dangerous assumption that the water saved will be used for the sector's future growth. So far the CEP plans are notably silent on defining meaningful opportunities for using conserved water to achieve healthy aquatic ecosystems.

Oil and Gas and Oilsands Mining Sector CEP Plan

The upstream oil and gas sector expects growth in oil sands mining and *in situ* production, increased total water demand, and increased non-saline water use productivity. The CEP plan, *Water Conservation, Efficiency and Productivity Plan – Upstream Oil and Gas Sector*, developed by the Canadian Association of Petroleum Producers and Oil Sands Developers Group, maintains that significant improvements in water use have already been achieved and



River valley of the South Saskatchewan River.

PHOTO: © D. OLSON

are expected to continue by increasing recycling rates and replacing non-saline water use with saline groundwater. Productivity is expected to improve by 15 percent for conventional oil, approximately 30 percent for oil sands mining and 47 percent for oil sands *in situ*.

By 2015 two-thirds of the sector's non-saline water use will be withdrawn from the Athabasca River. Northern rivers most affected by oil sands development, such as the Athabasca River, are anticipated to experience less ecological decline than they would without conservation measures. Opportunities to benefit rivers in southern Alberta remain to be identified by producers. The Upstream Oil and Gas Sector accounts for less than 5 percent of total water allocation and less than 2 percent of actual use (2006) in the closed sub-basins of the South Saskatchewan River Basin

Urban Municipalities Sector CEP Plan

The urban municipality sector plan, *AUMA Water Conservation Efficiency and Productivity Plan* developed by the Alberta Urban Municipalities Association, is a "plan to do plans." It aims to build capacity of individual municipalities to develop and implement their own CEP plans. The sector plan sets short-term targets regarding the

proportion of municipalities that will measure and report water use, develop CEP plans, reduce leaks from infrastructure, and increase uptake of water efficient technologies. Public resources (educational, technical and financial) from Alberta Environment and Alberta Transportation are identified as necessary to meet the targets.

Opportunities to benefit source waters have yet to be identified by individual municipalities in CEP plans. Predicted

"Opportunities to benefit aquatic ecosystems stressed by high water withdrawals will be irretrievably lost if clearer direction is not provided on using conserved water to benefit the environment as part of CEP planning."

urban population growth at a rate of one to three percent is expected to counteract water savings and result in increased overall municipal water use. In the closed sub-basins of the South Saskatchewan River Basin, urban municipalities account for less than 15 percent of total water allocation and less than 5 percent of actual use (2006). Approximately 70 to 80 percent of the surface water withdrawn for municipal purposes is returned, following treatment, to the river a short distance downstream from the withdrawal point.

Irrigation Sector CEP Plan

The irrigation sector expects a 15 percent increase in productivity by 2015 and a 15 percent efficiency gain. The CEP plan, *Irrigation Sector Conservation, Efficiency, Productivity Plan 2005-2015* developed by the Alberta Irrigation Projects Association (AIPA), identifies three engineering measures for saving water. The first is to line large canals and to replace smaller canals and ditches with pipelines. The second is to automate water flow control and measurement in combination with more balancing ponds. The third, an on-farm measure, is to switch to high efficiency low-pressure drop tube centre pivots from flood irrigation, side roll wheel moves and high pressure pivots.

The first two engineering measures dealing with district delivery systems have and continue to be implemented under the provincial Irrigation Rehabilitation Program begun in 1969. This is a cost-shared program between Alberta Agriculture and Rural Development and Alberta's 13 irrigation districts. Since 1969 funding levels have varied dramatically between \$600,000 and \$33,400,000 per year. The provincial/irrigation district cost-share ratio has varied starting at 86 percent province/14 percent irrigation district in 1969 and changing to 75 percent /25 percent in 1995. In addition Alberta Agriculture has already instituted a program to advance water CEP on farms.

In the closed sub-basins of the South Saskatchewan River Basin, the irrigation sector is the 800 pound gorilla in the water allocation arena. It accounts for about 80 percent of total water allocation and 85 percent of actual use (2006). A one percent efficiency gain in this sector saves about 23 million m³ of water annually. This volume equates to a flow of 0.73 m³ per second for a year. A 15 percent efficiency gain by the Irrigation Sector would conserve a volume of water similar to the mean annual flow of the Elbow River.

Unlike CEP plans for the upstream oil and gas and municipal sectors, the AIPA notes that the irrigation sector CEP plan presents "tremendous potential to free-up the available water supply for environmental purposes, industry, municipal use and irrigation growth in the South Saskatchewan River Basin."



Waterfall along Yarrow Creek in the Castle.

PHOTO: © N. DOUGLAS

Conserved water is already being used for growth in irrigation districts, amounting to a 12 percent increase in district expansion limits over the last decade. Like CEP plans for the upstream oil and gas and municipal sectors, the irrigation sector CEP plan has an enormous blind spot; it does not specify opportunities for contributing to the *Water for Life* goal of healthy aquatic ecosystems.

Improving CEP Planning to Benefit the Environment

Although overall sector plans are completed, individual municipalities, irrigation districts and oil and gas companies have yet to develop CEP plans. Other major water use sectors in the province, including power generation, forestry, chemical and petrochemical sectors, are currently developing CEP plans. Opportunities to benefit aquatic ecosystems stressed by high water withdrawals will be irretrievably lost if clearer direction is not provided on using conserved water to benefit the environment as part of CEP planning.

Carolyn Campbell and I prepared

a review of CEP plans from the environmental benefits perspective for the environmental organizations participating in the Water Caucus of the Alberta Environmental Network. These organizations have asked for the following improvements in CEP planning. Specific suggestions that are consistent with guidance developed by the Alberta Water Council include requiring CEP planning to:

- identify aquatic ecosystems under stress in the watersheds where the sector, or an individual company, municipality, or irrigation district operates;
- define specific and meaningful opportunities for applying some conserved water to improve aquatic ecosystem health;
- involve Watershed Protection Advisory Councils in the review of draft CEP plans to determine if the healthy aquatic ecosystem goals of watershed management plans are being addressed; and,
- target a specific “conservation

for the environment” amount and commit to applying it to identified environmental opportunities.

As I water the plants in our garden from the rain barrel, I contemplate why my husband and I go to the extra effort and investment to conserve water. My thoughts flow from this small act of water conservation to the rivers that provide the lifeblood for my prairie home. Water conservation, efficiency and productivity planning by major water using sectors provides a window of opportunity for Albertans, at home and at work, to make this link between water conservation and river health. If done well, CEP plans will help us a great deal in our quest to achieve clean drinking water, healthy aquatic ecosystems, and reliable, quality water supplies for a sustainable economy. Much work still needs to be done. 🌊

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