



SASKATCHEWAN RIVER BASIN

Water Management

It's a hot day and that cold water sure tastes good. You wash the dishes then turn on the lawn sprinkler. In the nearby reservoir, kids splash while water-skiers swoop. Down-stream, pipes channel river water up to wheat fields, where big spray guns shoot water in a rainbowed circle. A nearby cattle owner pumps water for his thirsty calves. Treated wastewater from a potato plant returns to the river, then flows through a turbine in a hydroelectric power station.

WATER FACTS...

- Volumes of water are measured in cubic decameters (dam^3). A farm dugout is about two dam^3 .
- Water flow is measured in cubic meters per second (m^3/s). A flow of one m^3/s would fill a dugout in about 15 minutes.
- Natural flows in prairie rivers are typically highly variable. For example, historical records show a high flow rate at Saskatoon of $3,940 \text{ m}^3/\text{s}$ and a low rate of $14.2 \text{ m}^3/\text{s}$, with an average flow of $259 \text{ m}^3/\text{s}$.

Everyone needs water. Water, once an abundant natural resource, is becoming a more valuable commodity due to droughts and overuse. Ensuring that the right amount of water is available when and where it is needed is called water management. To manage water effectively, we need to measure the amount of water and predict flows and levels, especially if there might be droughts or floods. Water management often involves building dams with reservoirs which can store or release water as required. Decisions need to be made about who gets how much water and when.

As there are more demands on our water resources, water management becomes more complex. Water use in the basin has been increasing each year. Sometimes more water is needed than is available. Conflicts among different users are increasing.

Achieving fair water management is part of sustainable development. We need water management to sustain and support the growth of our communities, agriculture and industries, and to reduce the human and economic costs resulting from too little or too much water. And the needs and requirements of the aquatic ecosystem must also be taken into consideration. The aquatic ecosystem provides the water for our current needs and those of future generations.

Water is an essential resource for all life on the planet. Of all the water resources on Earth, only three percent of the water is fresh and two-thirds of the freshwater is stored in ice caps and glaciers. Of the remaining one percent, a fifth is in remote, inaccessible areas and much of the seasonal rainfall in monsoonal deluges and floods cannot easily be used.

Successful management of any resources requires accurate knowledge of the resource available, the uses to which it may be put, the competing demands for the resource, measures and processes to evaluate the significance and worth of competing demands and mechanisms to translate policy decisions into actions on the ground.

For water as a resource this is particularly difficult since sources of water can cross many national boundaries and the uses of water include many that are difficult to assign financial value to and may also be difficult to manage in conventional terms. Examples include rare species or ecosystems or the very long term value of ancient ground water reserves.

Water Usage in the Saskatchewan River Basin

We often think of water in terms of how we use it. Some uses are called *instream uses*, because they take place with the water remaining in its natural setting, “in the stream”. Examples are recreation, wildlife and ecosystem preservation. These are called *non-consumptive uses*.

Withdrawal uses mean water is removed from the river or lake, for drinking water, irrigation, livestock or industry. Most of the water is returned, but some is used up and does not return. This is called a *consumptive use*.

Consumptive Uses

- Drinking Water
- Irrigation
- Livestock watering
- Industry

Non-consumptive Uses

- Hydroelectric generation
- Recreation
- Wildlife
- Ecosystem preservation
- Sewage or wastewater breakdown

Who is responsible for water management?

Water management best occurs by considering an entire basin. Cooperation and coordination is required to balance the needs of different users and because water flows across provincial and international boundaries. The main responsibility for water management rests with provincial governments. Legislation, such as the Manitoba Water Rights Act, sets policy while government agencies, such as the Water Security Agency, administer allocation. Licences are granted to individual users.



Photo credit: Ducks Unlimited Canada

Several boards and councils also manage water.

For example, the Prairie Provinces Water Board administers the Prairie Provinces Master Agreement on Apportionment, which requires Alberta to deliver 50 percent of annual natural flows to Saskatchewan and Saskatchewan to supply 50 percent of what it receives to Manitoba.

Everyone responsible for water in the Saskatchewan River Basin must make decisions which are rational, fair and consistent.

Aquatic Ecosystems

Fish make up only one component of the aquatic ecosystem. Amphibians, insects, plants and microorganisms all depend on a healthy aquatic ecosystem. Ensuring an adequate instream flow of water means that there will be enough oxygen for aquatic life to continue to thrive and sufficient moisture for aquatic plants to grow. An adequate flow keeps sediment levels low and any pollution entering the river is diluted or broken down more quickly. Water management must include maintaining sufficient instream flow.

Groundwater

Out of sight and often forgotten, groundwater is an essential source of drinking water for many communities and individuals and for livestock, irrigation and industry. It also recharges or supplies water to lakes and rivers. Groundwater is the source of many springs in the basin which eventually become creeks, smaller rivers and streams. The danger is that we may use up this resource before we notice it's gone. Water management must make groundwater protection a priority.

Drinking Water

Over three million people depend on the basin for their water. Drinking water is the top priority in water allocation. On average we use about 450 litres of water per person each day.

Control Structures

The flow of water in the basin is controlled at many places by dams and weirs. These control structures smooth out the high and low flows and water can be stored or released as needed for different uses. Dams and weirs continue to be constructed on small rivers and streams. The cumulative impact of all of these small projects must be monitored carefully to prevent negative impacts to the aquatic ecosystem and to ensure equitable allocation.

Irrigation

In the dry climate of the prairies, irrigation is important for growing crops. Irrigation is the largest consumptive use of water in the basin. Portions of southern Alberta have been granted water allocations to such an extent that Alberta Environment no longer accepts applications for water allocations in the Bow, Oldman and South Saskatchewan River sub-basins.

Water Allocation

Water allocation means deciding how to share the water resource among all the users, as well as ensuring the protection of the aquatic ecosystem. Water allocation is complex, and there are many issues which must be considered. Some important issues and uses are listed throughout this document.



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Droughts

Too little water is a concern for all users and for the environment. Water is often allocated assuming normal flow years. During droughts, conflicting demands for water increases. Because of its large size and the number of people dependent on it, Lake Diefenbaker requires extra management attention to balance the needs of all users during droughts.

Floods

Heavy rainfalls and fast melts of deep snow often cause floods. Some flooding is beneficial for a healthy river ecosystem, for example, providing nutrients for riverbottom forests. But floods can badly damage homes, farms and businesses. Dams, dykes and diversion channels help to provide flood protection. Maintaining vegetation near rivers limits run-off from heavy rains and can help reduce flooding.

Wetlands

Wetlands help guard against floods, buffer shorelines against erosion and purify water by acting as filters. They store water, filter pollutants and contribute to groundwater supplies and provide valuable habitat for wildlife. Wetlands across Canada also provide direct economic benefits through the harvest of marsh hay, wild rice, cranberries, peat moss and sphagnum moss. Income is also generated from recreational activities that abound at wetlands, such as bird watching, and hunting and fishing. Wetlands are wonderful for demonstrating and observing ecological principles in a natural ecosystem. Canadians depend on wetlands and the educational opportunities they provide across the country.

Water Management Issues for the Future

Escalating needs for water will increase conflict among users and threaten the aquatic environment. Other future issues which we must work on include:

- **Planning for long term uses.** What will new water requirements be? Do we have enough water for all of these uses?
- **Managing the demand for water.** We have emphasized getting the most water to the most people. The prairie provinces are among the biggest users of water in Canada. Can we reduce the amount of water we use at home, in industry, in the fields? Can new technology help us to do this?
- **Coordinating decisions.** Do water management and allocation decisions in one

area of the basin conflict with those in another area? Can we enhance decisions made at local level by more cooperation? How is the issue of aboriginal water rights addressed?

- **Costs of water.** Canadian pay very little for their water compared to other countries. Are we paying the real cost of water and how much is this?
- **Environmental impacts.** Many decisions about water are made without environmental review. What is the cumulative impact of all those individual decisions, such as the number of control structures in the basin?
- **Information gaps.** We still do not know enough about flows, uses and unauthorized withdrawals. What do we need to know, what information do we need to collect and how do we fund this research?

For More Information

Partners FOR the Saskatchewan River Basin

402 Third Avenue South
Saskatoon, Saskatchewan
S7K 3G5

Phone: (306) 665-6887

Fax: (306) 665-6117

email: partners@saskriverbasin.ca

web: <http://www.saskriverbasin.ca>

The fact sheet series includes:
Introduction and Overview
Water Management
Hydroelectric Operations
Water Quality
Wetlands and Waterfowl

What YOU can Do!

Get involved in water management!

- Conserve water in your home, school, farm or workplace. Many towns and cities have water conservation ideas, some of which are easy to do.
- Get informed. Learn more about water management in general. Partners FOR the Saskatchewan River Basin has a network of partners who can provide more information on water management. Who uses the water, how much do they use, how are decisions made?
- Participate in any hearings, open houses or other public events in your area about water management. Let people know your opinion and listen to what others suggest.

You *can* make a difference!



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