

Partners FOR the



Saskatchewan
River Basin

SASKATCHEWAN RIVER BASIN

WATER USES ...

w Drinking Water
Supply

w Recreation

w Irrigation

w Livestock
Watering

w Industry

w Fish and Wildlife

Big drops of rain or winter snowflakes, waves lapping on the shore of a lake, spray shooting out from an irrigation system, the roar and splash of rapids in a river, water running over the landscape during the spring melt. These are all images of water within the Saskatchewan River Basin, but is water the same everywhere throughout the basin? Is all of the water suitable for the many different uses of water? What factors influence water quality in the basin?

Water quality is defined as the characteristics of water which determine if it is suitable for different uses. These characteristics are chemical, biological and physical. The amount of oxygen in

the water, the level of sediment and traces of pesticides are examples. For each use, we need to know which characteristics are important and how to measure them. We need to know the impact of human activities so that we can maintain good water quality. We especially need to know how water use changes the natural ecosystem, since a healthy ecosystem is the basis of sustainability.

MEASURING

WATER QUALITY

Measuring water quality indicators tells us the suitability of water for different uses. These indicators can be quantitative mea-

Water Quality is one in a series of fact sheets. Fact sheets available on Water Management and Hydroelectric Operations also discuss topics related

Fecal Coliforms	<ul style="list-style-type: none"> w indicator of bacteriological contamination w largest source is from sewage plants and human waste w monitored to determine suitability for irrigation, recreation and drinking water
Dissolved Oxygen	<ul style="list-style-type: none"> w health problems can occur if concentrations too high and water is consumed
Salt	<ul style="list-style-type: none"> w a good measure of ecosystem health w a minimum level is needed to protect aquatic life w excessive waste and algal blooms lead to oxygen depletion w fish kills are the most obvious sign of insufficient oxygen
Phosphorus	<ul style="list-style-type: none"> w monitored to determine suitability for drinking water and irrigation w too much reduces crop yields and causes irrigated fields to be infertile w potential sources are concentration of salts from evaporation during irrigation, runoff, water softeners and road salt
Pesticides	

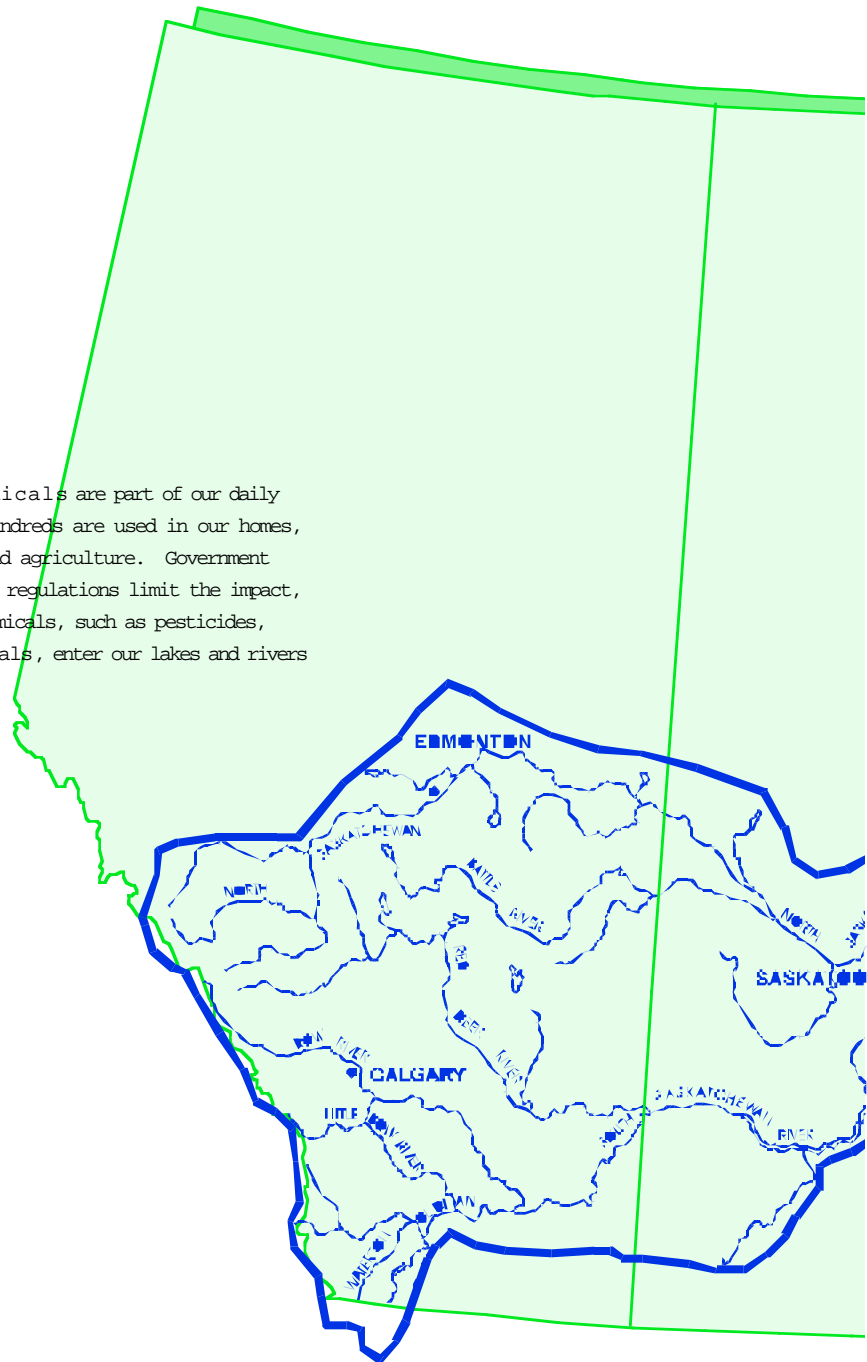
WATER QUALITY ISSUES

Water quality in the Saskatchewan River Basin is generally good. In some areas where human activities have impacted on water quality, actions have been taken to encourage the return to a healthy aquatic ecosystem. In other areas, however, there are signs that the aquatic ecosystem is under stress. For example, stud-

Point Source Pollution is direct and concentrated discharges such as sewage effluent or industrial waste. In the last few decades, the concentrations of many pollutants have been reduced or eliminated through regulation and environmental licencing. Some licences still permit the release of pollutants, however, and

Nonpoint Source Pollution is often associated with runoff and erosion from agricultural areas, construction sites, forestry operations and our backyards. These sources may be difficult to identify in terms of content, quantity and time of discharge. They are difficult to control. Although each source may only contribute a

Toxic Chemicals are part of our daily lives, and hundreds are used in our homes, industries and agriculture. Government approvals and regulations limit the impact, but toxic chemicals, such as pesticides, PCBs and metals, enter our lakes and rivers



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Eutrophication means increases in the nutrient levels of lakes and rivers. This process occurs naturally, but human activities speed up the process. Agricultural runoff, sewage and industrial effluent add extra nutrients, especially phosphorus. Eutrophication leads to dense growths of algae and aquatic weeds, turning shallow prairie lakes green in the summer and making them unsuitable for recreation. Under certain conditions some blue-green

Ground Water in the Saskatchewan River Basin is an integral element of the basin's aquatic ecosystem. The quality of water found below the surface in wells and aquifers is just as important as surface water quality in lakes and rivers. Pesticides and nitrates can seep into ground water contaminating wells used for drinking water and aquifers used for irriga-

Oxygen levels in water are one of the better indicators of ecosystem health. All organisms need oxygen to live, including invertebrates and fish. Aquatic plants and algae produce and use oxygen during their growth cycle. When this vegetation dies, it decays and consumes oxygen in the process. Most prairie lakes and rivers are naturally very fertile and have a lot of natural growth. Nutrient loading from human activities, such as soil runoff, increases aquatic vegetation above normal levels and

Waterborne Disease can be caused by microbiological pollution if pathogens are consumed by humans and animals. Naturally occurring microbes can also cause disease such as giardiasis. Drinking water, irrigation and recreation are all affected. Beaches can be closed if fecal coliform levels are too high. Their largest source in major rivers is effluent from urban areas while in smaller rivers, agricultural operations may be the biggest source. Although treatment of sewage

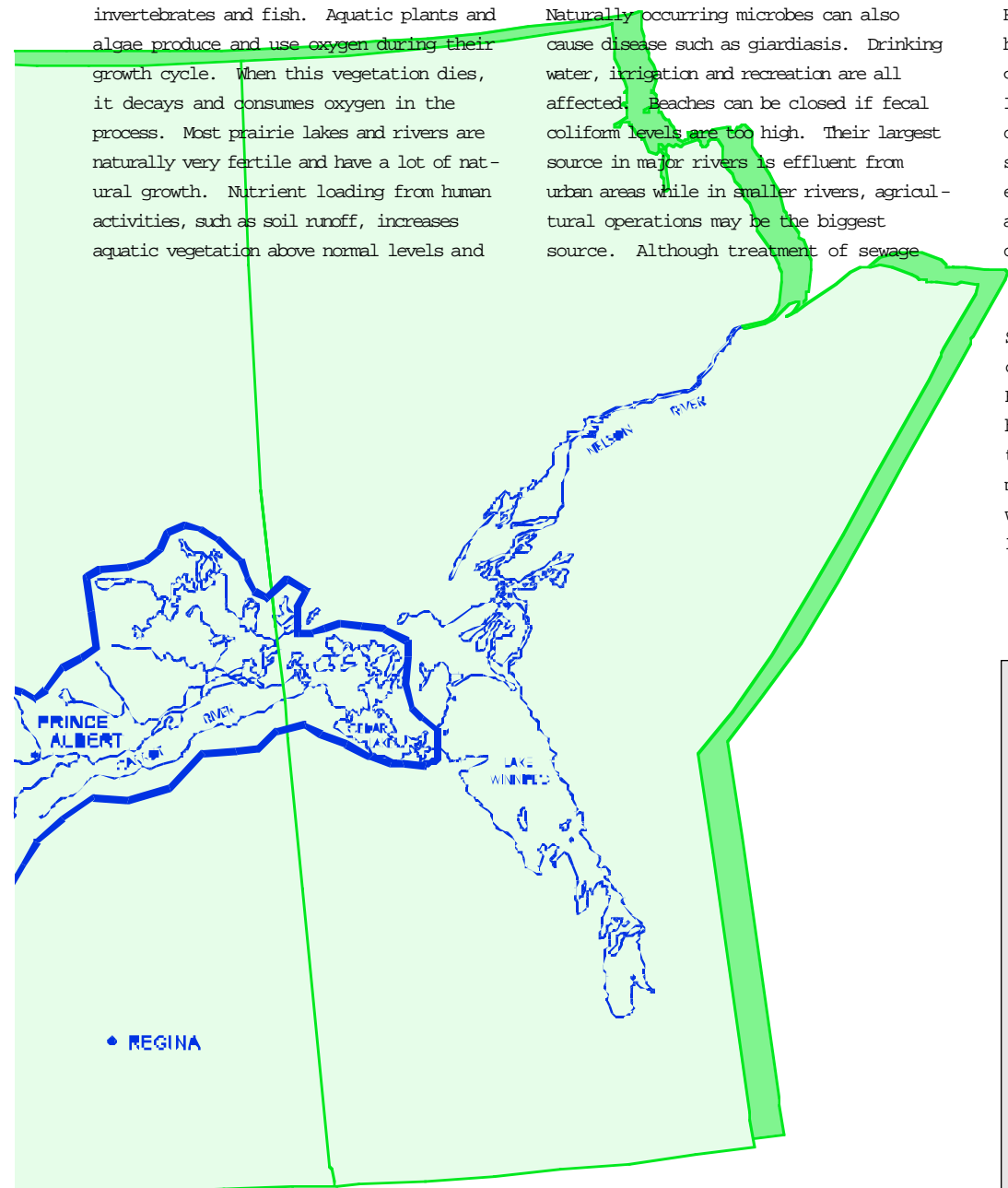
Salinity occurs naturally in some areas of the basin, such as saline ground water discharges in the Cumberland Marshes. Human activities can cause unnaturally high levels. High salt levels degrade the quality of the water, and limit its uses. Irrigation and water softeners added to our drinking water are the two main sources of salts. During irrigation, water evaporates, concentrating the salts already in the water. As the water runs off the fields, it also picks up natural salts in

Sedimentation and muddy waters are a common sight in the Saskatchewan River Basin, where many rivers carry a naturally high level of sediment at certain times of the year. Human activities increase sediment levels, mainly from soil erosion by water on agricultural and deforested lands. Increased sediment loads increase the

The Case of the Disappearing Oxygen

One of Saskatchewan's most prized fisheries is being threatened by a lack of oxygen in the water. Since construction of the hydroelectric dam on the Saskatchewan River at Nipawin, there have been rapid declines in summer in the amount of dissolved oxygen downstream of the dam, often falling below the levels required to support aquatic life. Although they can predict when the oxygen levels will decline, researchers have not been able to determine the cause of the problem. To compound the problem, during periods of low flow, the gates at the dam are often closed to stockpile water in the dam's reservoir, but this shuts off or reduces the flow of water downstream of the dam. No, or minimal, flow makes the dissolved oxygen problem worse. This problem exists for a large volume of the reservoir (i.e. waters below 16 metres in depth)

Drinking Water The quality of the water we drink from our taps is of the highest concern to us. We want to be sure that we are protected from naturally occurring viruses and bacteria and from other contaminants such as metals and pesticides. Stringent guidelines for treated drinking water provide that protection, even if the quality of the source water is marginal. However, the higher the quality of the water source, the lower the costs for the treatment. We also like our drink-



POLLUTION SOLUTIONS

Protection of our water resources and improvements in water quality are priorities for government, communities, industry and individuals. Many solutions have been found including:

Reviews, regulations and licencing by government. For example, regulations restricted the amount of phosphate in laundry detergents, reducing eutrophication. At The Pas, Manitoba, the Environment Act Licence issued to the Repap pulp and paper mill requires the mill effluent to meet water quality standards including suspended solids and biochemical oxygen demand.

Technology is providing solu-

tions. Calgary has invested \$150 million to reduce phosphorus and ammonia and to add disinfectant equipment to its sewage treatment plant. Saskatoon is investing \$50 million to upgrade its sewage treatment and disinfection systems over the next few years. In the Nipawin area, two major wastewater systems have been upgraded and discharges to the river during the high recreational use period in summer have been eliminated. Continued improvements in wastewater treatment are costly, but are required to sustain healthy aquatic systems.

Land and water management practices directly impact water quality. Farmers are applying best management practices for livestock and riverbank management across the prairies to reduce agricultural pollution. Farmers who water their cattle away from

For More Information

This fact sheet was published by Partners FOR the Saskatchewan River Basin.

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WHAT YOU CAN DO

- w Reduce, then eliminate the use of hazardous cleaning products which find their way down the drain in your home. Purchase or make environmentally-friendly alternatives from ingredients such as vinegar, baking soda and household ammonia. Reduce or eliminate water softeners from your home.
- w Think about what you flush down the toilet. Put items such as dental floss and disposable diapers in the garbage. Compost vegetable food scraps. Do not flush waste household products: contact your provincial environmental department for advice on disposal options.
- w Control weeds by non-chemical means, such as hand-pulling, companion planting or using natural herbicides and mulching practices. Don't use pesticides and other hazardous materials in your garden or on your lawn.
- w Take hazardous products, such as waste oil from your car, to a hazardous waste disposal site. Don't dump hazardous products down storm drains.
- w Riverbank property owners should consider maintaining or planting vegetation along the water's edge to reduce runoff.
- w Think about water quality when you are on holiday too. Make sure your cottage has a proper sewage disposal system. Control spills from power boats. When camping in remote areas bury biodegradable waste at least 60 metres from any water source and pack out non-biodegradable garbage.
- w Get involved and stay informed. Participate in any hearings, open houses or other public events in your area about water quality. Let people

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