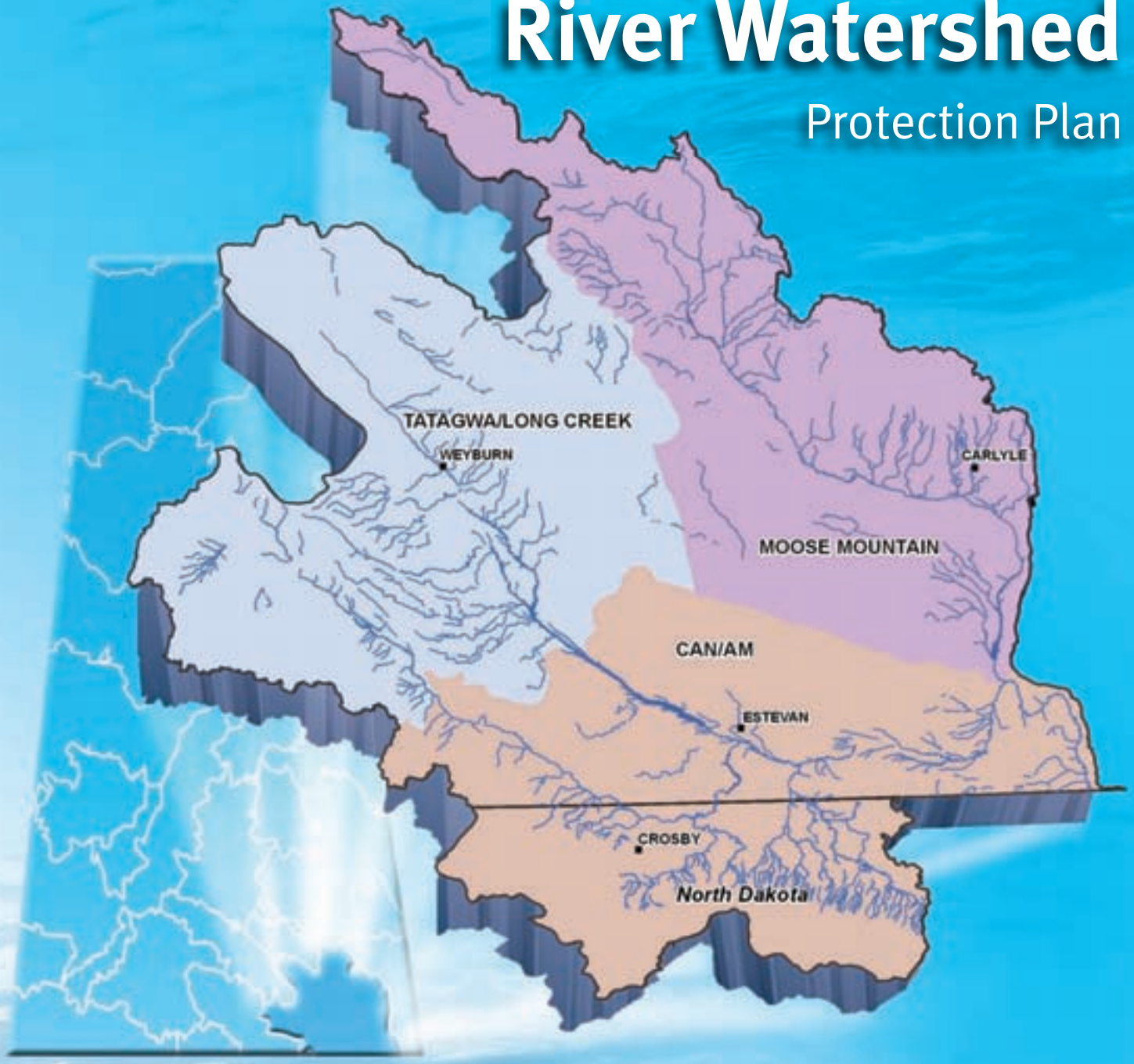
Upper Souris River Watershed

Protection Plan



October 2010

Saskatchewan Watershed Authority

upper souris watershed association

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Executive Summary

Saskatchewan has some of the best and most abundant supplies of water in the world, and communities have a growing interest in sound water management and source water protection.

In spring 2008, Saskatchewan Watershed Authority planners approached stakeholders in the Upper Souris River Watershed to participate in watershed and aquifer planning.

The Upper Souris River Watershed Protection Plan is the product of subsequent planning efforts which involved rural and urban municipal representatives, First Nations and Métis, nature-based conservation groups, agricultural agencies, and the oil, gas and energy sectors. Committee members discussed the challenges, options and opportunities around source water protection in their watersheds.

The objectives and action items in this Plan have been proposed and accepted by the members of the Watershed Advisory Committees and reviewed by subject experts from the Technical Committee. Watershed residents were consulted about the Plan through open house venues and their comments were provided to the Watershed Advisory Committees for consideration.

Watershed and aquifer planning by watershed residents is a viable and proven part of sustainable watershed management. Objectives and actions focus on fostering healthy watersheds and protecting source water quality and quantity. Although only high priority items are contained in the Plan, it can be revised to address any future needs.

The core of the Upper Souris River Watershed Protection Plan is the objectives and actions developed by the Watershed Advisory Committees. Nine categories were identified: Communications and Information; Water Quality; Watershed Management Considerations; Aquifer and Ground Water; Water Conservation; Monitoring and Research; Governance; Implementation; and Monitoring Progress. Twenty-nine objectives and 40 key actions are contained within the Plan.

The Upper Souris Watershed Association (USWA) has been established to lead plan implementation. This non-profit group is comprised of representatives from the same local governments and organizations that constituted the Watershed Advisory Committees.

Message from the Chair


Photo courtesy Vicki East, P.Ag.

Water problems and challenges are connected and should be addressed in a holistic manner.

These words, taken from the second edition of the United Nations' World Water Development Report, sum up the work of the Watershed Advisory and Technical Committees that created the Upper Souris River Watershed Protection Plan.

The Plan was developed under the leadership of the Saskatchewan Watershed Authority, through consultation with local Watershed Advisory Committees. The Committees' broad membership included representatives from urban and Rural Municipalities, industries, organizations, Agri-Environmental Group Plan (AEGP) committees, Métis Nations and First Nations.

We knew, from a rather unique perspective, that we were involved in watershed planning to protect the gift of water. We understood the importance of our work, and the reason for our work, as reflected in a Native American teaching:

> *Treat the earth well: it was not given to you by your parents; it was loaned to you by your children. We do not inherit the earth from our ancestors; we borrow it from our children.*

In our discussions, culture became an important element. Accordingly, our mission statement* recognizes and supports the cultural value of water, as expressed by this First Nations' quote:

> *Children were encouraged to develop strict discipline and a high regard for sharing. When a girl picked her first berries and dug her first roots, they were given away to an elder so she would share her future success. When a child carried water for the home, an elder would give compliments, pretending to taste meat in water carried by a boy or berries in that of a girl. The child was encouraged not to be lazy and to grow straight like a sapling.*

We know, as we work to implement the Upper Souris River Watershed Protection Plan, that we are all activists, as defined by Ross Perot who said, "The activist is not the man who says the river is dirty. The activist is the man who cleans up the river."

It is an exciting time, with much at stake.

Mary Rose Boyer, Chairperson,
Upper Souris Watershed Association

* Upper Souris Watershed Association Mission Statement: The Upper Souris Watershed Association, through collaborative planning and facilitating partnerships, will protect and improve water quality, water quantity and the health of our watershed. To preserve the beauty, diversity, and integrity of the watershed, we will raise awareness and understanding by promoting sustainable environmental, economic and cultural activities.

Message from the Watershed Planning Team

The Upper Souris River Watershed Protection Plan is the ninth protection plan completed since the Saskatchewan Watershed Authority initiated the planning process in 2003.

Successful plan development depends on gaining the support and involvement of area residents, industries, organizations and governments. The creation of the *Upper Souris Watershed Association* to help ensure this Plan's success is a strong example of local support.

This is Saskatchewan's first watershed planning process to cross international boundaries. People's interests and needs for water are the same, whether they are from Saskatchewan or North Dakota. The co-operation demonstrated between watershed residents in both countries proves that international boundaries do not need to be a barrier to watershed protection.

Work to implement the Upper Souris River Watershed Protection Plan has just begun and the Saskatchewan Watershed Authority and other provincial organizations have committed to support implementation. Effective leadership, a strong vision and genuine concern for people, the environment and source water protection, will contribute to the Plan's success. The ultimate success of the Plan, however, rests with watershed residents who must take up the challenge to ensure a healthy watershed and safe, reliable water sources, now and in the future.

Working with the people of the Upper Souris River Watershed to complete this unique and innovative project has been both pleasurable and satisfying. If the effort and enthusiasm of all those involved in drafting this Plan is sustained, the Plan's success will be guaranteed.

Jeff Olson
Senior Watershed Planning Coordinator
Watershed and Aquifer Planning
Saskatchewan Watershed Authority

1. Introduction

Since European settlement of the Upper Souris River Watershed began, development has occurred through the expansion of agriculture, mining, drilling, and urbanization. These human influences will continue; it is the mitigation of these impacts that needs to be addressed.

Local residents have taken actions to protect the environment and water quality on a specific issue basis. Organized collaborative planning will help to ensure that water quality, water quantity and watershed health are maintained or improved in the future.

The Upper Souris River Technical Committee, working closely with the Watershed Advisory Committees, identified three important factors to be considered during the planning process:

- The Souris River and its tributaries are prairie streams. Unlike pristine glacial melt water, the water contains natural contaminants and/or nutrients.
- The Upper Souris River Watershed, for the most part, is a healthy watershed. The challenge is to maintain that health and work toward continual improvement.
- Watershed residents see the benefits of working together to ensure an adequate amount of good quality water now and in the future. This commitment will help to ensure the Plan's success.

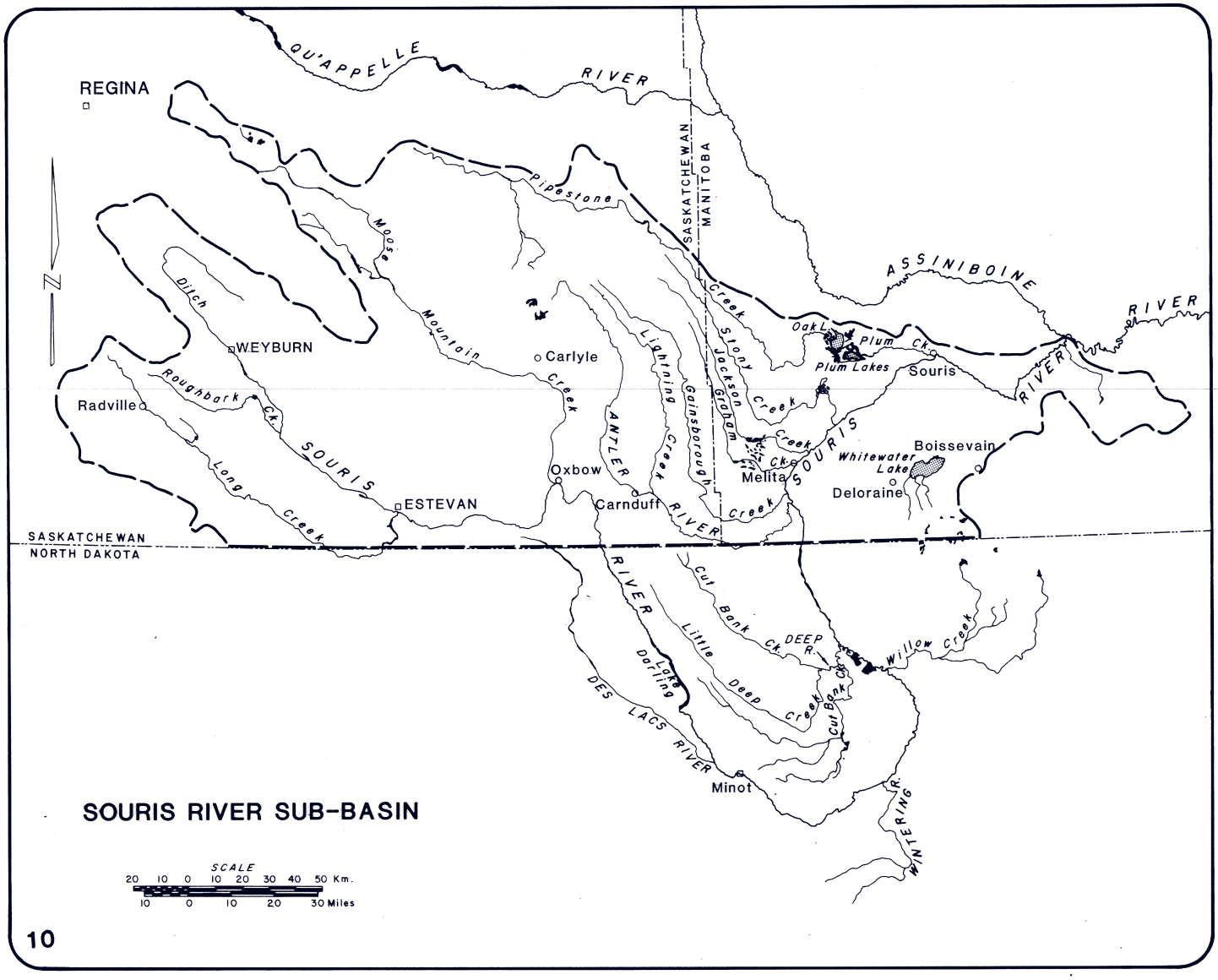
1.1 Location and Physical Setting

The Souris River, known as the Mouse River in the United States, has its headwaters in Saskatchewan, flows into North Dakota and then travels back north into Manitoba. About 20,400 square km of the Souris River basin in southeastern Saskatchewan are encompassed by the Upper Souris River Watershed, including sub-watershed areas of the Souris River main stem, Long Creek and Moose Mountain Creek.

Photo courtesy Vicki East, P.Ag.

The Upper Souris River Watershed is part of the larger Assiniboine River basin and the major basin of the Nelson River, which eventually contributes to the Arctic Ocean via Hudson's Bay.

Glacial moraines and the remnants of glacial lake plains dot this region. The highest point is found in the Moose Mountain uplands, which rise about 300 meters above the Souris plain. A portion of the Missouri Coteau forms the southwestern boundary of the watershed.


REGINA
QU'APPELLE RIVER
SASKATCHEWAN
MANITOBA
Pipestone
Moose Mountain Creek
Ditch
WEYBURN
Carlyle
Radville
Roughbark Ck.
Long Creek
SOURIS
ESTEVAN
Oxbow
Carnduff
ANTLER RIVER
Lightning Creek
Grassy Creek
Jackson Creek
Stony Creek
Oak L.
Plum Ck.
Plum Lakes
Souris
ASSINIBOINE RIVER
Melita
Whitewater Lake
Boissevain
Deloraine
SASKATCHEWAN
NORTH DAKOTA
Cut Bank Ck.
DEEP R.
Willow Creek
Little Deep Creek
Lake Darling
DES LACS RIVER
Minot
WINTERING R.
SOURIS RIVER SUB-BASIN
SCALE
20 10 0 10 20 30 40 50 Km.
10 0 10 20 30 Miles
10

Generally, area soils belong to three major groups. Chernozemic (dark coloured grassland) soils cover much of the area, regosolic (weakly developed) soils are present in the Souris River main stem area, and podzolic (light coloured forest) soils are found in the Moose Mountain upland.

Natural vegetation varies in the watershed. Slightly dryer areas in the southwest are characterized by mixed grass prairie vegetation. As moisture increases to the north and east, vegetation ranges from parkland (widely spaced trees or bluffs of trees) to hardwood forest. Much of the native vegetation has been eradicated by cultivation and drainage.

1.2 Climate

The climate in the Upper Souris River Watershed is semi-arid, thus evaporation and transpiration often exceeds precipitation. Temperatures vary greatly on a monthly and annual basis, which is common in the Prairies. For example, the mean January temperature in Estevan is -15.9^{o} C while the corresponding July value is 19.7^{o} C. The hottest temperature recorded in Canada occurred in the watershed at Midale and Yellow Grass, Saskatchewan, on July 5, 1937, when the temperature reached 45^{o} C.


Photo courtesy Vicki East, P.Ag.

The southwest portion is marginally drier than the rest of the area and the northeast section is somewhat wetter. Average annual precipitation is about 420 mm, although wide fluctuations are common. Most of the precipitation occurs during summer storms that can produce up to 100 mm in a 24-hour period. In an average year, gross evaporation is close to 900 mm in the Estevan, Saskatchewan, area and the region's annual mean soil moisture deficit is close to 500 mm.


Photo courtesy Vicki East, P.Ag.

The runoff from the Souris basin is less than 1 per cent of the precipitation received. This low runoff makes the Souris River sensitive to precipitation, and a flow can turn from "…a trickle to a torrent in a few days."[1]

Major flooding of communities and agricultural land located in the Souris River's flood plain has often occurred in the past century. Flood mitigation programs were implemented in Weyburn, Estevan, Oxbow and Roche Peerce. These programs led to the relocation of repeatedly flooded homes and buildings, the construction of berms and alternate floodways and the acquisition of regularly flooded land.

The organization of Conservation and Development Authorities and development of drainage works has helped reduce agricultural flooding and construction of the Rafferty and Alameda Dams has lowered the extent of potential damage due to flooding in both Saskatchewan and North Dakota.

[1] International Souris River Board, Hydrology Fact Sheet

Saskatchewan is susceptible to frequent and often severe droughts. In meteorological terms, a drought is an extended period of below-normal precipitation (rain or snow) that may last for several months or years. Drought can affect a single municipality or the entire province, and can occur in any season.

Southeastern Saskatchewan experienced severe drought between 1917 -1926 and 1929 - 1937. The latter drought was one of the most severe of the twentieth century. In 1961, the area and intensity of drought in Saskatchewan exceeded even those of the 1930s.


Photo courtesy SK Archives

The late 1980s were also warm and dry. In 1988, one of the hottest summers ever recorded, southern Saskatchewan received only 50% of normal precipitation. The most recent drought period was 2000 - 2003, during which Saskatchewan recorded its driest year in over a century.

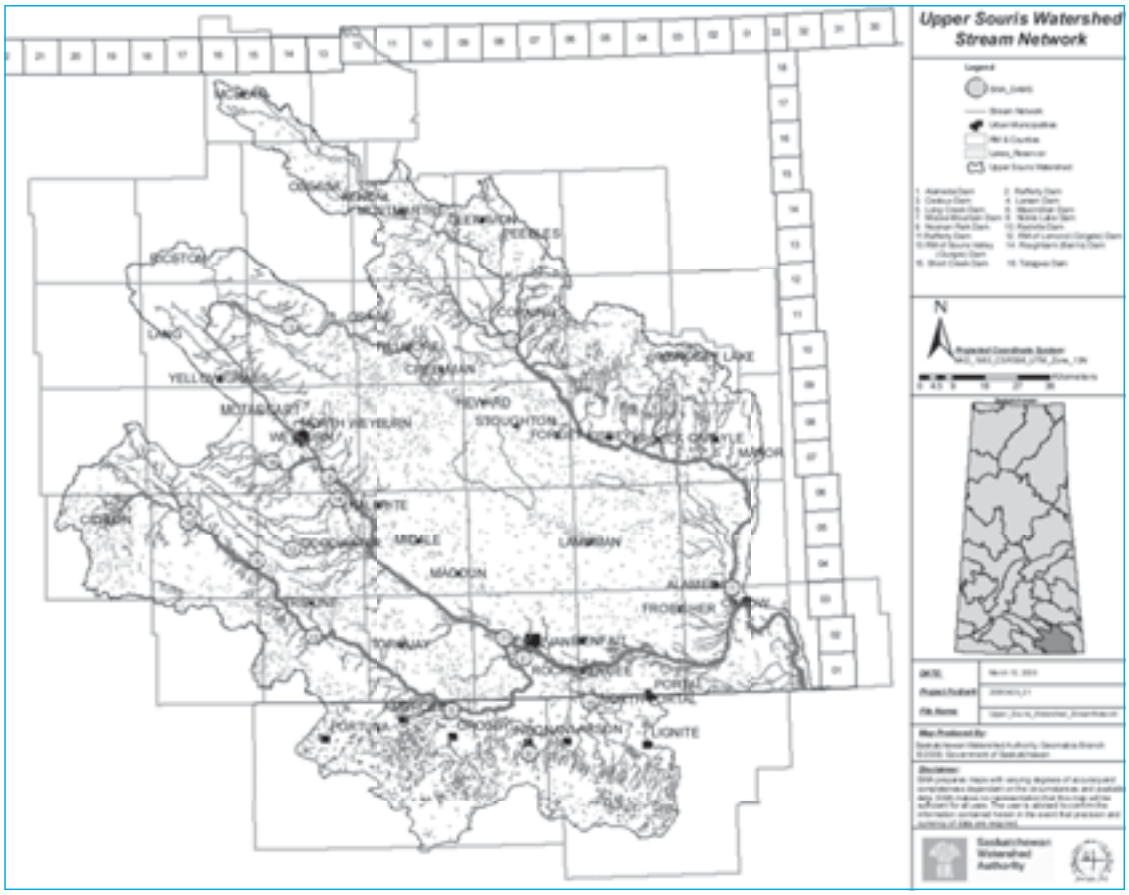
Scientists claim twentieth century droughts were fairly moderate and short-lived compared to those within previous centuries. Data from tree-rings and lake sediment cores show that severe, prolonged drought periods (i.e. up to several decades) occurred on the southern Prairies in the early 1600s, late 1700s, and mid-1800s. These super-droughts are typical in dry, continental-type climates, and Saskatchewan may experience future drought events of similar magnitude.


Photo courtesy Vicki East, P.Ag.

Social and economic impacts of drought are wide-ranging. Droughts threaten wetlands and waterfowl, reduce municipal water supplies, raise the risk of forest and prairie fires, reduce crop yields and disrupt livestock production. Due to the importance of agriculture in Saskatchewan, such economic losses can be crippling. In 1961, generally considered Saskatchewan's worst drought year, losses to prairie wheat production alone totaled $668 million. The 1986 - 1988 drought also triggered staggering losses to Canadian agriculture, including a $4 billion drop in grain exports.

Saskatchewan farmers have adopted a range of water and soil moisture conservation strategies to combat the effects of drought. Current strategies for ensuring stable water supplies include developing wells, dugouts and reservoirs. Approaches for retention of soil moisture include developing irrigation systems, shelterbelts and perennial cover or application of stubble mulching, minimum tillage and reduced summer fallow.

Water use within the Upper Souris River Watershed is expected to increase in the future due to growth in the industrial and agricultural sectors. As the need for water increases, supply shortages will likely become frequent events within the watershed.



1.3 History of Settlement in the Watershed

The area of the Upper Souris River Watershed is known to have been inhabited by humans for 11,000 years. This section will discuss the history and pre-history of the watershed including First Nations, Métis and, finally, European settlement in the late nineteenth century.

1.3.1 First Nations

First Nations people have inhabited Saskatchewan for nearly 11,000 years. Traditional cultures followed the ideology that humans are a part of creation and exist within a web of life.[2] Spiritual ceremonies reflected the role of humans within the framework of life, supporting the principle that all aspects of life, living and non-living, contain a spiritual asset, including water.

Ceremonies such as the "...burning of sweet grass represented communication with the spirit world; the vision quest a connection with protector spirits; the sweat lodge a spiritual cleansing; and the thirst (or rain) dance symbolized the process of renewal of life."[3] These beliefs helped ensure the survival of self-sustaining societies.

The fur trade, one of the most significant resource events in Canadian history, brought dramatic changes, merging European and First Nations cultures and initiating the first economic relationship between the two. Hunting and trapping shifted from a subsistence lifestyle to an income based lifestyle for both First Nations and Métis, which influenced settlement near trading posts as the dependency on European goods grew.

[2] Government of Saskatchewan: Aboriginal People, http://www.gov.sk.ca/Default.aspx?DN=d35c114d-b058-49db-896a-4f657f5fd66e
[3] The Encyclopedia of Saskatchewan: Aboriginal Peoples of Saskatchewan

To support the peaceful settlement of Canada, Great Britain negotiated treaties with First Nations throughout the country. In the Prairies, Treaty 4 was signed by representatives of the Crown and tribal chiefs, who signed on behalf of their band members.

Treaties were negotiated in good faith, with the premise that First Nations would help allow for settlement by giving up land in exchange for alternate land locations, medicine and the right to continue traditional ways such as fishing and hunting.

The formation of Carry-the-Kettle First Nation began with the signing of an adhesion to Treaty 4 Four on September 25, 1877. On June 5, 1885, the Carry-the-Kettle Reserve was established 80 km east of Regina and 11 km south of Sintaluta, Saskatchewan.

Chief Wahpemakwa (White Bear) signed Treaty 4 in 1875 and in 1877 accepted a reserve on the east side of Moose Mountain, creating White Bear First Nation.


Photo courtesy SK Archives

In September 1875, Chief Kitchi-Kah-Me-Win (Great Seaman or Ocean Man, Kicheekahmenin, Kickekamewin) signed an adhesion to Treaty 4 and Ocean Man First Nation was created. In 1882, the Ocean Man Reserve for Assiniboine, Cree, and Salteaux bands was established adjacent to Chief Pheasant Rump's reserve in the Moose Mountains north of Kisbey.

In 1876, Pheasant Rump Nakota First Nation also signed an adhesion to Treaty 4 and a reserve was accepted in 1881, located northwest of Kisbey, Saskatchewan. In 1901, following several years of persuasion, Ocean Man and Pheasant Rump First Nations surrendered their reserve lands and amalgamated with the White Bear First Nation.

Descendants of the amalgamated communities initiated a land claim against the federal government to regain surrendered reserves. In 1990, Ocean Man, Pheasant Rump and White Bear were once again recognized as distinct bands. By 1992, all three bands had regained their individual reserve status and have occupied those lands since.

Members of these First Nations were integral to the area economy working as laborers, freighting for settlers, hauling timber, cutting and selling firewood and hay, and making plough beams, sleds and collars. They also developed herds of cattle and sheep, winning many prizes at local exhibitions. Women knitted socks, mitts, gloves and mufflers for their own use and for sale, made Seneca root and worked as housekeepers.[4]

[4] The Encyclopedia of Saskatchewan: Aboriginal Peoples of Saskatchewan, http://esask.uregina.ca/entry/aboriginal_peoplesof_saskatchewan.html, Canadian Plains Research Centre

1.3.2 Métis


Photo courtesy SK Archives

Local Métis representative and historian, Mary Rose Boyer, has provided a history of the Métis in the Souris River valley. The Souris River Valley Métis did not sign any treaties and therefore have no specific written rights, but in court challenges the Métis' rights to traditional cultural ways have been recognized. With respect to treaty and aboriginal rights pertaining to water, the federal and provincial governments, First Nations and Métis may often have differing opinions.

Fur trading and buffalo hunting were the economic activities that drew Métis people to the Souris River Valley area. During the 1700s, Métis hunters and traders made frequent stops at St. Peter's Spring and Long Creek, travelling between the then Spanish Territory (now North Dakota) south of Estevan, and the Brandon House-Red River area to the northeast. The Souris River was a valuable source of water and respite on the long journeys to meet Assiniboine trading customers.

The Boundary Commission Survey (est. 1873-1874) and the North West Mounted Police (est. 1874) both hired Métis scouts, guides and hunters called the 49th Rangers to help them cross this part of the country, following the Souris River for the most part.

In the mid to late 1800s, decreasing profits from fur trading and buffalo hunting brought Métis families to the Souris River Valley to try their hand at agriculture. Many of the families that supported Louis Riel in the Red River conflict also fled to the area.

As early as 1873, Métis families were living as farmers and ranchers on lands bordering the River. About 40 families lived on or near the Souris River by the late 1800s and early 1900s.[5]


Photo courtesy SK Archives

1.3.3 European Settlement

Homesteading in the watershed happened in the late 1800s and early 1900s after the signing of treaties allowed for the settlement of Western Canada. Many people of American, British, French, Scandinavian and other nationalities immigrated to the area with the hope of making a better life for themselves. Homesteading brought with it the need for railway development, industry and communities to service the people of the watershed.

[5] Compiled by Mary Rose Boyer, Roche Peerce from Christine Blondeau-Perry, Souris River Valley Métis Settlement Map and http://cap.estevan.sk.ca/community/history/index2.html

2. The Watershed Today[6]

Since 1951, the population of the Upper Souris River Watershed has consistently declined, particularly the rural population. In contrast, the population of the two largest communities in the watershed, Estevan and Weyburn, has remained relatively stable. At present, almost 32,000 people, or 72 per cent of the watershed area population, reside in cities, towns, and villages.

Economic activity and land use within the watershed is dominated by agriculture. The area is comprised of about 75 per cent cropland, 15 per cent grassland, 5 per cent shrubs and trees, and 5 per cent water bodies and marshland.[7] Livestock production is an important activity, and in 1990, the number of area cattle was close to 190,000.

The energy sector is also important to the economy, with about 50 per cent of Saskatchewan's producing oil wells located in the area. Presently, many new wells are being drilled in the North Dakota and Saskatchewan portions of the watershed to develop the Bakken oil reserves.

Coal is also a key resource. Fifteen to 20 per cent of Saskatchewan's recoverable coal reserves are situated in the Estevan-Bienfait region. Electrical power generation is also significant. The coal fired power generation of Boundary and Shand power stations provide about 40 per cent of total provincial power on any given day.

Boundary Dam was built in 1957 on Long Creek which is a major tributary of the Souris River to provide cooling water for Boundary Dam Generating Station. A channel links Boundary Dam and Rafferty Dam, allowing water to be moved between the two reservoirs. The reservoirs provide water for the Shand Power Station. Fishing and boating are enjoyed in all three of the reservoirs and hunting and trapping have been traditional activities in the river valley.

[6] The Encyclopedia of Saskatchewan
[7] Upper Souris Land Cover GIS Map, Upper Souris Background Report, March 2009

3. Watershed Protection Principles

In 2003, the initial concept behind watershed planning was protection of water for human use at the source. Due to the interests of local people, source water protection is evolving to be watershed protection, and potentially, integrated watershed management. The principles for source water protection will be discussed in the following sections.

Integrated Watershed Management - a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems. (Global Water Partnership)

3.1 The Multi-Barrier Approach to Drinking Water Protection

The drinking water supply can be broken down into three parts: source water, water treatment and water distribution. As drinking water travels to communities, homes and businesses, contamination can occur in several ways. The Multi-Barrier Approach to managing drinking water supplies is a preventive risk management approach that identifies known and potential hazards and ensures barriers are in place to reduce or eliminate the risk of contamination.

Photo courtesy Ducks Unlimited Canada

Source water protection is the first of several barriers of defence to eliminating or preventing the risk of disease or illness for humans. The second key barrier is the treatment of water. The continual removal of bacteria, viruses and other organisms requires chlorination, reverse osmosis, filtration, etc. The only way to know what type of treatment a water supply needs is to have a comprehensive test of the source water completed by an expert.

Saskatchewan communities must meet strict water supply testing and treatment standards. The same cannot be said for private water supply systems. Although people are encouraged to test their water supply, most limit testing to the Saskatchewan Public Health test for both E. coli bacteria and nitrates. As a reflection of this "what we don't know can't hurt us" attitude, more than half of farm respondents (60.8 per cent) surveyed in the Upper Qu'Appelle River watershed did not have any type of treatment unit or filter on their water system.[8]

3.2 Benefits of Protecting Source Water: Quality and Quantity

Protecting source waters can reduce the cost of water treatment and improve water quality. Sound water resource management means protecting and promoting the processes that break down wastes and adopting land use practices that can protect water quality from contamination.

[8] Saskatchewan Watershed Authority, Summary of the Water Use Survey in the Upper Qu'Appelle Watershed, April 2004

3.2.1 Quality

Where there are known sources of pollution, reducing these contributions to surface water and ground water can prevent contaminants from reaching water supplies. Source water protection also includes maintaining and not overloading nature's own purification systems such as natural wetlands and marshes.

Protecting specific ecosystems, such as wetlands which purify water by removing contaminants from our drinking water, also protects water for recreational use as well as for livestock, wildlife, fish and their habitats. Natural riparian (shoreline) areas filter sediments which can carry chemicals and nutrients from upland runoff. This natural capacity to minimize the effects of runoff waters can be significantly reduced by a variety of human activities along the water's edge.

There are economic benefits to having high quality water available for use by many industries, including manufacturing and agricultural processing. Often the availability of dependable high quality water supplies can be the driver that induces an industry to locate in a particular area.

Higher quality source water will require less complex treatment which translates to less cost. Also, should a treatment failure occur, high quality source water poses a lower risk to human health.

3.2.2 Quantity

Water is a renewable resource and different types of water supplies are fully replenished during the hydrological cycle, but at very different rates. For example, water storage in lakes is replenished over a period of about 17 years, while rivers are replenished about every 16 days. (Table 1)

Water of Hydrosphere	Period of Renewal
Biological water	several hours
Atmospheric moisture	8 days
Channel network	16 days
Soil moisture	1 year
Bogs	5 years
Lakes	17 years
Ground water	1400 years
Mountain glaciers	1600 years
World Ocean	2500 years

Table 1[9]

[9] Unesco, November 2005, www.unesco.org

Ground and surface waters are part of the hydrological cycle. Ground water close to the surface can be influenced in both quality and quantity by surface activities. Deeper ground water is influenced much less by surface activities and more by local geology. Surface water supplies are directly affected by surface activities and by seasonal and annual variations in the hydrological cycle. (Figure 1)

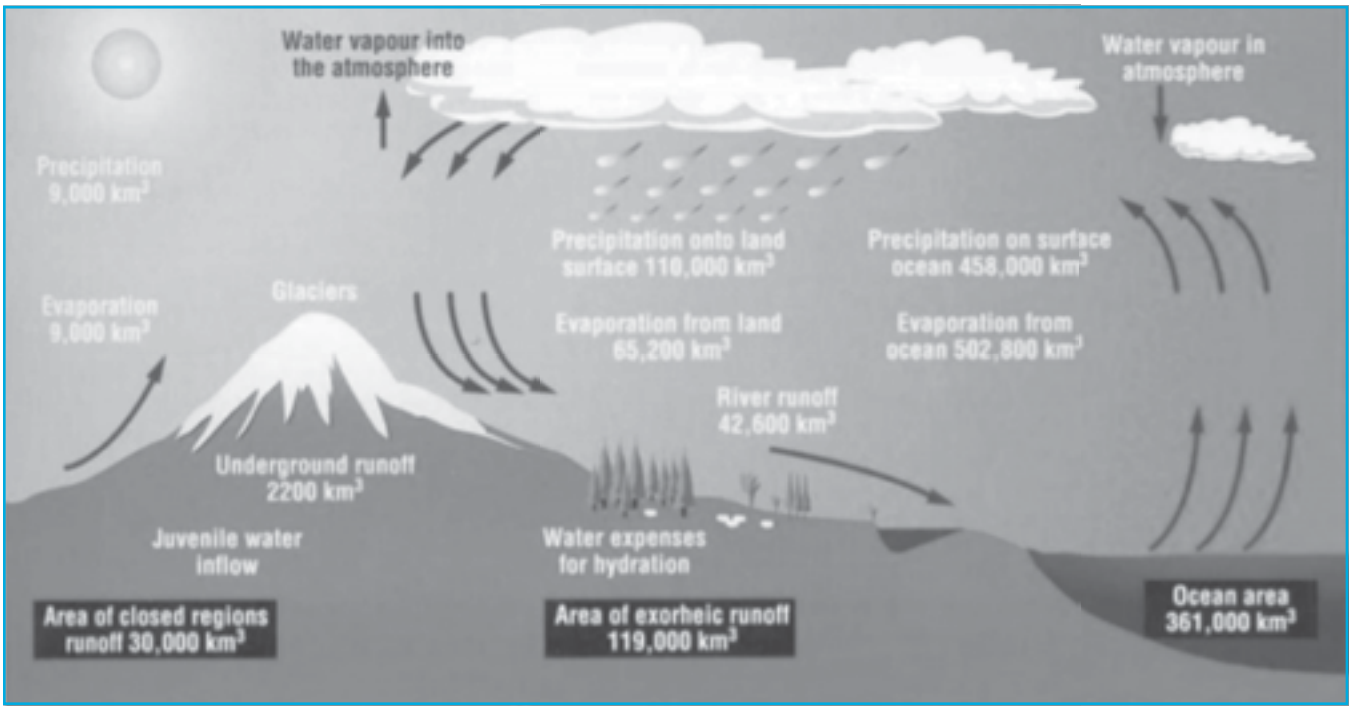


Figure 1: The Water Cycle[10]

4. Watershed Planning

Watershed planning is the first barrier of defense to protect drinking water. Planning involves identifying threats and opportunities related to source water protection and providing action items to address the threats and take advantage of the opportunities.

In spring 2008, public meetings were held throughout the Upper Souris River Watershed to determine public support for watershed planning. People in attendance expressed keen interest in ensuring safe and reliable water sources.

4.1 People

The Watershed Advisory Committees involved in the planning process have committed themselves and their local governments and organizations to implement the Plan and ensure that water and their watershed are protected for future generations.

[10] Unesco, November 2005, www.unesco.org

4.1.1 Upper Souris River Watershed Advisory Committees

The Upper Souris River Watershed Protection Plan was developed by local Watershed Advisory Committees in each of three sub-watersheds: **CanAm, Tatagwa/Long Creek** and **Moose Mountain**. Technical support was provided by the Upper Souris River Watershed Technical Committee. The committees were made up of people from rural and urban municipalities, First Nations, Métis communities, Conservation and Development Authorities, local industries and interest groups.

The Can/Am sub-watershed includes a portion of North Dakota in the United States. As a result, the Can/Am Advisory Committee includes members from communities in the North Dakota portion of the watershed. North Dakota's interests and issues are similar to Saskatchewan's; both share the goal of ensuring adequate supplies of safe water for everyone, now and in the future. Delivering local watershed management and stewardship programming across international boundaries has been recognized as an important challenge.


Photo courtesy Vicki East, P.Ag.

The Upper Souris River Watershed Protection Plan was produced using a consensus-based approach for decision-making. All of the objectives and key actions were ultimately agreed upon by the Watershed Advisory Committee members.

4.1.2 Upper Souris River Watershed Technical Committee

Throughout the planning process, the Upper Souris River Technical Committee provided important technical information to the Water Advisory Committees.

The Technical Committee was comprised of representatives from:

- Province of Saskatchewan and Government of Canada agencies
- State of North Dakota and United States federal government agencies
- non-government organizations
- industry

A full participant list for all committees can be found in Appendix A.

A *Background Portfolio* was developed by the Technical Committee to provide:

- a collective understanding of the Upper Souris River Watershed
- increased awareness of the factors that can affect the watershed and the quantity and quality of area water

The Background Portfolio is contained on the CD attached to this Plan or can be downloaded from the Upper Souris Watershed Association or Saskatchewan Watershed Authority website. Requests for digital CD or paper copies of the Background Portfolio can be made to any Saskatchewan Watershed Authority office.

Within the Background Portfolio, the watershed is described using physical characteristics, ecology, land use, climate, population, demographics and major economic activities including agriculture, tourism, recreation and industry.

Water resources are described in terms of quantity, quality, allocation and use. Different land cover functions are described for upland, riparian and wetland habitats. Watershed management is explained by municipal planning and zoning, federal and provincial legislation, stewardship activities and funding.

Data from sources on both sides of the international boundary was integrated when available. The use of the metric system in Canada and the imperial system in the United States posed a challenge for data merging across the international boundary.

4.1.3 Planning Team

The planning team for the Upper Souris River Watershed consisted of two staff from the Saskatchewan Watershed Authority's Watershed Planning and Land Management Branch. The watershed planners completed a number of tasks, including:

- establishing and guiding the Technical and Watershed Advisory Committees
- developing the Committees' terms of reference
- facilitating Watershed Advisory and Technical Committee meetings
- compiling background information
- documenting the findings of the Technical Committee and the outcomes of stakeholder deliberations

The goals and objectives of the planning team could not have been realized without the dedicated work of the Watershed Advisory and Technical Committees. Simply put, the planners established an arena for these groups to determine the management and protection strategies for the Upper Souris River Watershed and the water resources.

4.1.4 Upper Souris Watershed Association

The Upper Souris Watershed Association has been officially recognized as the implementing agency for the Upper Souris River Watershed Protection Plan. The Association created a long term Mission Statement:

> *The Upper Souris Watershed Association, through collaborative planning and facilitating partnerships, will protect and improve water quality, water quantity and the health of our watershed. To preserve the beauty, diversity, and integrity of the watershed, we will raise awareness and understanding by promoting sustainable environmental, economic and cultural activities.*

4.2 The Planning Process

The planning process followed the framework as outlined in the *Protecting our Water: A Watershed and Aquifer Planning Model for Saskatchewan*, 2003.

4.2.1 Forming Committees

One of the first steps in the watershed planning process is to establish the required committees. The Watershed Advisory Committees are composed of representatives of stakeholder groups resident in the watershed. The Technical Committee is composed of technical experts on watersheds and water.

4.2.2 Collecting and Consolidating Background Information

Members of the Watershed Advisory Committees require accurate information. This includes information about demographics, economic activities, land use, climate, geography, soils, surface and ground water availability, water use, wastewater treatment, and environmental and ecological topics.

This background information is used to supplement the local knowledge and experience possessed by Watershed Advisory Committee members. This information is consolidated in the Background Portfolio for use in making appropriate watershed management decisions.

4.2.3 Identifying Interests and Issues

All three Watershed Advisory Committees separately identified a variety of interests and issues around source water protection in the watershed. Some issues were unique to the individual sub-watershed, while others were common to all. Following presentations by Technical Committee members, technical information was provided to the Advisory Committees and some interests and issues were discarded as being either invalid or of very low priority. Final action items were developed considering these identified interests and issues.

A Stressor Evaluation Model was developed by Saskatchewan Watershed Authority planners and used by the Technical Committee to rank the issues that came from all three Watershed Advisory Committees. The opinion of the Technical Committee was that:

> *Although the ranking system was useful in determining which stressors were of more concern in this watershed than others, there was no attempt to rank these in comparison to other watersheds. The overall condition of the watershed is good, with no major stressors requiring immediate attention.*

4.2.4 Developing Categories, Objectives and Action Items

During the planning process, the Watershed Advisory Committees identified a number of interests and issues around watershed protection. Saskatchewan Watershed Authority planners reviewed these items to determine the general category or topic.

4.2.4.1 Categories

The interests and issues were refined with objectives and actions for each topic. The objectives and actions were then grouped into the following categories:

- Communications and Information
- Water Quality
- Watershed Management Considerations
- Aquifer and Ground water
- Water Conservation
- Monitoring and Research
- Governance
- Implementation
- Monitoring Progress

4.2.4.2 Objectives

As an outcome of the research and discussions undertaken by the Water Advisory Committees and the Technical Committee, issues were identified and specific objectives were established. These objectives were then used to develop the action items, which outline ways to address the identified issues.

4.2.4.3 Action Items

The action items in the Upper Souris River Watershed Protection Plan have four main components:

- date the action is initiated
- targeted completion date
- organization taking the lead on each item
- partners helping to support and implement the item

The actions items are not formatted in any priority ranking. The participants in the planning exercise believe that all of the action items are important.

4.2.5 Implementing the Plan

Even the best written plan will not provide results unless it is successfully implemented. An important part of the planning process is to establish a group which coordinates the implementation of the plan. The Upper Souris Watershed Association will work with the support of the Saskatchewan Watershed Authority and other organizations, to implement this Plan.

5. Watershed Plan Objectives and Action Items

The planning process culminates in consensus-based 1) objective setting and 2) definition of key actions to meet those objectives. The objectives and subsequent key actions are organized under nine topic categories. Within each category, statements that are fundamental to providing the reader with context to this portion of the report, are provided in bullet form. These statements have been extracted from the notes from the watershed advisory and technical committee meetings that were held throughout the planning cycle.

5.1 Communications and Information

- Residents generally have a limited knowledge about their watershed. Saskatchewan studies show that most people are unaware of the basic facts about water quality and quantity and how these relate to the watershed.
- People are not well informed about the impact that the oil, gas and coal industries have on water and what these industries are doing to mitigate the impacts.

5.1.1 Objective: Raise watershed residents' awareness about water, the watershed and what they can do to maintain or improve water quality and quantity for future generations.

Key Actions	Implementation Date	Completion Date	**Lead Responsibility** Partners
1. Develop a public water and watershed awareness strategy that targets both adults and school children.	June 2010	June 2013	**Upper Souris Watershed Association** Sun Country Health Region Schools

North Dakota watershed tour participants at Short Creek Dam, ND

5.1.2 Objective: Raise watershed residents' awareness of the oil, gas and coal industries' efforts to mitigate their effects on water and the watershed.

Key Actions	Implementation Date	Completion Date	Lead Responsibility Partners
2. Develop communications tools to inform watershed residents on how the oil, gas and coal industries impact water and steps being taken to protect water.	2011	2013	**Upper Souris Watershed Association** Canadian Association of Petroleum Producers SaskPower Sherrit Coal

5.2 Water Quality

- In the Upper Souris River Watershed, surface water quality is representative of a prairie stream, not glacial snowmelt.
- Ground water quality varies depending on the individual aquifer.
- Surface water quality is dependent upon annual precipitation and in a given year, the precipitation may vary across the watershed.
- Agriculture has significantly changed the landscape, hydrology and ecosystems of the watershed and this activity is believed to have an impact on water quality.
- The degree of wetland loss – nature's water filter - varies in the watershed, from negligible to extensive. Agricultural drainage of wetlands for spring runoff management and agricultural cropping has brought economic benefits to the watershed. Environmental effects of agricultural drainage are not well understood in Saskatchewan, with stakeholders having differing opinions

Wetland - an area of low-lying land covered by water often enough to support aquatic plants and wildlife for part of the life cycle. The wetland area includes the wet basin and adjacent upland.

- Effluent releases from municipal waste water treatment facilities may cause levels of organic material that are above the affected area's assimilative capacity. The timing of releases in relation to stream flow conditions (higher flows equals better dilution) will have an impact.

Photo courtesy Vicki East, P.Ag.

5.2.1 Objective: Maintain and improve water quality in the watershed for future generations by supporting agricultural producers to adopt Beneficial Management Practices.

Key Actions	Implementation Date	Completion Date	Lead Responsibility Partners
3. Support the continuation of incentive programs such as the Environmental Farm Plan or Agri-Environmental Group Plans by ensuring a delivery mechanism throughout the watershed.	June 2011	June 2013	**Upper Souris Watershed Association** Cornerstone Agri-Environmental Group Plan North Moose Mountain Agri-Environmental Group Plan Long Creek Agri-Environmental Group Plan Provincial Council of Agricultural Diversification and Development Boards of Saskatchewan Inc. (PCAB) Boards Saskatchewan Ministry of Agriculture Saskatchewan Watershed Authority Ducks Unlimited Canada Inc.
4. Encourage the adoption of programs that reflect public recognition and compensation to landowners for providing Ecological Goods and Services.	June 2011	June 2013	**Upper Souris Watershed Association**
5. Encourage the retention and restoration of wetlands and riparian areas where losses are creating water quality and quantity concerns.	June 2013	June 2016	**Upper Souris Watershed Association** Saskatchewan Watershed Authority Ducks Unlimited Canada Inc.
6. Support the implementation of the Rafferty / Alameda Land Management Strategy.	June 2010	June 2012	**Upper Souris Watershed Association** Saskatchewan Watershed Authority

5.2.2 Objective: Support research, education and communication on the effects of releases of wastewater effluent and, in particular, pharmaceuticals, in wastewater treatment.

Key Actions	Implementation Date	Completion Date	Lead Responsibility Partners
7. Develop an education program informing the public of the effects of disposing of pharmaceuticals via wastewater systems.	June 2010	June 2012	**Upper Souris Watershed Association** Saskatchewan Ministry of Environment Saskatchewan Watershed Authority
8. Conduct a research project to determine the effectiveness of sewage lagoons on the decomposition of pharmaceuticals.	June 2013	June 2015	**Upper Souris Watershed Association** Saskatchewan Ministry of Environment Sun Country Health Region
9. Support the long term voluntary goal of complete containment of municipal effluent through alternative infrastructure incentive programs and research.	June 2013	Ongoing	**Upper Souris Watershed Association** Sun Country Health Region

Wastewater effluent - sewage or other wastewater - treated or untreated - that flows out of a treatment plant, sewer, or industrial outfall and generally refers to wastes discharged into surface waters.

5.3 Watershed Management Considerations

- Water management impacts the economic, social and environmental well-being of the watershed.
- All water is managed by the province through the Saskatchewan Watershed Authority. At present, there is no formal mechanism to have the interests or viewpoints of local people considered in water management.
- Effective storm water management is not widely practiced in the Upper Souris River Watershed. Storm water from urban runoff is believed to have a potential detrimental effect on water quality, the extent of which is presently unknown.
- Interest has been expressed in developing recreation subdivisions adjacent to Rafferty and Alameda reservoirs. Considering the potential impacts to water quality from waste water storage and storm water releases, development next to reservoirs must undergo a higher level of scrutiny.
- Water quality downstream of the three major dams in the Souris River is sometimes marginal, with low dissolved oxygen (DO) and high phosphorus, especially in the winter months when flows are low. Low flows in the winter months may result in fish kills at the Saskatchewan/North Dakota border. North Dakota is also concerned with nutrient enrichment contributing to excessive algae growth during summer.
- Deadfall from trees killed by Dutch elm disease is causing blockages in the Souris River main stem, resulting in problems with municipal infrastructure and possibly reducing water quality.
- Road development in the watershed has increased barriers to fish migration, restricting fish habitat and potentially impacting fish populations.
- In the future, drought and flood occurrences may increase in both frequency and intensity due to climate change.
- North Dakota residents are developing “climate change secure” municipal supplies of water by constructing extensive water pipeline systems from the Missouri River.
- Instream flows require ecological limits to ensure continuing economic and human benefits such as a healthy fishery and recreational opportunities.

5.3.1 Objective: Encourage communities to consider the potential impacts of urban runoff to receiving waters.

Key Actions	Implementation Date	Completion Date	Lead Responsibility Partners
10. Develop a storm water management policy and education campaign to make the public aware of the potential threats from indiscriminate dumping of contaminants and provide awareness on how the storm water system works	June 2011	June 2013	**Upper Souris Watershed Association** Urban Communities Saskatchewan Watershed Authority Environment Canada Saskatchewan Wildlife Federation

5.3.2 Objective: Determine if exceedances of phosphorus, E-coli bacteria and dissolved oxygen at the Souris River - Sherwood, North Dakota water quality testing site are a result of human or natural causes.

Exceedances - When set water quality objectives are not achieved such conditions are referred to as "exceedances."

Key Actions	Implementation Date	Completion Date	Lead Responsibility Partners
11. Review and interpret available water quality data to assess upstream and downstream flows from the Rafferty and Alameda dams for nutrient and dissolved oxygen trends at the Sherwood, North Dakota border crossing.	June 2010	June 2012	**Upper Souris Watershed Association** Saskatchewan Watershed Authority Environment Canada

Water quality sampling on Roughbark Creek near Colgate, SK

5.3.3 Objective: Reduce the contaminant, nutrient, and dissolved oxygen water quality exceedance problems of the Souris River main stem downstream of the three major dams.

Key Actions	Implementation Date	Completion Date	Lead Responsibility Partners
12. Set achievable goals and actions to reduce the nutrient loading and dissolved oxygen problems downstream in North Dakota.	June 2013	June 2015	**Upper Souris Watershed Association** Saskatchewan Watershed Authority International Souris River Board – Aquatic Ecosystem Health Committee
13. Research the potential benefits of using the mid-level riparian structure on Alameda Dam to improve water quality releases downstream.	June 2012	June 2014	**Saskatchewan Watershed Authority** Upper Souris Watershed Association

Photo courtesy Vicki East, P.Ag.

International Souris River Board - formal board created in April 2000 by the Governments of Canada and United States through the International Joint Commission for the consolidation of water quantity, water quality, and the oversight for flood forecasting and operations in the trans-boundary Souris River basin.

5.3.4 Objective: Determine appropriate instream flow needs in the Souris River main stem downstream of the three major dams.

Key Actions	Implementation Date	Completion Date	Lead Responsibility Partners
14. Assess instream flow needs for all major altered flow regimes in the Souris River main stem to determine ecological limits.	June 2012	June 2015	**Saskatchewan Watershed Authority**

5.3.5 Objective: Improve watershed management by ensuring proponents and regulators of recreational development adjacent to reservoirs consider the effects on the water and watershed.

Key Actions	Implementation Date	Completion Date	Lead Responsibility Partners
15. Work with Rural Municipalities to develop bylaws or zoning changes that would enable a higher level of scrutiny for subdivisions occurring adjacent to the Rafferty and Alameda Reservoirs.	June 2012	June 2014	**Upper Souris Watershed Association** Rural Municipalities Saskatchewan Watershed Authority


Photo courtesy Vicki East, P.Ag.

5.3.6 Objective: Improve fish habitat and subsequently fish populations within the watershed.

Key Actions	Implementation Date	Completion Date	Lead Responsibility Partners
16. Develop a strategy to identify and address key barriers to fish migration and lost access to prime fish spawning habitat.	June 2012	June 2014	**Upper Souris Watershed Association** Saskatchewan Ministry of Environment Saskatchewan Wildlife Federation Fisheries and Oceans Canada

5.3.7 Objective: Improve the environmental health of the Souris River main stem downstream of the three major dams from a holistic perspective. (Figure 2).

Key Actions	**Implementation Date**	**Completion Date**	**Lead Responsibility** Partners
17. Develop a Souris River Main Stem Restoration Project downstream of Rafferty, Boundary and Alameda Dams to enhance the ecology of the river for the benefit of the river itself.	June 2010	June 2013	**Upper Souris River Watershed Association** Saskatchewan Watershed Authority Saskatchewan Ministry of Environment Fisheries and Oceans Canada

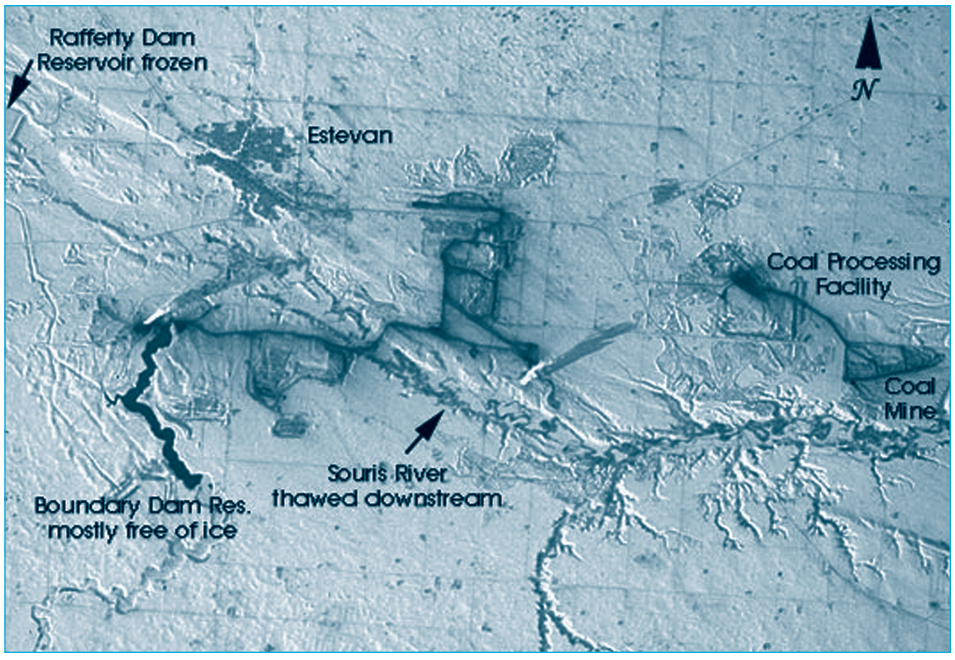


Figure 2: Souris River Estevan Satellite photograph

5.3.8 Objective: Develop an overall Watershed Drought Contingency Plan.

Key Actions	Implementation Date	Completion Date	Lead Responsibility Partners
18. Support the provincial government in developing Provincial Drought Contingency Plans on an individual watershed basis involving watershed residents in plan development and implementation.	June 2011	June 2013	**Upper Souris Watershed Association** Saskatchewan Watershed Authority

5.3.9 Objective: Improve watershed residents' understanding and response to droughts within the watershed.

Key Actions	Implementation Date	Completion Date	Lead Responsibility Partners
19. Develop a "drought scale" as an educational tool to better convey what problems may occur with various types and durations of drought.	June 2012	June 2014	**Saskatchewan Watershed Authority** Upper Souris Watershed Association

5.3.10 Objective: Help watershed residents prepare and adapt to potential future climate change involving drought.

Key Actions	Implementation Date	Completion Date	Lead Responsibility Partners
20. Educate the public on ways to mitigate the effects of drought.	June 2013	June 2015	**Upper Souris Watershed Association**

5.3.11 Objective: Improve the drought-preparation capabilities of the watershed.

Key Actions	Implementation Date	Completion Date	Lead Responsibility Partners
21. Explore the feasibility of developing more community pipeline networks to mitigate expected long term droughts.	June 2013	June 2015	**Upper Souris Watershed Association**

Drought - generally in reference to periods of less than average or normal precipitation over a set time, sufficiently prolonged to cause serious hydrological imbalance that result in biological or economic losses.

5.3.12 Objective: Improve the public's understanding of the operation of the major dams in the watershed and ensure public input in those operating plans.

Key Actions	Implementation Date	Completion Date	Lead Responsibility Partners
22. Develop written operating plans for Boundary, Rafferty, and Alameda reservoirs in partnership with SaskPower and with direct consultation of local people, organizations and industry.	June 2012	June 2015	**Saskatchewan Watershed Authority** SaskPower Upper Souris Watershed Association

5.4 Aquifer and Ground Water


Photo courtesy Vicki East, P.Ag.

- Ground water can become contaminated from numerous activities or sources, including gravel extraction, septic systems and agriculture practices. Ground water quality in Saskatchewan is highly variable, usually highly mineralized and, in the majority of cases, does not meet the drinking water quality guidelines.
- Water wells provide potable water to communities and rural residents within the watershed. Water is routinely tested and treated in urban communities while rural residents only do basic testing and rarely treat their water. Humans use of untreated water is not recommended due to the potential for increased risks for some watershed residents.
- Abandoned water wells have the potential to contaminate ground water and affect adjacent water wells.

5.4.1 Objective: Lower the human health problems associated with drinking water and/or using raw water.

Key Actions	Implementation Date	Completion Date	Lead Responsibility Partners
23. Develop a program to educate the public on the need to test and treat their private water supplies.	June 2010	June 2013	**Upper Souris Watershed Association** Sun Country Health Region

5.4.2 Objective: Reduce the potential for aquifer contamination from abandoned water wells.

Key Actions	Implementation Date	Completion Date	Lead Responsibility Partners
24. Develop a program to identify and decommission abandoned water wells in the watershed.	June 2011	June 2013	**Upper Souris Watershed Association** Saskatchewan Watershed Authority

Abandoned water well decommissioning workshop

5.4.3 Objective: Reduce potential human health risks from community water supplies.

Key Actions	Implementation Date	Completion Date	Lead Responsibility Partners
25. Conduct a scoping exercise to assess whether there are at-risk communities in the watershed.	June 2011	June 2013	**Saskatchewan Watershed Authority**

5.5 Water Conservation

- A secure and high quality water supply is essential to human health, and is also a key driver of economic expansion. The purpose of conserving water revolves around meeting those needs while ensuring an adequate supply remains for environmental and future development. Wise use and conservation of water is always important, but becomes more important during times of drought.
- Canadians are the second highest water users in the world. The average urban Canadian uses 343 litres per capita per day residentially. In Saskatchewan, average residential daily use per capita is 293 litres per day.[11]
- The loss of treated water due to leaking municipal distribution systems can be as high as 40 per cent of water treated. Leak detection equipment is expensive and requires technical expertise to operate, therefore small communities within the watershed may not be able to afford to own and operate leak detection equipment.

5.5.1 Objective: Implement measures to reduce the overall loss of water in municipal water systems.

Key Actions	**Implementation Date**	**Completion Date**	**Lead Responsibility** Partners
26. Develop an effective and affordable Municipal Leak Detection Program with the cooperation of all municipalities in the watershed.	June 2011	June 2013	**Upper Souris Watershed Association** City of Weyburn City of Estevan Urban communities

5.6 Monitoring and Research

- A key requirement of watershed protection planning is good information. Watershed organizations require good water quality data that has been collected on a consistent basis.
- Water quality data for the Upper Souris River Watershed is collected and interpreted by many agencies, each with their own goals. Presently, there are no watershed health benchmarks to assess whether changes to the watershed are a result of human influences.

[11] Saskatchewan Watershed Authority, Saskatchewan Water Conservation Strategy, 2005

5.6.1 Objective: Provide a leadership role in water quality data collection and interpretation for better understanding by watershed residents and all communities and agencies involved in water quality mandates.

Water quality – the chemical, physical and biological characteristics of water with respect to its suitability for a specific use.

Key Actions	Implementation Date	Completion Date	Lead Responsibility Partners
27. Develop a mechanism to interpret water quality data to understand past, present and future condition of the watershed.	June 2013	June 2015	**Upper Souris Watershed Association** International Souris River Board Saskatchewan Watershed Authority

5.6.2 Objective: Increase public understanding of significant human influences on the watershed and facilitate the collection and interpretation of water quality data.

Key Actions	Implementation Date	Completion Date	Lead Responsibility Partners
28. Move towards a centrally located water quality data repository.	June 2013	June 2015	**Upper Souris Watershed Association** International Souris River Board – Aquatic Ecosystem Health Committee Saskatchewan Watershed Authority Saskatchewan Ministry of Environment

5.6.3 Objective: Improve the water quality database for the watershed for access by the public and stakeholders.

Key Actions	Implementation Date	Completion Date	Lead Responsibility Partners
29. Engage the International Souris River Board Water Quality Committee to expand their mandate to include broader collection and interpretation of data to be shared annually with the public and local Watershed Advisory Committees to influence change in the watershed.	June 2011	June 2012	**Upper Souris Watershed Association** International Souris River Board

5.6.4 Objective: Improve general understanding of new threats to water and human health.

Key Actions	Implementation Date	Completion Date	Lead Responsibility Partners
30. Advance the academic research into pharmaceutical residuals in wastewater treatment and effluent releases.	June 2012	June 2014	**Upper Souris Watershed Association** Saskatchewan Watershed Authority University of Saskatchewan University of Regina
31. Develop an education and management plan to manage the impacts of pharmaceuticals to the receiving waters in the watershed.	June 2011	June 2015	**Upper Souris Watershed Association** Saskatchewan Ministry of Environment Health Canada Sun Country Health Region
32. Support the long term voluntary goal of complete containment of municipal effluent through alternative infrastructure incentive programs and research.	June 2013	Ongoing	**Upper Souris Watershed Association** Sun Country Health Region Saskatchewan Ministry of Environment

North Dakota watershed tour participants at County Courthouse, Crosby, ND

5.6.5 Objective: Improve the water quality of the water entering Nickle Lake.

Key Actions	**Implementation Date**	**Completion Date**	**Lead Responsibility** Partners
33. Understand the spring siltation problems experienced by the City of Weyburn and develop a research project to identify the potential causes and solutions of the spring erosion and sedimentation.	June 2011	June 2015	**Upper Souris Watershed Association** Saskatchewan Watershed Authority Souris Conservation and Development Authority Rural Municipalities

5.6.6 Objective: Improve the overall quality of water in the watershed by identifying and then reducing potential human phosphorus sources.

Key Actions	Implementation Date	Completion Date	**Lead Responsibility** Partners
34. Develop a research program to identify most likely sources of manmade non-natural introduced phosphorus in the watershed and develop a mitigation strategy.	May 2011	December 2015	**Upper Souris Watershed Association** Saskatchewan Watershed Authority Saskatchewan Ministry of Environment

5.7 Governance

The Watershed Advisory Committees dealt with watershed governance, particularly in terms of representation on the International Souris River Board.

- The International Souris River Board (ISRB) was established by the International Joint Commission (IJC) to monitor the Canada/US allocation agreement for the Souris River basin.
- As part of the IJC's International Watershed Initiative, the Souris River basin has been evolving into joint water quality and quantity management.

5.7.1 Objective: Ensure the people of the Upper Souris River Watershed have direct influence on water management decisions that affect them inside and outside of their watershed.

Key Actions	**Implementation Date**	**Completion Date**	**Lead Responsibility** Partners
35. Encourage the International Souris River Board (ISRB) to establish a local representation mechanism on their Board from residents of the Souris River basin to reflect local interests and issues.	June 2011	March 2012	**Upper Souris River Watershed Association** Other watershed groups and similar organizations in Saskatchewan, Manitoba and North Dakota.

5.8 Implementation

- Plan implementation should be assigned to the people most affected by the Upper Souris River Watershed Protection Plan, since they have the most at stake and will be motivated to see the Plan carried out.
- Watershed groups have been established to ensure effective and fiscally responsible implementation.
- Local influence and decision-making must be supported by scientific data, interpretation, knowledge and expert opinion.

5.8.1 Objective: Create a local watershed entity comprised of representatives of municipalities, First Nations, Métis organizations, agriculture and industry to implement the key actions contained in the Plan.

Key Actions	Implementation Date	Completion Date	Lead Responsibility Partners
36. Organize and incorporate an implementation agency.	Immediately	March 2010	**Watershed Advisory Committees** Saskatchewan Watershed Authority
37. Obtain municipal, provincial and federal sustained core financial support to ensure the longevity of the implementation agency.	June 2010	June 2011	**Upper Souris Watershed Association** Saskatchewan Association of Watersheds

5.8.2 Objective: Ensure local decision-making is based on the best available scientific data, interpretation and expert opinion.

Key Actions	Implementation Date	Completion Date	Lead Responsibility Partners
38. Maintain the Technical Committee of the watershed planning initiative. This committee shall meet annually.	Immediately	Ongoing	**Upper Souris Watershed Association** Saskatchewan Watershed Authority

5.9 Monitoring Progress

5.9.1 Objective: Monitor change in the watershed.

Key Actions	Implementation Date	Completion Date	**Lead Responsibility** Partners
39. Provide the parameters for a benchmark State of the Watershed Report.	Immediately	June 2012	**Upper Souris Watershed Association** Upper Souris Technical Committee Saskatchewan Watershed Authority Ministry of Environment
40. Create a custom State of the Watershed Report every ten years in order to provide benchmarks and record progress.	Immediately	March 2020	**Upper Souris Watershed Association** Upper Souris Technical Committee Saskatchewan Watershed Authority Saskatchewan Ministry of Environment

Photo courtesy Vicki East, P.Ag.

6. Conclusion

The Upper Souris River Watershed Protection Plan is an important step toward ensuring ongoing watershed protection. This is a significant project, one that has area residents coming together to make a difference in their watershed. The Plan has successfully heightened awareness of water and the environment.

The Upper Souris River Watershed Protection Plan is a working, living document and will be implemented through the support of a number of partners with public participation. The Saskatchewan Watershed Authority and Upper Souris Watershed Association recognize that significant effort will be required from provincial ministries, state and federal departments and other agencies to implement the plan. This cooperation between all parties will be a key factor in achieving the goal of watershed protection for the Upper Souris River basin.

The Government of Saskatchewan, through the Saskatchewan Watershed Authority, is committed to support the implementation of the Watershed Protection Plan in partnership with the Upper Souris Watershed Association. The Authority is also committed, in partnership with the Ministry of Agriculture, to assist with the implementation of Agri-Environmental Group Plans which will support several recommendations in the Protection Plan.

Success depends on watershed residents doing their part to implement the Plan. If you are interested in becoming involved, contact your local Watershed Advisory Committee member or municipal office.

7. Glossary of Terms

Aquatic – consisting of, relating to or being in water; living or growing in, on or near water.

Aquifer – an underground layer of porous rock, sand or other material that allows movement of water between layers of non-porous rock or clay. Usually restricted to water-bearing structures capable of yielding water in sufficient quantity to constitute a usable supply.

Assimilative capacity - natural ability of water and soil to use and decompose potential pollutants without harmful effects to the environment.

Climate – meteorological elements (precipitation, temperature, radiation, wind, cloudiness, etc.) that characterize the average and extreme conditions of the atmosphere over long periods of time at a location or region of the earth's surface.

Climate change – an alteration in measured meteorological conditions that significantly differ from previous average conditions and are seen to endure, bringing about corresponding changes in ecosystems and socio-economic activities.

Consensus – an outcome of mutual agreement that brings diverse beliefs, approaches or ideals to common understanding and resolution, i.e.: resolving issues related to environmental, social or economic sustainability.

Conservation – the preservation and renewal, when possible, of human and natural resources that affects use and promotes protection and improvement of natural resources.

Development – building, engineering, mining or other operations that alter or intensify the use of a resource.

Diversity – the measure of the number of species and their relative abundance.

Drainage – movement of water off of land, either naturally or man-made, unauthorized or approved.

Drought - generally in reference to periods of less than average or normal precipitation over a set time, sufficiently prolonged to cause serious hydrological imbalance that result in biological or economic losses.

Ducks Unlimited Canada, Inc. – an entity that conserves, restores and manages wetlands and associated habitat for North American waterfowl.

Ecological – pertains to the relationship between living organisms and their environments.

Ecological goods and services - are the benefits arising from the ecological functions of healthy ecosystems.

Economic development – the process of using and converting resources into wealth, jobs and an enhanced quality of life.

Ecosystem – a dynamic complex of organisms (biota) including humans, and their physical environment that interact as a functional unit in nature.

Exceedances - when set water quality objectives are not achieved such conditions are referred to as "exceedances."

First Nation – an Indian band or an Indian community functioning as a band but not having official band status, not including Inuit or Métis peoples.

Ground water – subsurface water usually in aquifers; water that occurs in voids or crevices of rock and soil, usually from a spring or well.

Habitat – natural surrounds or native environment where a plant or animal grows and lives

Holistic – relating to or concerned with the whole or complete system rather than an analysis of dissected parts for treatment (e.g., holistic ecology).

Infrastructure – basic facilities, services and installations needed for a community or society to function, such as transportation, communication, health, power, water and wastewater treatment systems.

Integrated Watershed Management - a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems. (Global Water Partnership)

International Souris River Board - a formal board created in April 2000 by the Governments of Canada and United States through the International Joint Commission for the consolidation of water quantity, water quality, and the oversight for flood forecasting and operations in the trans-boundary Souris River basin.

Land cover – predominant vegetation on the surface of a parcel of land.

Land use – the present use of an area of land.

Main stem – defined as the principal channel within a given watershed, into which all of the tributary streams flow.

Métis - means a person who self-identifies as Métis, is of historic Métis Nation ancestry, is distinct from other Aboriginal peoples and is accepted by the Métis Nation. (As defined by the Métis Nation – Saskatchewan)

Migration – the cyclical movement of birds from southern wintering grounds to northerly reproductive food-rich areas, then returning to wintering grounds.

Minimum tillage – the minimum use of primary and/or secondary tillage to meet crop production requirements under existing soil and climatic conditions, usually resulting in fewer tillage operations than more conventional tillage.

Mitigation – reduction or elimination of negative impacts from a specific activity.

Moraine - is any glacially formed accumulation of unconsolidated glacial debris (soil and rock) which can occur in currently glaciated and formerly glaciated regions, such as those areas acted upon by a past ice age.

Partnership – co-operative, collaborative alliance between/among stakeholders in a non-legal arrangement used to improve and build relationships and achieve common goals.

Policy – a course or principle of action adopted or proposed.

Pollution – alternation of the character or quality of the environment that renders it unfit or less suited for use. Water pollution alters the physical, chemical or biological properties through introduction of substance(s) that adversely affect beneficial uses for water.

Reverse osmosis – a water treatment process in which water is forced through a semi-permeable membrane. Clean water passes through the membrane and impurities too large to pass through the pours of the membrane are left behind and flushed away.

Riparian areas – the zone of vegetation alongside waterways and other surface water. Lush vegetation is the best sign of healthy, well-managed riparian areas and is critical to filtering and slowing runoff.

River basin – an area that contributes to form a watershed.

Saskatchewan Wildlife Federation – a non-profit, non-government charitable organization comprising more than 25,000 Saskatchewan sportsmen and conservationists.

Sewage – the waste and wastewater from residential or commercial establishments that are normally discharged into sewers.

Sewage lagoon – a shallow pond where sunlight, bacterial action and oxygen work to purify wastewater; also used for storage of wastewater.

Source water – untreated water from streams, rivers, lakes or underground aquifers used to supply private wells and public drinking water.

Source water protection – the prevention of pollution and the sound management of factors and activities that (may) threaten water quality and quantity of lakes, reservoirs, rivers, streams and ground water.

Stakeholder – individual or group with direct or indirect interest of issues or situations, usually involved in understanding and helping resolve or improve their situations.

Stewardship – judicious care and responsibility by individuals or institutions for reducing their impacts on the natural environment.

Sustainable – the ability to manage and sustain a resource over time; the capability of being continued with minimal long-term effect on the environment.

Wastewater - also known as sewage, wastewater is essentially the water supply of a community after it has been fouled by various uses. It may be composed of a combination of domestic wastewater (human and animal wastes), industrial wastewater (wastewater in which industrial wastes predominate) and storm water (runoff resulting from precipitation).

Wastewater effluent – sewage or other wastewater - treated or untreated - that flows out of a treatment plant, sewer, or industrial outfall and generally refers to wastes discharged into surface waters.

Watershed – an elevated boundary contained by its drainage divide and subject to surface and subsurface drainage under gravity to the ocean or interior lakes.

Watershed advisory committee – a diverse group of people from a community who dedicate their efforts to the completion of a watershed plan. The committee's function is to discuss and facilitate consensus-based decision-making among stakeholders that will help resolve issues of source water protection and sound watershed management.

Watershed health – the desired maintenance over time of biological diversity, biotic integrity and ecological processes of a watershed.

Watershed and aquifer planning – a process, within the geographic confines of a watershed or aquifer and with the participation of stakeholders, to develop plans to protect the watershed and, in particular, source water for human consumption and use.

Watershed management - a process within the geographic confines of a watershed that facilitates planning, directing, monitoring and evaluating activities to ensure sustainable, reliable, safe and clean water supplies.

Watershed protection - the treatment of watershed lands to control soil, water and wind erosion and ensure sound management and protection of source waters.

Water quality – the chemical, physical and biological characteristics of water with respect to its suitability for a specific use.

Wetland – an area of low-lying land covered by water often enough to support aquatic plants and wildlife for part of the life cycle. The wetland area includes the wet basin and adjacent upland.

8. Appendices

Appendix A. Upper Souris River Watershed Committees

CanAm Watershed Advisory Committee

Last Name	First Name	Group Representation
Boyer	Mary Rose	Estevan Local, Métis Nation - Saskatchewan
Clarke	Allan	Mainprize Regional Park
Clements	Doug	City of Noonan/Divide County Water Resource District/Burk- Divide-Williams Water Authority
East	Vicki	Ducks Unlimited Canada
Forster	Rob	Town of Bienfait
Hammett	Garry	Town of Bienfait
Halirewich	Mike	Estevan Branch, Saskatchewan Wildlife Federation
Herzberg	Lawrence	Village of Frobisher
Hutchison	Andrew	Sherritt Coal (formerly Prairie Mines and Royalty)
Jahn	Lorne	Rural Municipality of Estevan No. 5
Jahn	Reginald	Village of Roche Percee
Neuman	Mark	Cornerstone Agri-Environmental Group Plan
Renkas	Blaine	Sherritt Coal (formerly Prairie Mines and Royalty)
Rucks	Edwin	Rural Municipality of Enniskillen No. 3
Steinke	Joy	Rural Municipality of Cambria No. 6
Sutter	Kevin	City of Estevan
Twietmeyer	Jack	Souris-Moose Creek Branch, Saskatchewan Wildlife Federation, Rural Municipality of Enniskillen No. 3
Wang	Lin	Boundary Dam Power Station, SaskPower
Zeleny	Mike	Boundary Dam Power Station, SaskPower
Zieglgansberger	Don	Rural Municipality of Coalfields No. 4

Moose Mountain Watershed Advisory Committee

Last Name	First Name	Group Representation
Basken	Lyle	Village of Kenosee Lake
Breault	Tom	Rural Municipality of Tecumseh No. 65, North Moose Mountain Creek Agri-Environmental Group Plan
Dinsley	Dave	Arcola Local, Métis Nation - Saskatchewan,
Duncan	Robert	Moose Mountain Branch, Saskatchewan Wildlife Federation

Fornwald	Brian	Rural Municipality of Browning No. 34
Fournier	Robert	Save a Goose Branch, Saskatchewan Wildlife Federation
Gordon	Larry	Rural Municipality of Brock No. 64
Nankivell	Cliff	Village of Kisbey
Huriet	Yvan	Village of Forget
King	Kevin	Rural Municipality of Golden West No. 95
Leier	George	Rural Municipality of Francis No. 127
Locke	Gord	Moose Mountain Provincial Park
Lutz	Huguette	Town of Carlyle
McMillan	Ken	Town of Arcola
Morrison	Blaine	Town of Stoughton
Neuman	Mark	Cornerstone Agri-Environmental Group Plan
Scarrow	Don	Arcola Local, Métis Nation - Saskatchewan,
Shepherd	Gloria	Ocean Man First Nation
Shirley	Don	Town of Carlyle
Slykhuis	Cliff	Rural Municipality of Hazelwood No. 94
Twietmeyer	Jack	Souris-Moose Creek Branch, Saskatchewan Wildlife Federation, Rural Municipality of Enniskillen No. 3
Walls	Trent	Cornerstone Agri-Environmental Group Plan
Wilson	Jack	Rural Municipality of Moose Mountain No. 63 and Cornerstone Agri-Environmental Group Plan

Tatagwa/Long Creek Watershed Advisory Committee

Last Name	First Name	Group Representation
Barmby	Alan	Souris Conservation Area Authority
Bellavance	David	Town of Radville
Clarke	Allan	Mainprize Regional Park
Culham	Lloyd	Tatagwa Conservation Area Authority and Rural Municipality of Weyburn No.67
Dreger	Brian	Souris Conservation Area Authority
East	Vicki	Ducks Unlimited Canada
Frank	Blaine	City of Weyburn
Hauglum	Allan	Town of Midale/Mainprize Regional Park
Irwin	Brad	Rural Municipality of Lomond No. 37
Kot	Bernie	Rural Municipality of Wellington No. 97
Krausher	Alan	Rural Municipality of Laurier No. 38

Rosengren	Norma	Rural Municipality of Cymri No. 36
Thorn	Mark	Rural Municipality of Brokenshell No. 68
Walkeden	Twila	Cenovus Energy (formerly Encana Resources)

Interim Upper Souris Watershed Association Board

Last Name	First Name	Group Representation
Breault	Tom	Rural Municipality of Tecumseh No. 65, North Moose Mountain Creek Agri-Environmental Group Plan
Boyer	Mary Rose	Métis Nation, Saskatchewan, Estevan Local
Frank	Blaine	City of Weyburn
Hauglum	Allan	Town of Midale / Mainprize Regional Park
Hoimyr	Mark	Long Creek Agri-Environmental Group Plan
Jahn	Reginald	Village of Roche Percee
Kot	Bernie	Rural Municipality of Wellington No. 97
Shirley	Don	Town of Carlyle
Morrison	Blaine	Town of Stoughton
Neuman	Mark	Cornerstone Agri-Environmental Group Plan
Shepherd	Gloria	Ocean Man First Nation
Sutter	Kevin	City of Estevan
Twietmeyer	Jack	Souris-Moose Creek Branch, Saskatchewan Wildlife Federation, Rural Municipality of Enniskillen No. 3
Walkeden	Twila	Cenovus Energy (formerly Encana Resources)
Zeleny	Mike	Boundary Dam Power Station, SaskPower

Upper Souris Watershed Technical Committee

Last Name	First Name	Group Representation
Barrett	Kent	Senior Geographic Information Systems Technician, Agri-Environment Services Branch, Agriculture and Agri-Food Canada
Beaton	Ashley	Junior Planning Consultant, Community Planning, Saskatchewan Ministry of Municipal Affairs
Brook	Doug	Conservation Programs Specialist, Ducks Unlimited Canada
Clark	Rob	Manager, Water Systems, Saskatchewan Ministry of Government Services
Debenham	Jill	Farm Stewardship and Watershed Advisor, Provincial Council of ADD Boards (PCAB)
Dubord	Marc	Ground Water Advisor, Cenovus Energy (formerly EnCana Resources)

Duchscherer	Heather	Environmental Scientist, Water Quality Division, North Dakota Department of Health
Duncan	Bruce	Senior Geologist, Fuel Resources, SaskPower
East	Vicki	Conservation Programs Specialist, Ducks Unlimited Canada
Graybiel	Kim	Director, Policy & Planning Branch, Saskatchewan Ministry of Environment
Grigg	John	Supervisor, Southeast Region, Regional Operations, Saskatchewan Watershed Authority
Gulka	Stacy	Agrologist (Articling), Projects and Partnerships, Saskatchewan Watershed Authority
Howard	Bruce	A/District Manager, Prairie Region, Fisheries and Oceans Canada
Johnson	Doug	Director, Basin Operations, Saskatchewan Watershed Authority
Kirkness	Robert	Senior Hydrologist, Basin Operations, Saskatchewan Watershed Authority
Lay	John	Petroleum and Natural Gas Technician, Saskatchewan Ministry of Energy and Resources
Lo	Kei	Senior Hydrogeologist, Ground Water Management Branch, Saskatchewan Watershed Authority
McRae	Kylie	Conservation Programs Specialist, Ducks Unlimited Canada
Molde	Clinton	Manager, Southeast Regional Operations, Saskatchewan Watershed Authority
Neil	Gary	Manager, Watershed Planning and Land Management, Saskatchewan Watershed Authority
Olson	Jeff	Senior Watershed Planning Coordinator, Watershed and Aquifer Planning Branch, Saskatchewan Watershed Authority
O'Neill	Kevin	Ecologist, Science, Information and Monitoring, Saskatchewan Watershed Authority
Paulson	Grant	Senior Public Health Inspector, Sun Country Health Region
Quagraine	Emmanuel	Plant Chemist, Shand Power Station, SaskPower
Rappel	John	Supervisor, Fuel Resources, SaskPower
Sahlu	Girma	Senior Engineering Advisor, Environment Canada (Prairie Provinces Water Board)
Schuster	Tim	Manager, Fuel Supply, SaskPower
Siba	Dwayne	Senior Technologist, Regional Operations, Southeast Region, Saskatchewan Watershed Authority
Siegfried	Alina	Watershed Protection Coordinator, Saskatchewan Environmental Society
Soulodre	Etienne	Senior Agrologist, Saskatchewan Watershed Authority

Tubbsum	Muhammad	Senior Geographic Information Systems Analyst, Information Services, Saskatchewan Watershed Authority
Waddell	Marin	Planning Consultant, Saskatchewan Ministry of Municipal Affairs
Wang	Lin	Environmental Systems Specialist, Boundary Dam Power Station, SaskPower
West	Rick	Supervisor, Environmental Planning, Environmental and Regulatory Affairs, SaskPower
Wright	Rick	Senior Ecosystem Protection Specialist, Saskatchewan Ministry of Environment
Yee	Brian	Senior Engineering Advisor, Environment Canada, Secretary, International Souris River Board of Control
Zeleny	Mike	Plant Manager, Boundary Dam Power Station, SaskPower
Zitta	Richard	Provincial Ecologist, Ministry of Environment

Appendix B. Summary of Objectives

5.1 Communications and Information

5.1.1 Objective: Raise watershed residents' awareness about water, the watershed and what they can do to maintain or improve the quality and quantity for future generations.

5.1.2 Objective: Raise watershed residents' awareness of the oil, gas and coal industries' efforts to mitigate their effects on water and the watershed.

5.2 Water Quality

5.2.1 Objective: Maintain and improve water quality in the watershed for future generations by supporting agricultural producers to adopt Beneficial Management Practices.

5.2.2 Objective: Support research, education and communication on the effects of releases of wastewater effluent and, in particular, pharmaceuticals, in wastewater treatment.

5.3 Watershed Management Considerations

5.3.1 Objective: Encourage communities to consider the potential impacts of urban runoff to receiving waters.

5.3.2 Objective: Determine if exceedances of phosphorus, E-coli bacteria and dissolved oxygen at the Souris River – Sherwood, North Dakota water quality testing site are a result of human or natural causes.

5.3.3 Objective: Reduce the contaminant, nutrient, and dissolved oxygen water quality exceedances problems of the Souris River main stem downstream of the three major dams.

5.3.4 Objective: Determine appropriate instream flow needs in the Souris River main stem downstream of the three major dams.

5.3.5 Objective: Improve watershed management by ensuring proponents and regulators of recreational development adjacent to reservoirs consider the effects on the water and watershed.

5.3.6 Objective: Improve fish habitat and subsequently fish populations within the watershed.

5.3.7 Objective: Improve the environmental health of the Souris River main stem, downstream of the three major damns, from a holistic perspective.

5.3.8 Objective: Develop an overall Watershed Drought Contingency Plan.

5.3.9 Objective: Improve watershed residents' understanding and response to droughts within the watershed.

5.3.10 Objective: Help watershed residents prepare and adapt to potential future climate change involving drought.

5.3.11 Objective: Improve the drought-proofing capabilities of the watershed.

5.3.12 Objective: Improve the public's understanding of the operation of the major dams in the watershed and ensure public input in those operating plans.

5.4 Aquifer and Ground Water

5.4.1 Objective: Lower the human health problems associated with drinking and/or using raw water.

5.4.2 Objective: Reduce the potential for aquifer contamination from abandoned water wells.

5.4.3 Objective: Reduce potential human health risks from community water supplies.

5.5 Water Conservation

5.5.1 Objective: Implement measures to reduce the overall loss of water in municipal water systems.

5.6 Monitoring and Research

5.6.1 Objective: Provide a leadership role in water quality data collection and interpretation, for better understanding by watershed residents and all communities and agencies involved in water quality mandates.

5.6.2 Objective: Increase public understanding of significant human influences on the watershed and facilitate the collection and interpretation of water quality data.

5.6.3 Objective: Improve the water quality database for the watershed for access by the public and stakeholders.

5.6.4 Objective: Improve general understanding of new threats to water and human health.

5.6.5 Objective: Improve the water quality of the water entering Nickle Lake.

5.6.6 Objective: Improve the overall quality of water in the watershed by identifying and then reducing potential human phosphorus sources.

5.7 Governance

5.7.1 Objective: Ensure the people of the Upper Souris River Watershed have direct influence on water management decisions that affect them inside and outside of their watershed.

5.8 Implementation

5.8.1 Objective: Create a local watershed entity comprised of representatives of municipalities, First Nations, Métis organizations, agriculture and industry to implement the key actions contained in the Plan.

5.8.2 Objective: Ensure local decision-making is based on the best available scientific data, interpretation and expert opinion.

5.9 Monitoring Progress in the Watershed

5.9.1 Objective: Monitor change in the watershed.