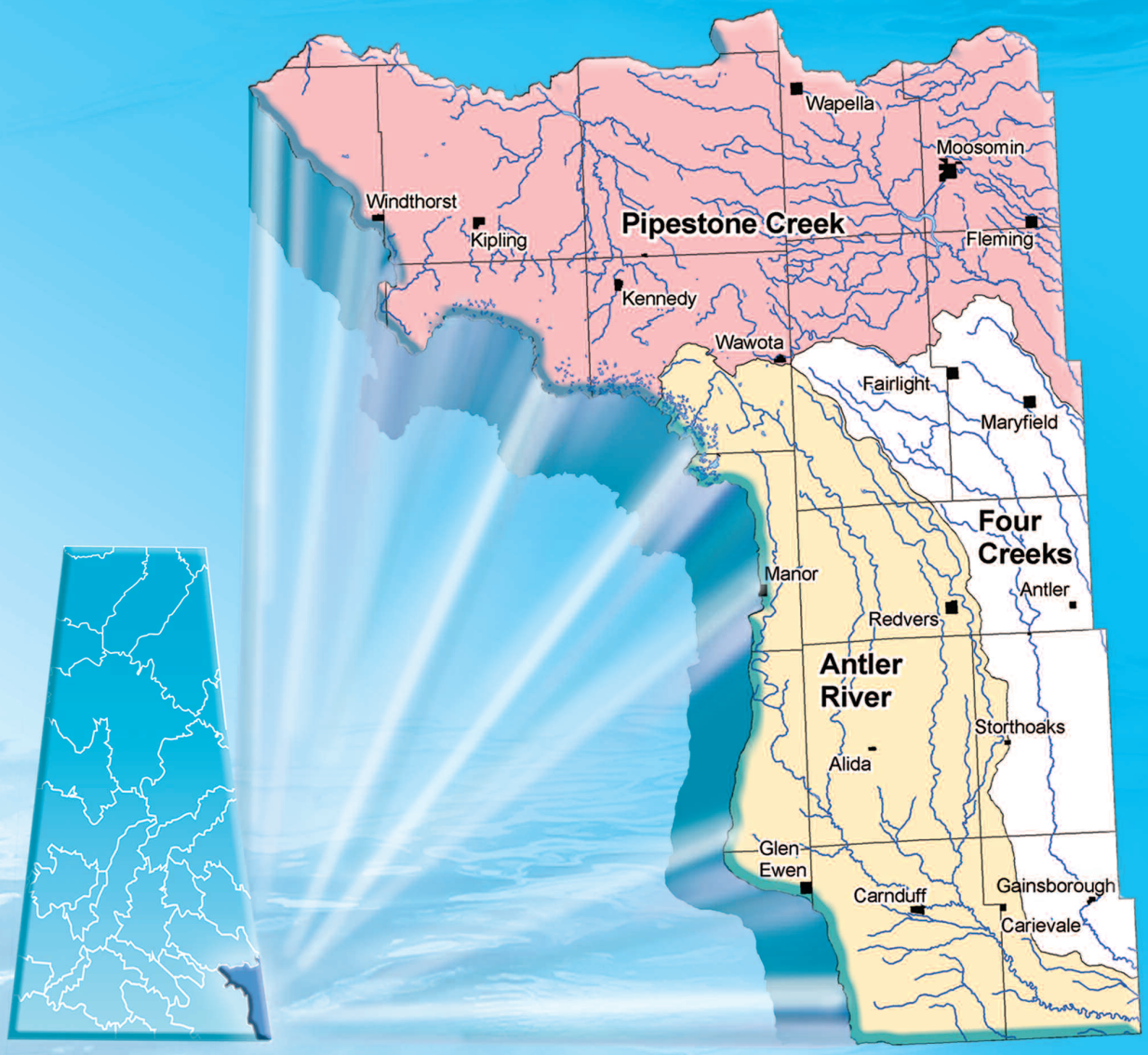
# Lower Souris River Watershed

## Source Water Protection Plan

March 2006




Saskatchewan Watershed Authority

Lower Souris River Watershed Advisory Committees

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# 1. Commitment from Participants

## 1.1 A Message from your Watershed Advisory Committee Chairs

**Ross Madsen**
***Four Creeks Watershed Advisory Committee Chair and Reeve of the Rural Municipality of Antler No. 61***

"After six years of meetings and much consultation, with the help of the Four Creeks Watershed Advisory Committee members, R.M. councillors, Jeff Olson, Etienne Soulodre, Collin McGuire and the Technical Committee, we have a management plan to digest, poke holes in, delete or add to. Now is the time to act on many of the recommendations – let us get to it."

**John Van Eaton**
***Pipestone Creek Watershed Advisory Committee Chair and appointee for the Rural Municipality of Maryfield No. 91***

"As with most things in life, watershed planning does not benefit from having the pendulum swing all the way to one side or the other. Considering all the interests in a watershed during planning and implementation, we have the greatest chance to succeed if moderation is practiced, with room to adapt to changing conditions."

**Warren Steves**
***Antler River Watershed Advisory Committee Chair and Reeve of the Rural Municipality of Argyle No. 1***

"Everyone's goal must be to protect the quality and quantity of clean drinking water for humans, animals and the environment. The goal of the Advisory Committee is to identify potential sources of contamination, whether it be from intensive livestock operations, urban centres, oil and gas operations, or any other potential sources. We need to protect the environment that purifies our water, such as wetlands that are drained unnecessarily. We also need to start monitoring water quality to detect the fertilizers and chemicals coming from farmland runoff in wet years. All of this must be done in a spirit of cooperation with all watershed residents. This watershed plan is the start of the journey to that noble end."

A **watershed** is an area that, because of topographic slope, contributes water to a specified surface water drainage system, such as a stream or river.

## 1.2 Lower Souris River Watershed Advisory Committee Mission Statement

**"Balancing the economic, environmental, and social values to sustain and improve the watershed for future generations."**

## 1.3 A Message to Watershed Residents from your Watershed Planning Team

The Province of Saskatchewan formally initiated the watershed planning process in the spring of 2003, but local residents had their own ideas about how to protect source water long before that. The 3 Creeks Watershed Board, which included rural municipalities in both Saskatchewan and Manitoba, started gathering the information needed for watershed planning in 1999. A considerable amount of that work is reflected in the Lower Souris River Watershed Background Report. (The Background Report can be downloaded at www.swa.ca, or a hard copy or CD version can be requested from any Saskatchewan Watershed Authority office or by calling 1-866 SASKH2O.) The Moosomin Lake stewardship group monitored water quality in the lake but soon realized that the whole Pipestone Creek Watershed had a lot more to do with water quality than just the area surrounding the lake. It was with this local foresight, vision and initiative in mind that the Lower Souris River Watershed was chosen as one of the first watersheds in Saskatchewan in which to initiate watershed planning. It will be this same leadership, vision and genuine concern for people, the environment and source water protection that will see this plan succeed.

The planning team would like to thank all those that contributed to the development of this plan, and in particular, the three Watershed Advisory Committees whose understanding, perseverance and patience during the process was much appreciated. A special thanks to the chairs of the committees – Ross Madsen, John Van Eaton and Warren Steves – for their leadership, direction and commitment to this planning process, and to Jim Cairns of the Provincial Council of Agriculture Development and Diversification (ADD) Boards for his participation as a co-chair in the Environmental Farm Plan group initiative.

Thanks to the invaluable advice and information provided by the Lower Souris River Watershed Technical Committee, in particular the extraordinary efforts and support of Etienne Soulodre of Projects and Partnerships, Saskatchewan Watershed Authority and Doug Brook of Ducks Unlimited Canada. In addition, thanks go to our colleagues in the Watershed and Aquifer Planning unit, whose insights and mentorship during this new process helped to make it a success.

Also, a special recognition to Glen Campbell and Gregg Fotheringham of the West Souris River Conservation District and Phil Weiss of Manitoba Water Stewardship, whose encouragement and support ensured success not only to the plan but to its implementation. This exemplary inter-provincial co-operation between watershed residents will prove that watershed health is more important than provincial boundaries.

# 2. Watershed Protection and You

## 2.1 One Step in the Multi-Barrier Approach to Drinking Water Protection

The drinking water supply can be broken down into three parts: source water, the drinking water treatment system, and the distribution system that carries the treated water to homes, businesses,

schools, and other buildings. As drinking water travels on its journey to you, it could become contaminated in many ways. The multi-barrier approach to managing drinking water supplies is one preventive risk management approach that identifies all these known and potential hazards and makes sure barriers are in place to reduce or eliminate the risk of contamination. The implementation of this Source Water Protection Plan represents the first barrier in protecting source waters. It cannot be stressed enough that source water protection is only the first barrier of defence against waterborne diseases or illnesses. Another key barrier is the routine treatment of water sources, usually by chlorination, and continual removal of unwanted waterborne elements such as bacteria, viruses, and organisms, by means of reverse osmosis, filtering, etc. **The only way of knowing what treatment the water supply needs is to have an expert do a comprehensive test of the source water, and then implement recommended measures to reduce risk.**

**Source water** is untreated water which will be used for a specified purpose, such as human use and consumption. Examples of source water include lakes, reservoirs, rivers, streams and groundwater. **Source water protection** is the prevention of pollution and sound management of factors and activities that (may) threaten water quality and quantity.

Saskatchewan communities are required to meet strict standards of testing and treatment of their water supplies. The same cannot be said for private water supply systems. Although many people are encouraged to test their water supply, most limit it to the testing available from the Provincial Laboratory for both E. coli and nitrates. As a reflection of this "what we don't know can't hurt us" attitude, almost half of the farm respondents surveyed in the Upper Qu'Appelle River Watershed drank unfiltered water right from the tap (48.5%), and more than half the farms (60.8%) did not have any type of treatment unit or filter on their water system.[1]

*Photo courtesy Ducks Unlimited Canada*

All watershed residents have an interest in protecting source water and, as such, all should be responsible for the implementation of this Source Water Protection Plan. Everyone should and can do their part. That includes big parts, such as being a councillor for a city or rural municipality which is responsible for the drinking water of hundreds of people, or small parts, such as practising stewardship and testing and treating the water on your own farm. Get involved and do your part!

## 2.2 Secondary Benefits of Protecting Source Water: Quality and Quantity

### 2.2.1 Quality

Protecting source water can mean removing and/or reducing known point sources of pollution and accumulative non-point source pollution. Source water protection can also mean maintaining nature's own purification systems and not overloading them.

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

Protecting specific ecosystems such as wetlands that remove contaminants and purify our drinking water also means protecting water for recreational uses such as swimming and boating and for livestock use, as well as for wildlife and fish habitats. Healthy riparian areas remove sedimentation which can carry waterborne chemicals. The uplands are areas that have the most human activity and therefore can potentially affect runoff waters.

There are economic benefits to having higher quality water available in many industries, such as manufacturing and value-added agriculture. Many times a good quality, high quantity water source can be the driving force that entices an industry to locate in a particular area.

When source water is of the highest natural quality, treatment is less costly and less complex. The potential health risks posed by the failure of treatment systems is also reduced.

**Riparian areas** are zones of vegetation adjacent to rivers and streams with a differing density, diversity, and productivity of plant and animal species relative to nearby upland areas.

### 2.2.2 Quantity

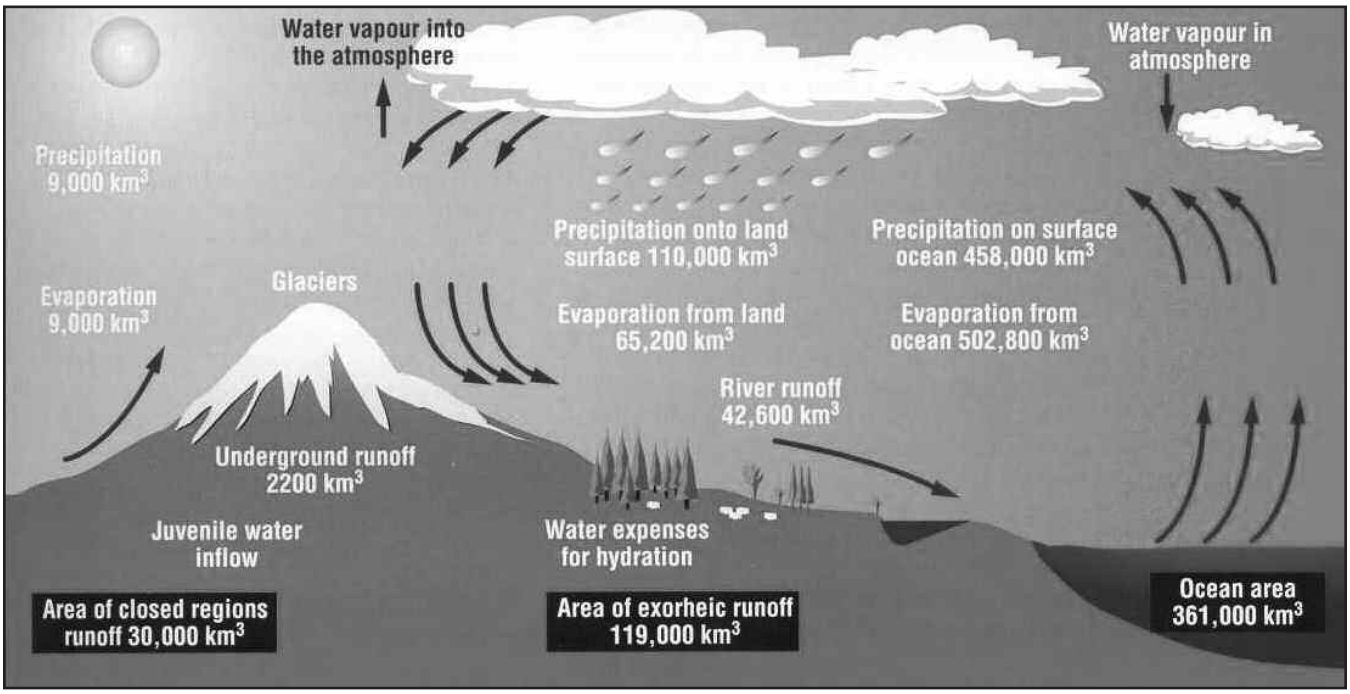
Water is a renewable resource. Different forms of water are fully replenished during the hydrological cycle, but at very different rates. For instance, the period for complete recharge of oceanic waters takes about 2,500 years, permafrost and ice about 10,000 years and deep groundwater and mountainous glaciers 1,500 years. Water storage in lakes is fully replenished over 17 years, and in rivers about every 16 days (see page 5 - water resources renewal chart).

Surface water and groundwater are directly related and form a part of the hydrological cycle (see page 5 - Hydrological Cycle diagram). Groundwater that is close to the surface can be influenced in both quality and quantity by surface activities. Deeper groundwater is usually much less influenced by surface activities.

Ensuring water supplies are available now and in the future means there will be water for people and nature, and requires that we account for fluctuations in supply. While the potential effects of climate change are still being debated, what is not debatable is that there will be droughts, there will be floods, and as such, we should plan to mitigate the effects from these natural occurrences.

| Water of Hydrosphere | Period of renewal |
|---|---|
| World Ocean | 2,500 years |
| Groundwater | 1,400 years |
| Polar ice | 9,700 years |
| Mountain glaciers | 1,600 years |
| Ground ice of the permafrost zone | 10,000 years |
| Lakes | 17 years |
| Bogs | 5 years |
| Soil moisture | 1 years |
| Channel network | 16 days |
| Atmospheric moisture | 8 days |
| Biological water | several hours |

Periods of water resources renewal on the Earth. [2]

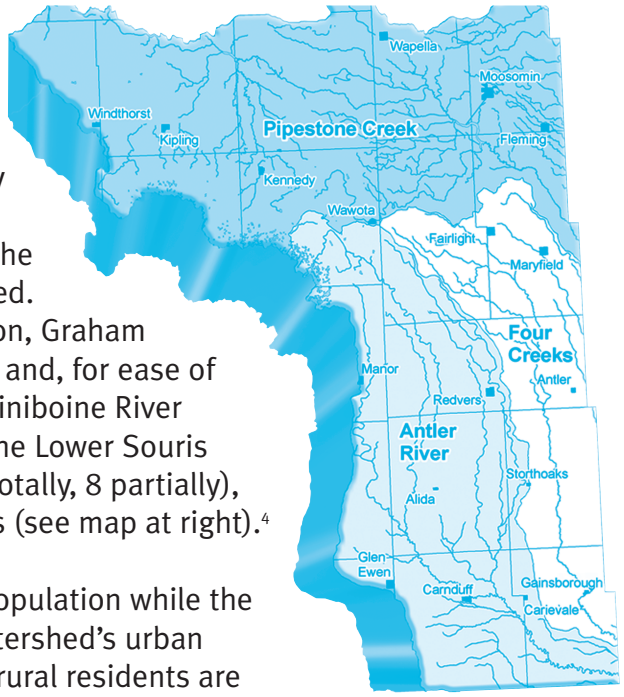



Hydrological Cycle [3]

[2] *http://www.unesco.org/science/waterday2000/Cycle.htm November 15, 2005*

[3] *http://www.unesco.org/science/waterday2000/Cycle.htm*

# 3. Lower Souris River Watershed




The Lower Souris River Watershed is a conglomeration of smaller watersheds that eventually flow into the Souris River in Manitoba. These watersheds include the Pipestone Creek Watershed, the Antler River Watershed, and the Four Creeks Watershed. The Four Creeks Watershed contains the Stony, Jackson, Graham and Gainsborough Creeks occurring in Saskatchewan and, for ease of watershed planning, a small portion of the Upper Assiniboine River Watershed occurring south of the Qu'Appelle River. The Lower Souris River Watershed includes 20 rural municipalities (12 totally, 8 partially), 19 urban municipalities, and three First Nations' lands (see map at right).[4]

The rural population accounts for 37 percent of the population while the remaining 63 percent of the population live in the watershed's urban communities. The majority of communities and most rural residents are dependant on groundwater wells to meet their water supply needs, including drinking water. Many of the community groundwater wells are under the direct influence of surface water.[5] The importance of co-operation between rural and urban residents in ensuring a safe and adequate source water supply cannot be stressed enough.

**Stewardship** is caring for land and associated resources and maintaining healthy ecosystems for future generations.

Historically, the Lower Souris River Watershed was dominated by fescue grasslands and aspen parkland. Conversion to agricultural land use has resulted in increased amounts of sediment and nutrients leaving the land and entering the aquatic system. Land use in the watershed is currently 80 percent cropland, 10 percent grassland, four percent shrubs, three percent trees, and two percent marsh.[6] Riparian areas have been eliminated or diminished to narrow corridors along the tributaries, streams and rivers. With this in mind, rural landowners and agricultural producers will be key participants in restoration and protection of the watershed. Their individual and collective actions in response to this plan are a critical element of its success.

# 4. Watershed Planning Methodology

Consistent with Saskatchewan's *Long Term Safe Drinking Water Strategy*,[7] the purpose of the Lower Souris River Watershed Source Water Protection Plan, as the first barrier of defence to protecting drinking water, is to identify the threats and opportunities around protecting source waters in the watershed, and provide a plan to address these threats and take advantage of opportunities.

[4] Population Map, *Lower Souris River Watershed Background Report*, November 2005
[5] Municipal Water Supply, *Lower Souris River Watershed Background Report*, November 2005
[6] Landcover Map, *Lower Souris River Watershed Background Report*, November 2005
[7] Province of Saskatchewan, April 2003

To facilitate planning and encourage local participation, the Lower Souris River Watershed was divided into the Antler River, Four Creeks and Pipestone Creek watershed planning areas. Activities involving watershed stewardship had already been underway in the Four Creeks Watershed since 1999, and in the Moosomin Reservoir/Pipestone Creek Watershed since 2002. The Lower Souris River Watershed Source Water Protection Plan was developed by the local advisory committees in each watershed planning area with critical support from the Lower Souris River Watershed Technical Committee.

The membership of the Watershed Advisory Committees includes representatives from local municipalities, First Nations, and industry, environmental and agricultural interest organizations. Technical support was provided by a variety of government agencies and from Ducks Unlimited Canada. (Participant lists for all committees can be found in the Appendix.)

In support of the planning process, the Lower Souris River Watershed Background Report was developed to provide everyone with a collective understanding of the watershed. This report provides a wide range of information to help build awareness of the many factors that affect the watershed and, ultimately, the quantity and quality of the water. The watershed is described in terms of its physical characteristics, ecology, land use, climate population demographics, and major economic activities, which include agriculture, tourism and recreation, and industry. Water resources are related 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.

This Source Water Protection Plan identifies threats to source waters and provides strategies to address these threats. The plan was formulated using a consensus approach, with all objectives, recommendations and key actions decided by all the Watershed Advisory Committee members. Specifically, this plan assembled pertinent information, analyzed threats and opportunities, built commitments to protect source water, and summarized the Committee's discussions and technical analysis in a number of recommendations. Finally, key actions were formulated from recommendations to be implemented, stating their implementation date and the agency or agencies responsible.

This plan is a living document that can be changed, altered or adapted to suit the needs of watershed residents through the input of the local Watershed Advisory Committees.

# 5. Interests and Issues

All three Watershed Advisory Committees identified a variety of interests and issues surrounding source water protection in the watershed. Some issues were unique to the individual watershed planning area, while others were common to all. After information was given to the Watershed Advisory Committees and presentations were made by Technical Committee members, some issues and interests were discarded, as they were determined to be either invalid (perception versus reality) or of very low concern and interest. The following chart identifies issues in the entire Lower Souris River Watershed and indicates which Watershed Advisory Committee initiated the issue.

Most of the interests and issues below are interconnected. This is to be expected, as a watershed represents a complex interdependency of relationships.

| | Antler River | Four Creeks | Pipestone Creek |
|---|---|---|---|
| Watershed Education | ■ | ■ | ■ |
| Groundwater Threats and Protection | ■ | ■ | ■ |
| Community Water Supplies | ■ | ■ | ■ |
| Water Quality Monitoring and Moosomin Reservoir | ■ | ■ | ■ |
| Landfills (Waste Disposal Ground) | ■ | ■ | ■ |
| Municipal Sewage Lagoons | ■ | ■ | ■ |
| Agricultural Activities | ■ | ■ | ■ |
| Watershed Management | | ■ | |
| Fish Migration and Habitat | | | ■ |
| Water Supply for Small Communities | ■ | | |
| Auburton Reservoir Potential Spillway Failure | ■ | | |
| Operation of Moosomin Dam | | | ■ |
| Water Conservation | | ■ | |

# 6. Planning Objectives and Recommendations

The Lower Souris River Watershed Advisory Committee has identified the following objectives, recommendations and key actions. The lead agency responsible for the key action is indicated in bold.

## 6.1 Watershed Education

*Photo courtesy Ducks Unlimited Canada*

People often take good quality abundant water for granted. They do not always understand how their actions affect the water, or how good stewardship and land-use practices can be implemented to maintain and improve their water.

Educational programs can raise awareness of watershed issues and change the values and beliefs people have regarding watershed resources. This attitudinal change prefaces behavioural change; people generally try to be consistent in their attitudes and behaviours. Changing behaviour is fundamental to promoting sustainability, as the cumulative impact of individual and group actions far outweighs what can be accomplished through the management of agencies such as the Saskatchewan Watershed Authority.

***Objective:***

To increase the watershed residents' knowledge and awareness of the intrinsic and economic value of water and how they can protect the quality of water.

***Recommendations:***

- Support WET (Water Education for Teachers), which focuses on school students.
- Support the "Living by Water" program, which focuses on cottage owners.
- Support 4-H program camps.
- Distribute watershed information to rural municipalities, villages, towns, schools, libraries, etc.
- Provide water "manuals" to people with wells to help them better understand how to protect their water supply.
- Provide shock chlorination fact sheets to watershed residents.
- Provide wellhead protection information to watershed residents.

## Key Action: Develop and implement an education and communication strategy within the watershed.

| Implementation Date | Completion date | Responsibility |
|---|---|---|
| April 1, 2006 | November 1, 2006 | Lower Souris River Watershed Board<br>Saskatchewan Watershed Authority - Marketing and Education<br>Ducks Unlimited Canada |

## Key Action: Initiate a focus group and survey to track success of the education and communication strategy within the watershed.

| Implementation Date | Completion date | Responsibility |
|---|---|---|
| April 1, 2006 | November 1, 2006 (Repeat in 2009) | Saskatchewan Watershed Authority - Marketing and Education |

**Success Measurement:**

Reconvene a similar focus group in ten years and measure any increase in the focus group's awareness of the watershed.[8]

# 6.2 Groundwater Threats and Protection

Measuring groundwater quality is generally a difficult task. The amount of groundwater data is limited in the Lower Souris River Watershed. The actual quantity of water available for use is difficult and expensive to estimate, while resources available for groundwater research are limited. Groundwater can be contaminated from numerous activities or sources, including oil and gas exploration and production, gravel extraction, septic systems, and agriculture practices. Generally speaking, the deeper the groundwater source is located, the less potential there is for the quality of the water to be impacted by surface activities.

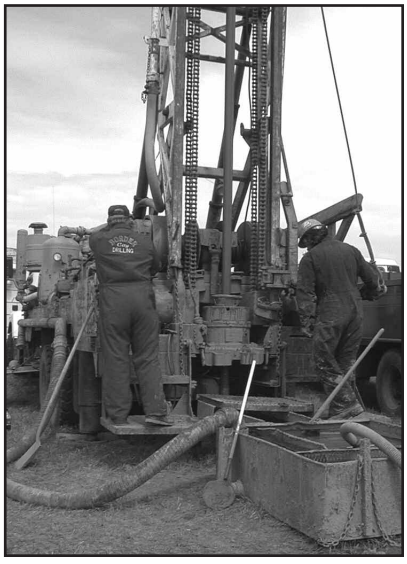


*Photo courtesy Prairie Farm Rehabilitation Administration*

[8] One of Saskatchewan Watershed Authority's *State of the Watershed Reporting Framework* indicators

The primary domestic groundwater zone used for drinking water is the near-surface zone, where groundwater is more directly and efficiently connected to precipitation and surface water features. Aquifers in this zone are more prone to drought and more vulnerable to contamination from surface activities, although the general water quality is usually less mineralized than water from deeper sources. Aquifers in this zone are used primarily for domestic supplies because they have limited well yields. Surface water bodies, including lakes, rivers and wetlands, can serve as either recharge or discharge areas for groundwater, depending on the local hydrogeology.

**Groundwater** is, generally, all subsurface water as distinct from surface water; specifically, the part that is in the saturated zone of a defined aquifer – an underground layer of porous rock, sand, or gravel containing large amounts of water.

Wellhead protection includes protecting the "capture zone" of a well from contamination, including direct contamination from activities in close proximity to the well. Good wellhead protection practices include the prevention of the reverse contamination of water supplies by back-flows and cross-connections. Once contaminated, groundwater is not easily restored to its former condition.

Groundwater is the primary water source of drinking water for the majority of communities and rural residents within the watershed. Source water protection of both the quality and quantity of groundwater is extremely important.

### *Objective:*

- To protect groundwater from contamination.

### *Recommendations:*

- Determine any additional groundwater threats not yet identified.
- Determine the relative risk of groundwater contamination.
- Develop a risk analysis model for groundwater that can be applied to all contamination threats.
- Develop a groundwater risks map.
- Develop an abandoned water well program.
- Continue to support existing wellhead protection information programs.
- Establish workshops for residents which demonstrate how to properly locate, construct and maintain well water supply systems.
- Cost-share in properly sealing abandoned water wells.
- Promote the Saskatchewan Watershed Authority's Rural Water Quality Advisory Program among rural residents of the watershed.

- Provide educational information on:
  - the effects of improperly sealed shot holes to seismic exploration companies; and
  - the legal requirements of seismic operations concerning shot hole use and abandonment.
- Locate and quantify aquifers within the watershed.

### Key Action: Develop an abandoned well program within the watershed.

| Implementation Date | Completion date | Responsibility |
|---|---|---|
| April 1, 2006 | March 31, 2007 | **Saskatchewan Watershed Authority - Groundwater Management; Regional Operations, Weyburn**<br>Prairie Farm Rehabilitation Administration<br>Lower Souris River Watershed Board |

### Key Action: Develop an informational package on how the oil and gas industry protects the watershed's source water.

| Implementation Date | Completion date | Responsibility |
|---|---|---|
| January 1, 2006 | April 1, 2006 | **Canadian Association of Petroleum Producers**<br>Saskatchewan Industry and Resources |

## 6.3 Community Water Supplies

For most communities, source water is tested to determine proper water treatment. Any failure in the treatment process can result in potential contamination of drinking water. In order to reduce the health risks due to such failures, source water should be of the highest natural quality. Man-made contamination risks can be reduced or eliminated through good stewardship practices and wellhead protection.

The Saskatchewan Watershed Authority is presently evaluating groundwater risks for communities in the Lower Souris River Watershed. This evaluation is scheduled for completion in the spring of 2006. Provincial agencies such as Saskatchewan Environment and Saskatchewan Government Relations are also looking into tools that could be used to protect source water in the future. These initiatives will be a major advancement in the knowledge and preventative actions required to protect community water wells from contamination.

***Objective:***

To protect community water wells from contamination.

***Recommendation:***

Develop a methodology to determine the relative vulnerability of community source water supplies.

## Key Action: Develop a groundwater risks methodology for community wells within the watershed.

| Implementation Date | Completion date | Responsibility |
|---|---|---|
| In progress | March 31, 2007 | Saskatchewan Watershed Authority - Regional Operations, Weyburn; Projects and Partnerships |

## Key Action: Develop a wellhead integrity program within the watershed.

| Implementation Date | Completion date | Responsibility |
|---|---|---|
| April 1, 2006 | March 31, 2009 | Saskatchewan Watershed Authority - Groundwater Management; Regional Operations, Weyburn; Projects and Partnerships; Watershed and Aquifer Planning<br>Lower Souris River Watershed Board |

**Success Measurement:**
All communities understand the threats to their groundwater and take steps to reduce them.

# 6.4 Water Quality Monitoring and Moosomin Reservoir

*Photo courtesy Ducks Unlimited Canada*

Water quality sampling in the Lower Souris River Watershed has been limited and mainly corresponds to municipal wastewater effluent releases. The exception is Moosomin Reservoir, which has a data set that permits interpretation. The Water Quality Index score for Moosomin Reservoir is in the "fair" range.[9] Three parameters are largely responsible for this Water Quality Index rating for Moosomin Reservoir. They are total phosphorous, total dissolved solids (TDS) and chlorophyll *a*.

The **Water Quality Index** is a means to summarize large amounts of water quality data into simple terms (i.e., excellent, good, fair, marginal, poor) for consistent reporting.

Increased stream velocity will cause natural erosion of stream banks and channels, adding soil that contains natural phosphorous. Total dissolved solids (TDS) are a measure of the amount of dissolved substances in the water. Sources of dissolved substances include soil erosion, discharge of waste municipal and industrial agricultural runoff, and groundwater (springs). Chlorophyll *a* is a green pigment found in plants and is used to measure the quantity of algae in a water body.

It may not be cost effective to develop a comprehensive water quality monitoring program. Moreover, these programs may show the condition of the water but not necessarily why the water is in that condition. Using knowledge from other watersheds in North America, we know the type of activities that can degrade water quality and how to mitigate those activities. Ultimately, everyone wants to know the answer to the question: "Is what we are doing having any long-term influence on water quality?" Targeted water quality testing may give us this answer.

[9] Water Quality Section, Lower Souris River Watershed Background Report, November 2005

***Objectives:***

- To reduce levels of total phosphorous, total dissolved solids (TDS) and chlorophyll *a* by 25 percent within the next 10 years.
- To determine the cause of water quality deterioration in the Moosomin Reservoir.

***Recommendations:***

Conduct water quality monitoring in the watershed to determine the present state of the water quality and track changes in water quality over time.

### Key Action: Develop a source water quality monitoring plan to track phosphorus, TDS, and chlorophyll *a* levels in the watershed planning areas.

| Implementation Date | Completion date | Lead Responsibility (Partners) |
|---|---|---|
| April 1, 2006 | March 31, 2007 | **Saskatchewan Watershed Authority - Monitoring and Assessment Branch**<br>Saskatchewan Environment<br>Saskatchewan Health |

**Success Measurement:**

1. Total phosphorous, total dissolved solids (TDS) and chlorophyll *a* are reduced on an average of 25 percent within the next 10 years.
2. The Water Quality Index rating for Moosomin Lake improves from consistently "fair" to consistently "good" within the next 10 years.

## 6.5 Landfills (Waste Disposal Ground)

Landfills are potential contaminators of both groundwater and surface water. The extent and potential risk of contamination is directly determined by local geological characteristics of the individual landfill.

Landfills contain high levels of contaminants. Over time communities have learned what not to put in landfills. The licensing of landfills has improved landfill use, but there remains an unknown level of threat to water quality.

*Photo courtesy Saskatchewan Environment*

***Objective:***

To determine the relative risk of landfills to both groundwater and surface water.

***Recommendations:***

- Identify all abandoned landfills in the watershed.
- Develop a risk analysis model that can be applied to all landfills to protect public water supplies.

## Key Action: Determine the level of risk to source water within the watershed from community landfills.

| Implementation Date | Completion date | Responsibility |
|---|---|---|
| April 1, 2006 | March 31, 2009 | Saskatchewan Environment |

## Key Action: Develop a database of all existing and abandoned landfills within the watershed.

| Implementation Date | Completion date | Responsibility |
|---|---|---|
| April 1, 2006 | March 31, 2009 | Saskatchewan Environment<br>Urban and Rural Municipalities |

**Success Measurement:**
All communities understand the threat to their source water posed by landfills and, if necessary, take steps to reduce those risks.

## 6.6 Municipal Sewage Lagoons

Sewage lagoons can adversely affect both groundwater and surface water through ground leaching and wastewater releases. Municipal wastewater effluent discharge is one of the largest causes of point-source pollution, by volume, to surface water in Canada.[10] Some municipal lagoons were established before their general environmental impacts to water were known. The extent of the relative risk they present is generally unknown. The risk of groundwater contamination by nitrates can be very high.

Disposal of sewage by general collection and placement in a tertiary lagoon system is an accepted practice. Some communities need to release liquid effluent annually or biannually into a wetland, watercourse, stream or river. This effluent lowers the quality of the receiving waters and is potentially undesirable unless the receiving water has adequate assimilative capacity. Due to climate variance, effluent may not even reach watercourses in some dry years that it would reach in wet years. Some communities have also shrunk in size to the point that they no longer need to discharge, and the system effectively operates as an evaporative lagoon. In other cases, effluent irrigation or exfiltration is used from the secondary/storage cell or an actual evaporative system is in place.

**Assimilative capacity** is the ability of a water body to cleanse itself, or its capacity to receive waste waters or toxic materials without harmful effects and without damage to aquatic life or humans who consume the water.

***Objective:***
To determine the relative risk of municipal lagoons to water supplies.

***Recommendations:***
- Identify the location of all municipal lagoons in the watershed.
- Identify which lagoons release effluent.
- Determine whether lagoons are having any affect on groundwater or surface water.

[10] Environment Canada, 2004.

## Key Action: Determine the level of risk to source water within the watershed from community lagoons.

| Implementation Date | Completion date | Responsibility |
|---|---|---|
| April 1, 2006 | March 31, 2007 | Saskatchewan Environment |

**Success Measurement:** All communities understand the risk to their source water posed by lagoons and wastewater effluent and, if necessary, take steps to reduce those risks.

# 6.7 Agricultural Activities

Agricultural activities take place on more than 99 percent of the land within the watershed.[11] Cropland accounts for approximately 80 percent of the landcover use in the Lower Souris River Watershed.[12] With this in mind, cropping practices have a significant influence on the quality of water. Agricultural threats to source water can be categorized as either point source or non-point source.

Potential point source threats from agricultural activities can include intensive livestock operations, manure storage, livestock wintering areas, chemical storage and disposal areas, septic systems, and fuel storage. Some potential non-point source agricultural threats include livestock grazing, chemical, fertilizer and manure application, and land drainage, which adversely affects surface water and directly or indirectly affects nature's ability to purify water. Many of these potential point and non-point pollution sources can be identified and addressed on individual farms through the completion of an Environmental Farm Plan.

Accumulative effects from non-point sources are of the greatest potential concern because they are largely from activities that, by themselves, do not appear very harmful. However, when these activities occur collectively within a significant portion of the watershed, they can have major effects on water quality and the larger environment. The drainage of wetlands is one example. While the loss of one wetland is not necessarily significant to the watershed, the collective loss of a significant amount of wetlands in the watershed can mean losing the benefits they provide, such as moderation of downstream flooding, groundwater recharge, nutrient absorption, carbon sinks, and wildlife and fish habitat.

**Point source pollution** can be traced back to a specific source such as an oil spill, a discharge pipe or a sewage ditch.

**Non-point source pollution** cannot be traced back to a specific source. Non-point source pollution is difficult to identify because it can occur any place activities disturb land or water. Agriculture, urban runoff, forestry, grazing, septic systems, construction, recreational boating, careless household management, and sediment from eroding stream banks can all contribute to this type of pollution.

[11] Land Tenure Map, *Lower Souris River Watershed Background Report*, November 2005
[12] Landcover Map, *Lower Souris River Watershed Background Report*, November 2005

*Objective:*

To minimize the agricultural impacts to surface and ground source water within the watershed.

*Recommendations:*

- Provide annual recognition to local producers that practice good stewardship of their land.[13]
- Provide educational information to local producers on:
  - beneficial management farming practices that limit the amount of nutrient and chemical residues transported during spring runoff or in high rainfall events.
  - economical and environmental beneficial grazing management practices.
  - the benefits of conservation tillage programs.
  - the benefits of grassed waterways in protecting water quality.
  - the benefits of wetlands to surface water quality and ground water recharge.
  - saline tolerant grass seed provided to cereal crop farmers.
  - the benefits of fall seeded crops.
  - manure storage and handling by intensive livestock operations.
  - land drainage, i.e.: regulations, rights and responsibilities, and the effects of land drainage on people and the environment.

*Photo courtesy Ducks Unlimited Canada*

- Establish annual grazing management workshops, field days and seminars to promote protection of riparian areas without duplicating existing programs.
- Cost-share with landowners to establish grassed waterways and vegetation buffers to control erosion, slow runoff and filter chemicals and nutrients from runoff.
- Initiate a pilot project showcasing grazing of Fish & Wildlife Development Fund lands as a beneficial management practice demonstration opportunity in the Graham Creek area.

A **wetland** is an area that is saturated by surface or ground water, with vegetation adapted for life under those soil conditions, as swamps, bogs, fens, marshes, and estuaries. Wetlands are a source of water, forage, and wildlife habitat, and perform a number of important functions such as groundwater recharge, water storage, flood control, sediment and residue trapping, shoreline protection, and nutrient cycling and storage.

## Key Action: Support the agricultural Beneficial Management Practices of the Lower Souris River Green Plan initiative.

| Implementation Date | Completion date | Responsibility |
|---|---|---|
| April 1, 2006 | March 31, 2009 | Lower Souris River Watershed Board |

## Key Actions: Develop a fact sheet on agricultural drainage and farm water management within the watershed.

| Implementation Date | Completion date | Responsibility |
|---|---|---|
| April 1, 2006 | March 31, 2007 | Saskatchewan Watershed Authority - Regional Operations, Weyburn<br>Lower Souris River Watershed Board |

[13] This has already been established in two of the watershed planning areas.

**Success Measurement:**

1. Have a minimum of 20 percent of all landowners within the watershed complete an Environmental Farm Plan by 2010.
2. By 2010, see an overall improvement of 20 percent to Riparian Health, Riparian Buffer, Rangeland Health, and Permanent Cover as measured by "*State of the Watershed Reporting Framework*" indicators by 2010.

## 6.8 Watershed Management

The management of water is a multi-faceted responsibility that includes local people and the municipal, provincial and federal governments. Water management decisions affect local people and are too important to not have some type of public involvement in the decision-making process.

*Photo courtesy Ducks Unlimited Canada*

### *Recommendations:*

- Create a Lower Souris River Watershed Board and continue the Watershed Advisory Committees in all three watershed planning areas to provide advice on water management decisions in the watershed.
- Amend provincial legislation to allow for more flexibility in implementing local water management decisions.
- Analyze waterway capacity, which would include creating an inventory of all infrastructure including culverts, bridges, streams and ditches in the Four Creeks watershed planning area. (At present, only the Rural Municipality of Antler No. 61 has done any of this work.)
- Determine a standard design event for the system that would balance the infrastructure to handle the design event.
- Use the water capacity analysis to bring pressure to bear on those agencies responsible for infrastructure (e.g. the culverts used at Highway 18 west of Gainsborough) to modify culvert/watercourse capacities to meet the standard design event chosen.
- Investigate the feasibility of controlling spring flows of water to buffer downstream peaks through gated culverts, thereby lowering the potential risk for environmental impacts due to flooding.
- Address agricultural flooding by investigating, promoting and offering programs to slow runoff, enabling greater water infiltration (i.e., water flow controls, ditch check structures, vegetation establishment).
- Address agricultural flooding by considering road design that incorporates ditches that carry runoff water, rather than the present system of moving unwanted water through ditches on private lands.

### *Objective:*

To have greater involvement of local people in watershed management decisions within the watershed.

## Key Action: Create the Lower Souris River Watershed Board and continue the Watershed Advisory Committees in all three watershed planning areas to provide advice on water management decisions in the watershed.

| Implementation Date | Completion date | Responsibility |
|---|---|---|
| In progress | April 1, 2006 | **Lower Souris Watershed Board**<br>Saskatchewan Watershed Authority |

## Key Action: Develop a drainage and wetlands policy within the Four Creeks watershed planning area.

| Implementation Date | Completion date | Responsibility |
|---|---|---|
| In progress | April 1, 2006 | **Saskatchewan Watershed Authority - Policy; Regional Operations, Weyburn**<br>Four Creeks Watershed Advisory Committee |

## Key Action: Conduct a drainage and wetland inventory needs assessment in the Four Creeks watershed planning area and, from the inventory, determine potential storage sites.

| Implementation Date | Completion date | **Lead Responsibility** (Partners) |
|---|---|---|
| April 1, 2006 | November 1, 2006 | **Saskatchewan Watershed Authority - Regional Operations, Weyburn**<br>Lower Souris River Watershed Board<br>Four Creeks Watershed Advisory Committee<br>Ducks Unlimited Canada<br>Prairie Provinces Water Board<br>West Souris River Conservation District |

*Photo courtesy Ducks Unlimited Canada*

**Success Measurement:**

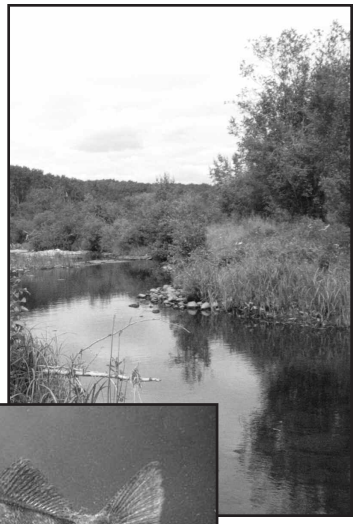
1. All water management decisions are discussed and recommendations are given by the Lower Souris River Watershed Board.
2. Watershed residents understand water management decisions.
3. Fifty percent of all drainage projects requiring approval have licenses.
4. There are fewer drainage complaints, less unwanted flooding of agricultural land, and more restored and protected wetlands.

# 6.9 Fish Migration and Habitat

Although the extent of fish migration and habitat is relatively unknown in the Lower Souris River Watershed, the Pipestone watershed planning area contains a good fish population located both upstream and downstream of Moosomin Reservoir.

**Barriers to fish passage** are any features or constructs that prevent fish movement within the water body, and can include water control dams, beaver dams, roads, man-made crossings, culverts, and sediment deposit areas.

The range of fish habitat and migration in the Antler River and Four Creeks watershed planning areas is not fully understood.



The West Souris River Conservation District has initiated a fisheries inventory review for a number of streams in their region, including the Jackson, Stony, and Graham Creeks. It is anticipated that this review will be made public once completed.

Although not directly a source water protection initiative, fish populations and fish habitat are an excellent indicator of the health of any watershed.

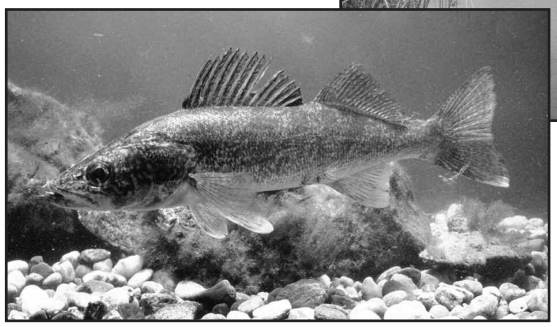


*Photo courtesy Fisheries and Oceans Canada*

### *Objective:*

To increase the knowledge of fish habitat and range within the Antler River and Four Creeks watershed planning areas and improve both fish migration and habitat in the Pipestone Creek watershed planning area.

### *Recommendations:*

- Evaluate the barriers to fish migration on Pipestone Creek and contributing major streams.
- Develop a plan to improve fish migration on Pipestone Creek.
- Determine the extent of fish habitat loss upstream of Moosomin Reservoir and determine if action is required.
- Conduct a fish habitat and migration survey to determine the extent and range of fish species within the Antler River and Four Creeks watershed planning areas.

## Key Action: Within the Pipestone Creek watershed planning area: improve fish habitat by the development of rock riffle structures downstream of Moosomin Dam.

| Implementation Date | Completion date | Responsibility |
|---|---|---|
| In progress | April, 2007 | **Wawota Wildlife Federation**<br>Saskatchewan Environment<br>Saskatchewan Watershed Authority |

## Key Action: Within the Antler River and Four Creeks watershed planning areas: conduct a fish habitat and migration survey to determine the extent and range of fish species.

| Implementation Date | Completion date | Responsibility |
|---|---|---|
| April 1, 2006 | March 31, 2009 | **Fisheries and Oceans Canada**<br>Saskatchewan Environment |

## Key Action: Evaluate the barriers to fish migration upstream of Moosomin Reservoir on Pipestone Creek and contributing major streams.

| Implementation Date | Completion date | Responsibility |
|---|---|---|
| April 1, 2006 | March 31, 2009 | **Fisheries and Oceans Canada**<br>Saskatchewan Environment<br>Lower Souris River Watershed Board |

**Success Measurement:**

1. Fish range and habitat has been increased in the Pipestone Creek watershed planning area.
2. A fish habitat and range map has been developed for the Lower Souris River Watershed.

# 6.10 Water Supply for Small Communities

Small communities need to supply good, safe, quality water to residents in an economically feasible way. Concerns have been raised that the cost of providing certified quality water has been an economic struggle for many small communities. This economic challenge raises the potential risk of water contamination. Regulations requiring certified water treatment plant operators, additional testing, and upgrading of water treatment facilities have been the key barriers.

**Water treatment** is a key barrier in preventing the contamination of drinking water.

***Objective:***

To have all communities provide a safe, economical water supply.

***Recommendations:***

- Explore the feasibility of developing a regional water supply.
- Explore the sharing of expertise and technical equipment by communities.

## Key Action: Develop a feasibility study for a rural pipeline(s) within the watershed.

| Implementation Date | Completion date | Responsibility |
|---|---|---|
| April 1, 2006 | March 31, 2009 | **SaskWater**<br>Cornerstone Regional Economic Development Authority<br>Urban and Rural Municipalities<br>Saskatchewan Watershed Authority - Basin Operations |

**Success Measurement:**

All small communities have safe, sustainable, adequate and affordable water supplies by 2020.

## 6.11 Auburton Reservoir Potential Spillway Failure

The dam was constructed by the Prairie Farm Rehabilitation Administration (PFRA) in 1949 at the request of the Rural Municipality of Reciprocity No. 32. PFRA obtained permission to construct the dam from the Saskatchewan Water Rights Branch in 1957, but land control was not acquired and a water license was not issued. PFRA maintained the project between 1949 and 1969 with various minor repairs to the spillway and riparian outlet.

Auburton Reservoir is at risk of eventual failure through spillway erosion. This will result in the loss of the second largest reservoir in the Lower Souris River Watershed. An inspection and report on the cost of repairing the spillway was done in 1992, and concluded cost estimates of $250,000 to $500,000 in 1992 dollars. Unless repaired, the dam will most likely fail within the next 20 years. This reservoir provides alternate water supplies for local residents in times of drought, provides wildlife habitat and could potentially provide a local fishery.

***Objective:***

To determine the options for maintaining or abandoning Auburton Reservoir.

***Recommendations:***

- Allow the dam to fail.
- Develop a restoration plan for Auburton Reservoir.
- Determine if the Saskatchewan Watershed Authority will take over the dam.
- Determine the value of the reservoir to the landowner, locals, and municipal, provincial and federal governments.
- Coordinate efforts by local, provincial and federal governments to find a solution to ensure the dam is kept in place.

### Key Action: Develop a decision options paper in conjunction with the landowner.

| Implementation Date | Completion date | Responsibility |
|---|---|---|
| April 1, 2006 | March 31, 2008 | **Saskatchewan Watershed Authority - Regional Operations, Weyburn**<br>Lower Souris River Watershed Board<br>Antler River Watershed Advisory Committee<br>Landowner |

**Success Measurement:**

A decision on the future of Auburton Dam is reached by 2009.

# 6.12 Operation of Moosomin Dam

Moosomin Dam has been operated as a "run of the river" reservoir. Releases are sometimes made from the dam for downstream users, including local Saskatchewan farmers, Manitoba farmers and Manitoba communities. It is not always clear to residents in Saskatchewan and Manitoba why releases are or aren't made, or how this decision is determined. Local people in the watershed in Saskatchewan and downstream in Manitoba want to be directly involved in the decision-making process.

*Photo courtesy Saskatchewan Environment*

***Objective:***

To develop a mechanism to involve the public in the decision-making process in the operation of the dam.

***Recommendations:***

- Create a Public Advisory Committee of all stakeholders for the Moosomin Dam.
- Develop a written operating plan for the Moosomin Dam.

## Key Action: Create a Public Advisory Committee of all stakeholders for the Moosomin Dam.

| Implementation Date | Completion date | Responsibility |
|---|---|---|
| April 1, 2006 | November 1, 2006 | **Saskatchewan Watershed Authority - Regional Operations**<br>Prairie Farm Rehabilitation Administration |

## Key Action: Develop a written operating plan for the Moosomin Dam.

| Implementation Date | Completion date | Responsibility |
|---|---|---|
| November 1, 2006 | March 31, 2007 | **Saskatchewan Watershed Authority - Regional Operations, Weyburn**<br>Prairie Farm Rehabilitation Administration<br>Lower Souris River Watershed Board<br>Pipestone Creek Watershed Advisory Committee<br>West Souris River Conservation District<br>Manitoba Conservation |

**Success Measurement:**

Watershed residents who have an interest in the Moosomin Dam have input on its operation and understand how and why the dam is operated.

## 6.13 Water Conservation

Historical records and future predictions include scenarios for periods of time when water was and will be in shortage. The development of water storage is seen as a prudent water management practice.

***Objective:***

To provide for the development of water storage and wetland restoration at key locations within the watershed where surface water will be scarce during times of drought.

***Recommendations:***

- Determine interest in restoring the dam on Gainsborough Creek (Sec 18-8-30-W1st) to a licensable condition.
- Determine interest in a possible water storage project on Gainsborough Creek at W6-8-30-W1.
- Examine the possibility for pothole consolidation projects as an alternative to draining water off farmland and providing usable on-farm storage.
- Restore wetlands' function of storing water.
- Restore usable on-farm storage through the restoration of drained wetlands, and enhance and protect wetlands to ensure their multiple benefits in the future.

### Key Action: Initiate the restoration of storage dams or wetlands at a minimum of five locations in the Four Creeks watershed planning area.

| Implementation Date | Completion date | Responsibility |
|---|---|---|
| April 1, 2006 | March 31, 2007 | **Lower Souris River Watershed Board**<br>Four Creeks Watershed Advisory Committee<br>Saskatchewan Watershed Authority - Regional Operations, Weyburn<br>Ducks Unlimited Canada<br>Saskatchewan Environment |

**Success Measurement:**

Additional water storage is identified and at least five water projects are completed by 2007.

# 7. Implementation

A key element of any plan is its implementation. Without it, the plan is no more than a list of good intentions. In the case of the Lower Souris River Watershed Source Water Protection Plan, the Watershed Advisory Committees recognize this fact and realize that there must be a concerted effort to ensure action items are followed through and acted upon. The Watershed Advisory Committees also recognize that watershed protection is a multi-jurisdictional and multi-agency activity involving local people and the support of both the provincial and federal levels of government. This support must not only be moral, but also financial.

The Watershed Advisory Committees envision the implementation and coordination of the watershed plan being conducted at the local level. Although volunteers can be effective in the short-term, they are not the answer to maintaining long-term sustainable watershed protection. The Watershed Advisory Committees are willing to consider hiring a Watershed Coordinator for plan implementation **IF** there is a financial commitment from other source water protection partners with similar interests. The Watershed Advisory Committees see this as the most cost-efficient and pragmatic way to ensure watersheds are protected now and, more importantly, into the future. Commencing and organizing a watershed community initiative can be very rewarding, but also poses challenges such as finding the right people and partners, communicating needs and results, raising funds, and staying afloat. Without this new direction, the Watershed Advisory Committees predict "more of the same old, same old". The Four Creeks and Pipestone Creek Watershed Advisory Committees have already organized themselves as non-profit organizations.

The Watershed Advisory Committees also recognize the invaluable advice and technical information provided by the Technical Committee. Based on this, the Watershed Advisory Committees recommend that the Technical Committee continue to meet at least once per year for the purpose of advising and supporting plan implementation, assessing the success of the plan, and for the continuing evolution of the plan.

## Key Action: Hire a Watershed Coordinator on a three-year pilot project basis.

| Implementation Date | Completion date | Responsibility |
|---|---|---|
| April 1, 2006 | March 31, 2009 | **Lower Souris River Watershed Board**<br>Saskatchewan Watershed Authority<br>Ducks Unlimited Canada |

## Key Action: Continue with the Lower Souris River Watershed Technical Committee and meet annually with the Watershed Advisory Committees.

| Implementation Date | Completion date | Responsibility |
|---|---|---|
| April 1, 2006 | Indefinitely | **Lower Souris River Watershed Board**<br>Saskatchewan Watershed Authority<br>Lower Souris River Watershed Technical Committee |

# 8. Measuring Plan Success - The Yearly Report Card

The Saskatchewan Watershed Authority will continue to support integrated water management through the plan's implementation phase by committing at least one planning team member to be involved with the Watershed Advisory Committees. Consistent with the *State of the Watershed Reporting Framework*, a yearly watershed report card will be prepared by the watershed planning team to report on the progress of the action items, objectives and goals of the plan. The report card will report on the achievements, opportunities and challenges of meeting the overall vision and make any adjustments to the plan that have been recommended by the Watershed Advisory Committees.

The intent of the ***State of the Watershed Reporting Framework*** is to establish a method for the consistent reporting of a standardized set of indicators combined with a rating system to assess overall source water conditions. This reporting system will allow comparisons of watershed health to be made among watersheds and within a watershed over time.

## Measurements of Successes

Successes can be categorized into three time periods:

- Short-Term (1-5 years) successes: Completion of tasks in timeframe stipulated.
- Medium-Term (5-20 years) successes: An observable change in attitudes.
- Long-Term (20+ years) successes: Realize changes in the watershed.

Once completed, many of the action items will be a milestone achievement. The effects of those action items may not necessarily be seen immediately. It may take decades to see a change in fish habitat or environmental change and even generations to see the changes in water quality or the change in attitude to protect source water.

In addition to the measurements of success included here, there will be other ways to measure success. These include tracking of improvements in certain indicators found in the *State of the Watershed Reporting Framework* and improvement in the Water Quality Index where reported. The *State of the Watershed Reporting Framework* is a report card based on a conceptual, but simplistic, model of a watershed that explicitly recognizes relationships between human activities (stressors), the state of the watershed (condition), impacts on the ecosystem, and associated management activities (responses). It will also reflect how we look at watersheds (structure and function) in the context of source water protection.

# 9. Conclusion

This Source Water Protection Plan is the start of making a difference in protecting source water in the Lower Souris River Watershed. The development of this plan has already resulted in a heightened awareness of source water protection amongst watershed residents. This plan does not ask all the questions, nor does it have all the answers, but it is a start towards local people making a bigger difference in their own watershed. This is not the end, but rather a beginning. The work has just begun. The success of this plan is dependant on watershed residents, as everyone can do his or her own part to protect source water.

Taking up the challenge is both noble and the right thing to do. If you are interested in becoming involved, contact your local Watershed Advisory Committee member or rural or urban municipality about making a difference in protecting source water. The Government of Saskatchewan, through the Saskatchewan Watershed Authority, is committed to supporting the implementation of watershed plans through programming, mentorship, and encouragement.

# Appendix

## Watershed Advisory Committees

### Antler River Watershed Advisory Committee

| Member | Organization |
|---|---|
| Warren Steeves (Chair) | R.M. of Argyle No. 1 |
| Jim Burnett | Village of Glen Ewen |
| Rick Dancey | R.M. of Storthoaks No. 31 |
| David Frecon | R.M. of Antler No. 61 |
| Ross Madsen | R.M. of Antler No. 61 |
| Wade McWhirter | R.M. of Reciprocity No. 32 |
| Archie Miller | Village of Manor |
| Brian Miller | R.M. of Mount Pleasant No. 2 |
| Valerie Olney | R.M. of Argyle No. 1 |
| Edwin Rucks | R.M. of Enniskillen No. 3 |
| Jeff Sanborn | Town of Redvers |

### Four Creeks Watershed Advisory Committee

| Member | Organization |
|---|---|
| Ross Madsen (Chair) | R.M. of Antler No. 61 |
| David Frecon | R.M. of Antler No. 61 |
| George Howden | R.M. of Argyle No. 1 |
| Jim Lorette | R.M. of Storthoaks No. 31 |
| Lee McMillen | Saskatchewan Stock Growers Association |
| Bob Meredith | R.M. of Argyle No. 1 |
| Elaine Morgan | R.M. of Storthoaks No. 31 |
| Paul Poirer | R.M. of Storthoaks No. 31 |
| Rick Poirer | R.M. of Antler No. 61 |
| Dell Real | R.M. of Storthoaks No. 31 |
| Don Taylor | Saskatchewan Association of Rural Municipalities |
| John Thiessen | R.M. of Maryfield No. 91 |
| Ian Thompson | Saskatchewan Stock Growers Association |

## Pipestone Creek Watershed Advisory Committee

| Member | Organization |
|---|---|
| John Van Eaton (Chair) | R.M. of Maryfield No. 91 |
| Ross Allary | Ochapawace First Nation |
| Jack Berglund | R.M. of Wawken No. 93 |
| Ernest Briggs | R.M. of Willowdale No. 153 |
| Nancy Campbell | Town of Wapella |
| Jim Cairns | R.M. of Silverwood No. 123 |
| Chris Davidson | Moosomin Regional Park Board |
| Ron Dube | R.M. of Hazelwood No. 94 |
| Glen Ekert | Holistic Ranchers |
| Al Ferguson | Moosomin Regional Park Board |
| Robert Fournier | Saskatchewan Wildlife Federation |
| Hal Garrett | R.M. of Martin No. 122 |
| Dean Godon | Moosomin Regional Park Board |
| Rhonda Hall | R.M. of Walpole No. 92 |
| James Hoff | R.M. of Chester No. 125 |
| Wesley Kemp | R.M. of Kingsley No. 124 |
| Kevin Kish | Town of Kipling |
| Terry Latham | Wawota Wildlife Federation |
| Marshall McLeod | R.M. of Moosomin No. 121 |
| Elmer Molnar | Village of Kennedy |
| Arthur Murray | Chester Conservation and Development Area Authority |
| Mervin Schmidt | R.M. of Elcapo No. 154 |
| Norm Schmidt | Moosomin Cottage Owners |
| Terry Sheppard | Rocanville Fish and Wildlife |
| Rob Stolz | Saskatchewan Environment |
| Denise Swallow | Village of Windthorst |
| Angus Turpie Jr. | Moosomin Conservation and Development Area Authority |

## Lower Souris River Watershed Technical Committee

| Member | Organization |
|---|---|
| Kent M. Barrett | Agriculture and Agri-Food Canada |
| Doug Brook | Ducks Unlimited Canada |
| Glen Campbell | West Souris River Conservation District |
| Sheldon Clarke | Government Relations – Community Planning |
| Lars DePauw | Penn West Petroleum Ltd. |
| Dwayne Donald | Ducks Unlimited Canada |
| John Fahlman | Saskatchewan Watershed Authority |
| Terry Hanley | Saskatchewan Watershed Authority |
| Lorne Klein | Saskatchewan Agriculture and Food |
| Brian Mathieson | Saskatchewan Industry and Resources |
| Allan McCutcheon | Saskatchewan Environment |
| Maureen McKegney-Clay | Agriculture and Agri-Food Canada – Prairie Farm Rehabilitation Administration |
| Clint Molde | Saskatchewan Watershed Authority |
| Bart Oegema | Saskatchewan Watershed Authority |
| Kevin O'Neill | Saskatchewan Watershed Authority |
| Kathleen Rispler | Regina Qu'Appelle Health Region |
| Girma Sahlu | Environment Canada |
| Darlene Sakires | Canadian Natural Resources Ltd. |
| Etienne Soulodre | Saskatchewan Watershed Authority |
| Phil Weiss | Manitoba Water Stewardship |
| Rick West | Fisheries and Oceans Canada |
| Brent Wilson | Saskatchewan Environment |
| Jim Yarotsky | Agriculture and Agri-Food Canada |

## Lower Souris River Watershed Planning Team

| Member | Organization |
|---|---|
| Jeff Olson | Saskatchewan Watershed Authority |
| Collin McGuire | Saskatchewan Watershed Authority |