Shell River

Integrated Watershed Management Plan

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF APPENDICES

ACKNOWLEDGEMENTS

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Member municipalities that have participated in the creation of this plan include the Rural Municipalities of Russell, Shellmouth-Boulton, Shell River and Silver Creek, the Village of Binscarth and the Towns of Roblin and Russell.

Special thanks go to the members of the Project Management Team which included Rick Olding, Wayne Buick, Mike Shenderevich, District Manager Sharla Boychuk from the Lake of the Prairies Conservation District, and Watershed Planner David Jones from Manitoba Water Stewardship.

Additional thanks go to the members of the Assiniboine four-watershed project management team which shepherded the process from the start, which included Dave Dobson from Ducks Unlimited; Manitoba Water Stewardship planners Phil Weiss & Sheldon Kowalchuck; Project Management Team Members John Whitaker, Robbie Craig, Robert Alexander, Geordie Daneliuk, Ron Turetsky, Ed MacKay, and Dennis Pedersen, all of whom were instrumental in the initial stages of the planning process.

EXECUTIVE SUMMARY

In 2006, the Lake of the Prairies Conservation District was designated the Water Planning Authority for the Shell River watershed as part of a larger initiative to complete watershed plans on the upper reaches of the Assiniboine River.

Through the input of technical experts, local stakeholders, and watershed residents, the Shell River Water Planning Authority developed a vision and six broad goals which serve as the foundation for Shell River Integrated Watershed Management Plan. The goals fall under the overall vision for the watershed and, based generally upon the issues identified, serve as broad, guiding statements for what we are setting out to accomplish.

Under the goals are a number of specific, measurable objectives. These objectives form the basis for management actions within the watershed. These actions have been identified as steps necessary to achieve our goals, objectives and ultimately the vision for the watershed. This plan will serve as a roadmap for the Lake of the Prairies Conservation District, government, and other partnering agencies in order to maintain and improve the health of our watershed.

Watershed Vision

"To have in our watershed the best possible water for all people, the environment, and our economy."

Watershed Goals

Goal 1: To ensure Drinking Water and Ground Water Supplies are safeguarded now and into the future

Goal 2: To maintain and improve surface water quality that ensures the health of aquatic ecosystems as well as the enjoyment and economic benefit of our communities

Goal 3: Promote and support responsible surface water management to reduce soil erosion and flooding and protect natural wetland habitat

Goal 4: Engage watershed residents by providing watershed health information and educational activities that promote opportunities for action

Goal 5: Encourage and support sustainable land use planning efforts within the watershed

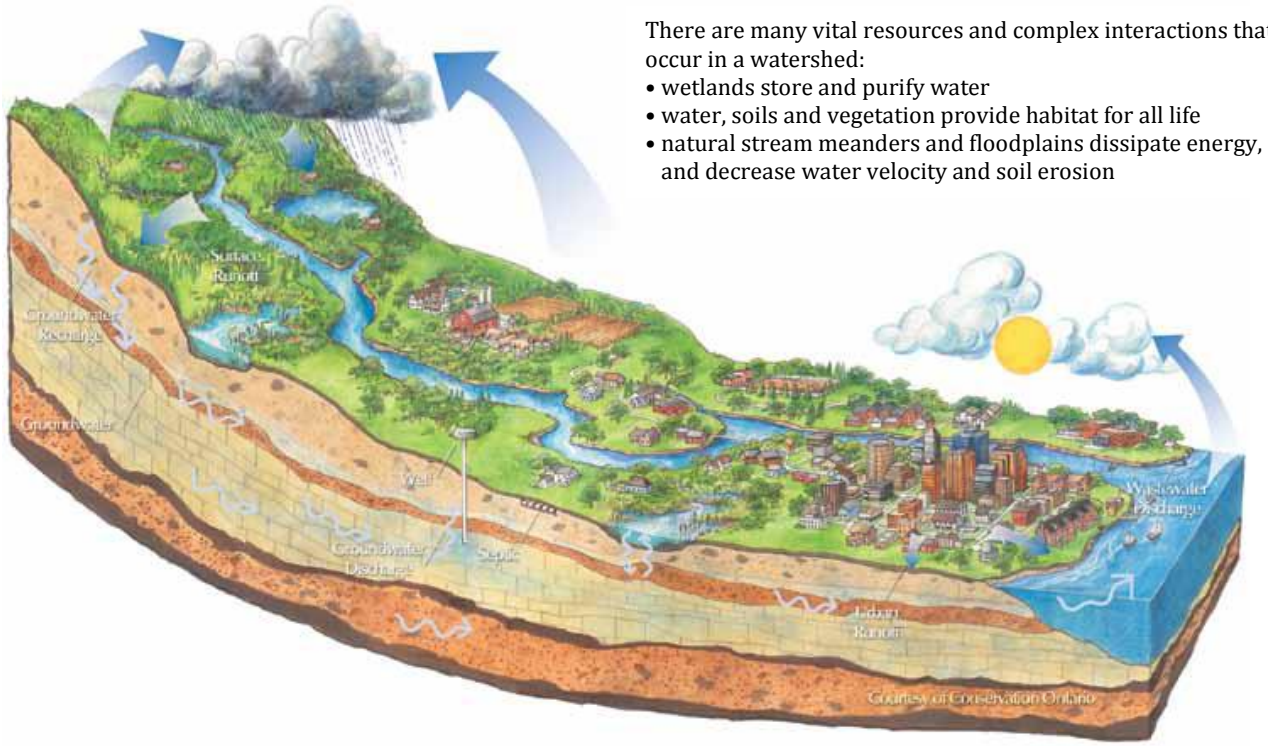
Goal 6: Maintain communications with watershed managers upstream to encourage cooperation across jurisdictional boundaries

1. INTRODUCTION

Welcome to the Integrated Watershed Management Plan for the Shell River watershed. This plan is the result of more than three years of work from a variety of organizations including the Lake of the Prairies Conservation District, local watershed residents and technical experts. This plan is intended to propose shared goals for the watershed and present a plan for action to achieve these goals for residents, communities and organizations within the watershed. This plan will only succeed if you and the rest of the watershed community embrace this plan and become active and involved in the plan's implementation.

Defining a Watershed

At the most basic level, a watershed is an area of land that drains to a common point. The land and water within a watershed are connected by a common stream or drainage system. This connectivity extends beyond the physical connection between a stream and a river, and extends to the plants and animals that depend upon these systems for life. Everyone living or working within a watershed is part of this cohesive unit and needs to cooperate to maintain a healthy watershed.



There are many vital resources and complex interactions that occur in a watershed:
- wetlands store and purify water
- water, soils and vegetation provide habitat for all life
- natural stream meanders and floodplains dissipate energy, and decrease water velocity and soil erosion

The Importance of Watershed Planning

Watershed groups have found a long list of economic, administrative, and ecological benefits to watershed planning, including:

- helping local groups prioritize limited resources
- providing community members with an active voice in protecting and restoring watershed resources that are important to the community
- providing access to a greater number of resources for project implementation
- providing a structure for targeting geographic areas for protection to maximize the efficiency of community planning efforts
- providing a baseline or a benchmark for measuring the success of management efforts
- the realization that prevention and planning is less costly than restoration

Water moves downstream through a watershed, and any activity that effects water quality, quantity, or rate of movement at one location will effect locations downstream. Given that impacts are felt at the watershed level, watersheds are considered the most ecologically appropriate units for managing water.

Integrated Watershed Management Planning in Manitoba

In January 2006, *The Water Protection Act* came into effect within the Province of Manitoba. The purpose of the *Act* is *"to provide for the protection and stewardship of Manitoba's water resources and aquatic ecosystems…"* The *Act* sets out specific guidelines to follow when developing integrated watershed management plans, and defines their content.

An integrated watershed management plan, or 'IWMP', is a plan prepared by the community that describes the actions needed over time to achieve a sustainable, healthy watershed. The IWMP can be thought of as a roadmap for the community that outlines watershed priorities and presents a strategic plan to address these priorities. The plan also defines ways to measure future progress on meeting watershed goals and objectives. Quantifying improvements in the health of the watershed over time is important to all watershed residents.

The watershed-based management philosophy is a way to consider a wide range of environmental, economic, and social issues in conjunction with the community's vision for the future of the watershed. Working within watersheds, rather than political boundaries, the planning process provides opportunities to address water quality and quantity, community and habitat issues beyond the scope of single jurisdictions.

An integrated watershed management plan helps local stakeholder groups such as conservation districts set programming agendas and efficiently direct funds to watershed priorities. Information and recommendations in the plan can also be used by local municipalities and planning districts in developing responsible and sustainable development plans. Each plan is unique and based largely on the issues and concerns of the watershed community. Partnerships, cooperation, local input and funding are all important components in developing and implementing a successful watershed management plan.

Transboundary Water Management and Planning

The Shell River watershed straddles the Manitoba-Saskatchewan border and forms part of the much larger Assiniboine River Basin, which has headwaters that originate in Saskatchewan. Managing watersheds across jurisdictional boundaries poses unique challenges and requires cooperation between all levels of government and local citizens.

Prairie Provinces Water Board

The ownership of the waters of a river system flowing through several jurisdictions can give rise to many administrative and water use problems. In 1948 Manitoba, Saskatchewan, Alberta and Canada formed the Prairie Provinces Water Board (PPWB) to recommend the best use of inter-provincial water and to help resolve conflicts between upstream and downstream users.

The mandate of the Prairie Provinces Water Board is to ensure eastward flowing inter-provincial streams are shared equitably, that water quality at inter-provincial boundaries is maintained at acceptable levels, and to facilitate a cooperative approach for the integrated development and management of inter-provincial streams and aquifers to ensure their sustainability.

The Prairie Provinces Water Board is made up of one representative each from Manitoba, Saskatchewan and Alberta, and two from the federal government. The Board has three permanent committees made up of personnel from provincial and federal agencies, which assist in technical work, such as data analysis, and provide advice to the Board. These committees are:

- The *Committee on Hydrology* studies questions related to the quantity of water in streams crossing provincial borders. The committee also reviews natural flow calculations for use in the Master Agreement on Apportionment, which provides a simple formula for equal sharing of available water among the three provinces.
- The *Committee on Water Quality* coordinates the PPWB water quality monitoring program, addresses issues about the quality of water crossing inter-provincial borders and is responsible for the Water Quality Contingency Plan. The contingency plan keeps downstream water users informed of any contaminant spills or unusual water quality conditions.
- The *Committee on Groundwater* deals with questions related to the use and the quality of groundwater shared by the provinces.

Upper Assiniboine River Basin Study

In October 1996, the governments of Saskatchewan, Manitoba and Canada agreed to conduct *The Upper Assiniboine River Basin Study*. The study was initiated as a result of the 1995 flood and other issues, including drainage and flood control and the disappearance of valuable wetland habitat. In addition, there was uncertainty regarding sustainable water supplies for municipal, industrial, agricultural and recreational purposes and a lack of knowledge regarding the hydrologic and ecological processes and their effects within the watershed. There was also growing concern that the quality of water was deteriorating, and uncertainty about appropriate measures for aquifer management and protection. *The Upper Assiniboine River Basin Study* provided information respecting the Basin's water resources, and information and recommendations on which to base decisions affecting future water management.

Saskatchewan Watershed Authority

The Saskatchewan Watershed Authority was established in October 2002 to manage and protect water quantity and quality within Saskatchewan. The Saskatchewan Watershed Authority is responsible for managing watershed and aquifer planning in Saskatchewan. Beginning in 2003, a number of local watershed groups were formed to carry out source water protection planning in Saskatchewan's watersheds. Each watershed group was lead by local Watershed Advisory Committee and Technical Committee members. A total of seven source water protection plans have been completed in Saskatchewan since the initiative began. In addition to establishing the model for local watershed groups and source water protection plans, the Saskatchewan Water Authority released Saskatchewan's first *State of the Watershed Report* in March 2007.

Assiniboine River Watershed Authority

In 2004, two Watershed Advisory Committees were established within the Assiniboine River watershed in Saskatchewan to lead the planning and decision-making process. Their work built upon the *Upper Assiniboine River Basin Study*, with a focus on source water protection. The study was utilized extensively to develop a background report for the watershed and to prepare a list of the areas of concern related to source water protection.

The *Assiniboine River Watershed Source Water Protection Plan* in Saskatchewan was published in August 2006 and identified a key number of strategies, including the recommendation that a formal Assiniboine River Watershed Authority (or Conservation District or Source Water Protection Authority) be established in Saskatchewan. In May 2007, the Assiniboine Watershed Stewardship Association began operations. The association's work is guided in part by the *Assiniboine River Watershed Source Water Protection Plan*.

2. THE WATERSHED PLANNING PROCESS

Key Participants in the Planning Process

Watershed Residents
Watershed residents are the single most important group in the creation and implementation of this watershed plan. This plan is intended to be a reflection of the collective values of all watershed residents in relation to the environment and natural resources. In the process of drafting this plan, watershed residents participated in the planning process and shared their priorities for issues facing the watershed and their vision of what they would like the Shell River watershed to look like for future generations.

Water Planning Authority
The Water Planning Authority (WPA) is the agency that is designated under the authority of the Water Protection Act with the responsibility to conduct the preparation of the watershed management plan. The Lake of the Prairies Conservation District has been designated the Water Planning Authority for the Shell River watershed.

Watershed Planning Advisory Team
The Watershed Planning Advisory Team (WPAT) is a collection of representatives from key stakeholders and technical support staff. The role of the WPAT is to collect and interpret local and technical information on the watershed and provide input on the formation of the watershed plan.

Project Management Team
The Shell River PMT consists of local representatives and the District Manager from Lake of the Prairies Conservation District. The role of the PMT is to act as the key decision-makers in the planning process. As such, the Shell River PMT met regularly and was responsible for designing communication materials, planning open houses to engage public participation; combining the local and technical input to generate the goals, objectives, and actions for the watershed; and finalizing the content of the IWMP.

Steps in the Planning Process

Establishment of the Water Planning Authority and Project Management Team
The Lake of the Prairies Conservation District was designated the Water Planning Authority for the Shell River Watershed in May 2006. The Shell River Watershed was part of a much larger planning initiative that involved three other watersheds; Little Saskatchewan River, Arrow-Oak and Assiniboine-Birdtail. All four watersheds are located within the Assiniboine River Basin. In June 2006, a joint Terms of Reference was developed and adopted by all four watersheds.

Immediately following the adoption of the Terms of Reference, a joint Project Management Team was created to manage all four watershed plans in the Assiniboine River basin. In the summer of 2008, the original project management team was divided into four smaller project management teams to better facilitate the planning process. The Shell River project management team was formed and began to focus on gathering local input from area residents.

Creation of the Water Planning Advisory Team

The Water Planning Advisory Team was formed in 2006 following the establishment of the PMT. The WPAT met 10 times during the planning process between late 2006 and the end of 2007 and received technical presentations from a wide variety of technical experts from government and other agencies. This information was utilized in the creation of the *Shell River State of the Watershed Report.*

State of the Watershed Report

The intent of the *Shell River State of the Watershed Report* was to provide an overview of the current health of the watershed, identify the watershed issues and priority areas, and provide recommendations and options to address the issues. The Project Management Team compiled the technical and scientific data submissions from the Watershed Planning Advisory Team into the "Shell River Watershed - State of the Watershed Report". Key WPAT members provided assessments, evaluations, interpretations and suggestions related to their specific areas of expertise. In addition, several earlier studies and reports were referenced that together provided a comprehensive documentation of the natural resources and related issues and concerns in the Shell River Watershed. The state of the watershed report was completed in June 2008. Copies of the report may be obtained from the Lake of the Prairies Conservation District or online at www.lpcd.mb.ca.

Public Consultations

The Water Protection Act requires the Water Planning Authority to provide residents of the watershed the opportunity to provide input into the development of the plan. Between August and November of 2008, six public consultation meetings were held to provide the public with opportunities to identify watershed issues and concerns. Public meetings were held at Child's Lake Lodge, Inglis, Kilman Cottages, Prairie Lake Lodge, Ricker's Campground and Roblin.

Plan Preparation

Starting in February of 2009, the Project Management Team met regularly to begin drafting the goals, objectives and actions to be included in the draft plan. The Team also reported progress to the Water Planning Authority on a regular basis.

The Process

3. THE SHELL RIVER WATERSHED

Location and Dominant Features

The Shell River watershed straddles the Manitoba-Saskatchewan border in western Manitoba and encompasses portions of the Duck and Riding Mountains (Figure 1). The Manitoba portion of the watershed covers approximately 2996 km² (1157 square miles). The Shell River Watershed forms part of the much larger Assiniboine River Basin, which has headwaters that originate in Saskatchewan.

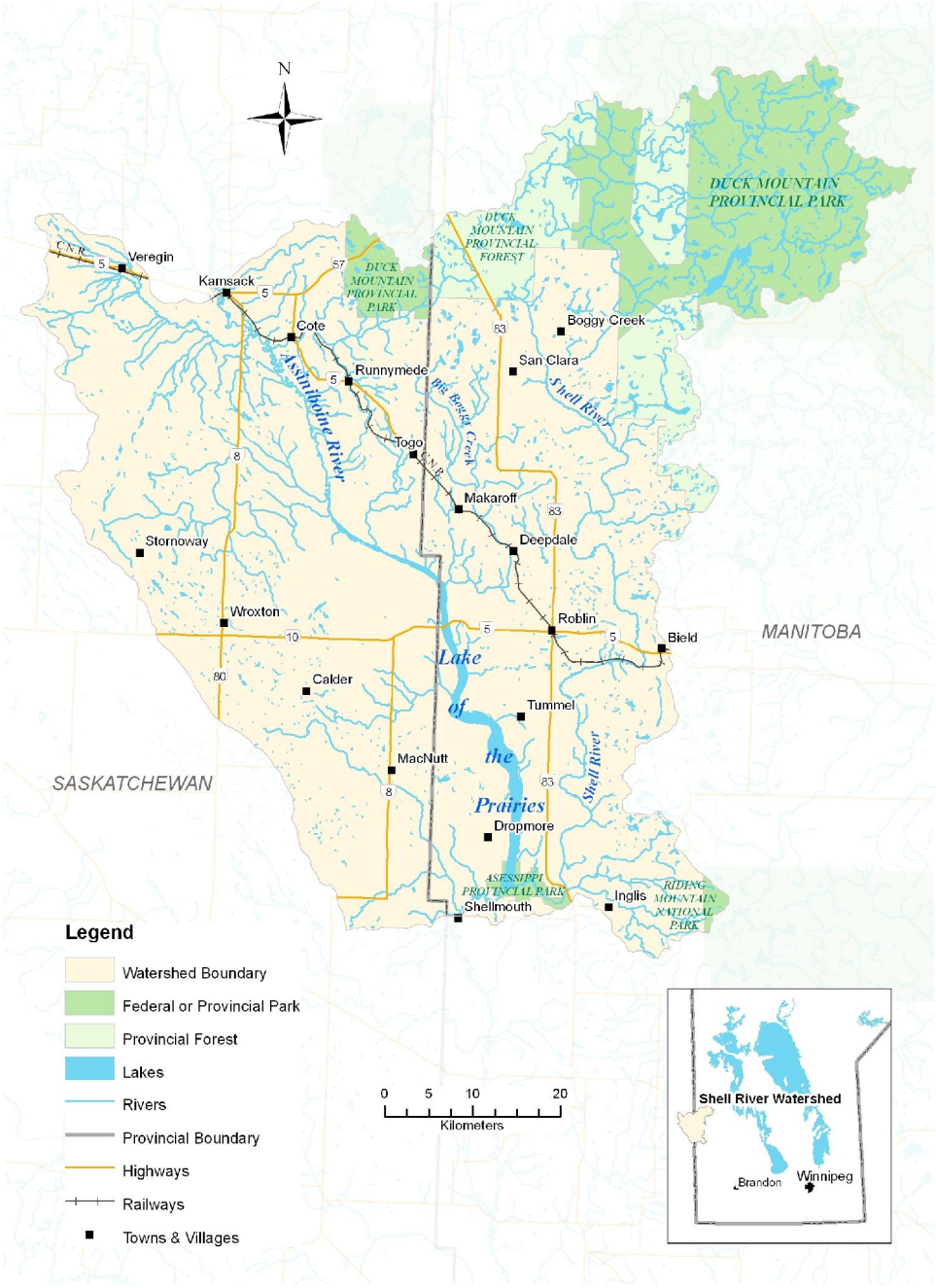


Figure 1: The Shell River Watershed

The Shellmouth Reservoir (commonly referred to as Lake of the Prairies) is the dominant water body within the watershed. Many other smaller lakes can be found throughout the watershed. The Shellmouth Reservoir is approximately 56 km (35 miles) in length straddling the Saskatchewan-Manitoba border. The Shellmouth Dam, which created the reservoir, is located approximately 35 km (22 miles) downstream of the provincial boundary. The dam was constructed in 1969 by the Prairie Farm Rehabilitation Administration (PFRA) at a cost of approximately $52 million. The earthen fill dam is 425 m in length with a height of 21 m. The dam was constructed to control downstream flooding. Recreation and downstream water supply also factors into the operation of the dam. The Shellmouth Dam is managed by the Province of Manitoba with input from the Shellmouth Dam Liaison Committee. Operating guidelines for the dam have been adopted according to the various seasons throughout the year.

Major waterways within the Shell River Watershed include the Assiniboine River, Shell River and Big Boggy Creek. Local headwater areas include the Duck and Riding Mountains, which form part of the Manitoba Escarpment. There are currently 3 Water Survey of Canada stream flow gauging stations located in the watershed; Shell River near Roblin, Shell River near Inglis, and the Assiniboine River near the Shellmouth Dam. Long term water quality sampling is measured quarterly at the Shell River near PTH 83 and at the PTH 5 bridge on Lake of the Prairies.

Significant changes in elevation can be found throughout the watershed, with values ranging from 780 m (2559 ft) above sea level in the northeastern portion of the watershed, down to 400 m (1312 ft) above sea level in the Assiniboine River valley. The greatest local relief is found in the valleys associated with the Assiniboine and Shell Rivers and Big Boggy Creek. Valley bottoms can be up to 60 m (196 ft) below the surrounding land surface.

Land Use

Agriculture and related agri-business is the main industry within the watershed. The Shell River Watershed is comprised of many different types of agricultural activities. From the headwater areas of the Shell River, farms are defined as mainly mixed operations focused on grain and cattle. As one moves southward, farming operations become larger, with a greater focus on grain and oil seed farming operations. At the base of the watershed, more specialized larger operations such as hog, potato, and poultry production can be found. Agriculture is an extremely important contributor to the economy in the Shell River Watershed. While the number of farms has been steadily decreasing since 1972, the average farm size has increased.

Cottage development and tourism and recreation opportunities located adjacent to Lake of the Prairies are also a significant land use and contributor to the local economy.

More detailed background information on the Shell River Watershed may be found in the *Shell River Watershed State of the Watershed Report.*

4. WATERSHED VISION, GOALS AND OBJECTIVES

Key Watershed Management Principles

Several key watershed management principles provided a foundation to the Water Planning Authority, the Project Management Team and the Watershed Planning Advisory Team throughout the planning process. These principles help to illustrate the connections and inter-relationships within a watershed, and assisted with the development of management strategies and specific actions for the watershed:

- Nothing happens in isolation – everything is connected by the land and water in a watershed
- Water management planning should be based on watersheds
- Clean water is critical to the sustainability of our local communities and environment
- Water planning process needs to be community-based and inclusive of all stakeholders
- Management strategies need to be adaptive to changing conditions and situations
- Decisions need to be made considering the best available science, local knowledge and experience
- Monitoring and research is an essential part of water management
- Nothing happens overnight - large-scale landscape improvements require long-term commitment and participation
- Building momentum through implementation successes is critical to reaching watershed goals and long-term success
- Opportunities for learning and participating must be easily accessible

Watershed Vision

Through the signing of the Memorandum of Understanding with the Province of Manitoba, the Shell River Water Planning Authority adopted the following vision for the watershed:

> ***"To have in our watershed the best possible water for all people, the environment, and our economy."***

Watershed Goals and Objectives

Through various meetings and discussions during the planning process, watershed residents, local organizations and resource professionals have identified many issues and concerns within the Shell River Watershed.

Many comments were received throughout the six public consultation events and through the input of resource professionals. These issues and concerns were categorized into similar "issue categories" and were ranked according to the frequency of responses.

While recognizing all of the issues identified are important, the Water Planning Authority has chosen to focus activities on those most in need of immediate attention. The issues to work at over the next five to six years have been organized into six broad categories. Each category contains a brief discussion of the issues, the identification of goals, objectives and actions that relate to the issues along with potential implementation partners and timeframes.

Source Water Protection

Watershed Goal 1: To ensure drinking water and ground water supplies are safeguarded now and into the future

Objectives:

•1A- Establish source water protection zones for public water source capture zones and develop a protection plan for each zone

•1B- Provide high priority to protection of wetlands and potential recharge areas within public source water protection zones

•1C- Provide information and services to owners of private wells within source water protection zones so they can take initiative to protect their own sources

•1D- Expand groundwater resource inventory

Drinking water safety is a top concern for local community residents. Water quality is determined by the chemical, physical, and biological components of our water. Clean, safe, reliable drinking water is essential for prosperous watershed and community health.

Within the Shell River watershed the majority of drinking water sources rely on ground water. Drinking water sources include public sources, semi-public systems, and private wells. Public drinking water sources are present in the communities of Roblin and Inglis. A semi-public system is privately owned but provides a water source to 15 or less connections (i.e. a restaurant with its own well). Private wells are for residential purposes only.

All public drinking water sources within the Shell River watershed meet the *Guidelines for Canadian Drinking Water Quality* (www.hc-sc.gc.ca). These guidelines set acceptable concentrations of substances in the drinking water available for public consumption. Although we can take measures to treat our water through chlorination and filtering processes, it is most effective to protect the quality of our water at source locations to prevent contamination occurrences. The majority of public drinking water sources within the watershed have initially been identified as being highly susceptible to pollution. This is due to most public drinking water sources relying on unconfined aquifers as their main source of water. The presence of possible sources of pollution, such as old dump sites, petroleum storage sites and lagoons in the vicinity of public drinking water sources can also affect the susceptibility rating.

We must work to better understand and reduce adverse effects of potentially harmful human practices. Many of our land management practices can degrade the quality of our drinking water sources. While it is impossible to eliminate all sources of groundwater pollution, we can take preventative measures through the implementation of Beneficial Management Practices (BMPs) to improve and maintain sustainable practices that will reduce potentially negative risks to groundwater contamination. This includes developing a comprehensive groundwater resource inventory through ongoing well water testing and well head assessments and developing comprehensive source water protection plans for all public drinking water sources.

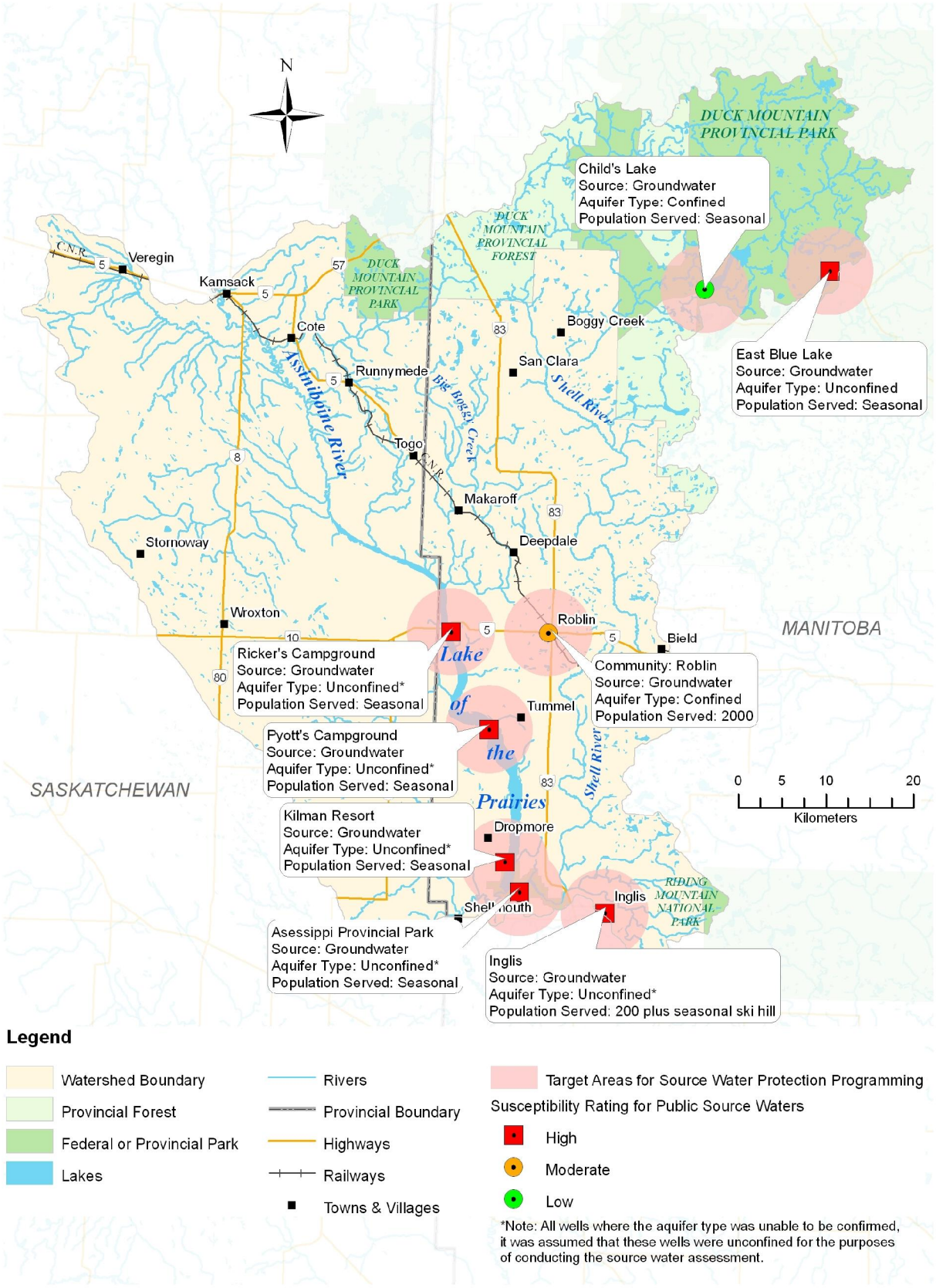


Figure 2: Source Water Protection Target Areas

Surface Water Quality

Watershed Goal 2: To maintain and improve surface water quality that ensures the health of aquatic ecosystems as well as the enjoyment and economic benefit of our communities

Objectives:

•2A- Mitigate impacts on water quality by reducing pollutant runoff from urban, household and municipal activities

•2B- Mitigate impacts on water quality limiting excess nutrient runoff from agricultural lands

•2C- Protecting and restore wetland and riparian habitat

In the prairies the natural state of our lakes and streams are important to us. According to our public consultations, the quality of these waterways is cited as one of the top public concerns. Lake of the Prairies is home to a diverse range of natural beauty. This natural beauty has attracted many visitors and recreational enthusiasts and has contributed to the recent expansion of cottage development along the lake. The health of the fragile vegetation and aquatic communities must be taken into consideration during future expansion of developmental activities. The natural features of this special area are valued by local residents and recreation visitors. We must work together to maintain and restore these natural features.

Through our public consultations, algae were cited as the number one factor limiting recreation and enjoyment on Lake of the Prairies. Algae problems can be a result of excess nutrients, such as Phosphorus and Nitrogen. Algae blooms alter the aquatic conditions in a lake. Excessive aquatic growth will deplete critical oxygen levels, threatening the survival of fish and other aquatic life. Blue-green algae are also a serious health concern as they can produce potent toxins which can be hazardous to wildlife, livestock, and people.

A watershed approach is essential to improving surface water quality. Our public consultations highlighted a mixture of feelings towards pollution responsibilities. However, as a watershed community we must work together to ensure we all do our part to reduce our collective nutrient inputs. The solution will involve strong contributions from urban, rural, agricultural, industrial and municipal sources. The map that follows identifies areas of the watershed to focus water quality incentive programming to help reach our goal more effectively.

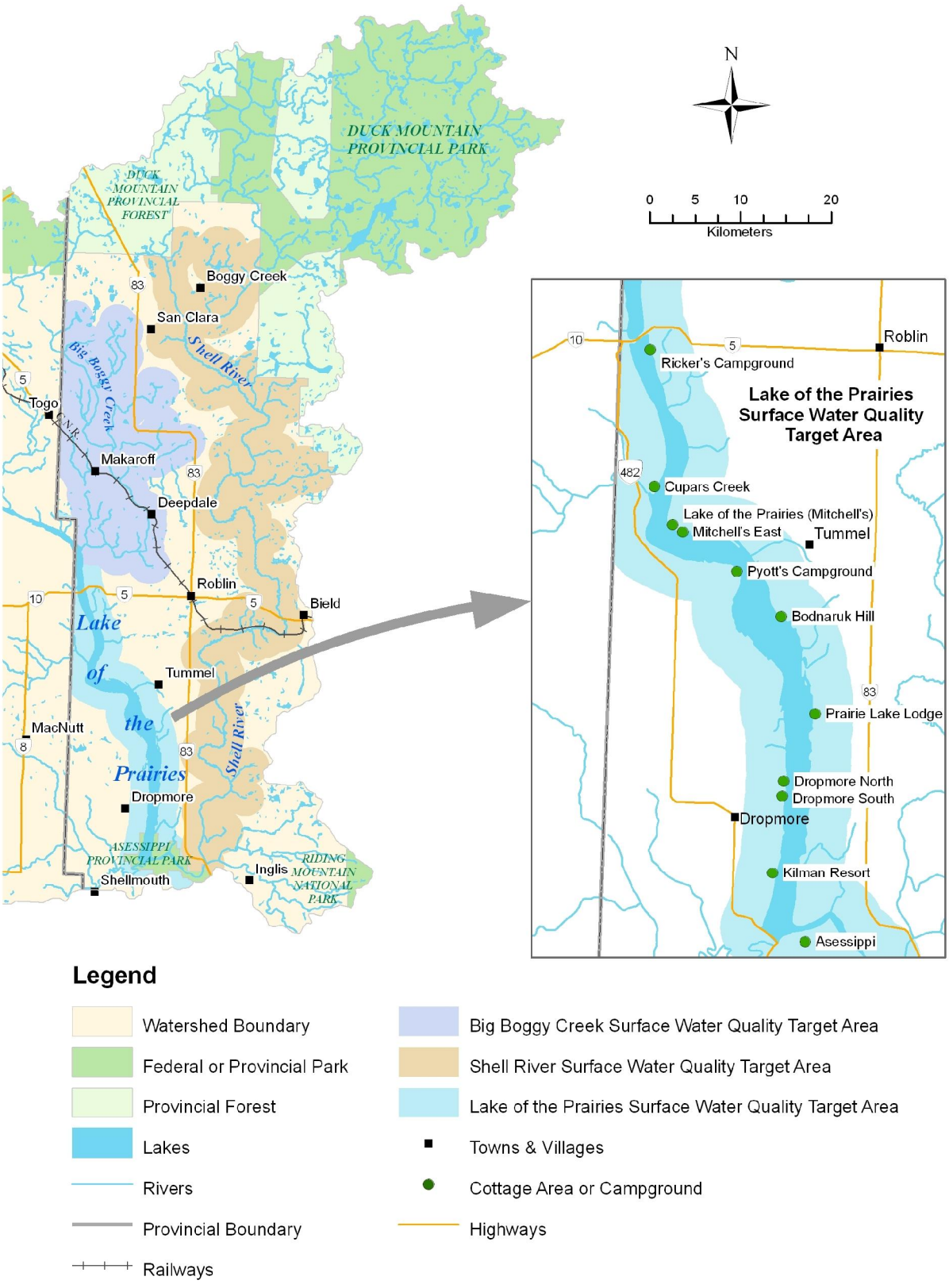


Figure 3: Surface Water Quality Target Areas

Surface Water Management

Watershed Goal 3: Promote and support responsible surface water management to reduce soil erosion and flooding and protect natural wetland habitat

Objectives:

•3A- Provide technical support in drainage works for assisting with drainage problems, on a case-by-case basis

•3B-Protect natural surface water features such as wetlands which buffer against flood and drought occurrences

•3C- Investigate structural water retention opportunities for capturing sediment, reducing soil erosion and maintaining stream base flow

•3D- Communicate monitored reservoir levels and resulting management practices on Lake of the Prairies to local stakeholders

Surface water management decisions must be made with regards to the entire watershed. Actions that occur upstream may negatively impact downstream areas if proper planning is not in place. Our management practices must take these connections into consideration before beginning any surface water management project. When water is drained from the land at a faster rate, it can contribute to higher peak flows, which can result in:

- Infrastructure damage
- Higher erosion rates and water quality impairment
- Reduced water retention
- Potential water shortages

Wetlands were identified as particularly important and vulnerable natural areas within our watershed. They assist in reducing the impacts of flood and drought by capturing water and releasing it slowly. Wetlands provide a source for water retention and allow water to percolate through soils and recharge groundwater supplies. This maintains a higher water table, improving the agricultural capability of surrounding soils.

Recent studies through Ducks Unlimited Canada have cited the ecological and economic benefits of wetland restoration (*The Impacts of Wetland Loss in Manitoba)*. Wetlands provide a variety of essential aquatic functions and provide valuable habitat for fish, waterfowl and wildlife. Wetlands also act as natural filters, improving water quality by filtering sediment, nutrients and bacteria from receiving waters.

The Shellmouth Reservoir, commonly referred to as Lake of the Prairies, is a unique watershed feature which requires special attention in regards to surface water management. The reservoir was constructed to reduce downstream flooding, and as a result, can experience water level fluctuations throughout the year. Water levels are managed by Manitoba Water Stewardship in partnership with the Shellmouth Dam Liaison Committee. These fluctuations in water levels can affect the physical characteristics of the shoreline along the reservoir and along the banks of the Assiniboine River downstream. Erosion is often evident in these areas and is a major concern of area residents.

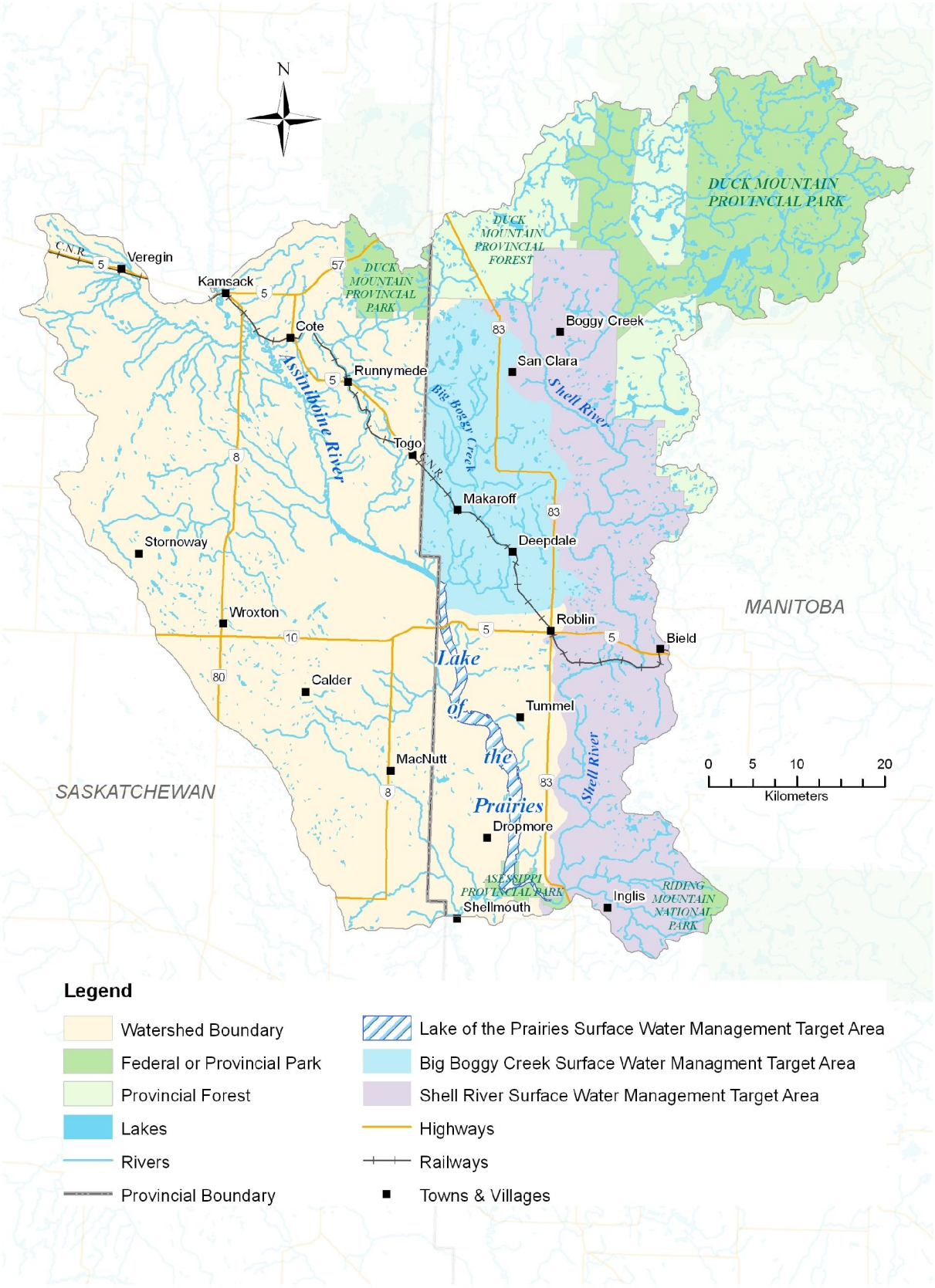


Figure 4: Surface Water Management Target Areas

Watershed Extension

Watershed Goal 4: Engage watershed residents by providing watershed health information and educational activities that promote opportunities for action

Objectives:

•4A- Host educational events to feature accomplishments by the community and watershed organizations

•4B- Publish a watershed health report card to communicate watershed health to residents

•4C- Develop evaluation criteria to assess partnerships, projects, educational events, and watershed awareness

•4D- Partner with watershed organizations to communicate the inventory of natural areas including wetlands, riparian habitat, and native grass prairie

Successful, long-term watershed management requires a watershed organization that is prepared with specific tools and resources to effectively promote and manage the health of the watershed. Contributions of local community residents that are working together to understand our watershed and assist in its protection are just as important. Watershed residents provide vital local knowledge and enhance strong community connections to the history of the local area.

Watershed health is not always easy to measure and it can sometimes be difficult to communicate the benefits of watershed protection, especially when working with a wide range of stakeholders. A watershed health report card is a tool that can be used, and will be implemented in the Shell River watershed to communicate watershed goals and track our progress as we work to achieve those goals. A watershed report card provides a means to measure the health and vulnerabilities present by using a number of measurable variables, such as wetland restoration and water quality parameters. These variables will be measured and weighed to grade sections of the watershed. These report cards will highlight changes and trends over time, and also provide a means to engage watershed residents locally.

A focus on educational activities through landowner workshops, youth eco-camps, open house events, and conventions will continue to assist in encouraging conservation efforts throughout the watershed. Each individual contribution through conservation efforts and practices will help to create stronger community ties and provide a naturally healthier place within the Shell River watershed.

Sustainable Development

Watershed Goal 5: Encourage and support sustainable land use planning efforts within the watershed

Objectives:

•5A- Use responsible planning and Geographic Information Systems to protect natural habitat and ecologically sensitive sites

•5B- Enhance sustainable land use planning and tourism strategies by communicating natural habitat assessment information

•5C- Promote the economic benefits of maintaining intact native habitat

The native habitat within the Shell River watershed has attracted a high level of outdoor recreational and tourism visitors. This has assisted in the recent cottage and subdivision development along Lake of the Prairies and its surrounding areas. Steps must be taken to ensure this development is carried out in a sustainable manner in order to protect the native prairie habitat. The riparian zones along Lake of the Prairies are of special concern as these zones are experiencing the highest levels of development through cottage subdivision. Riparian zones are transition areas where the land meets the water. Partnering with the planning districts and engaging cottage residents will help to ensure we protect the fragile shorelines of Lake of the Prairies.

Our community can achieve sustainable land use planning through sharing accurate habitat assessment information. Currently, plans are underway to develop a shared natural habitat geodatabase to store spatial information that will be used to by local planning districts and watershed organizations. Watershed protection should allow for sustainable growth that incorporates the ecological value of landscapes and the benefits of ecosystem and community health.

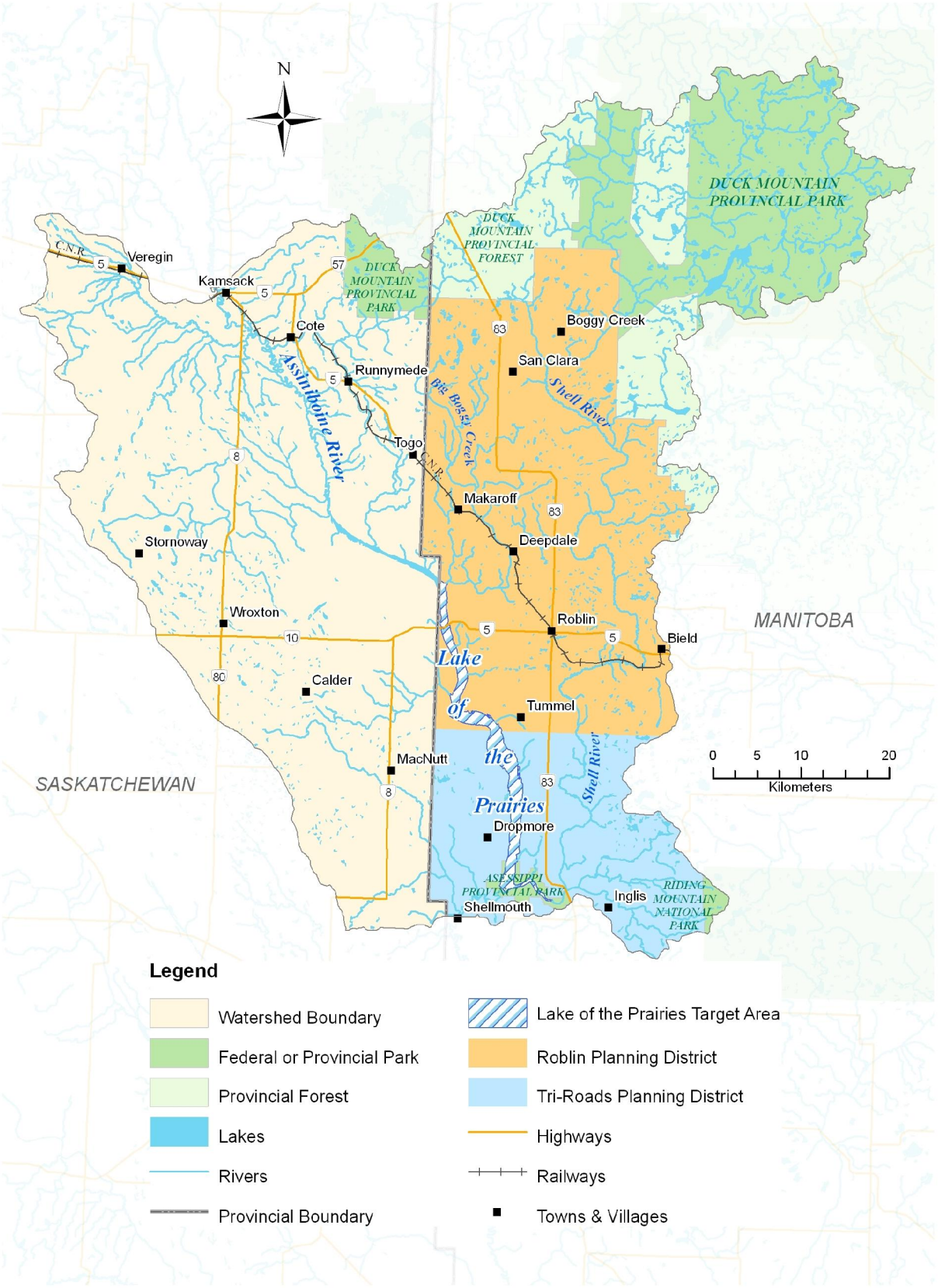


Figure 5: Sustainable Development Target Areas

Liaison Activities

Watershed Goal 6: Maintain communications with watershed managers upstream to encourage cooperation across jurisdictional boundaries

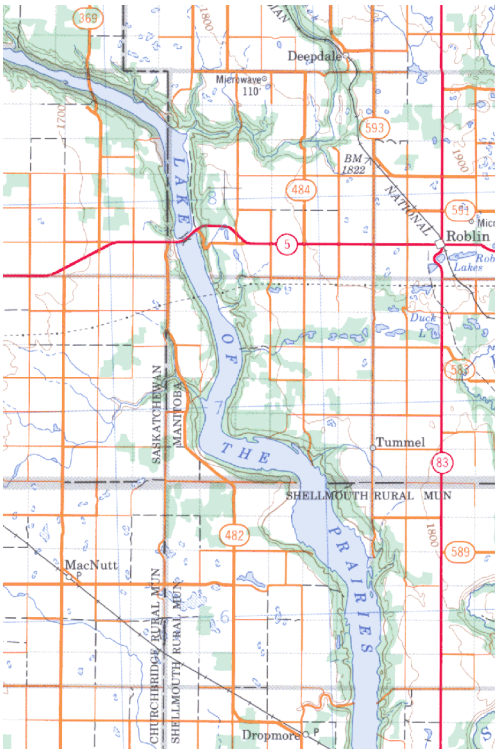
Objectives:

•6A- Investigate opportunities for information sharing with watershed organizations upstream

•6B- Identify areas of similarity between partnering watershed organizations and work towards continuity and collective cooperation in overall watershed protection

The Shell River watershed, like many other watersheds, falls on a number of political and jurisdictional boundaries. Water does not follow political boundaries; instead it is controlled by the topography of the landscape. An effective watershed plan encompasses the entire watershed drainage area and manages it as one continuous unit.

Cross-boundary liaison and partnerships are required in a watershed with a number of political boundaries. Within the Shell River Watershed there are two main jurisdictions to partner with. The first boundary to consider is the interprovincial boundary between Manitoba and Saskatchewan. The Assiniboine River begins in Saskatchewan and then feeds into Lake of the Prairies. The Shell River Watershed includes almost as much land in Saskatchewan as it does in Manitoba due to the inclusion of the upper Assiniboine River basin. The impact of the Saskatchewan half of this watershed is evident in the Manitoba portion of this watershed, as we are directly downstream of management activities in Saskatchewan. The second jurisdictional boundary is Duck Mountain Provincial Park and Forest, where the headwaters of the Shell River are located. A number of forestry management practices occur regularly in the Duck Mountains and have influence on existing conditions downstream. A proposed twin watershed study in the Duck Mountains will look at forestry management practices in the headwaters of the Shell River.



A partnered watershed plan will outline objectives and goals that can be utilized across these jurisdictional boundaries to benefit the entire watershed. Long term goals within the Shell River Watershed include joint funded projects, information sharing agreements and joint planning activities. These liaison activities will initiate planning and communication efforts that will encourage cooperation between all partnering watershed organizations and interested stakeholders.

5. IMPLEMENTATION PLAN - RECOMMENDED ACTION ITEMS

The Implementation Plan outlines the actions that need to be completed in order to meet our goals and objectives. Each action has an associated measure of success, potential partnering organizations to assist in implementation, a timeframe, and the targeted area to complete the action within.

List of Potential Partnership Organizations

- APT Asessippi Parkland Tourism
- AWSA Assiniboine Watershed Alliance
- DUC Ducks Unlimited Canada
- EDOs Economic Development Offices
- IMCD Intermountain Conservation District
- LP Louisiana Pacific Woodlands
- MAFRI Manitoba Agriculture Food and Rural Initiatives
- MBMF Manitoba Model Forest
- MHHC Manitoba Habitat Heritage Corporation
- MIT Manitoba Infrastructure and Transportation
- MWS Manitoba Water Stewardship
- NCC Nature Conservancy of Canada
- PC Parks Canada
- PDs Planning Districts
- PHP Parkland Habitat Partnership
- RMs Rural Municipalities
- SLWCD Swan Lake Watershed Conservation District
- SWA Saskatchewan Watershed Authority

Goal 1: Source Water Protection

Action	Measure of Success	Partners	Timeframe	Target Areas
Objective 1.A				
1.1. Review source water protection criteria	Obtain criteria	CD, MWS	Summer 2010	n/a
1.2. Facilitate establishment of source water protection committees for each public well	Establish committee led by local community	CD	2012	Roblin and Inglis
1.3. Develop source water protection plan	Source water protection plan is developed with ongoing review	Source water protection committee	2012	Public water sources
1.4. Develop signage and public awareness activities on source water protection	Establish signage and public awareness activities	CD, RMs, MIT, owners of semi-public water sources	2011	Watershed wide
Objective 1.B				
1.5. Inventory natural areas within protection zone and make information available	Updated mapping information in GIS database completed	CD, Ag Canada, MAFRI, MWS, PDs	Spring 2010 - ongoing	Source water protection zones

1.6. Encourage land owners to take advantage of wetland and natural area protection programs offered by other agencies or the province	Successful program uptake by private landowners	DU, MWS, MHHC, NCC, CDs	Ongoing	Partnership considerations within source water protection zones
Objective 1.C				
1.7. Provide information packages on home well inspection and distribute through web, local plumbers, open houses or other points of contact	Number of information packages distributed and positive feedback from partner agencies	CD, MWS	2010	Private residential wells watershed wide
1.8. Continue abandoned well sealing program	Number of abandoned wells sealed	CD	Ongoing	Source water protection zones
1.9. Conduct annual well water testing through Manitoba Water Stewardship	Number of participants on well testing day, action taken by landowners on positive tests	CD, MWS	Winter 2010 - ongoing	Private residential wells watershed wide
Objective 1.D				
1.10. Establish local database for well quality testing and location data	Well data is organized in a usable form	MWS, CD	2010 - ongoing	Private residential wells watershed wide
1.11. Continue efforts to document aquifer location and characteristics	Availability of aquifer information	MWS with support from CD	Ongoing	Watershed wide
1.12. Make groundwater data accessible to public	Availability of data and public interest	CD	Winter 2010	CD
1.13. Conduct well inventory	Number of wells recorded	CD	Pilot summer 2010	Source water protection zones

Goal 2: Surface Water Quality

Action	Measure of Success	Partners	Timeframe	Target Areas
Objective 2.A				
2.1. Offer incentive programs for the installation of rain gardens, rainwater catchment systems, rooftop gardens and garden composting	Number of urban water conservation activities	CD	2009 - ongoing	Roblin, Inglis and community cluster areas, cottage owners
2.2. Support responsible management of urban storm water and snow removal	Improvements to the management of urban storm water and snow removal	Municipalities, CD	2010 - 2011	Roblin, Inglis
2.3. Support improved management and regulation of cosmetic fertilization	Information and education provided	CD, MWS	Ongoing	Watershed wide
2.4. Support and encourage the regulation of Phosphates in household detergents	Information and education provided	CD, MWS	Ongoing	Watershed wide

Objective 2.B				
2.5. Provide technical advice and offer incentive programs for Alternate Watering systems for livestock	Number of applications and number of completed projects	CD	Ongoing	Lake of the Prairies and its major tributaries
2.6. Provide technical and financial assistance towards livestock winter site management	Number of improved wintering sites	CD, MAFRI, grazing clubs	2011	Lake of the Prairies and its major tributaries
2.7. Conduct and support educational workshops on nutrient and fertility management	Number of workshops conducted and number of participants	CD, DUC, grazing clubs, MAFRI	Ongoing	Lake of the Prairies and its major tributaries
Objective 2.C				
2.8. Gather habitat assessment information for the watershed and make mapping services available to stakeholders inside and outside the watershed	Complete and usable GIS database and evaluation of public satisfaction for services rendered.	CD, PHP, NCC, DUC, MHHC	2009 - ongoing	Fish bearing waterways, source water protection zones
2.9. Provide financial and technical assistance to protect and restore wetlands within the watershed	Number of acres of restored and protected wetlands in the watershed	MWS, DUC, Delta Waterfowl, NCC and MHHC	2010 - 2011	Watershed wide
2.10. Provide financial and technical assistance for grassed waterways and buffer strips	Overall distance of grassed waterways and buffer strips established	CD	Ongoing	Watershed wide
2.11. Provide financial and technical assistance for livestock exclusion fencing	Distance of shoreline fenced	CD	Ongoing	Lake of the Prairies and its major tributaries

Goal 3: Responsible Surface Water Management

Action	Measure of Success	Partners	Timeframe	Target Areas
Objective 3.A				
3.1. Assessing problem areas, through technical support, where erosion or excessive flooding is occurring due to drainage works	Accurate technical and GIS data in problem areas	CD, RMs, MWS	2010 - ongoing	Watershed wide
3.2. Provide technical support for drain improvement through consultation with sub-district committees	Accurate technical support	Municipalities with assistance from the CD	2009 - ongoing	Areas of high priority
Objective 3.B				
3.3. Distribute education materials featuring surface water management as a priority for wetland protection	Number of materials distributed, positive public response	CD	2010 - ongoing	Watershed wide
Objective 3.C				
3.4. Investigate options for retention where restoration of natural wetlands is not feasible	Successful projects completed, reduction of peak flows	CD	2010 - ongoing	Main tributaries suffering from erosion

Objective 3.D				
3.5. Communicate reservoir updates on website along with appropriate information contacts	Positive feedback from interested parties	MWS, CD	2010 - ongoing	Lake of the Prairies
3.6. Utilize educational tools to communicate the management practices and purpose of the Shellmouth Reservoir	Comprehensive understanding of the purpose of the Shellmouth Reservoir	CD, MWS, watershed residents	2010 - ongoing	Lake of the Prairies
3.7. Host an open house session to address public concerns regarding lake levels on Lake of the Prairies	Attendance from a wide range of interested stakeholders and that a greater understanding of reservoir management action are met	CD, MWS, MB Cons., watershed residents	2010	Lake of the Prairies
3.8. Identify and promote research on the health of Lake of the Prairies to identify knowledge gaps and identify best management practices	Cooperation with partners to initiate research that will foster a greater understanding of the aquatic and management processes affecting Lake of the Prairies	CD, MWS, NCC, DFO, DUC, interested stakeholders	2010 - ongoing	Lake of the Prairies and watershed wide

Goal 4: Engaging Watershed Residents

Action	Measure of Success	Partners	Timeframe	Target Areas
Objective 4.A				
4.1. Host a banquet annually and invite members of the community attend and learn of the year's accomplishments, successes, and observe local youth competitions	Banquet is well attended	CD with support from MWS	Ongoing	CD
4.2. Feature landowners in community newspaper articles and feature annual farm family of the year	Awards are presented	CD	Ongoing	CD
Objective 4.B				
4.3. Create watershed health report card template based on set criteria	Determine criteria to measure and score watershed health	CD, watershed residents	Pilot summer 2010	Watershed wide
4.4. Distribute watershed report cards	Positive feedback from watershed residents and partnering organizations	Watershed residents	2011	Watershed wide
4.5. Evaluate report cards based on feedback, determine intervals for distributing report cards	Uptake of watershed health report cards as recognizable indicators of watershed health	Watershed residents	2012	Watershed wide
Objective 4.C				
4.6. Evaluate existing and ongoing programs, events and activities based on set criteria	Useful evaluation for all programs and events	CD with support from MWS	Fall 2009 - ongoing	CD
4.7. Use educational and other community events to highlight program successes	Positive feedback by audience	CD	Ongoing	CD

Objective 4.D				
4.8. Provide access to reports and mapping of natural areas and wildlife ecological corridors	Positive feedback on mapping services	CD	Winter 2010	CD

Goal 5: Sustainable Development

Action	Measure of Success	Partners	Timeframe	Target Areas
Objective 5.A				
5.1. Share habitat assessment information with PDs so more effective development guidelines can be made	Hire GIS technician, creation of a comprehensive geodatabase	CD, PDs	2009 - ongoing	Lake of the Prairies
5.2. Utilize habitat assessment information to implement sustainable land use planning	Implement sustainable land use planning through GIS	CD, PDs	2011 - ongoing	Lake of the Prairies
Objective 5.B				
5.1. Make available inventory of significant ecological resources to tourism/EDO's in order to promote the area	Relationship built with EDO's, number of partnership initiatives	CD, EDO	Ongoing	Areas of unique natural and recreational value
Objective 5.C				
5.4. Gather information and reports from partnering organizations to highlight economic value of native habitat	Distribution of reports to watershed residents	CD, MWS, MB Cons, EDOs, DUC, NCC, MHHC	2010 - ongoing	Watershed wide

Goal 6: Liaison Activities

Action	Measure of Success	Partners	Timeframe	Target Areas
Objective 6.A				
6.1. Meet with upstream jurisdictions in Duck Mountain Provincial Park and Forest and in Saskatchewan to discuss common goals and activities	Ongoing dialogue, attend meetings	CD, MWS, MB Cons, SWA, AWSA, LP	2009 - ongoing	Duck Mountain Provincial Park and Forest, Saskatchewan
6.2. Participate in the Shell River Twin Watershed Study	Meet with Twin Watershed Study stakeholders, collect information on the Shell River	LP, SLCD, IMCD, PC, MBMF	2009 - ongoing	Shell River tributaries in Duck Mountain Provincial Park and Forest
Objective 6.B				
6.2. Compare source water protection efforts and identify areas for sharing of resources	Similar source water protection plans across jurisdictions	CD, MWS	2010	Watershed wide

REFERENCES

Ducks Unlimited Canada (2008). *The Impacts of Wetland Loss in Manitoba.* www.ducks.ca/conserve/research/projects/broughtons/pdf/broughtons-factsheet.pdf

Shell River Project Management Team (2008). *State of the Watershed Report - Shell River Watershed.* www.lpcd.mb.ca/resourses/Shell%20River%20State%20of%20the%20Watershed%20Report.pdf

APPENDIX A

Watershed Planning Advisory Team Invitation List

Agriculture and Agri-Food Canada/PFRA	Friends of Rivers Lake
Archie Miniota Economic Development	Gambler First Nation
Asessippi Parkland Tourism	GreenWing Energy Management Ltd.
Asessippi Ski Area and Winter Park	Hamiota Economic Development Corp.
Assiniboine Agricultural Producers	Harding Ag Society
Assiniboine Community College	Harrison CDC
Assiniboine Development Corridor	Husky Energy Inc.
Assiniboine Valley Producers Association	Inglis and Area Business Group
Assiniboine-Birdtail Soil Association	Intermountain Conservation District
Beautiful Plains School Division	Int'l Erosion Control Ass.-Northern Plains Chapter
Birdtail Sioux First Nation	Keeseekoowenin First Nation
Birtle & District Community Development Corp.	Kelvin Nerbas
Birtle Ag Society	Keystone Agricultural Producers
Birtle and District Chamber of Commerce	Keystone Vegetable Producers Association
Birtle and District Community Development Corp.	Kilman's Cottage Association
Blanshard & District CDC	Lake Audy/Riding Mountain Landowners Ass.
Bluestem Wildlife	Lake Enterprises Ltd
Boggy Creek Metis Association	Lake of The Prairies Conservation District
Boundary Colony	Lakeside Resort (Ditch Lake)
Boundary Lane School	Little River Game & Fish Association
Brandon & Area Environmental Council	Little Saskatchewan Game & Fish
Brandon Naturalist Society	Little Saskatchewan River Conservation District
Brandon Soil Management Association	Long Range Game & Fish
Brandon University	Lost Meadows
Brandon Wildlife Association	Louisiana Pacific
Bunge Canada	MacDonald Soil and Water Conservation
Canola Council of Canada	Manitoba Aboriginal and Northern Affairs
Carlton Trail Planning	Manitoba Ag Woodlot Program
Central Agricultural Conservation Area	Manitoba Agriculture, Food and Rural Initiatives
Citizens for the Responsible Application of Phosphorus	Manitoba Canola Growers Association
Clear Lake Cabin Owners Association	Manitoba Cattle Producers Association
Clear Lake Cottage Owners Association	Manitoba Chicken Producers
Climate Change Connection	Manitoba Conservation/Conservation Data Center
CN	Manitoba Conservation/Environment Officer
Cool Spring Colony	Manitoba Conservation/Forestry
CP	Manitoba Conservation/Land and Water Use
Dairy Farmers of Manitoba	Manitoba Conservation/Remote Sensing
Decker Colony	Manitoba Conservation/Wildlife
Deerboine Colony	Manitoba Eco-Network, Water Caucus
Delta Waterfowl	Manitoba Forage Seed Association
Ditch Lake - Beatty Sub-division	Manitoba Forestry Association
Ducks Unlimited Canada	Manitoba Habitat Heritage Corporation
Duke Energy	Manitoba Hydro
Eagle Guide Service	Manitoba Industry, Economic Development & Mines
Elkhorn Ag Society	Manitoba Intergovernmental Affairs /Trade
Emergency Measures Organization-Western Region	Manitoba Intergovernmental Affairs/Planning Districts
Enbridge	
Enerplus	Manitoba Naturalists' Society
Environment Canada/CWS	Manitoba Pork Council
Erickson & District Wildlife Association	Manitoba Pulse Growers Association
Erickson Clanwilliam CDC	Manitoba Transportation and Government Services
Fisheries and Oceans Canada/DFO	Manitoba Trappers Association
Flax Council of Canada	Manitoba Water Services Board
FLIPPR	Manitoba Water Stewardship/Environment Office
Fort la Bosse School Division	Manitoba Water Stewardship/Fisheries
Friends of Riding Mountain National Park	Manitoba Water Stewardship/Groundwater

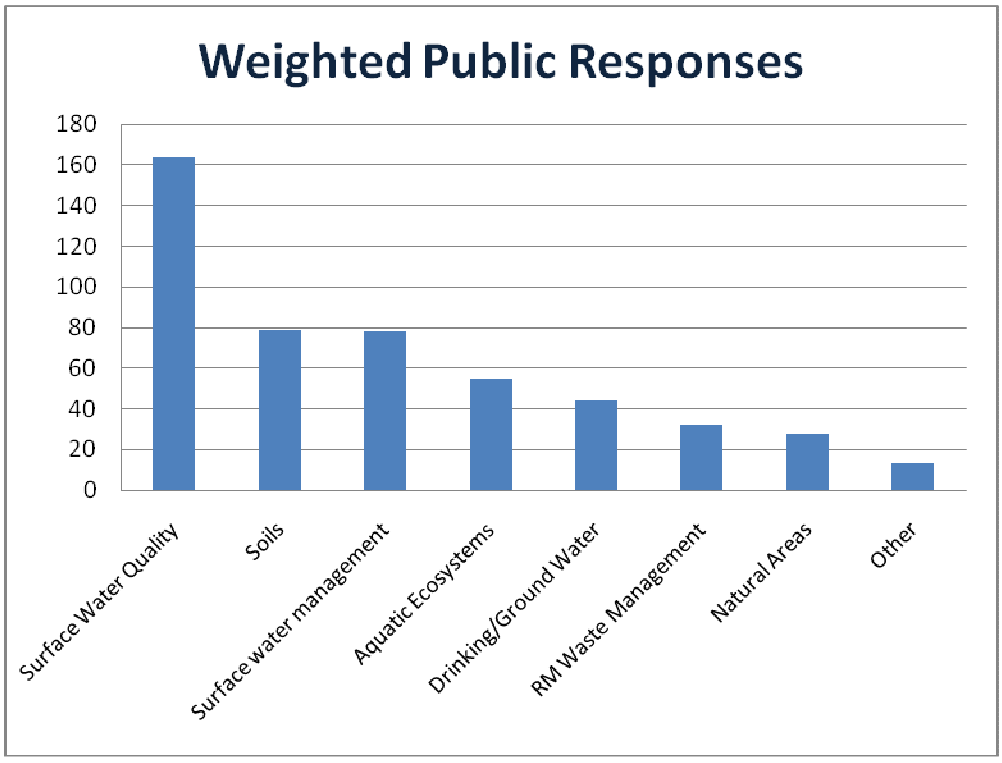
Manitoba Water Stewardship/Licencing	Manitoba Water Stewardship/Hydrology
Manitoba Water Stewardship/Water Quality	RM of Hamiota
Manitoba Zero Tillage Research Association	RM of Harrison
Manitoba Science, Technology, Energy and Mines Petroleum Branch	RM of Hills burg
Mid West Recreation	RM of Miniota
Mid West Weed District	RM of Minto
Mid-Assiniboine River Conservation District	RM of Odanah
Midwest Planning	RM of Park
Mid-West Planning District	RM of Park (North)
Minnedosa Ag Group	RM of Pipestone
Minnedosa Ag Society	RM of Rosedale
Minnedosa Chamber of Commerce	RM of Rossburn
Minnedosa Fish Enhancement	RM of Russell
Minnedosa Soil Management Association	RM of Saskatchewan
Minnedosa Wildlife Association	RM of Shell River
Mixedwood Forest Society	RM of Shoal Lake
Mountain View School Division	RM of Sifton
MTS (Manitoba Telephone)	RM of Silver Creek
National Farmers Union	RM of Strathclair
Nature Conservancy of Canada	RM of Swan River
Neepawa & Area Planning District	RM of Wallace
Oak River Ag Society	RM of Whitehead
Oak River Colony	RM of Woodworth
Oakburn Game and Fish	Roblin & District CDC
Onanole Fish & Wildlife	Roblin Ag Society
Organic Producers Association	Roblin Chamber of Commerce
Otter Lake Cottage Owners Association	Roblin Planning District
Park West School Division	Rolling River First Nation
Parks Canada-Riding Mountain National Park	Rolling River School Division
Parks Canada-Riding Mountain National Park	Rossburn & District CDC
Pelly Trail CDC	Rossburn Community Development Corp.
Plainview Colony	Rossburn Planning
Plainview Colony School	Rossburn Recreation Commission
Prairie Fruit Growers Association	Rossman Game and Fish
Prairie Lake Lodge	Russell Ag Society
Prairie West Recreation	Russell Chamber of Commerce
Pyott's Campground	Russell Game and Fish
Rapid City & District Wildlife Association	San Clara Metis Association
Rapid City Ag Society	Sandy Lake Cottage Owners Association
Rapid City Cattle Producers	Sandy Lake Game & Fish
Red River Community College	Sandy Lake Rec Association
Ricker's Campground	Saskatchewan Watershed Authority
Riding Mountain Biosphere Reserve	SAVED
Riding Mountain Landowners Association	Shellmouth Community
Riding Mountain Liaison Committee	Shoal Lake Ag Society
Rivers Ag Society	Shoal Lake Chamber of Commerce
Rivers Game & Fish	Shoal Lake Economic Development
Rivers West	Shoal Lake Enhancement Corp
Rivers-Daly CDC	Shoal Lake Planning
RM o f Archie	Silver Beach Cottage Owner's Association
RM of Birtle	Sioux Valley Dakota Nation
RM of Blanshard	Snake Creek Wildlife Association
RM of Clanwilliam	South Ditch Lake Recreational Co-op Limited
RM of Daly	South Riding Mountain Planning District
RM of Ellice	South Riding Mountain Wildlife Association
RM of Grandview	Southwest Regional Development Corp
Tanner's Crossing Planning District	Starbuck Marketing Club
Town of Birtle	Strathclair Ag Society
Town of Erickson	Strathclair CDC
Town of Hamiota	

Town of Minnedosa Town of Rapid City Town of Rivers Town of Roblin Town of Rossburn Town of Russell Town of Shoal Lake Trans Canada Pipeline TransCanada West Tri-Roads Planning District University of Manitoba (NRI) University of Winnipeg Environmental Science Upper Assiniboine River Conservation District Valley Inc/Minnedosa & Area CDC Valley Recreation District Vegetable Growers Association of Manitoba Village of Binscarth Village of Elkhorn Village of St. Lazare Virden Ag Society Virden Area Wildlife Association Virden Economic Development Wasagaming Chamber of Commerce Wasagaming Tenants' Association Water Ski Manitoba Water Wisdom Waywayseecappo First Nation West Souris River Conservation District Wolf Creek Conservation Woodlot Association of Manitoba Woodworth CDC Woodworth Conservation Group Woodworth Ducks Unlimited Woodworth Game & Fishing Association Woodworth Soil Association Yellowhead REDA	

APPENDIX B: SUMMARY OF PUBLIC INPUT

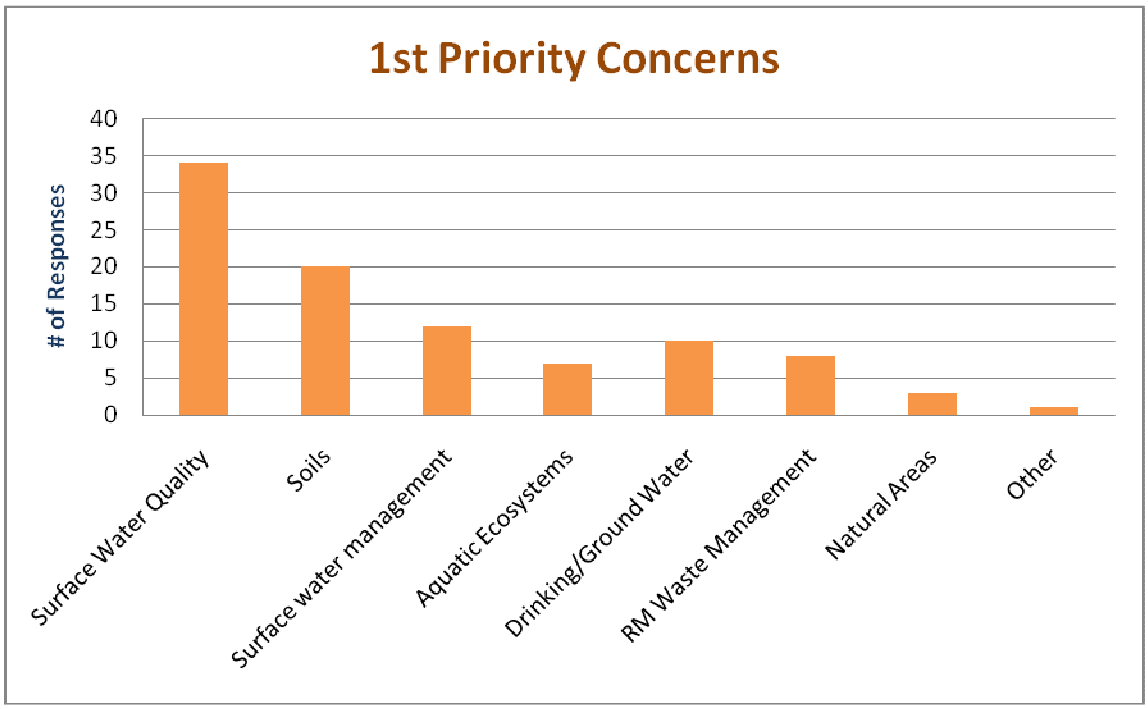
Public Response Graphs

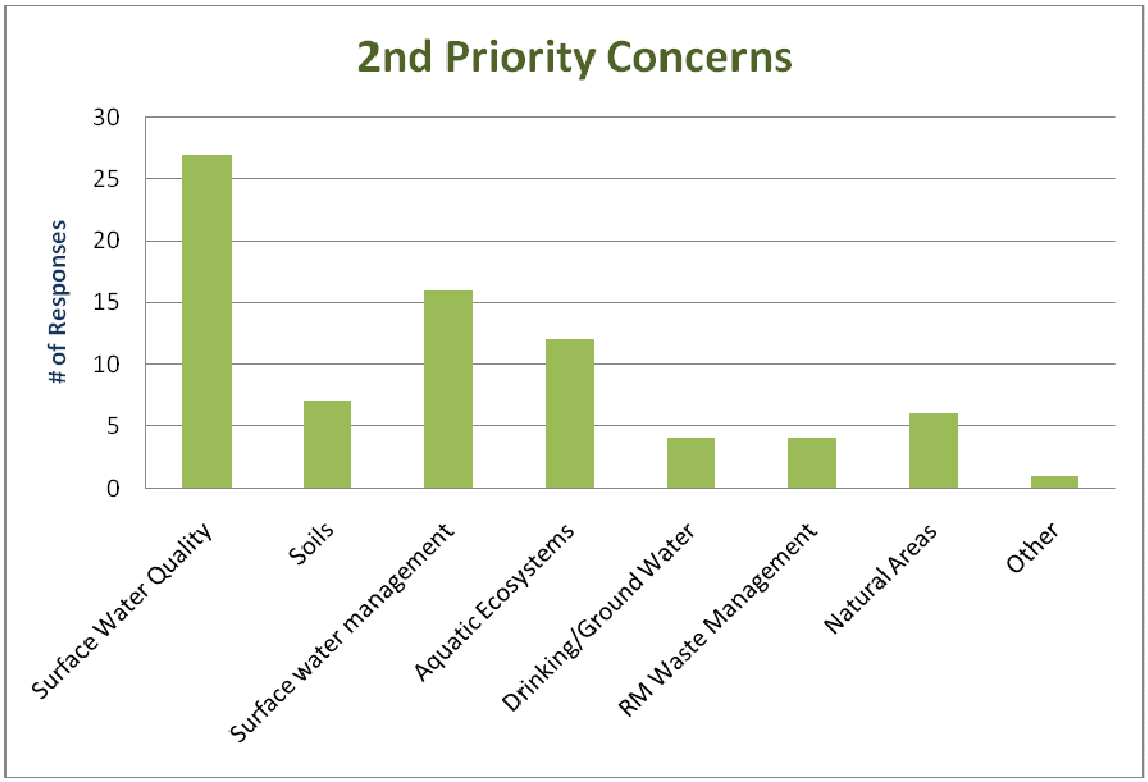
The following graphs display the public responses from consultations that took place in 2008. These responses were placed into categories, counted, weighed based on priority and presented in graphical form. They are to provide a picture of the public concerns which will be used in conjunction with technical recommendations in developing our watershed goals.

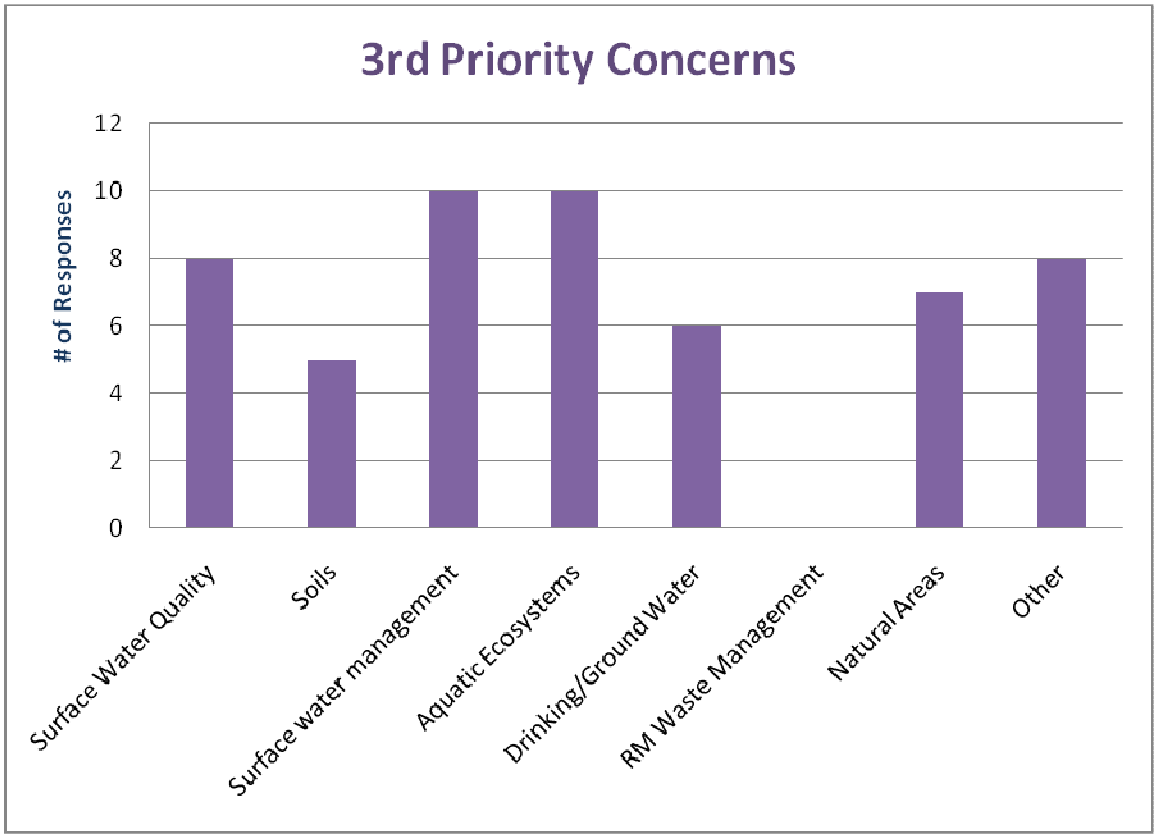


During the winter of 2010 a water testing program was initiated to look at drinking water quality within the watershed. The results of this testing and the level of public concern regarding drinking water quality indicate that drinking water may be a higher concern now than it was in 2008.

The graphs below display our overall ranking for public issues discussed at the public consultations. Categories were weighted by giving three points to each 1st priority response, two points for 2nd priority response and one point for a 3rd priority response.







Public Concerns Summary

The Public Concerns have been broken down into similar categories as seen in the State of the Watershed Report for Shell River Watershed.

1). Surface Water

- **Surface Water Quality**

This category received the highest weighted score and the highest number one priority issue response. Most public concerns were directed towards nutrient loading in Lake of the Prairies and effects of lake algal blooms, sedimentation, agricultural and municipal inputs. This was a primary concern for many cottage owners along Lake of the Prairies.

- **Surface Water Management**

The concern that brought this topic to the second highest ranking was the water level fluctuations on Lake of the Prairies. The Shellmouth Reservoir is a unique feature within the Shell River watershed and is managed for drought and flood occurrences. Surface water management also highlighted concerns with agricultural drainage and increased runoff downstream. Erosion has become a more evident issue in areas with high levels of cumulative drainage.

2). Ground Water and Source Water Protection

- **Drinking Water / Ground Water**

Drinking and ground water concerns were targeted towards susceptibility of contamination in drinking water. The majority of our drinking water within the Shell River watershed comes from groundwater sources. Potentially harmful land management practices can greatly influence the quality of our drinking water through groundwater contamination.

Source water protection plans have been initiated through well water testing programs that are available to watershed residents. The characteristics and results of the tested wells will be recorded and used to develop a more comprehensive groundwater database within the watershed. This database will assist in identifying potentially sensitive sites for groundwater contamination. Source water protection zones and management of these zones will be established for public drinking water sources.

3). Habitat

- **Natural Areas / Habitat**

This category includes concerns regarding the preservation of wetlands, riparian habitats, and trees. Individuals cited concerns with effects on water quality, flooding, and quality of native habitat, especially for wildlife. It was noted in a couple of responses that natural areas should be preserved as they benefit all watershed residents. More economic incentive programs should be available to preserve and restore natural habitat.

- **Aquatic Ecosystem**

There were multiple responses citing fisheries management and fish habitat degradation as a primary concern, especially in Lake of the Prairies. Concern for local fisheries habitat includes both recreational and economic interests. Quality fish habitat within Lake of the Prairies is a top priority within the Shell River watershed, other important fisheries habitat include the Goose Lakes, Child's Lake, Blue Lakes, and Twin Lakes.

4). Soils

- **Soils**

This category is of high public concern, primarily due to the extent of shoreline erosion along Lake of the Prairies. Erosion is a highly visible process. Concerns were directed towards loss of property, decreased agricultural productivity, road and infrastructure degradation, and resulting siltation to water bodies. A small number of responses indicated soil quality as a concern with respect to organic matter conservation.

5). Other

- **Rural Municipality Waste Management**

This category includes all comments regarding waste management practices within the Shell River watershed. Concerns included; municipal lagoon concerns, specifically in Roblin, and restricted recycling opportunities in Inglis.

APPENDIX C: GLOSSARY OF TERMS AND ACRONYMS

Glossary of Terms

Aquifer: geological feature which holds significant quantities of water or allows significant quantities of water to flow through.

Aquitard: a less permeable layer which is a barrier to water flow in an aquifer.

Effective Drainage Area: the portion of the watershed which is expected to contribute runoff to the main waterways during a median runoff year.

Gross Drainage Area: the topographic extent of the watershed.

Groundwater: water that fills the spaces (pores and fractures) within the ground.

Surface Water: water that has collected on the ground or in a stream, river, lake, wetland, or ocean

Water Quality: the chemical, biological, and physical characteristics of water.

Acronyms

AWSA	Assiniboine Watershed Alliance
BMP	Best Management Practices
CD	Conservation District
DMPF	Duck Mountain Provincial Forest
DMPP	Duck Mountain Provincial Park
DUC	Ducks Unlimited Canada
EDO	Economic Development Office
IWMP	Integrated Watershed Management Plan
LP	Louisiana Pacific
LPCD	Lake of the Prairies Conservation District
MAFRI	Manitoba Agriculture Food and Rural Initiatives
MHHC	Manitoba Habitat Heritage Corporation
MIT	Manitoba Infrastructure and Transportation
MWS	Manitoba Water Stewardship
NCC	Nature Conservancy of Canada
PD	Planning District
PHP	Parkland Habitat Partnership
PMT	Planning Management Team
SK	Saskatchewan
SWA	Saskatchewan Watershed Authority
WPA	Watershed Planning Authority
WPAT	Watershed Planning Advisory Team