

Assiniboine-Birdtail

Integrated
Watershed
Management
Plan



A Word from the PMT Chairman



Greetings,

As the chair of the Assiniboine-Birdtail Watershed Project Management Team, I am pleased to present the first Integrated Watershed Management Plan. It is my hope that this first step may be the beginning of a more thoughtful approach to land use planning. Decisions will address not only the desire to maximize economic profitability, but also the long-term needs and hopes of the broadest segment of this region's inhabitants, bird, fish and animal as well as human.

In this time of climate uncertainty, I am confident that decision makers moving forward will use lessons learned from the past, along with information in the IWMP to guide their decisions, resulting in perpetually sustainable economic activities, and high standards of health and quality of life.

My sincere thanks to all who contributed time and knowledge to this project, which would not have come to be without them.

Geordie Daneliuk
Chair,
Assiniboine-Birdtail Project Management Team

Honourable Christine Melnick Minister of Water Stewardship



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ACKNOWLEDGEMENTS

The Assiniboine-Birdtail Watershed Planning Authority would like to gratefully acknowledge and thank the Lake of the Prairies & Upper Assiniboine River Conservation Districts, the watershed planning advisory team members, member municipalities, and all watershed residents and stakeholders for their support, input and participation in developing the Assiniboine-Birdtail Watershed Management Plan.

Special thanks go to the members of the Project Management Team which included Georgie Daneliuk, Kelvin Nerbas and manager Eric Busch from the Lake of the Prairies CD; Robbie Craig, Tom Judd, Oliver Low and manager Ryan Canart from the Upper Assiniboine River CD; and David Jones and Jason Senyk from Manitoba Water Stewardship.

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



In partnership with the Rural Municipalities of:

Archie
Birtle
Ellice
Miniota
Rosburn
Russell
Silver Creek



And the Towns of:

Rosburn
Russell
Birtle



And the Communities/ Villages of:

Angusville
Binscarth
Elkhorn
Foxwarren
Miniota
McAuley
St. Lazare

EXECUTIVE SUMMARY

In 2006, the Lake of the Prairies Conservation District and the Upper Assiniboine River Conservation District were jointly designated the Water Planning Authority for the Assiniboine-Birdtail 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 Water Planning Authority developed five broad goals which serve as the foundation for this watershed plan.

WATERSHED GOALS & OBJECTIVES

1	To identify surface water management issues and implement sustainable water management strategies
2	To have surface water of a quality which does not limit human activity or impair ecological function
3	To achieve a balance between human and ecological interests by conserving and restoring natural features on the landscape
4	To provide tools and knowledge to empower residents to safeguard all of our drinking water sources
5	To increase knowledge and address data gaps to improve groundwater quality and quantity

A number of specific, measurable objectives were developed, each of which break the watershed goals into more manageable components. These objectives form the basis for management actions within the watershed. All of the plan's goals, objectives and actions work to achieve a common vision for the watershed: **"To have in our watershed the best possible water for all people, the environment, and our economy."** This plan will serve as a roadmap for the Conservation Districts, government, and other agencies in order to reach this vision, to maintain and improve the health of our watershed.

Map of Assiniboine-Birdtail Watershed

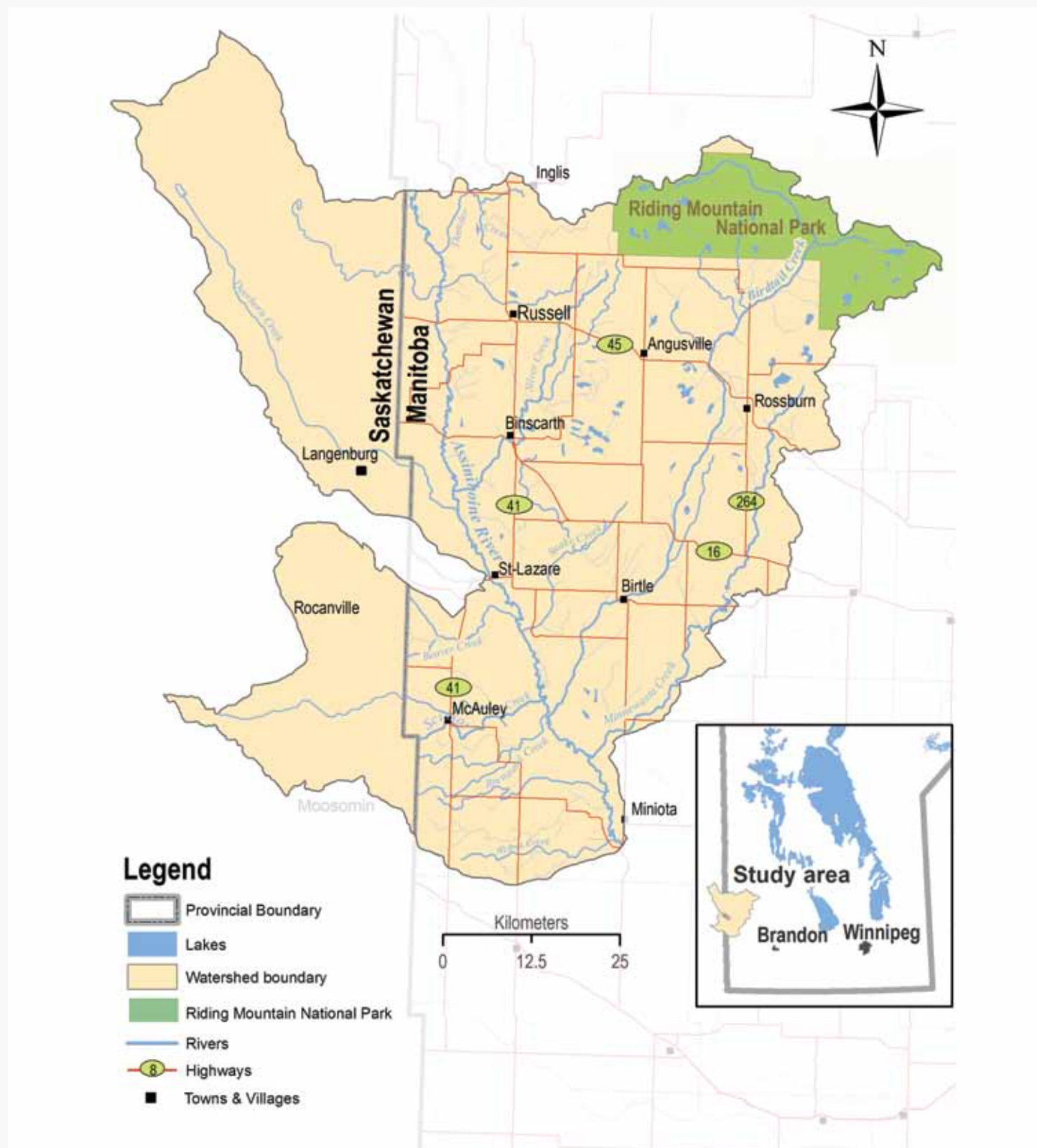


Figure 1: The Assiniboine-Birdtail Watershed

INTRODUCTION

Welcome to the Assiniboine-Birdtail Integrated Watershed Management Plan (IWMP). This plan is the result of over three years of work from a variety of organizations, foremost Lake of the Prairies and Upper Assiniboine River Conservation Districts, local people and technical experts. It is important to note though that this plan was not produced by or for any one specific agency or organization. This plan is intended for the communities within the Assiniboine-Birdtail Watershed. Therefore, it will only succeed if residence and stakeholders alike embrace this plan and become active and involved in the plan's implementation.

WHAT IS A WATERSHED?

A watershed is defined as an area of land where all surface waters flow to a common point. For ease of management, we often designate a point along a river as the bottom of a watershed. For this watershed that point is the Assiniboine River crossing of Provincial highway #83 in the R.M. of Miniota. Surface and groundwater is connected within a watershed and either flows downstream across the landscape through waterways or vertically through the various layers of soil and substrate. This connectivity extends beyond the soil and water to include the plants and animals that depend upon these systems for life.

A watershed is defined by topography, its natural boundary; as opposed to municipal or provincial boundaries which are sometimes arbitrarily derived. Since a watershed is a natural spatial unit defined by the landscape, a watershed is also the area most logically suited to manage and make decisions about water. Water crosses so many human boundaries, managing or planning for a watershed requires that landowners, municipalities, towns, businesses, and other stakeholders work together on a watershed basis.

WATERSHED MANAGEMENT PRINCIPLES

The following watershed management principles provided a foundation to the Watershed Planning Advisory Team and the Project Management Team throughout the planning process. These principles help to illustrate the connections and inter-relationships within a watershed, and assist 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
- Upstream is connected to downstream
- Water management planning should be based on watersheds
- What happens on the land is reflected in the water
- Clean water is critical to the sustainability of our local communities and environment
- The watershed 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

WHAT IS AN INTEGRATED WATERSHED MANAGEMENT PLAN?

An integrated watershed management plan (IWMP) is intended to be used as a roadmap to assist the watershed community in reaching its goals and objectives in regards to watershed health.

An integrated watershed management plan is unique in that it is focused on the natural resources and environment. Development plans and other planning initiatives typically contain sections dealing with general environmental concerns and/or specific resources, these areas are typically dealt with as constraints to development rather than specific objectives in their own right. This presents an opportunity for the two planning processes to compliment each other and provide tools for the community to address both environmental and development goals.

The IWMP is not intended to operate in a void apart from development plans and older, existing studies. Wherever possible existing plans and studies were consulted and recommendations incorporated into this plan. Moving forward, subsequent plans will consider this planning effort.

PURPOSE - WHY CREATE AN INTEGRATED WATERSHED MANAGEMENT PLAN?

The purpose of this plan is to clearly state the goals for the protection, conservation, or restoration of land and water, aquatic ecosystems and drinking water sources in the watershed. The plan is also intended to outline the specific actions that each agency and stakeholder have committed to implement in order achieve these goals.

KEY PLAYERS 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, 30 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 Assiniboine-Birdtail Watershed to look like for future generations.

WATER PLANNING AUTHORITY (WPA)

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. For this watershed, the Lake of the Prairies and Upper Assiniboine River Conservation Districts share the responsibility as a joint WPA.

WATERSHED PLANNING ADVISORY TEAM (WPAT)

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. 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.

PROJECT MANAGEMENT TEAM (PMT)

The Project Management Team (PMT) for the Assiniboine-Birdtail Watershed was formed in the summer of 2008. Prior to this point, the planning process was steered by a large PMT committee comprised of members from three conservation districts which oversaw the development of four congruent watershed plans. The Assiniboine-Birdtail PMT is a collection of five local representatives, the managers from both the Lake of the Prairies and Upper Assiniboine River Conservation Districts and a watershed planner from Manitoba Water Stewardship. The role of the PMT is to act as the key decision-makers in the planning process. The Assiniboine-Birdtail 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.

PLANNING PROCESS AND TIMELINE

In early 2006, the Assiniboine-Birdtail Watershed and three neighbouring watersheds; the Little Saskatchewan River, Arrow-Oak River and Shell River were joined together into a single planning process to produce individual watershed management plans for each watershed. This combined planning process was unprecedented in Manitoba and involved Little Saskatchewan River, Upper Assiniboine River, and Lake of the Prairies Conservation Districts sharing the responsibility as the legal authority to conduct watershed planning. The combined planning process simplified the data submission process for the technical advisory group and to complete the plans in a timely manner.

A terms of reference detailing the timelines, budget, roles and responsibilities for the parties involved in the planning process was signed in June of 2006. The planning process, however, has had to be adaptive in order to meet changing circumstances. For example, the planning process was originally scheduled to take two years but due to staff turnover and delays in the collection and submission of technical data, the process took over three years to complete.

In February of 2008, following the collection of technical data, the four-watershed project management team made the decision to split the process into four separate planning processes – one for each watershed. This was done in recognition of the fact that the four watersheds are geographically and socioeconomically unique and it allowed each watershed to create a management plan that best reflected the needs of watershed residents.

In June of 2008 the State of the Watershed Report was released for the Assiniboine-Birdtail Watershed. This report contained a summary of the existing scientific data and the issues facing the watershed from the perspective of the resource experts. In late November 2008, a series of seven public open houses were held in order to garner feedback and capture the resource and environmental concerns of watershed residents. During the winter of 2008 and into 2009, the Project Management Team for the Assiniboine-Birdtail Watershed began the task of combining the issues brought forward by both the experts and the local people – the watershed issues and the action plan contained herein are the result of this work.



Figure 2: The watershed planning process

WATERSHED BACKGROUND

The State of the Watershed Report for the Assiniboine-Birdtail Watershed contains background information and a summary of the available data on the people, environment and resources of the watershed. If you are interested in learning more about the watershed or if you would like some detailed background information on watershed issues please see the Assiniboine-Birdtail State of the Watershed Report (2008) available from your local CD office or online at www.lpcd.mb.ca/iwmp.html or www.uarcd.com/IWMP.htm.

Autumn sunset over Grayling Lake, Riding Mountain National Park.



WATERSHED GOALS AND OBJECTIVES

The table below shows how this watershed management plan is structured and organized. 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 the individual objectives. Each objective is based upon a specific issue, focus area, or both. The actions have been identified as steps necessary to achieve our goals, objectives and ultimately the vision for our watershed.

Watershed Vision

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

GOALS AND OBJECTIVES

1	To identify surface water management issues and implement sustainable water management strategies A: Identify surface water management issues by gathering local knowledge from watershed stakeholders B: Implement sustainable water management strategies that minimize negative impacts to the watershed and its stakeholders
2	To have surface water of a quality which does not limit human activity or impair ecological function A: Limit nutrient loading in the watershed B: Limit sediment loading in the watershed C: Increase awareness of all potential sources of pollution in the watershed
3	To achieve a balance between human and ecological interests by conserving and restoring natural features on the landscape A: Protect existing wetlands, riparian areas and other aquatic habitats while seeking areas for restoration efforts B: Protect existing native grasslands and provide information on sustainable management practices C: Protect existing forest cover while seeking areas for restoration efforts
4	To provide tools and knowledge to empower residents to safeguard all of our drinking water sources A: Identify and mitigate potential threats to public drinking water sources B: Identify and mitigate potential threats to semi-public drinking water sources C: Help owners of private wells ensure the safety of their drinking water sources
5	To increase knowledge and address data gaps to improve groundwater quality and quantity A: Identify recharge and withdrawal areas and rates

1 Our Goal: To identify surface water management issues and implement sustainable water management strategies

When we discuss drainage or surface water management in Manitoba, emotions often run high. Watershed management decisions in our watershed are often made at a small scale by looking at individual culverts or fields, with little consideration given to upstream activities or downstream impacts. Our focus tends to be the management of water quantities with little consideration given to other areas such as water quality, soils or habitat. For example, when water is removed from the land at a faster rate, there is more water flowing in the drains, streams and rivers over a shorter time frame. This leads to higher peak flows which can result in:

- Infrastructure damage
- Higher erosion rates, leading to poorer water quality
- Reduced water retention which can lead to a greater potential for water shortages

During public consultations in this watershed, public feedback was divided between those who wanted to see an improved drainage system and those who cited problems with flooding and erosion and wanted to see retention of water on the landscape. Due to the special concerns noted during public consultations and through site visits, three sub-watersheds have been targeted due to significant erosion. These target areas include the Thunder Creek, Silver Creek and Minnewasta Creek sub-watersheds.

In order to effectively manage our surface waters, we must identify our past actions that have led us to the concerns we face today. Once we have identified our past actions, we can work towards solutions for the future. A number of objectives and actions were identified to help us reach our goal. These objectives and actions include:

Objective 1A: Identify surface water management issues by gathering local knowledge from watershed stakeholders

RECOMMENDED ACTIONS TO IMPLEMENT:

1. Establish a surface water management committee that will conduct focus group meetings with local landowners, municipal councils, and the provincial government in order to gather data relating to flooding, erosion and other pressure points within the watershed
2. Develop criteria to assess and prioritize management strategies that will take into account ecological and economic constraints

Objective 1B: Implement sustainable water management strategies that minimize negative impacts to the watershed and its stakeholders

RECOMMENDED ACTIONS TO IMPLEMENT:

1. Reduce peak flows through water retention initiatives
2. Promote efforts to increase soil organic matter by implementing management strategies
3. Coordinate monthly meetings to review and discuss the status of drainage applications with key participants that include the local Water Resources Officer from Manitoba Water Stewardship (Water Control Works and Drainage Licensing) and representatives from the local municipalities and conservation districts such as zero tillage and permanent forage cover on sensitive lands

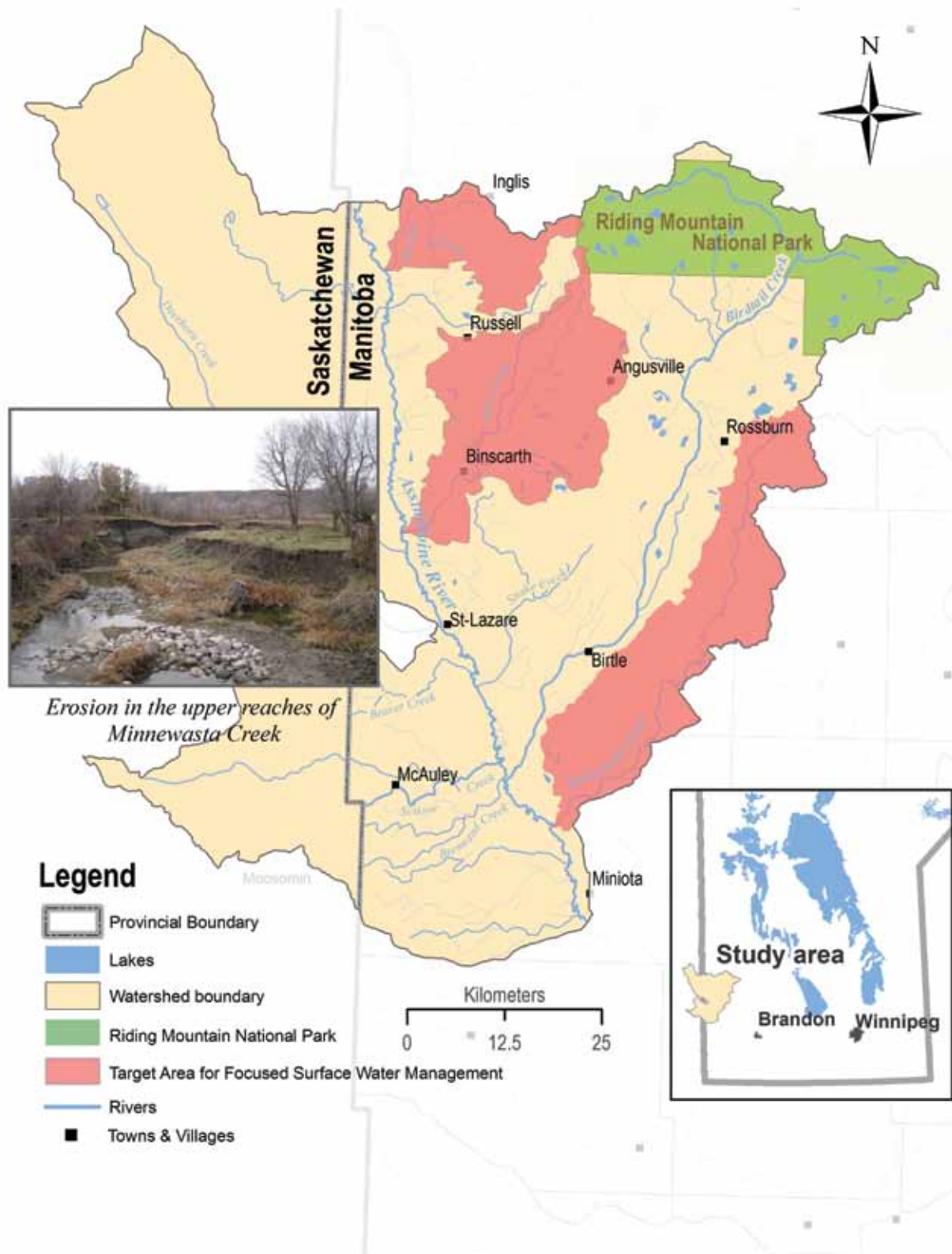


Figure 3: Areas to target Surface Water Management in the Assiniboine-Birdtail Watershed

2 Our Goal: To have surface water of a quality which does not limit human activity or impair ecological function

Water quality describes the chemical and physical characteristics of water. Three sites within the Assiniboine-Birdtail watershed are routinely monitored for various water quality variables. Two of these sites are on the Assiniboine River near Russell and south of Miniota. The third site, on the Birdtail Creek near Birtle, was established in 2001.

At all three sites within the watershed, the concentration of phosphorus has almost always exceeded the provincial guideline of 0.05 mg/L when tested. Total suspended solids in the Assiniboine River near Russell and south of Miniota have commonly exceeded 25 mg/L.

Water quality issues arising during the public consultations tended to focus on water quality issues at Silver Beach and along the Birdtail Creek and Assiniboine River and the potential impacts to recreational opportunities in these areas. Residents felt it was very important that these areas remain healthy for fishing, swimming and other recreational purposes.

A number of objectives and actions were identified to help us reach our goal. These objectives include:

Objective 2A: Limit nutrient loading in the watershed

RECOMMENDED ACTIONS TO IMPLEMENT:

1. Research and promote Beneficial Management Practices (BMPs) that reduce nutrient loading such as riparian buffers or grassed filter strips in partnership with stakeholders
2. Request to the Province that all order 1-7 watercourses within the Assiniboine-Birdtail Watershed receive vulnerable status under the Nutrient Management Regulation
3. Conduct a riparian assessment to identify and rank point sources of nutrient loading
4. Conduct a review of the water quality monitoring network and any issues and strategies with key participants that include Manitoba Water Stewardship (Water Science and Management) and the conservation districts

Objective 2B: Limit sediment loading in the watershed

RECOMMENDED ACTIONS TO IMPLEMENT:

1. Conduct a riparian assessment to identify and rank point sources of sediment contribution
2. Implement sediment control measures such as backflood structures, grassed waterways, sediment traps and perennial cover programs

Objective 2C: Increase awareness of all potential sources of pollution in the watershed

RECOMMENDED ACTIONS TO IMPLEMENT:

1. Gather and communicate current relevant information regarding potential sources of pollution
2. Develop a communications plan to increase the awareness of potential sources of pollution

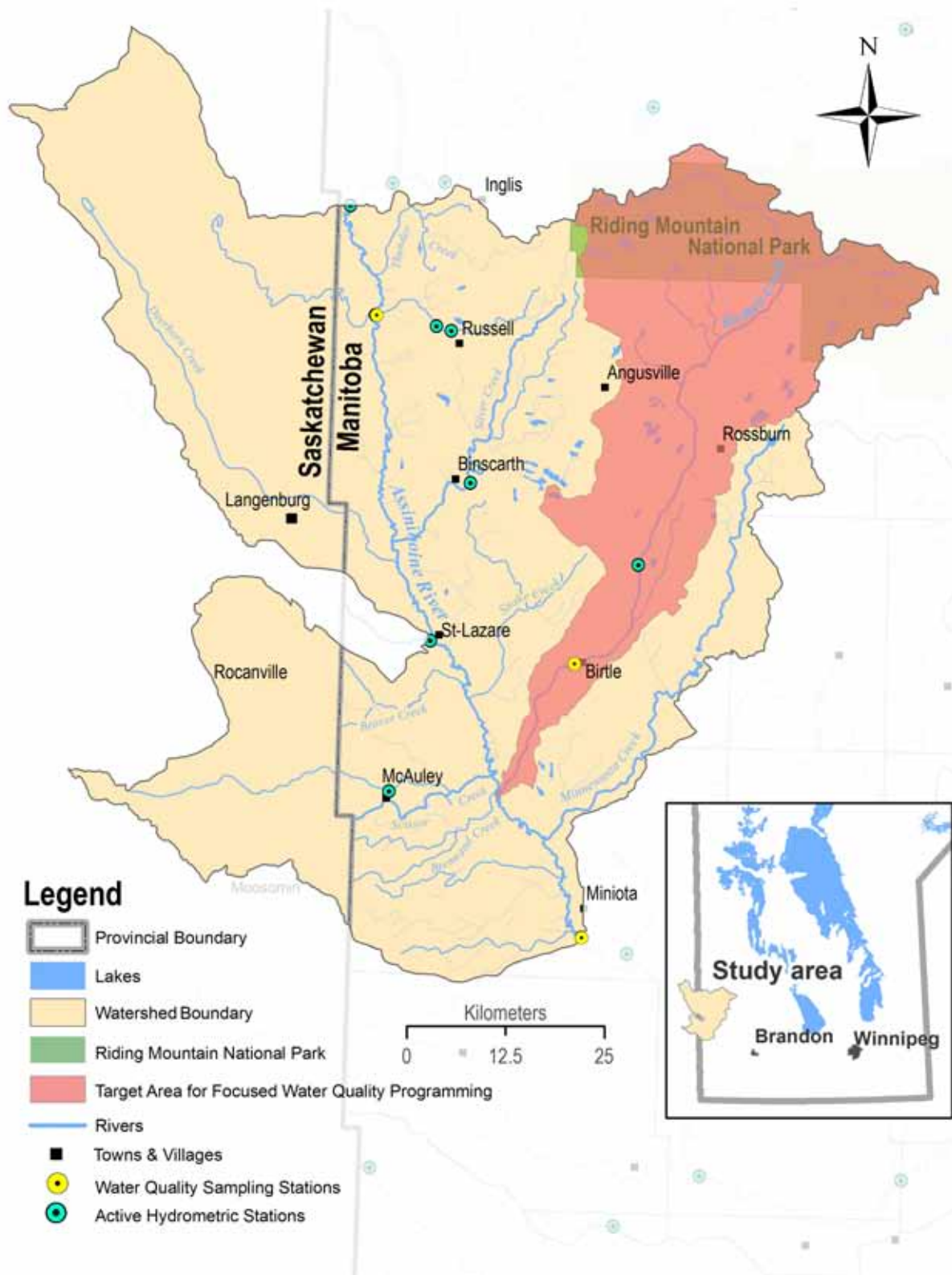


Figure 4: Areas to target Surface Water Quality Programming in the Assiniboine-Birdtail Watershed

3 Our Goal: To achieve a balance between human and ecological interests by conserving and restoring natural features on the landscape

Our activities on the landscape play a critical role in determining ecosystem health. In order to promote healthy aquatic and terrestrial ecosystems, we must recognize the role that we play.

Despite ongoing conservation efforts, the indication is that natural habitat, particularly wetlands, are being lost at an increasing rate within the watershed. Wetland losses pose negative ecological consequences and can have negative impacts to water quality and quantity.

In addition to wetland loss, there is also a concern over the loss of native grasslands and forest cover within the watershed. Native grasslands and forests are important for providing biodiversity and wildlife habitat within the watershed.

In order to reach our goal and achieve a balance within the ecosystem, a number of objectives and actions were identified. These objectives and actions include:

Objective 3A: Protect existing wetlands, riparian areas and other aquatic habitats while seeking areas for restoration efforts

RECOMMENDED ACTIONS TO IMPLEMENT:

1. Complete watershed inventories of wetlands, riparian areas and other aquatic habitats and barriers to fish passage in conjunction with conservation agencies
2. Fund wetland conservation easement program in conjunction with conservation agencies
3. Demonstrate alternative land uses that would discourage the drainage of wetlands
4. Protect riparian areas and other aquatic habitats through incentive programming
5. Conduct an instream flow needs assessment on the Birdtail Creek

Objective 3B: Protect existing native grasslands and provide information on sustainable management practices

RECOMMENDED ACTIONS TO IMPLEMENT:

1. Identify all remaining native grasslands not protected under easement agreements
2. Develop native grassland easement projects with conservation agencies
3. Identify and protect critical wildlife habitat through incentive programming and easements

Objective 3C: Protect existing forest cover while seeking areas for restoration efforts

RECOMMENDED ACTIONS TO IMPLEMENT:

1. Create a proposal to restore forest cover on undeveloped road allowances
2. Develop a conservation corridor policy with municipal partners
3. Develop regulations and permit system for the removal of woodlots

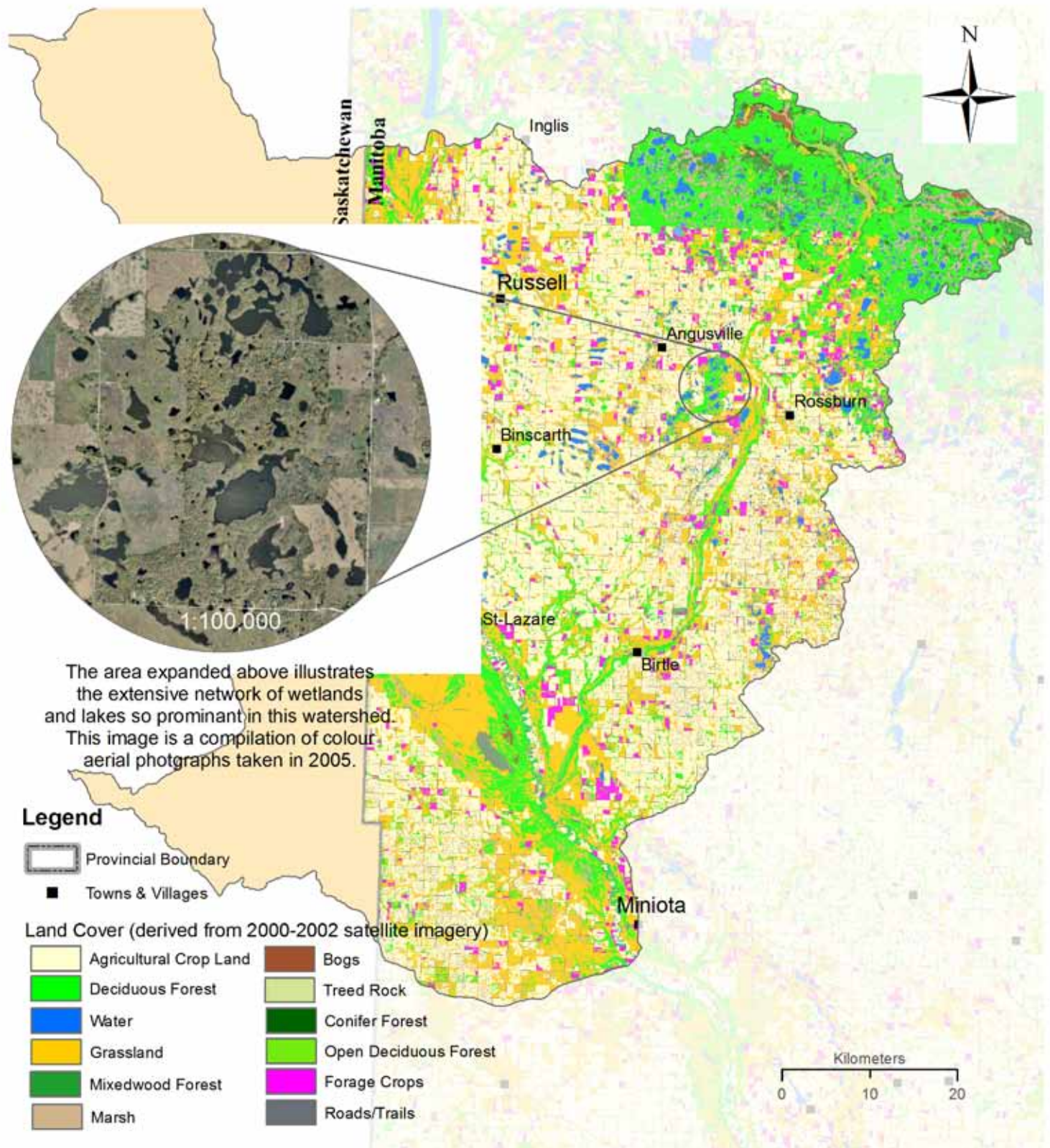


Figure 5: Landcover in the Assiniboine-Birdtail Watershed

4 Our Goal: To provide tools and knowledge to empower residents to safeguard all of our drinking water sources

Clean, potable drinking water is critical for human life and a necessity for prosperous sustainable communities. The Assiniboine-Birdtail Watershed contains eight public drinking water sources and many more semi-public systems (i.e. schools, hospitals) and private wells. In this watershed, public sources of drinking water come from surface and ground water, while semi-public and private sources typically rely on ground water. This makes protecting both our surface and ground water sources extremely important.

Drinking water quality was a major concern cited by watershed residents during the public consultation process. The public drinking water source at St. Lazare is the only public source in the watershed that relies upon surface water and has been under a Boil Water Advisory since December 2005. Boil Water Advisories are issued for a water system or a water source by a Medical Officer of Health (Manitoba Health) due to a confirmed or suspected bacteriological quality problem.

There are a number of land use activities that may impact the quality of our surface and ground waters. It makes sense to reduce the risk of contamination by ensuring that good land management practices are conducted throughout the watershed, and especially adjacent to a drinking water source.

To meet our goal of safeguarding our drinking water sources, a number of objectives and actions have been identified. These include:

Objective 4A: Identify and mitigate potential threats to public drinking water sources

RECOMMENDED ACTIONS TO IMPLEMENT:

1. Establish a Drinking Water Committee to develop and implement Source Water Protection Plans

Objective 4B: Identify and mitigate potential threats to semi-public drinking water sources

RECOMMENDED ACTIONS TO IMPLEMENT:

1. Create a digital map of all semi-public drinking water sources in watershed
2. Identify and rank threats to semi-public drinking water sources and prioritize mitigation efforts

Objective 4C: Help owners of private wells ensure the safety of their drinking water sources

RECOMMENDED ACTIONS TO IMPLEMENT:

1. Promote BMPs that address well head protection
2. Provide incentive programs to landowners to protect private drinking water sources
3. Conduct a watershed-wide well water testing day

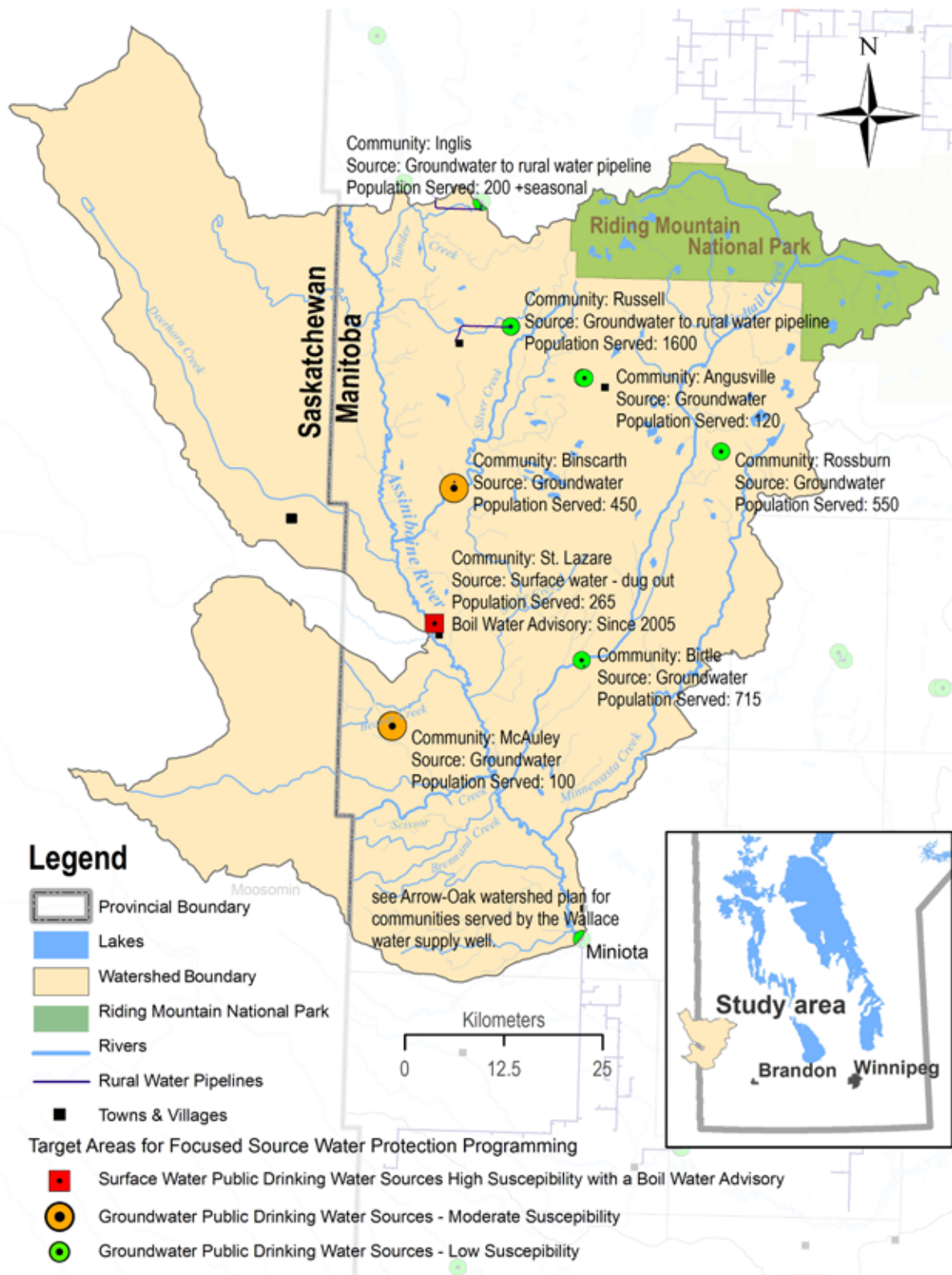


Figure 6: Public Water Supply Systems in the Assiniboine-Birdtail Watershed

5 Our Goal: To increase knowledge and address data gaps to improve groundwater quality and quantity

Groundwater in our watershed is the main source of drinking water for most urban and rural areas in the watershed. Our groundwater resources vary between shallow and vulnerable sand and gravel aquifers and deeply buried and confined aquifers.

One of the central concerns relating to groundwater in the watershed is that there is insufficient knowledge about the number, location, and construction of active and abandoned wells in the watershed. Abandoned or improperly sealed wells form a particular hazard as they pose a contamination hazard for the aquifers which may affect other wells that utilize the same groundwater.

Another key area of concern identified by watershed residents was a lack of information about the total quantity of water available from key aquifers, the volume of recharge versus withdrawal, and the critical areas which serve to recharge local aquifers. More information on these areas will assist in protecting groundwater from contamination and in ensuring that the water is available for future generations.

Depending on the soils, topography, and underlying geology, human activities at the surface can potentially impact groundwater quality and quantity. Some of the activities which may impact groundwater quality and quantity are:

- Application of fertilizers
- Operation of municipal or private sewage systems
- Application of herbicides, pesticides, and fungicides
- Contamination from livestock wastes
- Loss of wetlands (reduction in recharge)

In order to reach our goal to increase our knowledge surrounding groundwater, one objective and a number of actions were identified.

Objective 5A: Identify recharge and withdrawal areas and rates

RECOMMENDED ACTIONS TO IMPLEMENT:

1. Commission a ground water study to identify recharge areas
2. Create digital maps depicting withdrawal areas and rates
3. Create educational campaigns such as brochures and newsletters and incentive programs such as rebates on water efficient fixtures that encourage water conservation

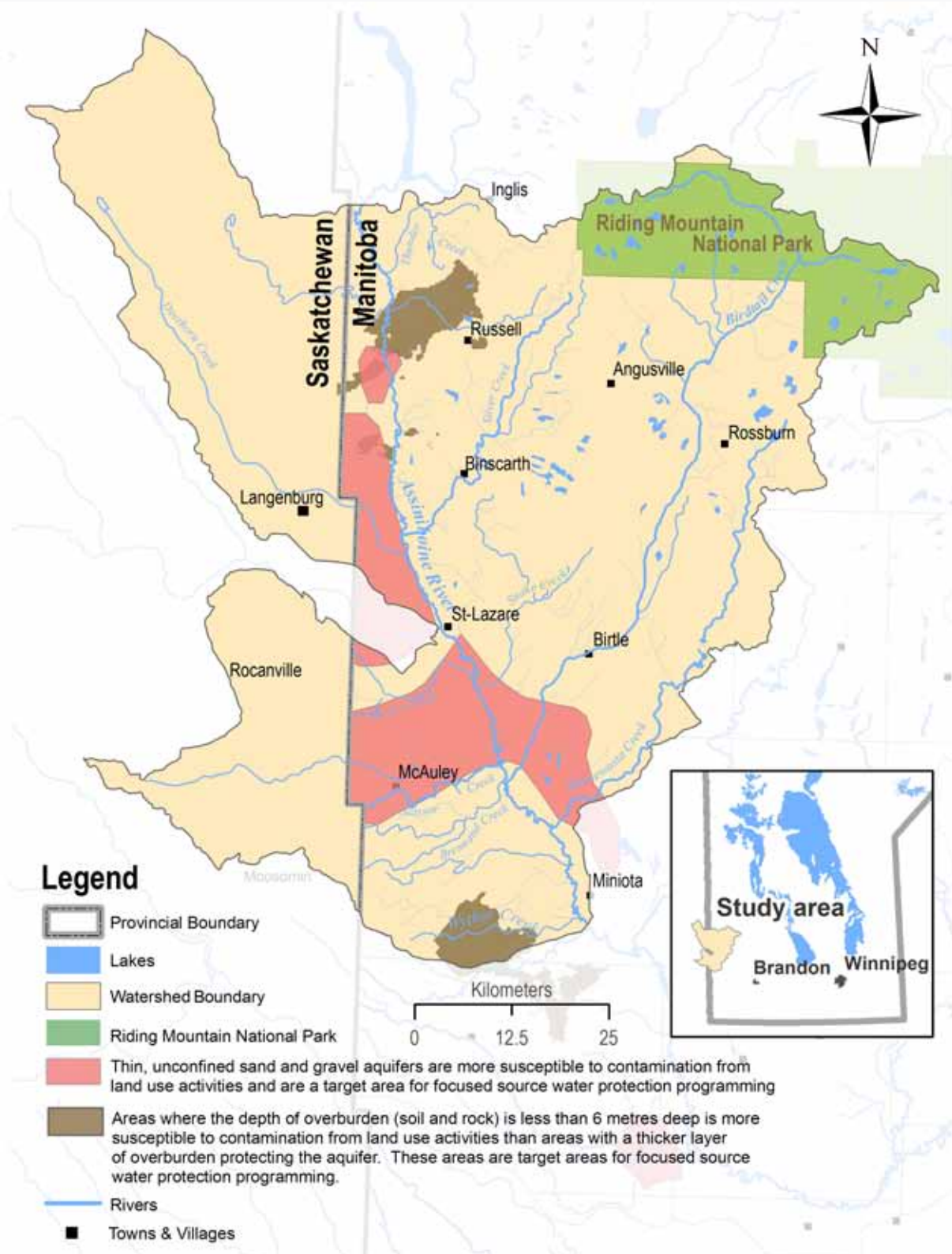


Figure 7: Areas to target Groundwater Management Programming in the Assiniboine-Birdtail Watershed

IMPLEMENTATION PLAN

In the introduction, the IWMP was compared to a roadmap for the watershed, laying out where we want to go (the goals and objectives) and how we plan to get there (the actions). In this section, the focus is on the actions that need to be completed in order to reach our goals and objectives. The actions in this section are grouped and colour coded according to the goal(s) the action will help accomplish. The implementation plan also includes a measure of success for each action, partner agencies that can assist in implementation, a target timeframe to complete the action, specific target areas for the action, and a reference to the specific objective(s) that each action will accomplish.

A peaceful Minnewasta Creek



PLANNING PROCESS AND TIMELINE

Action	Measure of Success	Potential Partners	Timeframe	Target Area(s)
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Objective 1A:

1.	Establish a surface water management committee that will conduct focus group meetings with local landowners, municipal councils, and the provincial government in order to gather data relating to flooding, erosion and other pressure points within the watershed	Report submitted to the Water Planning Authority	Conservation Districts, Municipalities and Landowners		Thunder, Silver and Minnewasta Creeks
2.	Develop criteria to assess and prioritize management strategies that will take into account ecological and economic constraints	Completion and adoption of criteria	Conservation Districts		Thunder, Silver and Minnewasta Creeks

Objective 1B:

1.	Reduce peak flows through water retention initiatives	Number of initiatives completed and observed reduction of peak flows	Conservation Districts, Municipalities and Landowners	Ongoing	Thunder, Silver and Minnewasta Creeks
2.	Promote efforts to increase soil organic matter by implementing management strategies such as zero tillage and permanent forage cover on sensitive lands	Number of farms and acres influenced; Increases in soil carbon; Number of attempts to support landowners	Conservation Districts, Manitoba Agriculture, Food and Rural Initiatives and other conservation groups	Ongoing	Thunder, Silver and Minnewasta Creeks
3.	Coordinate monthly meetings to review and discuss the status of drainage applications with key participants that include the local Water Resources Officer from Manitoba Water Stewardship (Water Control Works and Drainage Licensing) and representatives from the local municipalities and conservation districts	Monthly Meetings	Conservation Districts, and Manitoba Water Stewardship	Ongoing	Watershed wide
4.	Ensure that the Shellmouth Reservoir Regulation Liaison Committee operates and communicates effectively through regular meetings or correspondence and that all members of the committee provide input into the operation of the Shellmouth Reservoir	Increased dialogue	Conservation Districts, and Manitoba Water Stewardship	Ongoing	Shellmouth Reservoir

Action	Measure of Success	Potential Partners	Timeframe	Target Area(s)
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Objective 2A:

1.	Research and promote Beneficial Management Practices (BMPs) that reduce nutrient loading such as riparian buffers or grassed filter strips in partnership with stakeholders	Number of advertising or marketing events throughout the year	Conservation Districts, Manitoba Agriculture, Food and Rural Initiatives and Ducks Unlimited Canada	Ongoing	Watershed Wide
2.	Request to the Province that all Order 1-7 watercourses within the Assiniboine-Birdtail watershed receive vulnerable status under the Nutrient Management Regulation	Change in regulations	Conservation Districts and Manitoba Water Stewardship	2012	All Order 1-7 watercourses
3.	Conduct a riparian assessment to identify and rank point sources of nutrient loading	List of projects and implementation schedule	Conservation Districts, Manitoba Agriculture, Food and Rural Initiatives , Agriculture Canada and Landowners	Ongoing	Watershed wide
4.	Conduct a review of the water quality monitoring network and any issues and strategies with key participants that include Manitoba Water Stewardship (Water Science and Management) and the conservation districts	Meetings to determine scope of water quality testing within the watershed	Conservation Districts and Manitoba Water Stewardship	2012	Watershed wide

Objective 2B:

1.	Conduct a riparian assessment to identify and rank point sources of sediment contribution	List of potential projects for the CD to target	Conservation Districts and Municipalities	2012-2015	Watershed Wide
2.	Implement sediment control measures such as backflood structures , grassed waterways, sediment traps and perennial cover programs	Number of projects completed	Conservation Districts and Municipalities	Ongoing	Sediment contribution points

Objective 2C:

1.	Gather and communicate relevant current information regarding potential sources of pollution	Library of information available to all Manitobans	Government of Manitoba	Ongoing	Province wide
2.	Develop a communications plan to increase the awareness of potential sources of pollution	Public uptake	Conservation Districts	Ongoing	Watershed wide

Action	Measure of Success	Potential Partners	Timeframe	Target Area(s)
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Objective 3A:

1.	Complete watershed inventories of wetlands, riparian areas and other aquatic habitats and barriers to fish passage in conjunction with conservation agencies	List of ranked projects for mitigation work	Conservation Districts, Manitoba Water Stewardship, Department of Oceans and Fisheries Canada and Landowners	2010-2015	Watershed Wide
2.	Fund wetlands conservation easement programs in conjunction with conservation agencies	Acres secured	Conservation Districts and other Conservation Agencies	Ongoing	Wetlands
3.	Demonstrate alternative land uses that would discourage the drainage of wetlands	Number of demonstration projects	Conservation Districts	2010 - 2015	Wetlands
4.	Protect riparian areas and other aquatic habitats through incentive programming	Acres of area protected	Conservation Districts and Manitoba Water Stewardship	Ongoing	Riparian area
5.	Conduct an instream flow needs assessment on the Birdtail Creek	Completed assessment with recommendations	Manitoba Water Stewardship	2010 - 2015	Birdtail Creek

Objective 3B:

1.	Identify all remaining native grasslands not protected under easement agreements	Map of existing sites needing protection	Conservation Districts, Manitoba Habitat Heritage Corporation, Nature Conservancy of Canada and Livestock Producers	2012	Native grasslands
2.	Develop native grassland easement projects with conservation agencies	Percentage of available sites remaining to be secured	Conservation Districts, Manitoba Habitat Heritage Corporation, Nature Conservancy of Canada and Livestock Producers	Ongoing	Native Grasslands
3.	Identify and protect critical wildlife habitat through incentive programming and easements	Number of sites protected	Conservation Districts, Manitoba Conservation and other habitat protection organizations	Ongoing	Critical Wildlife Habitat

Objective 3C:

1.	Create a proposal to restore forest cover on undeveloped road allowances	Proposal accepted by municipalities	Conservation Districts and Municipalities	2013	Undeveloped road allowances
2.	Develop a conservation corridor policy with municipal partners	Adoption of policy	Conservation Districts and Municipalities	2013	Undeveloped road allowances
3.	Develop regulations and permit system for the removal of woodlots	100% landowner compliance	Government of Manitoba and Conservation Districts	2015	Province wide

Action	Measure of Success	Potential Partners	Timeframe	Target Area(s)
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Objective 4A:

1.	Establish a Drinking Water Committee to develop and implement Source Water Protection Plans	Completion of plans	Conservation Districts, Municipalities and Manitoba Water Stewardship	Initiate 2012	Public water sources
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Objective 4B:

1.	Create a digital map of all semi-public water sources in the watershed	Completion of map	Conservation Districts, Municipalities and Manitoba Water Stewardship	2012	Semi-public water sources
2.	Identify and rank threats to semi-public water sources and prioritize mitigation efforts	Complete assessment of all semi-public water sources	Conservation Districts, Municipalities and Manitoba Water Stewardship	2013	Semi-public water sources

Objective 4C:

1.	Promote Beneficial Management Practices (BMPs) that address well head protection	Identify and improve 10% of private wells and distribute pamphlet to all households	Conservation Districts, Municipalities and Manitoba Water Stewardship	2012	Private wells
2.	Provide incentive programs to landowners to protect private water sources	Implement programs at 10% of private wells	Conservation Districts	Ongoing	Private wells
3.	Conduct a watershed-wide well water testing day	25% of all private wells tested	Conservation Districts	Biennially	Private wells

Objective 5A:

1.	Commission a ground water study to identify recharge areas	Map of recharge areas	Manitoba Water Stewardship	2010 - 2020	Watershed wide
2.	Create digital maps depicting withdrawal areas and rates	Map of withdrawal areas and rates	Manitoba Water Stewardship	2010 - 2013	Watershed wide
3.	Create educational campaigns and incentive programs that encourage water conservation	Number of materials distributed and related inquiries	Conservation Districts	Ongoing	Watershed wide



Thunder Creek

INTEGRATED WATERSHED MANAGEMENT PLAN SUMMARY

The Assiniboine-Birdtail Integrated Watershed Management Plan recommends focusing efforts on different parts of the watershed based on the location of potentially vulnerable sand and gravel aquifers and areas of public concern. A summary of all target areas is provided here to illustrate:

- where to focus incentive-based programming throughout the watershed;
- areas to consider potentially sensitive when planning future development; and,
- the connection between land activities and source water protection.

SOURCE WATER PROTECTION TARGET AREAS

Drinking water quality was a major concern cited by watershed residents during the public consultation process. The public drinking water source at St-Lazare is the only public source in the watershed that relies upon surface water and has been under a Boil Water Advisory since December 2005. Boil Water Advisories are issued for a water system or a water source by a Medical Officer of Health (Manitoba Health) due to a confirmed or suspected bacteriological quality problem. In order to safeguard the drinking water sources in the watershed, those sources with a higher potential for contamination, or those that may already be contaminated, will be given the priority. Actions will include:

1. Establish a Drinking Water Committee to develop and implement Source Water Protection Plans
2. Promote Beneficial Management Practices (BMPs) that address well head protection
3. Provide incentive programs to landowners to protect private drinking water sources
4. Conduct a watershed-wide well water testing day

EVALUATION AND REPORTING

An IWMP is not meant to be complete once the plan is printed. This integrated watershed management plan is meant to guide conservation and resource management initiatives in the watershed over the next 10 years. During this time, socioeconomic and environmental circumstances will certainly change and the needs and priorities of watershed residents and stakeholders will change as well. As such, this IWMP is meant to be adaptive, which means that it is not written in stone and the Water Planning Authority, with the advice of the WPAT, has the ability to change objectives as needed, along with the actions and policies recommended to meet these objectives.

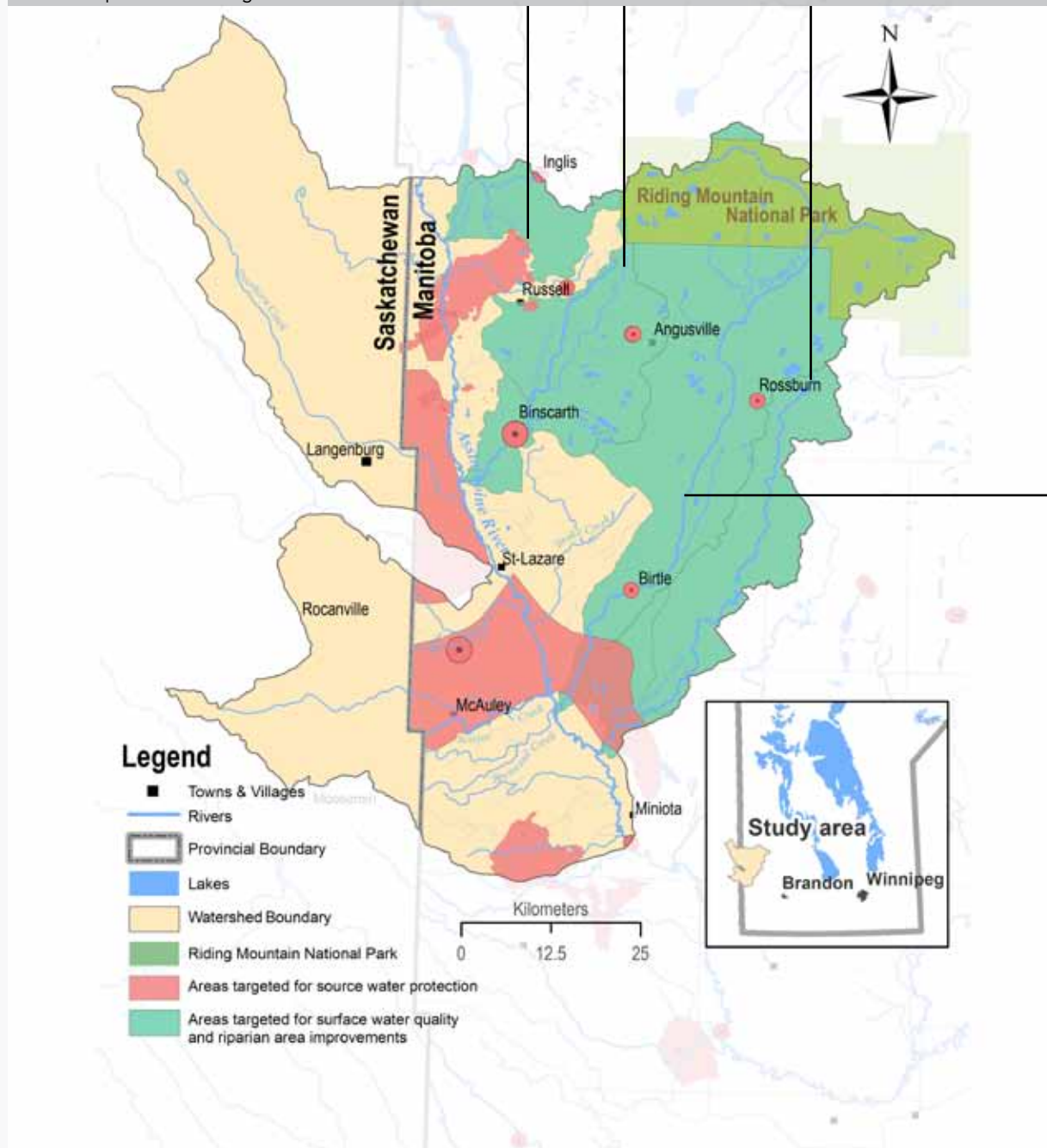
Our success in implementation will be evaluated primarily by the progress made towards meeting our stated objectives. The secondary means of evaluating progress will be meeting the measure of success listed for each individual action. In this manner, if the actions we take do not allow us to reach our objectives we may need to revise actions or add new ones, or alter our objectives to be more realistic.

Reports on plan implementation will be produced every two years in order to update stakeholders and watershed residents on the progress towards reaching our objectives from the IWMP. In addition to biennial updates, this watershed management plan will undergo a full, comprehensive review in 2014, halfway through its intended lifespan.

Thunder, Silver and Minnewasta Creek Target Areas

Due to significant erosion noted during public consultations and through site visits, these sub-watersheds will receive targeted actions such as:

1. Establish a surface water management committee that will conduct focus group meetings with local landowners, municipal councils, and the provincial government in order to gather data related to flooding, erosion and other pressure points within the watershed
2. Reduce peak flows through water retention initiatives



Birdtail Creek Target Area

The Birdtail Creek sub-watershed provides an excellent opportunity to focus efforts on surface water quality and quantity management. Actions such as:

1. Research, promote and deliver BMPs that reduce nutrient loading such as riparian buffers or grassed filter strips in partnership with stakeholders
2. Implement sediment control measures such as backflow structures, grassed waterways, sediment traps and perennial cover programs

Figure 8: The Assiniboine-Birdtail Integrated Watershed Management Plan recommends focusing efforts to different parts of the watershed based on susceptibility to contamination and areas of public concern.

APENDIX A: Watershed Planning Advisory Team - Invite List

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

MTS (Manitoba Telephone)	RM of Russell	Tanner's Crossing Planning District
National Farmers Union	RM of Saskatchewan	Town of Birtle
Nature Conservancy of Canada	RM of Shell River	Town of Erickson
Neepawa & Area Planning District	RM of Shoal Lake	Town of Hamiota
Oak River Ag Society	RM of Sifton	Town of Minnedosa
Oak River Colony	RM of Silver Creek	Town of Rapid City
Oakburn Game and Fish	RM of Strathclair	Town of Rivers
Onanole Fish & Wildlife	RM of Swan River	Town of Roblin
Organic Producers Association	RM of Wallace	Town of Rossburn
Otter Lake Cottage Owners Association	RM of Whitehead	Town of Russell
Park West School Division	RM of Woodworth	Town of Shoal Lake
Parks Canada-Riding Mountain National Park	Roblin & District CDC	Trans Canada Pipeline
Parks Canada-Riding Mountain National Park	Roblin Ag Society	TransCanada West
Pelly Trail CDC	Roblin Chamber of Commerce	Tri-Roads Planning District
Plainview Colony	Roblin Planning District	University of Manitoba (NRI)
Plainview Colony School	Rolling River First Nation	University of Winnipeg Environmental Science
Prairie Fruit Growers Association	Rolling River School Division	Upper Assiniboine River Conservation District
Prairie Lake Lodge	Rosburn & District CDC	Valley Inc/Minnedosa & Area CDC
Prairie West Recreation	Rosburn Community Development Corp.	Valley Recreation District
Pyott's Campground	Rosburn Planning	Vegetable Growers Association of Manitoba
Rapid City & District Wildlife Association	Rosburn Recreation Commission	Village of Binscarth
Rapid City Ag Society	Rossmann Lake Game and Fish	Village of Elkhorn
Rapid City Cattle Producers	Russell Ag Society	Village of St. Lazare
Red River Community College	Russell Chamber of Commerce	Virden Ag Society
Ricker's Campground	Russell Game and Fish	Virden Area Wildlife Association
Riding Mountain Biosphere Reserve	San Clara Metis Association	Virden Economic Development
Riding Mountain Landowners Association	Sandy Lake Cottage Owners Association	Wasagaming Chamber of Commerce
Riding Mountain Liaison Committee	Sandy Lake Game & Fish	Wasagaming Tenants' Association
Rivers Ag Society	Sandy Lake Rec Association	Water Ski Manitoba
Rivers Game & Fish	Saskatchewan Watershed Authority	Water Wisdom
Rivers West	SAVED	Waywayseecappo First Nation
Rivers-Daly CDC	Shellmouth Community	West Souris River Conservation District
RM of Archie	Shoal Lake Ag Society	Wolf Creek Conservation
RM of Birtle	Shoal Lake Chamber of Commerce	Woodlot Association of Manitoba
RM of Blanshard	Shoal Lake Economic Development	Woodworth CDC
RM of Clanwilliam	Shoal Lake Enhancement Corp	Woodworth Conservation Group
RM of Daly	Shoal Lake Planning	Woodworth Ducks Unlimited
RM of Ellice	Silver Beach Cottage Owner's Association	Woodworth Game & Fishing Association
RM of Grandview	Sioux Valley Dakota Nation	Woodworth Soil Association
RM of Hamiota	Snake Creek Wildlife Association	Yellowhead REDA
RM of Harrison	South Ditch Lake Recreational Co-op Limited	
RM of Hillsburg	South Riding Mountain Planning District	
RM of Minnitiota	South Riding Mountain Wildlife Association	
RM of Minto	Southwest Regional Development Corp	
RM of Odanah	Starbuck Marketing Club	
RM of Park	Strathclair Ag Society	
RM of Park (North)	Strathclair CDC	
RM of Pipestone		
RM of Rosedale		
RM of Rossburn		

APENDIX B: Summary of Public Input

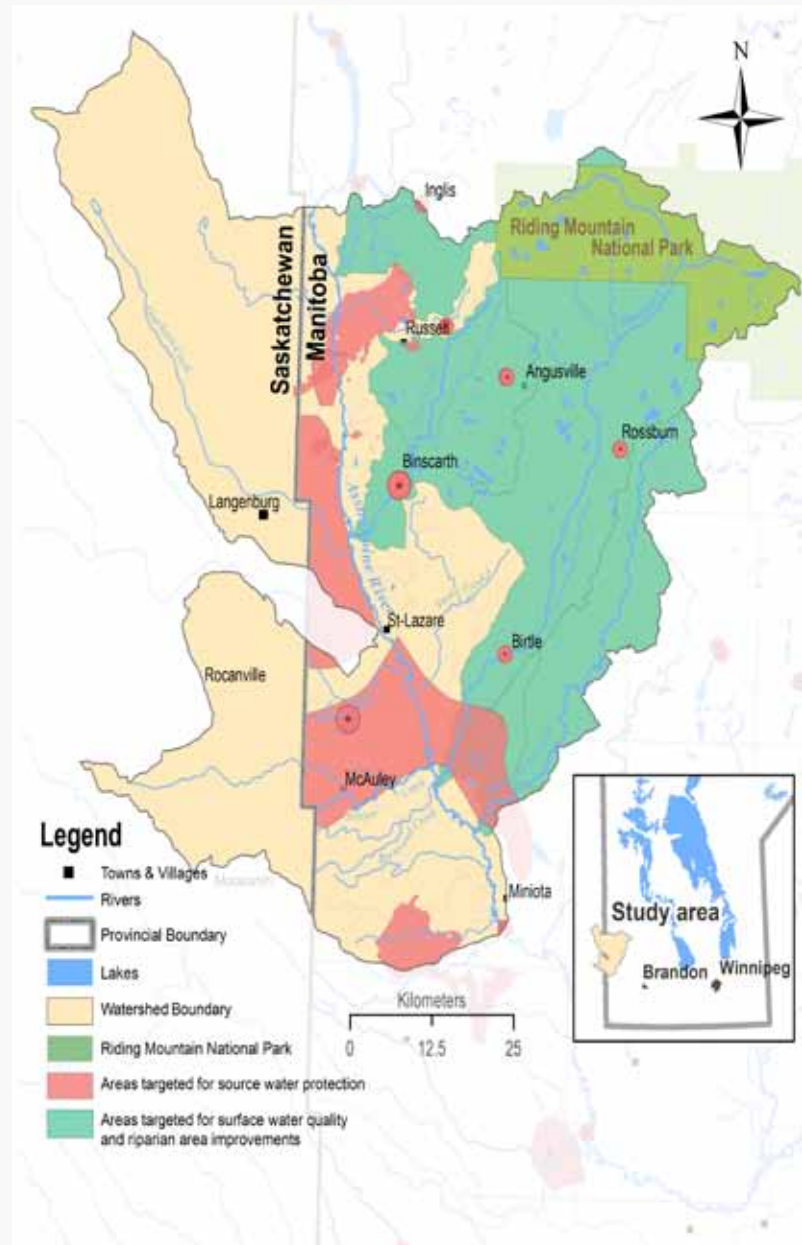
ASSINIBOINE-BIRDTAIL WATERSHED (05ME) - PUBLIC CONCERNS

In January 2006 the Lake of the Prairies (LPCD) & Upper Assiniboine River Conservation District (UARCD) were jointly designated as the Watershed Planning Authority (WPA) for watershed 05ME (Figure 1) by the Province of Manitoba. This watershed plan was initiated as part of a larger planning initiative for the Assiniboine River which also included the Shell River-05MD, Arrow-Oak-05MG, and Little Saskatchewan River-05MF. Following the collection of data and the compilation of a State of the Watershed (SOW) Report, a Project Management Team (PMT) was created specifically for each of the four watersheds in order to provide more local input and guidance on planning for each of the individual watersheds.

The next step in the development of the IWMP was to hold public forums to explore the water concerns of local residents and other stakeholders within the watershed. The issues identified at these public forums will provide direction to the Assiniboine-Birdtail PMT on the direction and focus of the Integrated Watershed Management Plan. Seven meetings were held across the watershed with the goal of engaging residents and soliciting a range of public issues. The meetings were held in November 2008 at: Birtle, St. Lazare, Rosburn, Angusville, McAuley, Binscarth, and Russell.

At each of the public meetings the attendees were asked to provide their top three concerns related to water within the Assiniboine-Birdtail Watershed. Attendees were also asked to contribute ideas on how their issues could be resolved and, if the issue was successfully resolved, what that success would look like in 25 years. Participants at each of these public open houses were also asked to form groups, discuss the issues in the watershed, and form a collective list of issues and solutions for the watershed. This was done to allow for discussions on issues and to obtain more general concerns within the watershed as opposed to very site specific issues garnered through individual responses. All of the individual and group responses were collected and compiled in a digital format, word for word, by members of the PMT. The complete list of public and group concerns is available on the Assiniboine IWMP website at <http://www.uarcd.com/IWMP.htm>.

In order to analyze the individual and group responses, the public responses were categorized into a primary issue category (e.g. surface water quality), a sub-category if enough information was provided (e.g. nutrients), and a target location if provided (e.g. Silver Creek). This methodology required some subjectivity in the categorization process but concerted efforts were made to capture the essence of the issues. In the event that several concerns were addressed in one issue statement, the first issue mentioned was taken as the category, or the issue for which solutions were provided was taken as the dominant concern.



The following is a summary of what 30 watershed residents told us.

MAIN CATEGORIZATION OF ISSUES

TOP PRIORITY ISSUES – INDIVIDUAL RESPONSES (N=30)

1. 7 people, representing 23% of respondents, cited surface water management (i.e. drainage) as their number one concern
2. 11 people, representing 37% of respondents, cited surface water quality as their number one concern
3. 4 people, representing 13% of respondents, cited ground water as their number one concern
4. 4 people, representing 13% of respondents, cited natural areas (i.e. wetlands, riparian zones and wildlife) as their number one concern
5. 2 people, representing about 7% of respondents, cited drinking water as their number one concern
6. 2 people, representing about 7% of respondents, cited soils as their number one concern

TOP PRIORITY ISSUES – GROUP RESPONSES (N=5):

1. 3 Groups, representing 44% of responses, cited surface water management as their number one concern
2. 1 Group, representing 20% of responses, cited natural areas as their number one concern
3. 1 Group, representing 20% of responses, cited surface water quality as their number one concern

In order to better incorporate all of the public input and priorities, a weighting system was used which provides more relative importance (weight) to first and second priority issues (i.e. 1st priority = 3 points, 2nd priority = 2 points, 3rd priority = 1 points). **Figure 1** shows the results from the individual input based on this weighting system and **Figure 2** shows the results from the group input based on the same weighting system.

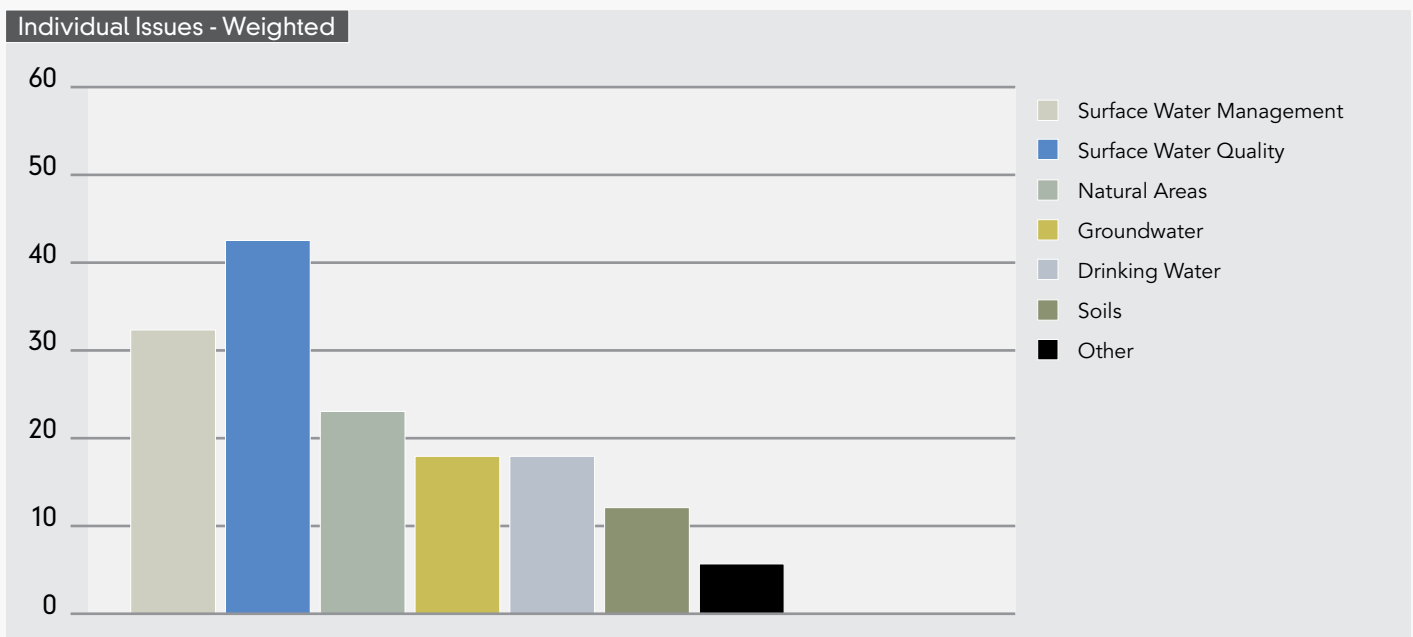


Figure i: Weighted ranking of individual issues based on priority level

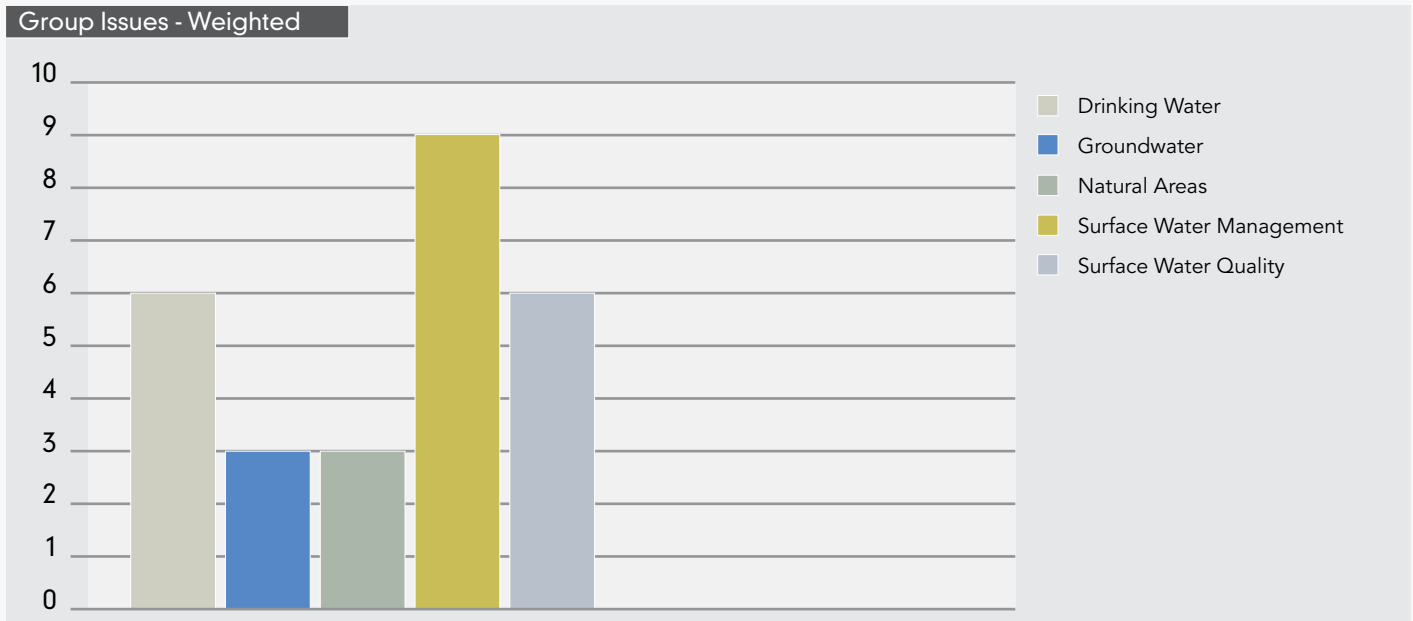


Figure i: Weighted ranking of individual issues based on priority level

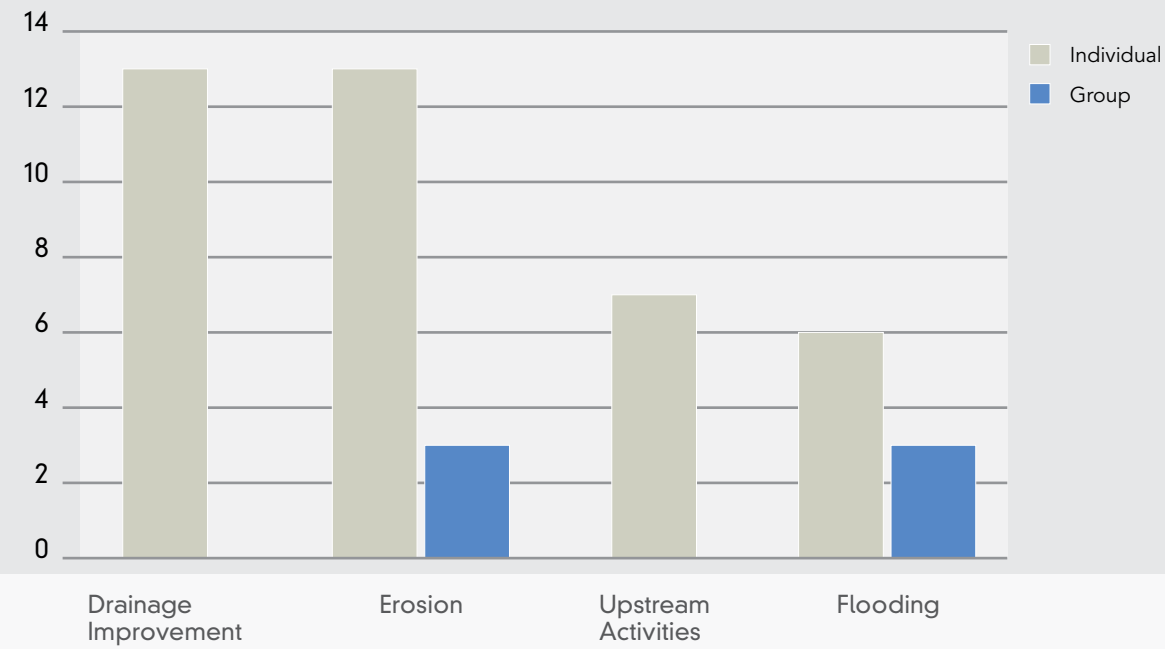
The results from the individual and group results are similar, clearly placing Surface Water Management as the most important issue to local residents. The top five local priorities were surface water quality, surface water management, threats to natural areas and ground water, and drinking water; these five issues received 89% of the weighted support from individuals and 100% of the weighted support from groups.



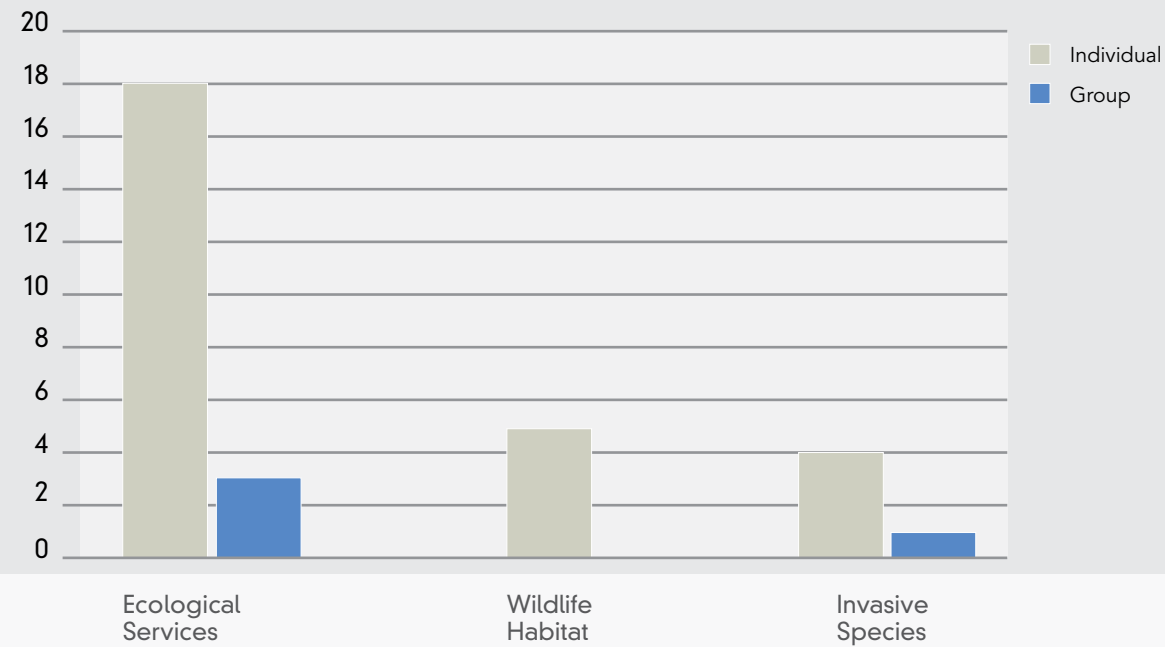
SUB-CATEGORIZATION OF ISSUES

In order to provide more specific direction for the integrated watershed management plan the four highest priority areas of concern were further broken down into sub-categories. These sub-categories are outlined here in order to allow for a better understanding of the nature of the concerns and will, therefore, assist in the design of better and more relevant solutions. A glossary, explaining each of the sub-categories can be found at the end of this document.

Surface Water Management - Sub Categories



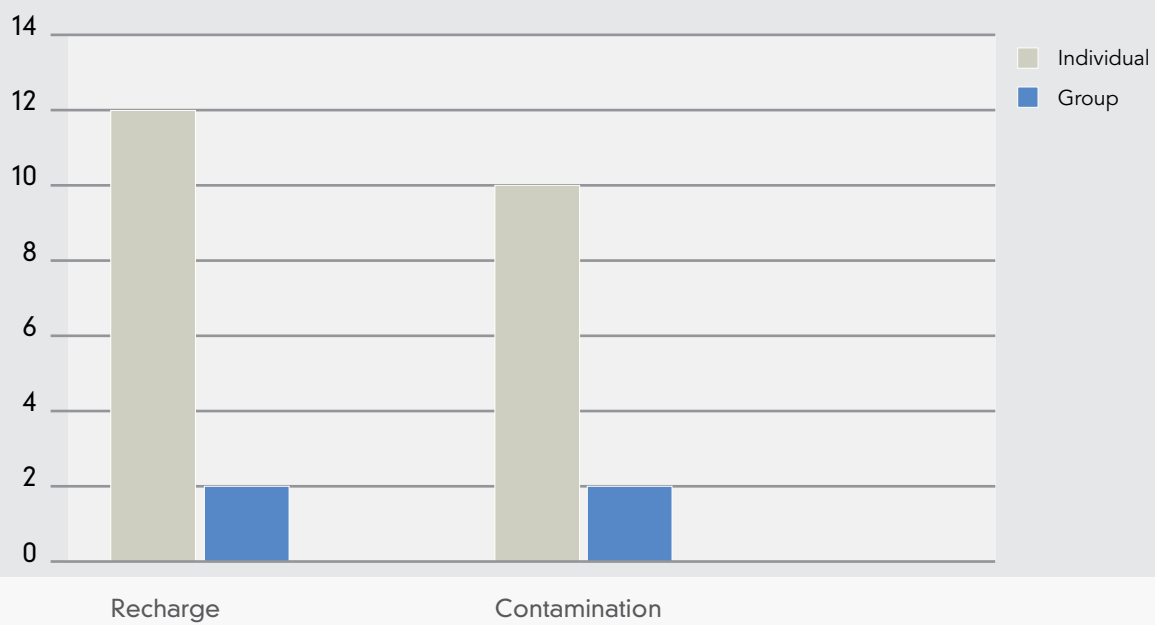
Natural Areas - Sub Categories



Drinking Water Sub Categories



Groundwater Sub Categories



TARGET LOCATIONS

SURFACE WATER MANAGEMENT

There were a number of key areas identified for surface water management concerns. These included: flooding and erosion in the Thunder Creek, Silver Creek, and Minnewasta Creek sub-districts. The PMT also recognized the need to conduct a more thorough evaluation of the watersheds water flow bottlenecks and erosion 'hotspots'.

SURFACE WATER QUALITY

Key areas identified for surface water quality concerns include lower reaches of the Birdtail River Watershed, Silver Creek Watershed and Silver Beach recreational areas. Local concerns helped focus attention on these areas because of the recreational use of these waters.

NATURAL AREAS

Road allowances were identified as an important natural area. Numerous respondents called for the preservation of natural habitat on undeveloped road allowances, and the restoration of road allowances which have been developed or cleared by neighbouring landowners back into natural habitat states.

GROUNDWATER QUALITY

The key target area for groundwater quality identified by respondents was source water zones as mapped in the drinking water section of the State of the Watershed Report.

SUMMARY

This document was prepared for the benefit of the PMT, all watershed stakeholders, and the public at large in order to provide an overview of the concerns voiced by residents of the Assiniboine-Birdtail Watershed. The five key issues in the Assiniboine-Birdtail Watershed, as identified by the public, are: surface water management, surface water quality, natural areas, safeguarding drinking water, and groundwater quality. The breakdown and analysis of the public input will be used by the PMT, in conjunction with the technical and scientific input, in the preparation of the Assiniboine-Birdtail IWMP.

GLOSSARY

MAIN CATEGORIES

Main categories were established based on the statements provided to the PMT by the public. The PMT used the following definitions when categorizing comments into main categories.

DRINKING WATER

Water fit for human consumption.

GROUNDWATER

Water held in soil or rock.

NATURAL AREAS

A generic term referring to wetlands, riparian areas, woodlands, wildlife habitat and parks. This term does not necessarily refer to water but may refer to areas that are typically seen as beneficial to water quality.

SOILS

The impact of soil on waterways and lakes which primarily refers to soil and shoreline erosion.

SURFACE WATER MANAGEMENT

The control of surface water, primarily runoff, through the drainage network.

SURFACE WATER QUALITY

The health of any water body on the surface of the land including water runoff, creeks, rivers, wetlands and lakes.

PUBLIC WATER SOURCE

A surface or groundwater source that provides water to a system with 15 or more service connections.

SUB-CATEGORIES

Sub-categories were established based on the statements provided to the PMT by the public. The PMT used the following definitions when categorizing comments into sub-categories.

DRAINAGE IMPROVEMENT

The construction of new drains and the general up-keep and cleaning of existing drains to allow swift flow of water.

DRINKING WATER QUANTITY

The amount of water that is fit for human consumption.

DRINKING WATER SOURCE PROTECTION

Protecting the sources of drinking water.

ECOLOGICAL SERVICES

The benefits arising from the ecological functions of healthy ecosystems.

EROSION

The removal of soil by water action.

FLOODING

Excess water found on the land for extended periods of time.

INVASIVE SPECIES

Non-native species that adversely affect the habitats they invade.

GROUNDWATER CONTAMINATION

Groundwater pollution caused by chemicals, pathogens and other contaminants.

GROUNDWATER RECHARGE

A hydrologic process where water moves downward from surface water to groundwater.

UPSTREAM ACTIVITIES

Those activities occurring upstream of a particular location that may have a negative impact on downstream areas.

WATER RETENTION

An area of land designated to be a water holding area which can include but is not limited to wetlands.

WILDLIFE HABITAT

An ecological or environmental area that is inhabited by a particular wild animal or plant species.



Assiniboine-Birdtail
Integrated Watershed Management Plan