

La Salle River Integrated Watershed Management Plan

DRAFT – October 21, 2009

This is a DRAFT document for review by the Water Planning Authority for the La Salle River Watershed. Following their approval, it will be forwarded to Manitoba Water Stewardship for final review and provincial approval.



ACKNOWLEDGEMENTS

The La Salle Redboine Conservation District would like to gratefully acknowledge and thank all of its key partners, member municipalities, the watershed planning advisory team and local stakeholders for their support, input and participation in developing the La Salle River Integrated Watershed Management Plan. This initiative would have not been possible without their valuable contributions.



Special thanks to the members of the Project Management Team which included Rodney Burns, Roland Rasmussen and Keith Wallcraft from the La Salle Redboine Conservation District, and Patrick Watson and Jonathan Wiens from Manitoba Water Stewardship. Additional thanks go to the sub-district committee members of the La Salle Redboine Conservation District, the previous manager of the Conservation District, David Huck, and Manitoba Water Stewardship planner, Barry Oswald, all of whom were instrumental in initiating and moving the planning process along.

EXECUTIVE SUMMARY

In 2006, the La Salle Redboine Conservation District started an Integrated Watershed Management Plan for the La Salle River Watershed. Considering information on the characteristics of the watershed and input received by local stakeholders, the watershed planning advisory team developed the following vision and goals for the La Salle River Watershed.

VISION

“We want to have clean, safe and abundant water that sustains our vibrant local communities and a system of coordinated surface water management that respects current water users, agriculture, downstream residents, and aquatic ecosystems.”

GOAL #1

To improve the state of surface water management in terms of alleviating downstream flooding and ensuring there is sufficient water available during dry periods

Drainage works and activities will be better coordinated by establishing a committee to review and establish surface water management policies for the two unique regions of the watershed – Red River Valley and Lower Assiniboine Delta.

The maintenance program for the Provincial Waterways infrastructure will improve by: involving the La Salle Redboine CD in the development and review of the annual maintenance schedule and 5-year work plans; assessing all licensed water control structures; and developing a detailed surface water management pilot project (sub-watershed drainage plan).

The drainage licensing process will improve by: involving the La Salle Redboine CD in the review process for all new drain and drainage upgrade applications; providing all watershed residents with information on the process of applying for drainage works; and ensuring that Manitoba Water Stewardship – Water Resource Officers are widely available to investigate drainage works, distribute applications for review and enforce conditions applied to approved licenses.

To alleviate downstream flooding, enhance wildlife habitat and protect against flooding, water control / retention projects will be developed in the Central La Salle River sub-district, ring-dykes will be built to protect residential properties, incentives will be made available to protect and enhance wetlands, and options to mitigate issues related to flooding at the Elm Creek Channel will be further assessed.

Digital maps of flood-prone and spring / summer flooding areas will be developed to assist with targeting the construction of water control / retention projects, setting priorities for infrastructure maintenance, and in making sustainable land development and drainage project application decisions.

GOAL #2

To protect and improve water quality

Water quality has declined significantly in the La Salle River Watershed since the early 1970's.

Point and non-point nutrient loading and a relatively slow moving river system have exacerbated the already naturally high nutrient levels.

Financial and technical incentives and assistance will be available for landowners to implement water quality beneficial management practices and assess the environmental risk of their operations.

Scientific research into finding better options for the disposal of nutrient-rich municipal lagoon wastewater and the implementation of new wastewater management technologies will be encouraged, targets for nutrient reductions will be developed, and the long-term water quality monitoring program will continue.

Drinking water sources will be better protected through the: establishment of a Source Water Protection Committee, targeted water protection programming and activities in source water protection zones, sealing of abandoned wells and wellhead protection initiatives, and the incorporation of municipal development plan zoning by-laws to restrict and manage certain activities that could pose a threat to drinking water sources.

GOAL #3

To improve the health of the rivers and riparian areas

In a recent riparian assessment conducted along the main stem and tributaries of the La Salle River, 119 potential rehabilitation sites were identified, which clearly indicates the need for better river management and riparian protection, a rehabilitation work plan and a new way of looking at the way we use our land and waterways in this watershed.

In order to secure existing critical riparian areas and rehabilitate degraded and impacted riparian areas, financial and technical assistance programs will be offered to landowners along the main rivers and tributaries. An Ecological Goods and Services type program, specifically targeting critical riparian areas, will be part of the efforts to conserve and protect existing critical riparian areas.

Municipalities will play a role in protecting and managing river and riparian areas utilizing zoning by-laws regarding development in riparian areas.

Communities will be encouraged to participate in river clean-up initiatives and be provided with information on how to eliminate or manage nuisance and invasive species.

GOAL #4

To increase public participation in watershed stewardship activities

Improving watershed education will help people better understand how land use activities impact water quality and quantity in the watershed. Building capacity with the public, in schools, with local government and other organizations as well as encouraging projects like road-side interpretive sites will all help to increase knowledge and improve watershed health over the long-term.

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1.0 INTRODUCTION

1.1 Watershed

A watershed is a topographically defined area of land where water flows through a network of waterways and ends up at a common downstream point such as a large river or lake. It is a diverse environment of living (i.e. plants, animals, bugs, fish, etc.) and non-living (i.e. air, water, soil, temperature, etc.) things all connected by a common water resource.

The land and water use activities and developments of the local watershed residents have a tremendous influence on the health of the watershed, just as the watershed has an influence on the health of its residents. Many things in a watershed are in constant and dependent interaction with each other and when a disruptive action or change occurs, there are inevitable consequences that occur elsewhere in the watershed.

1.2 Integrated Watershed Management Planning

Integrated Watershed Management Planning is a comprehensive, multi-resource planning process that brings together watershed stakeholders who identify watershed issues and concerns, and work together to develop and implement a watershed management plan that addresses issues and improved the overall health and sustainability of the watershed.

1.3 Purpose

The purpose of the La Salle River Integrated Watershed Management Plan (IWMP) is to improve the health and sustainability of the watershed by identifying watershed issues, recommending actions to address the issues, and developing stakeholder buy-in and cooperation to successfully implement the plan.

1.4 Watershed Management Principles

The following principles were essential in provided general direction to the Watershed Planning Advisory Team and all stakeholders throughout the planning process, providing a base understanding on the connections and inter-relationships within a watershed, and assisting with the development of management strategies 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
- Watershed planning process needs to be community-based, transparent and inclusive and respectful of all stakeholders
- Management strategies need to be adaptive to changing conditions and situations
- Decisions need to be made considering the best available science and local knowledge and experience

- Monitoring, research and evaluation are essential parts of watershed 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

1.5 Planning Process

The planning process used to develop the La Salle River IWMP was as follows:

- March 2006 – La Salle Redboine Conservation District designated the Water Planning Authority for the La Salle River Watershed
- May 2006 – Completed a Terms of Reference
- June 2006 – January 2007– Prepared the State of the Watershed Report
- March 2007 – Held first round of public input meetings to identify priority issues and solutions
- October 2007 – Completed first Draft Plan
- November 2007 – Watershed Planning Advisory Team reviewed Draft Plan
- June 2008 – Held second round of public input meetings
- October 2008 – Held meeting with Rural Municipalities re: drainage infrastructure
- February 2009 – Completed second Draft Plan
- April 2009 – Final review of second Draft Plan
- July 2009 – Submitted Final Plan for Provincial approval
- Present – Implementation

Appendix A lists all of the members of the Watershed Planning Advisory Team.

1.6 Land Use Planning

Land use planning addresses physical, economic and social development within a defined municipality or planning district. Land use planning is long range, comprehensive planning that provides direction for development and implementation of specific strategies. Land use planning responds to the requirements of *The Planning Act*, providing policies based upon community goals and objectives for the conservation and use of community resources. Land use planning promotes development practices, which are sustainable and compatible with surrounding land use. Land use planning involves collaboration between provincial departments, local governments and their citizens, and is an essential part of building healthy, prosperous and sustainable communities.

A development plan is a land use planning by-law adopted by a planning authority (Planning District or Municipality) that outlines the long-term vision and goals of a community. The development plan is used to guide development within the planning area of a Municipality or Planning District. Planning districts and municipalities are the local planning authorities responsible for the development of land and resources in their designated planning area. Using the Provincial Land Use Policies, *The Planning Act*, and working together with Manitoba Intergovernmental Affairs, the local planning authority prepares a development plan and associated zoning by-laws that define and regulate certain uses and activities.

2.0 CHARACTERISTICS OF THE LA SALLE RIVER WATERSHED

The following section provides an overview of the La Salle River Watershed. All of the information was referenced from the La Salle River Watershed – State of the Watershed Report, May 2007. The full report can be viewed online at www.lasalledredboine.com or at the La Salle Redboine Conservation District office.

2.1 Location, Size and Population

The La Salle River Watershed is approximately 2,400 km² in size and has a population of approximately 14,000.

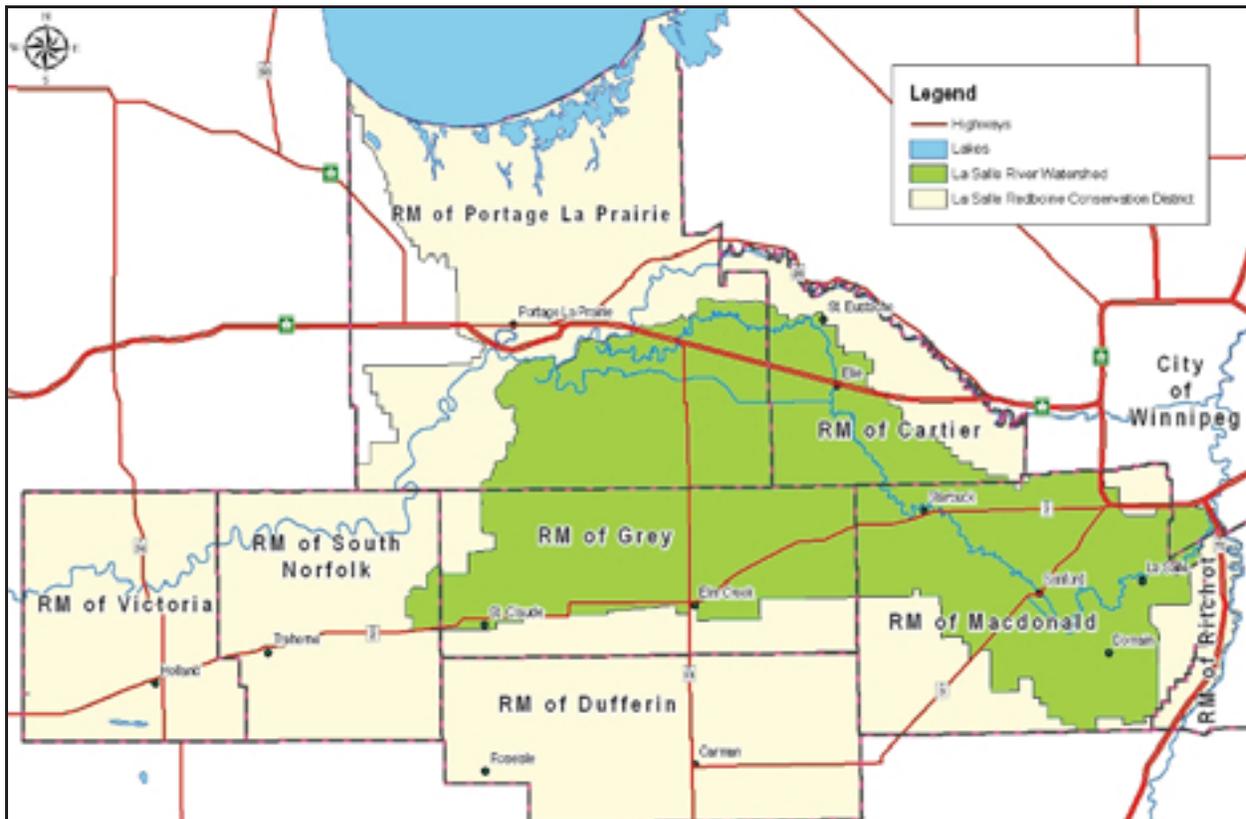


Figure 1 – Rural Municipalities and the La Salle River Watershed in the La Salle Redboine Conservation District

2.2 Regions

The La Salle River Watershed is generally characterized by two unique regions based on similar land and water characteristics as described in Table 1. The regional variation in the watershed is an important consideration when proposing policies relating to land and water management. Figure 2 and 3 illustrate some of the land and water features of the watershed. Figure 3 also illustrates the three sub-districts in the watershed.

Table 1 – Regional Characteristics in the La Salle River Watershed

Zone / Region	Topography	Agricultural Capability	Natural Drainage	Drainage Standard	Water Retention Potential	Anticipated cost/benefit of drainage
Red River Valley	Flat	Majority Class 1,2,3 “Prime Agricultural Lands”	Poor	Cereal (grain-major) / Special crops	Poor	High
Lower Assiniboine Delta	Moderate / steep	Mostly Classes 3,4,5,6	Good	Cereal crops (wet sands) / Pioneer (no drainage)	Good / Excellent	Medium

2.3 Surface Water Quality

The Canadian Council of Minister of the Environment (CCME) Water Quality Index is used to summarize large amounts of water quality data (25 variables) into simple terms for reporting in a consistent manner. The Water Quality Index for the La Salle River Watershed, in the period from 1990 to 2005 has been calculated as “fair”, with some years calculated even lower as “marginal”. Concentrations of Dicamba and MCPA (broadleaf weed herbicides) generally exceed the guidelines when detected and greatly influence the index. The fecal coliform guideline was exceeded relatively few times on the La Salle River during that period. The low ratings are due to the number of measured water quality variables that exceed the Canadian Council of Ministers of the Environment (CCME) Water Quality Index guidelines.

Water Quality Index

Excellent (95-100): Water quality never or very rarely exceeds guidelines

Good (80-94): Water quality rarely exceeds water quality guidelines

Fair (60-79): Water quality sometimes exceeds guidelines and possibly by a large margin

Marginal (45-59): Water quality often exceeds guidelines and/or by a considerable margin

Poor (0-44): Water quality usually exceeds guidelines and/or by a large margin

While dissolved oxygen concentrations throughout the La Salle River during the summer are generally above the Manitoba Surface Water Quality Objective for the protection of aquatic life, oxygen depletion does occur occasionally during the summer. In winter, oxygen consumption greatly exceeds oxygen production and anaerobic conditions often occur.

Nutrient sources entering the La Salle River and impacting water quality include agricultural inputs from commercial fertilizers and livestock manure, septic fields, wastewater treatment facilities, enhanced drainage, soil loss and erosion, and natural in-stream and watershed

Land features of the La Salle River Watershed

AND WHAT THESE FEATURES MEAN FOR PEOPLE LIVING IN THE WATERSHED

Natural landscape characteristics such as elevation and soil type play a major role in how the land is used by people who live in the La Salle River Watershed. The map below illustrates agriculture capability in the watershed. Considering topography / elevation and agriculture capability, the watershed can be divided into two distinct regions separated by the Lake Agassiz Beach Ridge: the Red River Valley Region and the Lower Assiniboine Delta Region.

Lower Assiniboine Delta Region

- Soil surface texture is sandy and coarse loamy
- Underlain by approximately 3 meters of medium to fine sand over clay
- Internal soil drainage is mostly imperfect with small areas of well, poor and very poor
- Suitability for irrigation is mostly good with some areas of fair and poor
- Salinity is not an issue
- Water erosion risk is negligible to low
- Wind erosion risk of bare exposed soil is high to severe

Red River Valley Region

- Soil surface texture is clayey
- Underlain by mostly clay, ranging from 50 meters depth near Portage la Prairie to less than 5 meters at the eastern edge of the watershed
- Internal soil drainage is imperfect to poor
- Suitability for irrigation is poor with some areas of fair to good in the northeast
- Soil salinity is generally not an issue
- Water erosion risk is negligible to low
- Wind erosion risk of bare exposed soil is moderate to high

Soils suitable for annual crops cover over 86% of the watershed, enabling a thriving farming community. However, all people in the watershed repeatedly struggle with soil drainage and flooding problems due to the flat topography.

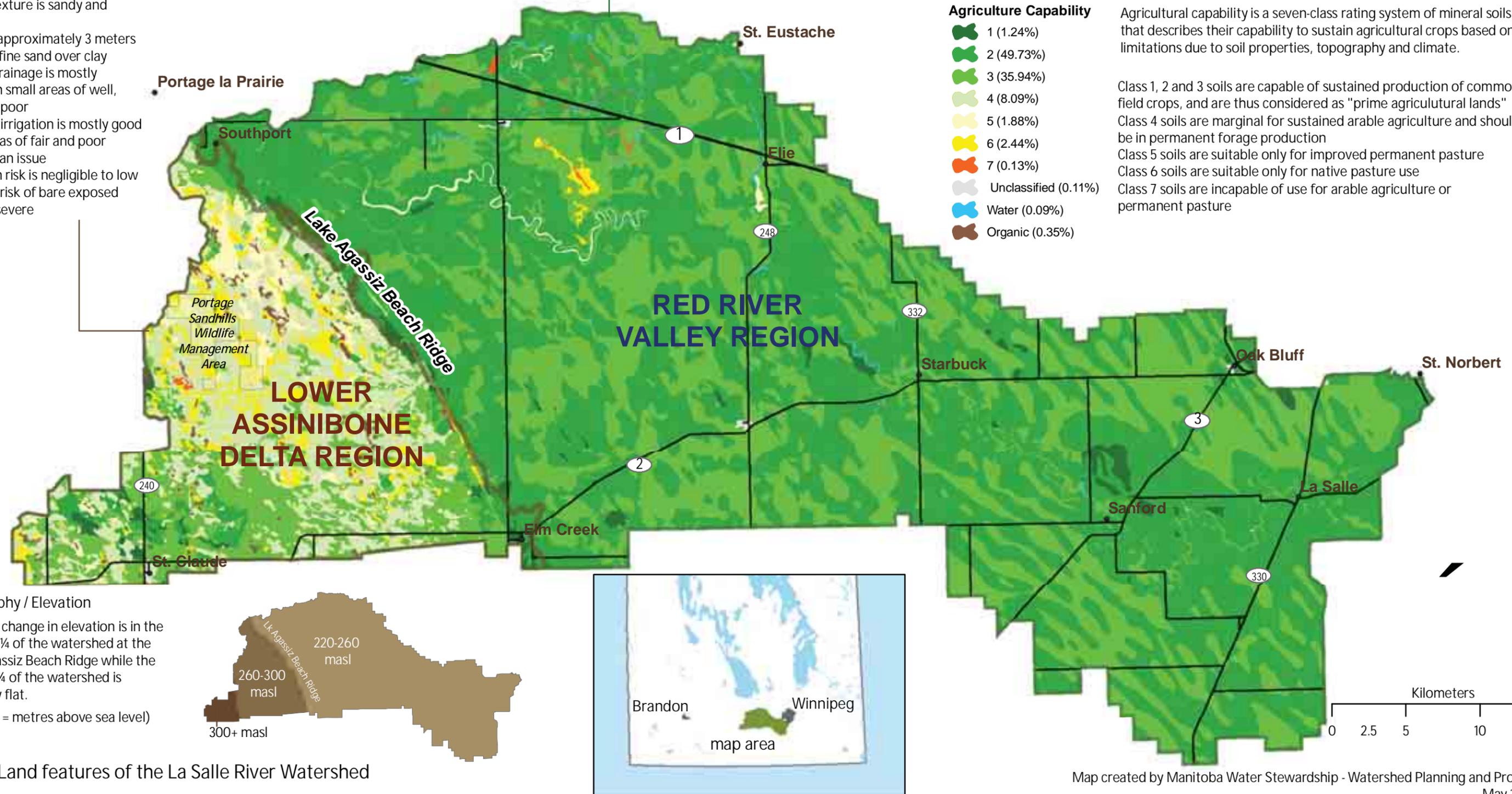


Figure 2 - Land features of the La Salle River Watershed

Water Features of the La Salle River Watershed

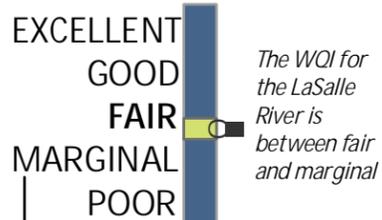
AND WHAT THESE FEATURES MEAN FOR PEOPLE LIVING IN THE WATERSHED

The La Salle River is a tributary of the Red River and has its headwaters located about 10 km southeast of the City of Portage la Prairie. The river flows eastward along a meandering course from its source to eventually converge with the Red River in St. Norbert, at the south end of Winnipeg. The reach of the river is close to 140 km long, running through a relatively low gradient, intensively cultivated watershed over 2,400 square kilometres in size. It is one of the most extensively drained watersheds in Manitoba with over 1,946 km of constructed drains.

Water Quality in the La Salle River

Water quality in the La Salle River has declined significantly over the last 30 years. This decline has been measured through various indices and parameters, such as the water quality index (WQI).

The basic premise of the WQI is that water quality is excellent when all guidelines set to protect water uses are met virtually all the time. The WQI declines when water quality guidelines are exceeded.



The WQI for the La Salle River is between fair and marginal.

Why is it fair to marginal?

- Since the early 1970's, there has been a 194% increase in total phosphorus and a 146% increase in total nitrogen in the La Salle River.
- Over 36% of all water samples taken in the La Salle River contain dicamba, a herbicide commonly used to control broadleaf weeds.
- Riparian areas in the La Salle River are severely degraded. In a recent riparian assessment, over 119 rehabilitation sites were identified for restoration.
- There are a significant number of livestock in the watershed, as well as 25 wastewater lagoons, 17 of which drain directly into a waterway. These nutrients are slow to move through this watershed due to its low elevation, resulting in a long occupancy time for all chemicals added to the River.

The Cartier Regional Water Distribution System services six rural municipalities; the RM of Cartier, RM of Portage la Prairie, RM of St. Francois Xavier, RM of Headingley, RM of Grey, and the RM of Rosser.

City of Portage la Prairie WTP provides drinking water for Southport

Stephenfield Regional WTP services Haywood, St. Claude and surrounding areas

MacDonald Regional WTP in Sanford services Sanford, Brunkild, Domain, Oak Bluff, and Starbuck and almost all surrounding areas

Hydrology and Groundwater

- On average, 70-75% of annual run off volume occurs in early March to end of May
- Over the last 41 of 50 years of recorded data, the annual peak flow occurred in April, during spring run off
- 76% of water available for allocation has been allocated, with three quarters of that allocated water going towards irrigation projects
- Aquifer sustainable yield estimates and groundwater allocation budgets have not been established for the La Salle River Watershed
- There are limited potable groundwater resources in the watershed



The Elie Dam, one of 8 major water control structures in the La Salle River Watershed.



There are limited clean drinking water sources in the watershed, with much of the population relying on rural water pipelines to pipe water to homes and towns.

Legend

- Rural water pipeline
- Waterways
- U Dams
- W Long term water quality monitoring stations
- Water Treatment Plant (WTP)
- Wastewater treatment facilities

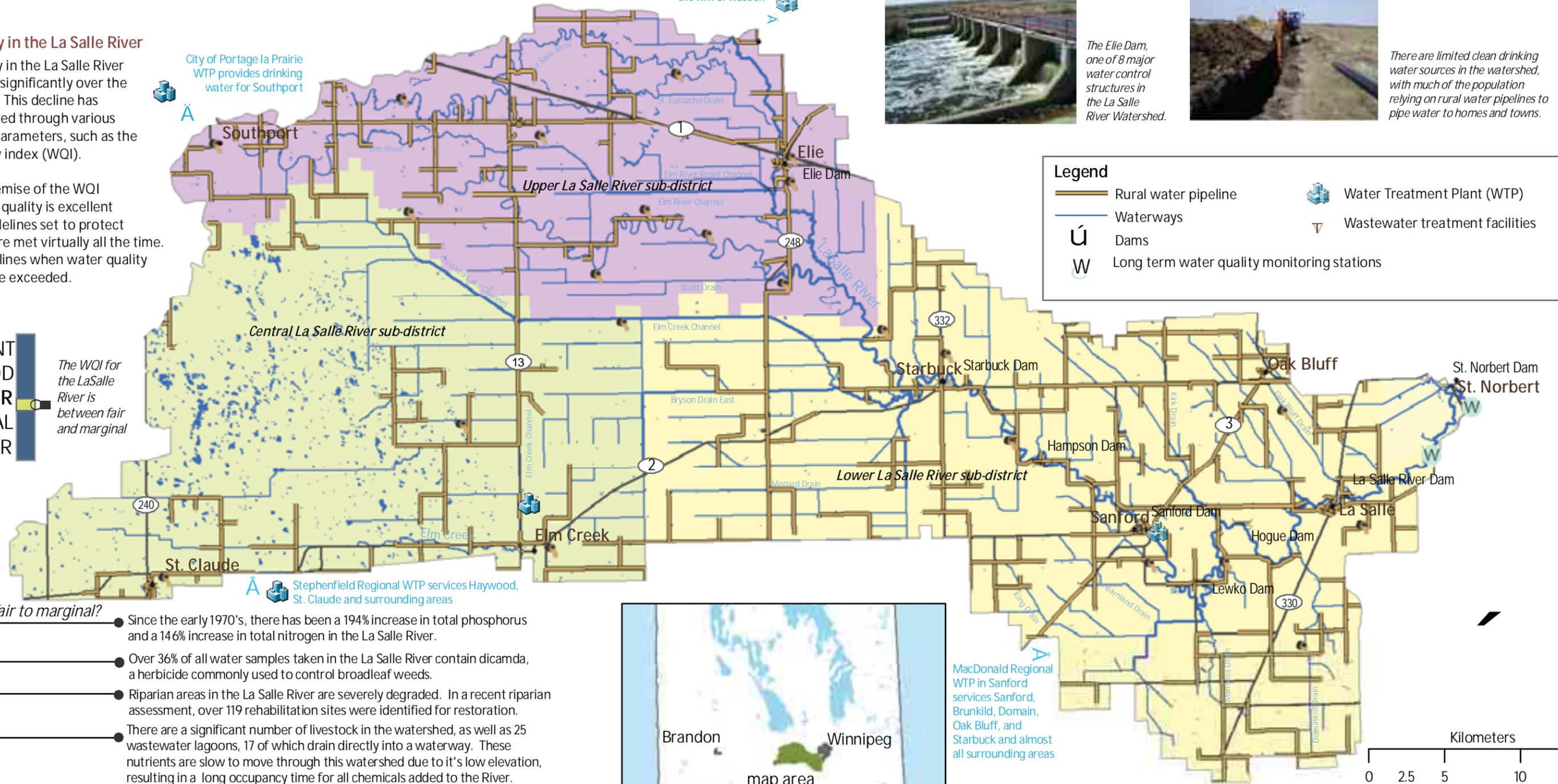


Figure 3 - Water features of the La Salle River Watershed

processes. Jones and Armstrong (2001) determined that from 1974 to 1999, the median Total Nitrogen (TN) and Total Phosphorus (TP) concentrations increased by 145.5% and 193.8% respectively. According to Bourne et al. (2002) the La Salle River contributed 1.5% of the Total Nitrogen load and 1.3% of the Total Phosphorus load to the Red River in 2001.

2.4 Riparian Areas and Aquatic Ecosystems

The La Salle River Watershed Assessment Survey initiated by La Salle Redboine Conservation District and completed by North / South Consultants Inc. in 2006, determined qualitative classifications of channel morphology, bank stability, and riparian zone function along approximately 262 km of streams in the La Salle River Watershed. Based on these ratings, one of four aquatic habitat quality ratings was assigned to each stream reach where attributes were similar. The description of the classes used and results for the La Salle River Watershed are shown in Figure 4 below. The qualitative results represent the overall very poor condition of the streams in the La Salle River Watershed. The watershed survey also identified 119 potential restoration sites.

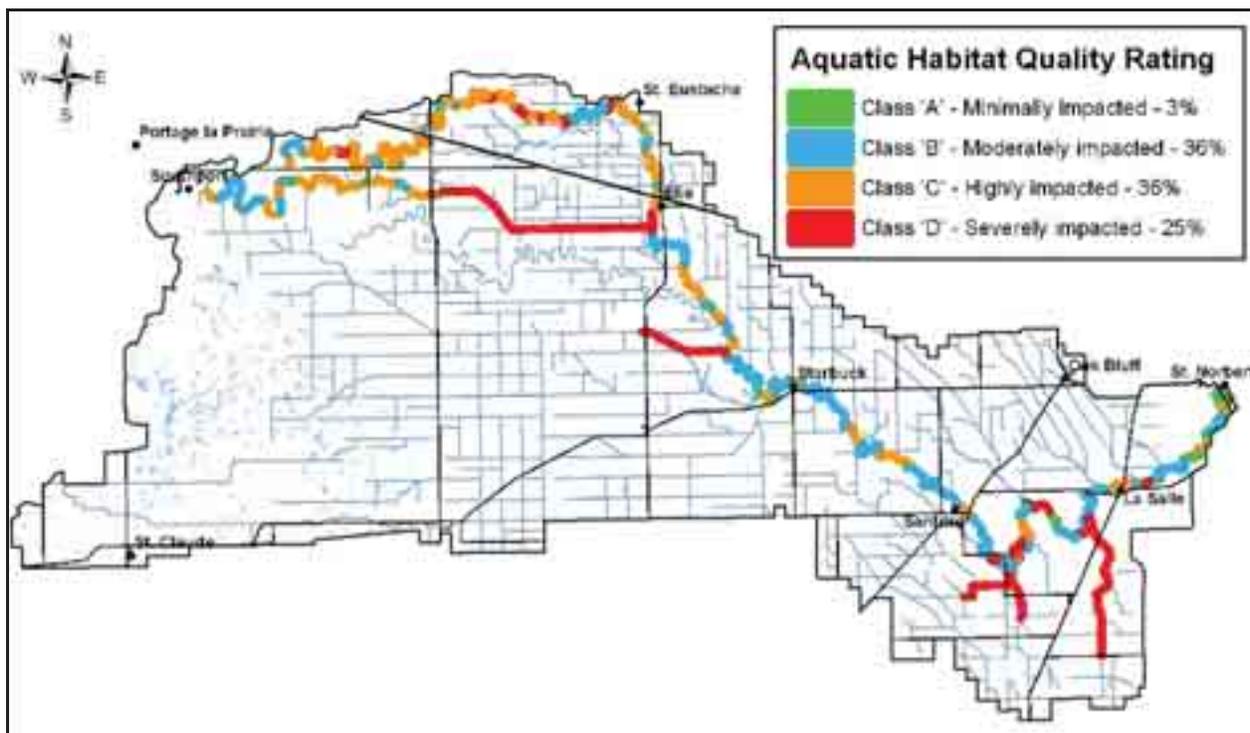


Figure 4 – Aquatic Habitat Quality Ratings for the Major Streams in the La Salle River Watershed

Fish

The La Salle River is the main fish-bearing waterway in the watershed while the majority of the other waterways are constructed drains. As a tributary of the Red River, there is a potential for many of the documented 53 fish species found in the Red River, to occupy the La Salle River, yet very few can actually survive there. A recent watershed assessment focusing on fish, fish habitat and riparian areas in the La Salle River Watershed identified only 13 species in the La Salle River and its tributaries. The actual fish utilization of the La Salle River is largely restricted

due to habitat suitability, water quality and a series of low head dams that restrict movement up from the Red River.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) lists three of the fish species potentially inhabiting the La Salle River Watershed as 'special concern': the bigmouth buffalo, silver chub and chestnut lamprey.



St. Norbert Dam

3.0 ISSUES

The Project Management Team held meetings involving local stakeholders and the Watershed Planning Advisory Team in order to identify and prioritize the issues and concerns in the watershed and to suggest solutions that would form the basis for the goals, objectives and recommended actions.

Surface Water Management related issues:

- Land clearing and drainage in headwaters of watershed
- Timing and volume of flow in Elm Creek Channel
- Flooding causing damages to properties, communities and cropland
- Lack of foresight and coordination on drainage
- Excess vegetation, soil erosion, blockages, slumping and slope failures in improperly maintained drains
- Inadequate funding for proper maintenance of the Provincial waterways infrastructure (drains, dams, crossings)
- Enforcement of illegal drainage activities and license conditions
- Outdated drainage standards for Provincial waterways
- Volume of water actually being used for irrigation
- Wetland and pothole drainage / elimination - loss of natural water retention areas
- Beaver dams



Water Quality Management related issues:

- Water quality degradation
- Overland flooding during heavy summer rain events carries nutrients, fertilizers, pesticides, animal manure and contaminants into waterways
- Impacts of livestock operations, livestock handling facilities and manure management
- Municipal sewage lagoons and effluent releases
- Insufficient water quality monitoring throughout watershed
- Run-off from urban areas
- Shallow wide-diameter wells in the Lower Assiniboine Delta region have high vulnerability of contamination
- Abandoned / improperly decommissioned wells
- Observed decline in groundwater quality in RM of Grey
- Number of potential threats of contamination to drinking water sources

- Fall field application of manure and fertilizer – greater chance of run-off
- Stagnant water in La Salle River in summer and fall (in dry years)
- Suitability of water for cropland irrigation and livestock?
- Concentrations of Dicamba and MCPA (broadleaf herbicides) exceeding the water quality guidelines for irrigation
- Incorporation of effective and sustainable water supply and waste water management into all future developments
- Provincial / federal programs (i.e. Crop Insurance) that are counter productive to protecting water quality
- Aging and deteriorating municipal and private wastewater treatment systems
- Quality of the water diverted into watershed from Assiniboine River at three pumping stations?
- Potential for cost increases for domestic water treatment or alternate water source
- Potential threat of orphaned contaminated sites

Riparian Zone and Aquatic Ecosystem Management related issues:

- Fallen trees in rivers are restricting and blocking flow which is causing further flooding and negative impacts on water quality
- River bank erosion and failure – threat to riverside properties and infrastructure
- River recreational opportunities (canoeing, snowmobiling, etc) are limited in some areas due to dead trees, debris and blockages in river
- Poor aquatic habitat – a recent study on aquatic habitat quality ratings for the watershed showed that over 60% of streams were highly to severely impacted
- Excessive sediments restricting flow in La Salle River
- Livestock operations near waterways and livestock having free access to streams
- Residential development in flood prone areas or riparian zones along the La Salle River
- Loss of natural areas, wildlife habitat and wetlands
- Lack of protection for habitat for endangered plant and animals
- Anaerobic conditions in La Salle River in winter which impacts aquatic life

Watershed Awareness and Stewardship related issues:

- Not enough watershed education going out to residents so they can learn more about their watershed and what they can do to protect, restore and enhance it
- Limited funding opportunities for changes / improvements to farming operations as a result of this plan and new legislation and regulations
- Landowners are not compensated for the ecological goods and services they provide to society



4.0 VISION, GOALS AND OBJECTIVES

The vision, goals and objectives were developed and based largely on the priority issues identified by the watershed planning advisory team and at public meetings throughout the planning process.

VISION	
<p>“We want to have clean and safe water that sustains our vibrant local communities and a system of coordinated water use and management that respects current water users, agriculture, downstream residents, and aquatic ecosystems.”</p>	
GOALS	OBJECTIVES
<p>1. To improve the state of surface water management in terms of alleviating downstream flooding and ensuring there is sufficient water available during dry periods</p>	<p>1a. Coordinate properly designed drainage works and activities by developing a surface water management plan and policies for the watershed</p> <p>1b. Improve the Provincial Waterways infrastructure maintenance schedule</p> <p>1c. Improve the drainage licensing process</p> <p>1d. Develop water control and flood protection projects</p>
<p>2. To protect and improve water quality</p>	<p>2a. Reduce and eliminate point and non-point source pollution to waterways</p> <p>2b. Eliminate or minimize any risks of contamination to drinking water sources</p>
<p>3. To improve the health of the rivers and riparian areas</p>	<p>3a. Protect and enhance riparian habitat areas along the La Salle River</p> <p>3b. Remove excess debris and garbage from the La Salle River</p>
<p>4. To increase public participation in watershed stewardship activities</p>	<p>4a. Provide watershed awareness, education and participation opportunities to the public</p>

5.0 RECOMMENDED ACTIONS

Watershed stakeholders and the Watershed Planning Advisory Team recommended the following objectives and actions to meet the goals and achieve the vision for the watershed.

Objective 1a: Coordinate properly designed drainage works and activities by developing a surface water management plan and policies for the watershed

Recommended action:

- Establish a committee to develop a surface water management plan and policies for the La Salle River Watershed to manage issues outlined in Figure 5.

Measure of success:

- Surface Water Management Committee for the La Salle River Watershed is established
- Surface water management plan and policies for the La Salle River Watershed are completed

Objective 1b: Improve the Provincial Waterways infrastructure maintenance schedule

Recommended actions:

- Involve the La Salle Redboine CD in the development and review of the annual works and maintenance schedule for Provincial Waterways infrastructure
- Conduct an assessment report of all the licensed water control structures in the La Salle River Watershed
- Develop a detailed Surface Water Management Pilot Project (Drainage Plan) in a representative sub-watershed in the La Salle River Watershed

Measure of success:

- La Salle Redboine CD is a participant in the development and review of the Provincial Waterways infrastructure maintenance schedule
- Kilometers of Provincial Waterways maintained and reconstructed per year (based on a recent 5 year average) has not decreased
- Number of Provincial and Municipal crossings maintained and replaced per year (based on a recent 5 year average) has not decreased
- An assessment report of all the water control structures in the La Salle River Watershed is completed
- Sub-watershed drainage plan is completed
- Funding for the Provincial Waterways infrastructure has not decreased

Surface Water Management Plan and Policies in the La Salle River Watershed

LINKING LAND AND WATER

In November 2008, representatives from municipalities, Manitoba Water Stewardship and the LSRBCD met to identify issues and solutions related to surface water management. Admittedly not an inclusive list, the group identified 26 problem areas in the watershed as shown on the map.

In 2006, the LSRBCD completed the La Salle River Watershed Assessment Survey which identified 119 riparian rehabilitation project sites in the main river and tributaries of the La Salle River. In addition, 75 potential barriers to fish passage were also identified. It will take many years of hard work and landowner cooperation to address all of the identified projects.

Surface water management policies for the two distinct regions of the La Salle River Watershed were developed with consideration for the agricultural capability, soil characteristics, drainage limitations, land use and topography. The two regions are the Red River Valley and Lower Assiniboine Delta.

Lower Assiniboine Delta Region

This region is characterized by greater topographic changes and more limitations to agriculture.

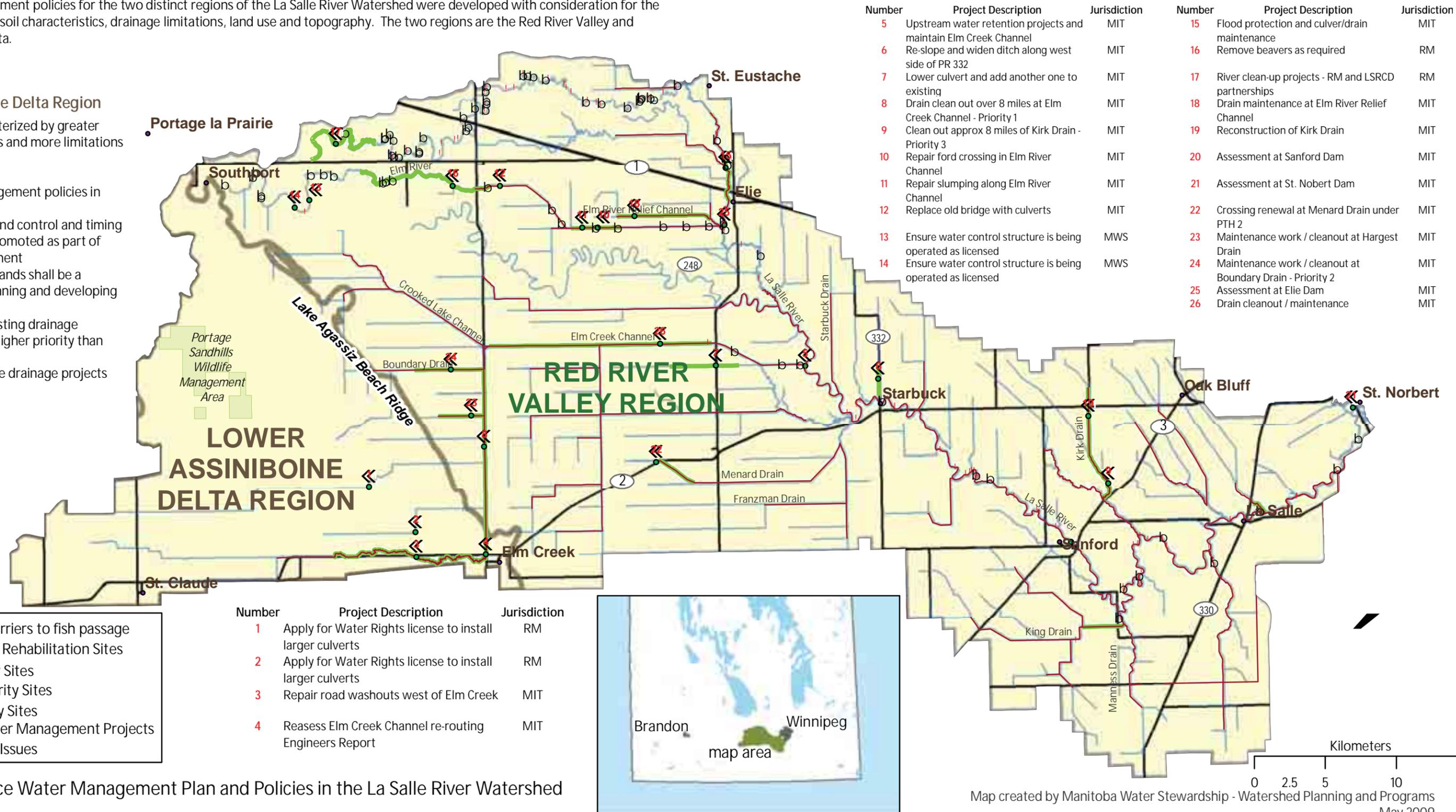
Surface water management policies in this region include:

- Water retention, and control and timing of runoff, shall be promoted as part of watershed management
- Protection of wetlands shall be a consideration in planning and developing drainage projects
- Maintenance of existing drainage systems shall be of higher priority than reconstruction
- No new or upgrade drainage projects

Red River Valley Region

This region is characterized by soils with high agricultural capability, little change in topography, and poor natural drainage. Surface water management policies in this region include:

- Drainage projects shall be planned and executed so that projects in one area do not adversely affect another area
- Drainage projects which service more land area will receive higher priority over projects providing benefit to a small area
- Drainage projects will be planned and executed with consideration for wetland areas, fish habitat and downstream water quality
- Water retention, and control and timing of runoff, shall be promoted as part of watershed management
- Landowners shall be provided with incentives to protect and restore riparian areas along the La Salle River
- Debris blockages and garbage shall be removed from the La Salle River



Legend

- b Potential Barriers to fish passage
- ▲ Aquatic Ecosystem Rehabilitation Sites
- ! First Priority Sites
- ! Second Priority Sites
- ! Third Priority Sites
- Surface Water Management Projects
- Drains with Issues

Number	Project Description	Jurisdiction
1	Apply for Water Rights license to install larger culverts	RM
2	Apply for Water Rights license to install larger culverts	RM
3	Repair road washouts west of Elm Creek	MIT
4	Reassess Elm Creek Channel re-routing Engineers Report	MIT

Figure 5 - Surface Water Management Plan and Policies in the La Salle River Watershed

Objective 1c: Improve the drainage licensing process

Recommended actions:

- Involve the La Salle Redboine CD in the review process of water rights license applications that propose new drains or drainage upgrades in the watershed
- Ensure that Manitoba Water Stewardship - Water Resource Officers are available to distribute drainage work applications for review and assessment, investigate drainage works, follow-up on and enforce conditions applied to approved licenses, and make water rights license application forms and contact numbers easy to obtain

Measure of success:

- La Salle Redboine CD is providing input and comments on water rights license applications that have proposed new drains and drainage upgrades in the watershed
- Water Resource Officers are investigating drainage works and enforcing conditions applied to approved water rights licenses
- Fewer complaints about the drainage licensing process based on observations from Water Resource Officers and local municipalities

Objective 1d: Develop water control and flood protection projects

Recommended actions:

- Identify and develop water control / retention projects in the Central La Salle River sub-district
- Construct ring dykes at specific locations in the Central La Salle River sub-district to protect rural residences from flooding
- Protect and enhance wetlands in the Central La Salle River sub-district with financial incentives and conservation agreements
- Conduct an analysis of the flooding issues at the Elm Creek Channel and determine the most achievable and beneficial options to mitigate the issues
- Develop digital maps of flood-prone and spring / summer flooding areas in the watershed

Measure of success:

- Decrease in losses from flooding based on current and historical loss benchmarks
- Water is held back in water control / retention projects throughout the watershed
- No net loss of wetlands based on Agriculture and Agri-Food Canada census data from 2006
- All necessary ring dykes in the Central La Salle River sub-district have been constructed
- Digital maps of flood-prone areas in the watershed have been developed

Objective 2a: Reduce and eliminate point and non-point source pollution to waterways

Recommended actions:

- Provide incentive programs for producers to implement beneficial management practices that reduce or eliminate excess nutrients from entering waterways
- Conduct scientific research on the options for disposal of nutrient-rich municipal lagoon wastewater
- Provide agriculture extension programs to help producers assess the environmental risk of their operations and encourage soil testing
- Encourage the establishment and maintenance of permanent cover along waterways to minimize soil loss and stream bank erosion
- Continue the long-term water quality monitoring programs and support additional water quality related research
- Develop feasible science-based targets for nutrient concentration reductions necessary for the La Salle River

Measure of success:

- Water Quality Index has not decreased based on the subsequent ten year period
- Number of beneficial management practices that have been implemented throughout the watershed
- Livestock manure is not applied to areas prone to spring / summer flooding
- Continuation of the long-term water quality monitoring program

Objective 2b: Eliminate or minimize any risks of contamination to drinking water sources

Recommended actions:

- Establish a Source Water Protection Committee to identify threats and assess the risk of contamination to the two drinking water sources in the watershed
- Target source water protection programming and activities to the areas around and upstream of the two drinking water source intakes at Sanford and Elm Creek (see Figures 6 and 7)
- Develop zoning by-laws that restrict and manage activities in the source water protection zones of the two public drinking water sources in the watershed
- Seal all abandoned wells throughout the watershed

Drinking Water Source and Source Water Protection Zone for Sanford

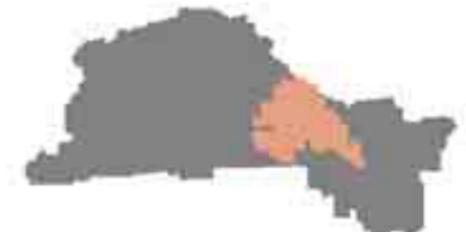
The purpose of this map is to illustrate the location of the Sanford public drinking water source and the associated source water protection zone. The source water protection zone was established using a 400 metre buffer that extends 40 kilometers upstream of the intake point. This type of predefined buffer can be modified by the source water protection committee as they learn more information. The source water protection committee will also develop more detailed maps showing the potential threats to contamination within the protection zone.

Figure 6. Drinking Water Source and Source Water Protection Zone for Sanford

The orthophoto illustrates land use within 40 km with a 400m buffer of the surface sources. There are many land use activities within the source water protection zone that impact the quality of the source water received at Sanford.

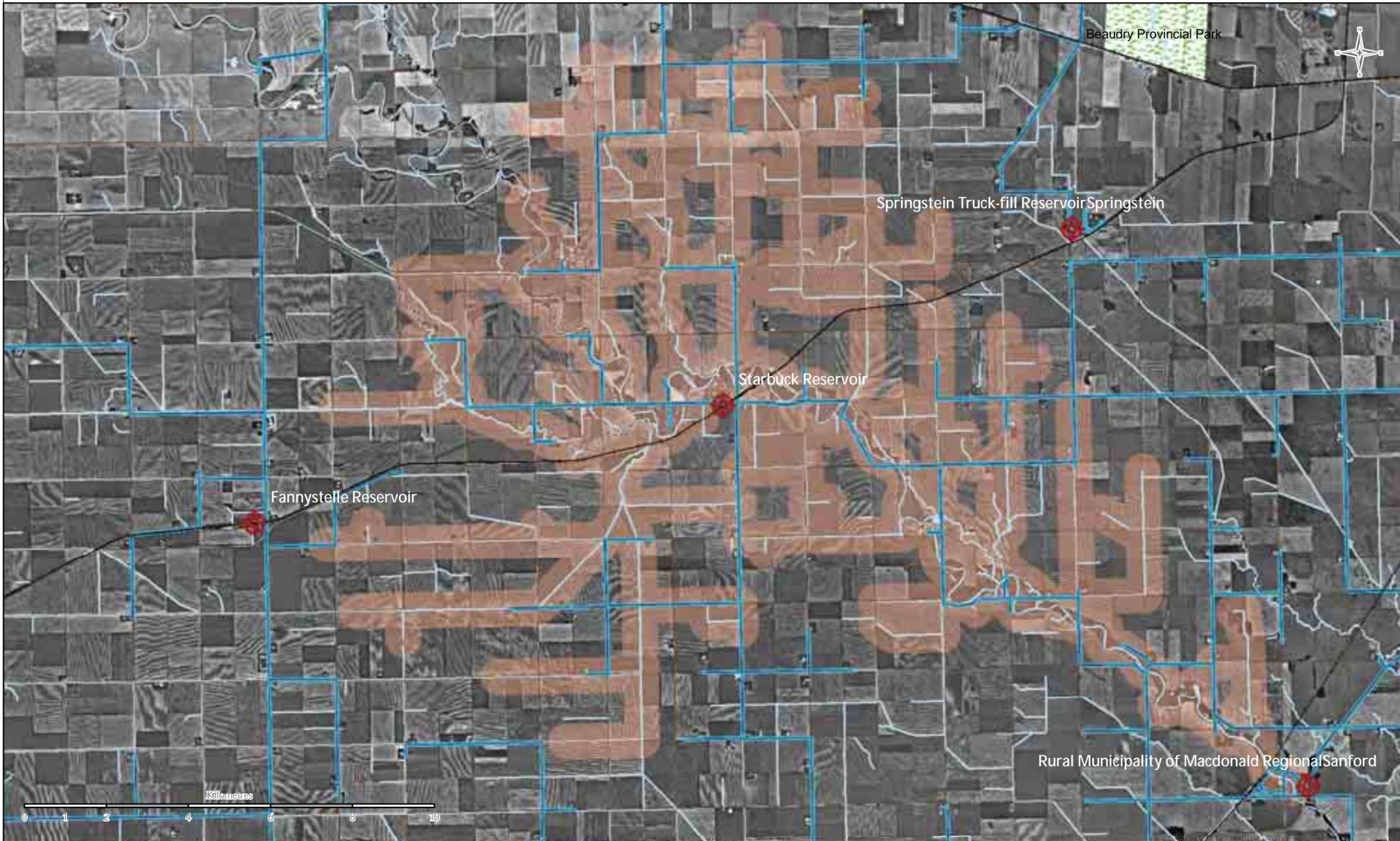
- | | |
|---|--|
|  Surface Water Drinking Sources |  Wildlife Management Areas |
|  Surface Water Buffer (400m) |  Provincial Parks |
|  Rural Water Pipelines |  Railways |
|  Lakes & Rivers |  Roadways |

La Salle River Watershed



The source water protection area for Sanford is located in the western part of the La Salle River watershed.

Date: 20090713
Projection: UTM, NAD83, Zone 14



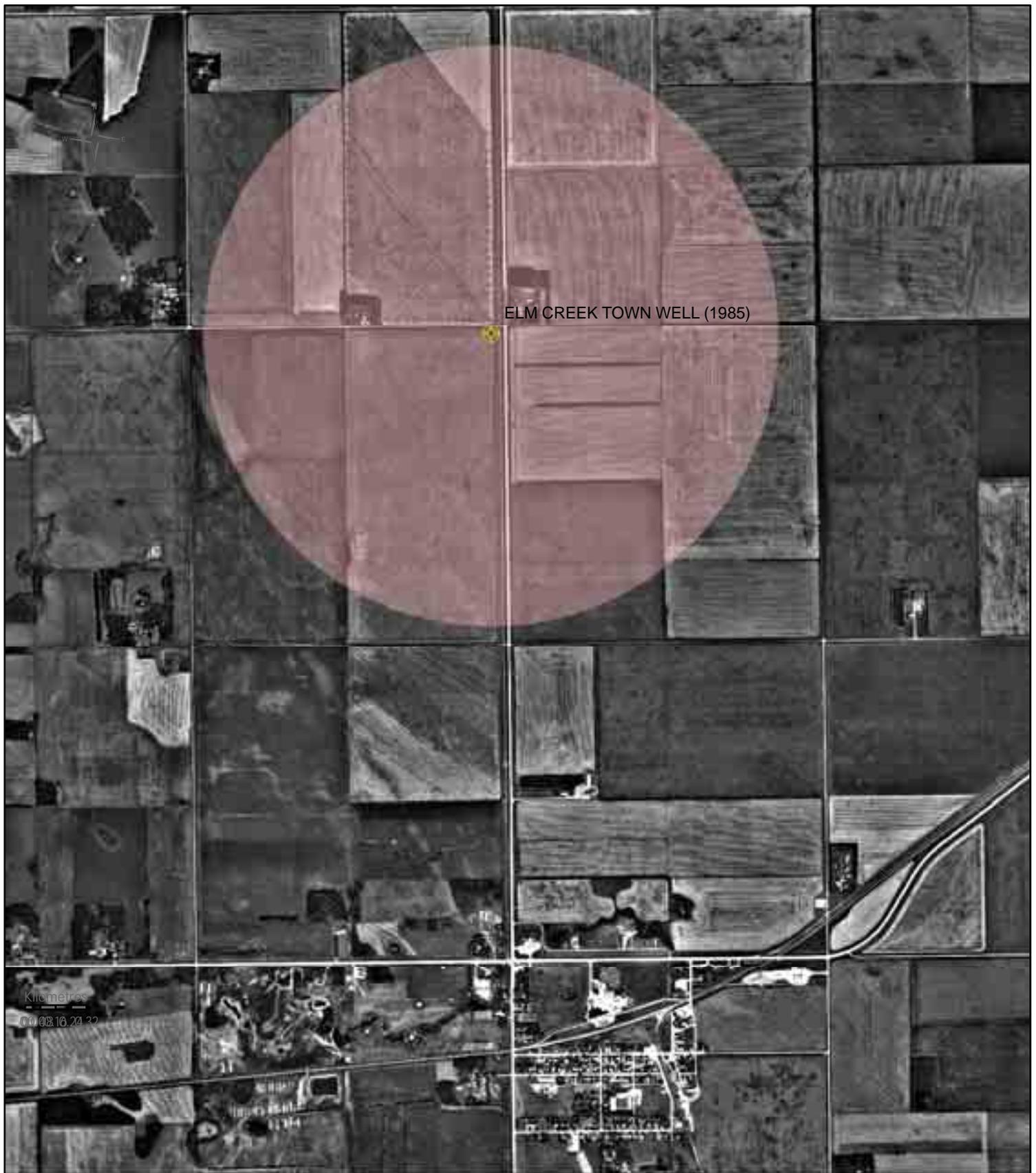


Figure 7. Public drinking water supply for the town of Elm Creek

The purpose of this map is to illustrate the location of the drinking water source and associated source water protection zone for the town of Elm Creek.



Municipal Wells



Source Water Protection Area



Rural Water Pipelines



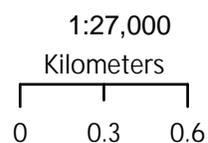
Roadways



Lakes & Rivers



Railways



Date: 20090617

Projection: UTM, NAD83, Zone 14



- Encourage all owners of private wells to perform a well assessment, implement wellhead protection measures and have their well water tested annually

Measure of success:

- Source Water Protection Committee has been established
- Source water protection programming is being implemented in the target areas of each of the drinking water sources in the watershed
- Municipalities realize the important role and influence they have in managing land use and development activities in source water protection areas, and are making the necessary additions to their development plans and zoning by-laws
- Source water quality at Sanford and Elm Creek water treatment plants has not decreased
- All abandoned wells are sealed
- Owners of private wells are making wellhead protection improvements and having their well water tested annually

<p>Objective 3a: Protect and enhance riparian habitat areas along the La Salle River</p>

Recommended actions:

- Utilize Conservation Agreements and other financial and technical assistance programs to secure existing critical riparian areas and rehabilitate degraded / impacted riparian areas along the La Salle River
- Investigate the feasibility of an Ecological Goods and Services type program and providing tax credits to landowners that protect or restore critical riparian areas
- Undertake riparian rehabilitation projects identified in the La Salle River Watershed Assessment Survey – 2006 (see Figure 5)
- Harmonize / develop municipal zoning by-laws regarding development in riparian areas
- Provide local communities with information on nuisance and invasive species and how to manage them and stop them from spreading into other areas

Measure of success:

- Increase in the area of critical riparian habitat that is secured along the La Salle River
- An Ecological Goods and Services type program is being provided to landowners to protect and restore critical riparian areas
- At least 8 riparian rehabilitation projects from the La Salle River Watershed Assessment Survey are completed each year
- Municipalities realize the benefits of protecting and restoring riparian areas and are making the necessary additions to their municipal development plans and zoning by-laws
- Based on observations from the Municipal Works Foreman and local Weed District Officers, the presence of nuisance and invasive species has not increased

Objective 3b: Remove excess debris and garbage from the La Salle River

Recommended actions:

- Remove debris blockages from the La Salle River at sites that may damage crossing infrastructure or cause overland flooding
- Encourage and support local communities in undertaking La Salle River clean-up events

Measure of success:

- Majority of the debris blockages in the La Salle River have been cleaned up
- Local communities have adopted annual river clean-up events throughout the watershed



Scouts, Cubs and Beavers planting trees along La Salle River near Elie

Objective 4a: Provide watershed awareness, education and participation opportunities to the public

Recommended actions:

- Provide watershed management education to local communities and schools through presentations, fact sheets, literature, newspaper articles and public service announcements
- Build the capacity of municipal governments, organizations and residents by sponsoring land and water management related workshops and field tours and incorporating watershed management presentations into municipal and agriculture extension activities

- Develop watershed education / interpretive highway rest-stop sites at locations throughout the watershed
- Continue to improve and update watershed management information on the La Salle Redboine CD website

Measure of success:

- Watershed residents are aware of existing opportunities to improve their watershed and are participating in watershed stewardship activities
- La Salle Redboine CD is a well respected and valued organization and is seen as the “Steward” of the La Salle River
- Three new watershed education / interpretive highway rest-stop sites have been developed
- La Salle Redboine CD is operating a very useful and informative website



6.0 WATERSHED POLICIES

The Water Planning Authority will strive to adhere to the following watershed policies for the La Salle River Watershed.

1. Technical assistance and financial incentive programs should be available to encourage beneficial management practices that conserve wildlife and riparian habitat and protect and enhance water quality and aquatic ecosystems.
2. New developments or drainage projects should not impose negative impacts on the existing surface water drainage system, aquatic ecosystems, water quality and quantity, or groundwater.
3. Water quality protection programming and activities should be given the highest priority in designated source water protection zones.
4. Water storage / retention projects should be incorporated into water management planning as a way of slowing down runoff, reducing flooding and erosion, improving water quality, providing wildlife habitat, and recharging groundwater aquifers.
5. Maintenance of existing drains shall receive higher priority over reconstruction upgrades or new drains.
6. Land subject to serious flooding and that which is not flood protected, should be left in a natural state, enhanced as a water storage / retention site, or developed for recreational purposes.

7.0 IMPLEMENTATION

Implementing the plan for the La Salle River Watershed involves a coordinated and cooperative effort by a large group of watershed stakeholders.

The watershed stakeholders for implementation include:

- Landowners
- Municipal governments
- La Salle Redboine Conservation District
- Community groups and local associations
- Local businesses
- Planning Districts
- Provincial government
- Federal government

The implementation table below lists recommended actions to meet the goals for the watershed, and the organizations that could play a part in achieving the actions based on their mandate, and roles and responsibilities in the watershed, however; it does not formally commit those organizations to completing the actions.

The La Salle Redboine Conservation District is expected to play a significant role in the implementation of the plan. The District currently receives an annual grant (2009-10) of \$300,000 from Manitoba Water Stewardship, around \$90,000 from its municipal partners, and because of its non-profit, charitable status, it is able to acquire additional money from other available funding programs.

The Water Planning Authority will do an annual review of the plan with the objective of ensuring its successful implementation and relevance in meeting the goals for the watershed. In addition, the Water Planning Authority will celebrate implementation successes and recognize the landowners and organizations that are participated in improving the health and sustainability of the watershed.

Appendix B lists some general activities that watershed residents can adopt to protect, conserve and restore the health of the La Salle River Watershed.

Acronyms in Table 2:

AAFC / AESB – Agriculture and Agri-Food Canada / Agri-Environment Services Branch
MAFRI – Manitoba Agriculture, Food and Rural Initiatives
MHHC – Manitoba Habitat Heritage Corporation
MWS – Manitoba Water Stewardship

Table 2 – Implementation of the La Salle River Integrated Watershed Management Plan (Recommended Actions are not listed in priority).

Legend	Recommended Action for:	
	La Salle Redboine Conservation District.....	
	Manitoba Water Stewardship - Water Control Systems Management.....	
	Manitoba Water Stewardship - Water Control Works and Drainage Licensing.....	
	Manitoba Water Stewardship – Water Science and Management.....	
	Manitoba Infrastructure and Transportation.....	
	Manitoba Agriculture, Food, and Rural Initiatives.....	
	Municipalities.....	

#	Recommended Actions	Organizations that could play a role in implementation	Time frame
1	Establish a Source Water Protection Committee to identify threats and assess the risk of contamination to the two drinking water sources in the watershed	<ul style="list-style-type: none"> o La Salle Redboine CD o MWS - Office of Drinking Water o MWS - Groundwater o MWS – Watershed Planning / Programs o MB Infrastructure and Transportation o Municipalities 	2009-2011
2	Target source water protection programming and activities to the areas around and upstream of the two drinking water source intakes at Sanford and Elm Creek	<ul style="list-style-type: none"> o La Salle Redboine CD o Municipalities o MWS - Watershed Planning / Programs o MHHC o MAFRI o AAFC / AESB 	2009-2019
3	Establish a committee to develop a surface water management plan and policies for the La Salle River Watershed	<ul style="list-style-type: none"> o La Salle Redboine CD o MWS - Water Control Systems Management o MB Infrastructure and Transportation o Planning District o Municipalities o MAFRI 	2009-2011
4	Investigate the feasibility of an Ecological Goods and Services type program and providing tax credits to landowners that protect or restore critical riparian areas	<ul style="list-style-type: none"> o La Salle Redboine CD o MHHC o MWS o Municipalities o MAFRI o Ducks Unlimited 	2009-2011
5	Protect and enhance wetlands in the Central La Salle River sub-district with financial incentives and conservation agreements	<ul style="list-style-type: none"> o La Salle Redboine CD o MHHC o Ducks Unlimited o MWS – Watershed Planning / Programs 	2009-2019

#	Recommended Actions	Organizations that could play a role in implementation	Time frame
6	Identify and develop water control / retention projects in the Central La Salle River sub-district	<ul style="list-style-type: none"> o La Salle Redboine CD o MWS - Water Control Systems Management, o MB Infrastructure and Transportation o Municipalities 	2009-2019
7	Encourage the establishment and maintenance of permanent cover along waterways to minimize soil loss and stream bank erosion	<ul style="list-style-type: none"> o La Salle Redboine CD o MAFRI o MHHC o Municipalities 	2009-2019
8	Provide incentive programs for producers to implement beneficial management practices that reduce or eliminate excess nutrients from entering waterways	<ul style="list-style-type: none"> o La Salle Redboine CD o MAFRI o AAFC / AESB MHHC o Ducks Unlimited o MWS – Watershed Planning / Programs o MB Conservation 	2009-2019
9	Seal all abandoned wells throughout the watershed	<ul style="list-style-type: none"> o La Salle Redboine CD o MWS - Office of Drinking Water o MWS - Groundwater Management o MAFRI 	2009-2019
10	Encourage all owners of private wells to perform a well assessment, implement wellhead protection measures and have their well water tested annually	<ul style="list-style-type: none"> o La Salle Redboine CD o MWS - Office of Drinking Water o MWS - Groundwater Management o Municipalities 	2009-2019
11	Utilize Conservation Agreements and other financial and technical assistance programs to secure existing critical riparian areas and rehabilitate degraded / impacted riparian areas along the La Salle River	<ul style="list-style-type: none"> o La Salle Redboine CD o MHHC o MAFRI o MWS – Watershed Planning / Programs o AAFC / AESB 	2009-2019

#	Recommended Actions	Organizations that could play a role in implementation	Time frame
12	Undertake riparian rehabilitation projects identified in the La Salle River Watershed Assessment Survey – 2006	<ul style="list-style-type: none"> o La Salle Redboine CD o MHHC o Municipalities o MAFRI o AAFC / AESB 	2009-2019
13	Encourage and support local communities in undertaking La Salle River clean-up events	<ul style="list-style-type: none"> o La Salle Redboine CD o Municipalities o MHHC o MWS 	2009-2019
14	Provide watershed management education to local communities and schools through presentations, fact sheets, literature, newspaper articles and public service announcements	<ul style="list-style-type: none"> o La Salle Redboine CD o Schools o MWS o MHHC o Ducks Unlimited 	2009-2019
15	Build the capacity of municipal governments, organizations and residents by sponsoring land and water management related workshops and field tours and incorporating watershed management presentations into municipal and agriculture extension activities	<ul style="list-style-type: none"> o La Salle Redboine CD o MAFRI o MWS o MHHC o Ducks Unlimited o AAFC / AESB 	2009-2019
16	Develop watershed education / interpretive highway rest-stop sites at locations throughout the watershed	<ul style="list-style-type: none"> o La Salle Redboine CD o MB Infrastructure and Transportation o MWS o Ducks Unlimited o Municipalities 	2009-2019
17	Continue to improve and update watershed management information on the La Salle Redboine CD website	<ul style="list-style-type: none"> o La Salle Redboine CD o Municipalities 	2009-2019

#	Recommended Actions	Organizations that could play a role in implementation	Time frame
18	Provide local communities with information on nuisance and invasive species and how to manage them and stop them from spreading into other areas	<ul style="list-style-type: none"> o La Salle Redboine CD o MAFRI o MWS - Water Science and Management o Ducks Unlimited 	2009-2011
19	Remove debris blockages from the La Salle River at sites that may damage crossing infrastructure or cause overland flooding	<ul style="list-style-type: none"> o La Salle Redboine CD o MB Infrastructure and Transportation o Municipalities 	2009-2012
20	Develop a detailed Surface Water Management Pilot Project (Drainage Plan) in a representative sub-watershed in the La Salle River Watershed	<ul style="list-style-type: none"> o MWS - Water Control Systems Management o MB Infrastructure and Transportation o La Salle Redboine CD o Municipalities 	2009-2011
21	Develop digital maps of flood-prone and spring / summer flooding areas in the watershed	<ul style="list-style-type: none"> o MWS - Water Control Systems Management o MB Conservation – Environmental Operations o MB Intergovernmental Affairs – Community Planning Services o MB Infrastructure and Transportation o AAFC / AESB o La Salle Redboine CD 	2009-2011
22	Involve the La Salle Redboine CD in the development and review of the annual works and maintenance schedule for Provincial Waterways infrastructure	<ul style="list-style-type: none"> o MWS - Water Control Systems Management o MB Infrastructure and Transportation o La Salle Redboine CD 	2009-2019

#	Recommended Actions	Organizations that could play a role in implementation	Time frame
23	Involve the La Salle Redboine CD in the review process of water rights license applications that propose new drains or drainage upgrades in the watershed	<ul style="list-style-type: none"> ○ MWS - Water Control Works and Drainage Licensing ○ La Salle Redboine CD 	2009-2019
24	Ensure that Manitoba Water Stewardship - Water Resource Officers are available to distribute drainage work applications for review and assessment, investigate drainage works, follow-up on and enforce conditions applied to approved licenses, and make water rights license application forms and contact numbers easy to obtain	<ul style="list-style-type: none"> ○ MWS - Water Control Works and Drainage Licensing ○ Municipalities ○ La Salle Redboine CD ○ MB Infrastructure and Transportation 	2009-2019
25	Conduct scientific research on the options for disposal of nutrient-rich municipal lagoon wastewater	<ul style="list-style-type: none"> ○ MB Conservation – Environmental Operations ○ MWS - Water Science and Management ○ Municipalities ○ La Salle Redboine CD 	2009-2019
26	Continue the long-term water quality monitoring programs and support additional water quality related research	<ul style="list-style-type: none"> ○ MWS - Water Science and Management ○ La Salle Redboine CD ○ Municipalities 	2009-2019
27	Develop feasible science-based targets for nutrient concentration reductions necessary for the La Salle River	<ul style="list-style-type: none"> ○ MWS - Water Science and Management ○ La Salle Redboine CD ○ Municipalities 	2009-2011

#	Recommended Actions	Organizations that could play a role in implementation	Time frame
28	Conduct an assessment report of all the licensed water control structures in the La Salle River Watershed	<ul style="list-style-type: none"> o MB Infrastructure and Transportation o MWS - Water Control Systems Management o La Salle Redboine CD o Municipalities 	2009-2011
29	Conduct an analysis of the flooding issues at the Elm Creek Channel and determine the most achievable and beneficial options to mitigate the issues	<ul style="list-style-type: none"> o MB Infrastructure and Transportation o MWS - Water Control Systems Management o Municipalities o La Salle Redboine CD 	2009-2011
30	Provide agriculture extension programs to help producers assess the environmental risk of their operations and encourage soil testing	<ul style="list-style-type: none"> o MAFRI o AAFC / AESB o MB Conservation – Environmental Operations o La Salle Redboine CD o Municipalities 	2009-2019
31	Harmonize / develop municipal zoning by-laws regarding development in riparian areas	<ul style="list-style-type: none"> o Municipalities o La Salle Redboine CD o MAFRI o MB Intergovernmental Affairs – Community Planning Services 	2009-2019
32	Develop zoning by-laws that restrict and manage activities in the source water protection zones of the two drinking water sources in the watershed	<ul style="list-style-type: none"> o Municipalities o La Salle Redboine CD o MB Intergovernmental Affairs – Community Planning Services 	2009-2019
33	Construct ring dykes at specific locations in the Central La Salle River sub-district to protect rural residences from flooding	<ul style="list-style-type: none"> o Municipalities o La Salle Redboine CD o MWS – Water Control Systems Management 	2009-2012

APPENDIX A: WATERSHED PLANNING ADVISORY TEAM – MEMBERSHIP LIST

Community groups and local associations

Assiniboine Community College	Central Manitoba Resource Management
Bon Homme Colony	Brant Wood Colony
Community of Sanford	Cross Country Snow Drifters, RM Macdonald
Club Snow - Portage la Prairie	Central Plains/White Plains Regional Dev.
Community of Elm Creek	Community of Springstein
Community of Fannystelle	Community of St. Claude
Community of Haywood	Community of St. Eustache
Community of La Salle	Community of St. Norbert
Community of Oakville	Community of Starbuck
Dairy Farmers of Manitoba	Homewood Colony
Domain Recreation Club	Huron Colony
Elm River Colony	Iberville Colony
Grand Colony	International Erosion Control Assoc - NPC
James Valley Colony	Manitoba Cattle Producers Association
Keystone Agricultural Producers	Manitoba Pork Council
La Salle District Chamber of Commerce	Manitoba Pulse Growers Association
Manitoba Canola Growers Association	Manitoba Zero Tillage Research Assoc.
Milltown Colony	Portage la Prairie School Division
Nature Conservancy of Canada	Portage Planning District
Organic Producers Association	Prairie Fruit Growers Association
Portage Economic & Community Dev.	Prairie Rose School Division
Prairie Spirit School Division	RM of Grey
Rivers West	RM of Macdonald
RM of Cartier	RM of Portage
RM of Ritchot	St. Claude Game & Fish
Rosedale Colony	Starlite Colony
Sanford Collegiate	Sunnyside Colony
Snoflies - Carman & Area	Vegetable Growers Association of Manitoba
Vermillion Colony	Waldhiem Colony
White Plains Recreation District	White Plains Crop Improvement Association
White Plains Crop Improvement Assoc.	Winnipeg Naturalist Services Branch

Science and technical support agencies

Agriculture and Agri-Food Canada – Agri-Environment Services Branch	MB Agriculture, Food and Rural Initiatives (MAFRI)
Conservation Data Centre	Environment Canada
Delta Marsh Field Station	Fisheries and Oceans Canada
Ducks Unlimited Canada	MB Habitat Heritage Corporation (MHHC)
MB Conservation – Geomatics & Remote Sensing / Environmental Operations, Wildlife & Ecosystem Protection	MB Water Stewardship – Ecological Services / Regulatory & Operational Services
MB Intergovernmental Affairs	MB Science, Technology, Energy & Mines
MB Infrastructure and Transportation	MB Water Services Board

APPENDIX B: LOCAL PARTICIPATION TO PROTECT AND IMPROVE THE HEALTH OF THE LA SALLE RIVER WATERSHED

All watershed residents can play a role in ensuring the long-term health and sustainability of the La Salle River Watershed.

Here are some suggestions on how you can help:

At Home:

- Use low phosphorus or phosphate-free detergents, soaps and household cleaners
- Maintain the La Salle River by protecting natural riparian vegetation and removing garbage and debris from the river and river banks
- Initiate and organize an annual river clean-up or tree planting day within your community
- Ensure that your septic system is functioning properly and is serviced on a regular basis
- Get your abandoned well sealed
- If your water comes from a well, have it tested annually
- Use energy and water efficient fixtures / appliances to reduce water consumption
- Find out where your drinking water comes from

On the Farm:

- Ensure farm drainage is licensed and constructed following proper design principles of no net increase of nutrients to waterways and no destruction of aquatic habitat
- Control drainage from property to eliminate potential flooding threat to downstream neighbors
- Value and maintain wetlands as essential parts of the landscape puzzle
- Don't apply fertilizers or livestock manure next to waterways
- Keep livestock and manure storage sites away from waterways and out of flood prone areas
- Consider spring rather than fall fertilizer application to reduce losses from flooding and runoff
- Incorporate Phytase into your swine and poultry feed
- Consider building a short-term water retention project on your property
- Base fertilizer / manure application on your soil test results and on the needs of your crop
- Establish and maintain some grass cover along waterways to help reduce erosion, catch sediment and provide wildlife habitat

Request your Municipal and Provincial governments to:

- Provide greater financial support to maintain the existing network of Provincial Waterways critical for the success of the farming community
- Implement land use and development decisions that eliminate risk and protect your drinking water source

APPENDIX C: GLOSSARY

Aquatic ecosystem – The components of the earth related to, living in or located in or on water or the beds or shores of a water body, including but not limited to:

- a) all organic and inorganic matter, and
- b) all living organisms and their habitat, and their interacting natural systems.

Beneficial Management Practice (BMP) – a practical solution used to deal with soil and water conservation concerns, including techniques used to manage agricultural and urban runoff and modify agricultural waste management.

Drinking water source – means raw, untreated water in the environment that is used to supply a drinking water system as defined in *The Drinking Water Safety Act*.

Ecological goods and services – are the natural services that healthy ecosystems provide to society such as the purification of air and water, water supply, raw materials (timber), recreation, habitat, scenery, waste treatment, climate stabilization, erosion control and sediment retention, regeneration of soil fertility, soil formation, carbon storage, biological control and pollination, to name a few.

Non-point source pollution – is pollution that cannot be traced to a single site or source. It is often characterized by garbage, debris, trash, fertilizers, oils, pesticides and other waste and debris.

Point source pollution – is pollution from a single identifiable source, such as a wastewater effluent pipe discharging into a river.

Provincial Land Use Policies (PLUPs) – set of policies describing the Provincial interest in sustainable land use and development. Local planning authorities use them as a guide when preparing their development plan.

Riparian area – represents an area of land adjacent to a waterbody or watercourse that is saturated by groundwater or intermittently inundated by surface water at a frequency or duration sufficient to support the prevalence of vegetation typically adapted for life in saturated soil.

Stakeholder – means a person (or group) who is responsible for making or implementing a management action, who will be affected by the action, or who can aid or prevent its implementation.

Water control works – means any dyke, dam, surface or subsurface drain, drainage, improved natural waterway, canal, tunnel, bridge, culvert borehole or contrivance for carrying or conducting water, that:

- a) temporarily or permanently alters or may alter the flow or level of water, including but not limited to water in a waterway or waterbody, by any means, including drainage; or
- b) changes or may change the location or direction of flow of water, including but not limited to water in a waterway or waterbody, by any means, including drainage.

Waterway – means any landscape feature (natural or artificial) that continuously or intermittently transports water on the earth’s surface, including headwater, rivers, creeks, channels, streams and drains.

Water Quality Index (WQI) – is a means of summarizing large amounts of data into simple terms for reporting to management and the public in a consistent manner. It is calculated using twenty-five water quality variables and combines the scope, frequency and amplitude that variables exceed the water quality objectives and guidelines. The Water Quality Index ranges from 0-100 and is used to rank water quality into categories ranging from poor to excellent. Similar to the UV index or an air quality index, it can tell us whether the overall quality of water bodies poses a potential threat to various uses of water, such as habitat for aquatic life, irrigation water for agriculture and livestock, recreation and aesthetics, and drinking water supplies.

Zoning By-law – is a detailed document (text and maps) used by a planning authority (municipality or planning district) to implement development plan policies. A zoning by-law works by regulating land use and development to ensure that it is consistent with the objectives and policies of the development plan.