SOUTHWEST INTERLAKE

INTEGRATED WATERSHED MANAGEMENT PLAN

EXECUTIVE SUMMARY

The West Interlake Watershed Conservation District, in partnership with local stakeholders, developed the Southwest Interlake Integrated Watershed Management Plan. A Project Management Team facilitated the completion of the plan and established three watershed goals, based on review of technical information and public input received.

WATERSHED GOALS

1 **SURFACE WATER MANAGEMENT**
Enhance surface water management while ensuring that practices and activities respect current land use, the environment, and potential for downstream impacts

2 **WATER QUALITY PROTECTION**
Protect and improve groundwater and surface water quality

3 **FISH AND WILDLIFE HABITAT CONSERVATION**
Protect, restore and enhance fish and wildlife habitat

Recommendations to address watershed issues and meet the watershed goals have been developed and assigned to one or more organizations. The implementation of these recommendations through partnerships and cooperation over the next ten years is vital to the long-term health and sustainability of the Southwest Interlake Watershed.

Front cover photo: Burnt Lake northeast of Lundar, MB.

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Fenced pasture near St. Laurent

West Interlake Watershed Conservation District's 2016 field tour

INTRODUCTION

The planning process for the Southwest Interlake IWMP began in 2014, with the Manitoba government, under the authority of The Water Protection Act, designating the West Interlake Watershed Conservation District (WIWCD) as the Water Planning Authority for the Southwest Interlake Watershed. The Water Planning Authority's primary role was to lead the development of the plan.

The West Interlake Watershed Conservation District appointed a Project Management Team to undertake the planning process and develop the plan. The team was responsible for engaging the public throughout the planning process, obtaining information relevant to the watershed, coordinating all meetings, writing the plan, and moving it along through the review and approval process.

To obtain technical information about the watershed, the Project Management Team established a Watershed Team comprised of representatives from organizations with interests and management responsibilities in the watershed. The Watershed Team also provided recommendations to address watershed issues, reviewed the draft plan, and committed to plan implementation.

Four public meetings were held throughout the planning process where watershed residents and stakeholders provided valuable input on watershed values, issues, and required actions. A record of the public meetings was documented in a 'What we heard' report, available on the West Interlake Watershed Conservation District website at **www.wiwcd.com**.

An **Integrated Watershed Management Plan (IWMP)** is a document prepared with local input and with the purpose of maintaining a healthy watershed by addressing issues and positively influencing the stewardship of land, water, and aquatic ecosystems. A healthy watershed is the result of good land and water management practices, community efforts to support and protect water quality, responsible land use planning, and an ethic of sustainability and environmental stewardship.

SOUTHWEST INTERLAKE WATERSHED

The Southwest Interlake Watershed is located along the eastern shore of Lake Manitoba in Manitoba's Interlake Region. The watershed is approximately 3,829 km^2 (1,478 mi^2) in size and part of the 79,000 square km^2 (30,500 mi^2) Lake Manitoba Basin. The watershed includes all or parts of the municipalities of Armstrong, Coldwell, St. Laurent, Woodlands, West Interlake, Portage la Prairie, Fisher, and Rockwood. The watershed has a resident population of about 4,400 people.

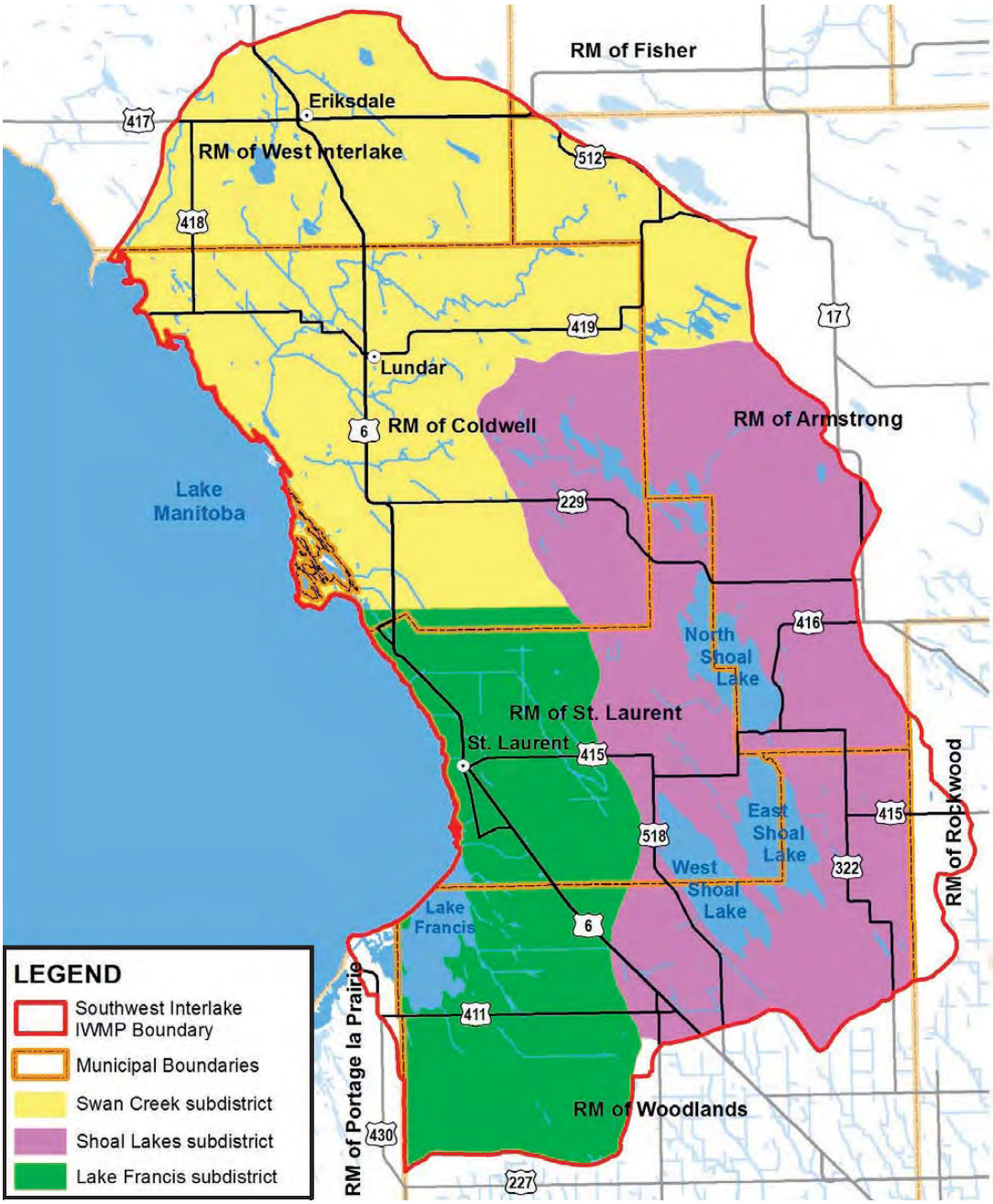


Figure 1: Municipalities and WIWCD subdistricts in the Southwest Interlake Watershed

LAND COVER AND LAND USE

Land cover in the watershed is primarily grassland/rangeland, trees and wetlands. Based on 2002 land cover data, 37.5% of the land was classified as grassland and rangeland, 26% trees, 19.5% wetlands, 6.5% water, 5% agricultural cropland, 4% forages, and 1.5% urban/transportation. The predominant land use is agriculture for livestock production.

TOPOGRAPHY

The watershed is characterized by relatively flat land, scarred with many shallow parallel undulations and ridges oriented in a northwesterly direction, commonly referred to as ridge and swale topography. Elevation in the watershed decreases from east to west.

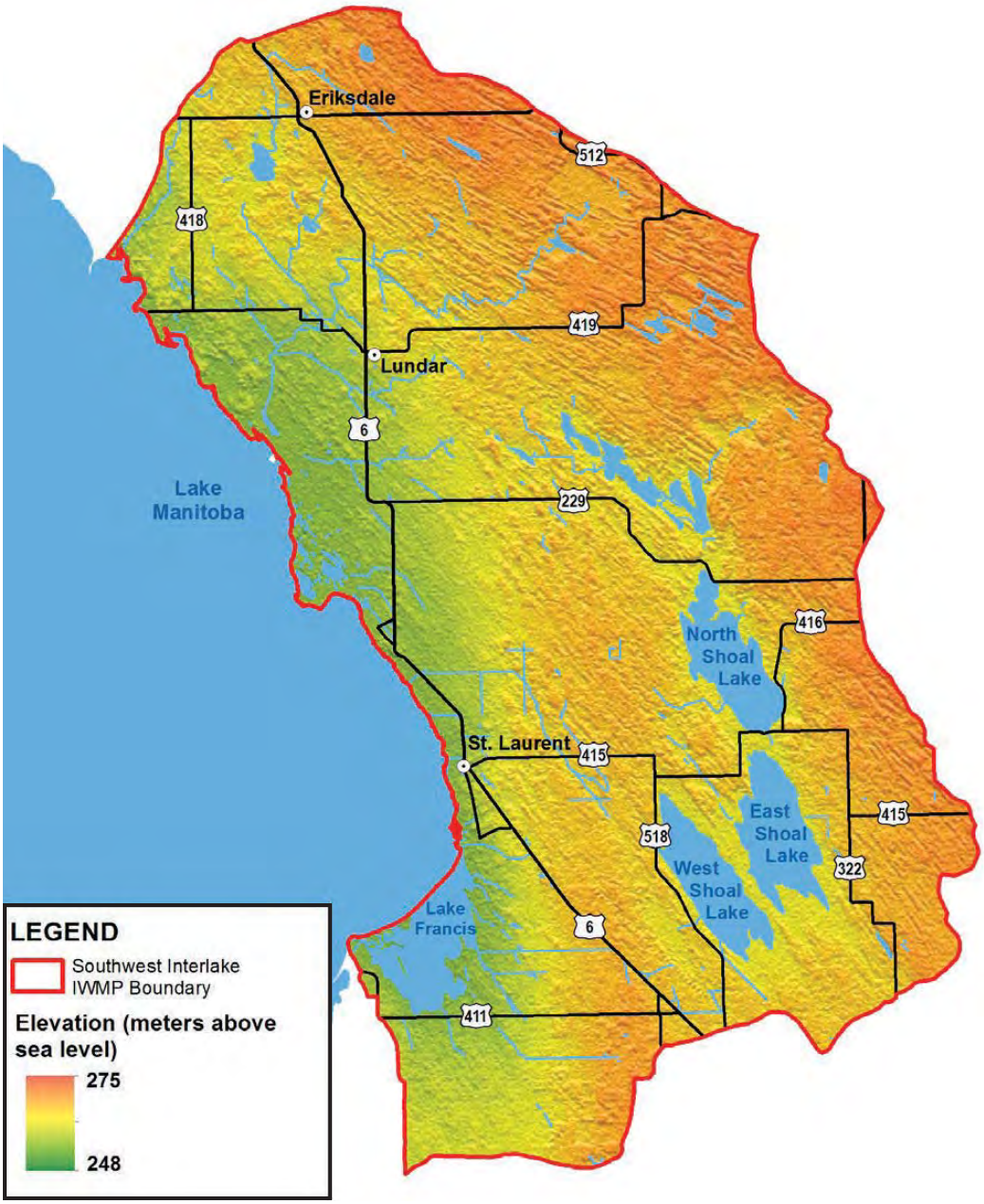


Figure 2: Topography in the Southwest Interlake Watershed

AGRICULTURAL CAPABILITY

The Canada Land Inventory classifications of agricultural capability is a 7-class system of rating mineral soils based on the severity of limitations they present to dry land farming. The rating system indicates the capability of land to sustain agricultural crops based on limitations with soil properties, landscape features and climate.

The agricultural capability information shown in Figure 3 is based on reconnaissance level soil survey information from the Fisher-Teulon soil survey report of 1961, at a scale of 1:100,000. Land in the watershed is classified as: 66.5% Class 4, 13% Class 7, 11.8% Class 6, 5% Class 5, 3.5% organic soils, and 0.2% Class 3.

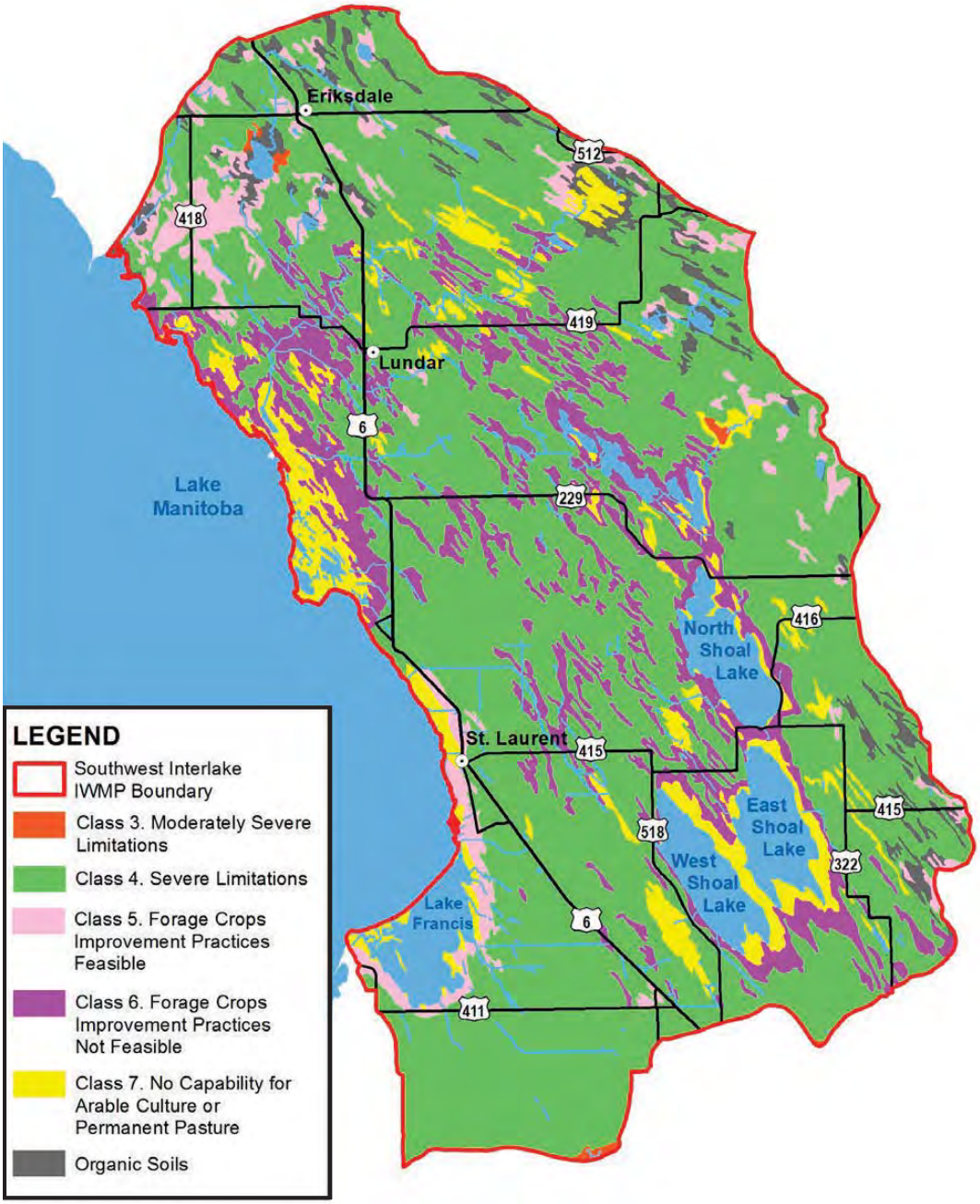


Figure 3: Agricultural Capability in the Southwest Interlake Watershed

WATERWAYS AND WATER CONTROL INFRASTRUCTURE

The main waterways in the watershed are Swan Creek, Burnt Lake Drain, Hatchery Drain, Chippewa Creek Drain, Lundar (Mud Lake) Drain, Island Lake Drain, and Wagon Creek.

There are 130 km of provincial waterways, over 180 km of municipal drains, three provincial dams and 13 Ducks Unlimited Canada wetland projects located in the watershed.

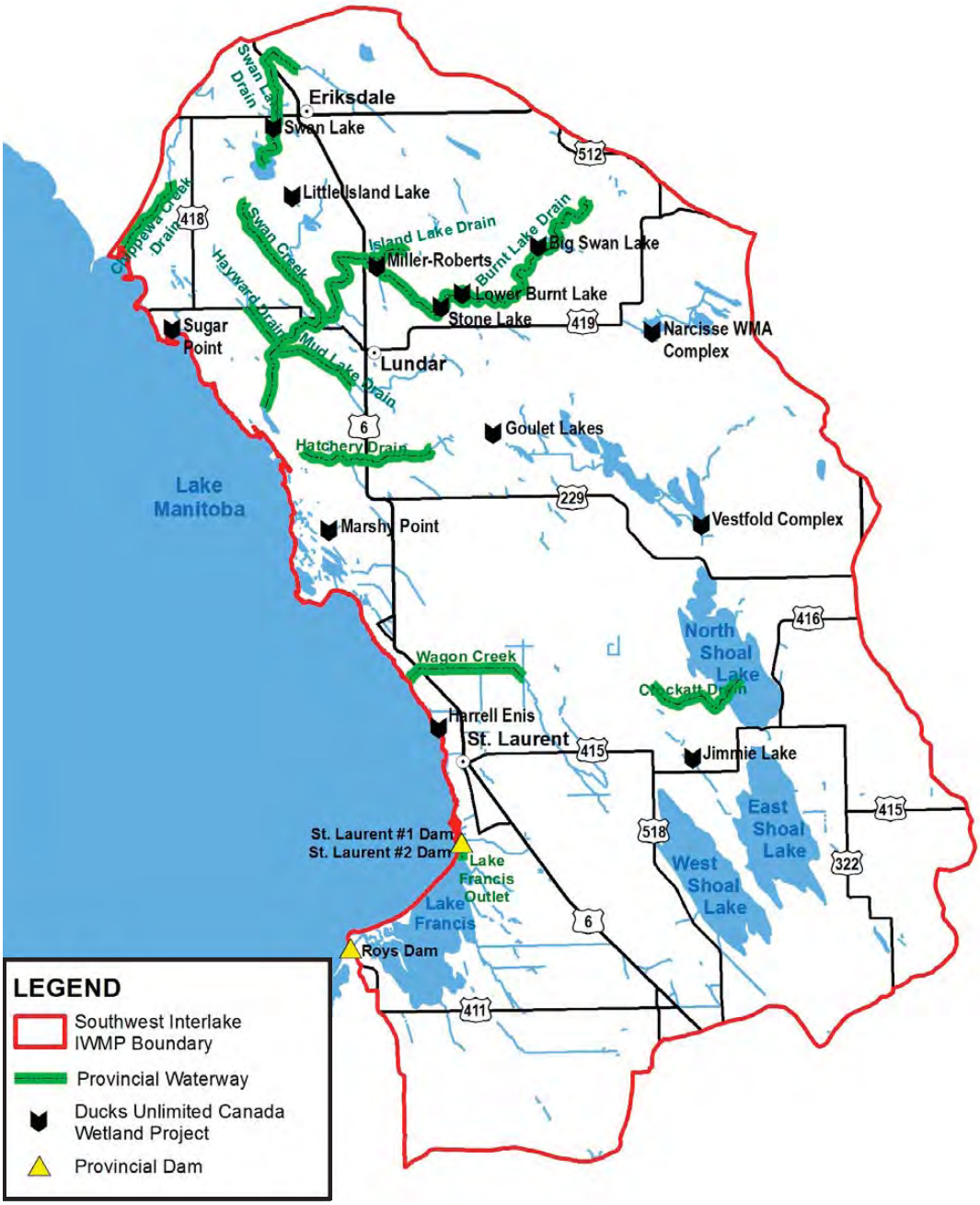


Figure 4: Waterways and Water Control Infrastructure in the Southwest Interlake Watershed

SURFACE WATER QUALITY

Manitoba Sustainable Development maintains one long-term water quality monitoring site in the watershed at the Swan Creek Drain near Lundar. Water sampling at the site began in 2011. The site is sampled on a quarterly basis for general chemistry, nutrients, metals, and bacteria.

The results from the long-term monitoring site are as follows:

PHOSPHORUS

Total phosphorus concentrations were typically near the Manitoba Water Quality Guideline for rivers of 0.05 mg/L with some elevated concentrations above the acceptable guideline in the autumn and spring of some years. Phosphorus is a key element necessary for plant development in aquatic ecosystems but high levels can cause algae growth, impair drinking water quality, and limit recreational activities.

NITROGEN

Total nitrogen concentrations were relatively constant at about 2.0 mg/L. Although there is no provincial guideline for total nitrogen, one piece of the objective is to limit nitrogen to the extent necessary to prevent nuisance growth and reproduction of aquatic plants, fungi and bacteria or that which would render the water unsuitable for other beneficial uses.

DISSOLVED OXYGEN

Dissolved oxygen concentrations were typically above the Manitoba objective of 5.0 mg/L, indicating that there is adequate dissolved oxygen present to support healthy aquatic life. Winter dissolved oxygen concentrations are variable and were occasionally below acceptable levels for aquatic life.

BACTERIA

E. coli bacteria densities were typically less than the Manitoba Water Quality recreational objective of 200 *E. coli* per 100 mL.

Additional surface water quality testing was completed at the following locations in the watershed:

SHOAL LAKES

Water quality was sampled in the Shoal Lakes as part of the 2010 Shoal Lakes Watershed Study[1] and the 2014 Shoal Lakes Watershed Aquatic and Riparian Assessment[2]. The results showed similar water quality among the three Shoal Lakes. Water quality was described as relatively turbid and very hard, with naturally high concentrations of nutrients, relatively high conductivity and levels of total dissolved solids, and slightly saline and alkaline (pH >7).

SWAN CREEK WATERSHED

Results from the 2009 Swan Creek Watershed Riparian and Aquatic Habitat Assessment[3] showed issues with nutrient loading and algal blooms in the Lundar (Mud Lake) Drain, Hatchery Drain, and Burnt Lake Drain. Turbidity due to high sediment loads and the presence of livestock in riparian areas and waterways was also an issue in some areas of the watershed.

LAKE FRANCIS WATERSHED

Results from the 2010 Lake Francis Watershed Riparian and Aquatic Habitat Assessment[4] indicated that water quality in the study area was good. Dissolved oxygen and water temperatures were within the standards and normal ranges for Manitoba surface waters during the open water season. Although localized issues with turbidity due to the activities of carp were observed, turbidity was not identified as a major issue.

CLEAN BEACHES PROGRAM

Twin Lakes Beach is sampled for *E. coli* bacteria and the presence of algal blooms through the Clean Beaches Program. When water quality issues that could affect public health are observed at a beach, advisories to inform the public are posted on the Clean Beaches Program website and advisory signs are placed at the beach.

Results from the Clean Beaches Program can be found at: **Manitoba.ca/beaches**

Lake Manitoba beach

GROUNDWATER

Groundwater is the primary water source for domestic, agricultural, municipal and commercial use in the watershed. The primary aquifer used is the fractured dolomite and limestone bedrock Carbonate aquifer. The Winnipeg Formation aquifer lies beneath the Carbonate aquifer but is not typically used as a water source due to high salinity.

GROUNDWATER QUALITY

Water quality in the Carbonate aquifer is generally good but typically 'hard'. Hard water contains calcium and magnesium. In some areas of the watershed, fluoride concentrations have been measured above the drinking water quality guideline of 1.5 mg/L.

From 2009 to 2018, the West Interlake Watershed Conservation District partnered with Manitoba Sustainable Development to carry out a well inventory and groundwater assessment project. The purpose of the project was to identify locations of water wells, existing water quality issues, and inform people about the importance of proper water well maintenance. During the nine years that the conservation district participated in the project, they collected over 1,650 well water samples.

The results showed:

- **2.5% of samples exceeded the Manitoba maximum acceptable concentration of *E. coli* per 100 mL of water.**
- **24% of samples exceeded the Manitoba maximum acceptable concentration of Total Coliform per 100 mL of water.**
- **4.7% of samples tested for Nitrates exceeded the Manitoba maximum acceptable concentration for Nitrate of 10 mg/L of NO3 as N.**

Sample results and recommendations to address any observed water quality issues were sent directly to well owners.

GROUNDWATER RECHARGE AND DISCHARGE

Groundwater recharge occurs where water moves downward through the soil into an aquifer. Recharge may occur throughout areas of the watershed but generally is greater in the higher elevations (Figure 2) on the eastern side of the watershed, particularly in areas where the overburden material is thin.

Groundwater discharge is where groundwater moves from an aquifer to the surface. Discharge can occur from flowing wells or at permanent wetlands, springs or seeps. Discharge areas have been observed in the Shoal Lakes, Lundar and Lake Manitoba shoreline areas.

Flowing wells occur throughout the watershed at locations where the water pressure is great enough to force water above ground up through a well casing. The occurrences of flowing wells can change from season to season and from year to year based on local water level conditions. Using information from water well reports, Figure 5 illustrates the highest recorded groundwater level and areas where flowing wells have been reported in

the watershed at the time when the well was completed. Due to the incomplete coverage of water well data throughout the watershed, it is possible that there are places in the watershed where flowing conditions exist but are not shown on the map.

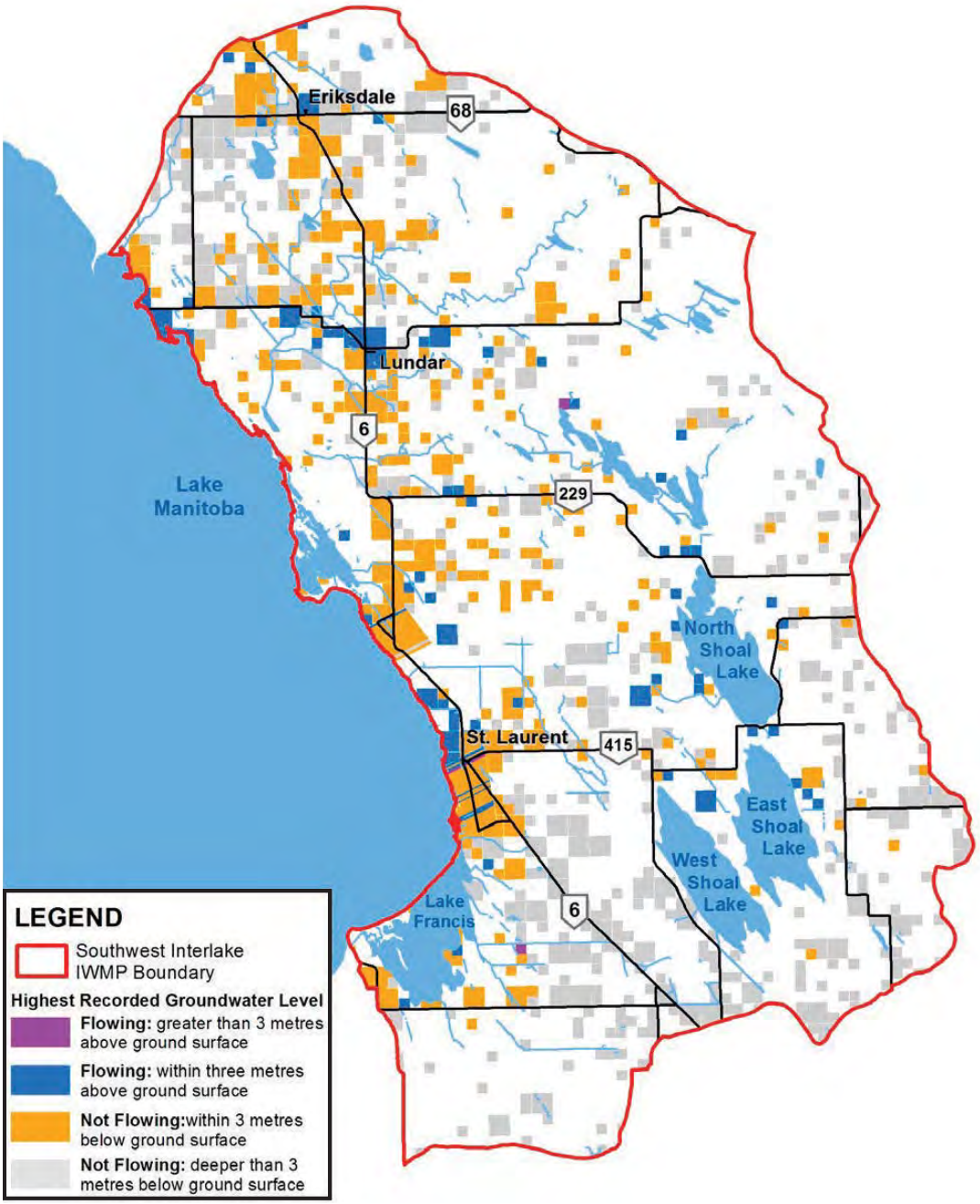


Figure 5: Highest Recorded Groundwater Levels in the Southwest Interlake Watershed excerpt from Flowing and High Water Levels in Manitoba Wells 2016.[13]

WATER USE LICENSING

Water use licensing is authorized under The Water Rights Act. In accordance with the Act, a water use licence is required if water use exceeds 5,500 imperial gallons/day (25,000 liters/day). Water use less than this daily volume falls under the domestic use exemption. As of 2018, there were four licensed water use projects in the Southwest Interlake Watershed. The current water use allocations in the watershed are believed to be well below the sustainable yield of the waterways and aquifers.

Flowing well in the Interlake

FISH

There are 46 species of fish found in the watershed. This represents about half of the fish species found in Manitoba. Marshes and waterways within the watershed that connect to Lake Manitoba are critical spawning, feeding, and nursery habitat for mature and juvenile fish.

WILDLIFE

Mammals found in the watershed include white-tailed deer, elk and black bear and many fur-bearing animals such as coyotes, foxes and beavers. These animals occur throughout the area thanks to the diversity of habitat types and the large tracts of intact wilderness on both private and crown lands.

The Canadian Wildlife Service has identified nationally important colonial water bird nesting habitat in the watershed, and recognizes the area as significant for waterfowl breeding and staging. Bird Studies Canada recognizes the Lake Francis Wildlife Management Area as a 'globally significant wetland' for waterfowl and water bird species. The Manitoba Implementation Plan Committee for the North American Waterfowl Management Plan has listed Lake Francis, Shoal Lakes, and Marshy Point as 'marshes of great significance'.

Bird species of concern observed in these important areas include:

- Horned Grebe (special concern) - passage migrant
- Western Grebe (special concern) - breeding colonies
- Least Bittern (threatened)
- Yellow Rail (special concern)
- Piping Plover (endangered) - historical records
- Red-necked Phalarope (special concern) - passage migrant
- Short-eared Owl (special concern)
- Eastern Whip-Poor-Will
- Red-headed Woodpecker (threatened)
- Eastern Wood Pewee (threatened)
- Olive-sided Flycatcher (threatened) - passage
- Bank Swallow (threatened) - breeds in local area
- Barn Swallow (threatened) - breeds in local area
- Harris Sparrow (special concern) - passage
- Bobolink (threatened)
- Rusty Blackbird (special concern)

Tall-grass prairie, the ecosystem supporting many of the listed species at risk, is itself listed as an Endangered Ecosystem under The Manitoba Endangered Species and Ecosystems Act. The watershed encompasses the northernmost extent of tall-grass prairie in North America and one of only two landscape-scale tall-grass prairie remnants remaining in Manitoba.

The grasslands in the watershed support several prairie-endemic species at risk including Dakota Skipper, Small White Lady's Slipper, and False Foxgloves, all of which are found in few other places in Canada. All of these are listed under national and/or provincial endangered species lists.

PROTECTED AREAS

Lundar Beach Provincial Park and nine Wildlife Management Areas are found either partly or entirely within the watershed. Some Wildlife Management Areas are designated as protected areas where commercial activities such as logging, mining, hydroelectric development, oil and gas development, exploring for and harvesting peat, and other activities that significantly and adversely affect habitat are prohibited by law. Protected areas are identified for biodiversity conservation purposes and contribute to overall watershed health by conserving critical wildlife habitat and ecologically significant lands

COMMUNITY PASTURES

There are four community pastures in or near to the Southwest Interlake Watershed. The Woodlands Community Pasture is managed by the RM of Woodlands. The Portage Community Pasture is managed by the Portage Pasture Association. The Narcisse and Mulvihill Community Pastures are managed by the Association of Manitoba Community Pastures.

Community pastures provide valuable grazing land for local cattle producers, and support some of the last remaining natural prairie ecosystems in Manitoba.

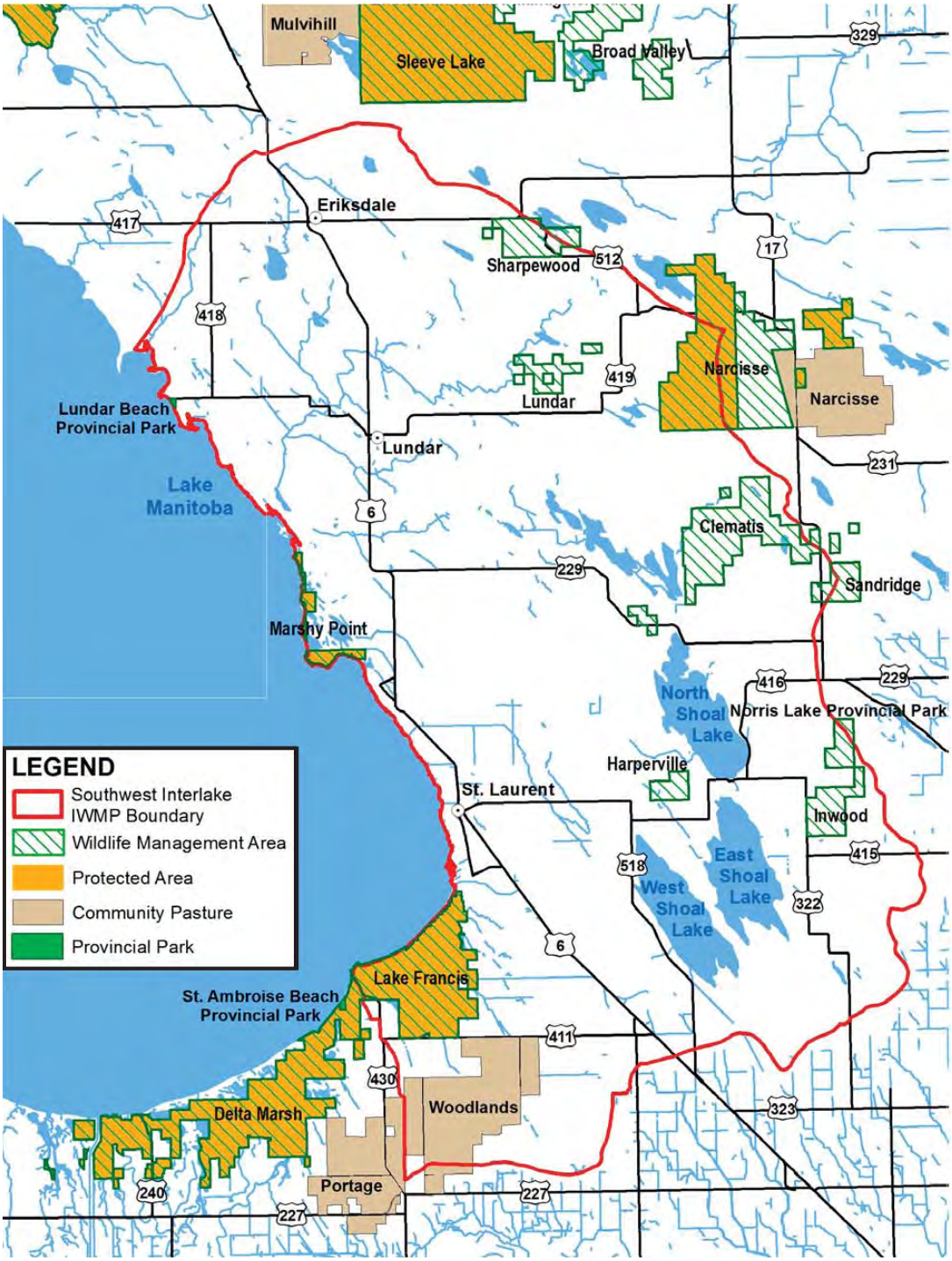


Figure 6: Protected and Conserved Areas in the Southwest Interlake Watershed

LAND USE PLANNING

The Planning Act provides the legislative framework for land use planning in Manitoba. The Provincial Planning Regulation sets out the Province's interest in land and resources, and includes Provincial Land Use Policies (PLUPs) which guide local and provincial authorities in preparing land use plans and making sustainable land use and development decisions.

Municipalities may join to form a Planning District in order to benefit from regional cooperation, coordination of land use policies and development regulations, and sharing of administrative and enforcement functions. Planning Districts must adopt a Development Plan that is consistent with the PLUPs but customized to local conditions. Once adopted, the Development Plan replaces the PLUPs. Any amendment to, or replacement of, the Development Plan requires a public hearing process, as well as approval by the Minister to ensure compliance with the PLUPs.

Development plans include policies intended to protect and manage water, natural areas, riparian areas and aquatic ecosystems, and to control activities and development in hazard areas that include land subject to flooding, water erosion, bank instability, landslides or subsidence. Municipalities play a very important role in watershed management through adherence to policies listed in their development plans. Planning districts or municipalities may request comments on development proposals from stakeholder organizations including conservation districts.

The member municipalities of a Planning District must adopt either a regional Zoning By-law or individual municipal Zoning By-laws. Zoning By-laws provide the means by which to implement the objectives and policies of the Development Plan and mechanisms to establish standards of development. Any amendment to, or replacement of, a Zoning By-law requires approval of Council and must be consistent with the Development Plan.

Plans and by-laws adopted within the Southwest Interlake Watershed:

1. RM of Woodlands
   - RM of Woodlands Development Plan 2643-14
   - RM of Woodlands Zoning By-law 2648-14
2. Western Interlake Planning District (RMs of St. Laurent, Coldwell and West Interlake)
   - Western Interlake Planning District Development Plan By-law 2-04
   - RM of St. Laurent Zoning By-law 5-05
   - RM of Coldwell Zoning By-law 5-05
   - Municipality of West Interlake:
     - RM of Eriksdale Zoning By-law 7-05
     - RM of Siglunes Zoning By-law 6-05
3. Fisher Armstrong Planning District (RMs of Armstrong and Fisher)
   - Fisher Armstrong Planning District Development Plan By-law 3-02
   - RM of Armstrong Zoning By-law 6-04
   - RM of Fisher Zoning By-law 1055-00
4. South Interlake Planning District (RM of Rockwood, RM of Rosser, Town of Teulon, and Town of Stonewall)
   - South Interlake Planning District Development Plan By-law 3-10
   - RM of Rockwood Zoning By-law 17-09
5. Portage la Prairie Planning District (RM of Portage la Prairie and City of Portage la Prairie)
   - Portage la Prairie Planning District Development Plan By-law 1-2006
   - RM of Portage la Prairie Zoning By-law 3096

WATERSHED GOALS

Upon review of technical information and the public input received on watershed issues, three goals were established for the watershed.

1 **SURFACE WATER MANAGEMENT**
Enhance surface water management while ensuring that practices and activities respect current land use, the environment, and potential for downstream impacts

2 **WATER QUALITY PROTECTION**
Protect and improve groundwater and surface water quality

3 **FISH AND WILDLIFE HABITAT CONSERVATION**
Protect, restore and enhance fish and wildlife habitat

The following three sections of the plan include information on watershed issues, existing and proposed management strategies, recommendations to address priority issues, and the organizations involved in plan implementation.

Hatchery Drain

SURFACE WATER MANAGEMENT

ENHANCE SURFACE WATER MANAGEMENT WHILE ENSURING THAT PRACTICES AND ACTIVITIES RESPECT CURRENT LAND USE, THE ENVIRONMENT, AND POTENTIAL FOR DOWNSTREAM IMPACTS.

FLOODED AREAS THROUGHOUT THE WATERSHED

High water levels throughout the Southwest Interlake Watershed over the past decade have significantly changed the landscape and created many issues for residents. The prolonged high water has: reduced acres available for farming, created challenges with access into areas, killed trees, negatively impacted shoreline areas, provided favourable conditions for beavers, contributed to aquatic plant growth in drains and lowland areas, contributed to the spread of weeds and invasive species, and changed surface water flows.

Many of the landscape changes, such as shoreline erosion and the spread of noxious weeds and invasive species, have significantly altered the landscape. Other changes, such as flooded agricultural land, damaged roads, an overabundance of beavers, overgrown drains, and increased fuel load and risk of fires due to dead trees, remain as issues and will require time and money to address. Although provincial financial assistance to assist people with issues caused by the high water levels in the watershed was delivered, eligibility was limited which has left many local producers struggling to address the remaining issues.

RECOMMENDATION	LEAD
1. Work with local landowners, municipalities, Manitoba Agriculture and the West Interlake Watershed Conservation District to develop and implement land restoration plans on crown land in the watershed that has been negatively impacted by high water levels. The management activities could include: timber salvage harvesting, debris clean-up, prescribed burns, establishment of fire guards, pasture grazing, removal of manure piles, and abandoned well sealing.	Manitoba Sustainable Development - Parks and Regional Services, Central Region

2011 FLOOD

In the spring and summer of 2011, water from the Assiniboine River and the Lake Manitoba Basins contributed to very high water levels at Lake Manitoba. Water from the Assiniboine River Basin was diverted into Lake Manitoba through the Portage Diversion. The diversion was used at maximum capability to lessen the risk of downstream flooding. When water levels at Lake Manitoba were approaching their peak level, wind storms occurred and significantly compounded flooding issues, causing extensive and severe damages to properties along the lake.

In response to the devastating impacts of the flood on the Lake Manitoba shoreline, waterfront property owners and municipalities constructed a variety of flood protection works and shoreline protection projects. Emergency Measures Organization (EMO), Manitoba Agricultural Services Corporation (MASC), and Manitoba Infrastructure assisted local people and municipalities during the flood by delivering assistance programs.

PORTAGE DIVERSION

The Portage Diversion is a system of water control structures that can divert water from the Assiniboine River into Lake Manitoba to reduce the risk of flooding downstream along the Assiniboine River and in Winnipeg. Manitoba Infrastructure operates the Portage Diversion according to a set of provincial objectives and operational guidelines. The diversion was put into operation in 1970 and includes two water control structures:

1. **Assiniboine River control structure (spillway) -** serves to regulate flows into the Lower Assiniboine River towards Winnipeg. When the gates are raised, water is backed up in the Assiniboine River and diverted through the diversion inlet structure and into the channel.

2. **Diversion inlet structure and channel –** the inlet structure directs and controls water flow into the channel.

Many people raised concerns with the operations of the Portage Diversion during the 2011 Flood and stated that there needs to be equal or greater outlet capacity from Lake Manitoba if the diversion is to be used regularly and at maximum capacity.

FAIRFORD RIVER WATER CONTROL STRUCTURE

The Fairford River Water Control Structure is located at PTH #6 on the Fairford River and was put into operation in 1961. The structure was built for two primary purposes:

1. To reduce flooding on Lake Manitoba by allowing additional water to flow down the Fairford River into Lake Pinemuta and Lake St. Martin and eventually into Lake Winnipeg via the Dauphin River; and
2. To maintain lake levels during periods of low inflow by reducing outflow into the Fairford River.

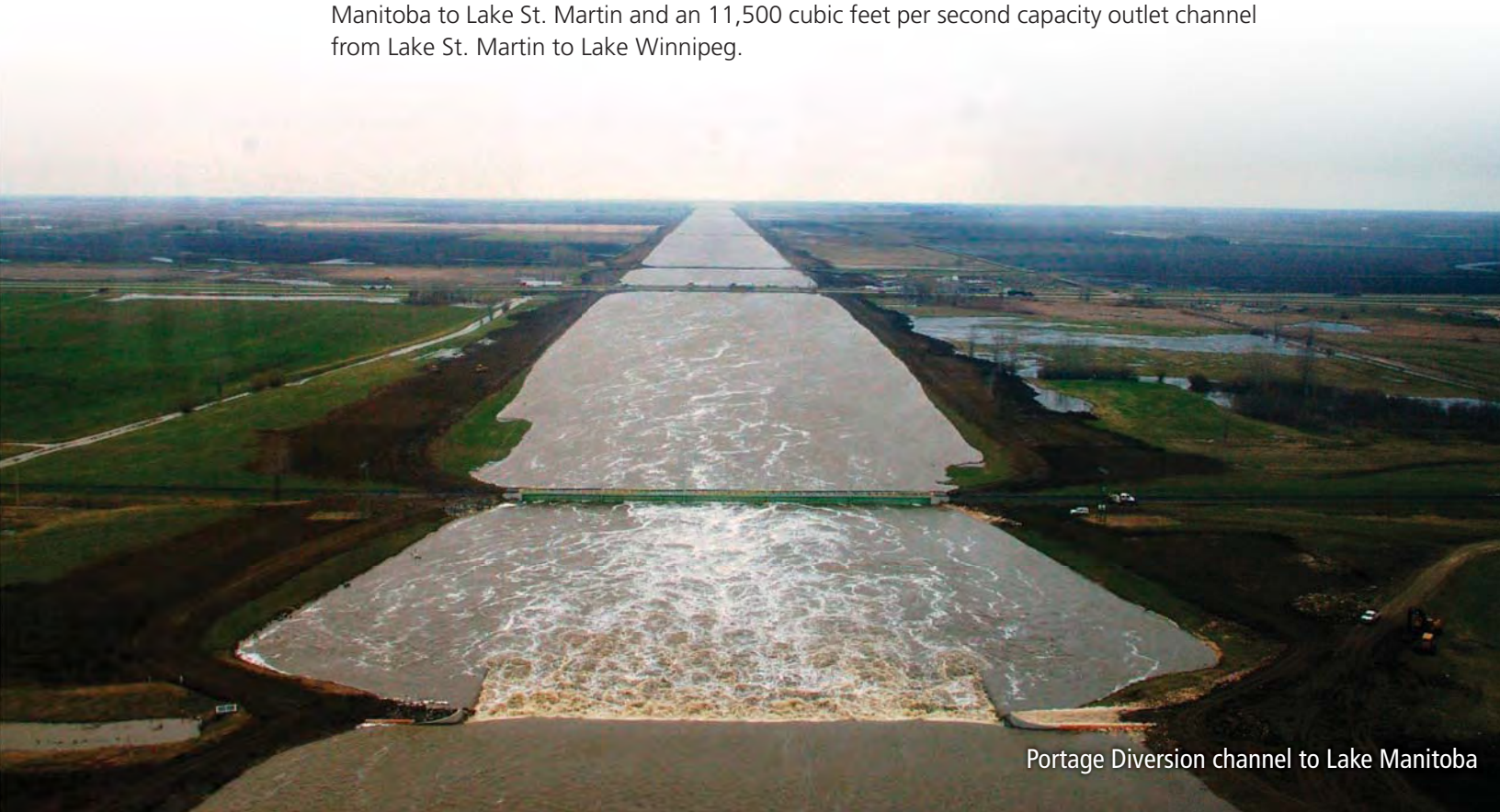
Since put into operation, the structure has significantly changed the patterns of water level fluctuations previously observed at Lake Manitoba. Before 1961, the lake fluctuated through a range of about four feet over multi-year cycles. Fluctuations beyond four feet occurred in 1964 when the lake got as low as 810 feet above sea level and as high as 814.5 above sea level in 1976, 2008 and 2009. Post 1961, the highest water level occurred in 2011 when the flood peak at Lake Manitoba reached 817 feet above sea level.

EMERGENCY CHANNEL

During the flood of 2011, under declaration of a state of emergency, Manitoba Infrastructure constructed an emergency outlet channel from Lake St. Martin to Lake Winnipeg. The channel was put into operation on November 1, 2011 and was successful in lowering water levels at Lake St. Martin. Because the channel was constructed on an emergency basis without any environmental reviews, it was closed in the fall of 2012.

In October 2013, Manitoba Infrastructure released the 2011 Flood: Technical Review of Lake Manitoba, Lake St. Martin and Assiniboine River Water Levels report[5]. The purpose of the report was to examine the 2011 flood events on Lake Manitoba and the Assiniboine River and the linkages between these events, and to address the question of whether artificial flooding occurred on Lake Manitoba. The report includes information about the Assiniboine River and Lake Manitoba Watersheds, geography of the region, pre-development conditions, history of flood events, existing water control infrastructure, regulated versus unregulated flooding, analysis of the 2011 flood event, and conclusions and next steps.

Manitoba Infrastructure is proposing the construction of additional water control works for the purpose of reducing the frequency and severity of high flood levels on Lake Manitoba. The proposed projects include a 7,500 cubic feet per second outlet channel from Lake Manitoba to Lake St. Martin and an 11,500 cubic feet per second capacity outlet channel from Lake St. Martin to Lake Winnipeg.



Portage Diversion channel to Lake Manitoba

RECOMMENDATIONS	LEAD
1. Construct the proposed new outlets from Lake Manitoba and Lake St. Martin to increase outflow capacity and provide better regulation of water levels at Lake Manitoba.	Manitoba Infrastructure - Water Management and Structures Division
2. Continue to implement the recommendations in the 2011 Flood: Technical Review of Lake Manitoba, Lake St. Martin and Assiniboine River Water Levels report.	
3. Operate the Portage Diversion in accordance with provincial objectives and operational guidelines and notify the public prior to use.	
4. Provide technical support for water retention projects in the Assiniboine River Basin upstream of Portage la Prairie.	Manitoba Sustainable Development - Water Science and Watershed Management Branch
5. Restrict developments that accelerate erosion and contribute to shoreline instability.	Planning Districts and Municipalities
6. Deliver a tree planting program to assist watershed residents with re-establishing trees lost as a result of the 2011 Flood.	West Interlake Watershed Conservation District
7. Raise the profile of downstream issues at Lake Manitoba and support wetland protection and water retention projects throughout the Southwest Interlake Watershed and the Assiniboine River Basin upstream of Portage la Prairie.	
8. Prior to starting a shoreline restoration or protection project, property owners should: • Review the Lake Winnipeg Shoreline Management Handbook[6] • Obtain technical advice from the Shoreline Erosion Technical Committee (SETC) through their local municipality • Communicate with adjacent property owners to adopt a coordinated and effective approach to shoreline protection or restoration works • Accurately determine the ownership of the land where structures are planned to be built • Obtain the necessary work permits by contacting the applicable Planning District or local municipal office	Property owners
9. Plant locally sourced trees, shrubs, willows, and deep rooting grasses along shorelines and along riparian areas to help minimize erosion and provide shoreline stabilization.	

HIGH WATER LEVELS IN THE SHOAL LAKES AREA

In 1990, the water level at the Shoal Lakes was the lowest ever recorded at 259 meters (850.20 feet) above sea level. By the mid-90s, due to drainage improvements and increased precipitation as a result of the extended wet cycle, water levels began to rise. By 2010, the water level at the Shoal Lakes was at its highest ever recorded level of 261.78 meters (858.86 feet) above sea level. The record high water level observed at Shoal Lakes was representative of high water throughout the watershed. In addition to the thousands of acres of flooded agricultural land, many roads were impacted by the high water. In 2015, sections of PR 415 and PR 416 were closed due to flooding. This led to a 1,200 signature petition requesting the Manitoba government immediately repair the damaged roads.

In 2001, the Western Interlake Water Management Association submitted a request to Manitoba Conservation (now Manitoba Sustainable Development) to study options for controlling water levels at Shoal Lakes. Subsequently, a committee comprised of provincial representatives and Ducks Unlimited Canada was established to investigate and prepare a feasibility report. The final report, Shoal Lakes Water Management Options – Preliminary Investigations[7], was released in August 2002. The report presented three options for lowering lake levels in the Shoal Lakes area. All three of the options involved the construction of drainage outlets from the Shoal Lakes to Lake Manitoba. The report stated that the work was preliminary in nature and intended only to determine if any of the options warranted further analysis. After some relatively simple cost-benefit analyses, using only benefits to agriculture and local infrastructure, one option was discounted, and two were deemed worthy of further examination.

In 2010, KGS Group was hired by Manitoba Water Stewardship (now Manitoba Sustainable Development) to conduct the Shoal Lakes Watershed Study. The purpose of the study was to review existing information and reports and explore options to address high water issues. Upon completion of the study and following some additional public meetings, Manitoba Infrastructure and Manitoba Agriculture developed the Shoal Lakes Agricultural Flooding Assistance Program. The intent of the program was to provide assistance and financial support to agricultural producers affected by the flooding in the Shoal Lakes area.

The Shoal Lakes Agricultural Flooding Assistance Program included:

Part A

- Assistance for lost production: land payments for lost production (per acre) 2011 and retroactive payment for 2010
- Transportation assistance (April 1, 2011 to March 15, 2012) to transport feed to livestock or livestock to feed
- Transitional assistance: voluntary buy-out participants provided one additional year (2012) for lost production component
- Special assistance: assistance provided for emergency costs such as equipment rental, animal rescue, temporary pens, and emergency feed purchases

Part B

- Shoal Lakes Voluntary Buyout Program

Although the assistance program was helpful to some landowners, others that intended to continue farming in the area felt that the bigger issues and challenges with high water levels and flooding were not adequately addressed. In addition, they raised concerns that the potential threat of flooding to downstream municipalities along the Grassmere Drain had been ignored. They stated that the threat could be addressed with a combination of controlled outlets from Shoal Lakes. As of 2018, there are no plans to construct outlets from the Shoal Lakes to Lake Manitoba or Grassmere Drain.

People also raised issues with how the assistance program was delivered and how fair and equitable it was. They questioned why some upland parcels, unaffected by the high water events, were purchased through the program, the fairness and accuracy of the land assessment values used to determine the land purchase offers, and if local farmers would, as promised, be given first opportunities for the available Crown land leases on land purchased through the program.

Crown land coding indicates if land is made available for agricultural leases. Some of the lands around the Shoal Lakes, considered unsuitable for agriculture but of high value as wildlife habitat, are being considered for designation as a Wildlife Management Area.

RECOMMENDATIONS	LEAD
1. Provide local producers with agricultural Crown land lease opportunities and long-term lease agreements in the Shoal Lakes area.	Manitoba Agriculture - Agri-Resource Branch
2. Repair the flood-damaged stretches of PR 415 and PR 416 to allow year-round travel.	Manitoba Infrastructure - Highways Regional Operations, Region 4, West Central

Shoal Lakes Flooding at PR518

DRAIN MAINTENANCE AND THE WATER RIGHTS ACT

Drains in Manitoba are classified by size from order 1 to 7. First order drains are the smallest and 7th order are the largest. In the Southwest Interlake Watershed, municipalities typically maintain the 1st, 2nd, and some 3rd order drains, while Manitoba Infrastructure maintains the 3rd order and higher drains. Responsibility for the drains includes the associated crossings and bridges. The exception to this is crossings under provincial roads and provincial trunk highways, which are the responsibility of Manitoba Infrastructure. The drains under provincial jurisdiction are generally designated as provincial waterways.

The Water Rights Act is intended to minimize negative impacts of drainage works on downstream landowners or jurisdictions and mitigate negative environmental impacts. All upgrading or construction of drainage works by agricultural producers, stakeholder organizations or municipal governments is subject to the provisions of the Act.

RECOMMENDATIONS	LEAD
1. Complete the remaining mile of reconstruction in the Hatchery Drain upstream of the old PTH #6.	Manitoba Infrastructure - Water Management and Structures Division
2. Undertake safety upgrades to operating work area at the Swan Lake outlet water control structure.	
3. Continue the drain maintenance and culvert crossing replacement work in the Burnt Lake Drain upstream of PTH #6.	
4. Add an additional culvert in the Lundar Drain where it connects to the Swan Creek.	
5. Obtain authorizations in accordance with The Water Rights Act prior to undertaking any land drainage, water retention or crossing projects.	Property owners

WATER MANAGEMENT AT LAKE FRANCIS

The high water level at Lake Francis has created local issues with flooding of adjacent agricultural land. While some local stakeholders are okay with high water levels at Lake Francis, others want the lake managed at a lower average water level that includes seasonal water level fluctuations to improve wetland function and habitat diversity.

Water levels at Lake Francis are controlled by the two dams at the north outlet: St. Laurent Dam #1 and #2 (shown on Figure 4). The St. Laurent dams became operational on June 24, 1952. They were primarily intended to divert water into Lake Francis when needed and to hold water in Lake Francis to improve habitat conditions for muskrats. The initial plan was to maintain water levels in Lake Francis at a maximum elevation of 813.5 feet (247.95 meters) above sea level in the spring and allow water levels to recede naturally through evaporation the rest of the year. To compensate for situations where wind from Lake Manitoba causes water levels to rise to 813.5 feet above sea level in Lake Francis, the St. Laurent Dam #2 is set at 812.5 feet above sea level and easements have been placed on private land adjacent to Lake Francis.

Manitoba Infrastructure operates and maintains the water control structures that control water levels at Lake Francis. Since most of Lake Francis is within the Lake Francis Wildlife Management Area, Manitoba Infrastructure works in coordination with the Wildlife and Fisheries Branch of Manitoba Sustainable Development.

Other efforts to manage water levels at Lake Francis have occurred over the years. Roy's Canal is a water control structure built in 1947 with the intention of moving water, as needed, between Lake Francis and East Delta Marsh. The project was originally thought to be feasible when the Clandeboye Dam, often referred to as Roy's Dam, was in place, but it never ended up yielding the anticipated benefits. The Lambert Creek is a drain that was built in 2001, under emergency conditions, with the intention of lowering water levels in Lake Francis. A few years after it was built, it became completely blocked by the accumulation of sand at the Lake Manitoba shoreline therefore it also didn't yield the anticipated benefits. Two natural connections between Lake Francis and Lake Manitoba west of the Twin Lakes Road were blocked by the Provincial government around 1944 in an effort to raise water levels in Lake Francis and improve habitat conditions for muskrats.

RECOMMENDATIONS	LEAD
1. Maintain a Lake Francis committee comprised of provincial staff and local stakeholders to develop a plan that meets the needs of multiple stakeholders in the area.	Manitoba Sustainable Development - Wildlife and Fisheries Branch
2. Undertake operating safety upgrades at the St. Laurent dams.	Manitoba Infrastructure - Water Management and Structures Division

Lake Francis Outlet and St. Laurent Dam #2

DUCKS UNLIMITED CANADA WETLAND PROJECTS

Due to challenges with high water levels since the mid-90s and aging infrastructure, issues exist at some of the Ducks Unlimited Canada's 13 wetland projects in the watershed. Ducks Unlimited Canada continues to complete engineering inspections at these controls to monitor conditions. Water levels and flows have exceeded design capacity at some of the Ducks Unlimited Canada control structures, limiting the use of the infrastructure to control water levels. Landowners and municipalities have expressed frustration with a lack of communication and project maintenance by Ducks Unlimited Canada, and would like to see this improved.

Ducks Unlimited Canada invites landowners to contact them to address individual concerns and to work towards solutions, where possible. Ducks Unlimited Canada (Manitoba) can be contacted at 1-204-729-3500.

RECOMMENDATIONS	LEAD
1. Establish a working group of representatives from Ducks Unlimited Canada, Manitoba Sustainable Development, Manitoba Agriculture, Manitoba Infrastructure, West Interlake Watershed Conservation District, municipalities, Nature Conservancy of Canada, and other key stakeholders to explore management concerns and future plans at Ducks Unlimited Canada's 13 wetland projects in the watershed.	Manitoba Sustainable Development - Drainage and Water Rights Licensing Branch

Ducks Unlimited water control structure on the Burnt Lake Drain.

BEAVERS

Although beavers provide benefits to the watershed by creating and maintaining wetland habitat for fish and wildlife, they cause damage to private property, agricultural land and public infrastructure. Governments and landowners face on-going battles and costs associated with controlling nuisance beavers and removing beaver dams.

Activities that remove nuisance beavers and/or disturb a beaver dam must be in accordance with The Wildlife Act and federal regulations / guidelines. Beaver control related proposals on Crown land should always be discussed with a Manitoba Conservation Officer.

Over the years, Manitoba Sustainable Development and Manitoba Agriculture have delivered a variety of nuisance beaver control programs. The general purpose of the programs was to control nuisance beavers that were causing flooding on agricultural land. Rural municipalities, Northern Affairs Community Councils, First Nations, and pasture associations were eligible to apply for funding.

RECOMMENDATIONS	LEAD
1. Renew and continue to deliver nuisance beaver control programming to municipalities, Northern Affairs Community Councils, First Nations, and pasture associations.	Manitoba Agriculture - Agri-Resource Branch
2. Partner with the West Interlake Watershed Conservation District to deliver beaver management workshops and provide information about effective beaver control methods.	Manitoba Sustainable Development - Wildlife and Fisheries Branch

CLIMATE CHANGE ADAPTATION

There is consensus among scientists that climate change is occurring, and in some cases effects are already being felt. Climate change projections for this region generally indicate warmer and wetter winters and longer, warmer and drier summers. Precipitation is likely to vary more from year to year and extreme weather events will likely become more common. This will have implications for our economy, natural environment, health and well-being. Adapting to climate change will bring opportunities as well as challenges. The Prairie Climate Center predicts that over the next few decades, Manitoba could experience significant climatic changes and recommends that municipalities start preparing for the anticipated impacts of these changes. To prepare, municipalities should be learning more about the potential impacts and associated risks, discussing necessary updates to their Development Plans and Zoning By-Laws, and developing actions to improve community resiliency.

Droughts and floods are natural parts of the climatic cycle and can have devastating impacts on landscapes and communities. Both are difficult to predict and adapt to. The most recent climate change models are predicting higher average temperatures and more days above 30 degrees Celsius over the next 30 to 50 years throughout most of Manitoba. It is possible that these warmer conditions could lead to droughts that are more severe and longer in duration and floods that occur more frequently and with higher water levels. Droughts and floods can create an environment that is more susceptible to erosion, forest fires, disease, and the invasion of less desirable species. It can also cause severe and long-term socioeconomic impacts to farmers and communities.

MANITOBA DROUGHT MANAGEMENT STRATEGY

In January 2016, Manitoba Sustainable Development released the Drought Management Strategy. The strategy proposes to assess drought preparedness of basins across Manitoba using variables such as water sources and their reliability, current management of water supply infrastructure, socioeconomic conditions, drought mitigation strategies currently in place, and existing communication networks. The intent of the strategy is to help increase drought resiliency throughout Manitoba.

RECOMMENDATIONS	LEAD
1. Prepare for the anticipated impacts of climate change by learning more about the potential impacts and associated risks, updating Development Plans and Zoning By-Laws and developing an action plan to improve community resiliency.	Municipalities
2. Work with municipalities and key stakeholders to complete a drought preparedness assessment for the Southwest Interlake Watershed.	Manitoba Sustainable Development - Water Science and Watershed Management Branch

WATER QUALITY PROTECTION

PROTECT AND IMPROVE GROUNDWATER AND SURFACE WATER QUALITY

Groundwater and surface water quality is generally described as good throughout the watershed but current activities and proposed developments create risks to water quality.

Groundwater is the primary source of drinking water for people in the watershed. Eliminating or minimizing any risks of pollution to groundwater is critical to the long-term sustainability of safe drinking water sources.

THE GROUNDWATER AND WATER WELL ACT

The primary legislation to manage activities related to the use of groundwater in Manitoba is The Groundwater and Water Well Act. The Act and regulations came into force on January 1, 2017 and replaced The Ground Water and Water Well Act and Well Drilling Regulation introduced in the 1960s.

The Groundwater and Water Well Act applies to the construction and sealing of different types of wells such as:

- water supply wells, including dug and sand point wells
- wells constructed to serve the geothermal industry
- geotechnical wells to serve the construction industry
- monitoring wells to serve the environmental sector

The Act is supported by two regulations:

1) Groundwater and Water Well (General Matters) Regulation which deals with matters such as specifying classes of well-drilling contractors, licensing of well-drilling contractors, liability insurance, contamination found during the construction or sealing of wells, well construction and well sealing reports, and availability of groundwater information
2) Well Standards Regulation which sets out the rules for the construction and sealing of wells and test holes

Newly completed well

THE DRINKING WATER SAFETY ACT

The Drinking Water Safety Act addresses the construction, operation and monitoring of drinking water systems in Manitoba. The Act is supported by the Drinking Water Safety Regulation and the Drinking Water Quality Standards Regulation.

The Drinking Water Safety Act defines three types of water systems: public, semi-public and private. A public water system is defined as a water system with 15 or more service connections, or a system that has fewer than 15 service connections, but has been specifically designated in accordance with the Act, as a public water system. A semi-public water system is defined as a water system that is not a public water system or a private water system. A private water system is a water system that supplies water only to one private residence, or despite supplying water to commercial premises or to more than one private residence, is designated in accordance with the Act, as a private water system.

SOURCE WATER ASSESSMENTS

Owners of public water systems must declare their status to the Office of Drinking Water and operate in compliance with The Drinking Water Safety Act. As of 2018, there were four public water systems and 36 semi-public water systems in the watershed.

Source water assessments were completed at each of the four public water systems in the watershed in July 2015. An assessment team visited each of the sites to identify any threats to source water contamination at the wellhead and within the predetermined 1.5 km radius source water protection area. During the assessments no major threats to water quality were identified and the risk of contamination was rated as very low.

RECOMMENDATIONS	LEAD
1. Place restrictions on activities and developments that present a risk of source water contamination within the 1.5 km radius source water protection area around a public water system well.	Planning Districts and Municipalities

RESPONSIBILITIES OF OWNING A WATER WELL

There are inherent responsibilities with owning and operating a water well such as protecting the wellhead from any potential sources of contamination, performing regular wellhead and water system inspections, and conducting regular water testing. To assist people with properly maintaining their water well and ensuring safe drinking water, Manitoba Sustainable Development provides Well Water Fact Sheets and on-line information.

In accordance with The Groundwater and Water Well Act, any issues with water well maintenance, abandoned wells and flowing wells are the responsibility of the well owner. Abandoned wells can pose a threat to groundwater quality, human health and public safety. Flowing wells can cause issues such as frozen culverts and localized flooding.

The West Interlake Watershed Conservation District realizes the importance of protecting groundwater and offers an abandoned well sealing program. From 2008 to 2018, the conservation district assisted property owners with sealing 130 abandoned wells through the program.

RECOMMENDATIONS	LEAD
1. Implement: 1) Well Head Protection – any efforts or actions at a well or the immediate area around the well to protect it from contamination. 2) Inspection - to ensure the well is operating safely and efficiently. 3) Well Water Testing – annual testing following the correct sampling procedures.	Property owners
2. Seal abandoned wells.	
3. Address issues related to flowing wells in accordance with The Groundwater and Water Well Act.	
4. Retain a licensed well-drilling contractor for the construction of new water wells and an experienced and reputable contractor for water well hook-ups using pitless well construction. https://www.gov.mb.ca/sd/waterstewardship/water_quality/wells_groundwater	
5. Locate new water wells a safe distance from potential sources of contamination and in an area away from surface water runoff pathways and at a minimum distance as specified in provincial regulations.	
6. Ensure that wells located in flood-prone areas have adequate well head protection to prevent flood water from entering and contaminating the well.	
7. Promote the following booklets: a) Manitoba Well Aware[13] b) Guide for Sealing Abandoned Water Wells in Manitoba[13] c) Constructing and Sealing Wells in Manitoba[13]	Manitoba Sustainable Development - Water Science and Watershed Management Branch
8. Partner with West Interlake Watershed Conservation District on the well inventory and groundwater assessment project.	
9. Work in partnership with the West Interlake Watershed Conservation District to encourage and assist property owners with sealing abandoned wells and implementing well head protection, inspection and well water testing.	Municipalities
10. Revisit the wells where issues were observed during the well inventory and groundwater assessment project to retest water quality and assist the well owner with addressing the issues.	West Interlake Watershed Conservation District

ONSITE WASTEWATER MANAGEMENT

Watershed residents and cottagers along Lake Manitoba have expressed concerns over onsite wastewater management, pit privies, integrity of holding tanks, saturated septic fields, illegal pump-outs, and the absence of inspections and enforcement.

Regulations under The Environment Act and Public Health Act exist to protect water quality and public health. Manitoba Environment Officers administer and enforce the Onsite Wastewater Management Systems Regulation pursuant to The Environment Act and Public Health Inspectors administer regulations pursuant to The Public Health Act.

Onsite Wastewater Management Systems information:
www.gov.mb.ca/sd/envprograms/wastewater/index.html

Complaints related to onsite wastewater management issues can be directed to:
Manitoba Sustainable Development 204-785-5030

Holding tank / pump-out systems, if regularly inspected and properly maintained, are the onsite wastewater management systems with the highest level of protection to surface water and groundwater. Wastewater held in holding tanks is pumped out and hauled to a licensed wastewater treatment facility or sewage lagoon.

In a local effort to address some of the onsite wastewater management issues in their local communities, some of the cottage associations along the eastern shores of Lake Manitoba have recently initiated a working relationship with their local Public Health Inspector.

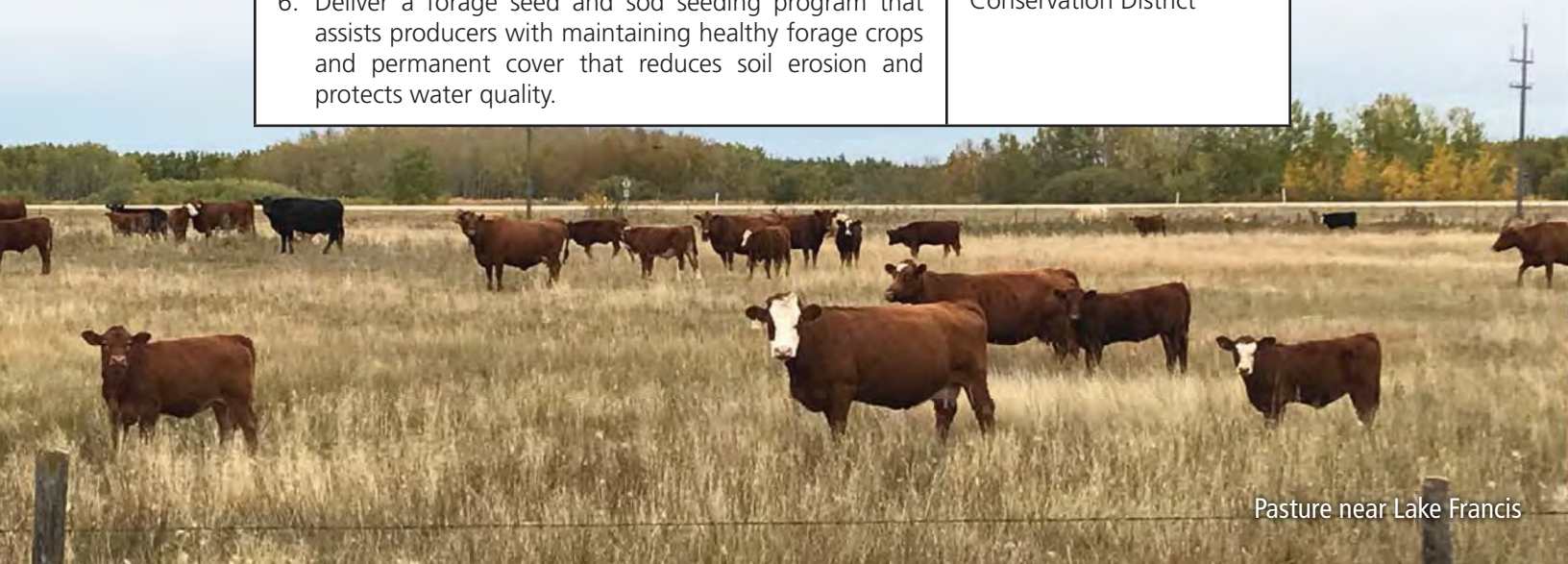
RECOMMENDATIONS	LEAD
1. Increase the number of inspections of onsite wastewater management systems along Lake Manitoba to ensure they are in adherence with provincial regulations.	Manitoba Sustainable Development - Environmental Compliance and Enforcement, Central Region
2. Deliver public awareness initiatives related to owner responsibilities and proper maintenance of onsite wastewater management systems.	
3. Work in cooperation with Manitoba Sustainable Development to ensure that all onsite wastewater management systems are in adherence with the Onsite Wastewater Management Regulation of The Environment Act.	Property owners
4. Perform regular maintenance of onsite wastewater management systems – including leak inspections and regular pump outs by a qualified hauler.	
5. Dispose of greywater into a septic field or holding tank.	
6. Decommission pit privies that are not in adherence with the Onsite Wastewater Management Regulation.	

LIVESTOCK OPERATIONS

Livestock operations can provide numerous economic and environmental benefits but also have the potential to degrade surface water quality, groundwater and aquatic habitats. Implementing effective management strategies such as controlling runoff from livestock feeding areas, restricting livestock direct access to waterways, and moving manure from feeding sites are an important part of maintaining a successful livestock operation.

The Livestock Manure and Mortalities Management Regulation, under The Environment Act, prescribes requirements for the use, management, and storage of livestock manure and mortalities in agricultural operations. Environment Officers from Manitoba Sustainable Development administer and enforce the regulation. Livestock producers are required to adhere to the regulation and are encouraged to implement best management practices that improve their operations and reduce environmental risk associated with manure.

RECOMMENDATIONS	LEAD
1. Implement riparian area fencing and off-site watering systems to protect water quality, improve livestock health, improve wildlife habitat, and enhance biodiversity.	Livestock producers
2. Direct drainage from livestock feeding and wintering sites through grassed buffer strips or into water retention basins.	
3. Prevent the build-up of manure and excess nutrients in the soil by relocating winter feeding sites and applying manure to crop or pasture land at agronomic rates.	
4. Provide technical assistance and funding for the implementation of beneficial management practices for livestock operations.	Manitoba Agriculture - Agri-Resource Branch
5. Deliver riparian management programming that includes riparian area fencing, off-site watering and winter watering systems.	West Interlake Watershed Conservation District
6. Deliver a forage seed and sod seeding program that assists producers with maintaining healthy forage crops and permanent cover that reduces soil erosion and protects water quality.	



Pasture near Lake Francis

IMPACT OF PORTAGE DIVERSION ON WATER QUALITY

Based on university research completed by Page[8], Nicholson[9], Pernerowski[10], and Fred[11], the Water Quality Management Section of Manitoba Sustainable Development reports that in years when the Portage Diversion is operated to divert water from the Assiniboine River to Lake Manitoba, it was the major contributor of phosphorus to the lake. In years when the diversion was in operation, it contributed from 38 to 87 percent of the total phosphorus inputs to the lake. In 2011, 3,378 tonnes of phosphorus were loaded from the Assiniboine River Diversion. By comparison, in 2008, when the Portage Diversion was not operated, only 89 tonnes of phosphorus were loaded to Lake Manitoba from other sources such as the Waterhen River, Whitemud River, and atmospheric deposition.

Research has also shown that phosphorus in the southern basin of Lake Manitoba does not quickly move north out of the lake but remains in sediment where it can be re-suspended by wind and wave action. Re-suspension of phosphorus can negatively impact water quality.

RECOMMENDATIONS	LEAD
1. Continue to monitor water quality in the Assiniboine River and south basin of Lake Manitoba.	Manitoba Sustainable Development - Water Science and Watershed Management Branch
2. Encourage the implementation of beneficial management practices that retain water on the landscape and reduce nutrient loading in the Assiniboine River Basin upstream of Portage la Prairie.	

HAZARDOUS WASTE

Hazardous waste can pose a serious risk to human health and contamination of groundwater. Hazardous waste items commonly found around most homes include: paints, lacquers, turpentine, wood preservatives, kerosene, bleach, ammonia, batteries, fluorescent/CFL bulbs, rodent poison, insecticides, fertilizers, fungicides, herbicides, gasoline, antifreeze, brake and transmission fluids. Hazardous waste should not be disposed of in regular garbage and should be taken to a local waste transfer site.

Certain building and landscaping products can pose threats to human health and the environment. Railway ties treated with creosote are not recommended for any landscaping or shoreline construction projects. Creosote is a mixture of toxic chemicals that can leach into soil or water and are toxic to plants and people.

PETROLEUM PRODUCTS

Petroleum products and allied petroleum products can pose a serious risk to contamination of soil and water. Contamination can occur from large spills or from small leaks and spills over a long period of time. Allied petroleum products are defined in the Storage and Handling of Petroleum Products and Allied Products Regulation. Some common Allied Products include thinner, solvent, boiled linseed oil, acetone, isopropanol, benzene, and methanol.

Manitoba's Dangerous Goods Handling and Transportation Act and the Storage and Handling of Petroleum Products and Allied Products Regulation place conditions and requirements on the use, replacement or decommissioning of large volume petroleum storage tanks. Petroleum product and allied product storage facilities are required to have operating permits in accordance with the Regulation. For storage tank systems with aboveground tanks 5,000 liters or greater, and/or underground tanks, Manitoba Sustainable Development requires that all storage tank systems be inspected and maintained in accordance with the Regulation. Inspections and performance testing can only be completed by a provincially licensed petroleum technician.

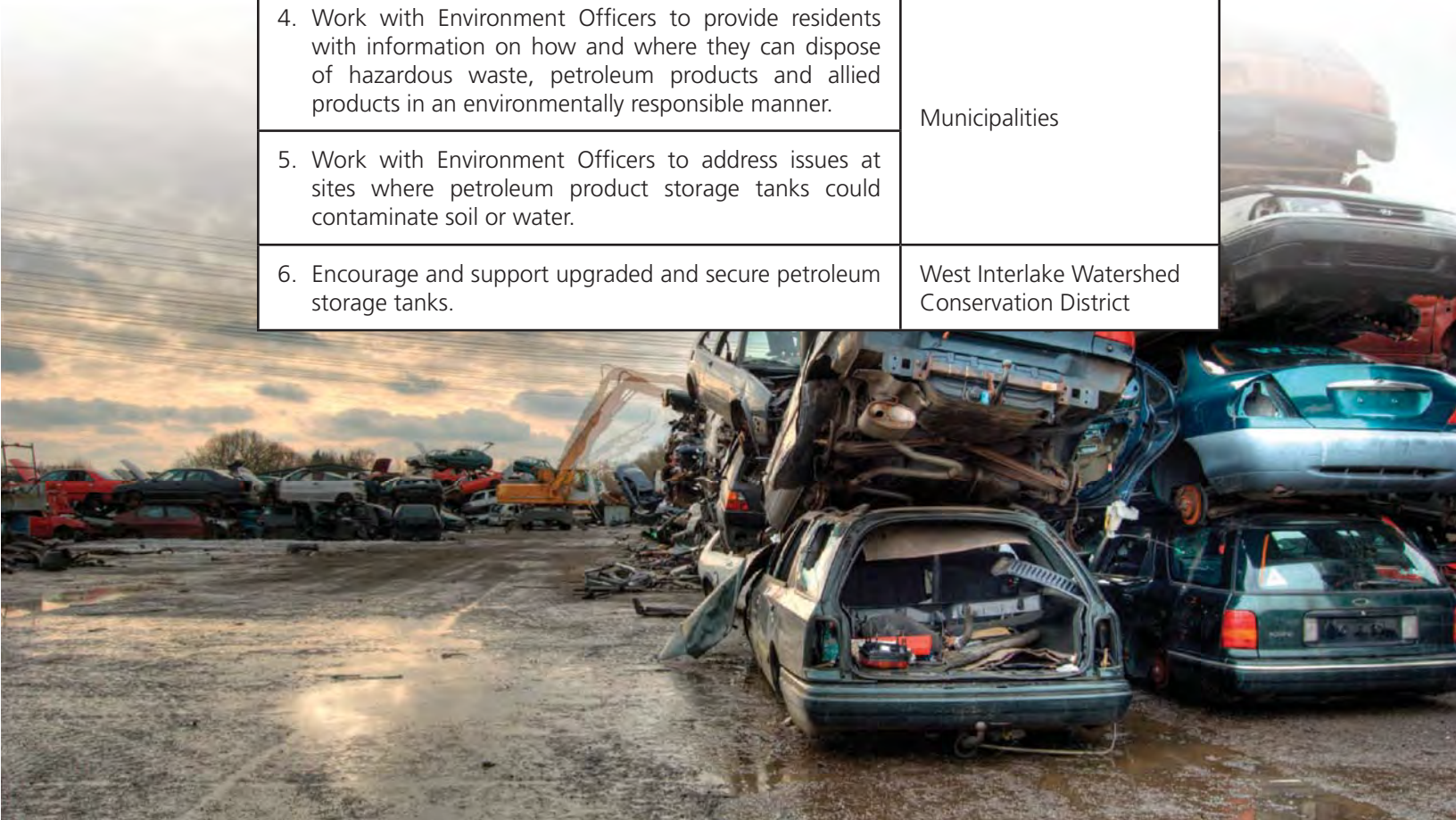
Owners of petroleum and allied product storage facilities are responsible to proactively identify and eliminate risks to soil or water contamination and public health. Where spills and runoff from petroleum storage tanks could potentially contaminate soil or water, owners should contact an Environment Officer to inform them of the situation and address the issues.

CLASSES OF DEVELOPMENT REGULATION

The Classes of Development Regulation under The Environment Act specifies what types of developments require environmental assessment and licensing prior to construction and operation. During the environmental review and assessment process, measures to protect against the potential of these developments to contaminate water are prescribed and included as conditions on the operating licence. Developments such as auto salvage facilities, commercial fertilizer and agricultural chemical storage facilities, and agricultural and industrial processing facilities are examples of some of the types of developments that would require an Environment Act licence under the regulation.

24/7 Environmental Emergency Response Line:
204-944-4888 or toll-free 1-855-944-4888

RECOMMENDATIONS	LEAD
1. Take hazardous waste to your local waste transfer site for proper disposal, and never flush or pour hazardous chemicals down the drain, storm sewer, or on the ground.	Property owners
2. Avoid the use of creosote-treated railway ties for any landscaping or shoreline restoration projects.	
3. To prevent contamination of soil or water, store petroleum products and allied products in a safe and secure location and in accordance with the Storage and Handling of Petroleum Products and Allied Products Regulation.	
4. Work with Environment Officers to provide residents with information on how and where they can dispose of hazardous waste, petroleum products and allied products in an environmentally responsible manner.	Municipalities
5. Work with Environment Officers to address issues at sites where petroleum product storage tanks could contaminate soil or water.	
6. Encourage and support upgraded and secure petroleum storage tanks.	West Interlake Watershed Conservation District



FISH AND WILDLIFE HABITAT CONSERVATION

PROTECT, RESTORE AND ENHANCE FISH AND WILDLIFE HABITAT

Protecting, restoring and enhancing upland areas, riparian areas and aquatic ecosystems helps to provide habitat for fish and wildlife.

RIPARIAN AND AQUATIC ASSESSMENTS

The West Interlake Watershed Conservation District facilitated the completion of riparian and aquatic assessments in the Swan Creek Watershed[3], Lake Francis Watershed[4], and Shoal Lakes Watershed[2]. The assessments included comments on waterway issues, rated the condition of the riparian area habitat into one of three classes, and provided recommendations and lists of potential rehabilitation sites to protect, restore and enhance habitat.

The assessments rated **riparian area habitat** into one of three classes based on site conditions and information obtained from aerial and ground-truthing surveys.

Electrofishing / waterway assessments

- **Class A - Minimally Impacted Riparian Area Habitat**
  Riparian area is greater than 10 m in width on each side of the waterway and is considered adequate to protect the integrity of the aquatic environment. Erosion, degradation and sediment loading is not a concern.
- **Class B - Moderately Impacted Riparian Area Habitat**
  Riparian area is typically less than 10 m in width and functions adequately at capturing and filtering nutrients and sediments before they enter waterways. Vegetation in the riparian areas is somewhat lacking as a result of livestock grazing, location nearby a road, and/or agricultural activities that are encroaching upon the waterway.
- **Class C - Highly Impacted Riparian Area Habitat**
  Riparian area is less than 5 m in width on at least one side of the waterway and appearing degraded and inadequate to protect the integrity of the aquatic environment. Habitat is negatively impacted by extensive erosion, culverts, and/or livestock trampling near watering areas.

  ***These are the areas in most need of rehabilitation efforts.**

SWAN CREEK WATERSHED RIPARIAN AND AQUATIC ASSESSMENT

The riparian area habitat along 146 km of waterways in the Swan Creek Watershed was classified as:

- 3% Class A - minimally impacted
- 91% Class B - moderately impacted
- 6% Class C - highly impacted

LAKE FRANCIS WATERSHED RIPARIAN AND AQUATIC ASSESSMENT

The riparian area habitat along 44 km of waterways in the Lake Francis Watershed was classified as:

- 25% Class A - minimally impacted
- 64% Class B - moderately impacted
- 11% Class C - highly impacted

SHOAL LAKES WATERSHED RIPARIAN AND AQUATIC ASSESSMENT

A total of 199 km of riparian area habitat was assessed along the shoreline of the Shoal Lakes and waterways in the Shoal Lake Watershed.

The riparian area habitat along 181 km of shoreline at the Shoal Lakes was classified as:

- 81% Class A - minimally impacted
- 16% Class B - moderately impacted
- 3% Class C - highly impacted

The riparian area habitat along 18 km of waterways in the Shoal Lakes Watershed was classified as:

- 17% Class A - minimally impacted
- 78% Class B - moderately impacted
- 5% Class C - highly impacted

The Shoal Lakes Watershed Assessment states that since about 2011, fish populations in the Shoal Lakes have increased due to the higher than normal water levels. The assessment also states that even though the lakes may currently be providing sufficient over-winter dissolved oxygen levels for fish species with importance in the lake; winter and summer fish kills could occur if the lake water levels recede significantly.

In 2012, Manitoba Sustainable Development deposited walleye fry into North Shoal Lake. No survival and recruitment assessments were completed but according to local fishermen, the effort was largely unsuccessful. There are no plans for any additional fish stocking at the Shoal Lakes.

WATERWAY ISSUES

A number of waterway issues were identified during the completion of the riparian and aquatic assessments.

- Point source nutrient and sediment loading has negatively impacted water quality within sections of some drains.
- Unrestricted livestock access to waterways has degraded riparian areas and fish habitat and negatively impacted water quality.
- Extensive channelization of natural waterways has reduced fish habitat diversity and altered natural flow regimes.
- Man-made barriers to fish passage such as perched culverts, undersized culverts, bridges, water control structures, earthen dams, ford crossings, rock weirs, and commercial fishing nets and natural barriers such as beaver dams and debris have segmented aquatic habitat and restricted access to upstream habitat. It was noted in the assessments that the degree of impediment to fish movement at the barriers changes annually based on water flow conditions.

PLANNING FISH HABITAT ENHANCEMENT PROJECTS

Proponents are strongly encouraged to discuss all proposed fish habitat enhancement projects with provincial fisheries staff and are responsible for obtaining all necessary provincial and federal authorizations.

RECOMMENDATIONS	LEAD
1. Work with Manitoba Sustainable Development - Wildlife and Fisheries Branch and Manitoba Infrastructure - Water Management and Structures Division to assess the potential for constructing spawning shoals and riffle structures to increase the levels of dissolved oxygen, aquatic diversity and available spawning habitat in waterways throughout the watershed.	West Interlake Watershed Conservation District
2. Work with Manitoba Sustainable Development - Wildlife and Fisheries Branch to develop projects that will address the issues at the Class C Habitat identified in the Swan Creek, Lake Francis and Shoal Lakes Watershed Riparian and Aquatic Assessments.	
3. Work with Manitoba Sustainable Development - Wildlife and Fisheries Branch to investigate barriers to fish passage and determine the need to improve or further restrict fish passage.	
4. Work with Manitoba Infrastructure - Water Management and Structures Division to investigate the potential for relocating the riparian area fence 10 meters farther back from the Swamp Lake Drain (Provincial Waterway) to allow the area to naturally re-vegetate.	
5. Hold information meetings with local landowners, municipalities, government agencies and key stakeholders to discuss future plans and proposals to protect, restore and enhance fish and wildlife habitat.	
6. Work with Manitoba Sustainable Development to manage beaver fences in the Swamp Lake Drain so that they don't restrict fish passage during the spring spawning season.	

7. Continue to issue spring creek White Sucker (mullet) licences during the spring period on waterways connected to Lake Manitoba. Annual harvest rates should continue to be based on commercial fishers' deliveries.	Manitoba Sustainable Development - Wildlife and Fisheries Branch
8. Continue to conduct the annual Lake Index program which includes an average of 45 net locations spread throughout Lake Manitoba.	
9. Continue to operate the Swan Creek Hatchery to provide a supplementary source of walleye fry for Lake Manitoba and other lakes throughout Manitoba.	
10. Continue to manage the installation and removal of screens on the St. Laurent dams in late May / early June to prevent Carp from moving into Lake Francis. Remove the screens on the dams in August / early September to allow juvenile fish to exit the lake prior to winter freeze-up. This strategy will allow native mature fish to access Lake Francis for spring spawning and the opportunity for juvenile fish to spend the summer in the valuable nursery habitat of the lake in spring and summer.	
11. Work with Manitoba Sustainable Development - Wildlife and Fisheries Branch to address the barrier to fish passage at the Hatchery Drain Highway #6 culvert crossing.	Manitoba Infrastructure - Water Management and Structures Division

Highway 6 crossing at Hatchery Drain

AQUATIC INVASIVE SPECIES

Invasive species are plants, animals or other organisms that have been introduced either deliberately or unintentionally, outside of their region of origin. They can threaten the productivity and existence of native species and are successful in their new environments due to their high reproductive rates and absence of predators and diseases[12]. The severity of impacts of some invasive species may be difficult to predict.

Manitoba has several aquatic invasive species, as identified under the Aquatic Invasive Species regulations, such as zebra mussels, rainbow smelt, rusty crayfish and spiny water flea. The four species of invasive (Asian) carp, Prussian carp, and quagga mussels are not found in Manitoba but present a real threat as they are in nearby and upstream jurisdictions.

Human-related vectors such as the overland movement of watercraft, all terrain vehicles, water-related equipment, and float planes can rapidly spread aquatic invasive species to new areas. Preventing the spread of aquatic invasive species, like zebra mussels, is extremely important because once they become established, they generally cannot be eradicated.

To prevent the spread of aquatic invasive species, all people involved in water-related activities must take the following steps before moving any watercraft or water-related equipment from one water body into another water body:

1. **CLEAN** and remove aquatic invasive species and aquatic plants prior to leaving the shore of a water body.
2. **DRAIN** all water from the watercraft (ex. ballast tanks, motor, live well, compartments, etc.) and water-related equipment (ex. bait buckets, boating accessories, etc.) prior to leaving the shore. Drain plugs must be kept out while transporting watercraft.
3. **DRY** completely or decontaminate water-related equipment prior to placing in another water body.
4. **DISPOSE** of all bait used in a provincially-designated control zone water body prior to leaving the shore.
5. **DECONTAMINATE** if watercraft or water-related equipment were last used in a provincially-designated control zone and before placing into another water body.

Aquatic invasive species are listed in schedules attached to the Aquatic Invasive Species Regulation (SOR/2015-0212) under the federal Fisheries Act and the Aquatic Invasive Species Regulation under The Water Protection Act. Possessing any of the listed species in Manitoba is illegal.

ZEBRA MUSSELS

Adult zebra mussels are fingernail-sized, clam-like invertebrates named for their striped pattern on their shells. They are native to the Black and Caspian region of Eurasia, and were introduced to the Great Lakes region of North America in the late 1980s by ocean-going cargo ships. By 1990, zebra mussels had spread extensively throughout all of the Great Lakes and into many eastern U.S. states.

Adult zebra mussels attached to a native mussel from Lake Winnipeg. Credit: Manitoba Sustainable Development

Adult zebra mussels covering a substrate sampler used for monitoring their presence. This sampler was removed from Gimli Harbour in Lake Winnipeg. Credit: Manitoba Sustainable Development

Fully grown, adult zebra mussels are usually 2.5 cm (1 inch) or smaller in size. Adult zebra mussels can survive out of water for up to 30 days depending on the temperature and humidity. Young zebra mussels, in their larval stage, are called veligers. These veligers are microscopic and can passively move downstream by water movement to new locations. They can also be carried unknowingly in water transported by un-drained watercraft, water-based aircraft, ATVs, and water-related equipment such as bait buckets.

Zebra mussels can aggressively invade new areas and reproduce quickly. Adult females can produce upwards of one million eggs each year. They are able to attach themselves to almost anything in water and can have significant negative environmental, economic, and human health implications. In areas where zebra mussels have become established, include:

- shift in the food web
- decline in Lake Whitefish and Walleye populations
- clogged water intake pipes
- more toxic algae blooms
- decline in lake-front property value
- higher water and electricity rates
- greater nuisance to boaters, commercial fishers, anglers and beach-goers

RECOMMENDATIONS	LEAD
1. Deliver public awareness initiatives on aquatic invasive species in the watershed and ways to control and minimize further spread.	Manitoba Sustainable Development - Wildlife and Fisheries Branch
2. Prevent the introduction and further spread of aquatic invasive species by following all provisions outlined in The Water Protection Act and Aquatic Invasive Species Regulation. This includes implementing the CLEAN, DRAIN, DRY, DISPOSE and DECONTAMINATE requirements when moving between water bodies and decontaminating watercraft and water-related equipment used in a control zone before placing it into another water body.	General public
3. Never dump live bait, aquarium water, plants, fish or animals or relocate aquatic fish or animals from one water body to another.	
4. Report all observations of aquatic invasive species to Manitoba Sustainable Development online at www.gov.mb.ca/waterstewardship/stopais/ais_reporting.html or by calling 1-87-STOP-AIS 0 (1-877-867-2470).	

COMMON CARP

Common carp are large, undesirable, vigorous bottom feeders that impact aquatic ecosystems by disturbing aquatic vegetation and substrates. Carp are an introduced species that have since become well established in southwest and central Manitoba and are now considered 'naturalized'. Some small scale commercial harvesting of carp occurs at Lake Manitoba but the market demand is very limited. Efforts to find new markets for carp are ongoing.

Ducks Unlimited Canada is currently leading a multi-partner, marsh restoration project to reverse the deterioration of Delta Marsh. Field studies completed by Ducks Unlimited Canada at Delta Marsh have shown that carp have contributed to increased turbidity and phytoplankton blooms, loss of submerged vegetation, and the destruction of native fish habitat. Phase 1 of the marsh restoration project involved the exclusion of carp from the marsh. During the winter of 2012-13, seven permanent exclusion structures were built on channels connecting the marsh to Lake Manitoba. Baseline information to describe the topography, bathymetry, land use, hydraulics, hydrology, and ecology of the Delta Marsh and adjacent areas was collected to determine changes and scientifically assess the impacts of carp exclusion on the marsh. Depending on what the results show, it is anticipated that similar projects could be implemented at other marshes in the watershed, most notably Lake Francis.

RECOMMENDATIONS	LEAD
1. Continue to support the commercial harvest of carp as long as there are no long term implications to the fishery / aquatic resource and there is a market demand for the fish.	Manitoba Sustainable Development - Wildlife and Fisheries Branch
2. Share the results of the Delta Marsh restoration project with all key stakeholders associated with Lake Manitoba.	Ducks Unlimited Canada

IMPACTS FROM ALL-TERRAIN VEHICLES

In some areas of the watershed, all-terrain vehicle (ATV) riders have violated provincial regulations and created issues by making ruts in agricultural fields and drainage ditches, damaging crops and hayland, destroying aquatic vegetation and fish habitat, causing grass fires, and spreading aquatic invasive species and noxious weeds.

REPORTING NOXIOUS WEEDS

In accordance with The Noxious Weed Act and associated Noxious Weeds Regulation, all observations of noxious weeds should be reported to Manitoba Agriculture, Weed District, or local municipality. These organizations can assess the severity of the infestation and design a noxious weed control strategy.

RECOMMENDATIONS	LEAD
1. All-terrain vehicle (ATV) riders should avoid making ruts in fields and drainage ditches, destroying aquatic vegetation and fish habitat, damaging crops and hayland, traveling through areas infested with noxious weeds, and ensure that their machine is equipped with a spark arrester to reduce the risk of causing a grass fire.	General public
2. Contact Manitoba Agriculture or the local Weed District to report all observations of noxious weeds.	
3. Prior to planning an ATV derby that includes travel across crown land, organizers should receive authorization from a Manitoba Conservation Officer and local municipality.	
4. Establish and promote an approved ATV trail network to direct riders away from critical habitat areas and reduce the number of ATV-related landscape issues.	Manitoba Sustainable Development - Parks and Regional Services, Central Region
5. Provide ongoing public education about the importance of controlling noxious weeds.	Manitoba Agriculture - Agri-Resource Branch

WILDLIFE HABITAT MANAGEMENT

The Wildlife and Fisheries Branch of Manitoba Sustainable Development manages Wildlife Management Areas for the conservation of plant and animal biodiversity, and to provide people with outdoor recreational opportunities such as birding, wildlife watching, hunting, trapping and fishing. Figure 6 shows the locations of the nine Wildlife Management Areas either partly or entirely within the watershed.

Piping Plovers are listed as an endangered species by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and are protected under Canada's Species at Risk Act. Human disturbances and high water levels have negatively impacted much of their sandy beach nesting habitat at the Shoal Lakes, Lake Francis and along the southern shoreline of Lake Manitoba. Conservation efforts to enhance the Piping Plover population include public education, awareness and participation in protecting and enhancing nesting habitat and eliminating disturbance during the nesting season.

Nature Conservancy of Canada (NCC) and Manitoba Habitat Heritage Corporation (MHHC) partner with local landowners and stakeholders by providing stewardship and conservation / protection options for ecologically significant areas. The Interlake supports a unique mosaic of prairie grasslands, forest and wetlands, in addition to alvar and shoreline habitats.

Piping Plover

RECOMMENDATIONS	LEAD
1. Minimize disturbance at Piping Plover beach nesting habitat areas from early June to late July.	General public
2. Work in cooperation with local stakeholders to develop a plan to effectively manage the native grassland and wildlife habitat in the Lake Francis area through land management techniques such as prescribed burns, access restrictions, and aspen control.	Manitoba Sustainable Development - Wildlife and Fisheries Branch
3. Draft and implement habitat management plans for each of the Wildlife Management Areas in the watershed.	
4. Restore and enhance beach nesting habitat for Piping Plovers.	
5. Conserve ecologically significant lands in partnership with local landowners and stakeholders by providing options such as purchases, donations, conservation easements and stewardship plans.	Nature Conservancy of Canada Manitoba Habitat Heritage Corporation

Spawning shoals constructed by West Interlake Watershed Conservation District

PLAN IMPLEMENTATION AND REPORTING ON PROGRESS

The responsibilities and long-term commitment of the West Interlake Watershed Conservation District, provincial, federal and municipal governments, stakeholder organizations, property owners, and the general public to implement the recommendations listed in the plan are important to protecting the long-term health and sustainability of the Southwest Interlake Watershed.

Each of the organizations involved in plan implementation will be asked to report on their progress related to plan implementation over the next ten years. Manitoba Sustainable Development will work with organizations to develop a progress report. It is anticipated that the Southwest Interlake Integrated Watershed Management Plan will be reviewed after ten years of implementation.

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