EAST DUCK MOUNTAIN - SAGEMACE BAY

INTEGRATED WATERSHED MANAGEMENT PLAN

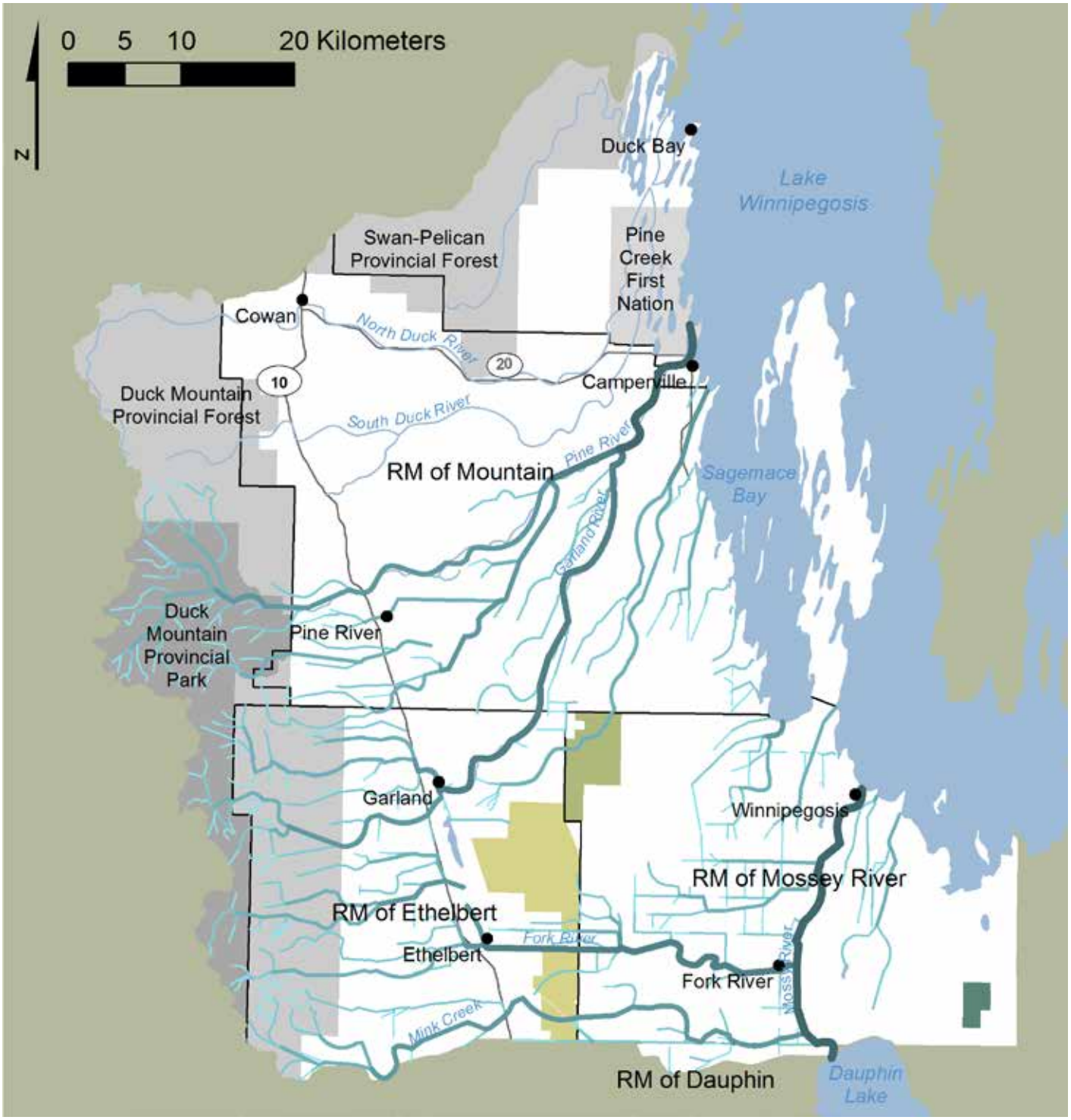

FIGURE 1 The East Duck Mountain - Sagemace Bay Watershed

Point River Wildlife Management Area
Ethelbert Community Pasture
Welden Wildlife Management Area

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COVER PHOTO: VIEW OF THE DUCK MOUNTAINS NEAR ETHELBERT, MB

Baldy Mountain, in Duck Mountain Provincial Park

ACKNOWLEDGEMENTS

The East Duck Mountain – Sagemace Bay Watershed Planning Authority would like to gratefully acknowledge and thank the Project Management Team members, Watershed Team members, member municipalities, and all watershed residents and stakeholders for their support, input and participation in developing the East Duck Mountain – Sagemace Bay Integrated Watershed Management Plan.

Member municipalities that have participated in the creation of this plan include the Rural Municipalities of Ethelbert, Mossey River and Mountain and the Villages of Ethelbert and Winnipegosis.

Special thanks go to the members of the Project Management Team which included Marvin Kovachik, Ken Shewchuk, Mike Semeniuk, Ron Kostyshyn, Dane Guignon, Wayne Lytwyn, Mitch Michaluk, Greg Rehaluk, Kevin Janzen, District Managers Bruce Stratuliak, Jody Tucker, Aaron Kulbacki and Jeff Thiele, and Financial Administrator Laurie Hykawy from the Intermountain Conservation District, and Watershed Planners David Jones, Suzanne Chiupka, and April North from Manitoba Conservation and Water Stewardship.

Manitoba

INTERMOUNTAIN CONSERVATION DISTRICT

Loon Lake Wetland

EXECUTIVE SUMMARY

The East Duck Mountain – Sagemace Bay Integrated Watershed Management Plan was developed in partnership with the Intermountain Conservation District, the Province of Manitoba, and community stakeholders. This plan outlines actions addressing the priority land and water issues identified by watershed residents.

Three goals were developed to address these issues:

1. **REDUCE THE IMPACTS OF OVERLAND FLOODING**
2. **PROTECT AND IMPROVE SURFACE WATER QUALITY**
3. **PROTECT DRINKING WATER**

Hundreds of thousands of dollars will be directed toward conservation programming in this watershed over the next ten years. Governments, stakeholders and residents each have a role to play in ensuring this plan is successfully implemented. By developing new partnerships and integrating our resources we can look forward to measurable improvements in our area over the next ten years.

Old Highway Bridge on the Garland River

Students at the Intermountain Water Festival

INTRODUCTION

WHAT IS AN INTEGRATED WATERSHED MANAGEMENT PLAN?

An Integrated Watershed Management Plan (IWMP) is a plan prepared with input from the community that describes the actions needed over time to achieve a sustainable, healthy watershed. The plan can be thought of as a roadmap for the community that outlines watershed priorities and presents strategies to address these priorities.

WHY WATERSHED PLANNING?

A watershed can be defined topographically as an area of land in which all water drains to a common point. Using the watershed as the planning unit provides opportunities to address water quality and quantity issues in both the upstream and downstream portions of a watershed. Working within watersheds gives people the opportunity to address water quality, quantity, community and habitat issues beyond the scope of single jurisdictions like towns or municipalities.

WHY INTEGRATED PLANNING?

An Integrated Watershed Management Plan uses an inclusive planning process to identify watershed issues and share knowledge. It is presented as a plan of action that combines the needs of people and diverse industries, while being supportive of ecosystems within the watershed. An integrated plan considers all land activities within the watershed that impact water quality and quantity.

WHO WILL LEAD IMPLEMENTATION?

The East Duck Mountain – Sagemace Bay Watershed is located within the Intermountain Conservation District, between the Duck Mountains and Lake Winnipegosis. Intermountain Conservation District is governed by a seven member board and is funded through a municipal–provincial partnership. The District offers incentive-based programming aimed at improving soil, water and aquatic ecosystem health, and provides educational programs to schools and watershed residents. The primary role of the District will be to carry out and coordinate the implementation of the actions within this plan.

THE WATERSHED PLANNING PROCESS

KEY PARTICIPANTS IN THE PLANNING PROCESS

WATERSHED RESIDENTS

Watershed residents are the single most important group in the creation and implementation of any watershed plan. In the process of drafting this plan, watershed residents participated in three public consultation meetings (in Cowan, Garland, and Winnipegosis), sharing their priorities for the watershed and their vision of what they would like the East Duck Mountain – Sagemace Bay Watershed to look like for future generations.

WATER PLANNING AUTHORITY

The Water Planning Authority is the agency that is designated under the authority of *The Water Protection Act* with the responsibility to prepare the Integrated Watershed Management Plan. The Intermountain Conservation District was designated as the Water Planning Authority for the East Duck Mountain – Sagemace Bay Watershed.

PROJECT MANAGEMENT TEAM

The Project Management Team (PMT) consists of local representatives, the Intermountain Conservation District Manager and a Watershed Planner from Manitoba Conservation and Water Stewardship. The PMT was responsible for designing communication materials; planning open houses to engage public participation; bringing together local and technical input to generate the goals, objectives, and actions for the watershed; and finalizing the content of the plan.

Intermountain Conservation District, its partner municipalities, the Province of Manitoba, and other stakeholders are key to successful implementation of the plan over the next decade. The PMT will continue to meet every two to four years to monitor progress as the plan is implemented.

Intermountain Office Site near Ethelbert

Intermountain Conservation District designated as Water Planning Authority (WPA)

Organization of Project Management Team (PMT) and public consultations

Review and summary of public consultations and watershed team technical submissions

WATERSHED TEAM

The Watershed Team is comprised of a wide variety of technical experts from government and key stakeholder groups. The Watershed Team met several times during the planning process to provide input and recommendations to the Project Management Team.

Garland Open House

Drafting of goals, objectives and actions; draft plan preparation

Plan forwarded to Conservation and Water Stewardship for review and approval

Implementation of the actions in the plan

Monitoring progress: every 2-4 years

THE EAST DUCK MOUNTAIN - SAGEMACE BAY WATERSHED

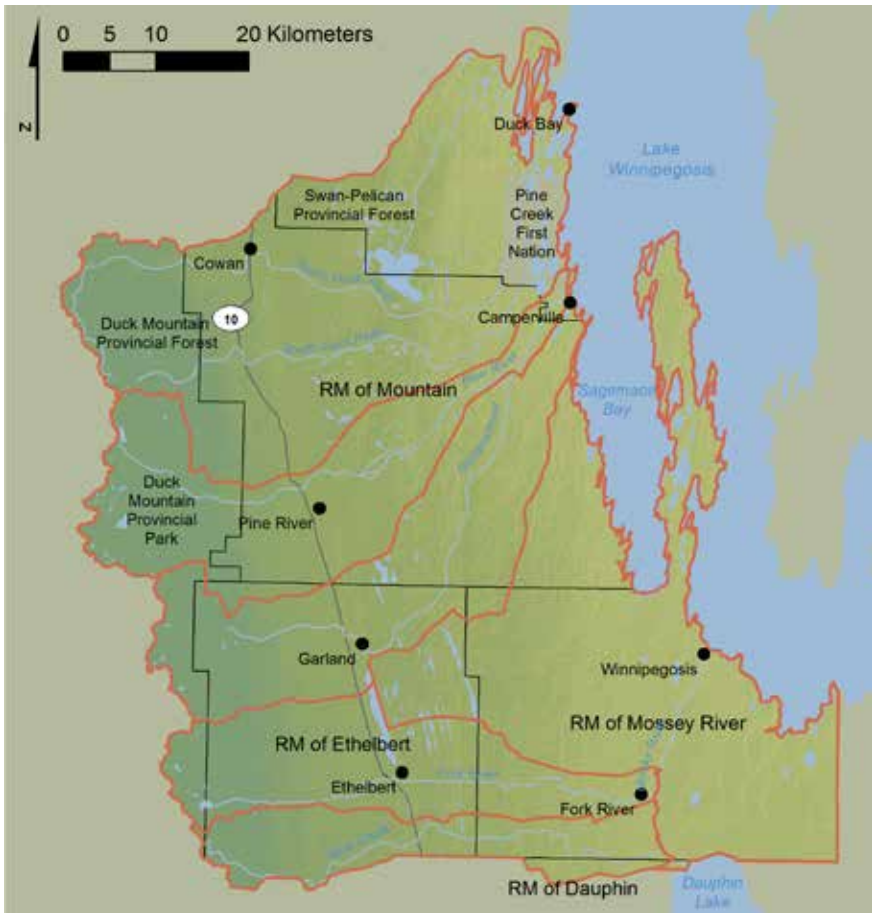


FIGURE 2. Topography of the East Duck Mountain – Sagemace Bay Watershed

DID YOU KNOW

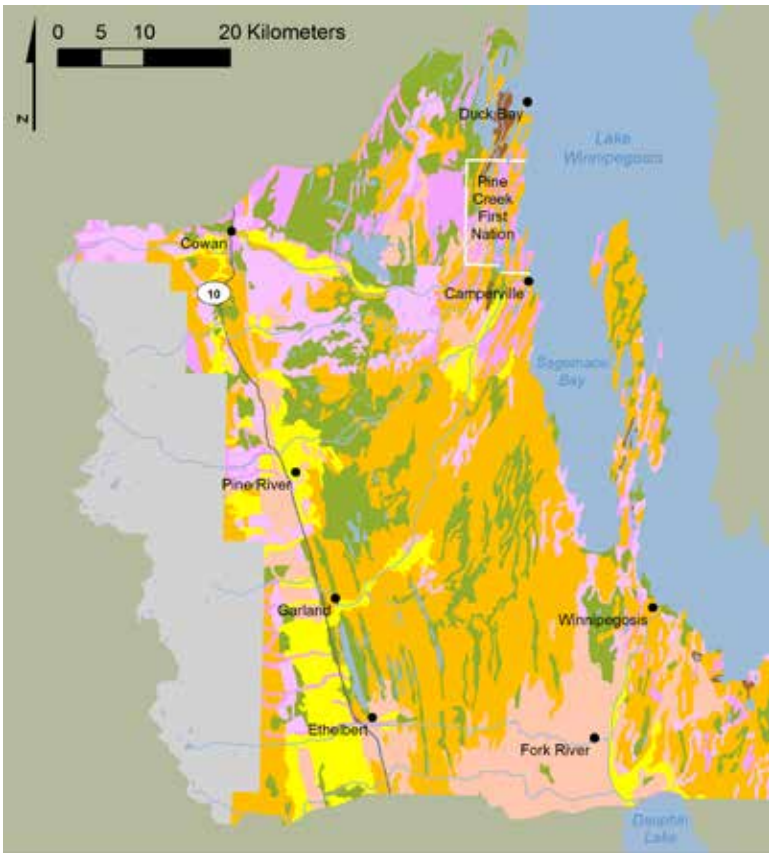
The East Duck Mountain – Sagemace Bay Watershed is the steepest sloping watershed in Manitoba? It ranges from the highest point in Manitoba, Baldy Mountain (832 metres above sea level) to Lake Winnipegosis (254 metres above sea level) over a mere 30 miles.

The East Duck Mountain – Sagemace Bay Watershed is located in west central Manitoba and is approximately 4,300 km^2 (1,660 sq.mi.) in size. The watershed is bordered by the Duck Mountain Provincial Forest and Park in the west and Lake Winnipegosis in the east (Figure 2). The East Duck Mountain – Sagemace Bay Watershed forms part of the much larger Lake Winnipegosis and Lake Manitoba Basins. Eight communities and one First Nation are located within the watershed - Camperville, Cowan, Duck Bay, Ethelbert, Fork River, Garland, Pine Creek First Nation, Pine River, and Winnipegosis. Pine Creek First Nation is located along the west shore of Lake Winnipegosis, in the northeastern portion of the watershed.

Lake Winnipegosis, along the eastern boundary of the watershed, is the dominant water body; however, many smaller lakes can be found throughout the watershed.

Major waterways in the East Duck Mountain – Sagemace Bay Watershed include the Fork, Mossy, Garland, Pine and North and South Duck Rivers. Headwater areas are located exclusively within the Duck Mountains – part of the Manitoba Escarpment. Hydrology, water quality, soils, hydrogeology, and socio-economic data collection efforts have occurred in the East Duck Mountain – Sagemace Bay Watershed over the years. Much of the data has been referenced throughout this Integrated Watershed Management Plan.

Agricultural capability, as classified by the Canada Land Inventory (CLI), can be described as the ability of the land to



DID YOU KNOW

Lake Winnipegosis is Manitoba's 2nd largest lake and Canada's 11th largest lake?

It has a surface area of 5,370 km² and is over 240 km long. Its main tributaries are the Red Deer, Woody and Swan Rivers. Water drains from Lake Winnipegosis to Lake Manitoba through the Waterhen River, and eventually moves downstream through Lake Winnipeg, the Nelson River and Hudson Bay.

- Class 1. No Significant Limitations
- Class 2. Moderate Limitations
- Class 3. Moderately Severe Limitations
- Class 4. Severe Limitations
- Class 5. Forage Crops Improvement Practices Feasible
- Class 6. No Capability for Arable Culture or Permanent Pasture
- Class 7. No Capability for Arable Culture or Permanent
- Special Cases
- Organic Soils

FIGURE 3. Agricultural Capability of the East Duck Mountain - Sagemace Bay Watershed. Data provided by the Canada Land Inventory.

support appropriate types of crops and agriculture management techniques. Classes ranging from one to seven are used by the CLI, with one being the highest rated land class with no limitations to annual crop production, and seven being the lowest rated land (not suitable for agriculture). Within the East Duck Mountain – Sagemace Bay Watershed, approximately 39% of the land base is classified as Classes 1, 2 or 3 (Figure 3). Approximately 61% of the watershed is classified as Class 4 or lower.

There are several small dams located within the watershed that were designed and constructed to help control downstream flooding and to provide drought protection. These dams were constructed by the Prairie Farm Rehabilitation Administration (PFRA) between 1956 and 1962, and include the Shanty Lake Dam, the Pine River Dam, and the Beaver Lake Dam. All of these dams are located on Crown lands within the Duck Mountain Provincial Forest and Park, and are currently managed by Manitoba Infrastructure and Transportation.

Significant changes in elevation occur as you travel east through the watershed, ranging from approximately 832 metres above sea level in the western portion of the watershed, down to approximately 246 metres above sea level near Lake Winnipegosis (Figure 2). This large change in elevation creates a significant management challenge due to the steep change in elevation at the eastern boundary of the escarpment, along the edge of Duck Mountain Provincial Park.

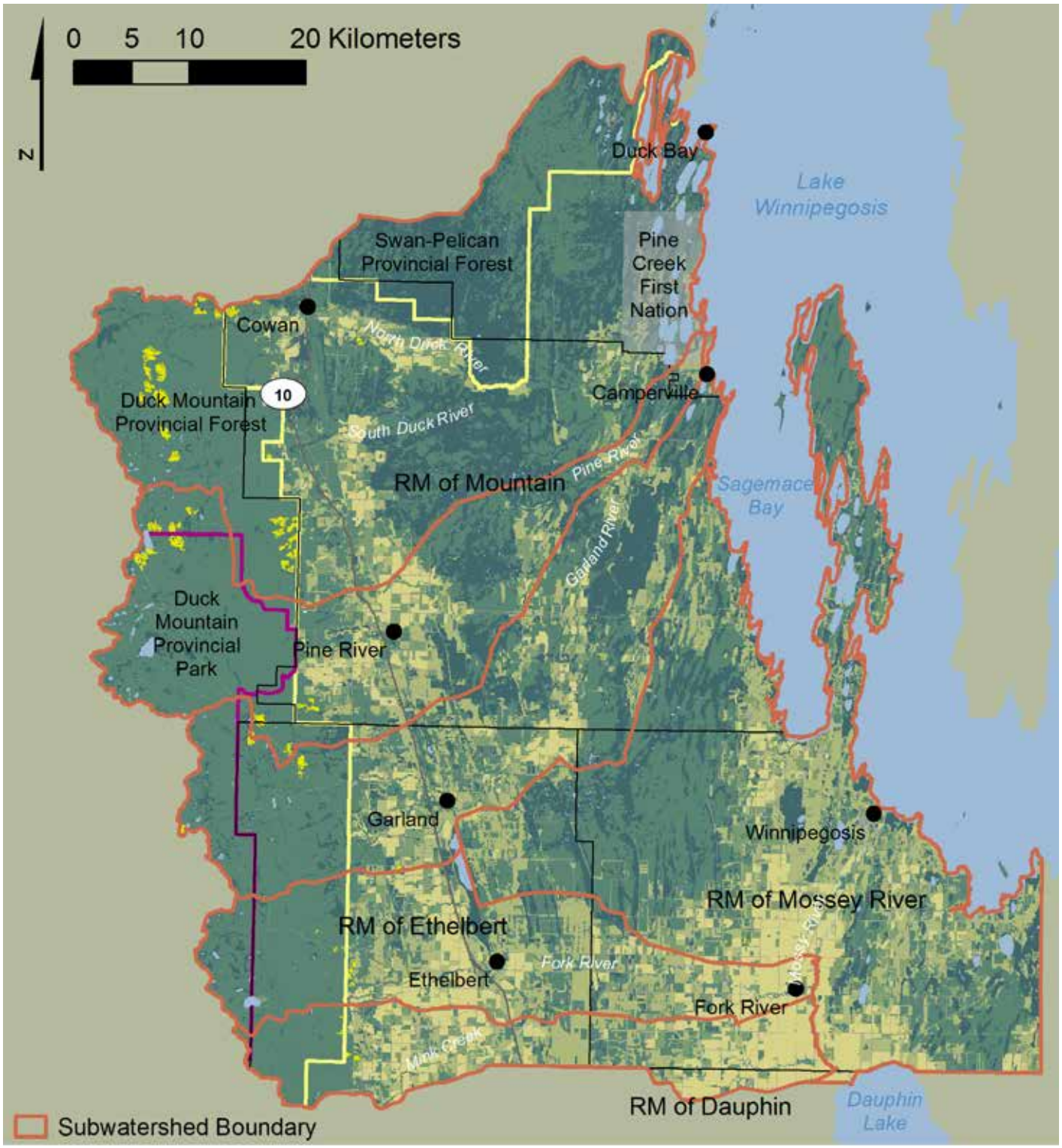


FIGURE 4. Land Cover in the East Duck Mountain – Sagemace Bay Watershed (2006 LandSat Imagery).

- Cropland
- Grassland & Pasture
- Forage
- Trees
- Wetlands
- Water
- Transporation & Development
- Forest Cutovers

View of Watershed from Duck Mountains

DID YOU KNOW

Forest harvesting activities are regulated by a series of provincial acts, regulations and guidelines, as well as industry-directed forest management plans, policies, procedures and standard operating guidelines. The provincial guidebook, Manitoba Conservation Forest Practices Guidebook: Forest Management Guidelines for Riparian Management Areas, sets standards for sustainable forest management practices adjacent to riparian and aquatic systems in permitted zones.

Harvesting practices are permitted, restricted or prohibited in different zones, depending on site conditions and distance to riparian areas. Social and traditional values, water quality, fish habitat, soils, wildlife, and forest health are taken into consideration in the development of a zone.

Forestry companies develop and implement sustainable forest management plans within their approved Forest Management License Areas, as outlined in *The Forest Act*. These plans are developed with public and government input, and are generally approved with conditions established by Manitoba Conservation and Water Stewardship.

LAND COVER AND LAND USE

Forest (a combination of Deciduous, Mixed Wood, Coniferous, and Open Deciduous Forest classes) is the primary land cover in the East Duck Mountain - Sagemace Bay Watershed (Figure 4). The Duck Mountain Provincial Forest and Park occupies the extreme western edge of the watershed.

Using 2006 satellite imagery for analysis, 38,667 hectares (or 9%) of the watershed was classified as annual cropland; the majority of which is located in the Mossy River subwatershed region (24,367 hectares). Grassland/pasture areas cover 69,613 hectares (16%) of the watershed and are more prevalent in the eastern and southern subwatersheds. Forages, mostly consisting of alfalfa, make up about 5% of the watershed and are most common in the south and eastern subwatersheds. Marshes, fens, and open water are common (35,357 hectares, or 8%), particularly in the eastern portions of the watershed. Most of the wetland areas are marsh type landscapes that exist between old beach ridges formed from receding glacial lakes.

Each subwatershed's land cover is distinct and thereby defines land use. For example, the Mossy River subwatershed exhibits the highest agriculture land use in the East Duck Mountain - Sagemace Bay Watershed, as its landcover is made up of more annual cropland and forages than any other region. Forestry activities are greatest in the Duck and Pine River watersheds as noted by the presence of forest cutovers in these areas.

WATERSHED GOALS AND OBJECTIVES

Through various meetings and discussions during the planning process, watershed residents, local organizations and resource professionals identified many issues and concerns within the East Duck Mountain – Sagemace Bay Watershed. A summary of public consultations can be found in the Appendix.

While recognizing that all of the issues identified are important, the Water Planning Authority has chosen to focus activities on those most in need of immediate attention. The issues to work at over the next eight to ten years have been organized into three broad watershed goals. Each of the following sections focuses on one of these goals, discusses the issues, and identifies objectives and actions that will assist in achieving the goal. An implementation table can be found starting on page 36. The table summarizes all watershed goals, objectives and actions along with potential implementation partners.

WATERSHED GOALS

1. **REDUCE THE IMPACTS OF OVERLAND FLOODING**
2. **PROTECT AND IMPROVE SURFACE WATER QUALITY**
3. **PROTECT DRINKING WATER**

Duck Mountain Provincial Park

Lake Winnipegosis

WATERSHED GOAL 1

REDUCE THE IMPACTS OF OVERLAND FLOODING

OVERLAND FLOODING IN THE WATERSHED

Residents and municipalities in the East Duck Mountain – Sagemace Bay Watershed are frustrated with the repeated flooding of agricultural lands. During public consultations, emotions ran high as affected landowners throughout the watershed voiced their concerns. Public feedback was often divided between those who wanted flood waters off the land as quickly as possible and those that expressed concern with the negative impacts caused by unlicensed drainage activities.

Overall, flooding has caused water management challenges for rural municipalities, private landowners, and Crown lands throughout the lower East Duck Mountain – Sagemace Bay Watershed. There are significant repair costs and economic losses to governments and landowners due to road washouts, and the loss of agricultural land through flooding and erosion. There have also been negative impacts on the local Community Pasture and the Point River Wildlife Management Area.

The frequency and extent of overland flooding is influenced by a number of factors, including extreme precipitation events, waterlogged soils, unlicensed drainage activities, forestry activities and substantial beaver populations. Daily mean flows on the Mossy and Garland Rivers are variable, as seen in hydrographs produced for those waterways (Figures 5 and 6).

Average runoff per square mile of drainage area was calculated for the North Pine, North Duck, Garland and Mossy Rivers (Table 1). The North Duck and North Pine Rivers produce a large amount of runoff per square mile, averaging between 244 and 387 acre-feet per square mile. The Mossy River's drainage area is vast, including the Dauphin Lake Watershed (over 3,250 square miles or 8,400 km^2), in addition to the Fork, Fishing and Mink Rivers in the East Duck Mountain - Sagemace Bay Watershed (Figure 7).

TABLE 1. Runoff productivity for subwatersheds in the East Duck Mountain – Sagemace Bay Watershed.

Subwatershed	Drainage Area KM^2 (MI^2)	Average Runoff (Acre-Feet Per Square Mile)	
		March - May	June - October
North Pine River	210 (81)	244.2	304.3
North Duck River	228 (88)	386.9	345.1
Garland River	435 (168)	182.4	116.9
Mossy River	8,740 (3,375)	26.8	113.4

NOTE: Values for the entire watershed could not be provided because a large portion of the area is ungauged.

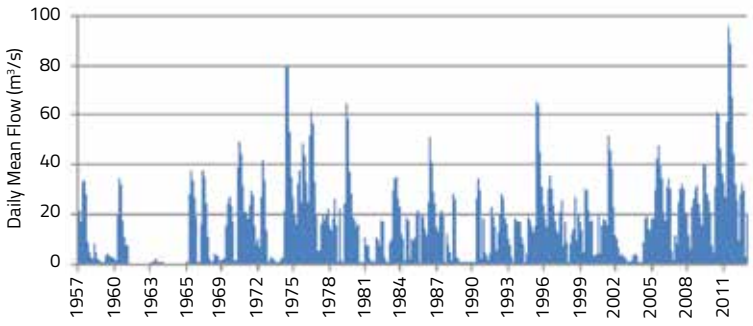


FIGURE 5. Daily Mean Flow on Mossy River below Outlet to Dauphin Lake (05U025)

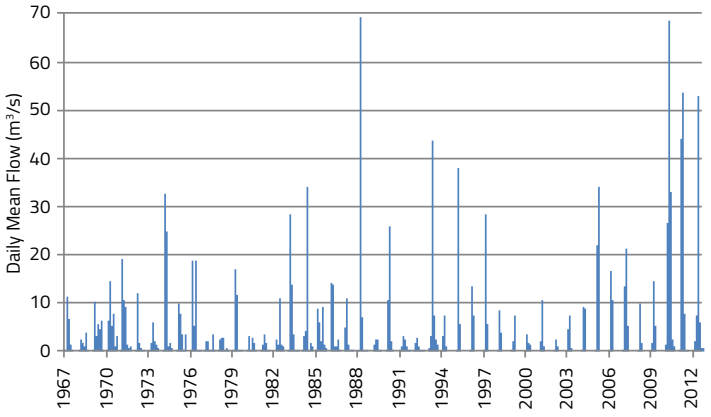


FIGURE 6. Daily Mean Flow on Garland River near Duck River (05LG006)

LANDSCAPE CHARACTERISTICS

The upper reaches of streams in East Duck Mountain - Sagemace Bay Watershed originate on the eastern slopes of the Duck Mountains. These reaches are characterized by deep ravine-like channels with very steep slopes (or gradients). The lower reaches change dramatically at the bottom of the escarpment, where gradients are much flatter. The area located east of the Duck Mountains was once an extensive beach area of Glacial Lake Agassiz. Numerous beach ridges running in a northwest – southeast direction were formed as the glacial lake receded. Provincial Trunk Highway 10 and the now-abandoned Canadian National Railway tracks were built on such ridges. These ridges are generally perpendicular to the flow patterns of streams coming off the Duck Mountains. The major streams of the watershed cut through the ridges on their way to Lake Winnipegosis. Flood flows are detained in the low-lying, waterlogged areas lying between the ridges, and are released gradually back into the streams over time.

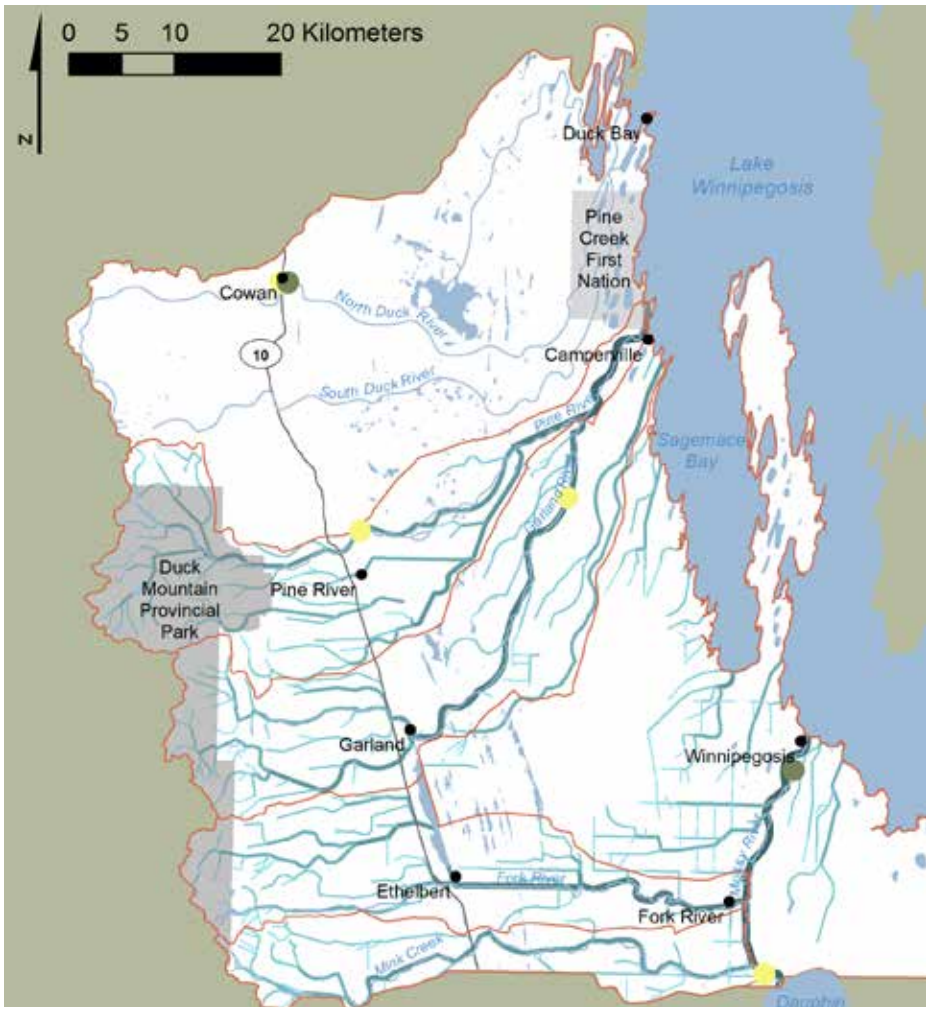


FIGURE 7. Designated Drain Orders in the East Duck Mountain - Sagemace Bay Watershed

WATERWAY MANAGEMENT

Drains and waterways in Manitoba are classified from 1st order (smallest) to 7th order (largest). Municipalities, towns and villages typically maintain all 1st, 2nd, and some 3rd order drains, whereas the Province of Manitoba typically manages and maintains most of the 3rd order and higher order drains.

Figure 7 shows the drainage network within the East Duck Mountain – Sagemace Bay Watershed. Most of the higher order waterways follow natural rivers and creeks, such as the Mossy, Fork, Garland and Pine Rivers. There are about 125 km of provincial waterways and approximately 1,800 km of municipal drains and waterways in the watershed. These include about 400 km of 1st order, 665 km of 2nd order, 350 km of 3rd order, 210 km of 4th order, 120 km of 5th order, and 55 km of 6th order waterways in the watershed.

GOAL 1: UNDERSTANDING THE ISSUES

SILTATION AND BEAVERS

Rapid runoff from the Duck Mountains transports significant amounts of eroded material, a portion of which is deposited in streams and drains in the flatter, downstream sections of the watershed, reducing their water-carrying capacity.

The large number of beaver dams in streams and drains within the watershed further reduces the water carrying capacity of waterways and causes additional flooding.

FORESTRY

Although logging practices are generally approached sustainably by the forestry industry in Manitoba, through the incorporation of forest regeneration, sustainability and riparian health considerations into management plans, logging in the Duck Mountains has impacted, to some degree, the volume and timing of runoff that moves off the slopes of the mountain.

WATERWAY MANAGEMENT

Various reaches of natural waterways have been altered by local landowners, municipalities and the provincial government in order to move water more quickly off the land for agricultural purposes.

Uncoordinated waterway management and poor maintenance of existing drainage systems has led to surface water management problems throughout the watershed.

CUMULATIVE EFFECTS

Erosion, widening and siltation of channels downstream of the mountain and escarpment has caused water managment challenges for residents of the watershed. The cumulative effects of forestry, extreme precipitation events, climate and weather cycles, siltation, erosion, beavers and uncoordinated waterway management have all contributed to surface water management challenges throughout the watershed.

Overland flooding on Hwy #20 between Camperville and Cowan

OBJECTIVE 1A

Coordinated waterway management that involves all levels of jurisdiction.

For more details see the Implementation Plan on page 37.

ACTIONS

1. Clear channel obstructions to maintain water flows (other than beaver dams, which are covered in objective 1B).

2. Implement water retention measures as outlined in the Surface Water Management Plan (e.g., control or drop structures on escarpment streams, pages 20-27). Review historical studies of the Garland River Floodway and other historical reports.

3. Mitigate sites identified by local municipalities where surface water management issues exist. A list of priority projects will be maintained at the IMCD office.

4. Ensure that all stakeholders are aware of regulations that affect waterway management; work with all stakeholders to mitigate illegal water diversion on Crown lands.

5. Review forestry management practices in the Duck Mountains and their effect on runoff timing and volumes downstream.

GOAL 1: OBJECTIVES

THE NEED FOR COORDINATED WATERWAY MANAGEMENT

A number of authorities are responsible for waterway management in Manitoba. The provincial government, through the Department of Infrastructure and Transportation, is responsible for the maintenance and construction of provincial drains and structures throughout the province. In some areas of the province, local conservation districts have taken over the responsibility for some lower order drains. Municipalities across the province are generally responsible for smaller drains (orders 1, 2 and some 3). This multi-stakeholder approach to waterway management can sometimes lead to uncoordinated waterway maintenance.

Early in the planning process, member municipalities within the East Duck Mountain – Sagemace Bay Watershed sat down together to identify areas within their respective municipalities where issues related to waterway management exist. These issues were then compiled by the Project Management Team and shared with Manitoba Infrastructure and Transportation and Manitoba Conservation and Water Stewardship. Intermountain Conservation District maintains a list of the recommended actions for each problem area. In addition, the information gathered during these meetings was helpful in the development of the East Duck Mountain – Sagemace Bay Surface Water Management Plan, which can be found on pages 20-27.

WATER RETENTION

Lowering the peak flow of water, spreading it over a larger period, and temporarily storing water until peak flows have passed, allows for needed drainage activities while reducing the costs associated with replacing valuable infrastructure or causing downstream flooding impacts. Stakeholders within the East Duck Mountain – Sagemace Bay Watershed should work towards increasing current water storage capacities of the system to help mitigate the frequency and severity of flooding. The amount of upstream water storage needed to reduce peak flows by 10% (for 1 in 10-year events) has been estimated at 1,350-3,800 acre feet (Table 2).

TABLE 2. Analysis of associated storage needed in the East Duck - Sagemace Bay Watershed to reduce peak flows by 10% within the sub-watershed.

	1:10 Year Flows			
Sub-watershed (drainage area)	**Daily Peak Flow (cfs)**	**Hydrograph Volume (ac-ft)**	**Daily Peak Flow after 10% reduction (cfs)**	**Associated Storage Needed (ac-ft)**
North Pine River (582 sq km)	2,200	41,200	1,900	3,800
North Duck River (499 sq km)	3,890	39,940	3,500	3,380
Garland River (507 sq km)	1,110	15,390	1,000	1,350

Beaver near Duck Mountain Provincial Forest

THE NEED FOR A COMPREHENSIVE APPROACH TO BEAVER MANAGEMENT

Large numbers of beaver dams in watercourses within the watershed have reduced the water-carrying capacity of waterways and have contributed to significant flooding in some areas. Although beavers can provide valuable benefits to the watershed through water retention and habitat enhancement, they can also devastate productive agricultural lands if populations are left unchecked.

Historically, beavers provided an important economic opportunity for local trappers. However, due to an aging trapper population, a lack of interest in trapping by younger generations, low pelt prices and high fuel prices, beaver trapping has declined significantly. The Province and rural municipalities in the watershed have made various attempts to encourage trapping during the last 20 years.

- The Municipal Problem Beaver Subsidy Program was introduced in 1993 by Manitoba Conservation and Water Stewardship to assist municipalities experiencing significant beaver-related problems. This program was somewhat ineffective as summer pelt prices were low.

- The Winter Beaver Subsidy Program was initiated in 2001 by Manitoba Conservation and Water Stewardship, encouraging trapping when pelts were at their prime and of higher value. The program initially offered an incentive of $15 per beaver harvested from designated problem areas. This subsidy was later increased to $20 per beaver in 2010.

- A pilot program in 2011 increased the provincial problem beaver subsidy to $50 per beaver. Municipalities in the East Duck Mountain – Sagemace Bay Watershed participated in the program, and provided the subsidy to trappers removing beavers from designated sites authorized by municipal officials and natural resource officers.

The Intermountain Conservation District has initiated and worked co-operatively with landowners, municipalities and other agencies to try to alleviate beaver problems in the watershed. The use of various techniques such as beaver deceivers, small and large scale dam removals and trapping has resulted in mixed success over the years.

OBJECTIVE 1B

Implement a comprehensive approach to beaver management.

For more details see the Implementation Plan on page 38.

ACTIONS

1. Implement beaver dam management in priority areas in the watershed on a systematic, cyclical basis.

2. Encourage dedicated trappers to trap beaver in priority areas in conjunction with beaver dam removals. Work with landowners and leaseholders to ensure success.

3. Adopt a year-round incentive program that would reduce beaver population numbers.

4. Deliver educational programs for all types of beaver management (trapping, beaver deceivers, etc).

SURFACE WATER MANAGEMENT PLAN

In Manitoba, a surface water management plan typically refers to the management of water to prevent or reduce flood damage on agricultural or residential land. Although flood protection is important, surface water management can also serve to offer recreational opportunities, enhance the function of aquatic ecosystems, improve water quality, and increase water supply.

Current tools utilized for flood protection include low-level dams, the channelization of streams and the construction of drains to remove water off the land as quickly as possible. However, a watershed-based approach to surface water management is being adopted throughout Manitoba, recognizing that any activity that affects water quality, quantity or flow rate in one part of the watershed has an impact throughout the watershed. Understanding this connectivity between upstream and downstream is helpful when planning and making decisions about surface water management.

The Project Management Team hosted a series of meetings with representatives from the Province and the RMs of Mossey River, Ethelbert, and Mountain to discuss surface water management in the East Duck Mountain – Sagemace Bay Watershed. Information gathered at these meetings was used to identify three watershed zones, each with a unique surface water management priority. Zones were delineated based on landscape characteristics such as topography, soil capability, drainage limitations and land cover.

1

MOUNTAIN AND ESCARPMENT ZONE

Comprised of mostly Crown lands, including Duck Mountain Provincial Park and Provincial Forest, this zone is characterized by steep slopes and forested land cover. Surface water runoff from this zone travels quickly down the slopes of the escarpment, heading east toward Lake Winnipegosis. Forestry is the predominant land use in this zone, although the eastern edge of the escarpment between Duck Mountain Provincial Forest and Highway 10 has been put into agricultural production for annual crops and pasture.

2

LOWLAND AGRICULTURE ZONE

Characterized by Class 2 and 3 agricultural soils, annual crop production is common in this zone alongside areas of cattle ranching and hay production. Removal of excess runoff in a timely manner is necessary to minimize crop damages and resulting economic losses to producers.

3

GRAZING AND CROWN LANDS ZONE

This zone is comprised of lower-classed soils with drainage limitations, restricting agricultural use to primarily cattle, pasture and hay production. A large proportion of land in this zone is held by the Crown, and although some Crown land is leased for agricultural land uses, a large proportion of Crown lands are "vacant" – i.e., not leased. Topography in this zone is relatively flat, and runoff is slowed and detained by the numerous Glacial Lake Agassiz beach ridges between the escarpment and Lake Winnipegosis.

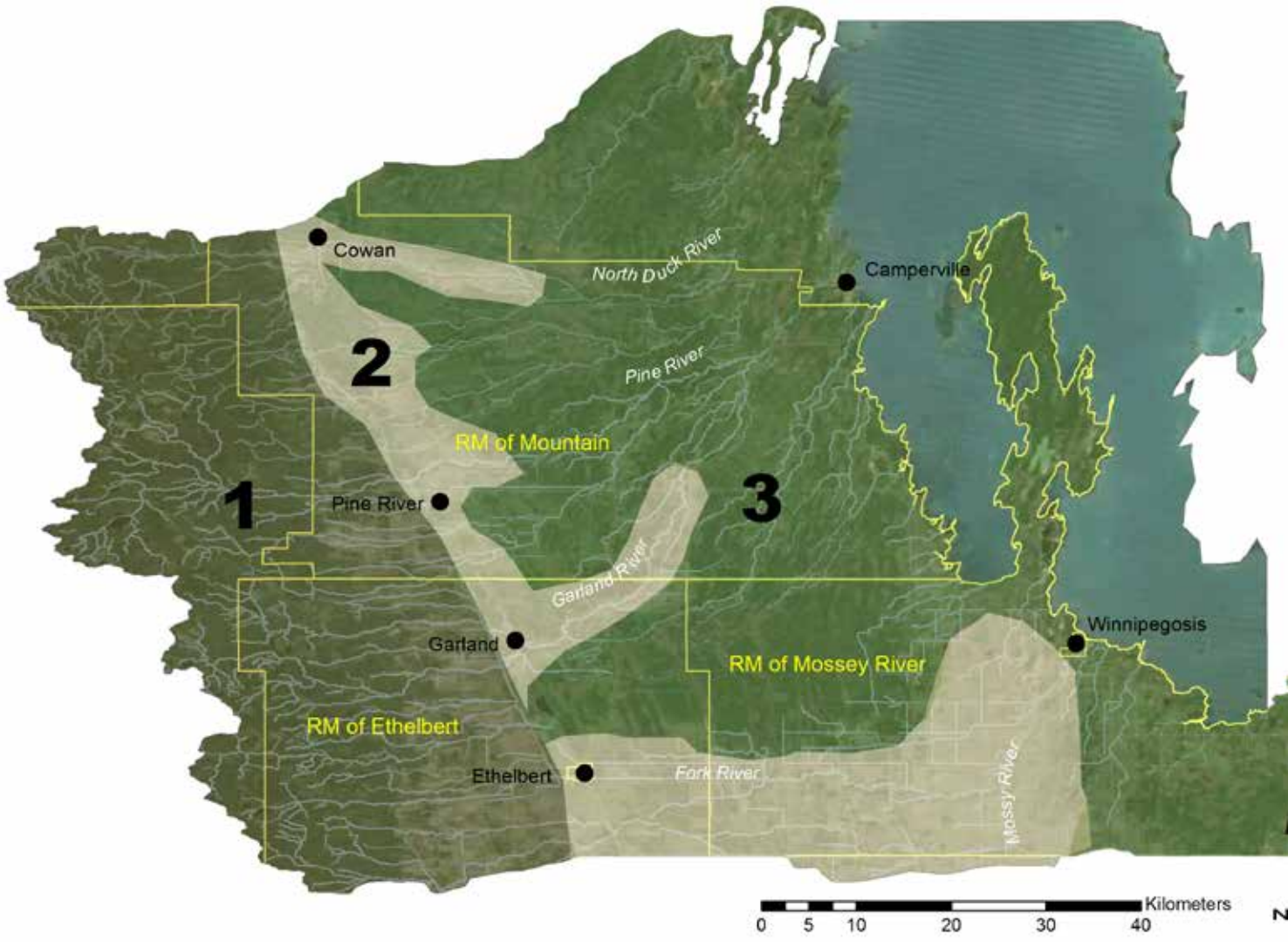


Figure 8. Surface Water Management Zones in the East Duck-Sagemace Bay Watershed.
Note: Zone boundaries are approximate, based on consultation with the PMT.

MOUNTAIN AND ESCARPMENT ZONE

Our goal is to slow the rate at which water leaves this zone, through the maintenance of natural water holding capacity (permanent natural cover), and through the construction of water retention infrastructure.

Duck Mountain Provincial Forest Sign on PR#367

CHALLENGES OF THIS ZONE

- Steep slopes contribute to water volumes moving quickly off the Duck Mountains.
- Watercourses continue to deepen and widen as water moves off the Duck Mountains and escarpment. A combination of upstream land uses and heavy precipitation has resulted in streambanks eroding in this zone and downstream in the Agriculture Zone.
- Deposition of silt occurs where slopes level out, near the eastern edge of the escarpment and further downstream. Siltation reduces the carrying capacity of waterways in the lower elevations of this zone and further downstream.
- Overabundant beavers compound water management challenges. Although beaver dams retain water, dam washouts cause damage to infrastructure (culverts, roads, bridges) and erode soils and streambanks.

TYPES OF TOOLS APPROPRIATE TO APPLY IN THIS ZONE INCLUDE:

- **Water Retention (Public land):** Understand the best places to locate new water retention projects through the use of historical reports and new information where available. Enhancing natural storage should be examined by IMCD and Duck Mountain Provincial Park. Construction of these structures should be considered for feasible projects. Control structures could be drawn down when downstream conditions are suitable to allow for renewed capacity for spring runoff.
- **Water Retention (Private land):** Work with landowners to retain water, either permanently or temporarily, during spring melt and after heavy summer rainfall events. Examples include backfloods, small dams, control gates on existing/new culverts, etc.
- **Removal of Debris:** Install debris-catching structures upstream of culverts to help prevent washouts of these structures. Routine maintenance to remove debris is critical. Clear obstruction from waterways were necessary.
- **Land Protection:** Provide access to land protection programs such as conservation agreements, taxation easements, ecological goods and services programs, etc.
- **Beneficial Management Practices:** Promote and provide technical and financial assistance for the implementation of beneficial management practices aimed at protecting and enhancing natural cover, riparian areas, and wetlands in this zone.
- **Forestry Practices:** Review forestry management practices to encourage beneficial management practices that maintain water holding capacity after logging has taken place.

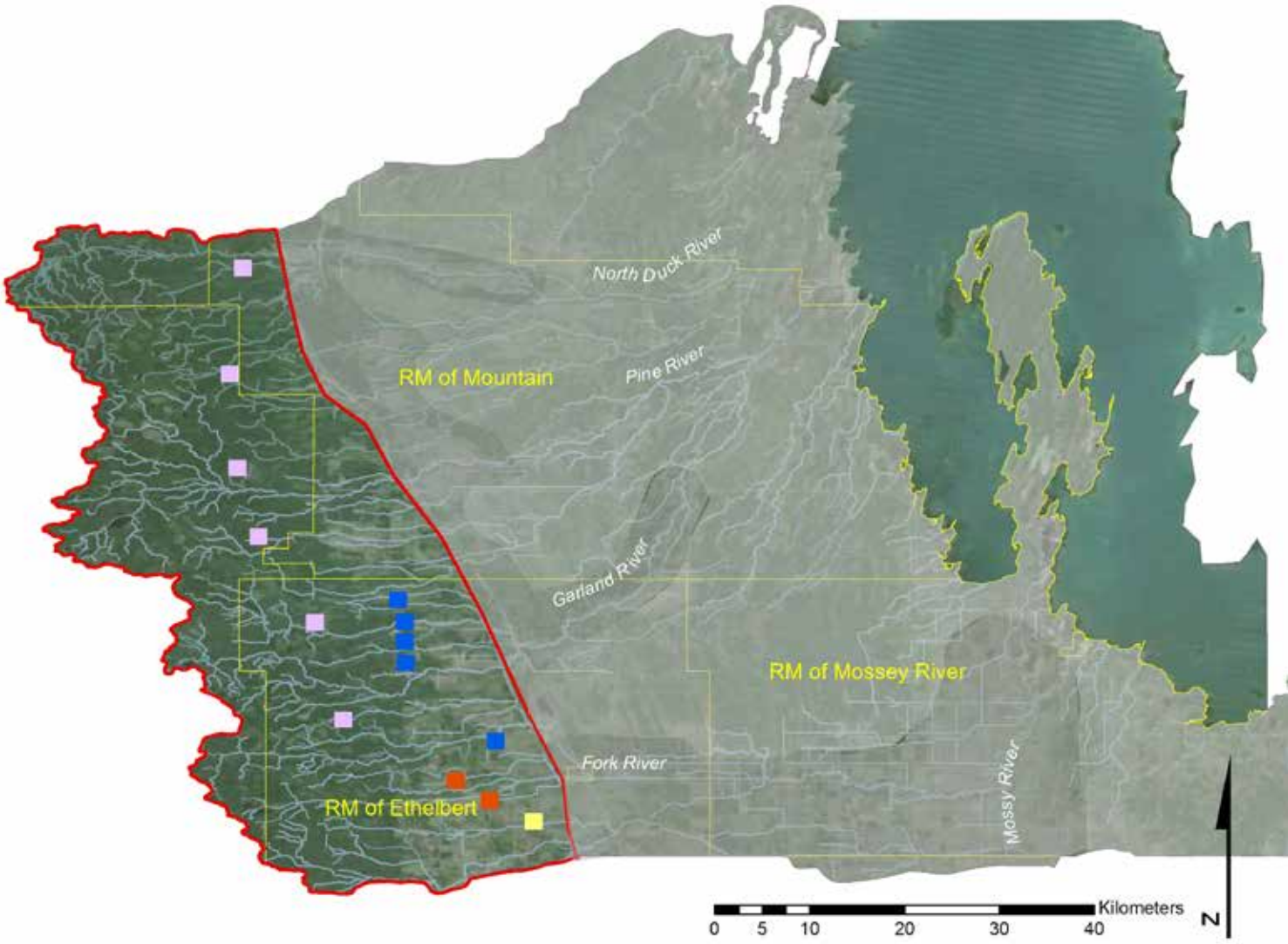


Figure 9. The Mountain and Escarpment surface water management zone and locations of surface water management issue areas (coloured boxes).

MOUNTAIN AND ESCARPMENT ZONE: PLAN IN ACTION

	ISSUE	ACTION
	Overland flooding occurs frequently.	Intermountain CD will work with RMs, landowners, Crown lands managers, and other stakeholders to encourage adoption of tools listed above.
	Carrying capacity of natural watercourses is reduced due to siltation.	Intermountain CD will explore the development of silt traps and upstream solutions to these chronic siltation areas.
	Better maintenance and coordination of drainage infrastructure is required – upstream culverts are larger than downstream, etc.	RMs should investigate the installation of gated culverts to allow for timed releases. Intermountain CD will work with RMs to coordinate drainage system infrastructure and maintenance using a watershed approach.
	Enhancement of natural water retention areas may be possible.	Intermountain CD will re-evaluate PFRA's recommendations for small dams, with technical assistance from Conservation and Water Stewardship.

Note: Intermountain Conservation District maintains a detailed list of target areas – coloured boxes are approximate locations for illustrative purposes.

LOWLAND AGRICULTURE ZONE

Our goal in this zone is to improve management of surface water to maximize economic benefit of annual crop production while minimizing negative impacts downstream and to the environment.

View of the Fork River Elevator

CHALLENGES OF THIS ZONE

- Siltation and obstructions in natural waterways reduce water carrying capacity; banks are overtopped after spring melt and summer rainfall.
- Streambank erosion, caused by increased water volumes and velocities, has increased due to upstream land uses and heavy precipitation in recent years. This impacts landowners by encroaching on productive land along water courses, and causing siltation downstream.
- Soils in this zone have limited inherent drainage capacity – the majority of annual cropland in the watershed is characterized by "imperfect" drainage. This results in a large dependence on constructed drains to improve spring and summer field drainage.
- Drainage maintenance is an ongoing concern – siltation, vegetation growth, and large obstructions in constructed drains cause reduced water carrying capacity. This limits field crop productivity and causes overland flooding.
- The amount and rate of water which this zone receives from the Mountain and Escarpment Zone creates significant water management and erosion challenges.
- Overabundant beavers compound water management challenges.

TYPES OF TOOLS APPROPRIATE TO APPLY IN THIS ZONE INCLUDE:

- **Water retention:** Adopt downstream-friendly surface water management practices to retain water flows until peak waters have receded further downstream, for example, control gates on culverts, small dams in escarpment areas.
- **Maintenance:** Maintain and improve drainage infrastructure to minimize downstream impacts. Remove brush growth from provincial drains. Install debris-catching structures upstream of culverts.
- **Shoreline stabilization:** Clear obstructions (dead trees) from waterways and stabilize shorelines to prevent further erosion.
- **Crown lands management**: Work with Crown lands leaseholders and managers to ensure all management decisions are suitable to natural watershed characteristics; and, minimize negative impacts downstream.
- **Riparian buffers:** Promote and provide technical and financial assistance for the implementation of beneficial management practices in riparian buffer zones.

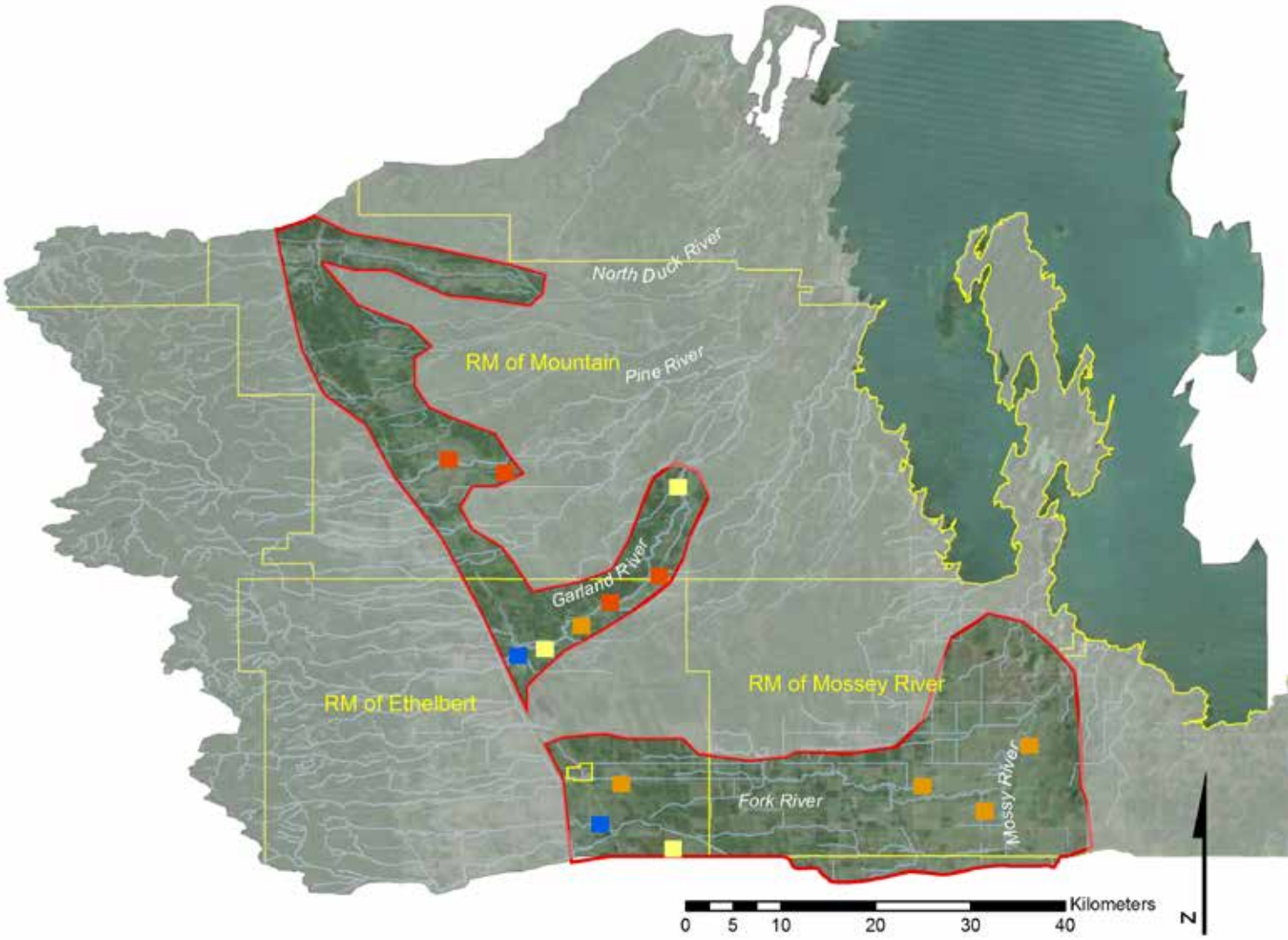


Figure 10. The Lowland Agriculture surface water management zone and locations of surface water management issue areas (coloured boxes).

LOWLAND AGRICULTURE ZONE: PLAN IN ACTION

	ISSUE	ACTION
	Overland flooding occurs frequently.	Intermountain CD will work with RMs, landowners, Crown lands managers, and other stakeholders to encourage adoption of tools listed above.
	Carrying capacity of natural watercourses is reduced due to siltation.	Intermountain CD will explore the development of traps and upstream solutions for these chronic siltation areas.
	Better maintenance and coordination of drainage infrastructure is required – upstream culverts are larger than downstream, etc.	RMs should examine installation of gated culverts to allow for timed releases. Intermountain CD will work with RMs to coordinate drainage system infrastructure and maintenance using a watershed approach.
	Implement BMPS in riparian areas to stabilize shorelines and maintain permanent cover in riparian buffer zones.	Intermountain CD will work with landowners to provide technical support for implementation.

Note: Intermountain Conservation District maintains a detailed list of target areas – coloured boxes are approximate locations for illustrative purposes.

GRAZING AND CROWN LANDS ZONE

Our goal in this zone is to maintain a balance between agricultural production and natural areas.

Cattle grazing in the watershed

CHALLENGES OF THIS ZONE

- Crown lands in this zone are predominantly vacant (i.e., not currently leased for agricultural use), creating challenges for adjacent private or leased lands due to inadequate drainage infrastructure and maintenance and wildlife (including overabundant beavers).
- Privately-held land is subject to overland flooding due to inadequate drainage infrastructure and maintenance.
- Siltation and obstructions in natural waterways cause reduced water carrying capacity, and banks are overtopped after spring melt and summer rainfall.
- Soils in this zone have limited inherent drainage capacity – The majority of the watershed's soils are classified as "imperfect, poor, or very poor" drainage classes.

TYPES OF TOOLS APPROPRIATE TO APPLY IN THIS ZONE INCLUDE:

- **Land protection:** Implement land protection programs on low-lying, flood-prone areas (e.g., conservation agreements, taxation easements, ecological goods and services programs, etc.). The goal is to reduce the burden on private landowners while maintaining the "ecological goods and services" provided by such low-lying areas.
- **Upstream drain management:** When available, upstream drain management and licensing should include consideration and mitigation for timed releases after peak flows have receded.
- **Crown lands management:** Work with Crown lands leaseholders and managers to ensure all management decisions are suitable to natural watershed characteristics; and minimize negative impacts downstream.

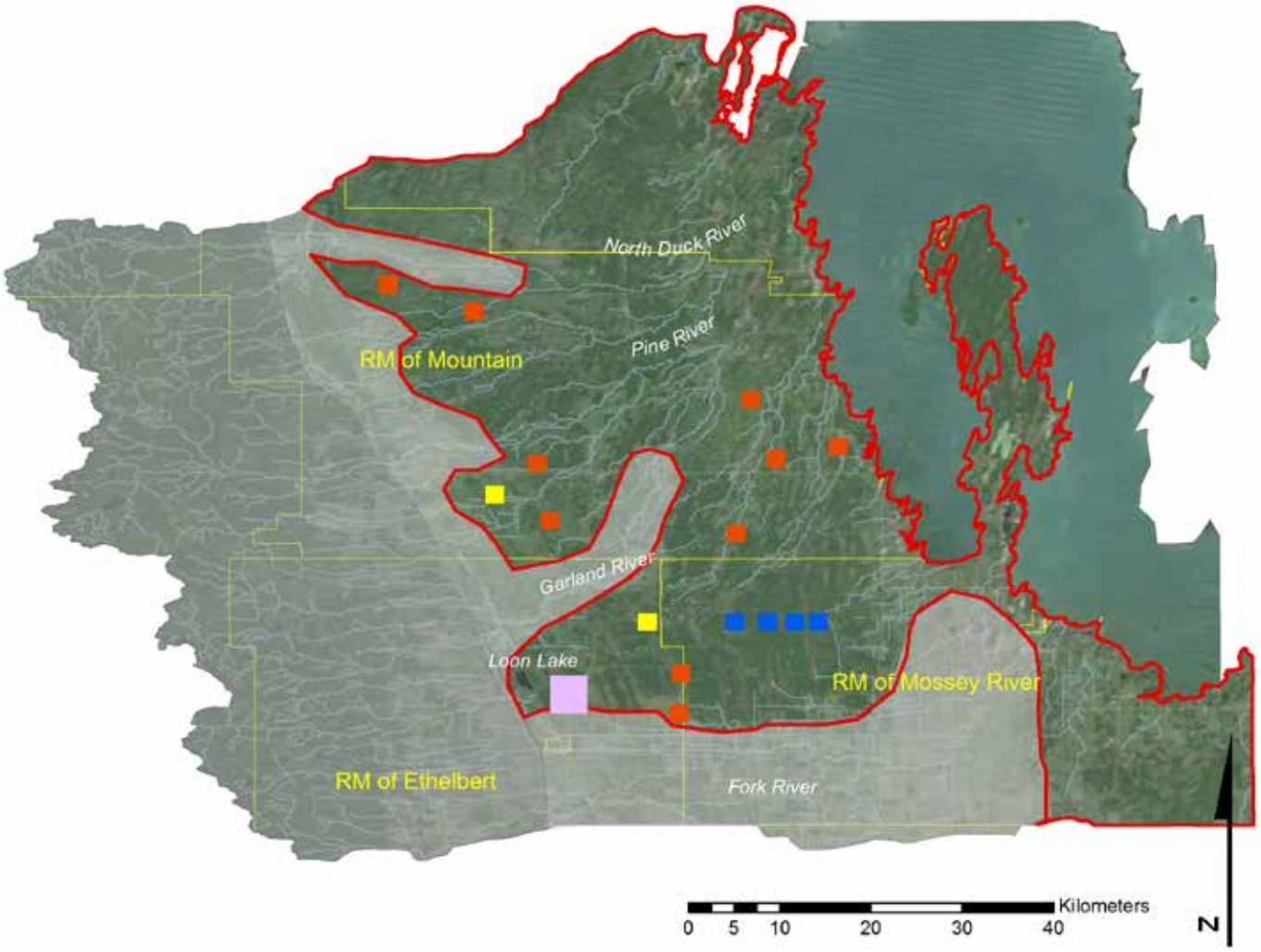


Figure 11. The Grazing and Crown lands surface water management zone and locations of surface water management issue areas (coloured boxes).

GRAZING AND CROWN LANDS ZONE: PLAN IN ACTION

	ISSUE	ACTION
	Overland flooding occurs frequently.	Intermountain CD will work with RMs, landowners, Crown lands managers, and other stakeholders to encourage adoption of tools listed above.
	Overland flooding around Loon Lake.	Intermountain CD will examine the possibility of enhancing the water retention capacity of Loon Lake.
	Natural ridges may erode due to high water levels, impacting residences and pasture.	Intermountain CD will work with RMs to coordinate drainage system infrastructure. RMs will be responsible for recommended works.
	Better coordination of drainage infrastructure is required – upstream culverts are larger than downstream, better maintenance is required, etc.	Intermountain CD will work with RMs and Crown land managers to coordinate drainage system infrastructure. RMs should examine the installation of gated culverts to allow for timed releases. RMs should also conduct maintenance work in identified problem areas.

Note: Intermountain Conservation District maintains a detailed list of target areas – coloured boxes are approximate locations for illustrative purposes.

WATERSHED GOAL 2

PROTECT AND IMPROVE SURFACE WATER QUALITY

LONG-TERM TRENDS: SURFACE WATER QUALITY

Surface water quality data are collected by the Water Quality Management Section of Manitoba Conservation and Water Stewardship from two long-term monitoring stations in the East Duck Mountain – Sagemace Bay Watershed (North Duck and Mossy Rivers; Table 3, Figure 7 - page 16). Data are collected for the purpose of long term monitoring and include variables such as nutrients (nitrogen and phosphorus), total suspended sediments, bacteria, metals, and pesticides.

Manitoba Conservation and Water Stewardship uses a Water Quality Index (WQI) to summarize large amounts of water quality data into simple terms (i.e., excellent, good, fair, marginal, poor). Sufficient data (including nutrients, suspended solids, bacteria, and pesticide concentrations, to name a few) were available to calculate the WQI for both long-term monitoring stations for 1992-2013. The WQI demonstrated that water quality in both the Mossy and North Duck Rivers ranged from good to excellent during the period of record.

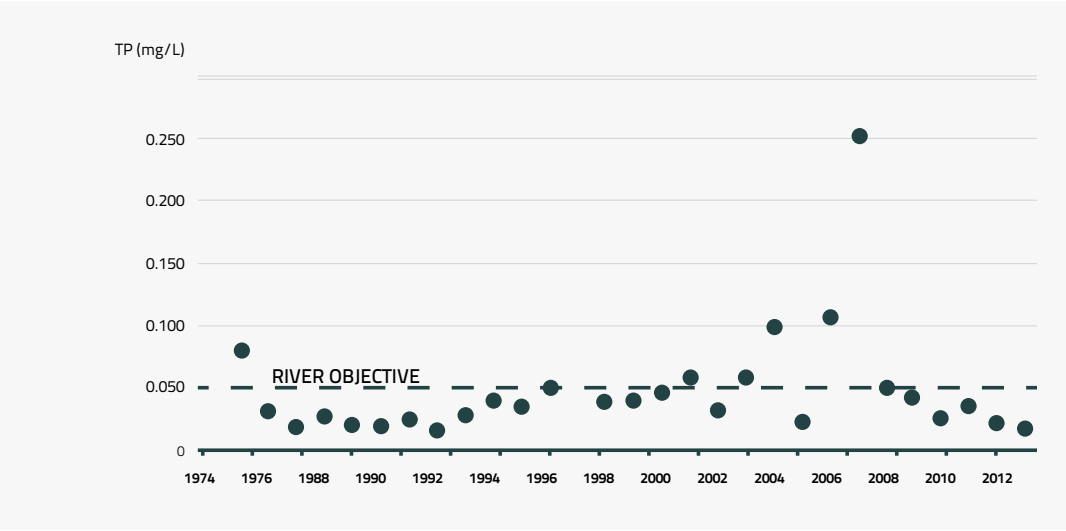


FIGURE 12. Total Phosphorus (TP) on the North Duck River near Cowan from 1974 - 2013.

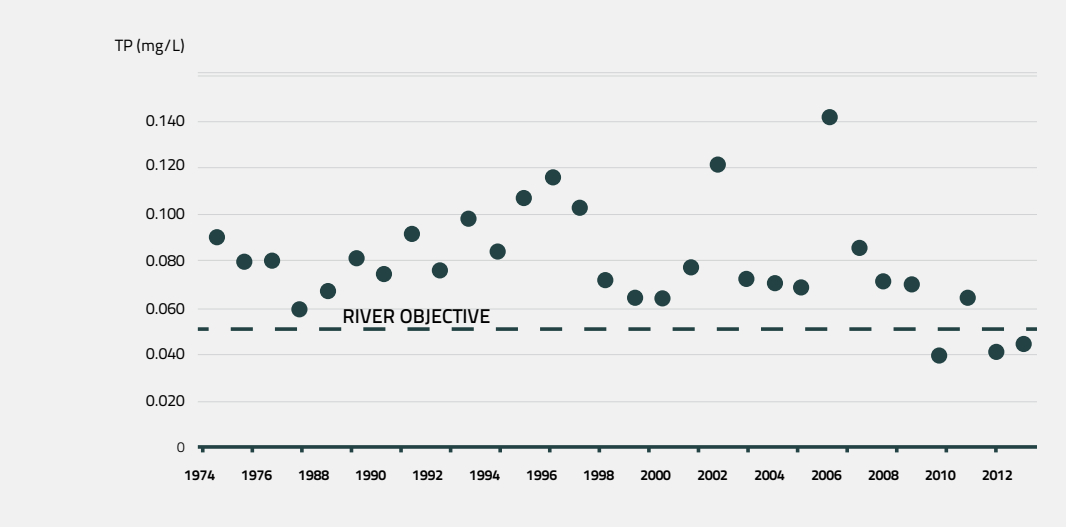


FIGURE 13. Total Phosphorus (TP) on the Mossy River near Winnipegosis from 1974 – 2013.

Despite good to excellent WQI scores for the North Duck and Mossy Rivers, total phosphorus (TP) concentrations at both sites have exceeded the Manitoba Water Quality guideline for rivers of 0.05 mg TP/L throughout the period of record (Figures 12 and 13). Total phosphorus concentrations in the North Duck River were below the guideline in all instances but a few. Conversely, the Mossy River exceeded the guideline in all instances but a few, with total phosphorus concentrations ranging between 0.06 and 0.14 mg/L throughout most of the period of record.

The difference in phosphorus concentrations in the North Duck and Mossy Rivers is likely a result of watershed size, soil types and land use in their respective subwatersheds. The North Duck River originates in the Duck Mountains, and is a relatively small subwatershed with limited forestry and agricultural land use activities. The Mossy River is the only outlet leaving Dauphin Lake, a much larger watershed that drains an area of 8,400 km^2, almost twice the size of the entire East Duck Mountain – Sagemace Bay Watershed. Seven tributaries drain into Dauphin Lake, including the Valley, Wilson, Vermillion, Edwards, Ochre and Turtle Rivers. Siltation due to channel straightening within the Dauphin Lake Watershed has been cited as a primary driver of total phosphorus concentrations within Dauphin Lake, and hence, the Mossy River.

In July of 2007, levels of TP in the North Duck River were measured at 0.498 mg/L, which is almost ten times greater than the Manitoba Water Quality guideline of 0.05 mg/L[1]. This may have been due to sample collection coinciding with a large rainstorm, which would have caused increased surface water runoff, suspension of sediments and thus elevated total phosphorus concentrations. Overall, elevated TP concentrations in the North Duck River tend to occur during spring runoff and summer precipitation events. Both increase surface water runoff thus elevating nutrient loading, including total phosphorus concentrations.

Taking steps to prevent excessive phosphorous loading in the East Duck Mountain – Sagemace Bay Watershed is important for many reasons including: protecting water quality in Lake Winnipegosis (a source of drinking water for Duck Bay and Camperville) and preventing downstream impacts beyond Lake Winnipegosis in the larger Lake Winnipeg and Nelson River drainage basins.

DID YOU KNOW

Excessive levels of phosphorus and nitrogen fuel the production of algae and aquatic plants. Extensive algal blooms can cause changes to aquatic habitat, reduce essential levels of oxygen, clog commercial fishers' nets, interfere with drinking water treatment facilities, cause taste and odour problems and affect recreational activities. In addition, some forms of blue-green algae can produce toxins.

TABLE 3. Water quality monitoring stations within the East Duck Mountain – Sagemace Bay Watershed.

STATION NUMBER	LOCATION	PERIOD OF RECORD	SAMPLING FREQUENCY	AGENCY
MB05LGS001	North Duck River at PTH #10, near Cowan	1975-1977, 1988-2013	Monthly in open water season	Province
MB05LJS006	Mossy River at PR #364 near Winnipegosis	1974-1977, 1988 - 2013	Monthly in open water season	Province

[1]Phosphorus loads entering receiving water bodies such as Dauphin Lake and Lake Winnipegosis are calculated using both the concentration of phosphorus measured in the water, and the volume of water that is flowing at that time. Phosphorus concentrations, presented here, are a snapshot of water quality conditions in the North Duck and Mossy Rivers.

OBJECTIVE 2A

Promote and implement Beneficial Management Practices that help to protect and improve surface water quality.

For more details see the Implementation Plan on page 39.

ACTIONS

1. Implement beneficial management practices (BMPs) that reduce or eliminate excess nutrients from entering waterways, including improved manure management and location of livestock confinement areas, off-stream watering, exclusion fencing, vegetated riparian buffers, etc.

2. Implement BMPs in riparian areas that minimize soil loss and filter runoff, such as grassed waterways and stream bank stabilizations.

3. Promote and deliver forage seed incentive program, incorporating native varieties where possible.

4. Promote nutrient management planning aimed at matching application rates with crop nutrient requirements.

Wheat field eroding into the Garland River

BENEFICIAL MANAGEMENT PRACTICES (BMP)

...TO REDUCE NUTRIENT LOADING

The implementation of beneficial management practices that reduce nutrient loading, along with awareness and incentive programs, are important to achieving the goal of improving water quality in waterways within the East Duck Mountain – Sagemace Bay Watershed. Beneficial management practices (BMPs) that reduce or eliminate excess nutrients from entering waterways are targeted to each land use. Examples include exclusion fencing, off-site watering systems, vegetated riparian buffers, wintering site management, improved manure management, relocation of livestock facilities and improved fertilizer application practices for the agriculture industry.

...TO IMPROVE RIPARIAN AREAS

Creating, protecting and improving riparian areas is important to the health of the watershed as they act as natural filters of both surface water and groundwater, provide wildlife habitat, and protect stream banks and shoreline from flooding and erosion. Implementing BMPs such as grassed waterways and shoreline stabilization will help to protect and improve riparian areas in the East Duck Mountain – Sagemace Bay Watershed.

Pine River on Hwy#10

Village of Winnipegosis

DID YOU KNOW

Riparian areas are the transitional zones found along waterways, stream banks, lake shores and wetlands. Healthy riparian areas may have any combination of trees, shrubs and grasses depending on local conditions. Riparian areas are highly valuable ecosystems because they connect aquatic ecosystems to terrestrial ecosystems, providing habitat for wildlife and filtering of surface runoff.

...TO BETTER MANAGE WASTEWATER

Failing septic systems and aging municipal wastewater treatment lagoons pose a high risk of contaminating both surface and groundwater resources. Septic systems may be failing if they were not installed properly, not well maintained, if equipment fails, or if the infrastructure is aging and needs replacement. Education on how to inspect and properly maintain septic systems is important in protecting water quality.

Municipal wastewater effluent typically contains human and other organic waste, nutrients, pathogens, suspended solids and household and industrial chemicals that may pose risks to human health and the environment. To minimize these risks, management of effluent quality, proper levels of treatment, monitoring before discharge, and reporting are important. Management plans that address these issues for municipal lagoons are an example of best management practices that could be implemented in the East Duck Mountain – Sagemace Bay Watershed.

IMPROVING AWARENESS

Understanding the activities, developments and land uses that pose a high risk of impairing water quality is important; even more so is providing education and awareness of the opportunities available to residents of the East Duck Mountain – Sagemace Bay Watershed to reduce these risks. Examples include awareness of pilot projects (such as cattail harvesting) and educational campaigns (such as the Lake Friendly Accord) that are taking place elsewhere in the province but may provide benefits locally, workshops for stakeholder groups and continued support of the annual Water Festival for district schools.

ACTIONS

5. Promote best management practices for waste and sewage disposal including the operation of lagoons and septic fields, and the disposal of chemical and hazardous goods.

6. Investigate harvesting of cattails for biofuel production – generating revenue for landowners while maintaining cattails' benefits such as nutrient uptake and sediment trapping.

7. Promote the Lake Friendly campaign and the opportunities for reducing nutrient loading to waterways.

8. Provide opportunities for education to all stakeholders, including students, residents, agricultural producers and municipal councillors.

WATERSHED GOAL 3
PROTECT DRINKING WATER SOURCES

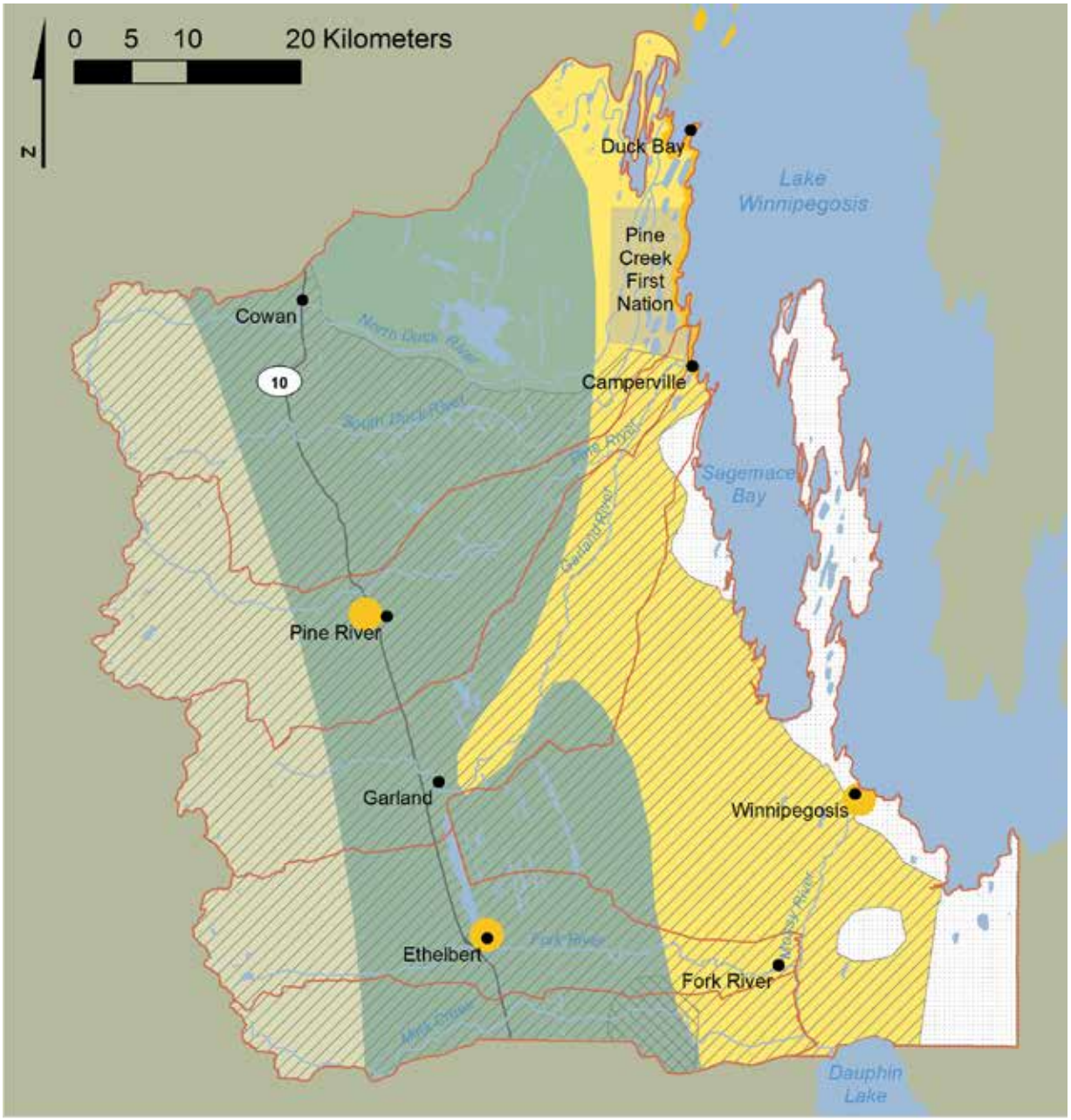


FIGURE 14. Location of source water protection buffer zones in the East Duck Mountain – Sagemace Bay Watershed

- Subwatershed Boundary
- Source Water Protection Buffer
- Areas with Very Few Widely Scattered Minor Sand and Gravel Aquifers
- Lenses of Sand and Gravel
- Major Buried Sand and Gravel
- Carbonate Rocks: Limestone and Dolomite
- No Bedrock Aquifers At Less Than 150 Metres
- Sandstone and Sand (Cretaceous Swan River Formation)

DRINKING WATER SOURCES IN THE EAST DUCK MOUNTAIN - SAGEMACE BAY WATERSHED

Maintaining drinking water quality and supply is a top concern for community residents in the East Duck Mountain – Sagemace Bay Watershed. Clean, reliable drinking water is essential for prosperous, safe communities, and ensuring that high quality water continues to be available for residents of the East Duck Mountain – Sagemace Bay Watershed is a priority.

Manitoba legislation defines public drinking water systems as those serving more than 15 connections. The East Duck Mountain – Sagemace Bay Watershed contains five public drinking water systems (Figure 14). Pine River, Ethelbert and Winnipegosis withdraw water from groundwater sources, whereas Camperville and Duck Bay withdraw water from Lake Winnipegosis. There are also numerous semi-public systems (i.e., schools, hospitals, restaurants) and a large number of private wells in this watershed.

Ethelbert, MB

OBJECTIVE 3A

Promote and implement Beneficial Management Practices that help to protect drinking water sources

For more details see the Implementation Plan on page 40.

ACTIONS

1. Promote and deliver private well protection, including an abandoned well sealing program, well testing, and well-head assessments.

2. Implement practices within source water protection zones that reduce the risk of contamination of source waters (such as grassed buffers, contoured slopes, monitoring land use surrounding surface water intakes, etc.).

3. Monitor source water at all public, semi public and private drinking water distribution points to ensure high quality drinking water is delivered to residents.

SOURCE WATER ASSESSMENT AND PROTECTION IN MANITOBA

Protecting water at its source, before it arrives at our treatment facilities, is a preventative approach to drinking water management. It is less expensive and more ecologically responsible to prevent contamination of source waters than to try to remediate water quality with expensive treatment facilities. Source water protection also provides benefits to watersheds beyond those realized at the water treatment plant. Clean water benefits aquatic ecosystems, supports recreational and wildlife values, and ensures sustainability for future generations.

The approach to source water protection varies widely across Canada. Manitoba has adopted a 'grassroots' approach to source water protection. A source water assessment is conducted by a team of local, technical and nontechnical representatives, and their recommendations are included within an Integrated Watershed Management Plan. This locally-led approach to protecting drinking water sources is in line with the shared governance model adopted for soil and water management across municipal Manitoba through the Conservation Districts Program. The process is quick, easy to follow and relies primarily on the common sense of a small group of people.

Shanty Lake Dam in Duck Mountain Provincial Park

SOURCE WATER PROTECTION ASSESSMENT IN THE EAST DUCK MOUNTAIN - SAGEMACE BAY WATERSHED

The source water assessment team was comprised of a hydrogeologist, a regional drinking water officer, a watershed planner, conservation district representatives, and a municipal representative. The team made recommendations based on site visits to all five public systems conducted in 2011, a review of land uses near each site, and a follow-up discussion of potential threats to drinking water quality based on observations made during site visits and information available in the provincial groundwater database.

A number of potential risks were identified by the source water assessment team, including reliance on groundwater withdrawn from unconfined aquifers or groundwater under the direct influence of surface water. The presence of possible sources of pollution, such as old dump sites, petroleum storage sites and lagoons in the vicinity of public drinking water sources were also noted, as were land use practices within each source water protection buffer zone. Actions that will help to protect drinking water sources can be found in the table below.

In addition to this source water assessment, Intermountain Conservation District conducted a groundwater quality monitoring program during 2008 – 2010, testing 167 wells in the watershed in 2008, 251 in 2009, and 36 in 2010. Water quality was tested for total coliform and *E. coli* bacteria, as well as nitrates. Results showed that 1 in 5 wells failed to meet drinking water guidelines due to presence of bacteria or high levels of nitrates, and that high nitrate concentrations occurred most frequently in areas characterized by shallow overburden. Intermountain Conservation District communicated with the owners of these wells, providing information on the precautions required to protect their health.

SOURCE WATER PROTECTION PLAN

RECOMMENDATIONS	LEAD ORGANIZATION
Provide education on private well head management.	IMCD, MCWS – Office of Drinking Water, MCWS Groundwater Management
Locate new wells at a safe distance from potential sources of contamination and in an area away from surface water runoff.	Landowners, Certified Well Drillers
Seal unused and poorly constructed wells within source water protection zones.	IMCD
Ensure all wells that supply public drinking water meet the following criteria: ▪ intact well casing protected from surrounding transportation routes (bollards, shed or wellhouse). ▪ a permanent grass buffer at least 10 feet around the well. ▪ land should slope away from the well head to prevent surface water from ponding at or near the well head.	IMCD, MWCS – Office of Drinking Water, well owners

IMPLEMENTATION PLAN: RECOMMENDED ACTION ITEMS

Implementing the East Duck Mountain – Sagemace Bay IWMP will require support from all stakeholders, including businesses, environmental organizations, government and residents of the watershed.

The implementation table found on the following pages highlights actions that support watershed goals. Each action has a target area, a list of potential partners and a measure of success.

The primary mandate of the IMCD will be to carry out and coordinate the implementation of the actions within the East Duck Mountain – Sagemace Bay IWMP.

Incentive programs currently being offered by IMCD are already contributing to the plan's success, and include:

- Forage Seed Reimbursement
- Grassed Waterway
- Off-Stream Livestock watering
- Streambank Stabilization
- Creek Rehabilitation
- Livestock Crossings
- Riparian Fencing

POTENTIAL PARTNERS

Intermountain Conservation District (IMCD)	Louisiana Pacific Woodlands (LP)
Manitoba Agriculture Food and Rural Development (MAFRD)	Manitoba Conservation and Water Stewardship (MCWS)
Manitoba Habitat Heritage Corporation (MHHC)	Manitoba Infrastructure and Transportation (MIT)
Manitoba Trappers Association	Manitoba Forestry Association
Rural Municipalities (RMs)	Local Producers

KEEPING THE PLAN ALIVE

The Intermountain Conservation District will monitor progress toward plan implementation over its 10-year timeframe, reporting to stakeholders every 2-4 years.

The most important aspect of any Integrated Watershed Management Plan is implementation – without it, the plan is no more than a list of good intentions.

GOAL 1
REDUCE THE IMPACTS OF OVERLAND FLOODING

OBJECTIVE 1A: COORDINATED WATERWAY MANAGEMENT THAT INVOLVES ALL LEVELS OF JURISDICTION

	RECOMMENDED ACTIONS	TARGET AREAS	POTENTIAL PARTNERS	MEASURE OF SUCCESS
1	Clear channel obstructions to maintain water flows (other than beaver dams, which are covered in objective 1B).	Site – specific – refer to Surface Water Management Plan and supporting documents.	IMCD MCWS RMs	Reduced frequency of overland flooding events and subsequent damage.
2	Investigate feasible locations for implementation of water retention measures as outlined in the Surface Water Management Plan (e.g., control or drop structures in headwater areas). Review historical studies of the Garland River Floodway, the North Duck Headwater Retention Dam, and others.	Watercourses in escarpment areas, Loon Lake, Garland River, and others where applicable.	Conservation District MCWS MIT MAFRD MHHC	Increased water storage capacity; reduced time and effort spent repairing erosion damages.
3	Mitigate sites identified by local municipalities where surface water management issues exist. A list of priority projects will be maintained at the IMCD office.	Site – specific – refer to Surface Water Management Plan and supporting documents.	IMCD RMs MIT MCWS	Decreased number of surface water management issues.
4	Ensure that all stakeholders are aware of regulations that affect waterway management; work with all stakeholders to mitigate illegal water diversion on Crown lands.	Watershed-wide	MCWS MAFRD IMCD Landowners	Successful partnerships and open communication between all stakeholders.
5	Review forestry management practices in the Duck Mountains and their effect on runoff timing and volumes downstream.	Duck Mountain Provincial Forest and Park	LP Woodlands IMCD	Successful relationship between IMCD and LP formed; better understanding of impacts to the watershed and identification of potential solutions where needed.

GOAL 1
REDUCE THE IMPACTS OF OVERLAND FLOODING

OBJECTIVE 1B: IMPLEMENT A COMPREHENSIVE APPROACH TO BEAVER MANAGEMENT

	RECOMMENDED ACTIONS	TARGET AREAS	POTENTIAL PARTNERS	MEASURE OF SUCCESS
1	Implement beaver dam management in priority areas in the watershed on a systematic, cyclical basis.	Watershed-wide (list of problem areas held at IMCD)	IMCD MCWS MAFRD MIT RMs	Measureable reduction in the impacts of overland flooding as a result of beaver dams.
2	Encourage dedicated trappers to trap beaver in priority areas in conjunction with beaver dam removals. Work with landowners and leaseholders to ensure success.	Watershed-wide (list of problem areas held at IMCD)	MCWS MAFRD RMs Manitoba Trappers Association IMCD	Reduced beaver populations in problem areas.
3	Adopt a year-round incentive program that would reduce beaver population numbers.	Watershed-wide (list of problem areas held at IMCD)	MCWS RMs	Reduced beaver populations in problem areas.
4	Deliver educational programs for all types of beaver management (trapping, beaver deceivers, etc).	Watershed-wide	IMCD MCWS Manitoba Trappers Association	Increased public participation in and understanding of beaver management activities.

GOAL 2
PROTECT AND IMPROVE SURFACE WATER QUALITY

OBJECTIVE 2A: PROMOTE AND IMPLEMENT BENEFICIAL MANAGEMENT PRACTICES THAT HELP TO PROTECT AND IMPROVE SURFACE WATER QUALITY

	RECOMMENDED ACTIONS	TARGET AREAS	POTENTIAL PARTNERS	MEASURE OF SUCCESS
1	Implement beneficial management practices (BMPs) that reduce or eliminate excess nutrients from entering waterways, including improved manure management and location of livestock confinement areas, off-stream watering, exclusion fencing, vegetated riparian buffers, etc.	Watershed-wide	IMCD MAFRD	Increased adoption of these practices throughout the watershed.
2	Implement BMPs in riparian areas that minimize soil loss and filter runoff, such as grassed waterways and stream bank stabilizations.	Western half of the watershed	IMCD	Increased kilometers of protected and restored riparian buffer zones.
3	Promote and deliver forage seed incentive programs, incorporating native varieties where possible.	Class 4 and lower lands	IMCD	Increased number of acres of marginal land converted to perennial forage cover.
4	Promote nutrient management planning aimed at matching application rates with crop nutrient requirements.	Watershed-wide	IMCD MAFRD	Increased adoption of these practices.
5	Promote best management practices for waste and sewage disposal including the operation of lagoons and septic fields and the disposal of chemical and hazardous goods.	Watershed-wide	MCWS RMs IMCD	Increased awareness of the benefits and options for waste disposal.
6	Investigate harvesting of cattails for biofuel production – generating revenue for landowner while maintaining cattails' benefits such as nutrient uptake and sediment trapping.	Waterways, riparian areas, and wetlands throughout the watershed	MCWS IMCD MHHC	Pilot projects implemented.
7	Promote the Lake Friendly campaign and the opportunities for reducing nutrient loading to waterways.	Watershed-wide	IMCD Lake Friendly Stewards Alliance	Increased awareness and adoption of Lake Friendly actions – benefiting water quality throughout the watershed.
8	Provide opportunities for education to all stakeholders, including students, residents, agricultural producers, municipal councillors.	All communities in the watershed	IMCD	Each group of stakeholders is engaged through communication materials or formal workshops bi-annually. Water Festival held annually for district schools.

GOAL 3
PROTECT DRINKING WATER SOURCES

OBJECTIVE 3A: PROMOTE AND IMPLEMENT BENEFICIAL MANAGEMENT PRACTICES THAT HELP TO PROTECT DRINKING WATER SOURCES

	RECOMMENDED ACTIONS	TARGET AREAS	POTENTIAL PARTNERS	MEASURE OF SUCCESS
1	Promote and deliver private well protection, including an abandoned well sealing program, well testing, and wellhead assessments.	First priority- Source Water Protection Zones	IMCD	All private wells within source water protection zones are assessed and protected.
2	Implement practices within source water protection zones (such as grassed buffers, contoured slopes, monitoring land use surrounding surface water intakes, etc.) that reduce the risk of contamination of source waters.	First priority- Source Water Protection Zones	IMCD MCWS	Increased adoption of these measures at wellheads and surface water intakes.
3	Monitor source water at all public, semi public and private drinking water distribution points to ensure high quality drinking water is delivered to residents.	All communities within the watershed	IMCD MCWS	No Boil Water Advisories; all public drinking water treatment facilities meet Provincial Water Quality Standards.

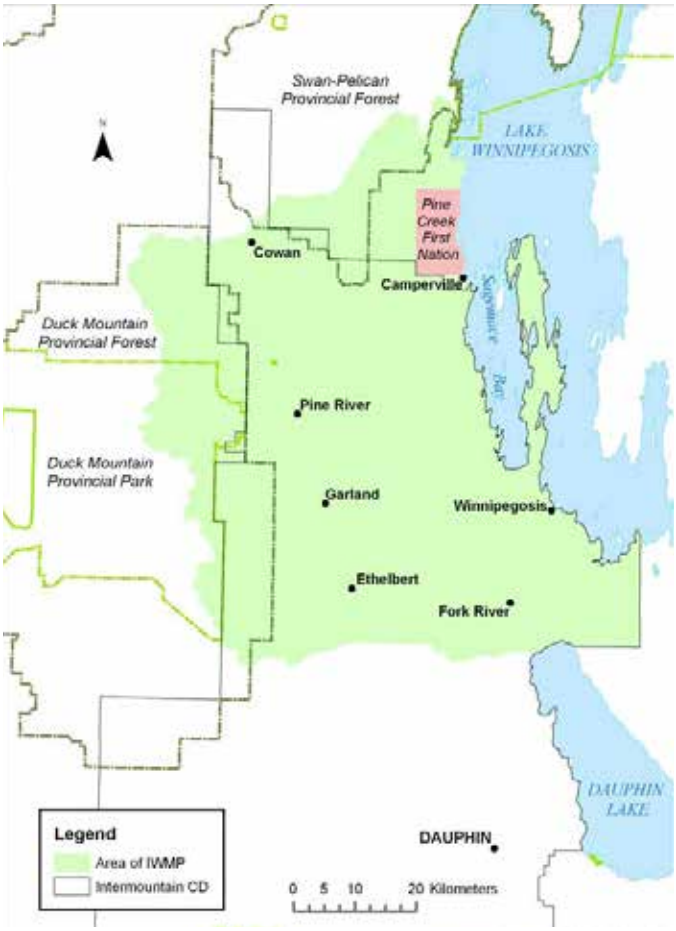
Beaver Dam on Stoney Creek

APPENDIX
SUMMARY OF PUBLIC ISSUES

The Intermountain Conservation District (IMCD) was designated as the Water Planning Authority for the East Duck Mountain - Sagemace Bay Watershed (05LG and parts of 05LJ and 05LH) by the Province of Manitoba to create a watershed management plan for the watershed. One of the first steps in the development of the plan was to hold public forums to explore the water concerns of local residents and other stakeholders within the planning area. The issues identified at these public forums provided direction on the scope of the Integrated Watershed Management Plan.

Early in the planning process the IMCD formed a Project Management Team (PMT) whose role was to guide the watershed planning process from conception to completion. One of the first tasks completed by the PMT was the organization of three public forums. Meetings were held in distinct areas of the watershed with the goal of engaging more people and soliciting a range of public issues. The meetings were held at Cowan, Garland and Winnipegosis.

At each of the public meetings the attendees were asked to provide their concerns related to the watershed. Attendees were also asked to contribute ideas on how their issues could be resolved and what they would like the watershed to look like in the future. All responses were recorded by members of the PMT.



[1] The project management team was initially comprised by: Marvin Kovacik (Chairperson), Michael Semeniuk(IMCD Vice-chair), Ken Shewchuk (R.M. of Ethelbert councilor), Ron Kostyshyn (Reeve of R.M. of Mossey River), Dane Guignon (Local producer), Wayne Lytwyn (Local producer), Mitch Michaluk (Mayor of Village of Ethelbert), Bruce Stratuliak (IMCD Manager), James Wellbourne (IMCD Watershed Planning Assistant) and David Jones (Watershed Planner, Manitoba Conservation and Water Stewardship).

During public forums and in completing survey response forms, interested members of the public identified numerous issues. The issues and suggested solutions, listed in order according to the frequency of appearance are:

SURFACE WATER

1. Flooding and Drainage/Drain Maintenance was the most prevalent issue identified throughout the entire series of public forums.
2. Water retention and management.
3. Erosion.

Ideas suggested by the public to address the above issues:

- Restore water courses back to their original location.
- Better beaver controls and maintenance (increased bounties etc.).
- Better coordination and notification of projects between R.M. and landowner.
- Removal of livestock from waterways.

SOILS AND LAND USE

1. Flooding and loss of usable land (and related issues such as increased flow rates).
2. Soil erosion.
3. Improper use of marginal land.

Ideas suggested by the public to address the above issues:

- Beaver control and maintenance and drainage/surface water management.
- Alternate use of land (give farmers/producers help on crown and municipal lands by reducing rent or taxes on land until it is useable again).
- Stay back from water courses.
- Higher incentives for producers.
- Land should be used for what it is suitable for.

GROUND WATER

1. Abandoned wells causing contamination.
2. Saturation of soil.
3. Well contamination.
4. Pine River Spring.

Ideas suggested by the public to address the above issues:

- Old wells should be sealed (RM should contribute $; IMCD should consider waiving $100 fee to increase interest).
- Restore Pine River Spring back to the way it was before it was leased.
- More recycling, less waste.
- More monitoring on livestock operations, better locations.
- If we could manage surface water it will have a positive effect on ground water.

SOURCE WATER PROTECTION

1. Contamination from various sources (abandoned wells, leaky lagoons etc.).
2. Source water quality.
3. Pine River Spring.

Ideas suggested by the public to address the above issues:

- Better water treatment technology (private water sources).
- Restore Pine River Spring back to the way it was before it was leased.

HABITAT AND WILDLIFE

1. Beavers and related issues such as flooding and destruction of timber land.
2. Wildlife movement out of wetter areas (more predators such as wolves in yard sites.
3. Food and commercial fisheries (beavers are damming streams and fish cannot get to spawning grounds; study on Fairford dam seems to have a connection with a drop in fish stocks).
4. Hunting practices.
5. Nuisance wildlife such as bears, moles and raccoons.

Ideas suggested by the public to address the above issues:

BEAVER

- Better trapping and controls need to be maintained by everyone.
- More dedicated trappers.
- More dedicated trappers and better population control.
- Increase bounty; develop monitoring system for population; set up trap lines in unused crown land areas.
- Promote prevention through population control rather than reaction through beaver dam cleanouts.

WILDLIFE MOVEMENT

- Baiting practices should be abandoned.

HUNTING PRACTICES

- Should be regulated on crown and private lands.

NUISANCE WILDLIFE

- More tags for bears.
- Mole trapping program.

PHOTO: SAGEMACE BAY, ON LAKE WINNIPEGOSIS

EAST DUCK MOUNTAIN - SAGEMACE BAY

INTEGRATED WATERSHED MANAGEMENT PLAN