

Manitoba Forestry Association Private Land Resource Planning Resource Management Plan

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2015_2012_RMP

Landowner/Organization:

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I. Introduction

As Manitoba's oldest conservation education organization, the Manitoba Forestry Association (MFA) is a leader in the field of forest education. We are a non-profit, registered charity governed by a board of voluntary directors.

Our mission is to inform and educate all Manitobans about the wise management of trees and forests as a vital part of the larger ecosystem, including their impact on climate change. We want Manitobans to understand that forests are an integral part of the global ecosystem and the lives of all human beings. Forests are used, but they must be managed in a sustainable manner to ensure they will remain healthy and productive today and for future generations.

The MFA has been delivering the Woodlot Program since 1992 throughout the Eastern, Interlake, and Parkland regions of the province. The program aims to promote land stewardship and to help landowners realize the potential of their wooded property in meeting their personal goals. These personalized plans are designed to provide landowners with the information they require to make informed decisions for the sustainable management of their woodlot for economic, environmental and social benefits.

In 2012 the MFA developed the Resource Management Plan (RMP) and process to better meet the needs of private land resource owners. The new Resource Management Plan (RMP) is offered to landowners, within our area of responsibility, through financial assistance provided by Manitoba's Sustainable Development Innovations Fund. The RMP provides the landowner with the information and support they require to manage, enhance or expand the woodland area of their property for economic, environmental or aesthetic purposes. For further information on the services provided through the Private Land Resource Planning program or for follow-up on your RMP, please contact the Manitoba Forestry Association.

Manitoba Forestry Association

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2. Information

2.1. Landowner Information

First Name:

Last Name:

Mailing Address:

City/Town:

Province:

Postal Code:

Home Phone:

Work Phone:

Residence on Woodlot:

2.2. Location of Woodlot

Rural Municipality

Legal Description:

Quarter Section

Section

Township

Range

Meridian

Rural 911 #:

Property Entrance GPS Coordinates:

Easting

Northing

Forest Section:

Aspen Parkland

Forest Management Unit

6

Ecoregion:

Aspen Parkland

Ecodistrict:

Melville

2.3. Landowner Objectives and Priorities

The objective of this resource management plan is to assess the effects of flooding in recent years on the riparian forests along the Pipestone Creek. Large trees were downed by recent floods and were washed downstream where some were deposited onto the banks of the creek on privately owned land. The deposition of these dead trees on landowners' properties, the threat of additional trees falling over into the creek, included with the loss of trees from the riparian forest due to these floods have been a concern for landowners. This has sparked an interest amongst landowners and the West Souris River Conservation District (WSRCD) to replant and restore the forest.

A field assessment of the riparian forest on this property was conducted to obtain an inventory of the tree and shrub species present within each stand, an estimate of the volume of live and dead trees in each stand, presence of wildlife, presence of insects and disease, stand characteristics, and resource feature identification (buildings, water features, nests, wildlife dens, sensitive areas, etc). The information gathered was used to develop this resource management plan.

This plan is intended to guide the WSRCD in assisting the landowner in restoring the health of the riparian area on the property. When a riparian area is healthy and functioning properly, the creek is able to recover quicker from a flood due to its increased resilience, the severity of flooding events may decrease and therein damage caused to the creek and surrounding land is reduced. This plan will also provide the WSRCD an estimated cost of the removal of dead trees from the property to mitigate the effects of the recent flooding.

3. Surrounding Lands

3.1. Ecodistrict

The woodlot is located in the **Melville Ecodistrict** of Manitoba. This ecodistrict extends a considerable distance into Saskatchewan. Approximately one-fifth of the district lies within Manitoba.

The natural vegetation of the Melville Ecodistrict was once park-like because of the presence of trees in and around depressions and grassland vegetation on the slopes and knolls. However, much of this vegetation has disappeared due to cultivation.

Under natural conditions, depressions are marked by aquatic vegetation. The lower portions of these basins contain water throughout the year, and the open water portion is ringed by slough grass, sedges and rushes. Surrounding this vegetation is a belt of willows which, in turn, is encircled by trembling aspen. Next is a border of shrubs comprised of prairie rose, silverberry, snowberry and others. This

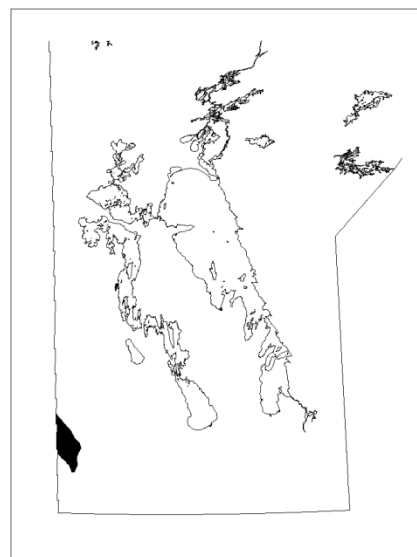


Figure 1: Melville Ecodistrict highlighted in black

vegetation gives way, if not cultivated, to a grassland of pasture sage, grama grass, June grass, anemone, chickweed, etc. on the drier knolls, while intermediate slopes have little bluestem, spear grass, ragwort and other grasses and forbs¹.

3.2. Watershed

The Melville Ecodistrict lies between the Pipestone Creek to the south and the Assiniboine River to the north.

The Manitoba portion of the ecodistrict is part of several watersheds. The northern and central sectors lie in the Foxwarren and Hamiota divisions of the Assiniboine River watershed, while the southern sector is part of the Hartney division of the Souris River watershed. Both watersheds are part of the Nelson River drainage system¹.

3.3. Land Use

Most of the land in the Melville Ecodistrict is cultivated for the production of spring wheat, other cereal grains, oil seeds and hay crops. The saline and Solonetzic soil areas are generally limited to pasture and hay production. The numerous wetlands are important as breeding habitat for various ducks and as staging areas for waterfowl¹.

¹Quoted from

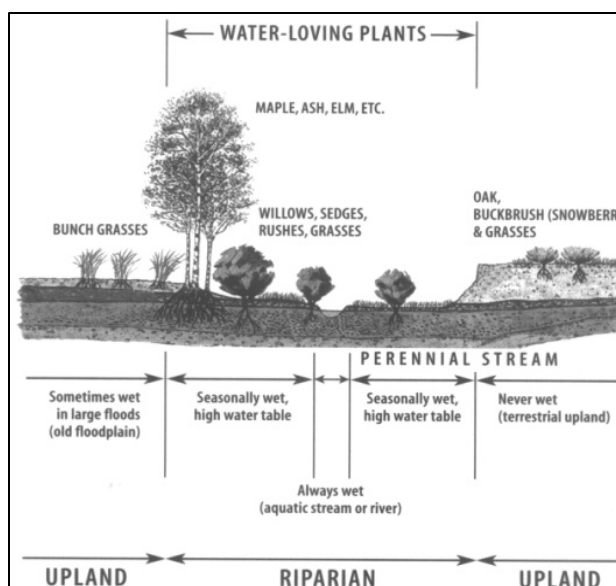
http://sis.agr.gc.ca/cansis/publications/ecostrat/provDescriptions/mbteee/mbteee_report.pdf

R.E. Smith, H. Veldhuis, G.F. Mills, R.G. Eilers, W.R. Fraser, and G.W. Lelyk. 1998. Terrestrial Ecozones, Ecoregions, and Ecodistricts of Manitoba, An Ecological Stratification of Manitoba's Natural Landscapes. Land Resource Unit, Brandon Research Centre, Research Branch Agriculture and Agri-Food Canada.

3.4. Riparian

The forest on this property is part of a riparian area along the Pipestone creek. These areas are periodically flooded and represent a transition zone between upland and aquatic habitats.

Riparian areas are an important feature as they make up approximately 5% of our forested land base and contain about 80% of the biodiversity. Maintenance and protection of riparian areas will help to ensure the long term ecological function of these areas.



Riparian areas:

- Support a wide array of wildlife species and add to the biodiversity of the area
 - Riparian areas are one of the most diverse ecosystems, providing food, shelter, reproductive sites, and water for many mammals, birds, and aquatic species.
- Reduce the flow of water within a stream channel
 - Forested riparian areas trap snow and delay the spring melt
 - Some riparian forests act as floodplains by providing temporary storage for high water. This slows flood waters and reduces the water's energy, thereby decreasing the severity of erosion.
- Prevent/reduce shoreline erosion
 - The roots of the woody vegetation in conjunction with the understory vegetation anchor the soil and reduce erosion of the banks, particularly during high water conditions.
 - Trunks of dead trees provide erosion protection and structural complexity, which play a role in modifying stream valleys.
- Maintain and improve water quality
 - Riparian vegetation slows runoff from surrounding agricultural land, allowing for sediments and nutrients to filtrate through the soil and root systems prior to entering the river. Without this, excess sedimentation and nutrient loading will occur in the water. This is detrimental to some fish and their habitat, as oxygen becomes limiting and spawning areas are lost.
 - The upper canopy of the trees shade the water and maintain cooler water temperatures, benefiting aquatic species.
- Recharge local groundwater reserves
 - Slow flood waters by allowing the absorption and storage of water in underground aquifers.
 - Maintain water flows in rivers and streams through storage and slow release of water.
 - Maintain high water table and extend width of productive riparian area

4. Resource Description

4.1. Existing Land Use

The majority of the property consists of grazing pasture and agricultural fields. The only wooded area on the property is the riparian forest that runs along the Pipestone creek.

4.2. Woodlot Description



The woodlot is located in the rural municipality of Pipestone on the quarter section of SE 05-08-27 W (refer to the Location Map on page 37). The woodlot is comprised of a riparian forest along the Pipestone Creek which runs through the property. The forest is approximately 25 m wide on each side of the creek, but will vary in width in some spots, ranging from almost no buffer to wider than 25 m. Generally, the Pipestone creek is surrounded by high, steep banks, but this varies throughout the property. Erosion of the creek bank is evident along some spots of the creek.

Overall the woodlot is comprised of overmature stands with no signs of regeneration of young trees. The species composition of the woodlot is Manitoba maple (*Acer negundo*). Understory shrub species include cherry (*Prunus spp.*).

The terrain throughout the woodlot is gentle to moderately sloped with small portions of undulating terrain. The riparian forest is surrounded by agricultural fields, creating an island of forest along the Pipestone Creek. The soils on the woodlot are comprised of clay (refer to the Surface Soil Classification Map on page 39).

4.3. Regeneration and Understory Shrub

Most, but not all, riparian areas can support trees and shrubs. Where trees and shrubs exist, they play an important role in riparian condition. Their root systems are generally excellent bank stabilizers and play a key role in the uptake of nutrients that could otherwise degrade water quality. A good indicator of ecological stability of a riparian area is the presence of trees and shrubs in all age classes, especially young age classes. Without signs of regeneration of preferred woody plants (those species that contribute most to riparian condition and stability) the long-term stability of the area is compromised.

Regeneration of a forested stand can occur either naturally or assisted by a variety of methods including planting. For a stand to naturally regenerate several key features must exist. First a seed source must be available, generally provided by mature trees of good health. Or, a disturbance must occur to initiate stump sprouting or root suckering from mature trees of good health. Secondly, suitable microsite conditions must be present in order for seed germination or root suckering to occur.

For trees that reproduce by seed, a suitable seed bed is required for seed germination to occur. A suitable seedbed is determined by the exposure of mineral soil and availability of appropriate levels of light, moisture and temperature. For trees that reproduce through root suckering, success is dependent on sufficient sunlight to heat the soil. This will initiate suckering from the **adventitious buds** on the roots of the trees that were harvested. The soil itself plays a crucial role in both natural and planted seedling development. The soil parent material, texture, depth, moisture, nutrients and aeration are all factors that determine development. Once started, seedlings must out-compete the surrounding vegetation for moisture, nutrients and light. Other factors that will affect a seedling's establishment and subsequent growth and survival include diseases and insect pests, animal browsing, and environmental factors such as wind or snow.

No regeneration was noted during the detailed resource assessment.

Shrubs form an important part of the riparian forest by adding to the diversity of the stand, and providing food and cover for wildlife. During the detailed assessment the woodlot foresters observed a low abundance of cherry shrubs in the understory.

4.4. Wildlife and Domestic Animals

During the detailed resource assessment the woodlot foresters took note of wildlife and wildlife signs throughout the woodlot. It was observed that raccoons are currently using the woodlot. There are signs that cattle may be free to graze in certain areas of the woodlot.

The woodlot's association with the Pipestone Creek makes it a prime area for wildlife use. The combination of water and vegetation mean riparian areas support a greater variety and number of plant and animal species than other habitats. These areas act as travel corridors for many animals in a fragmented landscape and are necessary for food, shelter, and reproduction. Properly designed and maintained riparian forest buffers may serve as breeding habitat,

important travel or migration corridors for wildlife, shelter in winter, and critical resting and refueling stops for migratory birds. The riparian forest along the Pipestone creek is surrounded by agriculture, providing a refuge for wildlife in the surrounding area.

The following wildlife associations or habitats could be present on this site:

- Birds
 - Waterfowl (nest in riparian areas)
 - Cavity nesting birds (nest in dead and dying, large diameter trees).
 - Song birds
 - Migratory birds
- Mammals
 - Beavers
 - White tailed deer
 - Racoons
 - Black bears
- Reptiles and amphibians
- Fish
- Invertebrates

Considering how critical riparian areas are to wildlife, it is important that the health of this riparian forest is enhanced and maintained. The more diverse the habitat, the greater its utility to many species of wildlife.

5. Management Planning

The ecological functions provided by riparian areas are integral to the wider landscape. Riparian forests can help slow floodwaters thereby reducing flood severity and its resulting impacts, protect water quality, and provide habitat for wildlife (mammals, birds, fish, etc.). Natural disturbances such as floods, grazing from native ungulates, beavers, fire, and drought, have always affected riparian forests. Resilient, healthy riparian forests are able to recover from these small scale natural disturbances and benefit from them. These natural disturbances create diverse riparian forests with a range of tree and shrub age classes and a variety of plant species, providing habitat for a wide variety of wildlife. Our use of these landscapes create an additive and cumulative effect which has often compromised resilience. When human activities negatively impact a riparian forest, the resilience of the forest and the functions it provides are compromised, not only affecting the health of the forest itself but of the wider landscape. In order for riparian areas to function properly, the integrity of these areas must be preserved.

The RM of Pipestone is predominated by agriculture. Much of the Pipestone creek is surrounded by agricultural activities, and is thereby affected by these activities. The impacts of activities such as unregulated cattle grazing in the riparian forest, inappropriate use of agricultural pesticides and herbicides, and the reduction in the width of the riparian forest along the creek negatively affect the health of the creek and in turn has wider impacts on the surrounding area.

In recent years, the Pipestone creek has experienced higher than normal flooding events. Landowners in the area have noticed the effects these floods have had on the riparian areas and their properties. Flooding has resulted in a loss of trees, trees left behind in poor health and with poor structural integrity, a buildup of dead trees washed up from flooding events, and eroded creek banks.

5.1. Management Plan

A field assessment of the riparian forest on this property was conducted in October of 2015 by the woodlot foresters to obtain an inventory of the tree and shrub species present within each stand, an estimate of the (dead and live) timber volume by tree species, presence of wildlife, presence of insects and disease, stand characteristics, and resource feature identification (buildings, water features, nests, wildlife dens, sensitive areas, etc).

The woodlot was divided into three stands based on geography, land use, and dominant tree species. Pre-determined spots (plots) within Stands 1 and 2 were surveyed. Stand 3 was not surveyed because it is an agricultural field with no trees present. Each stand is discussed separately in the management plan.

The Resource Inventory Map, located on page 42 illustrates the stand boundaries and plot locations.



Stand I



The area of stand I is 2.7 hectares (ha).

Stand I is an over mature, even aged stand dominated by Manitoba maple (100%). The majority of trees within the stand are in poor health. The average crown closure of the stand is 20%, indicating sparse tree cover within the stand (see Photograph I on page 15). No regeneration was observed, few shrubs (cherry) are present, and invasive herbaceous plants such as Canada thistle are present. A large amount of dead trees are present in the stand, either deposited by floods or are trees that have fallen over. A high percentage of decadent and dead wood reflects declining health of a riparian area and in this case is a result of the recent flooding events.

The estimated total **merchantable** volume (of *live* trees) for the 2.7 hectare area is 800 m³ or 296 m³/ha.

The estimated total volume (of *dead* trees) for the 2.7 hectare area is 130 m³ or 48 m³/ha.

Stand I Volume Summary

Stand	Area (ha)	Species	Live Trees - Volume (m ³) by DBH (cm)												Total Volume (m ³)	Total Volume/ha (m ³)
			10 cm	12 cm	14 cm	16 cm	18 cm	20 cm	22 cm	24 cm	26 cm	28 cm	30 cm	32 cm		
1	2.7	Manitoba Maple	1	3.2	7.6	12.3	17.3		28.1	33.9	80		53.0	60.0	800	296
Stand	Area (ha)	Species	Dead Trees - Volume (m ³) by DBH (cm)												Total Volume (m ³)	Total Volume/ha (m ³)
			10 cm	12 cm	14 cm	16 cm	18 cm	20 cm	22 cm	24 cm	26 cm	28 cm	30 cm	32 cm		
1	2.7	Manitoba Maple		6.4		24.6	17.3								130	48

Stand I Photos



Photograph 1: Stand I, Plot 1.

This photo shows the dense cover of grasses and herbaceous plants. This brown vine is wild cucumber (*Echinocystis lobata*), a native plant to Manitoba.



Photograph 2: Stand I, Plot 2

Stand 2



The area of stand 2 is 9.6 ha.

Stand 2 is an over mature, even aged stand dominated by Manitoba maple (100%). The average crown closure of the stand is 15%, indicating sparse tree cover within the stand (see Photograph 6 on page 18). No shrub species were present in the understory. Grasses and herbaceous plants were present at plots 2 and 4, whereas only bare soil was present at plots 1 and 3 (see Photograph 3 on page 17). No regeneration was observed throughout the stand. A large amount of dead trees are present in the stand, either deposited by floods or are trees that have fallen over.

The presence of compacted soil and the absence of understory shrubs suggests cattle grazing may be occurring at plots 3 and 4.

The estimated total **merchantable** volume (of *live* trees) for the 9.6 hectare area is 3,022 m³ or 315 m³/ha.
The estimated total volume (of *dead* trees) for the 9.6 hectare area is 2,464 m³ or 257 m³/ha.

Stand 2 Volume Summary

Stand	Area (ha)	Species	Live Trees - Volume (m ³) by DBH (cm)														Total Volume (m ³)	Total Volume/ha (m ³)	
			10 cm	12 cm	14 cm	16 cm	18 cm	20 cm	22 cm	24 cm	26 cm	28 cm	30 cm	32 cm	34 cm	36 cm			38 cm
2	9.6	Manitoba Maple		1.6		6.15	25.95	22.6	14.05		40	46.4	79.5			37.3	41.2	3,022	315
Stand	Area (ha)	Species	Dead Trees - Volume (m ³) by DBH (cm)														Total Volume (m ³)	Total Volume/ha (m ³)	
			10 cm	12 cm	14 cm	16 cm	18 cm	20 cm	22 cm	24 cm	26 cm	28 cm	30 cm	32 cm	34 cm	36 cm			38 cm
2	9.6	Manitoba Maple	0.5	6.4		30.8	34.6	22.6		17	20	46.4				37.3	41.2	2,464	257

Stand 2 Photos



Photograph 3: Stand 2, Plot 1.

No understory shrubs and very little vegetation in the understory.



Photograph 4: Stand 2, Plot 3.

Evidence of erosion along the banks of the creek and no presence of shrubs or trees along sections of the bank. The presence of trees and shrubs would assist in erosion reduction.



Photograph 5: Stand 2, Plot 3.

Mature trees within the stand damaged by flooding. This photo demonstrates the need for renewal. Young trees are required in order to replace the damaged and unhealthy trees.



Photograph 6: Stand 2.

This visual demonstrates the sparse canopy and understory cover of Stand 2.

Stand 3

Stand 3 was not surveyed because it is an agricultural field with no trees present.

5.2. Silvicultural Prescriptions

Silvicultural prescriptions for the woodlot's stands are described below. These prescriptions, or recommendations, provide information on the species associations that are present in the forest types on your property, along with the species' reproductive and developmental pathways.

Stands 1 & 2

Manitoba maple (*Acer negundo*), along with black ash (*Fraxinus nigra*), American elm (*Ulmus americana*), and basswood (*Tilia americana*) are commonly associated with seasonally flooded sites along watercourse riparian areas and may also contain balsam poplar.

Reproduction

Manitoba maple (*Acer negundo*)

Manitoba maple produces seed by 10 years of age and ripens from August to October. The winged seeds disperse in the wind from fall through to spring. Manitoba maple will establish readily on a variety of seedbeds but will begin to die after 1 or 2 years unless openings in the canopy are provided. Manitoba maple will produce stump and root sprouts from young, vigorous trees.

Green ash (*Fraxinus pennsylvanica*)

Green ash has both male and female trees. Seed is dispersed by the wind from July to October. Ash seed generally lies dormant in the litter for several years before germinating. Green ash only produces good stump sprouts in the younger sapling and pole stages.

American elm (*Ulmus americana*)

American elm seed develops early and disperse, by wind, by June. Seed production is abundant after 40 years of age and the winged seed mostly disperses within 100 meters of the tree but can travel as far as 400 meters. Seed usually germinates soon after falling but may remain dormant through the winter and germinate in the spring. Warm temperatures and good light conditions are ideal for germination but germination will also occur in darkness. Seed can also lie flooded for up to 1 month as long as it is not covered in silt. Elm will establish on moist leaf litter, moss and decaying logs but does best on rich, moist loams with good drainage.

Reaction to Competitor

Typical mixed hardwood forests where Manitoba maple, ash, and American elm are commonly found, whether on an upland site or riparian floodplain, occur on very rich sites which can support a dense layer of various shrub species. The shrub layer may contain species such as speckled alder (*Alnus rugosa*), beaked hazel (*Corylus cornuta*) and/or mountain maple (*Acer spicatum*), which when exposed to sunlight may flourish and outcompete regenerating tree species. The herb layer may contain sedges (*Carex* spp) and/or marsh reed grass (*Calamagrostis Canadensis*). These species, especially the marsh reed grass, can form dense layers that will inhibit shade intolerant species and severely deform seedlings as the dense grass collapses under winter snow loads.

Sites that have been subjected to domestic grazing are generally lacking in regeneration of canopy species and may include invasive species such as brome grass (*Bromus spp.*), bluegrass (*Poa spp.*), wheatgrass (*Agropyron spp.*), Canada thistle (*Cirsium arvense*), and sweet clover (*Melilotus spp.*), which may create competition problems for regeneration species.

Green ash and American elm are shade intolerant to intermediate in shade tolerance, whereas Manitoba maple is shade tolerant. The establishment of a dense shrub or sedge/grass layer may dominate the site and outcompete regenerating tree species.

Due to this, it is important to control shrub and herbacious plant competition for the first three years after the establishment of new trees.

5.3. Management Plan Activities

The management activities recommended for the woodlot are outlined in the table on the following page. Blocks have been assigned to specific areas of the woodlot. Each block has a specific set of management activities recommended for it.

Block A was assigned to Stand 1 and **Block B** was assigned to Stand 2. Management recommendations for each stand will be the same. Refer to the Operational Plan map on page 43 for a more detailed visual representation of the blocks.



Management Plan Activities for Blocks A & B

Management Objective	Management Activity Timing	Management Activity
Establish young trees in the riparian forest	Late Spring or Early Fall	<ul style="list-style-type: none"> Plant Manitoba maple (<i>Acer negundo</i>), green ash (<i>Fraxinus pennsylvanica</i>), American elm (<i>Ulmus americana</i>), and willow (<i>Salix spp.</i>) in open spots in the forest and along the creek where there is no forest cover. Keep livestock out of planting areas.
Maintain a minimum 30 m riparian buffer or wider	Late Spring or Early Fall	<ul style="list-style-type: none"> If possible, in areas where the riparian buffer is narrower than 30 m, give up some cropland to plant trees in order to widen the riparian area to 30 m wide or wider.
Manage competing vegetation	Before and after planting seedlings	<ul style="list-style-type: none"> Use brush blankets or mulching cloth around the planted tree seedlings to help with survival of the seedlings.
Protect the riparian area by keeping livestock out		<ul style="list-style-type: none"> Build fencing along the edge of the riparian area to keep livestock out in order to prevent damage to the area.
Dead tree removal	Late Fall, before freeze up or Winter	<ul style="list-style-type: none"> If removal of dead trees is necessary, follow the guidelines outlined in the following section. Ideally dead trees will be left in the forest as they form a very important component of a riparian area.

5.4. Operating Plans

Operating plans are developed to achieve the management activities proposed in the Management Plan Activities table on the previous page (page 24).

Recommendations are outlined in this section of the plan to restore the health and diversity of these forest stands, and consequently restore the health of the riparian area and its ecological functions. It is evident that agricultural activities in the vicinity have had a cumulative impact on the riparian area of the property. Activities such as livestock grazing, removal of riparian forest to make room for crops, introduction of invasive plant species into the forest, and inappropriate use of herbicides and pesticides can create cumulative negative impacts. These disturbances interfere with natural regeneration processes of tree and shrub species, resulting in a low stocked, over mature, even aged forest with no diversity in tree age classes, an absence of regeneration, and low abundance of shrubs.

In contrast, a healthy riparian area usually consists of a diverse mix of native tree, shrub, and understory plant species in varying age classes, standing dead trees and downed woody debris, and a canopy closure in the forest with no more than 5% bare soil present. Healthy riparian areas perform the following key ecological functions:

- Trap sediment
- Build and maintain the creek bank
- Store floodwater and energy
- Recharge groundwater
- Filter and buffer water
- Reduce and dissipate stream energy
- Maintain wildlife and plant biodiversity
- Create primary productivity

To obtain the goal of a healthy riparian area, the following activities are recommended for Blocks A & B:

- *Plant Manitoba maple (Acer negundo), green ash (Fraxinus pennsylvanica), American elm (Ulmus americana), and willow (Salix spp.) throughout the block to establish new, young trees in the stand. Focus on open spots in the forest and areas along the creek where there is a lack of forest cover.*
 - It is imperative that a healthy population of trees, in a range of ages, be present in the forest. Without the presence of younger trees in the stand, there will be no trees present to replace the older trees when they die. Mature healthy trees are required in the stand to continue the cycle of natural regeneration by either producing seeds or initiating stump sprouting. Without the presence of a variety of trees in different age ranges, it will eventually result in a loss of trees and will lead to reduced streambank integrity, increased channel incisement, excessive bank erosion, and reduced wildlife habitat values.
 - Seedling survival will be impacted when planting in compacted soil, so try to plant the seedlings strategically. Plant the seedlings in areas where livestock may

have avoided grazing and thus soil compaction may not be as severe. Plant next to debris, such as downed trees.

- *If sedge, grass or thistle is a problem, seedlings can be planted into a commercial Brush Blanket or brush blankets can be made from porous, mulching cloth purchased from a nursery supply store. Mulch can also be applied around the seedling but it will need to be maintained and may not control competing species sufficiently.*
- *Maintain a minimum 30 meter riparian buffer along the creek.*
 - There is no single ‘ideal’ buffer width, as this will depend on the particular wildlife species in mind and on the site, but we suggest a minimum of 30 meters will begin to provide sufficient wildlife habitat.
 - If possible, give up cropland to plant trees to achieve a 30 meter width.
- *If possible, expand the riparian area to a width greater than 30 m.*
 - A good rule of thumb is, wider is better. The wider the buffer, the greater the variety of wildlife species the riparian area can support, the better it can store and filter groundwater, and the more the creek bank will be strengthened and thus protected from erosion.
- *Keep livestock out of the riparian area*
 - Keep livestock out of the planting areas to avoid the newly planted seedlings from being grazed and trampled.
 - Grazing in riparian areas will damage vegetation and compact soil, introduce weed species into the riparian area, compromise stream bank stability, negatively affect water quality, and reduce the resilience of the riparian area and its ability to recover from natural disturbances, such as floods.
- *Leave dead and dying trees*
 - Dead and dying trees add structural complexity to a stream and riparian area by forming habitat for terrestrial and aquatic wildlife.
 - Standing dead trees are ideal cavity nesting and roosting sites and will increase wildlife and bird diversity if left standing.
 - They provide erosion protection by dissipating the flow of streams and therefore reduce the erosion power of the flowing water.
 - Flooding behind logs and other woody debris helps to recharge the floodplain with water and nutrients.
- *If removal of dead trees is necessary, use the following guidelines:*

- If the area is dry, harvest in late fall before freeze up. This will help scarify the soil and provide patches of bare mineral soil for seed germination to occur. If the area is wet, harvest during winter when the ground is frozen to reduce site disturbance of the rich, moist soils.
- Retain 5-10 well distributed snags per hectare.
- Avoid damaging young trees or desired shrub species with harvesting equipment.
- Caution must be exercised when cutting dead trees as large branches may fall during the felling process. Dead trees broken by the wind at 5 to 10 meters high are good cavity nesting sites and tend to be safer to leave standing when cutting with a chain saw.
- Avoid damaging large diameter dead trees, as these are current or future homes for cavity nesting wildlife and birds.
- A no equipment zone can be established for 10 to 20 meters from the watercourse where trees are harvested by chainsaw and pulled out with a cable or harvested by a feller-buncher which reaches in to harvest the trees.

6. Supplemental Reference Material

6.1. Recommended Reading

The Recommended Reading section identifies recommended reading material that will assist the woodlot owner in achieving the goals and objectives established in the RMP.

The following recommended reading and/or reference material has been identified:

- Managing the Water's Edge – Riparian Health Assessment for Streams and Small Rivers
- Riparian Areas- A User's Guide to Health
- Riparian Areas and Grazing Management
- Planning Your Riparian Planting Project in Alberta
- Performance Monitoring

6.2. Website Links

The following website links may provide valuable reference material towards the implementation of the RMP or provide more in-depth information on a subject related to your objectives and proposed management activities.

Website	Link	Description
Cows and Fish Website	http://cowsandfish.org	The Alberta Riparian Habitat Management Society, also known as "Cows and Fish", is a non-profit society striving to foster a better understanding of how improvements in grazing and other management of riparian areas can enhance landscape health and productivity, for the benefit of landowners, agricultural producers, communities and others who use and value riparian areas.

7. Conclusion

In conclusion, the Manitoba Forestry Association would like to thank you for your interest in our Private Land Resource Planning program. If, at any point in time you have any questions regarding the plan, forms, maps and or activities related to your resource management plan please contact your MFA Woodlot Foresters.

The MFA Private Land Resource Planning program remains available to provide the woodlot owner with further assistance on woodlot management, tree planting, operational planning, etc. including:

- Boundary layout boundary for harvest
- Tree marking for selection harvest
- Locating and mapping skid trails and landings
- Tree planting instruction and assistance
- Facilitation of timber sale agreements
- Recreational Trail development

Please contact your Woodlot Foresters for additional information regarding these interests and how we may assist.

Other educational programs offered through the MFA include:

- **Manitoba Envirothon:** The Manitoba Envirothon is an annual hands-on environmental education competition for high school students, designed to encourage team work, problem-solving skills, and public speaking skills while fostering an appreciation for current and local environmental issues.
- **Heritage Trees:** Our province is blessed with an abundance of trees, but did you know trees also make up an important part of Manitoba's natural heritage? Whether natural or planted, there are a great many trees in the province that may be considered exceptional. There might even be one in your own community! Maybe it is unusually large or tall; perhaps it was planted by early settlers or pioneers; or possibly it has a distinctive shape or even an entirely different form than normal. To learn more on how to nominate please visit <http://heritagetreeawards.ca/steps-nominating/>
- **Seedling Sales:** The Manitoba Forestry Association (MFA) offers a "Seedling Sales" program to landowners and the general public interested in planting coniferous species. Seedlings may be purchased and planted for numerous purposes including shelter, wildlife enhancement, aesthetic values, landscaping or for Christmas trees. Individuals also purchase our seedlings to give to guests at weddings, graduations, baptisms and anniversaries.

For more information on our programs/activities, how to become a member of our Association or to provide a donation, please visit our website at www.thinktrees.org or contact us using the phone/fax/email provided below.

Manitoba Forestry Association

900 Corydon Avenue | Winnipeg, Manitoba | R3M 0Y4

Phone (204) 453-3182 | Fax (204) 477-5765 | Email: info@thinktrees.org

Website: www.thinktrees.org

THANK YOU!

8. Glossary

8.1. Glossary of Acronyms

AAFC	Agriculture and Agri-Food Canada
FRI	Forest Resource Inventory
GIS	Geographic Information System
GPS	Global Positioning System
ha.	hectares
m ³	cubic meters
MFA	Manitoba Forestry Association
NTFP	Non-Timber Forest Products
PDF	Portable Document Format

8.2. Glossary of Map Acronyms

AS	Ash	LA	Large Tooth Aspen
B	Basswood	m	meter
BA	Balsam Poplar	m ³	cubic meters
BF	Balsam Fir	MM	Manitoba Maple
BO	Bur Oak	NAD	North American Datum
BS	Black Spruce	RP	Red Pine
CE	Eastern White Cedar	SP	Scots Pine
CO	Eastern Cottonwood	TA	Trembling Aspen
cm	centimetre	TL	Tamarack Larch
EL	White Elm	W	Willow
ha	hectares	WB	White Birch
HB	Hackberry	WP	White Pine
HH	Hop-hornbeam	WS	White Spruce
JP	Jack Pine	UTM	Universal Transverse Mercator

8.3. Glossary of Terms

adventitious bud - Buds which develop from places other than the tip of a stem or a leaf axil. An adventitious bud arises from any part of a stem, leaf, or root but lacks vascular connection with the pith. Adventitious buds are often formed after the stem is wounded or pruned. Some plants normally develop adventitious buds on their roots, which can extend quite a distance from the plant. Shoots that develop from adventitious buds on roots are termed suckers. They are a type of natural vegetative reproduction in many species.

afforestation – The establishment of a forest or stand of trees by sowing, planting or natural regeneration on an area not previously forested or in areas where forests were cleared long ago.

blowdown -Tree or trees felled or broken off by wind.

bole -A tree stem having substantial thickness and being capable of yielding sawtimber, veneer, logs, large poles or pulpwood; seedlings, saplings, and thin poles have stems, not boles.

canopy – The uppermost continuous layer of branches and foliage in a stand of trees.

carbon sink – Area where the rate of carbon uptake exceeds the rate of carbon release.

cavity nesting – Wildlife species, usually birds, that require cavities in trees for nesting and reproduction.

climax – the culminating, self-replacing seral stage in plant succession that is relatively stable and persists for a long time.

clones – a population of individuals all originating asexually from the same parent and therefore genetically identical.

coarse woody debris - (CWD) Typically, sound or rotting logs, stumps, or large branches that have fallen or been cut and left in the woods, or trees and branches that have died but remain standing or leaning.

crop trees - A healthy tree of a species that is ecologically suitable for the site, and commercially valuable.

crown closure – the point in stand development when all the available crown space has been occupied by live branches.

decadent – The term used to describe a tree or stand of trees that are deteriorating due to age. From a wildlife habitat perspective, decadence offers advantages such as cavity nesting sites.

deforestation – the long-term removal of trees from a forested site to permit other uses.

delimiting –the process of removing the limbs from the bole of the tree.

ecological goods and services – The benefits arising from the ecological functions of a healthy ecosystem.

e-type - the ecosite classification provides summaries of the site attributes for each ecosite within the ecozones; it also illustrates the relationship among the ecosites, within an ecozone, through a two-way matrix of moisture regime and species richness values.

ecozone – a broad scale ecological unit that is based on patterns that include climate, geography and ecological diversity. A framework of 15 ecozones, subdivided into 53

ecoprovinces, 194 ecoregions and 1,020 ecodistricts is the national ecological classification of Canada (CCFM 2000).

ecoregion - are large units of land and water that: contain a geographically distinct assemblage of natural communities and species; share a similar environmental factors including climate, physiography and soils; and interact ecologically in ways that are critical for their long-term persistence.

ecodistrict - part of an ecoregion, ecodistricts are characterized by distinctive groups of geology, landform and soils, vegetation, water, species and land use.

even aged stands – A stand of trees consisting of one or two age classes. Even-aged stands are often the result of fire, or a harvesting method such as clearcutting or shelterwood.

forest ecosystem classification vegetation type – FEC V-Type-There are 33 vegetation types with differing characteristics of forest overstory and understory floristic composition, forest structure, relationship to other types, successional trends, soil and site characteristics, and management interpretations.

forest inventory – A survey of the forest area to such data as area by condition, timber volume, species of trees, wildlife and habitat types, environmentally sensitive areas and critical habitats for the purpose of planning, purchase, evaluation, management and/or harvesting

forest resource inventory (FRI) – individual forest types are usually mapped in detail with area and volume estimates given for each type.

forest section - The forested portion of the province has been divided into ten Forest Sections that generally relate to common forest conditions throughout the Forest Section.

forest management unit - further define a forested area with common forest conditions that are managed in a similar manner.

geographic information system – The use of a computer system to overlay large volumes of spatial data of different kinds. The data are referenced to a set of geographical coordinates and encoded in a computer format so that they can be sorted, selectively retrieved, statically and spatially analyzed.

global positioning system – A navigation and positioning system with which the three dimensional geodetic positions can be determined in real time. The system consists of a constellation of satellites that broadcast on a pair of ultrasonic frequencies. The users receiver tracks the satellites from any location at any time thus establishing position.

glyphosate – The active chemical ingredient in herbicides such as Round-Up or other generic brands.

hardwood - Trees of the botanical group Angiospermae that generally have broad leaves (e.g., ash, oak, maple, poplar) in contrast to the conifers. The term has no reference to the actual hardness of the wood.

integrated resource management - A holistic approach to resource management that entails the management of two or more resources (e.g., water, soil, timber, pasture, wildlife, and recreation) and that integrates the values of the community into the design of policies or projects to use and sustain these resources in perpetuity.

leave area -All trees, regardless of species, age, or size, remaining on a harvested area as a result of a predetermined silviculture prescription to address a possible range of silviculture or resource needs.

log bolt -Any short log specially cut to length, usually for the manufacture of a specific product.

mineral soil – Any soil composed of mineral materials. Usually overlain by an organic or duff layer.

natural disturbance -Periodic impact of natural events such as fire, severe drought, insect or disease attack, or wind.

niche – The geographical range and habitat a species can or does occupy, and the ecological (function) role it can or does fulfill in an ecosystem.

non-timber forest products - Any commodity obtained from the forest that does not necessitate harvesting trees. It includes game animals, fur-bearers, nuts and seeds, berries, mushrooms, oils, foliage, medicinal plants, peat, fuelwood, forage, etc.

nurse log-Typically, a fallen log, tree, or stump that has decayed and become a rooting medium for new trees growing out of and on top of the decaying substrate.

organic soils – Soils dominated by organic horizons (i.e. peat and muck soils), characteristic of wet sites.

patch cutting -A silvicultural system that creates openings of less than 1 ha and is designed to manage each opening as a distinct even-aged opening.

pioneer species -Species that are the first to colonize a new site or a new ecosystem. They are generally shade-intolerant and need a lot of sunlight in order to grow. Poplars and birches are pioneer species.

regeneration -The act of renewing tree cover by establishing young trees naturally (natural seeding, coppice, or root suckers) or artificially (direct seeding or planting). Regeneration usually maintains the same forest type and is done promptly after the previous stand or forest was removed.

riparian – Anything connected with or immediately adjacent to the banks of a stream or body of water.

root sprouts (suckers) – Vegetative growth (branches) emerging from root nodes.

scarification - A method of seedbed preparation that consists of removing the forest floor or mechanically mixing it with the mineral soil to eliminate or reduce the dead organic material.

screefing - The removal of herbaceous vegetation and duff to expose a weed free soil surface for planting

selective harvesting – A silvicultural system used to create un-even aged stands, usually by the periodic removal of groups of trees or individual trees.

sensitive soils - Soils that, because of their slope gradient, texture class, moisture regime, or organic matter content, have a high or very high hazard for displacement, surface erosion, or compaction.

seral stage –The series of plant community conditions that develop during ecological succession from bare ground (or major disturbances) to the climax stage. Also called successional stages.

serotinous – Describes cones that stay on the tree for many years and only open to release their seed when stimulated by the heat from a fire or intense sun.

shade intolerant – Plant species that require open, sunny conditions for optimal growth and will grow poorly, if at all, in shady conditions.

shade tolerant – Plant species that have evolved to grow well in shade.

silvicultural prescription – One or more professional recommendations for controlling the establishment, composition, constitution and growth of forests from seedling through to the desired end point of the forest stand.

site index - A measure of site productivity. The indices are reported as the average height, in metres, that the tallest trees in a stand are expected to achieve at 50 years (age is measured at 1.3 m above the ground).

snag -A standing dead tree or part of a dead tree from which at least the smaller branches have fallen.

softwood - Generally, one of the botanical groups of trees that in most cases have needle- or scale-like leaves; the conifers; also the wood produced by such trees. The term has no reference to the actual hardness of the wood.

stand – An aggregation of trees occupying a specific area and sufficiently uniform in composition, age, arrangement, and condition so that it is distinguishable from the forest in adjoining areas. Stands are the basic management unit in silviculture.

stand tending -Activities such as thinning, spacing, weed or brush control, carried out in already established stands.

stepping stones - One or more separate patches of habitat in the intervening space between ecological isolates, that provide resources and refuge that assist animals to move through the landscape.

succession – A series of dynamic changes in ecosystem structure, function and species composition over time as a result of which one group of organisms succeeds another through stages leading to a potential climax stage.

understory – Trees and other woody species growing under the canopies of larger adjacent trees.

uneven aged stands -A stand of trees containing three or more age classes. In a balanced uneven-aged stand, each age class is represented by approximately equal areas, providing a balanced distribution of diameter classes.

watercourse - A natural stream or source or supply of water, whether usually containing water or not, such as a lake, river, creek, spring, ravine swamp, and gulch.

watershed - An area drained by a stream or river. A large watershed may contain several smaller watersheds.

wetland - A swamp, marsh, or other similar area that supports natural vegetation that is distinct from adjacent upland areas.

wildlife management areas - The Manitoba Wildlife Act provides for the designation of Crown lands as wildlife Management Areas (WMA's) for the "better management, conservation and enhancement of the wildlife resource of the province."

wildland/urban interface -Used to describe an area where various structures (most notably private homes) and other human developments meet or are intermingled with forest and other vegetative fuel types.

wildlife tree - A tree or group of trees that provide wildlife habitat, and assist in the conservation of stand-level biodiversity.

windthrow – A tree uprooted by the wind. Windthrow may indicate the presence of a pest problem, such as root rot. It is synonymous with blowdown.

woodlot - The wooded portion of a private property upon which small-scale forestry operations are carried out.

v-type – A classification system for the commercial forest areas of Manitoba. The classification system consists of 33 vegetation types and 22 soil types, which are identified using keys.

9. Resource Maps

9.1. Location Map

Scroll to the next page to view the Location Map.

9.2. Digital Ortho Imagery Map

Scroll to the next page to view the Digital ortho Imagery Map

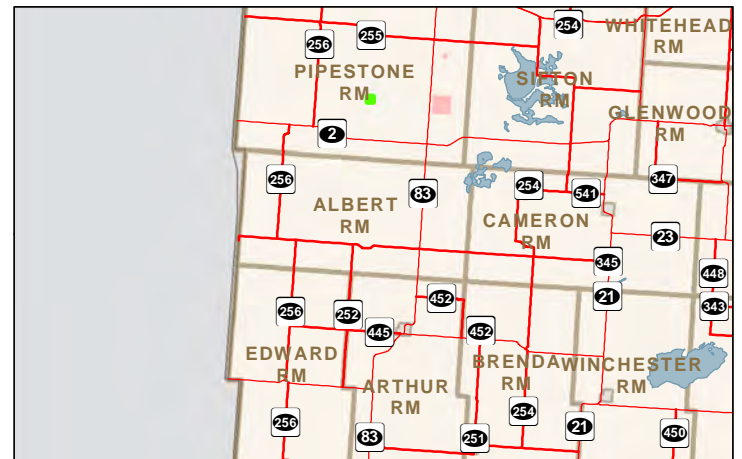


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Digital Ortho Imagery

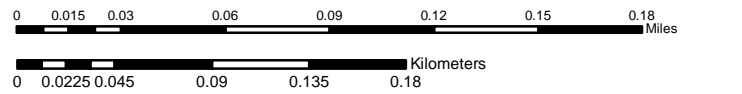
Plan 2015_2012_RMP
LOT ID PIP_08_27_KM008

Legend
 Property Boundary



Map Designed for Illustrative Purposes. The Manitoba Forestry Association does not guarantee the accuracy of the data depicted.

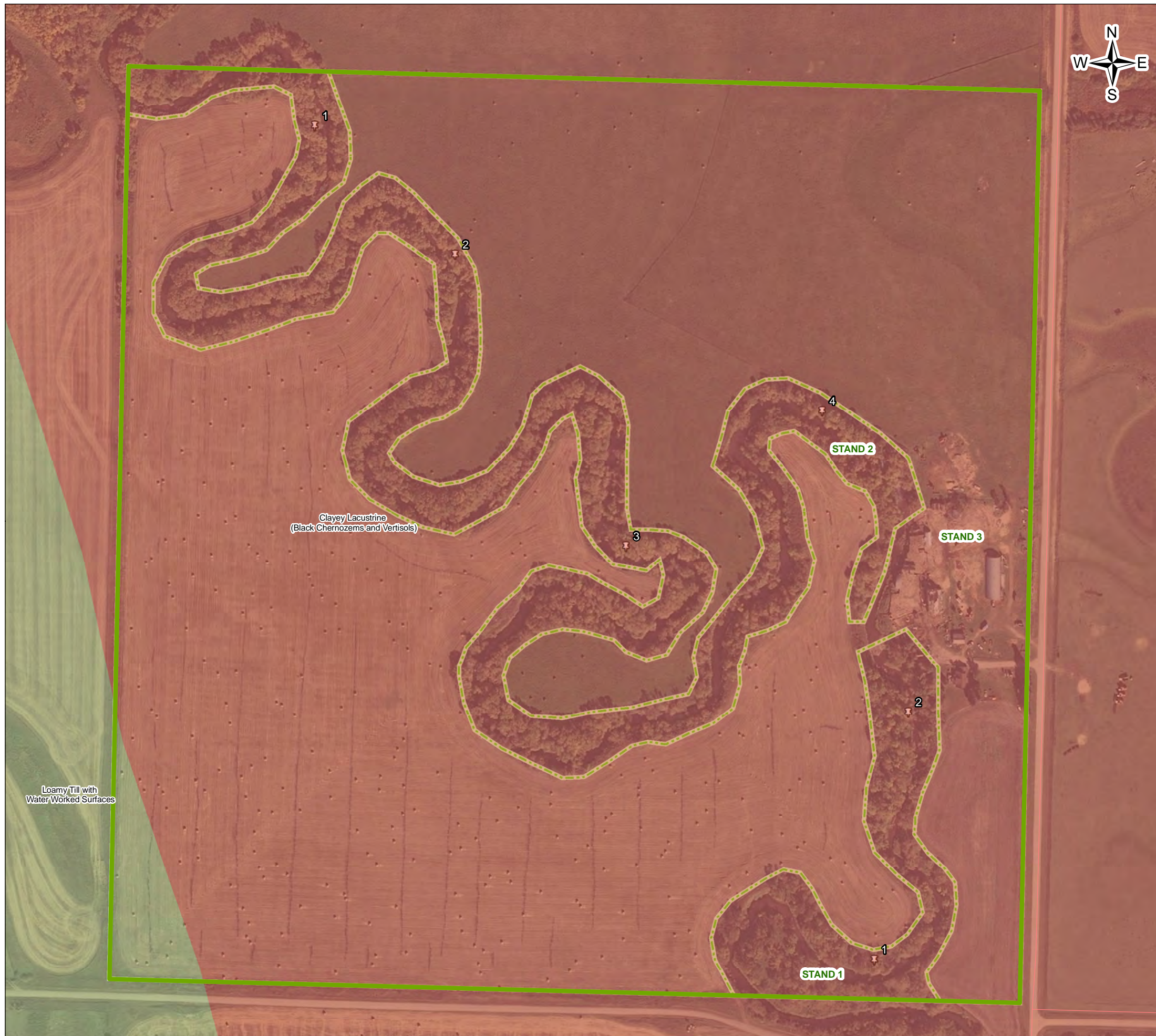
Scale 1:3,500
1 cm = 35 m
1" = 0.06 miles



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9.3. Surface Soil Classification Map

Scroll to the next page to view the Surface Soil Classification Map



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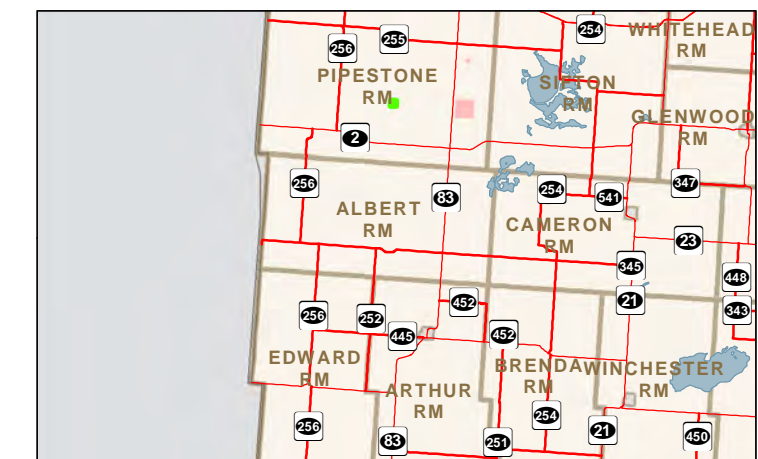
Surface Soil Classification

Plan 2015_2012_RMP

LOT ID PIP_08_27_KM008

Legend

- Property Boundary
- Stand Boundary
- Plot

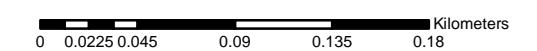
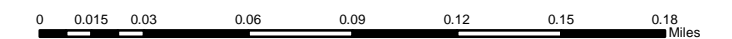


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Scale 1:3,500

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1" = 0.06 miles



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9.4. Forest Resource Inventory Map

The Forest Resource Inventory map shows the data created by the provincial Forest Resource Inventory in 1980 and 1982.

Scroll to the next page to view the Forest Resource Inventory Map.

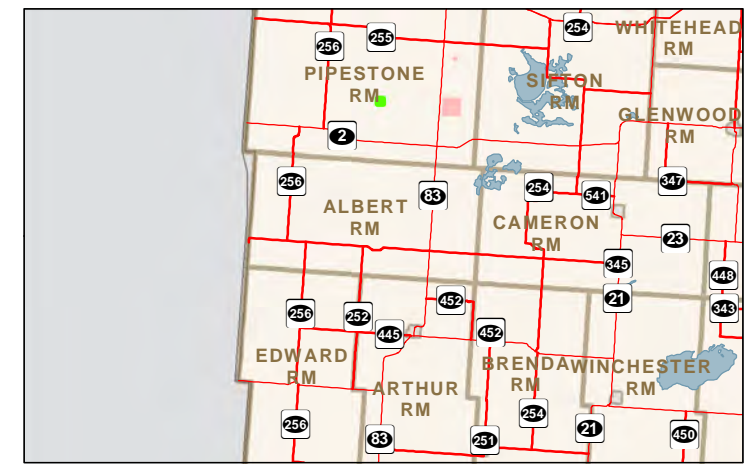


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Forest Resource Inventory

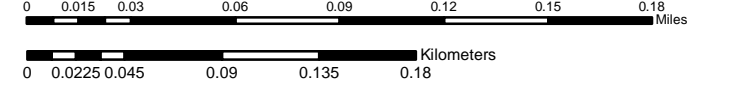
Plan 2015_2012_RMP
LOT ID PIP_08_27_KM008

- Legend**
- Property Boundary
 - FRI Stand Boundary
 - Other Hardwood
 - Mature
 - Non Forested
 - Meadow
 - Agriculture



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Scale 1:3,500
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10. Management Plan

10.1. Resource Inventory Map

Scroll to the next page to view the Resource Inventory Map.

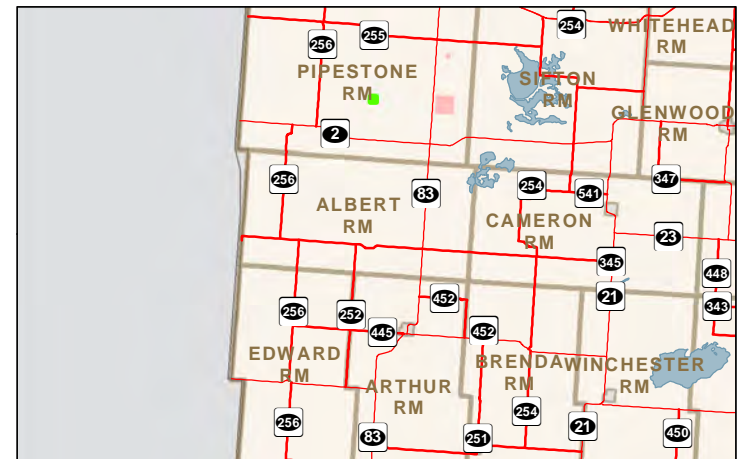


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Resource Inventory
Plan 2015_2012_RMP
LOT ID PIP_08_27_KM008

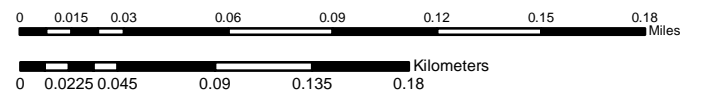
Legend

- Property Boundary
- Stand Boundary
- Plot
- Homestead



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II. Operational Plan Map

Scroll to the next page to view the Operational Plan Map.

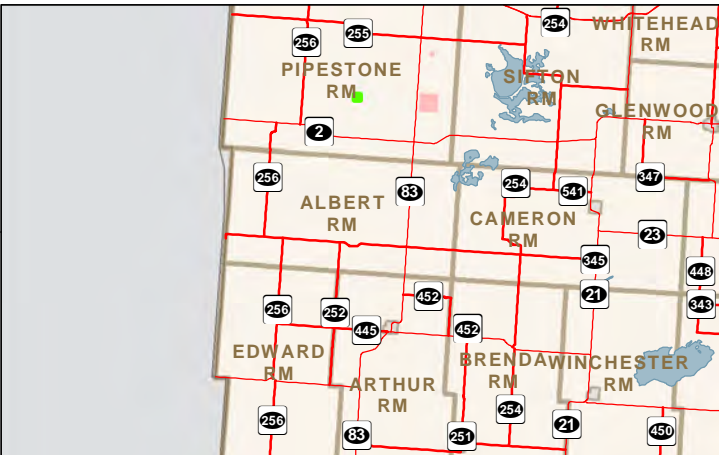


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Operating Plan

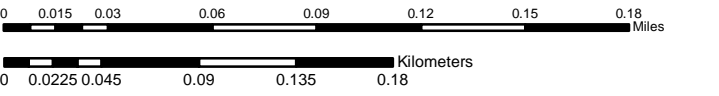
Plan 2015_2012_RMP
LOT ID PIP_08_27_KM008

- Legend**
- Property Boundary
 - Plan Block
 - ✚ Plot
 - 🏠 Homestead



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Scale 1:3,500
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