St. Vital Transmission Project

(Y36V)

St. Vital to Laverendrye Transmission Line

Rehabilitation and Invasive Species Management Plan

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Prepared by:

Prepared by Manitoba Hydro

Transmission & Distribution Environment and Engagement Department

Project Management Division

Manitoba Hydro

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Preface

This document presents the Rehabilitation and Invasive Species Management Plan (the Plan) for the construction of the St. Vital Transmission Project (the Project). It is intended to provide information and instruction to Manitoba Hydro employees as well as contractors, regulators and members of the public. The Plan provides regulatory context as well as general considerations and guidance pertinent to the post construction rehabilitation of project sites and management of invasive species within the Project footprint.

Manitoba Hydro employees and contractors are encouraged to contact the onsite Manitoba Hydro Environmental Inspector/Officer if they require information, clarification or support. Regulators and the Public are to direct any inquiries about this Plan to:

Manitoba Hydro
Transmission & Distribution Environment and Engagement Department
Manitoba Hydro
360 Portage Avenue
Winnipeg, MB
Canada R3C 0G8
1-877-343-1631

LEAProjects@hydro.mb.ca

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1.0 Introduction

Consistent with its corporate Environmental Management Policy, Manitoba Hydro has committed within the St. Vital Transmission Project (the Project) environmental assessment to developing a Rehabilitation and Invasive Species Management Plan (RISMP) as part of a larger suite of mitigation measures to minimize potential negative environmental and socio-economic effects.

Manitoba Hydro's Environmental Protection Program (EPP) provides the framework for the delivery, management and monitoring of environmental and socio-economic protection measures that satisfy corporate policies and commitments, regulatory requirements, environmental protection guidelines and best practices, and input during the Public Engagement Process (PEP) and First Nation and Metis Engagement Process (FNMEP). The Program describes how Manitoba Hydro is organized and functions to deliver timely, effective, and comprehensive solutions and mitigation measures to address potential environmental effects. This RISMP is a component of the EPP as illustrated in Figure 1.

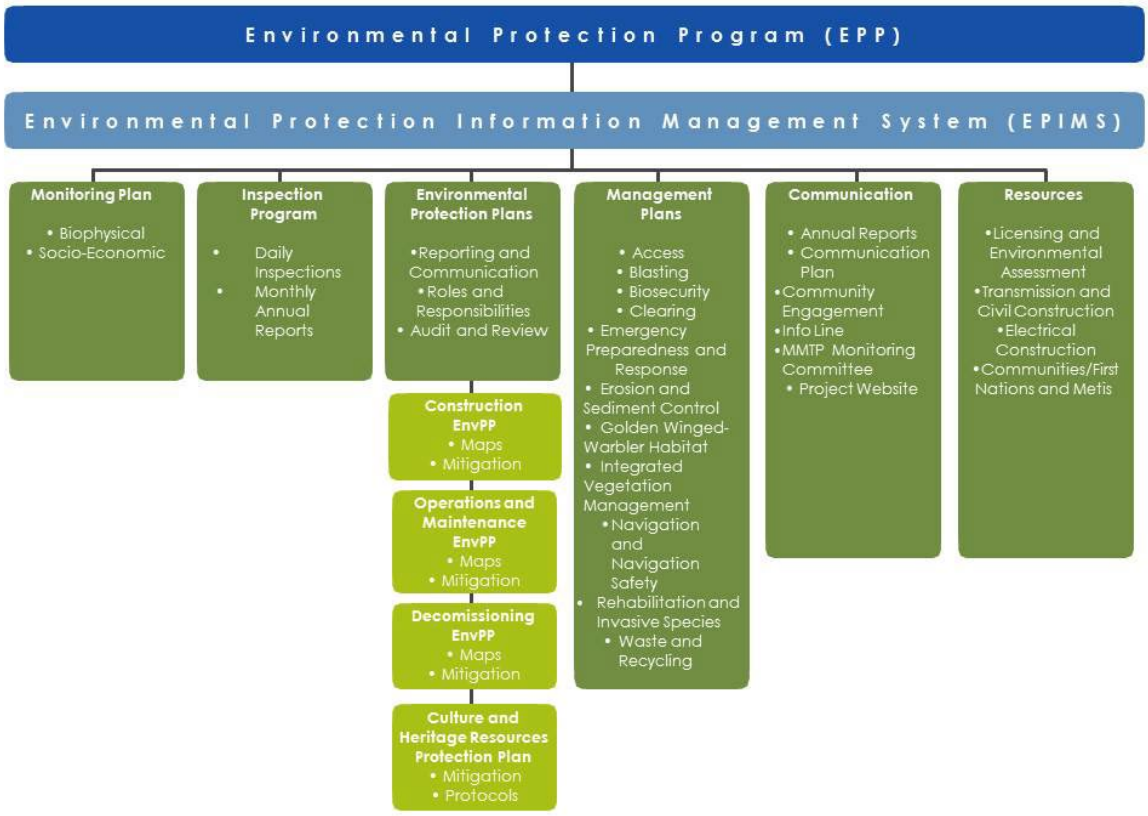

Figure 1: Transmission Environmental Protection Program

1.1 Commitment to environmental protection

Manitoba Hydro integrates environmentally responsible practices in all aspects of our business. Environmental protection can only be achieved with the involvement of Manitoba Hydro employees, consultants, contractors, Indigenous communities and organizations and the public at all stages of the Project from planning and design through construction and operational phases.

The use of an RISMP is a practical and direct implementation of Manitoba Hydro's environmental policy and its commitment to responsible environmental and social stewardship. It is a proactive approach to manage potential disturbance of access related to the construction of a new transmission line.

Manitoba Hydro is committed to implementing this RISMP and requiring Contractors to follow the terms of this and other applicable plans within the Environmental Protection Program.

1.2 Purpose and objectives

The purpose of this Rehabilitation and Invasive Species Management Plan (RISMP) is to provide information that will guide contractors and Manitoba Hydro staff through project construction, maintenance, and decommissioning in a manner that meets Manitoba Hydro's Environmental Management Policy and project commitments.

Rehabilitation is the process of returning the land in a project area to a condition compatible to its former state after development has disturbed the land. As there has already been a large amount of habitat degradation and increasing pressures on the surrounding areas, Manitoba Hydro seeks to enhance habitat and biodiversity on the ROW through the implementation of rehabilitation measures that consider traditional resource use along with wildlife habitat. Manitoba Hydro has participated in endeavours with researchers to measure and enhance the biodiversity of its ROW's. Manitoba Hydro continues to be open to discussing opportunities for research and collaboration with researchers from universities and Indigenous communities and organizations.

Invasive species management is the process of managing the invasive species growing in the project area through a variety of methods. Invasive species are plants, animals or other organisms that are growing outside of their country or region of origin and are out-competing or even replacing native organisms. They have a distinct advantage over our native species whose populations are kept in check by native predators, competitors, or disease.

Reasons for rehabilitation and invasive species management may include:

- Reducing the risk of erosion
- Controlling the spread of invasive plants
- Reducing access
- Reclaiming land
- Improving aesthetics
- Restoring ecosystem function

1.3 Roles and responsibilities

This section outlines the major roles and responsibilities of those involved in the implementation of the Plan.

A summary of roles and key responsibilities is found in Table 1. Communication and reporting on environmental issues, monitoring and compliance will be as outlined in Figure 2.

Table 1: Key Roles and responsibilities

Role	Responsibilities
Manitoba Hydro	• Identifying Invasive species locations in Biosecurity Management Plan Mapbook • Monitoring rehabilitation measure success • Review Contractor developed site-specific rehabilitation measures • Implement Invasive Species Management Treatment Options where required
Contractor	• Shall adhere to Rehabilitation and Invasive Species Management Plan including employee training, implement rehabilitation measures prescribed actions, signage and submit all required assessment documentation. • Respond and act promptly to resolve if any activities are identified as not in compliance with the RISMP or any regulatory requirements. • Conducting assessment of Project sites for rehabilitation • Develop and propose site specific rehabilitation measures as per guidelines • Implement site specific Rehabilitation Measures • Prevent the spread of Invasive plant species • Rehabilitate disturbed areas as soon as practicable or where deemed necessary by Manitoba Hydro , rehabilitation is not to be deferred until construction is complete

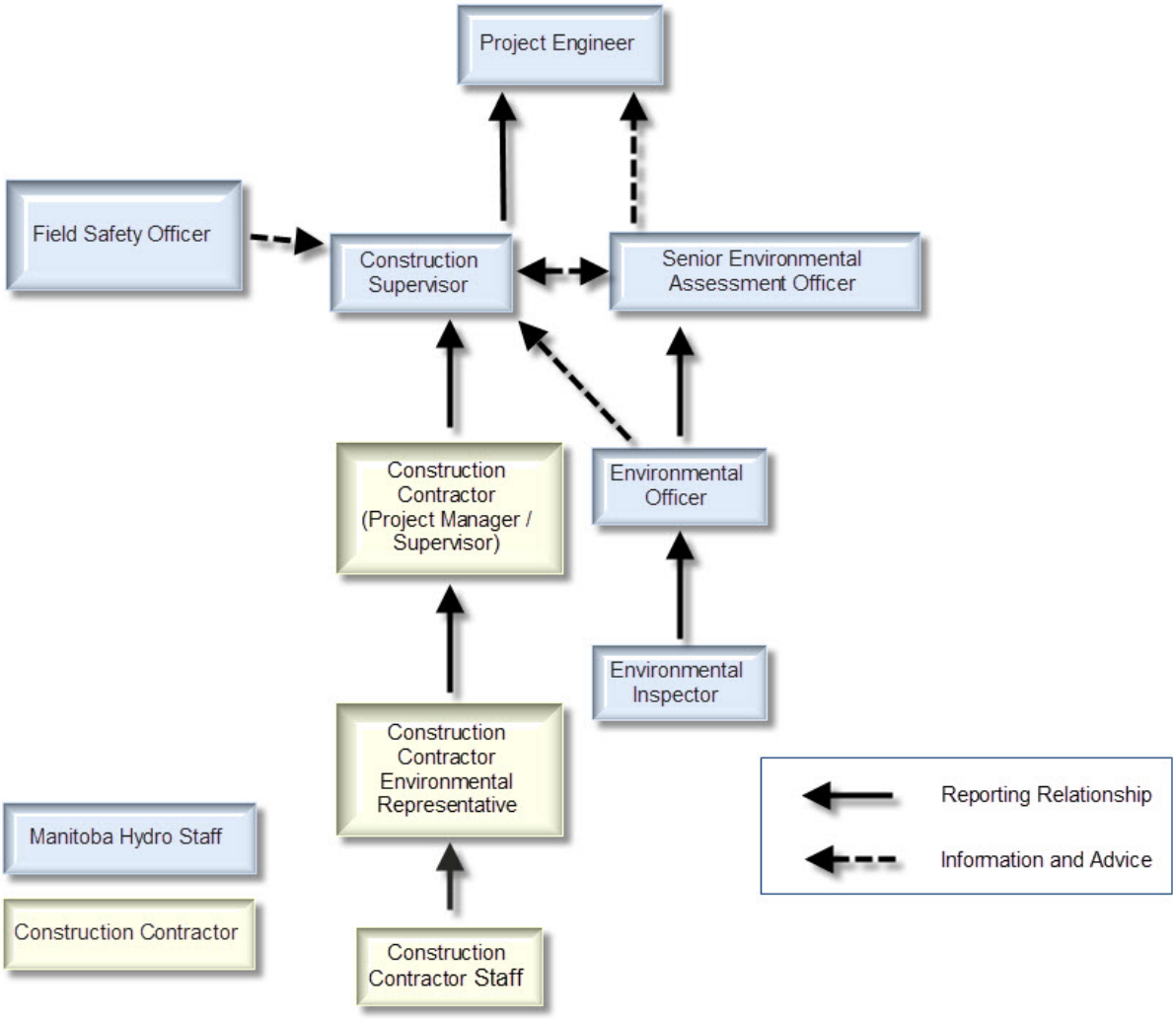

Figure 2: Environmental communication reporting structure

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2.0 Regulatory context

In Manitoba, the control of noxious weeds is regulated by The Noxious Weeds Act, C.C.S.M. c. N110 (including amendments from The Noxious Weeds Amendment Act, S.M. 2015, c. 38) and the Noxious Weeds Regulation (42/2017). Through recent amendments to the Act, the list of regulated noxious weeds has been updated and noxious weeds have been designated as tier 1, tier 2 or tier 3 noxious weeds based on prevalence, distribution and invasiveness.

The list of weeds designated as tier 1, tier 2 and tier 3 noxious weeds under the Noxious Weeds Regulation (42/2017) is found in Appendix G.

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3.0 Implementation

The intent of this section is to provide for implementation instructions to Manitoba Hydro and Contractor Project staff. The main project components that may require rehabilitation and invasive species management include the following:

- Right-of-way (RoW)
- Access routes and by-pass trails
- Borrow pits and quarries
- Marshalling yards (material and/or equipment storage, fly yards)
- Construction camps
- Station sites

3.1 Assessment

The Contractor shall conduct a rehabilitation assessment as described in the Guidelines of Rehabilitation by Land Cover below. The assessment will be documented though the use of the Rehabilitation Assessment Checklist (Appendix A).

3.2 Timing

The timing of when rehabilitation activities occur is key to preventing erosion, invasive species establishment, and preventing damage to rehabilitation measures. The Contractor is required to implement rehabilitation measures as soon practicable or as required by MH Environmental Inspector/Officer, rehabilitation is not to be deferred until construction is complete.

3.3 Guidelines for rehabilitation by land cover

3.3.1 Wetlands and riparian areas

Trigger(s) for the Assessment for rehabilitation by Contractor:

- Any construction activity that affects surface water drainage directly into a water body (watercourse and/or wetland) without sufficient erosion and sediment control measure in place
- When the depth of rutting exceeds 10cm for more than 15m in length;
- Admixing (mixing of topsoil and subsoils)

- Any excessive soil disturbance within wetland outside of tower footprint and stringing corridor
- Removal of riparian buffer shrub and understorey vegetation
- Debris from clearing or stream crossing below high water mark

Criteria to be assessed by Contractor (Manitoba Hydro may conduct its own assessment):

- Proximity to weed seed source
- Current ground and aquatic conditions
- Existing erosion and sediment control measures
- Accessibility to Project site(s)
- Safety
- Adjacent land use
- Timing of rehabilitation activities

Rehabilitation measures may include (site-specific rehabilitation measures will be developed by the Contractor and proposed to Manitoba Hydro for review):

- Flag or place barriers to mitigate further disturbance
- Implementation of erosion and sediment control measures where required
- Allow for passive revegetation
- Implement active revegetation through planting or seeding of native/traditional species
- Flag or place barriers after rehabilitation measures implemented to mitigate further disturbance
- Debris removal
- Other rehabilitation measures as approved by Manitoba Hydro

3.3.2 Cultivated lands

Trigger(s) for the Assessment for rehabilitation by Contractor:

- Sites that exceed threshold for work modification(s) as described in the Saturated/Thawed Soils Operating Guidelines
- Any excess construction materials (granular, clay, waste)
- Any travel off designated access routes
- Disturbance to existing in-field drainage
- Installation of tower or poles

Criteria to be assessed by Contractor (Manitoba Hydro may conduct its own assessment):

- proximity to weed seed source
- Current ground conditions
- Current crop and farming practices
- Existing erosion and sediment control measures
- Accessibility to Project site(s)
- Safety
- Adjacent land use
- Timing of rehabilitation activities

Rehabilitation measures may include (site-specific rehabilitation measures will be developed by the Contractor and proposed to Manitoba Hydro for review with landowner):

- Flag or place barriers to mitigate further disturbance
- Implementation of erosion and sediment control measures where required
- Cultivation to remove ruts and compaction
- Restore drainage to pre-existing condition
- Implement active revegetation through seeding of native/crop species acceptable to landowner within tower footprint
- Addition, spreading or removal of topsoil
- Flag or place barriers after rehabilitation measures implemented to mitigate further disturbance
- Construction material removal
- Other rehabilitation measures as approved by Manitoba Hydro

3.3.3 Access routes and trails

Trigger(s) for the Assessment for rehabilitation by Contractor:

- Any evidence of access route / trail structure damage occurring, such as admixing, or the creation of ruts that impedes local vehicle traffic
- Any excess construction materials (granular, clay, waste) within route/trail or ditches including rider pole installations
- Removal of snow fill approaches within access route / trail right of way prior to spring thaw

Criteria to be assessed by Contractor (Manitoba Hydro may conduct its own assessment):

- Proximity to weed seed source
- Current ground conditions
- Current access route / trail use
- Existing erosion and sediment control measures
- Accessibility to Project site(s)
- Safety
- Adjacent land use
- Timing of rehabilitation activities

Rehabilitation measures may include (site-specific rehabilitation measures will be developed by the Contractor and proposed to Manitoba Hydro for review):

- Flag/sign or place barriers to mitigate further disturbance
- Implementation of erosion and sediment control measures where required
- Allow for passive revegetation
- Implement active revegetation through planting or seeding of native/traditional species
- Back blading or grading to remove ruts/level surface
- Construction material and debris removal
- Adding or replacing gravel surface material
- Contouring or re-sloping
- Flag/sign or place barriers after rehabilitation measures implemented to mitigate further disturbance
- Excess construction material removal
- Other rehabilitation measures as approved by Manitoba Hydro

3.3.4 Forest, tame pasture and grasslands

Trigger(s) for the Assessment for rehabilitation by Contractor:

- When rutting depth exceeds 30 cm for more than 15 m in length
- Any travel off existing designated access routes
- Any excess construction materials (granular, clay, waste)
- Disturbance to existing in-field drainage
- Installation of tower or poles

Criteria to be assessed by Contractor (Manitoba Hydro may conduct its own assessment):

- Proximity to weed seed source
- Current ground conditions
- Current farming practices
- Existing erosion and sediment control measures
- Accessibility to Project site(s)
- safety
- Adjacent land use
- Timing of rehabilitation activities

Rehabilitation measures may include (site-specific work modifications will be developed by the Contractor and proposed to Manitoba Hydro for review):

- Flag/sign or place barriers to mitigate further disturbance
- Implementation of erosion and sediment control measures where required
- Allow for passive revegetation
- Implement active revegetation through planting or seeding of native/traditional species
- Back blading or grading to remove ruts
- Construction material and debris removal
- Flag/sign or place barriers after rehabilitation measures implemented to mitigate further disturbance
- Addition, spreading or removal of topsoil
- Other rehabilitation measures as approved by Manitoba Hydro

3.3.5 Borrow pits and quarries

Trigger(s) for the Assessment for rehabilitation by Contractor:

- When borrow pits or quarries are no longer required for foundation installation

Criteria to be assessed by Contractor (Manitoba Hydro may conduct its own assessment):

- Proximity to weed seed source
- Current ground conditions
- Existing erosion and sediment control measures
- Safety

- Adjacent land use
- Timing of rehabilitation activities

Rehabilitation measures may include (site-specific work modifications will be developed by the Contractor and proposed to Manitoba Hydro for review):

- Contouring or re-sloping
- Implementation of erosion and sediment control measures where required
- Allow for passive revegetation
- Implement active revegetation through planting or seeding of native/traditional species
- Back blading or grading to remove ruts
- Addition of topsoil
- Construction material and debris removal
- Flag/sign or place barriers after rehabilitation measures implemented to mitigate further disturbance
- Other rehabilitation measures as approved by Manitoba Hydro

3.4 Erosion and sediment control

Project activities may result in the disturbance or removal of topsoil and modification of the landscape. Where possible, removal of ground plant cover and soil disturbance should be minimized during project activities. Vegetation provides a protective cover for underlying soil and reduces surface runoff. Removal of vegetation cover exposes soil and can result in soil losses from wind and water erosion. In locations of rapid run-off, rills may develop. Soil erosion near watercourses can reduce water quality by causing sedimentation, resulting in a reduction of aquatic ecosystem health.

Erosion control of disturbance sites may be necessary prior to re-establishment of vegetation. Erosion control prescriptions will vary considerably based on the conditions found at the site. Refer to the Erosion and Sediment Control Plan for any measures that may need to be put in place prior to rehabilitation.

3.5 Site preparation

Site preparation for rehabilitation may vary with site conditions. Site preparation methods will depend largely on the degree of disturbance, soil conditions, and existing vegetation remaining and regenerating in sites.

Site preparation options include the following:

- Contouring – Site preparation may involve contouring of an area where a disturbance has occurred (e.g., borrow pits) prior to implementing other efforts.
- Addition or removal of topsoil – Where topsoil has been removed for project activities, site preparation should involve the replacement of topsoil. The salvage of topsoil is a priority that should be considered in the planning stages of a project. Topsoil is the uppermost layer of soil that is important for nutrient cycling and is a source for native plants. The amount of topsoil required for replacement should ideally match the depth of topsoil as to what was there before, or a minimum depth of 30 cm. Effective topsoil management is an essential component of rehabilitation success. Note: that should the addition of topsoil be required onsite, refer to the Biosecurity Management Plan to minimize biosecurity risk.
- Grading of ground material – Site preparation may involve grading of soils where a disturbance has occurred (e.g., rutting). On terrain with slopes, it is recommended that grading occur across a slope to reduce erosion, and grading of materials should not result in slopes steeper than a 5:1 ratio.
- Soil de-compaction – Equipment continually driving over an area may result in compaction. Soil compaction is the squeezing together of soil particles, reducing the space available for air and water which could reduce the capacity of the soil to support desired vegetation. Site preparation may involve treatment for soil compaction prior to re-establishment of vegetation by light discing or tilling to avoid loss of soil moisture and soil structure.
- Seedbed Preparation – Site preparation may also include preparing the seedbed prior to revegetation to enhance germination success. Seeding options discussed below.

3.6 Revegetation

Revegetation is the process of plants growing again on land previously disturbed. This may be a passive process by plant colonization and succession or an active accelerated process (e.g., seeding, planting) designed to repair a disturbance to the landscape.

3.6.1 Passive

Passive revegetation is a viable means of rehabilitation by natural seeding, sprouting, suckering or layering of vegetation. Where conditions are ideal regarding seedbank,

propagules, topography, slope, moisture, time of year, and condition of surrounding vegetation, natural regeneration will occur.

3.6.2 Active

Where conditions are not ideal for passive revegetation such as lack of seedbank or propagules, rehabilitation should involve active revegetation by planting or seeding.

3.6.2.1 Planting options

Options for rehabilitation by planting include the following:

- Tree seedlings – Tree seedlings may be obtained as either bare root or containerized stock. Bare root stock need to be handled carefully while in storage and during planting, and exposed roots can dry out quickly. Containerized stock provides root protection and increased flexibility as to timing of planting. Spacing for seedlings can be variable. Seedlings are recommended for large-scale plantings. Common seedlings for rehabilitation may include jack pine and red pine, white and black spruce.
- Transplanting – Transplanting is a form of artificial regeneration where plants are removed from one location and planted in another. Transplanting is a useful means of re-establishing native species quickly. Preferably, transplanting should occur from similar habitats and nearby sources to increase growing success. Vegetation transplanted in disturbed sites may increase the rate of natural regeneration by capturing seeds and organic material from surrounding plant cover. Transplanting is a recommended method for vegetation rehabilitation near watercourse crossings. Species such as hybrid poplar and willow cuttings are commonly planted because of their good rooting ability and fast growth rate.
- Sprigging – Plant sections cut from rhizomes or stolons that include the vegetation crowns and roots. Sprigging can be an effective method for disturbed and erodible stream crossing sites.

3.6.2.2 Seeding options

Options for rehabilitation by seeding include the following:

- Drill Seeding – Drill seeding involves a tractor-pulled seed drill. In larger areas, equipment can furrow soil, plant seed and pack soil over seed in one pass. Native seed drills are most efficient and accurate at placing seed. Drill seeding should be done into well-cultivated soil, free of lumps and debris, and firmly roller packed.

- Broadcast seeding – Broadcast seeding is accomplished by dispersing seed by machine or hand. Broadcasting is effective where the access of large machinery is not possible or recommended, although requires the use of more seed. An attempt should be made to incorporate the seeds into the soil as an additional step after broadcasting.
- Hydroseeding – Hydroseeding is a method that uses a slurry of seed, mulch, water and tackifier which is transported by a water tank that may be mounted on a truck or trailer and sprayed over prepared ground. Hydroseeding is an alternative to traditional broadcasting or drilling seeding.

3.7 Other important considerations and options

3.7.1 Ecological context

Rehabilitation prescription needs to be appropriate for the site under consideration. Manitoba is comprised of six ecozones representing large generalized ecological units characterized by interactive and adjusting abiotic and biotic factors. Selecting vegetation for rehabilitation needs to be suitable to the site. Appendix C identifies characteristic vegetation of Manitoba's ecozones.

3.7.2 Using native/traditional use species

Native species are plants occurring within their historic range bounded by the dispersal potential of the plant. These native/traditional use species are favoured for rehabilitation for several reasons, including resource use, ecological compatibility, palatability, and adaptation to local soils and climate. Native/traditional plant material will be used for rehabilitation of a disturbance area where the goal is to re-establish a native/traditional plant community. Appendix B is a selection of commercially available traditional plant species.

3.7.3 Seed mix recommendations

This section identifies native seed mixes for disturbances in Manitoba. Establishing long-term plant communities requires forethought as to appropriate species to use. Actual amounts of species present in a seed mix may vary depending upon seed availability. The best adapted species will result from seed collections in the region. If seed availability is an issue, it would be preferable to use the correct species, rather than the prescribed seed rates. Species listed in Appendix D can be chosen as a baseline mix and are generally commercially available. Both upland and lowland mixes are provided for northern, west

central, and southern Manitoba. Species listed in Appendix E are commercially available in Manitoba and may be added for diversity.

3.7.4 Commercial seed and plant providers

Purchasing native seed from commercial providers is a practical option for large rehabilitation sites. Where seed will be purchased, the following information should be considered:

- Species selection for seeding should be undertaken in conjunction with recommended seed mixes, generally with a dominance of native graminoids and subdominant native broadleaf herbs.
- Seed acquisition should be determined through consultation with a vegetation specialist, using ready available native local seed, wherever possible.
- Forage grasses should not be seeded as they are developed for maximum forage production, and may destroy habitat by taking over native plant communities.
- The genetic origin of the seeds should be from Manitoba or nearby provinces, from a region with similar ecological conditions.
- Commercial seed providers should produce certificates of analysis from an accredited laboratory that provides seed purity and germination values.

3.7.5 Seeding dates

There are two timing windows for seeding. The preferred time to seed occurs during the spring as soon as the ground has reached a desirable temperature (5°C) and the danger of a killing frost has past. The second and less successful time is dormant seeding in the fall once the ground temperature has lowered to 5°C, where seeds will germinate the following growing season. For sites with a high risk of erosion, seeding could occur at anytime.

3.7.6 Rates for seeding

Seeding rates can vary depending on method of seeding and applicator. Seeding rates may need to be adjusted for wind loss, animal consumption, slope, seed weight, germination rate, annual survivorship, and intended density of mature plants. General seeding rates include the following:

- Drill seeding <15 kg/ha
- Broadcast seeding 30 to 85 kg/ha

  - broadcast seeding involves scattering of seed manually by hand (or hand-held seeder) or mechanically.
- Hydroseeding 75 to 100 kg/ha
- Cover crops 2.2 to 5.5 kg/ha (seeded lightly to reduce competition with native species)

The seeding rate calculation for a species that occupies 10% of a seed mix (e.g. 84 kg/ha) includes the following: 84 kg/ha x 0.10 = 8.4 kg/ha.

3.7.7 Rates for planting tree seedlings

Spacing of tree seedlings can be variable within disturbance areas. In general, spacing to achieve about 2,500 seedlings per hectare requires spacing of 2.1 m between rows and 1.8 m between seedlings.

Transplanting cuttings such as poplar or willow species can be used. Cuttings should be a minimum length of 30 cm and buried in the ground at least half its length. Cuttings are most successfully transplanted in the spring and fall. Both poplar and willow species have good propagation success because of their rooting ability and are desirable for erosion control.

3.7.8 Fertilizers

Fertilizers can be added to the soil to supply one or more plant nutrients essential to the growth of plants that may be lacking in the soil at the site prescribed for rehabilitation. Fertilization may improve productivity of a rehabilitation effort during early growth stages. Applying excessive amounts of fertilizer can have negative environmental effects (e.g. seed damage, run-off, encourage invasive species, etc.). The storage, handling, and application of fertilizers are legislated in Manitoba (*The Water Protection Act*, *The Pesticides and Fertilizers Control Act*). This legislation is intended to protect Manitoba's water quality. It is important to consult this legislation prior to applying nutrients to rehabilitation sites.

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4.0 Invasive species management

Many Invasive species in Manitoba are so common now that they are often mistakenly considered native, these species have become widely naturalized through intentional and accidental introductions. Invasive species reduce biological diversity and threaten native ecosystems. Examples of invasive species in Manitoba include purple loosestrife, ox-eye daisy and leafy spurge. Plants listed by the Invasive Species Council of Manitoba are provided in Appendix F.

Once invasive species become established control measures can be costly to implement. Therefore, a successful invasive species management should involve taking preventative measures, early detection, and rapid management response.

The management of invasive species must consider the ownership of the land. The responsibilities for management on different ownership types are described below:

- ROW on private/municipal lands: As Manitoba Hydro has only an easement the responsibility of invasive species management lies with the landowner. If invasive weeds are introduced to the right-of-way as a direct result of Manitoba Hydro activities it will work with the landowner to implement control options.
- ROW on railway, road allowance or highway lands: As Manitoba Hydro does not have an easement the responsibility of invasive species management lies with the landowner. If invasive weeds are introduced to the right-of-way as a direct result of Manitoba Hydro activities it will work with the landowner to implement control options.
- ROW on Manitoba Hydro-owned lands: Manitoba Hydro is responsible for invasive species management to be in compliance with the *Manitoba Noxious Weeds Act*.
- ROW on Crown lands (including lands with third-party interests): As Manitoba Hydro has only an easement the responsibility of invasive species management lies with the Crown (landowner) or the third party interest. If invasive weeds are introduced to the right-of-way as a direct result of Manitoba Hydro activities Manitoba Hydro would consult with local Weed Supervisors and Manitoba Agriculture and/or Sustainable Development departments to implement control options.

4.1 Prevention

An initial step in controlling invasive plant species is preventing their establishment. Prevention is relatively cost-effective when compared to invasive species control and management efforts. Detailed biosecurity measures are outlined in the biosecurity management plan for the Project. Preventative measures may include the following:

- Education on how to identify invasive species and infestations.
- Avoid driving or walking through areas of invasive species.
- Clean and wash equipment and boots before entering and leaving a site to prevent transport of seeds.
- Design seed mixes with species that have differing growth forms to occupy the variety of niches available, and seed native species that are known to be competitive.
- Record early detection of invasive species problem areas on adjacent lands.
- A combination of promoting natural re-vegetation and re-establishment of vegetation cover, where required, using species suited to the post-construction land use to provide competition for germinating weeds.

4.2 STEP 1: Weed management thresholds and priority levels

Weed management conducted prior to and during construction will focus on managing weeds identified during pre-construction surveys, as necessary, as well as occurrences identified during construction.

The management thresholds for weed species for the Project are as follows:

- Invasive weed species (Appendix G of Reference i) must be maintained or reduced to a density and distribution level equivalent to or less than levels observed on adjacent lands with equivalent or similar land use and land management. The comparison should be made to the invasive weed conditions found during pre-construction surveys and as compared to adjacent lands during/after construction.
- Weeds must be treated and managed in compliance with the Manitoba Noxious Weeds Act and Regulation. Under the regulation, a person must:
    - destroy all tier 1 noxious weeds as listed in the Regulation that are on land that the person owns or occupies
    - destroy all tier 2 noxious weeds as listed in the Regulation that are on land that the person owns or occupies if the area colonized by the weeds is less than five acres

- control all tier 2 noxious weeds as listed in the Regulation that are on land that the person owns or occupies if the area colonized by the weeds is five acres or more
- control a tier 3 noxious weed as listed in the Regulation that is on land that the person owns or occupies if the weed's uncontrolled growth or spread is likely to negatively affect an aspect of Manitoba's economy or environment in the area of the land or the well-being of residents in proximity to the land

The priority for managing sites where the threshold as described above has been reached will be determined by the level of risk of increasing the density and distribution of weed species. Criteria for the site priority levels are outlined in Table 2.

Table 2: Priority levels for weed management

Priority level	Purpose or intent
High	To destroy Tier 1 and Tier 2 noxious weeds (<5 acres) currently threatening non-infested or highly susceptible sites within Project footprint.
Moderate	To control Tier 2 noxious weeds (>5 acres) and invasive species on sites in less susceptible areas of the Project footprint. This includes areas adjacent to lands such as treed pasture lands that have a well-established vegetation cover and, therefore, are less susceptible to weed species introduction.
Low	To control a tier 3 noxious weed on within the Project footprint if the weed's uncontrolled growth or spread is likely to negatively affect an aspect of Manitoba's economy or environment in the area of the land or the well-being of residents in proximity to the land

4.3 STEP 2: Determine whether management threshold has been reached

Compare the density and distribution of each weed species observed on the construction right-of-way to the density and distribution of the same species off-site or as outlined in the pre-construction weed survey report, to determine whether the management threshold has been reached.

4.4 STEP 3: Review treatment criteria

Choose an appropriate management option (i.e., mechanical, biological, or chemical) or a combination of treatments that will provide effective weed management, based on the data collected at weed occurrence sites. The criteria used to select a treatment method that balances the potential environmental impacts while providing adequate and cost efficient weed management are:

- Effectiveness of previous treatments;
- Biology of target weed species, area and density;
- Existing land use;
- Land ownership;
- Proximity of organic farms, water sources, bodies of water and environmentally sensitive sites;
- The possibility of adverse impacts to wildlife, fish, surrounding land, workers and adjacent residents;
- Economic impacts of weeds on surround land use;
- Timing of treatment
- Existing soil type;
- Site accessibility
- Cost and availability of treatment options; and
- The consequences of no treatment.

4.5 STEP 4: Select weed management treatment method

4.5.1 Manual / mechanical treatment option

Manual/Mechanical treatments are preferred for weeds located adjacent to cultivated or agricultural lands, organic farm lands and near waterbodies (e.g., drainages, wetlands). Manual/Mechanical options include:

- Mowing: mowing of weeds before weeds go to seed. Mowing may be combined with a pre-mowing herbicide treatment, ensuring that the herbicide has had sufficient time to absorb into the plants.
- Burning: targeted burning of weeds with torches or prescribed controlled burns
- String trimmers: to cut weeds at the ground surface to remove herbaceous vegetation at locations where access limits the use of larger equipment.

- Hand pulling: pulling of weeds in riparian and environmentally sensitive locations for annual and certain perennial weeds where all roots can be easily removed and weed density is sufficiently low enough to make hand pulling effective.
- When selecting a treatment, consideration should be made for the cultural, medicinal or commercial value of a plant to local communities.

Manual/Mechanical treatment options may be considered for use within 30 m of a watercourse, wetland or MH's ESSs.

4.5.2 Biological / Cultural / Native treatment option

Biological/Cultural/Native treatments are an alternative option near watercourses, within pastures, public recreation areas; where chemical application is not approved; or where manual/mechanical methods may not be effective. Biological options include:

- Biological insects and fungi: Canadian Food Inspection Agency approved insects and fungi might be considered to manage weed infestations where other methods have not proven successful.
- Grazing: High intensity livestock grazing has also proven an effective method for limiting weed infestations in select applications.
- Revegetation and erosion control: The use of erosion control measures such as blankets or the establishment of competitive vegetative cover on disturbances to stabilize soils and provide competition to weeds.

Biological/Cultural/Native treatment options may be considered for use within 30 m of a watercourse, wetland or MH's ESSs.

4.5.3 Chemical treatment option

Chemical treatments may be a necessary option when:

- Weed density and distribution has reached levels that other management options are not viable to control the weed infestation;
- Weed management in areas where mechanical and biological methods are not feasible or practical; and
- Where chemical management is the preferred option of the landowner or Weed Supervisor as designated under the Manitoba Noxious Weeds Act regulations.

Chemical treatments may be considered for use within 30 m of a MH's ESSs, but NOT within 30m of watercourses or wetlands.

4.5.4 No control management option

In some instances the implementation of a "no control" option and ongoing monitoring is the most practical and environmentally responsible course of action. In instances where "no control" is being considered as the treatment option, discussions with landowner and government regulators will occur. The No Control option may be considered for use within 30 m of a watercourse, wetland or MH's ESSs.

4.6 Treatment options for common species

The following identifies an overview of treatment options for some common invasive species.

4.6.1 Leafy spurge

- Manual control (hand-pulling) is effective for small infestations.
- Mechanical control (mowing) will reduce the plants ability to seed but has little long-term effect on the plant.
- Chemical control is effective in spring and fall.
- Biological control is considered a long-term management strategy.
- A combination of control measures in an integrated approach is recommended for this species.

4.6.2 Common tansy

- Manual control (hand-pulling) is effective for small infestations.
- Mechanical control (mowing) will reduce seed production but requires repeat treatment.
- Chemical control is effective.
- Biological control is anticipated to be an effective measure for this species in the future.
- Native species competition has been effective for small infestations.

4.6.3 Scentless chamomile

- Manual control (hand-pulling) is effective for small infestations.
- Mechanical control (mowing) is effective but requires repeat treatment.
- Chemical control is effective. Earlier applications have greater success.
- Biological control has had some success.

- Native species competition has been effective.
- A combination of control measures in an integrated approach is recommended for this species.

4.6.4 Purple loosestrife

- Manual control (hand-pulling) is effective for small infestations.
- Chemical control is effective in uplands. No herbicides are currently approved in Canada for treatment near or in water.
- Biological control is the most effective measure for large infestations near water.

4.6.5 Ox-eye daisy

- Manual control (hand-pulling) is effective for small infestations, if the roots are removed.
- Mechanical control (mowing) stimulates shoot growth and requires repeat treatment.
- Chemical control is effective.

4.6.6 Sweetclover

- Manual control (hand-pulling) is effective for small infestations, if the roots are removed.
- Mechanical control (mowing) should occur before seed production.
- Chemical control is effective.
- Native species competition has been effective as part of a management strategy including native seeding, burning and mowing.

4.6.7 Canada thistle

- Manual control (hand-pulling) is effective for small infestations, if the roots are removed.
- Mechanical control (mowing) is effective but requires repeat treatment.
- Chemical control is effective.

4.7 Training and documentation

Training, documentation and communication form a critical component of the implementation of this plan. Manitoba Hydro and the contractor(s) each have responsibility to ensure that their respective personnel are appropriately trained to carry

out their role in rehabilitation, and that proper documentation and communication is being conducted throughout the Project.

Manitoba Hydro will hold a Contractor Environmental Pre-Construction Orientation meeting to review Project specifics and key environmental requirements with all of its Contractors at a supervisory level. A summary of this Plan, implementation requirements, roles and responsibilities, and Manitoba Hydro's expectations will be presented at that time. Manitoba Hydro will also hold a separate pre-construction environmental meeting to provide the opportunity for Manitoba Hydro and Contractor environmental representatives to discuss Project specifics and environmental requirements in more depth.

5.0 Monitoring and follow-up

Monitoring and follow-up is an important component for rehabilitation and invasive species management. Monitoring will verify the implementation and effectiveness of rehabilitation measures and invasive species management. Successful rehabilitation of disturbed areas will be defined by the establishment of native species, no evidence of erosion, and resilience to the disturbance. The following should be completed during monitoring of disturbance areas:

- Disturbance areas should be inspected frequently in the first year and monitored annually thereafter until vegetation re-established.
- Monitoring may include an assessment of erosion control.
- Monitoring will include an assessment of vegetation to measure plant growth.
- Monitoring will be conducted by Manitoba Hydro Environmental Officer and/or vegetation specialists.

Environmental monitoring will determine if follow-up maintenance activities are required. Maintenance activities may include additional erosion control, re-seeding or further plantings, protection from browsing, and invasive species control.

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Appendix A

Rehabilitation checklist

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Appendix A: Rehabilitation checklist

Date (yyyy mm dd)	
Name of recorder	Company (*if different from Manitoba Hydro*)
Location GPS Coordinates *(UTM 14N)*	
Closest Structure Number if applicable #	
Description of disturbance (*type, size, sensitivity i.e. riparian area*)	
Proximity to weed sources *(closest invasive weed ESS)*	
Severity of disturbance *(e.g., erosion is occurring, disturbance is stable)*	
Slope of site (level 0-0.5%, nearly level 0.5-2.5%, very gentle to gentle 2-9%, moderate 10-15%, strong 16-30%, very strong to steep 31-100%)	
Current Ground conditions (*dry, moist, wet*)	
Timing of rehabilitation activities *(Immediate/once surface disturbance activities are complete and ground conditions allow)*	
Post disturbance vegetation conditions (*e.g. vegetation is removed or little is remaining*)	
Surrounding vegetation (*e.g. grassland, forest, riparian, wetland*) and predominant species if known	
Adjacent land uses (*e.g. agriculture/forest/residence*)	
Safety *(Are there any safety concerns?)*	
Accessibility *(Is the site accessible year round/winter/summer, is there alternate access to avoid site)*	
Existing Sediment and Erosion Control Measures *(silt fence, blanket)*	

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Appendix B

Selection of traditional plant species commercially available for rehabilitation

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Appendix B: Selection of traditional plant species commercially available for rehabilitation					
Provincial Scientific Name	**Traditional Use Plant Name**	**Provincial Rank**	**Commercial Availability**	**Rehabilitation Potential**	**Location of Use**
Abies balsamea	balsam fir	S5	yes	yes	forest
Achillea millefolium	yarrow	S5	yes	low	forest, grassland
Acorus americanus	weke	S5	yes	yes	wetland
Actaea racemosa	black snakeroot	not listed by MBCDC	plant unknown	unknown	unknown
Actaea rubra	baneberry	S5	potential to transplant	low	forest
Agastache foeniculum	giant hyssop	S5	yes	low	moist meadow, forest
Alnus incana	speckled alder	S5	yes	yes	riverbank, moist forest
Amelanchier alnifolia	saskatoon berry	S5	yes	yes	forest
Apocynum androsaemifolium	dogbane	S5	potential to transplant	low	forest
Aquilegia sp.	columbine	–	yes	low	forest
Aralia nudicaulis	wild sarsaparilla	S5	yes	low	forest
Arctostaphylos uva-ursi	common bearberry	S5	yes	yes	forest
Artemisia sp.	sage	–	yes	low	grassland
Asarum canadense	wild ginger	S3S4	yes	low	moist forest
Asclepias incarnata	swamp milkweed	S4	yes	low	wetland
Asclepias syriaca	common milkweed	S4	potential to transplant	low	riverbank, grassland
Betula papyrifera	paper birch	S5	yes	yes	forest
Caltha palustris	marsh marigold	S5	yes	low	wetland
Campanula sp.	harebell	–	yes	low	grassland, forest
Cannabis sativa	hemp	SNA	potential to transplant	low	forest
Chamerion angustifolium	fireweed	S5	yes	yes	forest
Conyza canadensis	Canada fleabane	S5	potential to transplant	low	grassland
Cornus canadensis	bunchberry	S5	yes	low	forest
Cornus sericea	red osier dogwood	S5	yes	yes	forest
Corylus americana	American hazelnut	S4	yes	yes	forest
Corylus cornuta	beaked hazelnut	S5	yes	yes	forest
Corylus sp.	hazelnut	–	yes	yes	forest

Appendix B: Selection of traditional plant species commercially available for rehabilitation					
Provincial Scientific Name	**Traditional Use Plant Name**	**Provincial Rank**	**Commercial Availability**	**Rehabilitation Potential**	**Location of Use**
Cratagus sp.	hawthorn	–	yes	yes	forest
Dasiphora fruticosa	shrubby cinquefoil	S5	yes	yes	forest
Fragaria virginiana	wild strawberry	S5	yes	low	forest
Geranium bicknellii	Bicknell's geranium	S5	potential to transplant	low	forest
Geum aleppicum	yellow avens	S5	potential to transplant	low	moist meadow, forest
Heuchera richardsonii	alumroot	S5	yes	low	grassland, forest
Hierochloe odorata	sweet grass	S5	yes	yes	grassland, forest
Hypericum perforatum	St. John's wort	SNA	yes	low	moist meadow, forest
Larix laricina	tamarack	S5	yes	yes	forest, wetland
Rhododendron groenlandicum	Labrador tea	S5	potential to transplant	low	forest
Lilium philadelphicum	wood lily	S4	yes	low	grassland, forest
Lycopus uniflorus	northern bugle-weed	S5	potential to transplant	low	wetland
Maianthemum canadense	Canada mayflower	S5	potential to transplant	low	forest
Mentha sp.	wild mint	–	yes	low	moist meadow
Oenothera flava	yellow evening primrose	SNA	potential to transplant	low	grassland, riverbank
Polygala senega	Seneca	S4	potential to transplant	low	grassland, forest
Populus balsamifera	balsam poplar	S5	potential to transplant	yes	forest
Potentilla arguta	tall cinquefoil	S5	potential to transplant	low	grassland
Prenanthes sp.	rattlesnake root	–	potential to transplant	low	forest
Prunella vulgaris	self-heal	S4	potential to transplant	low	grassland, forest
Prunus nigra	Canada wild plum	S4	yes	yes	forest
Prunus pensylvanica	pin cherry	S5	yes	yes	forest
Prunus pumila	sand cherry	S4	yes	yes	grassland, forest
Prunus sp.	plum	–	yes	yes	grassland, forest
Prunus virginiana	choke cherry	S5	potential to transplant	yes	forest
Pyrola sp.	wintergreen	–	potential to transplant	low	forest
Quercus macrocarpa	bur oak	S5	yes	yes	forest

Appendix B: Selection of traditional plant species commercially available for rehabilitation

Provincial Scientific Name	Traditional Use Plant Name	Provincial Rank	Commercial Availability	Rehabilitation Potential	Location of Use
Ribes americanum	wild black currant	S5	yes	yes	forest
Ribes oxyacanthoides ssp. *oxyacanthoides*	northern gooseberry	S5	potential to transplant	yes	forest
Rosa arkansana	prairie rose	S4	potential to transplant	yes	grassland
Rosa sp.	wild rose	–	yes	yes	grassland, forest
Rubus pubescens	dewberry	S5	potential to transplant	low	forest
Rubus sp.	blackberry	not listed by MBCDC	potential to transplant	low	forest
Rubus idaeus	raspberry	–	yes	yes	forest
Rubus sp.	wild raspberry	–	yes	yes	forest
Sibbaldiopsis tridentata	three-toothed cinquefoil	S5	potential to transplant	low	forest
Solidago canadensis	Canada goldenrod	S5	yes	low	grassland
Solidago gigantea	smooth goldenrod	S5	potential to transplant	low	grassland, forest
Spiraea alba	meadowsweet	S5	yes	yes	forest
Stachys palustris	marsh hedge-nettle	S5	potential to transplant	low	moist meadow
Symphoricarpos albus	snowberry	S5	yes	yes	forest, grassland
Thuja occidentalis	cedar	S4	yes	yes	forest
Trifolium pratense	red clover	SNA	yes	yes	forest, grassland
Vaccinium sp.	blueberry	–	yes	low	forest
Viburnum opulus	highbush cranberry	S5	yes	yes	forest
Viburnum rafinesquianum	downy arrow-wood	S4	yes	yes	forest
Vitis riparia	wild grapes	S3S4	yes	low	forest
Zizania palustris	wild rice	S4	yes	low	wetland

Notes:
1. A list of suppliers is available upon request
2. Traditional use plant names taken from the *Aboriginal Traditional Knowledge Study Community Report* submitted by Black River First Nation, Long Plain First Nation, and Swan Lake First Nation for the Manitoba-Minnesota Transmission Project (Manitoba Hydro 2015).

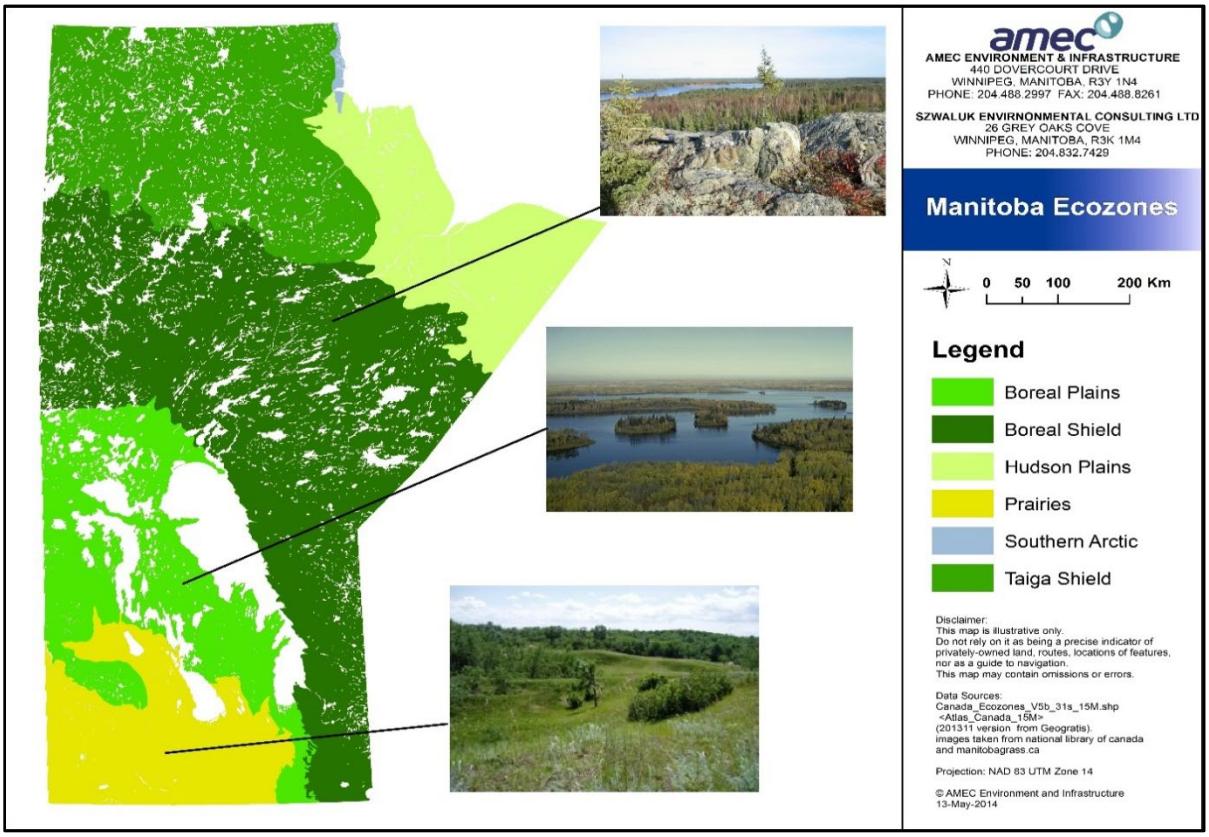
Appendix C

Characteristic vegetation of Manitoba's ecozones

Appendix C: Characteristic vegetation of Manitoba's ecozones

Manitoba ecozone	Characteristic vegetation
Southern Arctic	Occasional forest stands, dwarf birch, willows, ericaceous species, various herbs, mosses and lichens.
Hudson Plains	Black spruce, white spruce, tamarack, ericaceous shrubs, sedges, mosses and lichens. Closer to the coast there are marine marshes, shallow fens, and extensive mud flats with little vegetation.
Taiga Shield	Black spruce, white spruce, tamarack, and ground cover of dwarf birch, willows, northern Labrador tea, cotton grass, mosses, and lichens. Paper birch, balsam poplar and trembling aspen may be found. Bog and fen complexes are present.
Boreal Shield	Single-species forest stands, or mixed stands of white and black spruce, balsam fir, tamarack and jack pine. White birch, trembling aspen, and balsam poplar can be found. Understory is dominated by shrubs, forbs and lichen cover over bedrock outcrops.
Boreal Plains	White spruce, black spruce, jack pine and tamarack are the main coniferous species, while deciduous trees include white birch, trembling aspen and balsam poplar
Prairies	Predominantly agricultural crops and rangeland. Stands of trembling aspen, balsam poplar and bur oak occur.

Source: Smith et al. (1998)



Appendix D

Recommended Baseline Native Seed Mixes

Appendix D: Recommended baseline native seed mixes		
Common name	Scientific name	Percent in mix (total 100%)
Northern Manitoba – upland mesic to dry soils		
Short-leaved Fescue	*Festuca brachyphylla*	10
Canada Wild Rye	*Elymus cananadensis*	20
Tickle-grass	*Agrostis scabra*	10
Hairy Wild Rye	*Leymus innovatus*	20
June Grass	*Koeleria macrantha*	10
Rocky Mountain Fescue	*Festuca saximontana*	10
Richadson Needle Grass	*Achnatherum richardsonii*	15
Common Vetch	*Vicia americana*	5
Northern Manitoba – lowland wet meadow soils		
Fowl Blue Grass	*Poa palustis*	30
Marsh or Northern Reed Grass	*Calamagrostis canadensis or C. stricta*	10
Slough Grass	*Beckmannia syzigachne*	50
Tufted Hairgrass	*Deschampsia caespitosa*	10
West Central Manitoba – upland mesic to dry soils		
Tickle-grass	*Agrostis scabra*	10
Big Bluestem	*Andropogon gerardii*	20
Purple Prairie Clover	*Dalea purpurea var. purpurea*	5
Canada Wild Rye	*Elymus canadensis*	30
Hairy Wild Rye	*Leymus innovatus*	10
Rocky Mountain Fescue	*Festuca saximontana*	5
Awned Wheatgrass	*Elymus trachycaulus spp. subsecundus*	10
June Grass	*Koeleria macrantha*	5
Common Vetch	*Vicia americana*	5
West Central Manitoba – lowland wet meadow soils		
Slough Grass	*Beckmannia syzigachne*	50
Marsh or Northern Reed Grass	*Calamagrostis canadensis or C. stricta*	5
Tufted Hairgrass	*Deschampsia caespitosa*	30
Baltic Rush	*Juncus arcticus var. balticus*	5
Fowl Blue Grass	*Poa palustis*	10
Southern Manitoba – upland mesic to dry soils		
Awned Wheatgrass	*Elymus trachycaulus spp. subsecundus*	10
Big Bluestem	*Andropogon gerardii*	30

Appendix D: Recommended baseline native seed mixes		
Common name	Scientific name	Percent in mix (total 100%)
White Prairie-clover	*Dalea candida*	5
Purple Prairie Clover	*Dalea purpurea var. purpurea*	5
Canada Wild Rye	*Elymus canadensis*	20
June Grass	*Koeleria macrantha*	5
Little Bluestem	*Schizachyrium scoparium*	10
Indian Grass	*Sorghastrum nutans*	10
Common Vetch	*Vicia americana*	5
Southern Manitoba – lowland wet meadow soils		
Slough Grass	*Beckmannia syzigachne*	50
Marsh or Northern Reed Grass	*Calamagrostis canadensis or C. stricta*	10
Tufted Hairgrass	*Deschampsia caespitosa*	10
Fowl Blue Grass	*Poa palustis*	10
Prairie Cord Grass	*Spartina pectinata*	20

Appendix E

Selection of plant species commercially available for rehabilitation

Appendix E: Selection of plant species commercially available for rehabilitation

Note: A list of suppliers is available upon request

Scientific name	Common name	Seed	Seedling
Abies balsamea	Balsam Fir		X
Achnatherum hymenoides	Indian Rice Grass	X	
Achnatherum richardsonii	Richardson Needle Grass	X	
Agrostis scabra	Tickle-grass	X	
Andropogon gerardii	Big Bluestem	X	
Arctagrostis latifolia	Polar Grass	X	
Astragalus canadensis	Canada Milkvetch	X	
Beckmannia syzigachne	Slough Grass	X	
Bouteloua curtipendula	Side-oats Grama	X	
Bouteloua gracilis	Blue Grama	X	
Bromus anomalus	Nodding Brome	X	
Bromus ciliatus	Fringed Brome	X	
Buchloe dactyloides	Buffalo Grass	X	
Calamagrostis canadensis	Marsh Reed Grass	X	
Calamagrostis stricta ssp. inexpansa	Northern Reed Grass	X	
Calamolvilfa longifolia	Sand Grass	X	
Carex bebbii	Bebb's Sedge	X	
Dalea candida	White Prairie-clover	X	
Dalea purpurea var. purpurea	Purple Prairie Clover	X	
Deschampsia caespitosa	Tufted Hairgrass	X	
Distichlis spicata	Alkali Grass	X	
Elymus alaskanus ssp. latiglumus	Alaska Wild Rye	X	
Elymus canadensis	Canada Wild Rye	X	
Elymus glaucus	Smooth Wild Rye	X	
Elymus lanceolatus ssp. lanceolatus	Thickspike Wheatgrass	X	
Elymus lanceolatus ssp. psammophilus	Sand-dune Wheatgrass	X	
Elymus trachycaulus	Slender Wheat Grass	X	
Elymus trachycaulus spp. subsecundus	Awned Wheatgrass	X	
Elymus virginicus	Virginia Wild Rye	X	
Festuca brachyphylla	Short-leaved Fescue	X	

Appendix E: Selection of plant species commercially available for rehabilitation

Note: A list of suppliers is available upon request

Scientific name	Common name	Seed	Seedling
Festuca halii	Plains Rough Fescue	X	
Festuca saximontana	Rocky Mountain Fescue	X	
Glyceria grandis	Tall Manna Grass	X	
Helianthus maximiliani	Narrow-leaved Sunflower	X	
Hesperostipa comata ssp. comata	Spear Grass	X	
Hesperostipa curtiseta	Western Porcupine Grass	X	
Juncus arcticus var. balticus	Baltic Rush	X	
Koeleria macrantha	June Grass	X	
Leymus innovatus	Hairy Wild Rye	X	
Nassella viridula	Green Needle Grass	X	
Panicum virgatum	Switch Grass	X	
Pascopyrum smithii	Western Wheat Grass	X	
Picea glauca	White Spruce		X
Picea mariana	Black Spruce		X
Pinus banksia	Jack Pine		X
Pinus resinosa	Red Pine		X
Pinus strobus	Eastern White Pine		X
Poa alpina	Alpine Blue Grass	X	
Poa glauca	Glaucous Spear-grass	X	
Poa palustris	Fowl Blue Grass	X	
Poa secunda ssp. secunda	Curly Bluegrass	X	
Populus spp.	Hydbrid Poplar		X
Pseudoroegneria spicata ssp. spicata	Bluebunch Wheat Grass	X	
Quercus macrocarpa	Bur Oak		X
Salix spp.	Hybrid Willow		X
Schizachyrium scoparium	Little Bluestem	X	
Scolochloa festucacea	Sprangletop	X	
Sorgastrum nutans	Indian Grass	X	
Spartina gracilis	Alkali Cord Grass	X	
Spartina pectinata	Prairie Cord Grass	X	

Appendix E: Selection of plant species commercially available for rehabilitation ***Note: A list of suppliers is available upon request***			
Scientific name	Common name	Seed	Seedling
Sporobolus cryptandrus	Sand Dropseed	X	
Thuja occidentalis	Eastern White Cedar		X
Trisetum spicatum	Spike Trisetum	X	
Vicia americana	Common Vetch	X	

Appendix F

Invasive species listed by the Invasive Species Council of Manitoba

Appendix F: Invasive species listed by the Invasive Species Council of Manitoba Refer to Invasive Species Council of Manitoba Field Guide (2013) and website for identification	
Scientific name	Common name
Alliaria petiolata	Garlic Mustard
Arctium minus	Common Burdock
Berteroa incana	Hoary Alyssum
Bromus japonicus	Japanese Brome
Bromus tectorum	Downy Brome
Butomus umbellatus	Flowering Rush
Campanula rapunculoides	Creeping Bellflower
Carduus nutans	Nodding Thistle
Cirsium arvense	Canada Thistle
Cirsium vulgare	Bull Thistle
Convolvulus arvensis	Field Bindweed
Cynoglossum officinale	Hound's Tounge
Echium vulgar	Blue Weed
Eichhornia crassipes	Water Hyacinth
Euphorbia esula	Leafy Spurge
Fallopia japonica	Japanese Knotweed
Gypsophila paniculata	Baby's Breath
Heracleum mantegazzianam	Giant Hogweed
Hesperis matronalis	Dame's Rocket
Hieracium aurantiacum	Orange Hawkweed
Hypericum perforatum	St. John's Wort
Impatiens glandulifera	Himalayan Balsam
Jacobaea vulgaris	Tansy Ragwort
Knautia arvensis	Field Scabious
Leucanthemum vulgare	Ox-eye Daisy
Linaria dalmatica	Dalmatian Toadflax
Linaria vulgaris	Yellow Toadflax
Lychnis alba	White Cockle
Lythrum salicaria	Purple Loosestrife
Matricaria perforata	Scentless Chamomile
Odontites serotina	Red Bartsia
Onopordum acanthium	Scotch Thistle
Phalaris arundinacea	Reed Canary Grass
Phragmites australis spp. australis	Invasive Phragmites
Ranunculis acris	Tall Buttercup
Rhamnus cathartica	European Buckthorn

Appendix F: Invasive species listed by the Invasive Species Council of Manitoba Refer to Invasive Species Council of Manitoba Field Guide (2013) and website for identification	
Scientific name	Common name
Saponaria officinalis	Bouncing Bet
Saponaria vaccaria	Cow Cockle
Sonchus arvensis	Perennial Sow Thistle
Tanacetum vulgare	Common Tansy
Tribulus terrestris	Puncture Vine
Typha angustifolia and Typha x glauca	Narrow-leaved and Hybrid Cattail
Vicia cracca	Bird Vetch
Note: Listed species are category 2 species (localized presence in Manitoba) listed by the Invasive Species Council of Manitoba. Invasive species also are listed under The Noxious Weeds Act of Manitoba.	

Appendix G

Noxious Weeds Regulation Species List

Appendix G: Noxious Weeds Regulation Species List

Designated Tier 1 Noxious Weeds		
Common name	**Scientific name**	**Area for which Designation applies**
Amaranth, Palmer	*Amaranthus palmeri*	All areas of the province outside the Municipality of Bifrost-Riverton and the Rural Municipalities of Armstrong, Fisher, Gimli, Rockwood, St. Andrews and St. Clements
Bartsia, red	*Odontes vernus*	Whole province
Crupina, common	*Crupina vulgaris*	Whole province
Cupgrass, woolly	*Eriochloa villosa*	Whole province
Goatgrass, jointed	*Aegilops cylindrical*	Whole province
Hawkweed, orange	*Hieracium aurantiacum*	Whole province
Hogweed, giant	*Heracleum mantegazzianum*	Whole province
Hound's-tongue	*Cynoglassum officinale*	Whole province
Knapweed, diffuse	*Centaurea diffusa*	Whole province
Knapweed, Russian	*Acroptilon repens*	Whole province
Knapweed, spotted	*Centaurea stoebe*	Whole province
Knapweed, squarrose	*Centaurea virgata*	Whole province
Knotweed, Japanese	*Fallopia japonica*	Whole province
Mile-a-minute weed	*Persicaria perfoliata*	Whole province
Mustard, garlic	*Allaria petiolata*	Whole province
Patterson's curse	*Echium plantagineum*	Whole province
Pigweed, smooth	*Amaranthus hybridus*	Whole province
Saltcedar	*Tamarix spp.*	Whole province
Star-thistle, yellow	*Centaurea solstitialus*	Whole province
Tussock, serrated	*Nassella trichotoma*	Whole province
Waterhemp, tall	*Amaranthus turbriculatus*	Whole province

Designated Tier 2 Noxious Weeds		
Common name	**Scientific name**	**Area for which Designation applies**
Alyssum, hoary	*Berteroa incana*	Whole province
Baby's-breath	*Gypsophila paniculata*	Whole province
Bartsia, red	*Odontes vernus*	Municipality of Bifrost-Riverton and the Rural Municipalities of Armstrong, Fisher, Gimli, Rockwood, St. Andrews and St. Clements
Bouncingbet	*Saponaria officinalis*	Whole province
Brome, downy	*Bromus tectorum*	Whole province
Brome, Japanese	*Bromus japonicas*	Whole province
Campion, bladder	*Silene vulgaris*	Whole province
Chamomile, scentless	*Matricaria perforata*	Whole province
Common reed, invasive	*Phragmites australis australis*	Whole province
Daisy, ox-eye	*Leucanthemum vulgare*	Whole province
Nutsedge, yellow	*Cyperus esculentus*	Whole province
Scabious, field	*Knautia arvensis*	Whole province
Spurge, Cypress	*Euphorbia cyparissias*	Whole province
Spurge, leafy	*Euphorbia esula*	Whole province
St. John's-wort	*Hypericum perforatum*	Whole province
Tansy, common	*Tanacetum vulgare*	Whole province
Thistle, nodding	*Carduus nutans*	Whole province
Toadflax, Dalmatian	*Linaria dalmatica*	Whole province

Designated Tier 3 Noxious Weeds		
Common name	**Scientific name**	**Area for which Designation applies**
Absinth	*Artemisia absinthum*	Whole province
Barberry	*Berberis vulgaris*	Whole province
Barley, foxtail	*Hordeum jubatum*	Whole province
Bellflower, creeping	*Campanula rapunculoides*	Whole province
Buckthorn, European	*Rhamnus frangula*	Whole province
Burdock, common	*Arctium minus*	Whole province
Burdock, greater	*Arctium, lappa*	Whole province
Burdock, woolly	*Arctium, tomentosum*	Whole province
Campion, biennial	*Silene dioica*	Whole province
Catchfly, night-flowering	*Silene noctiflora*	Whole province
Cleavers	*Galium aparine*	Whole province
Cleavers, false	*Galium spurium*	Whole province
Cockle, white	*Silene alba*	Whole province
Dandelion	*Taraxacum officinale*	Whole province
Dodder	genus *Cuscuta*	Whole province
Fleabane, Canada	*Conyza canadensis*	Whole province
Flixweed	*Descurainia Sophia*	Whole province
Hawk's-beard, narrow-leaved	*Crepis tectorum*	Whole province
Hemlock, poison	*Conium maculatum*	Whole province
Hemp-nettle	*Galeopsis tetrahit*	Whole province
Hoary-cress	*Cardaria draba*	Whole province
Jimsonweed	*Datura stromonium*	Whole province
Kochia	*Kochia scoparia*	Whole province
Lamb's quarters	*Chenopodium album*	Whole province
Lettuce, prickly	*Lactuca seriola*	Whole province
Milkweed, common	*Asclepias syriaca*	Whole province
Milkweed, showy	*Aslepias speciosa*	Whole province
Mustard, wild	*Sinapis arvensis*	Whole province
Nightshade, American black	*Solanum americanum*	Whole province
Nightshade, cutleaf	*Solanum triflorum*	Whole province
Nightshade, hairy	*Solanum sarachoides*	Whole province
Parsnip, wild	*Pastinaca sativa*	Whole province
Ragweed, common	*Ambrosia artemisifolia*	Whole province
Ragweed, false	*Iva xanthifolia*	Whole province
Ragweed, giant	*Ambrosia trifida*	Whole province
Sow-thistle, annual	*Sonchus oleraceus*	Whole province

Designated Tier 3 Noxious Weeds		
Common name	**Scientific name**	**Area for which Designation applies**
Sow-thistle, perennial	*Sonchus arvensis*	Whole province
Sow-thistle, spiny annual	*Sonchus asper*	Whole province
Stinkweed	*Thlaspi arvense*	Whole province
Stork's bill	*Erodium cicutarium*	Whole province
Thistle, bull	*Cirsium vulgare*	Whole province
Thistle, Canada	*Circium arvense*	Whole province
Thistle, Russian	*Salsola pestifer*	Whole province
Toadflax, yellow	*Linaria vulgaris*	Whole province
Water hemlock, bulb-bearing	*Cicuta bulbifera*	Whole province
Water hemlock, northern	*Cicuta virosa*	Whole province
Water hemlock, spotted	*Cicuta maculate*	Whole province
Water hemlock, western	*Cicuta douglasii*	Whole province
Whitetop, hairy	*Cardaria pubescens*	Whole province
Whitetop, lenspod	*Cardaria chalepensis*	Whole province

Available in accessible formats upon request