MANITOBA-MINNESOTA TRANSMISSION PROJECT

Right-of-Way Habitat Management Plan for Managing Critical Golden-winged Warbler Habitat during Construction and Operation

Manitoba Hydro

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Right-of-Way Habitat Management Plan for Managing Critical Golden-winged Warbler Habitat during Construction and Operation of the Manitoba–Minnesota Transmission Project

Background

Golden-winged warbler is one of eleven Species of Conservation Concern (SOCC) associated with open forest habitat, which is discussed as part of potential environmental effects on wildlife and wildlife habitat (Chapter 9, Section 9.4.2 Manitoba Hydro 2015). It is the only species in the Regional Assessment Area (RAA) to have defined critical habitat.

The golden-winged warbler is a ground-nesting songbird that breeds in shrubby habitats adjacent to mature stands of deciduous and mixedwood forest (Manitoba Hydro 2015). It uses forest edge habitat and openings containing shrubs and grasses. Habitat is often regenerated by natural and human disturbances, including hydroelectric utility corridors, which can be preferred habitat for this species if corridors are maintained in a manner that retains shrubs and herbs along forest edges.

There are records from Bird Studies Canada and the Manitoba Breeding Bird Atlas of golden-winged warbler occurrences throughout the east portion of the RAA. Observations are concentrated in the areas surrounding the communities of Ste-Genevieve, Ross and Richer. In addition, six golden-winged warblers were detected during MMTP environmental assessment breeding bird surveys north and southwest of the community of Marchand, south of the community of Richer, and south of the Watson P. Davidson Wildlife Management Area (WMA) (Manitoba Hydro 2015).

Statement of Intent

The "*Recovery Strategy for the Golden-winged Warbler (Vermivora chrysoptera) in Canada*" was published in 2014 (Environment Canada 2014). Manitoba Hydro recognizes that a portion of the Manitoba-Minnesota Transmission Project intersects an area defined in this strategy as critical golden- winged warbler habitat. By utilizing an integrated vegetation management approach, application of standard operating procedures, best practices and the usage of adaptive

management techniques, Manitoba Hydro will endeavor to maintain or enhance the critical habitat of the golden-winged warbler within the Project right-of-way (ROW).

ROW Habitat Management Area for Golden-winged Warbler

For the purposes of this plan, a golden-winged warbler ROW Habitat Management Area (HMA) was developed. This area is comprised of the portion of the project ROW that intersects the five critical habitat grid squares as outlined in the recovery strategy (approximately 70 spans) (Map 1).

Within the "*Recovery Strategy for the Golden-winged Warbler (Vermivora chrysoptera) in Canada*" focal areas designate critical golden-winged warbler habitat on a broad scale throughout their range. Manitoba contains three focal areas, GL 1 near Dauphin along the western edge of the province, GL 2 in the Interlake, it is within GL 3 located in southeastern part of the province, through which the proposed ROW crosses. These focal areas are subdivided into 10 x 10km grid squares, based on the standardized UTM grid. A total of 177 grid squares occur in Manitoba, 60 of which are located in GL 3. Map 2 illustrates Potential Golden-winged Warbler Habitat and Critical Golden-winged Warbler Habitat Grids in the RAA intersected by the Project's transmission line ROW.

Goal and Objectives

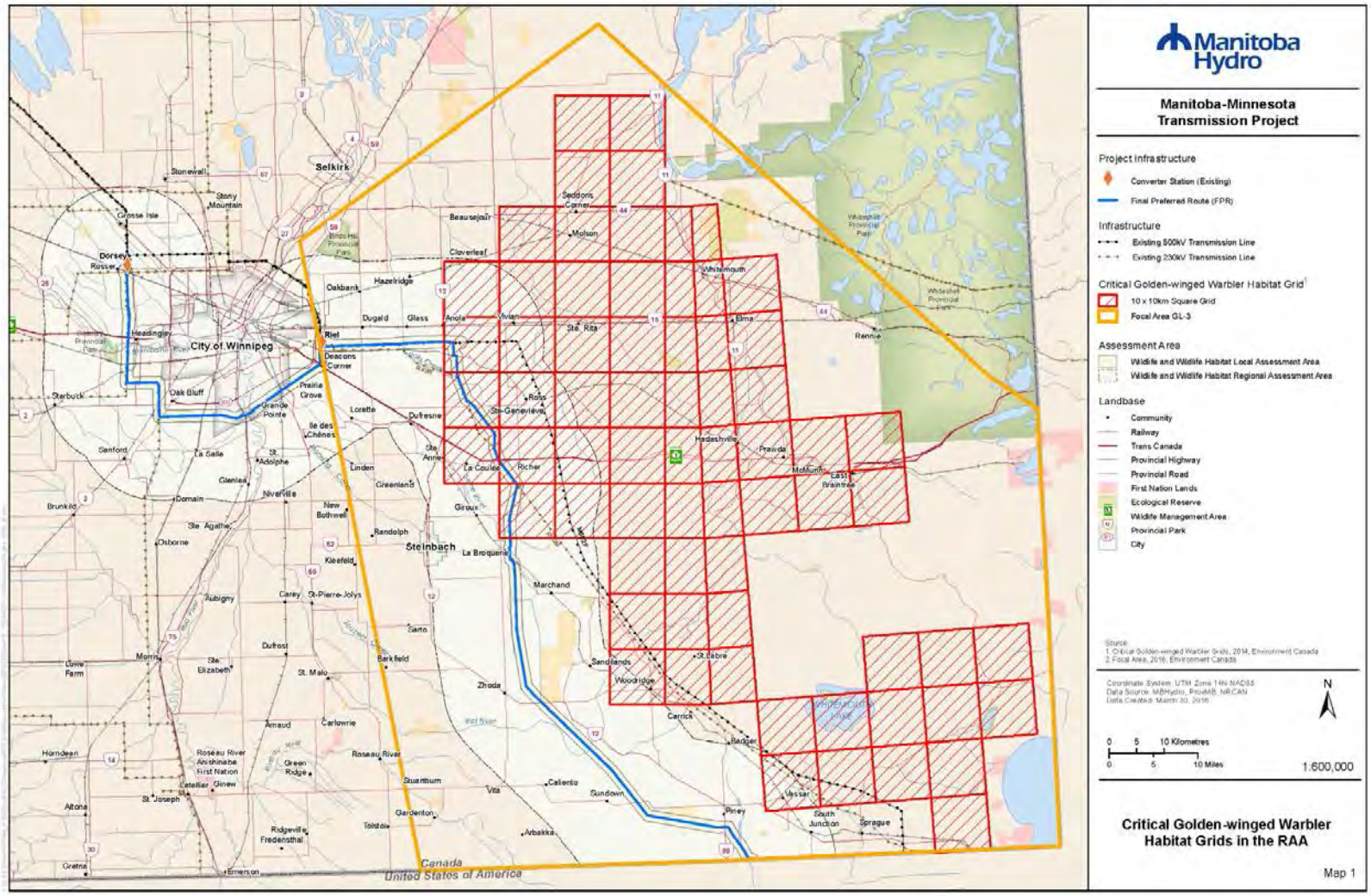
Goal: In sensitive areas of critical golden-winged warbler habitat, ROW vegetation will be selectively cleared and maintained using an integrated vegetation management approach to enhance long-term habitat suitability for golden-winged warbler.

Objective 1: To improve understanding of golden-winged warbler habitat distribution along the Project ROW.

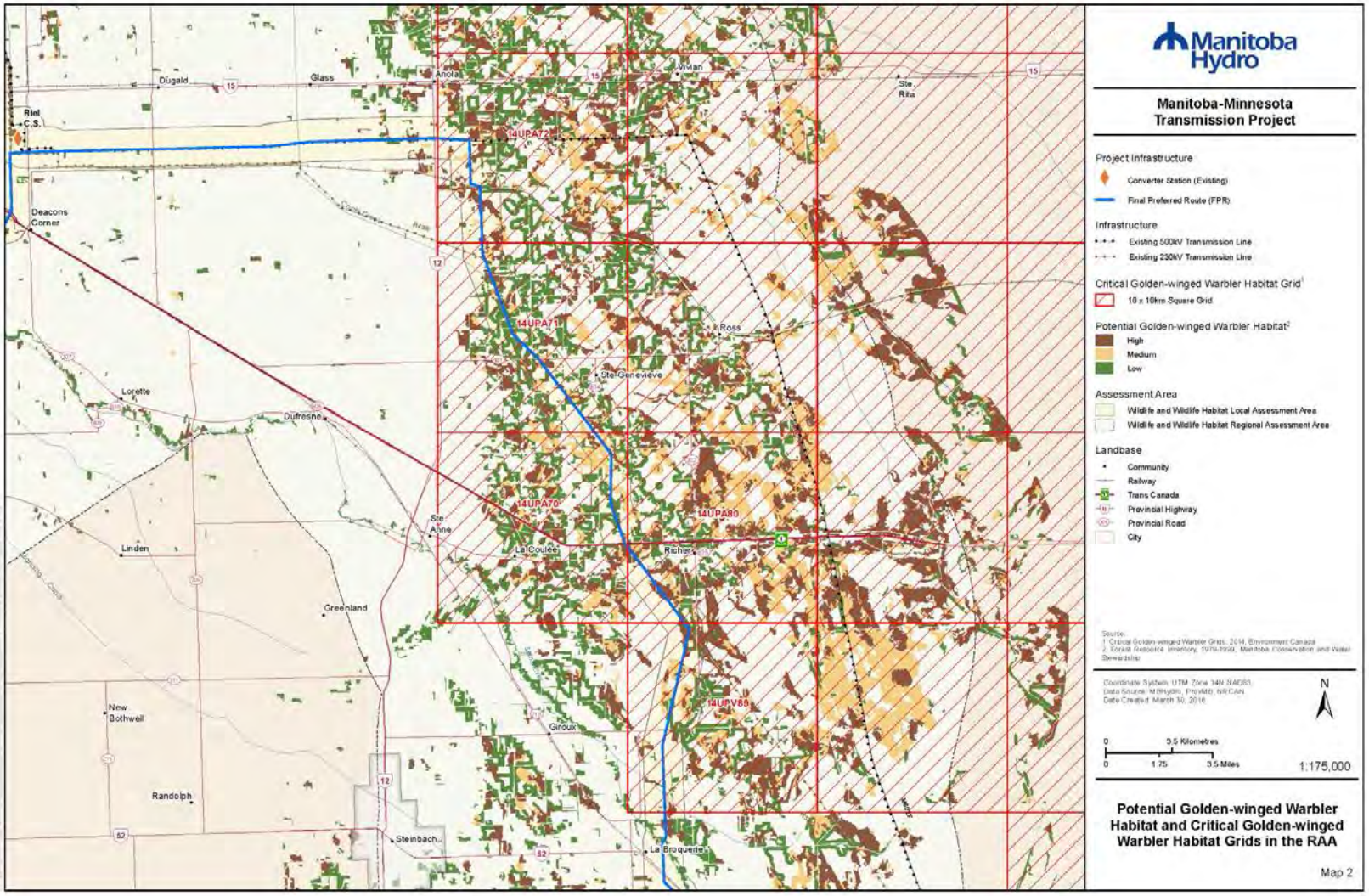
Objective 2: To apply construction clearing prescriptions suitable for the maintenance and development of potential golden-winged warbler habitat while allowing for safety considerations in the construction of the Project.

Objective 3: To apply operational vegetation maintenance prescriptions suitable for the enhancement of potential golden-winged warbler habitat, while abiding by legal requirements for the safe operation and maintenance of the Project.

Objective 4: To monitor the response of the local golden-winged warbler population along the Project ROW.



Map 1. Critical Golden-winged Warbler Habitat Grids in the RAA.



Map 2. Potential Golden-winged Warbler Habitat and Critical Golden-winged Warbler Habitat Grids in the RAA.

Baseline Conditions

Landscape-scale habitat suitability for golden-winged warblers was determined for the five 10 x 10km grid squares that intersect the ROW using Manitoba Conservation and Water Stewardship Forest Resource Inventory Data. The habitat standards presented in Environment Canada Recovery Strategy (50-75% forest cover that is composed of 50% deciduous or mixed forest, with less than 30% coniferous forest) (Environment Canada 2014), were used as a reference to calculate suitable and non-suitable habitat.

At baseline, one of the five grid squares met the Environment Canada standards for being suitable golden-winged warbler habitat, while the remaining four contained an amount slightly below the recommended amount of suitable habitat (Table 1, Map 2). Suitable habitat consisted mainly of broadleaf forest. Mixedwood forest was scarce. The predominant non-suitable habitat at the landscape scale was agriculture. Developed areas and meadow were less abundant than agricultural land, but are still relatively common in each grid square compared to other habitat types (Table 1).

Table 1. Baseline habitat areas (ha) within the 10 x 10km grid squares intersected by the Project ROW based on Environment Canada's landscape-scale habitat definition (Environment Canada 2014).

		10 x 10km Grid Square				
	Habitat Type (ha)	**14PA70**	**14PA71**	**14PA72**	**14PA80**	**14PV89**
Habitat	Broadleaf	3,787	3,914	4,748	5,355	2,978
	Mixedwood	22	2	7	32	102
	Total	3,809	3,915	4,755	5,388	3,081
	Percent of Grid	38	39	48	54	31
Non-Habitat	Coniferous	13	22	67	45	456
	Developed	1,001	907	847	621	279
	Fields (Agriculture)	4,415	4,189	2,792	1,248	2,536
	Willow/Alder	394	365	679	1,277	877
	Marsh Muskeg	23	15	46	394	1,925
	Meadow	257	588	763	977	750
	Shelter Belts	89	0	3	0	0
	Treed Muskeg	0	0	47	1	87
	Water	0	0	0	51	10
	Total	6,192	6,085	5,245	4,612	6,919
	Percent of Grid	62	61	52	46	69

Habitat suitability for golden-winged warblers was also determined for the section of the ROW that intersects the five 10 x 10km grid squares. A more detailed habitat model presented in the EIS (Appendix C) was applied to Forest Resource Inventory data to identify potential nesting and foraging habitat (EIS Map 9-24). The ROW was defined by buffering the Project centreline by 80m for sections that will use self-supporting towers and 100m for sections that will use guyed-towers.

In the ROW that intersects the five 10 x 10km critical habitat grid squares, the Project ROW contains approximate totals of 64ha of high, 40ha of medium, and 57ha of low potential habitat for golden-winged warblers (Table 2). Much of the existing habitat within the proposed ROW is considered non-habitat for golden-winged warblers (Table 2, Map 2).

Table 2. Baseline habitat areas (ha) within the five 10 x 10km critical habitat grid squares within the Project ROW based on EIS habitat models.

	Habitat Type	Potential Habitat Quality			Total (ha)
		High (ha)	Medium (ha)	Low (ha)	
Habitat	Grassland	4.7	5.7	0.0	10.4
	Productive Forest	44.8	30.5	57.0	132.3
	Shrub	14.9	3.7	0.0	18.6
	Total	64.4	39.9	57.0	161.3
Non-Habitat	NA	NA	NA	NA	199.3
					360.6

Implementation Phases

Planning Phase

In developing this section the publications "The Best Management Practices for the Golden-winged Warbler Habitat on Utility Rights of way in the Great Lakes" (ND) and "Best Management Practices for Golden-winged Warbler Habitat in the Aspen Parkland Transition Zone of Canada" (ND) provided valuable guidance on how best to plan and maintain vegetation along a ROW for the benefit of golden-winged warblers.

Habitat Management Sites (HMS) will be approximately 10ha in size, which is roughly equivalent to the ROW area between three transmission towers (two spans). There are approximately 90 spans in total within the ROW habitat management area. The size of the HMS is derived from recommendations made by Roth et al. (2012), who suggest that management sites be 2ha in size if located within 300m of existing suitable habitat and 10ha in size when located further than 300m from existing suitable habitat. Potential Golden-winged Warbler Habitat (Map 2) and vegetation surveys as described below will inform the selection of the HMS.

The near and long-term habitat management objective for the golden-winged warbler is to provide a mosaic of different vegetation types that are preferred by this species within each HMS. Habitat preferences for this species have been well documented and are generally described as clumps of shrubs interspersed with herbaceous openings, adjacent to mature forest. Specifically, ideal golden-winged warbler habitat within a HMS is defined as: (GWWAWG 2013)

- Tall shrubs and saplings (1-4m) unevenly distributed as clumps, consisting of up 30-70% of the management site;
- Shrub and sapling clumps interspersed with herbaceous openings that are primarily composed of forbs with a smaller proportion of grasses;

- Low woody vegetation (1m), leaf litter, and bare ground that occupies less than 25% of the opening's space;

- Low density of overstory trees (10-15/ha).

As the Project proceeds, the first objective will be to validate the amount of potential golden-winged warbler habitat present within the proposed ROW using vegetation surveys. Vegetation surveys will use a combination of remotely-sensed data, including LiDAR (light detection and ranging) and high-resolution imagery, as well as data collected from the ground. Remotely-sensed data will be used to improve understanding of where potential golden-winged warbler habitat is located along the ROW. Both spatial and quantitative information of tree and shrub species, their heights and grass-forb habitat patches derived from LiDAR imagery will be mapped. One of the most important factors in developing clearing prescriptions will be to determine the extent of tree growth along the Project ROW. Trees are not compatible with the safe operation and maintenance of a transmission line and must be managed when their height exceeds the vegetation clearance requirements for the safe operation of a transmission line. The derived plant community distributions will be used to develop vegetation management prescriptions for each management site. As additional digital imagery and ground-based vegetation survey data becomes available for the Project development area, Manitoba Hydro will develop specific mapping products to help guide on the ground clearing activities in golden-winged warbler critical habitat.

Construction Phase

Clearing of the ROW for transmission line construction will be considerate and selective in areas designated as golden-winged warbler habitat from the vegetation mapping described above. Within each HMS (two spans), vegetation clearing will occur in two separate zones (Figure 1). Vegetation management in Zone 1 (0-12m on either side of the centreline of the ROW and up to a 100 x 100m cleared area around the tower base) will involve the clearing of all trees and shrubs to provide safe access and work areas at tower footprints and during conductor stringing. Vegetation management within Zone 1 will likely involve the use of mechanical equipment such as feller-bunchers or mulchers to remove all standing woody vegetation.

After vegetation removal, poplar trees (*Populus tremuloides*) are expected to sucker and rapidly regrow. This rapid regrowth will hinder golden-winged warbler habitat and right-of-way vegetation management goals. To minimize the requirement to immediately apply foliar herbicide or conduct invasive mechanical clearing, a herbicidal stump treatment may be applied. This herbicidal stump treatment will be part of an integrated vegetation management approach to managing tall growing trees in Zone 1.

Vegetation management within Zone 2 (12-50m on either side of the centreline of the ROW between tower footprints) will involve the selective removal of woody vegetation. In this zone, all trees will be removed, but other vegetation, particularly forbs, some saplings, and most shrubs will be retained to the extent possible. The use of feller-bunchers and hand clearing will likely be used to remove all trees in this zone. On the outer edges of Zone 2, clearing equipment operators will work closely in real-time with Manitoba Hydro environmental inspectors in an effort to develop a feathered edge by selectively clearing vegetation in an uneven pattern to create a mosaic of habitats as described in Petzinger et. al (ND), Artuso et al. (ND) and GWWAWG (2013).

The conceptual vegetation clearing prescription described above applies to forested habitat. Large shrubland, wet areas, and grassland dominated plant communities will not require vegetation clearing beyond Zone 1, and as such will be maintained as close as possible to their existing and naturally occurring state.

Clearing activities will take place during the non-breeding season to minimize the disturbance during this critical period. If any construction activities cannot be achieved during the non-breeding season, pre-clearing nest surveys will be conducted, and a set-back distance of 300m from breeding and nest sites will be used to prevent disturbances to golden-winged warblers (EIS, Ch. 22, Appendix E). In addition, supply and marshalling yards will be located in previously developed areas or in low potential golden-winged warbler habitat.

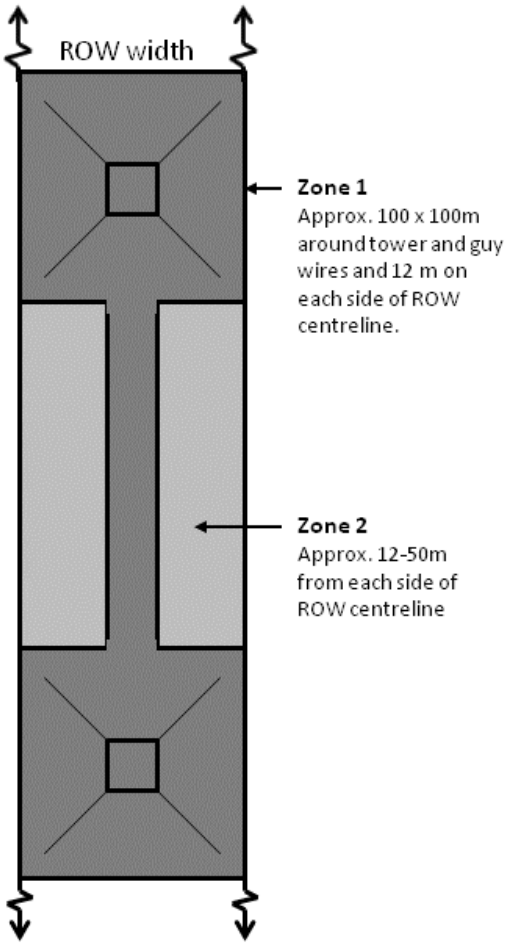


Figure 1. Vegetation clearing and management zones (100m ROW) within the five 10 x 10km critical habitat grid squares within the Project ROW (not too scale).

Operations Phase

The goal of long-term habitat management is to provide golden-winged warbler habitat as described above within the HMS. Following construction, within forested areas, shrubs and other vegetation will regenerate naturally through the spread of suckers and new growth from the existing seed bank. During operation and prior to vegetation management activities, Manitoba Hydro will assess vegetation diversity, distribution and height along the ROW. These results will be compared to the habitat preferences of golden-winged warbler (see Planning Section above). Where ROW vegetation characteristics substantially deviate from golden-winged warbler habitat preferences, as outlined in Petzinger et. al (ND), Artuso et al. (ND) and

GWWAWG (2013), Manitoba Hydro will adjust vegetation management prescriptions within HMS accordingly using an adaptive management approach.

Typically, vegetation management along transmission line ROWs occurs every 8-10 years (EIS, Section 2.13.3). Vegetation within Zone 1 will be maintained as a mosaic of grass, forbs and low shrubs to prevent interference with the transmission line and allow access for transmission line inspection and maintenance. Vegetation management in this zone will likely use a combination of mechanical mowing and the selective application of herbicides to prevent tree growth.

Vegetation within Zone 2 will be selectively managed to remove all trees but maintain the presence of a forbs, grasses, saplings, and a low and tall shrub layer. Along the outer edge of this zone, management will likely include the use of selective brush mowing and/or hand-clearing of trees to leave patches of shrubs and taller woody vegetation to create a feathered edge, as shown in Figure 2. Selective herbicide use may also be applied to prevent tree growth. Manitoba Hydro has considered the general vegetation management techniques described by Roth (2012b) to maintain specific habitat conditions for golden-winged warbler.

Figure 2. Example of high quality golden-winged warbler habitat along a transmission line ROW with a feathered edge (Petzinger et al. (ND). Photo credit Tom Langen).

Burning is not considered as a management tool in this plan due to risk of wildfire, the presence of private property, and other logistical constraints. Habitat management within farmland, pasture, or other developed land types is not practicable due to private land considerations and the lack of suitability for golden-winged warblers.

To maximize the diversity and habitat structure in the ROW, vegetation management will be staggered in space and time amongst HMS. An adaptive management approach will be used to determine the timing of vegetation prescriptions in each HMS as habitat development depends on numerous environmental factors. By alternating vegetation management within parts of Zone 2 over a suitable period (dependent on local environmental conditions), different stages of regenerating forest will develop within a single habitat management site and enhance the potential habitat suitability for golden-winged warblers (Figure 3).

Project Monitoring

The Manitoba-Minnesota Transmission Project - Environmental Monitoring Plan (Appendix 22C) outlines monitoring activities for bird species of conservation concern, including golden-winged warblers.

These monitoring objectives include:

- Identify the location of bird species of conservation concern within or in close proximity to the Project footprint with the purpose of establishing a Control-Impact monitoring program for known individuals and/or groups;
- Monitor species of conservation concern in close proximity to the transmission line and compare annual site fidelity and abundance to nearby control sites; and
- Determine the effectiveness of mitigation measures and, if appropriate, propose revisions to the existing plans or develop new mitigation options should unexpected impacts to birds occur as a result of construction or operation activities.

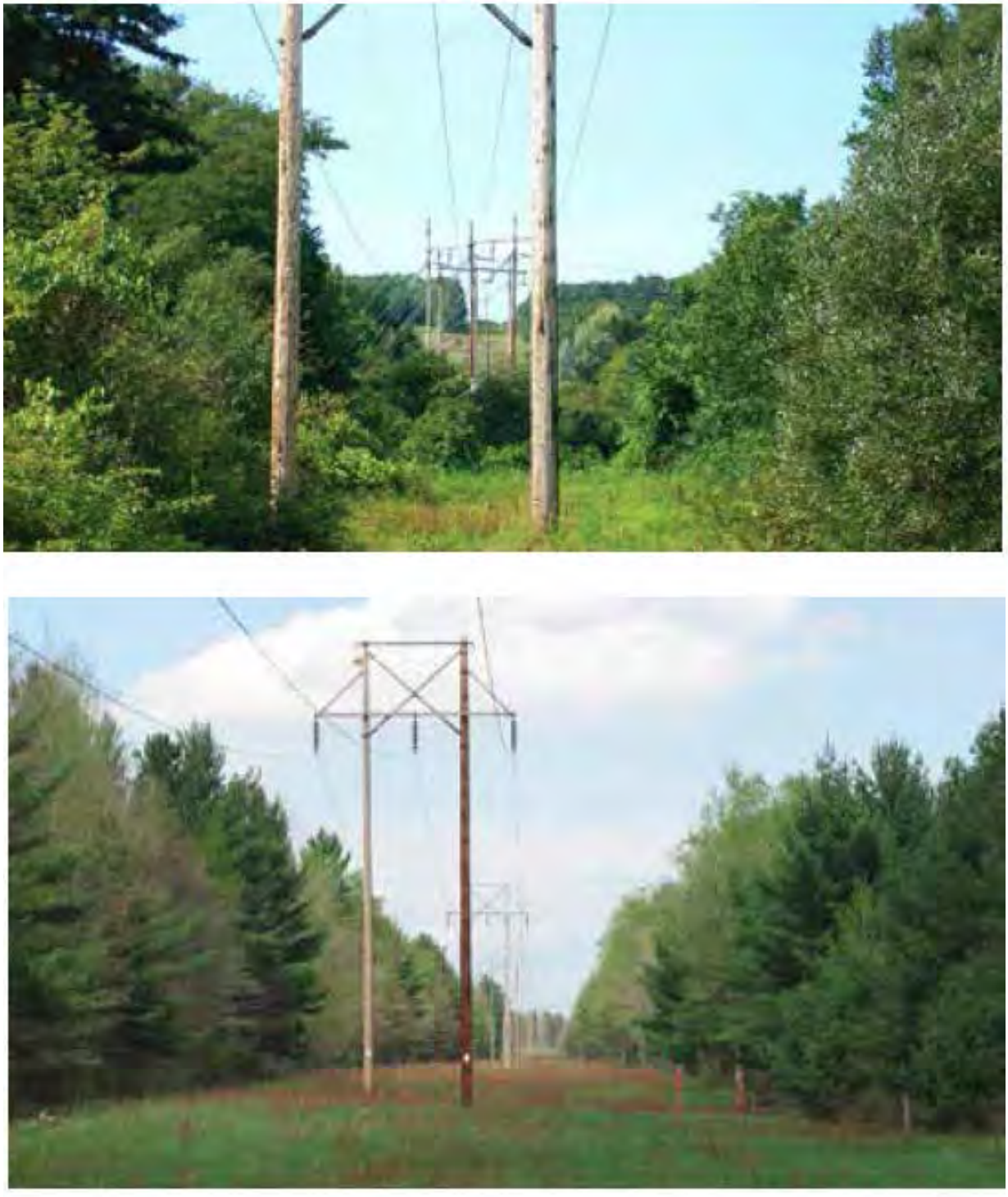


Figure 3. Examples of high quality (top) and poor quality (bottom) golden-winged warbler habitat in a transmission line ROW ((GWWAWG (2013). Photos credits from top and bottom: Sara Barker Swarthout; and Amber Roth)

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