Manitoba Hydro

Keeyask Transmission Project
Environmental Effects Monitoring Plan
Technical Reports

Prepared by:
Manitoba Hydro
Winnipeg, Manitoba
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KEEYASK TRANSMISSION PROJECT

ENVIRONMENTAL EFFECTS MONITORING

INVASIVE PLANT MONITORING IN 2016

Prepared for

Manitoba Hydro

By

ECOSTEM Ltd.

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SUMMARY

Non-native plants are plant species that are growing outside of their country or region of origin (Manitoba Hydro 2012). Non-native plants are introduced and spread by human activities and natural dispersal mechanisms. Invasive plants are non-native plants that can out-compete or even replace native plants. Invasive plants are of concern because they can crowd out other plant species and, in extreme cases, change vegetation composition or other ecosystem attributes. This report provides results for the invasive plant monitoring conducted in 2016/2017 for the Keeyask Generation Outlet transmission line (the Project).

As of July 2016, non-native or invasive plants were not observed in the cleared Project ROW at any of the locations surveyed, with one exception. Common dandelion was found growing at the eastern end of the ROW, where it meets with the borrow area adjacent to the Radisson Converter Station.

The virtual absence of non-native plants in the cleared Project ROW was likely due to a combination of factors including a lack of seed source, increased efforts to clean equipment, winter clearing, limited exposure of mineral substrates and the relatively short time since clearing.

A control recommendation for the single observed patch of common dandelion was not developed for several reasons.

Invasive plant monitoring will continue in summer 2017.

ACKNOWLEDGEMENTS

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STUDY TEAM

Dr. James Ehnes was the project manager and study designer.

Fieldwork in 2016 was conducted by Alex Snitowski and Brock Epp.

Data analysis and report writing in 2016 were completed by Brock Epp and James Ehnes. GIS analysis and cartography was completed by Alex Snitowski.

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1.0 INTRODUCTION

In 2014, Manitoba Hydro received an Environment Act Licence for construction, operation and maintenance of the Keeyask Transmission Project. Terms and conditions of the licence include monitoring the environmental impact from development of the Project as outlined in the licence conditions and the Project EA Report.

The Keeyask Transmission Project Environmental Effects Monitoring Plan included monitoring effects on terrestrial ecosystems and vegetation, focusing on intactness, ecosystem diversity, priority plants and invasive plants. Vegetation monitoring in the 2016/2017 year was related to ecosystem diversity, priority plants and invasive plants. This report provides results for the invasive plant monitoring conducted in 2016/2017, which includes results from field surveys conducted in summer 2016.

Non-native plants are those plants that are growing outside of their country or region of origin. Invasive plants are non-native plants that can out-compete or even replace native plants. Invasive plants are of concern because they can crowd out other plant species and, in extreme cases, change vegetation composition or other ecosystem attributes. Non-native plant species that are not generally invasive may become invasive under some local conditions, or may do so in the future with changing climate.

The invasive plant monitoring program includes a single study, the Invasive Plant Spread and Control study. The goals of this study are to determine the degree to which the Project contributes to introducing and spreading invasive and non-native plants, and to evaluate the effectiveness of mitigation measures. The overall objectives of the Invasive Plant Spread and Control study are to:

- Verify the implementation of mitigation measures such as appropriate seed mixes;
- Document the degree of invasive plant introduction and spread; and
- Recommend appropriate control and eradication programs, if there is introduction and/or spread.

Monitoring activities in the 2016/2017 year included fieldwork to address the last two study objectives, specifically with respect to the Keeyask Transmission Project (the Project).

2.0 METHODS

Section 4.2.4 of the Keeyask Transmission Project Environmental Effects Monitoring Plan outlines the methods for this study. The following summarizes the activities conducted during 2016.

2.1 DATA COLLECTION

Invasive plant data were collected along a series of transects at pre-determined locations within the cleared Project right-of-way (ROW). Transects locations were dispersed throughout the ROW length, primarily near existing roads since road use tends to increase the incidence of spreading invasive plants.

Non-native plant surveys were conducted on July 8 and 9, 2016 at the locations shown in Map 2-1. Each transect was surveyed by two people on foot. One person walked along the transect route provided by a Garmin Map62 or Map78 GPS unit. A botanist followed behind, surveying a variable width band centred on the transect. The width of the surveyed area varied with the terrain and height of vegetation, but was never less than 10 m wide. In addition, the botanist walked to vegetation patches away from the transect if they looked like they might include non-native plants. The combination of a pre-determined transect location and meandering searches generally meant that the surveys should detect any larger, taller patches of invasive plants in the entire ROW width along the pre-determined transect. This was facilitated by the openness of the cleared ROW shortly after clearing.

When a non-native plant location was found, data recorded at each species location included spatial coordinates, spatial extent and abundance. Additional notes were also recorded and photos were taken.

Non-native plant spatial extent at a location was recorded either as a point with an associated number of individuals or as a patch. The “point with number of individuals” method was typically used in locations where there less than 20 individual plants covering a very small area. In these situations, the number of plants and a GPS waypoint (using a Garmin Map 62 or Map 78) were recorded as close to centre of the patch as possible for the species.

For the remaining non-native plant locations, recorded patch data included estimated vegetation patch boundaries and non-native plant cover by species. Patch boundaries were obtained using a handheld GPS for each vegetation patch that included one or more non-native plant species. The percent cover of each non-native species within the vegetation patch boundaries was then visually estimated.

Vegetation patch boundaries were recorded in one of three ways:

1. **Point:** Used for small patches that had a relatively regular shape. Typically applied to small patches in open areas where the boundaries were visible from a single point. In these situations, a GPS waypoint was taken at the patch center whenever possible, with

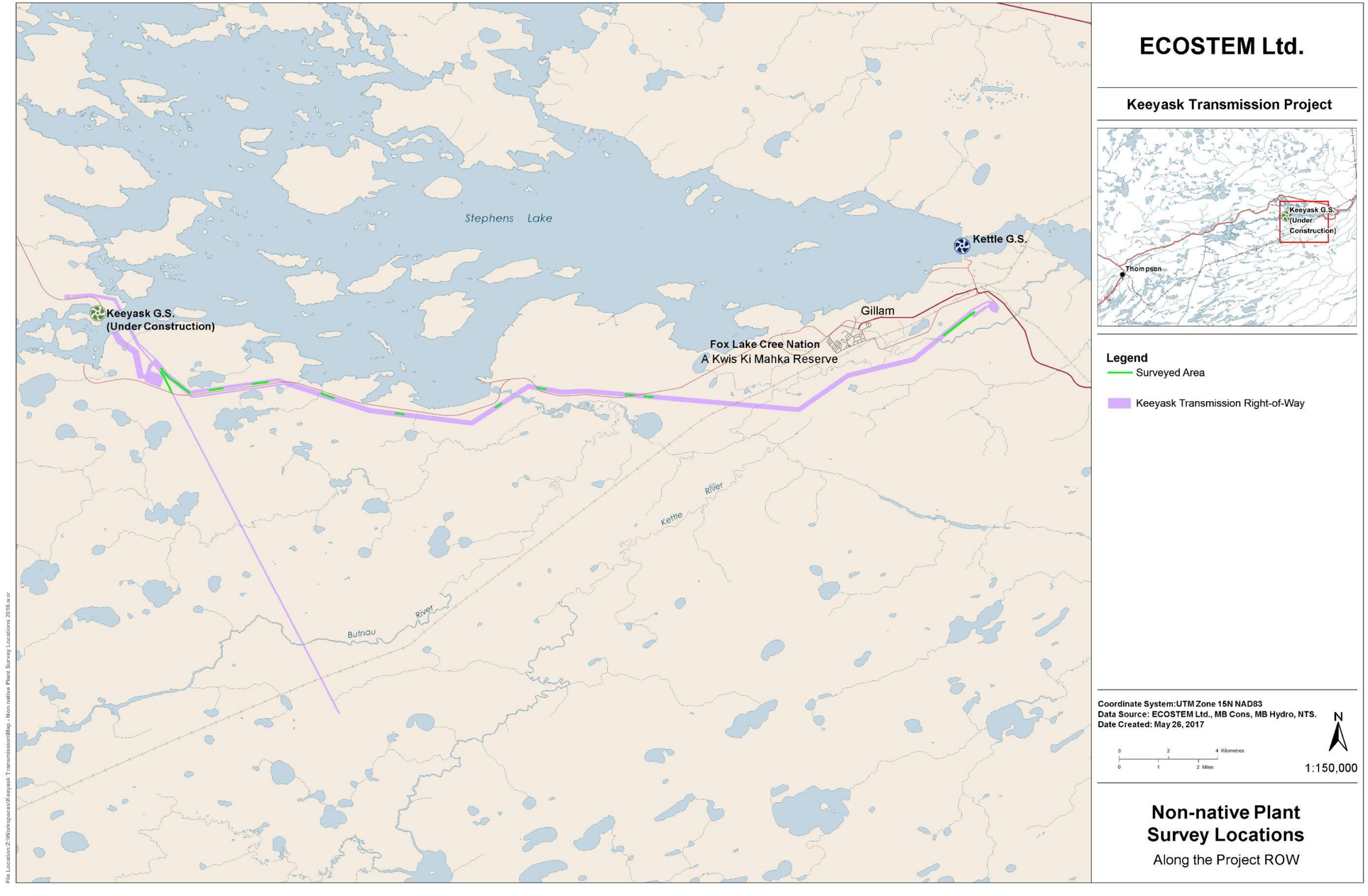
an associated ocular estimate of patch radius (in meters) for circular patches or the dimensional length (e.g. 2m x 4m) for rectangular patches.

2. **Band:** Used for patches too large to be recorded as a point and had a relatively regular band shape. In these situations, the length of the band of the non-native species (e.g. along a ditch) was walked while a GPS recorded a track log for the species. An estimate of the average band width in meters was recorded. For some wider bands, the band width was recorded using distinct features such as a specific impact area (e.g. width of the transmission line right-of-way).
3. **Defined Area:** Used if the patch could not be recorded as a point or a band. In these situations, the surveyor generally walked around the perimeter of a large homogeneous patch with non-native species cover while recording a GPS track log for the patch. Alternately, the surveyor walked through the area in a zig-zag transect so that the points generally corresponded to the boundaries of the patch. The former method was used when the non-native species could be observed throughout the patch from the outer boundaries, which typically occurred in open barren, or low vegetation areas. The latter method was used in heavily vegetated areas where non-native plants were not visible over a long distance. In this method, waypoints were added while recording the species tracklog to indicate if there was a change in cover.

For each non-native species patch, plant cover was estimated and recorded into one of the six classes listed in Table 2-1.

Table 2-1: Cover class and associated percent cover ranges used for non-native plant surveys

Cover Class	Percent Cover Range
Very sparse	>0 - 3%
Sparse	3 - 10%
Low	11 - 25%
Moderate	26 - 50%
High	51 - 75%
Very high	76 - 100%



Map 2-1: Non-native plant survey locations

2.2 MAPPING

Non-native plant distribution and abundance maps were produced by converting species spatial extent and cover data from the field surveys into GIS polygons. Where the patch extent method (Section 2.1) was used to record non-native species in the field, patch polygons were created from the GPS tracklogs. Polygons for locations where plants were recorded as individuals in the field were created by applying a fixed radius buffer around the location coordinate. The radius applied for each species at each point was a fixed value for the species multiplied by the number of plants recorded. The radius for one plant of a particular species was the estimated typical area covered by an individual plant (Appendix 1).

The non-native plant mapping provided two measures of non-native plant cover. One measure was the overall spatial extent of one or more non-native plant species, which also indicated species distribution. The other measure was the area covered by each species (approximate plant cover), which was used to indicate abundance. Non-native plant cover will almost always be lower than plant extent due to less than complete canopy closure within some of the mapped patches.

Non-native plant cover was derived from the patch cover class (Table 2-1) for locations recorded using the “patch method” or from multiples of individual plant area (Appendix 1) for locations recorded using the “number of individuals” method. The area covered by a species in a mapped patch was calculated by multiplying the patch area by the midpoint of the percent cover class (Table 2-1). For example, a 10 m^2 non-native plant patch with sparse cover for Species A would have a derived area of: 10 m^2 x 6.5% = 0.65 m^2 for Species A.

3.0 RESULTS

Eleven transects, totalling 8.1 km in length were surveyed in the Project ROW (Map 3-1).

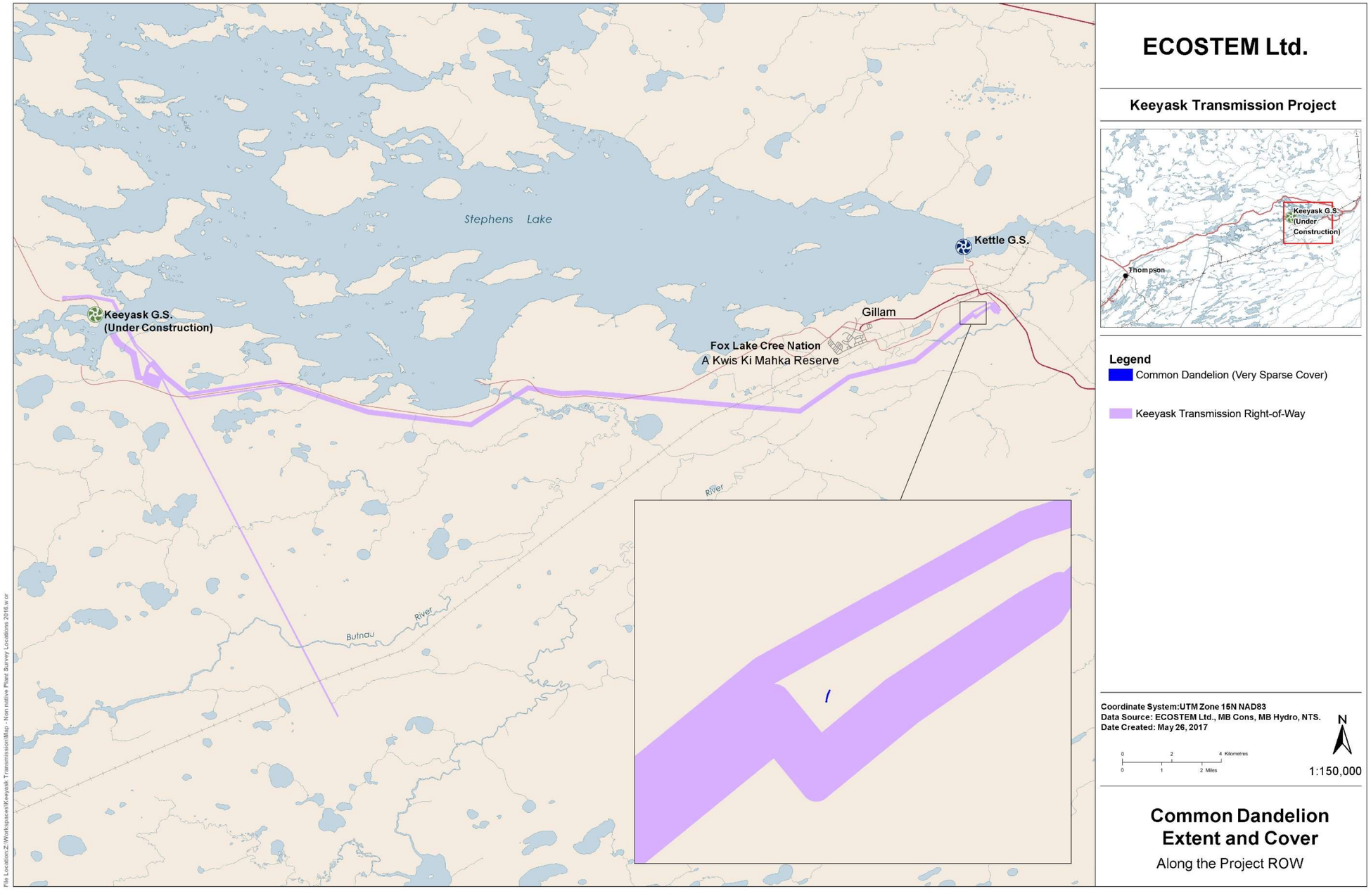
Non-native plants were found at only one location in the entire surveyed area. A single patch of common dandelion (*Taraxacum officinale*) was found in the ROW near the Radisson Converter Station adjacent to a pre-existing cutline.

The patch was an approximately 3 m wide band, covering approximately 88 m^2. Common dandelion cover within the patch was very sparse, with an estimated actual species cover of 1.3 m^2.

Common dandelion is a non-native plant, but not listed as an invasive species in Canada (White *et al.* 1993), or a species of concern by the Invasive Species Council of Manitoba (ISCM; 2017). It is, however, considered to be a noxious weed in Manitoba (Government of Manitoba 1988).

Mineral substrate exposure in the cleared ROW was quite limited (Photo 3-1), which lowered the availability of higher quality seedbed for non-native plant species.

Photo 3-1: Example of minimal exposure of mineral substrates in cleared ROW



Map 3-1: Common dandelion distribution and cover.

4.0 SUMMARY AND CONCLUSIONS

Non-native plants are plant species that are growing outside of their country or region of origin. Invasive plants are non-native plants that can out-compete or even replace native plants. Invasive plants are of concern because they can crowd out other plant species and, in extreme cases, adversely change vegetation composition or other ecosystem attributes.

The EA Report predicted that the Project is not expected to substantially increase the rate at which invasive plants are introduced and/or spread in the Project area (Manitoba Hydro 2012). Project environmental protection plans can include measures that minimize the risk that equipment transported to the area will spread seeds in the area.

The Invasive Plant Spread and Control study is determining the degree to which the Project contributes to introducing and spreading invasive and non-native plants. This study also recommends control measures where appropriate, and evaluates the effectiveness of mitigation measures.

As of July 2016, non-native or invasive plants were not observed in the cleared Project ROW at any of the locations surveyed, with one exception. Common dandelion was found growing at the eastern end of the ROW, where it meets with the borrow area adjacent to the Radisson Converter Station. These dandelion plants were growing at the edge of the clearing along an old cutline. It is quite likely that the plants were present along this cutline prior to Project clearing. It was noted in the Keeyask Transmission EA report that common dandelion was recorded in the broader area prior to Project clearing (Manitoba Hydro 2012).

The virtual absence of non-native plants in the cleared Project ROW was likely due to a combination of factors including the relatively short time since ROW clearing, a limited seed source, limited exposure of mineral substrates.

In terms of time since clearing, much of the ROW is adjacent to the recently constructed Keeyask Generation Project south access road. Invasive plant surveys within the recently cleared south access road found very few invasive plants in 2016 (ECOSTEM 2017), although some plants were beginning to establish, and could be a future seed source for the Project ROW.

For seed sources, along large portions of its length, the cleared ROW is separated from existing development (which could be a source for non-native plant seeds) by native vegetation than ranges between 20 m and more than 800 m in width. Much of the lower end of this width range was along the recently cleared south access road for the Keeyask Generation Project. In addition, a combination of winter clearing, and increased efforts to clean equipment prior to the start of work, likely reduced the amount of non-native seed transported into the ROW on vehicle tires or footwear.

Other studies in the region have found that the non-native plant species are most common on exposed mineral substrates (ECOSTEM unpublished data). Most of the vegetation clearing occurred when the ground was frozen, minimizing the creation of mineral substrates through disturbance of the surface organic layer (see Photo 3-1 for an example).

A control recommendation for the single observed patch of common dandelion was not developed for several reasons. While this non-native plant is considered a noxious weed in Manitoba, it is not listed as an invasive species of concern in Canada (White *et al.* 1993) or by the ISCM (2017). It is not known to crowd out native vegetation. Common dandelion is difficult to control since it is ubiquitous in human-disturbed areas and winds readily spread its light airborne seeds. Also, given the limited amount of vegetation clearing and ground disturbance, it is expected that native plant regeneration will eventually control dandelions along the ROW.

Invasive plant monitoring results to date are consistent with the prediction that the Project is not expected to substantially increase the rate at which invasive plants are introduced and/or spread in the Project area. Invasive plant monitoring in summer 2017 will survey the Keeyask Generation Outlet Transmission, Keeyask Generation Unit Line and Keeyask Construction Power ROWs.

5.0 LITERATURE CITED

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APPENDIX 1:
DETAILED TABLES

Table 5-1: Estimated radius and derived area for individual plant species

Species	Estimated Radius (cm)	Derived Area (m^2)
Arctium minus	25	0.196
Artemisia absinthium	25	0.196
Avena sativa	4	0.005
Capsella bursa-pastoris	5	0.008
Chenopodium album	10	0.031
Chrysanthemum leucanthemum	10	0.031
Cirsium arvense	10	0.031
Cirsium vulgare	15	0.071
Crepis tectorum	8	0.020
Descurainia sophoides	15	0.071
Helianthus annuus	20	0.126
Hordeum jubatum	4	0.005
Lotus corniculatus	25	0.196
Matricaria discoidea	7.5	0.018
Medicago lupulina	10	0.031
Medicago sativa	25	0.196
Melilotus albus	25	0.196
Melilotus officinalis	25	0.196
Oenothera biennis	20	0.126
Phleum pratense	3	0.003
Plantago major	10	0.031
Secale cereale	4	0.005
Silene csereii	10	0.031
Sonchus arvensis	10	0.031
Taraxacum officinale	10	0.031
Trifolium hybridum	20	0.126
Trifolium pratense	20	0.126
Trifolium repens	20	0.126
Tripleurospermum inodorum	5	0.008
Triticum aestivum	4	0.005
Verbascum thapsus	20	0.126
Vicia cracca	20	0.126

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