Keeyask Generation Project

Terrestrial Effects Monitoring Plan

Provincially Very Rare and Rare Plants Monitoring Report

TEMP-2021-04

KEEYASK

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KEEYASK GENERATION PROJECT

TERRESTRIAL EFFECTS MONITORING PLAN

REPORT #TEMP-2021-04

PROVINCIALLY VERY RARE AND RARE PLANT MONITORING

Prepared for

Manitoba Hydro

By

ECOSTEM Ltd.

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SUMMARY

Background

Construction of the Keeyask Generation Project (the Project) at Gull Rapids began in July 2014. The Keeyask Hydropower Limited Partnership (KHLP) was required to prepare a plan to monitor the effects of construction and operation of the generating station on the terrestrial environment. Monitoring results will help the KHLP, government regulators, members of local First Nation communities, and the general public understand how construction and operation of the generating station will affect the environment, and whether or not more needs to be done to reduce harmful effects.

Plants perform important functions in land ecosystems. Some plants are particularly important for ecological reasons (e.g., rare species) and/or social reasons (e.g., traditional food and cultural importance to the Keeyask partner First Nations). Provincially rare plant species are important to monitor because it is possible that the loss of a small number of these plants can have a large effect on the species in the Project region.

This report describes the results of the rare plant monitoring conducted during 2020, the seventh summer of Project construction.

Why is the study being done?

The environmental assessment studies carried out for the Project did not find any rare plant species in the areas that may be affected by Project development. However, because these plants could still be present but not yet discovered (as rare plants can be hard to find), the Provincially Very Rare and Rare Plant study is conducting additional searches for these rare species in Project areas. If any rare plants are found, appropriate mitigation (e.g., avoiding those areas or transplanting plants to an area that won't be disturbed) is proposed.

What was done?

Pre-clearing rare plant searches were not conducted in 2020 since new clearing for construction was not anticipated.

Rare plant surveys conducted in 2018 and 2019 found elegant hawksbeard, a critically imperiled plant in Manitoba. Elegant hawksbeard was found in the Start-up Camp and at several sites in Borrow Area B-6. The patches of plants were flagged so that they could be avoided. It was determined in 2019 that some of the plants in Borrow Area B-6 and the large patch of plants at the Start-up Camp were at risk from Project decommissioning activities. In September 2019 a botanist (plant specialist) transplanted three plants from Borrow Area B-6, and 92 plants from the Start-up Camp to other locations in the Project footprint that were at low risk for disturbance.

Elegant hawksbeard plant

In August 2020, a botanist conducted surveys to determine the status of the elegant hawksbeard at all of their known locations.

In addition to these surveys, when rare plants are found during any of the habitat or plant monitoring studies, they are documented by taking pictures, taking notes, recording coordinates and flagging the location so the plants can be found again and avoided, where possible.

Also, if rare or uncommon plants of importance to the Keeyask partner First Nations are found while doing any of the terrestrial habitat, ecosystem or plant monitoring studies (e.g., invasive plant monitoring), their locations are recorded.

What was found?

Monitoring determined that the none of the three elegant hawksbeard plants transplanted in Borrow Area B-6 were present in 2020, and several of the previously documented plant locations were disturbed by site preparation for rehabilitation. However, most of the plants left undisturbed in Borrow Area B-6 in 2019 (i.e., 20 of approximately 23 plants) were still present outside of the rehabilitation area. Also, new plants were found at two locations.

The 2020 surveys found that more than half of the plants transplanted from the Start-up Camp patch were still alive in all of the transplant locations. More than half of these transplanted plants flowered in 2020.

The large patch in the Start-up Camp that was marked for avoidance appeared to be undisturbed, and the number of plants was continuing to increase there.

No rare to uncommon plants of importance to the Keeyask partner First Nations were seen during any of the terrestrial habitat, ecosystem or plant monitoring surveys.

What does it mean?

The 2019 transplanting program successfully transferred many elegant hawksbeard plants to three new areas, helping to conserve the local populations. In addition to surviving the transplanting, these plants were able to flower. Future monitoring will determine if the seeds produced by these flowers are able to grow into new plants.

As of August 2020, Project activities successfully avoided plants at the Start-up Camp, but removed three plants (one transplanted, and two undisturbed) in 2019 at Borrow Area B-6. The plants removed at this site were not a concern for the local population because only three were removed and more plants have appeared naturally. The total number of plants at Borrow Area B-6 actually increased between 2019 and 2020.

Because of its natural site preferences, elegant hawksbeard will likely continue to spread in the disturbed Project areas that have exposed coarse mineral material (e.g., borrow areas and work areas). Disturbance near the known elegant hawksbeard sites in the Project footprint should be avoided or minimized, if possible.

What will be done next?

No additional pre-clearing rare plant surveys are planned for 2021 as the construction phase of the Project is nearing completion. Surveys in 2021 will determine if Project activities avoided the known elegant hawksbeard locations. The 2021 surveys will also determine if the plants transplanted to other areas are surviving and producing flowers.

ACKNOWLEDGEMENTS

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We would also like to thank North/South Consultants Inc., in particular Ron Bretecher and Shari Fournier, for their guidance, logistical support and other resources that made these studies possible.

STUDY TEAM

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

Fieldwork was conducted by Brock Epp and Karine Grotte.

Data analysis and report writing were completed by Brock Epp and James Ehnes. Cartography was completed by Alex Snitowski.

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1.0 INTRODUCTION

Construction of the Keeyask Generation Project (the Project), a 695 megawatt hydroelectric generating station (GS) and associated facilities, began in July 2014. The Project is located at Gull Rapids on the lower Nelson River in northern Manitoba where Gull Lake flows into Stephens Lake, 35 km upstream of the existing Kettle GS.

The *Keeyask Generation Project Response to EIS Guidelines* (the EIS), completed in June 2012, provides a summary of predicted effects and planned mitigation for the Project (KHLP 2012a). Technical supporting information for the terrestrial environment, including a description of the environmental setting, effects and mitigation, and a summary of proposed monitoring and follow-up programs is provided in the *Keeyask Generation Project Environmental Impact Statement Terrestrial Supporting Volume* (TE SV; KHLP 2012b). The *Keeyask Generation Project Terrestrial Effects Monitoring Plan* (TEMP) was developed as part of the licensing process for the Project (KHLP 2015). Monitoring activities for various components of the terrestrial environment were described, including the focus of this report, rare plants, during the construction and operation phases.

Priority plants are defined as those plants that are particularly important for ecological and/or social reasons. Priority plants are the native plant species that are highly sensitive to Project impacts, make high contributions to ecosystem function and/or are of particular interest to the partner First Nations. A plant species is considered to be highly sensitive to Project impacts if it is globally, nationally, provincially or regionally rare, near a range limit, has low reproductive capacity, depends on rare environmental conditions and/or depends on the natural disturbance regime (wildlife studies monitor plant species that are critical for the survival and/or reproduction of an animal species). The partner First Nations have noted a variety of plants of traditional importance that are present in the Project area, including *wihkis* (sweet flag; *Acorus americanus*) and northern Labrador tea (tea leaves; *Rhododendron tomentosum*).

The Priority Plants and Their Habitats study (see KHLP 2015, Section 3.1.3) verifies actual Project effects on known priority plant locations and priority plant habitats, including those plants that are important to the partner First Nations. This study commences in the final year of construction.

Because it is possible that existing locations of provincially very rare to rare plant species were not found during the environmental assessment studies, the Provincially Very Rare and Rare Plant study (i.e., this study) conducts additional searches and, in the unlikely event any of these species are found, prescribes appropriate mitigation.

The objectives of the Provincially Very Rare and Rare Plant study are to:

- Determine if any provincially very rare or rare plants occur within the Project zone of influence; and,
- In the unlikely event that a provincially very rare or rare plant is discovered:

- Confirm that any identified locations are well marked for avoidance where avoidance is practicable;
- Develop a transplanting plan for provincially very rare plant locations where avoidance is not practicable; and,
- Monitor the survival and vigour of all plants in any identified locations.

Monitoring for this study was conducted from 2014 to 2020. Several previous reports (ECOSTEM 2015; 2016; 2017a; 2018, 2019, 2020) provide results for the pre-clearing rare plant surveys and monitoring conducted from 2014 to 2019. This report presents results from the monitoring work conducted during 2020.

2.0 METHODS

2.1 APPROACH

Section 3.1.2 of the Terrestrial Effects Monitoring Plan (TEMP) details the methods for this study. The following summarizes the activities conducted during 2020.

The rare plant species included in this study were generally those which the Manitoba Conservation Data Centre (MBCDC) has classified as being critically imperiled to imperiled[1] in Manitoba. This includes species with conservation status ranks of S1, S1?, S1S2, S2 or S2?. The two initial exceptions were small pondweed (*Potamogeton pusillus* spp. *tenuissimus*) and Robbins pondweed (*P. robbinsii*), since the EIS analysis concluded that these species are actually not imperiled in the Keeyask region. Muskeg lousewort (*Pedicularis macrodonta*) was ranked as S2 (imperiled) by the MBCDC when construction monitoring began. The species was later excluded after it was found at more than 20 locations outside of the potential Project zone of influence on plants (Study Zone 2; Map 2-1). Additionally, the MBCDC has recently changed the species rank to S2S3 (vulnerable, potentially imperiled).

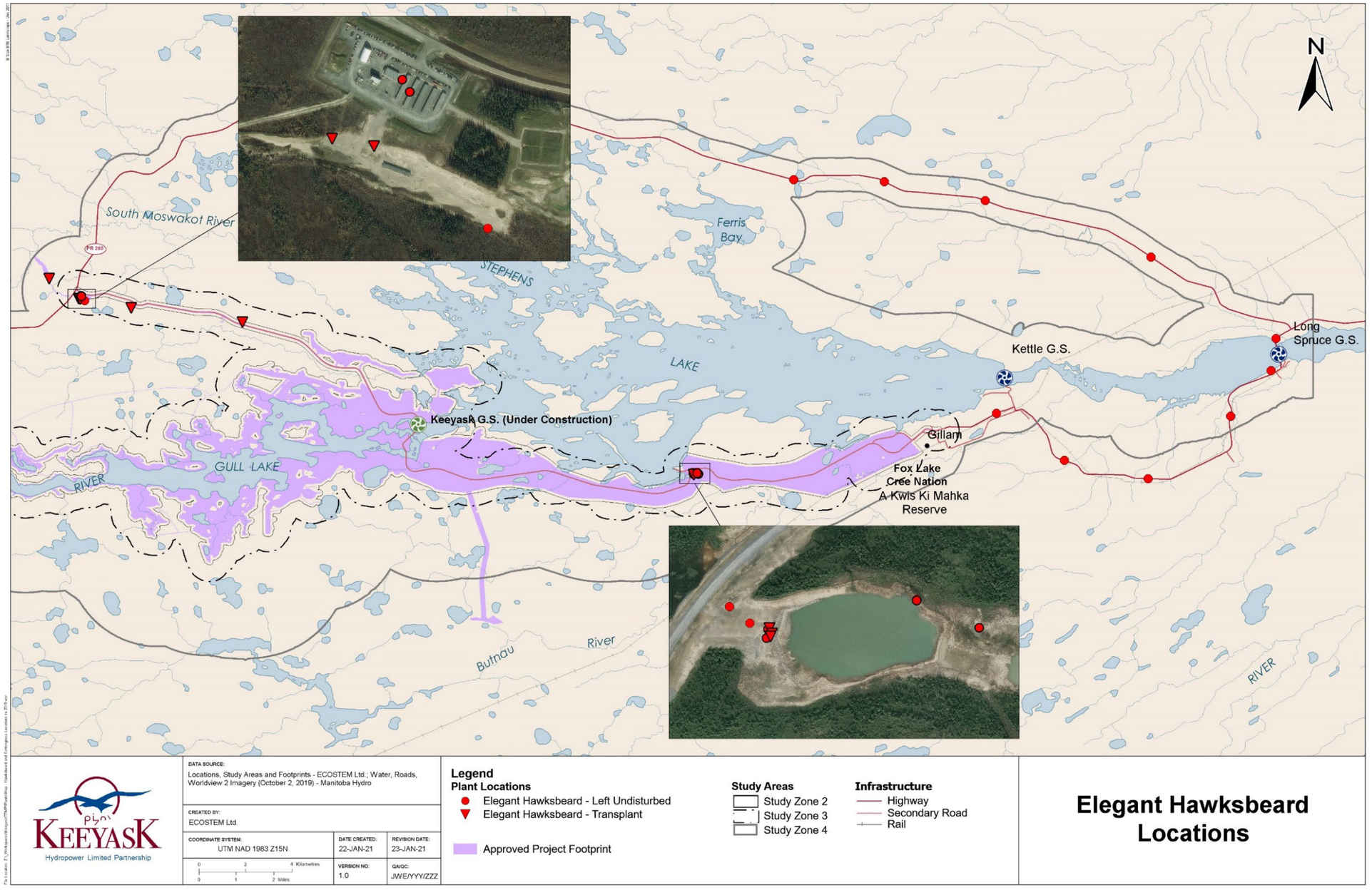
Uncommon plants of importance to the Keeyask partner First Nations recorded during field surveys to date have included northern Labrador tea and *wihkis* (sweet flag).

This monitoring study conducts pre-clearing rare plant surveys in areas that meet all of the following three criteria:

- Had not been previously surveyed for rare plants;
- Could be directly or indirectly affected by the Project (Study Zone 2; Map 2-1); and,
- Had the highest potential for supporting provincially very rare to rare species.

Pre-clearing rare plant surveys were not conducted in 2020 since new Project clearing was not anticipated at the time of the surveys. Monitoring activities in 2020 included surveys to monitor the survival and reproduction of elegant hawksbeard plants that had been transplanted in 2019.

[1] Note that the terminology used by the MBCDC has changed since the previous annual report, which were previously very rare (i.e. critically imperilled) to rare (i.e. imperilled).



Map 2-1: Known elegant hawksbeard sites identified in the Project area up to 2019.

2.2 ELEGANT HAWKSBEARD SURVEYS

Elegant hawksbeard (*Crepis elegans* [also called *Askellia elegans*]; Photo 2-1) has been found at four sites during TEMP construction monitoring (Map 2-1). Elegant hawksbeard is ranked as provincially critically imperiled (S1 species) by the Manitoba Conservation Data Centre (MBCDC 2018).

Photo 2-1: Elegant hawksbeard basal rosette growing in Borrow Area B-6 in 2018

In 2018 and 2019, elegant hawksbeard plants were found at several sites in Borrow Area B-6, and in the Start-up Camp (Photo 2-2). The plants in the Start-up Camp were located in a large patch (at least 125 plants) in the gravel between Dorm 1 and the kitchen trailer, as well as a single plant at another location between two trailers.

In 2019, it was determined that some of the plants in Borrow Area B-6 were growing in an area included in the Project's habitat rehabilitation program, and the plants in the Start-up Camp were growing in a high-traffic area that was also planned for decommissioning the following fall.

Photo 2-2: Site of the large elegant hawksbeard patch beside Dorm 1 in the Start-up Camp in 2019. Plants were too small to be visible in this photo. Inset shows typical size of plants in the patch at the time.

In September 2019, three plants from Borrow Area B-6 and 92 plants from the Start-up Camp were transplanted to other areas and sites because it was unlikely that they could be avoided (ECOSTEM 2020). In Borrow Area B-6, three plants were transplanted elsewhere in the borrow area, to sites outside of the planned rehabilitation area (Table 2-1; Map 2-1). A total of 92 plants were transplanted from the large patch in the Start-up Camp to four different areas that were sufficiently separated to be independent populations. Two sites were established in an unused portion of the Start-up Camp footprint, and single patches were established in Borrow Areas G-5 and KM-4, and the Memorial Site (Table 2-1; Map 2-1). The location of all transplant sites were recorded with a GPS, and all sites were marked with blue flagging tape.

In 2020, all the original plant sites, as well as the transplant sites were visited to determine the status of the plants, and determine if any new plants had established. At each transplant site, the surveyor searched the marked patch closely in an effort to locate all of the known number of transplanted individuals.

Table 2-1: Number of elegant hawksbeard plants transplanted from their source areas, and the number of plants at each new site.

Source Location	Number of Plants	Number Left at Source Site	Transplant Area	Number Transplanted
B-6 Borrow Area	26	23	Borrow Area B-6	3
Start-up Camp[1]	126	34	Start-up Camp[2]	25
			Borrow Area G-5	24
			Borrow Area KM-4	25
			Cemetery Site	18
All	**152**	**57**		**95**

Notes: [1] The number of plants in the large patch beside Dorm 1 was visually estimated to be approximately 125. [2] Plants distributed between two separate sites.

3.0 RESULTS

3.1 BORROW AREA B-6 PLANTS

In Borrow Area B-6, the three plants transplanted in September 2019, and an additional 23 pre-existing plants that had not been disturbed (Table 3-1) were marked for avoidance.

Table 3-1: Number of elegant hawksbeard plants at transplanted sites and at sites left undisturbed

Area	Status	Number of Plants 2019	Number of Plants 2020	Percent Remaining in 2020
B-6 Borrow Area	Left undisturbed	23	29	126.1
	Transplanted	3	0	0.0
Start-up Camp	Left undisturbed[1]	31	202	651.6
	Transplanted[2]	25	13	52.0
G-5 Borrow Area	Transplanted	24	21	87.5
KM-4 Borrow Area	Transplanted	25	23	92.0
Cemetery Site	Transplanted	18	13	72.2
Total number of plants		**149**	**301**	**202.0**

Notes: [1] The number of plants in the large patch beside Dorm 1 was an estimate. [2] Plants distributed between two separate sites.

None of the three transplanted plants in Borrow Area B6 were found during the 2020 surveys. The site of one of the plants was removed by a discer used during habitat rehabilitation site preparation (Photo 3-1). The other two sites appeared to be undisturbed, but no plants were found. Both of these plants were mature and flowering at the time of transplanting in 2019.

Two of the 23 pre-existing plants in Borrow Area B6 were removed by the discer. However, at one of these sites, seven new seedlings had established (Photo 3-2), including one on the recently disced substrate. This site was marked again and re-flagged with blue flagging tape for future avoidance.

Photo 3-1: Transplanted elegant hawksbeard location in Borrow Area B-6 that was removed by a discer

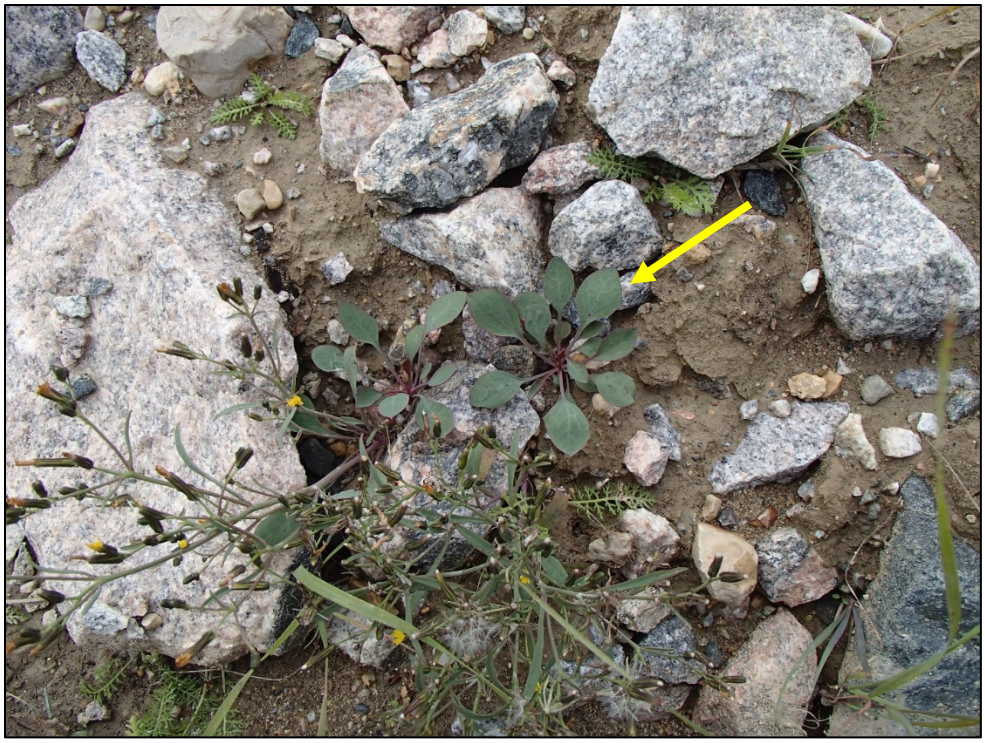


Photo 3-2: New elegant hawksbeard plants growing near a location that was removed by a discer

At one of the undisturbed sites in Borrow Area B6, one plant that was present in 2018 (basal rosette) and 2019 (flowering) was no longer present in 2020. There was no evidence of recent disturbance at this site. At another site, a patch of 20 plants found in 2019 were still present in 2020.

A single new plant was found at each of two new sites in 2020 (Map 3-1). These plants were well outside the actual rehabilitation area, and were not marked with blue flagging tape.

On a net basis, the total number of known elegant hawksbeard plants at Borrow Area B-6 increased by three between 2019 and 2020.

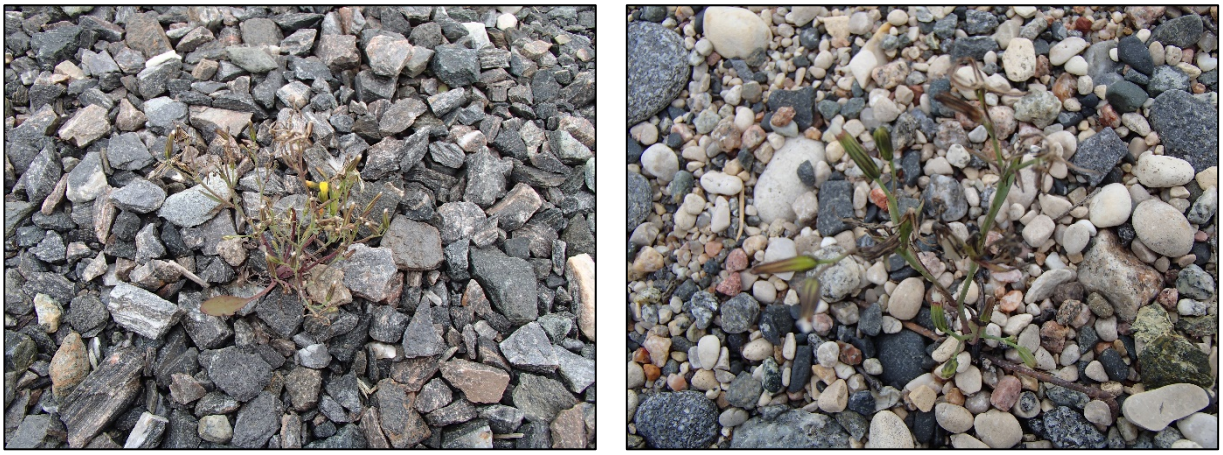
Map 3-1: Elegant hawksbeard status at undisturbed and transplanted sites in Borrow Area B-6

3.2 START-UP CAMP PLANTS

In the Start-up Camp, 92 plants were transplanted to other areas in September 2019, leaving at least 31 plants undisturbed in the original area (Table 3-1). Based on the plants found in September 2020, the overall survival rate of the transplanted plants was approximately 76%.

Overall vigour of the transplanted plants was variable. Based on a qualitative assessment, transplanted plants that had flowered and seeded appeared to be smaller and have fewer flower heads than undisturbed plants (Figure 3-1).

In 2019, a large patch of plants at the Start-up Camp were marked for avoidance. Surveys in 2020 found that the patch remained undisturbed, and the number of individuals there had increased to an estimated minimum of 200 plants (Photo 3-3). A single plant was incidentally found at another site between two unused trailers during invasive plant surveys at the Start-up Camp (Map 3-2).



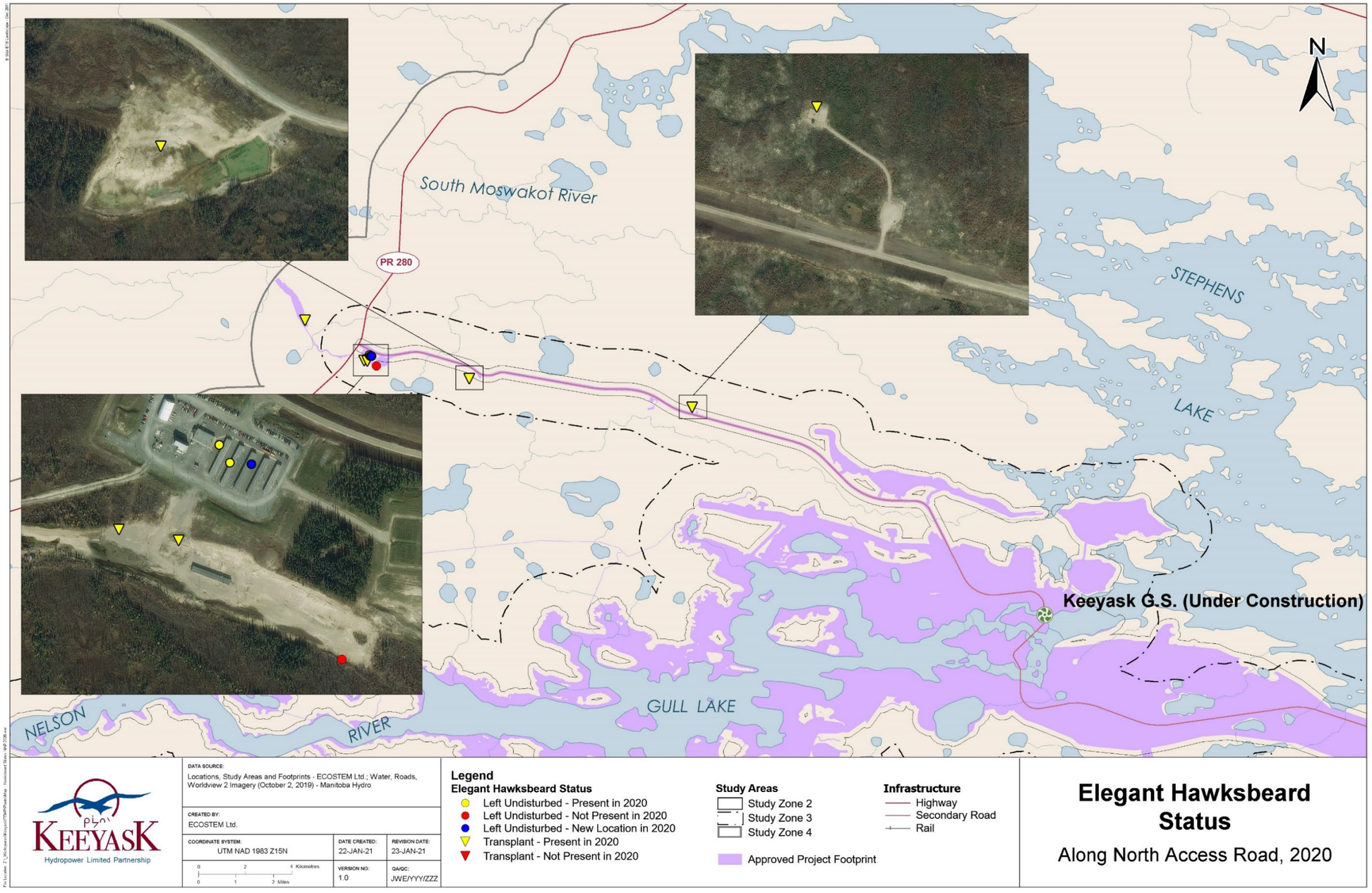
Left undisturbed (Start-up Camp) Transplanted (Start-up Camp)

Figure 3-1: Examples of flowering elegant hawksbeard left undisturbed and transplanted

Photo 3-3: Original patch of elegant hawksbeard at Start-up Camp in 2020

3.3 PLANT HEALTH

The percentage of surviving individuals ranged from 52% in the Start-up Camp transplant patches, to 92% at Borrow Area KM-4 (Table 3-1). More than half of the transplanted plants found in all planted patches had flowered and dispersed seed by the time of the survey.



Map 3-2: Elegant hawksbeard status at undisturbed and transplanted sites in 2020 at locations along the North Access Road

4.0 DISCUSSION

Elegant hawksbeard, which the MBCDC classifies as critically imperiled, was incidentally found during plant monitoring surveys conducted in 2016, 2018, 2019 and 2020. All of these plants were found on mineral substrates in highly disturbed sites in Project borrow and camp areas. Surveys over these years has indicated that elegant hawksbeard is becoming well established in certain areas, and is spreading.

Finding elegant hawksbeard in some of the newly developed borrow areas was not surprising. Under natural conditions, this species is typically found growing on recently disturbed, coarse substrates such as stream banks, gravelly flats, sandbars and roadsides (FNA 2020). Additionally, this species was previously found on disturbed bare gravel and mineral sites in the Project area and in the Wuskwatim Generation Project footprint (ECOSTEM 2017b). All of the elegant hawksbeard sites found in the Project area prior to Project construction were along Highway 280 and 290, which are continually disturbed environments. In the Wuskwatim Generation Project footprint, elegant hawksbeard was found on disturbed bare gravel and mineral sites, and was becoming widespread in some areas.

The transplanting program conducted in September 2019 moved a total of 95 plants into other portions of the Project footprint that were at low risk for further disturbance. The goal was to conserve the local populations by providing an additional seed source for the nearby seedbank and by facilitating seed dispersal into other areas.

The 2020 surveys found that the transplanting program was successful, with an overall 76% survival rate for the plants transplanted from the Start-up Camp. Also, more than half of the transplanted plants produced seed in 2020. Additionally, the undisturbed plants continued to spread in the Start-up Camp, and in areas outside of the rehabilitation area in Borrow Area B-6.

Based on the findings from monitoring for this and the Wuskwatim Generation Project, it seems likely that elegant hawksbeard will continue to appear on exposed, coarse mineral substrates that are no longer being used by the Project. The 2020 monitoring indicated that the undisturbed and transplanted individuals had flowered, and it is highly probable that these plants will have dispersed seed into the new transplant areas. Future monitoring will determine if new plants will successfully establish in these areas.

Some of the elegant hawksbeard plants remain at risk because they are in active Project areas as well as in areas planned for rehabilitation. None of the three transplanted individuals in Borrow Area B-6 were found, with at least one having been removed by a discer during site preparation for rehabilitation. The site preparation that removed the plants had occurred outside of the planned rehabilitation area.

As elegant hawksbeard is an S1 species, it is recommended that disturbance of the known sites be avoided or minimized, where possible.

5.0 SUMMARY AND CONCLUSIONS

Rare plant surveys conducted in 2018 and 2019 found elegant hawksbeard (*Crepis elegans*), a critically imperiled plant in Manitoba in the Start-up Camp and in Borrow Area B-6. It was determined in 2019 that some of the plants in Borrow Area B-6 as well as the large patch of plants at the Start-up Camp were at risk from ongoing Project construction and rehabilitation activities. In September 2019, 95 elegant hawksbeard plants were transplanted to other sites in the Project footprint that were at low risk for disturbance.

Priority plant monitoring surveys in 2020 focused on the known elegant hawksbeard sites, and on the success of the 2019 transplanting program. Pre-clearing rare plant searches were not conducted in 2020 since new clearing was not anticipated at the time of the surveys.

The three individuals transplanted in Borrow Area B-6 were not found in 2020. One of the transplant sites had been cultivated by a discer during site rehabilitation activities. However, new plants were found establishing outside of the rehabilitation area.

Surveys in 2020 found that there was an overall survival rate of 76% for the 92 individuals transplanted from the Start-up Camp. The minimum survival rate across the various transplant sites was 52%.

Overall, elegant hawksbeard is doing well in the Project area. The transplanted elegant hawksbeard plants flowered in 2020, and likely dispersed seed into the new areas. Also, new plants continued to appear at sites where pre-existing plants were left undisturbed, and new sites with elegant hawksbeard plants were found incidentally during invasive plant surveys. Overall, there was a large net increase in number of known plants from 2019 to 2020 (from approximately 150 to over 300 plants).

It is recommended that disturbance of the known elegant hawksbeard sites be avoided or minimized, where possible. Preserving these plants helps maintain local populations of a species that is critically imperiled in Manitoba by providing a seed source for the local seedbank and for dispersal to other areas.

No other rare to uncommon plants of importance to the Keeyask partner First Nations were recorded during any of the 2020 plant surveys.

No additional pre-clearing rare plant surveys are planned for the remainder of the construction monitoring since new clearing is not anticipated at this time.

Monitoring in summer 2021 will determine if the Project was able to avoid the known elegant hawksbeard plants, and to determine if new plants are establishing at the transplanted sites.

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