



Keeyask Generation Project
Terrestrial Effects Monitoring Plan

Provincially Very Rare and Rare Plants Monitoring Report

TEMP-2020-04



KEYYASK GENERATION PROJECT

TERRESTRIAL EFFECTS MONITORING PLAN

REPORT #TEMP-2020-04

PROVINCIALY VERY RARE AND RARE PLANT MONITORING

Prepared for
Manitoba Hydro

By
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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 2019, the sixth 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 2019 since new clearing was not anticipated at the time of the surveys.

Rare plant surveys conducted in 2017 had found five sites along the Ellis Esker access road corridor that had Scheuchzeri's cotton-grass, a species that is thought to be rare throughout the Province. In 2018, elegant hawksbeard, a provincially very rare plant, was found at three sites in Borrow Area B-6. A botanist (plant specialist) conducted rare plant surveys on July 2 and 4, 2019, to determine the status of these known rare plant locations, and see if they had since been disturbed by Project activities.



Scheuchzeri's cotton-grass flower

In August 2019, it was determined that some of the elegant hawksbeard plant sites in Borrow Area B-6, along with a newly discovered patch of elegant hawksbeard plants found in July 2019 in the Start-up Camp, were within areas likely to be disturbed during the Project's decommissioning and habitat rehabilitation activities. Selected plants from both areas were transplanted to other Project sites.



Elegant hawksbeard plant

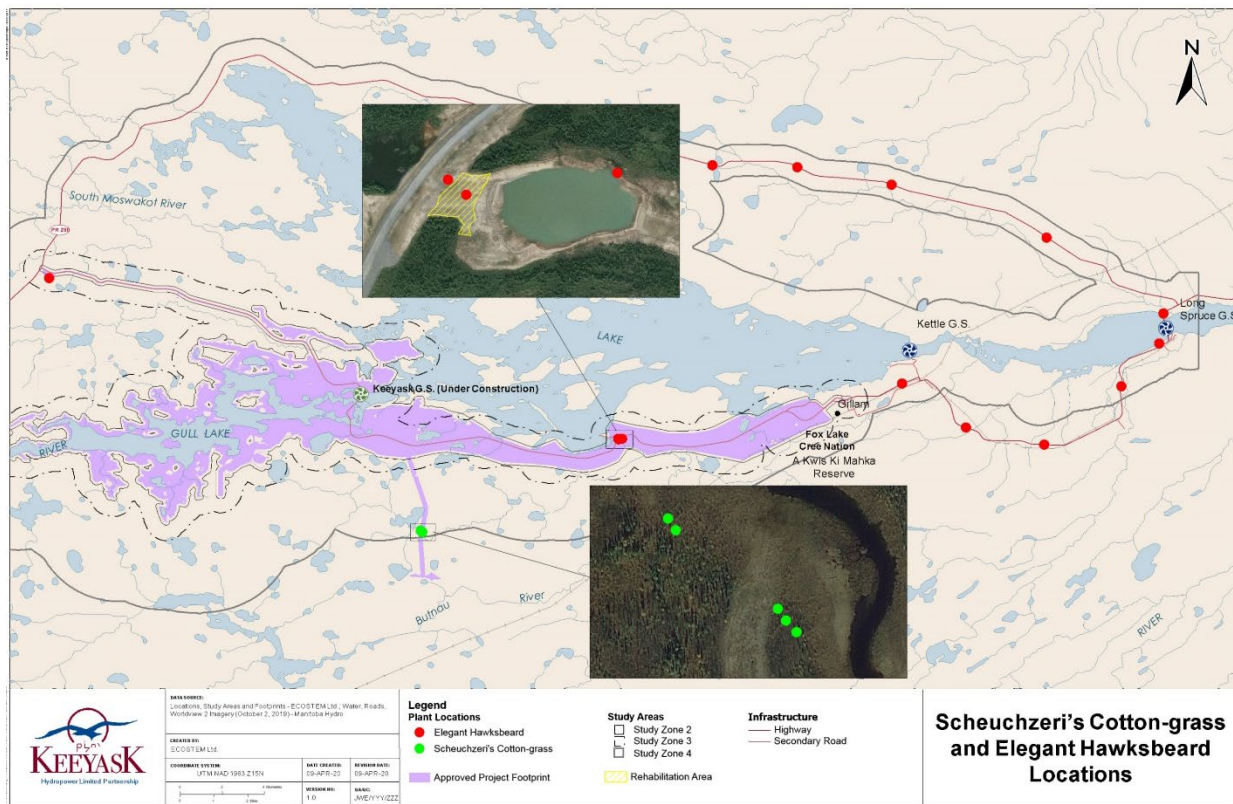
If rare or uncommon plants of importance to the Keeyask partner First Nations are found while doing this study, or any of the other plant monitoring studies (e.g., invasive plant monitoring), their locations are recorded.

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.

What was found?

Monitoring determined that the Scheuchzeri’s cotton-grass sites found in 2017 near the access road to the Ellis esker borrow area had not been disturbed by clearing or traffic. No further Project activity is planned near these rare plant sites.

The known elegant hawksbeard plant sites in Borrow Area B-6 were not disturbed, and all the plants were flowering. Elegant hawksbeard was found at an additional four sites in Borrow Area B-6, and a large patch of at least 125 plants was found growing in the Start-up Camp.



On September 9, a total of three elegant hawksbeard plants in Borrow Area B-6 were transplanted to other sites in the area, outside of the planned rehabilitation area. On September 10, 92 elegant hawksbeard plants were transplanted into five other locations in the Project areas where the chance of future disturbance was low.

No rare to uncommon plants of importance to the Keeyask partner First Nations were seen during these surveys.

What does it mean?

Clearing and disturbance for the Ellis Esker access road avoided the Scheuchzeri's cotton-grass plant locations found in 2017. The access road was decommissioned after construction activities in the winter of 2018/2019, and no further disturbance is expected at these sites.

Because of its natural site preferences, elegant hawksbeard will likely continue to spread in the disturbed coarse mineral areas (e.g., borrow areas and work areas) that are no longer used by the Project. 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 the remainder of the construction phase of the Project since new clearing is not anticipated at this time. No further monitoring is recommended for the known Scheuchzeri's cotton-grass sites near the Ellis Esker access road. Surveys in 2020 will determine if the elegant hawksbeard transplanting was successful.

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STUDY TEAM

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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 (KHL 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; KHL 2012b). The *Keeyask Generation Project Terrestrial Effects Monitoring Plan* (TEMP) was developed as part of the licensing process for the Project (KHL 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 KHL 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 2019. Several previous reports (ECOSTEM 2015; 2016; 2017a; 2018, 2019) provide results for the pre-clearing rare plant surveys and monitoring conducted from 2014 to 2018. This document presents results from the monitoring work conducted during 2019.

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 2019.

The rare plant species included in this study were generally those which the Manitoba Conservation Data Centre (MBCDC) has classified as being provincially very rare to rare. This included species with conservation concern 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 rare in the Keeyask region. Muskeg lousewort (*Pedicularis macrodonta*) was ranked as S2 (rare) 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 (potentially rare).

Uncommon plants of importance to the Keeyask partner First Nations recorded during field surveys 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 2019 since new Project clearing was not anticipated at the time of the surveys. Monitoring activities in 2019 included: (i) surveys to determine if the Project was able to avoid the known Scheuchzeri's cotton-grass sites along the Ellis Esker access road; and, (ii) transplanting selected elegant hawksbeard plants that had established in locations that would be disturbed during future decommissioning and revegetation activities.

2.2 SCHEUCHZERI'S COTTON-GRASS SURVEYS

Rare plant surveys were conducted in 2019 to determine if the Project was able to avoid the known Scheuchzeri's cotton-grass (*Eriophorum scheuchzeri*; Photo 2-1 and Photo 2-2) sites adjacent to the cleared Ellis Esker access road. This species was found during the 2017 pre-clearing rare plant survey. Scheuchzeri's cotton-grass is ranked as an S2? species by the MBCDC (2018). An S2? ranking means that the species is thought to be provincially rare but the uncertainty associated with this ranking means that it could actually be either provincially very rare or provincially uncommon.

In 2017 Scheuchzeri's cotton-grass was found at five sites near the planned Ellis Esker borrow area access corridor, which was utilized in the winter (Map 2-1). Monitoring in 2018 found that Project activities undertaken since the previous survey had not disturbed any of the known plant sites from 2017.

Further use of the Ellis Esker access corridor was planned for the winter of 2018/2019. The plant site nearest to the Project clearing was marked with flagging tape by Manitoba Hydro environmental staff in December 2018, so that it could be avoided by construction crews. The objectives of the Scheuchzeri's cotton-grass surveys in 2019 were to visit the known plant sites, and determine if the Project was able to avoid them.



Photo 2-1: Scheuchzeri's cotton-grass flower found in the Ellis Esker access road corridor in 2017



Photo 2-2: Scheuchzeri's cotton-grass plant found in the Ellis Esker access road corridor in 2017

2.3 ELEGANT HAWKSBEARD SURVEYS

Elegant hawksbeard (*Crepis elegans* [also called *Askellia elegans*]; Photo 2-3 and Photo 2-4) has been found at four sites during TEMP construction monitoring (Map 2-1). Elegant hawksbeard is ranked as an S1 species by the Manitoba Conservation Data Centre (MBCDC 2018). An S1 ranking means that the species is provincially very rare.

In 2018, single elegant hawksbeard plants were found at three sites in Borrow Area B-6. It was recommended that these sites be flagged and avoided. The objectives of the elegant hawksbeard surveys in 2019 were twofold: first, to determine the status of the plants at the sites found in 2018, and if present, to affix flagging tape around the locations to mark them for avoidance; and second, to search the area for additional plant sites using the same survey methods as in previous years (ECOSTEM 2019).

2.4 ELEGANT HAWKSBEARD TRANSPLANTING

In August 2019, it was determined that some of the known elegant hawksbeard sites in Borrow Area B-6 and the Start-Up Camp were within areas included in the Project's habitat rehabilitation program (Map 2-1). Site preparation for revegetation involved discing, which would destroy the plants. It was recommended that the plants be transplanted to locations outside of the site preparation areas.

The 2019 monitoring work included transplanting selected elegant hawksbeard plants. The transplanting was accomplished in two stages. Suitable transplanting areas were identified and, then, selected plants were safely transplanted into the new areas while minimizing damage and stress to the plants.

A suitable area for elegant hawksbeard transplanting had to meet two criteria. The area needed to have suitable site conditions for the species, which was assumed to be ones similar to those found at the existing plant sites. The area also had to be one where either no future disturbance was anticipated or site disturbance could be easily avoided.

Suitable site conditions were determined by sampling conditions at one or more of the known plant sites. A qualified botanist excavated a small pit in the substrate to a depth of approximately 20 cm into the mineral horizon using a spade. The substrate was assessed by noting the parent material and mineral texture, including any changes from the surface to the bottom of the pit. The degree of soil compaction and drainage regime were also noted.

For the candidate transplant areas, pits were excavated at representative locations and site conditions were recorded using the same method as for the known plant sites. The selected transplanting sites were those that had the optimal combinations of similar site conditions and a minimal chance for future site disturbance.

Transplanting was done as late as possible in the growing season, when the plants were preparing to go into dormancy for the winter, and much of the stored energy in the plant has been translocated into the roots. During the entire transplanting process, particular care was taken to protect roots of the plants. This was particularly challenging as all of the plants were growing in coarse, gravelly mineral substrate. Some methodological guidance was available through one study that successfully transplanted elegant hawksbeard from rocky soils in Alaska (Legge 1971).

The equipment used for transplanting is illustrated in Photo 2-5. Individual plants were prepared for transplanting by first wetting the substrate around the plant, which helps bind the coarse soil together. A spade was used to carefully dig around the plant, avoiding severing the fine roots and tap root. The plug of soil, along with the roots was carefully scooped onto the spade, or picked up by hand, while attempting to keep the soil as intact as possible around the roots. The plant and substrate was then placed into a paper bag, which was then placed in a container for transport (Photo 2-6).

After being transported to the new location, holes were excavated in the soil deep enough to accept the plant and soil surrounding the roots. The plants were carefully placed in the hole along with the transported soil, and the surrounding substrate was packed in around the plant. The transplanted plants and surrounding soil were then soaked with water. After plants were transplanted, the area was marked using flagging tape and PVC pipes.



Photo 2-3: Elegant hawksbeard basal rosette growing in Borrow Area B-6 in 2018



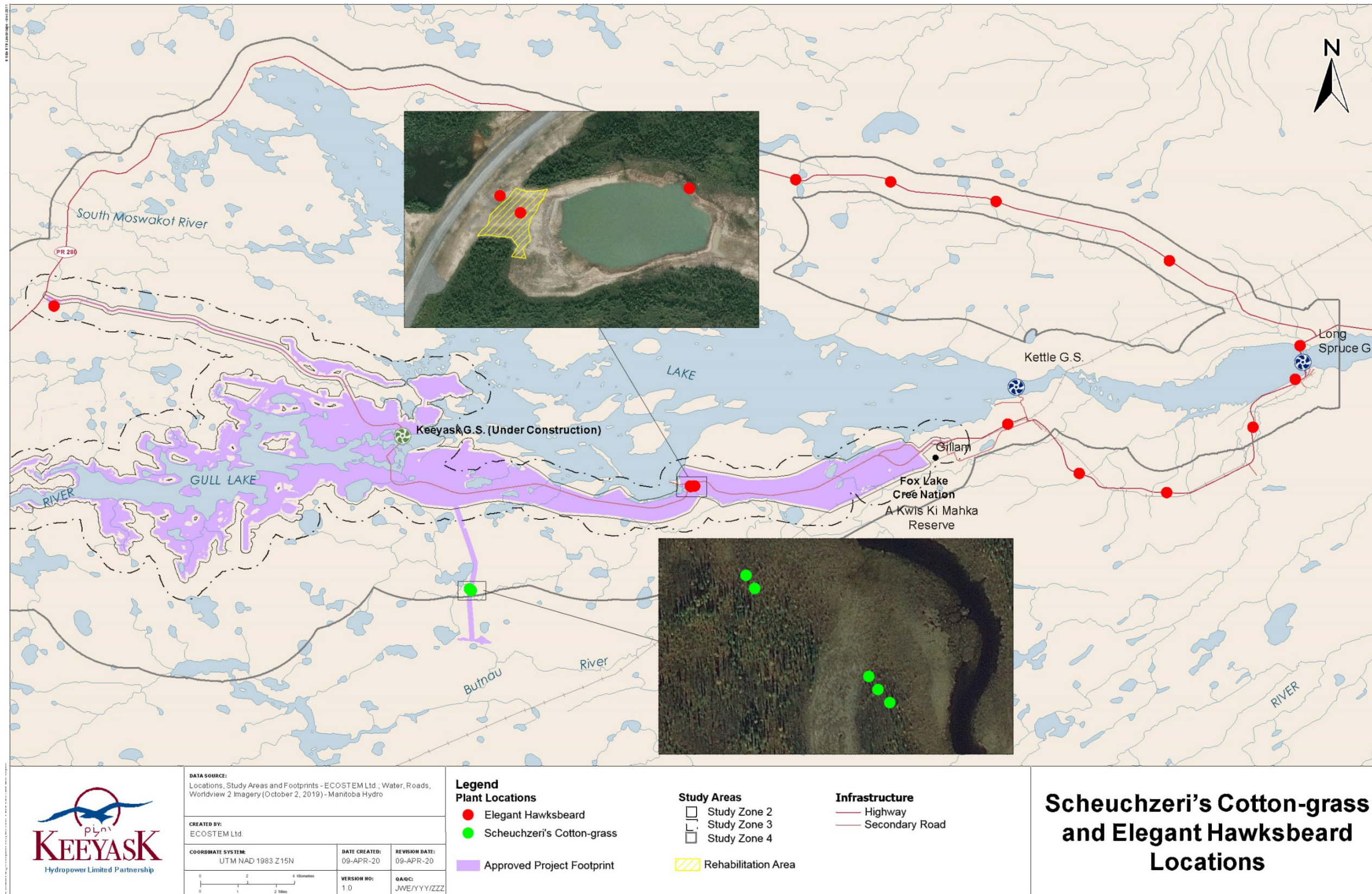
Photo 2-4: Elegant hawksbeard in flowering stage growing in Borrow Area B-6 in 2019



Photo 2-5: Equipment used for transplanting elegant hawksbeard and marking new locations



Photo 2-6: Elegant hawksbeard plants prepared for transportation



Map 2-1: Known Scheuchzeri's cotton-grass and elegant hawksbeard sites identified in the Project area up to 2018.

3.0 RESULTS

3.1 SCHEUCHZERI'S COTTON-GRASS REVISITS

Ground surveys on July 2, 2019, found that there had been no additional Project clearing or disturbance near the Scheuchzeri's cotton-grass location nearest the Ellis Esker access corridor clearing (Photo 3-1). While the location identified in 2017 was not disturbed, no Scheuchzeri's cotton-grass plants were found in the area.



Photo 3-1: Scheuchzeri's cotton grass location identified in 2017 beside the Ellis Esker access corridor clearing photographed on July 2, 2019

3.2 ELEGANT HAWKSBEARD REVISITS

The elegant hawksbeard plants found in 2018 in Borrow Area B-6 were found alive and appeared healthy when the area was surveyed on July 4, 2019 (Photo 2-4). All of the plants found in 2018 were flowering in 2019. Meandering surveys in the area found plants growing at four additional sites (Map 3-1). Single plants were found growing at three sites in the borrow area, in the vicinity of the two previously known sites nearer the South Access Road (SAR). A patch with approximately 20 plants (Photo 3-2) was also incidentally recorded during non-native plant surveys in the east half of the borrow area in late August.

During non-native plant surveys on July 2, 2019, a large patch estimated to have at least 125 small elegant hawksbeard plants was found growing in the gravel between Dorm 1 and the kitchen trailer at the Start-up Camp (Photo 3-3). Another single plant was found between Dorm 1 and Dorm 2. Manitoba Hydro environmental staff were immediately notified of the plants, and the patch was isolated with flagging tape because it was a high-traffic area.

It was recommended that the plants at the Start-up Camp be transplanted to another location for two reasons: the plant sites were in a high traffic area; and decommissioning of the infrastructure at the Start-up Camp was planned for as early as late September 2019. It was unlikely that the plants could be avoided during decommissioning activities. In early September, 2019, it was recommended that a minimum of 60 plants from the patch at Start-up Camp be transplanted to other locations.

3.3 INCIDENTAL OBSERVATIONS

No other plants classified as provincially rare or uncommon were found during the 2019 terrestrial habitat and plant monitoring. Rare to uncommon plants of importance to the Keeyask partner First Nations were not observed during the 2019 field surveys.

3.4 ELEGANT HAWKSBEARD TRANSPLANTING

On September 9, 2019, three elegant hawksbeard plants within the planned rehabilitation area of Borrow Area B-6 were transplanted to other sites within this borrow area (Table 3-1; Map 3-1). The plants were moved deeper into the borrow area, east of the planned rehabilitation area, at locations near the base of a rock berm. The locations were marked with blue flagging tape so they could be avoided by construction activities (Photo 3-4).

On September 10, 2019, 92 elegant hawksbeard plants were transplanted from the large patch in the Start-up Camp. 25 plants went to two other locations in the Start-up Camp footprint away from infrastructure (Map 3-2). The remaining plants were to three other widespread locations in the Project footprint that are no longer in use (Table 3-1; Map 3-3). These included Borrow Area G-

5, a previously rehabilitated portion of Borrow Area KM-4, and the north side of the Cemetary Site. Multiple transplanting sites were selected to increase the probability that the plants will successfully re-establish, and to reduce the risk of an unanticipated disturbance impacting a high proportion of the transplanting sites.

All of the transplant locations were marked with flagging tape. Figure 3-1 and Photo 3-5 to Photo 3-7 depict the transplant locations. All of the new locations were provided to Manitoba Hydro environmental staff.

Table 3-1: Number of elegant hawksbeard plants transplanted from their source areas, and the number of plants at each new location.

Source Location	Number of Plants	Number Left at Source Location	Transplant Location	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
			Cemetary 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 locations.



Photo 3-2: New patch of elegant hawksbeard plant growing in Borrow Area B-6 in 2019



Photo 3-3: Location of 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.

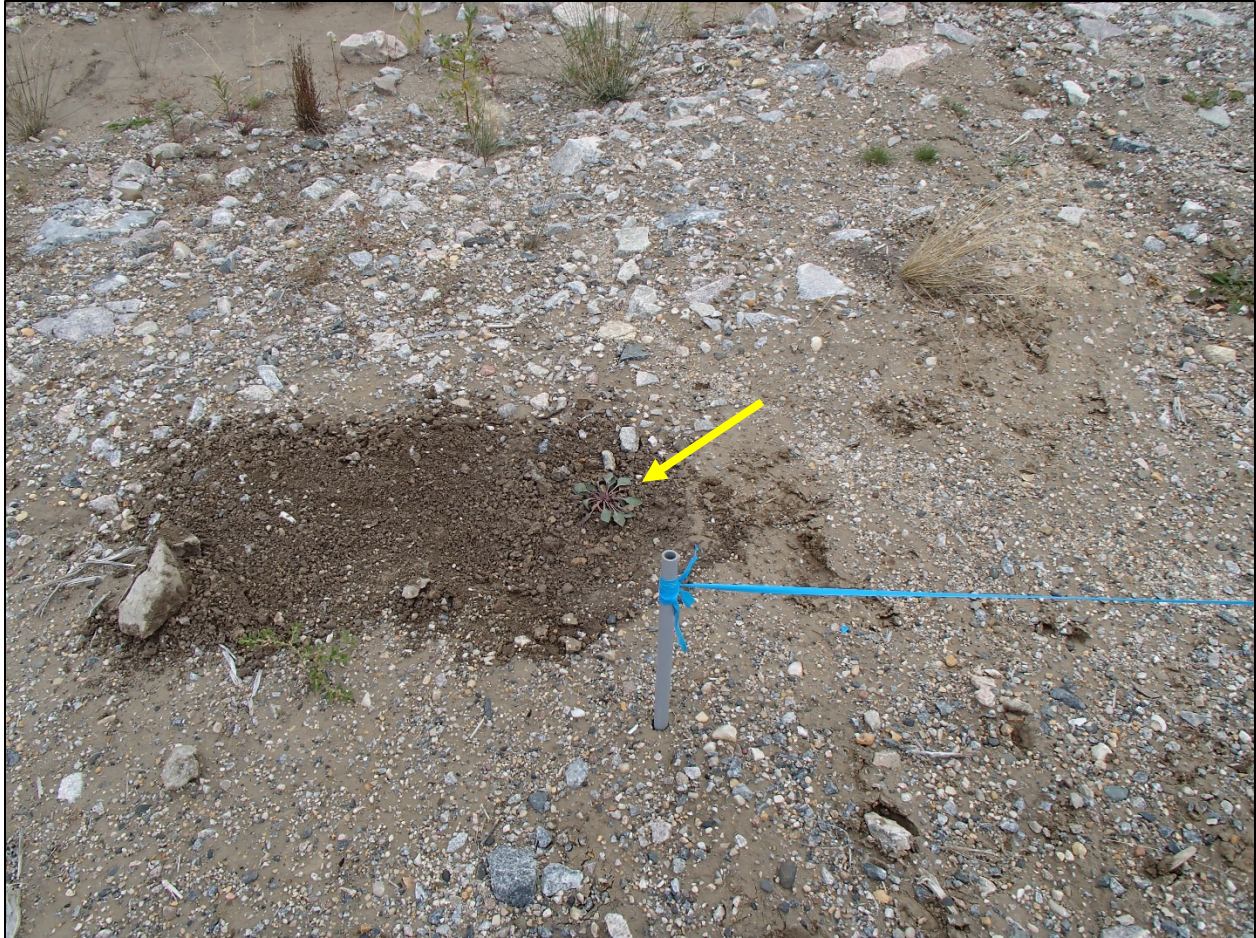


Photo 3-4: Transplanted elegant hawksbeard plant in Borrow Area B-6



Figure 3-1: Transplant locations in the Start-up camp



Photo 3-5: Transplant location in Borrow Area G-5

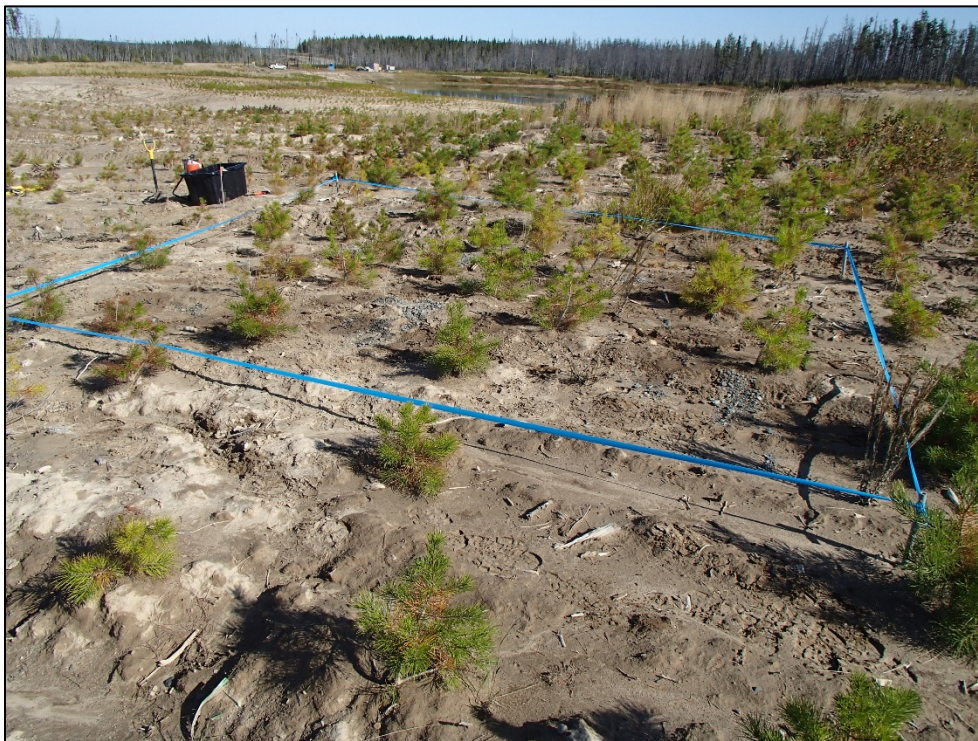
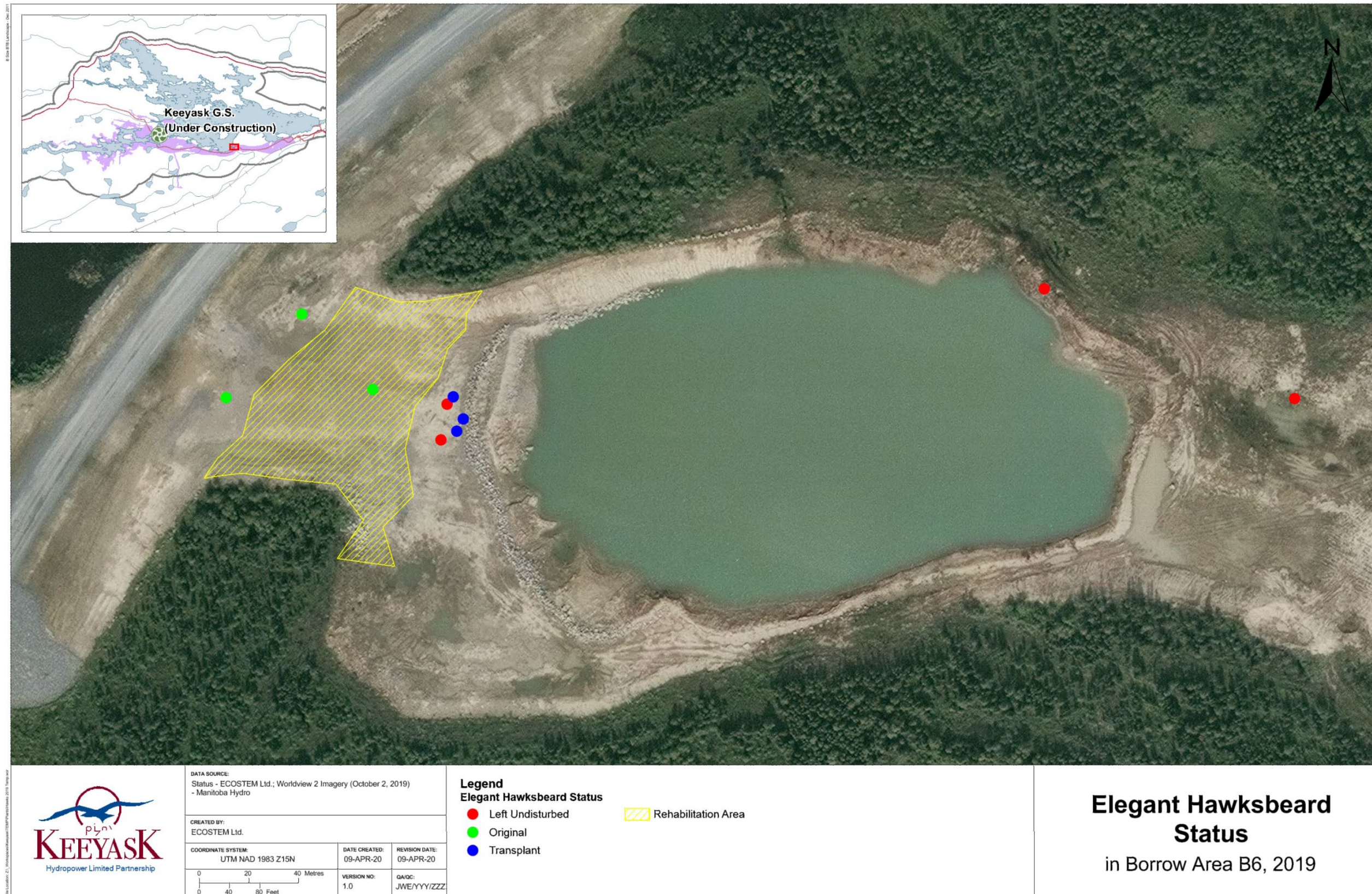


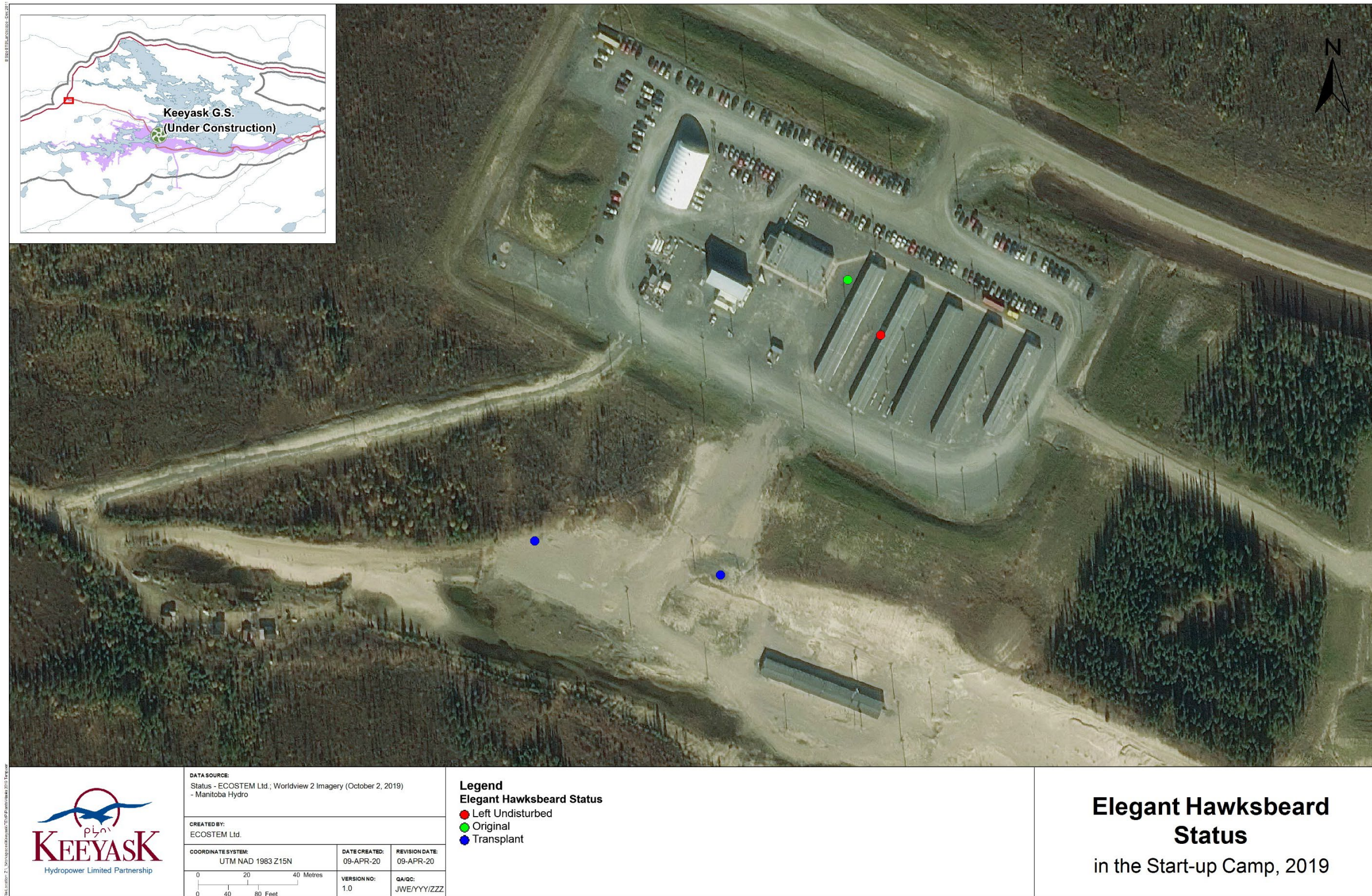
Photo 3-6: Transplant location in Borrow Area KM4



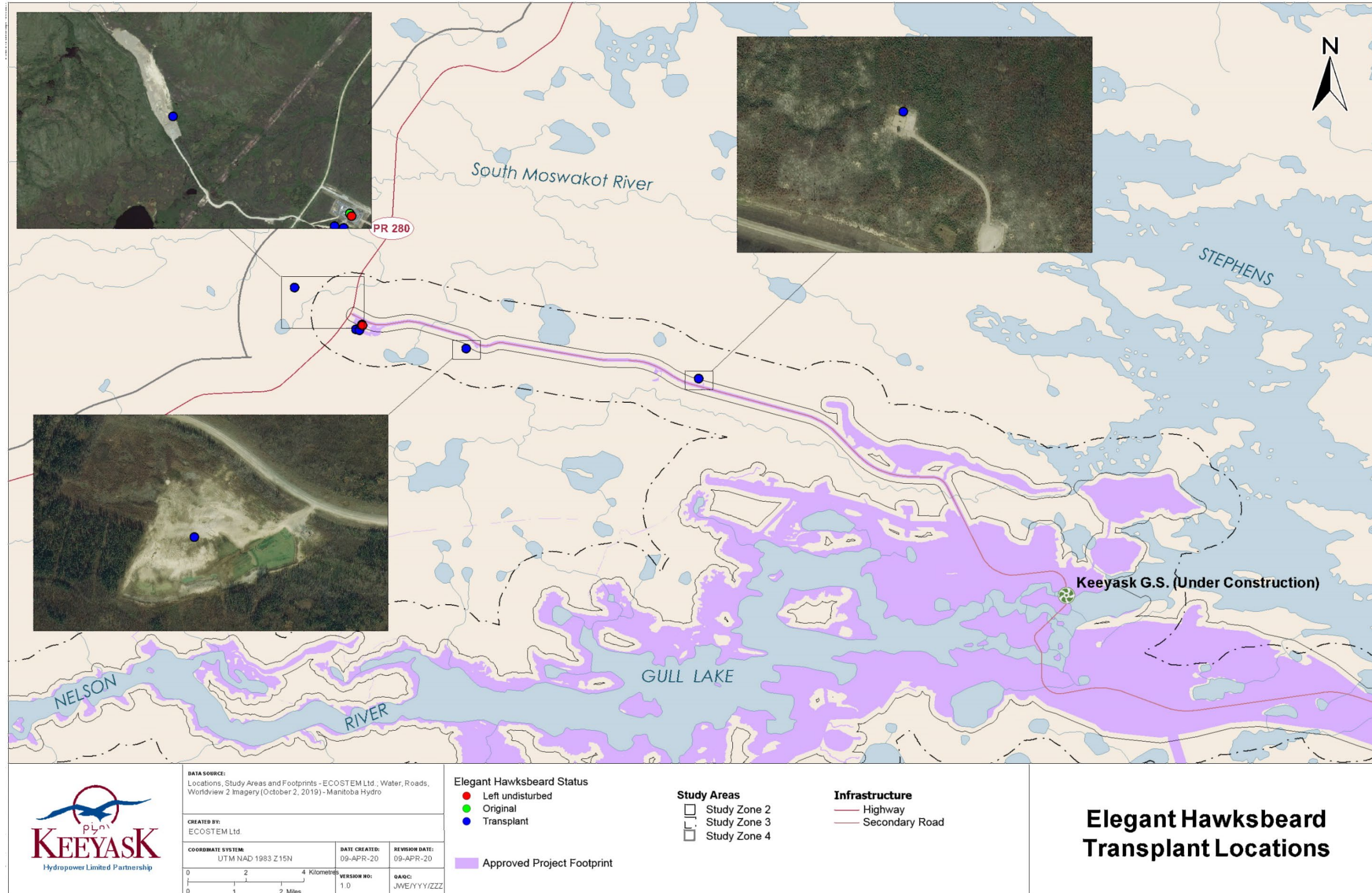
Photo 3-7: Transplant location in the Cemetary Site



Map 3-1: Elegant hawksbeard sites in Borrow Area B-6 before and after transplanting



Map 3-2: Elegant hawksbeard sites from Start-up Camp before and after transplanting



Map 3-3: Elegant hawksbeard transplant sites outside of the Start-up Camp

4.0 DISCUSSION

4.1 SCHEUCHZERI'S COTTON-GRASS

The 2019 priority plant surveys determined that none of the five Scheuchzeri's cotton-grass sites found in 2017 had been disturbed by Project clearing or traffic along the Ellis Esker access road. Following the winter of 2018/2019, the Ellis Esker access corridor was decommissioned. There were no Project activities in the vicinity of the known sites since the 2019 surveys were conducted, and none are planned for the future.

As of the 2019 surveys, the potential indirect effects of the road clearing and traffic on the known Scheuchzeri's cotton-grass sites were much lower than from a typical access road for two reasons. Clearing and vehicle use took place when the ground was frozen, which minimized ground vegetation and ground disturbance. Additionally, the frozen ground was used as the road bed (i.e., was only developed as a winter road).

While no Scheuchzeri's cotton-grass plants were found during the 2019 surveys, it does not mean that they were not present in the area. This is because the plants can be very difficult to spot and identify in the field, particularly after they have seeded. This issue is discussed in greater detail in ECOSTEM (2019).

It is recommended that monitoring of the known Scheuchzeri's cotton-grass sites adjacent to the Ellis Esker access road be discontinued. Future Project impacts on these sites are not anticipated because this temporary access road has been decommissioned.

4.2 ELEGANT HAWKSBEARD

Elegant hawksbeard, which the MBCDC classifies as a provincially very rare plant, was incidentally found during plant monitoring surveys conducted in 2016, 2018 and 2019. All of these plants were found on mineral substrates in highly disturbed sites in Project borrow areas.

Finding elegant hawksbeard in 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.

Based on the findings from monitoring for the Project and the Wuskwatim Generation Project, it seems likely that this species will continue to appear on exposed, coarse mineral substrates that are no longer being used by the Project. The 2019 monitoring indicated that the individuals found in 2018 had started to flower in July of 2019. It is highly probable that these plants will have dispersed seed.

In September, 2019, 95 elegant hawksbeard plants were transplanted from areas where future Project disturbance either was expected or was possible. Because a variety of natural and other factors can affect survival, a projection of how many plants were expected to survive was not made. Regarding the effects on transplanting alone, results from a prior experimental transplant were encouraging. In mid-August, 2019, three individual elegant hawksbeard plants were experimentally transplanted. All of these plants were still alive three weeks later (Photo 4-1). Surveys in 2020 will determine the survival and health of the 95 transplants.

As elegant hawksbeard is an S1 species, it is recommended that disturbance of the known sites be avoided or minimized, where possible. Preserving these plants provides a seed source for the local seedbank and for dispersal to other areas.



Photo 4-1: Elegant hawksbeard individual that was transplanted three weeks previously

5.0 SUMMARY AND CONCLUSIONS

Priority plant monitoring surveys in 2019 focused on the known Scheuchzeri's cotton-grass (*Eriophorum scheuchzeri*) sites near the Ellis Esker access corridor, and on elegant hawksbeard (*Crepis elegans*). The Manitoba Conservation Data Centre classifies Scheuchzeri's cotton-grass as likely rare within Manitoba as a whole (S2?; i.e., it is uncertain whether it actually is either more common or more rare), and elegant hawksbeard as very rare (S1).

Surveys in 2019 found that there was no disturbance to the Scheuchzeri's cotton-grass sites adjacent to the Ellis Esker access corridor. It is recommended that monitoring of these sites be discontinued as no further Project activity is planned near the sites, and substantive future indirect effects are not expected.

The 2019 surveys found that all three of the previously recorded elegant hawksbeard plants in Borrow Area B-6 were still present, and flowering. Surveys in the same general area found an additional three individual plants in three sites and a patch of approximately 20 plants at a fourth site. During non-native plant surveys in the Start-up Camp, a large patch with an estimated 125 individuals, and a single plant at a different location were incidentally recorded.

In September, 2019, 95 elegant hawksbeard plants were transplanted from areas where future Project disturbance either was expected or was possible.

It is recommended that disturbance of the known elegant hawksbeard sites be avoided or minimized, where possible, as this is an S1 species. Preserving these plants provides a seed source for the local seedbank and for dispersal to other areas.

No other rare plants were incidentally found during any of the terrestrial habitat and plant monitoring surveys in 2019. Additionally, no rare to uncommon plants of importance to the Keeyask partner First Nations were recorded during any of the 2019 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.

The known elegant hawksbeard sites will be surveyed in summer 2020 to determine if the Project was able to avoid them. Additionally, the elegant hawksbeard transplant areas will be surveyed to determine the survival and health of the plants.

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