# 4.0 EVALUATION OF ALTERNATIVE ROUTES AND OTHER INFRASTRUCTURE

This section describes the Construction Power Transmission and Generation Outlet Transmission alternative routes and the other Project infrastructure. Additionally, it compares the alternatives using the valued environmental components (VECs).

## 4.1 CONSTRUCTION POWER TRANSMISSION LINE

### 4.1.1 Alternative Route Descriptions

#### 4.1.1.1 Size

The approximate lengths of the alternative routes were 20.5 km for Alternative 1 and 21.5 km for Alternative 2. There was no overlap in the routes (Map 2-1).

The total land area encompassed by the two alternative route evaluation corridors was similar, with Alternative 1 including the smaller area (755 ha) compared with Alternative 2 (778 ha).

#### 4.1.1.2 Terrestrial Habitat

The ecosite composition of the Construction Power Transmission alternative route evaluation corridors was generally similar. The evaluation corridor for Alternative 2 had a somewhat higher proportion of wet and riparian peatlands compared with Alternative 1, particularly horizontal fen and riparian fen, as well as a slightly higher proportion of thin peatland. The latter three ecosite types were more likely to support priority habitat types that are of higher ecological concern (Section 2 of Keeyask HydroPower Partnership 2012b).

The ecosite composition of the Alternative 1 evaluation corridor included thin peatland and other peatland types for 91% of the land area. These peatlands were predominantly comprised of blanket bog (32%), veneer bog on slope (29%) and peat plateau bog/collapse scar peatland mosaics (17%; Table 4-1). Most of the remaining area was wet peatlands, primarily horizontal fen, and deep dry mineral (7% and 6%, respectively). Riparian peatlands accounted for a small proportion of Alternative 1 evaluation corridor area.

Land cover in Alternative 1 evaluation corridor (Map 3-1) was dominated by needleleaf treed vegetation on mineral or thin peatland and on other peatlands (75% combined; Table 4-2). Most of this area was comprised of the black spruce treed on shallow peatland (41%) and black spruce treed on thin peatland (24%) coarse habitat types, which were each common in the region (Section 2 of Keeyask HydroPower Partnership 2012b). Low vegetation on shallow peatland comprised most of the remaining habitat.

The ecosite composition of the Alternative 2 evaluation corridor was dominated by thin peatlands and other peatlands (89% of the area; Table 4-1. Thin peatlands (veneer bog on slope) comprised the highest proportion (32%), followed by blanket bog and peat plateau bog/ collapse scar peatland ecosite types. Horizontal fens (14%), deep dry mineral and riparian fens (5% each) made up most of the remaining area.

More than half of the land cover (59%) in Alternative 2 was needleleaf treed on mineral or thin peatland, and other peatlands (Table 4-2). Black spruce treed on shallow peatland was the most abundant coarse habitat type (28%), followed by black spruce treed on thin peatland (20%), both of which were common habitat types in the region. Most of the remaining area was low vegetation cover (29%), mostly on shallow peatland, and mineral or thin peatland.

#### 4.1.1.3 Plants

A total of 101 plant species were recorded in the Alternative 1 evaluation corridor and 88 species in the Alternative 2 evaluation corridor. Labrador tea was the only widespread vascular plant species, being abundant in Alternative 2 and sporadic in Alternative 1. The other moss species group was also widespread and at least sporadic in both of the alternative route evaluation corridors.

Two of 19 invasive plants known to occur in the Regional Study Area occurred within the Construction Power Transmission alternative route evaluation corridors (Map 3-6). Common dandelion was recorded at five locations along Alternative 1 corridor, and wild barley was recorded at one location along Alternative 2.

**Table 4-1: Land Type, Coarse Ecosite and Fine Ecosite Composition of the Construction Power Alternative Route Evaluation Corridors**

| Land Type | Coarse Ecosite Type | Fine Ecosite Type | Alternative 1 | | Alternative 2 | |
|---|---|---|---|---|---|---|
| | | | Area (ha) | % | Area (ha) | % |
| Mineral | Mineral | Deep dry mineral | 46 | 6.0 | 40 | 5.2 |
| | | Shallow/ thin mineral | | | 1 | 0.1 |
| Thin peatland | Thin peatland | Veneer bog on slope | 221 | 29.2 | 253 | 32.5 |
| Peatland | Shallow peatland | Blanket bog | 245 | 32.5 | 210 | 27.0 |
| | | Slope bog | 10 | 1.3 | 3 | 0.4 |
| | | Slope fen | 3 | 0.4 | 1 | 0.1 |
| | | Veneer bog | 3 | 0.5 | 0 | 0.0 |
| | Ground ice peatland | Blanket bog/ collapse scar peatland mosaic | | | | |
| | | Peat plateau bog | | | 5 | 0.7 |
| | | Peat plateau bog transitional stage | 20 | 2.6 | 20 | 2.5 |
| | | Peat plateau bog/ collapse scar peatland mosaic | 132 | 17.4 | 110 | 14.1 |
| | Permafrost peatland- other | Collapse scar bog | 0 | 0.0 | 1 | 0.1 |
| | | Horizontal fen/ blanket bog mosaic | | | | |
| | Deep peatland | Flat bog | | | | |
| | | Horizontal fen | 53 | 7.1 | 90 | 11.6 |
| Shore Zone Peatland | Riparian Peatland | Riparian bog | | | | |
| | | Riparian fen | 12 | 1.5 | 41 | 5.3 |
| Shore Zone-Regulated | Ice Scoured Upland | Ice scour on mineral above wet meadow zone | 0 | 0.0 | 2 | 0.3 |
| | Shoreline Wetland- regulated | Upper beach on sunken, disintegrated peatland | 11 | 1.4 | | |
| | | Upper beach- regulated | | | 2 | 0.2 |
| Shore Zone | Shoreline Wetland | Upper beach on sunken peat | 0 | 0.0 | | |
| | | Lower beach | | | 0 | 0.0 |
| *Total land area* | | | *755* | | *778* | |

**Table 4-2: Land cover and Coarse Habitat Type Composition of the Construction Power Alternative Route Evaluation Corridors**

| Land Cover Type | Coarse Habitat Type | Corridor Alternative 1 | | Corridor Alternative 2 | |
|---|---|---|---|---|---|
| | | Area (ha) | % | Area (ha) | % |
| Broadleaf treed on all ecosites | Broadleaf mixedwood on all ecosites | | | 7 | 0.9 |
| | Broadleaf treed on all ecosites | 0 | 0.0 | | |
| Needleleaf treed on mineral or thin peatland | Black spruce mixedwood on mineral or thin peatland | | | 1 | 0.1 |
| | Black spruce treed on mineral soil | 19 | 2.5 | 17 | 2.2 |
| | Black spruce treed on thin peatland | 181 | 24.0 | 159 | 20.5 |
| | Jack pine mixedwood on mineral or thin peatland | | | | |
| | Jack pine treed on mineral or thin peatland | 6 | 0.8 | 1 | 0.1 |
| Tall shrub on mineral or thin peatland | Tall shrub on mineral or thin peatland | 1 | 0.1 | 1 | 0.1 |
| Low vegetation on mineral or thin peatland | Low vegetation on mineral or thin peatland | 19 | 2.5 | 52 | 6.7 |
| Needleleaf treed on other peatlands | Black spruce treed on riparian peatland | 2 | 0.2 | 7 | 0.9 |
| | Black spruce treed on shallow peatland | 311 | 41.2 | 216 | 27.8 |
| | Black spruce treed on wet peatland | 17 | 2.2 | 41 | 5.2 |
| | Jack pine treed on shallow peatland | | | | |
| | Tamarack- black spruce mixture on riparian peatland | 0 | 0.0 | 0 | 0.0 |
| | Tamarack- black spruce mixture on wet peatland | 3 | 0.4 | 14 | 1.8 |
| | Tamarack treed on riparian peatland | | | | |
| | Tamarack treed on shallow peatland | 11 | 1.5 | 4 | 0.5 |
| | Tamarack treed on wet peatland | 14 | 1.9 | | |
| Tall shrub on other peatlands | Tall shrub on shallow peatland | 0 | 0.0 | 0 | 0.0 |
| | Tall shrub on wet peatland | 5 | 0.7 | | |
| Low vegetation on other peatlands | Low vegetation on shallow peatland | 85 | 11.3 | 112 | 14.4 |
| | Low vegetation on wet peatland | 15 | 1.9 | 35 | 4.5 |

**Table 4-2: Land cover and Coarse Habitat Type Composition of the Construction Power Alternative Route Evaluation Corridors**

| Land Cover Type | Coarse Habitat Type | Corridor Alternative 1 | | Corridor Alternative 2 | |
|---|---|---|---|---|---|
| | | Area (ha) | % | Area (ha) | % |
| Shrub/ low vegetation on riparian peatland | Low vegetation on riparian peatland | 8 | 1.1 | 24 | 3.1 |
| | Tall shrub on riparian peatland | 0 | 0.0 | 6 | 0.7 |
| Nelson River shore zone | Nelson River shrub and/or low vegetation on ice scoured mineral | | | 2 | 0.3 |
| | Nelson River shrub and/or low vegetation on sunken | 9 | 1.2 | 2 | 0.2 |
| | Nelson River shrub and/or low vegetation on upper | | | | |
| Off-system shore zone | Off-system marsh | 0 | 0.0 | 0 | 0.0 |
| Human infrastructure | | 49 | 6.4 | 77 | 10.0 |
| *Total land cover* | | *755* | | *778* | |

Notes: See Section 2 of Keeyask HydroPower Partnership (2012b) for a description of the land cover and coarse habitat types.

**Table 4-3: Broad Habitat Type and Priority Habitat Type Composition of the Construction Power Alternative Route Evaluation Corridors**

| Broad Habitat Type | Priority Habitat Criteria Met* | Cumulative % of Historical Area Already Affected** | Alternative 1 | | | Alternative 2 | | |
|---|---|---|---|---|---|---|---|---|
| | | | Total Area (ha) | % total area | % total priority area | Total Area (ha) | % total area | % total priority area |
| Balsam poplar mixedwood on all ecosites | RDS | | | | | | | |
| Black spruce dominant on ground ice peatland | None | 5.5 | 102 | 13.6 | | 64 | 8.2 | |
| Black spruce dominant on mineral | U | 5.7 | 19 | 2.5 | 11.9 | 17 | 2.2 | 7.1 |
| Black spruce dominant on riparian peatland | RDS | 5.4 | 2 | 0.2 | 1.1 | 7 | 0.9 | 2.9 |
| Black spruce dominant on shallow peatland | C | 5.6 | 193 | 25.5 | | 141 | 18.1 | |

**Table 4-3: Broad Habitat Type and Priority Habitat Type Composition of the Construction Power Alternative Route Evaluation Corridors**

| **Broad Habitat Type** | **Priority Habitat Criteria Met*** | **Cumulative % of Historical Area Already Affected**** | **Alternative 1** | | | **Alternative 2** | | |
|---|---|---|---|---|---|---|---|---|
| | | | Total Area (ha) | % total area | % total priority area | Total Area (ha) | % total area | % total priority area |
| Black spruce dominant on thin peatland | C | 5.6 | 175 | 23.2 | | 140 | 18.0 | |
| Black spruce dominant on wet peatland | UD | 5.3 | 17 | 2.2 | 10.5 | 41 | 5.2 | 16.6 |
| Black spruce mixedwood on mineral | R | 5.5 | | | | 1 | 0.1 | 0.2 |
| Black spruce mixedwood on thin peatland | RDS | 5.4 | | | | | | |
| Black spruce mixture on ground ice peatland | None | 5.8 | 4 | 0.5 | | 2 | 0.2 | |
| Black spruce mixture on mineral | RD | 8.8 | | | | | | |
| Black spruce mixture on shallow peatland | RD | 6.2 | 12 | 1.6 | 7.6 | 10 | 1.3 | 4.0 |
| Black spruce mixture on thin peatland | R | 7.2 | 1 | 0.1 | 0.5 | 10 | 1.3 | 4.1 |
| Black spruce mixture on wet peatland | R | 5.2 | 1 | 0.1 | 0.7 | 2 | 0.3 | 0.9 |
| Emergent on lower beach | R | | | | | | | |
| Emergent on upper beach | R | 2.8 | 0 | 0.0 | 0.0 | 0 | 0.0 | 0.0 |
| Jack pine dominant on mineral | UDS | 5.6 | | | | | | |
| Jack pine dominant on shallow peatland | RS | 5.0 | | | | | | |
| Jack pine dominant on thin peatland | RDS | 5.9 | | | | | | |
| Jack pine mixedwood on mineral | RD | 5.9 | | | | | | |
| Jack pine mixedwood on thin peatland | RDS | 6.6 | | | | | | |
| Jack pine mixture on thin peatland | R | 7.0 | | | | | | |
| Low vegetation on ground ice peatland | None | 5.7 | 41 | 5.4 | | 52 | 6.7 | |
| Low vegetation on mineral soil | None | 5.9 | 1 | 0.1 | | 0 | 0.1 | |
| Low vegetation on riparian peatland | U | 5.8 | 8 | 1.1 | 5.2 | 24 | 3.1 | 10.0 |
| Low vegetation on shallow peatland | U | 5.4 | 44 | 5.8 | 27.4 | 60 | 7.7 | 24.5 |
| Low vegetation on thin peatland | U | 5.5 | 18 | 2.4 | | 52 | 6.6 | |
| Low vegetation on wet peatland | U | 5.6 | 15 | 1.9 | 9.1 | 35 | 4.5 | 14.2 |
| Tall shrub on ground ice peatland | None | 5.3 | | | | | | |

**Table 4-3: Broad Habitat Type and Priority Habitat Type Composition of the Construction Power Alternative Route Evaluation Corridors**

| Broad Habitat Type | Priority Habitat Criteria Met* | Cumulative % of Historical Area Already Affected** | Alternative 1 | | | Alternative 2 | | |
|---|---|---|---|---|---|---|---|---|
| | | | Total Area (ha) | % total area | % total priority area | Total Area (ha) | % total area | % total priority area |
| Tall shrub on mineral | RD | 8.1 | | | | | | |
| Tall shrub on riparian peatland | R | 8.0 | 0 | 0.0 | 0.0 | 6 | 0.7 | 2.3 |
| Tall shrub on shallow peatland | RDS | 5.6 | 0 | 0.0 | 0.0 | 0 | 0.0 | 0.0 |
| Tall shrub on thin peatland | RDS | 7.3 | 1 | 0.1 | 0.4 | 1 | 0.1 | 0.3 |
| Tall shrub on wet peatland | R | 6.9 | 5 | 0.7 | 3.1 | | | |
| Tamarack- black spruce mixture on riparian peatland | RD | 6.4 | 0 | 0.0 | 0.0 | 0 | 0.0 | 0.1 |
| Tamarack dominant on ground ice peatland | None | 5.3 | | | | | | |
| Tamarack dominant on mineral | RDS | 6.3 | | | | | | |
| Tamarack dominant on riparian peatland | R | | | | | | | |
| Tamarack dominant on shallow peatland | R | | 0 | 0.0 | 0.0 | | | |
| Tamarack dominant on thin peatland | RDS | 5.8 | | | | | | |
| Tamarack dominant on wet peatland | R | 5.1 | 14 | 1.9 | 8.7 | | | |
| Tamarack mixture on ground ice peatland | None | 6.1 | 2 | 0.3 | | 1 | 0.2 | |
| Tamarack mixture on mineral | RDS | 7.6 | 6 | 0.8 | 3.5 | 1 | 0.1 | 0.2 |
| Tamarack mixture on shallow peatland | RD | 6.5 | 9 | 1.2 | 5.8 | 2 | 0.3 | 0.9 |
| Tamarack mixture on thin peatland | RDS | 7.5 | 5 | 0.7 | 3.1 | 9 | 1.2 | 3.9 |
| Tamarack mixture on wet peatland | RD | 5.2 | 2 | 0.2 | 1.0 | 12 | 1.5 | 4.9 |
| Trembling aspen dominant on all ecosites | RD | 6.7 | 0 | 0.0 | 0.2 | | | |
| Trembling aspen mixedwood on all ecosites | RDS | 6.1 | | | | 7 | 0.9 | 2.7 |
| *Total area (ha)* | | | *755* | | | *778* | | |
| *Total priority habitat area (ha)* | | | *161* | | | *244* | | |

* Priority habitat criteria: R=regionally rare; U= regionally uncommon; D= structurally diverse; and S= relatively high potential to support rare plant species.
** See Section 2 of Keeyask HydroPower Partnership (2012b) for the method used to determined cumulative percentage of historical area already affected.

### 4.1.2 Fragmentation

Alternative 1 was the slightly preferred Construction Power Transmission route in terms of potential fragmentation effects because it created lower increases to linear feature densities and smaller reductions to core area measures.

Since Alternative 1 was the shorter route by approximately 1 km, it produced a smaller increase to total linear feature densities (i.e., total and non-transportation densities). However, the difference in length was very small relative to the existing total length of linear features in the Regional Study Area.

Alternative 1 created a lower reduction in total core area than Alternative 2 but the difference was only 112 ha, which is quite small relative to the amount of core area in the Regional Study Area.

The same three core areas were affected by both alternative routes (Map 4-1). The sizes of these core areas ranged from 2,074 ha to 69,156 ha (Table 4-4). One of the fragmented core areas was a long, narrow block located between the railway and a transmission line ROW. Both Construction Power Transmission alternative routes split each of these three core areas into two blocks, creating six smaller core areas (Table 4-4). On this attribute, Alternative 1 was preferred because it left a larger habitat block from the largest of the three existing core areas. Alternative 1 also paralleled an existing trail for approximately 3.5 km thereby lessening the reduction in size for the largest core area.

**Table 4-4: Sizes of Core Areas Remaining for Each of the Construction Power Alternative Route Evaluation Corridors**

| Core Area ID* | Existing Environment (ha) | Area (ha) | |
|---|---|---|---|
| | | Alternative 1 | Alternative 2 |
| 4 | 69,156 | 68,725 | 68,607 |
| 37 | 2,360 | 2,305 | 2,296 |
| 40 | 2,074 | 2,034 | 2,048 |
| **Total** | **73,590** | **73,063** | **72,951** |

* See Map 4-1 for core area IDs.

### 4.1.3 Ecosystem Diversity

Alternative 1 was the preferred Construction Power Transmission route in terms of potential ecosystem diversity effects because it included the lowest area in priority habitat types and the lowest total habitat loss.

Neither alternative route evaluation corridor completely removed a stand level habitat type from the Regional Study Area. Additionally, neither alternative substantially altered the regional proportions of the common or uncommon habitat types.

Both alternative route evaluation corridors included one broad habitat type that was represented by less than 20 stands (i.e., tamarack- black spruce mixture on riparian peatland). The total area affected was less than 0.15 ha in both cases.

Although priority habitat types made up just over 21% (161 ha) of land area in Alternative 1 evaluation corridor (Table 4-3), nearly two-thirds of this area was comprised of six uncommon habitat types that were of lesser concern. Of the habitat types that met several priority criteria (regionally rare, diverse and/or higher rare species potential) and were of higher concern, tamarack mixtures on mineral, on shallow peatlands and on thin peatlands comprised a total of 12% of the priority habitat area affected, and black spruce mixture on shallow peatland made up an additional 8%.

For the Alternative 2 evaluation corridor, priority habitat accounted for more than 31% (244 ha) of the land area, but most of that area (73%) was in regionally uncommon rather than regionally rare types (Table 4-3). Low vegetation on shallow peatland, on wet peatland and on riparian peatland made up 49% of the priority habitat combined, followed by black spruce dominant on wet peatland (17%) and black spruce dominant on mineral (7%), all of which are regionally uncommon. As with Alternative 1, higher concern priority habitat types (multiple priority criteria met) with the largest proportion of area in Alternative 2 evaluation corridor included tamarack mixture on thin and wet peatland, but also black spruce dominant on riparian peatland (12%).

Each of the alternative route evaluation corridors included a very small amount of the shoreline wetland priority habitat types. Approximately 800 square meters of emergent on upper beach habitat occurred within each corridor (Table 4-3).

For the priority habitat types that were of higher concern, Alternative 1 evaluation corridor had less of these types in percentage of corridor area (1.7% vs. 3.1%) and absolute area (13 ha vs. 24 ha) than Alternative 2 (Table 4-3).

### 4.1.4 Priority Plants

Neither of the Construction Power Transmission alternative route evaluation corridors was preferred for priority plants. Both alternatives had a similar number of regionally rare and range limit species. Alternative 1 had more species of particular interest to KCNs because it had higher proportions of the common and uncommon habitat types, which is where most of these species were found (Section 3 of Keeyask HydroPower Partnership 2012b).

Species listed as endangered or threatened under MESA, SARA or COSEWIC were not expected to occur in either the alternative route evaluation corridors since none were anticipated to occur in the Regional Study Area (see Section 3.2.4.2).

As described in Section 3.2.4.2, extensive field studies did not detect any of the 13 provincially very rare species that could potentially occur in the Regional Study Area. Elegant hawk's-beard, the only species with an uncertain conservation concern rank of provincially rare or provincially very rare that was found in the Regional Study Area during field studies, was not recorded in either of the alternative route evaluation corridors.

Field studies found three of the 45 provincially rare to uncommon upland and wetland plant species that could potentially occur in the Regional Study Area, including shrubby willow (*Salix arbusculoides*), rock willow (*Salix vestita*) and oblong-leaved sundew (*Drosera anglica*) in the Construction Power Transmission alternative corridors (Table 4-5). Field studies in the Regional Study Area demonstrated that all of these species probably more regionally common than indicated by the provincial conservation concern ranks (Section 3 of Keeyask HydroPower Partnership 2012b).

Two of the remaining 15 priority plants, as well as one of the provincially rare species, encountered in the Construction Power Transmission alternative route evaluation corridors were regionally rare (Table 4-5), including wild daisy (*Erigeron hyssopifolius*), balsam poplar (*Populus balsamifera*) and oblong-leaved sundew.

Four range limit species were observed in the Alternative Route 1 evaluation corridor, and two were observed in corridor 2. Range limit species observed included shrubby willow, rock willow, jack pine (*Pinus banksiana*), northern Labrador tea (*Rhododendron tomentosum*) and hairy goldenrod (*Solidago hispida*). Plants of particular interest to KCNs that were observed in the Construction Power Transmission evaluation corridors were white birch, northern Labrador tea, bog bilberry, smooth wild strawberry, red currant, red raspberry, cloudberries and rock cranberry.

**Table 4-5: Number of Locations in the Construction Power Transmission Alternative Route Evaluation Corridors Where Priority Plant Species Were Found During Field Studies**

| Species | MBCDC S-Rank | Reason for inclusion | Alternative | |
|---|---|---|---|---|
| | | | 1 | 2 |
| Oblong-leaved sundew | S3 | Provincially uncommon/Regionally rare | 0 | 1 |
| Shrubby willow | S3 | Provincially uncommon/Range limit | 3 | 0 |
| Rock willow | S3 | Provincially uncommon/Range limit | 1 | 2 |
| Wild daisy | S4 | Regionally rare | 0 | 1 |
| Balsam poplar | S5 | Regionally rare | 2 | 1 |
| Jack pine | S5 | Range limit | 1 | 0 |
| Hairy goldenrod | S5 | Range limit | 0 | 1 |
| Northern Labrador-tea | S4 | Range limit/KCN importance | 1 | 0 |
| White birch | S5 | KCN importance | 4 | 10 |
| Smooth wild strawberry | S5 | KCN importance | 4 | 1 |
| Red currant | S5 | KCN importance | 0 | 1 |
| Cloudberry | S5 | KCN importance | 9 | 4 |
| Red raspberry | S5 | KCN importance | 0 | 5 |
| Bog bilberry | S5 | KCN importance | 12 | 6 |
| Rock cranberry | S5 | KCN importance | 14 | 7 |
| *Total* | | | *51* | *40* |
| *Provincially Uncommon Sub-total* | | | *4* | *3* |
| *Regionally Rare Sub-total* | | | *2* | *3* |
| *Range Limit Sub-total* | | | *6* | *3* |
| *KCN Importance Sub-total* | | | *44* | *34* |

### 4.1.5 Conclusions

From a terrestrial ecosystems, habitat and plants perspective, there were no major concerns with either of the two construction power alternative routes. Alternative Route 1 was the slightly preferred route since it was expected to create less fragmentation and have lower effects on ecosystem diversity.

Alternative 1 was the slightly preferred option in terms of potential fragmentation effects. It was the shorter route, which produced a smaller increase to total linear feature density. Both alternatives had similar core area effects since they both fragmented three core areas into six core areas with neither alternative producing a clearly preferable core area configuration. However, Alternative 1 followed an existing trail for approximately 3.5 km, which may create less potential for increased access than Alternative 2.

Alternative 1 was the preferred option in terms of potential ecosystem diversity effects because it affected a lower total area of terrestrial habitat, included a higher proportion of common habitat types and had the smallest area in priority habitat types.

Neither alternative was preferred for priority plants. Endangered, threatened or provincially rare plants were not expected to occur along either of the routes. Elegant hawk's-beard and swamp lousewort, the only provincially rare to very rare terrestrial plants found during field studies in the region, were not observed along either route. Although swamp lousewort was observed near Alternative 1, potential mitigation measures exist if this alternative is selected and this species is subsequently found in the preferred ROW. The number of locations where the remaining regionally rare or range limit plants were found during field studies was low and sufficiently similar given the sampling effort so that neither alternative was preferred. Alternative 1 had more species of particular interest to KCNs because it had higher proportions of the common and uncommon habitat types, which is where most of these species are found.

# 4.2 CONSTRUCTION POWER STATION

## 4.2.1 Site Description

The entire Construction Power Station footprint and potential terrestrial habitat zone of influence occurred on pre-existing human infrastructure and clearing associated with construction of the north access road (Map 3-1). More than half (51%) of this land area was thin peatland, with most of the remaining area comprised of peat plateau bog/ collapse scar peatland mosaics (37%). Fen was present in the habitat zone of influence.

**Table 4-6: Coarse and Fine Ecosite Types of the Construction Power Station**

| Coarse Ecosite Type | Fine Ecosite Type | Project Footprint | Habitat Zone of Influence | Total |
|---|---|---|---|---|
| Thin peatland | Veneer bog on slope | 58.7 | 49.2 | 50.9 |
| Ground ice peatland | Peat plateau bog/ collapse scar peatland mosaic | 34.9 | 37.9 | 37.4 |
| | Peat plateau bog transitional stage | 0.7 | 0.3 | 0.3 |
| | Peat plateau bog | 5.7 | | 1.1 |
| Deep peatland | Horizontal fen | | 8.3 | 6.8 |
| Riparian peatland | Riparian fen | | 4.4 | 3.6 |
| All types | | 100 | 100 | 100 |
| *Total land area (ha)* | | *4* | *16* | *19* |

## 4.2.2 Valued Environmental Components

There were no major concerns with the construction power station site from the terrestrial ecosystems, habitat and plants perspectives. This site did not include any sensitive habitat types or plant species of high conservation concern. Because the site was within an existing human infrastructure area, there would be no effects on fragmentation.

Details regarding the evaluation of construction power station site effects on the VECs is deferred to the Project effects assessment section since only one location was considered.

# 4.3 UNIT TRANSMISSION LINES

## 4.3.1 Site Description

Land comprised 74% of the Unit Transmission Line ROW area, with most of the water area associated with the Nelson River (Map 3-1).

Nearly all of the land area was peatland, dominated by shallow peatland (37%), thin peatland (26%) and ground ice peatland (31% combined). Mineral ecosites comprised less than 1% of the Unit Transmission Line ROW land area.

**Table 4-7: Coarse and Fine Ecosite Types in the Unit Transmission Lines right-of-way**

| Coarse Ecosite Type | Fine Ecosite Type | Project Footprint | Habitat Zone of Influence | Total |
|---|---|---|---|---|
| Mineral | Deep dry mineral | 0.0 | 2.0 | 0.5 |
| Thin peatland | Veneer bog on slope | 24.3 | 30.4 | 25.9 |
| Shallow peatland | Blanket bog | 42.1 | 21.7 | 36.7 |
| Ground ice peatland | Peat plateau bog/ collapse scar peatland mosaic | 21.2 | 17.0 | 20.1 |
| | Peat plateau bog transitional stage | 7.5 | 20.1 | 10.8 |
| Riparian peatland | Riparian fen | 2.1 | 1.9 | 2.0 |
| Ice scoured upland | Ice scour on mineral above wet meadow zone | 2.9 | 7.0 | 4.0 |
| All types | | 100.0 | 100.0 | 100.0 |
| *Total Land Area (ha)* | | *63* | *23* | *86* |

Land cover in the ROW was dominated by common needleleaf treed vegetation, primarily black spruce treed on shallow peatland and on thin peatland (54% and 24%, respectively). An additional 9% of the needleleaf cover was tamarack treed on shallow peatland habitat. Low vegetation made up most of the remaining area.

**Table 4-8: Land Cover and Coarse Habitat in the Unit Transmission Lines Right-Of-Way**

| Land Cover Type | Coarse Habitat Type | Project Footprint | Habitat Zone of Influence | Total |
|---|---|---|---|---|
| Needleleaf treed on mineral or thin peatland | Black spruce treed on mineral soil | | 1.7 | 0.4 |
| | Black spruce treed on thin peatland | 22.9 | 29.0 | 24.5 |
| Low vegetation on mineral or thin peatland | Low vegetation on mineral or thin peatland | 1.4 | 1.7 | 1.5 |
| Needleleaf treed on other peatlands | Black spruce treed on riparian peatland | | 0.1 | 0.0 |
| | Black spruce treed on shallow peatland | 55.3 | 48.5 | 53.5 |
| | Tamarack treed on shallow peatland | 10.1 | 5.5 | 8.9 |
| Tall shrub on other peatlands | Tall shrub on shallow peatland | 0.2 | | 0.1 |
| Low vegetation on other peatlands | Low vegetation on shallow peatland | 5.2 | 4.9 | 5.1 |
| Shrub/ low vegetation on riparian peatland | Tall shrub on riparian peatland | 0.9 | 0.8 | 0.9 |
| | Low vegetation on riparian peatland | 1.2 | 1.0 | 1.1 |
| Nelson River shore zone | Nelson River shrub and/or low vegetation on ice scoured upla | 2.9 | 7.0 | 4.0 |
| All types | | 100 | 100 | 100 |
| *Total land area (ha)* | | *63* | *23* | *86* |

## 4.3.2 Valued Environmental Components

There were no major concerns with the Unit Transmission Line ROW from the terrestrial ecosystems, habitat and plants perspectives. This site did not include any particularly sensitive habitat types or plant species of high conservation concern. Because the site was small and crossed two existing cutlines, fragmentation effects would be very limited.

Details regarding the evaluation of Unit Transmission Lines effects on the VECs is deferred to the Project effects assessment section since only one route was considered.

# 4.4 KEEYASK SWITCHING STATION

## 4.4.1 Site Description

Land comprised 100% of the Keeyask Switching Station area (Map 3-1).

Shallow peatlands (blanket bog) made up 55% of the ecosite cover in the Keeyask Switching Station area, with thin peatland and mineral ecosites comprising 32% and 13% of the total area, respectively. All most all of the mineral ecosites occurred in the habitat zone of influence.

**Table 4-9: Coarse and Fine Ecosite Types of the Keeyask Switching Station**

| Coarse Ecosite Type | Fine Ecosite Type | Project Footprint | Habitat Zone of Influence | Total |
|---|---|---|---|---|
| Mineral | Deep dry mineral | 0.2 | 24.1 | 13.3 |
| Thin peatland | Veneer bog on slope | 40.5 | 24.7 | 31.8 |
| Shallow peatland | Blanket bog | 59.3 | 51.2 | 54.8 |
| All types | | 100 | 100 | 100 |
| *Total land area (ha)* | | *31* | *38* | *68* |

Most of the land cover was needleleaf treed, almost entirely black spruce. The dominant habitat types were black spruce treed on shallow peatland (52%) and on thin peatland (32%). Black spruce treed on mineral made up an additional 13% of the area, almost entirely within the habitat zone of influence, with low vegetation on shallow peatland making up most of the remaining area.

**Table 4-10: Land Cover and Coarse Habitat of the Keeyask Switching Station**

| Land Cover | Coarse Habitat | Project Footprint | Habitat Zone of Influenc e | Total |
|---|---|---|---|---|
| Needleleaf treed on mineral or thin peatland | Black spruce treed on mineral soil | 0.2 | 24.1 | 13.3 |
| | Black spruce treed on thin peatland | 40.5 | 24.5 | 31.7 |
| Low vegetation on mineral or thin peatland | Low vegetation on mineral or thin peatland | | 0.2 | 0.1 |
| Needleleaf treed on other peatlands | Black spruce treed on shallow peatland | 58.2 | 46.8 | 51.9 |

**Table 4-10: Land Cover and Coarse Habitat of the Keeyask Switching Station**

| Land Cover | Coarse Habitat | Project Footprint | Habitat Zone of Influence | Total |
|---|---|---|---|---|
| | Tamarack treed on shallow peatland | | 0.8 | 0.4 |
| Low vegetation on other peatlands | Low vegetation on shallow peatland | 1.1 | 3.6 | 2.5 |
| Needleleaf treed on mineral or thin peatland | Black spruce treed on mineral soil | 0.2 | 24.1 | 13.3 |
| All types | | 100 | 100 | 100 |
| *Total land area (ha)* | | *31* | *38* | *68* |

## 4.4.2 Valued Environmental Components

There were no major concerns with the Keeyask Switching Station site from the terrestrial ecosystems, habitat and plants perspectives. This site did not include any particularly sensitive habitat types or plant species of high conservation concern. Because the site was very small and adjacent to existing cutlines, fragmentation effects would be very limited.

FLCN expressed concern that the switching station is on or near a jack pine ridge, which is a rare vegetation type, and would prefer not to see a tower there (Keeyask Transmission Project Workshop. 2012). It was determined that the jack pine ridge is southeast of the final switching station location.

Details regarding the evaluation of Keeyask Switching Station effects on the VECs is deferred to the Project effects assessment section since was only one location was considered.

# 4.5 GENERATION OUTLET TRANSMISSION LINES

## 4.5.1 Alternative Route Descriptions

### 4.5.1.1 Size

The approximate lengths of the Generation Outlet Transmission alternative routes ranged from approximately 40.3 km for Alternative C to 50.8 km for Alternative D (note that at the time this analysis was completed the routes included the temporary construction line route from the Keeyask Switching Station to the Construction Power Station, which adds an identical length for all four alternatives).

**Table 4-11: Total Lengths of the Generation Outlet Transmission Alternative Routes**

| Alternative | Length (km) |
|---|---|
| A | 41.7 |
| B | 40.7 |
| C | 40.3 |
| D | 50.8 |

The key differences between the four alternative Generation Outlet Transmission routes were their proximity to the Nelson River and existing human infrastructure (Map 2-1). Alternative C had the highest proportion of its route along existing human infrastructure and the Nelson River while Alternative A had the lowest proportion of its route along these features. Most of Alternative D followed existing human infrastructure if Alternative 1 was selected as the Construction Power Transmission preferred route. Alternative D was approximately 25% longer than the other alternative routes.

Alternative A had the highest proportion of its length to the south while Alternative C had the highest proportion of its length to the north (Map 2-1). Starting from the east, all of the alternatives initially followed an existing transmission line ROW. Alternative C branched to the north, following adjacent to the existing Butnau Road and the proposed Keeyask Generation Project south access road for most of its length. Alternatives A and B continued along an existing transmission line ROW for a short distance. Alternative B branched to the north where the existing transmission line ROW deflects to the north, traversing through approximately 7.5 km of area lacking existing human infrastructure before joining the Alternative C route. Alternative A continued in a southwesterly and then westerly direction through an area without existing human infrastructure before turning northwards to the Keeyask Generation Project dam site.

The total land area encompassed by each of the four alternative route evaluation corridors was not greatly different, with Alternative D including the largest area (1,972 ha) and Alternative C the smallest area (1,564 ha).

#### 4.5.1.2 Terrestrial Habitat

The terrestrial habitat composition of the alternative route evaluation corridors (Map 3-1), particularly A, B and D, was generally similar (note that this is based on partial mapping for Alternative D as described in Section 2.2.2). The corridor for Alternative C had considerably more black spruce treed on thin peatlands (a common habitat type), both in proportional and absolute terms, as well as considerably more black spruce treed on mineral soil (an uncommon habitat type). Alternative A had somewhat more black spruce treed on shallow peatlands (also a common habitat type), both in proportional and absolute terms. Both Alternatives A and B had higher proportions of wet and riparian peatlands than Alternatives C and D. Alternative D had a higher proportion of broadleaf treed, broadleaf mixedwood and jack pine treed habitat than the other alternatives. Ecosite mapping for the 17 km vegetation mapping gap indicated that there was a substantially lower proportion of mineral ecosites, and a higher proportion of ground ice peatland compared to the portion with detailed mapping. Helicopter-based oblique aerial photography and old Forest Resource Inventory data indicated that the southernmost portion of the Alternative D corridor was predominantly black spruce treed on thin, shallow and ground ice peatlands, which are regionally common habitat types.

In the Alternative A evaluation corridor, thin peatland and other peatland ecosites accounted for 84% of the land area, predominantly veneer bog on slope (38%) and blanket bog (29%). Deep dry mineral ecosites made up most of the remaining area. Wet and riparian peatlands were relatively scarce in the Alternative A corridor, with horizontal fen being the most abundant at 5%.

Land cover in the Alternative A evaluation corridor (Map 3-1) was dominated by a relatively even mixture of needleleaf treed on mineral or thin peatland and needleleaf treed on other peatlands (72% combined). Black spruce treed on thin peatland (29%) and black spruce treed on shallow peatland (27%), which are regionally common, were the most abundant coarse habitat types. In combination, low vegetation on mineral, thin and shallow peatland accounted for 18% of the land area. Wet and riparian peatland habitat types were relatively scarce in the Alternative A evaluation corridor, comprising 7% of the area combined.

**Table 4-12: Land Type, Coarse Ecosite and Fine Ecosite Composition of the Generation Outlet Alternative Route Evaluation Corridors**

| Land Type | Coarse Ecosite Type | Fine Ecosite Type | Alternative A | | Alternative B | | Alternative C | | Alternative D* | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Area (ha) | % | Area (ha) | % | Area (ha) | % | Area (ha) | % |
| Mineral | Mineral | Deep dry mineral | 230 | 14.1 | 208 | 13.1 | 273 | 17.4 | 264 | 13.4 |
| | | Shallow/ thin mineral | | | | | | | | |
| Thin peatland | Thin peatland | Veneer bog on slope | 628 | 38.5 | 669 | 42.3 | 768 | 49.1 | 552 | 28.0 |
| Peatland | Shallow peatland | Blanket bog | 470 | 28.8 | 376 | 23.7 | 315 | 20.1 | 574 | 29.1 |
| | | Slope bog | 7 | 0.4 | 12 | 0.8 | 12 | 0.8 | 12 | 0.6 |
| | | Slope fen | 0 | 0.0 | 2 | 0.1 | 1 | 0.1 | 8 | 0.4 |
| | | Veneer bog | 43 | 2.6 | 39 | 2.5 | 8 | 0.5 | 125 | 6.3 |
| | Ground ice peatland | Blanket bog/ collapse scar peatland mosaic | | | | | | | | |
| | | Peat plateau bog | 0 | 0.0 | 2 | 0.1 | | | 1 | 0.0 |
| | | Peat plateau bog transitional stage | 14 | 0.8 | 4 | 0.2 | 9 | 0.6 | 47 | 2.4 |
| | | Peat plateau bog/ collapse scar peatland mosaic | 110 | 6.8 | 104 | 6.6 | 67 | 4.3 | 264 | 13.4 |
| | Permafrost peatland-other | Collapse scar bog | 1 | 0.0 | 0 | 0.0 | 1 | 0.1 | | |
| | | Horizontal fen/ blanket bog mosaic | 0 | 0.0 | 0 | 0.0 | | | | |
| | Deep peatland | Flat bog | 7 | 0.4 | 14 | 0.9 | 5 | 0.3 | | |
| | | Horizontal fen | 84 | 5.1 | 107 | 6.8 | 65 | 4.1 | 79 | 4.0 |
| Shore Zone Peatland | Riparian Peatland | Riparian bog | | | 1 | 0.1 | 3 | 0.2 | 0 | 0.0 |
| | | Riparian fen | 21 | 1.3 | 30 | 1.9 | 21 | 1.4 | 15 | 0.8 |
| Shore Zone-Regulated | Ice Scoured Upland | Ice scour on mineral above wet meadow zone | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | | |
| | Shoreline Wetland-regulated | Upper beach on sunken, disintegrated peatland | 15 | 0.9 | 15 | 0.9 | 15 | 1.0 | | |
| | | Upper beach- regulated | | | | | 0 | 0.0 | 30 | 1.5 |
| Shore Zone | Shoreline Wetland | Lower beach | | | 0 | 0.0 | 0 | 0.0 | | |
| | | Upper beach on sunken peat | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| *Total land area* | | | *1,631* | | *1,583* | | *1,564* | | *1,972* | |

**Table 4-13: Land Cover and Coarse Habitat Type Composition of the Generation Outlet Alternative Route Evaluation Corridors**

| Land Cover Type | Coarse Habitat Type | Alternative A | | Alternative B | | Alternative C | | Alternative D | |
|---|---|---|---|---|---|---|---|---|---|
| | | Area (ha) | % | Area (ha) | % | Area (ha) | % | Area (ha) | % |
| Broadleaf treed on all ecosites | Broadleaf mixedwood on all ecosites | 3 | 0.2 | 4 | 0.2 | 3 | 0.2 | 13 | 1.2 |
| | Broadleaf treed on all ecosites | 11 | 0.7 | 11 | 0.7 | 6 | 0.4 | 11 | 1.1 |
| Needleleaf treed on mineral or thin peatland | Black spruce mixedwood on mineral or thin peatland | 8 | 0.5 | 10 | 0.6 | 13 | 0.8 | 16 | 1.5 |
| | Black spruce treed on mineral soil | 114 | 7.0 | 102 | 6.5 | 150 | 9.6 | 66 | 6.3 |
| | Black spruce treed on thin peatland | 467 | 28.6 | 501 | 31.7 | 682 | 43.6 | 315 | 30.1 |
| | Jack pine mixedwood on mineral or thin peatland | 8 | 0.5 | 8 | 0.5 | 13 | 0.8 | 8 | 0.8 |
| | Jack pine treed on mineral or thin peatland | 55 | 3.3 | 41 | 2.6 | 42 | 2.7 | 62 | 5.9 |
| Tall shrub on mineral or thin peatland | Tall shrub on mineral or thin peatland | 5 | 0.3 | 6 | 0.4 | 3 | 0.2 | 3 | 0.3 |
| Low vegetation on mineral or thin peatland | Low vegetation on mineral or thin peatland | 120 | 7.4 | 126 | 7.9 | 36 | 2.3 | 24 | 2.3 |
| Needleleaf treed on other peatlands | Black spruce treed on riparian peatland | 7 | 0.4 | 11 | 0.7 | 5 | 0.3 | 1 | 0.1 |
| | Black spruce treed on shallow peatland | 444 | 27.2 | 339 | 21.4 | 324 | 20.7 | 283 | 27.0 |
| | Black spruce treed on wet peatland | 34 | 2.1 | 52 | 3.3 | 32 | 2.0 | 11 | 1.0 |
| | Jack pine treed on shallow peatland | 0 | 0.0 | 0 | 0.0 | | | | |
| | Tamarack- black spruce mixture on riparian peatland | 3 | 0.2 | 3 | 0.2 | 0 | 0.0 | 0 | 0.0 |
| | Tamarack- black spruce mixture on wet peatland | 16 | 1.0 | 15 | 1.0 | 7 | 0.5 | 2 | 0.2 |
| | Tamarack treed on riparian peatland | | | | | 1 | 0.0 | | |
| | Tamarack treed on shallow peatland | 17 | 1.0 | 24 | 1.5 | 27 | 1.7 | 7 | 0.7 |
| | Tamarack treed on wet peatland | 3 | 0.2 | 2 | 0.1 | 0 | 0.0 | 4 | 0.4 |
| Tall shrub on other peatlands | Tall shrub on shallow peatland | 2 | 0.1 | 1 | 0.1 | 0 | 0.0 | 0 | 0.0 |
| | Tall shrub on wet peatland | 3 | 0.2 | 3 | 0.2 | 3 | 0.2 | 3 | 0.3 |
| Low vegetation on other peatlands | Low vegetation on shallow peatland | 173 | 10.6 | 164 | 10.4 | 51 | 3.3 | 63 | 6.1 |
| | Low vegetation on wet peatland | 35 | 2.2 | 47 | 2.9 | 25 | 1.6 | 14 | 1.4 |
| Shrub/ low vegetation on riparian peatland | Low vegetation on riparian peatland | 8 | 0.5 | 15 | 1.0 | 16 | 1.0 | 6 | 0.6 |
| | Tall shrub on riparian peatland | 2 | 0.1 | 2 | 0.1 | 1 | 0.1 | | |
| Nelson River shore zone | Nelson River shrub and/or low vegetation on ice | | | | | | | | |

**Table 4-13: Land Cover and Coarse Habitat Type Composition of the Generation Outlet Alternative Route Evaluation Corridors**

| Land Cover Type | Coarse Habitat Type | Alternative A | | Alternative B | | Alternative C | | Alternative D | |
|---|---|---|---|---|---|---|---|---|---|
| | | Area (ha) | % | Area (ha) | % | Area (ha) | % | Area (ha) | % |
| | scoured mineral | | | | | | | | |
| | Nelson River shrub and/or low vegetation on sunken | 10 | 0.6 | 10 | 0.7 | 11 | 0.7 | 10 | 1.0 |
| | Nelson River shrub and/or low vegetation on upper | | | | | | | | |
| Off-system shore zone | Off-system marsh | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | | |
| Human infrastructure | | 81 | 5.0 | 86 | 5.5 | 114 | 7.3 | 124 | 11.9 |
| *Total land cover* | | *1,631* | | *1,583* | | *1,564* | | *1,047*[1] | |

[1] Based on terrestrial habitat mapping for 52% of the area in corridor for Alternative D.

**Table 4-14: Broad Habitat Type and Priority Habitat Type Composition of the Generation Outlet Alternative Route Evaluation Corridors**

| Broad Habitat Type* | Priority Criteria Met** | Cumulative % Historical Area Affected*** | Alternative A | | | Alternative B | | | Alternative C | | | Alternative D**** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Total Area | % total area | % total priority area | Total Area | % total area | % total priority area | Total Area | % total area | % total priority area | Total Area | % total area | % total priority area |
| Balsam poplar mixedwood on all ecosites | RDS | | 0 | 0.0 | 0.1 | 0 | 0.0 | 0.1 | | | | | | |
| Black spruce dominant on ground ice peatland | None | 5.5 | 54 | 3.3 | | 57 | 3.6 | | 62 | 3.9 | | 65 | 6.2 | |
| Black spruce dominant on mineral | U | 5.7 | 101 | 6.2 | 20.3 | 84 | 5.3 | 15.8 | 123 | 7.9 | 28.0 | 62 | 5.8 | 19.5 |
| Black spruce dominant on riparian peatland | RDS | 5.4 | 7 | 0.4 | 1.4 | 11 | 0.7 | 2.0 | 5 | 0.3 | 1.0 | 1 | 0.1 | 0.4 |
| Black spruce dominant on shallow peatland | C | 5.6 | 375 | 23.0 | | 275 | 17.4 | | 252 | 16.1 | | 201 | 19.0 | |
| Black spruce dominant on thin peatland | C | 5.6 | 424 | 26.0 | | 444 | 28.0 | | 636 | 40.7 | | 294 | 27.8 | |
| Black spruce dominant on wet peatland | UD | 5.3 | 34 | 2.1 | 6.9 | 52 | 3.3 | 9.7 | 32 | 2.0 | 7.2 | 11 | 1.0 | 3.4 |
| Black spruce mixedwood on mineral | R | 5.5 | 8 | 0.5 | 1.6 | 9 | 0.6 | 1.7 | 12 | 0.8 | 2.8 | 16 | 1.5 | 4.9 |
| Black spruce mixedwood on thin peatland | RDS | 5.4 | | | | 1 | 0.0 | 0.1 | 1 | 0.0 | 0.1 | | | |
| Black spruce mixture on ground ice peatland | None | 5.8 | 4 | 0.3 | | 1 | 0.1 | | 2 | 0.1 | | 2 | 0.2 | |
| Black spruce mixture on mineral | RD | 8.8 | 13 | 0.8 | 2.6 | 18 | 1.1 | 3.4 | 26 | 1.7 | 6.0 | 4 | 0.4 | 1.2 |
| Black spruce mixture on shallow peatland | RD | 6.2 | 10 | 0.6 | 2.1 | 5 | 0.3 | 1.0 | 8 | 0.5 | 1.9 | 15 | 1.5 | 4.8 |
| Black spruce mixture on thin peatland | R | 7.2 | 10 | 0.6 | 2.0 | 21 | 1.4 | 4.0 | 27 | 1.7 | 6.0 | 10 | 0.9 | 3.0 |
| Black spruce mixture on wet peatland | R | 5.2 | 2 | 0.2 | 0.5 | 1 | 0.1 | 0.3 | 1 | 0.0 | 0.1 | 2 | 0.2 | 0.6 |
| Emergent on lower beach | R | | | | | 0 | 0.0 | 0.0 | 0 | 0.0 | 0.0 | | | |
| Emergent on upper beach | R | 2.8 | 0 | 0.0 | 0.0 | 0 | 0.0 | 0.0 | 0 | 0.0 | 0.0 | | | |
| Jack pine dominant on mineral | UDS | 5.6 | 39 | 2.4 | 7.8 | 31 | 1.9 | 5.7 | 34 | 2.2 | 7.7 | 55 | 5.2 | 17.3 |
| Jack pine dominant on shallow peatland | RS | 5.0 | 0 | 0.0 | 0.0 | 0 | 0.0 | 0.0 | | | | | | |

**Table 4-14: Broad Habitat Type and Priority Habitat Type Composition of the Generation Outlet Alternative Route Evaluation Corridors**

| Broad Habitat Type* | Priority Criteria Met** | Cumulative % Historical Area Affected*** | Alternative A | | | Alternative B | | | Alternative C | | | Alternative D**** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Total Area | % total area | % total priority area | Total Area | % total area | % total priority area | Total Area | % total area | % total priority area | Total Area | % total area | % total priority area |
| Jack pine dominant on thin peatland | RDS | 5.9 | 3 | 0.2 | 0.6 | 3 | 0.2 | 0.5 | 1 | 0.1 | 0.2 | 1 | 0.1 | 0.2 |
| Jack pine mixedwood on mineral | RD | 5.9 | 8 | 0.5 | 1.5 | 8 | 0.5 | 1.5 | 12 | 0.8 | 2.7 | 7 | 0.7 | 2.4 |
| Jack pine mixedwood on thin peatland | RDS | 6.6 | 1 | 0.0 | 0.1 | 1 | 0.0 | 0.1 | 1 | 0.0 | 0.2 | 0 | 0.0 | 0.1 |
| Jack pine mixture on thin peatland | R | 7.0 | 8 | 0.5 | 1.6 | 3 | 0.2 | 0.5 | 2 | 0.1 | 0.5 | 2 | 0.2 | 0.7 |
| Low vegetation on ground ice peatland | None | 5.7 | 63 | 3.8 | | 49 | 3.1 | | 10 | 0.6 | | 20 | 1.9 | |
| Low vegetation on mineral soil | None | 5.9 | 13 | 0.8 | | 9 | 0.6 | | 5 | 0.4 | | 4 | 0.4 | |
| Low vegetation on riparian peatland | U | 5.8 | 8 | 0.5 | 1.6 | 15 | 1.0 | 2.9 | 16 | 1.0 | 3.6 | 6 | 0.5 | 1.8 |
| Low vegetation on shallow peatland | U | 5.4 | 110 | 6.8 | 22.2 | 115 | 7.2 | 21.5 | 42 | 2.7 | 9.5 | 43 | 4.1 | 13.6 |
| Low vegetation on thin peatland | U | 5.5 | 107 | 6.6 | | 117 | 7.4 | | 31 | 2.0 | | 20 | 1.9 | |
| Low vegetation on wet peatland | U | 5.6 | 35 | 2.2 | 7.1 | 47 | 2.9 | 8.7 | 25 | 1.6 | 5.8 | 14 | 1.4 | 4.5 |
| Tall shrub on ground ice peatland | None | 5.3 | 0 | 0.0 | | 0 | 0.0 | | | | | | | |
| Tall shrub on mineral | RD | 8.1 | | | | | | | 0 | 0.0 | 0.1 | 0 | 0.0 | 0.0 |
| Tall shrub on riparian peatland | R | 8.0 | 2 | 0.1 | 0.5 | 2 | 0.1 | 0.3 | 1 | 0.1 | 0.3 | | | |
| Tall shrub on shallow peatland | RDS | 5.6 | 2 | 0.1 | 0.3 | 1 | 0.1 | 0.2 | 0 | 0.0 | 0.0 | 0 | 0.0 | 0.0 |
| Tall shrub on thin peatland | RDS | 7.3 | 5 | 0.3 | 1.0 | 6 | 0.4 | 1.1 | 3 | 0.2 | 0.6 | 3 | 0.2 | 0.8 |
| Tall shrub on wet peatland | R | 6.9 | 3 | 0.2 | 0.6 | 3 | 0.2 | 0.6 | 3 | 0.2 | 0.7 | 3 | 0.3 | 0.9 |
| Tamarack- black spruce mixture on riparian peatland | RD | 6.4 | 3 | 0.2 | 0.6 | 3 | 0.2 | 0.5 | 0 | 0.0 | 0.0 | 0 | 0.0 | 0.0 |
| Tamarack dominant on ground ice peatland | None | 5.3 | | | | | | | 0 | 0.0 | | 0 | 0.0 | |
| Tamarack dominant on mineral | RDS | 6.3 | | | | 1 | 0.1 | 0.3 | 2 | 0.1 | 0.3 | | | |
| Tamarack dominant on riparian peatland | R | | | | | | | | 1 | 0.0 | 0.2 | | | |
| Tamarack dominant on shallow peatland | R | | 0 | 0.0 | 0.0 | 0 | 0.0 | 0.0 | 0 | 0.0 | 0.1 | 0 | 0.0 | 0.1 |

**Table 4-14: Broad Habitat Type and Priority Habitat Type Composition of the Generation Outlet Alternative Route Evaluation Corridors**

| Broad Habitat Type* | Priority Criteria Met** | Cumulative % Historical Area Affected*** | Alternative A | | | Alternative B | | | Alternative C | | | Alternative D**** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Total Area | % total area | % total priority area | Total Area | % total area | % total priority area | Total Area | % total area | % total priority area | Total Area | % total area | % total priority area |
| Tamarack dominant on thin peatland | RDS | 5.8 | 7 | 0.5 | 1.5 | 9 | 0.6 | 1.6 | 1 | 0.0 | 0.1 | 1 | 0.1 | 0.4 |
| Tamarack dominant on wet peatland | R | 5.1 | 3 | 0.2 | 0.6 | 2 | 0.1 | 0.4 | 0 | 0.0 | 0.0 | 4 | 0.4 | 1.4 |
| Tamarack mixture on ground ice peatland | None | 6.1 | 2 | 0.1 | | 0 | 0.0 | | 1 | 0.1 | | 0 | 0.0 | |
| Tamarack mixture on mineral | RDS | 7.6 | 5 | 0.3 | 0.9 | 4 | 0.2 | 0.7 | 3 | 0.2 | 0.8 | 14 | 1.3 | 4.3 |
| Tamarack mixture on shallow peatland | RD | 6.5 | 15 | 0.9 | 3.0 | 23 | 1.5 | 4.3 | 25 | 1.6 | 5.7 | 7 | 0.7 | 2.2 |
| Tamarack mixture on thin peatland | RDS | 7.5 | 26 | 1.6 | 5.2 | 27 | 1.7 | 5.1 | 18 | 1.2 | 4.2 | 12 | 1.1 | 3.7 |
| Tamarack mixture on wet peatland | RD | 5.2 | 14 | 0.8 | 2.7 | 14 | 0.9 | 2.6 | 7 | 0.4 | 1.5 | 0 | 0.0 | 0.0 |
| Trembling aspen dominant on all ecosites | RD | 6.7 | 11 | 0.7 | 2.3 | 11 | 0.7 | 2.0 | 6 | 0.4 | 1.4 | 11 | 1.1 | 3.6 |
| Trembling aspen mixedwood on all ecosites | RDS | 6.1 | 2 | 0.1 | 0.5 | 3 | 0.2 | 0.6 | 3 | 0.2 | 0.7 | 13 | 1.2 | 4.0 |
| *Total area (ha)* | | | *1,631* | | | *1,583* | | | *1,564* | | | *1,057** | | |
| *Total priority habitat area (ha)* | | | *496* | | | *533* | | | *440* | | | *317** | | |

* See Section 2 of Keeyask HydroPower Partnership (2012b) for a description of the land cover and coarse habitat types.
** Priority habitat criteria: R=regionally rare; U= regionally uncommon; D= structurally diverse; and S= relatively high potential to support rare plant species.
*** See Section 2 of Keeyask HydroPower Partnership (2012b) for the methods used to determined cumulative percentage of historical area already affected.
***** Based on terrestrial habitat mapping for 52% of the area in corridor for Alternative D, plus 11 ha of priority habitat identified in the unmapped areas.

In the Alternative B evaluation corridor, the land type composition was an even mixture of thin peatlands and other peatlands, at 42% each. Other peatlands were predominantly comprised of the shallow peatland ecosite type, primarily blanket bog (24%), with most of the remaining area divided between peat plateau bog/ collapse scar mosaic and horizontal fen (7% each). Deep dry mineral made up most of the remaining area.

Land cover in the Alternative B evaluation corridor was predominantly needleleaf treed on mineral or thin peatland (42%), and needleleaf treed on other peatlands (28%). The regionally common habitat types, black spruce treed on thin peatland and black spruce treed on shallow peatland made up most of these two land cover types. Low vegetation on mineral or thin peatland and on shallow peatland made up an additional 18% of the habitat. Black spruce treed on mineral soil was the habitat type most commonly found on mineral ecosites. Wet and riparian peatlands made up 9% of the habitat, most of which supported black spruce treed or low vegetation types.

In the Alternative C evaluation corridor, 80% of the land area was thin peatland (49%) and other peatlands, with the blanket bog ecosite type making up most of the latter at 20% of the total land area. The peat plateau bog/ collapse scar peatland mosaic and horizontal fen ecosite types made up an additional 4% of the land area each. Deep dry mineral comprised 17% of the land area in this corridor.

Land cover in Alternative C evaluation corridor was predominantly needleleaf treed on mineral or thin peatland (57%), and needleleaf treed on other peatlands (25%). The common habitat types, black spruce treed on thin peatland and black spruce treed on shallow peatland made up most of these two land cover types (44% and 21%, respectively). Black spruce treed on mineral soil was the habitat type most commonly found on mineral ecosites, making up an additional 10% of the coarse habitat area. Wet and riparian peatlands made up 6% of the habitat combined.

In Alternative D evaluation corridor, over 84% of the land area was on thin peatland (28%) and other peatlands which were mostly comprised of blanket bog and peat plateau bog/ collapse scar mosaic (29% and 13% of the total land area, respectively). Alternative D had a higher proportion of the latter ecosite type than any of the other options. Deep dry mineral ecosites made up an additional 13% of the mapped area, with most of the remaining area in veneer bogs and horizontal fens.

Based on the available information, land cover composition in Alternative D evaluation corridor was very similar to that of Alternative A. Most of the area was needleleaf treed on mineral or thin peatland (45%), and needleleaf treed on other peatlands (29%). The two regionally common habitat types, black spruce treed on thin peatland and black spruce treed on shallow peatland comprised most of these land cover types (30% and 27%, respectively). On mineral ecosites, black spruce treed and jack pine treed habitat made up most of the cover (6% of the total area, each). In combination, tall shrub and low vegetation habitat on peatlands accounted for 8% of the mapped corridor area. Data from the FRI mapping and helicopter photography indicated that there could be an additional 23 ha of shrub/ low vegetation occurring on riparian peatland ecosites, with tall shrub on riparian peatland being the most abundant habitat.

#### 4.5.1.3 Plants

The total number of plant species recorded in each of the alternative route evaluation corridors ranged from 100 species in Alternative D to 141 species in Alternative B (note that plant occurrences were underrepresented in Alternative D for the reasons described in Section 4.5.4). The widespread and abundant species in the alternative route evaluation corridors were similar with a few exceptions. Labrador tea and rock cranberry were the most widespread and abundant vascular plant species in all four alternative route evaluation corridors. Big red stem (*Pleurozium schreberi*) and the other moss species group were also widespread and at least sporadic in each of the corridors. One lichen species, green reindeer lichen (*Cladina rangiferina*), and one lichen group identified to genus only (the cup lichens; *Cladonia* spp.) were widespread, but less abundant in all four alternative route evaluation corridors.

Invasive plant species were not found in the Generation Outlet Transmission alternative route evaluation corridors during field studies.

### 4.5.2 Fragmentation

The KCNs have expressed concern regarding cumulative effects of the Project on Local Study Area intactness. It was perceived that linear features such as transmission lines reduce forest habitat for wildlife (Split Lake Cree – Manitoba Hydro Joint Study Group, 1996).

Alternative C was the clearly preferred Generation Outlet Transmission alternative route in terms of fragmentation effects essentially because more of its length was near existing human infrastructure. Alternatives A and D were the least preferred.

Alternative C created the lowest increase to linear feature densities (i.e., total and non-transportation densities) since it was the shortest route (approximately 40.3 km long). As longest route, Alternative D was approximately 26% longer than Alternative C, which created the largest increase to linear feature densities.

Six core areas were crossed by at least one of the alternative routes, with the largest being 69,165 ha and 25,308 ha in size (Table 4-15). Compared with the other alternatives, Alternative C created the smallest reduction in total core area (355 ha) because more of its length was near existing human infrastructure (Table 4-15). Alternative A created the largest reduction total core area (1,151 ha), followed by Alternative D and then B.

By following the edge of the largest core area, Alternative C had the smallest effect on the size and spatial configuration of large core areas (Map 4-1). Alternative C the size of the largest core area by only 222 ha compared with a 1,004 ha reduction for Alternative A (Table 4-15). Alternative C also left the largest core area as a single large block whereas Alternative A fragmented this core area into four blocks. Additionally, Alternative C did not affect the second largest of the three core areas. Alternative B fragmented the largest core area into three blocks and reduced its size by 618 ha. While Alternatives B and A affected the second largest core area, this occurred at near its edge and Gillam.

Starting from Gillam, the first 28.8 km of the Alternative D route was situated between two existing transmission line ROWs and a railway line. Alternative D route is adjacent to the existing ROWs and approximately 1 km from the railway line. In general the preference would be to locate a human linear feature next to another linear feature to minimize the fragmentation of core areas. However, in this situation four linear features were located in close proximity, which could be a substantial deterrent for movements across this area. For the remainder of the route, the potential effects of Alternative D on the largest core areas depended on which of the Construction Power Transmission alternatives was selected as the preferred route. If Construction Power Transmission Alternative 2 was selected then Alternative D would fragment a larger core area into two core areas. If Construction Power Transmission Alternative 1 was selected then Alternative D would follow an existing linear feature, leaving the larger core area as a slightly smaller but single core area.

**Table 4-15: Sizes of Affected Core Areas in 2010 and With Each of the Generation Outlet Alternative Transmission Line Routes**

| Core Area ID* | Existing Environment (ha) | Generation Outlet Transmission Alternative (ha) | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| 4 | 69,165 | 68,161 | 68,690 | 68,943 | 68,593 |
| 9 | 25,308 | 25,163 | 25,167 | 25,307 | 25,308 |
| 37 | 2,360 | 2,360 | 2,360 | 2,360 | 2,293 |
| 40 | 2,074 | 2,074 | 2,074 | 2,074 | 1,844 |
| 92 | 322 | 319 | 319 | 189 | 267 |
| 94 | 315 | 315 | 315 | 315 | 253 |
| **All** | **99,544** | **98,393** | **98,926** | **99,189** | **98,559** |
| **Reduction from existing environment** | | **-1,151** | **-618** | **-355** | **-985** |

* See Map 4-1 for core area IDs.

Given the number of attributes considered for the fragmentation evaluation and that there was no clear ranking of the four alternative routes, a rank-based scoring of the alternatives was completed. On this basis, Alternative C was the preferred alternative route as it had the lowest total rank-based score, followed by Alternative B (Table 4-16). Alternatives A and D were least preferred, being tied with the highest score. It should be noted that the total scores should be interpreted in a qualitative manner and that the size of the differences in the total scores for the alternatives did not represent the magnitude of difference in effects.

**Table 4-16: Rank-based Scoring of Fragmentation Attributes for the Generation Outlet Alternative Transmission Line Routes**

| Fragmentation Attribute | Alternative Route Rank | | | |
|---|---|---|---|---|
| | A | B | C | D |
| Length | 2 | 3 | 1 | 4 |
| Total core area loss | 4 | 3 | 1 | 2 |
| Large core areas | 4 | 2 | 1 | 3 |
| Total linear feature width | 0 | 0 | 0 | 1 |
| Total score | 10 | 8 | 3 | 10 |

Notes: Alternative routes are ranked relative to each other. The lowest value indicates the lowest effects.

### 4.5.3 Ecosystem Diversity

Alternative Route C was the preferred Generation Outlet Transmission route in terms of potential ecosystem diversity effects because it had the smallest area in priority habitat types.

None of the four alternative route evaluation corridors completely removed a stand level habitat type from the Regional Study Area. Additionally, none of the alternatives substantially altered the regional proportions of the common or uncommon habitat types.

Nine broad habitat types represented by less than 20 stands were affected by at least one of the alternative route evaluation corridors. Alternative C affected the highest number of these types (8 types) followed by Alternative B (7 types) and then by Alternative A (4 types). Alternative D could not be evaluated because habitat mapping was not available for approximately 47% of the corridor area. Alternatives A and B each affected a relatively high amount of tamarack dominant on thin peatland (up to 9 ha). Eight of these nine broad habitat types are represented by less than 10 stands. When only considering these types, the order of ranking remains the same for all alternatives, reducing the number of habitat types affected by one, except for Alternative A. For all of these broad habitat types, all of the affected stands are less than one hectare in size, with the exception of tamarack dominant on thin peatland. Alternative route evaluation corridors A and B each affect a tamarack dominant on thin peatland stand that is nearly 3 hectares in size. Considering the size of the stands and total area affected, the three evaluated alternatives appeared to have similar stand effects.

None of the alternative route evaluation corridor included a substantial amount of priority shoreline wetland habitat (Map 3-1). Alternatives B and C affected the largest areas, but each area only encompassed just over 200 square meters of these habitat types (Table 4-14).

Priority habitat accounted for approximately 30% (496 ha) of the total land area in the Alternative A evaluation corridor (Table 4-14). Uncommon habitat types accounted for most of this area (58%), mostly consisting of low vegetation on shallow peatland (22%) and black spruce dominant on mineral (20%). Habitat types that were of higher concern because they met several priority habitat criteria covered 97 ha, or 5.9%, of the land area in the corridor. Jack pine dominant on mineral and tamarack mixture on thin peatland comprised nearly 8% and 5%, respectively, of the priority habitat area.

In the Alternative B evaluation corridor, priority habitat accounted for approximately 34% (533 ha) of the total land area (Table 4-14). Uncommon habitat types comprised most of this area (59%), being mostly low vegetation on shallow peatland (21%), black spruce dominant on mineral (16%) and black spruce dominant on wet peatland (10%). Habitat types of higher concern covered 97 ha, or 6.1%, of corridor land area. Jack pine dominant on mineral and tamarack mixture on thin peatland each made up approximately 6% of the priority habitat area.

Priority habitat covered approximately 28% (440 ha) of the total land area in the Alternative C evaluation corridor (Table 4-14). Uncommon habitat types accounted for most of this area (62%), with black spruce dominant on mineral (28%) making up the largest proportion by far. Habitat types of higher concern covered 70 ha, or 4.5%, of corridor land area. Jack pine dominant on mineral and tamarack mixture on thin peatland made up approximately 8% and 4%, respectively, of the priority habitat area.

For Alternative D, vegetation mapping was not available for 47% of evaluation corridor area. Only ecosite type and priority habitat types of higher concern were mapped for the entire corridor. Priority habitat covered at least 30% (317 ha) of the total mapped land area in the Alternative D corridor (Table 4-14). Uncommon habitat types made up 60% of the priority habitat area, with black spruce dominant on mineral making up the largest proportion at over 19%. Habitat types of higher concern covered at least 99 ha, or 5%, of the total land area in the corridor. Jack pine dominant on mineral comprised over 17% of the priority habitat area. An additional 12% of the area was divided between tamarack mixture on mineral, tamarack mixture on thin peatland, and trembling aspen mixedwood on all ecosites, each of which meet all three priority habitat criteria.

To facilitate and overall comparison based on the ecosystem diversity attributes, a rank-based scoring of the alternatives was completed. The number of habitat types represented by less than 20 stands was not included in the scoring because Alternative D could not be evaluated (see above). Based on the total rank-based score, Alternative C was preferred over Alternatives A and B followed by Alternative D (Table 4-17). It should be noted that the total scores should be interpreted in a qualitative manner and that the size of the differences in the total scores for the alternatives did not represent the magnitude of difference in effects.

**Table 4-17: Rank-based Scoring of Ecosystem Diversity Attributes for the Generation Outlet Alternative Transmission Line Routes**

| Ecosystem Diversity Attribute | Alternative Route Rank | | | |
|---|---|---|---|---|
| | A | B | C | D |
| Total priority habitat area | 2 | 3 | 1 | 4 |
| Highest concern priority habitat area | 2 | 2 | 1 | 4 |
| Total score | 4 | 5 | 2 | 8 |

Notes: Alternative route evaluation corridors are ranked relative to each other. The lowest value indicates the lowest effects.

### 4.5.4 Priority Plants

Alternative C was the preferred route amongst Alternative routes A, B and C in terms of potential priority plant effects because much lower numbers of rare and uncommon plant locations were found within this alternative route evaluation corridor. Alternative D could not be evaluated against the other alternatives in a completely consistent manner.

Endangered and threatened were not expected to occur in any of the alternative route evaluation corridors for the same reasons provided in Section 4.1.4.

Provincially very rare species were not found in any of the evaluation corridors during field studies. In the unlikely event that any provincially rare species are found during pre-construction field studies along the final selected route corridor, it is likely that the ROW can be routed to avoid these species where appropriate given engineering and other environmental considerations.

A total of 4 rare to uncommon plant species were found in the Alternative B and C evaluation corridors, compared with 3 species in the Alternative A evaluation corridor. In total, 10 individuals were observed in corridor C, compared to 18 and 26 observed in corridor A and B, respectively (Table 4-18).

Field studies found four of the 45 provincially rare to uncommon upland and wetland plant species that could potentially occur in the Regional Study Area, including Robbin's pondweed (*Potamogeton robbinsii*), shrubby willow (*Salix arbusculoides*), rock willow (*Salix vestita*) and American milk-vetch (*Astragalus americanus*) in the Generation Outlet Transmission alternative route evaluation corridors (Table 4-18). Of the three alternative route evaluation corridors, Alternative C included the lowest number of locations for provincially rare to uncommon species by far (Table 4-18). Effects on Robbin's pondweed were not expected regardless of which alternative was selected since this is a submergent wetland species and ROW construction and operation typically do not affect the littoral zone of waterbodies. All of the remaining species except for American milk-vetch were probably more regionally common than indicated by the provincial conservation concern ranks. All eight occurrences of American milk-vetch were along roadsides at two general locations in the Regional Study Area.

Since Alternative D was identified late in the evaluation process, only one of the sampling protocols used to measure plant species presence/absence was conducted in the evaluation corridor for this route. Consequently, the numerical comparisons provided above do not include this alternative. It can be stated that no provincially very rare species were found in this evaluation corridor and that one provincially rare species, muskeg lousewort (*Pedicularis macrodonta*), was found at one location in the corridor.

**Table 4-18: Number of Locations Where Priority Species were Found Within the Generation Outlet Alternative Route Evaluation Corridors During Field Studies**

| Species | MBCDC S-Rank | Reason for inclusion | Alternative | | | |
|---|---|---|---|---|---|---|
| | | | A | B | C | D* |
| Robbin's pondweed | S2 | Provincially rare | 0 | 1 | 1 | |
| Shrubby willow | S3 | Provincially uncommon/ Range limit | 1 | 3 | 2 | |
| Rock willow | S3 | Provincially uncommon/ Range limit | 12 | 13 | 5 | |
| American milk-vetch | S3 | Provincially uncommon | 5 | 9 | 2 | |
| | | | | | | |
| Blue columbine | S4 | Regionally rare | 1 | 1 | 0 | |
| Balsam poplar | S5 | Regionally rare | 1 | 4 | 4 | |
| | | | | | | |
| Jack pine | S5 | Range limit | 23 | 16 | 13 | |
| Goldthread | S5 | Range limit | 0 | 0 | 1 | |
| Northern Labrador-tea | S4 | Range limit/ KCN importance | 2 | 2 | 1 | |
| Hairy goldenrod | S5 | Range limit | 5 | 8 | 6 | |
| | | | | | | |
| White birch | S5 | KCN importance | 16 | 22 | 25 | |
| Smooth wild strawberry | S5 | KCN importance | 5 | 4 | 1 | |
| Red currant | S5 | KCN importance | 0 | 2 | 2 | |
| Cloudberry | S5 | KCN importance | 14 | 15 | 14 | |
| Red raspberry | S5 | KCN importance | 1 | 2 | 2 | |
| Bog bilberry | S5 | KCN importance | 26 | 25 | 19 | |
| Rock cranberry | S5 | KCN importance | 38 | 42 | 37 | |
| *Total* | | | *150* | *169* | *135* | |
| | | | | | | |
| *Provincially Rare/Uncommon Sub-total* | | | *18* | *26* | *10* | |
| *Regionally Rare Sub-total* | | | *2* | *5* | *4* | |
| *Range Limit Sub-total* | | | *43* | *42* | *28* | |
| *KCN Importance Sub-total* | | | *102* | *114* | *101* | |

* Values could not be calculated in a consistent manner with the other alternatives because the sampling approach differed for Alternative D.

### 4.5.5 Conclusions

In terms of potential Project effects on terrestrial habitat, ecosystem and plant VECs, there were no major concerns with any of the four Generation Outlet Transmission alternative routes. Alternative C was the preferred route because it was expected to minimize effects on fragmentation, ecosystem diversity and priority plants, largely because more of this alternative route was near existing human features. Alternatives A and D created the highest fragmentation effects and Alternative D had the highest ecosystem diversity effects.

Alternative C was the preferred option in terms of fragmentation effects. Alternative C produced the smallest increase to total linear feature density (since it was the shortest route) and the lowest reduction to total core area (because more of its length was near existing human infrastructure). Alternatives B had the second lowest effect on total core area because it was near existing human features for much of its length. Alternatives A and D were clearly the worst options in terms of fragmentation effects. Alternative A created the largest reduction in total core area, passed near the central portion of a large core area (approximately 70 $km^2$), and subdivided this large core area into three smaller blocks. Although Alternative D was routed near existing or proposed human features, it still created the second highest reduction in total core area. Additionally, the first 28.8 km of the Alternative D route was situated between two existing transmission line rights-of-way and a railway line. While the general preference would be to locate a human linear feature next to another linear feature to minimize the fragmentation of core areas, four linear features located in close proximity could be a substantial deterrent for movements across this area.

Alternative C was the preferred option in terms of potential ecosystem diversity effects because it affected a lower total area of terrestrial habitat, included the highest proportion of common habitat types and had the smallest area in priority habitat types. Alternative D affected substantially more terrestrial habitat than the other alternative route evaluation corridors as well as the highest amount of the priority habitat types that were of highest concern. Alternatives A and B had similar overall ecosystem diversity effects.

Alternative Route C was also the preferred option in terms of potential priority plant effects because much lower numbers of rare and uncommon plant locations were found within this alternative route evaluation corridor. Endangered, threatened or provincially very rare plants were not expected to occur along any of the alternative routes. Elegant hawk's-beard (*Crepis elegans*), the only provincially rare to very rare terrestrial plant found during field studies in the region, was not observed along either route. For the remaining priority plant species, Alternative C had considerably fewer priority plant species locations than the other two routes. Although the amount of rare plant survey work was lower along Alternative D, one provincially rare species was found at one location along this route. To the extent that rare plants are associated with the regionally rare habitat types, Alternative D could have the highest priority plant effects.

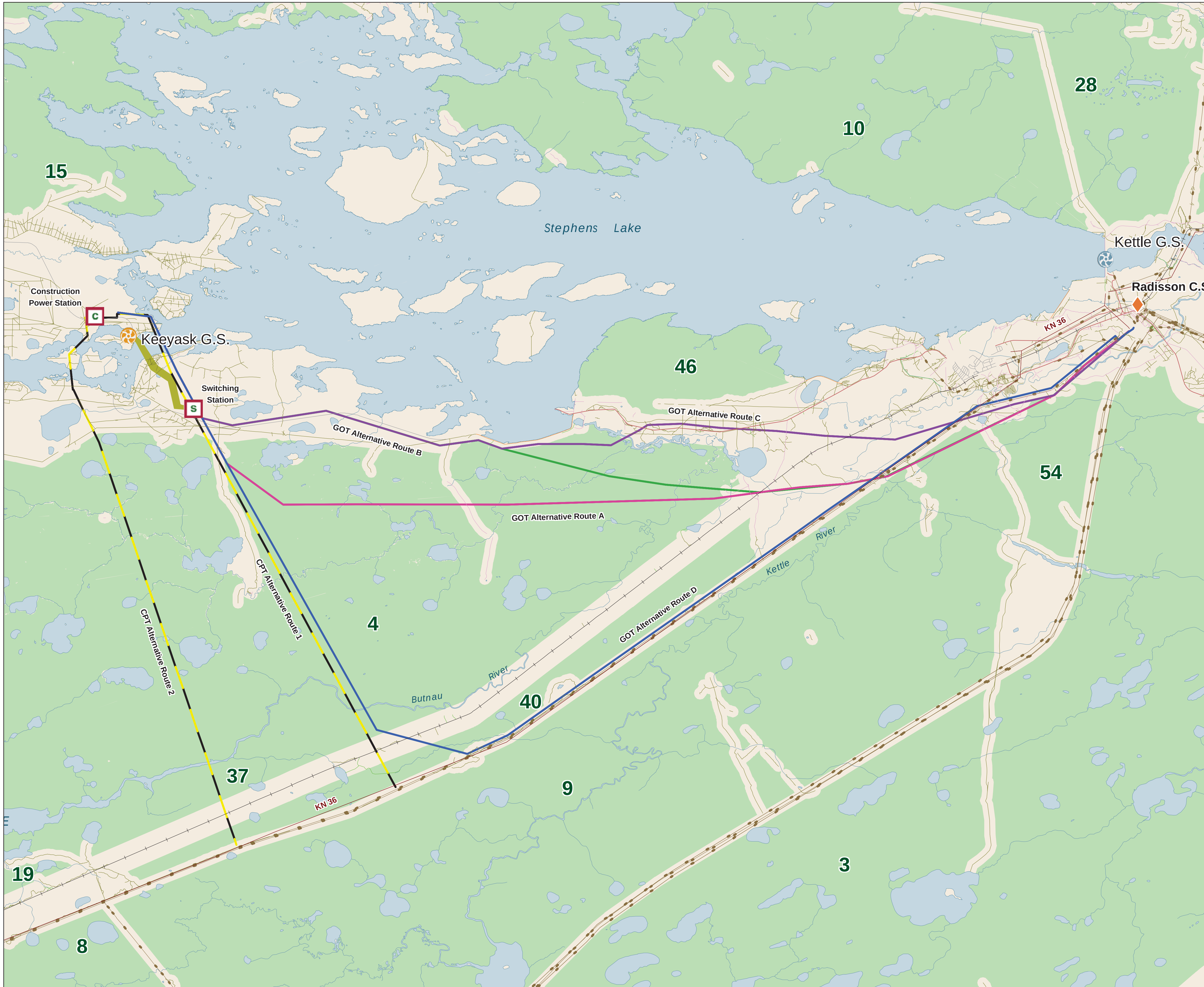
While Alternative C was the preferred route overall and Alternative D had the highest adverse effects relative to the other routes, the overall differences between the four Generation Outlet Transmission alternatives were not large. Regardless of which route is selected, final routing could likely avoid sites of relatively high concern.

Table 4-19 summarizes the results for the Generation Outlet Transmission alternative routes evaluation. For each VEC, the potential Project effects for the alternative are ranked relative to the alternative route with the lowest anticipated adverse effects. Note that the total scores should be interpreted in a qualitative manner and that the size of the differences in the total scores for the alternatives did not represent the magnitude of difference in effects.

**Table 4-19: Rank-based Scoring of Potential Effects on Valued Environmental Components for the Generation Outlet Transmission Line Alternative Routes**

| Valued Environmental Component | Alternative Route Rank | | | |
|---|---|---|---|---|
| | A | B | C | D |
| Fragmentation | 3 | 2 | 1 | 3 |
| Ecosystem diversity | 2 | 2 | 1 | 3 |
| Priority plants | 2 | 3 | 1 | 4 |

Notes: Alternative routes are ranked relative to each other. The lowest value indicates the lowest effects.




Manitoba Hydro

## Keeyask Transmission Project

**Core Areas**

- 1,000 ha minimum size

**Linear Feature Type**

- Highway
- Railway
- Winter Road
- Other Existing Transmission Line
- Dyke
- Cutline
- Ditch
- Path
- Road

**Project Infrastructure**

- Generation Outlet Transmission (GOT) Alternative Route A
- Generation Outlet Transmission (GOT) Alternative Route B
- Generation Outlet Transmission (GOT) Alternative Route C
- Generation Outlet Transmission (GOT) Alternative Route D
- Construction Power Transmission (CPT) Alternative Route 1 and 2
- Unit Transmission Line Right-of-Way
- C Construction Power Station
- S Switching Station

**Infrastructure**

- Converter Station
- Generating Station (Proposed)
- Generating Station
- Transmission Line KN36

Coordinate System:UTM Zone 15N NAD83
Data Source: ECOSTEM Ltd., MB Hydro, MB Cons, NTS.
Date Created: September 27, 2012

N

0 2 4 Kilometres
0 1 2 Miles

1:150,000

# Existing Core Areas Affected by the CPL and GOT Aternative Route

Map 4-1

File Location: Z:\Workspaces\Keeyask Transmission\Figures\Map 4-2 Existing core areas affected by the CPL and GOT alternative route V8.wor