

APPENDIX A

POTENTIAL RARE VEGETATION SPECIES IN THE CENTRAL MIXEDWOOD AND LOWER BOREAL HIGHLANDS NATURAL SUBREGIONS

TABLE A1

**POTENTIAL RARE VASCULAR PLANT SPECIES IN THE CENTRAL
MIXEDWOOD NATURAL SUBREGION OF THE PROPOSED PIPELINE PROJECT**

Scientific Name	Common Name	Habitat	Right-of-Way within Known Species Range	Preferred Habitat on Proposed Right-of-Way	Provincial Ranks	Federal/Global Ranks
<i>Agrostis exarata</i>	spike reedtop	Moist slopes and open areas; usually areas that hold snow late in the growing season. Flowering from late June to August.	--	Yes	S2 ¹	--
<i>Anemone quinquefolia</i>	wood anemone	Moist woods. Flowering in July.	--	Yes	S1 ¹	--
<i>Arabidopsis salsuginea</i>	mouse-ear cress	Moist, saline shores and flats by springs and lakes. Flowering from late April to June.	--	--	S1 ¹	--
<i>Arctagrostis arundinacea</i>	polar grass	Marshy ground and moist meadows.	--	Yes	S2S3 ¹	--
<i>Artemisia tilesii</i>	Herriot's sagewort	Open woods and river flats. Flowering from July to October.	Yes	Yes	S3 (W) ¹	--
<i>Aster engelmannii</i>	elegant aster	Open montane woods. Flowering from July to August.	--	--	S3S4 (W) ¹	--
<i>Aster umbellatus</i>	flat-topped white aster	Moist woods, thickets, meadows and swampy sites. Flowering from July to September.	--	Yes	S2 ¹	--
<i>Astragalus bodinii</i>	Bodin's milk vetch	Gravelly banks and moist, sandy meadows. Flowering in July.	Yes	--	S1 ¹	--
<i>Blysmus rufus</i>	red bulrush	Saline fens and poorly drained, iron-rich ponds. Flowering in July.	Yes	Yes	S1 ¹	--
<i>Botrychium crenulatum</i>	scalloped grape fern	Dry, open areas. Flowering from mid-spring to late summer.	--	--	S1 ¹	G3 ²
<i>Botrychium hesperium</i>	western grape fern	Mesic, grassy slopes and wooded areas. Flowering from early spring to early fall.	--	Yes	SU ¹	--
<i>Botrychium lanceolatum</i>	lance-leaved grape fern	Wet, rocky slopes, meadows and woods. Flowering from late spring to mid-summer.	--	Yes	S2 ¹	--
<i>Botrychium multifidum</i> var. <i>intermedium</i>	leather grape fern	Moist, sandy areas and fields.	--	--	S3 (W) ¹	--
<i>Botrychium oneidense</i>	blunt-lobed grape fern	Moist, shady, acidic woods and swamps.	--	Yes	S1 ¹	--
<i>Botrychium pinnatum</i>	northwestern grape fern	Moist or wet, open places. Flowering from June to August.	--	Yes	S3 ¹	--
<i>Campanula aparinoides</i>	marsh bellflower	Wet meadows and marshes.	--	Yes	S1 ¹	--
<i>Cardamine pratensis</i>	meadow bitter cress	Bogs and swamps. Flowering from June to July.	--	Yes	S3 (W) ¹	--
<i>Carex adusta</i>	browned sedge	Dry, acidic soil, moist, sandy ground under pine and stony ground. Flowering in July.	--	--	S1 ¹	--
<i>Carex arcta</i>	narrow sedge	Moist woods. Flowering in July.	--	Yes	S1 ¹	--
<i>Carex capitata</i>	capitate sedge	Boggy and often calcareous areas. Flowering from June to August.	--	Yes	S3 (W) ¹	--
<i>Carex heleonastes</i>	Hudson Bay sedge	Often calcareous bogs and marshes. Fruiting from June to August.	--	Yes	S2 ¹	--
<i>Carex hystericina</i>	porcupine sedge	Shady marshes. Flowering from May to June.	--	Yes	S1 ¹	--
<i>Carex lacustris</i>	lakeshore sedge	Marshes and swampy woods. Flowering from July to August.	--	Yes	S2 ¹	--
<i>Carex oligosperma</i>	few-fruited sedge	Wet meadows and bogs. Flowering in July.	Yes	Yes	S3? ¹	--
<i>Carex pedunculata</i>	stalked sedge	Forest edges. Flowering from May to June.	--	Yes	S1 ¹	--
<i>Carex scoparia</i>	broom sedge	Moist, open woodlands at moderate elevations. Flowering from June to July.	--	--	S1 ¹	--
<i>Carex umbellata</i>	umbellate sedge	Dry, open areas; often sandy. Fruiting from mid-March to mid-July.	--	--	S2 ¹	--
<i>Carex vulpinoidea</i>	fox sedge	Swampy ground. Flowering from May to July.	--	Yes	S2 ¹	--
<i>Chrysosplenium iowense</i>	golden saxifrage	Streambanks and marshy ground in shade. Flowering from May to June.	Yes	Yes	S3? ¹	G3? ²
<i>Coptis trifolia</i>	goldthread	Damp, mossy woods, muskeg, willow scrub and tundra. Flowering in July.	Yes	Yes	S3 (W) ¹	--

TABLE A1 Cont'd

Scientific Name	Common Name	Habitat	Right-of-Way within Known Species Range	Preferred Habitat on Proposed Right-of-Way	Provincial Ranks	Federal/Global Ranks
<i>Cypripedium acaule</i>	stemless lady's-slipper	Wetlands, woods, sand dunes and sphagnum bogs. Flowering from late June to July.	--	Yes	S3 ¹	--
<i>Cypripedium acaule</i>	stemless lady's-slipper	Wetlands, woods, sand dunes and sphagnum bogs. Flowering from late June to July.	--	Yes	S3 ¹	--
<i>Cystopteris montana</i>	mountain bladder fern	Springy or damp, calcareous places. Sporulating from summer to fall.	--	Yes	S2 ¹	--
<i>Danthonia spicata</i>	poverty oat grass	Dry to moist open areas and open woodland. Flowering in July. Produces fruit from late July to September.	--	Yes	S2 ¹	--
<i>Diphasiastrum sitchense</i>	ground-fir	Open woods and barrens.	--	Yes	S2 ¹	--
<i>Drosera linearis</i>	slenderleaf sundew	Marly bogs and wet, calcareous shores. Flowering in July.	--	Yes	S3 (W) ¹	--
<i>Dryopteris cristata</i>	crested shield fern	Moist woods and marshes.	--	Yes	S1 ¹	--
<i>Dryopteris filix-mas</i>	male fern	Wooded slopes.	--	Yes	S1 ¹	--
<i>Elatine triandra</i>	waterwort	Muddy shores and shallow water. Flowering from early summer to fall.	--	--	S1 ¹	--
<i>Eleocharis elliptica</i>	slender spikerush	Neutral to calcareous wet places. Flowering from May to August.	--	Yes	S2? ¹	--
<i>Epilobium halleanum</i>	Hall's willowherb	Moist ground. Flowering and produces fruit in July.	--	Yes	S1 ¹	--
<i>Epilobium lactiflorum</i>	white willowherb	Moist streambanks and moist slopes to alpine elevations. Flowering from June to August.	--	Yes	S2 ¹	--
<i>Eupatorium maculatum</i>	spotted Joe-pye weed	Marshy ground and moist, open woods. Flowering from July to September.	--	Yes	S1S2 ¹	--
<i>Gentianopsis detonsa</i> ssp. <i>raupii</i>	northern fringed gentian	Moist banks and meadows. Flowering from late June to early August.	--	Yes	S1 ¹	G3G5T3T5 ²
<i>Geranium carolinianum</i>	Carolina wild geranium	Dry, rocky woods and disturbed sites. Flowering from April to July.	--	Yes	S1 ¹	--
<i>Hedyotis longifolia</i>	long-leaved bluets	Open, sandy woods and montane slopes. Flowering from June to July.	--	--	S2 ¹	--
<i>Hypericum majus</i>	large Canada St. John's-wort	Moist depressions in sand dunes and sandy shores. Flowering from late June to September.	--	--	S2 ¹	--
<i>Juncus brevicaudatus</i>	short-tail rush	Shores and marshes; pioneer on wet ground. Fruiting from mid-summer to fall.	Yes	Yes	S2 ¹	--
<i>Juncus nevadensis</i>	Nevada rush	Wet areas. Flowering from July to August.	--	Yes	S1 ¹	--
<i>Juncus stygius</i> var. <i>americanus</i>	marsh rush	Fens, mossy areas around springs and seepages. Flowering in August.	Yes	Yes	S2 ¹	--
<i>Lactuca biennis</i>	tall blue lettuce	Moist, open woods. Flowering from July to August.	Yes	Yes	S2 ¹	--
<i>Liparis loeselii</i>	Loesel's twayblade	Cool, moist ravines, bogs or fens, wet, peaty or sandy meadows and exposed sand along the edges of lakes; colonises previously open and disturbed habitats during the early and middle stages of reforestation. Flowering from May to August.	--	Yes	S1 ¹	--
<i>Luzula acuminata</i>	sharp-pointed wood-rush	Moist woodland clearings. Flowering from April to May.	--	Yes	S1 ¹	--
<i>Luzula rufescens</i>	reddish wood-rush	Mixedwood forest. Flowering and fruiting in summer.	--	Yes	S1 ¹	--
<i>Malaxis paludosa</i>	bog adder's-mouth	Black spruce bogs in sphagnum moss. Flowering from June to August.	--	Yes	S1 ¹	--
<i>Mimulus guttatus</i>	yellow monkeyflower	Stream margins, meadows and springs. Flowering from July to August.	--	Yes	S2S3 ¹	--
<i>Monotropa hypopithys</i>	pinemap	Moist woods; saprophytic in coniferous woods. Flowering in July.	--	Yes	S2 ¹	--
<i>Muhlenbergia racemosa</i>	marsh muhly	Sandhills and dry slopes. Flowering from late July to August. Produces fruit from August to September.	--	--	S2 ¹	--

TABLE A1 Cont'd

Scientific Name	Common Name	Habitat	Right-of-Way within Known Species Range	Preferred Habitat on Proposed Right-of-Way	Provincial Ranks	Federal/Global Ranks
<i>Najas flexilis</i>	slender naiad	Ponds and streams. Flowering from July to August.	--	Yes	S2 ¹	--
<i>Nymphaea leibergii</i>	pygmy water-lily	Ponds and quiet waters. Flowering from June to September.	--	Yes	S1S2 ¹	--
<i>Nymphaea tetragona</i>	white water-lily	Lakes, ponds and slow-moving streams; likes deep and acidic water. Flowering throughout the summer.	--	Yes	S1 ¹	--
<i>Pellaea glabella</i>	smooth cliff-brake	Dry limestone rocks. Sporulating from summer to fall.	--	--	S2 ¹	--
<i>Pellaea glabella</i> ssp. <i>simplex</i>	smooth cliff-brake	Calcareous cliffs and ledges. Sporulating from summer to fall.	--	--	S2 ¹	--
<i>Phegopteris connectilis</i>	northern beech fern	Moist woodlands.	--	Yes	S2 ¹	--
<i>Physostegia ledinghamii</i>	false dragonhead	Moist woods and streambanks. Flowering from July to September.	--	Yes	S3 (W) ¹	G3? ²
<i>Pinguicula villosa</i>	small butterwort	Sphagnum bogs. Flowering from mid-June to July.	--	Yes	S2 ¹	--
<i>Plantago maritima</i>	seaside plantain	Saline marshes. Flowering in June.	--	Yes	S1 ¹	--
<i>Polygala paucifolia</i>	fringed milkwort	Marshy, coniferous woods. Flowering from May to early July.	--	Yes	S1 ¹	--
<i>Polypodium sibiricum</i>	Siberian polypody	Shaded, sheltered slopes. Sporulating from summer to early fall.	--	Yes	S3 (W) ¹	--
<i>Potamogeton foliosus</i>	leafy pondweed	Shallow standing water. Flowering from July to September.	--	Yes	S2 ¹	--
<i>Potamogeton robbinsii</i>	Robbins' pondweed	Shallow water. Flowering from August to September.	--	Yes	S1 ¹	--
<i>Potamogeton strictifolius</i>	linear-leaved pondweed	Wet places, submerged in water. Flowering from July to September.	--	Yes	S2 ¹	--
<i>Potentilla multifida</i>	branched cinquefoil	Gravel bars and open slopes. Flowering in July.	--	--	S1 ¹	--
<i>Rhynchospora capillacea</i>	slender beak-rush	Calcareous bogs. Flowering in July.	--	Yes	S1 ¹	--
<i>Sagittaria latifolia</i>	broad-leaved arrowhead	Ponds and lakes. Flowering in August.	--	--	S2 ¹	--
<i>Salix sitchensis</i>	Sitka willow	Alluvial soil (Athabasca River). Flowering in May.	--	--	S1 ¹	--
<i>Scirpus pallidus</i>	pale bulrush	Marshy areas. Flowering from June to July.	Yes	Yes	S1 ¹	--
<i>Sisyrinchium septentrionale</i>	pale blue-eyed grass	Moist, grassy areas. Flowering from May to July.	--	--	S3 ¹	G3G4 ²
<i>Sparganium glomeratum</i>	bur-reed	Ponds. Flowering in July.	--	Yes	S1 ¹	--
<i>Sparganium hyperboreum</i>	northern bur-reed	Aquatic plants in shallow alpine/subalpine lakes. Flowering from July to August.	--	--	S1 ¹	--
<i>Spartina pectinata</i>	prairie cord grass	Saline shores and marshes. Flowering from late June to July.	--	Yes	S1 ¹	--
<i>Spergularia salina</i>	salt-marsh sand spurry	Brackish or saline muds and sands. Flowering from May to August.	--	--	S2S3 ¹	--
<i>Sphenopholis obtusata</i>	prairie wedge grass	Moist meadows and open woods. Flowering from June to July.	--	--	S2 ¹	--
<i>Spiranthes lacera</i>	northern slender ladies'-tresses	Small disturbed areas within moist mixedwood forests. Flowering in mid-July.	--	Yes	S1 ¹	--
<i>Stellaria crispa</i>	wavy-leaved chickweed	Moist woods at moderate elevations. Flowering from June to July.	--	Yes	S2 ¹	--
<i>Streptopus roseus</i>	rose mandarin	Moist coniferous forests. Flowering from June to July.	--	Yes	S1 ¹	--
<i>Trichophorum clintonii</i>	Clinton's bulrush	Open woodland and turfy shores. Flowering from May to June.	--	--	S1 ¹	--
<i>Viola pallens</i>	Macloskey's violet	Boggy or wet ground and wet thickets. Flowering from May to July.	--	Yes	S2S3 ¹	--
<i>Wolffia columbiana</i>	watermeal	Floating or just beneath the surface in beaver ponds. Reproduce only by budding.	--	--	S2 ¹	--

Sources: ACIMS 2013a,b,c,d,e, Argus and Pryer 1990, COSEWIC 2014, Flora of North America Editorial Committee 1993+, Government of Canada 2014, Kershaw *et al.* 2001, Moss 1983, NatureServe 2014a, Porsild and Cody 1980, Williston 2001

Notes:

1. Provincial (S) ranks are assigned by the provincial and federal CDC(s); in cases of conflict or missing data, the provincial CDC will have preference. Ranks range from 1 (five or fewer occurrences) to 5 (demonstrably secure under present conditions); definitions below are adapted from NatureServe (2014b) unless noted otherwise.
 - S1 = Critically Imperilled: due to extreme rarity or due to some factor(s) making it especially vulnerable to extirpation. Typically five or fewer occurrences or very few remaining individuals (< 1,000).
 - S2 = Imperilled: due to rarity or due to some factor(s) making it very vulnerable to extirpation. Typically 6-20 occurrences or few remaining individuals (1,000-3,000).
 - S3 = Vulnerable: because rare and uncommon or found in a restricted range (even if abundant at some locations), or due to other factors making it vulnerable to extirpation. Typically 21-100 occurrences or between 3,000 and 10,000 individuals.
 - S4 = Apparently Secure: uncommon but not rare and usually widespread in the province. Possible cause of long-term concern. Usually more than 100 occurrences and more than 10,000 individuals.
 - S5 = Secure: common, widespread and abundant in the province. Essentially ineradicable under present conditions. Typically with considerably more than 100 occurrences and more than 10,000 individuals.
 - S#S# = Range Rank: a numeric range rank (*e.g.*, S2S3) is used to indicate the range of uncertainty about the exact status of the element.
 - SU = Unrankable: currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
 - S#? = Inexact numeric rank: denotes inexact numeric rank.
 - T = Designates a rank associated with a subspecies.
 - (W) = Watch List: elements that are not currently considered as high conservation concern but there is some information to suggest that they may become rare should there be significant alterations to the element's habitats or population. Data for watch listed elements are collected by ACIMS (2013b).
2. Global (G) ranks are based on species status world-wide and follow a system parallel to that for Provincial Ranks (Note 1), ranging from 1 (five or fewer occurrences) to 5 (demonstrably secure under present conditions). Only Global Ranks of concern (G1 to G3) or questionable ranks are displayed, range ranks (G#G#) which include a G1 to G3 ranking are also included (*e.g.*, G3G4) (NatureServe 2014b).

TABLE A2

**POTENTIAL RARE VASCULAR PLANT SPECIES IN THE LOWER BOREAL
HIGHLANDS NATURAL SUBREGION OF THE PROPOSED PIPELINE PROJECT**

Scientific Name	Common Name	Habitat	Right-of-Way within Known Species Range	Preferred Habitat on Proposed Right-of-Way	Provincial Ranks	Federal/Global Ranks
<i>Arctagrostis arundinacea</i>	polar grass	Marshy ground and moist meadows.	--	Yes	S2S3 ¹	--
<i>Astragalus bodinii</i>	Bodin's milk vetch	Gravelly banks and moist, sandy meadows. Flowering in July.	Yes	--	S1 ¹	--
<i>Boschniakia rossica</i>	ground-cone	Open woodland and scrub; parasitic on alder. Flowering in July.	--	--	S1 ¹	--
<i>Botrychium crenulatum</i>	scalloped grape fern	Dry, open areas. Flowering from mid-spring to late summer.	--	--	S1 ¹	G3 ²
<i>Botrychium hesperium</i>	western grape fern	Mesic, grassy slopes and wooded areas. Flowering from early spring to early fall.	--	Yes	SU ¹	--
<i>Botrychium lanceolatum</i>	lance-leaved grape fern	Wet, rocky slopes, meadows and woods. Flowering from late spring to mid-summer.	--	Yes	S2 ¹	--
<i>Botrychium pinnatum</i>	northwestern grape fern	Moist or wet, open places. Flowering from June to August.	--	Yes	S3 ¹	--
<i>Calamagrostis lapponica</i>	Lapland reed grass	Moist to dry, gravelly slopes at high elevations. Flowering in August.	--	--	S1 ¹	--
<i>Cardamine pratensis</i>	meadow bitter cress	Bogs and swamps. Flowering from June to July.	--	Yes	S3 (W) ¹	--
<i>Carex heleonastes</i>	Hudson Bay sedge	Often calcareous bogs and marshes. Fruiting from June to August.	--	Yes	S2 ¹	--
<i>Carex oligosperma</i>	few-fruited sedge	Wet meadows and bogs. Flowering in July.	Yes	Yes	S3? ¹	--
<i>Chrysosplenium iowense</i>	golden saxifrage	Streambanks and marshy ground in shade. Flowering from May to June.	Yes	Yes	S3? ¹	G3? ²
<i>Diphasiastrum sitchense</i>	ground-fir	Open woods and barrens.	--	Yes	S2 ¹	--
<i>Dryopteris cristata</i>	crested shield fern	Moist woods and marshes.	--	Yes	S1 ¹	--
<i>Isoetes echinospora</i>	northern quillwort	Ponds and lakes; shallow water. Flowering in late August.	--	Yes	S2 ¹	--
<i>Juncus stygius</i> var. <i>americanus</i>	marsh rush	Fens, and mossy areas around springs and seepages. Flowering in August.	Yes	Yes	S2 ¹	--
<i>Physostegia ledinghamii</i>	false dragonhead	Moist woods and streambanks. Flowering from July to September.	--	Yes	S3 (W) ¹	G3? ²
<i>Pinguicula villosa</i>	small butterwort	Sphagnum bogs. Flowering from mid-June to July.	--	Yes	S2 ¹	--
<i>Potamogeton obtusifolius</i>	blunt-leaved pondweed	Lakes, ponds, cold springs and streams. Flowering from July to September.	--	Yes	S2 ¹	--
<i>Scirpus pallidus</i>	pale bulrush	Marshy areas. Flowering from June to July.	Yes	Yes	S1 ¹	--

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 - S#S# = Range Rank: a numeric range rank (e.g., S2S3) is used to indicate the range of uncertainty about the exact status of the element.
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APPENDIX B

POTENTIAL RARE ECOLOGICAL COMMUNITIES IN THE CENTRAL MIXEDWOOD AND LOWER BOREAL HIGHLANDS NATURAL SUBREGIONS

TABLE B1

POTENTIAL RARE ECOLOGICAL COMMUNITIES IN THE CENTRAL MIXEDWOOD NATURAL SUBREGION

Scientific Names	Common Names	Right-of-Way within Community Range	Provincial and Global Ranks ¹
Forest/Woodland			
<i>Betula neoalaskana</i> / <i>Ledum groenlandicum</i>	Alaska birch/common Labrador tea	Yes	S1S2
<i>Larix laricina</i> - <i>Picea mariana</i> / <i>Cornus stolonifera</i> - <i>Rubus idaeus</i>	tamarack - black spruce/red-osier dogwood - wild red raspberry	Yes	S1S2
<i>Larix laricina</i> / <i>Carex prairea</i>	tamarack/prairie sedge	--	S1
<i>Picea glauca</i> / <i>Alnus incana</i> ssp. <i>tenuifolia</i> - <i>Betula neoalaskana</i> / <i>Equisetum pratense</i> / <i>Hylocomium splendens</i>	white spruce/river alder - Alaska birch/meadow horsetail/stair-step moss	Yes	S3
<i>Picea glauca</i> / <i>Cetraria islandica</i>	white spruce/lichen	Yes	S1?
<i>Picea glauca</i> / <i>Equisetum scirpoides</i> forest	white spruce/dwarf scouring-rush forest	Yes	SU
<i>Picea mariana</i> / <i>Cornus stolonifera</i> /feathermoss	black spruce/red-osier dogwood/feathermoss	Yes	S1S2
<i>Populus balsamifera</i> / <i>Alnus incana</i> ssp. <i>tenuifolia</i> - <i>Cornus stolonifera</i> / <i>Equisetum pratense</i>	balsam poplar/river alder - red-osier dogwood/meadow horsetail	--	S3
<i>Populus balsamifera</i> / <i>Rhamnus alnifolia</i> / <i>Equisetum arvense</i>	balsam poplar/alder-leaved buckthorn/common horsetail	--	S1
<i>Populus balsamifera</i> / <i>Viburnum opulus</i> / <i>Matteuccia struthiopteris</i>	balsam poplar/high-bush cranberry/ostrich fern	--	S1S2
<i>Populus tremuloides</i> / <i>Rosa acicularis</i> / <i>Apocynum androsaemifolium</i>	aspen/prickly rose/spreading dogbane	--	S1S2
<i>Populus tremuloides</i> / <i>Rubus parviflorus</i> / <i>Aralia nudicaulis</i>	aspen/thimbleberry/wild sarsaparilla	--	S2S3
<i>Populus tremuloides</i> / <i>Salix bebbiana</i> - <i>Corylus cornuta</i> / <i>Calamagrostis canadensis</i> - <i>Matteuccia struthiopteris</i>	aspen/beaked willow - beaked hazelnut/bluejoint - ostrich fern	--	S1
<i>Populus tremuloides</i> / <i>Vaccinium myrtilloides</i> woodland	aspen/common blueberry woodland	--	S2?
Shrubland			
<i>Alnus incana</i> ssp. <i>tenuifolia</i> / <i>Matteuccia struthiopteris</i> shrubland	river alder/ostrich fern shrubland	Yes	S2?
<i>Amelanchier alnifolia</i> / <i>Arctostaphylos uva-ursi</i> / <i>Oryzopsis pungens</i>	Saskatoon/common bearberry/northern rice grass	--	S2S3
<i>Andromeda polifolia</i> / <i>Sarracenia purpurea</i> / <i>Sphagnum angustifolium</i>	bog rosemary/pitcher-plant/peat moss	--	S1S2
<i>Chamaedaphne calyculata</i> - <i>Kalmia polifolia</i> / <i>Cladina mitis</i>	leatherleaf - northern laurel/green reindeer lichen	Yes	S1S2
<i>Salix drummondiana</i> / <i>Scirpus microcarpus</i> - <i>Calamagrostis canadensis</i>	Drummond's willow/small-fruited bulrush - bluejoint	Yes	S1
<i>Salix pedicellaris</i> / <i>Potentilla palustris</i> rich fen	bog willow/marsh cinquefoil rich fen	--	S2?
<i>Symphoricarpos albus</i> - <i>Amelanchier alnifolia</i> slope type	snowberry - saskatoon shrubby slope	Yes	S2?
Herbaceous			
<i>Atriplex subspicata</i> - <i>Puccinellia nuttalliana</i> - <i>Triglochin palustris</i> string fen	spearscale saltbrush - Nuttall's salt-meadow grass - slender arrow grass	--	S1S3
<i>Calamagrostis stricta</i> - <i>Triglochin maritima</i> string fen	narrow reed grass - seaside arrow grass string fen	--	S1S3
<i>Carex limosa</i> - <i>Menyanthes trifoliata</i> - <i>Cardamine pratensis</i>	mud sedge - buck-bean - meadow bitter cress	--	S1S2
<i>Carex limosa</i> - <i>Scheuchzeria palustris</i> / <i>Sphagnum teres</i> - <i>S. subsecundum</i>	mud sedge - scheuchzeria/peat moss	Yes	S1
<i>Carex oligosperma</i> / <i>Sphagnum subsecundum</i>	few-fruited sedge/twisted bog moss	--	S1S2
<i>Carex pseudocyperus</i> - <i>Calla palustris</i>	cyperus-like sedge - water arum	--	S2
<i>Carex retrorsa</i> marsh	turned sedge marsh	--	S1S2
<i>Carex rostrata</i> marsh	beaked sedge marsh	Yes	S2
<i>Elymus trachycaulus</i> - <i>Distichlis stricta</i>	slender wheat grass - salt grass	--	S1
<i>Elymus trachycaulus</i> - <i>Hierochloa hirta</i> ssp. <i>arctica</i>	slender wheat grass - sweet grass	--	SU
<i>Hudsonia tomentosa</i> sand flats	sand heather sand flats	Yes	S2?
<i>Triglochin maritima</i> - <i>Carex praegracilis</i> spring fen	seaside arrow-grass - graceful sedge spring fen	--	S1S2

TABLE B1 Cont'd

Scientific Names	Common Names	Right-of-Way within Community Range	Provincial and Global Ranks ¹
Sparsely Vegetated			
<i>Puccinellia nuttalliana</i> - <i>Suaeda calceoliformis</i> - <i>Spergularia marina</i> barren	Nuttall's salt-meadow grass - western sea-blite - salt-marsh sand spurry barren	--	S2
<i>Salicornia rubra</i> emergent marsh	samphire emergent marsh	--	S2, G2G3
Aquatic			
<i>Cymbella pusilla</i> - <i>Mastogloia smithii</i> - <i>Nitzschia palea</i>	diatom ponds	--	S1S3
<i>Isoetes echinospora</i> aquatic community	northern quillwort aquatic community	--	S1
<i>Sparganium eurycarpum</i> emergent aquatic vegetation	giant bur-reed emergent aquatic vegetation	Yes	S1S2

Source: Allen 2014

- Notes:**
- 1 Provincial (S) and Global (G) ratings range from S1 (five or fewer occurrences or very few remaining hectares) to S5 (demonstrably secure, though it may be quite rare in parts of its range, especially at the periphery). Ranks may be combined (e.g., S1S2). This indicates a larger margin of error than ranks assigned a "?" qualifier. Ratings that are not of concern (4-5) are not included.
 - ? = Element is not yet ranked (i.e., S?), or has an inexact numerical rank (e.g., S1?).
 - U = Unrankable: currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

TABLE B2

**POTENTIAL RARE ECOLOGICAL COMMUNITIES IN THE
LOWER BOREAL HIGHLANDS NATURAL SUBREGION**

Scientific Names	Common Names	Right-of-Way within Community Range	Provincial and Global Ranks ¹
Forest/Woodland			
<i>Picea glauca/Equisetum scirpoides</i> forest	white spruce/dwarf scouring-rush forest	Yes	SU
<i>Populus balsamifera/Viburnum opulus/Matteuccia struthiopteris</i>	balsam poplar/high-bush cranberry/ostrich fern	--	S1S2
Shrubland			
<i>Alnus incana</i> ssp. <i>tenuifolia</i> /Matteuccia struthiopteris shrubland	river alder/ostrich fern shrubland	Yes	S2?
<i>Salix pedicellaris/Potentilla palustris</i> rich fen	bog willow/marsh cinquefoil rich fen	--	S2?
Herbaceous			
<i>Carex rostrata</i> marsh	beaked sedge marsh	Yes	S2
Aquatic			
<i>Isoetes echinospora</i> aquatic community	northern quillwort aquatic community	--	S1
<i>Sparganium eurycarpum</i> emergent aquatic vegetation	giant bur-reed emergent aquatic vegetation	Yes	S1S2

Source: Allen 2014

- Notes: 1 Provincial (S) and Global (G) ratings range from S1 (5 or fewer occurrences or very few remaining hectares) to S5 (demonstrably secure, though it may be quite rare in parts of its range, especially at the periphery). Ranks may be combined (e.g., S1S2). This indicates a larger margin of error than ranks assigned a "?" qualifier. Ratings that are not of concern (4-5) are not included.
- ? = Element is not yet ranked (i.e., S?), or has an inexact numerical rank (e.g., S1?).

APPENDIX C

PHOTOPLATES



Plate 1 View north of typical coniferous forest vegetation community observed along the Project at SW 33-80-13 W4M (approximate KP 2.1) (July 25, 2013).



Plate 2 View northwest of typical deciduous forest vegetation community observed along the Project at NE 33-80-13 W4M (approximate KP 0.85) (July 25, 2013).



Plate 3 View east of typical mixedwood forest vegetation community observed along the Project at SW 29-81-16 W4M (approximate KP 36.2) (July 23, 2013).



Plate 4 View southeast of typical treed fen dominated by black spruce, observed along the Project at SE 23-81-16 W4M (approximate KP 29.3) (July 24, 2013).



Plate 5 View north of House River riparian area observed along the Project at SE 29-81-16 W4M (approximate KP 35.1) (July 23, 2013).



Plate 6 Goldthread plants observed at NE 36-80-14 W4M (approximate KP 6.2) (July 24, 2013).



Plate 7 Close-up of the inner stem of black-footed reindeer lichen at KP 29.5 (July 5, 2014).



Plate 8 Look south at sandy hilltop with scale beret lichen, fig-leaved pixie lichen and lesser pied pixie lichen at KP 29.65 (July 5, 2014).



Plate 9 Powdered beard lichen at KP 29.5 (July 5, 2014).



Plate 10 Transplanted branch of powdered beard lichen near KP 29.5 (July 5, 2014).



Plate 11 Five branch transplants of powdered beard lichen near KP 29.5 (July 5, 2014).



Plate 12 Scale beret lichen on ground surface at KP 29.65 (July 5, 2014).



Plate 13 Red and yellow collar moss in original location on Leismer Compressor Station (July 8, 2014).



Plate 14 Transplanted patch of red and yellow collar moss (July 8, 2014).

APPENDIX D**OBSERVED PLANT SPECIES – BY TYPE AND COMMON NAME**

Common Name	Scientific Name
TREES	
Alaska birch	<i>Betula neoalaskana</i>
aspen	<i>Populus tremuloides</i>
balsam fir	<i>Abies balsamea</i>
balsam poplar	<i>Populus balsamifera</i>
black spruce	<i>Picea mariana</i>
Jack pine	<i>Pinus banksiana</i>
tamarack	<i>Larix laricina</i>
white spruce	<i>Picea glauca</i>
SHRUBS	
basket willow	<i>Salix petiolaris</i>
beaked willow	<i>Salix bebbiana</i>
bracted honeysuckle	<i>Lonicera involucrata</i>
bristly black currant	<i>Ribes lacustre</i>
Canada buffaloberry	<i>Shepherdia canadensis</i>
common Labrador tea	<i>Ledum groenlandicum</i>
dwarf birch	<i>Betula pumila</i>
leatherleaf	<i>Chamaedaphne calyculata</i>
low-bush cranberry	<i>Viburnum edule</i>
northern gooseberry	<i>Ribes oxycanthoides</i>
prickly rose	<i>Rosa acicularis</i>
red-osier dogwood	<i>Cornus stolonifera</i>
river alder	<i>Alnus incana</i>
Scouler's willow	<i>Salix scouleriana</i>
snowberry	<i>Symphoricarpos albus</i>
wild red currant	<i>Ribes triste</i>
wild red raspberry	<i>Rubus idaeus</i>
willow species	<i>Salix</i> sp.
FORBS, DWARF SHRUBS	
aster species	<i>Aster</i> sp.
Bicknell's geranium	<i>Geranium bicknellii</i>
bishop's-cap	<i>Mitella nuda</i>
bog bilberry	<i>Vaccinium uliginosum</i>
bog cranberry	<i>Vaccinium vitis-idaea</i>
bog rosemary	<i>Andromeda polifolia</i>
bunchberry	<i>Cornus canadensis</i>
cloudberry	<i>Rubus chamaemorus</i>
common bearberry	<i>Arctostaphylos uva-ursi</i>
common blueberry	<i>Vaccinium myrtilloides</i>
common fireweed	<i>Epilobium angustifolium</i>
common horsetail	<i>Equisetum arvense</i>
common nettle	<i>Urtica dioica</i>
common pink wintergreen	<i>Pyrola asarifolia</i>
common yarrow	<i>Achillea millefolium</i>
cow-wheat	<i>Melampyrum lineare</i>
cream-colored vetchling	<i>Lathyrus ochroleucus</i>
crowberry	<i>Empetrum nigrum</i>
daisy fleabane species	<i>Erigeron</i> sp.
dewberry	<i>Rubus pubescens</i>
dwarf raspberry	<i>Rubus arcticus</i>
dwarf scouring-rush	<i>Equisetum scirpoides</i>
fairybells	<i>Disporum trachycarpum</i>

Common Name	Scientific Name
fleshy stitchwort	<i>Stellaria crassifolia</i>
goldthread	<i>Coptis trifolia</i>
greenish-flowered wintergreen	<i>Pyrola chlorantha</i>
ground-cedar	<i>Diphysastrum complanatum</i>
hooded ladies'-tresses	<i>Spiranthes romanzoffiana</i>
Labrador lousewort	<i>Pedicularis labradorica</i>
lesser rattlesnake plantain	<i>Goodyera repens</i>
Lindley's aster	<i>Aster ciliolatus</i>
many-flowered yarrow	<i>Achillea sibirica</i>
marsh cinquefoil	<i>Potentilla palustris</i>
marsh-marigold	<i>Caltha palustris</i>
moschatel	<i>Adoxa moschatellina</i>
narrow spinulose shield fern	<i>Dryopteris carthusiana</i>
narrow-leaved collomia	<i>Collomia linearis</i>
narrow-leaved hawkweed	<i>Hieracium umbellatum</i>
northern bastard toadflax	<i>Geocaulon lividum</i>
northern bedstraw	<i>Galium boreale</i>
northern green bog orchid	<i>Platanthera hyperborea</i>
northern laurel	<i>Kalmia polifolia</i>
northern starflower	<i>Trientalis borealis</i>
oak fern	<i>Gymnocarpium dryopteris</i>
one-flowered wintergreen	<i>Moneses uniflora</i>
one-sided wintergreen	<i>Orthilia secunda</i>
palmate-leaved coltsfoot	<i>Petasites frigidus</i> var. <i>palmatus</i>
purple avens	<i>Geum rivale</i>
red and white baneberry	<i>Actaea rubra</i>
round-leaved sundew	<i>Drosera rotundifolia</i>
running club-moss	<i>Lycopodium clavatum</i>
showy aster	<i>Eurybia conspicua</i>
small bedstraw	<i>Galium trifidum</i>
small bog cranberry	<i>Oxycoccus microcarpus</i>
small enchanter's nightshade	<i>Circaea alpina</i>
spotted touch-me-not	<i>Impatiens capensis</i>
spurred gentian	<i>Halenia deflexa</i>
star-flowered Solomon's-seal	<i>Smilacina stellata</i>
stiff club-moss	<i>Lycopodium annotinum</i>
swamp horsetail	<i>Equisetum fluviatile</i>
sweet coltsfoot	<i>Petasites frigidus</i>
tall larkspur	<i>Delphinium glaucum</i>
tall lungwort	<i>Mertensia paniculata</i>
three-toothed cinquefoil	<i>Potentilla tridentata</i>
twinflower	<i>Linnaea borealis</i>
twining honeysuckle	<i>Lonicera dioica</i>
water smartweed	<i>Polygonum coccineum</i>
western Canada violet	<i>Viola canadensis</i>
wild lily-of-the-valley	<i>Maianthemum canadense</i>
wild sarsaparilla	<i>Aralia nudicaulis</i>
wild strawberry	<i>Fragaria virginiana</i>
wild vetch	<i>Vicia americana</i>
woodland horsetail	<i>Equisetum sylvaticum</i>
yellow avens	<i>Geum aleppicum</i>
yellow rattle	<i>Rhinanthus minor</i>
GRASSES, SEDGES, RUSHES	
bluejoint	<i>Calamagrostis canadensis</i>
bog sedge	<i>Carex paupercula</i>
brownish sedge	<i>Carex brunnescens</i>
few-flowered sedge	<i>Carex pauciflora</i>

Common Name	Scientific Name
fowl bluegrass	<i>Poa palustris</i>
fowl manna grass	<i>Glyceria striata</i>
fringed brome	<i>Bromus ciliatus</i>
graceful manna grass	<i>Glyceria pulchella</i>
graceful sedge	<i>Carex praegracilis</i>
hairy wild rye	<i>Leymus innovatus</i>
inland sedge	<i>Carex interior</i>
Kentucky bluegrass	<i>Poa pratensis</i>
mud sedge	<i>Carex limosa</i>
northern reed grass	<i>Calamagrostis inexpansa</i>
purple oat grass	<i>Schizachne purpurascens</i>
red fescue	<i>Festuca rubra</i>
reed canary grass	<i>Phalaris arundinacea</i>
rough hair grass	<i>Agrostis scabra</i>
sheathed cotton grass	<i>Eriophorum vaginatum</i>
silvery sedge	<i>Carex canescens</i>
silvery-flowered sedge	<i>Carex aenea</i>
small-fruited bulrush	<i>Scirpus microcarpus</i>
three-seeded sedge	<i>Carex trisperma</i>
two-seeded sedge	<i>Carex disperma</i>
water sedge	<i>Carex aquatilis</i>
white-grained mountain rice grass	<i>Oryzopsis asperifolia</i>
MOSSES, LICHENS, LIVERWORTS	
abraded camouflage lichen	<i>Melanelixia subaurifera</i>
acute-leaved peat moss	<i>Sphagnum capillifolium</i>
American starburst lichen	<i>Imshaugia placodoria</i>
apple pelt lichen	<i>Peltigera malacea</i>
<i>Baeomyces</i> lichen	<i>Baeomyces rufus</i>
beard lichen	<i>Usnea lapponica</i>
beard lichen	<i>Usnea substerilis</i>
bighorn <i>Cladonia</i>	<i>Cladonia cornuta</i>
black saddle lichen	<i>Peltigera neckeri</i>
black-footed reindeer lichen	<i>Cladonia stygia</i>
boreal pixie-cup	<i>Cladonia borealis</i>
bottlebrush frost lichen	<i>Physconia detera</i>
bristly beard lichen	<i>Usnea hirta</i>
British soldiers	<i>Cladonia cristatella</i>
chalky Ramalina	<i>Ramalina pollinaria</i>
<i>Cladonia</i> lichen	<i>Cladonia botrytes</i>
<i>Cladonia</i> lichen	<i>Cladonia carneola</i>
<i>Cladonia</i> lichen	<i>Cladonia cenotea</i>
<i>Cladonia</i> lichen	<i>Cladonia chlorophaea</i>
<i>Cladonia</i> lichen	<i>Cladonia coniocraea</i>
<i>Cladonia</i> lichen	<i>Cladonia deformis</i>
<i>Cladonia</i> lichen	<i>Cladonia uncialis</i>
concentric pelt lichen	<i>Peltigera elisabethae</i>
crinkled snow lichen	<i>Flavocetraria nivalis</i>
cup lichen	<i>Cladonia macilenta</i>
deflated tube lichen	<i>Hypogymnia wilfiana</i>
disk lichen	<i>Lecidea leprarioides</i>
dot lichen	<i>Mycobilimbia pilularis</i>
elliptic <i>Plagiomnium</i> moss	<i>Plagiomnium ellipticum</i>
<i>Evernia</i> lichen	<i>Evernia mesomorpha</i>
field dog lichen	<i>Peltigera rufescens</i>
fig-leaved pixie lichen	<i>Cladonia macrophylla</i>
fishbone beard lichen	<i>Usnea filipendula</i>
fringed wrinkle lichen	<i>Tuckermannopsis americana</i>

Common Name	Scientific Name
golden moss	<i>Tomentypnum nitens</i>
granular mottled-disk lichen	<i>Trapeliopsis granulosa</i>
green starburst lichen	<i>Parmeliopsis ambigua</i>
grey starburst lichen	<i>Parmeliopsis hyperopta</i>
hammered shield lichen	<i>Parmelia sulcata</i>
hooded tube lichen	<i>Hypogymnia physodes</i>
<i>Hypocenomyce</i> lichen	<i>Hypocenomyce sorophora</i>
Iceland lichen	<i>Cetraria ericetorum</i>
knight's plume moss	<i>Ptilium crista-castrensis</i>
ladder lichen	<i>Cladonia cervicornis</i> ssp. <i>verticillata</i>
lesser pied pixie lichen	<i>Cladonia stricta</i>
<i>Marchantia</i> liverwort	<i>Marchantia polymorpha</i>
membranous dog lichen	<i>Peltigera membranacea</i>
naked kidney lichen	<i>Nephroma bellum</i>
nit beard lichen	<i>Usnea subfloridana</i>
northern camouflage lichen	<i>Melanohalea septentrionalis</i>
northern measles lichen	<i>Ramboldia cinnabarina</i>
old man's beard	<i>Bryoria capillaris</i>
old man's beard	<i>Bryoria furcellata</i>
old man's beard	<i>Bryoria fuscescens</i>
old man's beard	<i>Bryoria lanestris</i>
organ-pipe lichen	<i>Cladonia crispata</i>
peat moss species	<i>Sphagnum</i> sp.
pebbled pixie-cup lichen	<i>Cladonia pyxidata</i>
pepper-spore lichen species	<i>Rinodina</i> sp.
powdered beard lichen	<i>Usnea fulvareagens</i>
punctured <i>Ramalina</i>	<i>Ramalina dilacerata</i>
purple horn-toothed moss	<i>Ceratodon purpureus</i>
yed collar moss	<i>Splachnum rubrum</i>
reindeer lichen	<i>Cladonia arbuscula</i>
reindeer lichen	<i>Cladonia mitis</i>
reindeer lichen	<i>Cladonia rangiferina</i>
rim-lichen	<i>Lecanora impudens</i>
ruffled pelt lichen	<i>Peltigera leucophlebia</i>
rusty peat moss	<i>Sphagnum fuscum</i>
salted starburst lichen	<i>Imshaugia aleurites</i>
scabby pelt lichen	<i>Peltigera scabrosa</i>
scale beret lichen	<i>Baeomyces carneus</i>
Schreber's moss	<i>Pleurozium schreberi</i>
sieve lichen	<i>Cladonia multiformis</i>
smooth <i>Cladonia</i>	<i>Cladonia gracilis</i> ssp. <i>turbinata</i>
squarrose peat moss	<i>Sphagnum squarrosum</i>
stair-step moss	<i>Hylocomium splendens</i>
star-tipped reindeer lichen	<i>Cladonia stellaris</i>
straw beard lichen	<i>Usnea scabrata</i>
studded leather lichen	<i>Peltigera aphthosa</i>
thorn <i>Cladonia</i> lichen	<i>Cladonia uncialis</i>
<i>Thuidium</i> moss	<i>Thuidium recognitum</i>
tiny button lichen	<i>Amandinea punctata</i>
tree saucer lichen	<i>Ochrolechia arborea</i>
trumpet lichen	<i>Cladonia fimbriata</i>
tufted moss	<i>Aulacomnium palustre</i>
undulating pelt lichen	<i>Peltigera neopolydactyla</i>
varied rag lichen	<i>Platismatia glauca</i>
waxyleaf moss	<i>Dicranum polysetum</i>
woolly foam lichen	<i>Stereocaulon tomentosum</i>
wrinkle lichen	<i>Vulpicida pinastris</i>

Common Name	Scientific Name
yellow collar moss	<i>Splachnum luteum</i>
WEEDS, AGRONOMICS^{1,2,3}	
alsike clover	<i>Trifolium hybridum</i>
annual hawk's-beard	<i>Crepis tectorum</i>
awnless brome	<i>Bromus inermis</i>
bird's-foot trefoil	<i>Lotus corniculatus</i>
Canada thistle (creeping thistle)	<i>Cirsium arvense</i>
common dandelion	<i>Taraxacum officinale</i>
common plantain	<i>Plantago major</i>
common tansy	<i>Tanacetum vulgare</i>
quack grass	<i>Elytrigia repens</i> var. <i>repens</i>
red clover	<i>Trifolium pratense</i>
rough cinquefoil	<i>Potentilla norvegica</i>
scentless chamomile	<i>Matricaria perforata</i>
timothy	<i>Phleum pratense</i>
white sweet-clover	<i>Melilotus alba</i>
yellow sweet-clover	<i>Melilotus officinalis</i>

Notes:

- 1 **Bold** font denotes Noxious weed species. No Prohibited Noxious weeds were observed.
- 2 Where the Alberta *Weed Control Regulation* name for a species differs from the ACIMS list of all elements (ACIMS 2014c), the ACIMS name has been provided in brackets alongside the *Weed Control Regulation* name.
- 3 The status of species as native or not is according to the list of all elements in Alberta (ACIMS 2014c).














APPENDIX E**OBSERVED WEED SPECIES AND LAND USE BY LEGAL LOCATION**

Legal Location (W4M)	Land Use	Weeds Species ¹	Density ²	Comments
SE 4-81-13	Industrial (cleared area/powerline)	common tansy alsike clover common dandelion quack grass red clover	2 2 1 2 2	--
NE 33-80-13 (Compressor Station)	Industrial (cutline)	common dandelion alsike clover	1 4	--
SE 32-80-13	Industrial (cutblock)	alsike clover awnless brome common dandelion common plantain quack grass timothy white sweet-clover yellow sweet-clover	2 5 5 2 2 2 2 2	--
SW 4-81-15	Riparian	common tansy	2	--
NW 7-81-15	Industrial (right-of-way)	bird's-foot trefoil red clover	5 2	--
SE 23-81-16	Treed	red clover	2	--
SE 29-81-16	Treed	rough cinquefoil	2	--
NE 30-81-16	Industrial (cleared area/compressor station)	Canada thistle scentless chamomile annual hawk's-beard bird's-foot trefoil common dandelion quack grass common plantain	2 5 2 2 2 5 2	--

Notes: 1 Bold font denotes Noxious weed species.

2 Density code definitions are provided in Appendix F.

APPENDIX F**ALBERTA WEED DENSITY DISTRIBUTION CLASSES**

Class	Description of Abundance In Polygon	Distribution
0	None	
1	Rare	
2	A few sporadically occurring individual plants	
3	A single patch	
4	A single patch plus a few sporadically occurring plants	
5	Several sporadically occurring plants	
6	A single patch plus several sporadically occurring plants	
7	A few patches	
8	A few patches plus several sporadically occurring plants	
9	Several well-spaced patches	
10	Continuous uniform occurrences of well-spaced plants	
11	Continuous occurrence of plants with a few gaps in the distribution	
12	Continuous dense occurrence of plants	
13	Continuous occurrence of plants with a distinct linear edge in the polygon	

Source: Adams *et al.* 2009.

Note: - The density distribution class is determined over a sufficiently large area to account for normal variation in distribution pattern.