

March 29, 1996

## RECOMMENDED NATIVE GRASSES AND LEGUMES FOR REVEGETATING DISTURBED LANDS IN THE GREEN AREA

### Special Note:

In addition to controlling erosion, native species are used for revegetation mainly to maintain the genetic integrity of a site's native vegetation and to ensure the habitat is appropriate for wildlife after reclamation. These aims reflect the department's objective of managing resources in keeping with a landscape's ecology. The following lists of native grasses and legumes are specific to the designated natural regions and subregions of Alberta (see map for *Natural Regions and Subregions of Alberta*. 1994. Environmental Protection, Edmonton; also Appendix A). These plant species are indicated as natives for their particular subregions by *A Guide to Using Native Plants on Disturbed Lands*. (Gerling, H. S. et al., 1996. Alberta Agriculture, Food and Rural Development, Edmonton).

Seed mixes that are constituted for particular natural subregions must be based on the pertinent native grasses and legumes species list that follows. Other species not listed may be used in the seed mix, if the *Guide* indicates that the species is native to that subregion, and the appropriate Forest Ranger District Office approves the use of that native species on the specified site. The Forest Officer may require proof that the species in the seed mix purchased are indeed native, before seeding can proceed.

A seed mix (and seeding rate) should be chosen to meet the disturbed site's specific conditions (soil moisture, soil texture, aspect, slope steepness, etc.). Also consider the growth forms, growth habits and relative seed sizes for the species in the seed mix. Each mix should contain, where possible, four or five species of native grasses from at least three different genera, and preferably one or two species of native legumes that comprise about 15 percent of the number of seeds.

The seeding rate (number of live seeds per species per m<sup>2</sup>) should be predetermined for the

site, in order to calculate for each species its proportion by weight of the seeds in the seed mix. (Note that commercial quantities of seeds for the species on these lists were confirmed to exist, according to a 1994 survey by Public Lands Branch, Alberta Agriculture, Food and Rural Development.)

Reed grasses (*Calamagrostis* sp.), especially bluejoint (*C. canadensis*), have caused problems on reforestation sites by completely dominating clearings in woodlands (mesic to subhygric sites). Therefore, these species should not be included in reclamation seed mixes for the Green Area. The introduced subspecies smooth brome (*Bromus inermis* ssp. *inermis*), which is highly invasive of natural habitats, should not be confused with the recommended native subspecies pumpelly brome (*B. pumpellianus*, ssp.), which is on the lists. There may be situations where site conditions require a nurse crop to be seeded. In such cases, an annual grass or annual cereal crop that will die out completely after the first growing season may be added to the native species seed mix. Preferably, the nurse crop should be seeded late enough in the growing season to ensure that no propagules will live to grow in the next growing season.

The 1000-seed weights for most of the species are shown in Appendix B only as a guide. The weight will vary for a species depending on the natural subregion from which the seeds originated. Seed vendors should indicate the accurate weights per 1000 seeds from their inventories, so that the exact proportions of species can be determined for each seed mix.

The lists apply in the Green Area, excluding a 1-km buffer zone that extends inward from the boundaries with the White Area.

NATIVE GRASSES AND LEGUMES LISTS FOR THE GREEN AREA NATURAL SUBREGIONS

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SPECIES LIST # 1: Central Mixedwood, Wetland Mixedwood and Peace River Lowlands Subregions

Grasses

*Trisetum spicatum*, spike trisetum  
*Elymus innovatus*, hairy wild rye  
*Elymus canadensis*, Canada wild rye  
*Poa palustris*, fowl bluegrass  
*Oryzopsis pungens*, northern rice grass  
*Festuca saximontana*, Rocky Mtn. fescue  
*Koeleria macrantha*, June grass

*Deschampsia cespitosa*, tufted hair grass  
*Bromus ciliatus*, fringed brome  
*Oryzopsis asperifolia*,  
white-grained mountain rice grass

Legumes

*Vicia americana*, wild vetch  
*Hedysarum boreale*, northern hedysarum

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SPECIES LIST # 2: Dry Mixedwood Subregion

Grasses

*Elymus innovatus*, hairy wild rye  
*Bromus ciliatus*, fringed brome  
*Festuca saximontana*, Rocky Mnt. fescue  
*Koeleria macrantha*, June grass  
*Bromus anomalus*, nodding brome  
*Poa palustris*, fowl bluegrass

*Agropyron dasystachyum*, northern wheat grass  
*Agropyron smithii*, western wheat grass

Legumes

*Lathyrus ochroleucus*, cream-coloured vetchling  
*Vicia americana*, wild vetch

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SPECIES LIST # 3: Boreal Highlands and Sub-Arctic Subregions, and Athabasca Plain and Kazan Uplands Subregions

3A. Aspen-Balsam Poplar-White Spruce Reference Vegetation

Grasses

*Festuca altaica*, northern rough fescue  
*Elymus innovatus*, hairy wild rye  
*Trisetum spicatum*, spike trisetum  
*Agropyron dasystachyum*, northern wheat grass  
*Poa palustris*, fowl bluegrass  
*Festuca saximontana*, Rocky Mnt. fescue  
*Oryzopsis pungens*, northern rice grass  
*Bromus ciliatus*, fringed brome

*Elymus canadensis*, Canada wild rye  
*Oryzopsis asperifolia*,  
white-grained mountain rice grass

Legumes

*Vicia americana*, wild vetch  
*Lathyrus ochroleucus*, cream-coloured vetchling

3B. Black Spruce and White Spruce Reference Vegetation (in Sub-Arctic Subregion)

Grasses

*Elymus innovatus*, hairy wild rye  
*Poa palustris*, fowl bluegrass  
*Oryzopsis pungens*, northern rice grass  
*Alopecurus occidentalis*, alpine foxtail  
*Deschampsia cespitosa*, tufted hair grass  
*Trisetum spicatum*, spike trisetum

*Festuca saximontana*, Rocky Mnt. fescue  
*Phleum commutatum*, mountain timothy

Legumes

*Hedysarum alpinum*, alpine hedysarum  
*Lathyrus ochroleucus*, cream-coloured vetchling  
*Vicia americana*, wild vetch

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SPECIES LIST # 4: Alpine Subregion

Grasses

*Festuca altaica*, northern rough fescue  
*Festuca saximontana*, Rocky Mnt fescue  
*Poa alpina*, alpine bluegrass  
*Trisetum spicatum*, spike trisetum  
*Festuca campestris*, rough fescue  
*Agropyron violaceum*,  
broad-glumed wheat grass (Mountaineer)\*  
*Poa alpina*, alpine bluegrass (Glacier)\*  
*Poa alpina*, alpine bluegrass (Blueridge)\*

*Agropyron violaceum*, broad-glumed wheat grass  
*Poa glauca*, timberline bluegrass  
*Phleum commutatum*, mountain timothy

Legumes

*Hedysarum boreale*, northern hedysarum  
*Hedysarum boreale*, northern hedysarum\*\*  
*Hedysarum alpinum*, alpine hedysarum

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\*Alberta Environmental Centre/Reclamation Research Technical Advisory Committee special native grass selection for reclamation in the mountains and foothills region.

\*\*Wild Rose Consulting Inc./Reclamation Research Technical Advisory Committee special native legume collection for reclamation in the mountains and foothills region.

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SPECIES LIST # 5: Sub-Alpine Subregion

Grasses

*Festuca campestris*, rough fescue  
*Stipa richardsonii*, Richardson needle grass  
*Bromus carinatus*, keeled brome  
*Poa alpina*, alpine bluegrass  
*Bromus pumpellianus* ssp., pumpelly brome  
*Festuca idahoensis*, bluebunch fescue  
*Stipa columbiana*, Columbia needle grass  
*Poa cusickii*, early bluegrass  
*Poa alpina*, alpine bluegrass (Glacier)\*  
*Poa alpina*, alpine bluegrass (Blueridge)\*  
*Phleum commutatum*, mountain timothy

*Trisetum spicatum*, spike trisetum  
*Koeleria macrantha*, June grass

Legumes

*Lupinus sericeus*, silky perennial lupine  
*Astragalus crassicaarpus*, ground-plum  
*Hedysarum alpinum*, alpine hedysarum  
*Lathyrus ochroleucus*, cream-coloured vetchling  
*Astragalus alpinus*, alpine milk vetch\*\*  
*Oxytropis monticola*, late yellow locoweed\*\*  
*Oxytropis splendens*, showy locoweed\*\*

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\*See footnote to SPECIES LIST # 4 \*\*See footnote to SPECIES LIST # 4

SPECIES LIST # 6: Montane Subregion

Grasses

*Festuca campestris*, rough fescue  
*Bromus carinatus*, keeled brome  
*Keoheria macrantha*, June grass  
*Bromus pumpellianus* ssp., pumpelly brome  
*Bromus ciliatus*, fringed brome  
*Agropyron dasystachyum*, northern wheat grass  
*Agropyron subsecundum/trachycaulum*,  
awned/slender wheat grass  
*Agropyron smithii*, western wheat grass  
*Oryzopsis asperifolia*,  
white-grained mountain rice grass  
*Trisetum spicatum*, spike trisetum  
*Agropyron subsecundum*, bearded wheat grass  
(Hillcrest)\*  
*Agropyron trachycaulum*, slender wheat grass  
(Highlander)\*

*Festuca saximontana*, Rocky Mnt. fescue  
*Poa cusickii*, early bluegrass  
*Elymus glaucus*, smooth wild rye

Legumes

*Hedysarum alpinum*, alpine hedysarum  
*Vicia americana*, wild vetch  
*Astragalus americanus*, American milk vetch  
*Lupinus argenteus*, silvery perennial lupine  
*Lupinus sericeus*, silky perennial lupine  
*Hedysarum boreale*, northern hedysarum\*\*  
*Oxytropis splendens*, showy locoweed\*\*  
*Oxytropis monticola*, late yellow locoweed\*\*

----- \*See footnote to SPECIES LIST # 4 \*\*See footnote to SPECIES LIST # 4  
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SPECIES LIST # 7: Upper Foothills Subregion

Grasses

*Deschampsia cespitosa*, tufted hair grass  
*Festuca altaica*, northern rough fescue  
*Elymus innovatus*, hairy wild rye  
*Bromus pumpellianus* ssp., pumpelly brome  
*Bromus ciliatus*, fringed brome  
*Festuca campestris*, rough fescue  
*Poa palustris*, fowl bluegrass

Legumes

*Hedysarum alpinum*, alpine hedysarum  
*Vicia americana*, wild vetch  
*Lathyrus ochroleucus*, cream-coloured vetchling  
*Hedysarum boreale*, northern hedysarum  
*Hedysarum boreale*, northern hedysarum\*\*

----- \*\*See footnote to SPECIES LIST # 4  
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SPECIES LIST # 8: Lower Foothills Subregion

8A. Treed areas

Grasses

*Elymus innovatus*, hairy wild rye  
*Oryzopsis asperifolia*, white-grained  
mountain rice grass  
*Bromus ciliatus*, fringed brome  
*Trisetum spicatum*, spike trisetum  
*Poa palustris*, fowl bluegrass  
*Deschampsia cespitosa*, tufted hair grass  
*Elymus glaucus*, smooth wild rye grass

Legumes

*Hedysarum boreale*, northern hedysarum\*\*  
*Oxytropis deflexa*, reflexed locoweed\*\*  
*Vicia americana*, wild vetch  
*Lathyrus ochroleucus*, cream-coloured vetchling  
*Oxytropis monticola*, late yellow locoweed\*\*

8B. Grassy meadow areas (primarily Bragg Creek area and west of Turner Valley)

Grasses

*Festuca campestris*, rough fescue  
*Poa palustris*, fowl bluegrass  
*Bromus ciliatus*, fringed brome  
*Alopecurus occidentalis*, alpine foxtail  
*Stipa richardsonii*, Richardson needle grass  
*Agropyron dasystachyum*, northern wheat grass  
*Koeleria campestris*, June grass  
*Deschampsia cespitosa*, tufted hair grass  
*Bromus anomalus*, nodding brome  
*Poa cusickii*, early bluegrass

Legumes

*Hedysarum boreale*, northern hedysarum\*\*  
*Vicia americana*, wild vetch  
*Oxytropis monticola*, late yellow locoweed\*\*  
*Oxytropis deflexa*, reflexed locoweed\*\*  
*Lupinus sericeus*, silky perennial lupine  
*Lathyrus ochroleucus*, cream-coloured vetchling  
*Hedysarum alpinum*, alpine hedysarum  
*Astragalus crassicaarpus*, ground-plum

----- \*\*See footnote to SPECIES LIST # 4

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SPECIES LIST # 9: Foothills Parkland Subregion, and Foothills Fescue Subregion

Small areas of these two Subregions occur in the Green Area. Use Seed List for Montane Subregion (SPECIES LIST # 6).

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SPECIES LIST # 10: Peace River Parkland Subregion

A small area of this Subregion occurs in the Green Area. Use Seed List for Dry Mixedwood Subregion (SPECIES LIST # 2).



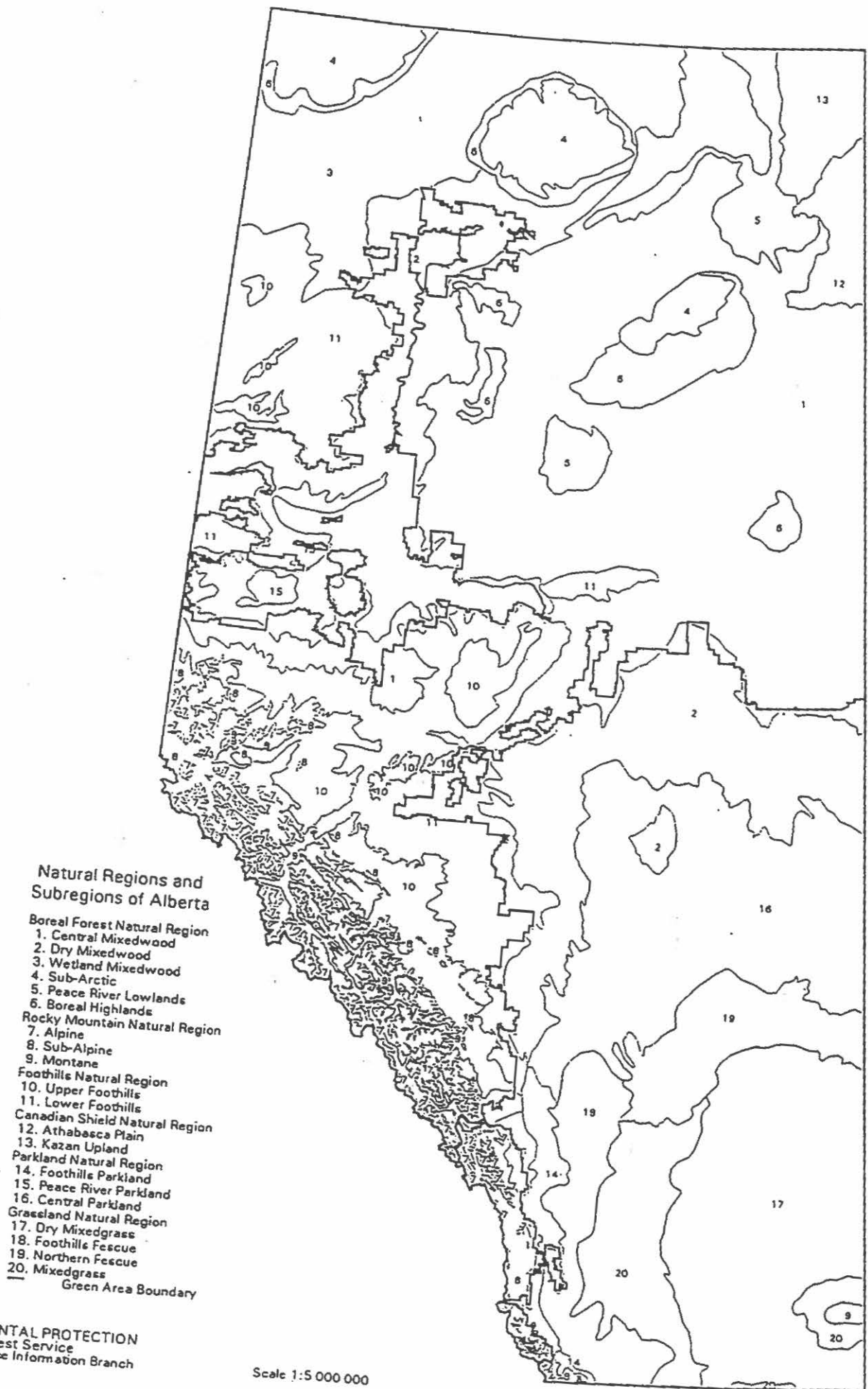
## Appendix A: Natural Subregions and the Ecoregions equivalents in the Green Area

(Use with map on page 10 to determine equivalent species list for Ecoregions.)

Natural Region and Subregion	Ecoprovince and Ecoregion (Equivalent)	SPECIES LIST #
<b>1. Boreal Forest</b>	<b>1. Boreal</b>	
a. Central Mixedwood	a. Mid Boreal Mixedwood	1
b. Dry Mixedwood	b. Low Boreal Mixedwood	2
c. Wetland Mixedwood	c. Mid Boreal Mixedwood	1
d. Sub-Arctic	d. Boreal Sub-Arctic	3
e. Peace River Lowlands	e. Mid Boreal Mixedwood	1
f. Boreal Highlands	f. High Boreal Mixedwood	3
<b>2. Rocky Mountain</b>	<b>2. Cordilleran</b>	
a. Alpine	a. Alpine	4
b. Sub-Alpine	b. Sub-Alpine	5
c. Montane	c. Montane	6
<b>3. Foothills</b>	<b>3. Boreal</b>	
a. Upper Foothills	a. Upper Boreal Cordilleran	7
b. Lower Foothills	b. Lower Boreal Cordilleran	8
<b>4. Canadian Shield</b>	<b>4. Boreal</b>	
a. Athabasca Plain	a. High Boreal Mixedwood	3
b. Kazan Uplands	b. High Boreal Mixedwood	3
<b>5. Parkland</b>	<b>5. Grassland/Boreal</b>	
a. Foothills Parkland*	a. Aspen Parkland	6
b. Peace River Parkland**	b. Low Boreal Mixedwood	2
<b>6. Grassland</b>	<b>6. Grassland</b>	
a. Foothills Fescue*	a. Fescue Grass	6

\* Only a small area of the Subregion occurs in the southwest region of the Green Area. Use seed mix for Montane (SPECIES LIST # 6) if necessary.

\*\*Only a small area of the Subregion occurs in the Peace River region of the Green Area. Use seed mix for Dry Mixedwood (SPECIES LIST # 2) if necessary.







## Appendix B: SOME NATIVE GRASSES AND LEGUMES SEED WEIGHTS

SPECIES		Seeds per gram	1000-seed weight (gm)
<b>Grasses</b>			
1.	<i>Agropyron dasystachyum</i> , northern wheat grass <i>Agropyron smithii</i> , western wheat grass <i>Agropyron subsecundum</i> , awned wheat grass <i>Agropyron trachycaulum</i> , slender wheat grass <i>Agropyron violaceum</i> , broad-glumed wheat grass <i>Agropyron subsecundum</i> , bearded wheat grass (Hillcrest)* <i>Agropyron trachycaulum</i> , slender wheat grass (Highlander)* <i>Agropyron violaceum</i> , broad-glumed wheat grass (Mountaineer)*	270 240 242 267 244 256 286 244	3.70 4.17 4.13 3.75 4.10 3.90 3.50 4.10
2.	<i>Alopecurus occidentalis</i> , alpine foxtail	1135	0.88
3.	<i>Bromus anomalus</i> , nodding brome <i>Bromus carinatus</i> , keeled brome <i>Bromus ciliatus</i> , fringed brome <i>Bromus pumpellianus</i> , ssp. pumpelly brome	255 95 300 280	3.92 10.5 3.33 3.57
4.	<i>Deschampsia cespitosa</i> , tufted hair grass	3125	0.32
5.	<i>Elymus canadensis</i> , Canada wild rye <i>Elymus glauca</i> , smooth wild rye <i>Elymus innovatus</i> , hairy wild rye	156 240 390	6.41 4.17 2.56
6.	<i>Festuca altaica</i> , northern rough fescue <i>Festuca campestris</i> , rough fescue <i>Festuca idahoensis</i> , bluebunch fescue <i>Festuca saximontana</i> , Rocky Mountain fescue	735 644 990 1498	1.36 1.55 1.01 0.67
7.	<i>Koeleria macrantha</i> , June grass	3333	0.30
8.	<i>Oryzopsis asperifolia</i> , white-grained mountain rice grass <i>Oryzopsis pungens</i> , northern rice grass		
9.	<i>Phleum commutatum</i> , mountain timothy		
10.	<i>Poa alpina</i> , alpine bluegrass <i>Poa cusickii</i> , early bluegrass <i>Poa glauca</i> , timberline bluegrass <i>Poa palustris</i> , fowl bluegrass <i>Poa alpina</i> , alpine bluegrass (Glacier)* <i>Poa alpina</i> , alpine bluegrass (Blueridge)*	1961 1408   1961 2041	0.51 0.71   0.51 0.49
11.	<i>Stipa columbiana</i> , Columbia needle grass <i>Stipa richardsonii</i> , Richardson needle grass	592 578	1.69 1.73
12.	<i>Trisetum spicatum</i> , spike trisetum	3571	0.28

### Legumes

1. <i>Astragalus americanus</i> , <i>Astragalus crassicaarpus</i> , <i>Astragalus alpinus</i> ,	American milk vetch ground-plum alpine milk vetch**	222 200 526	4.50 5.00 1.90
2. <i>Hedysarum alpinum</i> , <i>Hedysarum boreale</i> , <i>Hedysarum boreale</i> ,	alpine hedysarum northern hedysarum northern hedysarum**	238 200 196	4.20 5.00 5.10
3. <i>Lathyrus ochroleucus</i> ,	cream-coloured vetchling	67	14.9
4. <i>Lupinus argenteus</i> , <i>Lupinus sericeus</i> ,	silvery perenial lupine silky perenial lupine	480 44	2.08 22.8
5. <i>Oxytropis monticola</i> , <i>Oxytropis deflexa</i> , <i>Oxytropis splendens</i> ,	late yellow locoweed** reflexed locoweed** showy locoweed**	667 1111 714	1.50 0.90 1.40
6. <i>Vicia americana</i> ,	wild vetch	82	12.2

### Other native legumes\*\* tested (see Appendix C)

1. <i>Astragalus americanus</i> , <i>Astragalus vexilliflexus</i> ,	American milk vetch few-flowered milk vetch	222 345	4.50 2.90
2. <i>Hedysarum alpinum</i> , <i>Hedysarum sulphurescens</i> ,	alpine hedysarum yellow hedysarum	238 164	4.20 6.10
3. <i>Lupinus nootkatensis</i> , <i>Lupinus sericeus</i> ,	Nootka lupine silky perenial lupine	79 44	12.7 22.5
4. <i>Oxytropis cusickii</i> , <i>Oxytropis sericea</i> , <i>Oxytropis viscida</i> ,	alpine locoweed early yellow locoweed viscid locoweed	357 50 556	2.80 20.0 1.80

\*Native grasses collected from the mountains and foothills and developed through selection by Alberta Environmental Centre/ Reclamation Research Technical Advisory Committee (AEC/RRTAC) for use in reclamation in the mountains and foothills.

\*\*Native legumes collected from the mountains and foothills and tested in the field by Wild Rose Consulting, Inc./ Reclamation Research Technical Advisory Committee (WRC/RRTAC) for use in reclamation in the mountains and foothills.

## Appendix C: Other Native Legumes Tested for Use in Reclamation

The following other native legume seeds were collected by Wild Rose Consulting Inc./Reclamation Research Technical Advisory Committee from the Rocky Mountains and the foothills and tested for use in reclamation. If seeds for these legumes are available, they may be included in the seed mixes as follows:

Species	Species List #	Natural Subregion
<i>Astragalus americanus</i> , American milk vetch	6	Montane
<i>Astragalus vexilliflexus</i> , few-flowered milk vetch	8	Lower Foothills
<i>Hedysarum alpinum</i> , alpine hedysarum	4,5,6,7,8	Alpine, Subalpine, Montane, Upper Foothills, Lower Foothills
<i>Hedysarum sulphurescens</i> , yellow hedysarum	4,5,6,7	Alpine, Subalpine, Montane, Upper Foothills
<i>Lupinus sericeus</i> , silky perennial lupine	5,6,8	Subalpine, Montane, Lower Foothills
<i>Oxytropis sericea</i> , early yellow locoweed	5,6	Subalpine, Montane
<i>Oxytropis viscida</i> , visia locoweed	5	Subalpine

SEE APPENDIX A

- Ecoregions of Alberta**
- 1. Dry Mixed Grass
  - 2. Mixed Grass
  - 3. Fescue Grass
  - 4. Aspen Parkland
  - 5. Montane
  - 6. Subalpine
  - 7. Alpine
  - 8. Lower Boreal Cordilleran
  - 9. Upper Boreal Cordilleran
  - 10. Low Boreal Mixedwood
  - 11. Mid Boreal Mixedwood
  - 12. High Boreal Mixedwood
  - 13. Boreal Subarctic
- Green Area Boundary

ENVIRONMENTAL PROTECTION  
Land and Forest Service  
Forest Resource Information Branch

Scale 1:5 000 000

