FINAL REPORT
INTERIOR NATIVE SEED COLLECTION PROJECT

Prepared for:
Alaska Department of Transportation and Public Facilities
Northern Region

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Problem and Urgency Statement

Native seed sources for use in Interior and other regions of Alaska are limited in both commercial quantities and species. The limited variety of seeds makes meeting Alska Department of Transportation and Public Facilities (ADOT&PF) objectives in habitat enhancement, mitigation, erosion control and revegetation difficult, and at times impossible. Unlike many other state transportation departments, ADOT&PF does not have its own plant research and development section. The department must depend upon other agencies to investigate and propagate plant materials suitable for transportation projects. Having the Alaska Plant Materials Center, a section of the Department of Natural Resources, pursue seed collection and development of commercial quantities of native seed species greatly enhances ADOT&PF's ability to accomplish revegetation objectives and meet environmental requirements.

ADOT&PF has experienced shortages of specified native grass seed for projects in 1991-1992. Without commercially produced seed sources, few viable options are available to increase seed supplies. While there are currently a few native seed varieties being produced by Alaskan and circumpolar growers, it is important to broaden the variety of commercially available seed types to meet the increasing demands upon ADOT&PF for habitat enhancement, erosion protection, and mitigation for specific land forms, such as wetlands.

The process of developing seed crops is highly technical and it takes several years to identify plants that are appropriate and practical to produce as seed crops. It is not a venture that private enterprise usually can afford. If the policy of using native plant species as mandated by Federal Highway Administration or other federal agencies is enforced, ADOT&PF may be required to conduct yearly seed collection projects which are extremely costly and often ineffective. This research proposal is a cost effective opportunity for the Department to direct seed crop development for its increasing need to utilize native plant species in transportation projects.

The State of Alaska is in need of highway revegetation research, especially in the area of native wildflowers and non-traditional revegetation species, i.e.; wetland species. This project allowed for screening of native species presently invading right-of-ways in the interior. Those species with potential for commercial production were identified and procedures for germination and seed production were researched. This was new research as most of the species have never been used for any phase of revegetation.

The research brought native wildflowers and other species into commercial production in 1998. The phase of the program to commercialize native species concentrated on interior and northwestern Alaska collections only. Eventually, other areas of the state will be included in future research efforts.
This endeavor will work is if full cooperation exists between the user agency (DOT/PF), and the recognized revegetation research and plant production agency (Alaska PMC).

Presently, the APMC is working with both the U. S. Air Force and U. S. Navy to bring native Aleutian species into commercial production. This effort is consistent with the legislative mandate for the APMC. Part of this process involves review of other northern country's efforts to utilize native species.

Methods

The need for native seed is driven by political and practical objectives. Native seed production supports local economies. Native species are usually better adapted to local conditions and should perform better than introduced species. Native species are not likely to become pests. These comments were key to this native plant collection project jointly initiated by the Alaska Department of Natural Resources, Plant Materials Center and the Department of Transportation and Public Facilities, Northern Region in 1995.

The seed collection project was multi-faceted beginning with seed collection, seed cleaning, and progressing to initial production and finally commercial production. The project allowed new crops to be developed for Alaskan commercial seed growers.

Collection Effort

The actual collection effort began on August 6 and continued through the first week in September 1995. The travel and man days are recorded as follows:
Aug 6 - 13 Nome area, 8 man days
Aug 7 - 15 Fairbanks area, Tok, Delta, 9 man days
Aug 29 - 30 Fairbanks area, 2 man days
Aug 23 - 27 Tok, Delta, Black Rapids, 5 man days
Sep 2 - 8 Port Clarence, 7 man days

Travel to Nome, Port Clarence, and to a limited degree, Fairbanks, relied on commercial air transportation. The remainder of the Fairbanks, Delta, Tok, etc. travel utilized state vehicles or privately owned vehicles. The U.S. Coast Guard provided logistic support by shipping a state-owned 4-wheeler (ORV) to Port Clarence from Elmendorf and back.

Results of Collection Effort

A total of 153 collections were made during the gathering phase. A total of 72 species were collected. Amounts of seed for each species ranged from 1-2 grams to 12-15 kilograms.

These amounts reflect unclean, high moisture seed. The total unclean seed weight delivered to Palmer was approximately 108 kilograms (220 pounds). Seed drying was initiated immediately upon arrival at the Plant Materials Center.

It was estimated that 70 kilograms of seed would be available after drying and cleaning. All cleaning and germination testing was completed by April 1996. In addition, potential seed growers in the Interior were notified of seed availability. A portion of the seed collected in 1995 was used in DOT/PF demonstration plots planted in 1996.

The total collection, with species, weight and germination results, can be found in the Appendix (Tables A-1 to A-10).

Seed Distribution

In June 1996, initial production quantities of seed from the 1995 collection were distributed to eight seed growers in the Fairbanks/Eielson area. Two growers planted during the spring/summer of 1996. The remainder elected for dormant seeding in the fall of 1996. Approximately 30 pounds of seed representing 16 species were distributed. In most cases, the germination for these seed lots was commercially acceptable (see Table 1).

In addition to the Interior plantings, 23 species (Table 2) were planted at Palmer. Of these, 16 produced acceptable seedling stands. Seed production continued through the summer/fall of 1997 and 1998.

In 1994, the PMC collected a significant amount of *Agropyron pauciflorum* (a native wheatgrass) on Fort Wainwright. This seed was placed in production in the Interior as well. It was planted at Palmer in 1995. In 1997 and 1998, approximately 200 pounds of seed was produced each year. Figures 1 to 5 show some species being produced at Palmer.

Evaluation Plots

In June of 1996, a series (3) of evaluations were established near Fairbanks. The plots contained samples of the species expected to have the most potential in highway revegetation (see Figures 6, 7 and 8). Plots were established on south-facing cut and fill slopes and one was established in a median area. The median area plot was destroyed by maintenance activities.

The plots located at the Mitchell Express-way and Chena Hot Springs Road produced useful results. The Mitchell Express-way plot is supporting an excellent stand of native wheat grass (*Agropyron*), *Oxytropis, Astragalus, Hedysarum* and wildrye. All of these species are in initial production. The sites consisted of fairly typical gravel soils encountered along highways.

The Chena Hot Springs Road plots are located on silty soil. The wheat grasses, wildrye, *Hedysarum* and Alaska sorrel are exhibiting the best performance. These species are also in initial stages of commercial production.

In September 1997, the two plots were again evaluated. The Mitchell Expressway plot yielded excellent information. Both *Hedysarum Mackenzii* and *Hedysarum alpinum* exhibited strong vigorous growth. These two species outperformed all the other legumes in the trial. *Oxytropis deflexa* (Figure 12) and *Oxytropis campestris* (Figure 11) were rated as second and third respectively for native legumes. The native wheatgrasses were, however, the most impressive plantings. All three collections produced excellent stands with vigorous growth and significant ground cover (see Figures 9 and 10).

The plot located on Chena Hot Springs Road also provided good results. This area was more adapted to the grasses than the broadleaf species. The soil of this plot was not as gravelly as that at the Mitchell Expressway. Legumes are better adapted to gravelly soils. The best performance at the Chena Hot Springs Road plot was recorded for the wheatgrasses (Figure 13) and *Elymus innovatus*.

Table 1. Cooperators Producing Native Species.

Cooperator	Location	Species Given
D. C.	Fairbanks	*Oxytropis campestris* *Agropyron macrourum*
C. D.	Fairbanks	*Chrysanthemum arcticum* *Aster Sibericus* *Polygonum alaskanum* *Iris setosa* *Epilobium latifolium* *Carex gmelini*
H. G.	Fairbanks	*Agropyron pauciflorum* *Agropyron sp.* *Agropyron violaceum* *Epilobium latifolium*
C. K.	Fairbanks	*Hedysarum mackenzii* *Oxytropis campestris* *Agropyron pauciflorum* *Agropyron violaceum*
D. S.	Eielson	*Agropyron violaceum* *Agropyron macrourum* *Oxytropis campestris* *Hedysarum alpinum* *Hedysarum mackenzii* *Epilobium latifolium* *Elymus mollis* *Dryas drummondii* *Potentilla multifida*
W. S.	Eielson	*Agropyron pauciflorum*
B. W.	Eielson	*Agropyron macrourum* *Elymus inovatus* *Elymus mollis* *Oxytropis campestris* *Polygonum alaskanum* *Sanguisorba officinalis* *Epilobium latifolium* *Oxytropis maydelliana* *Artemisia borealis* *Dryas drummondii* *Potentilla multifida* *Carex gmelini*
T. V.	Fairbanks	*Oxytropis campestris* *Agropyron pauciflorum* *Agropyron violaceum*

Table 2 Native Species Planted at Palmer

PMC Plantings		
Species	Common Name	Rating
Poa lanata	Lanata Bluegrass	Good
Poa alpina	Alpine Bluegrass	Excellent
Poa arctica	Arctic Bluegrass	Good
Poa arctica vivip	Vivipirous Arctic Bluegrass	Excellent
Festuca altaica	Alaskan Fescue	Fair
Festuca vivipira	Vivipirous Fescue	Excellent
Festuca brachyantherum	Fescue	Good
Hordeum brachyantherum	Meadow Barley	Excellent
Elymus innovatus	Downy Wildrye	Excellent
Agropyron macrourum	Wheatgrass	Good
Agropyron pauciflorum	Slender Wheatgrass	Excellent
Agropyron spicatum	Spike Wheatgrass	Good
Carex acqualis	Water Sedge	Fair
Artemisia borealis	Boreal Sagebrush	Good
Cnidium cnidium	Cnidium	Excellent
Trisetum spicatum	Trisetum	Good

Figure 1 Beach lovage under initial production at Palmer

Figure 2. Arctic Bluegrass grown initial production field at Palmer.

Figure 3 Slender Wheatgrass in increase at Palmer.

Figure 4 Cnidium growing at the Plant Materials Center

Figure 5. Tripleurospermum, a potential wildflower for highway revegetation.

Figure 6. Mitchell Expressway, Fairbanks Off-Ramp, Parks

Hedysarum alpinum Fairbanks	*Hedysarum Mackenzii* Paxson
Elymus mollis Port Clarence	*Elymus innovatus* Fairbanks
Elymus innovatus Delta	*Agropyron macrourum* Tok - Delta
Agropyron violaceum Delta	*Agropyron macrourum* Fairbanks
Oxytropis deflexa Delta - Tok	*Astragalus alpinus* Delta
Oxytropis Maydelliana Port Clarence	*Oxytropis campestris* Delta - Tok - Salcha
Polygonum alaskanum Fairbanks	*Potentilla multifida* Tok - Delta - Salcha
Dryas drummondi Tok	*Epilobium latifolium* Port Clarence

Off-Ramp

Expressway

Figure 7. Mitchell Expressway, 1,000 ' From End of Project

East

Dryas drummondi Tok - Salcha
Potentilla multifida Tok - Delta - Salcha
Polygonum alaskanum Fairbanks
Oxytropis campestris Delta - Tok - Salcha
Oxytropis Maydelliana Port Clarence
Oxytropis deflexa Delta - Tok
Astragalus alpinus Delta
Agropyron violaceum Delta
Agropyron macrourum Tok - Delta
Agropyron macrourum Fairbanks
Elymus innovatus Fairbanks
Elymus innovatus Delta
Elymus mollis Port Clarence
Hedysarum Mackenzii Paxson
Hedysarum alpinum Fairbanks

West

Figure 8. Chena Hot Springs Road, Mi. 7 - 22, 5' x 10' Plots

Fairbanks

Rasmussen Road

Hedysarum alpinum Fairbanks
Hedysarum Mackenzii Paxson
Elymus mollis Port Clarence
Elymus innovatus Fairbanks
Agropyron macrourum Fairbanks
Agropyron macrourum Tok - Delta
Agropyron violaceum Delta
Astragalus alpinus Delta
Oxytropis deflexa Delta - Tok
Oxytropis Maydelliana Port Clarence
Oxytropis campestris Delta - Tok - Salcha
Polygonum alaskanum Fairbanks
Dryas drummondi Port Clarence
Potentilla multifida Tok - Delta - Salcha
Epilobium latifolium Port Clarence

Figure 9. Wheatgrass stand at Mitchell Expressway plot, September 1997.

Figure 10. Wheatgrass stand, top left, and *Elymus innovatus*, lower right, at Mitchell Expressway plot, September 1997.

Figure 11. *Oxytropis campestris* stand at Mitchell Expressway plot, September 1997.

Figure 12. *Oxytropis deflexa* stand, September 1997.

Figure 13. 1997 Chena Hot Springs Road showing an excellent stand of wheatgrass.

Johansen/Peger Road Interchange

In June 1997, a four-acre site was seeded on the Johansen/Peger Road Interchange. Previous seeding projects at this site produced poor results. Seed from an early increase of the Eielson collection of slender wheatgrass was used in the 1997 reseeding effort.

Prior to seeding all the existing vegetation cover, mostly weedy broadleaf species, was burned. The area was reseeded (30 pounds per acre) and fertilized (450 pounds 20-20-10 per acre).

By September 1997, the area supported a good stand of vegetation. Some of the vegetation was, however, from existing growth and seed on the site. The planted wheatgrass was present and providing good cover. In September 1998, the site supported an excellent stand of vegetation.

Figure 14. Johansen/Peger Road Interchange, September 1997. Southern aspect, viewed west.

Figure 15 Same area, northern aspect, viewed east.

Figure 16. Northwest Johansen Expressway/Peger Road, September 1998.

Figure 17. Northeast Johansen Expressway/Peger Road, September 1998.

Figure 18 Southeast Johansen Expressway/Peger Road, September

Figure 19 Southwest Johansen Expressway/Peger Road, September

Literature Search

As part of the contract, the Plant Materials Center reviewed literature pertinent to highway revegetation in the circumpolar region. In most cases, this review produced very little information. The most significant publication available was produced by the Yukon Department of Renewable Resources. A copy; Guidelines for Reclamation Revegetation in the Yukon, has been included with this report.

Conclusions

Wheatgrasses seem to have the greatest potential for revegetation in the Interior. Some of the native legumes also appear to be well suited for Interior revegetation needs. In addition to these species, two viviparous grasses could prove to be very valuable.

The viviparous grasses were collected between Nome and Council. Vivipary is a trait exhibited by some grass species, whereby seed is replaced by small plantlets in the seed head. If this trait can be commercialized, revegetation of disturbed land will be advanced by an order of magnitude. Placing the bulblets or plantlets will give a seeding project a three to four-week head start over traditional seedings. Techniques to use the viviparous plant parts are being studied by the Plant Materials Center.

Within five years, DOT/PF can expect eight to nine new cultivars to be readily available for highway and airport reseeding throughout the interior (Northern District).

APPENDIX

Table A-1. CHICKEN AREA

	Species	Lot	Wt. in Grams	Final Germination
367	*Potentilla multifida*	Pomu 9M38-95	17	75
432	*Carex aquatilis*	Caaq 9M38-95	0.9	1
433	*Carex aquatilis (?)*	Caaq 1-95	60	0
434	*Carex aquatilis*	Caaq 9M37-95	9	41
435	*Carex membranacea*	Came 1-95	2.3	0 (see test)
436	*Carex sp. (?)*	Casp 9M 35-95	27	13

Table A-2. DELTA AREA

	Species	Lot	Wt. in Grams	Final Germination
228	*Agropyron violaceum (heavy fraction)*	Agr MP 204-A	55	100
	Agropyron violaceum (light fraction)	Agro MP204-B	150	98
289	*Oxytropis campestris*	Oxca ABC 95	1,255	25
295	*Oxytropis campestris*	Oxca 7M25-95	225	16
296	*Oxytropis campestris*	Oxca MP250-95	533	31
297	*Oxytropis campestris*	Oxca MP 237-95	995	20
299	*Oxytropis campestris*	Oxca 26-95	26.4	56
317	*Oxytropis deflexa*	Oxde MP200-Rich 95	1.7	17
319	*Astragalus alpinus*	Asal 7M28-95	4.5	33
325	*Hedysarum Mackenzii*	Hema 7M30-95	106	69
335	*Sanguisorba officinalis*	Saof Delta 95	0.9	35
336	*Sanguisorba officinalis*	Saof 7M29-95	9.3	27

	Species	Lot	Wt. in Grams	Final Germination
339	*Sanguisorba officinalis*	Saof 1-95	14.8	39
340	*Sanguisorba officinalis*	Saof Delta 2-95	25.3	36
354	*Artemisia borealis*	Arbo 7M22-95	8.5	71
355	*Artemisia borealis*	Arbo M237	73	86
356	*Polygonum alasanum*	Poal 95	99	94
360	*Cnidium cnidifolium*	Cncn 1-95	5.7	51
361	*Cnidium cnidifolium*	Cncn 7M20-95	101	82
364	*Potentilla multifida*	Pomu 7M19-95	171	91
372	*Cnidium (cndidium?)*	Cncn Delta 95	13	30
373	*Sparganium sp.*	Spsp 4m50-95	59	0
468	*Agropyron macrourum*	Agma 7M27 1-95	67	97
469	*Agropyron macrourum*	Agma JR 1-95	16	24
493	*Festuca altaica*	Feal Delta 95	1.9	20
512	*Elymus innovatus (?)*	Elin 95M1-95	77	62
513	*Elymus innovatus (?)*	Elin Blk Rapids 95	81	86

Table A-3. EIELSON AREA

	Species	Lot	Wt. in Grams	Final Germination
452	*Carex sp.*	Casp 5M15-95	7	81

Table A-4. FAIRBANKS AREA

	Species	Lot	Wt. in Grams	Final Germination
310	*Oxytropis deflexa*	Oxde NPS10+Bag 2	26.1	58
311	*Oxytropis deflexa*	Oxde 4M9-95	97	1
312	*Oxytropis deflexa*	Oxde Knob Hill 95	120	37
314	*Oxytropis campestris*	Oxca 4M13-95	5.9	16
341	*Hedysarum alpinum*	Heal Knob Hill 95	0.9	70
344	*Hedysarum alpinum*	Heal 2M5-95	75	63
345	*Hedysarum alpinum*	Heal 217.4-95	176	74
346	*Hedysarum alpinum*	Heal Knob Hill 2-95	105	80
368	*Potentilla multifida*	Pomu Nordale 95	2.6	16
371	*Potentilla multifida*	Pomu Shaw 95	13.5	87
416	*Astragalus alpinus*	Asal 4M-12-95	58	12
417	*Polygonum alaskanum*	Poal 4M44-95	143	39
418	*Polygonum alaskanum*	Poal 11M50-95	90	47
419	*Polygonum alaskanum*	Poal 1-44-95	53	60
420	*Polygonum alaskanum*	Poal Light-95	-	63
424	*Potentilla palustris*	Popa 4M14-95	18.8	0
425	*Potentilla palustris*	Popa Nordale 95	0.5	1
449	*Papaver Macounii*	Pama 9M39-95	0.8	74
450	*Cordyalis sempervirens*	Cose 11M52-95	3	?
451	*Iris setosa*	Irse Nordale 95	6.7	0
453	*Spirea Beauverdiana*	Spbe 11M-95	very little	0
462	*Agropyron macrourum*	Agma 4M11 1-95	243	95

	Species	Lot	Wt. in Grams	Final Germination
476	*Plantago canescens*	Plca T Blf 95	0.7	73
514	*Elymus innovatus (?)*	Elin 1M1-95	103	83
515	*Elymus innovatus (?)*	Elin 7M21-95	7	76

Table A-5. NOME AREA

	Species	Lot	Wt. in Grams	Final Germination
251	*Honckenya peploides*	Nome 95	56.5	53
253	*Aster sibiricus*	Assi Nome trashy	4.5	66
254	*Aster sibiricus*	Assi Interior good seed	10.1	7
	Aster sibiricus	Assi Interior light seed	4.7	0
258	*Parrya nudicaulis*	Panu 95	0.8	2
259	*Ligusticum scoticum*	Lisc Nome 95	4.4	16
261	*Petasites hyperboreus*	Pehy 95	8.9	53
263	*Castilleja caudata*	Caca Nome 95	2.4	15
274	*Sanguisorba officinalis*	Saof Nome 95	0.9	71
275	*Polemonium acutiflorum*	Poac Nome 95	1.1	36
276	*Chrysanthemum arcticum*	Char Nome 95	1.8	85
277	*Boykinia Richardsonii*	Bori Nome 95	1.1	88
278	*Iris*	Iris Nome 95	101	32
279	*Oxytropis maydelliana*	Oxmay 95	9.8	18
280	*Oxytropis nigrescens*	Oxni Nome 95	1.2	6

	Species	Lot	Wt. in Grams	Final Germination
282	*Hedysarum alpinum*	Heal Nome 95	59.9	24
283	*Astragalus aboriginum*	Asab KPC 95	32	40
284	*Astragalus alpinus*	Asal Nome 95	1	28
285	*Astragalus aboriginum*	Asab Nome 95	148	7
286	*Lathyrus maritimus*	Lama 95	215	36
	Lathyrus maritimus	Lama light 95	158	0
290	*Eriophorum Scheuchzeri*	Ersc 95	22.6	49
291	*Eriophorum angustifolium*	Eran Teller 95	9.3	3
	Eriophorum angustifolium	Eran Nome 95	63	16
294	*Juncus arcticus*	Juar 95	7.3	96
306	*Oxytropis campestris*	Oxca Sandy 95	63.4	35
329	*Artemisia tilesii*	Arti 1-45-95	7.2	85
352	*Carex Gmelini*	Cagm 4-95 A (good seed)	279	95
	Carex Gmelini	Cagm 4-95 B (light seed)	67	93
437	*Carex saxatalis*	Casa Nome 95	9	4
454	*Poa eminens*	Poem Nome 1-95 (good)	4.9	12
	Poa eminens	Poem Nome 1-95 (light)	7	0
458	*Poa alpina*	Poal Nome 1-95	25	48

	Species	Lot	Wt. in Grams	Final Germination
459	*Agropyron macrourum*	Agma 1-95	112	87
463	*Poa arctica*	Poar Nome 1-95	1.8	20
466	*Poa arctica*	Poar 1-95	5.8	35
495	*Festuca altaica*	Feal Nome 95	17	50
503	*Festuca brachyphylla*	Febr Nome 95 A (good)	27	69
	Festuca brachyphylla	Febr Nome 95 B (light)	6	17
504	*Festuca brachyphylla*	Febr PHS Rd 95	0.5	0
507	*Trisetum spicatum*	Trsp Nome 1-95	0.7	90
509	*Trisetum spicatum*	Trsp 1-95	1.0	89

Table A-6. PAXON AREA

	Species	Lot	Wt. in Grams	Final Germination
321	*Hedysarum Mackenzii*	Hema 1-95	15	89
322	*Hedysarum Mackenzii*	Hema 2-94	53.9	86
324	*Hedysarum Mackenzii*	Hema Rich Hwy 95	254	89
326	*Hedysarum Mackenzii*	Hema 3-95	253	92
347	*Hedysarum alpinum*	Heal MP336-95	34	90
349	*Hedysarum alpinum*	Heal MP237	79	96

Table A-7. PORT CLARENCE AREA

	Species	Lot	Wt. in Grams	Final Germination
235	*Epilobium latifolium*	Epla KPC 95	300	95
	Epilobium latifolium	Epla KPC 95	235	90
	Epilobium latifolium	Epla KPC 95	200	80
236	*Rumex arcticus*	Ruar KPC 95	38.8	85
237				
247	*Artemisia tilesii*	Arti KPC 1-95	7.4	97
248	*Artemisia tilesii*	Arti KPC 2-95	13.5	100
249	*Artemisia arctica*	Arar 95	0.7	31
250	*Artemisia borealis*	Arbo KPC 95	102	97
255	*Bupleurum triradiatum*	Butr KPC 95	3.9	84
256	*Sedum rosea*	Sero KPC 95	34	69
257	*Conioselinum chinense*	Coch KPC 95	52.2	84
260	*Senecio pseudo-Arnica*	Seps KPC 95	17.4	3
262	*Castilleja caudata*	Caca KPC 95	3.5	0
281	*Oxytropis maydelliana*	Oxma KPC	390	32
293	*Parnassia palustris*	Papa KPC 95	1.7	8
330	*Artemisia tilesii*	Arti SS-95	0.5	78
455	*Poa eminens*	Poem KPC 1-95 good	7.2	77
	Poa eminens	Poem KPC 1-95 light	6	13
456	*Poa alpina*	Poal 1-95	15	61
457	*Poa alpina*	Poal KPC 1-95	23	47
460	*Poa arctica*	Poar KPC 1-95	3.9	78

	Species	Lot	Wt. in Grams	Final Germination
461	*Poa arctica*	Poar KPC2-95 A (good)	58	84
	Poa arctica	Poar KPC 2-95 B (light)	8	30
484	*Festuca rubra*	Feru KPC 95 A (good)	119	87
	Festuca rubra	Feru KPC 95 B (light)	37	80
496	*Festuca altaica*	Feal KPC 95	31	81
505	*Festuca brachyphylla*	Febr KPC 95	0.6	47
506	*Trisetum spicatum*	Trsp KPC 95	9	88
516	*Elymus mollis*	Elmo 1-95	450	91

Table A-8 SALCHA AREA

	Species	Lot	Wt. in Grams	Final Germination
308	*Oxytropis campestris*	Oxca 6M16-95	65.9	50
315	*Oxytropis campestris*	Oxca 6M18-95	27.6	16
348	*Hedysarum alpinum*	Heal 6M16-95	89	90
366	*Potentilla multifida*	Pomu 6M19-95	13	90

Table A-9. SLANA AREA

	Species	Lot	Wt. in Grams	Final Germination
313	*Oxytropis visida*	Oxvi Neb Rd 95	18.4	24
471	*Poa unknown sp*	Poa Tok 95	4.5	66
472	*Poa lanata*	Pola Neb Rd 95	263	88
475	*Dryas Drummondii*	Drdr Neb Rd 95	221	41
480	*Agropyron violaceum*	Agvi 1-95	31.5	93
481	*Agropyron violaceum*	Agvi N.R. 1-95	644	99

Table A-10. TOK AREA

	Species	Lot	Wt. in Grams	Final Germination
298	*Oxytropis campestris*	Oxca Tok 95	742	15
309	*Oxytropis deflexa*	Oxde 10M47-95	6.6	19
316	*Oxytropis deflexa*	Oxde 8M32-95	7	32
318	*Oxytropis deflexa*	Oxde 4M9A-95	334	1
320	*Astragalus alpinus*	Asal 4M12-95	355	17
323	*Hedysarum Mackenzii*	Hema 8M41-95	16.3	57
353	*Iris setosa*	Irse 4M55-95	39	19
365	*Potentilla multifida*	Pomu MP236-95	149	89
370	*Potentilla multifida*	Pomu 8M43-95	236	94
374	*Achillea borealis*	Acbo 1-95 A (best seed fraction)	4.9	89
	Achillea borealis	Acbo (B light seed fraction)	3.4	90
	Achillea borealis	Acbo (C Very light seed)	4.3	56
375	*Carex aquatilis (?)*	Caaq 4M53-95	109	0

	Species	Lot	Gm Wt.	Germination
376	*Castilleja hyperborea*	Cahy 1-95	1.1	5
448	*Achillea borealis*	Acbo 2-95	13.6	98
451A	*Silene Menziesii*	Sime 1-95	5	97
464	*Agropyron macrourum*	Agma 2-7 1-95	136	99
465	*Agropyron macrourum*	Agma 8M31 1-95	84	94
467	*Agropyron macrourum*	Agma 10M33 1-95	104	99
470	*Dryas Drummondii*	Drdr Tok 95	16	24
477	*Agropyron spicatum*	Agsp 1-95		100
478	*Juncus sp*	Jusp 9M33-95	3.7	0
482	*Agropyron sp.*	Agsp Tok 95	537	73
483	*Agropyron violaceum*	Agvi MP1294-95	800	100