

Final Report of Initial Demonstration  
and Advanced Conservation Plantings  
at the Mile Post 1408 Evaluation Plot  
Near Delta, Alaska, 1983 - 1986

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## Introduction

The Conservation Plant Project at the Alaska Plant Materials Center (PMC), in the Alaska Department of Natural Resources, Division of Agriculture, is responsible for developing new plant varieties (cultivars) for land reclamation, habitat enhancement, and erosion control. In addition to the development of new plant cultivars, this project also is responsible for developing techniques for erosion control and reclamation. In order to accomplish these goals, it is beneficial for the PMC to cooperate with industry, and other governmental agencies throughout Alaska.

## Purpose

Advanced Evaluation and Demonstration Plots are established throughout Alaska for three main purposes. The first purpose allows for advanced or final evaluation of plant materials that have performed well at the Palmer PMC for a period of at least three years. This offsite evaluation is important so that a plant's adaptability and range of suitability can be determined. If the plant does well at this stage it may be released as a new cultivar.

The second purpose provides an opportunity to establish demonstration plantings containing the species recommended for the area in The Revegetative Guide for Alaska. The results from the planting determine if changes should be made in "the Guide.

The third reason for the plots is to provide a centralized area for local plantings by the Cooperative Extension agents, District Conservationists (DC), or other cooperators. This allows the agent or DC to tailor the plot to local interests. The plots also give the agent or DC a "classroom" where specific plant materials may be viewed and worked with by local farmers, students, and other groups interested in farming or gardening.

Interest from the Salcha-Big Delta Soil and Water Conservation District, the Soil Conservation Service, USDA, Future Farmers of America, and Delta School District induced the Plant Materials Center to establish a large well protected plot at Mile Post 1408 near Delta. Because of the long term plans for this plot, the cooperators decided that public land should be used. The site also needed to be in an area with soils and weather fairly typical of the Barley Project. The only available land that fit these criteria was a site controlled by the Future Farmers of America and the Delta School District.

#### Site Preparation:

On June 21, 1983, clearing and fencing was completed. This work was completed by local farm volunteers and the Future Farmers of America. The site was well prepared by using standard farm equipment donated by local farmers and the University of Alaska Agriculture and Forestry Experiment Station.

## Methods

On June 21, 1983, 51 accessions of advance test plant material were planted. The complete 1983 array of accessions (Figure 1), with the exception of Glaucus Bluegrass T08867 and Alpine Bluegrass 235491, was replicated three times at the Delta plot. The Glaucus Bluegrass and Alpine Bluegrass were each planted once because seed supply was limited. Tilesy sage was planted in two plots only.

Two plots, were hand-seeded with pre-measured amounts of seed. The seeding rate for each accession was approximately 40 pounds per acre. The third plot was planted by using a Planet Jr. Drill. Following seeding, the plots were fertilized with 20-20-10 fertilizer at a rate of 450 pounds per acre (90 pounds actual nitrogen, 90 pounds actual phosphorus, and 45 pounds actual potash). After the hand seed plots were seeded and fertilized, the areas were raked by hand to incorporate the seed and fertilizer. The drill seed plot was not raked.

In addition to the advanced evaluation blocks, a demonstration planting of varieties recommended in The Revegetative Guide for Alaska was made (Figure 2). Each variety was planted in a 20' x 60' block which was then divided into thirds so that each variety could be grown in three fertilizer regimes. Fertilizer (20-20-10) was applied at the rates of 0 lb/a, 240 lb/a, and 480 lb/a. The demonstration area contained the 14 varieties.

Typical Plot Layout

<-----> 10' <----->

Nugget Kentucky Bluegrass	Merion Kentucky Bluegrass
Park Kentucky Bluegrass	Banff Kentucky Bluegrass
Sydsport Kentucky Bluegrass	Fylking Kentucky Bluegrass
Poa ampla	Troy Kentucky Bluegrass
Sherman Big Bluegrass	Canbar Canby Bluegrass
Tundra Bluegrass	Reubans Canada Bluegrass
Poa glauca T08867	Poa alpina
Agropyron subsecundum 371698	Sodar Streambank Wheatgrass
Nordan Crested Wheatgrass	Agropyron subsecundum Canada
Fairway Crested Wheatgrass	Agropyron violaceum
Summit Crested Wheatgrass	Agropyron boreal
Critana Thickspike Wheatgrass	Agropyron yukonese
Fulst Alkaligrass	Vantage Reed Canarygrass
Climax Timothy	Engmo Timothy
Elymus arenarius	Elymus sibiricus 34560
Elymus sibiricus 1966	Elymus sibiricus 2144
Norcoast Bering Hairgrass	Tufted Hairgrass
Sourdough Bluejoint	Calamagrostis canadensis Delta
Meadow Foxtail	Alopecurus geniculatus
Garrison Creeping Foxtail	Arctared Red Fescue
Boreal Red Fescue	Festuca scabrella
Beckmannia	Pennlawn Red Fescue
Durar Hard Fescue	Highlight Red Fescue
Covar Sheep Fescue	Manchar Smooth Brome
Alyeska	Carlton Smooth Brome
Tilesy Sage	

Figure 1. Typical Plot Layout

Demonstration Planting

	0 Fertilizer	240 lb. 20-20-10 per acre	480 lb. 20-20-10 per acre
Arctared			
Boreal			
Durar			
Park			
Merion			
Sourdough Bluejoint			
Engmo Timothy			
Manchar Smooth Brome			
Polar Brome			
Sodar Wheatgrass			
Creeping Foxtail			
Alaskaland Red Clover			
White Dutch Clover			
Aurora Alsike Clover			

Figure 2.

Advanced evaluation plots are evaluated at least once a year. The accessions are rated for vigor, percent stand, and numerous other factors such as hardiness, disease-resistance, and related characteristics. However, we have found that vigor and percent stand give a reliable indication of how the different accessions compare with each other. Figure 3 is an example of the evaluation sheets that will be presented in this report. The following numbers, followed by brief explanations, correspond to numbers on the example evaluation sheet:

1. Location and title of evaluation plot.
2. Number of evaluation blocks--This number may range from one to three blocks.
3. Year of Record· the year that evaluation data was collected.
4. Vigor--this number can range from one to nine. One is best and nine is the worst rating. If possible, this rating is determined by comparison with other accessions of the same species. The rating is based on color, height, health, flowering and/or seed production, and on the evaluator's knowledge of the plant, and its expected performance. If more than one block is planted, this number will be an average of the ratings for each block



2 # of Blocks	4	5							
6									1
'Merion' Kentucky Bluegrass									2
'Banff' Kentucky Bluegrass									3
'Park' Kentucky Bluegrass									4
etc.									5
									6
									7
									8
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Figure 3. Sample Advanced Evaluation Page.

5. Percent Stand--this number represents the percentage of the ground that is covered by the accession. Only live plant material is included; litter from previous year's growth and other species are not included. If more than one block is planted, this number will be an average of the ratings for each block.
  
6. The accession that is being rated. The accession is identified by its varietal and common name or its common name and its accession number.

### Results

By August 25, 1983, all of the accessions had germinated and produced measureable stands. The plots were again evaluated on September 23, 1984, and as expected some accessions had winterkilled. By August 6, 1985, the weaker survivors of the previous year had died out.

By the final evaluation on September 15, 1986, 'Nugget' Kentucky Bluegrass, 'Alyeska' Polargrass, 'Arctared' Red Fescue, 'Gruening' Alpine Bluegrass, 'Norcoast' Bering Hairgrass, 'Sourdough' Bluejoint and 'Boreal' Red Fescue performed the best.

Other accessions that performed very well were 'Pennlawn' Red Fescue, and 'Park' and 'Fylking' Kentucky Bluegrass, Siberian Wildrye 345600, and Tufted Hairgrass 372690

'Garrison' Creeping Foxtail and 'Durar' Hard Fescue are recommended by The Revegetative Guide for Alaska but failed to survive. The poor performance of 'Garrison' Creeping Foxtail and 'Egan' American Sloughgrass can probably be attributed, in part, to the dry nature of the site. See Figure 4 for complete year by year detail

In the demonstration planting of varieties recommended in The Revegetative Guide For Alaska, 'Arctared' and 'Boreal' Red Fescue, 'Sourdough' Bluejoint, 'Alyeska' Polargrass and Polar Brome outperformed all the other varieties of grass in all the categories. 'Aurora' Alsike Clover was the only legume to produce a stand, although it did not perform as well as would be expected. Alsike survived until 1985. Once again, 'Garrison' Creeping Foxtail, Engmo Timothy and 'Durar' performed very poorly.

3 Blocks of Plantings									
'Nugget' Kentucky Bluegrass	4	97	4	97	4	93	2	100	1
'Merion' Kentucky Bluegrass	6	93	4	100	6	74	4	93	
'Banff' Kentucky Bluegrass	4	93	2	100	7	53	7	60	
'Park' Kentucky Bluegrass	2	90	4	67	5	93	3	100	
'Sydsport' Kentucky Bluegrass	2	82	3	70	6	100	3	83	
'Fylking' Kentucky Bluegrass	4	87	6	80	9	36	3	100	
'Troy' Kentucky Bluegrass	4	83	5	57	7	63	-	-	
Big Bluegrass 387931	4	83	2	70	3	97	3	92	
'Sherman' Big Bluegrass	2	97	9	17	9	17	-	-	
'Canbar' Canby Bluegrass	4	90	8	33	9	17	-	-	
'Reubans' Canada Bluegrass	6	88	-	-	-	-	-	-	
'Tundra' glaucus Bluegrass	3	97	6	72	7	47	3	93	
Glaucus Bluegrass T08867 *	5	95	3	100	5	100	3	80	
'Gruening' Alpine Bluegrass *	5	60	1	60	1	80	1	100	
'Sodar' Streambank wheatgrass	2	90	6	67	7	60	-	-	
Bearded wheatgrass 371698	4	100	4	82	4	93	8	33	
Bearded wheatgrass 236693	5	83	8	28	8	30	8	33	
'Nordan' Crested wheatgrass	2	100	-	-	-	-	-	-	
'Fairway' Crested wheatgrass	4	93	-	-	-	-	-	-	
'Summit' Crested wheatgrass	4	83	5	50	7	47	6	66	
Violet wheatgrass T12050	6	88	2	97	2	100	3	80	
Boreal wheatgrass T12048	6	100	4	90	4	90	4	90	
Yukon wheatgrass T12051	6	97	4	87	6	83	-	-	
'Critana' Thickspike wheatgrass	3	97	6	83	9	25	-	-	
'Fults' Alkaligrass	2	90	-	-	-	-	-	-	
'Vantage' Reed Canarygrass	6	90	-	-	-	-	-	-	
'Engmo' timothy	4	100	5	67	7	33	5	83	
'Climax' timothy	4	100	9	10	9	10	8	47	
Beach wildrye 345978	8	12	3	22	8	7	9	7	
Siberian wildrye 345600	4	92	1	97	4	100	3	100	
Siberian wildrye 2144	2	92	3	97	7	95	5	95	
Siberian wildrye 1996	6	90	4	100	6	57	6	60	
'Norcoast' Bering hairgrass	3	93	2	85	2	100	2	100	
rass 372690	2	90	2	93	2	95	3	100	
	2	90	4	97	2	100	3	95	
ajoint	4	83	2	93	2	100	2	100	
	6	100	7	47	8	45	9	23	
Geniculated foxtail 314565	2	100	9	17	9	17	-	-	
Garrison Creeping foxtail	4	93	7	43	8	23	-	-	
'Arctared' Creeping red fescue	4	87	2	92	1	100	1	100	
'Boreal' Creeping red fescue	2	98	4	97	1	100	2	100	
'Pennlawn' Creeping red fescue	4	90	4	92	6	62	3	93	
Rough fescue 236849	4	87	3	92	2	100	3	86	
'Egan' American Sloughgrass	6	100	2	100	1	100	7	26	
'Durar' Hard fescue	5	83	4	98	4	100	8	33	
'Highlight' Sheep fescue	6	83	-	-	-	-	-	-	
'Covar' Sheep fescue	5	80	-	-	-	-	-	-	47
'Manchar' Smooth Brome	2	100	6	73	7	45	6	60	48
'Carlton' Smooth Brome	4	100	8	60	7	40	7	53	49
'Alyeska' Polar grass	4	100	3	97	1	100	1	100	
Tilesy Sage T12052 **			5	75	5	75	3	100	
on three replications unless other									
nted in one plot.									
anted in two plots.									

Figure

## Conclusions & Recommendations

All the following conclusions and recommendations are based on survival and performance. None of the plots were cut or harvested in any manner, therefore, no yield data or recovery rates have been determined. This is an important factor to consider if this data is used for agricultural application. Another important factor to consider when using this information, is that the plots received no supplemental fertilization after the initial planting. Supplemental fertilization or annual fertilization has positive effects on planting and appears to promote long-term survival.

- 1) If range or pasture seedings are attempted near Delta, 'Polar' Brome, 'Alyeska' Polargrass, 'Arctared' Red Fescue, 'Sourdough' Bluejoint or 'Nugget' Kentucky Bluegrass could be considered.
  
- 2) For revegetation after construction activities or other major disturbances, the following species and varieties should be used 'Nugget', 'Park' or 'Fylking' Kentucky Bluegrass, 'Gruening' Alpine Bluegrass, 'Norcoast' Bering Hairgrass, 'Sourdough' Bluejoint, 'Boreal' or 'Arctared' Red Fescue and 'Alyeska' Polargrass. Alsike Clover could be added as a small portion of a mix for temporary cover or diversity.

3) It is also recommended that 'Durar' Hard Fescue, 'Sodar' Streambank wheatgrass, and all clovers be dropped from The Revegetative Guide for Alaska, as possible cultivars for use at Delta, as they appear to be unsuitable. 'Garrison' Creeping Foxtail failed at the 1408 plot but this site is drier than that recommended for 'Garrison'. Notwithstanding the dry nature of the site, 'Garrison Creeping Foxtail has not survived in any plot planted by the Plant Materials Center, even on wet soil. Therefore, because of 'Garrison's' inconsistent performance, it is recommended that it too be dropped from The Revegetative Guide for Alaska.

APPENDIX I

Cooperators:

Soil Conservation Service, USDA  
 Cooperative Extension Service, U of A  
 Delta School District  
 Salcha-Big Delta Conservation District  
 Future Farmers of Alaska

Costs

DELTA				
Date	Activity	Travel	Per diem	Other
6/21/83	Plant site	110.00	220.00	50.00
8/25/83	Evaluate	0.00	80.00	
5/15/84	Evaluate	0.00	240.00	
8/15/84	Evaluate	0.00	80.00	
5/21/85	Evaluate	0.00	160.00	
8/06/85	Evaluate	0.00	80.00	
6/09/86	Evaluate	0.00	160.00	
9/15/86	Evaluate	<u>0.00</u>	<u>80.00</u>	
	<b>Total</b>	110.00	1,040.00	50.00
				<u><u>\$2,200.00</u></u>