Final Report of Initial Demonstration and Advanced Conservation Plantings at the City of Kenai Evaluation Plot in 1984 - 1987

Prepared by

State of Alaska

Department of Natural Resources

Division of Agriculture

Alaska Plant Materials Center

Stoney J. Wright, State Plant Materials Specialist

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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 Cooperative Extension Service and the City of Kenai persuaded the Plant Materials Center to establish a large, well protected plot in Kenai. Because of the long term plans for this plot, the cooperators decided that public land should be used. The only available land that fit these criteria was a triangular piece of city property at the intersection of First Street and Main Street Loop. This property is located next to the city softball fields.

Management History:

In the spring of 1984, the City of Kenai started to prepare the plot area. The first phase was to build up the planting area. This was accomplished by bringing in fill. Once the fill material was in place, the city leveled and compacted the site. The second phase of city involvement was the construction of a chain link fence around the plot. This was done to prevent vandalism.

On June 8, 1984, two Alaska Plant Materials Center employees transported a rototiller to Kenai to prepare the site. This proved to be impossible as the site was compacted to the point that a standard walk behind rototiller could not break the soil. Planting occurred after a local landscape contractor volunteered his equipment to prepare the necessary area. The Plant Materials Center transported a tractor and rotovator to Kenai on September 27, 1984 to complete the preparation and breaking of the soil

Methods

On June 8, 1984, 51 accessions of advance test plant material were planted. The complete 1983 array of accessions (Figure 1), with the exception of Rough Fescue 236849 and 'Gruening' Alpine Bluegrass, was replicated three times at the Kenai plot. The Rough Fescue and Alpine Bluegrass were each planted twice because seed supply was limited.

Two plots were hand-seeded with pre-measured amounts of seed. The seeding rates of each block were approximately 40 pounds per acre. The third plot was planted with a Planet Jr. Drill seeder. 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-seeded plots were seeded and fertilized, they were raked by hand to incorporate the seed and fertilizer. The drill-seeded plot was not raked.

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
Fults 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

In addition to the advanced evaluation blocks, a demonstration planting of recommended varieties from the "Revegetative Guide for Alaska" was planted (Figure 2). Each variety was planted in a 20' x 60' block. The demonstration area contained the 13 varieties. The block was then divided into thirds for fertilizer treatment. Fertilizer (20-20-10) was applied at the rates of 0 lb/a, 240 lb/a, and 480 lb/a to achieve three different fertilizer levels

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.

Demonstration Planting

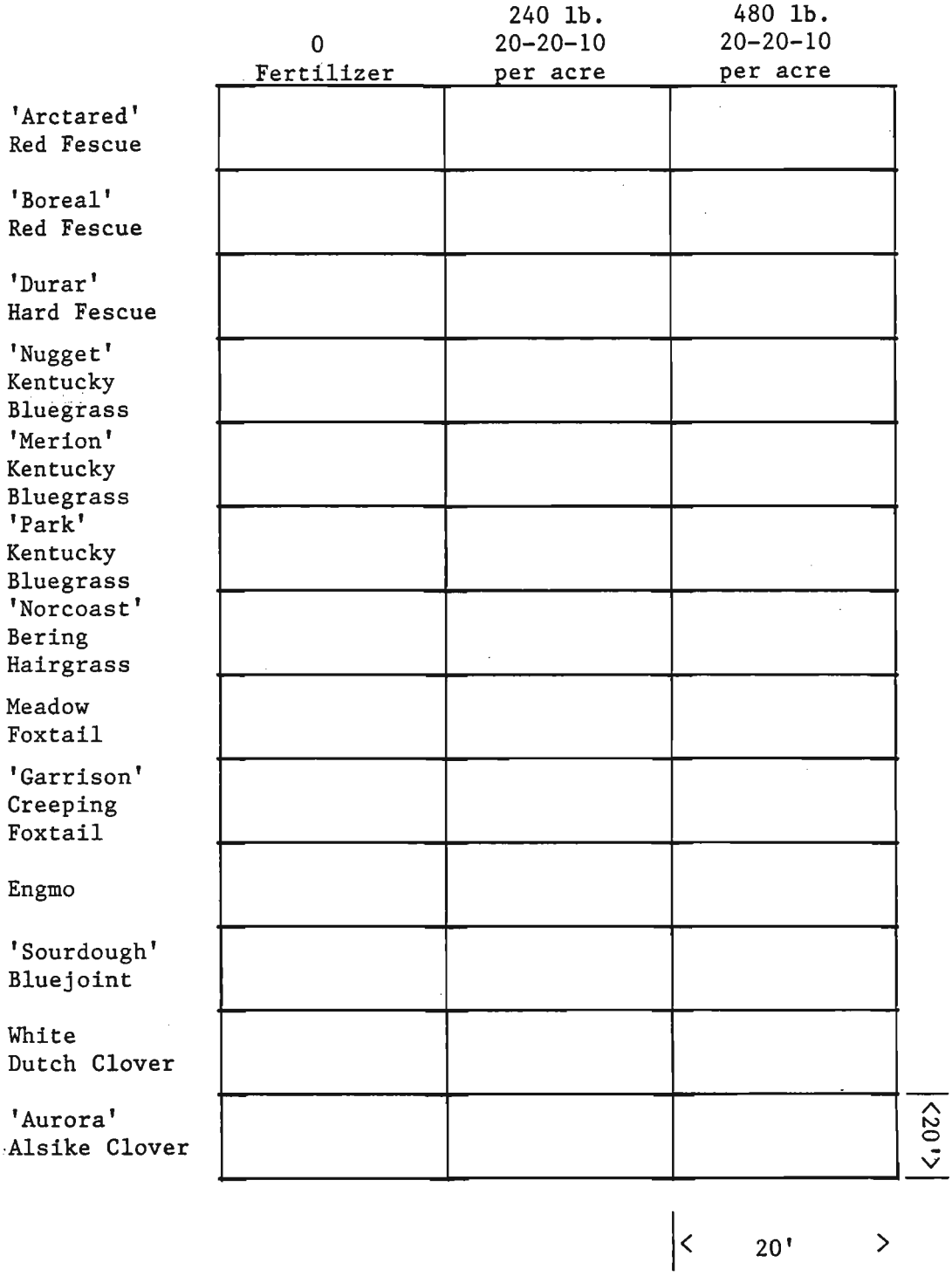

Figure 2.

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.

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 September 27, 1984, all of the accessions had germinated and produced measureable stands. The plots were again evaluated on August 15, 1985, and as expected some accessions had winterkilled. By September 10, 1986, the weaker survivors of the previous years had died out.

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

By the final evaluation on September 20, 1987, 'Merion' Kentucky Bluegrass, 'Gruening' Alpine Bluegrass, Rough Fescue, Glaucus Bluegrass T08867, 'Arctared' Red Fescue, 'Norcoast' Bering Hairgrass and Tufted Hairgrass 372690 performed the best.

Other accessions that performed very well were Big Bluegrass 387931, 'Boreal' Red Fescue, and 'Sydsport' and 'Nugget' Kentucky Bluegrass. Surprisingly, Meadow Foxtail, 'Durar' Hard Fescue, and 'Garrison' Creeping Foxtail failed to survive. 'Garrison', Meadow Foxtail, and 'Durar' are recommended by The Revegetative Guide for Alaska Figure 4 for complete year by year detail.

In the demonstration planting of recommended varieties from The Revegetative Guide For Alaska, 'Boreal', 'Arctared' Red Fescue, and 'Norcoast' Bering Hairgrass outperformed all the other varieties of grass in all the categories. Alsike and White Dutch Clover did not survive beyond 1984. Once again, 'Garrison' Creeping Foxtail 'Durar' did not survive.

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.

of Kenai Advanced Evaluation Plot	84		85		86		87		
3 Blocks of Plantings	% stand	vigor	% stand	vigor	% stand	vigor	% stand	vigor	
'Nugget' Kentucky Bluegrass	35	6	70	3	95	1	80	2	1
'Merion' Kentucky Bluegrass	70	5	70	3	90	3	100	1	2
'Banff' Kentucky Bluegrass	85	3	65	5	90	3	80	3	3
'Park' Kentucky Bluegrass	70	5	85	2	95	3	55	6	4
'Sydsport' Kentucky Bluegrass	70	3	80	2	95	2	90	3	5
'Fylking' Kentucky Bluegrass	55	4	90	1	93	3	60	3	6
'Troy' Kentucky Bluegrass	53	4	73	4	-	-	-	-	7
Big Bluegrass 387931	35	3	60	3	85	1	85	2	8
'Sherman' Big Bluegrass	80	1	10	9	-	-	-	-	9
'Canbar' Canby Bluegrass	75	5	33	9	-	-	-	-	10
'Reubans' Canada Bluegrass	90	3	33	8	15	9	-	-	11
'Tundra' glaucus Bluegrass	71	3	3	9	-	-	-	-	12
Glaucus Bluegrass T08867	75	2	90	2	100	1	100	1	13
'Gruening' Alpine Bluegrass *	95	1	95	1	100	1	95	1	14
'Sodar' Streambank wheatgrass	75	3	-	-	-	-	-	-	15
Bearded wheatgrass '1698	43	6	-	-	-	-	-	-	16
Bearded wheatgrass 236693	35	7	-	-	-	-	-	-	17
'Nordan' Crested wheatgrass	90	4	-	-	-	-	-	-	18
'Fairway' Crested wheatgrass	88	6	-	-	-	-	-	-	19
'Summit' Crested wheatgrass	70	5	-	-	-	-	-	-	20
Violet wheatgrass T12050	43	5	-	-	-	-	-	-	21
Boreal wheatgrass T12048	60	6	-	-	-	-	-	-	22
Yukon wheatgrass T12051	60	5	-	-	-	-	-	-	23
'Critana' Thickspike wheatgrass	70	4	-	-	-	-	-	-	24
'Fults' Alkaligrass	63	6	-	-	-	-	-	-	25
'Vantage' Reed Canarygrass	73	3	20	9	30	9	-	-	26
'Engmo' timothy	98	1	100	1	63	4	-	-	27
'Climax' timothy	95	1	100	5	85	7	-	-	28
Beach wildrye 345978	15	4	3	9	-	-	-	-	29
Siberian wildrye 345600	90	3	63	5	-	-	-	-	30
Siberian wildrye 2144	90	2	38	7	-	-	-	-	31
Siberian wildrye 1996	53	7	-	-	-	-	-	-	32
'Norcoast' Bering hairgrass	90	2	95	2	100	1	100	1	33
Tufted hairgrass 372690	65	1	80	2	100	2	100	1	34
Bluejoint	75	3	53	5	75	5	75	3	35
	33	7	50	5	60	5	50	7	36
	80	4	65	7	13	9	-	-	37
Geniculated foxtail 314565	100	1	100	1	-	-	-	-	38
Garrison Creeping foxtail	80	6	13	7	-	-	-	-	39
'Arctared' Creeping red fescue	65	4	90	3	100	1	100	2	40
'Boreal' Creeping red fescue	95	1	95	2	100	2	95	2	41
'Pennlawn' Creeping red fescue	85	2	95	2	90	1	85	3	42
Rough fescue 236849 *	80	1	90	1	100	1	100	2	43
American Sloughgrass T12053	30	5	60	3	50	5	-	-	44
'Durar' Hard fescue	60	5	13	9	-	-	-	-	45
'Highlight' Sheep fescue	73	3	63	5	60	3	73	4	46
'Covar' Sheep fescue	73	4	-	-	-	-	-	-	47
'Manchar' Smooth Brome	70	4	20	9	-	-	-	-	48
ton'	73	5	15	9	-	-	-	-	49
	33	7	50	5	60	3	33	5	50
	80	3	100	1	90	3	70	3	51
Based on three replications unless otherwise noted.									52
* Planted in two plots.									

Figure 4.

1 For revegetation after construction activities or other major disturbances, such as mining, the following species and varieties should be used: 'Nugget' or 'Merion' Kentucky Bluegrass, 'Gruening' Alpine Bluegrass, 'Norcoast' Bering Hairgrass, and 'Boreal' or 'Arctared' Red Fescue. Alsike Clover could be added as a small portion of a mix for temporary cover or diversity. A mixture of 'Norcoast' Bering Hairgrass and 'Boreal' or 'Arctared' Red Fescue would seem to be ideal for revegetation. At the time of this report 'Gruening' Alpine Bluegrass was not commercially available, and therefore should not be recommended. When 'Gruening' becomes available it should be in high demand on the Kenai.

2) It is also recommended that 'Durar' Hard Fescue and all clovers be dropped from The Revegetative Guide for Alaska, as possible cultivars for use near Kenai

3) This trial site was not suitable for evaluation of range or pasture potential. Therefore, these results should be used with caution if attempting these types of seed.

APPENDIX I

Cooperators:

Cooperative Extension Service, U of A
City of Kenai
Local Landscape Contractors

KENAI

Date	Activity	Travel	Per diem	Other
6/08/84	Prepare & Plant	0	160.00	141.00
	Rotovate & Evaluate	320.00	300.00	0
	Evaluate	0	80.00	0
	Evaluate	0	80.00	0
	Evaluate	0	80.00	0
	Evaluate	0	0	0
Total		320.00	700.00	141.00