DICKINSON EXPERIMENT STATION

NATIVE RANGE FERTILIZATION WITH

AMMONIUM NITRATE AND UREA – 1982

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A study that compares fertilization of native range between Ammonium Nitrate and Urea was started at the Dickinson Experiment Station in the spring of 1982. The trial was established on 2.6 acres located on the SW¼ SW¼ NW¼ sec. 16, T. 143 N., R 96 W. at the ranch headquarters of the Dickinson Experiment Station. The 30 X 60 foot plots were arranged in a randomized block design with three replications. The alleys between the replications were 10 feet wide and the perimeter border was 40 feet wide. A barbed wire fence was constructed to exclude grazing on the plots until after all of the data for that season were collected. The soil is moreau silty clay. The range site is clayey. The fertilization treatments were 40 and 60 pounds of Nitrogen per acre for Ammonium Nitrate and Urea applied annually and biennially, and 100 pounds of Nitrogen per acre for Ammonium Nitrate and Urea applied biennially. A total of ten fertilizer treatments and two control plots with no treatment were included in each replication. The fertilizer was broadcast applied on 4 May 1982. The data that were collected from these plots were: biweekly above ground herbage production separated into six categories, biweekly leaf height measurements and phenological phases of five major graminoid species, carbohydrate content of roots, shoots and leaves of two major grass species, quantitative species composition, biweekly soil moisture and monthly soil nutrient content at increments to 48 inches in depth.

The biweekly above ground herbage production was sampled by clipping to ground level two ¼m^2 quadrats for each plot. The herbage was separated into six categories: cool short, warm short, cool mid, warm mid, western wheatgrass and forbs. The samples were oven dried at 80˚C. The dried samples were then weighed in grams. The average weight of each category for the two ¼m^2 quadrats was determined and the average pounds per acre of herbage production was calculated for each category by multiplying the average weight in grams by 35.68. The total average production for each plot was found by the summation of the average pounds per acre for each category. The reported figures are means of the three replications for each treatment. Five biweekly clips were made for the 1982 season. The dates for these were 23-24 June, 9-12 July, 22-23 July, 9-13 August and 20-23 August.

The herbage samples were ground in a Wiley mill and analyzed for nutrient content by proximate analysis at the nutrition laboratory in the Animal Science Department at North Dakota State University under direction of Dr. Duane Erickson. The results of this analysis will be made available at a later date.

Biweekly leaf height measurements and phenological development of the flower stalks were collected for five dominant graminoid species: Carex heliophila, Bouteloua gracilis, Koeleria pyramidata, Agropyron smithii and Stipa comata. Twelve plants of each species were selected at random on each plot. All of the leaves of each plant were outstretched and measured to the nearest millimeter in sequence from the oldest to the newest. Along with the length measurements, the degree of dryness for the leaf blades was recorded. The categories of dryness used were: 0, .01-2, 2.1-25, 25.1-50, 50.1-75, 75.1-98 and 100 percent dry. The highest figure of the category was used to record the percentage of dryness for each leaf blade.

If the flower stalks were present, the height was measured and the phenological stage of development was recorded. The categories used were: flower stalk developing, head emergence, anthesis, seeds developing and seeds being shed. Seven biweekly leaf height and phenological development data were collected in the 1982 season. The dates for these were 27 May, 2-3, 7, 11 June, 21, 25, 28 June, 15, 19-20 July, 30 July, 2, 4 August, 12-13, 18 August, and 24-25 August.

Carbohydrate content samples of roots, shoots and leaves for Bouteloua gracilis, and Agropyron smithii were collected. Random plants of each species were collected from each plot. The soil was washed from the samples. The samples were divided into roots, shoots and leaves in the field and placed in a cooler containing dry ice. The samples from the three replications of each treatment were combined. The samples will be analyzed in the laboratory. Four carbohydrate content sample collections were made in the 1982 season. The dates for these were 18 June, 9 July, 3 August and 30 August.

Quantitative species composition data for each plot was collected during the period of 27 August to 2 September for the 1982 season. The herbaceous plants were sampled by the ten pin point-frame method (Levy and Madden 1933, Tinney, Aamodt, and Ahlgren 1937, Heady and Raden 1958, and Smith 1959). The point frame is a metal frame that is constructed to stand at a 60˚ angle with holes for ten pins spaced at 5 cm intervals. The frame was set down and the pins raised and then allowed to move down through the existing vegetation. If a pin hit the basal portion of a living plant, the species of that plant was recorded. Hits on Selaginella densa and the various species of lichens were also recorded as hits. The pins that did not make contact with living vegetation were counted as no hits. These were divided into litter (dead and decaying vegetation), soil (mineral soil not covered by litter or living vegetation) and rock (a hard mass of mineral substance large enough to obstruct plant growth, about the size of a half dollar or larger). Aerial hits were not recorded. Fifteen hundred points were read for each treatment (500 points per plot). A systematic sampling scheme was used for each plot. A permanent major transect was established two feet inside and parallel to the north boundary of each plot. Five minor transects were established perpendicular to the major transect at three foot intervals starting three feet from the east boundary of the plot. One hundred points were read on each minor transect. A species present list for forbs and shrubs on each plot was completed 2 September.

Soil moisture by the gravimetric method was taken four times during the 1982 season. The dates for these were: 16 June, 6 July, 20 July, and 11 August. The one inch Veihmeyer soil tube was used to collect the samples. Three locations were selected as sample sites for the trial: at the north end, in the center and at the south end. Two replications were taken at each location. The samples were collected at increments of 0-6, 6-12, 12-24, 24-36 and 36-48 inches in depth. Each subsample was placed in a numbered steel can of known weight. These were weighed, and then oven dried at 100˚C. The dried soil cans were again weighed. The difference in weight is the weight of the soil water. Percent soil moisture then can be calculated.

Soil nutrient content was collected monthly during the 1982 season. The samples were collected using the one inch Veihmeyer soil tube. Two replications were taken from each plot. The samples were collected at increments of 0-6, 6-12, 12-24, 24-36, and 36-48 inches in depth. Each subsample was placed in labeled soil bags and frozen. The samples will be analyzed for nutrient content by the soils laboratory at North Dakota State University. The results of this analysis will be made available at a later date.

PLEASE INSERT NATIVE RANGE FERTILIZATION FIGURE.

Table 1. Monthly Mean Maximum, Minimum and Average Temperatures in Centigrade (˚C) and Fahrenheit (˚F) and Monthly Precipitation in Millimeters (mm) and Inches (in) at the Ranch Headquarters, Dickinson Experiment Station, Sep 1981 – Dec 1982

	Temperature				Temperature				Precipitation	
Year Month	**Max (˚C)**	**Min (˚C)**	**Average (˚C)**		**Max (˚F)**	**Min (˚F)**	**Average (˚F)**		**(mm)**	**(in)**
1981:										
Sep	23.04	5.26	14.15		73.47	41.47	57.47		23.88	0.94
Oct	13.23	-0.97	6.13		55.81	30.26	43.03		12.45	0.49
Nov	9.06	-3.93	2.57		48.30	24.93	36.62		13.72	0.54
Dec	-3.64	-13.26	-8.45		25.45	8.13	16.79		15.24	0.60
1982:										
Jan	-13.39	-27.19	-20.43		7.90	-16.94	-4.77		27.69	1.09
Feb	-6.01	-17.30	-11.66		21.18	0.86	11.02		12.45	0.49
Mar	-0.63	-10.13	-5.38		30.87	13.77	22.32		49.02	1.93
Apr	8.96	-3.09	2.93		48.13	26.43	37.28		34.80	1.37
May	14.77	3.87	9.32		58.58	38.97	48.77		68.33	2.69
Jun	18.32	6.63	13.94		64.97	43.94	57.09		109.22	4.30
Jul	27.06	12.99	20.03		80.71	55.39	68.05		89.92	3.54
Aug	N/A(1)	10.88	N/A		N/A	51.58	N/A		44.45	1.75
Sep	N/A	4.33	N/A		N/A	39.80	N/A		42.93	1.69
Oct	N/A	0.32	N/A		N/A	32.58	N/A		146.05	5.75
Nov	2.02	-9.82	-3.90		35.63	14.33	24.98		6.60	0.26
Dec	-0.82	-11.77	-6.30		30.52	10.81	20.66		11.43	0.45

(1) Not available.

Table 2. Mean Biweekly above Ground Herbage Production by Category in Lbs/Acre for the Ammonium Nitrate Fertilization Treatment on Native Range at the Dickinson Experiment Station – 1982

Lbs of N/acre EY=annually EOY=biennially	9-11 Jun	23-24 Jun	9-12 Jul	22-23 Jul	9-13 Aug	22-23 Aug
40 E Y:						
Cool short		416.7	594.1	522.7	428.2	491.7
Warm short		226.6	286.2	544.8	233.7	293.7
Cool mid		316.5	278.3	398.6	273.0	428.2
Warm mid						224.8
Western whtg		305.8	312.9	370.0	205.2	331.8
Forbs		309.7	607.3	535.2	162.3	395.0
TOTAL:		1575.3	2078.7	2371.2	1302.3	2165.1
40 E O Y:						
Cool short		454.9	617.3	633.3	451.4	463.8
Warm short		307.6	257.6	407.5	349.7	283.7
Cool mid		297.9	252.6	459.6	116.0	388.3
Warm mid			153.4			
Western whtg		171.3	129.5	212.3	299.0	248.7
Forbs		265.1	341.8	651.9	90.8	131.0
TOTAL:		1496.8	1752.2	2364.5	1307.7	1515.3
Control:						
Cool short		280.1	253.3	292.6	182.0	285.1
Warm short		226.9	256.9	260.5	250.7	332.7
Cool mid		127.6	291.9	244.9	212.3	193.0
Warm mid		10.7				
Western whtg		151.1	124.9	142.7	155.2	155.2
Forbs		233.2	260.3	380.4	86.5	236.0
TOTAL:		1024.2	1187.3	1321.1	886.7	1202.1

Lbs of N/acre **EY=annually** **EOY=biennially**	**9-11** **Jun**	**23-24** **Jun**	**9-12** **Jul**	**22-23** **Jul**	**9-13** **Aug**	**22-23** **Aug**
60 E Y:						
Cool short		530.6	473.5	823.5	406.8	636.9
Warm short		310.4	457.4	444.2	314.9	512.0
Cool mid		337.9	489.9	574.5	240.8	280.1
Warm mid		39.3	146.3			
Western whtg		184.5	267.6	299.7	107.0	141.7
Forbs		328.3	530.9	484.5	114.2	467.4
TOTAL:		1730.9	2365.6	2626.4	1182.8	2038.1
60 E O Y:						
Cool short		428.9	538.8	539.8	743.9	639.7
Warm short		372.1	425.3	413.2	287.2	309.4
Cool mid		378.9	374.6	624.4	60.7	538.1
Warm mid						
Western whtg		166.6	248.7	334.3	388.9	182.0
Forbs		253.3	482.4	353.2	80.3	339.7
TOTAL:		1599.9	2069.8	2265.0	1561.0	2008.8
100 E O Y:						
Cool short		670.1	644.7	809.2	706.5	626.2
Warm short		282.6	509.5	390.7	371.1	553.0
Cool mid		239.1	293.7	407.8	287.2	394.3
Warm mid						130.2
Western whtg		379.3	701.1	311.5	413.9	789.6
Forbs		293.7	384.3	581.6	374.6	256.2
TOTAL:		1864.7	2533.3	2500.8	2153.3	2749.5

Table 3. Mean Biweekly above Ground Herbage Production by Category in Lbs/acre For the Urea Fertilization Treatment on Native Range at the Dickinson Experiment Station – 1982

Lbs of N/acre EY= annually EOY= biennially	9-11 Jun	23-24 Jun	9-12 Jul	22-23 Jul	9-13 Aug	20-23 Aug
40 E Y:						
Cool short		402.5	388.2	363.9	367.5	397.8
Warm short		238.3	382.5	411.4	342.5	313.3
Cool mid		279.4	266.5	258.7	19.6	397.8
Warm mid						
Western whtg		412.8	428.2	407.5	779.6	706.5
Forbs		471.7	422.1	676.1	199.8	254.4
TOTAL:		1804.7	1887.5	2117.6	1709.1	2069.8
40 E O Y:						
Cool short		404.3	531.6	543.4	251.5	632.6
Warm short		238.3	307.6	360.4	447.8	327.2
Cool mid		192.0	205.9	270.1	140.9	188.4
Warm mid		74.9				
Western whtg		220.5	192.0	180.9	217.7	420.3
Forbs		305.1	380.0	393.6	396.1	208.0
TOTAL:		1435.0	1617.0	1748.3	1454.0	1776.5
Control:						
Cool short		280.1	253.3	292.6	182.0	285.1
Warm short		226.9	256.9	260.5	250.7	332.7
Cool mid		127.6	291.9	244.9	212.3	193.0
Warm mid		10.7				
Western whtg		151.1	124.9	142.7	155.2	155.2
Forbs		233.2	260.3	380.4	86.5	236.0
TOTAL:		1024.2	1187.3	1321.1	886.7	1202.1

Lbs of N/acre **EY= annually** **EOY= biennially**	**9-11** **Jun**	**23-24** **Jun**	**9-12** **Jul**	**22-23** **Jul**	**9-13** **Aug**	**20-23** **Aug**
60 E Y:						
Cool short		595.1	465.6	456.0	365.7	315.8
Warm short		246.9	409.3	373.9	658.3	370.0
Cool mid		252.3	189.8	391.8	105.3	390.0
Warm mid						
Western whtg		191.6	229.1	365.0	212.3	336.1
Forbs		227.3	425.3	328.3	267.6	381.1
TOTAL:		1513.2	1719.1	1915.0	1609.2	1792.9
60 E O Y:						
Cool short		415.0	473.5	521.6	713.6	433.5
Warm short		301.5	332.9	334.3	413.9	387.8
Cool mid		403.2	305.8	895.6	162.3	570.2
Warm mid		17.8				
Western whtg		241.6	343.2	331.8	331.8	324.7
Forbs		287.2	453.9	578.7	454.9	335.4
TOTAL:		1666.3	1909.2	2662.1	2076.6	2051.6
100 E O Y:						
Cool short		686.8	548.8	742.9	429.0	788.5
Warm short		306.1	476.8	551.3	743.9	500.6
Cool mid		286.5	399.6	454.9	469.2	640.5
Warm mid						
Western whtg		278.3	448.5	489.9	503.1	543.4
Forbs		287.9	410.3	617.3	242.6	306.1
TOTAL:		1845.7	2284.0	2856.2	2388.8	2779.1

Table 4. Mean Biweekly Total above Ground Herbage Production, Given In Lbs/acre, For the Fertilization Treatments on Native Range of Ammonium Nitrate and Urea at the Dickinson Experiment Station - 1982

	AMMONIUM NITRATE							UREA					
	9-11 Jun	**23-24 Jun**	**9-12 Jul**	**22-23 Jul**	**9-13 Aug**	**20-23 Aug**		**9-11 Jun**	**23-24 Jun**	**9-12 Jul**	**22-23 Jul**	**9-13 Aug**	**20-23 Aug**
Rate Lbs of N/acre EY= annually EOY= biennially													
40 E Y		1575	2079	2371	1302	2165			1805	1887	2118	1709	2070
40 E O Y		1497	1752	2365	1308	1515			1435	1617	1748	1454	1777
60 E Y		1731	2366	2626	1183	2038			1513	1719	1915	1609	1793
60 E O Y		1600	2070	2265	1561	2009			1666	1909	2662	2076	2052
100 E O Y		1865	2533	2501	2153	2749			1846	2284	2856	2389	2779
Control		1024	1187	1321	887	1202			1024	1187	1321	887	1202

Table 5. Points Analysis of the Ammonium Nitrate Treatment at the 40 Pounds of Nitrogen per Acre Rage Applied Annually for the Native Range Fertilization Trial at Dickinson Experiment Station, 1982

Species	Basal Cover	Relative Cover	% Frequency	Relative % Freq.	Importance Value
Agropyron smithii	3.07	6.09	4.94	6.60	12.69
Bouteloua gracilis	14.47	29.37	15.27	20.87	50.23
Calamagrostis montanensis	0.27	0.57	0.63	0.85	1.43
Koeleria pyramidata	6.00	12.91	10.29	14.15	27.05
Muhlenbergia cuspidata	0.60	1.52	1.33	1.90	3.43
Stipa comata	2.13	4.25	4.24	5.73	9.98
Stipa viridula	1.80	3.75	3.24	4.41	8.16
Carex filifolia	1.93	4.00	3.95	5.36	9.36
Carex heliophila	1.47	3.38	3.34	4.66	8.04
Achillea millefolium	0.27	0.54	0.61	0.82	1.37
Antennaria parvifolia	0.53	1.25	1.15	1.63	2.88
Artemisia dracunculus	0.13	0.30	0.31	0.44	0.73
Artemisia frigida	0.73	1.50	1.38	1.87	3.38
Collomia linearis	0.13	0.29	0.31	0.43	0.71
Hedeoma hispida	0.13	0.26	0.30	0.40	0.65
Linum lewisii	0.13	0.29	0.31	0.43	0.71
Lotus americanus	0.20	0.41	0.46	0.62	1.03
Orthocarpus luteus	0.33	0.79	0.64	0.89	1.69
Phlox hoodii	0.67	1.26	1.47	1.95	3.21
Plantago purshii	0.47	0.95	1.07	1.44	2.38
Ratibida columniferra	0.13	0.26	0.30	0.40	0.65
Solidago missouriensis	0.07	0.11	0.14	0.18	0.30
Selaginella densa	5.53	13.13	7.60	10.71	23.84
Lichen spp.	5.93	12.84	9.64	13.25	26.09
Litter	50.87		23.52		
Soil	2.00		3.56		
Rock	0.00		0.00		

Table 6. Points Analysis of the Ammonium Nitrate Treatment at the 40 pounds of Nitrogen per Acre Rate Applied Biennially for the Native Range Fertilization Trial at Dickinson Experiment Station, 1982

Species	Basal Cover	Relative Cover	% Frequency	Relative % Freq.	Importance Value
Agropyron smithii	0.73	1.54	1.50	2.38	3.91
Bouteloua gracilis	13.13	31.87	17.75	27.51	59.38
Buchloe dactyloides	0.07	0.14	0.15	0.24	0.38
Calamagrostis montanensis	0.13	0.29	0.29	0.48	0.77
Koeleria pyramidata	3.73	7.99	6.56	9.74	17.73
Muhlenbergia cuspidata	1.93	3.97	2.16	3.25	7.22
Stipa comata	2.13	5.36	5.08	8.11	13.48
Stipa viridula	0.67	1.38	1.20	1.89	3.27
Carex filifolia	3.07	7.24	6.08	9.39	16.62
Carex heliophila	0.53	1.28	1.32	2.02	3.30
Antennaria parvifolia	0.27	0.85	0.75	1.19	2.05
Artemisia dracunculus	0.07	0.13	0.16	0.22	0.35
Echinacea angustifolia	0.07	0.14	0.15	0.24	0.38
Hedeoma hispida	0.07	0.13	0.16	0.22	0.35
Liatris punctata	0.13	0.47	0.40	0.63	1.11
Lotus americanus	0.13	0.47	0.40	0.63	1.11
Oxytropis lambertii	0.07	0.13	0.16	0.22	0.35
Phlox hoodii	0.20	0.60	0.56	0.86	1.46
Plantago purshii	0.13	0.29	0.29	0.48	0.77
Potentilla pensylvanica	0.07	0.13	0.16	0.22	0.35
Ratibida columniferra	0.13	0.25	0.32	0.44	0.69
Sphaeralcea coccinea	0.13	0.47	0.40	0.63	1.11
Selaginella densa	8.93	19.62	9.28	13.52	33.14
Lichen spp.	6.07	15.27	10.06	15.44	30.71
Litter	50.33		25.06		
Soil	7.07		9.59		
Rock	0.00		0.00		

Table 7. Points Analysis of the Ammonium Nitrate Treatment at the 60 Pounds of Nitrogen per Acre Rate Applied Annually For the Native Range Fertilization Trial at the Dickinson Experiment Station, 1982

Species	Basal Cover	Relative Cover	% Frequency	Relative % Freq.	Importance Value
Agropyron smithii	2.13	4.66	4.63	6.71	11.36
Bouteloua gracilis	17.93	39.17	18.62	27.29	66.34
Koeleria pyramidata	4.13	8.94	7.91	11.50	20.45
Muhlenbergia cuspidata	0.20	0.46	0.46	0.67	1.13
Stipa comata	2.93	7.06	6.02	8.89	15.95
Stipa viridula	0.20	0.39	0.47	0.66	1.05
Carex filifolia	3.53	7.92	6.38	9.31	17.24
Carex heliophila	1.33	3.29	3.13	4.67	7.95
Achillea millefolium	0.13	0.34	0.32	0.48	0.82
Antennaria parvifolia	0.20	0.46	0.46	0.67	1.13
Artemisia dracunculus	0.07	0.15	0.19	0.27	0.42
Artemisia frigida	0.67	1.52	1.39	2.00	0.42
Aster ericoides	0.07	0.12	0.14	0.19	3.52
Erysimum asperum	0.20	0.36	0.42	0.58	0.93
Gutierrazia sarothrae	0.07	0.12	0.14	0.19	0.31
Hedeoma hispida	0.07	0.12	0.14	0.19	0.31
Linum lewisii	0.07	0.15	0.19	0.27	0.42
Lotus americanus	0.13	0.24	0.14	0.19	0.43
Oxytropis lambertii	0.07	0.12	0.14	0.19	0.31
Phlox hoodii	0.47	1.04	1.06	1.53	2.57
Plantago purshii	0.27	0.61	0.65	0.94	1.55
Potentilla pensylvanica	0.13	0.24	0.28	0.39	0.62
Ratibida columniferra	0.33	0.63	0.75	1.04	1.67
Solidago missouriensis	0.07	0.15	0.19	0.27	0.43
Sphaeralcea coccinea	0.27	0.74	0.73	1.12	2.28
Selaginella densa	3.87	9.57	5.16	7.69	17.26
Lichen spp.	4.13	11.49	7.92	12.08	23.57
Litter	51.93		25.30		
Soil	4.40		6.68		
Rock	0.00		0.00		

Table 8. Points Analysis of the Ammonium Nitrate Treatment at the 60 Pounds of Nitrogen per Acre Rate Applied Biennially For the Native Range Fertilization Trial at Dickinson Experiment Station, 1982

Species	Basal Cover	Relative Cover	% Frequency	Relative % Freq.	Importance Value
Agropyron smithii	1.67	4.44	3.79	5.66	10.10
Bouteloua gracilis	17.00	36.71	20.61	30.23	66.94
Koeleria pyramidata	4.00	7.82	7.82	11.19	19.01
Muhlenbergia cuspidata	0.07	0.21	0.20	0.30	0.51
Stipa comata	3.07	7.10	6.69	9.77	16.86
Stipa viridula	0.33	0.94	0.93	1.43	2.37
Carex filifolia	1.60	3.95	3.88	5.81	9.77
Carex heliophila	0.93	2.31	2.29	3.38	5.70
Achillea millefolium	0.07	0.10	0.15	0.20	0.30
Antennaria parvifolia	0.33	0.56	0.47	0.66	1.22
Artemisia dracunculus	0.13	0.37	0.37	0.56	0.93
Artemisia frigida	0.13	0.41	0.39	0.61	1.02
Chenopodium album	0.07	0.21	0.20	0.30	0.51
Chenopodium leptophyllum	0.07	0.16	0.17	0.26	0.42
Phlox hoodii	0.13	0.32	0.34	0.52	0.84
Plantago purshii	0.33	0.90	0.91	1.39	2.28
Ratibida columniferra	0.07	0.21	0.20	0.30	0.51
Sphaeralcea coccinea	0.07	0.21	0.20	0.30	0.51
Selaginella densa	13.47	26.56	13.27	19.25	45.81
Lichen spp.	3.33	6.51	5.49	7.87	14.38
Litter	49.80		25.69		
Soil	3.33		5.94		
Rock	0.00		0.00		

Table 9. Points Analysis of the Ammonium Nitrate Treatment at the 100 Pounds of Nitrogen per Acre Rate Applied Biennially For the Native Range Fertilization Trial at Dickinson Experiment Station, 1982

Species	Basal Cover	Relative Cover	% Frequency	Relative % Freq.	Importance Value
Agropyron smithii	1.33	3.01	3.17	4.74	7.74
Bouteloua gracilis	13.87	31.02	16.98	24.78	55.80
Koeleria pyramidata	6.40	14.36	11.30	16.43	30.79
Muhlenbergia cuspidata	0.67	1.70	1.72	2.65	4.35
Panicum oligosanthes	0.20	0.59	0.39	0.61	1.20
Stipa comata	2.07	4.97	4.18	6.17	11.14
Stipa viridula	0.67	1.57	1.62	2.49	4.06
Carex filifolia	3.93	8.96	6.58	9.36	18.32
Carex heliophila	2.13	4.71	4.10	5.85	10.56
Antennaria parvifolia	0.53	1.31	1.17	1.73	3.04
Artemisia frigida	0.27	0.60	0.65	0.93	1.53
Chenopodium album	0.07	0.12	0.14	0.19	0.31
Phlox hoodii	0.27	0.60	0.50	0.74	1.34
Plantago purshii	0.13	0.35	0.36	0.55	0.90
Potentilla pensylvanica	0.07	0.20	0.19	0.30	0.50
Solidago missouriensis	0.07	0.20	0.19	0.30	0.50
Selaginella densa	1.67	4.44	2.35	3.60	8.04
Lichen spp.	9.27	21.29	12.69	18.58	39.87
Litter	51.93		24.94		
Soil	4.47		6.78		
Rock	0.00		0.00		

Table 10. Points Analysis of the Urea Treatment of the 40 Pounds of Nitrogen per Acre Applied Annually For the Native Range Fertilization Trial at the Dickinson Experiment Station, 1982

Species	Basal Cover	Relative Cover	% Frequency	Relative % Freq.	Importance Value
Agropyron smithii	3.40	6.23	6.14	8.51	14.74
Bouteloua gracilis	15.80	29.45	16.17	22.87	52.31
Koeleria pyramidata	5.80	11.05	10.62	15.04	26.09
Panicum oligosanthes	0.07	0.11	0.14	0.19	0.30
Stipa comata	1.33	2.30	2.48	3.32	5.62
Stipa viridula	1.80	3.47	2.95	4.24	7.98
Carex filifolia	0.33	0.67	0.80	1.15	1.82
Carex heliophila	0.53	0.97	0.91	1.26	2.23
Achillea millefolium	0.13	0.28	0.32	0.48	0.76
Antennaria parvifolia	2.33	4.63	3.68	5.36	9.99
Artemisia frigida	0.40	0.73	0.89	1.24	1.98
Lotus americanus	0.13	0.28	0.32	0.48	0.76
Orthocarpus luteus	0.07	0.17	0.18	0.29	0.45
Phlox hoodii	0.53	0.97	0.61	0.86	1.82
Plantago purshii	0.07	0.12	0.15	0.21	0.33
Potentilla pensylvanica	0.07	0.11	0.13	0.19	0.30
Ratibida columniferra	0.47	0.83	1.03	1.40	2.23
Solidago missouriensis	0.20	0.34	0.43	0.57	0.91
Sphaeralcea coccinea	0.07	0.17	0.18	0.29	0.45
Symphoricarpos occidentalis	0.13	0.33	0.36	0.57	0.91
Selaginella densa	12.47	26.95	11.94	17.80	44.74
Lichen spp.	4.73	9.84	9.48	13.66	23.50
Litter	45.53		23.81		
Soil	3.60		6.23		
Rock	0.00		0.00		

Table 11. Points Analysis of the Urea Treatment at the 40 Pounds of Nitrogen per Acre Rate Applied Biennially For the Native Range Fertilization Trial at Dickinson Experiment Station, 1982

Species	Basal Cover	Relative Cover	% Frequency	Relative % Freq.	Importance Value
Agropyron smithii	1.67	3.67	3.59	5.43	9.10
Bouteloua gracilis	17.47	38.51	18.98	28.62	67.14
Calamagrostis montanensis	0.07	0.15	0.15	0.21	0.36
Koeleria pyramidata	4.20	9.57	7.80	11.71	21.28
Muhlenbergia cuspidata	0.53	1.21	0.97	1.47	2.68
Stipa comata	1.87	4.10	4.07	6.18	10.28
Stipa viridula	0.93	2.03	1.99	2.89	4.92
Carex filifolia	2.07	4.38	3.51	5.31	9.69
Carex heliophila	1.47	3.26	3.44	5.19	8.46
Achillea millefolium	0.07	0.15	0.15	0.21	0.36
Antennaria parvifolia	0.73	1.60	0.94	1.45	3.05
Artemisia dracunculus	0.07	0.13	0.15	0.23	0.36
Artemisia frigida	0.33	0.71	0.60	0.89	1.60
Cerastium arvense	0.07	0.13	0.15	0.23	0.37
Lotus americanus	0.07	0.15	0.15	0.21	0.36
Orthocarpus luteus	0.27	0.58	0.61	0.85	1.44
Phlox hoodii	0.27	0.55	0.60	0.91	1.46
Plantago purshii	0.27	0.56	0.60	0.89	1.45
Potentilla pensylvanica	0.13	0.32	0.32	0.48	0.80
Ratibida columniferra	0.07	0.15	0.15	0.21	0.36
Selaginella densa	2.93	6.69	4.89	7.29	13.98
Lichen spp.	9.13	21.40	12.77	19.11	40.52
Litter	48.87		23.67		
Soil	6.47		9.74		
Rock	0.00		0.00		

Table 12. Points Analysis of the Urea Treatment at the 60 Pounds of Nitrogen per Acre Rate Applied Annually For the Native Range Fertilization Trial at Dickinson Experiment Station, 1982

Species	Basal Cover	Relative Cover	% Frequency	Relative % Freq.	Importance Value
Agropyron smithii	2.33	4.77	4.35	6.03	10.80
Bouteloua gracilis	13.87	30.10	16.20	23.39	53.49
Calamagrostis montanensis	0.47	0.93	0.89	1.24	2.17
Koeleria pyramidata	6.07	13.13	10.78	15.33	28.46
Muhlenbergia cuspidata	1.47	2.99	1.97	2.76	5.75
Stipa comata	2.47	5.19	4.91	6.90	12.09
Stipa viridula	1.13	2.33	2.42	3.37	5.72
Carex filifolia	2.13	4.56	4.20	5.97	10.53
Carex heliophila	0.47	1.10	1.15	1.69	2.79
Achillea millefolium	0.13	0.32	0.34	0.49	0.82
Antennaria parvifolia	0.53	1.28	1.15	1.70	2.98
Artemisia dracunculus	0.07	0.14	0.15	0.20	0.34
Artemisia frigida	0.27	0.53	0.45	0.62	1.15
Cerastium arvense	0.13	0.28	0.15	0.20	0.48
Erysimum asperum	0.07	0.13	0.15	0.21	0.34
Lotus americanus	0.07	0.13	0.15	0.21	0.34
Orthocarpus luteus	0.07	0.14	0.15	0.20	0.34
Petalostemon purpureum	0.07	0.18	0.19	0.29	0.48
Phlox hoodii	0.20	0.51	0.34	0.49	1.00
Plantago purshii	0.40	0.88	0.78	1.09	1.96
Potentilla pensylvanica	0.07	0.14	0.15	0.20	0.34
Ratibida columniferra	0.27	0.55	0.74	1.00	1.55
Solidago missouriensis	0.07	0.14	0.15	0.20	0.34
Solidago mollis	0.07	0.14	0.15	0.20	0.34
Selaginella densa	6.93	16.18	9.37	13.55	29.73
Lichen spp.	5.20	13.24	8.20	12.45	25.69
Litter	50.53		23.99		
Soil	4.47		6.41		
Rock	0.00		0.00		

Table 13. Points Analysis of the Urea Treatment at the 60 Pounds of Nitrogen per Acre Rate Applied Biennially For the Native Range Fertilization Trial at Dickinson Experiment Station, 1982

Species	Basal Cover	Relative Cover	% Frequency	Relative % Freq.	Importance Value
Agropyron smithii	3.00	5.85	5.35	7.41	13.26
Bouteloua gracilis	14.13	27.86	16.39	22.47	50.33
Buchloe dactyloides	0.33	0.66	0.72	0.96	1.62
Calamagrostis montanensis	0.47	0.91	0.86	1.16	2.07
Koeleria pyramidata	3.67	7.43	6.62	8.94	16.37
Muhlenbergia cuspidata	1.60	3.11	2.33	3.16	6.27
Stipa comata	4.93	9.74	8.67	11.80	21.54
Stipa viridula	0.47	0.95	1.06	1.49	2.44
Carex filifolia	4.27	8.35	6.51	8.75	17.09
Carex heliophila	1.13	2.29	2.38	3.26	5.54
Achillea millefolium	0.13	0.28	0.30	0.42	0.69
Antennaria parvifolia	0.47	0.97	0.94	1.37	2.34
Artemisia dracunculus	0.27	0.53	0.58	0.77	1.30
Artemisia frigida	0.40	0.80	0.89	1.23	2.03
Aster ericoides	0.13	0.27	0.29	0.38	0.66
Echinacea angustifolia	0.07	0.14	0.15	0.19	0.33
Erysimum asperum	0.07	0.14	0.15	0.19	0.33
Haplopappus spinulosus	0.20	0.37	0.43	0.58	0.95
Liatris punctata	0.20	0.40	0.43	0.58	0.97
Linum rigidum	0.07	0.14	0.15	0.19	0.33
Lotus americanus	0.07	0.14	0.15	0.19	0.33
Oxytropis lambertii	0.07	0.12	0.14	0.19	0.32
Petalostemon purpureum	0.07	0.12	0.14	0.19	0.32
Phlox hoodii	0.07	0.14	0.15	0.19	0.32
Plantago purshii	0.20	0.40	0.43	0.58	0.97
Potentilla pensylvanica	0.07	0.14	0.15	0.19	0.33
Solidago missouriensis	0.13	0.27	0.29	0.38	0.66
Selaginella densa	6.87	14.13	8.17	11.39	25.52
Lichen spp.	6.53	13.34	8.07	11.39	24.73
Litter	45.87		21.98		
Soil	4.07		5.13		
Rock	0.00		0.00		

Table 14. Points Analysis of the Urea Treatment at the 100 Pounds of Nitrogen per Acre Rate Applied Biennially for the Native Range Fertilization Trial at Dickinson Experiment Station, 1982

Species	Basal Cover	Relative Cover	% Frequency	Relative % Freq.	Importance Value
Agropyron smithii	2.53	5.26	4.89	7.18	12.44
Bouteloua gracilis	18.13	41.35	19.24	30.31	71.66
Buchloe dactyloides	0.13	0.30	0.29	0.05	0.80
Calamagrostis montanensis	0.40	0.85	0.89	1.40	2.25
Koeleria pyramidata	3.20	7.12	5.60	8.69	15.81
Muhlenbergia cuspidata	0.73	1.50	1.05	1.50	3.00
Poa compressa	0.07	0.13	0.15	0.20	0.33
Stipa comata	3.13	6.85	5.84	9.15	15.99
Stipa viridula	0.53	1.20	1.53	2.37	3.57
Carex filifolia	4.93	10.92	7.80	12.37	23.28
Carex heliophila	1.53	3.71	3.33	5.41	9.12
Antennaria parvifolia	0.47	0.88	0.33	0.40	1.28
Artemisia dracunculus	0.13	0.25	0.30	0.40	0.65
Artemisia frigida	0.20	0.43	0.47	0.68	1.11
Aster ericoides	0.13	0.25	0.30	0.40	0.65
Linum rigidum	0.07	0.18	0.17	0.28	0.46
Lotus americanus	0.07	0.18	0.17	0.28	0.46
Petalostemon purpureum	0.07	0.13	0.15	0.20	0.33
Plantago purshii	0.13	0.30	0.29	0.50	0.80
Selaginella densa	6.40	13.51	7.43	10.66	24.17
Lichen spp.	2.00	4.71	4.41	7.13	11.83
Litter	43.80		23.32		
Soil	11.20		11.98		
Rock	0.00		0.00		

Table 15. Points Analysis of the Control Treatment (N) and (S) for the Native Range Fertilization Trial at Dickinson Experiment Station, 1982

Species	Basal Cover	Relative Cover	% Frequency	Relative % Freq.	Importance Value
Agropyron smithii	1.37	3.47	3.12	4.94	8.40
Bouteloua curtipendula	0.17	0.44	0.35	0.54	0.98
Bouteloua gracilis	12.64	32.40	19.08	30.07	62.46
Buchloe dactyloides	0.20	0.52	0.26	0.41	0.93
Koeleria pyramidata	2.54	6.91	5.55	8.86	15.77
Muhlenbergia cuspidata	0.77	1.93	1.02	1.61	3.53
Stipa comata	1.60	4.31	4.01	6.38	10.65
Stipa viridula	0.37	0.93	0.94	1.49	2.42
Carex filifolia	1.74	4.19	4.08	6.26	10.46
Carex heliophila	0.80	2.06	2.23	3.44	5.50
Antennaria parvifolia	0.33	0.90	0.72	1.15	2.05
Artemisia dracunculus	0.14	0.32	0.35	0.53	0.85
Artemisia frigida	0.30	0.78	0.80	1.25	2.03
Erysimum inconspicum	0.04	0.09	0.09	0.14	0.22
Hedeoma hispida	0.07	0.17	0.17	0.27	0.44
Linum lewisii	0.04	0.09	0.09	0.14	0.22
Lotus americanus	0.17	0.33	0.36	0.51	0.84
Orthocarpus luteus	0.04	0.09	0.09	0.14	0.22
Petalostemon purpureum	0.07	0.17	0.17	0.27	0.44
Phlox hoodii	0.14	0.30	0.37	0.55	0.85
Plantago purshii	0.14	0.30	0.35	0.53	0.83
Psoralea argophylla	0.04	0.11	0.10	0.16	0.26
Ratibida columniferra	0.04	0.06	0.09	0.13	0.19
Solidago missouriensis	0.04	0.06	0.09	0.13	0.19
Solidago mollis	0.04	0.12	0.10	0.18	0.29
Sphaeralcea coccinea	0.04	0.08	0.09	0.14	0.21
Selaginella densa	10.87	23.89	11.08	16.86	40.74
Lichen spp.	5.14	15.08	8.00	13.02	28.10
Litter	55.34		26.97		
Soil	4.90		9.35		
Rock	0.00		0.00		

Table 16. Points Analysis of the Three Replications of the Ammonium Nitrate Treatment at the 40 Pounds of Nitrogen per Acre Rate Applied Annually for the Native Range Fertilization Trial at Dickinson Experiment Station, 1982

Species	Basal Cover			Relative Cover			Percent Frequency			Relative % Frequency			Importance Value		
	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3
Ag sm	3.80	0.20	5.20	6.51	0.55	11.21	6.78	0.52	7.51	8.79	0.76	10.26	15.30	1.31	21.47
Bo gr	20.60	6.40	16.40	35.27	17.49	35.34	16.95	12.44	16.43	21.98	18.18	22.44	57.25	35.67	57.78
Ca mo			0.80			1.72			1.88			2.56			4.28
Ko py	7.20	5.40	5.40	12.33	14.75	11.64	10.17	10.36	10.33	13.19	15.15	14.10	25.52	29.90	25.74
Mu cu		1.20	0.60		3.28	1.29		2.59	1.41		3.79	1.92		7.07	3.21
St co	4.20	1.40	0.80	7.19	3.83	1.72	7.20	3.63	1.88	9.34	5.30	2.56	16.53	9.13	4.28
St vi	1.40	0.40	3.60	2.40	1.09	7.76	2.21	1.04	6.57	2.75	1.52	8.97	5.15	2.61	16.73
Ca fi	3.00	1.40	1.40	5.14	3.83	3.02	5.93	3.11	2.82	7.69	4.55	3.85	12.83	8.38	6.87
Ca he	1.40	2.20	0.80	2.40	6.01	1.72	2.97	5.18	1.88	3.85	7.58	2.56	6.25	13.59	4.28
Ac mi	0.20		0.60	0.34		1.29	0.42		1.41	0.55		1.92	0.89		3.21
An pa	0.60	1.00		1.02	2.73		0.85	2.59		1.10	3.79		2.12	6.52	
Ar dr	0.20	0.20		0.34	0.55		0.42	0.52		0.55	0.76		0.89	1.31	
Ar fr	0.80	0.20	1.20	1.37	0.55	2.59	1.27	0.52	2.35	1.65	0.76	3.21	3.02	1.31	5.80
Co li			0.40			0.86			0.94			1.28			2.14
He hi	0.20		0.20	0.34		0.43	0.42		0.47	0.55		0.64	0.89		1.07
Li ri			0.40			0.86			0.94			1.28			2.14
Lo am	0.40	0.20		0.68	0.55		0.85	0.52		1.10	0.76		1.78	1.31	
Or lu		0.40	0.60		1.09	1.29		0.52	1.41		0.76	1.92		1.85	3.21
Ph ho	1.20		0.80	2.05		1.72	2.54		1.88	3.30		2.56	5.35		4.28
Pl pu	0.40		1.00	0.68		2.16	0.85		2.35	1.10		3.21	1.78		5.37
Ra co	0.20		0.20	0.34		0.43	0.42		0.47	0.55		0.64	0.89		1.07
So mi	0.20			0.34			0.42			0.55			0.89		
Se de	5.40	10.40	0.80	9.25	28.42	1.72	6.36	15.03	1.41	8.24	21.97	1.92	17.49	50.39	3.64
Lichen	7.00	5.60	5.20	12.00	15.30	11.21	10.17	9.84	8.92	13.19	14.39	12.18	25.19	29.69	23.39
Litter	40.80	60.00	51.80				21.19	25.91	23.47						
Soil	0.80	3.40	1.80				1.69	5.70	3.29						
Rock	0.00	0.00	0.00				0.00	0.00	0.00						

Table 17. Points Analysis of the Three Replications of the Ammonium Nitrate Treatment at the 40 Pounds of Nitrogen per Acre Rate Applied Biennially for the Native Range Fertilization Trial at Dickinson Experiment Station, 1982

Species	Basal Cover			Relative Cover			Percent Frequency			Relative % Frequency			Importance Value		
	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3
Ag sm	1.80		0.40	3.86		0.75	3.54		0.96	5.80		1.33	9.66		2.08
Bo gr	20.60	9.60	9.20	44.21	34.04	17.36	18.58	19.76	14.90	30.43	31.43	20.67	74.64	65.47	38.03
Bu da	0.20			0.43			0.44			0.72			1.15		
Ca mo	0.40			0.86			0.88			1.45			2.31		
Ko py	3.20	1.20	6.80	6.87	4.26	12.83	5.75	2.40	11.54	9.42	3.81	16.00	16.29	8.07	28.83
Mu cu	3.80		2.00	8.15		3.77	3.10		3.37	5.07		4.67	13.22		8.44
St co	4.00	1.80	0.60	8.58	6.38	1.13	8.41	5.39	1.44	13.77	8.57	2.00	22.35	14.95	3.13
St vi	1.40		0.60	3.00		1.13	2.65		0.96	4.35		1.33	7.35		2.46
Ca fi	4.00	2.00	3.20	8.58	7.09	6.04	7.08	5.39	5.77	11.59	8.57	8.00	20.17	15.66	14.04
Ca he	0.60	0.40	0.60	1.29	1.42	1.13	1.33	1.20	1.44	2.17	1.90	2.00	3.46	3.32	3.13
An pa	0.20	0.60		0.43	2.13		0.44	1.80		0.72	2.86		1.15	4.99	
Ar dr			0.20			0.38			0.48			0.67			1.05
Ec an	0.20			0.43			0.44			0.72			1.15		
He hi			0.20			0.38			0.48			0.67			1.05
Li pu		0.40			1.42			1.20			1.90			3.32	
Lo am		0.40			1.42			1.20			1.90			3.32	
Ox la			0.20			0.38			0.48			0.67			1.05
Ph ho		0.40	0.20		1.42	0.38		1.20	0.48		1.90	0.67		3.32	1.05
Pl pu	0.40			0.86			0.88			1.45			2.31		
Po pe			0.20			0.38			0.48			0.67			1.05
Ra co			0.40			0.75			0.96			1.33			2.08
Sp co		0.40			1.42			1.20			1.90			3.32	
Se de		5.00	21.80		17.73	41.13		9.58	18.27		15.24	25.33		32.97	66.46
Lichen	5.80	6.00	6.40	12.45	21.28	12.08	7.52	12.57	10.10	12.32	20.00	14.00	24.77	41.28	26.08
Litter	37.80	68.80	44.40				21.68	29.94	23.56						
Soil	15.60	3.00	2.60				17.26	7.19	4.33						
Rock	0.00	0.00	0.00				0.00	0.00	0.00						

Table 18. Points Analysis of the Three Replications of the Ammonium Nitrate Treatment at the 60 Pounds of Nitrogen per Acre Rate Applied Annually for the Native Range Fertilization Trial at Dickinson Experiment Station, 1982

Species	Basal Cover			Relative Cover			Percent Frequency			Relative % Frequency			Importance Value		
	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3
Ag sm	3.60	1.20	1.60	6.43	3.95	3.59	6.75	3.23	3.92	9.25	5.13	5.74	15.68	9.08	9.33
Bo gr	25.20	8.00	20.60	45.00	26.32	46.19	18.99	14.52	22.35	26.01	23.08	32.79	71.01	49.04	78.98
Ko py	7.20	2.20	3.00	12.86	7.24	6.73	10.55	5.91	7.26	14.45	9.40	10.66	27.31	16.64	17.39
Mu cu	0.40	0.20		0.71	0.66		0.84	0.54		1.16	0.85		1.87	1.51	
St co	4.20	3.20	1.40	7.50	10.53	3.14	7.17	6.99	3.91	9.83	11.11	5.74	17.33	21.64	8.88
St vi	0.40		0.20	0.71		0.45	0.84		0.56	1.16		0.82	1.87		1.27
Ca fi	4.60	2.00	4.00	8.21	6.58	8.97	7.59	4.84	6.70	10.40	7.69	9.84	18.60	14.27	18.84
Ca he	0.80	1.20	2.00	1.43	3.95	4.48	1.69	3.23	4.47	2.31	5.13	6.56	3.74	9.08	11.04
Ac mi	0.20	0.20		0.36	0.66		0.42	0.54		0.58	0.85		0.94	1.51	
An pa	0.40	0.20		0.71	0.66		0.84	0.54		1.16	0.85		1.87	1.51	
Ar dr			0.20			0.45			0.56			0.82			1.27
Ar fr	1.20	0.60	0.20	2.14	1.97	0.45	2.53	1.08	0.56	3.47	1.71	0.82	5.61	3.68	1.27
As er	0.20			0.36			0.42			0.58			0.94		
Er as	0.60			1.07			1.27			1.73			2.80		
Gu sa	0.20			0.36			0.42			0.58			0.94		
He hi	0.20			0.36			0.42			0.58			0.94		
Li le			0.20			0.45			0.56			0.82			1.27
Lo am	0.40			0.71			0.42			0.58			1.29		
Ox la	0.20			0.36			0.42			0.58			0.94		
Ph ho	1.00	0.40		1.79	1.32		2.11	1.08		2.89	1.71		4.68	3.03	
Pl pu	0.40	0.20	0.20	0.71	0.66	0.45	0.84	0.54	0.56	1.16	0.85	0.82	1.87	1.51	1.27
Po pe	0.40			0.71			0.84			1.16			1.87		
Ra co	0.80		0.20	1.43		0.45	1.69		0.56	2.31		0.82	3.74		1.27
So mi			0.20			0.45			0.56			0.82			1.27
Sp co		0.40	0.40		1.32	0.90		1.08	1.12		1.71	1.64		4.30	2.54
Se de	1.00	3.00	7.60	1.79	9.87	17.04	1.69	4.30	9.50	2.31	6.84	13.93	4.10	16.71	30.97
Lichen	2.40	7.40	2.60	4.29	24.34	5.83	4.22	14.52	5.03	5.78	23.08	7.38	10.07	47.42	13.21
Litter	40.40	62.20	53.20				21.10	26.88	27.93						
Soil	3.60	7.40	2.20				5.91	10.22	3.91						
Rock	0.00	0.00	0.00				0.00	0.00	0.00						

Table 19. Points Analysis of the Three Replications of the Ammonium Nitrate Treatment at the 60 Pounds of Nitrogen per Acre Rate Applied Biennially For the Native Range Fertilization Trial at Dickinson Experiment Station, 1982

Species	Basal Cover			Relative Cover			Percent Frequency			Relative % Frequency			Importance Value		
	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3
Ag sm	1.20	0.40	3.40	1.79	0.97	10.56	2.70	1.03	7.65	3.61	1.56	11.82	5.40	2.53	22.38
Bo gr	24.00	13.80	13.20	35.82	33.33	40.99	21.62	18.46	21.76	28.92	28.13	33.64	64.74	61.46	74.63
Ko py	7.20	3.20	1.60	10.75	7.73	4.97	12.16	7.18	4.12	16.27	10.94	6.36	27.02	18.67	11.33
Mu cu			0.20			0.62			0.59			0.91			1.53
St co	4.00	1.20	4.00	5.97	2.90	12.42	8.11	2.56	9.41	10.84	3.91	14.55	16.81	6.81	26.97
St vi		0.40	0.60		0.97	1.86		1.03	1.76		1.56	2.73		2.53	4.59
Ca fi	1.20	1.60	2.00	1.79	3.86	6.21	2.25	4.10	5.29	3.01	6.25	8.18	4.80	10.11	14.39
Ca he	1.00	0.20	1.60	1.49	0.48	4.97	2.25	0.51	4.12	3.01	0.78	6.36	4.50	1.26	11.33
Ac mi	0.20			0.30			0.45			0.60			0.90		
An pa	0.80	0.20		1.19	0.48		0.90	0.51		1.20	0.78		2.39	1.26	
Ar dr		0.20	0.20		0.48	0.62		0.51	0.59		0.78	0.91		1.26	1.53
Ar fr			0.40			1.24			1.18			1.82			3.06
Ch al			0.20			0.62			0.59			0.91			1.53
Ch le		0.20			0.48			0.51			0.78			1.26	
Ph ho		0.40			0.97			1.03			1.56			2.53	
Pl pu		0.60	0.40		1.45	1.24		1.54	1.18		2.34	1.82		3.79	3.06
Ra co			0.20			0.62			0.59			0.91			1.53
Sp co			0.20			0.62			0.59			0.91			1.53
Se de	21.80	15.40	3.20	32.54	37.20	9.94	16.22	19.49	4.11	21.69	29.69	6.36	54.23	66.89	16.30
Lichen	5.60	3.60	0.80	8.36	8.70	2.48	8.11	7.18	1.18	10.84	10.94	1.82	19.20	19.64	4.30
Litter	31.40	52.40	65.60				22.53	25.13	29.41						
Soil	1.60	6.20	2.20				2.70	9.23	5.88						
Rock	0.00	0.00	0.00				0.00	0.00	0.00						

Table 20. Points Analysis of the Three Replications of the Ammonium Nitrate Treatment at the 100 Pounds of Nitrogen per Acre Rate Applied Biennially For the Native Range Fertilization Trial at Dickinson Experiment Station, 1982

Species	Basal Cover			Relative Cover			Percent Frequency			Relative % Frequency			Importance Value		
	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3
Ag sm	0.80		3.20	1.47		7.55	1.73		7.77	2.27		11.94	3.74		19.49
Bo gr	17.80	7.20	16.60	32.60	21.30	39.15	19.48	11.56	19.90	25.57	18.18	30.60	58.17	39.48	69.75
Ko py	9.40	4.60	5.20	17.22	13.61	12.26	14.29	10.40	9.22	18.75	16.36	14.18	35.97	29.97	26.44
Mu cu	0.20	0.80	1.00	0.37	2.37	2.36	0.43	2.31	2.43	0.57	3.64	3.73	0.94	6.01	6.09
Pa ol		0.60			1.78			1.16			1.82			3.60	
St co	2.40	2.60	1.20	4.40	7.69	2.83	4.33	5.78	2.43	5.68	9.09	3.73	10.08	16.78	6.56
St vi			2.00			4.72			4.85			7.46			12.18
Ca fi	6.80	4.40	0.60	12.45	13.02	1.42	11.26	7.51	0.97	14.77	11.82	1.49	27.22	24.84	2.91
Ca he	3.40	1.40	1.60	6.23	4.14	3.77	6.49	2.89	2.91	8.52	4.55	4.48	14.75	8.69	8.25
An pa	0.60	0.80	0.20	1.10	2.37	0.47	1.30	1.73	0.49	1.70	2.73	0.75	2.80	5.10	1.22
Ar fr	0.40	0.20	0.20	0.73	0.59	0.47	0.87	0.58	0.49	1.14	0.91	0.75	1.87	1.50	1.22
Ch al	0.20			0.37			0.43			0.57			0.94		
Ph ho	0.40	0.20	0.20	0.73	0.59	0.47	0.43	0.58	0.49	0.57	0.91	0.75	1.30	1.50	1.22
Pl pu		0.20	0.20		0.59	0.47		0.58	0.49		0.91	0.75		1.50	1.22
Po pe		0.20			0.59			0.58			0.91			1.50	
So mi		0.20			0.59			0.58			0.91			1.50	
Se de	1.00	3.40	0.60	1.83	10.06	1.42	0.87	5.20	0.97	1.14	8.18	1.49	2.97	18.24	2.91
Lichen	11.20	7.00	9.60	20.51	20.71	22.64	14.29	12.14	11.65	18.75	19.09	17.91	39.26	39.80	40.55
Litter	44.20	62.60	49.00				21.65	28.90	24.27						
Soil	1.20	3.60	8.60				2.16	7.51	10.68						
Rock	0.00	0.00	0.00				0.00	0.00	0.00						

Table 21. Points Analysis of the Three Replications of the Urea Treatment at the 40 Pounds of Nitrogen per Acre Rate Applied Annually For the Native Range Fertilization Trial at the Dickinson Experiment Station, 1982

Species	Basal Cover			Relative Cover			Percent Frequency			Relative % Frequency			Importance Value		
	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3
Ag sm	3.40	0.40	6.40	5.78	1.00	11.90	6.52	1.09	10.81	8.62	1.72	15.19	14.40	2.72	27.09
Bo gr	19.60	5.20	22.60	33.33	13.00	42.01	18.26	10.87	19.37	24.14	17.24	27.22	57.47	30.24	69.23
Ko py	5.20	2.60	9.60	8.80	6.50	17.84	9.57	6.52	15.77	12.64	10.34	22.15	21.44	16.84	39.99
Pa ol	0.20			0.34			0.43			0.57			0.91		
St co	3.40		0.60	5.78		1.12	6.09		1.35	8.05		1.90	13.83		3.02
St vi		0.60	4.80		1.50	8.92		1.63	7.21		2.59	10.13		4.09	19.05
Ca fi	0.60	0.40		1.02	1.00		1.30	1.09		1.72	1.72		2.74	2.72	
Ca he	1.20	0.20	0.20	2.04	0.50	0.37	1.74	0.54	0.45	2.30	0.86	0.63	4.34	1.36	1.00
Ac mi	0.20	0.20		0.34	0.50		0.43	0.54		0.57	0.86		0.91	1.36	
An pa	3.40	2.20	1.40	5.78	5.50	2.60	3.91	4.89	2.25	5.17	7.76	3.16	10.95	13.26	5.76
Ar fr	0.20		1.00	0.34		1.86	0.43		2.25	0.57		3.16	0.91		5.02
Lo am	0.20	0.20		0.34	0.50		0.43	0.54		0.57	0.86		0.91	1.36	
Or lu		0.20			0.50			0.54			0.86			1.36	
Ph ho	1.40	0.20		2.38	0.50		1.30	0.54		1.72	0.86		4.10	1.36	
Pl pu			0.20			0.37			0.45			0.63			1.00
Po pe	0.20			0.34			0.40			0.57			0.91		
Ra co	0.80		0.60	1.36		1.12	1.74		1.35	2.30		1.90	3.66		3.02
So mi	0.60			1.02			1.30			1.72			2.74		
Sp co		0.20			0.50			0.54			0.86			1.36	
Sy oc		0.40			1.00			1.09			1.72			2.72	
Se de	15.20	21.40	0.80	25.85	53.50	1.49	11.74	22.28	1.80	15.52	35.34	2.53	41.37	88.84	4.02
Lichen	3.00	5.60	5.60	5.10	14.00	10.41	10.00	10.33	8.11	13.22	16.38	11.39	18.32	30.38	21.80
Litter	39.60	54.40	42.60				21.74	27.17	22.52						
Soil	1.60	5.60	3.60				2.61	9.78	6.31						
Rock	0.00	0.00	0.00				0.00	0.00	0.00						

Table 22. Points Analysis of the Three Replications of the Urea Treatment at the 40 Pounds of Nitrogen per Acre Rate Applied Biennially For the Native Range Fertilization Trial at Dickinson Experiment Station, 1982

Species	Basal Cover			Relative Cover			Percent Frequency			Relative % Frequency			Importance Value		
	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3
Ag sm	2.40	1.20	1.40	4.86	3.09	3.06	4.50	3.09	3.18	6.99	4.80	4.49	11.85	7.89	7.55
Bo gr	24.60	12.80	15.00	49.80	32.99	32.75	21.17	18.04	17.73	32.87	28.00	25.00	82.67	60.99	57.75
Ko py	3.40	4.40	4.80	6.88	11.34	10.48	5.41	9.80	8.18	8.39	15.20	11.54	15.27	26.54	22.02
Mu cu	0.60	0.60	0.40	1.21	1.55	0.87	0.45	1.55	0.91	0.70	2.44	1.28	1.91	3.99	2.15
St co	3.00	1.40	1.20	6.07	3.61	2.62	5.86	3.61	2.73	9.09	5.60	3.85	15.16	9.21	6.47
St vi	0.60	0.20	2.00	1.21	0.52	4.37	1.35	0.52	4.09	2.10	0.80	5.77	3.31	1.32	10.14
Ca fi	4.00	0.60	1.60	8.10	1.55	3.49	6.76	1.03	2.73	10.49	1.60	3.85	18.59	3.15	7.34
Ca he	1.80	1.20	1.40	3.64	3.09	3.06	4.05	3.09	3.18	6.29	4.80	4.49	9.93	7.89	7.55
Ac mi			0.20			0.44			0.45			0.64			1.08
An pa	1.00	0.40	0.80	2.02	1.03	1.75	1.35	1.03	0.45	2.10	1.60	0.64	4.12	2.63	2.39
Ar dr	0.20			0.40			0.45			0.70			1.10		
Ar fr	0.40		0.60	0.81		1.31	0.90		0.91	1.40		1.28	2.21		2.59
Ce ar	0.20			0.40			0.45			0.70			1.10		
Lo am			0.20			0.44			0.45			0.64			1.08
Or lu			0.80			1.75			1.82			2.56			4.31
Ph ho	0.60		0.20	1.21		0.44	1.35		0.45	2.10		0.64	3.31		1.08
Pl pu	0.40		0.40	0.81		0.87	0.90		0.91	1.40		1.28	2.21		2.15
Po pe		0.20	0.20		0.52	0.44		0.52	0.45		0.80	0.64		1.32	1.08
Ra co			0.20			0.44			0.45			0.64			1.08
Se de	2.60	3.20	3.00	5.26	8.25	6.55	3.15	5.15	6.36	4.90	8.00	8.97	10.16	16.25	15.52
Lichen	3.60	12.60	11.20	7.29	32.47	24.45	6.31	17.01	15.00	9.79	26.40	21.15	17.08	58.87	45.60
Litter	41.00	55.00	50.60				22.52	25.77	22.73						
Soil	9.60	6.20	3.60				13.06	9.79	6.36						
Rock	0.00	0.00	0.00				0.00	0.00	0.00						

Table 23. Points Analysis of the Three Replications of the Urea Treatment at the 60 Pounds of Nitrogen per Acre Rate Applied Annually For the Native Range Fertilization Trial at Dickinson Experiment Station, 1982

Species	Basal Cover			Relative Cover			Percent Frequency			Relative % Frequency			Importance Value		
	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3
Ag sm	3.60	0.20	3.20	7.09	0.55	6.67	7.11	0.56	5.38	10.06	0.88	7.14	17.15	1.43	13.81
Bo gr	21.60	9.00	11.00	42.52	24.86	22.92	17.78	15.56	15.25	25.16	24.78	20.24	67.68	49.64	43.16
Ca mo	1.00		0.40	1.97		0.83	1.78		0.90	2.52		1.19	4.49		2.02
Ko py	7.20	3.40	7.60	14.17	9.39	15.83	11.56	7.78	13.00	16.35	12.39	17.26	30.52	21.78	33.09
Mu cu	3.00	0.20	1.20	5.91	0.55	2.50	3.56	0.56	1.79	5.03	0.88	2.38	10.94	1.43	4.88
St co	3.40	0.80	3.20	6.69	2.21	6.67	6.67	2.22	5.83	9.43	3.54	7.74	16.12	5.75	14.41
St vi	2.00	0.20	1.20	3.94	0.55	2.50	4.00	0.56	2.69	5.66	0.88	3.57	9.66	1.43	6.07
Ca fi	3.00	1.00	2.40	5.91	2.76	5.00	5.33	2.78	4.48	7.55	4.42	5.95	13.46	7.18	10.95
Ca he	0.20	0.60	0.60	0.39	1.66	1.25	0.44	1.67	1.35	0.63	2.65	1.79	1.02	4.31	3.04
Ac mi		0.20	0.20		0.55	0.42		0.56	0.45		0.88	0.60		1.43	1.02
An pa	0.40	0.80	0.40	0.79	2.21	0.83	0.89	1.67	0.90	1.26	2.65	1.19	2.05	4.86	2.02
Ar dr			0.20			0.42			0.45			0.60			1.02
Ar fr	0.60		0.20	1.18		0.42	0.89		0.45	1.26		0.60	2.44		1.02
Ce ar			0.40			0.83			0.45			0.60			1.43
Er as	0.20			0.39			0.44			0.63			1.02		
Lo am	0.20			0.39			0.44			0.63			1.02		
Or lu			0.20			0.42			0.45			0.60			1.02
Pe pu		0.20			0.55			0.56			0.88			1.43	
Ph ho		0.40	0.20		1.10	0.42		0.56	0.45		0.88	0.60		1.98	1.02
Pl pu		0.20	1.00		0.55	2.08		0.56	1.79		0.88	2.38		1.43	4.46
Po pe			0.20			0.42			0.45			0.60			1.02
Ra co	0.20		0.60	0.39		1.25	0.44		1.79	0.63		2.38	1.02		3.63
So mi			0.20			0.42			0.45			0.60			1.02
So mo			0.20			0.42			0.45			0.60			1.02
Se de	2.00	8.00	10.80	3.94	22.10	22.50	4.44	11.11	12.56	6.29	17.70	16.67	10.23	39.80	39.17
Lichen	2.20	11.00	2.40	4.33	30.39	5.00	4.89	16.11	3.59	6.92	25.66	4.76	11.25	56.05	9.76
Litter	41.40	59.20	51.00				21.78	27.78	22.42						
Soil	7.80	4.60	1.00				7.56	9.44	2.24						
Rock	0.00	0.00	0.00				0.00	0.00	0.00						

Table 24. Points Analysis of the Three Replications of the Urea Treatment at the 60 Pounds of Nitrogen per Acre Rate Applied Biennially For the Native Range Fertilization Trial at Dickinson Experiment Station, 1982

Species	Basal Cover			Relative Cover			Percent Frequency			Relative % Frequency			Importance Value		
	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3
Ag sm	5.40	2.60	1.00	10.07	5.42	2.06	7.73	6.13	2.18	10.47	8.90	2.87	20.54	14.32	4.93
Bo gr	20.40	10.20	11.80	38.06	21.25	24.28	19.31	14.15	15.72	26.16	20.55	20.69	64.22	41.80	44.97
Bu da	0.40		0.60	0.75		1.23	0.86		1.31	1.16		1.72	1.91		2.95
Ca mo	0.80		0.60	1.49		1.23	1.72		0.87	2.33		1.15	3.82		2.38
Ko py	2.00	1.60	7.40	3.73	3.33	15.23	4.29	3.77	11.79	5.81	5.48	15.52	9.54	8.81	30.75
Mu cu	2.80	0.40	1.60	5.22	0.83	3.29	3.43	0.94	2.62	4.65	1.37	3.45	9.87	2.20	6.74
St co	6.80	3.00	5.00	12.69	6.25	10.29	10.73	5.66	9.61	14.53	8.22	12.64	27.22	14.47	22.93
St vi	0.20	0.80	0.40	0.37	1.67	0.82	0.43	1.89	0.87	0.58	2.74	1.15	0.95	4.41	1.97
Ca fi	6.80	0.40	5.60	12.69	0.83	11.52	10.73	0.94	7.86	14.53	1.37	10.34	27.22	2.20	21.86
Ca he	0.80	1.00	1.60	1.49	2.08	3.29	1.72	2.36	3.06	2.33	3.42	4.02	3.82	5.50	7.31
Ac mi		0.20	0.20		0.42	0.41		0.47	0.44		0.68	0.57		1.10	0.98
An pa		1.40			2.92			2.83			4.11			7.03	
Ar dr	0.20		0.60	0.37		1.23	0.43		1.31	0.58		1.72	0.95		2.95
Ar fr	0.40	0.40	0.40	0.75	0.83	0.82	0.86	0.94	0.87	1.16	1.37	1.15	1.91	2.20	1.97
As er			0.40			0.82			0.87			1.15			1.97
Ec an			0.20			0.41			0.44			0.57			0.98
Er as			0.20			0.41			0.44			0.57			0.98
Ha sp	0.60			1.12			1.29			1.74			2.86		
Li pu	0.20		0.40	0.37		0.82	0.43		0.87	0.58		1.15	0.95		1.97
Li ri			0.20			0.41			0.44			0.57			0.98
Lo am			0.20			0.41			0.44			0.57			0.98
Ox la	0.20			0.37			0.43			0.58			0.95		
Pe pu	0.20			0.37			0.43			0.58			0.95		
Ph ho			0.20			0.41			0.44			0.57			0.98
Pl pu	0.20		0.40	0.37		0.82	0.43		0.87	0.58		1.15	0.95		1.97
Po pe			0.20			0.41			0.44			0.57			0.98
So mi			0.40			0.82			0.87			1.15			1.97
Se de	1.60	11.40	7.60	2.99	23.75	15.64	3.00	13.21	8.30	4.07	19.18	10.92	7.06	42.93	26.56
Lichen	3.60	14.60	1.40	6.72	30.42	2.88	5.58	15.57	3.06	7.56	22.60	4.02	14.28	53.02	6.90
Litter	42.60	44.80	50.20				21.46	22.64	21.83						
Soil	3.80	7.20	1.20				4.72	8.49	2.18						
Rock	0.00	0.00	0.00				0.00	0.00	0.00						

Table 25. Points Analysis of the Three Replications of the Urea Treatment at the 100 Pounds of Nitrogen per Acre Rate Applied Biennially For the Native Range Fertilization Trial at Dickinson Experiment Station, 1982

Species	Basal Cover			Relative Cover			Percent Frequency			Relative % Frequency			Importance Value		
	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3
Ag sm	2.20	0.80	4.60	4.89	2.14	8.75	3.98	2.00	8.68	6.77	3.39	11.38	11.66	5.53	20.13
Bo gr	22.40	17.40	14.60	49.78	46.52	27.76	19.47	20.00	18.26	33.08	33.90	23.95	82.86	80.42	51.71
Bu da	0.40			0.89			0.88			1.50			2.39		
Ca mo	0.80		0.40	1.78		0.76	1.77		0.91	3.01		1.20	4.79		1.96
Ko py	2.00	3.20	4.40	4.44	8.56	8.37	4.42	6.00	6.39	7.52	10.17	8.38	11.96	18.73	16.75
Mu cu	1.00		1.20	2.22		2.28	0.88		2.28	1.50		2.99	3.72		5.27
Po co			0.20			0.38			0.46			0.60			0.98
St co	4.00	1.80	3.60	8.89	4.81	6.84	7.08	4.50	5.94	12.03	7.63	7.78	20.92	12.44	14.62
St vi	0.80	0.40	0.40	1.78	1.07	0.76	1.77	1.00	1.83	3.01	1.69	2.40	4.79	2.76	3.16
Ca fi	7.60	2.80	4.40	16.89	7.49	8.37	11.06	5.50	6.85	18.80	9.32	8.98	35.69	16.81	17.35
Ca he	1.20	2.60	0.80	2.67	6.95	1.52	2.65	5.50	1.83	4.51	9.32	2.40	7.18	16.27	3.92
An pa			1.40			2.63			0.91			1.20			3.83
Ar dr			0.40			0.76			0.91			1.20			1.96
Ar fr		0.20	0.40		0.53	0.76		0.50	0.91		0.85	1.20		1.38	1.96
As er			0.40			0.76			0.91			1.20			1.96
Li ri		0.20			0.53			0.50			0.85			1.38	
Lo am		0.20			0.53			0.50			0.85			1.38	
Pe pu			0.20			0.38			0.46			0.60			0.98
Pl pu	0.40			0.89			0.88			1.50			2.39		
Se de		5.20	14.00		13.90	26.62		6.50	15.98		11.02	20.96		24.92	47.58
Lichen	2.20	2.60	1.20	4.89	6.95	2.28	3.98	6.50	2.74	6.77	11.02	3.59	11.66	17.97	5.87
Litter	37.50	47.00	47.00				22.12	25.00	22.83						
Soil	17.60	15.60	0.40				19.03	16.00	0.91						
Rock	0.00	0.00	0.00				0.00	0.00	0.00						

Table 26. Points Analysis of the Three Replications of the Control Treatment (N) For the Native Range Fertilization Trial at Dickinson Experiment Station, 1982

Species	Basal Cover			Relative Cover			Percent Frequency			Relative % Frequency			Importance Value		
	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3
Ag sm	1.00	0.60	0.60	2.25	1.85	1.08	2.59	1.69	1.08	4.07	2.78	1.49	6.32	4.63	2.57
Bo gr	9.40	7.40	11.00	21.17	22.84	19.86	16.06	15.82	18.38	25.20	25.93	25.37	46.37	48.77	45.23
Ko py	1.60	2.80	1.80	3.60	8.64	3.25	3.63	6.21	3.24	5.69	10.19	4.48	9.29	18.83	7.73
Mu cu	0.20		0.20	0.45		0.36	0.52		0.54	0.81		0.75	1.26		1.11
St co	1.00	0.80	1.60	2.25	2.47	2.89	2.59	2.26	3.24	4.07	3.70	4.48	6.32	6.17	7.37
St vi	0.20			0.45			0.52			0.81			1.26		
Ca fi	0.20	1.00	3.60	0.45	3.09	6.50	0.52	2.82	8.11	0.81	4.63	11.19	1.26	7.72	17.69
Ca he	0.20	0.60	1.80	0.45	1.85	3.25	0.52	1.69	4.86	0.81	2.78	6.72	1.26	4.63	9.97
An pa	0.40	0.40	0.20	0.90	1.23	0.36	1.04	1.13	0.54	1.63	1.85	0.75	2.53	3.08	1.11
Ar dr			0.20			0.36			0.54			0.75			1.11
Ar fr		0.40	0.20		1.23	0.36		1.13	0.54		1.85	0.75		3.08	1.11
Lo am			0.80			1.44			1.62			2.24			3.68
Ph ho			0.60			1.08			1.62			2.24			3.32
Pl pu	0.40		0.20	0.90		0.36	1.04		0.54	1.63		0.75	2.53		1.11
Ps ar		0.20			0.62			0.56			0.93			1.55	
Ra co			0.20			0.36			0.54			0.75			1.11
So mi			0.20			0.36			0.54			0.75			1.11
Sp co	0.20			0.45			0.52			0.81			1.26		
Se de	21.40	7.80	31.60	48.20	24.07	57.04	21.76	11.86	24.86	34.15	19.44	34.33	82.35	43.51	91.37
Lichen	8.20	10.40	0.60	18.47	32.10	1.08	12.44	15.82	1.62	19.51	25.93	2.24	37.98	58.03	3.34
Litter	48.60	62.80	44.00				25.91	28.25	25.95						
Soil	7.00	4.80	0.60				10.36	10.73	1.62						
Rock	0.00	0.00	0.00				0.00	0.00	0.00						

Table 27. Points Analysis of the Three Replications of the Control Treatment (S) For the Native Range Fertilization Trial at Dickinson Experiment Station, 1982

Species	Basal Cover			Relative Cover			Percent Frequency			Relative % Frequency			Importance Value		
	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3	R-1	R-2	R-3
Ag sm	3.40	0.20	2.40	8.67	0.69	6.25	7.04	0.61	5.70	11.29	1.04	8.94	19.96	1.73	15.19
Bo cu			1.00			2.60			2.07			3.25			5.85
Bo gr	20.20	7.60	20.20	51.53	26.39	52.60	23.62	17.79	22.80	37.90	30.21	35.77	89.43	56.60	88.37
Bu da	0.20		1.00	0.51		2.60	0.50		1.04	0.81		1.63	1.32		4.23
Ko py	1.40	3.00	4.60	3.57	10.42	11.98	3.52	7.36	9.33	5.65	12.50	14.63	9.22	22.92	26.61
Mu cu	3.60		0.60	9.18		1.56	4.02		1.04	6.45		1.62	15.63		3.18
St co	1.60	2.20	2.40	4.08	7.64	6.25	3.52	6.75	5.70	5.65	11.46	8.94	9.73	19.10	15.19
St vi	1.20		0.80	3.06		2.08	3.02		2.07	4.84		3.25	7.90		5.33
Ca fi	3.00	0.80	1.80	7.65	2.78	4.69	6.53	1.84	4.66	10.48	3.13	7.32	18.13	5.91	12.01
Ca he		1.20	1.00		4.17	2.60		3.68	2.59		6.25	4.07		10.42	6.67
An pa	0.60	0.40		1.53	1.39		1.01	0.61		1.61	1.04		3.14	2.43	
Ar dr			0.60			1.56			1.55			2.44			4.00
Ar fr	0.40		0.80	1.02		2.08	1.01		2.07	1.61		3.25	2.63		5.33
Er in	0.20			0.51			0.50			0.81			1.32		
He hi	0.40			1.02			1.01			1.61			2.63		
Li ri			0.20			0.52			0.52			0.81			1.33
Lo am	0.20			0.51			0.50			0.81			1.32		
Or lu	0.20			0.51			0.50			0.81			1.32		
Pe pu	0.40			1.02			1.01			1.61			2.63		
Ph ho		0.20			0.69			0.61			1.04			1.73	
Pl pu			0.20			0.52			0.52			0.81			1.33
So mo		0.20			0.69			0.61			1.04			1.73	
Se de	0.60	3.00	0.80	1.53	10.42	2.08	1.01	4.91	2.07	1.61	8.33	3.25	3.14	18.75	5.33
Lichen	1.60	10.00		4.08	34.72		4.02	14.11		6.45	23.96		10.53	58.68	
Litter	53.40	66.40	56.80				25.13	30.67	25.91						
Soil	7.60	4.80	4.80				12.56	10.43	10.36						
Rock	0.00	0.00	0.00				0.00	0.00	0.00						

Table 28. Points Analysis of the Control Treatment (N) For the Native Range Fertilization Trial at Dickinson Experiment Station, 1982

Species	Basal Cover	Relative Cover	% Frequency	Relative % Freq.	Importance Value
Agropyron smithii	0.73	1.73	1.79	2.78	4.51
Bouteloua gracilis	9.27	21.29	16.75	25.50	46.79
Koeleria pyramidata	2.07	5.16	4.36	6.79	11.95
Muhlenbergia cuspidata	0.13	0.27	0.35	0.52	0.79
Stipa comata	1.13	2.62	2.70	4.08	6.62
Stipa viridula	0.07	0.15	0.17	0.27	0.42
Carex filifolia	1.60	3.34	3.82	5.54	8.89
Carex heliophila	0.87	1.85	2.36	3.44	5.29
Antennaria parvifolia	0.33	0.83	0.90	1.41	2.24
Artemisia dracunculus	0.07	0.12	0.18	0.25	0.37
Artemisia frigida	0.20	0.53	0.56	0.87	1.40
Lotus americanus	0.27	0.48	0.54	0.75	1.23
Phlox hoodii	0.20	0.36	0.54	0.75	1.11
Plantago purshii	0.20	0.42	0.53	0.79	1.21
Psoralea argophylla	0.07	0.21	0.19	0.31	0.52
Ratibida columniferra	0.07	0.12	0.18	0.25	0.37
Solidago missouriensis	0.07	0.12	0.18	0.25	0.37
Sphaeralcea coccinea	0.07	0.15	0.17	0.27	0.42
Selaginella densa	20.27	43.10	19.49	29.31	72.41
Lichen spp.	6.40	17.22	9.96	15.89	33.12
Litter	51.80		26.70		
Soil	4.13		7.57		
Rock	0.00		0.00		

Table 29. Points Analysis of the Control Treatment (S) of the Native Range Fertilization Trial at Dickinson Experiment Station, 1982

Species	Basal Cover	Relative Cover	% Frequency	Relative % Freq.	Importance Value
Agropyron smithii	2.00	5.20	4.45	7.09	12.29
Bouteloua curtipendula	0.33	0.87	0.69	1.08	1.95
Bouteloua gracilis	16.00	43.51	21.40	34.63	78.13
Buchloe dactyloides	0.40	1.04	0.51	0.81	1.85
Koeleria pyramidata	3.00	8.66	6.74	10.93	19.58
Muhlenbergia cuspidata	1.40	3.58	1.69	2.69	6.27
Stipa comata	2.07	5.99	5.32	8.68	14.67
Stipa viridula	0.67	1.70	1.70	2.70	4.41
Carex filifolia	1.87	5.04	4.34	6.98	12.02
Carex heliophila	0.73	2.26	2.09	3.44	5.70
Antennaria parvifolia	0.33	0.97	0.54	0.88	1.86
Artemisia dracunculus	0.20	0.52	0.52	0.81	1.33
Artemisia frigida	0.40	1.03	1.03	1.62	2.65
Erysimum inconspicum	0.07	0.17	0.17	0.27	0.44
Hedeoma hispida	0.13	0.34	0.34	0.54	0.88
Linum lewisii	0.07	0.17	0.17	0.27	0.44
Lotus americanus	0.07	0.17	0.17	0.27	0.44
Orthocarpus luteus	0.07	0.17	0.17	0.27	0.44
Petalostemon purpureum	0.13	0.34	0.34	0.54	0.88
Phlox hoodii	0.07	0.23	0.20	0.35	0.58
Plantago purshii	0.07	0.17	0.17	0.27	0.44
Solidago mollis	0.07	0.23	0.20	0.35	0.58
Selaginella densa	1.47	4.68	2.66	4.40	9.07
Lichen spp.	3.87	12.93	6.04	10.14	23.07
Litter	58.87		27.24		
Soil	5.67		11.12		
Rock	0.00		0.00		

Table 30. Percent Soil Moisture for Native Range Fertilization Trial, Dickinson Experiment Station, 1982

Sample Location Depth (in)	16 Jun East Rep.	16 Jun West Rep.	16 Jun Mean		6 Jul East Rep.	6 Jul West Rep.	6 Jul Mean		20 Jul East Rep.	20 Jul West Rep.	20 Jul Mean		11 Aug East Rep.	11 Aug West Rep.	11 Aug Mean
South:															
0-6	28.99	29.57	29.28		17.07	17.70	17.39		17.31	19.10	18.21		16.45	11.71	14.08
6-12	23.08	26.50	24.79		15.76	16.44	16.10		16.40	15.60	16.00		15.48	13.27	14.38
12-24	22.95	21.44	22.20		19.83	16.20	18.02		16.49	13.17	14.83		14.85	13.06	13.96
24-36	12.07	15.71	13.89		11.48	12.16	11.82		11.87	12.18	12.03		14.66	11.37	13.02
36-48	14.68	13.67	14.18		15.63	17.37	16.50		14.95	16.37	15.66		12.06	12.28	12.17
Central:															
0-6	25.27	31.05	28.16		17.78	20.51	19.15		19.57	21.07	20.32		14.20	11.66	12.93
6-12	25.17	23.71	24.44		18.54	16.18	17.36		16.84	17.62	17.23		14.48	10.33	12.41
12-24	23.08	20.13	21.61		18.42	19.26	18.84		17.46	16.71	17.09		15.15	10.15	12.65
24-36	17.62	11.14	14.38		18.75	9.64	14.20		18.16	9.26	13.71		15.59	11.21	13.40
36-48	13.49	11.60	12.55		13.17	7.86	10.52		12.67	6.99	9.83		9.27	14.23	11.75
North:															
0-6	28.70	31.86	30.28		19.79	17.90	18.85		23.85	21.97	22.91		11.83	11.75	11.79
6-12	26.50	25.70	26.10		18.64	18.64	18.64		20.80	19.28	20.16		10.81	12.80	11.81
12-24	21.68	22.31	22.00		17.79	17.46	17.63		18.16	19.52	18.84		12.82	12.12	12.47
24-36	18.96	11.08	15.02		20.86	20.77	20.82		15.75	17.58	16.67		12.64	11.90	12.27
36-48	14.52	12.82	13.67		13.01	12.57	12.79		13.01	6.39	9.70		15.16	13.76	14.46

Table 31. Mean Percent Soil Moisture for Native Range Fertilization Trial, Dickinson Experiment Station, 1982

Depth In Inches		16 Jun		6 Jul		20 Jul		11 Aug
0-6		29.24		18.46		20.48		12.93
6-12		25.11		17.37		17.80		12.87
12-24		21.94		18.16		16.92		13.03
24-36		14.43		15.61		14.14		12.90
36-48		13.47		13.27		11.73		12.79