



Perennial Food Plot Study

Annual Report 2004

**North Dakota Game and Fish Department
and
USDA-NRCS Bismarck Plant Materials Center**

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This is a cumulative report on project activities of the Perennial Food Plot Study. This study is a cooperative project of the USDA Natural Resources Conservation Service, Plant Materials Center, Bismarck, North Dakota and the North Dakota Game and Fish Department, Bismarck, North Dakota.

Objective:

The objective of this study is to compare two perennial mixes, a native mix and an introduced mix, and document species performance relative to a perennial food plot. General wildlife use will be observed and documented.

The study is located northeast of Wilton, North Dakota, on the Russ Stuart Game Management Area and Old John's Game Management Area. Two sites were identified, one on each of the game management areas.



Applying herbicides to prepare the plots for seeding



Old John's site showing plot shortly after it was burned



Seeding into grass sod that was chemically killed and burned provided an excellent seedbed.

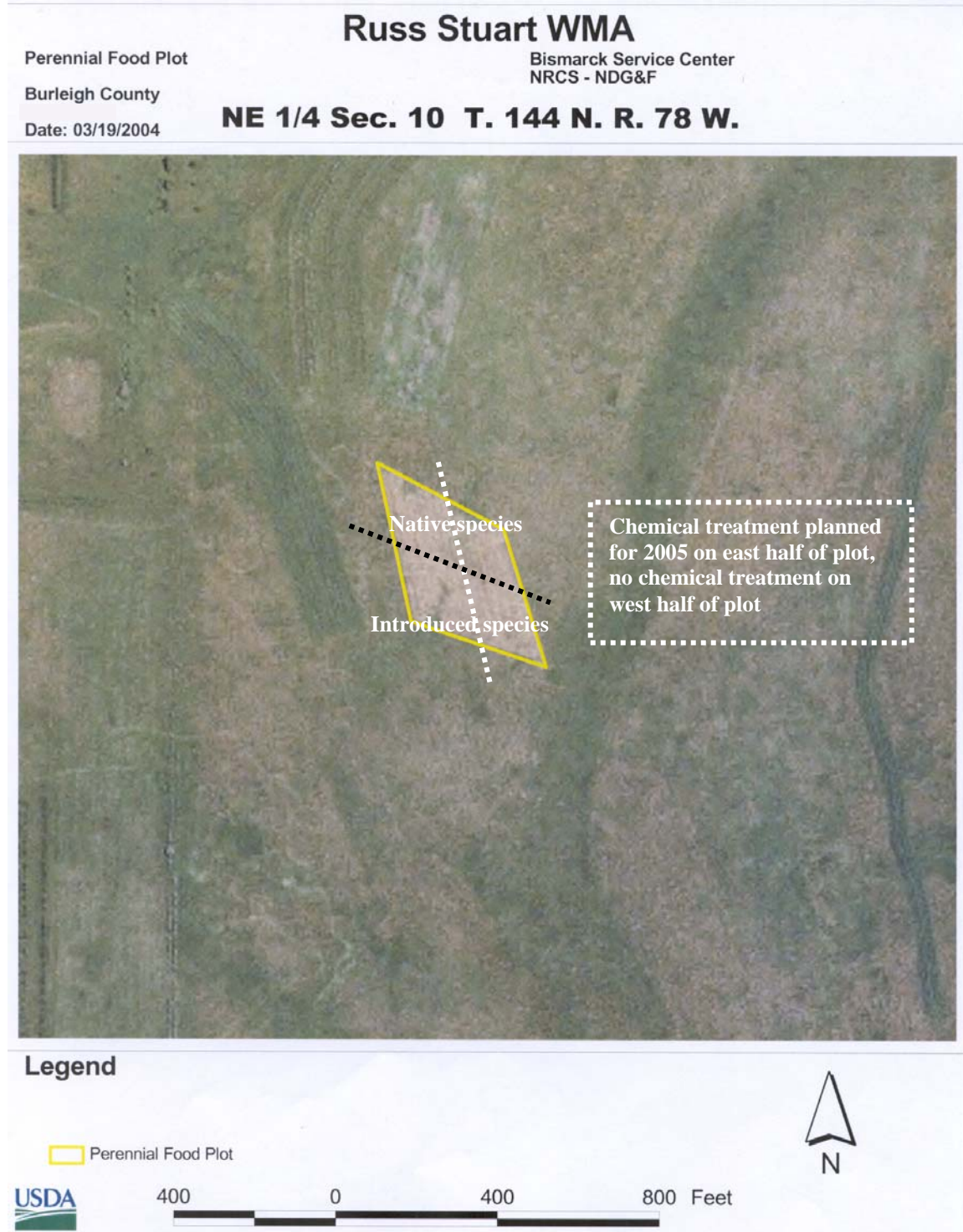


Completed no-till seeding

Site description:

The site is a 2.4 acre plot located on the Russ Stuart Wildlife Management Area in Burleigh County, North Dakota. The site is fairly level and comprised of a Belfield Rhoades loam soil. See Figure 1 for aerial view of the site.

Figure 1.



Site description:

The site is a 2.4 acre plot located on Old John's Wildlife Management Area in Sheridan County, North Dakota. Soils are mapped as Williams/Bowbells loam. See Figure 2 for an aerial view of the site.

Figure 2.



Site Preparation and Seeding:

Both sites were chemically treated on June 10, 2003, with a tank mix of 1 quart of Glyphosate and 1 pint of Poast per acre. The plots were treated again on July 15, 2003 with the same tank mix as on June 10, 2003. The plot borders were mowed on August 8, 2004. A third chemical application of 2 quarts of Glyphosate, 11 ounces of Stinger, 2 pints of 2,4-D amine and 3 gallons of ammonia sulfate were applied on August 13, 2004. The plots were burned by the North Dakota Game and Fish Department on October 11, 2004.



A no-till Truax grass drill was used to plant the plots on November 4, 2004. Each site was split in half to make two plots per site. Each plot is approximately 1.2 acres. The south half of each plot was seeded to an introduced mix and the north half was seeded to a native mix. See Tables 1 and 2 for a list of native species and seeding information. See Tables 3 and 4 for a list of introduced species and seeding information. Each of the two plots were also split in half from north to south to allow half of the native seeding and half of the introduced seeding to have a herbicide application applied in 2005 for weed control.

2004 Observations:

The dense sod of Kentucky bluegrass and other low growing vegetation did not burn well at the Russ Stuart site resulting in large areas of litter left on the soil surface. Kentucky bluegrass sod retained a large mass of both above and below ground residue that made seed to soil contact difficult when no-tilling into the killed and burned residue. The Old John's site had a much better burn which reduced most of the surface litter. The Old John's site



was predominantly smooth brome grass and sideoats grama, which provided a much more desirable seedbed. Available soil moisture at the time of seeding was good at both sites. Evaluations in 2005 will be completed on stand establishment and species performance.

Table 1. List of native species, including trees and shrubs, planted 11/04/2004 on two 1.2 acre sites.

Species	Name	Type*	Seeds per lb	Russ Stuart Planted PLS lb/ac	Old John's Planted PLS lb/ac
<i>Elymus canadensis</i>	canada wildrye	g	115000	0.37	0.37
<i>Panicum virgatum</i>	switchgrass	g	390000	0.11	0.11
<i>Andropogon gerardii</i>	big bluestem	g	176000	0.21	0.21
<i>Dalea candida</i>	white prairieclover	l	278000	0.28	0.24
<i>Dalea purpurea</i>	purple prairieclover	l	290000	0.27	0.27
<i>Astragalus canadensis</i>	canada milkvetch	l	266000	0.29	0.29
<i>Amorpha canescens</i>	leadplant	l	200000	0.39	0.38
<i>Chamaecrista nictitans</i>	partridge pea	l	50000	1.57	1.57
<i>Helianthus maximiliani</i>	max sunflower	f	250000	0.17	0.17
<i>Helianthus pauciflorus</i>	stiff sunflower	f	85000	0.51	0.51
<i>Silphium perfoliatum</i>	cup plant	f	34000	1.28	1.28
<i>Linum lewisii</i>	wild blue flax	f	287000	0.15	0.15
<i>Ratibida columnifera</i>	longheaded coneflower	f	737000	0.12	0.06
<i>Liatris punctata</i>	dotted gayfeather	f	63000	0.32	0.32
<i>Echinacea angustifolia</i>	echinacea	f	120000	0.36	0.37
<i>Gaillardia aristata</i>	blanket flower	f	157000	0.27	0.27
<i>Penstemon grandiflorus</i>	penstemon	f	273000	0.16	0.16
<i>Rudbeckia laciniata</i>	Golden glow-cutleaf	f	252222	0.06+.12**	0.06+.12**
<i>Solidago rigida</i>	stiff goldenrod	f	772000	0.06	0.06
<i>Agastache foeniculum</i>	giant hyssops	f	1538000	0.03	0.03
<i>Desmodium canadense</i>	showy tick trefoil	f	88000	0.26	0.26
<i>Monarda fistulosa</i>	wild bergamot	f	1463000	0.03	0.03
<i>Liatris ligulistylis</i>	meadow blazingstar	f	90000est	0.09	0.09
<i>Rosa arkansana</i>	rose	w	45000	0.25	0.25
<i>Shepherdia argentea</i>	buffaloberry	w	41000	0.40	0.40
<i>Amorpha fruticosa</i>	false indigo	w	52000	0.32	0.32
<i>Amelanchier alnifolia</i>	juneberry	w	82000	0.20	0.20
<i>Symphoricarpos occidentalis</i>	snowberry	w	74400	0.22	0.22
<i>Ribes aureum</i>	currant	w	240000	0.07	0.07
<i>Prunus virginiana</i>	chokecherry	w	4790	3.40**	3.40**
<i>Cornus sericea</i>	redosier dogwood	w	18500	0.78	0.78
<i>Coreopsis tinctoria</i>	plains coreopsis	a	1650000	0.08	0.08

*Type: g=grasses; l=legumes; f=forbs; w=woodies; a=annuals

**bulk seed amount, not PLS

Table 2. Seeding information for native species, including trees and shrubs.

Type	grasses	legumes	forbs	woodies	annuals	Total seeds/ft ² *
number	3	5	15	8	1	30
%of mix	10	30	50	10	10	
seeds/ft ² /specie	1.00	1.80	1.00	0.38	3.00	
seeds/acre**	43560	78408	43560	16335	130680	

*Annuals were not counted in the 30 seeds/ft² seeding rate

**Actual amount of seed planted for a species may differ from target seeding rate due to seed availability, quality and variation in seeds/pound (depending on reference).

Table 3. List of introduced species and native trees/shrubs planted 11/04/2004 on two 1.2 acre sites.

Species	Name	Type	Seeds per lb	Russ Stuart Planted PLS lb/ac	Old John's Planted PLS lb/ac
<i>Leymus racemosus</i>	mammoth wildrye	g	55000	3.58	3.55
<i>Thinopyrum intermedium</i>	intermediate wheatgrass	g	88000	0.76	0.76
<i>Elymus dahuricus</i>	dahurian wildrye	g	86000	0.76	0.76
<i>Thinopyrum ponticum</i>	tall wheatgrass	g	79000	0.82	0.82
<i>Medicago sativa</i>	alfalfa	l	210000	1.10	1.10
<i>Astragalus cicer</i>	cicer milkvetch	l	134000	1.37	1.37
<i>Trifolium pratense</i>	red clover	l	275000	0.67	0.67
<i>Onobrychis vicifolia</i>	sainfoin	l	22000	8.30	8.30
<i>Vicia villosa</i>	hairy vetch	l	20000	9.55	9.55
<i>Rosa arkansana</i>	rose	w	45000	0.37	0.37
<i>Sherpherdia argentea</i>	buffaloberry	w	41000	0.40	0.40
<i>Amorpha fruticosa</i>	false indigo	w	52000	0.32	0.32
<i>Amelanchier alnifolia</i>	juneberry	w	82000	0.20	0.20
<i>Symphoricarpos occidentalis</i>	snowberry	w	74400	0.22	0.22
<i>Ribes aureum</i>	currant	w	240000	0.07	0.07
<i>Cornus sericea</i>	redosier dogwood	w	18500	1.06	1.06
<i>Prunus virginiana</i>	chokecherry	w	4790	3.4**	3.4**
<i>Coreopsis tinctoria</i>	plains coreopsis	a	1650000	0.08	0.08

*Type: g=grasses; l=legumes; f=forbs; w=woodies; a=annuals

**bulk seed amount, not PLS

Table 4. Seeding information for introduced species and native trees/shrubs.

Type	grasses	legumes	forbs	woodies	annuals	Total seeds/ft ² *
number	4	5	0	8	1	30
%of mix	20	70	0	10	10	
seeds/ft ² /specie	1.50	4.20	0	0.38	3.00	
seeds/ac/specie**	65340	182952	0	16335	130680	

*Annuals were not counted in the 30 seeds/ft² seeding rate

**Actual amount of seed planted for a species may differ from target seeding rate due to seed availability, quality and variation in seeds/pound (depending on reference).

