



Perennial Food Plot Study

*Annual Report
2006*

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

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Perennial Food Plot Study

Cumulative Report 2003-2006

This is a cumulative report on study activities of the Perennial Food Plot Study started in 2003. This study is a cooperative project between the USDA Natural Resources Conservation Service, Plant Materials Center, Bismarck, North Dakota, and the North Dakota Game and Fish Department, Bismarck, North Dakota.

Study Objective:

The objective of this 5-year study is to evaluate establishment and plant performance of species in two perennial seed mixes, a native mix and an introduced mix. Establishment and growth characteristics will be documented for each mix. Recommended species and seeding rates for wildlife perennial food plots is a potential outcome of this study.

The study is located northeast of Wilton, North Dakota, on the Russell Stuart Wildlife Management Area (WMA) and Old John's Lake WMA. Two sites were identified, one on each of the wildlife management areas.

Site Preparation and Seeding:

Both sites were chemically treated on June 10, 2003, and July 15, 2003, with a tank mix of 1 quart/ac of glyphosate and 1 pint/ac Poast®. 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.

Plots were planted on November 4, 2004, using a no-till Truax grass drill. Each site (2.4 acres) was split in half to make two plots (1.2 acre) per site. 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 was also split in half from north to south to compare establishment with and without herbicide application.

General Observations:

2004: The dense sod of Kentucky bluegrass and other low growing vegetation did not burn well at the Russell Stuart WMA site leaving large areas of litter on the soil surface. Kentucky bluegrass sod retained a large mass of both above and below ground residue that impacted seed to soil contact when no-till seeding into the killed and burned residue. Burning removed most surface litter at the Old John's Lake WMA. The 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.

2005: Both the Russell Stuart WMA and the Old John's Lake WMA plots were split in half from north to south to allow half of the native seeding and half of the introduced

seeding to have herbicide applied in 2005. A 4 oz/acre rate of Plateau® herbicide was applied on May 5, 2005. No surfactant was used in the application.

No planted seedlings were actively growing on any of the eight treatments at the time of the Plateau® herbicide application on May 5, 2005. Canada thistle, absinth wormwood, and other weedy species seedlings were observed in low numbers for all treatments at this time. The Old John's Lake WMA plot had less actively growing weeds and less surface residue after over-wintering as compared to the Russell Stuart WMA plot. The surface (1-2 inch depth) soil moisture conditions in the plots were very dry.

Plants were evaluated in July, 2005. Species counts were randomly taken using a 2.4-ft² frame. See Tables 5 through 12 for data collected on the Russell Stuart WMA plots and Tables 13 through 20 for data collected on the Old John's Lake WMA plots.

On September 9, 2005, general stand observations were noted. The following comments were recorded. All treatments on the Russell Stuart WMA plots had higher planted species densities and much less weed competition than the Old John's Lake WMA plots. All plots planted with native species had the greatest seedling emergence and stand establishment (at Russell Stuart WMA and Old John's Lake WMA plots). Lack of surface residue, which exposed black mineral soil, may have contributed to the poorer stands at Old John's Lake WMA plots. The soil surface may have warmed too soon in the spring, causing seeds to germinate and seedlings to freeze. The Russell Stuart WMA site had more surface residue and was lower in elevation which probably resulted in cooler soil temperatures that reduced the chances for sprouting and emergence of the planted species.

2006: Both sites received very limited amounts of rainfall the 2006 growing season. This along with late spring frosts reduced overall plant growth and caused early dormancy and death in some species. Native species showing persistence in the stand were stiff sunflower, Maximilian sunflower, purple prairie clover, blue flax, shell-leaf penstemon, big bluestem, and switchgrass. Introduced species observed in the highest numbers included intermediate wheatgrass, Dahurian wildrye, and alfalfa. Large populations of absinth wormwood invaded both sites even with the use of no-till methods. Old John's had the highest concentrations of absinth wormwood and will have herbicide applied in 2007 after spring species counts are recorded. The Russell Stuart plots are less contaminated. No herbicide application is planned for 2007. The success of these small food plots has been greatly influenced by the surrounding vegetation. Smooth brome grass, quackgrass, and Kentucky bluegrass quickly invades the plots even when they have been chemically removed prior to planting. Plantings dominated by forbs were less competitive with invading unwanted species. Data will be collected at both sites in 2007. General recommendations on species and management techniques for future perennial food plot seedings will be developed. See Tables 5 through 20 for data collection from 2005 and 2006.

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>	Maximilian sunflower	f	250000	0.17	0.17
<i>Helianthus pauciflorus</i>	stiff sunflower	f	85000	0.51	0.51
<i>Siphium 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).

Russell Stuart Wildlife Management Area

Site description:

The site is a 2.4-acre plot located on the Russell Stuart Wildlife Management Area in Burleigh County, North Dakota. The site is fairly level and is comprised primarily of Bearden silty clay loam; slight or very slight saline. The ecological site is “limy subirrigated.” See Figure 1 for aerial view of the site.

Figure 1.



Russell Stuart WMA Plot

Native species seeding - No Plateau® herbicide applied

2005: Weed competition from annual weeds was much higher compared to the native plot that had Plateau® herbicide applied. Annual weeds showing the highest populations were lambsquarter, common ragweed, and kochia. Most of the planted species were observed in the plot. Native shrubs including buffaloberry, golden currant, redosier dogwood, western snowberry, and juneberry were observed in this plot.

2006: Species showing the highest plant densities in the plots were shell-leaf penstemon, blue flax, stiff sunflower, and Maximilian sunflower. Similar to the native sprayed plot, there was a great diversity of species. Plots had less bare ground than the native sprayed plots but had increased amounts of invading Kentucky bluegrass.

Native species seeding - Plateau® herbicide applied

2005: Large areas of bare ground were observed on this site. Canada thistle densities were higher compared to the unsprayed native plot. Most planted species were present but their growth was suppressed considerably. Maximilian sunflower and stiff sunflower appeared to be the least affected by the Plateau® herbicide in growth suppression. The overall stand composition was very similar to the unsprayed native plot.

2006: This plot has a more patchy appearance than the native unsprayed plot. Total cover is less due to reduced weed density. The increased bare ground has allowed increased encroachment of absinth wormwood and Canada thistle but less invasion of annual weeds and perennial grasses. This plot has good plant diversity with Maximilian sunflower, stiff sunflower, shell-leaf penstemon, blue flax, gaillardia, and hyssops being the most prominent in the plot.

Introduced species seeding - Plateau® herbicide applied

2005: A higher percentage of open ground was observed compared to the other three plots. Lower numbers of planted species were observed as compared to the unsprayed plot. Planted species present showed suppressed growth and lower vigor than the unsprayed introduced plot. Canada thistle populations were higher and annual weeds were lower on the sprayed plot compared to the unsprayed plot.

2006: Stand is much better than unsprayed introduced plot. Plant diversity is higher compared to the unsprayed introduced plot. Planted species are more vigorous and have less competition from invading perennial weeds.

Introduced species seeding - No Plateau® herbicide applied

2005: Annual weed population is similar to the native species seeding without the Plateau® herbicide application. Higher densities of annual weeds occur compared to the introduced species seeding that was sprayed with the Plateau® herbicide. Intermediate wheatgrass, tall wheatgrass, and Dahurian wildrye were the dominant planted grass species observed. The grasses observed were healthy and vigorous, many were headed out, and contained good seed fill. Alfalfa, sainfoin and cicer milkvetch were the dominant planted forbs observed.

2006: These plots had the poorest stand of all Russell Stuart WMA plots. Planted species of intermediate wheatgrass, tall wheatgrass, Dahurian wildrye, and alfalfa dominated the site. Large populations of wormwood, Kentucky bluegrass, and smooth brome grass invaded this plot.

Table 5. Russell Stuart WMA; native species seeded with herbicide application, random species counts taken 7/6/2005.

SPECIES	FRAME (2.4-ft ²)																				Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
bergamot																					0
blanketflower	1	2								1										1	5
blue flax	1	1	3											1							6
Canada milkvetch	1							1													2
coreopsis				2	1			1												1	5
cup plant																					0
dotted blazing star																					0
echinacea-coneflower											1					1					2
golden glow																					0
hyssops		1																			1
leadplant					3		1								1			1	1		7
longheaded coneflower																					0
Maximilian sunflower		1			1			1		3										1	7
meadow blazing star																					0
partridge pea		1	2																		3
penstemon	3	1	4													1					9
purple prairieclover														1							1
stiff goldenrod	1							1													2
stiff sunflower				2			2	1		1		4									10
tick trefoil	2		1							1									2		6
white prairieclover	1	1																			2
yellow coneflower				1			1														2
big bluestem							1				1									1	3
Canada wildrye						1				1				2				1			5
switchgrass	1			1				1		1											4
buffaloberry					1				1												2
chokecherry																					0
currant																					0
false indigo							1													1	2
juneberry																					0
prairie rose																					0
red dogwood	2																				2
snowberry																					0
% Weed Canopy	5	3	3	15	45	2	5	5	1	1	1	0	2	10	1	2	0	0	0	0	
Remarks: No forbs in frames 13 and 17.																					

Table 6. Russell Stuart WMA; native species seeded with no herbicide application, random species counts taken 7/6/2005.

SPECIES	FRAME (2.4-ft ²)																				Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
bergamot		1									1										2
blanketflower	1								2			1							1		5
blue flax			2		1						1			1		2		1			8
Canada milkvetch				2		1												3			6
coreopsis	1	1	2	1	2	11						4	4				1		2		29
cup plant	2		1					2	1							2					8
dotted blazing star									1						1					1	3
echinacea-coneflower				1			1		3	2										1	8
golden glow					1																1
hyssops						1					1		1		1						4
leadplant				2								1			1	1					5
longheaded coneflower			2																		2
Maximilian sunflower	1		2	1		1					2	1	2	2				1			13
meadow blazing star												1									1
partridge pea					2			3			1		1			1					8
penstemon		3			1	1					1							1			7
purple prairieclover	1			1									1			1					4
stiff goldenrod			1	2	1	2	1					1	1		2						11
stiff sunflower		1	1		2	3						1			1		1	1	1		12
tick trefoil		1											1			1		1			4
white prairieclover						1															1
yellow coneflower												2	1		1					2	6
big bluestem	1	1																			2
Canada wildrye		2	1		1				1	1		1	1			1		1			10
switchgrass													1								1
buffaloberry						1															1
chokecherry																					0
currant																					0
false indigo					2				1	1											4
juneberry											1										1
prairie rose																					0
red dogwood									2	1					1						4
snowberry																					0
% Weed Canopy	50	2	40	30	70	25	1	15	15	40	5	10	10	10	15	20	45	55	50	5	

Remarks: Mustard and lambsquarters were the major annual weeds present. Plants are vigorous. Greatest population of planted species of all treatments.

Table 7. Russell Stuart WMA, introduced species seeded with herbicide application, random species counts taken 7/6/2005.

SPECIES	FRAME (2.4-ft ²)																				Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
alfalfa	1	1														1					3
cicer milkvetch							1														1
hairy vetch																					0
plains coreopsis																					0
red clover																					0
sainfoin								1													1
grasses	10	1	3	4	2	1	5	0	0	6	3	0	5	5	2	0	7	2	3	3	62
buffaloberry		2						1											1		4
chokecherry																					0
false indigo																					0
golden currant																					0
juneberry																					0
redosier dogwood			1																		1
rose																					0
snowberry	1											1									2
% Weed Canopy	2	1	5	10	2	0	10	2	5	3	3	15	3	2	3	1	2	0	10	20	
<p>Remarks: More forbs were present on the north end of this treatment. South end very uneven ground surface. All plants stunted and yellow-colored.</p>																					

Table 8. Russell Stuart WMA; introduced species seeded with no herbicide application, random species counts taken 7/6/2005.

SPECIES	FRAME (2.4-ft ²)																				Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
alfalfa													1	1	1						3
cicer milkvetch											2	1									3
hairy vetch					1							1									2
plains coreopsis							1								1						3
red clover																					0
sainfoin				1				1		1			1			1			2	1	8
grasses	0	0	3	9	7	2	1	5	0	4	3	2	0	2	8	3	5	3	2	10	69
buffaloberry															1						1
chokecherry																					0
false indigo				1			1	1													3
golden currant																					0
juneberry																					0
redosier dogwood					2																2
rose																					0
snowberry																					0
% Weed Canopy	60	30	80	30	0	5	15	35	30	60	10	5	35	50	35	75	60	95	50	75	
Remarks: Lambsquarters and mustard are the major annual weeds present. Less weeds than in native planting. Red clover present in plots, but not counted. This treatment has the highest wormwood densities. Sainfoin most prevalent of planted legumes.																					

Table 9. Russell Stuart WMA; native species seeded with herbicide application, random species counts taken 9/8/2006.

SPECIES	FRAME (2.4-ft ²)																				*
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
bergamot	6	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0	19
blanketflower	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
blue flax	0	0	0	0	2	0	0	2	2	2	0	0	0	0	1	0	0	1	1	1	25
Canada milkvetch	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	4
coreopsis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
cupplant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2
dotted blazing star	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
echinacea-coneflower	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	4
golden glow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	4
hyssops	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
leadplant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
longheaded coneflower	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximilian sunflower	0	7	0	0	0	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	21
meadow blazing star	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
partridge pea	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1	0	6
penstemon	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	4
purple prairieclover	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	4
stiff goldenrod	0	1	0	0	1	0	0	1	0	1	0	0	0	0	1	0	0	0	0	2	15
stiff sunflower	6	2	6	6	0	9	0	5	0	0	0	0	0	0	13	0	0	10	5	0	129
tick trefoil	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	4
white prairieclover	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
yellow coneflower	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	4	0	0	15
big bluestem	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Canada wildrye	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
switchgrass	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	1	1	1	0	13
buffaloberry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
chokecherry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
currant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
false indigo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
juneberry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
prairie rose	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
red dogwood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
snowberry	0	0	0	0	0	3	2	0	0	0	2	0	1	0	0	0	0	0	0	2	21
Weed Canopy %	15	20	10	5	20	5	10	25	40	10	5	10	5	25	15	20	5	10	10	10	

* Seedlings /100 sq.ft.

Table 10. Russell Stuart WMA; native species seeded with no herbicide application, random species counts taken 9/8/2006.

SPECIES	FRAME (2.4-ft ²)																				*
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
bergamot	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
blanketflower	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2
blue flax	1	0	3	0	1	0	0	5	0	0	0	0	3	0	0	0	0	1	0	0	29
Canada milkvetch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
coreopsis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
cupplant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
dotted blazing star	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
echinacea-coneflower	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2
golden glow	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	4
hyssops	3	0	0	0	0	0	0	0	0	0	0	2	0	3	0	0	0	0	0	0	17
leadplant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
longheaded coneflower	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximilian sunflower	3	3	0	5	8	0	5	5	3	0	2	0	7	0	12	5	0	14	0	0	150
meadow blazing star	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
partridge pea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
penstemon	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	1	0	0	0	8
purple prairieclover	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
stiff goldenrod	1	1	1	0	2	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	15
stiff sunflower	0	0	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0	0	4	2	21
tick trefoil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
white prairieclover	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
yellow coneflower	0	0	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	1	0	2	13
big bluestem	0	0	0	0	0	1	0	0	1	0	0	0	0	2	0	0	0	0	0	0	8
Canada wildrye	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0	3	0	0	0	2	17
switchgrass	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0	0	6
buffaloberry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
chokecherry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
currant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
false indigo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
juneberry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
prairie rose	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
red dogwood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
snowberry	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	4
Weed Canopy %	60	40	30	10	30	50	40	70	20	30	50	40	80	40	20	30	30	30	50	20	

* Seedlings /100 sq.ft.

Table 11. Russell Stuart WMA, introduced species seeded with herbicide application, random species counts taken 9/8/2006.

SPECIES	FRAME (2.4-ft ²)																				*
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
alfalfa	0	0	1	0	4	0	0	0	0	0	2	1	0	1	0	0	0	0	0	1	21
cicer milkvetch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
hairy vetch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
plains coreopsis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
red clover	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
sainfoin	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	4
Dahurian wildrye	1	0	1	0	0	1	0	0	0	0	0	1	2	0	1	1	1	1	2	1	27
intermediate wheatgrass	0	0	0	1	2	1	1	0	0	1	2	0	0	2	0	0	0	3	0	0	27
mammoth wildrye	0	0	0	0	0	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0	10
tall wheatgrass	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	6
buffaloberry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
chokecherry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
false indigo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
golden currant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
juneberry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
redosier dogwood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
rose	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
snowberry	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	0	1	1	0	0	10
Weed Canopy %	10	5	5	10	5	5	5	5	10	30	40	25	50	10	5	20	20	30	10	10	

* Seedlings /100 sq.ft.

Table 12. Russell Stuart WMA, introduced species seeded without herbicide application, random species counts taken 9/8/2006.

SPECIES	FRAME (2.4-ft ²)																				*
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
alfalfa	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	1	0	0	1	0	10
cicer milkvetch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2
hairy vetch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
plains coreopsis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
red clover	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
sainfoin	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	4
Dahurian wildrye	1	1	0	3	1	1	0	2	1	0	1	1	1	1	2	0	0	3	2	1	46
intermediate wheatgrass	0	2	1	0	0	1	1	1	0	1	0	1	1	0	0	1	1	0	0	0	23
mammoth wildrye	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
tall wheatgrass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
buffaloberry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
chokecherry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
false indigo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
golden currant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
juneberry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
redosier dogwood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
rose	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
snowberry	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Weed Canopy %	50	40	60	60	50	40	30	20	60	50	30	20	75	60	80	40	30	50	40	40	

* Seedlings /100 sq.ft.

Old John's Lake Wildlife Management Area

Site description:

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

Figure 2.



Old John's Lake WMA Plot

Native species seeding - No Plateau® herbicide applied

2005: Very high weed competition, including high densities of quackgrass, green foxtail, smooth brome grass, and absinth wormwood were present. This plot had the most planted species present in the planting. The population of both Maximilian and stiff sunflower was less compared to the sprayed native plot. Very little bare ground was present at this time. The best stands were observed on the higher aspects of the site due to the decreased weed competition as compared to the lower site. Good densities of switchgrass and big bluestem were seen.

2006: Diversity of planted species was high. Shell-leaf penstemon, stiff sunflower, Maximilian sunflower, hyssops, green needlegrass, Canada wildrye, and big bluestem were the dominant planted species observed. Quackgrass and smooth brome grass were very dense in many areas.

Native species seeding - Plateau® herbicide applied

2005: More bare ground was observed compared to the unsprayed plot. Sweetclover and Canada thistle densities were higher on this site as compared to the unsprayed plot. Planted species densities were less and had suppressed growth when compared to the unsprayed.

2006: This plot has the highest density of quackgrass compared to all the Old John's plots. More bare ground compared to the unsprayed plots. The species diversity is high. Species most prevalent are shell-leaf penstemon, gallardia, stiff sunflower, Maximilian sunflower, and wild bergamot. Extremely dry conditions and the competition of quackgrass have noticeably reduced the plant vigor of the native species.

Introduced species seeding -No Plateau® herbicide applied

2005: The heaviest concentrations of absinth wormwood were observed on this site. The stand was poor and very few of the planted species were observed. Highest densities of sweetclover, smooth brome grass, and annual weeds occurred compared to the other three treatments.

2006: The stand is very poor and the density of smooth brome grass, yellow sweetclover and absinth wormwood is high. Some alfalfa, intermediate wheatgrass and Dahurian wildrye was present but vigor was greatly reduced.

Introduced species seeding - Plateau® herbicide applied

2005: The overall stand was poor. Some of the planted species were present in very low numbers. Their growth was suppressed. A higher percentage of bare ground was observed.

2006: There was an increased percentage of bare ground compared to the unsprayed plots. Cicer milkvetch and alfalfa are fairly abundant in this plot and plant vigor is good. The plot has the lowest concentrations of absinth wormwood but a heavy invasion of sweetclover. This plot lacks the grass component and is rated as poor.

Table 13. Old John's Lake WMA; native species seeded with herbicide application, random species counts taken 7/6/2005.

SPECIES	FRAME (2.4-ft ²)																				Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
bergamot																					0
blanketflower	1										1	1									3
blue flax						1				1					1					1	4
Canada milkvetch																					0
coreopsis				1						2								1			4
cup plant		1				1													1		3
dotted blazing star																	1				1
echinacea-coneflower						2												2		1	5
golden glow																					0
hyssops																					0
leadplant																					0
longheaded coneflower																					0
Maximilian sunflower				1																	1
meadow blazing star																					0
partridge pea			1																1		2
penstemon					1	1							3					1		1	7
purple prairieclover							1						2		1			1			5
stiff goldenrod																					0
stiff sunflower				1		1	1	1	1	1			1	1	1			1			10
tick trefoil																					0
white prairieclover	1						1					1									3
yellow coneflower																					0
big bluestem																			1		1
Canada wildrye													1					1			2
switchgrass																					0
buffaloberry					1																1
chokecherry																					0
currant																					0
false indigo															1						1
juneberry																					0
prairie rose																					0
red dogwood																					0
snowberry																					0
% Weed Canopy	5	3	2	20	1	10	10	15	65	20	1	25	15	75	15	2	2	3	20	35	
Remarks: Nothing found in frame 16; less stunted than at Russell Stuart site; seeded plants are more vigorous than at Russell Stuart site; large quackgrass patches; more weeds than at Russell Stuart site.																					

Table 14. Old John's Lake WMA; native species seeded with no herbicide application, random species counts taken 7/6/2005.

SPECIES	FRAME (2.4-ft ²)																				Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
bergamot																					0
blanketflower															1						1
blue flax											1		1		1			2			5
Canada milkvetch																					0
coreopsis											1						1				2
cup plant											1										1
dotted blazing star								1													1
echinacea-coneflower			1								1				1			1			4
golden glow																					0
hyssops																					0
leadplant																					0
longheaded coneflower																					0
Maximilian sunflower															1	1					2
meadow blazing star																					0
partridge pea																					0
penstemon						1					1			1							3
purple prairieclover																		1			1
stiff goldenrod															1						1
stiff sunflower	1		1											2	1		2		1		8
tick trefoil														1							1
white prairieclover											1				3					1	5
yellow coneflower																					0
big bluestem		1								1	1					1					4
Canada wildrye																				1	1
switchgrass																1		1			2
buffaloberry			1																		1
chokecherry																					0
currant																					0
false indigo																					0
juneberry																					0
prairie rose																					0
red dogwood																					0
snowberry																					0
% Weed Canopy	15	15	20	75	70	90	70	40	80	90	50	15	25	65	40	30	15	25	30	65	

Table 15. Old John's Lake WMA; introduced species seeded with herbicide application, random species counts taken 7/6/2005.

SPECIES	FRAME (2.4-ft ²)																				Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
alfalfa	1	2	2	2			3			1			2							1	14
cicer milkvetch	1	2	1	1							1		2						1	1	10
hairy vetch																					0
plains coreopsis																					0
red clover																					0
sainfoin				1																	1
grasses	1		2						1		0		0			4	6	0	0	0	14
buffaloberry																					0
chokecherry																					0
false indigo							1														1
golden currant																					0
juneberry																					0
redosier dogwood																					0
rose																					0
snowberry																					0
% Weed Canopy	50	20	25	25	60	5	35	35	15	35	20	20	15	70	10	15	60	15	10	15	
<p><u>Remarks:</u> Many Canada thistle patches, particularly frames 17, 18, and 19; sideoats grama in frame 7; high density of sweetclover; quackgrass; less sainfoin than Russell Stuart WMA site; less grasses than Russell Stuart WMA site.</p>																					

Table 16. Old John's Lake WMA; introduced species seeded with no herbicide application, random species counts taken 7/6/2005.

SPECIES	FRAME (2.4-ft ²)																				Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
alfalfa									1	1				1							3
cicer milkvetch										1	1			1							3
hairy vetch																					0
plains coreopsis																					0
red clover																					0
sainfoin														1							1
grasses			2	3	6	6		2	2		2	2	3	9	3					0	40
buffaloberry																				1	1
chokecherry																					0
false indigo																					0
golden currant																					0
juneberry																					0
redosier dogwood												2									2
rose																					0
snowberry																					0
% Weed Canopy	70	40	50	35	40	70	30	60	65	70	75	50	90	95	95	75	70	85	30	60	
<u>Remarks:</u> Large sweetclover patches and quackgrass; poor establishment from seeded species.																					

Table 17. Old John's Lake WMA; native species seeded with herbicide application, random species counts taken 9/8/2006.

SPECIES	FRAME (2.4-ft ²)																				*
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
bergamot	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
blanketflower	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
blue flax	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Canada milkvetch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
coreopsis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
cupplant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
dotted blazing star	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
echinacea-coneflower	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	4
golden glow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
hyssops	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
leadplant	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
longheaded coneflower	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximilian sunflower	2	0	3	1	0	2	0	1	3	1	3	0	0	0	0	1	0	3	0	0	42
meadow blazing star	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
partridge pea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
penstemon	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	4
purple prairieclover	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	4
stiff goldenrod	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
stiff sunflower	0	10	0	0	0	4	0	2	0	0	0	0	0	0	1	2	0	0	0	0	40
tick trefoil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2
white prairieclover	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
yellow coneflower	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2
big bluestem	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Canada wildrye	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	1	0	0	0	0	10
switchgrass	2	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
buffaloberry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
chokecherry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
currant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
false indigo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
juneberry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
prairie rose	0	0	2	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	10
red dogwood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
snowberry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Weed Canopy %	10	15	5	10	20	80	20	10	15	20	10	10	5	20	10	50	40	20	10	5	

* Seedlings /100 sq.ft.

Table 18. Old John's Lake WMA; native species seeded with no herbicide application, random species counts taken 9/8/2006.

SPECIES	FRAME (2.4-ft ²)																				*
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
bergamot	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
blanketflower	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2
blue flax	0	0	0	0	0	0	5	0	0	0	0	1	1	0	0	0	0	0	0	0	15
Canada milkvetch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2
coreopsis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
cupplant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
dotted blazing star	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
echinacea-coneflower	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2
golden glow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
hyssops	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
leadplant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
longheaded coneflower	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maximilian sunflower	2	0	1	0	0	1	1	0	0	4	5	0	0	0	0	0	1	0	1	0	33
meadow blazing star	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
partridge pea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
penstemon	0	0	0	4	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	13
purple prairieclover	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	4
stiff goldenrod	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
stiff sunflower	0	0	0	0	1	0	0	0	19	2	0	12	1	14	2	6	1	2	0	0	125
tick trefoil	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
white prairieclover	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
yellow coneflower	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
big bluestem	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	6
Canada wildrye	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	8
switchgrass	0	0	0	1	0	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	10
buffaloberry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
chokecherry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
currant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
false indigo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
juneberry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
prairie rose	0	0	0	0	1	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	15
red dogwood	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
snowberry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Weed Canopy %	60	50	20	70	50	80	90	60	60	50	70	60	70	70	80	80	70	70	60	50	

* Seedlings /100 sq.ft.

Table 19. Old John's Lake WMA; introduced species seeded with herbicide application, random species counts taken 9/8/2006.

SPECIES	FRAME (2.4-ft ²)																				*
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
alfalfa	0	0	2	0	0	0	0	0	0	0	0	1	0	2	2	2	2	3	4	1	40
cicer milkvetch	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
hairy vetch	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
plains coreopsis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
red clover	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
sainfoin	0	1	0	2	0	0	0	0	1	0	0	1	0	0	2	0	1	0	0	3	23
Dahurian wildrye	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
intermediate wheatgrass	0	0	0	0	1	0	2	1	0	2	1	1	0	0	0	1	0	1	1	0	23
mammoth wildrye	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
tall wheatgrass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
buffaloberry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
chokecherry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
false indigo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
golden currant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
juneberry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
redosier dogwood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
rose	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2	0	0	0	0	8
snowberry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Weed Canopy %	40	20	60	30	20	20	30	50	40	30	20	60	20	40	40	50	20	30	30	20	

* Seedlings /100 sq.ft.

Table 20. Old John's Lake WMA; introduced species seeded with no herbicide application, random species counts taken 9/8/2006.

SPECIES	FRAME (2.4-ft ²)																				*
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
alfalfa	0	0	0	0	0	3	1	0	0	1	1	0	0	0	0	1	0	0	0	0	15
cicer milkvetch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
hairy vetch	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
plains coreopsis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
red clover	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
sainfoin	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2
Dahurian wildrye	1	1	0	0	2	0	0	0	0	0	0	1	3	4	0	1	0	0	0	0	27
intermediate wheatgrass	0	1	0	1	0	1	0	0	0	1	1	1	0	0	1	1	1	1	0	0	21
mammoth wildrye	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
tall wheatgrass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
buffaloberry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
chokecherry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
false indigo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
golden currant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
juneberry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
redosier dogwood	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
rose	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2
snowberry	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Weed Canopy %	60	50	80	90	70	60	60	70	60	80	70	50	40	50	60	70	50	70	80	80	

* Seedlings /100 sq.ft.