

**SASKATCHEWAN RANGELAND ECOSYSTEMS:
ESTIMATION OF PERCENT COVER VALUES
FOR SPECIES ABUNDANCES**



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SUMMARY

Saskatchewan Rangeland Ecosystems is a classification of ecosites and communities for the Prairie Ecozone of Saskatchewan. Because the classification was based on existing data, species abundances are measured by percent cover for some community types and by percentage of biomass for other types. There would be many advantages in using a consistent measure throughout. Therefore, percent biomass values were used to estimate percent cover values for species within a community type. Tables are presented showing the resulting estimates for all described community types.

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BACKGROUND

Saskatchewan Rangeland Ecosystems is a classification of ecosites and plant communities for the Prairie Ecozone of Saskatchewan. The classification was presented in a series of publications, initially released in 2007, and revised and expanded in 2014 (Thorpe 2014). Since then, the use of the classification by range and conservation professionals has highlighted a number of gaps and other problems, which were reviewed and assessed by Thorpe (2023).

One of the problems with the existing classification is that species abundances are measured by percent cover in some communities, and by percentage of biomass in other communities. This reflects the use of existing plot data, from various sources with various sampling methods. The following text from Thorpe (2023) discusses this problem, and provides the rationale for the current analysis:

Percent cover is the most widely used measure in vegetation classifications across North America. However, percent biomass is often used in grasslands, where it has certain advantages. It is difficult to visualize the percent cover of a diffuse canopy of grass leaves, whereas it is easy to visualize how much each species contributes to the biomass of the stand. Moreover, percent biomass estimates can be checked by clipping and weighing, which facilitates training of field staff.

In the plots available for the Saskatchewan classification, only about one-quarter used percent cover. As a result, percent biomass figures prominently in the descriptions for grassland communities. This situation has a number of disadvantages:

- The community descriptions cannot readily be entered into general vegetation databases (e.g. for Canada or North America), in which percent cover is the standard.
- It is difficult to compare descriptions for different communities which are based on different measures.
- It can be difficult to compare plants from different vegetation layers in the same community. In some types, the herbaceous layer is measured by percent biomass, while shrubs are measured by percent cover.
- Even percent biomass may not mean the same thing in all plots. In some plot data, the percent biomass of a herbaceous species is relative to the total biomass of all herbaceous plants. However, in other plots, both herbaceous and woody plants are included in the total. Fortunately, most such data are in grassland communities where shrubs make up a small part of the biomass.
- Percent biomass does not capture differences in the overall amount of vegetation cover. Species abundances always total to 100, whether in dense stands or sparse stands (e.g. on badlands).

All of these problems would be eliminated if data were recorded as percent cover. Since we have so much data based on percent biomass, it would be useful to have a credible method for estimating percent cover from percent biomass.

The obvious objection to this approach is that the predicted percent cover values would be less accurate than values originally recorded as percent cover. However, this objection may not be fatal, for the following reasons:

First, even data originally recorded as percent cover are approximate. Percent cover values in vegetation survey data are almost always determined by visual estimation, either within small

sample quadrats which are then averaged, or over the entire area of a plot. In the case of a canopy of grass species, it can be particularly difficult to visualize the percent of the ground area covered by an individual species. This inherent imprecision is reflected in the common practice of estimating cover according to a scale of broad classes, such as the Daubenmire scale. In plot data, field-estimated Daubenmire classes are usually entered as the mid-point of the range of cover values in the class. A cover value of 37.5% in the plot data actually means that the field record was class 4, which means that the cover appeared to be somewhere between 25% and 50%. If the cover was really a little less than 25%, then the field record should have been class 3, in which case the plot data would have shown 15% instead of 37.5%. Clearly these are approximations, not precise values.

Second, the classification of communities in *Saskatchewan Rangeland Ecosystems* was based on broad patterns of species dominance, and these patterns still hold whether they are measured by percent biomass or by percent cover. Classification also made use of indices based on relative proportions of species (e.g. proportions of decreasers vs. increasers, proportion of exotic species), and these indices are independent of the measure of species abundance. For these reasons, conversion of percent biomass values to approximate percent cover values should not change the classification of plots into community types.

The purpose of the current project was to provide estimated percent cover values for all of the species composition data in *Saskatchewan Rangeland Ecosystems*.

METHODS

Analysis was at the level of the community type. The existing classification presents descriptions for 164 community types, each of which is based on a number of field plots. In each description, abundances of plant species are shown, either as percent biomass or percent cover. Species are grouped by structural layers, defined as follows:

- Trees – woody plants capable of maximum height >5 m
- Tall shrubs – woody plants capable of maximum height 1.5 m to 5 m
- Short shrubs – erect woody plants capable of maximum height <5 m
- Prostrate shrubs – woody plants with prostrate growth habit
- Cactus
- Herbs

For the purposes of the analysis, community types fell into several categories.

1. Types in which all species abundances are given as percent cover.
2. Types in which all species abundances are given as percent biomass.
3. Types in which species within woody layers are measured as percent cover, while species within the herb layer are measured as percent biomass.
4. Types in which species abundances are given both as percent cover and as percent biomass. This happened when the community type included some plots using one method and some using the other.

Percent cover values in the original data required no further analysis, and were used directly. Percent biomass values (in Categories 2, 3, and 4) were used to estimate percent cover values. This was done by multiplying the percent biomass of each species by the percent cover of the structural layer to which

that species belongs (Thorpe 2023). In other words, the percent cover of the layer is divided among the species within that layer in proportion to their percentage of biomass. For example, if a species is estimated to make up 19% of the herbaceous biomass, and the cover of the herb layer is estimated at 38%, then the cover of the species is estimated as: $19\% \times 38\% = 7\%$.

Ideally, this calculation is based on structural cover values estimated within the plots making up the community type. Unfortunately, these values are not always recorded in plot sampling. While structural cover values are shown in most community type descriptions, they are often based on a fraction of the plots making up the type. Use of structural cover values from a small fraction of the plots could give misleading results if these plots were atypical. To ensure representativeness, the structural cover values shown for the community type were used only if they were based on at least 75% of the plots in the type.

For other community types with less data on structural cover, the method used average values. These were determined by assembling all of the available structural cover values and looking for patterns among them. Patterns were sought by grouping community types by various criteria, and calculating average cover values over the types in the group.

For grassland community types, the following patterns were found:

- There were clear differences in structural cover values between “grassland” and “grassland with shrubs” structural types, so these were separated if possible.
- There were no clear differences among ecoregions, so these were ignored.
- There were differences related to ecosite:
 - Grasslands on Loam, Sand, Solonetzic, and Thin Ecosites, which collectively made up a large proportion of grassland community types, showed similar structural cover values, so these were combined as a “Normal” group.
 - Grasslands on Dunes Ecosite were lower in herbaceous cover than the Normal group.
 - Grasslands on Saline Subirrigated and Saline Wet Meadow Ecosites were lower in herbaceous cover than the Normal group.
 - Grasslands on Badlands Ecosite were lower in herbaceous cover than the Normal group.
 - Grasslands on Clay, Gravelly, Saline Upland, Overflow, and Subirrigated Ecosites were represented by small numbers of community types and showed no clear patterns, so were placed in the Normal group.

Average structural cover values for these groups of grassland types are shown in Table 1. Note that only in the Normal and Dunes groups were there enough plots to separate “Grassland” from “Grassland with shrubs”.

Table 1. Average percent cover values for structural layers in grassland community types.

Ecosite group	Structural type	Structural layer						Number of community types
		Tree	Tall Shrub	Short Shrub	Prostrate Shrub	Cactus	Herb	
Normal	Grassland	0	0	1	0	0	49	58
	Grassland with shrubs	0	0	9	0	0	39	3
Dunes	Grassland	0	0	2	2	0	36	9
	Grassland with shrubs	0	0	10	1	1	15	2
Saline	All	0	0	1	0	0	32	14
Badlands	All						25	2

For woody community types, many were already described using percent cover values, so no further analysis was needed. Woody types requiring prediction of percent cover from percent biomass included:

- Open Forest on Sand and Dunes Ecosites in Mixed and Dry Mixed Grassland
- Tall Shrubland on Dunes, Thin, and Subirrigated Ecosites
- Short Shrubland on Loam, Sand, Dunes, and Subirrigated Ecosites
- Prostrate Shrubland on Sand, Dunes, Thin, and Subirrigated Ecosites

Because of the small number of woody community types in the above groups, there was no basis for separation by ecosite, so overall averages by structural type were calculated (Table 2).

Table 2. Average percent cover values for structural layers in woody community types.

Structural type	Structural layer						Number of community types
	Tree	Tall Shrub	Short Shrub	Prostrate Shrub	Cactus	Herb	
Open Forest	24	8	18	13	0	14	3
Tall Shrubland	0	41	11	3	0	20	3
Short Shrubland	1	1	36	1	0	39	5
Prostrate Shrubland	0	2	4	38	0	19	7

The final calculation can be summarized as follows:

- For types in which all species abundances were measured by percent cover, use these values directly.
- For types in which species in certain layers were measured by percent cover, use these values directly.
- For types, or layers within types, in which species abundances were measured by percent biomass:
 - Select the appropriate percent cover values for structural layers.
 - Use the structural data recorded for the type where this was based on at least 75% of plots within the type
 - For other types, use the average structural data shown in Tables 1 and 2.
 - Multiply the percent biomass of the species by the percent cover of the structural layer to estimate the percent cover of the species.
- For types in which the original description included one set of plots measured by percent biomass and another set measured by percent cover:
 - Estimate percent cover values for the set originally measured by percent biomass
 - For each species, average the estimated percent cover values from the first set of plots with the original percent cover values from the second set. Averages are weighted by the number of plots in each set.

In some grassland data, both herbaceous and shrubby species were combined in a single set of percent biomass estimates. In other words, the total of 100% included both woody and herbaceous species. In these cases, structural layers were separated by calculating the total of percent biomass values for the

species in each layer, then calculating new percent biomass values by dividing by this layer-specific total. This meant that the new percent biomass values totalled to 100% within each vegetation layer. The analysis shown above was then applied to the new percent biomass values.

Percent cover values in the original data were used directly. However, it should be noted that there are two different concepts of percent cover. Values from most sources were based on the concept of “foliar cover”, which is defined as the percent of the ground surface covered by a vertical projection of the plant parts (usually leaves) above that surface. However, descriptions for many wetland communities were based on existing publications (Thompson and Hansen 2001), which used the concept of “canopy cover”. This is defined as the percent of the ground surface covered by entire canopies of plants (i.e. including leaves and the spaces between them). Canopy cover estimates are always higher than foliar cover estimates, and no method has been found to resolve this difference. Community types based on canopy cover are identified as such, and caution should be used in comparing them with types based on foliar cover.

Results for each community type are presented in tables with a standard format:

- CODE - as in the original publication, e.g. “DMG-LM-A”
- COMMUNITY NAME – as in the original publication, e.g. “Needle-and-thread – Northern Wheat-grass”
- ECOREGION – according to the map of range ecoregions in the original publication: Dry Mixed Grassland, Mixed Grassland, Aspen Parkland, Cypress Upland. Types which are considered to span all ecoregions are shown as Prairie Ecozone
- ECOSITE – according to the ecosite classification in the original publication
- STRUCTURAL TYPE – defined by cover of growth forms as defined below. Note that criteria are applied sequentially. For example, if a type qualifies as Closed or Open Forest, then the subsequent criteria are irrelevant.
 - Closed Forest: >50% cover of trees
 - Open Forest: 10 – 50% cover of trees
 - Tall Shrubland: >20% cover of tall shrubs
 - Short Shrubland: >20% cover of short shrubs
 - Prostrate Shrubland: >20% cover of prostrate shrubs
 - Bare: >80% bare soil
 - Grassland with shrubs: grassland with 5 – 20% cover of shrubs
 - Grassland: grassland with <5% cover of shrubs
- GRAZING STATUS – ecological status in relation to grazing impact, as interpreted in the original publication.
- SPECIES COMPOSITION
 - Measure of abundance is percent cover, either as in the original data, or as predicted from percent biomass.
 - Number of plots – sample size in the original community description.
 - Cover values of major species, grouped by structural layer; only species with at least 0.5% cover are listed as major species.
 - Cover values of minor species, grouped by structural layer, summed over all species with <0.5% cover.

LITERATURE CITED

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- Thorpe, J. 2023. Gap analysis for the classification of Saskatchewan Rangeland Ecosystems. Report submitted to Environment and Climate Change Canada.
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TABLES OF COMMUNITY TYPES ARRANGED BY ECOSITE

LOAM ECOSITE

CODE	DMG-LM-A	DMG-LM-B	DMG-LM-C
COMMUNITY NAME	Needle-and-thread - Northern Wheat-grass	Northern Wheat-grass - Western Porcupine-grass	Needle-and-thread - Wheat-grass - June Grass - Blue Grama
ECOREGION	Dry Mixed Grassland	Dry Mixed Grassland	Dry Mixed Grassland
ECOSITE	Loam	Loam	Loam
STRUCTURAL TYPE	Grassland	Grassland	Grassland
GRAZING STATUS	reference comm.	alternative reference comm.	minor alteration
SPECIES COMPOSITION			
measure of abundance	% cover	% cover	% cover
number of plots	n=37	n=20	n=61
Major short shrubs			
rose (<i>Rosa</i> spp.)	1		
silver sagebrush (<i>Artemisia cana</i>)			1
Major graminoids			
northern wheat-grass (<i>Elymus lanceolatus</i>)	17	8	6
needle-and-thread (<i>Hesperostipa comata</i>)	9	3	10
June grass (<i>Koeleria macrantha</i>)	3	2	6
blue grama (<i>Bouteloua gracilis</i>)	3	3	5
sedge (<i>Carex</i> spp.)	3	2	3
plains reed-grass (<i>Calamagrostis montanensis</i>)	2	2	3
western wheat-grass (<i>Pascopyrum smithii</i>)	2	2	4
western porcupine-grass (<i>Hesperostipa curtisetata</i>)	1	7	
green needle-grass (<i>Nassella viridula</i>)			1
Major forbs and half-shrubs			
pasture sage (<i>Artemisia frigida</i>)	3	2	4
scarlet mallow (<i>Sphaeralcea coccinea</i>)	1	1	1
Minor graminoids			
	1	1	1
Minor forbs and half-shrubs			
	3	3	4

CODE	DMG-LM-D	DMG-LM-E	DMG-LM-F
COMMUNITY NAME	June Grass - Needle-and- thread - Pasture Sage - Blue Grama	Blue Grama - Needle-and- thread - June Grass - Western Wheat-grass	Pasture Sage - Needle-and- thread - June Grass - Northern Wheat-grass
ECOREGION	Dry Mixed Grassland	Dry Mixed Grassland	Dry Mixed Grassland
ECOSITE	Loam	Loam	Loam
STRUCTURAL TYPE	Grassland	Grassland	Grassland
GRAZING STATUS	moderate alteration	moderate alteration	moderate alteration
SPECIES COMPOSITION			
measure of abundance	% cover	% cover	% cover
number of plots	n=21	n=18	n=14
Major short shrubs			
silver sagebrush (<i>Artemisia cana</i>)	1	1	1
Major graminoids			
northern wheat-grass (<i>Elymus lanceolatus</i>)	3	2	5
needle-and-thread (<i>Hesperostipa comata</i>)	9	8	11
June grass (<i>Koeleria macrantha</i>)	12	5	6
blue grama (<i>Bouteloua gracilis</i>)	6	11	4
sedge (<i>Carex</i> spp.)	2	4	3
plains reed-grass (<i>Calamagrostis montanensis</i>)	2	2	1
western wheat-grass (<i>Pascopyrum smithii</i>)	2	5	1
Sandberg's blue-grass (<i>Poa secunda</i> ssp. <i>secunda</i>)	1	1	
Major forbs and half-shrubs			
pasture sage (<i>Artemisia frigida</i>)	6	4	11
scarlet mallow (<i>Sphaeralcea coccinea</i>)	1	2	1
hairy golden-aster (<i>Heterotheca villosa</i>)	1		
Minor graminoids	1	1	0
Minor forbs and half-shrubs	4	4	6

CODE	MG-LM-A	MG-LM-B	MG-LM-C
COMMUNITY NAME	Western Porcupine-grass - Northern Wheat-grass	Western Porcupine-grass - Northern Wheat-grass - Sedge - Pasture Sage	Needle-and-thread - Northern Wheat-grass
ECOREGION	Mixed Grassland	Mixed Grassland	Mixed Grassland
ECOSITE	Loam	Loam	Loam
STRUCTURAL TYPE	Grassland	Grassland	Grassland
GRAZING STATUS	reference comm.	minor alteration	moderate alteration

SPECIES COMPOSITION

species measure	% cover	% cover	% cover
number of plots	n=89	n=189	n=143

Major short shrubs

rose (<i>Rosa</i> spp.)	1		
western snowberry (<i>Symphoricarpos occidentalis</i>)		1	

Major graminoids

western porcupine-grass (<i>Hesperostipa curtisetata</i>)	20	13	1
northern wheat-grass (<i>Elymus lanceolatus</i>)	12	7	11
needle-and-thread (<i>Hesperostipa comata</i>)	2	2	14
blue grama (<i>Bouteloua gracilis</i>)	1	2	3
sedge (<i>Carex</i> spp.)	4	5	4
June grass (<i>Koeleria macrantha</i>)	2	4	4
plains rough fescue (<i>Festuca altaica</i> ssp. <i>hallii</i>)	2		
western wheat-grass (<i>Pascopyrum smithii</i>)	1	3	3
green needle-grass (<i>Nassella viridula</i>)	1	1	
plains reed-grass (<i>Calamagrostis montanensis</i>)		1	1
Hooker's oat-grass (<i>Avenula hookeri</i>)		1	

Major forbs and half-shrubs

pasture sage (<i>Artemisia frigida</i>)	2	5	4
prairie crocus (<i>Pulsatilla patens</i>)	1	1	
scarlet mallow (<i>Sphaeralcea coccinea</i>)			1

Minor shrubs	0	0	1
Minor graminoids	1	2	2
Minor forbs and half-shrubs	2	4	3

CODE	MG-LM-D	MG-LM-E	MG-LM-F
COMMUNITY NAME	Needle-and-thread - Sedge - Pasture Sage	Pasture Sage - Needle-and-thread - Northern Wheat-grass	Blue Grama - Pasture Sage - June Grass
ECOREGION	Mixed Grassland	Mixed Grassland	Mixed Grassland
ECOSITE	Loam	Loam	Loam
STRUCTURAL TYPE	Grassland	Grassland	Grassland
GRAZING STATUS	significant alteration	significant alteration	significant alteration

SPECIES COMPOSITION

species measure	% cover	% cover	% cover
number of plots	n=51	n=54	n=26

Major short shrubs

silver sagebrush (<i>Artemisia cana</i>)			1
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Major graminoids

western porcupine-grass (<i>Hesperostipa curtisetata</i>)		1	1
northern wheat-grass (<i>Elymus lanceolatus</i>)	3	3	3
needle-and-thread (<i>Hesperostipa comata</i>)	20	5	4
blue grama (<i>Bouteloua gracilis</i>)	3	2	18
sedge (<i>Carex</i> spp.)	4	2	2
June grass (<i>Koeleria macrantha</i>)	3	4	5
western wheat-grass (<i>Pascopyrum smithii</i>)	1	1	2
Kentucky blue-grass (<i>Poa pratensis</i>)	1		
plains reed-grass (<i>Calamagrostis montanensis</i>)		1	
Hooker's oat-grass (<i>Avenula hookeri</i>)	1		

Major forbs and half-shrubs

pasture sage (<i>Artemisia frigida</i>)	7	15	7
prairie crocus (<i>Pulsatilla patens</i>)	2		1
common broomweed (<i>Gutierrezia sarothrae</i>)		1	
hairy golden-aster (<i>Heterotheca villosa</i>)			1
common yarrow (<i>Achillea millefolium</i>)			1
moss phlox (<i>Phlox hoodii</i>)	3	7	2
pliant milk-vetch (<i>Astragalus flexuosus</i>)	1		
silver-leaf psoralea (<i>Pediomelum argophyllum</i>)	1		

Minor shrubs	1	0	0
Minor graminoids	3	1	1
Minor forbs and half-shrubs	6	4	4

CODE	MG-LM-G
COMMUNITY NAME	Crested Wheat-grass - native grasses
ECOREGION	Mixed Grassland
ECOSITE	Loam
STRUCTURAL TYPE	Grassland
GRAZING STATUS	severe alteration
SPECIES COMPOSITION	
species measure	% cover
number of plots	n=10
Major short shrubs	
silver sagebrush (<i>Artemisia cana</i>)	1
Major graminoids	
crested wheat-grass (<i>Agropyron cristatum</i>)	27
sedge (<i>Carex</i> spp.)	3
smooth brome (<i>Bromus inermis</i>)	2
blue grama (<i>Bouteloua gracilis</i>)	2
Kentucky blue-grass (<i>Poa pratensis</i>)	1
fox-tail barley (<i>Hordeum jubatum</i>)	1
needle-and-thread (<i>Hesperostipa comata</i>)	1
Major forbs and half-shrubs	
pasture sage (<i>Artemisia frigida</i>)	3
alfalfa (<i>Medicago sativa</i>)	3
common broomweed (<i>Gutierrezia sarothrae</i>)	1
curly-cup gum-weed (<i>Grindelia squarrosa</i>)	1
sweet-clover (genus) (<i>Melilotus</i> spp.)	1
Minor graminoids	1
Minor forbs and half-shrubs	2

CODE	AP-LM-A	AP-LM-B	AP-LM-C
COMMUNITY NAME		Western	
	Plains Rough Fescue - Northern Wheat- grass - Western Porcupine-grass	Porcupine-grass - Northern Wheat-grass - Sedge - Pasture Sage	Sedge - Pasture Sage - Western Porcupine-grass - Northern Wheat-grass
ECOREGION	Aspen Parkland	Aspen Parkland	Aspen Parkland
ECOSITE	Loam	Loam	Loam
STRUCTURAL TYPE	Grassland	Grassland	Grassland
GRAZING STATUS	reference comm.	moderate alteration	moderate alteration
SPECIES COMPOSITION			
species measure	% cover	% cover	% cover
number of plots	n=18	n=26	n=16
Major short shrubs			
rose (genus) (<i>Rosa</i> spp.)	1		
western snowberry (<i>Symphoricarpos occidentalis</i>)		1	1
Major graminoids			
plains rough fescue (<i>Festuca altaica</i> ssp. <i>hallii</i>)	22	3	2
northern wheat-grass (<i>Elymus lanceolatus</i>)	6	11	5
western porcupine-grass (<i>Hesperostipa curtisetata</i>)	6	11	5
sedge (genus) (<i>Carex</i> spp.)	5	5	12
needle-and-thread (<i>Hesperostipa comata</i>)	1	2	2
June grass (<i>Koeleria macrantha</i>)	1	4	3
awned wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>subsecundus</i>)	1		
mat muhly (<i>Muhlenbergia richardsonis</i>)	1		
western wheat-grass (<i>Pascopyrum smithii</i>)		1	2
blue grama (<i>Bouteloua gracilis</i>)			1
Hooker's oat-grass (<i>Avenula hookeri</i>)		1	
inland salt grass (<i>Distichlis spicata</i> var. <i>stricta</i>)			1
Kentucky blue-grass (<i>Poa pratensis</i>)			1
Major forbs and half-shrubs			
pasture sage (<i>Artemisia frigida</i>)	2	6	6
common yarrow (<i>Achillea millefolium</i>)			1
three-flowered avens (<i>Geum triflorum</i>)			1
goldenrod (genus) (<i>Solidago</i> spp.)			1
prairie crocus (<i>Pulsatilla patens</i>)		1	
anemone (genus) (<i>Anemone</i> spp.)			1
northern bedstraw (<i>Galium boreale</i>)			1
smooth wild strawberry (<i>Fragaria virginiana</i>)			

Minor graminoids	2	2	2
Minor forbs and half-shrubs	4	3	4

CODE	AP-LM-D	AP-LM-E
COMMUNITY NAME	Needle-and-thread - Wheat-grass - Pasture Sage	Kentucky Blue-grass - Sedge
ECOREGION	Aspen Parkland	Aspen Parkland
ECOSITE	Loam	Loam
STRUCTURAL TYPE	Grassland	Grassland with shrubs
GRAZING STATUS	significant alteration	severe alteration

SPECIES COMPOSITION

species measure	% cover	% cover
number of plots	n=16	n=63

Major short shrubs

rose (genus) (<i>Rosa</i> spp.)		2
western snowberry (<i>Symphoricarpos occidentalis</i>)	1	7

Major graminoids

plains rough fescue (<i>Festuca altaica</i> ssp. <i>hallii</i>)	1	1
northern wheat-grass (<i>Elymus lanceolatus</i>)	5	2
western porcupine-grass (<i>Hesperostipa curtisetata</i>)	2	2
sedge (genus) (<i>Carex</i> spp.)	5	4
needle-and-thread (<i>Hesperostipa comata</i>)	15	1
June grass (<i>Koeleria macrantha</i>)	4	1
awned wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>subsecundus</i>)	2	1
mat muhly (<i>Muhlenbergia richardsonis</i>)		1
smooth brome (<i>Bromus inermis</i>)		2
western wheat-grass (<i>Pascopyrum smithii</i>)	5	2
blue grama (<i>Bouteloua gracilis</i>)	5	
Hooker's oat-grass (<i>Avenula hookeri</i>)	3	
sand-grass (<i>Calamovilfa longifolia</i>)	2	
plains reed-grass (<i>Calamagrostis montanensis</i>)	1	
Kentucky blue-grass (<i>Poa pratensis</i>)	3	9

Major forbs and half-shrubs

pasture sage (<i>Artemisia frigida</i>)	8	1
breadroot (<i>Pediomelum esculentum</i>)	3	
milk-vetch (genus) (<i>Astragalus</i> spp.)	2	1
common yarrow (<i>Achillea millefolium</i>)	1	1
three-flowered avens (<i>Geum triflorum</i>)	2	
goldenrod (genus) (<i>Solidago</i> spp.)		1

hairy golden-aster (<i>Heterotheca villosa</i>)	1	
pussytoes (genus) (<i>Antennaria</i> spp.)	1	
mountain blue-eyed-grass (<i>Sisyrinchium montanum</i>)	1	
northern pygmyflower (<i>Androsace septentrionalis</i>)	1	
prairie sage (<i>Artemisia ludoviciana</i>)	1	
northern bedstraw (<i>Galium boreale</i>)		
smooth wild strawberry (<i>Fragaria virginiana</i>)		1
Minor graminoids	1	3
Minor forbs and half-shrubs	7	7

CODE	CU-LM-A	CU-LM-B
COMMUNITY NAME	Rough Fescue	Sedge - Kentucky Blue-grass - Dandelion
ECOREGION	Cypress Upland	Cypress Upland
ECOSITE	Loam	Loam
STRUCTURAL TYPE	Grassland	Grassland
GRAZING STATUS	reference comm.	severe alteration
SPECIES COMPOSITION		
species measure	% cover	% cover
number of plots	n-26	n=4
Major trees		
trembling aspen (<i>Populus tremuloides</i>)		2
Major tall shrubs		
saskatoon (<i>Amelanchier alnifolia</i>)		1
Major short shrubs		
shrubby cinquefoil (<i>Dasiphora fruticosa</i>)	1	
northern gooseberry (<i>Ribes oxycanthoides</i>)		1
prickly rose (<i>Rosa acicularis</i>)		1
northern snowberry (<i>Symphoricarpos albus</i>)		1
dwarf bilberry (<i>Vaccinium cespitosum</i>)		2
Major prostrate shrubs		
creeping juniper (<i>Juniperus horizontalis</i>)	1	
Major graminoids		
plains rough fescue (<i>Festuca altaica</i> ssp. <i>hallii</i>)	17	
timber wild oat-grass (<i>Danthonia intermedia</i>)	3	1
Kentucky blue-grass (<i>Poa pratensis</i>)	2	2
June grass (<i>Koeleria macrantha</i>)	1	
western porcupine-grass (<i>Hesperostipa curtisetata</i>)	1	1
sun-loving sedge (<i>Carex inops</i>)	1	
sedge (genus) (<i>Carex</i> spp.)	1	3
northern wheat-grass (<i>Elymus lanceolatus</i>)	1	
blunt sedge (<i>Carex obtusata</i>)	1	1
graceful sedge (<i>Carex praegracilis</i>)		4
bluebunch wheat-grass (<i>Pseudoroegneria spicata</i>)		1
rough hairgrass (<i>Agrostis scabra</i>)		1
Canada wild-rye (<i>Elymus canadensis</i>)		1

Major forbs and half-shrubs		
northern bedstraw (<i>Galium boreale</i>)	1	1
golden bean (<i>Thermopsis rhombifolia</i>)	1	
common yarrow (<i>Achillea millefolium</i>)	1	1
common dandelion (<i>Taraxacum officinale</i>)	1	3
three-flowered avens (<i>Geum triflorum</i>)	1	
meadow-rue (genus) (<i>Thalictrum</i> spp.)		1
Lindley's blue aster (<i>Symphotrichum ciliolatum</i>)		1
Richardson's geranium (<i>Geranium richardsonii</i>)		1
bastard toadflax (<i>Comandra umbellata</i> ssp. <i>pallida</i>)		1
shepherd's-purse (<i>Capsella bursa-pastoris</i>)		1
northern pygmyflower (<i>Androsace septentrionalis</i>)		1
hairy golden-aster (<i>Heterotheca villosa</i>)		1
Minor short shrubs	1	1
Minor graminoids	3	3
Minor forbs and half-shrubs	16	8

CODE	MG-LM-H	AP-LM-I
COMMUNITY NAME	Snowberry / Western Porcupine-grass	Snowberry - Wolf-willow / Western Porcupine-grass - Sedge
ECOREGION	Mixed Grassland	Aspen Parkland
ECOSITE	Loam	Loam
STRUCTURAL TYPE	Short Shrubland	Short Shrubland
GRAZING STATUS	unknown	unknown

SPECIES COMPOSITION

species measure	% cover	% cover
number of plots	n=6	n=11

Major trees

trembling aspen (<i>Populus tremuloides</i>)	1	2
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Major tall shrubs

wolf-willow (<i>Elaeagnus commutata</i>)	4	13
choke cherry (<i>Prunus virginiana</i>)		1

Major short shrubs

western snowberry (<i>Symphoricarpos occidentalis</i>)	29	38
rose (genus) (<i>Rosa</i> spp.)	1	3
silver sagebrush (<i>Artemisia cana</i>)	1	

Major prostrate shrubs

creeping juniper (<i>Juniperus horizontalis</i>)		1
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Major graminoids

western porcupine-grass (<i>Hesperostipa curtisetata</i>)	11	12
Kentucky blue-grass (<i>Poa pratensis</i>)	6	9
sedge (genus) (<i>Carex</i> spp.)	5	10
green needle-grass (<i>Nassella viridula</i>)	3	
blue grama (<i>Bouteloua gracilis</i>)	3	
little bluestem (<i>Schizachyrium scoparium</i>)	2	
sand-grass (<i>Calamovilfa longifolia</i>)	2	1
wheat-grass (<i>Agropyron</i> genus) (<i>Agropyron</i> spp.)	2	
crested wheat-grass (<i>Agropyron cristatum</i>)	1	
western wheat-grass (<i>Pascopyrum smithii</i>)	1	
plains rough fescue (<i>Festuca altaica</i> ssp. <i>hallii</i>)	1	4
slender wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>)	1	
needle-and-thread (<i>Hesperostipa comata</i>)	1	5

fox-tail barley (<i>Hordeum jubatum</i>)		2
Hooker's oat-grass (<i>Avenula hookeri</i>)		2
June grass (<i>Koeleria macrantha</i>)		2
needle-grass (<i>Hesperostipa</i> genus) (<i>Hesperostipa</i> spp.)		2
awned wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>subsecundus</i>)		2
sand dropseed (<i>Sporobolus cryptandrus</i>)		1
Major forbs and half-shrubs		
pasture sage (<i>Artemisia frigida</i>)	2	1
prairie sage (<i>Artemisia ludoviciana</i>)	1	3
curly-cup gum-weed (<i>Grindelia squarrosa</i>)	1	
prairie coneflower (<i>Ratibida columnifera</i>)	1	
wild blue lettuce (<i>Mulgedium pulchellum</i>)	1	
Pennsylvania pellitory (<i>Parietaria pensylvanica</i>)	1	
pussytoes (genus) (<i>Antennaria</i> spp.)		2
bedstraw (genus) (<i>Galium</i> spp.)		2
common yarrow (<i>Achillea millefolium</i>)		1
American vetch (<i>Vicia americana</i>)		1
purple prairie-clover (<i>Dalea purpurea</i> var. <i>purpurea</i>)		1
meadow-rue (genus) (<i>Thalictrum</i> spp.)		1
cinquefoil (genus) (<i>Potentilla</i> spp.)		1
Minor graminoids	1	1
Minor forbs and half-shrubs	1	3

CODE	AP-LM-F	AP-LM-G	AP-LM-H
COMMUNITY NAME	Aspen / Saskatoon / Rose	Aspen / Snowberry - Rose	Aspen / Snowberry - Rose / Kentucky Blue-grass
ECOREGION	Aspen Parkland	Aspen Parkland	Aspen Parkland
ECOSITE	Loam	Loam	Loam
STRUCTURAL TYPE	Open Forest	Open Forest	Closed Forest
GRAZING STATUS	reference comm.	significant alteration	significant alteration

SPECIES COMPOSITION

species measure	% cover	% cover	% cover
number of plots	n=6	n=9	n=12

Major trees

trembling aspen (<i>Populus tremuloides</i>)	41	46	54
balsam poplar (<i>Populus balsamifera</i>)	13	1	13

Major tall shrubs

saskatoon (<i>Amelanchier alnifolia</i>)	9		1
beaked hazelnut (<i>Corylus cornuta</i>)	3		2
chokecherry (<i>Prunus virginiana</i>)	2		1
willow (<i>Salix</i> spp.)	2	3	6
red-osier dogwood (<i>Cornus stolonifera</i>)	1		1
buckthorn (<i>Rhamnus cathartica</i>)		1	

Major short shrubs

rose (<i>Rosa</i> spp.)	9	8	9
western snowberry (<i>Symphoricarpos occidentalis</i>)	4	48	12
wild red raspberry (<i>Rubus idaeus</i>)	2		1
currant (<i>Ribes</i> spp.)	1		1
narrow-leaved meadowsweet (<i>Spiraea alba</i>)		1	

Major graminoids

white-grained mountain rice grass (<i>Oryzopsis asperifolia</i>)	4	2	6
hay sedge (<i>Carex siccata</i>)	2	2	
Kentucky blue grass (<i>Poa pratensis</i>)	2	1	17
bearded wheat grass (<i>Agropyron trachycaulum</i> var. unilaterale)	1		
hairy wild rye (<i>Elymus innovatus</i>)	1		
purple oat grass (<i>Schizachne purpurascens</i>)	1		

Major forbs and half-shrubs

violet (<i>Viola</i> spp.)	4		2
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smooth wild strawberry (<i>Fragaria virginiana</i>)	4	1	3
common dandelion (<i>Taraxacum officinale</i>)	1		4
spreading dogbane (<i>Apocynum androsaemifolium</i>)	2		
wild sarsaparilla (<i>Aralia nudicaulis</i>)	2		
wild peavine (<i>Lathyrus venosus</i>)	2		3
Lindley's aster (<i>Aster ciliolatus</i>)	1		
fireweed (<i>Epilobium angustifolium</i>)	1		
cream-colored vetchling (<i>Lathyrus ochroleucus</i>)	1		
showy aster (<i>Aster conspicuus</i>)	1		
American vetch (<i>Vicia americana</i>)	1		1
two-leaved solomon's seal (<i>Maianthemum canadense</i>)	1		
star-flowered solomon's-seal (<i>Smilacina stellata</i>)	1	1	2
fairybells (<i>Disporum trachycarpum</i>)	1		
veiny meadow-rue (<i>Thalictrum venulosum</i>)	1	1	2
northern bedstraw (<i>Galium boreale</i>)	1		2
tall meadow-rue (<i>Thalictrum dasycarpum</i>)			1
Canada anemone (<i>Anemone canadensis</i>)			1
nodding stickseed (<i>Hackelia americana</i>)		3	
Minor tall shrubs	1	0	0
Minor short shrubs	0	1	1
Minor graminoids	1	0	2
Minor forbs and half-shrubs	2	2	5

SAND AND SANDY LOAM ECOSITES

CODE	MG-SD-A	MG-SD-B	MG-SD-C
COMMUNITY NAME	Needle-and-thread - Sand Grass	Needle-and-thread - Wheat-grass - Sedge	Needle-and-thread - June Grass - Sedge - Blue Grama
ECOREGION	Mixed & Dry Mixed Grassland	Mixed & Dry Mixed Grassland	Mixed & Dry Mixed Grassland
ECOSITE	Sand & Sandy Loam	Sand & Sandy Loam	Sand & Sandy Loam
STRUCTURAL TYPE	Grassland	Grassland	Grassland
GRAZING STATUS	reference comm.	reference comm.	minor alteration
SPECIES COMPOSITION			
species measure	% cover	% cover	% cover
number of plots	n=33	n=23	n=52
Major short shrubs			
western snowberry (<i>Symphoricarpos occidentalis</i>)		1	
rose (genus) (<i>Rosa</i> spp.)			1
Major graminoids			
needle-and-thread (<i>Hesperostipa comata</i>)	13	12	10
sand-grass (<i>Calamovilfa longifolia</i>)	7	1	2
western wheat-grass (<i>Pascopyrum smithii</i>)	1	5	2
northern wheat-grass (<i>Elymus lanceolatus</i>)		4	1
sedge (genus) (<i>Carex</i> spp.)	4	5	6
June grass (<i>Koeleria macrantha</i>)	3	5	7
blue grama (<i>Bouteloua gracilis</i>)	3	4	7
plains reed-grass (<i>Calamagrostis montanensis</i>)	1		1
sand dropseed (<i>Sporobolus cryptandrus</i>)	1		
western porcupine-grass (<i>Hesperostipa curtisetata</i>)		3	1
Sandberg's blue-grass (<i>Poa secunda</i> ssp. <i>secunda</i>)		1	
crested wheat-grass (<i>Agropyron cristatum</i>)			
Major forbs and half-shrubs			
pasture sage (<i>Artemisia frigida</i>)	3	3	5
lance-leaved psoralea (<i>Psoralidium lanceolatum</i>)	1	1	1
hairy golden-aster (<i>Heterotheca villosa</i>)	1	1	1
scarlet mallow (<i>Sphaeralcea coccinea</i>)		1	
Minor short shrubs	1	0	1
Minor graminoids	1	2	2
Minor forbs and half-shrubs	2	2	3

CODE	MG-SD-D	MG-SD-E
COMMUNITY NAME	Pasture Sage - June Grass - Sedge - Needle- and-thread - Blue Grama	Crested Wheat- grass
ECOREGION	Mixed & Dry Mixed Grassland	Mixed & Dry Mixed Grassland
ECOSITE	Sand & Sandy Loam	Sand & Sandy Loam
STRUCTURAL TYPE	Grassland	Grassland
GRAZING STATUS	moderate alternation	severe alteration

SPECIES COMPOSITION

species measure	% cover	% cover
number of plots	n=42	n=12

Major short shrubs

western snowberry (<i>Symphoricarpos occidentalis</i>)		1
rose (genus) (<i>Rosa</i> spp.)	1	

Major graminoids

needle-and-thread (<i>Hesperostipa comata</i>)	5	3
sand-grass (<i>Calamovilfa longifolia</i>)	1	
western wheat-grass (<i>Pascopyrum smithii</i>)	1	1
northern wheat-grass (<i>Elymus lanceolatus</i>)		1
sedge (genus) (<i>Carex</i> spp.)	6	2
June grass (<i>Koeleria macrantha</i>)	6	1
blue grama (<i>Bouteloua gracilis</i>)	4	2
plains reed-grass (<i>Calamagrostis montanensis</i>)	1	
Canada blue-grass (<i>Poa compressa</i>)		1
Nuttall's alkali-grass (<i>Puccinellia nuttalliana</i>)		1
western porcupine-grass (<i>Hesperostipa curtiseta</i>)		1
inland salt grass (<i>Distichlis spicata</i> var. <i>stricta</i>)		1
crested wheat-grass (<i>Agropyron cristatum</i>)		31

Major forbs and half-shrubs		
pasture sage (<i>Artemisia frigida</i>)	7	3
lance-leaved psoralea (<i>Psoralidium lanceolatum</i>)	1	1
hairy golden-aster (<i>Heterotheca villosa</i>)	1	
moss phlox (<i>Phlox hoodii</i>)	3	
goldenrod (genus) (<i>Solidago</i> spp.)		1
prairie sage (<i>Artemisia ludoviciana</i>)		1
silver-leaf psoralea (<i>Pediomelum argophyllum</i>)		1
sweet-clover (genus) (<i>Melilotus</i> spp.)		4
Minor graminoids	3	1
Minor forbs and half-shrubs	5	3

CODE	MG-SD-F
	Creeping Juniper / Sedge - Sand
COMMUNITY NAME	Grass
ECOREGION	Mixed and Dry Mixed Grassland
RANGE SITE	Sand
STRUCTURAL TYPE	Prostrate Shrubland
GRAZING STATUS	unknown
SPECIES COMPOSITION	
species measure	% cover
number of plots	n=17
Major short shrubs	
western snowberry (<i>Symphoricarpos occidentalis</i>)	1
Major prostrate shrubs	
creeping juniper (<i>Juniperus horizontalis</i>)	38
bearberry (<i>Arctostaphylos uva-ursi</i>)	2
Major graminoids	
sun-loving sedge (<i>Carex inops</i>)	1
sand grass (<i>Calamovilfa longifolia</i>)	1
june grass (<i>Koeleria macrantha</i>)	1
blunt sedge (<i>Carex obtusata</i>)	1
graceful sedge (<i>Carex praegracilis</i>)	1
Minor short shrubs	1
Minor graminoids	4
Minor forbs and half-shrubs	1

CODE	MG-SD-G
COMMUNITY NAME	Rose - Snowberry / Sand Grass - Needle-and- thread - Pasture Sage
ECOREGION	Mixed and Dry Mixed Grassland
ECOSITE	Sand
STRUCTURAL TYPE	Short Shrubland
GRAZING STATUS	unknown

SPECIES COMPOSITION

species measure	% cover
number of plots	n=9

Major trees

balsam poplar (<i>Populus balsamifera</i>)	1
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Major short shrubs

rose (<i>Rosa</i> spp.)	14
western snowberry (<i>Symphoricarpos occidentalis</i>)	13
wolf-willow (<i>Elaeagnus commutata</i>)	1

Major graminoids

sand grass (<i>Calamovilfa longifolia</i>)	3
needle-and-thread (<i>Hesperostipa comata</i> ssp. <i>Comata</i>)	3
graceful sedge (<i>Carex praegracilis</i>)	1
blue-grass (<i>Poa</i> spp.)	1
sun-loving sedge (<i>Carex inops</i>)	1
low sedge (<i>Carex duriuscula</i>)	1
slender wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>Trachycaulus</i>)	1
sand dropseed (<i>Sporobolus cryptandrus</i>)	1

Major forbs and half-shrubs

pasture sage (<i>Artemisia frigida</i>)	3
Missouri goldenrod (<i>Solidago missouriensis</i>)	2
lance-leaved psoralea (<i>Psoraleidium lanceolatum</i>)	1
wild licorice (<i>Glycyrrhiza lepidota</i>)	1

Minor graminoids

	3
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Minor forbs and half-shrubs

	1
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CODE	DMG-SD-H
COMMUNITY NAME	Aspen / Creeping Juniper / Awned Wheat- grass - Wild licorice
ECOREGION	Dry Mixed Grassland
ECOSITE	Sand
STRUCTURAL TYPE	Open Forest
GRAZING STATUS	unknown

SPECIES COMPOSITION

species measure	% cover
number of plots	n=10

Major trees

trembling aspen (<i>Populus tremuloides</i>)	17
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Major tall shrubs

peach-leaf willow (<i>Salix amygdaloides</i>)	1
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Major short shrubs

western snowberry (<i>Symphoricarpos occidentalis</i>)	3
rose (<i>Rosa</i> spp.)	2
wolf-willow (<i>Elaeagnus commutata</i>)	1

Major prostrate shrubs

creeping juniper (<i>Juniperus horizontalis</i>)	10
bearberry (<i>Arctostaphylos uva-ursi</i>)	1

Major graminoids

	1
awned wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>subsecundus</i>)	
sand grass (<i>Calamovilfa longifolia</i>)	1
northern wheat-grass (<i>Elymus lanceolatus</i> var. <i>lanceolatus</i>)	1
Sun-loving sedge (<i>Carex inops</i>)	1

Major forbs and half-shrubs

wild licorice (<i>Glycyrrhiza lepidota</i>)	2
Missouri goldenrod (<i>Solidago missouriensis</i>)	1
Fremont's goosefoot (<i>Chenopodium fremontii</i>)	1

Minor graminoids

	3
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Minor forbs and half-shrubs

	1
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CODE	AP-SD-A	AP-SD-B	AP-SD-C
COMMUNITY NAME	Western Porcupine-grass	Western Porcupine-grass - Sedge	Sedge - Western Porcupine-grass - June Grass
ECOREGION	Aspen Parkland	Aspen Parkland	Aspen Parkland
ECOSITE	Sand & Sandy Loam	Sand & Sandy Loam	Sand & Sandy Loam
STRUCTURAL TYPE	Grassland	Grassland	Grassland
STATUS	reference comm.	minor alteration	moderate alteration
SPECIES COMPOSITION	predicted	predicted	predicted
species measure	%cover	%cover	%cover
number of plots	n=14	n=25	n=20
Major short shrubs			
western snowberry (<i>Symphoricarpos occidentalis</i>)	1		1
rose (genus) (<i>Rosa</i> spp.)		1	
Major graminoids			
western porcupine-grass (<i>Hesperostipa curtisetata</i>)	13	11	5
sedge (genus) (<i>Carex</i> spp.)	4	7	10
needle-and-thread (<i>Hesperostipa comata</i>)	3	2	3
June grass (<i>Koeleria macrantha</i>)	1	3	5
northern wheat-grass (<i>Elymus lanceolatus</i>)	2	1	1
plains rough fescue (<i>Festuca altaica</i> ssp. <i>hallii</i>)	1	1	
blue grama (<i>Bouteloua gracilis</i>)	1	3	2
Hooker's oat-grass (<i>Avenula hookeri</i>)	1	1	2
sand-grass (<i>Calamovilfa longifolia</i>)	1	1	2
plains muhly (<i>Muhlenbergia cuspidata</i>)	1		
western wheat-grass (<i>Pascopyrum smithii</i>)		1	2
awned wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>subsecundus</i>)		1	1
Rocky Mountain fescue (<i>Festuca saximontana</i>)		1	1
witch-grass (<i>Panicum capillare</i>)		1	1
Kentucky blue-grass (<i>Poa pratensis</i>)		2	1

Major forbs and half-shrubs			
pasture sage (<i>Artemisia frigida</i>)	1	2	3
goldenrod (genus) (<i>Solidago</i> spp.)			1
hairy golden-aster (<i>Heterotheca villosa</i>)		1	1
prairie crocus (<i>Pulsatilla patens</i>)	1	1	
field chickweed (<i>Cerastium arvense</i>)		1	1
bastard toadflax (<i>Comandra umbellata</i> ssp. <i>pallida</i>)		1	
pussytoes (genus) (<i>Antennaria</i> spp.)		1	
northern bedstraw (<i>Galium boreale</i>)		1	
<hr/>			
Minor graminoids	1	2	2
Minor forbs and half-shrubs	2	5	5

CODE	AP-SD-D	AP-SD-E	AP-SD-F
COMMUNITY NAME	Needle-and-thread - June Grass	Pasture Sage - Sedge - Needle-and-thread - June Grass	Crested Wheat-grass - Sedge
ECOREGION	Aspen Parkland	Aspen Parkland	Aspen Parkland
ECOSITE	Sand & Sandy Loam	Sand & Sandy Loam	Sand & Sandy Loam
STRUCTURAL TYPE	Grassland	Grassland	Grassland
STATUS	moderate alteration	significant alteration	severe alteration
SPECIES COMPOSITION	predicted	predicted	predicted
species measure	%cover	%cover	%cover
number of plots	n=20	n=20	n=7
Major short shrubs			
western snowberry (<i>Symphoricarpos occidentalis</i>)	1		1
rose (genus) (<i>Rosa</i> spp.)		1	
Major graminoids			
western porcupine-grass (<i>Hesperostipa curtisetata</i>)	2	2	1
sedge (genus) (<i>Carex</i> spp.)	5	8	5
needle-and-thread (<i>Hesperostipa comata</i>)	13	6	3
June grass (<i>Koeleria macrantha</i>)	5	5	4
northern wheat-grass (<i>Elymus lanceolatus</i>)	3	1	1
blue grama (<i>Bouteloua gracilis</i>)	1	2	1
sand-grass (<i>Calamovilfa longifolia</i>)	1	1	
Canada wild-rye (<i>Elymus canadensis</i>)			2
Sandberg's blue-grass (<i>Poa secunda</i> ssp. <i>secunda</i>)	1		1
western wheat-grass (<i>Pascopyrum smithii</i>)	2	2	1
plains reed-grass (<i>Calamagrostis montanensis</i>)	1		
Kentucky blue-grass (<i>Poa pratensis</i>)	1	2	2
smooth brome (<i>Bromus inermis</i>)			1
crested wheat-grass (<i>Agropyron cristatum</i>)			11

Major forbs and half-shrubs			
pasture sage (<i>Artemisia frigida</i>)	7	8	5
goldenrod (genus) (<i>Solidago</i> spp.)	1	1	1
hairy golden-aster (<i>Heterotheca villosa</i>)			2
prairie crocus (<i>Pulsatilla patens</i>)	1		
field chickweed (<i>Cerastium arvense</i>)		1	
golden bean (<i>Thermopsis rhombifolia</i>)			1
tufted white prairie aster (<i>Symphyotrichum ericoides</i> var. <i>pansum</i>)			1
three-flowered avens (<i>Geum triflorum</i>)	1		
prairie sage (<i>Artemisia ludoviciana</i>)			1
American wild licorice (<i>Glycyrrhiza lepidota</i>)			1
Minor graminoids	3	3	1
Minor forbs and half-shrubs	3	7	2

CODE	AP-SD-G	AP-SD-H
COMMUNITY NAME	Aspen / Chokecherry- Saskatoon / Rose-Snowberry / Sedge	Aspen / Chokecherry / Snowberry-Rose
ECOREGION	Aspen Parkland	Aspen Parkland
ECOSITE	Sand & Sandy Loam	Sand & Sandy Loam
STRUCTURAL TYPE	Open Forest	Closed Forest
GRAZING STATUS	reference comm.	moderate alteration
SPECIES COMPOSITION		
species measure	% cover	% cover
number of plots	n=16	n=9
Major trees		
trembling aspen (<i>Populus tremuloides</i>)	48	69
balsam poplar (<i>Populus balsamifera</i>)		2
Major tall shrubs		
chokecherry (<i>Prunus virginiana</i>)	12	5
saskatoon (<i>Amelanchier alnifolia</i>)	11	3
pincherry (<i>Prunus pensylvanica</i>)	3	
beaked hazelnut (<i>Corylus cornuta</i>)	2	
twining honeysuckle (<i>Lonicera dioica</i>)	1	2
willow (<i>Salix</i> spp.)		
wolf-willow (<i>Elaeagnus commutata</i>)		2
river birch (<i>Betula occidentalis</i>)		1
Major short shrubs		
rose (<i>Rosa</i> spp.)	8	7
snowberry (<i>Symphoricarpos</i> spp.)	6	28
wild red raspberry (<i>Rubus idaeus</i>)	1	
Major prostrate shrubs		
bearberry (<i>Arctostaphylos uva-ursi</i>)	1	1
Major graminoids		
sedge (<i>Carex</i> spp.)	5	3
purple oat grass (<i>Schizachne purpurascens</i>)	2	1
white-grained mountain rice grass (<i>Oryzopsis asperifolia</i>)	1	1
Hooker's oat grass (<i>Helictotrichon hookeri</i>)	1	
bearded wheat grass (<i>Agropyron trachycaulum</i> var. <i>unilaterale</i>)		1
Kentucky blue grass (<i>Poa pratensis</i>)	2	

Major forbs and half-shrubs		
vetchling (<i>Lathyrus</i> spp.)	2	2
northern bedstraw (<i>Galium boreale</i>)	2	2
wild sarsaparilla (<i>Aralia nudicaulis</i>)	1	
star-flowered solomon's-seal (<i>Smilacina stellata</i>)	1	
golden bean (<i>Thermopsis rhombifolia</i>)	1	2
two-leaved solomon's seal (<i>Maianthemum canadense</i>)	1	
veiny meadow-rue (<i>Thalictrum venulosum</i>)	1	
American vetch (<i>Vicia americana</i>)	1	
violet (<i>Viola</i> spp.)		1
smooth wild strawberry (<i>Fragaria virginiana</i>)		1
Minor short shrubs		
	0	1
Minor graminoids		
	1	1
Minor forbs and half-shrubs		
	2	4

CODE	AP-SD-I	AP-SD-J
COMMUNITY NAME	Aspen / Sedge-Purple Oat Grass	Aspen / Snowberry- Rose / Kentucky Blue- grass-Purple Oat Grass
ECOREGION	Aspen Parkland	Aspen Parkland
ECOSITE	Sand & Sandy Loam	Sand & Sandy Loam
STRUCTURAL TYPE	Open Forest	Closed Forest
GRAZING STATUS	moderate alteration	significant alteration
SPECIES COMPOSITION		
species measure	% cover	% cover
number of plots	n=30	n=12
Major trees		
trembling aspen (<i>Populus tremuloides</i>)	34	59
Major tall shrubs		
chokecherry (<i>Prunus virginiana</i>)	1	3
saskatoon (<i>Amelanchier alnifolia</i>)		3
twining honeysuckle (<i>Lonicera dioica</i>)	1	
willow (<i>Salix</i> spp.)		1
wolf-willow (<i>Elaeagnus commutata</i>)	1	1
river birch (<i>Betula occidentalis</i>)	1	
Major short shrubs		
rose (<i>Rosa</i> spp.)	3	5
snowberry (<i>Symphoricarpos</i> spp.)	2	15
wild red raspberry (<i>Rubus idaeus</i>)		1
Major prostrate shrubs		
bearberry (<i>Arctostaphylos uva-ursi</i>)	1	1
creeping juniper (<i>Juniperus horizontalis</i>)	1	
Major graminoids		
sedge (<i>Carex</i> spp.)	15	4
purple oat grass (<i>Schizachne purpurascens</i>)	8	6
white-grained mountain rice grass (<i>Oryzopsis asperifolia</i>)	2	2
Hooker's oat grass (<i>Helictotrichon hookeri</i>)	1	
bearded wheat grass (<i>Agropyron trachycaulum</i> var. unilaterale)	2	4

baltic rush (<i>Juncus balticus</i>)	1	1
northern rice grass (<i>Oryzopsis pungens</i>)	1	
plains rough fescue (<i>Festuca hallii</i>)	1	
Kentucky blue grass (<i>Poa pratensis</i>)	1	16
Major forbs and half-shrubs		
vetchling (<i>Lathyrus</i> spp.)	2	2
northern bedstraw (<i>Galium boreale</i>)	4	4
golden bean (<i>Thermopsis rhombifolia</i>)	1	2
veiny meadow-rue (<i>Thalictrum venulosum</i>)	1	
American vetch (<i>Vicia americana</i>)	1	1
violet (<i>Viola</i> spp.)		1
common dandelion (<i>Taraxacum officinale</i>)		1
smooth wild strawberry (<i>Fragaria virginiana</i>)	1	1
woolly yarrow (<i>Achillea millefolium</i>)	1	
goldenrod (<i>Solidago</i> spp.)	1	
pasture sage (<i>Artemisia frigida</i>)	1	
Minor tall shrubs		
	1	0
Minor graminoids		
	2	2
Minor forbs and half-shrubs		
	7	5

CLAY ECOSITE

CODE	MG-CY-A	MG-CY-B	MG-CY-C
COMMUNITY NAME	Northern Wheat-grass	Northern Wheat-grass - Western Wheat-grass - June Grass - Sedge	Pasture Sage - Northern Wheat-grass - Sedge - Western Wheat-grass
ECOREGION	Mixed Grassland	Mixed Grassland	Mixed Grassland
ECOSITE	Clay	Clay	Clay
STRUCTURAL TYPE	Grassland	Grassland	Grassland
STATUS	reference comm.	minor alteration	moderate alteration

SPECIES COMPOSITION

species measure	% cover	% cover	% cover
number of plots	n=21	n=20	n=14

Major short shrubs

snowberry (genus) (<i>Symphoricarpos</i> spp.)			1
rose (genus) (<i>Rosa</i> spp.)	1		
silver sagebrush (<i>Artemisia cana</i>)		1	

Major graminoids

northern wheat-grass (<i>Elymus lanceolatus</i>)	22	8	8
western wheat-grass (<i>Pascopyrum smithii</i>)	3	8	5
needle-and-thread (<i>Hesperostipa comata</i>)	3	4	4
sedge (genus) (<i>Carex</i> spp.)	3	5	6
June grass (<i>Koeleria macrantha</i>)	2	5	2
green needle-grass (<i>Nassella viridula</i>)	2	1	
blue grama (<i>Bouteloua gracilis</i>)	1	4	2
porcupine-grass (<i>Hesperostipa spartea</i>)		2	1
blue-grass (genus) (<i>Poa</i> spp.)		4	2

Major forbs and half-shrubs

pasture sage (<i>Artemisia frigida</i>)	3	4	14
winterfat (<i>Krascheninnikovia lanata</i>)	1		
goldenrod (genus) (<i>Solidago</i> spp.)		1	

Minor graminoids

	1	1	1
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Minor forbs and half-shrubs

	2	3	5
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SOLONETZIC ECOSITE

CODE	DMG-SO-A	DMG-SO-B
COMMUNITY NAME	Northern Wheat-grass - Needle-and-thread - June Grass	Northern Wheat-grass - June Grass - Pasture Sage - Blue Grama
ECOREGION	Dry Mixed Grassland	Dry Mixed Grassland
ECOSITE	Solonetzic	Solonetzic
STRUCTURAL TYPE	Grassland	Grassland
GRAZING STATUS	reference comm.	minor alteration

SPECIES COMPOSITION

species measure	% cover	% cover
number of plots	n=22	n=39

Major short shrubs

silver sagebrush (<i>Artemisia cana</i>)	1	1
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Major graminoids

northern wheat-grass (<i>Elymus lanceolatus</i>)	13	11
needle-and-thread (<i>Hesperostipa comata</i>)	8	5
June grass (<i>Koeleria macrantha</i>)	6	8
western wheat-grass (<i>Pascopyrum smithii</i>)	5	4
blue grama (<i>Bouteloua gracilis</i>)	5	5
sedge (genus) (<i>Carex</i> spp.)	2	3
plains reed-grass (<i>Calamagrostis montanensis</i>)	1	2
Sandberg's blue-grass (<i>Poa secunda</i> ssp. <i>secunda</i>)	1	1
green needle-grass (<i>Nassella viridula</i>)	1	

Major forbs and half-shrubs

pasture sage (<i>Artemisia frigida</i>)	3	5
scarlet mallow (<i>Sphaeralcea coccinea</i>)	2	1
moss phlox (<i>Phlox hoodii</i>)		1

Minor graminoids

	0	1
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Minor forbs and half-shrubs

	2	2
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CODE	DMG-SO-C	DMG-SO-D
COMMUNITY NAME	June Grass - Northern Wheat- grass - Pasture Sage - Blue Grama	June Grass - Pasture Sage - Blue Grama - Northern Wheat- grass
ECOREGION	Dry Mixed Grassland	Dry Mixed Grassland
ECOSITE	Solonetzic	Solonetzic
STRUCTURAL TYPE	Grassland	Grassland
GRAZING STATUS	moderate alteration	moderate alteration

SPECIES COMPOSITION		
species measure	% cover	% cover
number of plots	n=30	n=26

Major short shrubs		
silver sagebrush (<i>Artemisia cana</i>)	1	1

Major graminoids		
northern wheat-grass (<i>Elymus lanceolatus</i>)	10	5
needle-and-thread (<i>Hesperostipa comata</i>)	4	4
June grass (<i>Koeleria macrantha</i>)	11	11
western wheat-grass (<i>Pascopyrum smithii</i>)	2	1
blue grama (<i>Bouteloua gracilis</i>)	6	8
sedge (genus) (<i>Carex</i> spp.)	2	2
plains reed-grass (<i>Calamagrostis montanensis</i>)	2	2
Sandberg's blue-grass (<i>Poa secunda</i> ssp. <i>secunda</i>)	1	1

Major forbs and half-shrubs		
pasture sage (<i>Artemisia frigida</i>)	7	10
scarlet mallow (<i>Sphaeralcea coccinea</i>)	1	1
moss phlox (<i>Phlox hoodii</i>)	1	1

Minor graminoids	0	1
Minor forbs and half-shrubs	2	2

CODE	MG-SO-A	MG-SO-B	MG-SO-C
COMMUNITY NAME	Wheat-grass - Western Porcupine-grass - June Grass	Western Wheat- grass - Sedge - June Grass	June Grass - Pasture Sage - Sedge
ECOREGION	Mixed Grassland	Mixed Grassland	Mixed Grassland
ECOSITE	Solonetzic	Solonetzic	Solonetzic
STRUCTURAL TYPE	Grassland	Grassland	Grassland
GRAZING STATUS	reference comm.	minor alteration	moderate alteration

SPECIES COMPOSITION

species measure	%cover	%cover	%cover
number of plots	n=31	n=52	n=15

Major short shrubs

western snowberry (<i>Symphoricarpos occidentalis</i>)	1		1
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Major graminoids

western wheat-grass (<i>Pascopyrum smithii</i>)	9	9	4
western porcupine-grass (<i>Hesperostipa curtisetata</i>)	7	2	1
northern wheat-grass (<i>Elymus lanceolatus</i>)	6	3	3
June grass (<i>Koeleria macrantha</i>)	6	6	8
sedge (genus) (<i>Carex</i> spp.)	5	6	7
blue grama (<i>Bouteloua gracilis</i>)	2	2	4
green needle-grass (<i>Nassella viridula</i>)	2	1	2
needle-and-thread (<i>Hesperostipa comata</i>)	2	3	2
Sandberg's blue-grass (<i>Poa secunda</i> ssp. <i>secunda</i>)	2	2	
plains reed-grass (<i>Calamagrostis montanensis</i>)			3
blue-grass (genus) (<i>Poa</i> spp.)		1	
Canada blue-grass (<i>Poa compressa</i>)		1	

Major forbs and half-shrubs

pasture sage (<i>Artemisia frigida</i>)	2	2	7
common yarrow (<i>Achillea millefolium</i>)		1	1
prairie crocus (<i>Pulsatilla patens</i>)		1	
curly-cup gum-weed (<i>Grindelia squarrosa</i>)		1	1
hairy golden-aster (<i>Heterotheca villosa</i>)		1	
scarlet mallow (<i>Sphaeralcea coccinea</i>)			1
common broomweed (<i>Gutierrezia sarothrae</i>)			1
northern pygmyflower (<i>Androsace septentrionalis</i>)			1

Minor shorb shrubs	0	1	0
Minor graminoids	3	2	2
Minor forbs and half-shrubs	4	5	3

GRAVELLY ECOSITE

CODE	MG-GR-A	MG-GR-B	MG-GR-C
COMMUNITY NAME	Western Porcupine-grass - Northern Wheat-grass – Needle-and-thread	Needle-and-thread - June Grass - Pasture Sage	Pasture Sage - June Grass – Needle-and-thread - Blue Grama
ECOREGION	Mixed Grassland	Mixed Grassland	Mixed Grassland
ECOSITE	Gravelly	Gravelly	Gravelly
STRUCTURAL TYPE	Grassland	Grassland	Grassland
GRAZING STATUS	reference comm.	moderate alteration	significant alteration

SPECIES COMPOSITION

species measure	% cover	% cover	% cover
number of plots	n=35	n=74	n=15

Major short shrubs

snowberry (genus) (<i>Symphoricarpos</i> spp.)	1	1	
rose (genus) (<i>Rosa</i> spp.)		1	

Major graminoids

western porcupine-grass (<i>Hesperostipa curtisetata</i>)	12	2	1
northern wheat-grass (<i>Elymus lanceolatus</i>)	6	3	
needle-and-thread (<i>Hesperostipa comata</i>)	6	11	9
western wheat-grass (<i>Pascopyrum smithii</i>)	4	2	2
sedge (genus) (<i>Carex</i> spp.)	3	5	4
June grass (<i>Koeleria macrantha</i>)	3	8	9
green needle-grass (<i>Nassella viridula</i>)	1		
blue grama (<i>Bouteloua gracilis</i>)	1	5	6
plains reed-grass (<i>Calamagrostis montanensis</i>)	1		
Hooker's oat-grass (<i>Avenula hookeri</i>)	1		
blue-grass (genus) (<i>Poa</i> spp.)	1		

Major forbs and half-shrubs

pasture sage (<i>Artemisia frigida</i>)	3	5	11
prairie crocus (<i>Pulsatilla patens</i>)		1	
hairy golden-aster (<i>Heterotheca villosa</i>)			1
common broomweed (<i>Gutierrezia sarothrae</i>)			1
moss phlox (<i>Phlox hoodii</i>)			3

Minor graminoids

Minor forbs and half-shrubs

Minor graminoids	1	2	1
Minor forbs and half-shrubs	5	5	6

CODE	AP-GR-A	AP-GR-B
COMMUNITY NAME	Western Porcupine-grass - Sedge - Needle- and-thread	Pasture Sage - Needle-and- thread - June Grass - Sedge
ECOREGION	Aspen Parkland	Aspen Parkland
ECOSITE	Gravelly	Gravelly
STRUCTURAL TYPE	Grassland	Grassland
GRAZING STATUS	minor alteration	moderate alteration

SPECIES COMPOSITION

species measure	% cover	% cover
number of plots	n=8	n=11

Major short shrubs

rose (genus) (<i>Rosa</i> spp.)		1
snowberry (genus) (<i>Symphoricarpos</i> spp.)		1

Major graminoids

western porcupine-grass (<i>Hesperostipa curtisetata</i>)	13	2
sedge (genus) (<i>Carex</i> spp.)	7	5
needle-and-thread (<i>Hesperostipa comata</i>)	6	7
June grass (<i>Koeleria macrantha</i>)	5	6
northern wheat-grass (<i>Elymus lanceolatus</i>)	5	4
plains rough fescue (<i>Festuca altaica</i> ssp. <i>hallii</i>)	4	1
Sandberg's blue-grass (<i>Poa secunda</i> ssp. <i>secunda</i>)	1	2
blue grama (<i>Bouteloua gracilis</i>)	1	2
plains reed-grass (<i>Calamagrostis montanensis</i>)	1	1
crested wheat-grass (<i>Agropyron cristatum</i>)		1
western wheat-grass (<i>Pascopyrum smithii</i>)		1

Major forbs and half-shrubs

pasture sage (<i>Artemisia frigida</i>)	3	12
cut-leaf anemone (<i>Anemone multifida</i>)	1	
prairie crocus (<i>Pulsatilla patens</i>)	1	1
cinquefoil (genus) (<i>Potentilla</i> spp.)		1

Minor graminoids

Minor forbs and half-shrubs

1	1
2	3

DUNES ECOSITE

CODE	DMG-DN-A	DMG-DN-B	DMG-DN-C
COMMUNITY NAME	Needle-and-thread	Silver Sagebrush - Needle-and-thread	Needle-and-thread - Pasture Sage
ECOREGION	Dry Mixed Grassland	Dry Mixed Grassland	Dry Mixed Grassland
ECOSITE	Dunes Grassland	Dunes Grassland with shrubs	Dunes Grassland
STRUCTURAL TYPE			
GRAZING STATUS	reference comm.	reference comm.	moderate alteration

SPECIES COMPOSITION

species measure	%cover	%cover	%cover
number of plots	n=14	n=17	n=13

Major short shrubs

silver sagebrush (<i>Artemisia cana</i>)		7	
rose (genus) (<i>Rosa</i> spp.)	1		1
western snowberry (<i>Symphoricarpos occidentalis</i>)		1	1

Major prostrate shrubs

creeping juniper (<i>Juniperus horizontalis</i>)	0	2	2
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Major graminoids

needle-and-thread (<i>Hesperostipa comata</i>)	14	4	8
sand-grass (<i>Calamovilfa longifolia</i>)	4	1	3
June grass (<i>Koeleria macrantha</i>)	3	2	2
northern wheat-grass (<i>Elymus lanceolatus</i>)	3	2	2
sedge (genus) (<i>Carex</i> spp.)	2		3
western wheat-grass (<i>Pascopyrum smithii</i>)	2	1	2
blue grama (<i>Bouteloua gracilis</i>)	1		1
sand dropseed (<i>Sporobolus cryptandrus</i>)	1		

Major forbs and half-shrubs

pasture sage (<i>Artemisia frigida</i>)	4	1	7
lance-leaved psoralea (<i>Psoralidium lanceolatum</i>)	2	2	2
lamb's-quarters (<i>Chenopodium album</i>)			1
hairy golden-aster (<i>Heterotheca villosa</i>)			1
prairie sage (<i>Artemisia ludoviciana</i>)			1

Minor short shrubs

Minor graminoids

Minor forbs and half-shrubs

Minor short shrubs	1	1	0
Minor graminoids	0	2	1
Minor forbs and half-shrubs	1	1	1

CODE	DMG-DN-D	DMG-DN-E
COMMUNITY NAME	Needle-and-thread - Lance-leaved Psoralea - Pasture Sage - Sand Grass	Silver Sagebrush - Needle-and-thread - Sand Grass
ECOREGION	Dry Mixed Grassland	Dry Mixed Grassland
ECOSITE	Dunes Grassland	Dunes Grassland with shrubs
STRUCTURAL TYPE		
GRAZING STATUS	unknown	unknown

SPECIES COMPOSITION

species measure	%cover	%cover
number of plots	n=18	n=16

Major short shrubs

silver sagebrush (<i>Artemisia cana</i>)		11
rose (genus) (<i>Rosa</i> spp.)	2	
western snowberry (<i>Symphoricarpos occidentalis</i>)		1

Major prostrate shrubs

creeping juniper (<i>Juniperus horizontalis</i>)	0	1
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Major cactus

brittle prickly-pear (<i>Opuntia fragilis</i>)	2	1
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Major graminoids

needle-and-thread (<i>Hesperostipa comata</i>)	5	4
sand-grass (<i>Calamovilfa longifolia</i>)	3	3
June grass (<i>Koeleria macrantha</i>)	1	1
northern wheat-grass (<i>Elymus lanceolatus</i>)	1	1
sedge (genus) (<i>Carex</i> spp.)	1	
western wheat-grass (<i>Pascopyrum smithii</i>)	1	
sand dropseed (<i>Sporobolus cryptandrus</i>)	1	1

Major forbs and half-shrubs

pasture sage (<i>Artemisia frigida</i>)	4	1
lance-leaved psoralea (<i>Psoralidium lanceolatum</i>)	5	2
lamb's-quarters (<i>Chenopodium album</i>)	1	1
Fendler's cryptanthe (<i>Cryptantha fendleri</i>)	1	
Missouri goldenrod (<i>Solidago missouriensis</i>)	1	
prairie sage (<i>Artemisia ludoviciana</i>)		

Minor short shrubs	1	0
Minor graminoids	1	0
Minor forbs and half-shrubs	1	1

CODE	MG-DN-A	MG-DN-B	MG-DN-C
COMMUNITY NAME	Sedge – Needle-and-thread – Western Porcupine-grass	Sedge – Needle-and-thread – June Grass	Sedge – June Grass – Needle-and-thread
ECOREGION	Mixed Grassland	Mixed Grassland	Mixed Grassland
ECOSITE	Dunes	Dunes	Dunes
STRUCTURAL TYPE	Grassland	Grassland	Grassland
GRAZING STATUS	reference comm.	minor alteration	moderate alteration

SPECIES COMPOSITION

species measure	%cover	%cover	%cover
number of plots	n=23	n=59	n=27

Major short shrubs

rose (genus) (<i>Rosa</i> spp.)	2	1	1
western snowberry (<i>Symphoricarpos occidentalis</i>)	1	1	1

Major graminoids

needle-and-thread (<i>Hesperostipa comata</i>)	12	7	6
sedge (genus) (<i>Carex</i> spp.)	7	10	3
sand-grass (<i>Calamovilfa longifolia</i>)	4	3	8
June grass (<i>Koeleria macrantha</i>)	3	5	4
western wheat-grass (<i>Pascopyrum smithii</i>)	2	1	
blue grama (<i>Bouteloua gracilis</i>)	1	1	1
sand dropseed (<i>Sporobolus cryptandrus</i>)	1		1
western porcupine-grass (<i>Hesperostipa curtiseta</i>)	1	1	
green needle-grass (<i>Nassella viridula</i>)	1		
northern wheat-grass (<i>Elymus lanceolatus</i>)	1	1	1
plains rough fescue (<i>Festuca altaica</i> ssp. <i>hallii</i>)	1		
plains reed-grass (<i>Calamagrostis montanensis</i>)		1	
Rocky Mountain fescue (<i>Festuca saximontana</i>)		1	

Major forbs and half-shrubs

pasture sage (<i>Artemisia frigida</i>)	3	3	6
lance-leaved psoralea (<i>Psoralidium lanceolatum</i>)	1	1	9
hairy golden-aster (<i>Heterotheca villosa</i>)	1	1	3
goldenrod (genus) (<i>Solidago</i> spp.)			1

Minor prostrate shrubs

Minor prostrate shrubs	0	1	0
Minor graminoids	2	1	2
Minor forbs and half-shrubs	2	4	4

CODE	MG-DN-D
COMMUNITY NAME	Lance-leaved Psoralea – Sand Grass – Pasture Sage – Needle- and-thread
ECOREGION	Mixed Grassland
ECOSITE	Dunes
STRUCTURAL TYPE	Grassland
GRAZING STATUS	unknown
SPECIES COMPOSITION	
species measure	%cover
number of plots	n=13
Major short shrubs	
rose (genus) (<i>Rosa</i> spp.)	1
western snowberry (<i>Symphoricarpos occidentalis</i>)	1
Major prostrate shrubs	
creeping juniper (<i>Juniperus horizontalis</i>)	1
Major graminoids	
needle-and-thread (<i>Hesperostipa comata</i>)	5
sedge (genus) (<i>Carex</i> spp.)	8
sand-grass (<i>Calamovilfa longifolia</i>)	2
June grass (<i>Koeleria macrantha</i>)	6
western wheat-grass (<i>Pascopyrum smithii</i>)	1
blue grama (<i>Bouteloua gracilis</i>)	2
northern wheat-grass (<i>Elymus lanceolatus</i>)	1
plains reed-grass (<i>Calamagrostis montanensis</i>)	1
Kentucky blue-grass (<i>Poa pratensis</i>)	1
Rocky Mountain fescue (<i>Festuca saximontana</i>)	1
Major forbs and half-shrubs	
pasture sage (<i>Artemisia frigida</i>)	4
lance-leaved psoralea (<i>Psoralidium lanceolatum</i>)	2
hairy golden-aster (<i>Heterotheca villosa</i>)	2
golden bean (<i>Thermopsis rhombifolia</i>)	1
field chickweed (<i>Cerastium arvense</i>)	1
Minor graminoids	1
Minor forbs and half-shrubs	4

CODE	AP-DN-A	AP-DN-B
COMMUNITY NAME	Sedge – Sand Grass – Needle- and-thread	Sedge – Pasture Sage – June Grass
ECOREGION	Aspen Parkland	Aspen Parkland
ECOSITE	Dunes	Dunes
STRUCTURAL TYPE	Grassland	Grassland
GRAZING STATUS	moderate alteration	significant alteration
SPECIES COMPOSITION		
species measure	% cover	% cover
number of plots	n=18	n=28
Major tall shrubs		
wolf-willow (<i>Elaeagnus commutata</i>)		1
choke cherry (<i>Prunus virginiana</i>)	1	
Major short shrubs		
rose (genus) (<i>Rosa</i> spp.)	1	1
Major prostrate shrubs		
common bearberry (<i>Arctostaphylos uva-ursi</i>)	2	
creeping juniper (<i>Juniperus horizontalis</i>)	4	1
Major graminoids		
sedge (genus) (<i>Carex</i> spp.)	7	13
sand-grass (<i>Calamovilfa longifolia</i>)	4	3
June grass (<i>Koeleria macrantha</i>)	1	3
needle-and-thread (<i>Hesperostipa comata</i>)	4	3
blue grama (<i>Bouteloua gracilis</i>)	2	2
Rocky Mountain fescue (<i>Festuca saximontana</i>)		2
plains rough fescue (<i>Festuca altaica</i> ssp. <i>hallii</i>)	3	1
western wheat-grass (<i>Pascopyrum smithii</i>)	1	1
western porcupine-grass (<i>Hesperostipa curtisetata</i>)	1	
sand dropseed (<i>Sporobolus cryptandrus</i>)	1	
Major forbs and half-shrubs		
pasture sage (<i>Artemisia frigida</i>)	1	4
field chickweed (<i>Cerastium arvense</i>)		1
hairy golden-aster (<i>Heterotheca villosa</i>)		1
Missouri goldenrod (<i>Solidago missouriensis</i>)		1
golden bean (<i>Thermopsis rhombifolia</i>)		1
Minor graminoids	2	2
Minor forbs and half-shrubs	3	4

CODE	DMG-DN-G	MG-DN-F
	Aspen / Creeping Juniper / Reed-grass - Wheat-grass	Aspen / Choke- cherry / Snowberry / Sedge
COMMUNITY NAME	Dry Mixed Grassland	Mixed Grassland
ECOREGION		
ECOSITE	Dunes	Dunes
STRUCTURAL TYPE	Open Forest	Open Forest
GRAZING STATUS	unknown	reference comm.

SPECIES COMPOSITION

species measure	% cover	% cover
number of plots	n=9	n=11

Major trees

trembling aspen (<i>Populus tremuloides</i>)	21	30
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Major tall shrubs

choke cherry (<i>Prunus virginiana</i>)		11
saskatoon (<i>Amelanchier alnifolia</i>)		5
twining honeysuckle (<i>Lonicera dioica</i>)		1

Major short shrubs

western snowberry (<i>Symphoricarpos occidentalis</i>)	4	11
rose (genus) (<i>Rosa</i> spp.)		8
northern snowberry (<i>Symphoricarpos albus</i>)		1

Major creeping shrubs

creeping juniper (<i>Juniperus horizontalis</i>)	13	5
common bearberry (<i>Arctostaphylos uva-ursi</i>)		7

Major graminoids

northern reed-grass (<i>Calamagrostis stricta</i> ssp. inexpansa)	2	
awned wheat-grass (<i>Elymus trachycaulus</i> ssp. subsecundus)	2	
northern wheat-grass (<i>Elymus lanceolatus</i>)	1	
sand-grass (<i>Calamovilfa longifolia</i>)	1	2
sun-loving sedge (<i>Carex inops</i>)		1
blunt sedge (<i>Carex obtusata</i>)		5
hay sedge (<i>Carex siccata</i>)		6

Major forbs and half-shrubs		
lance-leaved psoralea (<i>Psoralea lanceolata</i>)	1	
northern bedstraw (<i>Galium boreale</i>)		1
cream-colored vetchling (<i>Lathyrus ochroleucus</i>)		1
golden bean (<i>Thermopsis rhombifolia</i>)		1
Minor short shrubs		
	1	0
Minor graminoids		
	2	2
Minor forbs and half-shrubs		
	2	2

CODE	PEZ-DN-A
COMMUNITY NAME	Choke-cherry / Sedge
ECOREGION	Prairie Ecozone
ECOSITE	Dunes
STRUCTURAL TYPE	Tall Shrubland
GRAZING STATUS	unknown
SPECIES COMPOSITION	
species measure	% cover
number of plots	n=25
Major trees	
trembling aspen (<i>Populus tremuloides</i>)	1
Major tall shrubs	
choke cherry (<i>Prunus virginiana</i>)	19
saskatoon (<i>Amelanchier alnifolia</i>)	3
Major short shrubs	
western snowberry (<i>Symphoricarpos occidentalis</i>)	3
rose (genus) (<i>Rosa</i> spp.)	3
Major prostrate shrubs	
creeping juniper (<i>Juniperus horizontalis</i>)	4
common bearberry (<i>Arctostaphylos uva-ursi</i>)	2
Major graminoids	
blunt sedge (<i>Carex obtusata</i>)	4
hay sedge (<i>Carex siccata</i>)	4
sun-loving sedge (<i>Carex inops</i>)	2
sand-grass (<i>Calamovilfa longifolia</i>)	2
awned wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>subsecundus</i>)	1
needle-and-thread (<i>Hesperostipa comata</i>)	1
Major forbs and half-shrubs	
golden bean (<i>Thermopsis rhombifolia</i>)	3
star-flowered solomon's-seal (<i>Maianthemum stellatum</i>)	2
northern bedstraw (<i>Galium boreale</i>)	1
goldenrod (genus) (<i>Solidago</i> spp.)	1
Minor short shrubs	
	1
Minor graminoids	
	3
Minor forbs and half-shrubs	
	4

CODE	PEZ-DN-B
COMMUNITY NAME	Western Snowberry / Needle-and- thread-Sedge
ECOREGION	Prairie Ecozone
RANGE SITE	Dunes
STRUCTURAL TYPE	Short Shrubland
GRAZING STATUS	unknown

SPECIES COMPOSITION

species measure	% cover
number of plots	n=16

Major tall shrubs

choke cherry (<i>Prunus virginiana</i>)	2
wolf-willow (<i>Elaeagnus commutata</i>)	1

Major short shrubs

western snowberry (<i>Symphoricarpos occidentalis</i>)	20
rose (genus) (<i>Rosa</i> spp.)	6

Major prostrate shrubs

creeping juniper (<i>Juniperus horizontalis</i>)	1
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Major graminoids

needle-and-thread (<i>Hesperostipa comata</i>)	4
blunt sedge (<i>Carex obtusata</i>)	3
sun-loving sedge (<i>Carex inops</i>)	2
sand-grass (<i>Calamovilfa longifolia</i>)	2
hay sedge (<i>Carex siccata</i>)	2
June grass (<i>Koeleria macrantha</i>)	1
awned wheat-grass (<i>Elymus trachycaulus</i> ssp. subsecundus)	1
little-seed rice-grass (<i>Piptatherum micranthum</i>)	1
slender wheat-grass (<i>Elymus trachycaulus</i> ssp. trachycaulus)	1
western wheat-grass (<i>Pascopyrum smithii</i>)	1
Canada wild-rye (<i>Elymus canadensis</i>)	1
sand dropseed (<i>Sporobolus cryptandrus</i>)	1
graceful sedge (<i>Carex praegracilis</i>)	1
western porcupine-grass (<i>Hesperostipa curtiseta</i>)	1

Major forbs and half-shrubs

pasture sage (<i>Artemisia frigida</i>)	1
hairy golden-aster (<i>Heterotheca villosa</i>)	1
lance-leaved psoralea (<i>Psoraleidium lanceolatum</i>)	1

Minor graminoids 3

Minor forbs and half-shrubs 3

CODE	DMG-DN-F	MG-DN-E	AP-DN-C
COMMUNITY NAME	Creeping Juniper	Creeping Juniper - Blunt Sedge - Sand Grass	Creeping Juniper
ECOREGION	Dry Mixed Grassland	Mixed Grassland	Aspen Parkland
ECOSITE	Dunes	Dunes	Dunes
STRUCTURAL TYPE	Prostrate Shrubland	Prostrate Shrubland	Prostrate Shrubland
GRAZING STATUS	unknown	unknown	unknown
SPECIES COMPOSITION			
species measure	% cover	% cover	% cover
number of plots	n=12	n=18	n=24
Major trees			
trembling aspen (<i>Populus tremuloides</i>)	1		
Major tall shrubs			
wolf-willow (<i>Elaeagnus commutata</i>)		1	
choke cherry (<i>Prunus virginiana</i>)			1
Major short shrubs			
silver sagebrush (<i>Artemisia cana</i>)	1		
western snowberry (<i>Symphoricarpos occidentalis</i>)	2	1	
Major prostrate shrubs			
creeping juniper (<i>Juniperus horizontalis</i>)	27	39	52
common bearberry (<i>Arctostaphylos uva-ursi</i>)	4	9	2
Major graminoids			
northern wheat-grass (<i>Elymus lanceolatus</i>)	1		1
sand-grass (<i>Calamovilfa longifolia</i>)	1	3	1
June grass (<i>Koeleria macrantha</i>)	1	1	1
western wheat-grass (<i>Pascopyrum smithii</i>)	1		
needle-and-thread (<i>Hesperostipa comata</i>)	1	1	1
sun-loving sedge (<i>Carex inops</i>)		1	2
plains rough fescue (<i>Festuca altaica</i> ssp. <i>hallii</i>)			2
blunt sedge (<i>Carex obtusata</i>)		2	2
hay sedge (<i>Carex siccata</i>)		1	1
western porcupine-grass (<i>Hesperostipa curtisetata</i>)			1
awned wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>subsecundus</i>)		1	

Major forbs and half-shrubs			
pasture sage (<i>Artemisia frigida</i>)	1	1	1
lance-leaved psoralea (<i>Psoralea lanceolata</i>)	1	2	
prairie clubmoss (<i>Selaginella densa</i>)			2
golden bean (<i>Thermopsis rhombifolia</i>)		1	1
Minor short shrubs			
Minor cactus	0	0	1
Minor graminoids	0	1	0
Minor forbs and half-shrubs	2	1	2
Minor forbs and half-shrubs	1	2	3

THIN ECOSITE

CODE	DMG-TH-A	DMG-TH-B
COMMUNITY NAME	Needle-and-thread - Northern Wheat-grass - June Grass	June Grass - Needle-and-thread - Northern Wheat-grass - Blue Grama
ECOREGION	Dry Mixed Grassland	Dry Mixed Grassland
ECOSITE	Thin	Thin
STRUCTURAL TYPE	Grassland	Grassland
GRAZING STATUS	reference comm.	minor alteration

SPECIES COMPOSITION

species measure	%cover	%cover
number of plots	n=15	n=19

Major short shrubs

silver sagebrush (<i>Artemisia cana</i>)	1	1
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Major graminoids

needle-and-thread (<i>Hesperostipa comata</i>)	11	8
northern wheat-grass (<i>Elymus lanceolatus</i>)	9	6
June grass (<i>Koeleria macrantha</i>)	5	8
blue grama (<i>Bouteloua gracilis</i>)	3	5
sedge (genus) (<i>Carex</i> spp.)	2	3
western wheat-grass (<i>Pascopyrum smithii</i>)	2	2
plains reed-grass (<i>Calamagrostis montanensis</i>)	2	1
Sandberg's blue-grass (<i>Poa secunda</i> ssp. <i>secunda</i>)	2	1
green needle-grass (<i>Nassella viridula</i>)	1	
plains muhly (<i>Muhlenbergia cuspidata</i>)	1	1
slender wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>)	1	

Major forbs and half-shrubs

pasture sage (<i>Artemisia frigida</i>)	2	4
common broomweed (<i>Gutierrezia sarothrae</i>)	1	
poverty-weed (<i>Iva axillaris</i>)	1	
moss phlox (<i>Phlox hoodii</i>)	1	1
scarlet mallow (<i>Sphaeralcea coccinea</i>)	1	1
American vetch (<i>Vicia americana</i>)	1	1

Minor graminoids

	1	1
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Minor forbs and half-shrubs

	4	5
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CODE	MG-TH-A	MG-TH-B	MG-TH-C
COMMUNITY NAME	Western Porcupine-grass - Northern Wheat-grass - Green Needle-grass	Northern Wheat-grass - Needle-and-thread - Blue Grama - Western Wheat-grass	Needle-and-thread - Blue Grama - June Grass
ECOREGION	Mixed Grassland	Mixed Grassland	Mixed Grassland
ECOSITE	Thin	Thin	Thin
STRUCTURAL TYPE	Grassland reference comm.	Grassland moderate alteration	Grassland significant alteration
GRAZING STATUS			
SPECIES COMPOSITION			
species measure	%cover	%cover	%cover
number of plots	n=13	n=17	n=18
Major short shrubs			
rose (genus) (<i>Rosa</i> spp.)	1	1	1
Major graminoids			
western porcupine-grass (<i>Hesperostipa curtisetata</i>)	17	1	1
northern wheat-grass (<i>Elymus lanceolatus</i>)	9	12	5
green needle-grass (<i>Nassella viridula</i>)	4	1	1
needle-and-thread (<i>Hesperostipa comata</i>)	1	11	9
June grass (<i>Koeleria macrantha</i>)	2	3	6
sedge (genus) (<i>Carex</i> spp.)	2	2	2
western wheat-grass (<i>Pascopyrum smithii</i>)	2	5	4
plains rough fescue (<i>Festuca altaica</i> ssp. <i>hallii</i>)	2		
Hooker's oat-grass (<i>Avenula hookeri</i>)	1		1
sand-grass (<i>Calamovilfa longifolia</i>)	1		
blue grama (<i>Bouteloua gracilis</i>)	1	6	8
plains muhly (<i>Muhlenbergia cuspidata</i>)	1		
early blue-grass (<i>Poa cusickii</i>)	1		
crested wheat-grass (<i>Agropyron cristatum</i>)			1
blue-grass (genus) (<i>Poa</i> spp.)		1	
Major forbs and half-shrubs			
pasture sage (<i>Artemisia frigida</i>)	2	3	5
prairie sage (<i>Artemisia ludoviciana</i>)		1	1
Minor graminoids			
	1	1	1
Minor forbs and half-shrubs			
	5	3	3

CODE	AP-TH-A	AP-TH-B
COMMUNITY NAME	Needle-and-thread – Northern Wheat-grass - Western Porcupine-grass	Needle-and-thread - Blue Grama
ECOREGION	Aspen Parkland	Aspen Parkland
ECOSITE	Thin	Thin
STRUCTURAL TYPE	Grassland	Grassland
GRAZING STATUS	moderate alteration	significant alteration

SPECIES COMPOSITION

species measure	% cover	% cover
number of plots	n=9	n=10

Major tall shrubs

saskatoon (<i>Amelanchier alnifolia</i>)		1
wolf-willow (<i>Elaeagnus commutata</i>)		1

Major short shrubs

prairie rose (<i>Rosa arkansana</i>)		1
western snowberry (<i>Symphoricarpos occidentalis</i>)		1

Major prostrate shrubs

creeping juniper (<i>Juniperus horizontalis</i>)	2	
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Major graminoids

needle-and-thread (<i>Hesperostipa comata</i>)	10	6
blue grama (<i>Bouteloua gracilis</i>)	1	5
sedge (genus) (<i>Carex</i> spp.)	2	4
green needle-grass (<i>Nassella viridula</i>)	2	3
plains rough fescue (<i>Festuca altaica</i> ssp. <i>hallii</i>)	2	3
plains muhly (<i>Muhlenbergia cuspidata</i>)		2
Kentucky blue-grass (<i>Poa pratensis</i>)	1	1
sand-grass (<i>Calamovilfa longifolia</i>)	2	1
western porcupine-grass (<i>Hesperostipa curtiseta</i>)	7	1
common timothy (<i>Phleum pratense</i>)		1
northern wheat-grass (<i>Elymus lanceolatus</i>)	8	1
June grass (<i>Koeleria macrantha</i>)	1	

Major forbs and half-shrubs		
prairie crocus (<i>Pulsatilla patens</i>)	1	
golden bean (<i>Thermopsis rhombifolia</i>)	1	2
northern bedstraw (<i>Galium boreale</i>)		2
common yarrow (<i>Achillea millefolium</i>)		1
hairy wild-parsley (<i>Lomatium foeniculaceum</i>)		2
Minor tall shrubs		
	1	0
Minor graminoids		
	1	2
Minor forbs and half-shrubs		
	1	2

CODE	PEZ-TH-A
COMMUNITY NAME	Choke-cherry - Saskatoon
ECOREGION	Prairie Ecozone
ECOSITE	Thin
STRUCTURAL TYPE	Tall Shrubland
GRAZING STATUS	unknown

SPECIES COMPOSITION

species measure	% cover
number of plots	n=6

Major trees

trembling aspen (<i>Populus tremuloides</i>)	1
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Major tall shrubs

choke cherry (<i>Prunus virginiana</i>)	25
saskatoon (<i>Amelanchier alnifolia</i>)	16
red-osier dogwood (<i>Cornus sericea</i> ssp. <i>stolonifera</i>)	1
pin cherry (<i>Prunus pensylvanica</i>)	1
wolf-willow (<i>Elaeagnus commutata</i>)	1

Major short shrubs

northern snowberry (<i>Symphoricarpos albus</i>)	6
western snowberry (<i>Symphoricarpos occidentalis</i>)	4
low juniper (<i>Juniperus communis</i>)	3
Wood's rose (<i>Rosa woodsii</i>)	2
northern gooseberry (<i>Ribes oxycanthoides</i>)	2
Canada buffalo-berry (<i>Shepherdia canadensis</i>)	1

Major prostrate shrubs

creeping juniper (<i>Juniperus horizontalis</i>)	1
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Major graminoids

Kentucky blue-grass (<i>Poa pratensis</i>)	7
western porcupine-grass (<i>Hesperostipa curtisetata</i>)	3
plains muhly (<i>Muhlenbergia cuspidata</i>)	3
slender wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>)	1
awned wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>subsecundus</i>)	1

Major forbs and half-shrubs

western Canada violet (<i>Viola canadensis</i>)	2
northern bedstraw (<i>Galium boreale</i>)	1
star-flowered solomon's-seal (<i>Maianthemum stellatum</i>)	1
fairy bells (<i>Prosartes trachycarpum</i>)	1

Minor graminoids 2**Minor forbs and half-shrubs** 4

CODE	MG-TH-D
COMMUNITY NAME	Creeping Juniper
ECOREGION	Mixed Grassland
ECOSITE	Thin
STRUCTURAL TYPE	Prostrate Shrubland
GRAZING STATUS	unknown

SPECIES COMPOSITION

species measure	% cover
number of plots	n=9

Major prostrate shrubs

creeping juniper (<i>Juniperus horizontalis</i>)	34
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Major graminoids

northern wheat-grass (<i>Elymus lanceolatus</i>)	3
Hooker's oat-grass (<i>Avenula hookeri</i>)	1
thread-leaf sedge (<i>Carex filifolia</i>)	3
sun-loving sedge (<i>Carex inops</i>)	1
June grass (<i>Koeleria macrantha</i>)	1
plains muhly (<i>Muhlenbergia cuspidata</i>)	1

Major forbs and half-shrubs

prairie crocus (<i>Pulsatilla patens</i>)	1
three-flowered avens (<i>Geum triflorum</i>)	1
moss phlox (<i>Phlox hoodii</i>)	1
prairie clubmoss (<i>Selaginella densa</i>)	2

Minor short shrubs

	1
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Minor graminoids

	2
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Minor forbs and half-shrubs

	7
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BADLANDS ECOSITE

CODE	MG-BD-A	MG-BD-B	MG-BD-C
COMMUNITY NAME	Northern Wheat-grass - Western Wheat-grass - Pasture Sage	Western Wheat-grass	Bare Shale Community
ECOREGION	Mixed Grassland	Mixed Grassland	Mixed Grassland
ECOSITE	Badlands	Badlands	Badlands
STRUCTURAL TYPE	Grassland	Grassland	Bare
GRAZING STATUS	unknown	unknown	unknown
SPECIES COMPOSITION			
species measure	% cover	% cover	% cover
number of plots	n=16	n=9	n=4
Major graminoids			
northern wheat-grass (<i>Elymus lanceolatus</i>)	8	2	
western wheat-grass (<i>Pascopyrum smithii</i>)	6	6	
June grass (<i>Koeleria macrantha</i>)	2	1	
sedge (genus) (<i>Carex</i> spp.)	2	1	
Sandberg's blue-grass (<i>Poa secunda</i> ssp. <i>secunda</i>)	2	2	
blue grama (<i>Bouteloua gracilis</i>)	1	1	
needle-and-thread (<i>Hesperostipa comata</i>)		1	
Sandberg's blue-grass (<i>Poa secunda</i> ssp. <i>secunda</i>)		1	
rough hairgrass (<i>Agrostis scabra</i>)		1	
inland salt grass (<i>Distichlis spicata</i> var. <i>stricta</i>)		2	
Nuttall's alkali-grass (<i>Puccinellia nuttalliana</i>)		1	
fox-tail barley (<i>Hordeum jubatum</i>)			1
Major forbs and half-shrubs			
pasture sage (<i>Artemisia frigida</i>)	3	2	
scarlet mallow (<i>Sphaeralcea coccinea</i>)	1		
Nuttall's atriplex (<i>Atriplex gardneri</i>)	1	1	
American vetch (<i>Vicia americana</i>)	1		
sea-milkwort (<i>Glaux maritima</i>)		1	
common broomweed (<i>Gutierrezia sarothrae</i>)		1	
long-leaved sage (<i>Artemisia longifolia</i>)			2
rillscale (<i>Atriplex suckleyi</i>)			1
poverty-weed (<i>Iva axillaris</i>)			1
Minor graminoids	1	0	0
Minor forbs and half-shrubs	2	2	0

OVERFLOW AND SUBIRRIGATED ECOSITES

CODE	DMG-OV-A	DMG-OV-B
COMMUNITY NAME	Silver Sagebrush (high-density) / Wheat-grass	Silver Sagebrush (low-density) / Wheat-grass
ECOREGION	Dry Mixed Grassland	Dry Mixed Grassland
ECOSITE	Overflow	Overflow
STRUCTURAL TYPES	Grassland with shrubs	Grassland with shrubs
GRAZING STATUS	reference comm.	reference comm.
SPECIES COMPOSITION		
species measure	% cover	% cover
number of plots	n=13	n=10
Major short shrubs		
silver sagebrush (<i>Artemisia cana</i>)	8	3
western snowberry (<i>Symphoricarpos occidentalis</i>)	2	1
Major prostrate shrubs		
creeping juniper (<i>Juniperus horizontalis</i>)		1
Major graminoids		
northern wheat-grass (<i>Elymus lanceolatus</i>)	10	4
western wheat-grass (<i>Pascopyrum smithii</i>)	3	3
needle-and-thread (<i>Hesperostipa comata</i>)	4	1
blue grama (<i>Bouteloua gracilis</i>)	4	2
low sedge (<i>Carex duriuscula</i>)	2	2
plains reed-grass (<i>Calamagrostis montanensis</i>)	1	1
green needle-grass (<i>Nassella viridula</i>)	1	1
June grass (<i>Koeleria macrantha</i>)	1	1
Major forbs and half-shrubs		
pasture sage (<i>Artemisia frigida</i>)	2	1
American wild licorice (<i>Glycyrrhiza lepidota</i>)		1
Minor graminoids	1	1
Minor forbs and half-shrubs	2	4

CODE	MG-SUB-A	MG-SUB-B
COMMUNITY NAME	Western Wheat-grass - Western Porcupine-grass - Northern Wheat-grass	Pasture Sage - Western Wheat-grass
ECOREGION	Mixed Grassland	Mixed Grassland
ECOSITE	Overflow & Subirrigated	Overflow & Subirrigated
STRUCTURAL TYPES	Grassland	Grassland
GRAZING STATUS	reference comm.	moderate alteration

SPECIES COMPOSITION

species measure	% cover	% cover
number of plots	n=10	n=15

Major short shrubs

shrubby cinquefoil (<i>Dasiphora fruticosa</i>)		1
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Major graminoids

western wheat-grass (<i>Pascopyrum smithii</i>)	9	6
blue grama (<i>Bouteloua gracilis</i>)	2	4
western porcupine-grass (<i>Hesperostipa curtisetata</i>)	9	4
sedge (genus) (<i>Carex</i> spp.)	2	4
needle-and-thread (<i>Hesperostipa comata</i>)	3	4
June grass (<i>Koeleria macrantha</i>)	4	3
northern wheat-grass (<i>Elymus lanceolatus</i>)	6	3
plains reed-grass (<i>Calamagrostis montanensis</i>)	1	1
Kentucky blue-grass (<i>Poa pratensis</i>)		1
blue-grass (genus) (<i>Poa</i> spp.)	1	1
early blue-grass (<i>Poa cusickii</i>)		1
green needle-grass (<i>Nassella viridula</i>)		1
Hooker's oat-grass (<i>Avenula hookeri</i>)	1	
Sandberg's blue-grass (<i>Poa secunda</i> ssp. <i>secunda</i>)	1	

Major forbs and half-shrubs

pasture sage (<i>Artemisia frigida</i>)	3	7
prairie crocus (<i>Pulsatilla patens</i>)	1	
scarlet mallow (<i>Sphaeralcea coccinea</i>)		1

Minor graminoids

Minor graminoids	0	1
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Minor forbs and half-shrubs

Minor forbs and half-shrubs	4	6
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CODE	PEZ-SUB-A
COMMUNITY NAME	Kentucky Blue-grass
ECOREGION	Prairie Ecozone
ECOSITE	Overflow & Subirrigated
STRUCTURAL TYPES	Grassland
GRAZING STATUS	severe alteration

SPECIES COMPOSITION

species measure	% cover
number of plots	n=10

Major short shrubs

prairie rose (<i>Rosa arkansana</i>)	1
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Major graminoids

Kentucky blue-grass (<i>Poa pratensis</i>)	21
sedge (genus) (<i>Carex</i> spp.)	4
western wheat-grass (<i>Pascopyrum smithii</i>)	3
slender wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>)	2
quack grass (<i>Elymus repens</i>)	1
mat muhly (<i>Muhlenbergia richardsonis</i>)	1
smooth brome (<i>Bromus inermis</i>)	1
June grass (<i>Koeleria macrantha</i>)	1
blue grama (<i>Bouteloua gracilis</i>)	1
fox-tail barley (<i>Hordeum jubatum</i>)	1
northern reed-grass (<i>Calamagrostis stricta</i> ssp. <i>inexpansa</i>)	1

Major forbs and half-shrubs

common yarrow (<i>Achillea millefolium</i>)	1
common dandelion (<i>Taraxacum officinale</i>)	1
pussytoes (genus) (<i>Antennaria</i> spp.)	1

Minor graminoids

Minor graminoids	2
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Minor forbs and half-shrubs

Minor forbs and half-shrubs	3
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CODE	PEZ-SUB-B
COMMUNITY NAME	Smooth Brome
ECOREGION	Prairie Ecozone
ECOSITE	Overflow & Subirrigated
STRUCTURAL TYPE	Grassland
GRAZING STATUS	severe alteration

SPECIES COMPOSITION

species measure	% canopy cover
number of plots	not available - from existing pub.

Major short shrubs

rose (<i>Rosa</i> spp.)	1
western snowberry (<i>Symphoricarpos occidentalis</i>)	1

Major graminoids

smooth brome (<i>Bromus inermis</i>)	96
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Major forbs and half-shrubs

American wild licorice (<i>Glycyrrhiza lepidota</i>)	1
water smartweed (<i>Persicaria amphibia</i>)	1

Minor forbs and half-shrubs

	2
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CODE	PEZ-SUB-C
COMMUNITY NAME	Western Snow-berry
ECOREGION	Prairie Ecozone
ECOSITE	Overflow & Subirrigated
STRUCTURAL TYPES	Short Shrubland
GRAZING STATUS	unknown
SPECIES COMPOSITION	
species measure	% cover
number of plots	n=10
Major tall shrubs	
choke cherry (<i>Prunus virginiana</i>)	1
Major short shrubs	
western snowberry (<i>Symphoricarpos occidentalis</i>)	22
silver sagebrush (<i>Artemisia cana</i>)	3
Wood's rose (<i>Rosa woodsii</i>)	1
Major prostrate shrubs	
creeping juniper (<i>Juniperus horizontalis</i>)	2
Major graminoids	
Kentucky blue-grass (<i>Poa pratensis</i>)	8
northern wheat-grass (<i>Elymus lanceolatus</i>)	4
needle-and-thread (<i>Hesperostipa comata</i>)	3
low sedge (<i>Carex duriuscula</i>)	3
slender wheat-grass (<i>Elymus trachycaulus</i> ssp. trachycaulus)	1
crested wheat-grass (<i>Agropyron cristatum</i>)	1
western wheat-grass (<i>Pascopyrum smithii</i>)	1
green needle-grass (<i>Nassella viridula</i>)	1
Major forbs and half-shrubs	
pasture sage (<i>Artemisia frigida</i>)	1
stiff-leaved goldenrod (<i>Solidago rigida</i>)	1
Canada goldenrod (<i>Solidago canadensis</i>)	1
Minor tall shrubs	1
Minor short shrubs	1
Minor graminoids	3
Minor forbs and half-shrubs	6

CODE	PEZ-SUB-D
COMMUNITY NAME	Choke-cherry - Saskatoon
ECOREGION	Prairie Ecozone
ECOSITE	Overflow & Subirrigated
STRUCTURAL TYPES	Tall Shrubland
GRAZING STATUS	unknown
SPECIES COMPOSITION	
species measure	% cover
number of plots	n=9
Major tall shrubs	
choke cherry (<i>Prunus virginiana</i>)	47
saskatoon (<i>Amelanchier alnifolia</i>)	13
red-osier dogwood (<i>Cornus sericea</i> ssp. <i>stolonifera</i>)	1
Major short shrubs	
western snowberry (<i>Symphoricarpos occidentalis</i>)	8
northern gooseberry (<i>Ribes oxycanthoides</i>)	1
low juniper (<i>Juniperus communis</i>)	1
poison-ivy (<i>Toxicodendron rydbergii</i>)	1
skunk-bush (<i>Rhus trilobata</i>)	1
Wood's rose (<i>Rosa woodsii</i>)	1
Major prostrate shrubs	
creeping juniper (<i>Juniperus horizontalis</i>)	2
Major graminoids	
Kentucky blue-grass (<i>Poa pratensis</i>)	1
slender wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>)	1
little-seed rice-grass (<i>Piptatherum micranthum</i>)	1
northern wheat-grass (<i>Elymus lanceolatus</i>)	1
Major forbs and half-shrubs	
western Canada violet (<i>Viola canadensis</i>)	2
Minor tall shrubs	
	1
Minor graminoids	
	3
Minor forbs and half-shrubs	
	6

CODE	MG-SUB-E
COMMUNITY NAME	Thorny Buffalo-berry / Western Snowberry / Kentucky Blue-grass
ECOREGION	Mixed and Dry Mixed Grassland
ECOSITE	Overflow & Subirrigated
STRUCTURAL TYPES	Tall Shrubland
GRAZING STATUS	unknown

SPECIES COMPOSITION

species measure	% canopy cover
number of plots	not available - from existing pub.

Major tall shrubs

thorny buffalo-berry (<i>Shepherdia argentea</i>)	76
choke-cherry (<i>Prunus virginiana</i>)	2
red-osier dogwood (<i>Cornus sericea</i>)	1

Major short shrubs

western snowberry (<i>Symphoricarpos occidentalis</i>)	37
rose (<i>Rosa</i> spp.)	12
golden currant (<i>Ribes aureum</i>)	5
wild red raspberry (<i>Rubus idaeus</i>)	1
wild black currant (<i>Ribes americanum</i>)	1

Major graminoids

Kentucky blue-grass (<i>Poa pratensis</i>)	22
smooth brome (<i>Bromus inermis</i>)	5
slender wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>)	3
redtop (<i>Agrostis stolonifera</i>)	2
Japanese chess (<i>Bromus japonicus</i>)	2
Virginia wild-rye (<i>Elymus virginicus</i>)	1
western wheat-grass (<i>Pascopyrum smithii</i>)	1

Major forbs and half-shrubs	
Pennsylvania pellitory (<i>Parietaria pensylvanica</i>)	11
common yarrow (<i>Achillea millefolium</i>)	4
Canada thistle (<i>Cirsium arvense</i>)	3
northern bedstraw (<i>Galium boreale</i>)	2
cleavers (<i>Galium aparine</i>)	2
late goldenrod (<i>Solidago gigantea</i>)	1
star-flowered solomon's-seal (<i>Maianthemum stellatum</i>)	1
prairie sage (<i>Artemisia ludoviciana</i>)	1
pasture sage (<i>Artemisia frigida</i>)	1
wild bergamot (<i>Monarda fistulosa</i>)	1
strawberry-blite (<i>Chenopodium capitatum</i>)	1
stinging nettle (<i>Urtica dioica</i>)	1
poison-ivy (<i>Toxicodendron rydbergii</i>)	1
lesser burdock (<i>Arctium minus</i>)	1
nodding stickseed (<i>Hackelia deflexa</i> var. <i>americana</i>)	1
Canada goldenrod (<i>Solidago canadensis</i>)	1
Minor tall shrubs	1
Minor short shrubs	1
Minor graminoids	1
Minor forbs and half-shrubs	6

CODE	PEZ-SUB-F	PEZ-SUB-G	PEZ-SUB-H
COMMUNITY NAME	Basket Willow - Dogwood	Basket Willow – Dogwood / Rose / Smooth Brome	Basket Willow
ECOREGION	Prairie Ecozone	Prairie Ecozone	Prairie Ecozone
ECOSITE	Subirrigated	Subirrigated	Subirrigated
STRUCTURAL TYPES	Tall Shrubland	Tall Shrubland	Tall Shrubland
GRAZING STATUS	reference comm.	moderate alteration	moderate alteration

SPECIES COMPOSITION

species measure	% canopy cover	% canopy cover	% canopy cover
number of plots	not available - from existing pub.	not available - from existing pub.	not available - from existing pub.

Major tall shrubs

basket willow (<i>Salix petiolaris</i>)	87	70	73
red-osier dogwood (<i>Cornus sericea</i>)	23	13	
beaked willow (<i>Salix bebbiana</i>)	2	1	
yellow willow (<i>Salix famelica</i>)	1		
sandbar willow (<i>Salix interior</i>)		10	
plane-leaf willow (<i>Salix planifolia</i>)		1	
river birch (<i>Betula occidentalis</i>)			2
thorny buffalo-berry (<i>Shepherdia argentea</i>)			1

Major short shrubs

western snowberry (<i>Symphoricarpos occidentalis</i>)	7	5	6
rose (<i>Rosa</i> spp.)		13	1
wild red raspberry (<i>Rubus idaeus</i>)		4	
northern gooseberry (<i>Ribes oxycanthoides</i>)		1	
wolf-willow (<i>Elaeagnus commutata</i>)			1

Major graminoids

smooth brome (<i>Bromus inermis</i>)	2	33	19
awned sedge (<i>Carex atherodes</i>)	1		
many-headed sedge (<i>Carex sychnocephala</i>)	1		
Kentucky blue-grass (<i>Poa pratensis</i>)		7	6
fowl blue-grass (<i>Poa palustris</i>)		4	1
common timothy (<i>Phleum pratense</i>)		1	1
redtop (<i>Agrostis stolonifera</i>)		4	
marsh reed-grass (<i>Calamagrostis canadensis</i>)		1	
slender wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>)		1	
Baltic rush (<i>Juncus arcticus</i> var. <i>balticus</i>)			12
woolly sedge (<i>Carex pellita</i>)			8

graceful sedge (<i>Carex praeegracilis</i>)			1
tufted hair-grass (<i>Deschampsia cespitosa</i>)			1
giant reed-grass (<i>Phragmites australis</i>)			1
Major forbs and half-shrubs			
sow-thistle (<i>Sonchus</i> spp.)	1	4	6
chamisso's arnica (<i>Arnica chamissonis</i>)	1		
Canada thistle (<i>Cirsium arvense</i>)		1	3
veiny meadow-rue (<i>Thalictrum venulosum</i>)		3	2
Canada goldenrod (<i>Solidago canadensis</i>)		4	
American wild licorice (<i>Glycyrrhiza lepidota</i>)		3	
water smartweed (<i>Persicaria amphibia</i> var. <i>emersum</i>)		1	
yellow avens (<i>Geum aleppicum</i>)		1	
western dock (<i>Rumex occidentalis</i>)		1	
common dandelion (<i>Taraxacum officinale</i>)		1	
white sweet-clover (<i>Melilotus alba</i>)			2
graceful cinquefoil (<i>Potentilla gracilis</i>)			2
silverweed (<i>Argentina anserina</i>)			2
pink wintergreen (<i>Pyrola asarifolia</i>)			2
star-flowered solomon's-seal (<i>Maianthemum stellatum</i>)			1
wild mint (<i>Mentha arvensis</i>)			1
blue-bur (<i>Lappula squarrosa</i>)			1
slender blue beardtongue (<i>Penstemon procerus</i>)			1
rush aster (<i>Symphotrichum boreale</i>)			1
seaside arrow-grass (<i>Triglochin maritimum</i>)			1
Minor tall shrubs			
		1	1
Minor short shrubs			
	1		
Minor graminoids			
		1	1
Minor forbs and half-shrubs			
	2	7	3

CODE	PEZ-SUB-I	PEZ-SUB-J	PEZ-SUB-K
COMMUNITY NAME	Beaked Willow - Dogwood	Beaked Willow – Dogwood / Smooth Brome	Beaked Willow
ECOREGION	Prairie Ecozone	Prairie Ecozone	Prairie Ecozone
ECOSITE	Subirrigated	Subirrigated	Subirrigated
STRUCTURAL TYPES	Tall Shrubland	Tall Shrubland	Tall Shrubland
GRAZING STATUS	reference comm.	minor alteration	moderate alteration

SPECIES COMPOSITION

species measure	% canopy cover	% canopy cover	% canopy cover
number of plots	not available - from existing pub.	not available - from existing pub.	not available - from existing pub.

Major trees

white birch (<i>Betula papyrifera</i>)	1		
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Major tall shrubs

beaked willow (<i>Salix bebbiana</i>)	61	60	56
red-osier dogwood (<i>Cornus sericea</i>)	33	21	
basket willow (<i>Salix petiolaris</i>)	1	3	1
false mountain willow (<i>Salix pseudomonticola</i>)	3		2
saskatoon (<i>Amelanchier alnifolia</i>)	2		
choke-cherry (<i>Prunus virginiana</i>)	1		
sandbar willow (<i>Salix interior</i>)		1	
plane-leaf willow (<i>Salix planifolia</i>)		6	2
yellow willow (<i>Salix famelica</i>)		1	1
myrtle-leaved willow (<i>Salix myrtillifolia</i>)			2

Major short shrubs

rose (<i>Rosa</i> spp.)	6	5	2
western snowberry (<i>Symphoricarpos occidentalis</i>)	5	7	3
northern gooseberry (<i>Ribes oxycanthoides</i>)	1	1	2
wild red raspberry (<i>Rubus idaeus</i>)		1	2

Major prostrate shrubs

creeping juniper (<i>Juniperus horizontalis</i>)		4	
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Major graminoids

redtop (<i>Agrostis stolonifera</i>)	3	3	1
Kentucky blue-grass (<i>Poa pratensis</i>)	3	7	8
smooth brome (<i>Bromus inermis</i>)	3	16	5
manna-grass (<i>Glyceria</i> spp.)	3	7	2

marsh reed-grass (<i>Calamagrostis canadensis</i>)	2	4	4
common timothy (<i>Phleum pratense</i>)	2	2	7
reed canary-grass (<i>Phalaris arundinacea</i>)	7	1	
awned sedge (<i>Carex atherodes</i>)	5	1	
fowl blue-grass (<i>Poa palustris</i>)	1		3
Bebb's sedge (<i>Carex bebbii</i>)	1		
American slough grass (<i>Beckmannia syzigachne</i>)		2	
Torrey's rush (<i>Juncus torreyi</i>)		1	
slender wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>)		1	
western wheat-grass (<i>Pascopyrum smithii</i>)		1	
Baltic rush (<i>Juncus arcticus</i> var. <i>balticus</i>)			6
fringed brome (<i>Bromus ciliatus</i>)			1
mountain sedge (<i>Carex scopulorum</i>)			1
Major forbs and half-shrubs			
field horsetail (<i>Equisetum arvense</i>)	4	2	3
Canada goldenrod (<i>Solidago canadensis</i>)	2	2	1
stinging nettle (<i>Urtica dioica</i>)	1	1	1
common dandelion (<i>Taraxacum officinale</i>)	1	1	2
smooth wild strawberry (<i>Fragaria virginiana</i>)	1	1	1
veiny meadow-rue (<i>Thalictrum venulosum</i>)	2	1	
star-flowered solomon's-seal (<i>Maianthemum stellatum</i>)	2	1	
water-hemlock (<i>Cicuta maculata</i>)	1	1	
Missouri goldenrod (<i>Solidago missouriensis</i>)	6		1
hairy hedge-nettle (<i>Stachys pilosa</i>)	2		1
wild mint (<i>Mentha arvensis</i>)	2		1
western meadow-rue (<i>Thalictrum occidentale</i>)	1		1
geranium (<i>Geranium</i> spp.)	1		2
cut-leaf avens (<i>Geum macrophyllum</i>)	1		1
American vetch (<i>Vicia americana</i>)	1		1
western Canada violet (<i>Viola canadensis</i>)	2		
common fireweed (<i>Chamerion angustifolium</i>)	2		
Lindley's blue aster (<i>Symphotrichum ciliolatum</i>)	1		
northern bedstraw (<i>Galium boreale</i>)	1		
perennial sow-thistle (<i>Sonchus arvensis</i>)		4	2
Canada thistle (<i>Cirsium arvense</i>)		1	1
sweet-scented bedstraw (<i>Galium triflorum</i>)		1	
tufted white prairie aster (<i>Symphotrichum ericoides</i>)		1	
pink wintergreen (<i>Pyrola asarifolia</i>)		1	
long-headed anemone (<i>Anemone cylindrica</i>)		1	
northern willow-herb (<i>Epilobium ciliatum</i>)		1	
sow-thistle (<i>Sonchus</i> spp.)		1	
small yellow water buttercup (<i>Ranunculus gmelinii</i>)		1	
white clover (<i>Trifolium repens</i>)			3

cow-parsnip (<i>Heracleum maximum</i>)			3
small enchanter's-nightshade (<i>Circaea alpina</i>)			2
smooth blue aster (<i>Symphyotrichum laeve</i>)			1
small bedstraw (<i>Galium trifidum</i>)			1
tall buttercup (<i>Ranunculus acris</i>)			1
tall lungwort (<i>Mertensia paniculata</i>)			1
Minor trees			1
Minor tall shrubs		1	2
Minor short shrubs	2	2	2
Minor graminoids	3	2	4
Minor forbs and half-shrubs	8	9	11

CODE	PEZ-SUB-L	PEZ-SUB-M	PEZ-SUB-N
COMMUNITY NAME	Yellow Willow – Red-osier Dogwood / Rose	Yellow Willow – Dogwood – Sandbar Willow / Western Snowberry / Smooth Brome	Yellow Willow – Sandbar Willow
ECOREGION	Prairie Ecozone	Prairie Ecozone	Prairie Ecozone
ECOSITE	Subirrigated	Subirrigated	Subirrigated
STRUCTURAL TYPES	Tall Shrubland	Tall Shrubland	Tall Shrubland
GRAZING STATUS	reference comm.	moderate alteration	significant alteration

SPECIES COMPOSITION

species measure	% canopy cover	% canopy cover	% canopy cover
number of plots	not available - from existing pub.	not available - from existing pub.	not available - from existing pub.

Major trees

plains cottonwood (<i>Populus deltoides</i>)	1	0	
balsam poplar (<i>Populus balsamifera</i>)		1	

Major tall shrubs

yellow willow (<i>Salix famelica</i>)	59	27	37
red-osier dogwood (<i>Cornus sericea</i>)	34	18	
sandbar willow (<i>Salix interior</i>)	3	14	25
western river alder (<i>Alnus incana</i> ssp. <i>tenuifolia</i>)	1	2	1
river birch (<i>Betula occidentalis</i>)		4	
plane-leaf willow (<i>Salix planifolia</i>)		2	
choke-cherry (<i>Prunus virginiana</i>)		1	
thorny buffalo-berry (<i>Shepherdia argentea</i>)		1	
basket willow (<i>Salix petiolaris</i>)		1	
saskatoon (<i>Amelanchier alnifolia</i>)		3	1
shining willow (<i>Salix lucida</i>)			5
beaked willow (<i>Salix bebbiana</i>)			1

Major short shrubs

rose (<i>Rosa</i> spp.)	10	9	7
western snowberry (<i>Symphoricarpos occidentalis</i>)	3	10	4
northern gooseberry (<i>Ribes oxycanthoides</i>)	1	1	
golden currant (<i>Ribes aureum</i>)		1	
wolf-willow (<i>Elaeagnus commutata</i>)			3

Major graminoids

smooth brome (<i>Bromus inermis</i>)	2	21	1
northern wheat-grass (<i>Elymus lanceolatus</i>)	4		
Sprengel's sedge (<i>Carex sprengei</i>)	3		
western wheat-grass (<i>Pascopyrum smithii</i>)	1		
slender wedge-grass (<i>Sphenopholis intermedia</i>)	1		
Kentucky blue-grass (<i>Poa pratensis</i>)		3	4
Baltic rush (<i>Juncus arcticus</i> var. <i>balticus</i>)		2	1
redtop (<i>Agrostis stolonifera</i>)		1	3
fowl blue-grass (<i>Poa palustris</i>)		1	5
marsh reed-grass (<i>Calamagrostis canadensis</i>)		1	2
quack grass (<i>Elymus repens</i>)		1	
slender wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>)		1	
reed canary-grass (<i>Phalaris arundinacea</i>)			3
rough hairgrass (<i>Agrostis scabra</i>)			2
small-fruited bulrush (<i>Scirpus microcarpus</i>)			1

Major forbs and half-shrubs

Canada thistle (<i>Cirsium arvense</i>)	2	2	1
Canada goldenrod (<i>Solidago canadensis</i>)	1	1	1
star-flowered solomon's-seal (<i>Maianthemum stellatum</i>)	2	2	
goldenrod (<i>Solidago</i> spp.)	1	2	
western Canada violet (<i>Viola canadensis</i>)	4		
northern bedstraw (<i>Galium boreale</i>)	3		
dogbane (<i>Apocynum</i> spp.)	1		
spiny-leaved annual sow-thistle (<i>Sonchus asper</i>)	1		
wild sarsaparilla (<i>Aralia nudicaulis</i>)	1		
marsh skullcap (<i>Scutellaria galericulata</i>)	1		
wild mint (<i>Mentha arvensis</i>)	1		
American wild licorice (<i>Glycyrrhiza lepidota</i>)		2	1
field horsetail (<i>Equisetum arvense</i>)		1	2
American vetch (<i>Vicia americana</i>)		2	
western white clematis (<i>Clematis ligusticifolia</i>)		2	
stinging nettle (<i>Urtica dioica</i>)		1	
late goldenrod (<i>Solidago gigantea</i>)		1	
fringed loosestrife (<i>Lysimachia ciliata</i>)		1	
common tansy (<i>Tanacetum vulgare</i>)		1	
white sweet-clover (<i>Melilotus alba</i>)			2
common plantain (<i>Plantago major</i>)			1
silverweed (<i>Argentina anserina</i>)			1
northern willow-herb (<i>Epilobium ciliatum</i>)			1
western willow aster (<i>Symphotrichum lanceolatum</i> var. <i>hesperium</i>)			1

Major bryophytes			
sphagnum moss (Sphagnum spp.)	8		
Minor tall shrubs	2	1	1
Minor short shrubs	1	1	0
Minor graminoids	3	1	4
Minor forbs and half-shrubs	4	5	4

CODE	PEZ-SUB-O	PEZ-SUB-P
COMMUNITY NAME	Creeping Juniper - Bearberry / Wild Licorice	River Birch - Wolf-willow / Creeping Juniper - Bearberry
ECOREGION	Prairie Ecozone	Prairie Ecozone
ECOSITE	Subirrigated (sand)	Subirrigated (sand)
STRUCTURAL TYPES	Prostrate Shrubland	Tall Shrubland
GRAZING STATUS	unknown	unknown

SPECIES COMPOSITION

species measure	% cover	% cover
number of plots	n=6	n=7

Major trees

trembling aspen (<i>Populus tremuloides</i>)		1
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Major tall shrubs

river birch (<i>Betula occidentalis</i>)		3
beaked willow (<i>Salix bebbiana</i>)		3
choke cherry (<i>Prunus virginiana</i>)		1
wolf-willow (<i>Elaeagnus commutata</i>)	2	13

Major short shrubs

western snowberry (<i>Symphoricarpos occidentalis</i>)	2	3
rose (genus) (<i>Rosa</i> spp.)		4

Major prostrate shrubs

creeping juniper (<i>Juniperus horizontalis</i>)	34	24
common bearberry (<i>Arctostaphylos uva-ursi</i>)	19	17

Major graminoids

hay sedge (<i>Carex siccata</i>)		2
sand-grass (<i>Calamovilfa longifolia</i>)	1	1
sun-loving sedge (<i>Carex inops</i>)		1
little bluestem (<i>Schizachyrium scoparium</i>)	1	1
June grass (<i>Koeleria macrantha</i>)		1
blunt sedge (<i>Carex obtusata</i>)		1
blue grama (<i>Bouteloua gracilis</i>)	1	
graceful sedge (<i>Carex praegracilis</i>)	1	
western wheat-grass (<i>Pascopyrum smithii</i>)	1	
low sedge (<i>Carex duriuscula</i>)	1	

Major forbs and half-shrubs		
American wild licorice (<i>Glycyrrhiza lepidota</i>)	2	1
pasture sage (<i>Artemisia frigida</i>)	1	1
golden bean (<i>Thermopsis rhombifolia</i>)		1
horsetail (genus) (<i>Equisetum</i> spp.)		1
Minor graminoids		
	3	3
Minor forbs and half-shrubs		
	2	3

CODE	PEZ-SUB-Q	PEZ-SUB-R	PEZ-SUB-S
COMMUNITY NAME	Aspen / Dogwood – Saskatoon – Choke-cherry	Aspen / Dogwood / Snowberry – Rose / Smooth Brome – Kentucky Blue- grass	Aspen / Kentucky Blue- grass – Smooth Brome
ECOREGION	Prairie Ecozone	Prairie Ecozone	Prairie Ecozone
ECOSITE	Overflow and Subirrigated	Overflow and Subirrigated	Overflow and Subirrigated
STRUCTURAL TYPES	Closed Forest	Closed Forest	Closed Forest
GRAZING STATUS	reference comm.	moderate alteration	significant alteration

SPECIES COMPOSITION

species measure	% canopy cover	% canopy cover	% canopy cover
number of plots	not available - from existing pub.	not available - from existing pub.	not available - from existing pub.

Major trees

trembling aspen (<i>Populus tremuloides</i>)	44	64	86
balsam poplar (<i>Populus balsamifera</i>)	8	4	
narrow-leaved cottonwood (<i>Populus angustifolia</i>)	1		

Major tall shrubs

red-osier dogwood (<i>Cornus sericea</i>)	15	13	
saskatoon (<i>Amelanchier alnifolia</i>)	11	5	
choke-cherry (<i>Prunus virginiana</i>)	10	4	
beaked willow (<i>Salix bebbiana</i>)	1	8	
low bush-cranberry (<i>Viburnum edule</i>)	2		
beaked hazelnut (<i>Corylus cornuta</i>)	1		
round-leaved hawthorn (<i>Crataegus chrysocarpa</i>)		1	

Major short shrubs

wild red raspberry (<i>Rubus idaeus</i>)	6	7	1
rose (<i>Rosa</i> spp.)	6	12	4
western snowberry (<i>Symphoricarpos occidentalis</i>)	3	16	3
northern snowberry (<i>Symphoricarpos albus</i>)	1	1	
wild black currant (<i>Ribes americanum</i>)	1		
Canada buffalo-berry (<i>Shepherdia canadensis</i>)	1		
northern gooseberry (<i>Ribes oxycanthoides</i>)		3	1

Major graminoids			
Kentucky blue-grass (<i>Poa pratensis</i>)	3	10	19
smooth brome (<i>Bromus inermis</i>)	1	23	12
marsh reed-grass (<i>Calamagrostis canadensis</i>)	1	1	6
reed-grass (<i>Calamagrostis</i> spp.)	1		
Sprengel's sedge (<i>Carex sprengelii</i>)	1		
common timothy (<i>Phleum pratense</i>)		1	9
Virginia wild-rye (<i>Elymus virginicus</i>)		1	
awned sedge (<i>Carex atherodes</i>)		1	
western wheat-grass (<i>Pascopyrum smithii</i>)		1	
fowl blue-grass (<i>Poa palustris</i>)			4
quack grass (<i>Elymus repens</i>)			4
woolly sedge (<i>Carex pellita</i>)			2
slender wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>)			1
narrow reed-grass (<i>Calamagrostis stricta</i> ssp. <i>stricta</i>)			1
Major forbs and half-shrubs			
northern bedstraw (<i>Galium boreale</i>)	2	2	1
Richardson's geranium (<i>Geranium richardsonii</i>)	1	1	2
field horsetail (<i>Equisetum arvense</i>)	1	2	1
smooth wild strawberry (<i>Fragaria virginiana</i>)	1	2	1
American vetch (<i>Vicia americana</i>)	1	1	1
western Canada violet (<i>Viola canadensis</i>)	3	2	
star-flowered solomon's-seal (<i>Maianthemum stellatum</i>)	1	4	
purple clematis (<i>Clematis occidentalis</i>)	1	1	
wild sarsaparilla (<i>Aralia nudicaulis</i>)	5		
tall lungwort (<i>Mertensia paniculata</i>)	1		
baneberry (<i>Actaea rubra</i>)	1		
veiny meadow-rue (<i>Thalictrum venulosum</i>)		2	1
Canada thistle (<i>Cirsium arvense</i>)		2	1
common dandelion (<i>Taraxacum officinale</i>)		1	2
smooth blue aster (<i>Symphyotrichum laeve</i>)		1	1
common fireweed (<i>Chamerion angustifolium</i>)		1	
pink wintergreen (<i>Pyrola asarifolia</i>)		1	
grooved agrimony (<i>Agrimonia striata</i>)		1	
cow-parsnip (<i>Heracleum maximum</i>)			4
Lindley's blue aster (<i>Symphyotrichum ciliolatum</i>)			1
Canada goldenrod (<i>Solidago canadensis</i>)			1
Minor tall shrubs	1	1	1
Minor short shrubs	2	1	0
Minor graminoids	1	3	2
Minor forbs and half-shrubs	7	7	7

CODE	AP-SUB-A	AP-SUB-B	AP-SUB-C
COMMUNITY NAME	Balsam Poplar - Aspen / Dogwood / Sarsaparilla	Balsam Poplar - Aspen / Snowberry - Rose	Balsam Poplar / Smooth Brome - Kentucky Blue- grass
ECOREGION	Aspen Parkland	Aspen Parkland	Aspen Parkland
ECOSITE	Overflow and Subirrigated	Overflow and Subirrigated	Overflow and Subirrigated
STRUCTURAL TYPES	Closed Forest	Open Forest	Open Forest
GRAZING STATUS	Reference comm	Signif alteration	Severe alteration

SPECIES COMPOSITION

species measure	% cover	% cover	% canopy cover
number of plots	n=22	n=8	not available - from existing pub.

Major trees

balsam poplar (<i>Populus balsamifera</i>)	31	27	58
trembling aspen (<i>Populus tremuloides</i>)	20	11	1
white birch (<i>Betula papyrifera</i>)	2		
jack poplar (<i>Populus X jackii</i>)	2		
Manitoba maple (<i>Acer negundo</i>)	1		

Major tall shrubs

beaked hazelnut (<i>Corylus cornuta</i>)	3	3	1
willow (genus) (<i>Salix</i> spp.)	1		2
choke cherry (<i>Prunus virginiana</i>)	4	1	
saskatoon (<i>Amelanchier alnifolia</i>)	3	1	
red-osier dogwood (<i>Cornus sericea</i>)	14		
pin cherry (<i>Prunus pensylvanica</i>)	2		
high bush-cranberry (<i>Viburnum opulus</i>)	2		
European buckthorn (<i>Rhamnus cathartica</i>)	1		

Major short shrubs

rose (genus) (<i>Rosa</i> spp.)	5	10	1
wild red raspberry (<i>Rubus idaeus</i>)	3	1	1
western snowberry (<i>Symphoricarpos occidentalis</i>)	2	12	2
Canada buffalo-berry (<i>Shepherdia canadensis</i>)	1	2	
northern snowberry (<i>Symphoricarpos albus</i>)	1		
poison-ivy (<i>Toxicodendron rydbergii</i>)	1		
northern gooseberry (<i>Ribes oxycanthoides</i>)		2	
wolf-willow (<i>Elaeagnus commutata</i>)			1

Major prostrate shrubs

common bearberry (<i>Arctostaphylos uva-ursi</i>)	1		
creeping juniper (<i>Juniperus horizontalis</i>)	1		

Major graminoids

Kentucky blue-grass (<i>Poa pratensis</i>)	1	2	11
sedge (genus) (<i>Carex</i> spp.)	1		1
rough-leaved rice-grass (<i>Oryzopsis asperifolia</i>)	2	1	
false melic grass (<i>Schizachne purpurascens</i>)	1		
smooth brome (<i>Bromus inermis</i>)			26
common timothy (<i>Phleum pratense</i>)			8
rough hairgrass (<i>Agrostis scabra</i>)			1
quack grass (<i>Elymus repens</i>)			1
marsh reed-grass (<i>Calamagrostis canadensis</i>)			1
fox-tail barley (<i>Hordeum jubatum</i>)			1
reed canary-grass (<i>Phalaris arundinacea</i>)			1
fowl blue-grass (<i>Poa palustris</i>)			1
western wheat-grass (<i>Pascopyrum smithii</i>)			1

Major forbs and half-shrubs

wild sarsaparilla (<i>Aralia nudicaulis</i>)	11	6	2
Canada thistle (<i>Cirsium arvense</i>)	1		1
dewberry (<i>Rubus pubescens</i>)	1		
violet (genus) (<i>Viola</i> spp.)	1		
raspberry (genus) (<i>Rubus</i> spp.)	1		
meadow horsetail (<i>Equisetum pratense</i>)	1		
wild lily-of-the-valley (<i>Maianthemum canadense</i>)	1		
smooth wild strawberry (<i>Fragaria virginiana</i>)		1	
northern bedstraw (<i>Galium boreale</i>)		1	
purple vetchling (<i>Lathyrus venosus</i>)		1	
Richardson's geranium (<i>Geranium richardsonii</i>)			2
stinging nettle (<i>Urtica dioica</i>)			1
wavy-leaved thistle (<i>Cirsium undulatum</i>)			1
star-flowered solomon's-seal (<i>Maianthemum stellatum</i>)			1
common dandelion (<i>Taraxacum officinale</i>)			1
field horsetail (<i>Equisetum arvense</i>)			1
Canada goldenrod (<i>Solidago canadensis</i>)			1
cow-parsnip (<i>Heracleum maximum</i>)			1
American wild licorice (<i>Glycyrrhiza lepidota</i>)			1
sweet-scented bedstraw (<i>Galium triflorum</i>)			1
late goldenrod (<i>Solidago gigantea</i>)			1
butter-and-eggs (<i>Linaria vulgaris</i>)			1
western sweet-cicely (<i>Osmorhiza berteroi</i>)			1
tall coneflower (<i>Rudbeckia laciniata</i>)			1

meadow-rue (<i>Thalictrum</i> spp.)			1
western Canada violet (<i>Viola canadensis</i>)			1
Minor tall shrubs	1	1	1
Minor short shrubs	1	1	1
Minor graminoids	1	1	1
Minor forbs and half-shrubs	5	3	9

CODE	MG-SUB-C	MG-SUB-D	MG-SUB-E
COMMUNITY NAME	Plains Cottonwood / Dogwood – Willow	Plains Cottonwood / Snowberry - Rose	Plains Cottonwood / Smooth Brome
ECOREGION	Mixed and Dry Mixed Grassland	Mixed and Dry Mixed Grassland	Mixed and Dry Mixed Grassland
ECOSITE	Overflow and Subirrigated	Overflow and Subirrigated	Overflow and Subirrigated
STRUCTURAL TYPES	Open Forest	Open Forest	Open Forest
GRAZING STATUS	reference comm	significant alteration	severe alteration

SPECIES COMPOSITION

species measure	% canopy cover	% canopy cover	% canopy cover
number of plots	not available - from existing pub.	not available - from existing pub.	not available - from existing pub.

Major trees

plains cottonwood (<i>Populus deltoides</i>)	56	51	65
lance-leaved cottonwood (<i>Populus x acuminata</i>)	9		
balsam poplar (<i>Populus balsamifera</i>)	5	2	
narrow-leaved cottonwood (<i>Populus angustifolia</i>)	2	1	
peach-leaved willow (<i>Salix amygdaloides</i>)		1	

Major tall shrubs

red-osier dogwood (<i>Cornus sericea</i>)	50		
yellow willow (<i>Salix famelica</i>)	17	4	
sandbar willow (<i>Salix interior</i>)	8	7	1
thorny buffalo-berry (<i>Shepherdia argentea</i>)		5	
choke-cherry (<i>Prunus virginiana</i>)	5	2	
riverbank grape (<i>Vitis riparia</i>)		2	
western river alder (<i>Alnus incana</i> ssp. <i>tenuifolia</i>)	1		

Major short shrubs

western snowberry (<i>Symphoricarpos occidentalis</i>)	1	25	2
rose (<i>Rosa</i> spp.)	10	18	

Major graminoids

smooth brome (<i>Bromus inermis</i>)	8	7	14
western wheat-grass (<i>Pascopyrum smithii</i>)	1	9	5
Canada wild-rye (<i>Elymus canadensis</i>)		4	7
quack grass (<i>Elymus repens</i>)	2	1	6
marsh muhly (<i>Muhlenbergia racemosa</i>)		1	5

Kentucky blue-grass (<i>Poa pratensis</i>)		5	3
northern wheat-grass (<i>Elymus lanceolatus</i>)	5		
slender wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>)			3
fowl blue-grass (<i>Poa palustris</i>)		2	2
fox-tail barley (<i>Hordeum jubatum</i>)	2	1	
blue-grass (<i>Poa</i> spp.)		2	
redtop (<i>Agrostis stolonifera</i>)		2	
downy brome (<i>Bromus tectorum</i>)		1	
prairie cord-grass (<i>Spartina pectinata</i>)			1
sand-grass (<i>Calamovilfa longifolia</i>)			1
Major forbs			
Canada goldenrod (<i>Solidago canadensis</i>)	13	1	3
star-flowered solomon's-seal (<i>Maianthemum stellatum</i>)	7	2	
American wild licorice (<i>Glycyrrhiza lepidota</i>)	2	2	4
poison-ivy (<i>Toxicodendron rydbergii</i>)		4	
perennial sow-thistle (<i>Sonchus arvensis</i>)		3	
white sweet-clover (<i>Melilotus alba</i>)	2	1	2
Indian hemp (<i>Apocynum cannabinum</i>)			2
field horsetail (<i>Equisetum arvense</i>)			2
leafy spurge (<i>Euphorbia esula</i>)	2	2	
western white clematis (<i>Clematis ligusticifolia</i>)		2	
Canada thistle (<i>Cirsium arvense</i>)		2	
late goldenrod (<i>Solidago gigantea</i>)		1	1
absinthe (<i>Artemisia absinthium</i>)			1
golden bean (<i>Thermopsis rhombifolia</i>)		1	1
long-headed anemone (<i>Anemone cylindrica</i>)	1		
wild sarsaparilla (<i>Aralia nudicaulis</i>)	1		
fringed loosestrife (<i>Lysimachia ciliata</i>)	1		
yellow sweet-clover (<i>Melilotus officinalis</i>)		1	
spreading dogbane (<i>Apocynum androsaemifolium</i>)		1	
alfalfa (<i>Medicago sativa</i>)		1	
curled dock (<i>Rumex crispus</i>)		1	
American vetch (<i>Vicia americana</i>)	1		
Minor trees			
	1	0	1
Minor tall shrubs			
	0	1	2
Minor short shrubs			
	1	2	1
Minor graminoids			
	1	3	1
Minor forbs			
	3	3	4

CODE	AP-SUB-D
COMMUNITY NAME	Balsam Poplar - Aspen / Willow - River Birch
ECOREGION	Aspen Parkland
ECOSITE	Subirrigated (sand)
STRUCTURAL TYPES	Open Forest
GRAZING STATUS	unknown

SPECIES COMPOSITION

species measure	% cover
number of plots	n=10

Major trees

balsam poplar (<i>Populus balsamifera</i>)	28
trembling aspen (<i>Populus tremuloides</i>)	11

Major tall shrubs

willow (<i>Salix</i> spp.)	15
river birch (<i>Betula occidentalis</i>)	15
saskatoon (<i>Amelanchier alnifolia</i>)	2
red-osier dogwood (<i>Cornus sericea</i> ssp. <i>stolonifera</i>)	1

Major short shrubs

rose (<i>Rosa</i> spp.)	5
western snowberry (<i>Symphoricarpos occidentalis</i>)	4
wolf-willow (<i>Elaeagnus commutata</i>)	2

Major graminoids

sedge (<i>Carex</i> spp.)	2
smooth brome (<i>Bromus inermis</i>)	2
fowl manna grass (<i>Glyceria striata</i>)	2

Major forbs

wild sarsaparilla (<i>Aralia nudicaulis</i>)	4
smooth wild strawberry (<i>Fragaria virginiana</i>)	1

Minor graminoids

	1
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Minor forbs

	4
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CODE	AP-SUB-E	MG-SUB-F
COMMUNITY NAME	Balsam Poplar, Recent Alluvium	Plains Cottonwood, Recent Alluvium
ECOREGION	Aspen Parkland	Mixed and Dry Mixed Grassland
ECOSITE	Subirrigated (recent alluvium)	Subirrigated (recent alluvium)
STRUCTURAL TYPES	Open Forest	Open Forest
GRAZING STATUS	unknown	unknown

SPECIES COMPOSITION

species measure	% canopy cover	% canopy cover
number of plots	not available - from existing pub.	not available - from existing pub.

Major trees

balsam poplar (<i>Populus balsamifera</i>)	43	
plains cottonwood (<i>Populus deltoides</i>)		31
narrow-leaved cottonwood (<i>Populus angustifolia</i>)	3	2
peach-leaved willow (<i>Salix amygdaloides</i>)		4

Major tall shrubs

sandbar willow (<i>Salix interior</i>)	6	13
yellow willow (<i>Salix famelica</i>)	3	1
western river alder (<i>Alnus incana</i> ssp. <i>tenuifolia</i>)	4	
shining willow (<i>Salix lucida</i>)	2	
river birch (<i>Betula occidentalis</i>)	1	
wolf-willow (<i>Elaeagnus commutata</i>)	1	
Scouler's willow (<i>Salix scouleriana</i>)	1	

Major short shrubs

Wood's rose (<i>Rosa woodsii</i>)	1	
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Major graminoids

redtop (<i>Agrostis stolonifera</i>)	1	1
marsh reed-grass (<i>Calamagrostis canadensis</i>)	8	
fowl blue-grass (<i>Poa palustris</i>)	3	
northern wheat-grass (<i>Elymus lanceolatus</i>)	2	
smooth brome (<i>Bromus inermis</i>)	1	
quack grass (<i>Elymus repens</i>)	1	
western wheat-grass (<i>Pascopyrum smithii</i>)		4

three-square bulrush (<i>Schoenoplectus pungens</i>)		4
reed canary-grass (<i>Phalaris arundinacea</i>)		3
Canada wild-rye (<i>Elymus canadensis</i>)		2
barnyard grass (<i>Echinochloa crusgalli</i>)		2
marsh muhly (<i>Muhlenbergia racemosa</i>)		1
sand dropseed (<i>Sporobolus cryptandrus</i>)		1
slender wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>)		1

Major forbs

field horsetail (<i>Equisetum arvense</i>)	1	1
Canadian bunchberry (<i>Cornus canadensis</i>)	7	
western meadow-rue (<i>Thalictrum occidentale</i>)	7	
cow-parsnip (<i>Heracleum maximum</i>)	3	
white sweet-clover (<i>Melilotus alba</i>)	2	
star-flowered solomon's-seal (<i>Maianthemum stellatum</i>)	2	
Indian hemp (<i>Apocynum cannabinum</i>)	1	
fireweed (<i>Chamerion angustifolium</i>)	1	
late goldenrod (<i>Solidago gigantea</i>)	1	
clasping-leaf twisted-stalk (<i>Streptopus amplexifolius</i>)	1	
western willow aster (<i>Symphiotrichum lanceolatum</i> var. <i>hesperium</i>)	1	
common dandelion (<i>Taraxacum officinale</i>)	1	
cocklebur (<i>Xanthium strumarium</i>)		4
graceful cinquefoil (<i>Potentilla gracilis</i>)		2
prostrate knotweed (<i>Polygonum aviculare</i>)		1
water smartweed (<i>Persicaria amphibia</i>)		1
Canada thistle (<i>Cirsium arvense</i>)		1
American wild licorice (<i>Glycyrrhiza lepidota</i>)		1

Minor tall shrubs	1	0
Minor graminoids	1	2
Minor forbs	3	3

CODE	PEZ-SUB-T	PEZ-SUB-U
COMMUNITY NAME	Ash - Maple / Choke-cherry	Ash - Maple / Smooth Brome
ECOREGION	Prairie Ecozone	Prairie Ecozone
ECOSITE	Overflow & Subirrigated	Overflow & Subirrigated
STRUCTURAL TYPES	Open Forest	Open Forest
GRAZING STATUS	reference comm.	significant alteration

SPECIES COMPOSITION

species measure	% cover	% cover
number of plots	n=11	n=12

Major trees

green ash (<i>Fraxinus pennsylvanica</i>)	25	14
Manitoba maple (<i>Acer negundo</i>)	21	15
balsam poplar (<i>Populus balsamifera</i>)	2	
trembling aspen (<i>Populus tremuloides</i>)	1	
jack poplar (<i>Populus X jackii</i>)		3

Major tall shrubs

pin cherry (<i>Prunus pensylvanica</i>)	8	
willow (genus) (<i>Salix</i> spp.)	3	
European buckthorn (<i>Rhamnus cathartica</i>)	2	
beaked hazelnut (<i>Corylus cornuta</i>)	1	
choke cherry (<i>Prunus virginiana</i>)	13	5
saskatoon (<i>Amelanchier alnifolia</i>)	3	5
high bush-cranberry (<i>Viburnum opulus</i>)	2	2
red-osier dogwood (<i>Cornus sericea</i> ssp. <i>stolonifera</i>)	1	3
yellow willow (<i>Salix famelica</i>)		1
sandbar willow (<i>Salix interior</i>)		1
wolf-willow (<i>Elaeagnus commutata</i>)		1

Major short shrubs

western snowberry (<i>Symphoricarpos occidentalis</i>)	5	7
poison-ivy (<i>Toxicodendron rydbergii</i>)	1	2
northern gooseberry (<i>Ribes oxycanthoides</i>)		1
Wood's rose (<i>Rosa woodsii</i>)		1

Major prostrate shrubs

creeping juniper (<i>Juniperus horizontalis</i>)		1
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Major graminoids

blue wild-rye (<i>Elymus glaucus</i>)	1	
Sprengel's sedge (<i>Carex sprengelii</i>)	6	1
Kentucky blue-grass (<i>Poa pratensis</i>)		4
smooth brome (<i>Bromus inermis</i>)		16

Major forbs and half-shrubs

wild sarsaparilla (<i>Aralia nudicaulis</i>)	3	
sweet-scented bedstraw (<i>Galium triflorum</i>)	1	
black snakeroot (<i>Sanicula marilandica</i>)	1	
Pennsylvania pellitory (<i>Parietaria pensylvanica</i>)	1	
Fremont's goosefoot (<i>Chenopodium fremontii</i>)	1	
western Canada violet (<i>Viola canadensis</i>)	7	1
stinging nettle (<i>Urtica dioica</i>)	1	1
lesser burdock (<i>Arctium minus</i>)		1
leafy spurge (<i>Euphorbia esula</i>)		1
Canada goldenrod (<i>Solidago canadensis</i>)		1

Minor trees	1	0
Minor tall shrubs	0	1
Minor short shrubs	1	0
Minor graminoids	2	1
Minor forbs	4	4

MEADOW AND MARSH ECOSITES

CODE	PEZ-WMD-A
COMMUNITY NAME	Reed-grass - Baltic Rush
ECOREGION	Prairie Ecozone
ECOSITE	Wet Meadow
STRUCTURAL TYPE	Grassland
GRAZING STATUS	reference comm.

SPECIES COMPOSITION

species measure	% canopy cover
number of plots	not available - from existing pub.

Major graminoids

Narrow reed-grass (<i>Calamagrostis stricta</i> ssp. <i>stricta</i>)	33
Northern reed-grass (<i>Calamagrostis stricta</i> ssp. <i>inexpansa</i>)	29
Baltic rush (<i>Juncus arcticus</i> var. <i>balticus</i>)	12
fowl blue-grass (<i>Poa palustris</i>)	6
fox-tail barley (<i>Hordeum jubatum</i>)	4
woolly sedge (<i>Carex pellita</i>)	3
western wheat-grass (<i>Pascopyrum smithii</i>)	2
Kentucky blue-grass (<i>Poa pratensis</i>)	2
tufted hair-grass (<i>Deschampsia cespitosa</i>)	1

Major forbs and half-shrubs

wild mint (<i>Mentha arvensis</i>)	4
stinging nettle (<i>Urtica dioica</i>)	3
silverweed (<i>Argentina anserina</i>)	2
sow-thistle (<i>Sonchus</i> spp.)	2
white sweet-clover (<i>Melilotus alba</i>)	2
Pennsylvania cinquefoil (<i>Potentilla pensylvanica</i>)	2
violet (<i>Viola</i> spp.)	1
Canada thistle (<i>Cirsium arvense</i>)	1

Minor graminoids	1
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Minor forbs and half-shrubs	4
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CODE	PEZ-WMD-B	PEZ-WMD-C
COMMUNITY NAME	Woolly Sedge	Woolly Sedge - Baltic Rush
ECOREGION	Prairie Ecozone	Prairie Ecozone
ECOSITE	Wet Meadow	Wet Meadow
STRUCTURAL TYPE	Grassland	Grassland
GRAZING STATUS	reference comm.	moderate alteration

SPECIES COMPOSITION

species measure	% canopy cover	% canopy cover
number of plots	not available - from existing pub.	not available - from existing pub.

Major graminoids

woolly sedge (<i>Carex pellita</i>)	65	51
three-square bulrush (<i>Schoenoplectus pungens</i>)	3	4
creeping spike-rush (<i>Eleocharis palustris</i>)	6	
hairy-fruited sedge (<i>Carex lasiocarpa</i>)	4	
sweet grass (<i>Anthoxanthum hirtum</i>)	1	
Baltic rush (<i>Juncus arcticus</i> var. <i>balticus</i>)		17
narrow reed-grass (<i>Calamagrostis stricta</i> ssp. <i>stricta</i>)		6
redtop (<i>Agrostis stolonifera</i>)		6
marsh reed-grass (<i>Calamagrostis canadensis</i>)		4
reed canary-grass (<i>Phalaris arundinacea</i>)		4
fowl blue-grass (<i>Poa palustris</i>)		4
Kentucky blue-grass (<i>Poa pratensis</i>)		3
beaked sedge (<i>Carex utriculata</i>)		2
Bebb's sedge (<i>Carex bebbii</i>)		1
tufted hair-grass (<i>Deschampsia cespitosa</i>)		1
quack grass (<i>Elymus repens</i>)		1
common timothy (<i>Phleum pratense</i>)		1

Major forbs and half-shrubs

fireweed (<i>Chamerion angustifolium</i>)	2	
water-hemlock (<i>Cicuta maculata</i>)		6
silverweed (<i>Argentina anserina</i>)		4
field horsetail (<i>Equisetum arvense</i>)		4
marsh cinquefoil (<i>Comarum palustre</i>)		3
western aster (<i>Symphotrichum ascendens</i>)		3
wild mint (<i>Mentha arvensis</i>)		2
Canada thistle (<i>Cirsium arvense</i>)		1
water smartweed (<i>Persicaria amphibia</i>)		1

CODE	PEZ-WMD-D	PEZ-WMD-E
COMMUNITY NAME	Tufted Hair-grass	Tufted Hair-grass - Forbs
ECOREGION	Prairie Ecozone	Prairie Ecozone
ECOSITE	Wet Meadow	Wet Meadow
STRUCTURAL TYPE	Grassland	Grassland
GRAZING STATUS	reference comm.	minor alteration
SPECIES COMPOSITION		
species measure	% canopy cover	% canopy cover
number of plots	not available - from existing pub.	not available - from existing pub.
Major graminoids		
tufted hair-grass (<i>Deschampsia cespitosa</i>)	77	70
fox-tail barley (<i>Hordeum jubatum</i>)	3	4
inland salt grass (<i>Distichlis spicata</i> var. <i>stricta</i>)	1	1
slender wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>)	1	1
creeping spike-rush (<i>Eleocharis palustris</i>)	3	
three-square bulrush (<i>Schoenoplectus pungens</i>)	3	
Baltic rush (<i>Juncus arcticus</i> var. <i>balticus</i>)	1	
rough hairgrass (<i>Agrostis scabra</i>)		4
fowl blue-grass (<i>Poa palustris</i>)		3
western wheat-grass (<i>Pascopyrum smithii</i>)		1
awned sedge (<i>Carex atherodes</i>)		1
Major forbs and half-shrubs		
red samphire (<i>Salicornia rubra</i>)	1	
silverweed (<i>Argentina anserina</i>)		5
bastard toadflax (<i>Comandra umbellata</i>)		5
western aster (<i>Symphotrichum ascendens</i>)		5
chamisso's arnica (<i>Arnica chamissonis</i>)		4
northern ragwort (<i>Packera streptanthifolia</i>)		1
western sea-blite (<i>Suaeda calceoliformis</i>)		1
Minor graminoids		1
Minor forbs and half-shrubs		3

CODE	PEZ-WMD-F
COMMUNITY NAME	Baltic Rush
ECOREGION	Prairie Ecozone
ECOSITE	Wet Meadow
STRUCTURAL TYPE	Grassland
GRAZING STATUS	significant alteration

SPECIES COMPOSITION

species measure	% canopy cover
number of plots	not available - from existing pub.

Major graminoids

Baltic rush (<i>Juncus arcticus</i> var. <i>balticus</i>)	84
fox-tail barley (<i>Hordeum jubatum</i>)	9
fowl blue-grass (<i>Poa palustris</i>)	2
Kentucky blue-grass (<i>Poa pratensis</i>)	1
marsh reed-grass (<i>Calamagrostis canadensis</i>)	1
Canada blue-grass (<i>Poa compressa</i>)	1
bluebunch wheat-grass (<i>Pseudoroegneria spicata</i>)	1

Major forbs and half-shrubs

rayless groundsel (<i>Packera indecora</i>)	3
cuckoo-flower (<i>Cardamine pratensis</i>)	1
glaucous willowherb (<i>Epilobium glaberrimum</i>)	1
wild mint (<i>Mentha arvensis</i>)	1
seaside arrow-grass (<i>Triglochin maritimum</i>)	1
perennial sow-thistle (<i>Sonchus arvensis</i>)	1
prickly lettuce (<i>Lactuca serriola</i>)	1

Minor graminoids	2
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Minor forbs and half-shrubs	2
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CODE	PEZ-WMD-G	PEZ-WMD-H
COMMUNITY NAME	Basket Willow / Awned Sedge	Basket Willow / Awned Sedge - Sow-thistle
ECOREGION	Prairie Ecozone	Prairie Ecozone
ECOSITE	Wet Meadow	Wet Meadow
STRUCTURAL TYPE	Tall Shrubland	Tall Shrubland
GRAZING STATUS	reference comm.	moderate alteration

SPECIES COMPOSITION

species measure	% canopy cover	% canopy cover
number of plots	not available - from existing pub.	not available - from existing pub.

Major tall shrubs

basket willow (<i>Salix petiolaris</i>)	96	81
red-osier dogwood (<i>Cornus sericea</i>)	1	6
beaked willow (<i>Salix bebbiana</i>)		1
plane-leaf willow (<i>Salix planifolia</i>)		1

Major short shrubs

rose (<i>Rosa</i> spp.)		2
western snowberry (<i>Symphoricarpos occidentalis</i>)		1
northern gooseberry (<i>Ribes oxycanthoides</i>)		1
bog birch (<i>Betula glandulosa</i>)		1

Major graminoids

awned sedge (<i>Carex atherodes</i>)	24	11
fowl blue-grass (<i>Poa palustris</i>)	3	2
smooth brome (<i>Bromus inermis</i>)		4
Kentucky blue-grass (<i>Poa pratensis</i>)		4
prairie sedge (<i>Carex prairea</i>)		4
redtop (<i>Agrostis stolonifera</i>)		3
beaked sedge (<i>Carex utriculata</i>)		3
alpine foxtail (<i>Alopecurus alpinus</i>)		2
water sedge (<i>Carex aquatilis</i>)		2
Rocky Mountain fescue (<i>Festuca saximontana</i>)		1
spangletop (<i>Scolochloa festucacea</i>)		1

Major forbs and half-shrubs		
perennial sow-thistle (<i>Sonchus arvensis</i>)	1	11
wild mint (<i>Mentha arvensis</i>)	1	1
common dandelion (<i>Taraxacum officinale</i>)		1
long-headed anemone (<i>Anemone cylindrica</i>)		4
yellow marsh-marigold (<i>Caltha palustris</i>)		2
aster (<i>Symphyotrichum</i> spp.)		2
cut-leaf avens (<i>Geum macrophyllum</i>)		2
common hound's-tongue (<i>Cynoglossum officinale</i>)		1
stemless raspberry (<i>Rubus arcticus</i>)		1
northern bedstraw (<i>Galium boreale</i>)		1
western dock (<i>Rumex occidentalis</i>)		1
silverweed (<i>Argentina anserina</i>)		3
Canada thistle (<i>Cirsium arvense</i>)		2
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Minor graminoids	1	
Minor forbs and half-shrubs	2	3

CODE	PEZ-WMD-I	PEZ-WMD-J
COMMUNITY NAME	Beaked Willow / Awned Sedge – Beaked Sedge	Beaked Willow / Beaked Sedge – Field Horsetail
ECOREGION	Prairie Ecozone	Prairie Ecozone
ECOSITE	Wet Meadow	Wet Meadow
STRUCTURAL TYPE	Tall Shrubland	Tall Shrubland
GRAZING STATUS	reference comm.	moderate alteration

SPECIES COMPOSITION

species measure	% canopy cover	% canopy cover
number of plots	not available - from existing pub.	not available - from existing pub.

Major tall shrubs

beaked willow (<i>Salix bebbiana</i>)	53	49
basket willow (<i>Salix petiolaris</i>)	6	5
yellow willow (<i>Salix famelica</i>)	1	2
red-osier dogwood (<i>Cornus sericea</i>)	1	1
Drummond's willow (<i>Salix drummondiana</i>)	1	
myrtle-leaved willow (<i>Salix myrtilifolia</i>)	4	
plane-leaf willow (<i>Salix planifolia</i>)	1	
false mountain willow (<i>Salix pseudomonticola</i>)		1
autumn willow (<i>Salix serissima</i>)		2
Booth's willow (<i>Salix boothii</i>)		1

Major short shrubs

western snowberry (<i>Symphoricarpos occidentalis</i>)	1	3
bog birch (<i>Betula glandulosa</i>)	1	1

Major graminoids

awned sedge (<i>Carex atherodes</i>)	27	8
beaked sedge (<i>Carex utriculata</i>)	12	17
smooth brome (<i>Bromus inermis</i>)	7	3
Baltic rush (<i>Juncus arcticus</i> var. <i>balticus</i>)	3	8
Kentucky blue-grass (<i>Poa pratensis</i>)	1	1
marsh reed-grass (<i>Calamagrostis canadensis</i>)	3	
woolly sedge (<i>Carex pellita</i>)	1	1
water sedge (<i>Carex aquatilis</i>)	2	1
Norway sedge (<i>Carex media</i>)	2	
alpine foxtail (<i>Alopecurus alpinus</i>)	1	
fowl blue-grass (<i>Poa palustris</i>)		2
common timothy (<i>Phleum pratense</i>)		4
redtop (<i>Agrostis stolonifera</i>)		7

fowl manna-grass (<i>Glyceria striata</i>)		1
tall manna-grass (<i>Glyceria grandis</i>)		5
reed canary-grass (<i>Phalaris arundinacea</i>)		3
American slough grass (<i>Beckmannia syzigachne</i>)		3
field meadow-foxtail (<i>Alopecurus pratensis</i>)		1
narrow reed-grass (<i>Calamagrostis stricta</i> ssp. <i>stricta</i>)		1
slender wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>)		1

Major forbs and half-shrubs

Lyll's angelica (<i>Angelica arguta</i>)	1	7
field horsetail (<i>Equisetum arvense</i>)	9	13
Canada goldenrod (<i>Solidago canadensis</i>)	2	6
common dandelion (<i>Taraxacum officinale</i>)	1	2
wild mint (<i>Mentha arvensis</i>)	1	6
cut-leaf avens (<i>Geum macrophyllum</i>)	1	2
American vetch (<i>Vicia americana</i>)	1	1
arrow-leaved colt's-foot (<i>Petasites sagittatus</i>)	1	4
smooth blue aster (<i>Symphyotrichum laeve</i>)	2	
western meadow-rue (<i>Thalictrum occidentale</i>)	1	
tall lungwort (<i>Mertensia paniculata</i>)	1	
water smartweed (<i>Persicaria amphibia</i>)	3	
yellow avens (<i>Geum aleppicum</i>)	2	
star-flowered solomon's-seal (<i>Maianthemum stellatum</i>)	2	
swamp horsetail (<i>Equisetum fluviatile</i>)	2	
violet (<i>Viola</i> spp.)	1	
bishop's-cap (<i>Mitella nuda</i>)	1	
sow-thistle (<i>Sonchus</i> spp.)	1	
cow-parsnip (<i>Heracleum maximum</i>)		4
white clover (<i>Trifolium repens</i>)		1
tall buttercup (<i>Ranunculus acris</i>)		1
Richardson's geranium (<i>Geranium richardsonii</i>)		1
Canada thistle (<i>Cirsium arvense</i>)		1
western aster (<i>Symphyotrichum ascendens</i>)		3
water-hemlock (<i>Cicuta maculata</i>)		3
common monkey-flower (<i>Mimulus guttatus</i>)		3
kidney-leaved white violet (<i>Viola renifolia</i>)		3
fringed loosestrife (<i>Lysimachia ciliata</i>)		1
modest aster (<i>Canadanthus modestus</i>)		1

Minor trees		1
Minor tall shrubs	1	1
Minor short shrubs		1
Minor graminoids	1	2
Minor forbs and half-shrubs	3	8

CODE	PEZ-SMH-A
COMMUNITY NAME	Water Sedge - Beaked Sedge
ECOREGION	Prairie Ecozone
ECOSITE	Shallow Marsh
STRUCTURAL TYPE	Marsh
GRAZING STATUS	reference comm.
SPECIES COMPOSITION	
species measure	% cover
number of plots	n=12
Major tall shrubs	
willow (<i>Salix</i> spp.)	5
Major graminoids	
water sedge (<i>Carex aquatilis</i>)	36
beaked sedge (<i>Carex utriculata</i>)	22
common cat-tail (<i>Typha latifolia</i>)	7
reed-grass (<i>Calamagrostis</i> spp.)	2
soft-stem bulrush (<i>Schoenoplectus tabernaemontani</i>)	1
green sedge (<i>Carex viridula</i>)	1
creeping spike-rush (<i>Eleocharis palustris</i>)	1
Baltic rush (<i>Juncus arcticus</i> var. <i>balticus</i>)	1
Major forbs and half-shrubs	
western willow aster (<i>Symphotrichum lanceolatum</i> var. <i>hesperium</i>)	1
dock (<i>Rumex</i> spp.)	1
sow-thistle (<i>Sonchus</i> spp.)	1
wild mint (<i>Mentha arvensis</i>)	1
Minor graminoids	3
Minor forbs and half-shrubs	2

CODE	PEZ-SMH-B
COMMUNITY NAME	Awned Sedge
ECOREGION	Prairie Ecozone
ECOSITE	Shallow Marsh
STRUCTURAL TYPE	Marsh
GRAZING STATUS	reference comm.

SPECIES COMPOSITION

species measure	% canopy cover
number of plots	not available - from existing pub.

Major graminoids

awned sedge (<i>Carex atherodes</i>)	84
fowl blue-grass (<i>Poa palustris</i>)	5
beaked sedge (<i>Carex utriculata</i>)	2
small-fruited bulrush (<i>Scirpus microcarpus</i>)	2
spangletop (<i>Scolochloa festucacea</i>)	2
water sedge (<i>Carex aquatilis</i>)	1

Major forbs and half-shrubs

water smartweed (<i>Persicaria amphibia</i>)	1
marsh skullcap (<i>Scutellaria galericulata</i>)	1
swamp horsetail (<i>Equisetum fluviatile</i>)	1
northern willow-herb (<i>Epilobium ciliatum</i>)	1

Minor graminoids	1
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Minor forbs and half-shrubs	3
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CODE	PEZ-SMH-C
COMMUNITY NAME	Creeping Spike-rush
ECOREGION	Prairie Ecozone
ECOSITE	Shallow Marsh
STRUCTURAL TYPE	Marsh
GRAZING STATUS	reference comm.

SPECIES COMPOSITION

species measure	% canopy cover
number of plots	not available - from existing pub.

Major graminoids

creeping spike-rush (<i>Eleocharis palustris</i>)	78
Baltic rush (<i>Juncus arcticus</i> var. <i>balticus</i>)	2
short-awned foxtail (<i>Alopecurus aequalis</i>)	1
redtop (<i>Agrostis stolonifera</i>)	1
hardstem bulrush (<i>Schoenoplectus acutus</i>)	1

Major forbs and half-shrubs

shore buttercup (<i>Ranunculus cymbalaria</i>)	2
tall scouring-rush (<i>Equisetum hyemale</i>)	2
curled dock (<i>Rumex crispus</i>)	1
dock-leaved smartweed (<i>Persicaria lapathifolia</i>)	1
field horsetail (<i>Equisetum arvense</i>)	1

Minor graminoids	2
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Minor forbs and half-shrubs	2
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CODE	PEZ-SMH-D
COMMUNITY NAME	Spangletop
ECOREGION	Prairie Ecozone
ECOSITE	Shallow Marsh
STRUCTURAL TYPE	Marsh
GRAZING STATUS	reference comm.

SPECIES COMPOSITION

species measure	% canopy cover
number of plots	not available - from existing pub.

Major graminoids

spangletop (<i>Scolochloa festucacea</i>)	94
awned sedge (<i>Carex atherodes</i>)	2
creeping spike-rush (<i>Eleocharis palustris</i>)	2

Minor graminoids

	1
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CODE	PEZ-SMH-E
COMMUNITY NAME	Manna-grass
ECOREGION	Prairie Ecozone
ECOSITE	Shallow Marsh
STRUCTURAL TYPE	Marsh
GRAZING STATUS	reference comm.

SPECIES COMPOSITION

species measure	% canopy cover
number of plots	not available - from existing pub.

Major graminoids

tall manna-grass (<i>Glyceria grandis</i>)	84
American slough grass (<i>Beckmannia syzigachne</i>)	7
creeping spike-rush (<i>Eleocharis palustris</i>)	5
short-awned foxtail (<i>Alopecurus aequalis</i>)	2
Bebb's sedge (<i>Carex bebbii</i>)	2
awned sedge (<i>Carex atherodes</i>)	2
fowl blue-grass (<i>Poa palustris</i>)	1
fox-tail barley (<i>Hordeum jubatum</i>)	1
common cat-tail (<i>Typha latifolia</i>)	1

Major forbs and half-shrubs

wild mint (<i>Mentha arvensis</i>)	4
swamp horsetail (<i>Equisetum fluviatile</i>)	2
water smartweed (<i>Persicaria amphibia</i>)	1
dock-leaved smartweed (<i>Persicaria lapathifolia</i>)	1
narrow-leaved willow-herb (<i>Epilobium leptophyllum</i>)	1
small bedstraw (<i>Galium trifidum</i>)	1

Minor graminoids	1
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Minor forbs and half-shrubs	1
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CODE	PEZ-SMH-F
COMMUNITY NAME	Reed Canary-grass
ECOREGION	Prairie Ecozone
ECOSITE	Shallow Marsh
STRUCTURAL TYPE	Marsh
GRAZING STATUS	unknown

SPECIES COMPOSITION

species measure	% canopy cover
number of plots	not available - from existing pub.

Major graminoids

reed canary-grass (<i>Phalaris arundinacea</i>)	93
awned sedge (<i>Carex atherodes</i>)	2
fowl blue-grass (<i>Poa palustris</i>)	1
redtop (<i>Agrostis stolonifera</i>)	1
small-fruited bulrush (<i>Scirpus microcarpus</i>)	1

Major forbs and half-shrubs

Canada thistle (<i>Cirsium arvense</i>)	1
water smartweed (<i>Persicaria amphibia</i>)	1
field horsetail (<i>Equisetum arvense</i>)	1
wild mint (<i>Mentha arvensis</i>)	1
white sweet-clover (<i>Melilotus alba</i>)	1

Minor graminoids	1
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Minor forbs and half-shrubs	1
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CODE	PEZ-SMH-G
COMMUNITY NAME	Water Smartweed
ECOREGION	Prairie Ecozone
ECOSITE	Shallow Marsh
STRUCTURAL TYPE	Marsh
GRAZING STATUS	unknown

SPECIES COMPOSITION

species measure	% canopy cover
number of plots	not available - from existing pub.

Major forbs and half-shrubs

water smartweed (<i>Persicaria amphibia</i>)	94
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Major graminoids

water sedge (<i>Carex aquatilis</i>)	4
awned sedge (<i>Carex atherodes</i>)	1

Minor graminoids

	1
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CODE	PEZ-DMH-A
COMMUNITY NAME	Cat-tail
ECOREGION	Prairie Ecozone
ECOSITE	Deep Marsh
STRUCTURAL TYPE	Marsh
GRAZING STATUS	reference comm.

SPECIES COMPOSITION

species measure	% canopy cover
number of plots	not available - from existing pub.

Major graminoids

common cat-tail (<i>Typha latifolia</i>)	88
soft-stem bulrush (<i>Schoenoplectus tabernaemontani</i>)	5
three-square bulrush (<i>Schoenoplectus pungens</i>)	2
creeping spike-rush (<i>Eleocharis palustris</i>)	1
beaked sedge (<i>Carex utriculata</i>)	1
hardstem bulrush (<i>Schoenoplectus acutus</i>)	1
fox-tail barley (<i>Hordeum jubatum</i>)	1
reed canary-grass (<i>Phalaris arundinacea</i>)	1

Major forbs and half-shrubs

wild mint (<i>Mentha arvensis</i>)	1
broad-leaved arrowhead (<i>Sagittaria latifolia</i>)	1
water-hemlock (<i>Cicuta maculata</i>)	1
desert goosefoot (<i>Chenopodium pratericola</i>)	1
water-parsnip (<i>Sium suave</i>)	1

Minor graminoids	1
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Minor forbs and half-shrubs	2
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CODE	PEZ-DMH-B	PEZ-DMH-C
COMMUNITY NAME	Hardstem Bulrush – Softstem Bulrush	Hardstem Bulrush – Fox- tail Barley
ECOREGION	Prairie Ecozone	Prairie Ecozone
ECOSITE	Deep Marsh	Deep Marsh
STRUCTURAL TYPE	Marsh	Marsh
GRAZING STATUS	reference comm.	minor alteration

SPECIES COMPOSITION

species measure	% canopy cover	% canopy cover
number of plots	not available - from existing pub.	not available - from existing pub.

Major graminoids

hardstem bulrush (<i>Schoenoplectus acutus</i>)	71	73
soft-stem bulrush (<i>Schoenoplectus tabernaemontani</i>)	13	2
common cat-tail (<i>Typha latifolia</i>)	1	
fox-tail barley (<i>Hordeum jubatum</i>)		10
creeping spike-rush (<i>Eleocharis palustris</i>)		3
quack grass (<i>Elymus repens</i>)		3
spike-rush (<i>Eleocharis</i> spp.)		2
awned sedge (<i>Carex atherodes</i>)		1
prairie bulrush (<i>Bolboschoenus maritimus</i> ssp. <i>paludosus</i>)		1

Major forbs and half-shrubs

swamp horsetail (<i>Equisetum fluviatile</i>)		6
cocklebur (<i>Xanthium strumarium</i>)		2
water smartweed (<i>Persicaria amphibia</i>)		2
lamb's-quarters (<i>Chenopodium album</i>)		1
curled dock (<i>Rumex crispus</i>)		1
wild mint (<i>Mentha arvensis</i>)		1
rough water-horehound (<i>Lycopus asper</i>)		1
golden dock (<i>Rumex fueginus</i>)		1
northern willow-herb (<i>Epilobium ciliatum</i>)		1

Minor graminoids	0	2
Minor forbs	1	3

CODE	PEZ-DMH-D
COMMUNITY NAME	Common Reed
ECOREGION	Prairie Ecozone
ECOSITE	Deep Marsh
STRUCTURAL TYPE	Marsh
GRAZING STATUS	reference comm.

SPECIES COMPOSITION

species measure	% canopy cover
number of plots	not available - from existing pub.

Major graminoids

common reed (<i>Phragmites australis</i>)	91
smooth-cone sedge (<i>Carex laeviconica</i>)	2
creeping spike-rush (<i>Eleocharis palustris</i>)	1

Major forbs and half-shrubs

Canada thistle (<i>Cirsium arvense</i>)	3
American wild licorice (<i>Glycyrrhiza lepidota</i>)	2
white sweet-clover (<i>Melilotus alba</i>)	2
curled dock (<i>Rumex crispus</i>)	2
perennial sow-thistle (<i>Sonchus arvensis</i>)	1

Minor graminoids	1
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Minor forbs and half-shrubs	2
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SALINE ECOSITES

CODE	AP-UPSA-A
COMMUNITY NAME	Western Porcupine-grass - Slender Wheat-grass - Sedge - Salt Grass - Pasture Sage
ECOREGION	Aspen Parkland
ECOSITES	Saline Upland (somewhat saline)
STRUCTURAL TYPE	Grassland
GRAZING STATUS	unknown
SPECIES COMPOSITION	
species measure	% cover
number of plots	n=4
Major short shrubs	
western snowberry (<i>Symphoricarpos occidentalis</i>)	1
Major graminoids	
western porcupine-grass (<i>Hesperostipa curtisetata</i>)	8
slender wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>)	6
sedge (genus) (<i>Carex</i> spp.)	5
inland salt grass (<i>Distichlis spicata</i> var. <i>stricta</i>)	5
June grass (<i>Koeleria macrantha</i>)	3
blue grama (<i>Bouteloua gracilis</i>)	3
western wheat-grass (<i>Pascopyrum smithii</i>)	2
awned wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>subsecundus</i>)	2
green needle-grass (<i>Nassella viridula</i>)	2
northern wheat-grass (<i>Elymus lanceolatus</i>)	1
needle-and-thread (<i>Hesperostipa comata</i>)	1
mat muhly (<i>Muhlenbergia richardsonis</i>)	1
alkali cord-grass (<i>Spartina gracilis</i>)	1
Major forbs and half-shrubs	
pasture sage (<i>Artemisia frigida</i>)	5
saltbush (genus) (<i>Atriplex</i> spp.)	1
Minor graminoids	
	1
Minor forbs and half-shrubs	
	3

CODE	MG-UPSA-A	MG-UPSA-B
COMMUNITY NAME	Northern Wheat-grass - June Grass - Pasture Sage	Blue Grama - Northern Wheat-grass - Western Wheat- grass
ECOREGION	Mixed Grassland	Mixed Grassland
ECOSITES	Saline Upland (somewhat saline)	Saline Upland (somewhat saline)
STRUCTURAL TYPE	Grassland	Grassland
GRAZING STATUS	reference comm.	moderate alteration
SPECIES COMPOSITION	predicted	predicted
species measure	% cover	% cover
number of plots	n=5	n=12
Major short shrubs		
western snowberry (<i>Symphoricarpos occidentalis</i>)	1	
silver sagebrush (<i>Artemisia cana</i>)		1
Major graminoids		
northern wheat-grass (<i>Elymus lanceolatus</i>)	10	6
June grass (<i>Koeleria macrantha</i>)	5	3
western wheat-grass (<i>Pascopyrum smithii</i>)	3	5
blue grama (<i>Bouteloua gracilis</i>)	1	9
inland salt grass (<i>Distichlis spicata</i> var. <i>stricta</i>)	4	4
sedge (genus) (<i>Carex</i> spp.)	4	2
needle-and-thread (<i>Hesperostipa comata</i>)	4	3
plains reed-grass (<i>Calamagrostis montanensis</i>)		1
green needle-grass (<i>Nassella viridula</i>)	1	1
Sandberg's blue-grass (<i>Poa secunda</i> ssp. <i>secunda</i>)	1	1
western porcupine-grass (<i>Hesperostipa curtipetala</i>)	1	
slender wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>)	1	
awned wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>subsecundus</i>)	1	
blue-grass (genus) (<i>Poa</i> spp.)	1	
crested wheat-grass (<i>Agropyron cristatum</i>)	1	
Nuttall's alkali-grass (<i>Puccinellia nuttalliana</i>)	1	

Major forbs and half-shrubs		
pasture sage (<i>Artemisia frigida</i>)	5	5
sea-milkwort (<i>Glaux maritima</i>)	2	
common yarrow (<i>Achillea millefolium</i>)	1	
prairie crocus (<i>Pulsatilla patens</i>)	1	
curly-cup gum-weed (<i>Grindelia squarrosa</i>)		1
prairie sage (<i>Artemisia ludoviciana</i>)		2
American wild licorice (<i>Glycyrrhiza lepidota</i>)		1
Minor graminoids	1	2
Minor forbs and half-shrubs	2	4

CODE	AP-SUBSA-A	AP-SUBSA-B
COMMUNITY NAME	Slender Wheat-grass - Salt-grass	Blue-grass - Salt Grass - Forbs
ECOREGION	Aspen Parkland	Aspen Parkland
ECOSITES	Saline Overflow & Subirrigated (somewhat saline)	Saline Overflow & Subirrigated (somewhat saline)
STRUCTURAL TYPE	Grassland	Grassland
GRAZING STATUS	reference comm.	moderate alteration

SPECIES COMPOSITION

species measure	% cover	% cover
number of plots	n=15	n=17

Major short shrubs

western snowberry (<i>Symphoricarpos occidentalis</i>)	1	1
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Major graminoids

slender wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>)	4	3
inland salt grass (<i>Distichlis spicata</i> var. <i>stricta</i>)	4	3
sedge (genus) (<i>Carex</i> spp.)	3	2
mat muhly (<i>Muhlenbergia richardsonis</i>)	2	1
June grass (<i>Koeleria macrantha</i>)	2	2
blue-grass (genus) (<i>Poa</i> spp.)	2	8
northern wheat-grass (<i>Elymus lanceolatus</i>)	2	
western wheat-grass (<i>Pascopyrum smithii</i>)	1	1
northern reed-grass (<i>Calamagrostis stricta</i> ssp. <i>inexpansa</i>)	1	
Sandberg's blue-grass (<i>Poa secunda</i> ssp. <i>secunda</i>)	1	

Major forbs and half-shrubs

pasture sage (<i>Artemisia frigida</i>)	1	1
perennial sow-thistle (<i>Sonchus arvensis</i>)	1	
goldenrod (genus) (<i>Solidago</i> spp.)	1	
curly-cup gum-weed (<i>Grindelia squarrosa</i>)		1
pussytoes (genus) (<i>Antennaria</i> spp.)		1
aster (<i>Symphyotrichum</i> genus) (<i>Symphyotrichum</i> spp.)		1

Minor graminoids	2	1
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Minor forbs and half-shrubs	5	6
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CODE	AP-SUBSA-C	AP-SUBSA-D	AP-SUBSA-E
COMMUNITY NAME	Salt Grass - Slender Wheat-grass	Salt Grass	Salt Grass - Forbs
ECOREGION	Aspen Parkland	Aspen Parkland	Aspen Parkland
ECOSITES	Saline Overflow & Subirrigated (moderately saline)	Saline Overflow & Subirrigated (moderately saline)	Saline Overflow & Subirrigated (moderately saline)
STRUCTURAL TYPE	Grassland	Grassland	Grassland
GRAZING STATUS	reference comm.	minor alteration	moderate alteration
SPECIES COMPOSITION			
species measure	% cover	% cover	% cover
number of plots	n=26	n=26	n=21
Major short shrubs			
western snowberry (<i>Symphoricarpos occidentalis</i>)	1	1	1
Major graminoids			
slender wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>)	6	3	2
inland salt grass (<i>Distichlis spicata</i> var. <i>stricta</i>)	7	10	11
sedge (genus) (<i>Carex</i> spp.)	2	1	1
mat muhly (<i>Muhlenbergia richardsonis</i>)	1	1	1
June grass (<i>Koeleria macrantha</i>)	1	2	1
blue-grass (genus) (<i>Poa</i> spp.)	1	1	2
northern wheat-grass (<i>Elymus lanceolatus</i>)	1	1	
western wheat-grass (<i>Pascopyrum smithii</i>)	2	2	2
northern reed-grass (<i>Calamagrostis stricta</i> ssp. <i>inexpansa</i>)	1		
fox-tail barley (<i>Hordeum jubatum</i>)	1	1	1
plains reed-grass (<i>Calamagrostis montanensis</i>)		1	1
Nuttall's alkali-grass (<i>Puccinellia nuttalliana</i>)	2	1	
alkali cord-grass (<i>Spartina gracilis</i>)	1		
Major forbs and half-shrubs			
pasture sage (<i>Artemisia frigida</i>)		1	1
perennial sow-thistle (<i>Sonchus arvensis</i>)	1		
curly-cup gum-weed (<i>Grindelia squarrosa</i>)	1	1	1
pussytoes (genus) (<i>Antennaria</i> spp.)			1
tufted white prairie aster (<i>Symphotrichum ericoides</i> var. <i>pansum</i>)	1	1	1
Minor graminoids	2	2	2
Minor forbs and half-shrubs	4	5	7

CODE	MG-SUBSA-A	MG-SUBSA-B	MG-SUBSA-C
COMMUNITY NAME	Sedge - Western Wheat-grass - Needle-and-thread	Western Wheat-grass - Blue Grama	Salt Grass - Sedge
ECOREGION	Mixed Grassland	Mixed Grassland	Mixed Grassland
ECOSITES	Saline Overflow & Subirrigated (somewhat salinie)	Saline Overflow & Subirrigated (somewhat salinie)	Saline Overflow & Subirrigated (moderately saline)
STRUCTURAL TYPE	Grassland	Grassland	Grassland
GRAZING STATUS	reference comm.	minor alteration	unknown

SPECIES COMPOSITION

species measure	% cover	% cover	% cover
number of plots	n=7	n=12	n=17

Major short shrubs

western snowberry (<i>Symphoricarpos occidentalis</i>)	1		1
silver sagebrush (<i>Artemisia cana</i>)		1	

Major graminoids

sedge (genus) (<i>Carex</i> spp.)	9	2	3
western wheat-grass (<i>Pascopyrum smithii</i>)	4	4	3
needle-and-thread (<i>Hesperostipa comata</i>)	4	3	1
blue grama (<i>Bouteloua gracilis</i>)	1	4	1
inland salt grass (<i>Distichlis spicata</i> var. <i>stricta</i>)	2	2	8
northern wheat-grass (<i>Elymus lanceolatus</i>)	2		1
June grass (<i>Koeleria macrantha</i>)	2	1	2
slender wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>)	1	1	1
alkali cord-grass (<i>Spartina gracilis</i>)	1	2	1
Sandberg's blue-grass (<i>Poa secunda</i> ssp. <i>secunda</i>)	1		
sand-grass (<i>Calamovilfa longifolia</i>)	1		
Nuttall's alkali-grass (<i>Puccinellia nuttalliana</i>)			2
fox-tail barley (<i>Hordeum jubatum</i>)		2	
blue-grass (genus) (<i>Poa</i> spp.)			1
rush (genus) (<i>Juncus</i> spp.)		2	
rough hairgrass (<i>Agrostis scabra</i>)		1	

Major forbs and half-shrubs			
pasture sage (<i>Artemisia frigida</i>)	2	2	2
curly-cup gum-weed (<i>Grindelia squarrosa</i>)			1
common yarrow (<i>Achillea millefolium</i>)			1
prairie sage (<i>Artemisia ludoviciana</i>)		1	
American wild licorice (<i>Glycyrrhiza lepidota</i>)		1	
Minor graminoids			
	2	2	2
Minor forbs and half-shrubs			
	2	2	3

CODE	DMG-SUBSA-A
COMMUNITY NAME	Greasewood - Northern Wheat- grass
ECOREGION	Dry Mixed Grassland
ECOSITES	Saline Subirrigated
STRUCTURAL TYPE	Grassland with shrubs
GRAZING STATUS	reference comm.

SPECIES COMPOSITION

species measure	% cover
number of plots	n=8

Major short shrubs

greasewood (<i>Sarcobatus vermiculatus</i>)	3
silver sagebrush (<i>Artemisia cana</i>)	2
western snowberry (<i>Symphoricarpos occidentalis</i>)	1

Major cactus

plains prickly-pear (<i>Opuntia polyacantha</i>)	1
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Major graminoids

northern wheat-grass (<i>Elymus lanceolatus</i>)	14
inland salt grass (<i>Distichlis spicata</i> var. <i>stricta</i>)	3
Sandberg's blue-grass (<i>Poa secunda</i> ssp. <i>secunda</i>)	2
western wheat-grass (<i>Pascopyrum smithii</i>)	2
low sedge (<i>Carex duriuscula</i>)	1
Nuttall's alkali-grass (<i>Puccinellia nuttalliana</i>)	1
tufted hair-grass (<i>Deschampsia cespitosa</i>)	1
fox-tail barley (<i>Hordeum jubatum</i>)	1
blue grama (<i>Bouteloua gracilis</i>)	1
needle-and-thread (<i>Hesperostipa comata</i>)	1

Major forbs and half-shrubs

pasture sage (<i>Artemisia frigida</i>)	2
rubber rabbit-brush (<i>Ericameria nauseosa</i> var. <i>nauseosa</i>)	1
low pussytoes (<i>Antennaria parvifolia</i>)	1
saline plantain (<i>Plantago eriopoda</i>)	1

Minor graminoids	1
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Minor forbs and half-shrubs	1
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CODE	PEZ-WMDSA-A	PEZ-WMDSA-B
COMMUNITY NAME	Northern Reed-grass - Salt Grass	Salt Grass - Northern Reed-grass
ECOREGION	Prairie Ecozone	Prairie Ecozone
ECOSITE	Saline Wet Meadow (somewhat saline)	Saline Wet Meadow (somewhat saline)
STRUCTURAL TYPE	Grassland	Grassland
GRAZING STATUS	reference comm.	moderate alteration
SPECIES COMPOSITION		
species measure	% cover	% cover
number of plots	n=45	n=24
Major short shrubs		
western snowberry (<i>Symphoricarpos occidentalis</i>)	1	1
Major graminoids		
northern reed-grass (<i>Calamagrostis stricta</i> ssp. <i>inexpansa</i>)	12	5
inland salt grass (<i>Distichlis spicata</i> var. <i>stricta</i>)	6	8
slender wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>)	3	2
sedge (genus) (<i>Carex</i> spp.)	2	2
blue-grass (genus) (<i>Poa</i> spp.)	1	2
fox-tail barley (<i>Hordeum jubatum</i>)	1	3
Major forbs and half-shrubs		
aster (<i>Symphyotrichum</i> genus) (<i>Symphyotrichum</i> spp.)	1	1
ragweed (genus) (<i>Ambrosia</i> spp.)	1	1
tufted white prairie aster (<i>Symphyotrichum ericoides</i> var. <i>pansum</i>)	1	1
flat-spine bur-ragweed (<i>Ambrosia acanthicarpa</i>)	1	1
perennial sow-thistle (<i>Sonchus arvensis</i>)	1	1
curly-cup gum-weed (<i>Grindelia squarrosa</i>)		1
pussytoes (genus) (<i>Antennaria</i> spp.)		1
Minor graminoids	1	1
Minor forbs and half-shrubs	3	5

CODE	PEZ-WMDSA-C	PEZ-WMDSA-D	PEZ-WMDSA-E
COMMUNITY NAME	Salt Grass - Northern Reed-grass	Salt Grass	Nuttall's Alkali-grass - Salt Grass - Foxtail Barley
ECOREGION	Prairie Ecozone	Prairie Ecozone	Prairie Ecozone
ECOSITE	Saline Wet Meadow (moderately saline)	Saline Wet Meadow (moderately saline)	Saline Wet Meadow
STRUCTURAL TYPE	Grassland	Grassland	Grassland
GRAZING STATUS	reference comm.	minor alteration	reference comm.
SPECIES COMPOSITION			
species measure	% cover	% cover	% cover
number of plots	n=40	n=31	n=15
Major short shrubs			
western snowberry (<i>Symphoricarpos occidentalis</i>)	1		
Major graminoids			
northern reed-grass (<i>Calamagrostis stricta</i> ssp. <i>inexpansa</i>)	5	2	1
inland salt grass (<i>Distichlis spicata</i> var. <i>stricta</i>)	10	13	5
slender wheat-grass (<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>)	3	2	2
sedge (genus) (<i>Carex</i> spp.)	1	1	1
blue-grass (genus) (<i>Poa</i> spp.)	1	1	1
fox-tail barley (<i>Hordeum jubatum</i>)	2	2	4
alkali cord-grass (<i>Spartina gracilis</i>)	2		1
Nuttall's alkali-grass (<i>Puccinellia nuttalliana</i>)	2	1	11
Major forbs and half-shrubs			
aster (<i>Symphotrichum</i> genus) (<i>Symphotrichum</i> spp.)		1	
tufted white prairie aster (<i>Symphotrichum ericoides</i> var. <i>pansum</i>)	1	1	1
flat-spine bur-ragweed (<i>Ambrosia acanthicarpa</i>)		1	
perennial sow-thistle (<i>Sonchus arvensis</i>)	1	1	1
red samphire (<i>Salicornia rubra</i>)		1	1
curly-cup gum-weed (<i>Grindelia squarrosa</i>)	1	2	1
seaside arrow-grass (<i>Triglochin maritimum</i>)	1		1
Minor graminoids	1	1	1
Minor forbs and half-shrubs	3	5	3

CODE	PEZ-SMHSA-A
COMMUNITY NAME	Three-square Bulrush
ECOREGION	Prairie Ecozone
ECOSITE	Saline Shallow Marsh
STRUCTURAL TYPE	Marsh
GRAZING STATUS	reference comm.

SPECIES COMPOSITION

species measure	% canopy cover
number of plots	not available - from existing pub.

Major graminoids

three-square bulrush (<i>Schoenoplectus pungens</i>)	81
creeping spike-rush (<i>Eleocharis palustris</i>)	3
fox-tail barley (<i>Hordeum jubatum</i>)	2
Baltic rush (<i>Juncus arcticus</i> var. <i>balticus</i>)	2
prairie cord-grass (<i>Spartina pectinata</i>)	1
Kentucky blue-grass (<i>Poa pratensis</i>)	1

Major forbs and half-shrubs

perennial sow-thistle (<i>Sonchus arvensis</i>)	1
red samphire (<i>Salicornia rubra</i>)	1
cocklebur (<i>Xanthium strumarium</i>)	1
wild mint (<i>Mentha arvensis</i>)	1
aster (<i>Symphyotrichum</i> spp.)	1
seaside arrow-grass (<i>Triglochin maritimum</i>)	1
silverweed (<i>Argentina anserina</i>)	1
lamb's-quarters (<i>Chenopodium album</i>)	1

Minor graminoids	2
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Minor forbs and half-shrubs	3
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CODE	PEZ-SMHTA-B
COMMUNITY NAME	Nevada Bulrush
ECOREGION	Prairie Ecozone
ECOSITE	Saline Shallow Marsh
STRUCTURAL TYPE	Marsh
GRAZING STATUS	reference comm.

SPECIES COMPOSITION

species measure	% cover
number of plots	n=6

Major graminoids

Nevada bulrush (<i>Scirpus nevadensis</i>)	23
inland salt grass (<i>Distichlis spicata</i> var. <i>stricta</i>)	3
alkali cord-grass (<i>Spartina gracilis</i>)	3
fox-tail barley (<i>Hordeum jubatum</i>)	2
Nuttall's alkali-grass (<i>Puccinellia nuttalliana</i>)	1

Major forbs and half-shrubs

rayless aster (<i>Symphyotrichum ciliatum</i>)	3
buttercup (<i>Ranunculus</i> spp.)	1

Minor graminoids

	1
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Minor forbs and half-shrubs

	2
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CODE	PEZ-SMHTA-C
COMMUNITY NAME	Red Samphire
ECOREGION	Prairie Ecozone
ECOSITE	Saline Shallow Marsh
STRUCTURAL TYPE	Marsh
GRAZING STATUS	unknown

SPECIES COMPOSITION

species measure	% canopy cover
	not available - from
number of plots	existing pub.

Major graminoids

fox-tail barley (<i>Hordeum jubatum</i>)	1
Nuttall's alkali-grass (<i>Puccinellia nuttalliana</i>)	1

Major forbs and half-shrubs

red samphire (<i>Salicornia rubra</i>)	69
western sea-blite (<i>Suaeda calceoliformis</i>)	1

CODE	PEZ-DMHSA-A
COMMUNITY NAME	Prairie Bulrush
ECOREGION	Prairie Ecozone
ECOSITE	Saline Deep Marsh
STRUCTURAL TYPE	Marsh
GRAZING STATUS	reference comm.

SPECIES COMPOSITION

species measure	% canopy cover
	not available - from
number of plots	existing pub.

Major graminoids

prairie bulrush (<i>Bolboschoenus maritimus</i> ssp. <i>paludosus</i>)	85
creeping spike-rush (<i>Eleocharis palustris</i>)	3
fox-tail barley (<i>Hordeum jubatum</i>)	3
three-square bulrush (<i>Schoenoplectus pungens</i>)	2
northern manna-grass (<i>Glyceria borealis</i>)	1
hardstem bulrush (<i>Schoenoplectus acutus</i>)	1

Major forbs and half-shrubs

saltbush (<i>Atriplex</i> spp.)	1
field horsetail (<i>Equisetum arvense</i>)	1
wild mint (<i>Mentha arvensis</i>)	1
golden dock (<i>Rumex fueginus</i>)	1

Minor tall shrubs

	1
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Minor graminoids	1
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Minor forbs and half-shrubs	2
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